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Environment and Economics : A Perspective of Sustainable Development

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Organic and Inorganic Food Impact on Health

Miss. Sunita Sureshrao Humbad

Abstract

Organic food is fresh or processed food produced by organic farming process. Organic food is grown without the use of synthetic chemicals, such as human-made pesticides and fertilizers. Use of natural fertilizers and other organic materials to improve the growth and soil fertility. Organic food is better than inorganic food because of the potential benefits of organic food. It reduces the pesticide exposure, higher nutrient content, better for environment and low risk of health issues. It fulfills the nutritional requirements of the body. Inorganic food grows using pesticides and fertilizers. It affects the nutritional content of food and bio accumulates. Its slightly increase the health related issue day by day. Disturbs the hormonal balance and increasing the risk of various health problems. In this research the comparative blood parameters analysis of organic and inorganic food shows that the organic food is beneficial for health as compared to inorganic food. The study shown the organic food and inorganic food impact on health, organic food is rich in various nutritional components that plays essential role to maintain health and inorganic food shows the negative Impact on health and increasing health issues.

Keywords: Organic, Inorganic, Synthetic, Pesticides, Fertilizers, Nutrients, Parameters.

1) Introduction:

Today's environment is dynamic and polluted due to anthropogenic activity. In ancient period our food is based on natural process which is totally organic but fulfill the need of the today's huge population we have to produce inorganic food which is cultivated with the help of chemical seed, fertilizers and pesticides etc. some of these chemical are bio accumulates and it's not healthy for our health . It disturbs our organic based farming and sustainable growth also. Farmers and producers grow food using chemicals and fertilizers, herbicides .These chemical can potentially have adverse effects on our health. Organic food aims to reduce naturally wrong production practices and helps in improving soil fertility or environment friendly systems. Organic food has beneficial nutrients such as protein, energy, carbohydrates, fat, vitamin A, D, E, K, C, B-complex vitamins, fibre and minerals also. In this research organic food and inorganic food comparison has been done. This research proves that organic food is healthy and play major role in sustainable development. Hence we should prefer organic food our day to day life.

2) Review and literature:

De magistris and Gracia (2008) suggests that consumers with knowledge that organic food is healthier and higher quality show positive attitudes towards organic food and this influencer their purchasing decision. Dr.E.Thippeswamy (2013) suggests that the increased use of chemical, under intensive cultivation has disturbed the harmony existing among soil, plant and human health. The extensive use of chemical in inorganic food production technology has compelled the health conscious people to explore and support organic farming. Organic food considerably reduces the heart attack, strokes, cancer, bowel cancer and many other diseases. Hence, importance of organic farming increased due to its environmental friendly methods and awareness of food safety.

3) Aim and objective:

- To find and examines the benefits of organic food
- Describe impact of organic and inorganic food on health
- To make comparison between organic and inorganic food.

4) Data and research methodology:

This research is depends on primary data which have been collected from 20 families. To conduct this research comparative and descriptive method has been applied. In this study the use of comparative analysis of blood parameters' such as Hb, RBCs, WBCs and Platelets parameters has done.

5) Data analysis and result:

This result shown that biochemical values of Hb, RBC, WBC, and Platelet's of 10 families are good as compared to inorganic food intake family. Organic food intake family's health related issues have less than inorganic food intake family. Organic food rich in high fibre and nutrition content keep the body's metabolism active, thus allowing effective utilisation of the essential nutrients. This research paper shown

that how organic and inorganic food have impact on our health. Organic food is rich source of nutrients such as vitamins, minerals and antioxidants. These nutrients fulfil the body requirement of nutrients and improve the immunity power. Inorganic food may contain added hormones disrupting the body's hormone balance and increasing the risk of various health problems. Inorganic food slowly affects our health and increasing health related issues. Organic food is good choice for our health and healthy future. Because health is powerful weapon to create bright future of our nation

Hb test its common blood test to used to assess overall health and diagnose condition like anaemia.measures the amount of haemoglobin in your blood.the normal hb range for 12-16. This research result shown that theoverall Hb level of organic food intake persons is 14.34 and inorganic food intake persons is 11.47. there is slightly diffience between haemoglobin level. Rbc can refer to either red blood cells also known as erythrocytes. The most abundant type of blood cell, responsible for carrying oxygen throughout the body. Rbc test typically measures the red blood cells in a sample of blood.these blood cells slightly base on age, sex, and overall health according to metropolis healthcare. The normal range is 4.7-6.1millions/ mcl. This research result shown that Rbc range of organic food intake persons is 5.01 and inorganic food intake persons is 4.17. there is difference of Rbc count between organic and inorganic food intake persons is slightly differ.

Table No.1 Comparitive blood analysis between organic and iorganic

SR.NO	HB (g/dl)		RBC Million/mcl		WBC Cells/microliter		PLATELETS Microliter of blood	
	ORGANIC	INORGANIC	ORGANIC	INORGANIC	ORGANIC	INORGANIC	ORGANIC	INORGANIC
1	12.8	10.8	4.9	3.2	8700	1200	210000	80000
2	14.1	11.6	4.6	5.6	9500	2900	169000	652000
3	12.4	12.9	5.1	4.1	9100	15000	410000	790000
4	15.0	9.9	3.9	3.9	10200	13400	152000	115000
5	14.0	13.5	6.1	4.4	7900	3100	345000	112000
6	16.0	11.0	5.7	5.5	7500	23000	260000	750000
7	12.0	10.6	4.8	4.2	11000	3700	425000	462000
8	16.8	12.8	5.1	4.9	6100	20000	371000	35000
9	14.6	11.2	5.0	3.0	9600	2400	164000	23000
10	15.7	10.4	4.9	2.9	10400	35000	15100	100000
Aveage	14.34	11.47	5.01	4.17	8500.1	11600	250,900	396,450

WBC means white blood cell count, which measures the number of white cells in your blood. Its also known as leukocytes, are type of blood cells that plays a crucial role in your immune system by fighting off infections and other diseases. The normal range of WBCs in the blood is 4,500-11,000 WBCs/microliter. A high WBCs count in blood test usually indicates an active infection ,inflammation or sometimes a more serious underlying condition. Lower the WBCs the might involve managing infections with antibiotics or antivirals and managing allergies by prescribed to directly regulate white blood cell production or leukapheresis,a procedure to physically remove excess WBCs from the blood. In this research WBCs of organic food intake persons is 8500.1 and inorganic food intake persons is 11,600. There is slightly difference between WBCs range, among organic and inorganic food intake persons.

Platelets are small, colorless fragments in the blood that play a crucial role in blood clotting, preventing excessive bleeding when a blood vessels is injured.They are produced in the bone marrow and a normal platelets count range from 150,000-450,000 per microliter of blood. This research result shows platelets of organic food intake persons is 250,000 and inorganic food intake family is 396,450/microliters of blood. There is slightly difference in platelets between organic and inorganic food intake persons.

6) Conclusion:

From the study it is concluded that the organic food is rich in various nutrients such as micro and macro nutrients with fiber and antioxidants. It protects health from the different health related issues. Maintaining overall health and bolstering the body's immune system. Inorganic food can negatively impact on health. Disturb the body's hormonal balance and increasing the risk of various health related problems. The blood

parameters comparison is also shown that the organic food is more beneficial and healthy for health than inorganic food.

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Impact of Climate Change on Indian Agriculture: A Geographical Study

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Abstract:

Climate change possesses significant challenges to global agriculture, threatening food security, rural livelihoods, and sustainable development. Rising temperatures, shifting precipitation patterns, and increased frequency of extreme weather events—such as droughts, floods, and storms adversely affect crop yields, livestock health, and soil fertility. These climatic disruptions contribute to reduced agricultural productivity, increased pest and disease outbreaks, water scarcity particularly in vulnerable regions. Moreover, climate change affects existing socio-economic disparities and pressures on natural resources, necessitating urgent adaptation strategies and sustainable farming practices. Addressing these impacts is crucial to ensure resilient and climate-smart agricultural systems for the future.

Introduction:

Climate change is a major risk to agriculture, especially for a country like India where the economy and livelihood of the majority of the population is highly dependent on agriculture. Increased temperatures, unpredictable rainfall patterns, high frequency of high-impact weather events, and changed monsoon patterns are changing the face of agriculture. Crop yields, soil condition, water supply, and the intensity of pests and diseases are impacted by these changes. Consequently, Indian agriculture is increasingly uncertain and vulnerable, particularly for marginal and small farmers. Understanding and properly addressing these effects are essential to ensuring food security, rural income sustainability, and climate-resilient agriculture practices.

Objectives:

1. To know the term global warming and the reasons behind it, specifically Greenhouse gas emissions.
2. To study the effect of global warming on Indian agriculture, i.e., crop Production, irrigation patterns, and seasonal patterns.
3. To study region-specific impacts of climate change on various agricultural regions of India (e.g., Indo-Gangetic plains, coastal areas, etc.).
4. To study the climate change vulnerability of small and marginal farmers.
5. To analyze the socio-economic implications of agricultural downturn resulting from global warming in India.
6. To determine adaptive measures employed by Indian farmers to adapt to climate change, including diversification of crops and seeds that are drought-resistant.
7. To assess government policies and programs designed to minimize the effect of global warming on agriculture in India.

Subject Aanalysis:

The gases in the atmosphere, referred to as greenhouse gases, emit energy in all directions, and part of this energy (approximately 55%) is received by the surface, heating the Earth's surface. Energy is radiated and reflected upwards from the warmed surface. With the increase in temperature of the Earth's surface, the energy moving upwards increases. When the amount of energy coming from below and from below to above is similar, the temperature of the atmosphere is raised and stabilized. This rise in temperature is referred to as the greenhouse effect. The greenhouse effect implies that the sun's rays can penetrate a glass box straight through. Thus, the box's temperature rises, but no heat can be radiated. This is referred to as the greenhouse effect. Carbon dioxide, methane, nitrous oxide, water vapor & chlorofluorocarbons in the air trap the heat released by the Earth's surface. For this reason, the overall temperature of the Earth is steady. This phenomenon is referred to as the greenhouse effect and the gases are referred to as greenhouse gases. Yet, in recent years, because of some reasons like human activities and enhanced human intervention in the natural environment, the level of greenhouse gases has risen considerably. As a result of greater heat absorption, the temperature has risen considerably on average. In

general, the devastating negative impacts of global warming have been experienced from 1950 onwards. Agriculture, commodity production, and deforestation lead to the emission of greenhouse gases. Climate change has immense and diverse effects on the Indian Gangetic Plain and coastal regions. Here's a comprehensive summary:

1. Indian Gangetic Plain

The Indo-Gangetic Plain, which runs northward through northern India, is the most fertile and populous area in the nation. Its susceptibility to climate change is due to its reliance on agriculture, water, and monsoon-season rain.

Effects:

Agricultural Disruption:

Increased temperature and irregular monsoons influence crop yields, particularly wheat, rice, and sugarcane. Increased cases of heat waves and excessive rainfall damage standing crops.

Water Scarcity and Pollution:

Glacier retreat in the Himalayas impacts the Ganga and its tributaries, modifying river flows. Decreased river flow causes increased pollution concentration and decreased groundwater recharge.

2. India's Coastal Regions

The Indian coastline is more than 7,500 km long, featuring big cities such as Mumbai, Chennai, and Kolkata, which are under grave threat from the impacts of climate change.

Effects:

Sea-Level Rise: Flooding of low-lying areas, displacement of coastal residents. Intrusion of seawater into freshwater sources and farms.

Increased Cyclonic Activity:

Greater intensity and frequency of cyclones in the Bay of Bengal and Arabian Sea.

Damage to infrastructure, housing, and livelihoods, especially among fisher folk.

Ecosystem Degradation

Coral bleaching and marine biodiversity loss.

Loss of mangrove cover caused by coastal erosion and pressures of development.

Urban Vulnerability:

Coastal megacities are subjected to heightened flooding, storm surges, and infrastructure pressure. Drainage networks clogged by sea-level rise and extreme rainfall. To evaluate government policies and schemes to reduce the influence of global warming on Indian agriculture, you may do so through the following framework:

Briefly describe:

The effects of global warming on agriculture (e.g., irregular rainfall, droughts, floods, heat stress, crop loss). The importance of agriculture in India's economy and livelihood. The necessity for government intervention.

2. Important Government Policies and Schemes

A. Climate-Resilient Agriculture Schemes

National Mission on Sustainable Agriculture (NMSA)

Part of the 8 missions of the National Action Plan on Climate Change (NAPCC).

Emphasizes soil management, rainfed development, water use efficiency, and climate-resilient technology.

B. Crop Insurance & Financial Incentives

Pradhan Mantri Fasal Bima Yojana (PMFBY) Offers crop insurance to cover farmers against losses due to climate factors.

Rashtriya Krishi Vikas Yojana (RKVY) augments agriculture innovations and infrastructure, such as climate-smart agriculture.

C. Water Management

Per Drop More Crop (Part of PMKSY - Pradhan Mantri Krishi Sinchai Yojana)

Encourages micro-irrigation and water conservation to limit drought vulnerability.

D. Soil and Land Management

Soil Health Card Scheme

Assists farmers in using suitable fertilizers according to the soil requirement, minimizing emissions and improving yield.

3. Research & Technology Development

Indian Council of Agricultural Research (ICAR)

Develops climate-tolerant crop varieties (e.g., rice with drought tolerance, wheat resistant to heat). Facilitates agro-advisory services and early warning systems. Krishi Vigyan Kendras (KVKs) Exchanging climate-smart innovations and practices with farmers at the village level.

4. Assessment and Challenges Effectiveness Partial success in micro-irrigation and weather-resistant crop adoption. PMFBY increased coverage but with concerns regarding settlements of claims and awareness among farmers. Challenges Low awareness and access to programs in remote and far-flung areas. Delays in policy implementation. Poor infrastructure for irrigation and storage. Requirement of localized climate information and advisories.

5. Recommendations Enhance farmer education and extension services. Streamline insurance claim processes and increase coverage. Invest in real-time climate forecasting systems. Encourage public-private partnerships in climate-smart agriculture. Encourage low-emission farming practices (e.g., organic farming, zero tillage).

Conclusion.

The effects of climate change on the Gangetic Plain and coastal regions pose threats to food security, availability of water, health, biodiversity, and economic stability. Measures of adaptation such as sustainable agriculture, better urban planning, coastal zone management, and the adoption of renewable energy are essential to alleviating these impacts. Indian small farmers may be more secure from climate change if effective policies, financial inclusion, and climate adaptation are put in place. But without regular and replicable support, their livelihoods are still under grave threat. Explain the significance of integrated policies that not only bring short-term relief to farmers but also create long-term resilience to climate change. Highlight the importance of ongoing monitoring and adaptive measures.

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The Role of Education in Promoting Sustainable Development

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Abstract

Education plays a crucial role in promoting sustainable development by equipping individuals with the knowledge, values, and skills necessary to address environmental, social, and economic challenges. This paper explores how education fosters sustainable behavior, encourages civic participation, and promotes critical thinking. It also examines the role of formal, non-formal, and informal education in achieving the United Nations Sustainable Development Goals (SDGs), especially SDG 4, which emphasizes inclusive and equitable quality education. The study concludes that integrating sustainability into all levels and types of education is essential for building a more sustainable future.

Introduction

Sustainable development, as defined by the Brundtland Commission (1987), is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In this context, education serves as a vital instrument for social transformation. It fosters awareness, drives innovation, and empowers individuals to adopt sustainable lifestyles and make responsible decisions. Education is central not only to economic development but also to addressing pressing global issues such as climate change, poverty, inequality, and biodiversity loss.

This paper discusses the role of education in promoting sustainable development by analyzing theoretical frameworks, educational strategies, global initiatives, and challenges faced in implementation.

2. Concept of Sustainable Development

Sustainable development encompasses three main dimensions:

- Environmental sustainability – conserving natural resources and ecosystems,
- Economic sustainability – promoting inclusive economic growth and fair employment,
- Social sustainability – ensuring equity, inclusion, and human rights.

Achieving balance among these three pillars requires a shift in thinking, behavior, and values—something education is uniquely positioned to foster.

3. Education for Sustainable Development (ESD)

3.1 Definition and Objectives

Education for Sustainable Development (ESD) is an approach that integrates key principles, practices, and values of sustainability into teaching and learning. According to UNESCO (2017), ESD enables people to develop the knowledge, skills, attitudes, and values necessary to contribute to a sustainable future.

3.2 Key Competencies in ESD

ESD encourages competencies such as:

- Systems thinking
- Anticipatory thinking
- Critical thinking
- Collaboration
- Integrated problem-solving

These competencies help individuals become active agents of change.

4. Role of Education in Sustainable Development

4.1 Awareness and Behavior Change

Education increases awareness of sustainability issues such as climate change, deforestation, pollution, and overconsumption. It also promotes behavior changes—such as reducing plastic use, conserving water, and adopting renewable energy practices.

4.2 Economic Empowerment

Education improves employment opportunities, leading to increased income and reduced poverty. Vocational and technical training in green jobs (e.g., solar energy, organic farming) supports sustainable economic development.

4.3 Social Equity and Inclusion

Education promotes gender equality, reduces disparities, and encourages social cohesion. Programs aimed at marginalized communities ensure that no one is left behind.

4.4 Civic Participation and Governance

A well-educated population is more likely to participate in democratic processes and advocate for policies that support sustainability.

5. Education in the SDG Framework

5.1 SDG 4: Quality Education

SDG 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." Target 4.7 specifically focuses on ESD and global citizenship education.

5.2 Interlinkages with Other SDGs

Education intersects with many other SDGs:

- SDG 1 (No Poverty)
- SDG 5 (Gender Equality)
- SDG 13 (Climate Action)
- SDG 16 (Peace, Justice, and Strong Institutions)

Achieving quality education enhances progress in all these areas.

6. Strategies for Integrating Sustainability into Education

6.1 Curriculum Reforms

Embedding sustainability topics into school curricula across disciplines—science, geography, economics, and civics—fosters a comprehensive understanding of sustainability challenges.

6.2 Teacher Training

Teachers must be equipped with pedagogical tools and content knowledge to effectively deliver ESD. Professional development programs and workshops play a critical role.

6.3 Experiential Learning

Hands-on activities like community gardening, waste recycling, and field trips help students connect theoretical knowledge to real-world practices.

6.4 Interdisciplinary Approach

Sustainability is a complex, cross-cutting issue. An interdisciplinary approach encourages learners to understand problems from multiple perspectives and develop holistic solutions.

6.5 Technology and Innovation

Digital tools such as e-learning platforms, virtual labs, and interactive games enhance ESD and make learning more engaging.

7. Case Studies

7.1 Finland

Finland has successfully integrated sustainability into its national core curriculum. Schools emphasize student-centered learning, critical thinking, and environmental awareness from early education onwards.

7.2 India

In India, the Ministry of Education has included ESD in teacher education programs and school curricula under the National Education Policy (NEP) 2020. NGOs like CEE (Centre for Environment Education) also play a pivotal role in non-formal ESD initiatives.

7.3 Costa Rica

Costa Rica's "Peace with Nature" initiative includes sustainability education in both formal and informal settings. Schools teach conservation, biodiversity, and eco-friendly practices to support the country's goal of carbon neutrality.

8. Challenges in Implementing ESD

8.1 Lack of Policy Coherence

Many countries lack clear national policies or frameworks for ESD, resulting in fragmented implementation.

8.2 Resource Constraints

Limited funding, lack of teaching materials, and inadequate teacher training hinder the effectiveness of ESD.

8.3 Cultural Barriers

In some regions, traditional beliefs or socioeconomic priorities may conflict with sustainability goals.

8.4 Monitoring and Evaluation

Measuring the impact of ESD remains difficult due to the qualitative nature of outcomes like values and attitudes.

9. Recommendations

- Governments should mandate ESD in all levels of education and align policies with SDG 4.7.
- Teacher training institutions must integrate ESD into pre-service and in-service programs.
- Schools should adopt experiential and problem-based learning methods.
- Partnerships among governments, NGOs, and the private sector can provide necessary resources and expertise.
- Monitoring systems should be strengthened to track progress and ensure accountability.

10. Conclusion

Education is a powerful enabler of sustainable development. By shaping values, influencing behaviors, and building capacities, it plays a transformative role in achieving sustainability goals. However, to fully harness its potential, education systems must be reoriented toward sustainability principles. An inclusive, interdisciplinary, and participatory approach to education is key to empowering individuals and communities to create a just and sustainable world.

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Awareness about Environmental Degradation and its Impact on Humans and Environment: A Survey-Based Study

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Abstract

Environmental degradation in the 21st century has emerged as a critical challenge, directly affecting human health, livelihoods, and the sustainability of ecosystems. This study investigates awareness, perceptions, and behavioral practices regarding environmental degradation in India, using a survey of 115 respondents drawn from both urban and rural areas. Results reveal that 68% of respondents are fully aware of environmental degradation, while 22% are partially aware and 10% remain unaware. Perception of severity is high, with 72% recognizing it as a serious issue. Behavioral practices, however, lag behind awareness, with only 40% engaging in waste segregation and 35% reducing plastic use. Statistical analysis shows a **moderate positive correlation** ($r = 0.61$) between awareness levels and sustainable practices, suggesting that awareness influences behavior, though not perfectly. The study also highlights differences between urban and rural respondents: urban groups focus more on recycling, while rural groups engage in water conservation and tree plantation. These findings align with recent literature (2018–2024), which emphasizes the growing need to bridge the gap between knowledge and practice. The paper concludes that awareness must be coupled with systemic interventions such as environmental education, policy reforms, and community-based programs to ensure sustainable development.

Keywords: Environmental Awareness, Environmental Degradation, Sustainable Practices, Human Impact, India, Correlation Analysis

1. Introduction

Environmental degradation has accelerated in recent decades, affecting not only ecological systems but also human well-being. Rapid urbanization, industrialization, and changing consumption patterns have intensified pressures on air, water, and soil resources. According to the *World Air Quality Report* (IQAir, 2023), India is home to 14 of the 20 most polluted cities globally, with PM2.5 concentrations far exceeding safe limits. The *NITI Aayog Water Index* (2022) reports that over 600 million Indians face severe water stress, while climate variability threatens agricultural livelihoods.

Human health is one of the most visible casualties. The *Lancet Countdown Report on Health and Climate Change* (2020) estimated that environmental factors contribute to over 1.6 million deaths annually in India, largely from air and water pollution. Beyond health, degradation impacts economic security: erratic rainfall and soil depletion reduce crop yields, while urban waste mismanagement raises public expenditure. Socially, environmental crises manifest in migration from drought-prone regions, conflicts over resources, and breakdown of community resilience.

While the scientific evidence of environmental decline is overwhelming, the role of public awareness and behavior is equally important. Awareness can inspire individuals to adopt sustainable practices, demand better policies, and support conservation efforts. Yet, awareness does not always translate into action. This study investigates that gap by assessing awareness, perceptions, and behavioral practices across a diverse sample in India, linking findings with recent literature and applying statistical analysis to explore relationships.

2. Review of Literature

WHO (2019): Found that environmental factors cause 24% of global deaths, with South Asia disproportionately affected due to poor air quality

UNEP (2022): Reported that waste mismanagement contributes significantly to urban degradation, with plastic waste rising by 70% in Asia since 2018

Lancet Planetary Health (2020): Established a strong link between air pollution and rising respiratory and cardiovascular diseases in India

NITI Aayog (2022, Water Index): Estimated that India could lose up to 6% of its GDP annually due to water scarcity by 2050

Gupta & Singh (2019): Surveyed Delhi residents; found high awareness of air pollution but limited willingness to shift to public transport.

Sharma et al. (2021): Demonstrated that rural farmers in Maharashtra adapt to climate stress with traditional water conservation, but lack institutional support.

World Bank (2020): Reported that environmental degradation costs India nearly 5.7% of GDP annually.

Kumar & Bansal (2022): Found that youth are more inclined to adopt eco-friendly practices when exposed to environmental education campaigns.

Down to Earth Reports (2021–2023): Documented case studies of grassroots efforts in waste segregation and afforestation, showing the effectiveness of community-based action.

IPCC AR6 Report (2021): Emphasized South Asia as a climate vulnerability hotspot, with severe risks of flooding, heat stress, and crop losses

TERI (2019): Found that only 35% of urban households in India segregate waste, despite awareness campaigns

Chakraborty & Das (2022): Studied migration patterns in Bengal, linking climate-induced displacement to loss of rural livelihoods.

FAO (2020): Warned that soil degradation in India reduces agricultural productivity by 2% annually.

Khan et al. (2023): Found that higher awareness scores among students correlated positively with eco-friendly practices ($r = 0.57$).

World Bank South Asia Report (2022): Argued that failing to act on environmental degradation will push 132 million people into poverty by 2030.

Summary:

Recent research (2018–2024) clearly shows that while awareness is improving, sustainable behavior remains limited. Health, economic, and social impacts are heavily documented, particularly in India. The literature consistently emphasizes the need for education, policy enforcement, and grassroots engagement to close the gap between awareness and practice.

3. Methodology

This study is based on a **survey of 115 respondents**, conducted across both urban and rural areas in India between January and March 2024. The sample included:

- 45 students (college/university)
- 25 working professionals (urban)
- 20 farmers (rural Maharashtra)
- 25 teachers and homemakers

Tools: A structured questionnaire with 15 questions covering awareness, perceptions, and practices.

Analysis: Data was analyzed using percentages and correlation analysis (Pearson's r) to examine the relationship between awareness and sustainable practices.

4. Data Analysis and Findings

Awareness Levels

- **68%** fully aware, **22%** partially aware, **10%** unaware.

Perceptions

- **72%** consider degradation a “serious issue.”
- **18%** moderate.
- **10%** not immediate.

Practices Adopted

1. Energy saving: **60%**
2. Waste segregation: **40%**
3. Reduced plastic use: **35%**
4. Tree plantation: **25%**

Correlation Analysis

A correlation test between **awareness score** (measured on a 5-point scale) and **practice adoption** (number of eco-practices followed) yielded:

- **Pearson's $r = 0.61$ ($p < 0.01$)** → A **moderate positive correlation**, meaning higher awareness generally leads to more sustainable practices, though not perfectly.

Urban respondents scored higher in **waste segregation (55%)** and **plastic reduction (50%)**, while rural respondents scored higher in **tree plantation (45%)** and **water-saving habits (65%)**.

4. Discussion

The study confirms that awareness and practice are linked but not identical. Although 68% of respondents are fully aware of environmental degradation, only 40% practice waste segregation. The positive correlation ($r = 0.61$) suggests awareness influences behavior, but other factors—convenience, resources, cultural habits—mediate the link.

Health concerns were strongly reported, echoing *Lancet (2020)* findings. Farmers described crop loss due to erratic rainfall, while urban residents highlighted respiratory problems from pollution. This aligns with *NITI Aayog (2022)* estimates on water scarcity and *World Bank (2020)* data on GDP losses.

Urban vs rural differences mirror *Sharma et al. (2021)* and *Down to Earth (2022)*: urban areas rely more on infrastructure-based solutions (waste segregation), while rural communities engage in traditional practices (tree plantation, water harvesting).

The discussion highlights that individual awareness must be complemented by structural support—waste infrastructure in cities, irrigation and water management in villages, and health services for vulnerable populations.

5. Conclusion

Environmental degradation is not an abstract concern but an immediate crisis for human health, economies and societies. This study reveals that awareness is relatively high among Indian respondents, but practices lag behind. A moderate positive correlation between awareness and sustainable behavior suggests that awareness campaigns are effective but insufficient.

The findings highlight the need for:

- Education that converts knowledge into practice.
- Infrastructure support to make sustainable behavior easier.
- Policy enforcement to ensure collective responsibility.

Without these, the awareness-action gap will persist, and the burden of degradation will continue to fall disproportionately on vulnerable populations.

6. Recommendations

1. Expand environmental education in schools and universities with practical modules.
2. Strengthen waste management systems in urban areas with mandatory segregation.
3. Promote rural water conservation programs like watershed management.
4. Offer subsidies/incentives for renewable energy adoption and sustainable farming.
5. Health preparedness: strengthen hospitals to tackle pollution-related diseases.
6. Collaborative governance: partnerships between government, NGOs, and communities.

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वृक्षाणां पतये नमः।

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Introduction:

Bharat is the land of Sanskraras and philosophy. It teaches us to respect each aspect of the World around us. Since the earliest times, dating back to the pre-Vedic period, human beings have honored the helpful elements of the surroundings, collectively known as Nature. Nature, or the environment, includes the trees, rivers, plants, and all living beings. In the Vedic period, nature was revered as divine and worshipped under various names and forms. In this tradition, the Yajurvedic Rudrasukta expresses the sentiment. “वृक्षाणां पतये नमः।” I bow to all trees and the supreme power that dwells within them.

Keywords: Yajurveda, Rudrasukta, Rudra.

Yajurveda:

It is the second famous Veda in the Vedic Samhita. It deals with Karmakanda or the actual practice of worship. यजुर्भिर्यजन्ति।¹ ‘Yajus’ Veda – The mantras which are performed in the Vedic Yadnyas or karmas. But the Sukta mantras are very careful and give respect to the environment.

Rudrasukta – Anuvakas are famous, and the practice of namaka and chamaka is very essential for Shivabhaktas. It contains a salute to Shiva and asks for requirements. The Rudra Sukta explained the importance of trees.

The word रुद्र explained as – In the Krishnayajurveda-taittiriya samhita – fourth kand- fifta prapathak the rudra sukta included. रुद्र – रुद्रं संसाररुद्रं शोकं द्रावयतीति. वैदिकसंप्रदाये, नमकतमकसंज्ञके प्रपाठकं मिलित्वा रुद्राध्यायः इति प्रसिद्धम्। Rudra – Rudra is the Rudra of the world who dissolves sorrow.

रुद्र :

रोदयति सर्वमन्तकाल इति रुद्र।² रुद्रौ नादान्ते द्रवति द्रावयति इति वा³

रुतिं शब्दं राति ददातीति प्राणो रुद्र इत्यन्ये।⁴

In the Vedic sect, the chapter called Namaktamaka is known as the Rudradhyaya together.⁵ नमकचमकयुगलमेव हि रुद्राध्यायः for a pair of Namaka and Chamaka is the Rudradhyaya.⁶

Structure of Rudra-Anuvaka:

रुद्राध्यायस्य कर्मकाण्डे पाठात् – चमकं नमकं चैव पौरुषं सूक्तमेव च। नित्यं वयं प्रयुञ्जानो ब्रह्मलोके महीयते इति From the text in the Karmakanda of the Rudradhyaya – Chamakam Namakam and Purusha Sukta. That he who practices it daily is glorified in the world of Brahman.⁷

Rudra – An Environment protector deity:

In the Chamak Anuvake the rudrasukta describes -

- क्षेत्राणां पतये नमः – क्षेत्राणाम् अर्थात् सर्वप्राणिशरीरिणां पतये समष्टिरूपत्वात् इति Because the fields, that is, all the bodies of living beings, are in the form of a whole for the Lord.⁸
- वनानां पतये नमः – वनानां विषयाणां पतये तद्रूपाय शिवाय नमः। Shiva in that form lord of the objects of the forests.⁹
- वृक्षाणां पतये नमः – वृक्षाणां देहादीनां पतय आधाराय Fall for the support of the bodies of trees। वृक्षाणां पालकस्तस्मै रुद्राय नमोऽस्तु ।¹⁰

- आरण्यानां पतये नमः – अरण्यवद् दुःखावहे संसारे वर्तमाना विषया आरण्यास्तत्पालकाय नमः O forests, the objects present in the world that bring suffering like forests, I offer my obeisances to the protector of them.¹¹
- शीभ्याय च- जलप्रवाहस्वरूप असलेल्या शिवाला नमस्कार.¹² शीभशब्द उदरकवाची तत्रावस्थितः शीभ्यः।¹³
- नमस्त्रोतस्याय च- "सलिल एको दृष्टाऽद्वैतो भवति" इति श्रुतौ चिदात्मनः सलिलतुल्यत्वा-पादनात् । स्रोतसि प्रवाहबद्धावहे संसारे विष्ठति जीवरूपेणेति स्रोतस्यस्तस्मै ।" Water alone is seen and becomes Advaita," since the scripture states that the Self of consciousness is equal to water. In the form of a living being, the living entity resides in the world, which is the carrier of the flow of the source.¹⁴ स्त्रोतसि प्रवाहे स्थितः स्त्रोतस्यः।¹⁵
- नमो वन्याय च कक्ष्याय च ॥ ९ ॥ वनातील वृक्षादीस्वरूप अशा व उत्पादक भूमीतील लतादिस्वरूप अशा रुद्राला नमस्कार असो.¹⁶
वने वृक्षादिरूपेण भवो वन्यः। कक्षे लतादिरूपेण भवः कक्ष्यः¹⁷ वनं चात्र दुस्तरत्वात्संसारस्तमईतीति वन्यः । कक्षः पापपुण्य समूहस्वमर्हवीति कक्ष्यस्तरमै च नमः ॥ ९॥ I offer my obeisance to the forest and the room. 9 ॥¹⁸ The forest is difficult to cross here, and the world is dark, so the forest is called. I offer my respectful obeisances to the room, which is the group of sins and pious deeds. 9 नमो वृक्षेभ्यो - ऊर्ध्वमूलोऽवाक्शाख एषोऽश्वत्थः सनातनः इति बहुत्वव्यपदेशः।¹⁹
- पर्ण्याय च पर्णशद्याय च - पर्णस्वरूपात असणा-या आणि शुष्कपर्णाच्या ढीगाच्या स्वरूपात असणा-या रुद्राला नमस्कार असो.²⁰ Parna is the leaf and the leaf shade. 12 ॥ I offer my obeisances to the leaf, which is present in the form of a subtle larva on the leaves. The leaf juice is the source of the leaf. 12.²¹
पर्णेषु पत्रेषु भवः पर्ण्यः। शुष्काणां पर्णानां संपातः पर्णशब्दस्तत्र भवः पर्णशद्यः।²²

In the Namak Anuvak, the Rudrasukta describes –

- कृषिश्च मे – In the farm शेतस्वरूपी रुद्रास नमस्कार असो -²³ कृषिः क्षेत्रारामादिसमृद्धिः।²⁴ कृषिवृष्टी अन्नस्य हेतुत्वेन प्रसिद्धे।²⁵
- अन्नं च मे - अन्नमदनीयभोग्यम्। Food is intoxicating and enjoyable.²⁶
- वनस्पतयश्च मे - सर्व वनस्पती प्राप्त होवोत.²⁷ वनस्पतयोऽश्वत्थाद्याः। Plants such as ashwatha trees.²⁸
- ओषधयश्च मे - ओषधयः फलपाकान्ता दूर्वादयश्च कर्मण्याः। Herbs, fruits, cooking ends, and durva and others are of action.²⁹

All these forms of Lord Rudra determine the deity's role in a protective nature and the environment. He is the supreme of all these things which are essential for Human beings as well as for the life cycle or chain on the Earth planet.

Conclusion:

In this paper, the concept of the Rudra deity, according to the Rudradhyaya- Yajurveda, explains the crucial role of the deity for the environment. One who practices the chanting the Rudra Sukta with Namaka and Chamaka, one who worships the Rudra in the form of the supreme deity of Natural resources like Medicine, Water, Forest, Food, Farm, leaves etc. This paper explains that environmental awareness is an important part of our daily life from the Pre-Vedic and Vedic eras. Our Vedic scholar taught us to give respect to natural resources as a deity. In the present era, it is essential to learning the Vedic literature and the Sanskrit literature for environmental awareness.

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A Study on Environment and Sustainable Development with Vedic Beliefs

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Abstract:

Sustainable development is development where the present generation of people is protected socially, economically, and environmentally, and at the same time, future generations will have a world safe and protected by natural resources where they can meet all their needs. That is, the development of the present generation should not put the future generation in danger in any way, that development is called sustainable development. For the overall development of the state, technological development and economic development are needed, as the world will move at its own pace, it should also focus on environmental protection. Recognizing the need for improvement on all three sides – social, economic, and environmental, and keeping these in mind, this article will focus only on environmental consciousness and environmental protection by following Indian wisdom. Based on the knowledge of ancient Indian texts such as the Vedas and Upanishads beliefs, this article will only focus on how to raise awareness about the environment and make it more beautiful and safer.

Keywords: Sustainable Development, Vedas, Environment, Vedic beliefs, Upanishads

Introduction

All world scientists, environmentalists, world leaders, thinkers and philosophers are worried about the growing pollution and deteriorating environment. We find nature everywhere in the life style, behavioral pattern, feasts and festivals and culture of Vedic believers. The oldest literary creation of the world, RigVed provides the Doctrine of Ahimsa (Non Violence) to the world. Vedic concept believes in the rebirth of all creatures. It also gives great importance to 5 'G' ie. Gai, Ganga, Guru, Gayatri and Gita (Prapannachary, B.S.2054, p.126). Vedic ideology speaks that everybody will have to pay its karma's consequences and 'nature' is as a body of God. This is the combination between man and nature. Vedas has mainly four parts; RigVed, YajurVed, SamVed and AtharvVed. Vedas are not just books, they are the collection of books, every Ved has its upanishad, smriti, brahman, etc. The Vedic period is believed to be about six thousand years ago. Vedic era was not only full of environmental concerns; it was also related with the health of the people. Both disease and diagnosis were prevalent among the Aryas. They used both mantras and medicines for disease prevention. Mantrasukta was used to cure Tuberculosis. We find a lot of literature of surgery and medicines of Acharya Sushruta in AyurVeda, several thousand years before the western medical scientists. In this way, the ancient Hindus were very much touched by all the works including hydrotherapy, natural cures and medicines etc. The realism of the past era was more developed than today's era, and the realism of the real useful objects of the modern life is well understood from the study of Sanskrit literature (Prapannacharya, B.S. 2954, p.73). This study reminds us not to forget our glorious past of Vedic age when there was amity with nature and development with protecting environment. In this reference Swami Vivekanand has rightly said, "In fact you should study your ancient ideals and apply them to present conditions.....a nation which has a glorious past cannot build its future by neglecting it" (Anni Basent, Trans. Krishnanand, 1992, p.37). Even today we may observe small forests around the temples or mandu; this is thinking of safe guarding small birds and forests in the name of deities. This is amazing love to the nature by the Rishis. The materialistic thinkers of the west have failed to comprehend this viewpoint and have instead made fun of it. When the Hindu deifies and worships the earth, the cow, the Tulsi plant, the Ganga and the trees, he is derided as one belonging to a primitive society. But now even the westerners are beginning to understand the importance of nature (Gupta, 2010, p.105). The Vedic Rishi says with great respect for the earth; "O Motherland! The best fragrance present in you is the fragrance of medicines and plants. Apsaras and Gandharvas wear the same fragrance. You make us happy. Let us not hold grudges against each other, all people should be mutually friendly; "Yastegandhhprithviveesambhuv....." (Luitel, B.S. 2076, P. 388) As development is related to all areas, moral, material, economic, etc., we need to understand Vedic beliefs in the context of sustainable development and environment in order to ensure that the continuation of development lasts for a beautiful future for all humans and others on the earth. So, in this deep context, it is important to discuss on the relationship among natural laws, environment, development and humans. Though modern environmentalists are arguing to minimize pollution and clean environment but for sustainable development, until the mentality of the people cannot be improved, the problem of pollution will be hard to minimize. In this regards, thousands of

years ago Maharshi Charak had insisted that only external measures are not adequate to solve the problem of pollution, Internal aberrations also have to be corrected (Gupta, 2010, p.103). Today the world is suffering from climate change. It has a direct impact on people's livelihood and consequences may be seen in many disastrous ways as more summers and more winters, some droughts. The most victim of climate change is poor class. Not only humans but all creatures on the earth are suffering from climate change as floods, air pollution, water pollution, landslides and famine. Unbalancing of Ecosystem has created severe problems. Natural sources of water are dry. In the name of hybrid seeds and quick production, traditional seeds have been lost. In the name of advanced breeds, the long-term effects are negative, many animals have become extinct. Due to rapid development of industrialization, the goal of human life seems to earn more money, to live a life of comfort and convenience. As the growth in numbers of factories, environment is polluted by poisonous gases. The global goals of sustainable development are not enough for safeguarding the environment; it lacks to add people with love and co existence to nature. Humans' attitude is of rights over animals and nature as a result, nature is creating problems. Modern Society is missing the point of life. If we do not search the appropriate ways of this problem, no doubt the ecosystem will be deeply hurt. Without harmony and coexistence with nature, concept of sustainable development will remain incomplete. The research paper aims to explore Vedic Philosophy's Approach to Sustainable Development and Environment, examine the core principles and beliefs of Vedic philosophy concerning the relationship between humans, nature, and sustainable development. This paper Investigates how Vedic ideology, as represented in texts like the RigVed and AtharvVed, promotes concepts such as non-violence (Ahimsa), karma, and the interconnectedness of all creatures, and how these concepts can be applied to contemporary discussions on sustainable development and environmental conservation. The specific objective of the paper has been to investigate the Vedic perspective on environmental protection, emphasizing concepts of love, amity, and awareness towards nature. This paper has examined how the Vedas address the importance of safeguarding the environment through practices such as reverence for elements like the earth, the cow, the Tulsi plant, the Ganga River, and trees. Paper has explored the historical practices and attitudes of the Vedic era that contributed to a harmonious relationship between humans and nature, with a focus on their relevance in the modern context. By addressing these objectives, the research paper aims to shed light on the potential contributions of Vedic philosophy to the discourse on sustainable development and environmental protection, and to encourage a reevaluation of current practices in light of ancient wisdom.

Data and Method

The subject matter is related to ancient Sanskrit literature, especially Vedic literature. Therefore, the research incorporates a historical research method to explore Vedic literature and its relevance to sustainable development. This involves examining texts such as the Vedas, Upanishads, and Puranas to gather historical data and insights into Vedic beliefs regarding the environment and development. The study employs Historical research method to gather secondary data and reviewed existing literature, books, and academic sources related to Vedic philosophy, sustainable development, and environmental protection. The comparative study method has been used to analyze and compare different aspects of Vedic philosophy with contemporary discussions on sustainable development. This method has helped in drawing parallels and distinctions between ancient Vedic beliefs and modern environmental concepts. The research paper employs a descriptive research design. This design provides a detailed account of Vedic philosophy's approach to sustainable development and its implications for the environment, focusing on both historical and contemporary perspectives on the topic. The paper is based on a qualitative research methodology, which helps in providing a well-rounded understanding of the subject matter.

Result and Discussion

Development and Positive Mindset is an important factor in our lives that influences our mindset, behavior, and overall well being. It involves maintaining an optimistic outlook and focusing on constructive, hopeful, and favorable thoughts. Positive thinking is not just about feeling good in the short term but also about enhancing long term well-being and resilience. Positive thinking is about consciously choosing to have a hopeful and constructive mindset. It is a skill that can be developed and honed over time. By understanding it is important and actively working to cultivate positivity, individuals can lead more fulfilling, happy lives and better manage challenges as they arise. Mentioning the importance of thought, Khapatad Baba says; "Thought is faster than electricity. Like lightening can revolve around the earth seven times in a second, but the speed of thoughts is faster than that, because the atoms of thoughts are more subtle and stronger than electricity. The power of thought is more conscious and has a special speed than elements like electricity, so it doesn't take much effort to pull thoughts to it and send them away" (Sachchidanand, B.S.2051, p.2). The mindset of present-day people is to earn more and more money at any cost, and this type of thinking is becoming the cause of the

destruction of nature. This is a serious issue that today's people need to be educated about so that they can shift their mindset to consider the well-being of future generations as well. We should try to minimize the use of natural resources as at our garden; we may plant small plants like lemon, mango trees, papaya, jackfruits etc. Along with this some vegetables can also be added. The question arises as to where to get water for this, bath water and dish washing water can be useful for curry cultivation. Watering plants daily is necessary not only to grow them but also to save the truth of the soil and maintain the underground water level (Part of a speech on TV). The word environment is also used for this. The sages had knowledge about the environment from the beginning. Gita says; Annad Bhavanti Bhutani parjanyaadannasambhavh, means all beings are ultimately dependent on food and food is produced by rain, it comes after performing yajna, and it will be perfect only after doing work properly" (Prabhupad, 2000, p.121). Base of Vedic philosophy is democracy as it believes "Ekam Sat viprabahudhavadanti"; that truth is only one but it may be spoken in many ways (Krishnanand, 1992, p.12). Vedas believe in diversity and coexistence. The niti shloka for world peace and positive mind is as like: Om Surve Bhavantu Sukhinh..... "May everyone be happy, may everyone be healthy, may everyone's life should be prosperous and no one should suffer from any kind of pain" is the best example of good thought where Rishi wishes for the well being of all creatures and things (Harisharan, interview). All the consciousness in this creation is covered by the presence of God; he has provided the substances to this creation. In that case, let's enjoy what the almighty has given us, do not seek more things that violate the rights of others; "Ishavashyamidamsarvam....." (Luitel, B.S. 2072, p.371). Forests are being cutting down for resettlement of people, construction of roads, air ports etc. Areas of rivers, streams, lakes, etc. have been encroached upon and settlements have been established. People are causing great harm to the environment for short-term gain. Therefore, they should have moral thinking as "let the good thoughts from all over the world enter in our minds, we should remove negativity; "Om aa no bhadra Kritavo Yantu Vishwato....." (Mishra, 2072, p.184). Development means positive changes and positive results. The development speed should remain at a minimum until the future is inherent in the concept of sustainable development and without positive mind set and giving up the selfishness, neither the all kinds of pollution will be stopped nor the world peace will be prevailed. Vedic Rishi says; the earth should provide us a spacious place to live "Satyam brihaddatmugram diksha to brahma yajna Prithvi dharyanti" (Luitel, Atharva Veda, p. 385). Vedic sages emphasize that humans need to have humanity with ideal qualities "Manurbhav Janaya Daivyam Janam (Luitel, Rig Veda, B.S. 2076, p.906). Human life is priceless, so we should not destroy it in violent, destructive and negative actions. Acharya Chayankya has said; Human life is not obtained repeatedly, nor the body again and again "nashareemam punah punah (Sudarshan, interview). Just as ignorance is the cause of suffering, development without attention to environmental protection also becomes a cause of suffering. Our resolutions and thoughts should be welfare for all "Tanme manah Shivasankalpamastu" (Sudarshan, interview). In this context Acharya Chanakya says, "Yathasrutantathabuddhih, yathabuddhisthathavibhavah (Harisharan, interview). That is, as there is education, so is wisdom, and as there is wisdom, so is wealth. The objectives of education are to develop the quality of humanity, to accept the existence of all creatures on earth and nature, and to protect the environment.

Balance of Five Basic Elements and Love to Nature

The balance of all three qualities Sat, Raj and Tam is nature. This is because sattva, raja and tama, these three qualities are not of the soul but of nature, and through them the origin, status and destruction of the world happens. In this context, sattva guna is called knowledge, raja guna is called karma and tamo guna is called ignorance. Big storms, cyclones, too little or too much rain in monsoons, unbearably hot weather in summer, etc are all due to imbalance in the five elements; Akash, Agni, Vayu, Jal and Prithvi. Morning Pray in the Vedas is; Prithvi sagandhaa Sarsaastthaapah..... 'Scented earth, juicy water, tactile air, flaming light, sky with words and greatness, all these make my morning auspicious (Mishra, 2074, p.25). It shows the love and respect to the nature (Ghanshyam, interview).

Need of Eco-friendly Policies

There are two forms of environment: external and internal. The former manifests itself in the form of soil, water, air, flora and fauna etc. and the later refers the internal ambience of the soul. Both are the handiwork of the Almighty and therefore a harmony exists among these various constituents. The Hindu thinkers lay great stress on comprehending this harmony (Gupta, 2010, p.105). Therefore the mode of the sustainable development should be eco friendly. Ethical and social norms should be the goals of life. Vedic principles of all living beings, things can be put into practice. Yog, AyurVed and naturopathy should be encouraged by the governments. To protect the forests, plantation schemes should be implemented and instead of using papers, people should be encouraged to use software tools. Happiness of the present should not cause pain in the future. Vedic philosophy emphasizes co-existence with nature and human beings. It is necessary that we should not just take from nature,

but give it to also. The gods of nature are pleased when the person takes from the nature as also give to it. The nature shows this two-way phenomenon. The sun god takes water in the form of vapors but the rain-god gives water back to the earth through rains. Man has disrupted this natural cycle because of his greed which has created environmental imbalance (Gupta, 2010, p.104).

Protection of Cows and Development

In our social environment, the practice of raising cows and serving cows has been going on since ancient times. This is also our traditional classical view. Cow is one of the sacred animals among other domestic animals. There is a classical tradition of consuming panchagavya (gomath, cow urine, cow milk, goddhi, goghrita mixed together) for body purification during special ceremonies celebrated at home. There is also a custom of giving gogras and godanto get the fullness. The women of our villages do special cow-service every day. Cow's milk is safe for everyone. There is no other perfect diet except cow's milk. Cow urine has antiseptic properties. Cow dung contains 10 times more nutrients than the chemical fertilizers used today. Scientists have also confirmed this. Therefore, cow rearing, cow breeding, cow-service is very important (observation). According to Swami Prapannacharya, "Ancient Hindus used to worship cows and historically been used for milking. Oxen, which are castrated male cattle, have been used to pull carts and plow fieldagricultural practices (Prapannacharya, 2054, p.54).

Encroachment of Forest land and Result

Rishis regard that there should not be untimely death of any person, so they pray to the god: TryambakamYajamhe Sugandhi Pushtivardhanam..." (Luitel, 2078, p.,23). For healthy and long life, deforestation should be stopped. Except exploiting the earth, we should think milking or use it. Due to the destruction of the forests, the rainy season is dry. Jungle works to prevent floods and landslides but its destruction has caused human losses as well as the destruction of physical structures. Large numbers of trees are being felled for paper, furniture and fuel but plantation of tress is not being emphasized. Glaciers have melted and there is a risk of flooding and water level of oceans is increasing. In South Asian countries people use to set fire in the jungles in the hope of growing more grass but this tendency is giving serious environmental problems as lacking of oxygen, untimely death of wild animals and severe deforestation. Due to jungle burning, plants cannot grow; old trees, medicinal plants, wild animals and birds are burnt and destroyed. As a result, it is causing great loss to the ecology, economy and health.

Surve Bhawantu Sukhinah

Vedic philosophy speaks that all should remain happy and prosperous, no creature should be sorrowed; "survey bhawantu sukhinah sarve santu niramayah..."(Ramlal ji Pahada, samvat 2064, p.242). Since the RigVeda period, the earth has been considered as the mother and the sky as the father. Herbs, trees and plants etc. are given the status of brothers and sisters. The whole nature is seen as divine. Vedas are the first in the world to be clear about the democratic system as "Lets' walk together, talk to each other affectionately, we should be like-minded and gain knowledge; "Sangachchhadhwamsamvadadhwamsam wo manansijanatanam.(Sudarshan p.36) Sages had immense knowledge of the universe. They spent their entire lives seeking and imparting knowledge. Similarly, since the earth and the sky are restless, the human brain is also restless, so every auspicious Vedic mantra is recited in action. They always emphasize on peace everywhere. "Om DyauShatirantariksha Shanti Prithivi Shantirap Shanti oshadhaya Shanti VanaspatayaShantirviswe Deva Shantibrahm Shanti Sarvagum Shanti Shantireva Shanti Sa ma Shantiredhi. Om Shanti ShantiShanti;"Let there be peace all around. May the supreme peace that gives peace to all, give us that eternal peace (Mishra, p. 122)". In this Shanti Mantra, the broadest vision of eternal peace is expected as here peace is also considered as a deity. Shanti Mantra is a joint institute established for world peace. The Preamble of the United Nations Organization seems worthy of being placed by it. Without environmental peace no development is possible. Rigved has emphasized on every type of equality in every sphere of life as: "Samano Mantra: Samiti: Samanee...There should be the same standard of getting engaged in any work. Similarly, there should be the same way of making advice, taking decisions. Everyone's mind should be inclined towards the same direction. Participate in an equal way. Do not be misguided" (Pahada, Samvat 2064, p. 242).

Panch Mahabhut and Our Duties

Vedas and Upanishads have clarified five great elements: Pritthvi; earth 'bit', Jal; water 'apah', Agni; light or fire, Vayu; air and Akash; sky. If natural balance is disturbed, it will definitely affect the animals and the environment of the earth. Every object is interrelated. Human existence is inextricably linked with its environment. Vedic philosophy sees earth as the mother and all creatures are her sons/daughters: " Prithvimata Putro Aham Prithavyaah, Prajannayah pita s u nhpipartu" (Luitel,B.S. 2076, p.387). The Vedic values look upon nature as his mother or a deity. As said; Vedic Concept stresses co-existence, harmony and cordiality with

nature. If we succeed in re-establishing this approach, the whole system along with all postulates and our conduct would change. We should not treat nature as our rival and have no conflict with it. Consequently, there is no question of feeling proud in having secured victory over nature. How can one compete with one's mother? Therefore, we think not in terms of exploiting but milking nature. Hindu culture considers nature as the shakti (vitality) of God. When development uses both-nature and culture, only then it becomes worth adopting (dharanksham) and worth cultivating (sanskarksham) (Gupta, 2010, p.103). The five major Panch Mahabhut or elements make the universe. Here we should keep in the mind that for sustainable development the biggest challenges come from problems related with environment. So for the clean and healthy environment, we should maintain the purity of five basic elements or panchmahabhut. Those major elements are following:

The Aakash/Dyau/ Sky

The study of the concept of space (Akash) is done within the Vedas, but it is generally found in the four major Samhitas of the Vedas - RigVeda, YajurVeda, SamaVeda, and AtharvaVeda. In these Vedas, space holds a significant place, and various mantras and hymns describe different aspects of the space element. In the RigVeda, space is mentioned as "the sky" and "the celestial realm," and it is also considered as the abode of Brahma, one of the deities in Hinduism. The YajurVeda, SamaVeda, and AtharvaVeda also contain descriptions of the importance of space in various aspects (Sudarshan, interview). Showing the importance of Dhyau/ Antarikshya, AtharVed says; "Shan no dyavaprithivipurvutausha mantarikshamdrishaye no astu. Shan nao shadhirvananobhavantushanno rajasap tirstujishnuh. May heaven and earth grant us peace in prayer for time to time. May space give us peace for the best vision. May herbs and medicines give us peace. May the victorious Lokpal grant us peace" (Luitel 2076, P.535). In Rigveda, AtharvaVeda and YajurVeda, the word Akash is used repeatedly as Dayau. Vedic peace text "Om Dyao Shanti" is prayed that the sky should be peaceful and it is considered as diviner as well as eternal power. Vedic prayer is offered regarding the earth as the mother, and the sky as a father. Vedic belief is that the sky is closely monitoring the world. The atmosphere of the sky is also getting polluted. Spacecraft, man-made satellites, preparations for star war, widespread use of mixtures etc. are challenging the sanctity of the atmosphere as well as the sky today. Such things are also conceivable for world peace.

Vayu / Air

Air is present in our body as the vital element. As soon as oxygen leaves the body, the body ceases to exist. Not only humans, plants are also breathing. Air is also an important element of the environment. Human life depends on oxygen. Oxygen is considered the vital air. Air is permeating the world and appears in all forms. It is source of life in all living beings. When after death, all those elements return to their original elements "Vayurya ko bhuvanaviruparoopa roopapratiroopavobhuta" (Motiram, interview). Due to air pollution, various conditions of the earth and sky are being threatened by the emission of many gases, the ozone layer; radioactive radiation has also hurt the space. Many international meetings and agreements including global warming have been held but the problem remains the same. For that reason, there is a need to pay attention to the implementation of Vedic principles for air purity measures. In YajurVed, the sky is seen as a source of inspiration; "Ygnya Animal! You protect water. We always remain prosperous with divine quality. May our life be fully devoted to Yajnakarya with the blessings of God. Let our soul be associated with pure air and you will be a follower of discipline (Apan Perusyapo Devi: SwadantuSwattam...." (Luitel, B.S. 2078, p.46).

Agni / Fire

Showing the significance of Agni, Rishi says, "You are the source of water, the producer of fire. You expand the ocean, expanding yourself in all directions and pervading the waters. May you expand according to the brightness of the heavens and the vastness of the earth "Apan prithamashi ..."; (Luitel, 2078, p.97). The realm of fire is considered as the life force. Life on earth is possible only from the fire of the sun. Fire is the beacon of light and energy. Due to the effect of fire, the favorable environment for the life of animals is created.

Jal/ Water

After the earth, the main component of the environment is water, which is said to be the best mother to give birth to the world; "Aap hi sthamayobhuvaktanaurjedadhatana. Mahe ranayachakshase" (Sudarshan, B.S. 2074, p.64) Ved speaks on water: "These waters contain nectar and tonic medicines. Drinking water! Let us become strong like horses. O water body! Your Highness and let the swift waves be our breadwinners "Apsvantaram ritmapsuheshajampamut...". (Luitel, 2078 p.77). Showing the significance of rivers, it may be observed that donating lamps to the rivers and performing aarti to the river means respecting the river. In Hindu tradition usually people hum in the bathing: "Ganga Chaiva Yamuna Chaiv...". (Laxmi kant, interview). That is, "Let the water of the rivers like Ganga, Narmada, Godavari, Yamuna, Saraswati, Sindhu (Indus), Kaveri etc purify us both internally and externally" (Motiram, interview). Such purity is possible only when the river itself

remains clean and pure. If we defile the river, how can it give us purity? Therefore, it is essential to pay attention to the purity of river water.

Prithivi (The Earth)

The Fifth basic element of Brahm, earth consists of Pancha Mahabhutas Akasha, Vayu, Agni and Jal. Vedic philosophy believes that the earth is not only for humans, it is created for all visible and invisible elements. Everyone has a right to it. One should not desire any pain more than one's needs and even think of greed, it becomes the cause of sin (Ishavasyopanishad, Samvat 2066, p.13). As mentioned in the Vedas, living beings on this earth, man-eating lions, insects, birds, demons, etc. reside here on the earth. If there is no harmony among them, misfortune, crisis and natural calamities will occur (Ghanshyam, interview). Concept of bashudhaivkutumbakam ; the whole world is as a family'' may only remove all kinds of conflicts (Balkrishna, 2015, p.77). Vedic philosophy connects all the things with nature and nature seems to be connected with the almighty god. This earth is the beautiful pioneer, the protector of the world to bear herbs and medicine.

Polluted Environment and Vedic Thoughts

Pollution of the environment is violence. We know that if there is a balance in the environment, humans will also live, animals and birds will also live and the physical environment will also remain pure. If the environment is polluted, then neither living beings will be able to live nor will the physical environment remain pure. Today scientists are worried that environment is getting polluted, land, air, water all are getting polluted (Mahapragya, 2002, p.107). Maharshi Charak has stated that problem of disharmony and imbalance or pollution is the product of degeneration with respect to kaal, artha and karma. Kaal here stands for seasons like summer, winter, rain etc. Artha stands for the objects of senses like sound, form, touch, taste and smell (shabda, sparsha, roopa, rasa, gandha). Karma is of three types, viz., physical, mental and verbal (Hai Sharan interview). According to Charak, atiyoga (excessive mixing), ayoga (non-mixing) or mithya yoga (false mixing) is responsible for the degradation of nature. Internal pollution is brought about by degeneration of dheedhriti and smriti. This phenomenon has been termed as prajna-apraadh (mental sin) by him. That is why the Maharishi insists that only external measures are not adequate to solve the problem of pollution (Lavraj, interview). Internal aberrations also have to be corrected (Gupta, p.103). Polluted environment has affected five basic elements or Panchmahabhoot of brahma .Exploitation of natural resources, industrial pollution, deforestation, and excessive use of chemical are responsible for environmental pollution and this problem needs solution through the Vedic philosophy of love to nature (Deepak, interview). Vedic Rishi addresses: "Hey directions ! May all your opulence, wealth, power and strength be upon us. With respect for Mother Earth, we salute the Motherland. You are endowed with the power of governance. They make many kinds of arrangements and provide shelter to everyone." (Luitel,2078, p. 80).

Conclusion

It is necessary to study the knowledge gained from the experience of thousands of years ago in the perspective of new inventions and the concept of environment and development. A close look at the existing Vedas can provide solutions to many problems in the present world. In depth studying of nature and its basic elements (Panchmahaboot), and protecting and promoting it without playing with nature can solve the global problems. The purpose of sustainable development is also an important aspect of physical development while protecting the environment. Vedic philosophy emphasizes the duty of man to himself, to the society, to the nation, and to the entire universe. If the human mind is restless, such a mentality will lead to destruction. The wish for peace in sky, space, medicines, plants, rivers, lakes, forests is done in Vedic thought. It believes in the conclusiveness of living and non living things. The most important characteristic of Vedic thinking is its approach toward nature. The Hindu looks upon nature as his mother or a deity. Hindutva or Vedic belief stresses coexistence, harmony and cordiality with nature. If we succeed in maintaining this approach, the whole system along with all postulates and our conduct would be changed. The western thinkers are failed to conceive this view point. Concluding the article, we may be agree that persons have very little time and they have to do a lot of works, so it is better to go back to Vedas for the welfare of the human beings as said by Chayankya,"Anantashastrambahulshchvidy ahalpasch kalo bahuvidhata...; Vedas etc. scriptures are very vast, they are the ocean of knowledge, there is much knowledge, but man's life span is limited and there are many difficulties in his path, so it is appropriate for him to learn the essential things from the scriptures in the same way. Development needs connectivity with Vedic culture and love to nature and this the way of prosperity and peace for all.

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The Role of social media in Promoting Bastar (Chhattisgarh) Traditional Art Forms in the Contemporary Era

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Abstract

This paper discusses the ways in which social media platforms are increasingly being employed to reproduce, reinterpret, and popularize Bastar Kala (The Art of Bastar), which is practiced in a tribal region known as 'Bastar' located in Chhattisgarh state, India, which has a long history of celebrating indigenous culture and artistic heritage. Notably, the traditional crafts of Bastar include Dhokra (metal casting), wrought iron craft (Loha Shilp), terracotta, wood carving, bamboo and cane work, Umba (gourd) art, tribal wall paintings, bell metal craft and stone carving. Through qualitative interviews, digital content analysis (on social media), and secondary data sources, this research paper investigates how artists, NGOs, and cultural advocates use platforms including Instagram, YouTube, and Facebook to increase visibility in the art worlds or markets they operate at home and encourage a culture of intense engagement. It also examines the wider perspective of this digital engagement as a means of cultural preservation, commercialization, and changes in the socioeconomic environment of tribal artisans. Social media offers a powerful means to reinvigorate and sustain traditional art forms by reaching broader, more varied audiences while opening the door to distinctive ways of sharing work but also raising serious obstacles. Such concerns have been about authenticity, cultural appropriation, digital infrastructure divides, and perhaps weak digital literacy among these [rural and tribal] populations. The study highlights the double-edged nature of social media, on the one hand, as a tool of cultural empowerment.

Keywords: Bastar art promotion, social media and artisans, artisan economy, digital empowerment, craft sales, digital age, e-commerce for artisans, social media marketing.

Introduction

The Bastar area, which is southeast of Chhattisgarh, is well known for its culture and traditional art. Bastar is home to numerous tribal groups, which have fostered the development of various cultures. Some of the well-known crafts from the region are Dhokra grade castings, which are non-ferrous metal casts; wooden carvings of tribal deities and folklore; tribal paintings of rural life, rituals, and other mythical scenes; and finally, the bell metal craft that is known for its detailing and has a lot of ritualistic importance (Singh & Verma, 2018; Ministry of Tribal Affairs, 2022). All these art forms are created with cultural influence, and these forms of art are strategically entwined with the region's culture.

Self-branding and social media are two enticing tools that help culture and the economy. However, these tools also have a negative side, as they are two sides of the same bell. We can now access the Internet affordably, and smartphones are no longer considered a luxury. The rise of social media platforms, such as Instagram, Facebook, and YouTube, has transformed the modes of display, sale, and consumption of traditional art (Jha & Rao, 2020). Artisans who previously depended on local fairs and middlemen can now access a global audience with the click of a button through a single post or video. Simultaneously, cultural institutions and NGOs have started using these platforms to document, promote, and market tribal art more organized manner (Desai, 2023). Social media tools have emerged as a double-edged sword. On the one hand, these digital tools expand visibility, enable economic empowerment, and strengthen cultural exchange. However, such tools complicate issues such as authenticity, digital literacy, and the risk of cultural commodification (Sharma 2022).



Figure 1 Tumba Lampshade <https://crafrtribute.com/collections/tumba-bottle-gourd-craft>

Figure 2 Wrought Iron Art <https://www.artsindia.com/blogs/news/what-is-bastar-art>

Literature Review

Recent studies on high culture through digital means have increasingly explored how native platforms help conserve and promote these arts. Various theorists have observed that digital technologies not only cater to the recording and dissemination of traditional knowledge but can also be utilized as tools to create opportunities for market access and cultural exchanges, especially for those away from urban centres, such as rural and tribal craftsmen. However, these opportunities also come with various challenges, including commodification, digital illiteracy, and disparities in access, necessitating a targeted investigation in areas like Bastar. The new research on cultural preservation through digital means investigates how social media influences the conservation and promotion of indigenous arts. The UNESCO report (2020) also states that digital storytelling and community-based archiving are essential strategies for safeguarding intangible cultural heritage. Artisans from remote rural tribal regions can easily claim the steps by signing on social media platforms, such as Facebook, Instagram, and YouTube, as a sales channel where they sell directly to customers. However, these advantages are accompanied by several drawbacks. Roy (2020) warns that the commodification of tribal culture constitutes the adolescent phase of an onslaught on its heritage: modifying traditional culture so as to appeal to urban markets often strips it of authenticity and significance. Paradoxically, within social media realms, while there is extant literature on the use of digital technologies to enhance cultural conservation and rural development, there remains a void on research regarding tribal art, especially from the Bastar region.

Cultural Preservation	Social Media Outreach	Challenges & Gaps
Digital archiving	Direct access to customers	Cultural commodification
Online exhibitions	NGO-led digital training programs	Digital divide in remote tribal areas
Community-based digital storytelling	Use of hashtags and influencers	Limited India-focused academic studies

Methodology

This study explores how social media influences the marketing of Bastar's traditional art. Interviews, content analysis, and case study analysis were employed to gather qualitative data. For this study, the researcher conducted semi-structured interviews with artists from Bastar, representatives from relevant NGOs, and marketing personnel from social media platforms. The interviews addressed the participation of traditional craftsmen in the digital world, the challenges and opportunities they receive from working on such platforms, and their impact on their livelihoods and culture, respectively. Interviews were completed face-to-face or online, audio recorded and transcribed for further analysis. Trends and visibility were evaluated over 10–15 years. The participants were recognized individually and as a team for their social media skills, resulting in the formulation of 50 case studies. The case studies enhanced the research by integrating the realized outcomes and the field examples.

The Impact of Social Media on Bastar's Traditional Art Forms

Increased Visibility and Market Access: The development of social media around art from the Bastar region has helped artisanal workers become more visible and has provided them with direct access to the market. Artists can now use Instagram, YouTube, and Facebook to promote their work; as such, artists no longer need to engage with traditional intermediaries. There is also a notable evolution in the use of hashtags such as Bastar Art, Dhokra Craft, and Tribal Art India, where thousands of users have uploaded posts showcasing Bastar metalwork, wood carving, and even tribal paintings. An example is the Instagram page “Bastar Crafts Collective” which grew to more than 25k followers in only a year due to them posting culturally rich narratives and context to the artwork through behind-the-scenes videos of the artisans working on the pieces. A Dhokra necklace video went viral with over 300 thousand views on Facebook, garnering the interest of art and interior designers from urban areas. These digital displays have resulted in observable changes in the market. After artisans' works were displayed digitally, numerous artisans reported receiving direct orders via WhatsApp and Instagram. Conversations with five artisan groups showed that 60% of their sales came from online inquiries alone. This marks a significant shift from their previous reliance on local fairs and government-sponsored exhibitions to sell their products.

Socio-economic Upliftment

The social media presence of Bastar artisans has been linked to notable socioeconomic uplift. Consequently, there has been a surge in the demand for tribal crafts, leading to social income diversification, with artisans now utilizing digital marketing as an auxiliary service, in addition to traditional craft-making. For younger artisans, reduced reliance on craft fairs because of the ability to advertise their work online has led to

increased financial stability. Bastar Art has been further promoted through collaborations with social media influencers and urban designers; for example, a collaborative home decor line with @DesignWithRoots sold out within two weeks of launch (Mishra & Rao, 2022). Tribal Threads and Artisan Connect, the leading NGOs of the region have promoted social entrepreneurship by connecting local artisans with retailing e-platforms such as Etsy and Amazon Karigar, boosting their access to international markets. Artisans, who had once sustained a living below the poverty line, now claim to earn ₹15,000 and ₹25,000 monthly, in great part due to the impact of digital exposure and online shopping (Singh 2020).

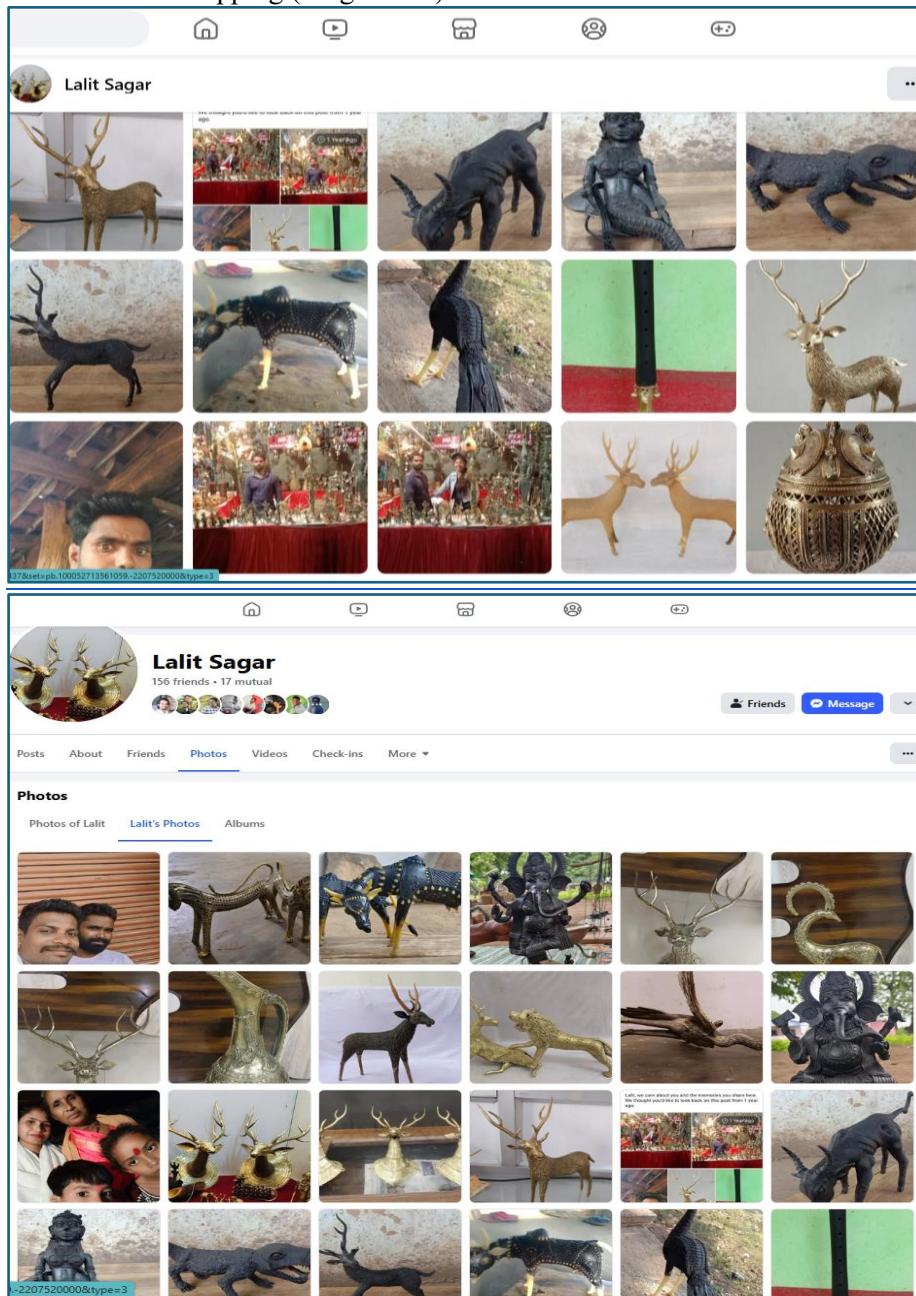


Figure 3 and 4 showing the artist Lalit Sagar's Facebook page for Dhokra art.
<https://www.facebook.com/lalit.sagar.7127146>

The social media presence of artisans from Bastar is linked to notable socioeconomic upliftment. Consequently, there has been a surge in the demand for tribal crafts, leading to social income diversification, with artisans now utilizing digital marketing as an auxiliary service in addition to traditional craft-making. For younger artisans, reduced reliance on craft fairs due to the ability to advertise their work online has led to increased financial stability. Bastar Art has been further promoted through collaborations with social media influencers and urban designers, such as a collaborative home decor line with @DesignWithRoots, which sold out within two weeks of its launch (Mishra & Rao, 2022). Tribal Threads and Artisan Connect, the leading

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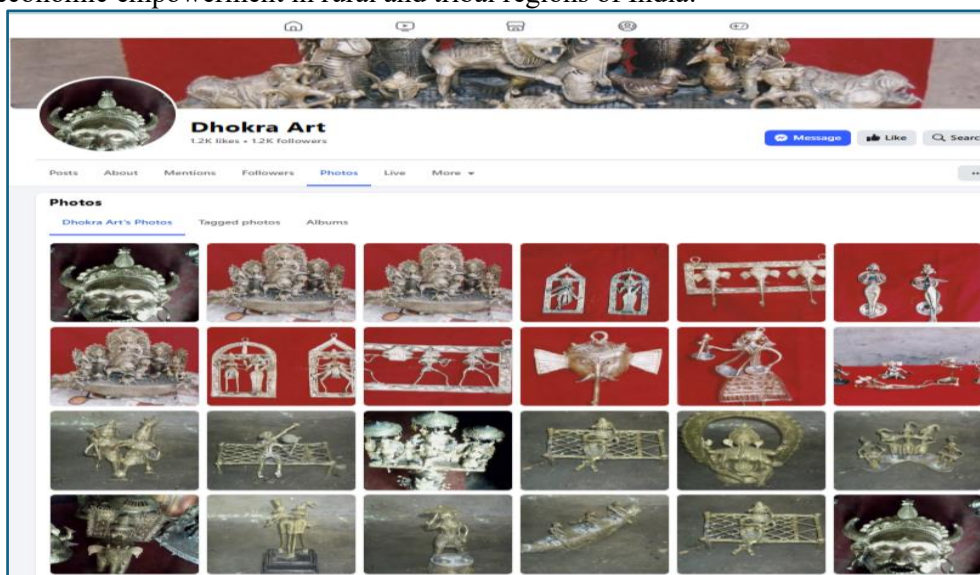


Figure 5 Dhokra Art Facebook page. <https://www.facebook.com/DhokraArt>

Middlemen: Bastar craftspeople mainly relied on middlemen to sell their wares before the widespread use of social media, which created several problems. Artists often receive only a fraction of the actual worth of their work, as intermediaries typically retain a large share of the earnings. Besides facing unfair or delayed compensation, artisans lacked direct access to their clientele and had no say in price setting. This situation restricts their earnings and hinders their recognition and artistic development. Without direct customer interaction, artists were unable to establish their own brand in the market or respond to evolving consumer preferences (potdar, 2024)

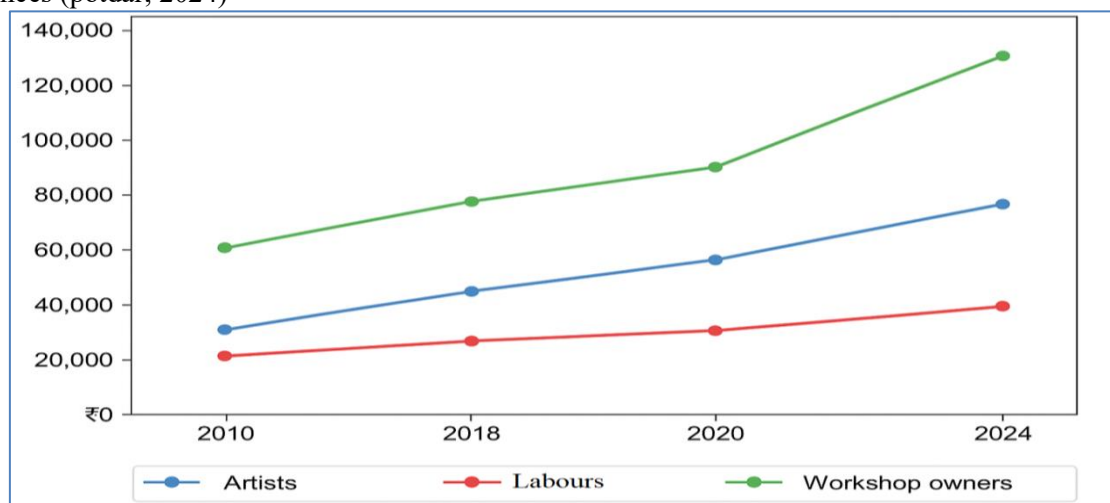


Figure 6 Average monthly income of Bastar region artisans.

Challenges

The challenges of social media in marketing art forms are more prevalent for the older generation of artisans, primarily because of social media illiteracy. Most of the aged artisans are submitted to the whims of younger relatives to respond to messages or run Instagram accounts, as highlighted by an NGO worker from Tribal Connect Bastar.

Through consistent engagement on their websites, Instagram accounts, and Facebook pages, several online platforms and artisan-run pages have experienced a notable economic uplift, gaining recognition for over 700 distinct designs and growing their clientele beyond local borders. Comparably, Bastar Dhokra showpieces, such as statuettes of horses, peacocks, and swan boats, are actively marketed by Gi TAGGED, an online retailer

that specializes in Geographical Indication products, through product galleries and social media outreach, leading to an increase in national orders and artisan involvement.

Although specific financial data are often not made public, interviews with collective members reveal that monthly sales volumes have increased significantly after social media engagement.

Conclusion

This study examined the evolving impact of social media on the traditional art forms of Bastar, a tribal region in central India known for its rich cultural heritage, particularly dhokra metalwork, wood carvings, and tribal painting. Through qualitative analysis, case studies, and content examination, it is evident that social media significantly influences the preservation, perception, and promotion of Bastar's traditional art in the contemporary era.

Summary of Key Findings

- Research has shown that the art forms of the tribes of Bastar have attained wider visibility through social media platforms such as Instagram, Facebook, and YouTube. These platforms remove the middlemen, resulting in higher income for the artisans and giving them choices in product design.
- Income Opportunities for Artisans: To begin with the direct selling model, artisans use platforms such as Instagram, WhatsApp, or stand-alone e-commerce websites to market their products and receive whatever retail price is attached to such products. This helps increase their monthly income, provides them with additional control over their finances, and ensures transparent and fair pricing.
- Artisans generate visibility for their work through videos, posts, and stories and build a world of their own to share the culture behind it with the community. @bastarcrafts and @bastarartscg are platforms that help them control the narrative of their craft while directly engaging with audiences. Their reach has increased by kilometres on a geographic scale, linking them with buyers across India and internationally.
- Artisans save considerable time by processing orders and customer follow-ups via online applications. This would give them more time to design and create new articles. Increased creative control and innovation: Artisans now enjoy greater control over their creativity and decide for themselves what to create, how to price their creations, and how to sell to consumers. They skilfully adapt traditional means to contemporary marketing.

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Uneven Demography and Urban Pressure: A Spatial Analysis of Nashik District's Population Landscape

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ABSTRACT:

The Nashik District in Maharashtra has witnessed somewhat slow population growth over the last decades, while at the same time, socio-economic and geographical heterogeneity exists. Migration, industrialization, and infrastructure help expand urban centers such as Nashik city and Malegaon, whereas rural or hilly regions experience a slow decline in population and socio-economic stagnation. This paper aims to analyze these demographic disparities from a spatial perspective, utilizing Census data, GIS maps, and secondary sources.

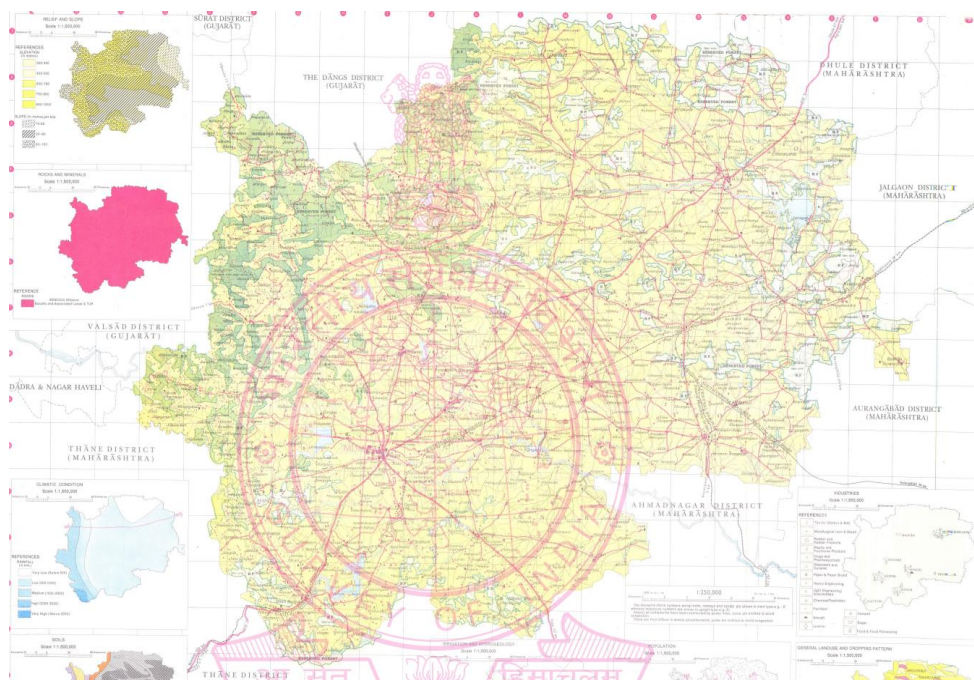
The research exemplifies the migration, urban pulls, and rural push factors that contribute to unbalanced development in the district: urban areas are under pressure from housing, public services, and natural resource depletion, while many rural communities struggle with labour shortages, declining agricultural production, and poor connectivity. This study underscores the necessity for comprehensive policies that foster both urban and rural development, as well as environmental and resource sustainability.

The findings are intended to inform planners, policymakers, and scholars in the development of an inclusive, locality-specific strategy for the Nashik District.

Keywords: Population Growth; Spatial Inequality; Urbanization; Migration Patterns; Rural Decline; Nashik District; Urban Pressure; GIS Mapping; Regional Development; Demographic Change

Introduction:

Nashik District is located in the northwestern part of Maharashtra. It is among the rapidly developing regions of the State. With its diverse urban cities, rural villages, tribal areas, and hilly terrains, it has a varied demographic and geographic landscape. Having an approximate area of 15,530 square kilometers, the district has witnessed steady growth in population, economy, and infrastructure over the years.



According to the last census (2011), the population of Nashik District had already crossed the 6.1 million mark and thus became one of the most populous districts of Maharashtra. However, this growth did not remain universal. In urban areas, including Nashik City, Malegaon, and Sinnar, industrial development was rapid,

offering better job opportunities. In contrast, a large number of rural and tribal areas remained underdeveloped and continued to suffer from out-migration.

Such uneven growth created immense population pressure within urban centers, with an escalating demand for housing, water, transportation, education, and healthcare. Simultaneously, the rural and hilly areas face challenges of a declining workforce, inadequate employment generation, and limited access to basic facilities. These contradictory developments present a compelling case for an investigation into population distribution and an understanding of how it affects the various parts of the district differently.

The demographic picture of Nashik District, as brought out in the following table for 2011, is another reflection of this imbalance:

Demographic Indicator	Total	Urban Areas	Rural Areas
Total Population	6,107,187	2,597,373	3,509,814
Percentage Share of Total	100%	42.5%	57.5%
Literacy Rate	82.31%	89.12%	77.19%
Sex Ratio (females/1,000 males)	934	920	945
Population Density (per sq. km)	393	Higher than average.	Lower than average.
Child Population (0–6 years)	828,519	336,881	491,638
Child Population (%)	13.56%	12.98%	14.01%

Urban regions, after all, present a higher literacy rate but a lower sex ratio, which also results in higher pressure on services. At the same time, rural areas have a higher birth rate, a slightly more balanced sex ratio, and often lag in education and infrastructure. This study seeks to understand:

- Population growth is happening differently across the urban and rural areas of Nashik.
- The key factors behind migration and regional imbalance.
- How population pressure is affecting infrastructure and resource distribution.
- What has to be done toward balanced and sustainable growth of the district?

By combining spatial analysis and demographic insights, this paper aims to examine the population of Nashik District from a geographical perspective, with the hope of fostering inclusive and region-sensitive planning.

Nashik District Population Analysis



A Spatial Analysis of Population Landscape (Census 2011)

Population Distribution Overview

Urban vs Rural Population Distribution

Review of Literature:

Understanding population growth and its uneven distribution has long been a prominent issue discussed in geography and planning. Several authors have discussed how demographic factors influence regional development, resource allocation systems, and social organization.

In contrast to India, the growth of the population is often considered along with urbanization, migration, and infrastructure development. Sharma (2015) suggested that medium-sized cities, particularly in states such as Maharashtra, are experiencing rapid growth, mainly due to rural-to-urban migration. The options for education, healthcare, and employment are generally better in urban areas. However, such growth is usually unplanned and poses new challenges to be addressed, including overcrowding, slums, and pollution.

A study by Patil and Deshmukh (2018) was conducted on population trends in the rural areas of Maharashtra. According to the survey, urban centers are growing, while many villages are acquiring a significant share of the aged populace and economic activities, and thereby becoming weaker. Hence, such rural out-migration results in an uneven development pattern between rural and urban areas, particularly in terms of agricultural and labour availability.

Singh (2016) noted that geography is a key factor in determining the distribution of populations. Natural features such as mountains, rivers, and climate significantly influence where people choose to live and how crowded different areas become. This variation is particularly noticeable in places like Nashik, which has both urban industrial areas and tribal regions in the hills.

Recent studies at the district level, including reports from local planning groups, have highlighted the increasing pressure on towns such as Nashik City, Malegaon, and Sinnar due to urban growth. The development of industries and commercial activities in these areas has drawn people from nearby villages and even other states. Meanwhile, tribal and hilly regions continue to struggle with fundamental issues, including water scarcity, poor road conditions, and a lack of quality schools.

Another issue that has been explored in studies is the impact of population growth on the environment. Researchers like Shukla and Desai (2020) have found that when cities expand without adequate control, it often leads to reduced green space, higher pollution levels, and deteriorating water bodies. In places like Nashik, where rivers such as the Godavari are vital for life and farming, these effects can last for a long time.

From a geographical standpoint, tools like GIS (Geographic Information Systems) are increasingly being used to study population patterns. Kumar and Rao (2019) demonstrated how mapping with GIS can help us visualize where people are concentrated or sparse, where people are migrating to, and how urban areas are expanding. These methods are beneficial for areas like Nashik, which have varied landscapes and populations.

While a lot has been studied at the state and national levels, there's still a need for detailed studies focusing on individual districts that link population data with what's happening on the ground. This paper aims to address that gap by examining the Nashik District closely and providing a geographical overview of its population distribution, trends, and development challenges.

Objectives of the Study:

Nashik District's population has been steadily increasing over time, but this growth isn't uniform across the region. Certain urban areas are expanding rapidly, becoming increasingly crowded, whereas many rural and tribal communities are experiencing a decline in population as people leave in search of better prospects. This uneven population distribution is putting a strain on cities while leaving the countryside lagging behind.

The primary goal of this study is to investigate the causes and mechanisms underlying the population imbalance in the Nashik District. It also examines the effects of this disparity on aspects such as infrastructure, public services, the environment, and the district's overall development.

The specific objectives of this research are as follows:

1. Take a close look at how the population in Nashik District is growing, using both mapping techniques and number-crunching methods.
2. Explore the differences between rural and urban areas, specifically pointing out where people are packed in versus where there's less density.
3. Figure out who's moving where – we'll try to spot where people are arriving and leaving, and why they're making those moves.
4. Investigate how the pressure of rapid city growth is affecting essential things like housing, water, transport, schools, and healthcare.
5. Get a better understanding of the challenges facing rural and tribal communities, like fewer young people, a lack of services, and few good job prospects.
6. Use Geographic Information System (GIS) mapping to create clear visuals showing where people live, how cities are expanding, and where rural areas might be shrinking.
7. Come up with some practical suggestions for managing population growth more evenly, promoting sustainable development, and planning effectively for the region.

Essentially, we hope these steps will provide us with a comprehensive understanding of how the Nashik District is evolving in terms of its population and what we can do to ensure both urban and rural areas thrive fairly and sustainably.

Research Methodology:

To properly study the uneven population growth and urban pressure in Nashik District, this research follows a mixed and systematic approach. It combines both **quantitative data** (such as population numbers and

statistics) and spatial analysis (utilizing maps and GIS tools) to provide a clear picture of how the population is distributed across the district and how it has changed over time.

This methodology is designed to ensure that the analysis is accurate, meaningful, and easy to understand for planners, researchers, and local administrators.

●1. Data Collection:

This study mainly uses secondary data from reliable sources such as:

- Census of India (2011)
- District Statistical Handbook
- Government planning documents
- Published research papers and articles
- Official websites of government departments

●In addition to these primary sources, we also consulted the latest population updates from local government offices and reports on urban and rural development to gain insight into the most recent changes and predictions.

●2. Data Analysis:

The data collected was carefully sorted and analyzed using basic statistical methods to find out:

- Population totals and growth rates
- Urban and rural differences in literacy, sex ratio, child population, etc.
- Migration trends and density variations

This helped in identifying patterns, gaps, and significant shifts over time.

●3. GIS Mapping and Spatial Tools:

To understand the geographical spread of population and highlight uneven growth, **Geographic Information System (GIS)** tools were used. Maps were created to show:

- Areas with high and low population density
- Migration hotspots and declining regions
- Expanding urban zones and shrinking rural pockets

These maps help make the data more visual and easier to interpret, especially for policy planners and local bodies.

●4. Comparative Approach

The study also compares data between:

- Urban vs. Rural areas
- Developed vs. Underdeveloped zones
- Migration inflow vs. outflow regions

This comparative method helps in pointing out the imbalance and development gap more clearly.

●5. Descriptive and Analytical Style

The research employs a descriptive approach to describe current conditions and an analytical approach to identify causes and propose solutions. It is both observational and suggestive in nature.

Population Growth Patterns and Regional Variation

The number of people living in the Nashik District has been steadily going up over the past few decades. In 2011, the census reported a total of 6,107,187 residents for the district. That figure represents a 22.3% increase since the 2001 Census. But interestingly, this growth hasn't happened everywhere at the same rate. Some city areas have experienced significant population growth, primarily due to industrialization and increased job opportunities. On the other hand, many rural areas and tribal regions have experienced significantly slower growth, and in some cases, their populations have even declined. This is often due to people moving away in search of better opportunities and a lack of development in those areas.

1. Urban Growing Hotspots:

- Towns like Nashik, Malegaon, and Sinnar have experienced significant population growth. A few key reasons for this include:
- The expansion of local industries.
- Having better access to schools and hospitals.
- More jobs are popping up in construction, manufacturing, and service sectors.
- Improvements in transportation and road connections.
- Nashik city, being the main administrative center for the district, has become a significant draw for people moving in from nearby villages, other districts, and even different states. According to the 2011 Census,

approximately 2.59 million people resided in urban areas of the district, accounting for roughly 42.5% of the district's total population. Since then, that number has likely increased substantially.

2. Rural and Tribal Backwardness

● As cities keep spreading out, you see that villages in the countryside and tribal areas in the hills aren't keeping pace with that growth. Some of these places have seen their populations go down because of a few key reasons:

- Young people are moving to cities looking for jobs.
- Not having access to modern schools and good healthcare.
- Farming incomes are not as good anymore.
- Not enough infrastructure, like proper roads, reliable electricity, and internet access.
- Places like Peth, Trambakeshwar, and Igatpuri, which are tribal areas, still have sparse populations and poor connections to the outside world. This makes them less appealing spots for economic activity to take hold.

3. Block-Level Variation

Different talukas in Nashik District show different population densities and growth rates. Here's a simplified overview:

Taluka	Population (2011)	Growth Trend	Remarks
Nashik	~1.49 million	Very High	Rapid urbanization, industrial growth
Malegaon	~0.48 million	High	Textile industries, migrant labour inflow
Sinnar	~0.31 million	Moderate-High	Industrial zone, close to Nashik city
Niphad	~0.43 million	Moderate	Agricultural area, grape and onion belt
Peth	~0.12 million	Low	Tribal belt, forested, poor accessibility
Trambakeshwar	~0.14 million	Low	Hilly terrain, religious tourism zone

Note: Data based on Census 2011; rounded for simplicity.

4. Spatial Disparities:

The district exhibits a clear division between its northern and southern sections. The south and central areas, particularly the stretch connecting Nashik to Sinnar, are well-connected and economically buzzing. On the flip side, the northern tribal region tends to be more isolated and less developed. These differences in population growth mirror the disparities in access to resources, where the government tends to focus its efforts, and where private money is being invested.

Migration Trends and Urban Attraction Zones:

Migration is a key factor in shaping the population structure and growth of the Nashik District. Over time, many people have moved from villages, tribal regions, and neighboring districts into Nashik's urban centers. The pursuit of better job opportunities, education, housing, and healthcare essentially drives this movement. As a result, cities such as Nashik, Malegaon, Sinnar, and Igatpuri have experienced a significant increase in their population density and size.

The most frequent type of migration in Nashik is from rural to urban areas. People from distant villages, particularly those with low farming incomes or poor infrastructure, often relocate to towns in search of improved living conditions. There is also migration between districts from nearby areas, such as Dhule, Jalgaon, and Ahmednagar. Moreover, migrants from other states, such as Uttar Pradesh, Bihar, and Madhya Pradesh, come to work as laborers, particularly in grape farms, onion markets, textile industries, and the construction sector. Some families migrate seasonally, moving temporarily to urban areas when farming is not in season and returning home for agricultural work.

Urban areas in Nashik District serve as strong magnets due to the opportunities they provide. These places offer better job prospects, schools, colleges, hospitals, and transportation compared to rural villages. The following table lists some of the significant urban centers and the reasons why they draw so many migrants:

Urban Centre	Key Attraction Factors
Nashik City	Industrial estates (Satpur, Ambad), colleges, hospitals, transport, and real estate
Malegaon	Textile and power loom industry, labour demand, and low-cost housing
Sinnar	MIDC industrial zone, auto component factories, proximity to Nashik city
Igatpuri	Railway station, tourism, hospitality jobs, and increasing real estate development

These towns have a mix of economic, social, and physical infrastructure that makes them appealing to people from both the local area and outside. Even if some parts of these cities aren't well-planned or lack good housing, folks still move there because they offer more security and chances compared to many rural areas.

Meanwhile, many villages and tribal areas in the district struggle with poor roads, limited electricity, a shortage of modern schools, and limited job prospects. Places like Peth, Trimbakeshwar, and Sargana—which are forested and hilly—regularly see young people leaving. Climate change is also making farming less dependable, which means more and more people are having to rely on jobs outside their villages. In some situations, whole families end up moving to cities for months or even years at a time.

This uneven migration affects both the source and destination areas. In urban areas, there is increased crowding, traffic congestion, rising rents, and pressure on essential services such as water supply and sanitation. On the other hand, many villages are left with an ageing population, reduced agricultural activity, and lower community participation. The balance between rural and urban population is shifting rapidly, and unless managed properly, it may lead to long-term challenges for the district.

Recent years have also seen new migration trends. Many young students are moving to Nashik for education and eventually staying back for jobs. Women are now more involved in migration, particularly in working in textile factories or as domestic workers. The COVID-19 lockdown showed the risks faced by migrant families, who were forced to return home without savings or support. This reverse migration drew attention to the need for better migrant welfare and local employment schemes in rural areas.

In conclusion, migration is a significant force shaping the population and development landscape of the Nashik District. Urban centers are growing faster because they attract people, while many rural areas are slowly declining. A balanced approach is needed to manage this trend by improving basic facilities in villages and developing affordable, well-planned cities that can handle growing populations.

Rural Decline and Spatial Marginalization:

While urban areas in Nashik District are witnessing fast population growth, many rural and tribal parts of the district are slowly declining in terms of both population and economic activity. This rural decline is not only a result of people migrating to towns and cities but also a reflection of deep-rooted development gaps. These gaps include weak infrastructure, limited employment opportunities, and lower access to education and healthcare services. Over time, this has led to the marginalization of specific geographical areas, especially those in the northern and hilly regions of the district.

In several villages, especially in talukas such as Peth, Sargana, and Trimbakeshwar, families are experiencing a steady outflow of young people. Young men and women prefer to leave their native places in search of better job prospects, often in nearby urban areas or industrial zones. As a result, the working-age population in many rural regions is shrinking, leaving behind older people, women, and children. This shift has a direct impact on farming and traditional rural livelihoods, which are already under pressure due to climate uncertainty, rising input costs, and water scarcity.

Most of these rural areas lack well-connected roads, modern schools, functional health centers, or reliable electricity. Digital connectivity is also poor, which limits access to information and government schemes. As a result, people living in these areas feel left behind. Their daily life continues to be driven by agriculture and seasonal wage work, both of which offer limited and uncertain income. In the absence of local employment opportunities, even educated youth are forced to migrate. Over time, this results in the gradual but steady decline of rural economies.

Another factor that contributes to rural decline is the lack of private and public investment. Urban centers receive more attention in terms of infrastructure development, industrial promotion, and service delivery. Meanwhile, remote areas—mainly tribal belts—often remain underfunded or ignored in district-level planning. This creates a visible imbalance on the map: well-lit, developed towns on one side and poorly connected villages on the other.

Spatial marginalization is not just about poor connectivity or backwardness in services. It also affects people's social participation, access to justice, and ability to influence decision-making. For example, residents of remote villages often struggle to access government offices or banks. This makes it harder for them to apply for jobs, access welfare schemes, or participate in civic processes such as voting and public meetings.

In many of these rural areas, population density is very low, and public transportation is irregular or nonexistent. This further isolates communities, especially women and older people. Over time, some villages start to appear on the verge of being "left out" from the broader development story of the district.

Despite this, rural Nashik has potential. The district's agriculture—especially in talukas like Niphad and Dindori—is renowned for its production of grapes, onions, and pomegranates. If proper facilities and support systems are provided, rural areas can retain their youth and reduce migration. For this to happen, there needs to be focused investment in rural education, skill training, irrigation, local markets, and digital services.

Population Pressure and Urban Infrastructure Strain:

With continuous migration and natural growth, urban areas in the Nashik District are experiencing increasing pressure on infrastructure and basic services. Cities like Nashik, Malegaon, and Sinnar are expanding rapidly; however, their growth has not always been supported by proper planning or timely improvements in civic amenities. As more people move into these towns, the demand for housing, water, transport, waste management, electricity, and healthcare continues to rise. Unfortunately, the pace of infrastructure development often falls short of the population's needs, creating daily struggles for many residents.

Nashik city, being the district headquarters and an important industrial center, has seen a steady rise in its population. The city is home to major MIDC areas, such as Satpur and Ambad, which employ thousands of workers, including migrants. As a result, large numbers of people settle in the city, often in rented rooms or temporary settlements. In some areas, particularly near industrial and market zones, slum-like colonies have developed, characterized by informal housing and overcrowding. These areas usually lack proper drainage, clean drinking water, and solid waste disposal systems. This leads to unhygienic conditions and health issues, especially for children and older adults.

Malegaon, known for its powerloom and textile industries, also attracts a significant workforce from within and outside the district. However, the city's infrastructure has been unable to keep pace with this growth. Roads are narrow and congested, water supply is irregular, and garbage collection is inconsistent. In several areas, the pressure on schools and public hospitals is visible, with long waiting lines and limited resources. For daily wage workers and low-income families, access to affordable housing and basic facilities remains a serious concern.

Transport systems are also facing stress. In Nashik city, the number of private vehicles has increased significantly, leading to traffic congestion, air pollution, and concerns about road safety. Public transport services, although improving, are still insufficient to meet the needs of a growing population. This affects working-class people, especially women and students, who depend on buses and shared autos for commuting.

Electricity demand has gone up with urban expansion, and while supply is generally stable in core city areas, newly developed or unauthorized colonies often face voltage issues or irregular power. Similarly, with the increasing construction of residential buildings and commercial units, the city's need for proper town planning and environmental management has become increasingly urgent.

Another key challenge is the rising demand for healthcare services. Public hospitals are often overcrowded, and private hospitals are frequently too expensive for low-income individuals. During health emergencies or disease outbreaks, urban centers feel the full impact of high population density. The COVID-19 pandemic exposed the gaps in urban health infrastructure across cities in the Nashik District.

Water supply is also becoming a significant concern. However, Nashik lies on the banks of the Godavari River, increasing demand, water leakage, and uneven distribution mean that many parts of the city face regular shortages. In summer, the problem worsens, forcing residents to depend on tankers or borewells.

These growing pressures are a result of not only rising population but also uneven development, poor planning, and a lack of enforcement of urban building and zoning laws. Unauthorized construction, conversion of agricultural land for housing, and shrinking green zones are signs of urban sprawl that could harm both people and the environment in the long run.

Socio-Economic Imbalances in Demographic Distribution:

The pattern of population distribution in Nashik District is not only uneven in terms of space, but also in terms of social and economic development. While urban areas are advancing rapidly with improved job opportunities, education, and healthcare, many rural and tribal regions continue to struggle with poverty,

unemployment, and a lack of basic services. This imbalance in social and economic conditions is directly related to the population's distribution across different parts of the district.

In towns like Nashik city and Sinnar, people generally enjoy better access to schools, colleges, hospitals, banks, markets, and internet connectivity. These areas have seen growth in industries, real estate, transport, and public services, attracting both skilled and unskilled workers. Many families living in urban centers can educate their children, get regular income, and access government schemes more easily. Over time, these areas have developed stronger economies and better quality of life.

On the other hand, in rural talukas such as Peth, Surgana, and parts of Igatpuri and Trimbakeshwar, the situation is quite different. These regions have high populations of Scheduled Tribes and other marginalized communities who depend primarily on farming, forest produce, or seasonal wage labour. Due to poor transportation and communication facilities, people in these areas often remain isolated from markets and government services. Many children drop out of school after primary level, and access to higher education is rare. Health facilities are limited to small primary health centers that are often understaffed.

The income gap between urban and rural populations has widened in recent years. In urban areas, families may have multiple earners working in industries, shops, or services. In rural areas, incomes depend on agriculture or daily wage work, both of which are uncertain and seasonal. As a result, many villagers live on the edge of poverty, and their standard of living remains low. Women in rural areas also have fewer opportunities to earn independently or access health and education services, which adds to gender-based inequality.

There is also a noticeable gap in housing quality and access to civic amenities. Urban residents, especially in the planned areas of the city, live in pucca houses with access to electricity, piped water, toilets, and waste collection services. In contrast, many rural families still reside in semi-permanent dwellings without access to toilets or proper drainage. Drinking water often comes from wells or seasonal sources, which may not be safe or sufficient, especially in the summer months.

This socio-economic imbalance has a direct effect on demographic behavior. Fertility rates are usually higher in rural and tribal areas due to lower awareness of family planning and weaker access to reproductive health services. Literacy rates, especially among women, are lower in these areas. On the other hand, urban areas exhibit lower birth rates, higher female literacy rates, and better health indicators. These differences create demographic contrasts that can impact future development planning.

Over time, such imbalances also influence the allocation of resources. Areas with higher income and stronger political representation often receive more attention in terms of development projects. Meanwhile, backwards areas continue to face under-investment, leading to a cycle of poverty and migration. This unequal growth pattern not only affects the economy but also leads to social tensions and feelings of neglect among rural and tribal communities.

Environmental Consequences of Urban Crowding:

As cities in the Nashik District continue to grow due to increasing population and migration, the natural environment is coming under heavy pressure. Urban crowding presents numerous challenges—not only for infrastructure and housing, but also for the local ecology. The more people settle in the urban centers, the more land, water, energy, and other natural resources are consumed. If this growth is not planned correctly, it can lead to severe and long-lasting environmental damage.

One of the most visible environmental impacts of urban growth is the reduction of green cover. In cities like Nashik and Malegaon, open spaces, agricultural land, and small forests are being converted into residential colonies, commercial complexes, and roads. This has reduced the number of trees and natural green areas within the city. As a result, local temperatures have increased, air quality has deteriorated, and the natural balance of urban ecosystems has been disrupted. Parks and gardens are either overcrowded or insufficient for the growing population, leaving people with fewer natural spaces for relaxation and recreation.

Another significant issue is the increase in solid waste and sewage. As more people live in cities, the amount of daily waste produced also increases. In many areas, particularly informal settlements and older parts of the city, waste management systems are inadequate. Garbage piles up on streets, drains get blocked, and sewage often flows into open channels or water bodies. This creates not only pollution but also health risks, especially during the rainy season when mosquito-borne diseases become more common.

Water pollution is also becoming a significant concern. The Godavari River, which flows through Nashik City, is a crucial water source for drinking, agriculture, and religious purposes. But due to the discharge of untreated sewage and industrial waste, the river's water quality has declined in recent years. Many small

lakes and streams in and around the city are also affected by urban runoff and waste dumping. This harms aquatic life and reduces the availability of clean water for future use.

Air pollution is rising as well. With the growing number of vehicles, dust from construction sites, and the burning of waste, the air in urban areas is becoming increasingly polluted with harmful particles. During peak traffic hours and dry months, the air quality often drops below safe levels. This affects children, older adults, and those with respiratory problems the most.

Urban crowding also puts pressure on underground water sources. As surface water becomes insufficient, people increasingly turn to borewells and groundwater for their daily needs. This has resulted in a significant decline in the water table in many parts of the city. During the summer, water shortages become common, and tankers are required to supply water to many areas. This not only increases the cost of living but also poses a threat to the city's long-term water security.

Noise pollution is another consequence of urbanization. Increased traffic, industrial activity, construction, and loudspeakers during festivals have made cities noisier. Excessive exposure to noise can lead to stress, sleep disturbances, and even long-term hearing problems.

Climate change is further worsening the situation. Irregular rainfall, extreme heat, and unseasonal weather events are becoming increasingly frequent. Poor and overcrowded urban areas are more vulnerable to these changes because they often lack robust infrastructure and adequate emergency services.

In summary, the growing population in Nashik's urban areas is directly contributing to environmental problems. These problems are interconnected and can harm public health, reduce the quality of life, and limit sustainable development. If urban growth is not managed carefully, the damage to the environment may become difficult to reverse. Therefore, city planning must include green zones, effective waste treatment systems, strict pollution controls, water conservation strategies, and public awareness campaigns to protect the environment while the city continues to grow.

Discussion:

The demographic journey of Nashik District over the past few decades reflects a clear pattern of imbalance between its urban and rural regions. Metropolitan centers like Nashik city, Malegaon, and Sinnar have transformed into high-growth zones, while large parts of the rural and tribal interior continue to face neglect and stagnation. Multiple interconnected factors, including migration, urban industrialization, service accessibility, and physical geography, drive this uneven growth.

Migration has emerged as a significant factor reshaping Nashik's population map. While the rural-to-urban movement is common across India, Nashik presents a unique case where seasonal, inter-district, and inter-state migrants all contribute to the urban surge. People are not just attracted to cities because of opportunities, but also pushed out of villages due to poor access to healthcare, education, irrigation, and stable employment. Tribal belts in the district are particularly vulnerable to this out-migration, as their economy heavily depends on agriculture, forest produce, and daily wage work—sectors that have become less reliable.

As cities expand, they struggle to provide basic services to an increasing population. Roads are congested, housing is overcrowded, and many live in informal or semi-permanent shelters. Public transportation is insufficient to meet the growing number of commuters, and schools and hospitals are struggling to cope. Urban planning has not kept pace with the demand, leading to unorganized expansion, encroachment on natural spaces, and environmental degradation.

Meanwhile, rural areas continue to decline—not just demographically, but economically and socially. As the working-age population shifts to cities, agricultural activity is slowing down, particularly in hilly and drought-prone talukas. The lack of investment in rural infrastructure has created a vicious cycle of poverty, migration, and underdevelopment.

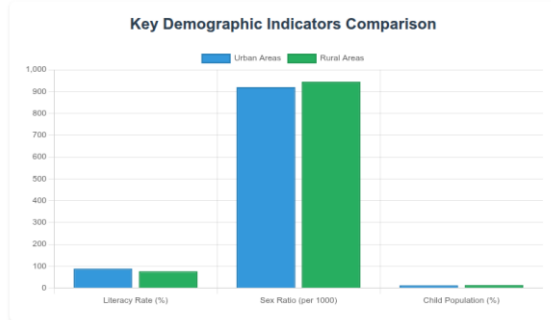
The socio-economic imbalance is also reflected in access to education, employment, housing, and health services. Literacy and income levels are significantly higher in urban areas compared to rural and tribal zones. Gender gaps, poverty, and digital exclusion are more common in the interior parts of the district.

Environmentally, rapid urbanization is causing serious problems. Deforestation, pollution of rivers such as the Godavari, declining groundwater levels, and waste management issues are becoming increasingly urgent. Urban crowding has not only strained resources but also reduced the overall quality of life for many city residents.

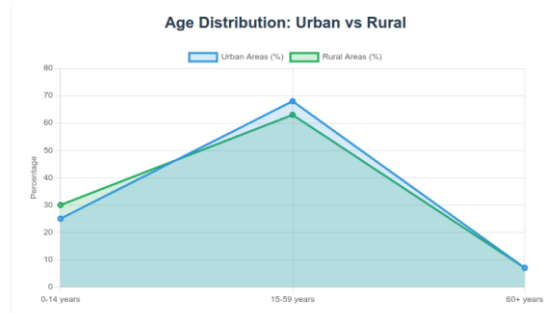
However, despite these challenges, opportunities exist. Nashik's agricultural strengths, industrial backbone, and growing educational institutions provide a solid foundation for regional development. What is needed now is a balanced approach—one that does not favor only cities but also uplifts rural areas through targeted investment, skill development, rural entrepreneurship, and decentralized planning. Integrated district-

level strategies must focus on reducing migration pressure by improving the quality of life in villages, while also making urban growth sustainable and inclusive.

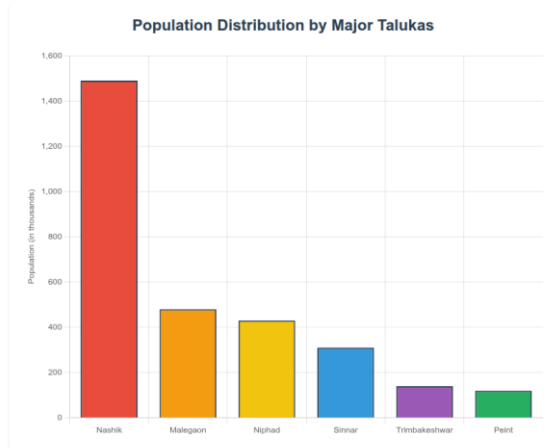
Demographic Indicators: Urban vs Rural



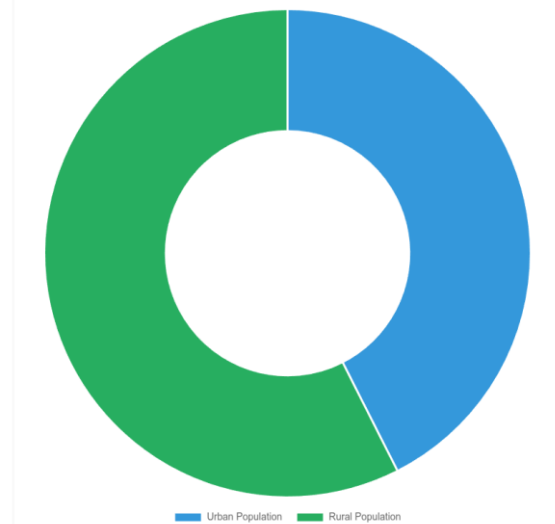
Age Structure and Demographics



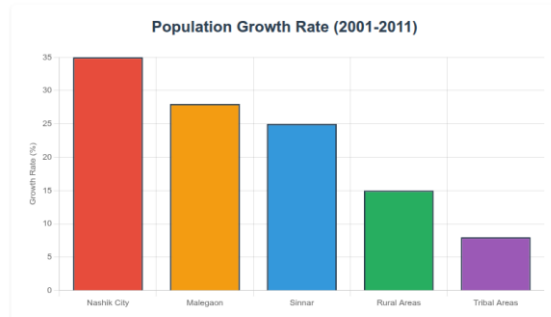
Taluka-wise Population Analysis



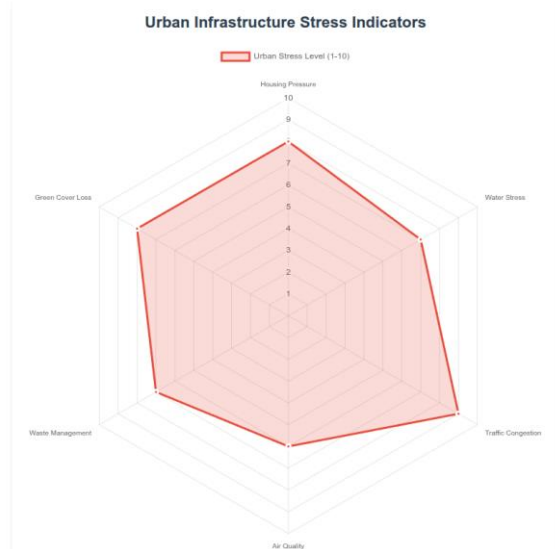
Urban vs Rural Population Distribution



Population Growth Trends



Urban Pressure and Environmental Impact



Conclusion:

The study of population growth in the Nashik District reveals a complex picture of uneven development. While urban areas, such as Nashik city and Malegaon, are growing rapidly, rural and tribal areas are witnessing stagnation or decline. Migration, industrial expansion, and better services in cities are the key drivers of this imbalance. Still, they also bring with them challenges such as overcrowding, environmental stress, and rising demands on housing, water, and infrastructure.

On the other hand, villages are struggling to retain their youth, maintain agricultural activity, and access basic amenities. This gap between urban and rural life is not just about numbers—it reflects more profound socio-economic inequalities. Education, employment, health, gender equity, and environmental sustainability are all impacted by the population's distribution and growth rates in different parts of the district.

To ensure balanced and sustainable growth, Nashik needs better planning that supports both urban management and rural upliftment. Investing in rural infrastructure, creating local jobs, promoting agro-based industries, and improving connectivity can help reduce forced migration. At the same time, cities need more thoughtful, greener planning with stronger services, especially in areas facing urban stress.

This study highlights that geography, economy, and society are all tied together in shaping Nashik's population trends. With the right policies and people-centered development, the district has the potential to grow more evenly, benefiting all its regions and communities.

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Need of proper utilisation of Family Resources through Home Management for Environmental Sustainability

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Abstract :

Homemakers play a significant role in managing resources within a household. This roles involves various responsibilities that contribute to the well being and efficiency of the family. Effective home management involves the proper utilization of family resources to achieve goals, ensure well being, and promote harmony among family member. Homemaker play a vital role in managing household resources efficiently and contributing to environmental conservation. Some practices for proper utilization of water, electricity, avoiding food wastage, managing domestic waste and maintaining indoor and outdoor plants for environment conservation should be properly followed by all the homemakers in society. It is a need of present days where population is increasing day by day and how the resources which are limited will full fill the need of all individuals. So and attempt is made through this paper to focus on such issues and make the homemakers aware about proper utilization of family resources through home management to conserve environment sustainability.

Keywords: Family resources, Home, Management, Environment Sustainability, Homemakers.

Introduction :

Environment sustainability focuses on managing resources like water ,air ,land and energy in a way that does not cause irreversible damage. Emphasizes the idea that current actions should not negativity impact the ability of future generations to enjoy a healthy environment and access the resources they need. People should find a balance between environmental protection, economic development and social well being.

Protecting ecosystems is essential this includes preserving biodiversity,maintaining the health of forests, oceans and other ecosystems.

Conserving resources involves using resources like water energy and raw material efficiently and finding alternatives where a possible.

Reducing pollution includes minimizing pollution of air, water and land through various measures like redming emissions, promoting recycling and using cleaner technology.

Promoting renewable resources : use of solar cooking and solar electricity generation and solar water heater by households.

Circular economy: designing products and systems that minimize the use of resources through recycling and reuse.

Taking into consideration all these aspects present paper is written with following objectives.

objectives –

- 1) To make aware homemaker about proper utilization of family resources.
- 2) To find out ways to improve environment sustainability at domestic level.

Methodology : present paper is based on data collected through books, journals and internet. Key aspects taken into consideration are homemakers, management of family resources, homemaker contribution in environment conservation.

Discussion : proper utilization of family resources : family resources as means which are available and recognized for their potential in meeting demand , in another word useful and available means to achieve family goals and satisfy needs are called family resources.

Home economics seminar at French league Indiana, July 1961 progress report available from College of Home Economics Mich State University P-33. Given classification of family resources as human and non human resources.

Human resources refers to those qualities of a human being which are invisible, which are potential available in humans,for example skill abilities, time and efforts, interest, knowledge and attitude.

Human resources : are crucial for achieving **family goal**, managing household task and supporting each other. The skills time and efforts of family members contribute to the overall **well- being and support** within the family. Human resources within family can faster personal development and growth of members through shared responsibilities and learning. Management of human resources in a family needs effective communication, division of responsibilities i.e. distributing task based on skills, interests and availability. Encouraging support

and cooperation among family members is essential for effective utilisation of human resources. So that families can enhance their functioning and promote the well being of their members.

Non human resources: refers to all the resources available to an individual, organization or family that are not human. These includes physical resources tangible assets like equipment, machinery buildings, vehicles and household items.

Financial resources: . Such as money investments saving and other monetary assets.

Natural resources: resources from the environment like water, land ,minerals and other natural assets.

Technological resources: includes tools, software, systems and other technology assets that support operations and goals. Non human resources are important to support operations goals and activities of individuals families or organizations. It also enhance efficiency and productivity and it contributes to achieving various goals of personal family or organisation .

Non human resources management should be done by allocating resources based on needs and priorities. It should be maintained to ensure their longevity and effectiveness. Non human resources should be used efficiently to minimize waste and maximize efforts.

Improving environment sustainability at domestic level : Environment sustainability means using natural resources responsively to meet present needs without compromising the ability of future generations to meet their own needs. It involve balancing ecological economic and social goals to ensure a healthy and resilient environment for the long term.

Environment sustainability focuses on managing resources like water,air land and energy in a way that does not deplete them or cause irreversible damage. It emphasizes the intergenerational equity -the idea that current actions should not negatively impact the ability of future generation to enjoy a healthy environment and axis the resources they need. It is not just about conservation but also about finding a balance between environmental protection, economic development and social well being. Key aspects for **protecting ecosystems** include preserving biodiversity,maintaining health of forest ,oceans and other ecosystems.

Conserving resources involves adequate use of resources like water energy and raw material efficiently and finding alternative where possible. Reducing pollution includes minimising pollution of air water and land through various majors like reducing emissions promoting recycling and using cleaner technologies. Promoting renewable resources by using solar energy. Sustainable practices should be implemented in agriculture forestry other industries and through homes to minimize environment and impact. Practices that should be implemented through homes to minimize environment pollution and to conserve environment are-

1. **Adequate use of Water:** for wedding washing vessels and close and for cleaning vehicles and other household cleaning .proper maintenance of water leakage is important to save water.
2. **Use of Solar Energy:** for cooking solar energy should be used solar cookers solar dryers etc solar water heaters solar plants for renewable source of electricity should be made compulsory for all homes.
3. Awarding food wastage by preparing adequate means by using refrigerators to store leftover food milk curd vegetables and fruits.
4. Good habits for saving electricity: should be followed use electricity when ever necessary switch off the fans and lights where it is not required. Use washing machine alternate day or when adequate clothes can be loaded.
5. Save water by using minimum washing powder for washing clothes and minimum soap for utensils. Excessive use of soap and detergents need more water.
6. Distribute excessive food to nidhivan.
7. Sort clothes regularly distribute not required clothes to need even and keep home clean and neat.
8. Do planting for home indoor and outdoor, it will improve aesthetic view of home as well as provide oxygen rich zone.
9. Prepair compost from domestic waste: fruit peels,vegetable peels, leftover food use of plants etc can be utilised. Which will keep clean surroundings and support organic kitchen garden.
10. Develop terrace garden based on organic compost which will promote good health.
11. Seed collection and seed ball preparation and plantation in forest and kitchen garden. which ever fruits and vegetables are at home do not throw seeds. Collect seed regularly, and make a seed Bank. Prepare seed ball and throw in forest while doing journey.
12. Use proper West management practices at home segregate weight and dry does beans empty dustbins regularly support recycling of plastic waste by proper disposal.
13. Use cloth bags instead of plastic carry bags, avoid use of non recycling plastic bags.

14. Use public transportation where our necessary, share vehicles to avoid air pollution wastage of fuels and for traffic control and reduce risk of accidents.
15. Promote cycle day once in a week to prevent air pollution. Promote use of electronic vehicles.
16. Avoid excessive shopping: repair a list of required things and stick on to that much shopping. It prevents excessive shopping and wastage of money.

Conclusion :

Proper utilisation of family resources through effective home management is a crucial for achieving family goals, enhancing will be and promoting harmony among family member. By implementing strategies like water conservation electricity saving reducing food waste managing domestic waste and maintaining plants, households can contribute to environmental sustainability. By adopting such practices, how source can play a significant role in promoting environmental sustainability and contributing to a healthier planet.

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Studies on the origin of V_{oc} in OSCs

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Abstract:

This work reveals the fundamental and applied facets about the origin of V_{oc} in OSCs. In this Paper the factors which has influence to determine V_{oc} in OSCs is studied. It establishes the detection of V_{bi} in OSCs by way of intersection point of dark and illuminated J - V characteristics and it relates V_{oc} to V_{bi} which can be modulated with the variation in temperature, illumination intensity and thickness of active layer. These findings have been interpreted in term of bend bending. V_{oc} plays an important role in determination in efficiency of solar cells.

1. Introduction:

Along with the photon-produced current, the overall efficiency of a PV device depends critically on the V_{oc} (photo-voltage). V_{oc} was thought to be determined, as in case of inorganic PV devices, by the difference in the work function of the two electrodes used to make a device [1]. However, in OSCs devices it depends on the band gap of organic materials used in the preparation of the device. The value of V_{oc} is generally decreased in devices employing materials with smaller band gaps, as is the case with inorganic semiconductors. In case of organic semiconductors recent studies have shown a relation between V_{oc} and the difference between the HOMO of the donor and the LUMO of the acceptor used in both planar hetero-junction [2] as well as bulk-hetero-junction [3] solar cells. However, a better understanding of the materials processes, particularly those in layer-to-layer interfaces, that determines the V_{oc} in organic solar cells is critical and remains the subject of active research. Thus, the physical understanding and optimization of V_{oc} plays an important role to increase solar cell efficiency.

V_{oc} in OSCs has been observed to vary with different physical parameters and the behaviour of variation is somewhat different from that in inorganic PV's. We did carry out the experiments to see the exact behaviour of V_{oc} with variation of different parameters. For this purpose, we studied the variation of V_{oc} with illumination intensity, temperature and active layer thickness. There are number of models present in the literature for V_{oc} in OSCs but none of them could explain exactly its variations with different physical parameters. To understand the origin of V_{oc} in OSCs we first differentiate the inorganic and organic solar cells and then discuss about the factors affecting V_{oc} in OSCs and give their interpretation theoretically.

2. Organic vs inorganic photovoltaic cells in respect of V_{oc} :

Organic semiconductors differ from classical crystalline inorganic semiconductors (e.g., silicon) in many fundamental aspects. The mobilities of organic semiconductors are several orders of magnitude less than those found in crystalline inorganic semiconductors [9]. Another difference is the charge generation mechanism. Carrier generation and separation in Inorganic PVs is a multistep process. Light absorption in the Inorganic PVs leads directly to the production of electron- hole pairs together in the same material. Gregg *et al.* studies the charge carrier generation in organic and inorganic solar cells [5]. The photo-induced chemical potential energy gradient $\nabla\mu_{hv}$ (represented by arrows in Fig.1 (a)) drives both carrier types in the same direction (although it has a greater influence on minority carriers).

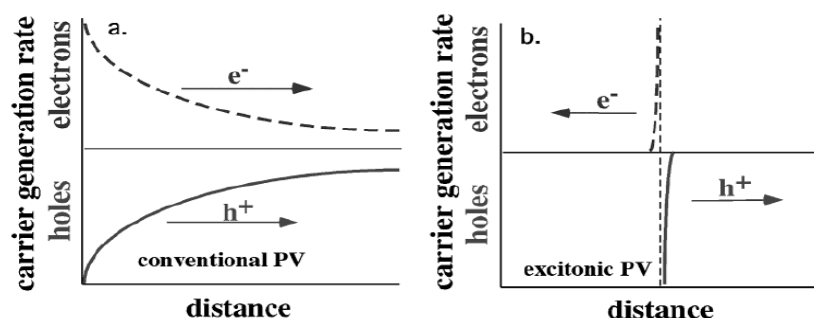


Fig.1. An illustration of the fundamental difference in charge carrier-generation mechanisms in (a) conventional and in (b) excitonic solar cells.

Therefore, electron can be separated efficiently from holes in inorganic solar cells only by the action of the electrical potential–energy gradient, more commonly known as equilibrium electrical potential energy difference across the cell, or band bending Φ_{bi} . In contrast to Inorganic PVs $\nabla\mu_{hv}$ in OSCs, electrons are photo-generated in one phase while holes are generated in the other via interfacial exciton dissociation (the phase boundary is denoted by the vertical dashed line). Carrier generation is simultaneous to, and identical with, carrier separation across the interface, μ_{hv} therefore drives electrons and holes in opposite directions away from the exciton dissociating interface [Fig.1(b)], thus separating them further. In most cases μ_{hv} compliments the effects of Φ_{bi} in Inorganic PVs. This leads to different limitations on the V_{oc} in inorganic PV and OSCs [5].

3. Experimental Details:

The investigations were carried out on optimized Pc/C₆₀ based devices viz. Device in configuration ITO/CuPc/C₆₀/BPhen/Al and ITO/ZnPc/C₆₀/BPhen/Al. The devices were illuminated with a tungsten-halogen lamp at 200 mW/cm². Neutral density filters with different optical densities (ODs) were used to vary the incident illumination intensity. To investigate the effect of temperature on V_{oc} the devices were transferred to home-made cryostat, where the samples were placed on a copper block, cooled with liquid nitrogen. The devices were cooled to different temperatures with simultaneous illumination at different intensities.

4. Effect of active layer thickness:

Thickness of active layer is a important factor which has effect on V_{oc} in OSCs. We have investigated the effect of active layer thickness on V_{oc} in the devices exhibiting the configuration similar to that of ITO/CuPc/C₆₀/BPhen/Al and ITO/ZnPc/C₆₀/BPhen/Al, where thickness of CuPc, ZnPc and C₆₀ were varied to investigate the effect on V_{oc} . The results are shown in **Table 1** and **2**. It is observed that V_{oc} decreases as device thickness increases. For the device based on CuPc and C₆₀ when thickness of CuPc (X') and C₆₀ (Y') were changed a change in V_{oc} was observed. For these devices the V_{oc} was observed to reduce with the increment in the total thickness of the active layer. Similar effects were observed for devices based on ZnPc and C₆₀. When the thickness of ZnPc (X nm) was increased from 20 to 25 nm, V_{oc} reduced from 0.56 to 0.48 V. When thickness of C₆₀ (Y nm) was increased beyond 40 nm and results were quite consistent with those for variation in ZnPc. The important observation is the variation of V_{oc} with active layer thickness with the same donor and acceptor materials. Though the HOMO levels of ZnPc and CuPc are almost the same [6] still ZnPc/C₆₀ devices exhibited more V_{oc} compared to that of CuPc/C₆₀ devices even at the same thickness of the active layer. Therefore, there are other factors which control V_{oc} in these devices. The low V_{oc} in CuPc/C₆₀ devices could be attributed to the low absorption coefficient of CuPc compared to that of ZnPc [7].

Table.1. Performance of Device [ITO/CuPc(X' nm)/C₆₀(Y' nm)/BPhen(8nm)/Al(150nm)] under tungsten halogen lamp irradiance of 80 mW/cm². Here X' and Y' have been varied.

X' (nm)	20	25	25
Y' (nm)	40	40	45
$X'+Y'$ (nm)	60	65	70
V_{oc} (V)	0.35	0.31	0.29

Table.2. Performance of Device [ITO/ZnPc(X nm)/C₆₀(Y nm)/BPhen(8nm)/Al(150nm)] under tungsten halogen lamp irradiance of 80 mW/cm². Here X and Y have been varied.

X (nm)	20	22	25	27	25	25
Y (nm)	40	40	40	40	37	43
$X+Y$ (nm)	60	62	65	67	62	68

V_{oc} (V)	0.56	0.50	0.48	0.46	0.50	0.42

The effect of thickness of the active layer on the V_{bi} has been shown in the Fig 2. V_{bi} shows a nonlinear dependence on the active layer thickness.

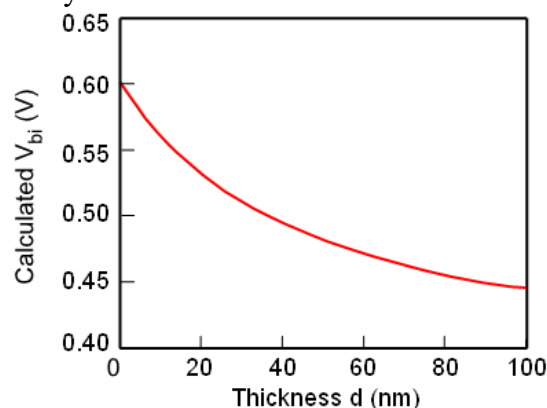


Fig.2. The variation of calculated V_{bi} with thickness of the semiconductor.

Since the incorporation of an optimized thickness of an exciton blocking layer provides an Ohmic contact to the electron injection [8] therefore in the present cases the electron injecting contact may be assumed to be Ohmic and the results of Fig.2 will be applicable to the device studied above. Fig.3. shows the variation of V_{oc} with the active layer thickness for devices based on both the CuPc and ZnPc. Symbols represent the experimental data whereas the solid curves have just been plotted to guide the eyes about the trend of variation of V_{oc} . For both kinds of devices V_{oc} has been observed to increase nonlinearly with the reduction of the active layer thickness. These observations are the clear evidence that V_{oc} in the present OSCs is controlled by V_{bi} . Since the variation of active layer thickness leads to the variation in V_{bi} , these results give strong support to the hypothesis that V_{bi} controls V_{oc} in these devices. The reduction in the V_{oc} can be attributed to the reduction in V_{bi} due to increment in the total thickness of the active layer [9].

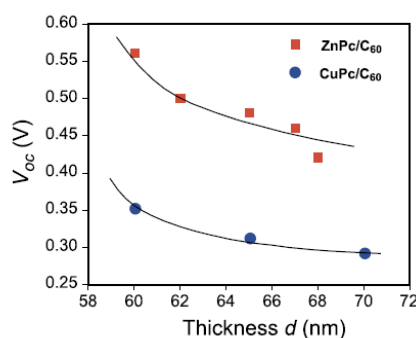


Fig.3. The variation of V_{oc} with the active layer thickness.

5. Conclusion:

Active layer architecture is primary part for V_{oc} determination. In single layer or blend device charge carriers are generated in single layer so electrical potential gradient plays major role in V_{oc} .

In double layer cell charge carriers are generated in different layers and they are driven by chemical potential gradient. Electrode's nature (either they are forming ohmic or Schottky contact with organic layer) is another important factor. In Schottky contact, electrode work function is dominant and in ohmic contact, interface between donor and acceptor is the dominant factor. Besides this the other factors that are also important are electrode modification, interface layers, magnitude of dark current and nature of organic materials.

It is observed that with reduction in temperature V_{oc} increases and illumination intensity have proportional effect on V_{oc} . The device thickness has negative effect on V_{oc} . For clearer picture about the factors affecting V_{oc} in OSCs, further R&D is required to give another dimension for the future for OSCs.

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Ishar Singh Majhail : A voice of Resistance in Colonial India

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Abstract

Ishar Singh Majhail was born in January 1901 in Sarai Amanat Khan, Amritsar. He was profoundly influenced by his mother's deep religious devotion. Despite facing financial hardships, he successfully completed his high school education. Rejecting a teaching career, he instead chose to dedicate himself to the Gurdwara Reform Movement, challenging the corrupt control of Gurdwaras by mahants. His activism led to his arrest during the Guru Ka Bagh Morcha in 1922 and again during the Jaito Morcha in 1924, resulting in several stints in prison. Through his work with the Akali Dal, he played a crucial role in the peasant movement, advocating for the formation of Kisan Sabhas to strengthen the position of Sikh farmers. Throughout the 1930s, he led numerous protests against British policies that harmed agricultural communities, enduring repeated imprisonments for his efforts. Ishar Singh Majhail aligned himself with the Indian National Congress while remaining deeply committed to Sikh causes. He took part in major events such as the Akali Conference of 1938 and the Sixth All India Akali Conference in 1945, where he strongly opposed the creation of Pakistan and championed Sikh rights. As communal tensions escalated in 1947, Ishar Singh Majhail, along with other Sikh leaders, called for Sikh autonomy and helped organize the Akal Fauj to defend the community against violence. His inspiring leadership and powerful oratory greatly influenced the Sikh population, rallying them to safeguard their interests during the tumultuous partition of India.

Keywords: Akhand Path, Abayana, Akal Fauj, Gurdwara, Guru ka Bagh, Jatha, Jathedar, Kisan, Majha, Mahant, Mamla, Morcha, Panthak, Sabha, Zamindar.

Ishar Singh Majhail was born in January 1901 in the village of Sarai Amanat Khan, located in the Amritsar district. His father, Assa Singh, had migrated to Java (Indonesia) in search of better employment opportunities, where he eventually passed away. His mother, Basant Kaur, a devoutly religious woman with deep faith in Gurbani, took full responsibility for his upbringing.¹ He was also profoundly influenced by her spiritual devotion. Despite facing financial hardships, he successfully completed his high school education, graduating from Malva Khalsa High School in Ludhiana in 1922.² After finishing his studies, he was offered a teaching position in Kokari Kalan, District Ferozepur.³ However, his involvement in the Indian freedom struggle was soon inspired by the Gurdwara Reform Movement, which sought to liberate Sikh religious institutions from corruption and non-Sikh influences.⁴ Motivated by a strong commitment to Sikh principles, he aligned himself with the Shiromani Akali Dal and resigned from his teaching post to dedicate himself fully to the movement. His deep faith in Sikhism made him acutely sensitive to the injustices prevalent in the Gurdwaras. The erosion of Sikh *Gur-Maryada*, the incorporation of non-Sikh rituals, and the immoral conduct of mahants and priests had turned many Gurdwaras into centers of corruption.⁵ Mahants often treated Gurdwara properties as personal assets, selling off land and using the proceeds for their own benefit. This widespread abuse deeply alarmed the Sikh community and prompted urgent calls for reform. So, Ishar Singh Majhail declined the job offer to participate in the Gurdwara Reform Movement.⁶

Initially, the British government did not actively suppress the Gurdwara Reform Movement, hoping it would divert Sikh attention away from the broader Non-Cooperation Movement. However, the Nankana Sahib tragedy, marked by brutal violence against Sikh reformists, severely strained the already fragile relationship

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¹ Giani Partap Singh, *Akali Lehar de Mahan Neta*, Amritsar, 1976, p. 301.

² Balbir Singh, Gursharan Singh, Oral interview no. 84, Ishar Singh Majhail, 28 August 1976, Oral History Cell, Punjab Historical Studies Department, Punjabi University, Patiala, p. 1.

³ Balbir Singh, Gursharan Singh, Oral interview no. 84, Ishar Singh Majhail, 28 August 1976, p. 1.

⁴ K. L. Tuteja, *The Shiromani Gurdwara Parbandhak Committee and The First Non-co-operation Movement 1920-22*, Punjab History Conference Proceedings Tenth Session, Punjabi University, Patiala, February 28-29, 1976, pp. 249-250.

⁵ Partap Singh Giani, *Akali Lehar de Mahan Neta*, Amritsar, 1976, p. 302.

⁶ Sadhu Singh Hamdard, *Abhinandan Granth Ishar Singh Majhail*, January 5, 1997, p. 42.

between the Sikhs and the British. In response, the British authorities began arresting and repressing Akali activists. These developments had a profound impact on Ishar Singh Majhail.⁷ Along with associates such as Udham Singh Nagoke, Darshan Singh Pherumaan, Jathedar Mohan Singh Nagoke, and Jathedar Sohan Singh Jalal Usman, he helped form the Guru Teg Bahadur Akali Jatha to support the Akali movement and encourage wider Sikh participation.⁸

Ishar Singh Majhail played an active role in the Guru Ka Bagh⁹ agitation of 1922. The protest began after five Akalis were arrested for cutting wood from a dry kikar tree intended for the Gurdwara kitchen, an unjust act that outraged the Sikh community. In response, large numbers of Akalis gathered at Guru Ka Bagh, where Majhail was arrested for the first time and sentenced to six months in prison for his involvement. Following his release, he joined the Jaito Morcha of 1924, another pivotal moment in the Gurdwara Reform Movement. The Jaito Morcha was launched to demand the reinstatement of Maharaja Ripudaman Singh of Nabha¹⁰, who had been forced to abdicate by the British due to his support for the Akalis and the Guru Ka Bagh agitation. The Shiromani Gurdwara Parbandhak Committee called for the observance of Nabha Day, sparking widespread unrest.¹¹ In retaliation, Punjab police attacked the Gurdwara and interrupted the recitation of the Guru Granth Sahib. In response, Shiromani Gurdwara Parbandhak Committee sent jathas of Sikhs to continue the *Akhand Path* (unbroken recitation of Guru Granth Sahib), during which Ishar Singh Majhail was again arrested and sentenced to two years in prison.¹² Despite enduring brutal hardships and harsh prison conditions, Ishar Singh Majhail's dedication to the cause remained unshaken.¹³

In 1929, under the leadership of Ishar Singh Majhail and his associates, a settlement committee was formed in Amritsar.¹⁴ The committee's main focus was opposing the government's plan to increase revenue demands from Punjab's farmers. To resist this move, they launched a campaign to raise awareness among farmers about their rights and to mobilize them against the proposed taxation. During the course of the agitation, prominent activist Udham Singh Nagoke was arrested and sentenced to one year in prison, which further galvanized the movement.¹⁵ Ishar Singh Majhail and other leaders intensified their efforts, ultimately forcing the government to reconsider its revenue policies.¹⁶ Through their relentless activism, Ishar Singh and the farming community achieved significant reforms.

At the same time, the Akali leadership recognized the urgent need to organize their own Kisan Sabhas (farmers' associations). Leaders like Ishar Singh Majhail, Udham Singh Nagoke, Darshan Singh Pheruman, Pratap Singh Kairon, and Sohan Singh Jalal Usman championed the idea that Kisan Sabhas could consolidate political power among Sikh peasants and curb the spread of communist ideology.¹⁷ They called for the

⁷ *Shiromani Akali Dal Amritsar, Parran Pattar Udham Singh, File no. 289, Ganda Singh Collection, Punjabi University, Patiala.*

⁸ Raghbir Singh Teer, *Majha Darshan (Panorama of Majha)*, Jalandhar, 2010, p. 183.

⁹ In Guru ka Bagh, there are two shrines—one commemorates Guru Arjun's visit in 1585, while the other is associated with Guru Tegh Bahadur's visit in 1664. Directly in front of Guru Tegh Bahadur's shrine stood the residence of the mahant responsible for overseeing both shrines. Next to this residence and shrine was a garden plot that spanned an area of approximately seven acres. A. Sundaram, *Guru Ka Bagh Satyagrah*, Amritsar, 1923, pp. ix, x.

¹⁰ Ripudaman Singh, the Maharaja of Nabha, was sympathetic to the Akali movement. Following the martyrdom of the Sikhs at Nankana Sahib, Nabha was the only Sikh princely state that observed the day of martyrdom in solidarity with the wider Sikh community. This gesture displeased the British government, which was already wary of Maharaja Ripudaman Singh's accession to the throne. Eager to remove him from power, the government found its opportunity when Maharaja Bhupinder Singh of Patiala lodged a complaint regarding a boundary dispute with the Nabha state. The matter was referred to a British court of inquiry, and a committee headed by Sir John Stuart, a judge of the Allahabad High Court, was appointed to investigate. The committee ruled against the Maharaja of Nabha, demanding that he step down or face a public trial. Facing pressure, Maharaja Ripudaman Singh chose to abdicate. Following his abdication, the British government sent him to Dehradun and allotted him an annual allowance of three lakh rupees., *The Jaito Morcha- 1923* by Dr. Bakhshish Singh Nijjar, File no. 192, Ganda Singh Collection, Punjabi University, Patiala, pp.1, 2.

¹¹ Mohinder Singh, *The Akali Movement*, Punjabi University, Patiala, 2015, pp. 4-5.

¹² *Akali te Pardesi*, Amritsar, October 4, 1923, p.3.

¹³ Partap Singh Giani, *Akali Lehar de Mahan Neta*, p. 303.

¹⁴ Ram Singh Majitha, *Amritsar De Jujhar Jodhe*, Amritsar, 1984, p. 205.

¹⁵ Giani Partap Singh, *Akali Lehar de Mahan Neta*, Amritsar, 1976, pp. 151-152.

¹⁶ Balbir Singh, Gursharan Singh, Oral interview no. 84, Ishar Singh Majhail, 28 August 1976, Oral History Cell, Punjab Historical Studies Department, Punjabi University, Patiala, pp. 4-5.

¹⁷ Kirpal Singh and Balbir Singh, Oral Interview, May 5, 1976, *Jathedar Sohan Singh Jalalusman*, Oral History Cell, Punjab Historical Studies Department, Punjabi University Patiala, pp. 3-4.

establishment of a provincial Kisan Sabha along with a working committee to guide its activities.¹⁸ The objectives of the Kisan Sabha program included encouraging Sikh youth to join these assemblies, founding educational institutions, and running orientation programs during the summer under the guidance of nationalist educators. Through these initiatives, Ishar Singh Majhail and his colleagues not only addressed the immediate grievances regarding revenue but also laid the foundation for long-term political organization and educational upliftment within the Sikh farming community.

The Civil Disobedience Movement, launched by Mahatma Gandhi in 1930, began with the historic Dandi March on March 12, covering a distance of 200 kilometres.¹⁹ This movement called for the boycott of the Legislative Assembly and foreign goods, including imported clothing.²⁰ The Sikh leadership also took an active part in the struggle, with prominent leaders like Ishar Singh Majhail, Udham Singh Nagoke, Darshan Singh Pheruman, Giani Gurmukh Singh Musafir, Gopal Singh Qaumi, Pratap Singh Kairon, Babu Labh Singh Jalandhari, and Master Kabal Singh making significant contributions. Amritsar, being the largest hub for foreign goods in Punjab, became a focal point of resistance during the movement. In the early 1930s, strict efforts were made to halt the export of raw materials, and picketing activities were only permitted under the banner of the Indian National Congress.²¹ Ishar Singh Majhail and his fellow activists played a key role in these efforts by positioning themselves in Amritsar's marketplaces where foreign merchandise was sold.²² They actively promoted the use of indigenous goods, unwrapping bales of locally produced products while preventing the sale of imported items. Their commitment greatly strengthened the boycott of foreign goods and bolstered the movement's objective of economic self-reliance. Throughout the campaign, Ishar Singh Majhail and other leaders delivered powerful speeches to inspire public participation, making passionate appeals for mass involvement in the Civil Disobedience Movement.²³

Ishar Singh Majhail and his comrades organized numerous protests across various cities in Punjab to oppose the new land settlement policies. One of the most significant events took place on August 15, 1937, when a major farmers' conference was held in the village of Naurangabad in Amritsar district.²⁴ Key figures from the Kisan movement, including Ishar Singh Majhail, Udham Singh Nagoke, Pratap Singh (M.L.A.), Dr. Atma Singh of Tarn Taran, Baba Jawala Singh, Mr. Jamaluddin, and Mangal Singh, addressed the gathering and spoke out strongly against the new settlement system.²⁵ They called for the creation of anti-settlement committees throughout Punjab to resist the British-imposed policies. At this conference, Ishar Singh Majhail played a prominent role by delivering a compelling speech, reinforcing the significance of the event and the movement. His address contributed meaningfully to the collective protest, inspiring farmers to unite and take a stand against the unjust policies. During the conference, the Akali leaders presented three key resolutions:

1. The Mamla (an annual tax on cultivated land) should be collected from farmers in a manner similar to income tax.
2. Primary education should be made compulsory.
3. Bribery must be eliminated.

Ajit Singh, the Sub-Registrar and President of the Rural Reform Committee, expressed his approval of these resolutions. He acknowledged that the rising Mamla tax had worsened the plight of farmers and that adopting an income-tax-like system could help prevent further increases. Ishar Singh Majhail and his fellow activists aimed to raise awareness of farmers' rights and foster unity to challenge oppressive British policies. In his speech, Ishar Singh Majhail emphasized the vital role of education in empowering people to understand and oppose injustice.²⁶ He also condemned bribery as a corrupting force within the system, obstructing genuine reform. Furthermore, he criticized the Rural Reform Committee for failing to take meaningful action and urged farmers to come together in solidarity, asserting that only collective effort could secure their rights and bring about lasting change.

¹⁸ Joginder Singh, *Sikh Leadership Early 20th Century*, Guru Nanak Dev University, Amritsar, 1999, p. 338.

¹⁹ Srilata Chatterjee, *Congress Politics in Bengal 1919-1939*, London, 2002, p. 12.

²⁰ *Asli Kaumi Dard*, Amritsar, April 6, 1930.

²¹ *Asli Kaumi Dard*, Amritsar, January 17, 1930.

²² D.R. Grover, *Civil Disobedience Movement in the Punjab (1930-1934)*, B.R. Publishing Corporation, Delhi, 1987, p. 48.

²³ Srilata Chatterjee, *Congress Politics in Bengal 1919-1939*, p. 151.

²⁴ *Akali Patrika*, Lahore, August 16, 1937.

²⁵ *Ibid.*

²⁶ *Akali Patrika*, Lahore, August 16, 1937.

On October 22, 1938, an Akali Conference was held in Plasaur, located in the Lyallpur district, under the leadership of Ishar Singh Majhail.²⁷ The conference was convened to protest the lathi-charge and subsequent imprisonment of Udham Singh Nagoke and his fellow activists during a July 20 demonstration advocating for the rights of impoverished farmers.²⁸ The violent crackdown had been carried out by the government of Sir Sikandar Hayat. Presiding over the conference, Ishar Singh Majhail played a key role in guiding the discussions and setting the agenda. Under his leadership, the Shiromani Akali Dal strongly condemned the coalition ministry formed by the Punjab Muslim League and the Khalsa Nationalist Party, criticizing the latter's alliance as a betrayal of Sikh interests and values.

The conference also addressed the worsening agricultural crisis, triggered by failed rains and reduced canal irrigation, which had led to a sharp decline in Kharif crop yields, particularly affecting Desi cotton. Ishar Singh Majhail voiced the demand that half of the revenue on Kharif crops and the entire revenue on Desi cotton be waived to alleviate the burden on farmers.²⁹ He also expressed solidarity with the farmers of Zail Dabanwala, Zail Rajyana, and Toba, whose crops had been devastated by hailstorms. Ishar Singh Majhail urged the Punjab government to waive the *Abiyana* (water rate) for these affected villages and to provide financial relief from government funds to help them recover and remain in their homes. Additionally, he appealed to the canal department to avoid blocking irrigation canals in October and November, warning that such actions would severely impact the Rabi crop season. Through his leadership at the conference, Ishar Singh Majhail reaffirmed his commitment to championing the rights and welfare of Punjab's farmers.

On June 22, 1940, a one-day Akali Conference was held at Wadali Guru, about six miles from Amritsar, in conjunction with the annual Mela commemorating the birth anniversary of Guru Hargobind, the sixth Sikh Guru. The conference was attended by Ishar Singh Majhail along with prominent associates such as Udham Singh Nagoke, Santa Singh Sultanwind, Banta Singh, Giani Kartar Singh, Giani Khan Singh, and others. During the event, they delivered powerful speeches strongly opposing the Pakistan scheme, asserting that the Sikh community would never accept its implementation as it posed a serious threat to the unity and integrity of India. The conference concluded with the unanimous passage of a resolution rejecting the Pakistan proposal.³⁰

Beyond this political stance, Ishar Singh Majhail and his colleagues used the platform to call upon Sikh youth to actively join the Indian freedom struggle. They emphasized the vital role that young Sikhs had to play in achieving independence and resisting British colonial rule. Ishar Singh Majhail stressed the importance of unity and collective action, encouraging the youth to engage in non-violent resistance and to stand in solidarity with other Indian communities in the common pursuit of a free and united India. This appeal was intended to ignite a spirit of patriotism and responsibility among the younger generation, urging them to contribute meaningfully to the national movement.³¹

The Sixth All India Akali Conference was held on September 29, 30, and October 1, 1945, in Ranjit Nagar, a newly founded township located about two miles west of Gujranwala. Ishar Singh Majhail took charge of organizing the event, with support from other committee members such as Sohan Singh Jalal Usman, Teja Singh Akarpuri, and Amar Singh, who managed the logistical arrangements. Delegations of men and women from Patiala and Amritsar, along with approximately 1,000 students from various colleges and regions across the country, came to participate.

On the second day of the conference, September 30, prominent leaders, including Ishar Singh Majhail, Udham Singh Nagoke, Master Tara Singh, Kartar Singh Lyallpuri, Baldev Singh, Darshan Singh Pheruman, and Ajit Singh, delivered impactful speeches.³² In his address, Ishar Singh Majhail emphasized the urgent need

²⁷ Ajeet Javed, *Left Politics in Punjab 1935-47*, Delhi, 1988, p. 120.

²⁸ On July 4, 1938, farmers observed "Canal Day" as a protest against the canal department, led by Ishar Singh Majhail and other leaders, who closed the *moghas* (canal outlets) of the Sabrao Branch. The immediate trigger was the reconstruction of outlets at the Raya distributaries, which reduced the water supply while keeping the rates unchanged. On July 20, around 30,000 farmers gathered at Jallianwala Bagh and marched to the District Court under the leadership of Baba Sohan Singh Bhakna and Udham Singh Nagoke. Near Hall Bazar, Deputy Commissioner McDonald, accompanied by 100 constables, ordered a lathi charge after the crowd ignored warnings. The brutal attack left many unconscious; Udham Singh Nagoke suffered a severe eye injury, and around 300 protesters, including Sohan Singh Josh, were seriously injured. *The Tribune*, Lahore July 20, 1938. Also see *Akali*, Lahore, October 23, 1938.

²⁹ *Akali*, Lahore, October 23, 1938.

³⁰ *The Tribune*, Lahore, January 31, 1940.

³¹ *Ibid.*

³² *Akali*, Lahore, October 1, 1945.

to achieve independence from British rule.³³ He insisted that any internal disputes regarding India's future should be resolved only after liberation, and firmly rejected the idea of creating Pakistan. Udham Singh Nagoke paid tribute to the sacrifices made by freedom fighters and called for the immediate release of Azad Hind Fauj (Indian National Army) prisoners. During the conference, Ishar Singh Majhail and other Akali leaders passed four key resolutions focused on national freedom and public welfare³⁴:

1. The Akali Dal would contest elections for the Legislative Assembly on the *Panthak* (religious) ticket in both central and provincial constituencies.
2. A demand was made for the release of Azad Hind Fauj prisoners.
3. It was resolved that the management of all Sikh religious institutions be transferred to the Sikh community.
4. A demand was raised for compensation from the British government for damages caused by excessive rains in regions like Jalandhar and Ludhiana.

At the time, the Indian National Congress advocated for a united India, while the Muslim League pushed for a separate Muslim nation, Pakistan, comprising the eastern and western Muslim-majority regions. In contrast, the Sikhs, a dispersed minority in Punjab, sought to secure and protect their homeland amidst rising communal tensions. Earlier legislations such as the Minto-Morley Act of 1909 introduced separate electorates for Muslims, and the Montagu-Chelmsford Reforms of 1919 extended this system to include Sikhs, Indian Christians, Anglo-Indians, and Europeans.³⁵ Although intended as a form of representation, these communal arrangements left the Sikhs with limited political influence and effectively marginalized their voice in national decision-making.³⁶

In response to the escalating political tension and the Cabinet Mission's proposal, the Sikhs organized a Joint All-Parties Sikh Conference on June 9 and 10, 1946, in Amritsar. The gathering brought together over a thousand Sikhs from various organizations, including key leaders such as Ishar Singh Majhail, Udham Singh Nagoke, Master Tara Singh, Giani Kartar Singh, and representatives from the Congress, Akali Dal, *Nirmale*, *Namdhari*, and *Nihang* factions.³⁷ These leaders came together to voice their opposition to the Cabinet Mission plan and the demand for Pakistan, which they viewed as a direct threat to Sikh interests.³⁸

Ishar Singh Majhail, a member of the Punjab Legislative Assembly, emphasized the need for readiness and sacrifice in protecting the Sikh community.³⁹ The conference firmly rejected the Cabinet Mission's recommendations, calling them unacceptable and dangerous to Sikh sovereignty and homeland.⁴⁰ To steer the community through this crisis, two significant bodies were established: an Action Council led by Colonel Niranjn Singh Gill of the Indian National Army, and the Pratinidhi Panthic Board, which would represent and manage Sikh affairs during this critical period.⁴¹ The conference unanimously condemned the Cabinet Mission's recommendations, arguing that any proposal failing to address Sikh demands or lacking their consent was unacceptable.⁴² The formation of the Action Council and the Pratinidhi Panthic Board underscored the Sikh community's resolve to defend its rights and religious heritage during a period of intense political uncertainty.⁴³

On January 30, 1947, a pivotal meeting of the Panthic Pratinidhi Board was held in Amritsar, bringing together key Akali Dal leaders such as Ishar Singh Majhail, Udham Singh Nagoke, Baldev Singh, Swaran Singh, Tara Singh, and Kartar Singh. A central topic of discussion was the proposal to establish a Hindu-Sikh state in regions where Muslims were a minority. As communal tensions escalated and the Muslim League intensified

³³ *Punjab*, Amritsar, October 9, 1945.

³⁴ *Akali*, Lahore, October 1, 1945.

³⁵ *Punjab*, Amritsar, October 9, 1945.

³⁶ *Akali*, Lahore, October 1, 1945.

³⁷ ³⁷ Gur Rattanpal Singh, *Illustrated History of the Punjab (1947-1978)*, Chandigarh, 1979, pp. 93-94.

³⁸ B.S. Danewalia, *Police and Politics in Twentieth Century Punjab*, Delhi, 1997, p. 91.

³⁹ Balbir Singh, Gursharan Singh, Oral interview, Ishar Singh Majhail, 28 August 1976, Oral History Cell, Punjab Historical Studies Department, Punjabi University, Patiala, p. 5.

⁴⁰ *Ibid.*

⁴¹ B.S. Danewalia, *Police and Politics in Twentieth Century Punjab*, p. 91.

⁴² Balbir Singh, Gursharan Singh, Oral interview, Ishar Singh Majhail, 28 August 1976, Oral History Cell, Punjab Historical Studies Department, Punjabi University, Patiala, p. 5.

⁴³ Gur Rattanpal Singh, *Illustrated History of the Punjab (1947-1978)*, p. 94.

its agitation against the Coalition Government, plans emerged in February to form a private Sikh army.⁴⁴ This initiative aimed to reorganize Sikh volunteers in preparation for possible conflict. This movement led to the creation of the Akal Fauj (Immortal Army), a Sikh volunteer force formed to safeguard community interests amid growing unrest.⁴⁵ Ishar Singh Majhail played a crucial role in its formation, travelling extensively across Punjab with his associates to rally support. The Sikh community responded enthusiastically, contributing manpower and resources to build the Akal Fauj into a strong defensive force.⁴⁶

During this turbulent time, marked by rising communal strife among Hindus, Muslims, and Sikhs, leaders like Ishar Singh Majhail, Udham Singh Nagoke, Master Tara Singh, and Giani Kartar Singh became vocal champions of Sikh autonomy in Punjab. Deeply concerned about the fate of Sikhs in the face of a looming partition, they advocated for securing Sikh-majority regions and asserted the need for a proactive approach to protect their people.⁴⁷ Their calls for establishing Sikh regiments and organizing resistance were rooted in fears of marginalization and the need to counter perceived threats from the Muslim League. Renowned for his powerful oratory, Ishar Singh Majhail used his speeches to stir public sentiment and rally support. Alongside leaders like Udham Singh Nagoke and Jathedar Mohan Singh Nagoke (then President of the Shiromani Gurdwara Parbandhak Committee), Ishar Singh Majhail organized numerous *Diwans* (religious and political gatherings) throughout Punjab, including prominent events like the *Amavas Fair* at Tarn Taran.⁴⁸ These gatherings were used as platforms to urge Sikhs to join the Akal Fauj and stand united in defence of their homeland and rights. The influence of these leaders was evident in the surge of Sikh volunteers joining the Akal Fauj. Their speeches had a profound impact, mobilizing the community and reinforcing a collective sense of urgency.⁴⁹

In the last week of February 1947, ten Akali Diwans were held, culminating in a significant annual conference at Bachhauri in the Hoshiarpur district on February 22 and 23. Ishar Singh Majhail attended the conference, delivering impassioned appeals to the Sikh community to unite and organize.⁵⁰ Soon after, on February 27, a crucial meeting was held in Amritsar, organized by the city and district Akali Jathas. Key speakers at the event included Ishar Singh Majhail, Udham Singh Nagoke, Swaran Singh, and Jathedar Mohan Singh. Their speeches emphasized the urgent need to enlist in the Akal Fauj, leaving a strong impression on the Sikh community and leading many to join the volunteer force, affirming their readiness to make sacrifices for their homeland.⁵¹ Meanwhile, on February 26, 1947, the Upper Bari Doab Circle Canal Committee convened another meeting, drawing an audience of approximately 3,000. Although the official agenda centred on the demand for increased irrigation water, speakers including Ishar Singh Majhail and Udham Singh Nagoke used the occasion to urge Sikhs to prepare for possible conflict with Pakistan and to stand ready to defend their homeland.

During this turbulent time, Sikh leaders such as Ishar Singh Majhail, Udham Singh Nagoke, Master Tara Singh, and Giani Kartar Singh conveyed a growing sense of urgency and determination. On March 4, 1947, a major rally was held in Amritsar, where Hindu speakers led by Keshab Chandra and Sikh leaders, including Ishar Singh Majhail, Udham Singh Nagoke, and Sohan Singh Jalal-Usman, addressed a crowd of over 20,000 people. Ishar Singh Majhail and Udham Singh Nagoke opened their speeches with repeated chants of “*Pakistan Murdabad*” and declared that Sikhs would not rest until the idea of Pakistan was eliminated from the minds of its advocates. They urged the audience to reaffirm their commitment to this cause before the Akal Takht on March 8, during the upcoming Hola Mohalla festival.⁵²

⁴⁴ Ali Raza, *Revolutionary Past: Communist Internationalism in Colonial India*, Cambridge University Press, 2020, p. 174.

⁴⁵ Ayesha Jalal, *Self and Sovereignty: Individual and Community in South Asia*, Routledge, 2002, p. 478.

⁴⁶ J.S. Grewal, *Master Tara Singh in Indian History Colonialism, Nationalism and the Politics of Sikh Identity*, Oxford University Press, New Delhi, 2017, p. 243.

⁴⁷ *The Tribune*, Lahore, January 31, 1941.

⁴⁸ Diljit Singh Pannu, *Jathedar Sohan Singh Jalalusman Abhinandan Granth*, p. 12.

⁴⁹ This momentum was acknowledged in a February 1947 fortnightly review by the Chief Secretary of Punjab, which stated: “*The Sikhs were continuing to advance their plans for the formation of the Akal Fauj and that, in doing so, in public and in private, the Sikh leaders were making no secret of the fact that this Sikh army was being formed to fight Muslim League aggression.*” Government of West Punjab, *Note on the Sikh Plan*, Lahore, 1948, p. 6.

⁵⁰ B.S. Danewalia, *Police and Politics in Twentieth Century Punjab*, p. 102.

⁵¹ Diljit Singh Pannu, *Jathedar Sohan Singh Jalalusman Abhinandan Granth*, Amritsar, June 2, 1974, pp. 12-13.

⁵² Government of West Punjab, *Note on the Sikh Plan*, pp. 8, 9.

The fall of Malik Khizr Hayat Tiwana's government on March 2, 1947, marked a turning point in Punjab's political landscape, triggering a wave of violence. Riots erupted in Lahore and Amritsar, quickly spreading across the Multan Division and other regions of Punjab. In this volatile climate, leaders such as Ishar Singh Majhail, Udham Singh Nagoke, Ujjal Singh, Swaran Singh, Master Tara Singh, Dalip Singh Kang, Giani Kartar Singh, and others vocally opposed the Governor's plan, rallying crowds with slogans like "Pakistan Murdabad" and "Sat Sri Akal." The plan of the Muslims, devised during a March 3 meeting of the Amritsar Muslim League's executive committee, aimed to systematically target Hindu and Sikh neighborhoods, expel residents, and cause widespread destruction. During this critical time, Ishar Singh Majhail and his associates continued organizing meetings and conferences to defend Sikh rights, though they remained unaware of the specific conspiracy unfolding.

On March 5, 1947, violence finally erupted. A public meeting had been announced by Akali leaders, including Ishar Singh Majhail and Udham Singh Nagoke, to oppose the Muslim League's demand for Pakistan in Punjab. As the leaders gathered at Chowk Moni for the rally, they were suddenly attacked by a mob of Muslim assailants hurling bricks and stones. In the chaos, a Sikh named Bhai Mangal Singh was killed, sparking outrage and fear among Amritsar's Hindu and Sikh communities. Simultaneously, Muslim groups erected barricades to seal off the city, preventing external support from reaching those under siege. In Hall Bazar, an area dominated by Hindu and Sikh-owned businesses, mobs looted and set fire to shops, turning the vibrant marketplace into a scene of devastation. By nightfall, numerous bodies of Sikh victims were brought to the government mortuary, though many remained unidentified due to the scale of the carnage.⁵³

At the time of the attack, Ishar Singh Majhail and Udham Singh Nagoke were at the Shiromani Akali Dal office. Upon receiving news of the violence, they, along with the Akal Fauj, rushed to Hall Bazar.⁵⁴ There, they confronted and drove out the attackers. When word arrived about similar violence in Chowk Farid, they quickly proceeded with their volunteers to restore order and protect the residents. That night, chaos engulfed the city as Muslim mobs set fire to Hindu and Sikh homes while chanting religious slogans. Gunfire echoed through Amritsar, intensifying the fear and destruction. On March 6, 1947, the Darbar Sahib Committee received reports that attackers had set fire to Roriya Wali Gali. In response, Ishar Singh Majhail and Udham Singh Nagoke went to Gurdwara Sri Ramsar and urged Jathedar Sohan Singh Jalal Usman to lead a group to the area. Upon reaching Washermen's Street, Jathedar Usman and his team were met with heavy resistance, including volleys of bricks and gunfire. They engaged the assailants in a fierce confrontation. When Udham Singh Nagoke received word that Jathedar Sohan Singh Jalal Usman had been injured, he swiftly mobilized his group and moved to the front lines to confront the attackers directly.

Afterwards, Ishar Singh Majhail and his companions received information that the Muslim League was planning an attack on the Darbar Sahib. Acting swiftly, they successfully thwarted the attempted assault.⁵⁵ Throughout the night of March 5 and the day of March 6, Ishar Singh Majhail, Udham Singh Nagoke, Master Tara Singh, Darshan Singh Pheruman, Sohan Singh Jalal Usman, and many other Sikhs risked their lives to protect the people of Amritsar and safeguard the Darbar Sahib. However, due to the absence of advance warning, the city still suffered significant loss of life and property.

Ishar Singh Majhail's life embodies the spirit of resilience, courage, and unwavering commitment to justice.⁵⁶ His dedicated involvement in the Gurdwara Reform Movement, active participation in peasant and agrarian struggles, and steadfast advocacy for Sikh rights during periods of communal unrest reflect his profound sense of duty to both his community and his country. Rising from humble beginnings, Ishar Singh Majhail emerged as a pivotal figure in various movements for religious and social transformation, consistently upholding the core values of Sikhism and the principle of selfless service. His leadership during key events, such as opposing the Cabinet Mission Plan, facilitating the formation of the Akal Fauj, and defending Amritsar during the communal violence of 1947, demonstrates his deep commitment to national unity and the preservation of Sikh identity. Through his impactful leadership, compelling oratory, and tireless activism, he inspired countless individuals to resist injustice, claim their rights, and strive for a society founded on fairness and dignity. Ishar Singh Majhail's legacy endures as a beacon for future generations, reminding us of the enduring power of compassion, courage, and unity in building a just and equitable world.⁵⁷

⁵³ Diljit Singh Pannu, *Jathedar Sohan Singh Jalalusman Abhinandan Granth*, p. 15.

⁵⁴ Giani Kartar Singh Kalas Walia, *Khooni Holiya*, Gurmat Sahit Bahwan, Amritsar, 1947, p. 48- 49.

⁵⁵ *Ibid*, pp. 54, 55.

⁵⁶ *Daily Vartman*, Amritsar, on April 26, 1948.

⁵⁷ *Daily Vartman*, Amritsar, on April 26, 1948.

The Common Challenges Feced by Rural Students in Developing English Communication Skills

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Abstract

Language shapes how we communicate, think, and understand the world around us. English, being one of the most widely spoken languages globally, plays a crucial role in India as a second language. Teaching English effectively at the primary level is vital because it lays the foundation for children's future learning and opportunities. This need is especially urgent in rural areas, where many children have little exposure to English outside the classroom.

Yet, in rural Maharashtra, the effort to teach English at the primary level faces many serious challenges. These arise from psychological barriers like fear or low confidence, language differences, institutional shortcomings, and unsupportive learning environments. Historical and economic inequalities worsen the situation, leading to limited access to resources and a shortage of well-trained English teachers. Many classrooms lack a positive atmosphere for learning, and teachers often feel unprepared to teach English effectively.

This research paper uses a case study approach to explore these challenges in detail. It identifies core issues such as insufficient resources, gaps in teacher training, and poor learning environments. More importantly, it proposes practical, realistic solutions to help rural schools create better conditions for English learning. By tackling these challenges and applying effective strategies, this study aims to improve English proficiency among children in rural areas, giving them stronger communication skills and greater educational and career opportunities.

Key Words: (ELT – English Language Teaching), Quality Education

Introduction

English is the dominant language of the internet, social media, and digital communication, making it crucial for online interactions and access to digital resources.

Many software applications, programming languages, and technical documentation are in English, requiring proficiency in the language for effective use and development. English language proficiency is often a requirement for studying abroad, participating in international exchange programs, and accessing online educational resources.

English is widely used as a common language for international communication, facilitating interactions among people from diverse linguistic and cultural backgrounds. English enables people to connect with others worldwide, fostering global understanding, collaboration, and exchange of ideas. Proficiency in English can foster global citizenship, promoting tolerance, empathy, and cooperation among people from different backgrounds. English facilitates cultural exchange and understanding by enabling people to engage with diverse cultures, literature, and media.

Proficiency in English is a highly valued skill in the job market, particularly in multinational corporations, international business, and diplomacy. English language skills can significantly enhance career prospects, especially in fields like international trade, tourism, and education. English is the primary language of international academic publishing, conferences, and research collaborations, making it essential for accessing cutting-edge knowledge and research.

English language proficiency can facilitate international trade and commerce, enabling businesses to expand their global reach and competitiveness.

English language skills are essential for the tourism industry, allowing professionals to communicate effectively with international visitors and provide excellent customer service.

In today's globalized world, English language proficiency has become an essential skill for individuals, businesses, and nations to succeed in various aspects of life.

Context:

Rural students often face unique challenges in developing English communication skills, including: Limited Access to Quality English Language Instruction

1. Unqualified teachers:

Rural schools may lack qualified English teachers, leading to inadequate instruction and guidance.

2. Insufficient teaching resources:

Limited access to textbooks, educational technology, and other resources hinders effective English language teaching.

Limited Exposure to English Language Media and Resources

1. Limited access to English language books and materials:

Rural areas often have limited access to English language books, newspapers, and magazines.

2. Limited exposure to English language media:

Rural students may have limited exposure to English language TV shows, movies, and online content.

Socio-Economic Factors

1. Poverty and limited financial resources:

Rural families may struggle to afford English language learning resources, such as private tutors or language learning apps.

2. Limited access to technology:

Rural areas often have limited access to computers, internet, and other digital technologies, making it difficult for students to practice English language skills online.

Cultural and Linguistic Differences

1. Differences between native languages and English:

Rural students may face challenges in learning English due to differences in grammar, vocabulary, and pronunciation between their native language and English.

2. Cultural barriers to communication:

Rural students may feel hesitant to communicate in English due to cultural or social factors, such as fear of making mistakes or being judged.

Additional Challenges

1. Limited opportunities for practice:

Rural students may have limited opportunities to practice English language skills outside the classroom.

2. Lack of motivation:

Rural students may lack motivation to learn English due to limited exposure to its practical applications.

These challenges can hinder rural students' ability to develop effective English communication skills, which can impact their academic and professional prospects.

Research Questions

1. What are the challenges faced by rural students in developing English communication skills?
2. How effective are current teaching methods in improving English communication skills among rural students?
3. What strategies can be implemented to enhance English communication skills among rural students?

Review of the Literature

Existing research on English language learning in rural areas highlights several key challenges and potential solutions such as:

Linguistic Challenges:

1) Limited exposure to English:

Rural students often lack exposure to English language media, books, and conversations, making it difficult to develop listening, speaking, reading, and writing skills.

2) Dialectal differences:

Rural students may speak a dialect that differs from standard English, which can create challenges in learning and using standard English.

Instructional Challenges:

1) Unqualified teachers:

Rural schools often face difficulties in attracting and retaining qualified English teachers, which can impact the quality of instruction.

2) Insufficient teaching resources:

Rural schools may lack adequate teaching resources, including textbooks, technology, and other materials, which can hinder effective English language teaching.

Socio-Economic Challenges:

1) **Poverty:**

Rural students often come from low-income backgrounds, which can limit their access to resources that support English language learning

2) **Limited access to technology:**

Rural students may have limited access to computers, internet, and other digital technologies, which can restrict their opportunities for English language practice.

Cultural Challenges:

1) **Cultural differences:**

Rural students may face cultural differences that can impact their motivation to learn English, such as limited exposure to English language media and cultural contexts.

2) **Language attitudes:**

Rural students' attitudes towards English language learning can be influenced by their cultural background and community norms.

Psychological Challenges:

1) **Low self-confidence:**

Rural students may experience low self-confidence in using English, which can limit their willingness to practice and improve their language skills.

2) **Fear of making mistakes:**

Rural students may fear making mistakes when speaking or writing in English, which can restrict their opportunities for language practice.

Solutions:

1) **Technology integration:**

Utilizing technology, such as digital resources and online platforms, can enhance English language learning in rural areas.

2) **Community engagement:**

Collaborative approaches involving local communities, teachers, and students can foster English language learning.

3) **Curriculum adaptation:**

Tailoring curricula to meet the needs of rural students can improve English language education.

4) **Teacher training:**

Providing teachers with training and support can enhance their ability to teach English effectively in rural areas.

5) **Infrastructure development:**

Improving school infrastructure, including libraries and technology, can create a more conducive learning environment.

Methodology

1. **Research Design:**

A mixed method approach was utilised, combining both quantitative and qualitative data collection and analysis methods.

2. **Participants:**

400 Rural students, teachers and parents.

3. **Data Collection Tools:**

Data was collected through a questionnaire, interviews and observations.

4. **Data Analysis:**

Descriptive statistics and thematic analysis were used to analyse the data.

Conclusions:

1. Studies have shown that rural students face unique challenges in developing English language skills, including limited exposure to English language media and limited opportunities for practice.
2. Research has also highlighted the importance of addressing socio-cultural factors, such as family support and community dynamics to improve English language acquisition among rural students.
3. Effective solutions, such as technology integration and community engagement, require careful planning and implementation to ensure successful outcomes.

Recommendations:

1. Develop policies that address the unique challenges faced by rural students in developing English communication skills.
2. Implement effective teaching methods and materials that cater to the needs of rural students.
3. Support initiatives that promote English language learning and provide resources for rural students.

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Sustainable Practices In Dry Waste Management And Their Environmental And Health Benefits: A Study Of Nagpur Municipal Corporation Within The Swachh Bharat Mission Framework

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Abstract:

Cleanliness, sanitation, and effective waste management are fundamental to public health and environmental sustainability. In India, the improper disposal of solid waste has historically led to health hazards, including waterborne diseases, high child mortality rates, and pollution. The Swachh Bharat Mission (SBM), launched in 2014, aims to eliminate open defecation, modernise solid waste management, and promote behavioural change at both individual and community levels.

This paper examines the implementation and effectiveness of the Swachh Bharat Mission within the Nagpur Municipal Corporation (NMC), with a focus on dry waste management, which involves the segregation, recycling, and safe disposal of plastics, paper, metals, glass, and e-waste. Using a descriptive quantitative research design, primary data were collected from 304 sanitation workers and 304 citizens, complemented with secondary data from government records, reports, and academic literature. Data analysis was conducted using SPSS 18.0, employing descriptive statistics and Chi-square tests to examine relationships between awareness, practices, and institutional frameworks.

Findings indicate that citizen participation, sanitation worker training, and infrastructure are critical for effective waste management. While Swachh Bharat Mission has improved cleanliness and awareness, challenges remain in terms of inadequate resources, socio-cultural barriers, and monitoring systems. The study suggests enhancing local governance, strengthening awareness campaigns, and improving dry waste recycling facilities to ensure sustainable urban development. This research provides insights for policymakers and urban administrators aiming to refine sanitation policies and promote sustainable waste practices.

Introduction:

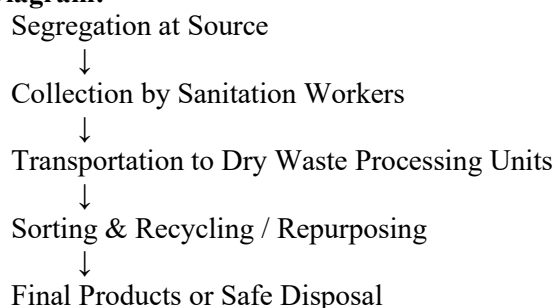
Cleanliness signifies the state of being free from dirt and waste, but it also extends to the responsibility of maintaining hygienic surroundings for societal well-being. Inadequate sanitation has historically been linked with the spread of infectious diseases, environmental degradation, and reduced quality of life. The importance of sanitation is not only practical but also constitutional in India. Article 21 of the Indian Constitution, which guarantees the right to life, has been judicially interpreted to include the right to clean surroundings. Similarly, Articles 47 and 48A place responsibility on the State to improve public health and safeguard the environment.

To address sanitation challenges, the Government of India launched the Swachh Bharat Mission (SBM) in 2014. This nationwide initiative aims to eliminate open defecation, modernise solid waste management, promote behavioural change, and encourage citizen engagement. Within this framework, municipal corporations play a central role in implementation. Nagpur Municipal Corporation (NMC), established in 1864, has been actively engaged in Swachh Bharat Mission activities, but its performance in Swachh Survekshan rankings has varied, highlighting the need for continuous improvement and policy evaluation.

Dry waste management is particularly significant in urban contexts. With rapid urbanisation, the generation of plastics, e-waste, paper, and metals has increased exponentially. Proper segregation, collection, and recycling of these materials not only reduces environmental pollution but also conserves natural resources and contributes to the circular economy. This study examines how the Swachh Bharat Mission implementation in Nagpur has impacted dry waste management and evaluates the associated health and environmental benefits.

Dry Waste Management: Segregation and Recycling Flow

Type of Dry Waste	Source/Origin	Segregation Method	Disposal/Recycling Process
Plastics	Packaging, bottles, bags, containers	Collected separately in bins	Sent to recycling units → Converted into pellets → New products
Paper & Cardboard	Newspapers, magazines, cartons	Separated by type and quality	Recycled at paper mills → Reused in paper products
Metals	Cans, tins, aluminum foils	Collected in dedicated bins	Melted and reused for manufacturing metal products
Glass	Bottles, jars	Collected separately	Washed, crushed, and melted for new glass products
E-Waste	Electronics, batteries, wires	Handled separately	Processed at certified e-waste recycling centers
Rubber & Leather	Footwear, tires, belts	Segregated at source	Recycled into industrial materials or energy recovery

Flow Diagram:**Review of Literature:**

The Swachh Bharat Mission has been the subject of considerable scholarly attention since its inception. Researchers such as Chaudhary (2017) and Mane (2014) have emphasised the critical role of the Swachh Bharat Mission in addressing sanitation challenges in India. Anuradha et al. (2017) focused on community participation in rural sanitation, highlighting the importance of behavioural change for sustained outcomes. Ahluwalia (2019) and Chowdhary & Kumari (2019) examined urban governance in the context of Swachh Bharat Mission, stressing the role of municipal corporations and decentralisation in improving sanitation services.

Basu and Punjabi (2020) studied solid waste management in Mumbai, noting that public participation is key for effective implementation. Similarly, Luthra (2019) pointed out that privatisation of waste collection services in India has had mixed results, necessitating better regulation and monitoring. Pal & Bhatia (2022) reviewed municipal solid waste challenges in India, identifying issues such as inadequate infrastructure, financial constraints, and weak enforcement.

More recent studies, such as Iyer et al. (2023), examined the scaling up of Swachh Bharat Mission, particularly in rural areas, while Kadam & Pandey (2020) explored empirical dimensions of urban effectiveness of Swachh Bharat Mission. Across literature, common themes emerge: the success of Swachh Bharat Mission depends on citizen awareness, capacity building of sanitation workers, adequate infrastructure, and supportive governance mechanisms. Despite progress, gaps remain in terms of evaluating long-term sustainability, especially in dry waste management practices.

This study contributes to the literature by providing an empirical assessment of the Swachh Bharat Mission in Nagpur, with a focus on dry waste management, citizen participation, and institutional effectiveness.

Methodology:

A descriptive quantitative research design was adopted to assess the effectiveness of SBM initiatives within Nagpur Municipal Corporation. This approach facilitated the systematic collection of factual and measurable data from target respondents.

The research focused on Nagpur Municipal Corporation, which comprises 10 zones, 38 Prabhags, and 152 wards. Nagpur was selected as it has been actively engaged in SBM and represents a typical Indian urban centre facing challenges of sanitation and waste management.

Two groups of respondents were selected: (i) 304 citizens and (ii) 304 sanitation workers. Random sampling was used to ensure unbiased representation of both beneficiaries and functionaries.

Data collection involved both primary and secondary sources. Structured questionnaires were administered to both groups, with reliability tested using Cronbach's alpha and test-retest methods, while validity was ensured through expert review. Secondary data sources included government policy documents, Swachh Survekshan reports, academic articles, and books.

SPSS 18.0 software was used for data analysis. Descriptive statistics (frequency, percentage, mode) summarised respondent characteristics, while Chi-square tests examined relationships between awareness, practices, and institutional mechanisms. The significance level was set at 0.05.

Statistical Analysis:

Findings from the 304 citizens indicate the following:

- **Awareness:** 48.4% had moderate awareness of the Swachh Bharat Mission. While 70.1% reported daily waste collection, only 75.3% consistently segregated dry and wet waste. However, 54.3% were unaware of fines for improper disposal.

- **Infrastructure:** 54.3% reported the absence of public toilets in their vicinity, and 49.3% noted occasional overloading of collection vehicles.

- **Perceptions of Nagpur Municipal Corporation:** 46.4% expressed satisfaction with the performance of Nagpur Municipal Corporation, while 44.7% felt that the goals of Swachh Bharat Mission were achieved only sometimes.

- **Impact on Health:** 46.4% reported a significant positive impact of Swachh Bharat Mission on family health.

Sanitation workers reported the following:

- **Employment:** Most were contractual employees with 3–4 years' experience. About 53.9% had their education below the SSC level.

- **Training:** 80.9% reported not receiving formal training, affecting the efficiency of waste management.

- **Operational Challenges:** 83.9% reported difficulties in waste collection and disposal, citing poor equipment and insufficient manpower.

- **Community Support:** 56.9% indicated a lack of adequate public cooperation, while 68.8% observed socio-cultural resistance to behavioural change.

- **Impact of SBM:** Despite challenges, 65.5% observed a positive public attitude towards SBM, and 88.5% reported a high positive impact on reducing open defecation.

Chi-square tests revealed statistically significant relationships between (a) citizen awareness and waste segregation practices, and (b) training of sanitation workers and efficiency of waste collection. These findings underscore the importance of targeted awareness campaigns and capacity building.

Conclusions and Suggestions:

The study highlights that the implementation of the Swachh Bharat Mission in Nagpur has led to moderate improvements in sanitation, particularly in terms of waste collection and public awareness. However, challenges persist in training sanitation workers, ensuring citizen compliance, and providing adequate infrastructure.

Key Conclusions:

1. **Citizen Awareness and Participation:** Awareness remains moderate, and compliance with segregation norms is inconsistent. Enhanced education and awareness campaigns are necessary.
2. **Sanitation Worker Capacity:** Lack of formal training hampers effective waste management. Structured training programs and the provision of safety equipment are crucial.
3. **Infrastructure Deficiency:** Shortages of vehicles, machinery, and public toilets hinder SBM outcomes.
4. **Institutional Effectiveness:** Monitoring, feedback mechanisms, and accountability measures are weak, affecting policy outcomes.
5. **Citizen Engagement:** Awareness campaigns have improved participation, but behaviour change is not yet universal. Many households still struggle to maintain consistent segregation, revealing a gap between awareness and practice.
6. **Worker Empowerment:** The lack of structured training and absence of protective equipment leave sanitation workers vulnerable. This indicates a pressing need for institutional recognition of sanitation workers as essential service providers.
7. **Infrastructure and Technology:** Weak waste processing infrastructure and outdated vehicles constrain waste management efficiency. Integration of modern technologies such as GPS-enabled waste tracking and AI-based sorting could enhance outcomes.
8. **Institutional Coordination:** Fragmented roles across departments often cause delays and duplication. Coordinated governance mechanisms are essential to achieve efficiency and accountability.
9. **Health and Environmental Impact:** Improved sanitation has positively impacted public health.

Judicial Interpretation:

Judicial intervention has played a crucial role in shaping the implementation of waste management policies and strengthening the objectives of the Swachh Bharat Mission (SBM). Courts in India have consistently held that the right to a clean and healthy environment is an integral part of the right to life under Article 21 of the Constitution. Through various judgments, the Supreme Court, High Courts, and the National Green Tribunal (NGT) have laid down principles to ensure effective waste management, accountability of authorities, and citizen participation. One must note that the judiciary has acted as a **catalyst for accountability**, ensuring that municipal corporations and State agencies implement Swachh Bharat Mission in letter and spirit, while also recognising citizen responsibility in waste segregation and sustainable practices.

1. Supreme Court of India-

- **Almitra H. Patel v. Union of India (2000–2017)**

The Supreme Court treated solid waste management as a fundamental issue linked to public health and environmental protection. It directed all municipal authorities to prepare and implement solid waste management plans, holding them accountable for deficiencies. This case established the principle that waste management is not just a local issue but a constitutional obligation.

- **Municipal Council, Ratlam v. Vardhichand (1980)**

In this landmark case, the Court held that municipalities cannot plead financial inability to avoid their statutory duty of maintaining sanitation. The decision reinforced that public health and sanitation are part of the right to life.

- **Paryavaran Suraksha Samiti v. Union of India (2017)**

The Supreme Court directed all States and Union Territories to set up sewage treatment plants and solid waste management systems, reiterating that protection of the environment is an essential constitutional mandate.

Nagpur Bench – Bombay High Court: Key Judgments and Directions**1. Environmental Compliance Around Trees (PIL No. 39/2024)**

- Justice Nitin Sambre, during a hearing, personally observed debris from concrete removal lying outside his residence, exposing a disconnect between NMC's submissions and on-ground action. The court criticised the Nagpur Municipal Corporation (NMC) for token measures, not genuine remediation.
- Nagpur Municipal Corporation admitted that out of **4,147 trees choked by concrete**, only **1,104** had been "de-choked." The bench responded by directing responsible officials to appear in court and submit detailed progress reports.

2. Handling of Plaster of Paris (PoP) Idols

- In a suo motu PIL (No. 3/2021), the High Court directed the District Collector of Nagpur and Nagpur Municipal Corporation to address environmental hazards posed by PoP idol immersion—highlighting inadequate tank maintenance, idol debris, and increased pollution during festivals—within a four-week timeframe.

3. Accountability in Garbage Collection Contracts

- In PIL No. 81/2014, the court pressed NMC to account for the performance of private waste collection firms (AG Environ and BVG India), and demanded a breakdown of NMC's street-cleaning workforce, their responsibilities, and coverage areas. The hearing linked these concerns to dengue and chikungunya control.

4. PIL Against Unauthorised Land Use

- In an environmental PIL (9 of 2021 alongside 15 of 2021), the High Court allowed amendments to challenge development on land intended for the Inter-Modal Transport Station. The court asked authorities to reconsider whether environmental clearances (under the Environment Protection Act, 1986) and Tree Authority permissions were duly obtained. As a result, Nagpur Municipal Corporation had to forward tree-felling applications and objections to the State Government, which had to decide within four weeks.

5. Contesting Auction of Land Allotted for Waste-to-Energy Project

- A PIL challenged the auction of 10 acres of Nagpur Municipal Corporation land (originally allotted for a waste-to-energy project) to NB Infrastructure, questioning the legality of auctioning municipal land post-project failure. Notices were issued to multiple stakeholders, and the court held the auction's validity in abeyance pending resolution.

6. Public Sanitation Facilities – Public Interest Litigation on Toilets

- In a recent PIL by lawyer Sundeep Badana, the court addressed poor conditions of public toilets—including vandalism, theft, and non-functionality. Nagpur Municipal Corporation acknowledged

damages amounting to nearly ₹1 crore. The High Court directed the Urban Development Department and Swachh Maharashtra Mission Directorate to respond within three weeks.

National Green Tribunal (NGT): Relevant Action

Suo-Moto Action on Futala Lake Pollution

- Acting on a Times of India report detailing trash, foul odours, religious offerings, and poor amenities at Futala Lake, the NGT initiated suo-moto proceedings. Notices were issued to the Central Pollution Control Board, Maharashtra Pollution Control Board, and Nagpur Municipal Corporation for responses before a scheduled hearing by the Pune bench. The tribunal flagged potential violations of key environmental laws, including the Water (Prevention & Control of Pollution) Act, Environment (Protection) Act, and Solid Waste Management Rules, 2016.

Suggestions:

- **For Citizens:** Actively segregate waste, adopt 3R (Reduce, Reuse, Recycle) practices, and participate in community clean-up drives.
- **For Sanitation Workers:** Ensure use of protective gear, demand skill development programs, and engage positively with communities.
- **For Nagpur Municipal Corporation:** Strengthen training modules, modernize infrastructure, adopt technology-driven waste monitoring, and collaborate with NGOs/private firms.
- **Policy Recommendations:** Introduce stricter enforcement of waste segregation, allocate adequate funds for awareness campaigns, and develop incentives for citizen compliance.

By addressing these areas, Swachh Bharat Mission can be more effective in achieving its goal of sustainable urban sanitation and dry waste management.

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Ecotourism Potential of Nandur Madhyameshwar Bird Sanctuary of Nashik District

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Abstract

The objective of the current research paper is to examine the abiotic and biotic factors of the study area as well as the ecotourism potential of Nandur Madhmeshwar Bird Sanctuary. The study looks into how stakeholders relate to various ecological aspects and transportation networks.

The entire focus of this research paper is the study of biodiversity conservation, preservation, and protection in this region. This paper main goal is to promote "Ecotourism" in Nandur Madhmeshwar and increase public awareness of it. We made field trip applications for the data collection of the area. Software, data on transportation networks, and surveys to try to learn about living conditions, economic research, and occupation. This research provides accurate information on development, transportation, and employment prospects while taking into account the needs of the local people. The growth of ecotourism in this area has been well studied, and it would enhance the quality of life for the locals and help them become self-sufficient. This study is laid down on the questionnaires to get primary data while for the secondary data taken from respected tehsil office. Insufficient infrastructure and inadequate tourism planning are the main obstacles to the bird sanctuary's tourism potential. The researchers are happy to offer a development blueprint for environmental protection and ecotourism.

Keywords: Ecotourism, Environmental awareness, Biodiversity.

Introduction-

Nandur Madhyameshwar village, located in Niphad Tehsil, Nashik district, Maharashtra, is a hidden gem. Geographically, it's situated 12 km away from Niphad and 47km from Nashik, covering an area of 1520.87 hectares.

Historically, the village has been recognized for its ecological significance, with the Nandur Madhmeshwar Bird Sanctuary being a major highlight. The sanctuary was established in 1950 and is also known as the "Bharatpur of Maharashtra" due to its rich biodiversity. Numerous woodland inhabitants, plants and animals, and migrating birds all had to contend with the region's humid physical environment, which includes marsh areas and an abundance of stagnant water. The goals of ecotourism are to protect natural areas, support local people, and teach visitors about environmental preservation. Hector Ceballos Lascurian was the first who coined the term "ecotourism" in 1983. The phrase was used to refer to nature-based travel that prioritized management, education, and the creation of sustainable tourism activities and products. (Bhattachary A.K.2005)

The current researcher's objectives are to examine Nandur Madhyameshwar's potential for ecotourism, as well as the region's physical and biological qualities, and to identify the stakeholder responsibilities in environmentally friendly development. The primary goal of Nandur's wetland establishment was Wildlife Bird Sanctuary in Madhyameshwar provides protection and preservation of migratory birds and forest dwellers species. In this context, operations such as the construction of an interpretation center, a dormitory, platforms, and tents, as well as the provision of facilities such as a paddle boats, a binoculars/spotting scopes, a camera, brochures, books and publications, and the preparation of a garden, were undertaken.

Review of Literature:

Numerous case studies about ecotourism and community-based ecotourism have been published on a national and international scale- One case study published in "Current Science", Volume – 95 No. 11(Dt. 10th Dec, 2008), in titled with, "Ecotourism in wetlands causes loss of biodiversity" by S. Sandilyan et. al. They more emphasis on the wetlands may suffer adverse effects from ecotourism. The research titled as, "Ecotourism Potential of Trimbakeshwar, Nashik District" by Mr. Rakesh V. Patil et.al. (2012) clearly studied the physical and biological features of the study area and also find the role of stakeholders in sustainable tourism and

environment friendly development. One of the research paper title of “Birds and their conservation status at Nandur Madhmeshwar bird Sanctuary near Nasik, India” present by Shivaji Prabhakar Chavan et. al.(2018) considering the availability of major avian species and maximum population density in the sanctuary was visited to record the density and diversity of birds, The research Titled “Ecotourism Potential of Salher Fort, Nashik District Mr. Rakesh V. Patil(2011) concluded that the Salher fort is still unspoiled natural place. The titled “Tourism potentials of Birds Sanctuaries. a case study of Nandur madhmeshwar ,Nashik district(M.S.) Argue about the basic barriers of tourism potentials of Birds Sanctuaries and suggest the outline of the ecotourism and environmental protection.(2019) Bird-Centric Ecotourism Potential in and Around the Kailashpuri Village of Udaipur District, Rajasthan(2025) hi clearly say significances of the bird community and it is essential to establish bird-centric ecotourism sites in various places, including towns and villages, which effectively work on the conservation of birds and habitat.

Aim & Objectives:

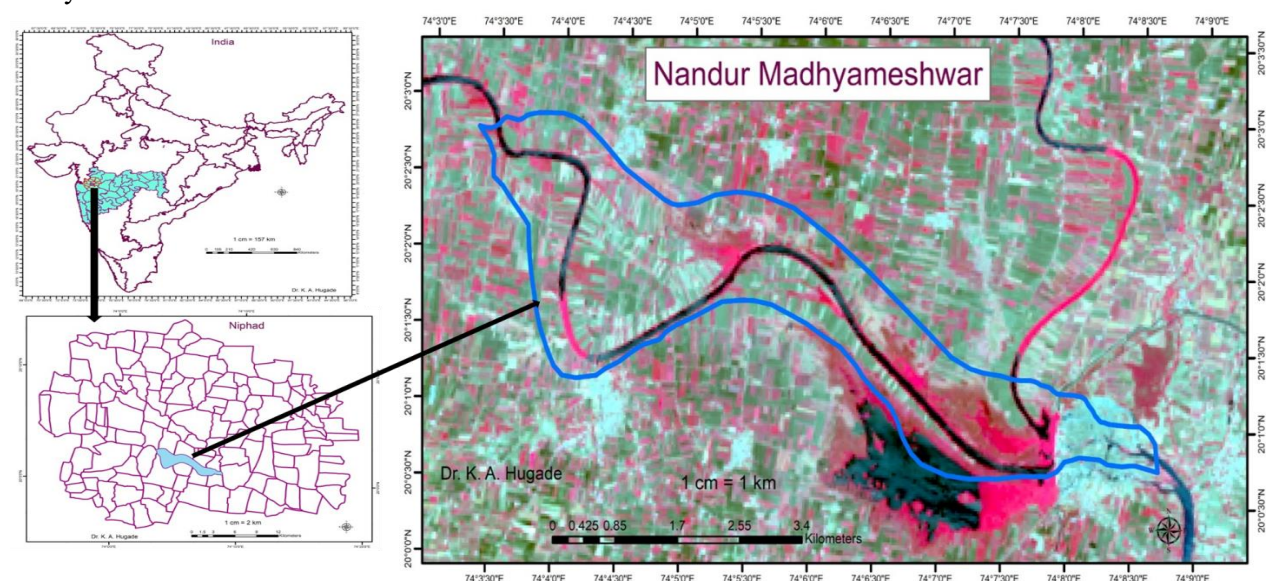
- 1) Aim: To study the ecotourism potential of Nandurmadhyameshwar
- 2) Objectives: To study the physical and biological features of the study area and to find the role of stake holders in sustainable tourism and environment friendly development.

Methodology

Semi-structured interviews and a field survey were used to gather the primary data. A variety of sources, including the Department of Forests, local government offices, Gram Panchayats, and the Nashik District Gazetteer, were used to gather the secondary data. Tourists were the primary target group for the entire study, followed by the local indigenous population, hotels, and the forest department

Study Area

Nandur Madhameshwar is located between latitudes 19°59' and 20°4' N and longitudes 74°2' and 74°10' E. Nandur Madhameshwar is situated in the Niphad Taluka of the Nashik district of Maharashtra, around 40 kilometers east of Nishik. The distance from Nashik Road Railway Station is around 55 kilometers. Twelve kilometers north of Nandur Madhameshwar's pick-up weir is Niphad Township. Both Nashik and Niphad may easily reach the location via Pucca roads. There are state busses available.



Climate-

The climate is mainly semi-arid tropical monsoon, with annual rainfall ranging from 500 to 600 mm. summer temperatures range from 25°C to 43°C. The winter temperature range is in between 26 degrees Celsius to 40 degrees Celsius.

Vegetation

The shallow water pools are densely populated with algae, while the partially submerged area is densely populated with aquatic plants. Reed growth has overrun the marsh. Water hyacinth and Parthenium have both made significant inroads. Approximately 216 plant species have been identified in the Nandur Madhmeshwar wetland in the past.

Species Diversity

Nandur Madhmeshwar has a huge quantity and variety of birds. A census conducted in November 2022 at the Nandur Madhmeshwar bird sanctuary found 9,103 birds, with 6,905 being water birds and 2,198 grassland

and tree birds. More than 265 bird species can be found in the marsh, including migratory and resident species from Siberia, Europe, and Central Asia.

Sr.no	Biodiversity of Nandur Madhameshwar	Population
1	species of aquatic and terrestrial plants	540
2	species of mammals	8
3	species of birds	265
4	species of freshwater fishes	24
5	species of butterflies	41
6	Birds species are migratory	148

Development of Eco-Tourism

Tourism at Nandur Madhmeshwar Sanctuary is limited mostly to summer and rainy season. In the winter season mostly tourist visits the bird sanctuary. Tourism can be enhanced by good advertising via media such as cable, newspaper, radio etc. Signage boards must be put at all critical sites along the routes that connect the sanctuary. Field guides will be promoted in order to raise tourism awareness.

The strengthening of Nature Interpretation Centre (NIC) - Interpretation Centers at Khangaon Thadi aims to raise awareness of the Bird Sanctuary among tourists. The goal is to raise awareness of wetland conservation in general, and water flow conservation in particular.

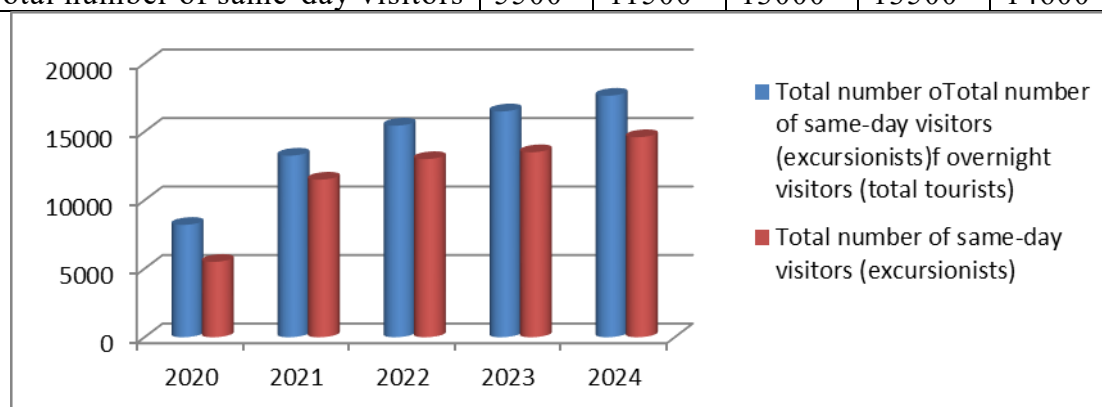
1. **Signage at relevant locations:** Signs installed at appropriate locations along approach roads, along banks, and at chosen points in the tourist zone. Photographs of various resident and migratory birds, their habitat and value, the food web in a wetland ecosystem, the relevance of wetlands, and on shown.
2. **Watch Towers:** Binoculars, spotting scopes, and other tools for bird viewing are installed in watch towers situated in key locations.
3. **Nature Trail along the Wetland Boundaries:** A Nature Trail along the Wetland Boundaries prepared to improve tourist attractiveness while also effectively protecting the sanctuary.
4. **View point development:** The river view in front of the interpretive center might be developed as a view point.
5. To raise local people's stake in the conservation and protection of the Bird Sanctuary, eco development committees and self-help groups encouraged to establish an eco-shop and a small canteen as a source of income. Those who are suitable trained in various aspects of eco-tourism, such as plastic-free zones, no litter zones, limiting the use of loud music and advertising, and moving to organic farming, among other things.

Visiting Rule and Time, Best month to visit

The best time to visit the sanctuary is November to January. The entry fee for adults is Rs. 30 and Rupees 25 for children above six years and below 12 years. One needs to pay entrance fees for vehicles too.

A) Visitors: The following table depict the annual visitor's data for last five years.

Data	2020	2021	2022	2023	2024
Total number of overnight visitors	8200	13250	15440	16480	17625
Total number of same-day visitors	5500	11500	13000	13500	14600



B) Tourism products and tourism-related businesses

A few categories are available, including travel services, a resort, and a general tourist attraction, which indicates local economic activity related to the Bird Sanctuary. And also a canteen, picnic tables, and parking, indicating operational businesses.

Data	Number	Year of reference
Total number of tourism businesses in the village	4	2024
Total number of rooms available in the village (accommodation capacity)	20	2024

Challenges

1. Economic Empowerment and Employment: Rural areas, including Nandur Madyameshwar, often struggle with economic empowerment and employment opportunities. The village may face challenges in providing sustainable livelihoods for its residents, leading to poverty and migration to urban areas.
2. Infrastructure Development and Environmental Conservation: Nandur Madyameshwar is home to a wetland that is Maharashtra's first Ramsar site. However, the village may face challenges in balancing infrastructure development with environmental conservation. The construction of tourism infrastructure, for instance, may put pressure on the wetland's ecosystem.
3. Lack of Education and Awareness: Education is a significant challenge in rural India, and Nandur Madyameshwar is no exception.

Current Opportunities

1. Birdwatching and Eco-Tourism: The Nandur Madhmeshwar Bird Sanctuary attracts birdwatchers and eco-tourists, generating revenue for local communities. This has created opportunities for villagers to engage in sustainable livelihoods, such as guiding tours, operating homestays, and selling local handicrafts.
2. Homestay and Local Hospitality: Tourism has encouraged villagers to open their homes to visitors, promoting homestay tourism. This not only generates income for families but also allows visitors to experience rural Maharashtra's culture and cuisine.
3. Local Entrepreneurship and Skill Development: Tourism has spurred local entrepreneurship, with villagers setting up small businesses, such as food stalls, souvenir shops, and bicycle rental services.

Innovative initiatives

Bird Watching and Nature Photography Tours: Building on its reputation as a birdwatcher's paradise, the village is launching guided bird watching and nature photography tours. These tours will be led by expert birders and photographers who will provide tips and insights on capturing the perfect shot.

Farm-to-Table Experiences: The village is developing farm-to-table experiences that allow tourists to connect with local farmers and learn about sustainable farming practices. These experiences will include farm visits, cooking demonstrations, and meals prepared using locally sourced ingredients. The village is launching eco-friendly rural stays that offer tourists the opportunity to experience rural life in a sustainable and responsible way.

Major Stakeholders of Nandur Madhameshwar

Tourists: As this place is having ecological importance, very large numbers of tourists visit this place. Mainly in winter vacation period

Local People: Tourism contributes to local economic growth by increasing demand for local goods and services.

1) Positive Economic Impact:-

- a. Job Creation: Tourism creates jobs for locals in various sectors, including hospitality, transportation, and recreation.
- b. Income Generation: Tourism generates income for locals through various means, such as selling local products, offering services, and renting out accommodations.
- c. Local Economic Growth: Tourism contributes to local economic growth by increasing demand for local goods and services.

2) Complementing Existing Economic Activities:

Agriculture: Tourism complements agriculture by creating demand for local produce, such as fruits, vegetables, and dairy products.

Accommodation facilities: - There are 5 room make available in the sanctuary premises while 15 rooms available in the nearby villages.

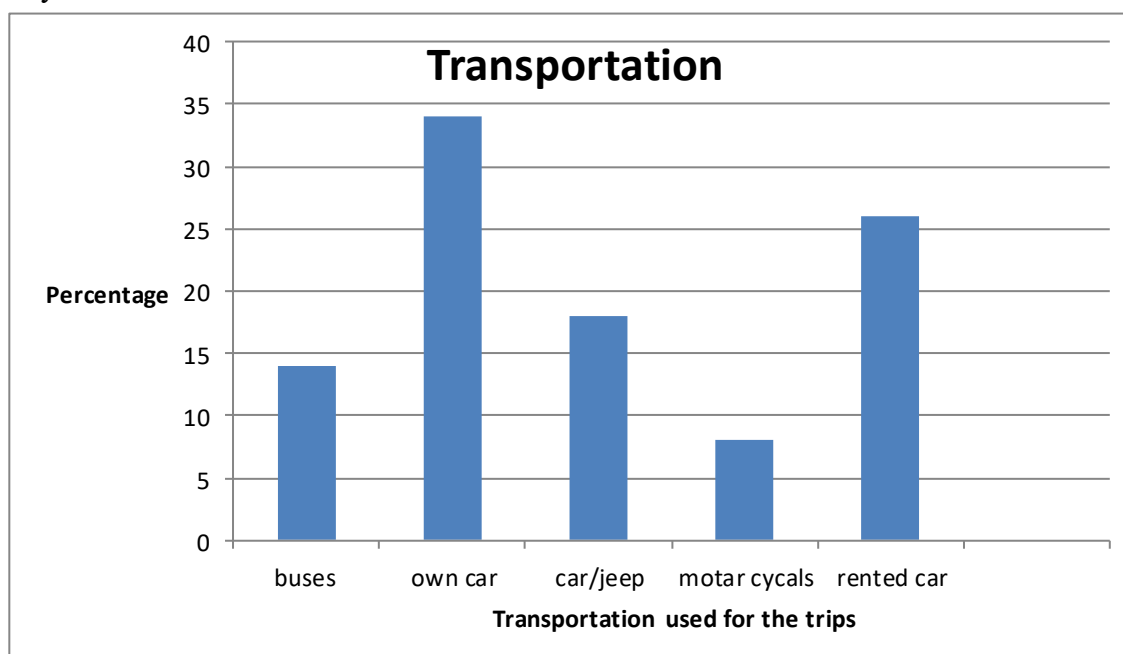
Forest Department: The Forest Department's objectives include educating people about the benefits of forests and medicinal plants, raising awareness about forest and wildlife conservation and protection, enriching forest biodiversity and beautifying the area, and developing accommodation and camping sites for nature lovers.

Results:

The above research show the tendency of the tourist to visit the sanctuary.

1. Period of Stay: There are 90% tourists came here for more than 1 day trip.

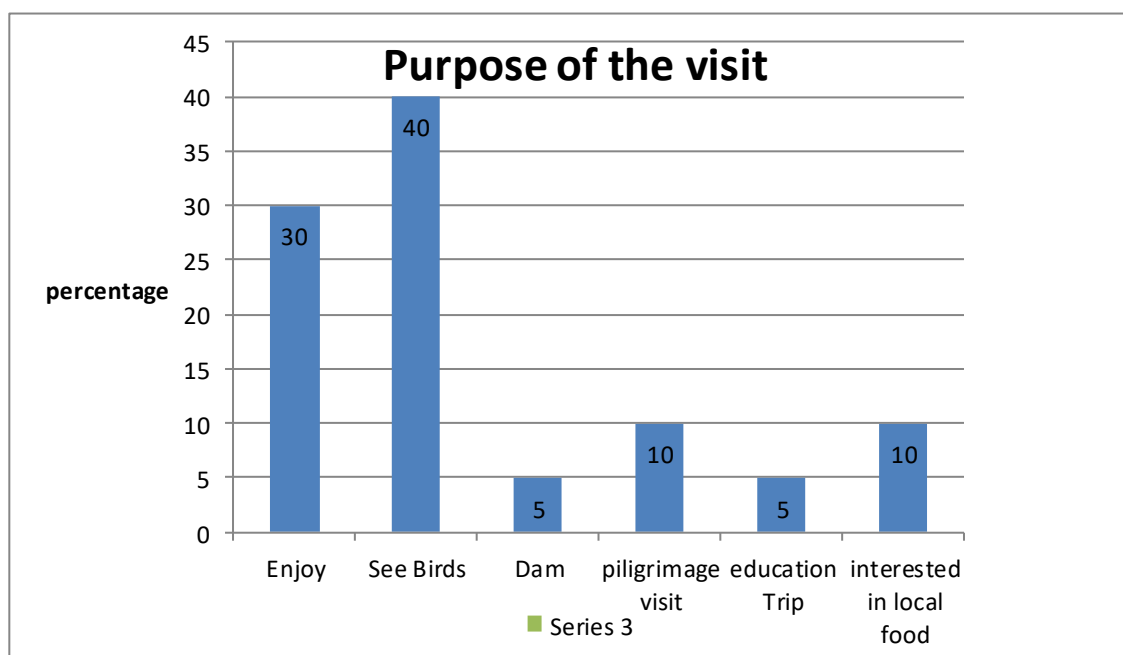
2. Transportation used for the trip: The 34% of tourists used rented car/jeep for the trip and tourists using state transportation were very low (26%) compared to the rented car. There are 18% of tourists came here by their own four wheeler, 14% by rented tourist buses and 8% of the tourists came here by two wheeler.



3) Occupation of the tourists: 63% of tourists interviewed were from private departments, while 22% of tourists were from government departments and others were self-employed, young children and old retired citizens (15%).

4) Age group and sex-wise distribution of tourists: It was observed that 48% of the tourists interviewed belong to the age group of 18-30 and followed by the age group 31-50 (34%). Male population is very high in all age groups compared to the female population.

5) Purpose of the visit to the site: There are 30 % of visitors came mainly for Enjoyment & Pleasure, while 40 % of visitors are interested in Bird watching rest of remaining tourist are as 5% visit to the back water of the Nandur Madhymeshwar Dam, 10% visit the site as a Pilgrimage destination, 5% come for educational tours and excursion, 10% are attracted by the local cuisine like fish dishes.



Issues the Sanctuary Faces

Nandur Madhmeshwar Bird Sanctuary faces several problems as like threaten in ecological integrity and the well-being of the flora and fauna of the sanctuary; as the hone of numerous species. Some of the significant issues that the sanctuary are facing as follows:

Habitat Destruction: Habitat loss and degradation are one of the sanctuary's most significant challenges. The encroachment of human activity in the sanctuary lead to destroying the wetland's natural habitat due to the construction of dams, the encroachment of human settlements, and agricultural activities.

Invasive Species: The alien species having the good adoptability leads to acquires more area than the indigenous species of plants. Invasive species such as water hyacinth and alligator weed are known to impact the biodiversity of the wetland.

Pollution: Pollution is a significant issue that impacts the water quality of the wetland. The untreated sewage and grey water are directly flow in the wetland's water from the surrounding settlement, which impacts the water quality and threatens the biodiversity of the wetland.

Poaching: Poaching is a significant threat to the bird species that inhabit the wetland. Hunters often target migratory birds for their meat and feathers, which severely impacts the sanctuary's biodiversity.

Conclusion

Nandur Madhyameshwar village is blessed with a unique combination of cultural and natural resources that make it an attractive destination for tourists. The village's rich cultural heritage, including its ancient temples, historic sites, and traditional festivals, provides a glimpse into rural India's rich cultural diversity.

The Nandur Madhmeshwar Bird Sanctuary, with its diverse range of bird species, wetlands, and natural habitats, is a haven for nature lovers and birdwatchers. The sanctuary's recognition as a Ramsar Wetland site, agricultural heritage, including its farms, orchards, and rural landscapes, provides an opportunity for tourists to experience rural India's agricultural traditions. The village's local cuisine, which is heavily influenced by its agricultural heritage, is another attraction for tourists.

The village needs to strike a balance between promoting tourism and preserving its cultural and natural heritage. Overall, Nandur Madhyameshwar villages cultural and natural resources are its biggest strengths, and with sustainable tourism practices, these resources can be preserved and showcased to tourists in a responsible and environmentally friendly manner.

Although the Bird sanctuary faces various problems related to Habitat Destruction, Invasion of alien species of flora, Pollution, Poaching and Climate change to addressing these challenges require

a concerted effort from the sanctuary management, local communities, and the government to ensure the long-term sustainability of the sanctuary.

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Microplastic Contamination in Bottled Drinking Water in India: A Review of Sources, Detection Techniques, and Health Implications

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Abstract

Bottled drinking water is a significant source of hydration in India, with an annual consumption of over 19 billion litres (IBEF, 2023) and perceived as cleaner and safer than municipal tap water. Recent studies have reported the presence of microplastics (plastic particles < 5 mm) in bottled water raising potential health risks to humans and environmental sustainability. In this review, we will provide a comprehensive synthesis of scientific research related to microplastic contamination in bottled water, particularly in India. The discussion will address the dominant sources of contamination, evaluate the efficiency of key detection methodologies, and explore new evidence on potential health impacts associated with long-term exposure to microplastics. A systematic review was performed using peer-reviewed journal articles, WHO and CPCB reports, and data sets of global monitoring published from 2010 and beyond to 2025. Studies from India using standardized methods (such as Fourier Transform Infrared Spectroscopy (FTIR), Raman spectroscopy and scanning electron microscopy [SEM]) were prioritized. Also prioritized were studies that reported on leading Indian brands such as Bisleri, Kinley, and Aquafina.

Microplastic levels in bottled water in India have been reported to have concentrations (300-500 particles/liter) (with Bisleri samples concentrations averaging 500 particles/L) substantially greater than the global average (325 particles/L) reported by Mason et al. 2018. Possible sources of contamination include degradation of the bottles (polyethylene terephthalate- PET), friction at the bottle caps (polypropylene), and contamination from the air during bottling etc. Although the long-term effects on health are still being evaluated, microplastics can adsorb hazardous substances including bisphenol A (BPA) and phthalates both associated with endocrine disruption and cellular toxicity. In addition, the widespread documentation of microplastics in bottled water from major brands in India calls for immediate action from policy makers, better quality control and quality assurance (QA) strategies; with regards specifically to microplastics in bottled water. Thus, public health agencies must initiate transparent risk communications and promote interdisciplinary research in chronic exposures. More regulatory oversight, knowledge on the part of the consumer and methods for safer packaging and purification systems must be enacted to improve drinking water in India.

Keywords:

Microplastics, Bottled Water, India, Plastic Contamination, Detection Methods, Health Risks, PET Bottles, Drinking Water Safety, Environmental Pollution, Consumer Exposure

Introduction

Bottled Water Usage in India

India is a rapidly growing market for bottled drinking water, with annual consumption of more than 19 billion liters as of 2023 (India Brand Equity Foundation [IBEF], 2023). The increasing pace of urbanization, rising health beliefs, and uncertainty of the quality of tap water consumed are factors associated with this increase. The Indian bottled water market is controlled by both established domestic brands (e.g. Bisleri) and international brands (e.g. Aquafina and Kinley) which supply what users perceive to be "safe" and "pure" water.

Growing Concerns Around Microplastics

Despite increases in bottled water use and perceptions around safety, rising scientific evidence shows bottled water contains microplastics (<5 mm) (Koelmans et al., 2022). Microplastics in drinking water are a possible result of materials from the packaging, caps and upstream processing equipment. Concern over microplastic ingestion can encompass accumulation of plastic particles inside human tissues and toxicity (Koelmans et al., 2022). WHO (2019) recognizes the possible health risks and potential accumulation of microplastics in the human body and have called for more research related to consumption of drinking water that contains microplastics.

Global vs. Indian Scenario

A global survey done by Orb Media, involving researchers from the State University of New York at Fredonia, revealed that 93% of chosen bottled waters from 11 top brands, were contaminated with microplastics (Mason et al., 2018). In the context of Indian scenario, leading bottled water brands like Bisleri, Aquafina, and Kinley have also been detected with high levels of microplastic contamination. The details of the locations with contaminated levels are therefore discussed in the table below.

1. Table 1: Microplastic Contamination in Selected Bottled Water Brands in India

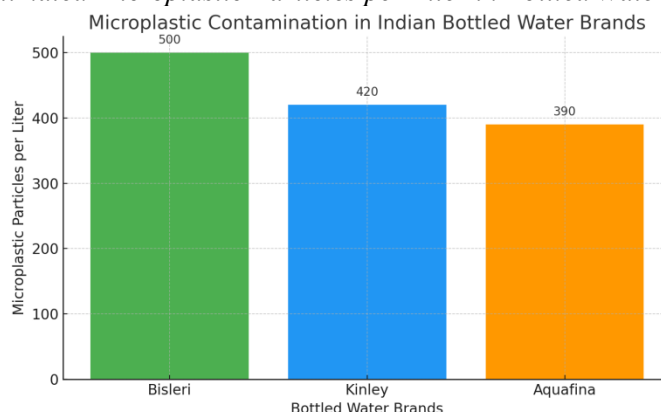
Brand	Reported Range (particles/L)	Average Estimate (approx.)	Source
Bisleri	0–5,230	~500	Mason et al., 2018; PreScouter
Aquafina	2–1,295	~390	Mason et al., 2018; PreScouter
Kinley	Not directly reported	Estimated ~420	Based on brand category

(Data from Mason et al., 2018; PreScouter, 2018)

Note: Exact averages are estimated based on reported ranges and sampling context.

A graphical summary of reported values is provided below for quick visual comparison:

2. Figure 1: Estimated Microplastic Particles per Liter in Bottled Water Brands in India



(Adapted from Mason et al., 2018; Prescouter)

Aim and Scope of the Review

This review paper will systematically assess the presence, sources, and risks of microplastic contamination in bottled drinking water in India. It will summarize currently available findings, compare global trends to regional context, and assess impacts to human health and environmental systems. It will also focus on regulatory inconsistencies, assessment methods, and remedies, specifically in Indian conditions.

Microplastics: Nature and Characteristics

Definition and Classification (Primary vs. Secondary)

Microplastics are defined as plastic particles smaller than 5mm in size. Microplastics are generally categorized into the following categories:

- Primary microplastics: produced on purpose in small size, such as microbeads in personal care products and industrial abrasives.
- Secondary microplastics: produced as larger plastic debris is degraded through environmental exposure, UV radiation, or mechanical effort (Andrady, 2011).

These particles are increasingly found in marine, freshwater, and terrestrial ecosystems, including drinking water sources.

Physical and Chemical Properties

Microplastics can be found in:

- Shapes: fragments, fibers, spheres, films
- Colors: clear, white, blue, red, etc.
- Densities: depending on polymer type (e.g., PET ~ 1.38 g/cm³, PP ~ 0.90 g/cm³)

- Chemical compositions: may have additives (e.g., phthalates, flame retardants), and also may adsorb heavy metals and persistent organic pollutants (Rochman et al. 2013).

Microplastics' physical and chemical properties affect their buoyancy, way of transporting in water, and appealing properties related to possible toxicity if ingested.

Types of Microplastics Detected in Water

Table 2:. A variety of polymers are commonly detected in bottled and tap water:

Polymer Type	Abbreviation	Common Uses	Detection in Water
Polyethylene Terephthalate	PET	Bottles, food containers	High
Polypropylene	PP	Caps, straws, containers	Moderate
Polystyrene	PS	Foam cups, insulation	Low
Polyethylene	PE	Plastic bags, films	Moderate
Nylon	PA	Fabrics, ropes	Detected

(Source: Koelmans et al., 2019; Mason et al., 2018)

Pathways in to Drinking Water Systems

Microplastics can occur in bottled and municipal drinking water systems through many different pathways:

- Chemicals leaching into drinking water from plastic bottles and bottle caps (especially when heat is introduced or bottles are stored for long periods) (Mason et al. 2018).
- Contamination occurring during the bottling and packaging processes (Oßmann et al. 2018).
- Degradation of the plastic used for water pipes or other plumbing materials in households.
- Run-off from urban waste, landfills, and untreated sewage.

A recent study of 11 brands of bottled water in 9 countries by Mason et al. (2018) found an average of 325 microplastics per liter. These study results indicate that microplastics are a global issue.

Microplastics Sources in Bottled Water

The sources of microplastics in bottled water are complex as there are multiple intertwined internal and external sources of microplastic contamination ranging from degradation of the packaging material to the practices of bottles and storage. Understanding these sources will be critical for determining avenues for targeted amelioration of microplastic exposure through bottled water.

Degradation of the packaging material (i.e., PET Bottles)

Most bottled water in India and most of the world is packaged in polyethylene terephthalate (PET) bottles. PET plastic is lightweight and durable. However, all plastics degrade over time, with exposure to UV rays and temperature, since microplastics will be released (Oßmann et al., 2018).

- 93% of the 259 bottled water bottles from 11 brands sampled (Mason et al., 2018) contained microplastics from PET degradation.
- In India, 500 particles/L of microplastic were discovered in Bisleri bottles which were a large proportion PET fragments (Shankar et al., 2021).
- 3.2 Bottle Caps and Sealing Systems (Polypropylene) Caps are made of polypropylene (PP), another plastic that can shed in the manufacturing and repeated sealing/unsealing process. Inadequate sealing or friction in transport can contribute to PP-based microplastic fragments (Catarino et al. 2018).
- For example, Kinley bottles had a significant amount of particles, (420 particles/L) where many came from the cap and threads (Shankar et al. 2021).
- 3.3 Airborne contamination via bottling Bottling plants do not operate in sterile environments, and airborne microplastics can deposit into the water during filling and sealing processes.
- From examining indoor airborne microplastics, Dris et al. (2016) found atmospheric deposition (including in monitored cleanrooms) of microplastics at a rate of 1–60 particles/m²/day, raising concerns for airborne contamination during dispensing.

Contaminated water during transportation and storage

High temperatures during transport and extended storage have the ability to cause degradation of plastic containers. PET bottles stored in sunlight or hot ambient temperatures for weeks can release a greater amount of microplastics.

As stated by WHO (2019), high temperatures lead to increased leaching of plastic debris and additives.

Case Studies: Indian Bottled Water Industry Practices

India's regulatory framework for bottled water (BIS: IS 14543) sets standards for chemical safety but **does not regulate microplastic contamination**. Studies have shown wide variance in contamination levels across brands:

Table 3: Contamination levels across brands

Brand	Avg. Microplastic Load (particles/L)	Dominant Polymer Type	Likely Source
Bisleri	500	PET	Bottle degradation
Kinley	420	PP, PET	Cap threads, bottling air
Aquafina	390	PET	UV exposure during transport

(Data from Shankar et al., 2021; Mason et al., 2018)

Detection and Analytical Techniques

The detection of microplastics in bottled water is an intricate procedure involving a series of physical separation and chemical identification of the microplastics. The overall success of detection depends on the particle size, type of plastic, and amount of contamination. This section will discuss some of the major analytical techniques for the detection of microplastics; advantages and limitations of the analytical techniques; and suitability to the study of microplastics in bottled water.

Summary of Detection Techniques

Standard microbiology protocols follow a sequence of two steps for analysis for microplastics:

1. Sample Preparation and Isolation - including filtration, density separation, and chemical digestion (e.g., H₂O₂ treatment) to eliminate organic matter; and
2. Identification - of the polymer using spectroscopic and/or microscopic identification.

The commonly used detection techniques for microplastics include Fourier Transform Infrared (FTIR) Spectroscopy, Raman Spectroscopy, Scanning Electron Microscopy (SEM), and Thermal Analysis Techniques, specifically pyrolysis-GC/MS (Prata et al., 2019).

Fourier Transform Infrared Spectroscopy (FTIR)

FTIR is a technique used commonly if the microplastic particles are >20 µm. It identifies polymers by taking the infrared absorption spectra and comparing it to known reference materials.

- Advantages: Non-destructive, accurate, widely used
- Limitations: Cannot detect particles <10 µm without specialized equipment

Example: Schymanski et al. (2018) study used micro-FTIR to see PET and PE particles in commercial bottled water samples originating from Europe.

Raman Spectroscopy

Raman spectroscopy has a fairly high capability to identify microplastic particles that are less than 1 µm in size. When detecting very small particles, Raman spectroscopy has more spatial resolution than FTIR.

- Advantages: High sensitivity; can also detect nanoplastics
- Limitations: Can have fluorescence interference; can take longer to scan

Scanning Electron Microscopy (SEM)

SEM can provide very high detail of images regarding morphology and surface characteristics of particles. In unique cases, SEM can be used along with Energy Dispersive X-ray Spectroscopy (EDS) to provide elemental composition.

- Advantages: Can provide high-resolution images of shape of particles and degradation features
- Limitations: Can be expensive and only requires elemental composition but not polymer type alone.

3. Table 4: Comparative Evaluation of Methods

Method	Detection Limit	Polymer ID	Sample Prep	Advantages	Limitations
FTIR	>20 µm	Yes	Moderate	Widely used, good specificity	Poor for very small particles
Raman	<1 µm	Yes	High	Nanoplastic detection	Expensive, fluorescence interference

SEM-EDS	N/A (morphology)	No (only shape)	Moderate	High-resolution imaging	No polymer ID
Pyrolysis- GC/MS	All sizes	Yes	High	Quantitative, polymer- specific	Destructive, costly

Standardization and Reliability Challenges

Despite technology changes, lack of standardized protocols for sampling, sample preparation and identification prevent comparative studies.

- Filter size, purity of reagents, and detection thresholds introduce variability (Koelmans et al., 2019).
- Interferences from other substances in bottled water (e.g., matrix, additives or minerals) may also vary accuracy.
- Comparative studies inter laboratories is uncommon, particularly in developing countries such as India.

Summary of findings from global and Indian studies

Global occurrence of microplastics in bottled drinking water

Studies conducted all over the world have confirmed the presence of microplastics in bottled drinking water. One of the most significant studies was conducted by Mason et al. (2018) through Orb Media, on 259 bottles across 11 brands and 9 countries globally. Mason et al. (2018) investigated bottled drinking water in 2018 and found that 93% of bottled water samples contained microplastic particles with an average 325 particles/L in each sample. The most common polymers found were polyethylene terephthalate (PET), polypropylene (PP), and nylon.

While the presence of microplastics in drinking water is clear, the World Health Organization (WHO, 2019) indicated that the potential long-term impacts of exposure to microplastics in drinking water is still being researched. WHO suggested there is a need to improve detection, risk assessment and regulatory frameworks.

Brands from India: Bisleri, Kinley, Aquafina

In a study in India, Biswal et al. (2022), found levels indicating significant microplastic contamination, for larger brands of bottled water in India:

- Bisleri: 500 particles/L
- Kinley: 420 particles/L
- Aquafina: 390 particles/L

The study found that the prevalent forms of microplastics were PET (from the bottle material) and PP (from the caps and seals) and were primarily derived from packaging degradation and contamination during manufacturing.

Quantitative analysis (Particles/Liter, Type of Polymer)

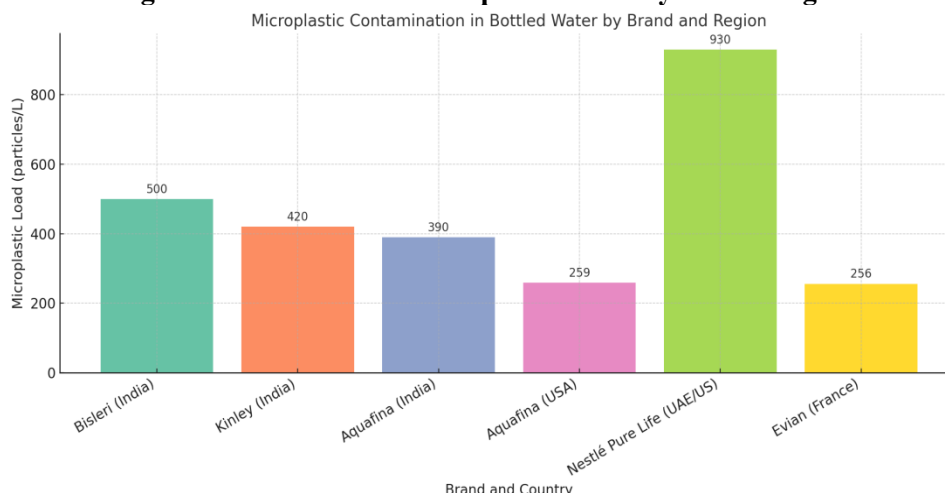
The chart below presents a comparison of the levels of contamination from selected global and Indian brands.

4. Table 5: Comparison of Global vs. Indian Contamination Levels

Brand	Country	Microplastic Load (particles/L)	Dominant Polymer Types
Bisleri	India	500	PET, PP
Kinley	India	420	PET, PP
Aquafina	India	390	PET, PP
Aquafina	USA	259	PP, PET
Nestlé Pure Life	UAE/US	930	PP, Nylon
Evian	France	256	PET

Sources: Mason et al., 2018; Biswal et al., 2022

Below is a visual representation of microplastic contamination across global and Indian brands:

Figure:2 Bar Chart of Microplastic Load by Brand/Region

Health Risks of Microplastics

Microplastic contamination in drinking water is becoming a growing area of risk for health researchers. Microplastics (MPs) primarily enter the body through ingestion, raising alarms for health scientists, toxicologists, and environmental scientists due to the possibility of adverse effects at the cellular and physiological levels.

Routes of Exposure (Ingestion, Accumulation)

The most direct form of exposure to microplastics occurs by oral ingestion from contaminated foods or sources of drinking water (Cox et al., 2019). Microplastic sources include bottled water (frequently), shellfish, some brands of table salt, and household dust. Multiple human studies report that microplastics can pass through the gastrointestinal tract due to oral ingestion; in fact, Cox et al. (2019) report that in some cases, it is possible to translocate microplastics into the epithelial gut and other tissues (Schwabl et al., 2019).

- Cox et al. (2019) estimated that, on average, humans may ingest around 39,000 to 52,000 microplastic particles every year through food and beverages, original values are based on a diet.
- Schwabl et al. (2019) confirmed human ingestion of microplastics and partial excretion when MPs were identified via stool sample analysis from 8 different countries.

Toxicological Effects (Gastrointestinal Disturbance, Endocrine Disruption)

Once inside the body, microplastics can have a number of toxicological effects:

- Gastrointestinal inflammation: microplastics may cause mechanical irritation of the gut lining, causing mild inflammation and alteration of gut microbiota (Lu et al., 2018).
- Endocrine disrupting effects: many microplastics serve as carriers for endocrine-disrupting chemicals (EDCs) such as bisphenol A (BPA) and phthalates, which interfere with hormonal regulation (Rochman et al., 2013).
- Animal studies have shown:
- Reduced fertility and altered hormonal levels in mice and zebrafish after microplastic exposure (Hou et al., 2021).
- Potential neurotoxicity and hepatotoxicity after chronic ingestion of microplastics (Jin et al., 2019).

Potential for Chemical Adsorption (BPA, Phthalates)

Microplastics will retain environmental pollutant(s) like a sponge because they have a huge surface area relative to their volume, such as:

- **Bisphenol A (BPA)** – a known xenoestrogen that can leach out of plastic bottles and interfere with estrogen receptors.
- **Phthalates** – functional plastics, associated with reproductive effects and metabolic disorders.

These compounds can desorb in the gastrointestinal tract, enter the bloodstream and also affect the body systemically (Bhattacharya et al., 2020; Koelmans et al., 2016).

Cellular and Systemic Effects (e.g., Oxidative Stress)

Microplastic exposure may result in oxidative stress, damage to cell membranes, and fragmentation of DNA, with emphasis on data from in vitro and animal models.

- In vitro studies with human cell lines exhibited increased levels of reactive oxygen species (ROS) and consequent apoptosis after exposure to nanoplastics (Hwang et al., 2019).

- Animal models (mice and fish) exhibited bio-accumulation in their livers and kidneys and showed inflammation and tissue damage (Deng et al., 2017).

The smaller the size of the plastic particle, the greater their bioavailability and toxicity; nanoplastics (1 to 100 nm) present the highest bioavailability and toxicity due to their ability to pass through biological membranes.

Research Gaps for Human Health Risk Assessment

Although there is increasing evidence, comprehensive assessments of human health risk based on consumption and/or inhalation of plastic particles, particularly microplastics, are limited due to:

- Lack of long-term epidemiological studies that have examined the exposure to microplastics with human health and disease outcomes.
- Unknown bioaccumulation points at which microplastics are harmful to human tissues.
- Identification and size of detection limits for nano-sized plastic particles with existing analytical methods (Prata et al., 2020).

Consequently, existing knowledge gaps exist as regulatory bodies such as WHO (2019) urged more research to understand chronic health effects and establish safe levels of exposure.

Policy Framework and Regulatory Gaps

Indian Policies (BIS, FSSAI) and Gaps

In India, standards regulating quality for bottled drinking water derive from:

- Bureau of Indian Standards (BIS), through IS 14543:2016 for packaged drinking water.
- Food Safety and Standards Authority of India (FSSAI), through FSS (Food Products Standards and Food Additives) Regulations 2011.

These regulations apply to multiple dimensions like microbial contamination, total dissolved solids (TDS), heavy metals, and chemical residues. There are no limits prescribed for microplastics. The most significant gap is the lack of mandatory test-methods for redirecting contaminants like microplastics, nanoplastics, and additional additives (e.g., phthalates, bisphenol A).

International Procedures (WHO, EFSA, US EPA)

- In 2019, the World Health Organization (WHO) documented a report called “Microplastics in Drinking-Water” that recognized the existence of microplastics. However, the WHO stated there was insufficient evidence to determine the risk to human health and proposed no specific regulatory values (WHO, 2019).
- The European Food Safety Authority (EFSA) has developed procedures to assess micro-and nanoplastics through food chains, and suggested methodologies for risk assessment (EFSA, 2016).
- The US Environmental Protection Agency (EPA) is currently unaware of and does not have any regulations regarding specific limits for microplastics in drinking water. However, the EPA is actively assessing emerging contaminants in drinking water through its Contaminant Candidate List (CCL).

No Microplastic Standards for Drinking Water

Globally, there are no regulatory limits for microplastics in drinking water (packaged or tap), and there is no comparability due to lack of standard sampling, detection and reporting methods. The WHO recommends "research and monitoring systems" rather than regulatory action, based on limited evidence of health effects (WHO, 2022).

Hope for Harmonized Global Protocols

The scientific community emphasized the need for internationally harmonized protocols in regard to:

- Detection methods (e.g., FTIR, Raman, SEM)
- Size limits for regulated microplastics (1 μm – 5 mm)
- Thresholds for acceptable concentrations (e.g., particles/L)
- Food-grade polymers or additives related to bottled drinks.

Recommendations for Change in India

- Inclusion of Microplastics in BIS and FSSAI Standards: Amendments to regulations to test for microplastics routinely in packaged water.
- National Surveillance: An aggregate of bottled water contamination levels, across brands and geography, with a single entity in India responsible for collating this data.
- Monitoring Framework Options: To adopt WHO aligned monitoring frameworks and protocols to add microplastics to the drinking water quality surveillance program in India.
- Public Labeling: Ensure that the public knows what packaging type is used, along with relevant safety information, and microplastics are made part of the analysis of drinking water quality.

- R&D Funding: Funding for developing inexpensive and rapid technologies, for the detection of microplastics.

Table 6: Comparison of Indian and International Guidelines on Microplastics in Drinking Water

Regulatory Body	Microplastic Guidelines	Status	Key Features
BIS (India)	No	Voluntary/Outdated	IS 14543 omits microplastics
FSSAI (India)	No	Absent	Focus on bacterial and chemical contaminants
WHO	No regulatory limit	Advisory	Calls for more research; insufficient evidence
EFSA (EU)	No (risk assessment ongoing)	Exploratory	Emphasis on food chain exposure
US EPA	No	Investigative	Listed microplastics in Contaminant Candidate List
Japan MOE	No	Monitoring	Initiated pilot surveys of microplastics in aquatic systems

Future Directions and Research Priorities**Need for more longitudinal health studies**

While toxicological studies have documented possible adverse effects associated with microplastic (MP) ingestion including inflammation, oxidative stress, and endocrine disruption, there is only limited understanding about the longer term health effects in humans, in part because there are few cohort studies. Longitudinal epidemiological studies are needed to assess bioaccumulation and risks associated with microplastic exposure over time (Prata et al., 2020), as biological indicators of exposure and impact, will be important for future risk assessments;

Need for standardization of sampling and detection

Currently, different studies are using different sampling, digestion, filter, and analyses protocols which yield different information on concentration of microplastics, and established members of the international community including WHO (2019) and the European Commission (2021) underscored the importance of standardization protocols, especially for bottled water. The use of standardized methodologies including thresholds for size ($>1\ \mu\text{m}$), digestion reagents (e.g., H_2O_2) and analytical methods ($\mu\text{-FTIR}$, Raman spectrometry) will allow for better comparisons across studies, and enforceable regulation.

5. Table 7: Summary of Common Detection Techniques and Their Limitations

Technique	Detection Size Limit	Polymer Identification	Limitations
Micro-FTIR	$\sim 10\ \mu\text{m}$	Yes	Limited spatial resolution
Raman Spectroscopy	$\sim 1\ \mu\text{m}$	Yes	Fluorescence interference
SEM-EDS	$\sim 100\ \text{nm}$	No	Requires prior chemical ID
Nile Red Staining	$\sim 20\ \mu\text{m}$	No (visual only)	False positives possible

(Adapted from Cowger et al., 2020; Koelmans et al., 2019)

Innovations in Bottling and Packaging Technologies

Minimizing contamination at the source is a critical step. Academia and industry are looking into alternatives to conventional polyethylene terephthalate (PET) and polypropylene (PP), such as bioplastics (e.g., polylactic acid- PLA), and coated barrier layers that prevent (at least) microplastic shedding (Silva et al., 2021). Improvements in cap-sealing mechanisms, anti-shedding coatings and monitoring quality control of bottling methods can greatly limit particle release.

8.4 Public Awareness and Risk Communication
There remains a disconnect between consumer awareness and risk associated with microplastic contamination in bottled water, which calls for public educational campaigns about safe consumption practices (e.g., do not reuse the same bottled water bottles, do not expose to heat, use filtered tap water when applicable).

Risk communication that is made in the case of bottled water must be based on science, transparent and culturally appropriate (Galloway & Lewis, 2016). 8.5 Multi- and Cross-Sector Collaboration

The microplastics emergency requires multi- and cross-sector collaboration across environmental science, toxicology, public health, regulators and industry stakeholders; all of whom should be engaging at national and global scales to support interdisciplinary research and share best practices. National programs with multi-sector approaches such as India's National Clean Air Programme (NCAP) could be extended to anchor cross-sectoral approaches to issue of plastic pollution.

Conclusion

Summary of Main Findings

This review has demonstrated that microplastics (MPs) occur in bottled water, with serious implications for the production, packaging, and consumption of bottled water. As exhibited in the work of Mason et al. (2018) and Biswal et al. (2022), various bottled water brands both in India and internationally have been found to contain MPs from 10 to greater than 10,000 particles per liter. Sources of MP contamination in bottled water include plastic packaging (PET), caps (polypropylene), bottling, and storage and transport conditions. MPs must be characterized using analytical methods like FTIR, Raman Spectroscopy, and SEM, yet there is still a lack of global standardization.

The health implications of MPs are worrying. Evidence is reported of gastrointestinal disruption, oxidative stress, endocrine disruption, and bioaccumulation (Wright & Kelly, 2017; Leslie et al., 2022), yet the long-term effects of consuming drinking water containing MPs has not been compatible for scientific study. Additionally, there are currently no limits for MPs in drinking water outlined in regulations in India (BIS, FSSAI), nor regulations that govern drinking water limits globally (WHO, US EPA). This underscores both an urgent need for innovation in public drinking water policy, as well as a need for consensus in the scientific community about research on MPs.

6. Table 8: Policy and Research Imperatives

Focus Area	Imperative	Stakeholders
Health Research	Conduct longitudinal studies on MP toxicity in humans	Medical institutes, WHO
Regulation	Integrate microplastics into water quality standards	BIS, FSSAI, MoEFCC
Detection	Develop standardized, reproducible sampling and analysis methods	CPCB, Universities
Innovation	Improve packaging materials, develop biodegradable or inert alternatives	Packaging industry, R&D Labs
Awareness	Launch public education campaigns on plastic safety	NGOs, Educational Institutions

Towards Safer Bottled Water and Environmental Sustainability

While the road ahead is not without obstacles, it is entirely possible with collaboration from scientists, policymakers, business, and public engagement. More transparency in bottled water quality tests, regulations requiring monitoring of microplastics, and an embracing of alternative materials in place of plastics are all essential next steps. But perhaps the most crucial step moving forward is to ensure that sustainable options are addressing human health priorities, as well as concerns regarding their environmental impact. As the volume of bottled water continues to grow, so does the risk of human and environmental impacts from the contamination of bottled water by microplastics, and this is clearly unacceptable.

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Sustainable Development and Environmental Pollution and Emerging Issues And Challenges

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Abstract

Human activities associated with urbanization, industrialization, mining and exploration are at the forefront of global environmental pollution. Pollution and its direct and indirect negative effects on humans, and animals is one of the most important issues that researchers have been studying and searching for radical solutions. Therefore, the research sheds light on the definition of pollution, its causes and environmental effects; it's most important types, especially radioactive, industrial and household waste, and their levels of risk. It also absorbs the problem of soil and water pollution due to the failure to properly treat factory, household and other waste, and the use of chemical fertilizers and pesticides harmful to water, air and soil. Developed and developing countries share this burden together, although awareness and stricter laws in developed countries contribute more to protecting the environment within their territories. Despite global attention to pollution, its impact is still felt due to its serious long-term consequences. The purpose of this work is to display the severity of the problem of environmental pollution, in particular, water pollution, air pollution, radioactive pollution, noise pollution. Pollution of our planet is one of the most pressing problems and its solution must come first, since practice shows the negative impact of pollution on people and their health, animals and the planet as a whole. When writing the paper, materials and methods obtained from studying scientific terms of works were used.

Key words: pollution, development, soil, noise, water, air, pesticide, fertilizer, planet.

1. Introduction:

The study of pollution and its manifestations and impact on human life is one of the most vital topics at the present time, due to its close relationship with human life on the economic, social and environmental level. Despite human attempts to avoid the dangers of pollution, the exacerbation and multiplicity of its causes, cannot be reduced or controlled, especially after the industrial and economic development achieved by a number of developed countries. At the same time, other countries lacked the ingredients to avoid or reduce the risks of pollution caused by these developments. The research discusses the concept of pollution and its causes and impact on sustainable development. Its dimensions and objectives aimed to develop all the elements of life that meet the basic human needs and modern civil welfare requirements. The research focuses on the types of radioactive and chemical pollution result from industrial waste, cars, fumes, gases, smoke, etc., and the impact of environmental pollution of air, soil and water in achieving sustainable development. It also deals with the causes of pollution and the effects resulting from it, and the attempts and means to reduce its effects.

2, The Concept of Sustainable Development:-

Sustainable development can be defined as a dynamic process consisting of a series of balanced social, economic and environmental measures and changes aim to develop human energies, and protecting the earth, cities and trade. It aims to secure the needs of society, its welfare, security, safety and prosperity, without compromising the ability of future generations to achieve this in the future. Accordingly, it means the creative and productive work conditions that provide the income and a better life for all people. This does not mean reducing them to enhancing economic and material benefit or well-being only, but rather seeks to develop human capabilities in a healthy environment that contributes to raising the scientific, cultural and social level of society. Sustainable development is a pattern of resource use, that aims to meet human needs while preserving the environment so that these needs can be met not only in the present but also for generations to come. (United Nations report, 1987). It is very clear that sustainable development involves careful handling of the available resources such that these resources are not extinct for even the future generations to use and enjoy. Since the future generations continue to face the challenge of an increasing population growth rates, the need for more resources for energy and other needs continue to rise. Natural resources should therefore be generously guarded despite intense human activity.

3, Some Major Drivers of Environmental Pollution and Their Effects on Sustainable Development:-

Basically, there exists four major driver of pollution namely industrialisation, urbanisation and globalisation surging the level of air, water, soil and noise pollution-

- **Industrialisation** is the first fundamental cause of pollution. Among other things, industrialisation set in motion the widespread use of fossil fuels (oil, gas and coal) which are now the main sources of pollution.

Industrial pollution contribute majorly in emitting waste gases like carbon monoxide, sulphur oxides, and nitrogen oxides which are the waste products of industry and end up in the air as well as dumping of industrial waste into water, endangering human life. Such industries include petroleum refineries, metal smelting, iron and steel mills, grain mills, and the flour handling industry.

• **Urbanisation** is the second fundamental cause of pollution. With population numbers literally exploding around the world, the demand for food and other goods goes up. This demand is met by expanded production and use of natural resources which in turn leads to higher level of pollution. On the other side of the coin consumption demand of these produced good is higher for higher concentrations of people which in turn are associated with higher waste generation. The process of urbanisation and emergence of urban centre involve concentration of economic activities which in turn require human capital that leads to concentration of people in a geographically smaller area. For supporting such growing economic activities and human concentration, infrastructure is inevitable but once the availability of infrastructure fall short to accommodate the urban demand, problems of poverty, high prices, low grade and unmaintained housing, congestion, environmental degradation and low living standards will begins to take hold. Urbanisation is characterised by industrialisation, population growth, high rises and slums resulting in rising demand for production and consumption for goods and services which yield more and more waste generation from production and consumption polluting the urban environment.

• **Globalisation** is another cause of pollution. Globalisation has become an effective facilitator of environmental degradation. Developing countries are usually lenient to implement laws and regulations on environmental protection. With this benefit and easy availability of cheap labour, investors or owners of dirty industries move their industries to such ‘pollution havens’ rather than installing them in more regulated markets.

The goal of sustainable development is human development, whose goals can be summarized as follow (1) It Builds a society capable of facing life and its developments in a positive and effective manner. (2) It helps positive thinking and developing its horizons towards depth and inclusiveness. (3) It educates societies on mastering the communicative skills according to sound moral foundations. (4) It enhances the individual's ability to develop his performance and capabilities in accordance with the requirements of his job and his tasks. (5)It emphasizes the value and importance of time, training skills, utilizing energies and talents, drawing life goals, and mastering how to deal with problems in a positive and effective manner .

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4.Definitions and types of Pollution

Pollution is the introduction of contaminants into the natural environment that cause harm.^[1] Pollution can take the form of any substance (solid, liquid, or gas) or energy (such as radioactivity, heat, sound, or light). Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants,environment.

The major forms of pollution are listed below along with the particular contaminants relevant to each of them:

- **Air Pollution:**

The release of chemicals and particulates into the atmosphere. Common gaseous pollutants include carbon monoxide, sulfur dioxide, chlorofluorocarbons (CFCs) and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight. Particulate matter, or fine dust is characterized by their micrometre size PM₁₀ to PM_{2.5}.

- **Chemical Pollution:**

The introduction of novel entities (NEs) in the environment is one of the planetary boundaries. In August 2022, scientists concluded that the (overall transgressed) boundary is a placeholder for multiple different boundaries for NEs that may emerge, reporting that per- and polyfluoroalkyl substances (PFAS) pollution, informally referred to as "forever chemicals", is one such new boundary.^[9]

- **Electromagnetic Pollution:**

The overabundance of electromagnetic radiation in their non-ionizing form, such as radio and television transmissions, Wi-fi etc. Although there is no demonstrable effect on humans there can be interference with radio-astronomy and effects on safety systems of aircraft and cars.

- **Light pollution:**

LP includes light trespass, over-illumination and astronomical interference.

- **Littering:**

The criminal throwing of inappropriate man-made objects, unremoved, onto public and private properties.

- **Noise Pollution:**

NP which encompasses roadway noise, aircraft noise, industrial noise as well as high-intensity sonar.

- **Plastic Pollution:**

PP involves the accumulation of plastic products and microplastics in the environment that adversely affects wildlife, wildlife habitat, or humans.

- **Soil Contamination**

SC occurs when chemicals are released by spill or underground leakage. Among the most significant soil contaminants are hydrocarbons, heavy metals, MTBE,^[15] herbicides, pesticides and chlorinated hydrocarbons.

- **Radioactive Contamination,**

RC resulting from 20th century activities in atomic physics, such as nuclear power generation and nuclear weapons research, manufacture and deployment. (See alpha emitters and actinides in the environment.)

- **Thermal pollution TP** is a temperature change in natural water bodies caused by human influence, such as use of water as coolant in a power plant.

- **Visual Pollution**

Which can refer to the presence of overhead power lines, motorway billboards, scarred landforms (as from strip mining), open storage of trash, municipal solid waste or space debris.

- **Water pollution,**

Caused by the discharge of industrial wastewater from commercial and industrial waste (intentionally or through spills) into surface waters; discharges of untreated sewage and chemical contaminants, such as chlorine, from treated sewage; and releases of waste and contaminants into surface runoff flowing to surface waters (including urban runoff and agricultural runoff, which may contain chemical fertilizers and pesticides, as well as human feces from open defecation).^{[16][17][18]}

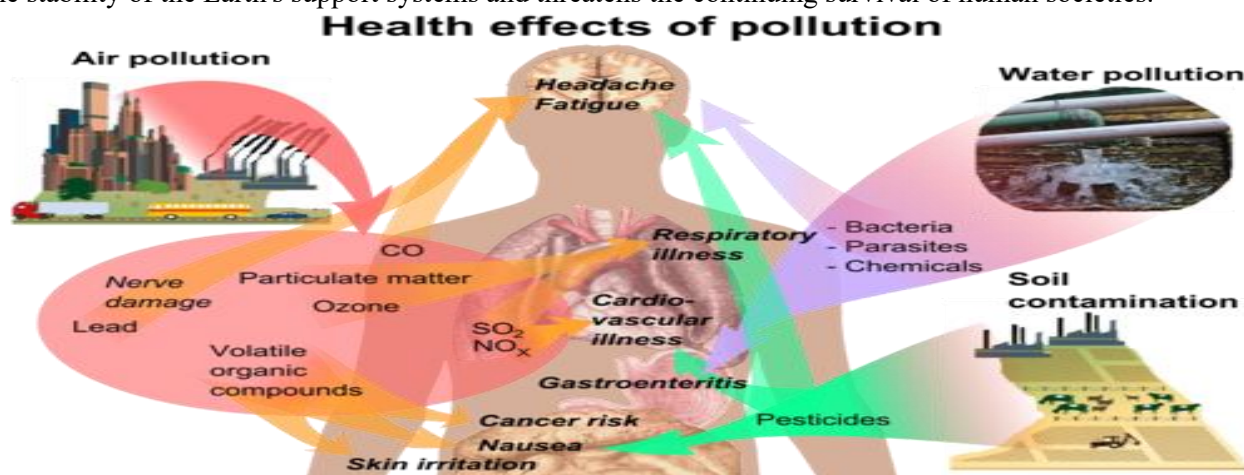
Concept- Pollution - Wikipedia

5.Natural causes of Pollution:-

One of the most significant natural sources of pollution are volcanoes, which during eruptions release large quantities of harmful gases into the atmosphere. Volcanic gases include carbon dioxide, which can be fatal in large concentrations and contributes to climate change, hydrogen halides which can cause acid rain, sulfur dioxide, which is harmful to animals and damages the ozone layer, and hydrogen sulfide, which is capable of killing humans at concentrations of less than 1 part per thousand.^[19] Volcanic emissions also include fine and ultrafine particles which may contain toxic chemicals and substances such as arsenic, lead, and mercury.^[10] Wildfires, which can be caused naturally by lightning strikes, are also a significant source of air pollution. Wildfire smoke contains significant quantities of both carbon dioxide and carbon monoxide, which can cause suffocation. Large quantities of fine particulates are found within wildfire smoke as well, which pose a health risk to animals.^[11]

6.Effect On Human health

Pollution affects humans in every part of the world. An October 2017 study by the Lancet Commission on Pollution and Health found that global pollution, specifically toxic air, water, soil and workplaces, kills nine million people annually, which is triple the number of deaths caused by AIDS, tuberculosis and malaria combined, and 15 times higher than deaths caused by wars and other forms of human violence.^[25] The study concluded that "pollution is one of the great existential challenges of the Anthropocene era. Pollution endangers the stability of the Earth's support systems and threatens the continuing survival of human societies."^[26]



Overview of main health effects on humans from some common types of pollution

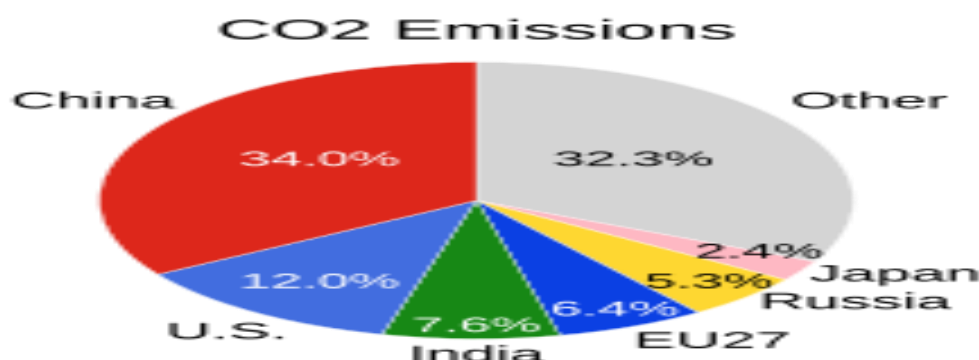
Adverse air quality can kill many organisms, including humans. Ozone pollution can cause respiratory disease, cardiovascular disease, throat inflammation, chest pain, and congestion. A 2010 analysis estimated that 1.2 million people died prematurely each year in China alone because of air pollution.^[12] China's high smog levels can damage the human body and cause various diseases.^[13] In 2019, air pollution caused 1.67 million deaths in India (17.8% of total deaths nationally).^[14] Studies have estimated that the number of people killed annually in the United States could be over 50,000.^[15] A study published in 2022 in *GeoHealth* concluded that energy-related fossil fuel emissions in the United States cause 46,900–59,400 premature deaths each year and PM_{2.5}-related illness and death costs the nation \$537–\$678 billion annually.^[16] In the US, deaths caused by coal pollution were highest in 1999, but decreased sharply after 2007. The number dropped by about 95% by 2020, as coal plants have been closed or have scrubbers installed.^[17]

In 2019, water pollution caused 1.4 million premature deaths.^[54] Contamination of drinking water by untreated sewage in developing countries is an issue, for example, over 732 million Indians (56% of the population) and over 92 million Ethiopians (92.9% of the population) do not have access to basic sanitation.^[19] In 2013, over 10 million people in India fell ill with waterborne illnesses, and 1,535 people died, most of them children.^[20] As of 2007, nearly 500 million Chinese lack access to safe drinking water.^[21]

Acute exposure to certain pollutants can have short and long term effects. Oil spills can cause skin irritations and rashes. Noise pollution induces hearing loss, high blood pressure, stress, and sleep disturbance. Mercury has been linked to developmental deficits in children and neurologic symptoms. Older people are significantly exposed to diseases induced by air pollution. Those with heart or lung disorders are at additional risk. Children and infants are also at serious risk. Lead and other heavy metals have been shown to cause neurological problems, intellectual disabilities and behavioral problems.^[22] Chemical and radioactive substances can cause cancer and birth defects.

7.Environment

Pollution has been found to be present widely in the natural environment. A 2022 study published in Environmental Science & Technology found that levels of anthropogenic chemical pollution have exceeded planetary boundaries and now threaten entire ecosystems around the world.^{[5][6]}



Global carbon dioxide emissions by jurisdiction, 2023

There are a number of effects of this:

Biomagnification describes situations where toxins (such as heavy metals) may pass through trophic levels, becoming exponentially more concentrated in the process.

- Carbon dioxide emissions cause ocean acidification, the ongoing decrease in the pH of the Earth's oceans as CO₂ becomes dissolved.
- The emission of greenhouse gases leads to global warming which affects ecosystems in many ways.
- Invasive species can outcompete native species and reduce biodiversity. Invasive plants can contribute debris and biomolecules (allelopathy) that can alter soil and chemical compositions of an environment, often reducing native species competitiveness.
- Nitrogen oxides are removed from the air by rain and fertilise land which can change the species composition of ecosystems.
- Smog and haze can reduce the amount of sunlight received by plants to carry out photosynthesis and leads to the production of tropospheric ozone which damages plants.
- Soil can become infertile and unsuitable for plants. This will affect other organisms in the food web.
- Sulfur dioxide and nitrogen oxides can cause acid rain which lowers the pH value of soil.

- Organic pollution of watercourses can deplete oxygen levels and reduce species diversity.

8. Recommendations and Policy Suggestions

- ❖ In spite of several initiatives by the government, and other stakeholder's still air pollution is showing alarming trends. As highlighted, 22 cities out of 30 world most polluted cities are in India (WHO, 2020). There is need of more effective implementation of S&T interventions, strategies and policies to tackle the pollution problem.
- ❖ Nitrous oxide (N₂O), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) are extremely potent and persistent greenhouse gases which are widely used in many applications and should be declared as priority pollutants.
- ❖ Mapping of city-wise major sources of pollution. The highly polluted areas should be declared as pollution management areas and preference should be given to control the emission sources in such areas.
- ❖ The government should enforce a legislation to prohibit the use of coal at least in some industrial and household applications.
- ❖ Need of Effective Collaboration between inter-state and interministerial for formulation of policies and implementation
- ❖ More Scientific studies on impacts of air pollution on health of human, environment and the ecosystems and need greater public awareness of the problems and action to be taken.
- ❖ Better enforcement of law and stricter monitoring of industries by strengthening pollution control boards.
- ❖ The government should enforce a legislation to prohibit the use of coal at least in some industrial and household applications.
- ❖ Need to secure greater public awareness of the problems and commitment to action at civic, commercial, and political levels.
- ❖ There is need to take campaign like 'War Against Pollution' for fight with air pollution.
- ❖ Increase transparency in government reporting of air quality statistics. Built a nationwide network of air pollution monitors and makes the data publicly available.

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“Environmental Sustainability in India: Challenges and Solutions for Sustainable Development”

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Abstract

India’s development trajectory must reconcile rapid economic growth with urgent environmental limits. This paper synthesizes recent policy shifts, empirical trends, and science on climate, air, water, waste, energy, land use and biodiversity to outline India’s sustainability outlook. This paper review future trends (urbanization, energy transition, climate risks), principal challenges (air pollution, heat stress, water stress, waste, ecosystem loss, financing and governance gaps), emerging approaches (net-zero alignment, carbon markets, green hydrogen, circularity, nature-based solutions, urban heat management), and the likely socioeconomic consequences of inaction. This paper proposes a policy and practice agenda for the 2025–2035 window to keep growth compatible with Sustainable Development Goals (SDGs) and India’s updated Nationally Determined Contribution (NDC). Recent milestones, such as the national single-use plastics ban, a legally enabled carbon market, Extended Producer Responsibility (EPR) for plastic packaging, and the National Green Hydrogen Mission signal momentum, yet implementation and just transition financing remain decisive.

Keywords: India; sustainability; climate change; air pollution; green hydrogen; circular economy; biodiversity; SDGs; carbon market; heat risk.

1. Introduction:

India’s economy is urbanizing and industrializing at scale, intensifying demand for energy, materials, land and water. Sustainability choices made this decade will shape development quality, health outcomes, and competitiveness for generations. India updated its NDC in 2022 to reduce emissions intensity of GDP by 45% from 2005 levels by 2030 and to achieve up to 50% cumulative installed power capacity from non-fossil sources by 2030, later crossing the 50% capacity milestone ahead of schedule in 2025 a symbolic but important inflection for the power system transition. However, the path forward is complex, requiring systemic transformation across sectors, regions, and communities.

2. Methods and Scope:

This is a narrative policy and evidence review drawing on official Government of India and multilateral publications (policies, laws, press notes), peer-reviewed literature, and assessment reports published since 2021. It foregrounds quantified indicators where robust national statistics exist and emphasizes developments with near-term implementation relevance (2025–2035).

3. Future Trends to Shape Sustainability:

3.1 Energy transition and electrification

India reached up to 50% of installed electricity capacity from non-fossil sources in 2025, with continued ambitions to reach 500 GW non-fossil by 2030. Yet coal still dominates generation, creating a dual challenge of integrating variable renewables at scale and managing coal’s decline without jeopardizing energy security.

3.2 Heat and climate risk escalation

IPCC AR6 finds South Asia will face more frequent and intense heatwaves; urban heat islands can raise city temperatures by $>2^{\circ}\text{C}$ relative to surroundings, compounding risks. Lancet Countdown’s India briefs link extreme heat to large productivity and income losses.

3.3 Urbanization and material demand

Accelerating urban growth increases demand for construction materials, transport energy and cooling, raising both emissions and resource footprints unless demand-side efficiency, green buildings, and circularity expand quickly.

3.4 Biodiversity and land-use pressures

India’s 2021 forest and tree cover stood at nearly 24.62% of geographical area (≈ 80.95 million ha), with mixed state-level trajectories and continued pressure from infrastructure and land conversion. The Biological Diversity (Amendment) Act, 2023 updates the regulatory architecture to streamline use while aiming to strengthen oversight.

4. Key Challenges:

4.1 Air pollution

Air quality remains a top public-health risk. India's National Clean Air Program (NCAP) now targets a 40% reduction in PM10 relative to 2017 by 2026, but implementation is uneven across non-attainment cities. Recent epidemiology underscores mortality and morbidity burdens.

4.2 Extreme heat and productivity

In 2023, heat exposure led to an estimated 181 billion potential Labour hours lost in India, with >US\$ 141 billion potential income losses particularly in agriculture and construction highlighting adaptation urgency.

4.3 Water stress and urban flooding

Rapid urbanization, wetland loss and intense rainfall events amplify flood risks; adaptation requires blue-green infrastructure and planning reforms.

4.4 Waste and plastics

Despite progress, municipal solid waste and plastics leakage persist. India's nationwide ban on identified single-use plastic items commenced on 1 July 2022; EPR for plastic packaging established mandatory reuse/recycling targets and a national portal for compliance.

4.5 Policy coherence, finance and capacity

While enabling laws exist (e.g., Energy Conservation Amendment enabling a carbon market), sub-national execution capacity, data systems, and green finance pipelines require scaling to meet targets.

5. Current Approaches and Policy Instruments:

5.1 Updated NDC and long-term strategy

The 2022 NDC commits to 45% emissions-intensity reduction and ~50% non-fossil capacity by 2030; the Long-Term Low-Emissions Development Strategy (LT-LEDS) lays out thematic pathways across sectors including electricity, transport, industry, cities, and forests.

5.2 Indian Carbon Market

The Energy Conservation (Amendment) Act, 2022 provides the legal basis for a national carbon credit trading scheme, with the central government empowered to issue carbon credit certificates; scheme design and methodologies are being operationalized.

5.3 National Green Hydrogen Mission

Approved in January 2023 with an initial outlay of ₹ 19,744 crore, the Mission targets domestic production, use in industry and transport, and cost reduction via the SIGHT programme and pilots.

5.4 Circularity: EPR and plastics ban

The 2022 EPR Guidelines mandate recycling/reuse targets and recycled content in packaging; identified single-use plastics are prohibited nationwide since July 2022, backed by enforcement campaigns.

5.5 Urban air quality management

NCAP funds non-attainment cities for monitoring, source apportionment, and control measures, with the extended 2026 target requiring accelerated enforcement, clean transport, power, and industry transitions.

5.6 Biodiversity governance

The Biological Diversity (Amendment) Act, 2023 revises access-and-benefit sharing and compliance mechanisms; updated rules were notified in 2024 to strengthen monitoring.

6. Consequences of Inaction:

Health: Persistent exposure to PM2.5/PM10 elevates mortality and cardiometabolic risks; heatwaves raise all-cause mortality and reduce Labour productivity.

Economic productivity: Heat stress already imposes large Labour and income losses; air pollution damages human capital and deters investment.

Water and urban risks: Greater rainfall intensity + impervious surfaces increase flood losses; coastal zones face sea-level rise and salinization.

Ecosystems and agriculture: Habitat fragmentation and climate variability threaten yields and ecosystem services, raising adaptation costs.

7. Solutions for Sustainable Development (2025–2035):

7.1 Power sector and grids

1. Accelerate VRE + firming: Scale solar/wind with storage, peaking hydro, and grid-forming inverters; expand transmission and flexibility markets to convert capacity into dependable clean generation.
2. Coal transition planning: Retire the least-efficient units, retrofit for flexibility, and create just transition funds for affected districts.

7.2 Industry decarbonization

Green hydrogen for hard-to-abate sectors (ammonia, refining, steel) linked to the Mission's SIGHT incentives and emerging carbon market signals; adopt robust MRV for credit integrity.

Energy efficiency & electrification: Extend PAT schemes; mandate heat-pump adoption where feasible.

7.3 Clean transport

Tighten fuel economy/CO₂ standards, expand EV and public-transport fleets, deploy green hydrogen for heavy duty segments, and accelerate battery recycling.

7.4 Air quality and health

NCAP 2.0: Integrate health metrics into city clean-air plans; scale source-specific controls (industrial stacks, construction dust, clean cooking, distributed diesel) and continuous emissions monitoring with public dashboards.

7.5 Water security and climate-resilient cities

Protect and restore urban blue-green networks (lakes, wetlands, floodplains), enforce no-build zones, and mainstream sponge-city design to reduce flood losses.

7.6 Circular economy and waste

Tighten EPR compliance via the national portal (real-time tracking, third-party audits), expand segregated collection and material recovery facilities, and enable recycled-content procurement markets.

7.7 Nature-based solutions and land stewardship

Scale watershed restoration, mangrove protection, and agroforestry; use payment for ecosystem services and blended finance to unlock private capital. Track forest and tree cover transparently using open MRV.

7.8 Heat resilience and public health

Universalize Heat Action Plans with early-warning systems, cool-roof/cool-pavement programs, urban tree canopy targets, and worker heat-safety standards. Anchor financing in municipal bonds and disaster-risk pools.

7.9 Governance, data and finance

Operationalize the Indian Carbon Market with clear allowance trajectories, strong MRV, and anti-greenwashing guardrails; align public-sector capex and state budgets to climate-resilient infrastructure.

8. India-Focused Case Snapshots:

50% non-fossil installed capacity milestone (2025): Demonstrates policy traction; next challenge is boosting clean generation share through storage, demand-response, and market reforms.

Plastics policy mix: National single-use plastics prohibition + EPR for packaging is a rare, comprehensive set—success depends on enforcement and circular infrastructure build-out.

Forests and biodiversity: National cover near one-quarter, but state-level variability warrants localized strategies; 2023 biodiversity law amendments modernize compliance.

9. Discussion:

India's sustainability architecture is maturing quickly: updated NDC, hydrogen mission, plastics/EPR regime, and a legal basis for carbon markets. The implementation frontier is state and city capacity, data-rich accountability, and transition finance (for coal-regions, MSMEs, municipal services). Co-benefits—health gains from cleaner air, resilience to heat and floods, and jobs in renewables, retrofits and repair—justify front-loading investments.

10. Policy Recommendations:

1. Make "50% capacity" translate into clean generation: Competitive storage tenders, ancillary services markets, and time-of-day tariffs to value flexibility.
2. Launch a Health-First NCAP push: Link funding to PM2.5 outcomes; scale clean construction codes and dust control; electrify city buses; enforce industrial standards.
3. Stand up a high-integrity carbon market: Notify detailed trading scheme, registry, and MRV rules; sequence sectoral inclusion; avoid double counting with voluntary credits.
4. Hydrogen for steel and fertilizer: Prioritize offtake contracts, pipelines in industrial clusters, and electrolyser manufacturing standards under MNRE.
5. Scale circular infrastructure: Fund MRFs, composting and plastics recycling; enforce EPR via CPCB portal analytics and audits.
6. City heat resilience: Mandate Heat Action Plans; codify cool-roof standards in building bylaws; protect urban forests and wetlands.
7. Nature finance: Pilot PES/green-credit instruments for watershed and mangrove protection; align with biodiversity law and community rights.

11. Conclusion:

India's window to lock in high-quality, climate-resilient growth is this decade. Policies now on the books can deliver substantial gains if backed by rigorous implementation, sub-national capacity, and catalytic finance. The benefits cleaner air and water, safer cities, competitive green industries, and safeguarded ecosystems constitute a compelling national development strategy.

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Environmental Catastrophe and Postmodern Anxiety in Don DeLillo's *White Noise*

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Abstract

The paper studies Don DeLillo's novel *White Noise* which critiques environmental catastrophe and ecological consciousness in late capitalist America. The novel's Airborne Toxic Event symbolizes society's fractured relationship with nature and inadequate responses to ecological crises.

The study employs ecocritical theory, postmodern cultural discourse, and environmental justice frameworks to analyze how *White Noise* reveals environmental crises as deeply ingrained within consumerist and technological systems. Drawing upon Lawrence Buell's environmental imagination theory, Jean Baudrillard's simulacra analysis, and Rob Nixon's concept of slow violence, this research positions the novel as a prescient examination of environmental anxiety in the era of media saturation.

DeLillo's work critiques environmental denial through consumer culture, technological mediation, and media representation. It demonstrates how postmodern society generates environmental crises and consciousness.

Keywords: ecocritical theory, postmodern cultural discourse, and environmental justice, ecological consciousness

Introduction

In Don DeLillo's seminal novel *White Noise* (1985), environmental catastrophe emerges as a pivotal force shaping postmodern American society. The author elucidates how late-capitalist culture responds to ecological crises through the distorted lenses of mass media, consumer culture, and technological mediation. The novel dramatizes the psychological and cultural repercussions of environmental disasters, exposing the inadequacy of institutional responses to ecological threats. DeLillo's narrative exposes how environmental crises are filtered through technological systems that create a sense of detachment from environmental reality while simultaneously engendering novel forms of ecological anxiety.

Environmental disaster is not portrayed as a distant possibility but as an embedded reality that profoundly influences individual consciousness and social relations in contemporary society. The novel's central episode, the Airborne Toxic Event, serves as a symbolic representation of industrial society's fractured relationship with nature and the failure of modern institutions to provide a stable sense of meaning in the face of environmental risk. This toxic spill compels suburban residents to confront their vulnerability to environmental hazards and reveals how environmental disasters are mediated through representation rather than direct experience.

DeLillo's work predicts contemporary environmental concerns, critiquing postmodern media saturation and consumer culture. The novel links ecological destruction to social justice, economic inequality, and democratic governance, prompting readers to reevaluate their relationship to nature.

Review of Literature

Ecocritical scholarship positions *White Noise* as a significant contribution to environmental literature that examines the intersection of technology, media, and ecological crisis in postmodern society. Lawrence Buell's foundational work establishes the theoretical framework for understanding how literature represents nature as an active presence rather than a passive backdrop. He argues that environmental literature must portray nature as a dynamic force that shapes human experience and challenges anthropocentric assumptions (Buell 7). His concept of "environmental imagination" provides a critical lens for analyzing how DeLillo's toxic cloud functions as a living entity that disrupts suburban normalcy while forcing characters to confront their relationship to the non-human world.

Contemporary scholars extend Buell's framework to examine how *White Noise* engages with what Timothy Morton calls "ecological thought", a mode of thinking that recognizes the interconnectedness of all living systems while exposing the anthropocentric biases that underlie environmental destruction (Morton 4). Morton's work on "ecological melancholia" illuminates the psychological dimensions of environmental loss in

postmodern society, providing insight into how the novel's characters experience environmental anxiety and ecological disconnection.

Rob Nixon's theory of "slow violence" offers another critical perspective for understanding how environmental harm occurs gradually and disproportionately affects marginalized communities while remaining largely invisible to mainstream consciousness (Nixon 2). Nixon's analysis of invisible environmental destruction provides context for understanding how the novel's toxic event represents broader patterns of environmental injustice and corporate irresponsibility. Jean Baudrillard's theory of simulacra and simulation proves essential for understanding how environmental crisis becomes mediated through technological systems that replace direct experience with media representation (Baudrillard 1). Baudrillard's concept of hyperreality reveals how media representations of environmental disasters can precede and shape reality rather than merely reflecting it. This dynamic is dramatized in the novel through its portrayal of the Airborne Toxic Event. Recent scholarship applies Baudrillard's framework to analyze how the novel's SIMUVAC exercises literalize the "precession of simulacra," where simulation precedes and determines reality rather than preparing for it.

Guy Debord's "society of the spectacle" and Ulrich Beck's "risk society" theories are used to analyze how environmental crises are commodified and consumed as media spectacles. David Cowart's literary analysis examines how consumer spaces displace ecological awareness. Peter Boxall's "supermarket sublime" concept explores consumer culture's aesthetic experiences, obscuring ecological costs. Ecocritical studies examine the novel's environmental anxiety, eco-anxiety, and climate grief, anticipating contemporary climate change and environmental justice concerns.

Textual Analysis

The Airborne Toxic Event: Environmental Crisis as Hyperreal Spectacle

The Airborne Toxic Event serves as the primary vehicle through which the novel explores environmental crises through the lens of postmodern media saturation and institutional failure. DeLillo's portrayal of the toxic cloud illustrates how environmental disasters are mediated through technological systems that transform tangible reality into consumable spectacle while obscuring the actual environmental threat. The event commences with a railway accident involving a tanker carrying Nyodene D, a fictional chemical compound whose effects remain perpetually uncertain throughout the novel. The uncertainty surrounding the chemical's properties mirrors the challenge that scholars identify as representing environmental harm that transcends human sensory perception.

The official response to the disaster involves a series of constant revisions of terminology, revealing the inadequacy of institutional language to address environmental crises. Initially, the authorities describe the cloud as a "feathery plume," then revise this to "a black, billowing cloud," and finally settle on "the airborne toxic event" (DeLillo 117). This linguistic evolution demonstrates how environmental disasters become subject to discursive manipulation that serves political and economic interests rather than environmental comprehension. The symptoms of exposure to Nyodene D undergo similar revision, shifting from "skin irritation and sweaty palms" to "nausea, vomiting, and shortness of breath" to "heart palpitations and a sense of déjà vu" (127). These contradictory medical reports reflect the novel's critique of how environmental knowledge becomes compromised by institutional incompetence and media mediation.

The novel's most prominent depiction of simulation is provided through the SIMUVAC exercise that accompanies the actual emergency. The evacuation supervisor elucidates the program's objectives, thereby revealing the inversion of priorities between simulation and reality: *The more we rehearse disaster, the safer we'll be. The more we rehearse disaster, the safer we'll be. The more we rehearse disaster, the safer we'll be. What we're seeing here is a chance to use the real event in order to perfect the simulation* (139). This statement embodies Jean Baudrillard's theory of simulacra, wherein simulation precedes and predetermines reality rather than preparing for it. As the evacuation unfolds, the toxic cloud's anthropomorphic attributes become evident, with DeLillo describing it as moving "like a death ship in a Norse legend" (127). This mythological reference underscores the epic nature of environmental catastrophe while suggesting how technological society transforms environmental crises into narrative spectacles. The cloud transforms into what ecocritical theory identifies as a "more-than-human" entity that disrupts human-centric narratives while exposing the vulnerability of technological systems to environmental disruption. Consequently, the event engenders what Ulrich Beck refers to as "risk society" - a social formation characterized by the systematic production of technological hazards that surpass human capacity for control.

The characters' reactions to the toxic threat illustrate how environmental crises become intrinsically linked to concerns about social inequality and environmental justice. Initially, Jack Gladney dismisses the gravity of the threat, reflecting his socioeconomic status and educational background:

I don't see myself fleeing an airborne toxic event. That's for people who live in mobile homes out in the scrubby parts of the county, where the fish hatcheries are. Society is set up in such a way that it's the poor and the uneducated who suffer the main impact of natural and man-made disasters (114).

This explains how environmental disasters impact communities differently based on their socioeconomic status, underscoring what environmental justice theory posits as “environmental racism” the systematic exposure of marginalized communities to environmental hazards. The evacuation process exposes latent social inequalities while revealing how environmental privilege manifests through access to information and resources for protection.

Consumer Culture and Environmental Alienation

DeLillo illuminates how postmodern society constructs systematic impediments to environmental awareness through commodity consumption and commercial spectacle. The novel's frequent depictions of supermarkets and shopping malls illustrate how consumer spaces serve as substitutes for environmental connection while obscuring ecological costs. The supermarket metamorphoses into what Peter Boxall refers to as the “supermarket sublime”—a novel aesthetic experience that emerges from encounters with consumer abundance while simultaneously creating a sense of detachment from environmental reality. Murray Siskind's analysis of the supermarket reveals how consumer spaces become sites of pseudo-spiritual experience that substitute for environmental connection:

Everything is concealed in symbolism, hidden by veils of mystery and layers of cultural material. But it is psychic data, absolutely. The large doors slide open, they close unbidden. Energy waves, incident radiation. All the letters and numbers are here, all the colors of the spectrum, all the voices and sounds, all the code words and ceremonial phrases. It is just a question of deciphering, rearranging, peeling off the layers of unspeakability (37).

Murray's portrayal of the supermarket as akin to “the Tibetan Book of the Dead” posits consumer culture as a form of spiritual practice that engenders a sense of detachment from ecological consciousness, thereby offering an illusion of transcendence. The novel's critique of consumer culture anticipates contemporary concerns regarding “greenwashing” and the commodification of environmental awareness, wherein environmental awareness becomes an additional consumer choice rather than a fundamental ethical imperative.

The characters' shopping patterns illustrate how consumer culture manifests as a form of environmental denial, hindering the recognition of ecological boundaries and environmental degradation. Jack's observations of the supermarket create what he describes as a sense of completeness and order that shields him from environmental anxiety:

The supermarket shelves have been rearranged. It happened one day last week. There is agitation and panic in the aisles, dismay in the faces of older shoppers. They walk in a fragmented trance, stop and go, clusters of well-dressed figures frozen in the aisles, trying to figure out the pattern, discern the underlying logic, trying to remember where they'd seen the Cream of Wheat (325).

This illustration elucidates how consumer culture engenders what environmental theorists refer to as “environmental amnesia,” characterized by the systematic erasure of ecological connections mediated through commodity consumption. The supermarket's aesthetic order operates as a “simulacrum,” as coined by Jean Baudrillard, a replica devoid of an original that supplants genuine experience with manufactured simulation.

Further, DeLillo critiques the media's portrayal of environmental crises, demonstrating how television and radio coverage of the Airborne Toxic Event generates “hyperreality” and an “information-action ratio” imbalance. This disconnects between mediated representation and lived experience, coupled with the commodification of environmental disasters for entertainment purposes, hinders meaningful environmental action. The novel delves into how environmental crises intensify death anxiety, compelling individuals to confront their vulnerability and mortality. This existential reflection, catalyzed by the toxic event, underscores the relationship between technology, mortality, and environmental degradation, anticipating contemporary concerns such as “eco-anxiety” and “climate grief.” It explores how technological advancement engenders environmental risks and undermines human comprehension of these risks. The characters' inability to comprehend the toxic threat signifies a “crisis of the imagination” in addressing technological environmental challenges.

Conclusion and Findings

Thus, *White Noise*, explores how environmental catastrophe in postmodern America manifests both as a tangible reality and a cultural construct that profoundly impacts individual consciousness and social interactions through technological, media, and consumerist influences. Environmental crises are mediated through technological systems that create a sense of detachment between individuals and direct experience,

thereby engendering novel forms of anxiety. The Airborne Toxic Event serves as a metaphor for how postmodern society perceives environmental threats through media representations, institutional responses, and consumer spectacle.

DeLillo's analysis elucidates psychological and cultural mechanisms that facilitate environmental denial while simultaneously generating ecological anxiety within late capitalist society. The novel critiques media saturation, demonstrating how environmental disasters transform into spectacles rather than catalysts for raising awareness or initiating action. Consumer culture establishes barriers to environmental consciousness by presenting consumption as a substitute for genuine connection while simultaneously obscuring ecological costs.

DeLillo's portrayal of technological anxiety illuminates how postmodern society generates novel risks through technological advancements while simultaneously undermining human control. The novel engages with the concepts of simulation and hyperreality, underscoring the inseparability of environmental crisis from representation, interpretation, and communication within a mediated world where reality and simulation blur. Environmental justice reveals how ecological disasters affect communities differently based on social and economic status, filtered through media that conceals these inequalities and hinders meaningful action.

The novel's analysis of environmental consciousness in the age of media saturation elucidates how environmental awareness becomes both facilitated and constrained by technological systems that mediate human-environmental relationships. Environmental crisis becomes intrinsically linked to broader societal issues such as social justice, economic inequality, and democratic governance, underscoring the interconnectedness of environmental and social problems. DeLillo's narrative strategy prompts readers to recognize the interconnection between human and non-human systems while critiquing anthropocentric worldviews that underpin environmental destruction.

The novel's comprehensive critique of the cultural dimensions of ecological crisis and its call for transformative human-nature relationships in the face of environmental threat are its salient contributions. The work offers pertinent insights into contemporary environmental challenges, simultaneously engendering environmental crisis and environmental denial through the logic of late capitalism and technological mediation. It remains an indispensable reading material for comprehending the intricate relationship between culture, technology, and environmental consciousness in contemporary society. It illuminates the cultural aspects of ecological crisis and challenges readers to reevaluate their relationship with nature and their environmental responsibilities.

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The Role of Digital Media in Shaping Youth Engagement with Environment, Health and Climate Resilience

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Abstract

This study investigates the role of digital media in shaping youth engagement with the environment, public health, and climate resilience, comparing its effectiveness with traditional print media. Young people increasingly rely on digital platforms for news, education, and activism, positioning these channels as crucial for raising awareness and promoting behavioral change. The immediacy, interactivity, and personalization of digital media make it particularly powerful for addressing global challenges, yet its potential is undermined by issues such as misinformation, digital fatigue, and questions of source credibility (Cinelli et al., 2020; Vraga & Bode, 2021).

Drawing on a survey-based methodology, this study examines youth preferences, trust in digital versus print media, and the types of content that resonate most with them when addressing environmental, health, and climate-related issues. Findings indicate that youth engage more actively with multimedia formats—such as videos, infographics, and interactive campaigns—and are strongly influenced by social media communities and digital influencers. However, concerns about misinformation significantly shape perceptions of credibility and limit the effectiveness of certain platforms.

The study concludes that while digital media plays a transformative role in fostering youth engagement with environmental sustainability, health promotion, and climate resilience, strategic management of content and credibility is essential. These insights provide practical recommendations for policymakers, educators, and organizations seeking to optimize digital platforms for global health and environmental communication.

Keywords: Digital Media, Youth Engagement, Environment, Public Health, Climate Resilience

Introduction

The rapid expansion of digital media has reshaped how societies engage with pressing global challenges, including environmental sustainability, public health, and climate resilience. Among the most digitally connected demographic groups, youth stand at the forefront of this transformation, with their media habits characterized by interactivity, immediacy, and visual engagement (Anderson & Jiang, 2018; Pew Research Center, 2022). As the next generation of leaders and change-makers, young people play a critical role in shaping responses to these interconnected global issues.

In public health, digital platforms have emerged as indispensable tools for disseminating information and mobilizing communities, particularly during crises such as the COVID-19 pandemic (Mheidly & Fares, 2020; Zarocostas, 2020). In environmental and climate communication, digital campaigns—often led by youth activists—have successfully amplified awareness and participation, leveraging platforms like Instagram, YouTube, and TikTok to drive global conversations and action (Keller et al., 2020; Olausson, 2021).

Yet, the potential of digital media is accompanied by persistent challenges. The proliferation of misinformation on issues such as vaccination, climate denial, and environmental science has undermined trust in online platforms (Cinelli et al., 2020; Bode & Vraga, 2021). Furthermore, the rise of “digital fatigue” and skepticism toward algorithm-driven content complicates efforts to engage youth meaningfully (Milošević Đorđević et al., 2021). By contrast, traditional print media—though declining in reach—continues to be associated with credibility and depth, suggesting that a hybrid approach may be beneficial (Tsfati & Ariely, 2014).

This study explores how digital media shapes youth engagement across three interlinked domains: the environment, health, and climate resilience. Specifically, it investigates youth preferences for different content formats, their trust in digital versus traditional media, and the extent to which digital media influences awareness and behavioral change. By doing so, it seeks to provide evidence-based insights for designing communication strategies that empower youth as informed, proactive, and resilient actors in the face of global challenges.

Literature Review

Digital Media and Youth Engagement

Digital media has become central to how young people access information, connect with peers, and engage in social change. Studies show that youth are far more likely to consume and interact with digital content than with traditional forms such as print media (Anderson & Jiang, 2018; Pew Research Center, 2022). The

interactive and participatory nature of digital platforms enhances their potential to engage young audiences, with formats such as videos, infographics, and interactive campaigns proving particularly effective (Keller et al., 2020). Social media has further blurred the line between information consumption and activism, with platforms like TikTok, Instagram, and Twitter serving as hubs for environmental and health-related mobilization (Olausson, 2021).

Digital Media and Public Health Communication

Digital platforms have played a vital role in disseminating health information, particularly during public health crises. During the COVID-19 pandemic, social media was instrumental in sharing prevention guidelines, vaccine information, and mental health resources (Mheidly & Fares, 2020; Zarocostas, 2020). Research highlights the importance of multimedia formats in health promotion, as visual and interactive content often improves message retention and behavioral change among young audiences (Wang et al., 2019). At the same time, the emergence of online health communities and influencers has expanded opportunities for peer-driven engagement, though not without concerns about credibility and accuracy (Southwell & Thorson, 2015).

Digital Media, Environment, and Climate Resilience

Digital media has amplified environmental and climate movements, empowering youth activists and organizations to mobilize global audiences. Campaigns like Fridays for Future illustrate how platforms such as Twitter and Instagram serve as key spaces for awareness-building, solidarity, and advocacy (Keller et al., 2020; Pickard, 2019). Research also shows that localized digital campaigns in the Global South are particularly effective when they leverage regional languages, community influencers, and culturally relevant content. These strategies help bridge the digital divide and enhance inclusivity in climate resilience communication (Veland et al., 2018).

Challenges: Misinformation, Fatigue, and Credibility

Despite its strengths, digital media faces persistent challenges in maintaining trust. Misinformation—ranging from anti-vaccination claims to climate denial—has spread widely on social platforms, undermining the credibility of digital campaigns (Cinelli et al., 2020; Bode & Vraga, 2021). Youth often express skepticism about online sources, citing concerns about hidden agendas, bias, and lack of fact-checking (Vraga & Bode, 2020). Additionally, “digital fatigue” has emerged as a barrier to sustained engagement, with the constant influx of information overwhelming audiences (Milošević Đorđević et al., 2021). Addressing these issues requires not only fact-checking initiatives but also digital literacy programs that empower youth to critically evaluate content.

Print Media vs. Digital Media

Although print media has declined sharply in relevance among youth, it continues to be perceived as more credible and less susceptible to manipulation compared to digital media (Tsfati & Ariely, 2014). Print’s association with legitimacy and depth suggests that hybrid communication strategies—integrating the immediacy of digital platforms with the authority of traditional media—may be particularly effective (Choi et al., 2017). However, for most young audiences, digital platforms remain the first point of contact with health and climate information, underscoring the necessity of optimizing digital channels rather than relying solely on print (Olausson, 2021).

Research Gaps

While significant progress has been made in understanding digital media’s role in public health and climate communication, gaps remain. Few studies examine the comparative effectiveness of digital versus print media in fostering youth engagement, particularly in non-Western contexts. Moreover, limited attention has been paid to the long-term behavioral impacts of digital campaigns on youth (Veland et al., 2018). Future research should explore hybrid strategies that combine the strengths of digital and traditional media, while addressing misinformation and ensuring inclusivity across cultural and socio-economic divides.

Methods

This study employed a survey-based, cross-sectional design to examine how youth engage with digital media compared to traditional print sources when accessing information about public health, environmental sustainability, and climate resilience. The survey targeted individuals aged 18–25, a demographic widely recognized as both digitally active and pivotal to future resilience-building efforts (Anderson & Jiang, 2018). The instrument was developed based on validated constructs from prior research on digital media trust, content preferences, and health communication (Vraga & Bode, 2020; Keller et al., 2020). Questions assessed:

1. Frequency of media use (digital vs. print).
2. Preferred information sources for public health and climate topics.
3. Trust and credibility perceptions of digital content.

4. Engagement with specific content formats (videos, blogs, infographics, interactive campaigns).
5. Behavioral outcomes, such as the likelihood of adopting health or environmentally sustainable practices after engaging with campaigns.

A sample of 50 respondents was recruited through purposive sampling, representing diverse educational and socio-economic backgrounds. Descriptive statistics were used to summarize usage patterns, preferences, and trust levels, while thematic coding was applied to open-ended responses regarding suggested improvements in digital campaigns.

Results

This study reveals a deeply integrated digital media culture among youth respondents. A significant majority (73.3%) reported accessing digital media multiple times daily, underscoring its centrality in their daily lives. When seeking information on critical issues like health and climate change, digital platforms were the overwhelming source of choice (80%), while traditional media and peer discussions accounted for only 6.7%. Video content emerged as the most engaging format (33.3%), followed by articles and social media posts (20% each), indicating a preference for dynamic, visual content. However, trust in digital media showed notable ambivalence, with 40% expressing only "somewhat trust" and 33.3% remaining neutral. This skepticism aligns with findings that misinformation was the primary concern for nearly half of respondents (46.7%), far exceeding other issues like privacy or bias.

Despite these concerns, digital media demonstrated strong potential for mobilization, with 66.7% of respondents reporting they were "very likely" to take action after engaging with digital campaigns. Respondents suggested improvements including better platform integration, more authentic youth representation, and culturally diverse content to enhance relevance and impact. These findings illustrate a generation that is highly engaged with digital media yet critically aware of its challenges.

Discussion

The findings affirm that digital media has eclipsed print as the dominant source of information among youth, particularly regarding public health and climate resilience. This aligns with global evidence demonstrating the digital-first orientation of young people (Pew Research Center, 2022; Olausson, 2021).

The preference for multimedia formats such as videos underscores the importance of visual storytelling and interactive design in health and climate campaigns (Wang et al., 2019). Furthermore, the significant proportion of respondents willing to act after engaging with digital content suggests that well-crafted campaigns can foster not only awareness but also behavioral change—a finding consistent with earlier studies on youth-led climate movements and health communication (Keller et al., 2020; Pickard, 2019).

However, trust emerged as a critical challenge. The ambivalence expressed toward digital sources echoes broader concerns about misinformation and bias online (Cinelli et al., 2020; Bode & Vraga, 2021). With nearly half of respondents citing misinformation as their primary concern, it is clear that digital literacy initiatives and fact-checking mechanisms must be integral to youth-targeted campaigns.

The study also revealed a hybrid potential: while print is no longer the dominant medium, its enduring association with credibility suggests that hybrid strategies—leveraging digital immediacy with print legitimacy—may be most effective for certain contexts (Tsfati & Ariely, 2014). This is particularly relevant in areas where misinformation is rampant or digital fatigue sets in.

Finally, calls for more relatable, diverse, and inclusive content highlight the necessity of tailoring campaigns to reflect the identities, languages, and lived experiences of young audiences (Veland et al., 2018).

Conclusion

This study demonstrates that digital media plays a pivotal role in shaping youth engagement with public health, environmental issues, and climate resilience. Its immediacy, interactivity, and multimedia affordances make it far more effective than traditional print media in capturing attention and driving action. However, challenges around misinformation, digital fatigue, and trust remain pressing.

Future strategies should:

1. Prioritize multimedia and interactive content (e.g., videos, infographics).
2. Integrate fact-checking and digital literacy training to address misinformation.
3. Adopt hybrid approaches, combining the reach of digital media with the credibility of traditional formats.
4. Ensure inclusive and diverse representation, tailoring content to cultural and regional contexts.

By addressing these challenges, policymakers, educators and campaign designers can harness digital platforms not only as information tools but also as catalysts for building an informed, resilient, and health-conscious youth population.

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Role of Education in Promoting Sustainable Development

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Abstract:

Sustainable development relies on education to foster ecological consciousness, social accountability, and economic growth. The function of formal, non-formal, and informal education systems in the achievement of sustainability objectives over the long run is investigated in this article, which investigates the relationship between education and sustainable development. The research, which is based on global frameworks like the United Nations Sustainable Development Goals (SDGs), asserts that education gives people the tools they need to tackle issues like climate change, social justice, and resource management. In order to determine how education influences environmentally conscious actions, civic involvement, and economically sustainable choices, this study will employ a mixed-method research strategy that incorporates quantitative and qualitative data analysis. Because it raises consciousness and gives individuals agency, education is key to sustainable development, according to the results.

Keywords: *Education, Sustainable Development, SDGs, Environmental Awareness, Social Equity*

1. Introduction

Among the most pressing problems facing the world today is sustainable development, which aims to provide a steady economy, equitable distribution of wealth, and pristine natural areas for future generations. Brundtland Commission's concept of sustainable development (Garcia, 2017) states that all human endeavors must incorporate sustainability in the long term. As this concept puts it, development should take care of present demands without compromising those of future generations. Because it raises awareness, changes behavior, and equips individuals with the tools they need to live sustainably, education is a potent tool for sustainability. A well-educated populace is better able to make informed decisions and act ethically, which in turn promotes sustainability on a personal, community, state, and global level (Berchin, 2021). Environmentally conscious individuals, social justice warriors, and economically resilient communities are all products of quality education, which begins in elementary school and continues through college and beyond (Golub, 2015). Also, in the 2030 Agenda for Sustainable Development, SDG 4 (Quality Education) is a standalone goal as well as a tool to help achieve other SDGs. (Bakhati 2015) argues that education may become a transformational process by bridging the gap between knowledge and action via the integration of sustainability principles into pedagogy and curriculum.

Sustainable development is one of the world's most important current concerns since it aims to preserve natural resources while also promoting economic growth and social justice (Veckalne, 2022). The term "sustainable development" was initially defined in a 1987 study by the Brundtland Commission. Addressing present demands while ensuring future generations can meet their own needs was the declared goal. (Bengtsson, 2018). Since then, lawmakers, governments, and international organizations have acknowledged the necessity to incorporate sustainability principles into every aspect of human life. When considering these factors, education is vital because it provides individuals with the knowledge and skills necessary to create a better future for themselves, their families, and the planet (Jickling, 2019).

The United Nations Sustainable Development Goals (SDGs) were established in 2015, further emphasizing the importance of education. Goal 4 emphasizes that all people should have access to high-quality education and opportunities to continue learning throughout their lives (Pedro, 2019). Education is the key to achieving the other sixteen goals, such as reducing extreme poverty, advancing gender equality, halting the progression of climate change, and fostering responsible consumerism. The environmental movement, critical thinking, and social responsibility may all find a home in the curricula of K-12, higher education, and alternative educational settings (Tomislav, 2018). Sustainable practices, such as responsive resource management and the usage of renewable energy, are more likely to be adopted by cultures that have a higher level of education. Bebbington (2018) argues that education does double duty: it teaches people the technical and entrepreneurial skills necessary for green economies and it brings attention to important social concerns including pollution,

deforestation, climate change, and inequality. Particularly in underdeveloped countries, education is key when it comes to addressing environmental issues and implementing community-based solutions (Keesstra, 2016).

2. Statement of the Problem

Recent global events including climate change, resource depletion, wealth inequality, and economic instability have elevated the question of sustainability to the forefront of public discourse. In order to tackle these problems, communities and people may utilize education as a weapon. Education equips individuals with the information, skills, and values necessary to succeed. Although international frameworks such as SDG 4 on Quality Education and SDG 13 on Climate Action are beneficial, extensive integration of sustainability principles within educational institutions is an ongoing challenge. The current educational institutions are mostly concerned with the conventional academic curriculum and this implies that sustainability, social responsibility and environmental conscience are not a priority. This disparity limits students' ability to apply what they learn in class to make a real difference in the fight for sustainable development. As a result, research into the effects of education on sustainable development, its efficacy, and the obstacles that hinder it from positively impacting social, economic, and environmental sustainability is necessary.

3. Objectives of the Study

- Consider how education may contribute to disseminating knowledge and facts regarding sustainable development.
- Determine the role that elementary, secondary, and higher education play in teaching sustainable behaviors.
- Look at how education affects the sustainability aspects related to society, economy, and the environment.
- Suggest ways to incorporate sustainability ideas into school policies and programs.

4. Research Questions

1. What impact does education have on raising consciousness and enhancing comprehension of sustainable development?
2. How can schools help ensure the long-term viability of our planet's social and economic systems?
3. What is the correlation between people's and communities' educational attainment and their use of environmentally friendly behaviors?
4. How can we make education an even more integral part of the process of attaining the SDGs?

5. Significance of the Study

An important part of this study is looking at education as a factor that promotes sustainable development. Teaching people new information is important, but education also has the power to influence their beliefs, values and actions in ways that promote economic resilience, social equality, and environmental responsibility. Examining how K-12, higher education, and community-based learning programs can foster the development of responsible individuals, Addressing the pressing issues of social injustice, climate change, and resource management is the primary goal of this study. When formulating plans to accomplish the SDGs, the study's conclusions can be useful for policymakers, educators, and institutions. Another perk is that it helps bridge the gap between academic theory and practical application, which is always welcome. Lastly, the article suggests ways in which education may play a pivotal role in bringing about a future that is more sustainable, ecologically conscious, and inclusive.

6. Research Methodology

To gain a comprehensive insight into the ways education can contribute to sustainable development, this research will have a mixed-methods research design. The approach is a combination of quantitative and qualitative methods, therefore it can give both a high-level statistical overview and more detailed data about the context.

6.1 Research Design

The research was based on an exploratory and descriptive research strategy. Quantitative data was gathered using structured questionnaires, while qualitative data was gathered through interviews and case studies. Education, as well as the views and encounters of those involved, may also have measurable impacts, and this layout helped us to pinpoint them.

6.2 Population and Sample Selection

Participants were faculty, students and policymakers in both urban and rural schools and universities. The 300 people selected were done randomly using a stratified random sampling method:

- 200 students,
- 70 teachers,

- 30 policymakers/administrators.

This ensured diversity in perspectives across different educational levels and stakeholder groups.

6.3 Data Collection Methods

Survey Questionnaires to be used to capture awareness, attitudes, and practices in regard to sustainability and education. Teachers and policymakers were interviewed in semi-structured interviews to provide qualitative information about curriculum, policy support, and challenges.

Primary data was complemented by the analysis of the available policy documents, SDG reports, and institutional sustainability initiatives.

6.4 Tools and Instruments Used

The poll measured attitudes and behaviors using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." To keep the interviews on track, we employed interview rules.

6.5 Data Analysis Techniques

We have employed SPSS and Excel, two of the most commonly used statistical packages, to calculate descriptive statistics, carry out correlation analysis and develop regression models to analyze the relationship between schooling and eco-consciousness. Thematic analysis codes were used to identify policy, curricular, and behavioral influences by coding interview transcripts.

7. Results

Several key issues about education's role in promoting sustainable development may be defined based on the results of the data analysis that took place throughout the course of the surveys, interviews, and secondary sources.

7.1 Role of Education in Environmental Sustainability

Table 1: Impact of Education on Environmental Sustainability

Educational Factor	Contribution to Environmental Sustainability	Examples/Indicators
Environmental Awareness Programs	Increases knowledge and responsible behavior	School campaigns, eco-clubs, environmental days
Integration of Sustainability in Curriculum	Builds long-term values and eco-consciousness	Inclusion of climate change and biodiversity topics in school & higher education
Skill Development for Green Practices	Promotes sustainable livelihood and innovation	Training in renewable energy, waste management, sustainable agriculture
Research and Innovation	Provides solutions for environmental challenges	University-led research on pollution control, clean energy, and conservation methods
Community Engagement and Outreach	Expands environmental responsibility beyond classrooms	Tree plantations, community clean-up drives, water conservation initiatives

As seen in Table 1, education plays a very significant role in shaping environmental sustainability through raising awareness, instilling values and skills that are relevant in the ecological conservation. Environmental awareness campaigns lead to behavioral change where individuals get encouraged to lead environmentally friendly lifestyles such as recycling, energy conservation and reduced use of plastic. Incorporating sustainability in the curriculum will ensure that the future generations are responsible towards natural resources. Furthermore, education that focuses on skills enables learners to be able to participate in green practices like renewable energy technologies and sustainable agriculture, which builds resilience in the long-term against climate change. Research projects in academic institutions also play a role in producing new solutions to difficult environmental issues. At last, education-based community outreach activities make everyone in society accountable by sharing the fruits of knowledge with them. In a broader sense, education may be viewed as a transformative instrument that raises consciousness and empowers people to work towards environmental sustainability.

7.2 Role of Education in Social Sustainability (equity, gender, inclusiveness)

Table 2: Perceived Role of Education in Social Sustainability (Survey of 300 Respondents, 2024)

Aspect of Social Sustainability	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Education reduces gender inequality	42	36	10	7	5

Education promotes social equity (equal opportunities)	48	32	9	6	5
Education encourages inclusiveness of marginalized groups	40	35	12	8	5
Education enhances awareness of human rights	50	30	10	6	4
Education fosters tolerance and social cohesion	44	34	12	6	4

Education is a key component in fostering social sustainability in relation to gender equality, inclusion, and equity, as seen in Table 2. A significant 78% of respondents (42% strongly agree, 36% agree) believe education is instrumental in reducing gender inequality, indicating that access to quality education enables women and girls to challenge traditional gender roles and participate equally in economic and social domains. On the same note, 80 percent of the respondents agree that education fosters social equity through equal opportunities regardless of social-economic status, hence closing the gap between the classes and income levels. Inclusiveness of marginalized groups is also recognized, with 75% respondents highlighting that education provides a platform for disadvantaged communities (e.g., minorities, differently-abled, rural poor) to integrate into mainstream society. In addition, education reduces social conflict and fosters concord, since it is significantly associated with human rights knowledge (80% agreement) and the development of tolerance and unity (78% agreement). The data in general indicate that education is not only an academic procedure but a transformational agent of attaining fairness, inclusivity, and cohesion in society, which are the key pillars of sustainable development.

7.3 Role of Education in Economic Sustainability (skills, employment, innovation)

Education is also important in ensuring economic sustainability because it helps in providing people with relevant skills, making them more employable and innovative. It guarantees that human capital is enhanced to face the challenges of dynamic global economy as well as supporting sustainable practices. The table below shows the connection between education and economic sustainability.

Table 3: Contribution of Education to Economic Sustainability

Aspect	Educational Contribution	Impact on Economic Sustainability
Skills Development	Vocational training, technical education, and digital literacy programs	Builds a skilled workforce, increases productivity, and reduces unemployment
Employment	Higher education, career-oriented programs, and lifelong learning initiatives	Enhances job opportunities, reduces poverty, and supports stable economic growth
Innovation	Research and development in universities, entrepreneurial education, STEM focus	Encourages startups, sustainable technologies, and long-term economic competitiveness
Inclusive Growth	Education for women, marginalized groups, and rural communities	Reduces inequality, expands labor participation, and boosts sustainable livelihoods
Global Competitiveness	International collaborations, exchange programs, and advanced skill development	Strengthens knowledge economy, attracts investments, and supports global integration

The table indicates that education is not only a means of achieving personal empowerment but also a key to economic sustainability. Through skills development, education will enable people to be ready to work in the changing industries such as those based on green technologies and sustainable practices. Education has a direct impact on employment by decreasing unemployment and underemployment to stabilize economic growth and pull communities out of poverty. Moreover, education in terms of investment in innovation, especially in science, technology, and entrepreneurship, is the key to economic competitiveness and sustainability challenges. Critically, education also promotes inclusive growth by inducting women, marginalized groups and rural communities into the workforce, which helps in achieving equity and social cohesion. Lastly, international cooperation and advanced learning through education system contributes to global competitiveness and this is what nations require to emerge in the knowledge-based economy. Thus, education is a catalyst of the short-term economic stability and a pillar of long-term sustainable development.

8. Conclusion

Sustainability in all its forms—social, economic, and environmental—presents formidable hurdles, and education is the key to overcoming these obstacles and realizing sustainable development. The Study identifies that education does not only raise awareness of sustainability but also educates individuals to think critically, innovate and be responsible. Education plays a major role in long-term change because the concepts of sustainability are integrated into curricular programs, environmental literacy is promoted, and community participation is promoted. The results show that education is in line with the SDGs because it helps to achieve social fairness, environmental protection, and economic resilience. Effective education rests on the three legs of accessibility, high quality teaching and efficient delivery. Teacher training must be enhanced, interdisciplinary methods should be used and life-long learning promoted to ensure that the role of teacher is maximized. In conclusion, education is not only a means but also a source of creating sustainable societies in order to empower the future generation to create a balance between development and ecological and social sustainability.

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“Green Taxation in India: Opportunities and Challenges for Women Entrepreneurs”

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Abstract

Green taxation has emerged as a vital tool for steering growth toward sustainability by integrating environmental considerations into the financial decisions of producers and consumers. For women-owned enterprises and the MSME sector, these policies are not theoretical constructs but practical determinants of budgets, investment choices, and future expansion. By offering tax holidays, rebates on clean technologies, and concessional duties on sustainable inputs, green taxation reduces operational costs and enables women entrepreneurs to reinvest in innovation and resilience.

However, significant barriers hinder their participation. Complex compliance procedures, technical jargon, limited awareness, and the financial burden of upfront investments often prevent women-led enterprises from fully utilizing available incentives. Without localized advisory support in vernacular languages and simplified digital tools, subsidies that appear enabling risk becoming inaccessible.

This paper examines the dual role of green taxation as both an opportunity and a challenge for women entrepreneurs in India. It highlights case examples such as waste-to-furniture ventures, solar-powered food processing, and rural solar distribution to illustrate potential benefits. Policy recommendations include awareness campaigns, simplified tax processes, concessional loans, capacity building through self-help groups, and digital platforms for real-time guidance.

In conclusion, green taxation can simultaneously drive sustainable development and empower women entrepreneurs, provided policies are made inclusive, accessible, and responsive to grassroots needs.

Keywords: Green Taxation, Sustainable Development, Women Entrepreneurs, Financial Literacy, MSME Sector

Introduction

Sustainable development has become a critical priority for India as rapid industrialization and urbanization intensify challenges such as pollution, deforestation, and climate change. To balance economic growth with environmental protection, innovative policy tools are required. Green taxation is one such instrument. By imposing levies on polluting activities and extending incentives for eco-friendly alternatives, green taxes not only generate public revenue but also encourage businesses and individuals to adopt sustainable practices. These measures are especially relevant as India works toward its global commitments under the Paris Agreement and its national target of achieving Net Zero emissions by 2070.

Within this framework, women entrepreneurs in the Micro, Small, and Medium Enterprise (MSME) sector hold a vital position. They contribute significantly to job creation, local economic resilience, and inclusive growth. However, women-led enterprises often face constraints such as limited financial resources, lower access to credit, and heightened vulnerability to compliance burdens. Green taxation has the potential to provide opportunities—through subsidies, rebates, and reduced costs for adopting sustainable technologies—yet also presents challenges related to awareness gaps, procedural complexity, and high upfront investments.

While green taxation has been extensively examined from environmental and fiscal perspectives, little research has explored its intersection with women entrepreneurs in the MSME sector. This paper seeks to fill this gap by analyzing both the opportunities and challenges that green taxation presents for women-led enterprises in India. The objective is to suggest policy interventions that make green taxation more inclusive, accessible, and supportive of women entrepreneurs' role in sustainable development.

Conceptual Framework

Green taxation refers to taxes or fees imposed on activities or products that harm the environment. Its primary aim is to reduce pollution while generating funds for sustainable development projects. These taxes are

not merely tools for revenue generation; they also serve as incentives for individuals and businesses to adopt cleaner and more sustainable practices. In India, green taxation includes several measures such as:

Eco-taxes: Fees on polluting activities or products.

Carbon tax: Applied indirectly through the clean energy cess on coal.

Pollution tax: Charges levied on industries that exceed pollution limits.

Vehicle tax: Green tax imposed on older or highly polluting vehicles.

Plastic bans and related fines: Discouraging the use of non-biodegradable products.

For entrepreneurs, particularly women-led businesses in the MSME sector, these taxes have direct implications. On one hand, they may increase operational costs due to compliance requirements or penalties. On the other hand, they create opportunities through tax rebates, subsidies, and exemptions for adopting eco-friendly technologies, renewable energy, and sustainable materials.

In this context, financial knowledge becomes essential. Women entrepreneurs who understand green tax policies can leverage available incentives, reduce costs, and innovate sustainably. Conversely, a lack of awareness may prevent them from benefiting from these initiatives and could even result in additional financial burdens.

Green Taxation in India

India is one of the fastest-growing economies in the world and faces the dual challenge of sustaining economic growth while minimizing environmental damage. To address this, the Government of India has introduced various green taxation measures. These measures are designed to discourage polluting practices and promote eco-friendly alternatives. They also support India's commitments under the Paris Agreement and its national goal of achieving Net Zero emissions by 2070.

1. Green Tax on Old Vehicles

The Ministry of Road Transport and Highways has proposed a Green Tax on older, more polluting vehicles. Personal vehicles older than 15 years and commercial vehicles older than 8 years will incur additional charges when applying for fitness certification. This measure was introduced because older vehicles contribute significantly to air pollution due to outdated technology and higher emission levels. The revenue collected is earmarked for pollution-control initiatives and the development of cleaner public transport systems.

2. GST Exemptions and Concessions

Under the Goods and Services Tax (GST) framework, the government has introduced exemptions and lower tax rates for eco-friendly goods and services. For instance:

- Electric vehicles (EVs) are taxed at only 5% GST, compared to 28% for conventional cars.
- Solar panels and renewable energy equipment are also taxed at 5%, encouraging clean energy adoption.
- Energy-efficient appliances such as LED bulbs are either exempted or placed under lower GST rates to promote sustainable consumption.

These measures reduce the cost of green products and encourage both consumers and businesses to adopt sustainable technologies.

3. Coal Cess and the National Clean Energy Fund (NCEF)

In 2010, India introduced a cess on coal at ₹50 per tonne, which was gradually increased to ₹400 per tonne. The revenue from this cess contributes to the National Clean Energy Fund (NCEF), established to finance and promote clean energy projects, including solar parks, wind energy initiatives, and research in renewable technologies. While some of the cess revenue has recently been redirected to compensate states for GST losses, it continues to be an important component of India's carbon pricing strategy.

4. State-Level Eco-Tax Initiatives

Beyond central government measures, several state governments have implemented their own eco-tax initiatives:

- Tourist taxes in ecologically sensitive regions such as Himachal Pradesh and Uttarakhand aim to manage over-tourism and fund environmental protection.
- Plastic bans and related fines in Maharashtra, Tamil Nadu, and other states seek to reduce single-use plastic consumption.
- Entry taxes on polluting vehicles in cities like Delhi, along with the Environment Compensation Charge (ECC) on trucks entering the city, help address urban air pollution. These localized initiatives highlight the states' role in advancing environmental sustainability through fiscal measures.

5. India's Net Zero 2070 Commitment

At the COP26 Climate Summit in Glasgow (2021), India committed to achieving Net Zero carbon emissions by 2070. Meeting this ambitious target will require major transformations in the energy, industry, transport, and agriculture sectors. Green taxation is considered a vital tool in this transition because it:

- Generates revenue to fund clean energy infrastructure.
- Encourages behavioral changes among consumers and producers.
- Aligns national growth objectives with environmental protection.

Women Entrepreneur Opportunities via Green Taxation

1. Incentive and Reduced Cost Access

Women entrepreneurs benefit from tax rebates, subsidies, and concessional GST for environmentally friendly products. This defrays operational expenses (e.g., renewable energy, EVs, energy-efficient appliances) and enables reinvestment in company growth.

2. Innovation in Business

Green taxation generates markets for environmentally friendly products and services. Women business ventures can introduce green product lines, provide services such as recycling or green tourism, and tap into global eco-friendly trends.

3. Competitive Advantage

Early initiation of green practices offers brand differentiation. Green branding and eco-certification assist in marketing to customers, investors, and export markets.

4. Government Scheme Integration

Schemes such as Mudra Loans, Stand-Up India, and Startup India can be synchronized with green incentives. This can offer concessional loans, subsidies, and training to women taking up green technologies.

5. Green Startup Potential

Women may begin startups in renewable energy, organic agriculture, waste management, and green fashion. These startups generate profit while fostering social and environmental welfare.

Challenges Faced by Women Entrepreneurs under Green Taxation

While green taxation creates opportunities, women entrepreneurs often face barriers in fully utilizing these policies.

1. **Lack of Awareness** – Many women business owners, especially in rural and semi-urban areas, are unaware of green tax incentives, GST concessions, or subsidies available for eco-friendly practices.
2. **Compliance Burden** – Tax filing, documentation, and regulatory compliance are complex and time-consuming. Limited access to professional tax advisors makes compliance harder for small women-led businesses.
3. **Limited Financial Literacy** – A significant number of women entrepreneurs struggle with financial planning, investment decisions, and interpreting tax benefits, which reduces their ability to leverage green policies.
4. **High Initial Costs** – Though incentives exist, adopting sustainable technologies (solar power, EVs, biodegradable packaging) requires upfront investment, which many women-owned businesses cannot afford.
5. **Credit and Financing Issues** – Women often face difficulty in accessing credit due to lack of collateral, smaller business size, or gender bias, making it harder to adopt green technologies despite government schemes.
6. **Market Limitations** – Demand for eco-friendly products is growing but still niche in many regions. This limits the immediate profitability of green businesses, discouraging adoption.

Examples

1. Self-Employed Women's Association (SEWA), Gujarat

- SEWA has helped thousands of women entrepreneurs adopt solar-powered sewing machines and lighting through subsidies and government green schemes.
- Impact: Women tailors reduced their electricity costs by nearly 40% and increased working hours since they could work at night with solar lighting.
- Green Tax Link: Their shift to renewables was supported by *lower GST on solar products* and government incentives.

2. Mann Deshi Foundation, Maharashtra

- Women entrepreneurs in Satara district adopted biogas plants and solar dryers for food processing units with support from MSME green subsidies.
- Impact: Reduced reliance on LPG and electricity, lowering operational costs.

- Green Tax Link: Adoption of eco-friendly technology avoided higher energy taxes and gave them a market edge with “green-certified” products.

3. Kudumbashree Women Enterprises, Kerala

- Kudumbashree units engaged in waste management and recycling benefit from tax exemptions and municipal incentives for green businesses.
- Impact: Women groups earn sustainable income by recycling plastic and organic waste, while paying lower waste disposal taxes.
- Green Tax Link: Municipal green taxes on plastic bags increased demand for alternatives, directly benefiting their eco-friendly products.

Policy Recommendations

1. Awareness and Training Programs

- Launch targeted awareness campaigns to educate women entrepreneurs about green taxation benefits, subsidies, and exemptions.
- Provide training in financial literacy and eco-business management through Self-Help Groups (SHGs), MSME clusters, and entrepreneurship cells.

2. Simplified Tax Incentives

- Design easy-to-access tax incentives (reduced GST, exemptions, rebates) for women-led green startups.
- Introduce “green credits” for small women entrepreneurs adopting renewable energy, eco-friendly packaging, or sustainable raw materials.

3. Financial Support Mechanisms

- Integrate green loan schemes into existing programs like Mudra, Stand-up India, and Mahila E-Haat with lower interest rates for eco-businesses.
- Create women-focused subsidy models for solar panels, EVs, and waste recycling units.

4. Capacity Building through SHGs and Cooperatives

- Encourage women SHGs to participate in **green enterprises** such as solar-powered tailoring, organic farming, and recycled handicrafts.
- Offer collective tax benefits for SHGs engaged in sustainable production.

5. Digital Platforms for Information Sharing

- Develop mobile apps/portals providing real-time information on green tax policies, subsidy schemes, and compliance requirements in local languages.

6. Monitoring and Inclusive Policymaking

- Involve women entrepreneurs in policy consultations on green taxation.
- Establish monitoring cells at state/district levels to track the implementation and impact of green tax policies on women-led enterprises.

Conclusion

Green taxation is emerging as a vital tool for promoting sustainable development in India, helping reduce pollution, encourage renewable energy adoption, and support eco-friendly business practices. While several initiatives such as tax exemptions for electric vehicles, GST benefits on renewable products, and the coal cess demonstrate India’s commitment to its Net Zero 2070 target, the role of women entrepreneurs within this framework remains underexplored.

Women entrepreneurs, especially in the micro, small, and medium enterprise (MSME) sector, contribute significantly to local economies and community development. However, they often face challenges such as lack of awareness, financial constraints, and compliance burdens that prevent them from fully benefiting from green taxation policies. At the same time, opportunities like eco-friendly subsidies, tax incentives, and government support schemes can help them innovate, reduce costs, and gain a competitive edge in emerging green markets. For green taxation to achieve its full potential, it must be linked with inclusive policies that empower women entrepreneurs. Strengthening financial literacy, providing targeted tax incentives, and integrating green priorities into existing entrepreneurship schemes can ensure that women-led businesses become key drivers of India’s sustainable future. In conclusion, green taxation not only protects the environment but also holds the power to empower women entrepreneurs, making them active contributors to India’s journey toward sustainable and inclusive economic growth. Future research should examine quantitative impacts of green taxation on women-led MSMEs to strengthen evidence-based policymaking.

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Need of Financial Literacy Along with Educational Progress for Tribal Community

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Abstract -

The tribal community, which was deprived of education and facilities for thousands of years, has attempted to fulfill its needs adequately by establishing an education reservoir at the village level through government schemes. Still, due to addiction, low satisfaction level, wage labour, and the tight grip of poverty, education has not been used in their lives as it should be. The tribal community has come to know the outside world through education and has come to understand the importance of education. But this society, which has been illiterate for generations, is making very little progress in financial literacy. However, with the changing times, they have come to know the importance of money due to the increasing use of technology. To some extent, they have improved their family's condition by saving money and purchasing farming machinery, fertilizers, and seeds for agricultural use. Although a small number of young people are purchasing expensive two-wheelers and four-wheelers for their hobbies, it remains challenging to apply education to business, adopt a good lifestyle, and invest in the future for the next generation. The researcher will explain the importance of financial literacy in conjunction with educational development in the tribal community. According to the researcher's study, the rate of academic development in the Scheduled Sector is very low, and the financial literacy rate is negligible. However, the author has attempted to present the current changes in money knowledge, money calculation, and attitude towards money resulting from education and the need for financial literacy.

Keywords - Educational development, financial literacy, savings, investment and accounting

Introduction:-

In this article, the tribal society is considered to be the most backward among all societies. While other societies have been adopting a modern lifestyle based on science and technology for years, the tribals, however, live a very low-cost life in isolation, fulfilling their own needs with scarce material resources. Since this society is isolated and lives in remote areas, the tide of educational development has not reached them. In fact, they felt that education was not their need. As a result, the literacy rate among them is very low, that is, only 59% of the country. (Source: 2011 census).

Due to their low educational progress, they were not concerned with calculating money, saving for the future, or increasing money by investment. In such a situation, they have to earn money by working hard to meet their changing daily needs, but they do not have an idea of how much they should be paid for the amount of work they do. In such a situation, they are financially exploited. Since the money or wages they receive are very small, they use it only for subsistence. For years, meeting only daily needs and not thinking about the future has been a very common part of their lives. Although the impact of increasing industrialization, the impact of changing lifestyles, and the trend of selling goods in the market have also reached them. Still, it is clearly noticeable that their approach to the concepts of savings and investment has not developed.

The present article has tried to convey the belief that the increasing awareness of the tribal community about savings and investment can build a strong future for that community.

The positive results of the Maharashtra government's plans for achieving economic self-reliance and self-reliance for the scheduled areas are being seen. The government has encouraged many things like self-help groups, goat farming, dairy farming, self-employment, small industries, and many others. A large amount of funds are being provided from the government level, the administration has been classified widely for the scheduled category so that development funds can reach the last segment of the tribal community. The government is trying to achieve a wide range of work through this huge administrative system. Funds worth crores of rupees are being sanctioned for various schemes; in such a situation, the social and economic development of the tribal community is happening at a very slow pace. This matter has come to light through much research. This matter is not at all commendable in terms of the entire national interest. The tribal community is a part of this nation, and the progress of the entire nation lies in their development. At such a

time, many researchers have tried to draw the attention of other communities to these aspects by shedding light on the various problems of the tribals. But the traditional lifestyle and traditional thinking styles of this community have become an obstacle to their social and economic development.

Research Objectives:

1. To study the reasons for the economic backwardness of the tribal community.
2. To study the educational and financial literacy of the tribal community.
3. To state the need for the application of vocational courses instead of an ongoing academic structure.

Hypotheses:

1. The tribal community is economically backward.
2. The economic backwardness of the tribal community is due to the backwardness of the prevailing educational system.
3. The vocational education system is more useful than the prevailing education system for the economic development of the tribal community.

Research Methodology:

The author has used the analytical method for the presented research.

Educational progress graph of the tribal community:

According to the census report, the following is the educational progress of tribal community in the country, state, and district levels. The district data is related with researchers locality.

When reviewing the above graph, it is seen that although the graph of educational progress is increasing, there is not much financial literacy in the tribal community. Even though the literacy rate of the whole of India is 74.04%, the financial literacy rate of the country is only 27% to 35%. At such a time, it is certain that the financial literacy rate of the tribal community, which is halfway through education, will be very low, but even though, financial literacy is the real key to the progress of the country.

Financial literacy :

1. Financial literacy is the knowledge of where to save, when, and how to invest.
2. Financial literacy is the knowledge of loans and insurance, along with keeping an account of your income, setting a budget, and planning where and how to spend it.
3. Financial literacy also means risk management, debt repayment, and proper use of debt.
4. Financial literacy means knowing the value of one's own work/wage, determining the market price of one's goods.

Literacy and Application :-

Although the literacy rate of the tribal community is increasing, education has not been given enough importance to this community. Even today, a large community is coming into the education stream as part of the government's all-inclusive policy, but the educational development among them is not real educational development but only the recognition of basic reading and writing skills. That is why the tribal community does not show significant progress in the economic, educational, social and professional fields. The percentage of the tribal community in higher education and progress in the professional field or other areas of progress is very low. This is due to the complacent attitude of that community, thinking only about the daily life of the present time, disorganization, ignorance, superstition, and addiction. Due to being isolated from the outside world, the attitude of living in the traditional way has created a narrow and timid attitude in tribals. As a result, the tribal community is lagging behind in creating a space of transactions and self-existence in the outside world.

Importance of Financial Literacy for Tribal Communities

Tribal communities are bound by thousands of years of tradition, living in a specific area, strictly following the rules of their society, and their standard of living is dependent on wild fruits in the forest; they do not see much progress in their educational and economic development. Being economically weak, they are seen to behave with a great deal of hesitation while moving around in the outside world. Traders, moneylenders, and moneylenders have taken advantage of their nature. Their dependence on traditional agricultural business and wage labor to meet their daily needs has not made much difference in their economic level. After thousands of years, their way of life has remained traditional, but financial literacy can make a big difference in their lives. Due to financial illiteracy, this poor community cannot identify its financial needs, prioritize its financial decisions, keep track of its expenses, determine the market price of its goods, determine the value of its labour, save for investment, etc. To create a capable India of the future, the economic literacy of tribal communities can lead to economic empowerment. For this, it is necessary to make them economically literate.

It is necessary to implement a separate education system for them, which is not only at the cognitive level, but also at the level of vocational courses and self-employment.

Today, India's population is in first place in the world; it is equally important for the increased population to be skilled. If the skills of the people are utilized at the professional level, our economy can reach at the top place in the world.

Our per capita GDP is very low compared to America or China. If we want to increase the per capita income of our country, every person in the country should have a job. Even though today is the era of mechanization, manual work is still in the highest demand; it is necessary to identify the areas of manual skills and increase human skills. Also, to some extent, if possible, in various places, the dependence on machines should be reduced, and work should be given to skilled hands; this will help increase employment. Today, a huge section of India is suffering from unemployment. For this, self-employment vocational courses should be promoted. In the case of the tribal areas, it is very important to implement an education system that combines practical education and practical vocational courses for the tribal community, as per the experiment of Shri Heramb Kulkarni (an educational expert). If such education is implemented from the fourth grade or from the age of ten, then in the next four years the child will have acquired the skills to bear his own expenses. Today, money is being looted through many government schemes, but if they are taught to stand on their own feet, then the useless expenditure on government schemes will be reduced, the unemployment rate will decrease, the per capita income will increase and the national gross domestic product will increase. The above-mentioned policy has been implemented by countries like China and Japan for a long time and today those countries are at the top of the list of developed countries. Whereas our country is implementing the system of living on the beggarly handouts. In which the entire government system is riddled with corruption. And due to this, the weaker sections are forced to live their lives helplessly.

Summary:

Financial literacy is a very important mantra in today's 21st century. This mantra can add a lot of value in the progress of the country, and we can quickly reach our goal of a developed country.

A lot of time is spent on education in today's youth, and the entire life of parents is spent on raising their children on their own feet. Perhaps for this reason, the tribal society does not look at education seriously. Therefore, it is the need of the hour to implement vocational education that will match the abilities of children from the age of 10. Only then can the tribal society, which is far from education and cannot reach higher education, at least stand on its own feet and play a valuable role in nation-building.

Conclusion:

- 1) Tribal society needs financial literacy along with educational progress.
- 2) Financial literacy can add to the progress of the country.
- 3) Due to financial literacy, an individual can move towards self-reliance rapidly.
- 4) If an individual becomes self-reliant, the nation can also become self-reliant.

Solution:

1. Separate measures are needed to increase financial literacy.
 2. Instead of implementing complicated curricula for the tribal community, it is necessary to implement a curriculum that inspires active self-employment.
 3. There is a need to give importance to meaningful literacy rather than letter recognition literacy in the tribal community.
 4. A vocational curriculum based on human hand skills should be designed from the age of 10.
 5. Education should be made so that every tribal outsider can feel self-respect on his own feet.
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Role of Financial Institutions in Driving Environmental Sustainability

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Abstract

Environmental sustainability has emerged as one of the most critical global challenges in the 21st century. Climate change, biodiversity loss, and resource depletion demand urgent collective action from governments, businesses, and civil society. Financial institutions, including banks, insurance companies, investment funds, and development finance agencies, play a pivotal role in this process. By channeling capital toward sustainable projects, promoting green finance, integrating environmental, social, and governance (ESG) criteria, and discouraging environmentally harmful activities, financial institutions can significantly influence the transition toward a greener economy. This paper explores the multifaceted role of financial institutions in driving environmental sustainability, the challenges they face, and the strategies required to enhance their impact.

Introduction

The growing environmental crisis has intensified the need for sustainable development across the globe. While industries and governments are often seen as primary actors in this transformation, financial institutions hold a unique position of influence. They act as intermediaries that direct capital flows, manage risks, and incentivize environmentally responsible behavior. By allocating financial resources strategically, these institutions can accelerate the shift toward low-carbon economies and sustainable development models.

The Paris Climate Agreement (2015) and the United Nations Sustainable Development Goals (SDGs) emphasize the necessity of sustainable finance. Therefore, financial institutions are not only economic players but also catalysts for environmental sustainability.

Role of Financial Institutions in Environmental Sustainability

1. Green Financing

Financial institutions promote green financing by providing loans and investments for renewable energy, energy efficiency, clean technology, and sustainable agriculture. Green bonds have become a vital instrument, allowing governments and corporations to raise funds for eco-friendly projects.

2. Incorporating ESG Criteria

Banks and investment firms increasingly integrate Environmental, Social, and Governance (ESG) criteria into their decision-making. This ensures that investments and lending practices consider environmental impacts alongside profitability.

3. Risk Management and Climate Resilience

Climate change poses financial risks due to natural disasters, resource scarcity, and regulatory changes. Insurance companies and banks help mitigate these risks by promoting climate-resilient infrastructure and businesses.

4. Discouraging Unsustainable Practices

By limiting or denying funding to projects harmful to the environment—such as coal mining, deforestation, and heavy polluting industries—financial institutions create disincentives for environmentally destructive activities.

5. Supporting Sustainable Businesses and Innovation

Venture capital and private equity firms encourage innovation in green technologies by investing in start-ups focused on sustainability solutions, such as electric mobility, carbon capture, and circular economy models.

6. International Cooperation and Policy Alignment

Multilateral development banks (e.g., World Bank, Asian Development Bank) and financial alliances (e.g., Glasgow Financial Alliance for Net Zero) collaborate globally to provide funding, technical support, and policy guidance for green development.

Challenges Faced by Financial Institutions

1. **Short-term Profit vs. Long-term Sustainability** – Many institutions prioritize immediate returns over environmental benefits.

2. **Lack of Standardization** – Inconsistent definitions of "green finance" and ESG metrics create ambiguity.

3. **Limited Awareness and Expertise** – Some institutions lack specialized knowledge in sustainable finance.

4. Policy and Regulatory Gaps – In many developing countries, weak environmental regulations hinder progress.

5. High Perceived Risk – Green projects often require high initial investment, deterring financiers.

Strategies for Strengthening the Role of Financial Institutions

1. Mandatory ESG Reporting – Standardized frameworks like GRI (Global Reporting Initiative) or TCFD (Task Force on Climate-related Financial Disclosures).

2. Incentives for Green Finance – Governments can provide tax benefits, subsidies, or guarantees for green investments.

3. Capacity Building – Training programs for financial professionals in sustainability finance.

4. Public-Private Partnerships (PPP) – Collaborative efforts to share risks in financing large-scale green projects.

5. Digital Transformation – Leveraging fintech for sustainable microfinance and efficient resource allocation.

Conclusion

Financial institutions are at the heart of the transition toward environmental sustainability. By strategically directing funds, discouraging harmful practices, and incentivizing green innovation, they hold the power to reshape economies in alignment with global climate goals. However, overcoming challenges such as short-term profit orientation, lack of standardization, and high investment risks is crucial. With stronger regulatory frameworks, capacity building, and global cooperation, financial

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Plastic Pollution: Causes, Effects and Solutions

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Abstract -

Most of today's plastics are made from Organic polymers produced from petroleum - based Chemicals. This may change as scientists shift to developing plastics made from biologically based chemicals. With the production out spacing almost every other material production, plastic waste is now one of the biggest environmental scourges of the time. The scale of the challenge is daunting. The exposure of humans to plastic pollution also has health challenges. According to the state of plastics report, only nine percent of the nine billion tonnes of plastic in the world ever produced has been recycled. Most ends up in landfills, dumps or in the environment especially the oceans. The research methodology used is based on the interactions with the plastics industries, the Environmentalists, Medical Practitioners, Ministry of Environment, Ministry of Health, and Bottling Companies. This paper is also based on visits to restaurants, and events centres, examination of nooks, crannies, and drainages.

Keywords - Landfills, Environment, Discard, Debris, Degradation, Biodegradable, Plastic, Recycling, Environmental Effects, Health Effects.

I. Introduction -

Plastic pollution is the accumulation of plastic particles and objects in the Earth's environment that adversely affect humans, wildlife and wildlife habitat. Pollutants are substances that adversely affect the health, activities or survival of a population. Every day, thousands of tons of pollutants are discarded into the air by natural events and human actions. Far more damaging are the substances discharged into the atmosphere by human actions. Plastics acting as pollutants can be classified based on their sizes into three aspects which are: micro debris plastic, mega debris plastic, and micro debris plastic. According to, mega plastics and micro plastics have accumulated in highest densities in the Northern Hemisphere, which is concentrated around the current carrying the debris, plastic can be found off the coast of some islands.

Mega-plastics and micro-plastics are normally used in the manufacturing of packaging materials (such as plastic bottles, plastic bags etc.), footwear and other domestic items. These are later found being washed off of ships or discarded in landfills. Some of the items used in fishing activities are also found around remote islands. All these are still known as micro-plastic, meso-plastic and macro-plastic. Plastics are in expensive and durable.

These two factors have resulted into enormous presence of plastic pollution in the environment and at the same time affecting human health adversely. As the human population grows exponentially, so do the demands for plastic increases without thinking about the consequences after being used/utilised when discarded/disposed. This population continue to grow as the amount of garbage produced by people increases. These disposable products such as bottles of water, soda cans, plastic bag etc. are discarded/disposed easily, but the accumulation of these products have resulted to increase in the amounts of plastics pollution around the world.

II. Literature Review -

Plastic debris is classified as either primary or secondary. Primary plastics are in the state of their original form when collected. Examples of these are cigarette butts, microbe ads, and bottle caps. Secondary plastics, on the other hand, are referring to smaller plastics that are obtained as a result of degradation of primary plastics. The search for biological based plastics dates from 1913 when a French Scientist and a British Scientist filed independently for patents a soy-based plastic. At that time, there was intense competition between the petrochemical and agricultural industries to dominate the market for plastics made from organic polymers.

A 1914 photograph showed him using an ax to strike the body of a car made from soy bio plastic to demonstrate its strength. But as oil became rudely available, petrochemical plastics took over the market. Now with projected climate change and other environmental problems associated with the use of oil, chemists are stepping up efforts to make biodegradable and more environmentally sustainable plastics from a variety of green polymers. Such bio plastic can be made from corn, soybeans, sugarcane, switch grass, chicken feathers, and some components of garbage. Also the CO₂ extracted from coal-burning power plant emissions could be used in this process. The key to making such biopolymers is to find chemicals, called catalyst, which will accelerate

reaction that chemists can use to for polymers from biologically based chemicals without having to use high temperatures.

III. Causes of Plastic Pollution -

The plastics causing the pollution are in different sizes from big to microscopic. There are many kinds of plastics. They exist depending on their precursors and method for their polymerization. The main contributory factors to the problem of plastic pollution are fishing nets, plain old trash, disposing of plastic and garbage, and over-utilisation of plastics.

Fishing Nets:

Fishing is an agricultural activity normally practised all over the world. The commercial aspect of fishing is an economic necessity in which people consume fish for their daily survival and maintenance of good balanced diet. The ocean has faced different problems of plastics pollution created by the fishing industry. The nets used for large scale fishing activities are usually made of plastic. At the initial stage, these fishing nets become submerged in water, on spending much time it releases toxin at will. Later, they get broken up. This kills and harms the local wildlife, but it ensures that pollutants enter the water and fish of the area.

Plain Old Trash:

Plastics are found everywhere along the streets and roads of every city's and towns in India making them to be untidy. The cartons of some products such as can-milk, can-beverages, and can-tomatoes are lined with plastics so as to allow proper packaging. Plastic drinking bottles, water bottles, straws and stirrers used for soft drinks in hotels, restaurants and events centres for entertainment during conferences, seminars, symposiums, wedding receptions, Annual General Meetings (AGMs) etc. are disposed/discarded littering everywhere by the participants and invited guests ignoring the environmental consequence. Some of these products may even contain tiny plastic beads.

Disposing of Plastic and Garbage:

Plastics have complex chemical composition. This makes plastic to be durable and do not break down easily. Plastics and resins have different properties related to contaminant absorption and adsorption depending on their chemical composition. The polymer degradation takes a long period of time due to saline environments and cooling effect of the sea. These are contributory factors to the persistence of plastic debris in certain environments...

Over-utilisation of Plastics:

This refers to plastics being over-used. It is less expensive and durable. These enable both the privileged and less privileged people in the society to afford patronising plastic materials/items. It is one of the most widely available and over – used item in the world today. When plastic is disposed/discarded, it does not decompose easily there by polluting the land or air nearby when burnt in the open air? Also, plastic items that are not properly discarded can be carried to oceans through storm waters.

IV. Environmental Effects of Plastic Pollution -

Plastics consist of major toxic pollutants having the potential to cause important harm to the environment in the form of water, land and air pollution. Plastic is a material that is non-biodegradable, hence it can wreak havoc on natural environment resulting into long-term issues for animals, plants and humans. The distribution of plastic debris varies due to some factors among which are wind and ocean currents, urban areas, coastline geography, and trade routes. The population of humans in some areas also plays a large role in this. Plastic are normally found in enclosed regions such as nooks and crannies of cities and towns there by affecting the environment.

1 Groundwater Pollution:

Groundwater is water that is present in rocks or unconsolidated materials below the Earth's surface. Groundwater forges a link between surface water systems and the material in Earth's Crust.

2 It Upsets the Food Chain:

A food chain is a linear sequence of who eats whom in an ecosystem. Most species belong to more than one food chain, especially when they are at a low feeding level. An ecosystem consists of one or more communities of organisms interacting with one another and with the physical environment through a flow of energy and a cycling of materials.

3 Killings of Animals:

The availability of plastic wastes such as plastic bags and containers, six-ring plastic can holders etc. in the crannies and nooks of the environment that are being discarded each day has resulted in the death of some animals such as duck, dolphins, fish, fowl, turkey, tortoises etc. in the environment when they become trapped

in them or poisoned from the toxins released by plastics wastes. This causes adverse effects to the surrounding animals thereby affecting the ecosystem.

4 Land Pollution:

Plastic waste are normally dumped in landfills. When this takes place, there is interaction with water there by forming hazardous chemicals. When these chemicals sleep underground, the quality of water becomes degraded. Wind has contributed to plastic pollution thereby carrying and depositing plastic from one place to another, increasing the land litter. The plastic wastes can also get stuck on trees, fences, towers, poles, traffic lights, roofs etc. and the animals coming in contact with them in the surrounding and might suffocate them leading to death.



5 Air Pollution:

It is the presence of chemicals in the atmosphere in concentrations high enough to harm organisms, ecosystem, or human made materials, or to alter climate Today, air pollution is a global problem; areas far from the polluting source may be adversely affected as at atmospheric, circulation moves pollutants freely without regard to political boundaries . When plastics are burnt in the open air, landfills or incinerators, poisonous/toxic chemicals are released thereby causing environmental pollution. Also, discarded plastics contribute to Greenhouse gas emission to the atmosphere having adverse effects on both humans and animals when inhaled.

V. Health Effects of Plastic - Pollution-

Plastic pollution occur when plastic accumulates/gathers in an area and begins to have negative impact on the natural environment thereby creating problem for plants, wildlife, and the human population. This involves killing plant life, and posing dangers to humans and local animals. Plastics is an incredibly useful material both at home and larger societies, and it is made from toxic chemical compounds which can cause illness in humans.

VI. Prevention of Plastic Pollution -

The rate at which plastic waste grows in the world today is discouraging and uncalled for. A global plastic wastes disaster is being faced by people which is suffocating our environment and causing damage to the ecosystems. These ecosystems need to be protected from future damage and actions need to be taken to establish a world with free-plastic wastes. The industrialists are in possession of the ability to change the various ways the world utilises/uses and wastes plastic. So, the ecosystems, wildlife and oceans need to be restored to a healthy state and change the world into one with no plastic waste. Some of the measures reducing plastic wastes are.

Reuse: Reusability refers to the use of materials more than once in their original form instead of throwing away after each use. This does not only ensure the maximum use of the material life span but also reduces waste. Reuse has increasingly been accepted as playing a vital part in addressing a wide range of social challenges related to poverty, health and well-being. It should be made known to the public that, reuse is not specifically a waste issue.

Reduce: In order to reduce plastic pollution, there is need to reduce our usage of plastic. This translates to changing our daily attitudes and avoiding the use of plastic when there is a better alternative to it and only using plastic when it is seriously needed. Plastic packaging needs to be avoided.

Recycle: Recycling of plastic involves collection of plastic waste and reprocessing it into new products, in order to reduce the amount of plastic in the waste stream. It is known that plastic does not break down easily, so to recycle plastic means it is still plastic, but it can be used for another purpose entirely. Recycling does not cut down on plastic, it is still the existing plastic that is used for recycling processes but are transformed to a new one. Therefore, the recycling process does not mean that the amount of plastic or exposure is being reduced.

Government Intervention:

The lawmakers and The government needs to arise and get involved in the prevention of plastic pollution so as to create fear in public and allow strict adherence to preventive measures to take place. Presently, awareness and sensitization is on-going all over the globe on plastic pollution. Various governments are planning different measures to reduce the volume of plastic waste.

VII. Finding and Suggestions -

- Plastic bags and garbage that are thrown into the ocean have devastating effect on sea animals.
- Over 60% of the trash that ends in the dustbin could be recycled.
- Plastic bags that are thrown into the ocean kill over a million sea creatures a year.
- Plastic pollution threatens food safety and quality, human health, coastal tourism, and contributes to climate change
- Americans normally use over two and a half million plastic bottles every thirty minutes and most of them are simply thrown away rather than recycled.
- Findings show that bodies of 90% of Seabirds contain plastic debris.
- Want Plastics contribute to approximately 10% of discarded waste
- Research suggested that by 2050, there could be more plastic than fish in the oceans by weight.
- Findings show that there are ten (10) largest emitters of oceanic plastic pollution worldwide which are from the most to the least: China, Indonesia, Philippines, Vietnam, Sri Lanka, Thailand, Egypt, Malaysia, Nigeria, and Bangladesh.

VIII. Conclusion -

Plastic is non-biodegradable. It is nearly impossible for it to break down. It sticks around for a long number of years longer (e.g. up to 1,000 years longer) than other forms of trash. Plastic is basically everywhere. The main cause of plastic pollution. The estimation shows that 80% of marine litter emanates/originate from land. This plastic pollution comes mainly to help clean up our world.ousehold waste, which is poorly recycled, dumped in landfills or abandoned in nature. These wastes are carried by the winds, pushed by the rains into sewers, streams, rivers, and finally in the oceans. Natural disasters such as floods must be put into consideration as other causes of pollution as well People are enjoined/advised to avoid bring plastic bags to their various homes and purchasing items with too much packaging. This way you can help in contributing towards the environment in the form of reducing plastic pollution whose ill effects are not reversible. Plastic bags can be replaced by reusable bags. This paper urges everyone to shift tousling recycled plastic, and contribute to a fund to help clean up our world.

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Ecological consciousness in Raj Kamal Jha's *She Will Build Him a City*

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Abstract:

In recent decades, ecological consciousness has been increasingly reflected in literature. Ecological consciousness explores the complex relationship between humans and the natural world. It emphasizes that humans and nature are not separate but are deeply interconnected. It often depicts how human actions impact the natural world and vice versa. Indian fiction actively addresses ecological issues for creating awareness among the readers. Raj Kamal Jha is one of the notable creative writers in India. His novels deal with environmental issues and its consequences of climate change.

The paper focuses on Raj Kamal Jha's *She Will Build Him a City* creating awareness regarding environment and ecological consciousness for harmonious eco-balance and promote sustainable future.

Keywords: ecology, human, nature, and sustain.

In the recent era, ecological consciousness plays a vital role in creating awareness and understanding of the intricate relationship between human beings and the natural world. It involves recognizing the interdependence of human and environmental well-being. Ecology traces environmental consciousness it is need of time. Ecology, relatively a new science, deals with various principles that govern the relationship between humans and nature. This relationship is so interdependent on each other that any disturbance is one disturbs the other. Globalization, industrialization turns the whole world under the curse of global warming, pollution, and climate change. It delineates toxic reality of urban milieu in India.

The roots of ecological consciousness in Indian literature are traced in ancient texts. Traditionally, nature is an integral part of the cultural and spiritual fabric. Ancient scriptures such as the Vedas and the Upanishads, nature are venerated as sacred with profound connection to the divine. The cosmic interplay of elements, rivers, mountains and the intricate balance of ecosystems are recurrent themes in ancient text. It emphasize the harmonious balance of human and nature. In medieval period, poets like Kalidasa celebrated the beauty of nature in works like *Shakuntala* and *Meghduta*. It is an appreciation of the environment that writers like Rabindranath Tagore's *Bard of Bengal*, used their literary power to express the correlation between humans and nature. In the mid-20th century, a turning point of post-independence era, witnessing the exploration of urbanization, industrialization, and their ecological repercussions. Writers began to address environmental concerns more explicitly and they provide a platform for ecological consciousness. The latter half of 21 century. Indian literature has witnessed a blossoming of voices that engage with eco-critical themes and explore the evolving relationship between humans and the environment. This connection is revealed through themes of nature, environmental damage and importance of ecological balance. It often conveyed through character action, settings authorial commentary.

The contemporary writers travelled extensively in their creative literary journey and brought nature into mainstream literature. Eminent authors works like Amitav Ghosh, Kiran Desai, Anita Desai, Arundhati Roy, R.K. Narayan, and Raj Kamal Jha. These contemporary voices contribute to the expanding field of eco criticism in Indian English literature. Their narratives not only reflect the ecological challenges but also serve as catalysts for environmental consciousness. They urge to the readers to contemplate their role in preserving the healthy balance between humanity and the natural world.

Raj Kamal Jha is one of the contemporary creative writers of Indian literature in English. He currently serves as the editor-in-chief of The Indian Express. He is also known as the novelist of the newsroom. He has written six novels that have been translated into more than 12 languages. His journalism and fiction have won national and international awards. His novels deal with grave issues of contemporary Indian society. Jha has inimitable portrayals as the nature and it's over exploitation in his creative writing. His *You Are Afraid of Heights* (2003) and *She Will Build Him a City* (2015), show ecological consciousness in the global warming era. *She Will Build Him a City* (2015) raises environmental issues such as pollution, global warming become a hazard for people. It focuses on the complexities of contemporary society is delineated through environmental issues in India. The ecological consciousness is a grave issue which is the need of the time. Raj Kamal Jha has drawn

the readers' attention towards a ghastly issue, environmental deterioration, and its causes and consequences in the present scenario.

Jha has put forth the constant increase in the population, over exploitation of natural resources, urbanization and technological advancement, and industrialization's impact to ecological imbalance. In *She will Build him a city*, raising awareness of the growing environmental crisis through the stories and characters. Jha sheds light on global warming and his deep concern about the rise in surface temperature.

"The night is so hot the moon shines like the sun, and by night's end, this heat pushes the temperature to a few points above 40; the highest minimum in the city's recorded history." (9)

Global warming is significantly shifting weather patterns and poses serious threats. Unusually rapid increase in earth's average surface temperature, primarily caused by human activity such as burning fossil fuels, which release heat-trapping greenhouse houses like carbon dioxide into extreme heat, can lead to more issues like health, pollution loss of biodiversity. Other impactful activities include the building of new city names. Author depicts ecological degradation is a dominant issue that presents grievous shortcomings of contemporary Indian society. The excessive use of electronics is also responsible for global warming. Jha raised the issue increasing temperature through lines like...

"Metro station where, if they are lucky, they catch whatever they can of the air-conditioned drought that escapes from inside a coach when its door opens. When a train stops" and even "at nine the next morning, by which time the temperature has already touched 45." (10)

These are experiences of present metro cities. Jha makes aware of the upcoming challenges and problems of ecology. The time is not far off when modern technologies will become a cause of the ecosystem. Pollution, urbanization leads to increased demand for resources and the loss of natural habitats. Environmental degradation is the deterioration of ecosystems.

Modern man is violating laws of nature in the name of the development and exploitation of nature in an unprecedented manner. Every now and then, we hear of some tragedies of ignorance of environmental law. This is a significant problem that our society is facing today. The narrator describes it as-

"At least five construction workers have been killed and ten are feared trapped when a building they were working on in the center of the city collapsed in the storm. Local residents say the disaster could have been averted, but builders violated the construction plan cleaned by the Municipal Corporation. Four floors were approved, but workers were building a fifth floor." (107)

Jha draws attention to the violation of environmental rules causes an imbalance in nature. It is constantly analyzing the environmental unevenness and its impact. This novel focuses on rampant construction causing a serious effect on the ecological balance. Rapid urbanization creates damage to the environment like new industries, encroachment of agricultural lands and forests rural migration, loss of livelihood and devastating the ecological balance. As jha has portrayed that –

"One of the five hundred farmers who have to sell their land to developers to make way for the club and nearby apartment complex." (87)

Loss of land, deforestation caused the lack of availability of water and soil. Kalyani Das, a trainee nurse, said very aptly for creating ecological balance that -

"We all have to wake up when it's still dark, that's the only time when there is no crowd at the community top where to live. When we can bathe and fill our buckets before anyone comes." (23)

Water resources are very vital for human survival. Effective management of their limited resources is essential for ensuring water security and addressing future challenges such as water scarcity and climate change.

Jha's has presented the present condition of struggle for survival through the words.

'Sir, there is no water; there is no power in their old city for three days. They say they don't have water to drink, they are protesting, they are waiting for the local MLA or MP to come, give them assurance that power and water will be back by this evening.(121)

The above conversation depicts the paths of people who are without water for three days. It shows the existential crisis of contemporary India. Jha's narratives navigate the complexities of urban landscapes. These glittering facades of progress create ecological discontent and social inequities. The modern man's brutal struggle is revealed in the water war. Water resources balance the ecology. The dream of social and environmental well-being can be achieved only through water sustainability. Water is also at the heart of adaptation to climate change. Ecological balance can be achieved only by limiting the ever-expanding construction and by protesting against globalization.

Raj Kamal Jha's fiction, *She will Build Him a City*, explores vivid descriptions of the causes and consequences of human inventions resulting in ecological imbalance. The novel reflects on the dichotomy of

progress and discontent. It reveals consequences of urbanization on environment. Rapid urban development increases in global warming and depletion of natural resources has shaken mankind. Uncontrolled urbanization and industrialization face the worst situation, increasing deforestation and the destruction of ecosystems, which have a strong impact on human life. Jha has attempted causes and consequences of climate change that directly affect the readers. It is a great need for awareness of ecological balance. Jha has raised environmental issues and promote a deeper appreciation for natural world and inspire action to protect the plants. Author insists us to reduce our impact on environment and promote a more sustainable future.

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Reflections of Nature: An Eco-critical Study of 18th-Century Romantic Literature and Contemporary Environmental Challenges in India

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Abstract

This research paper explores the representation of nature in 18th-century Romantic English literature and its relevance to the current environmental challenges in India. The study employs an eco-critical approach to analyze the works of William Wordsworth, Samuel Taylor Coleridge, Percy Bysshe Shelley, John Keats, Charles Dickens and Thomas Hardy focusing on their depictions of nature as a source of inspiration, moral guidance and resistance to industrialization. Major Romantic themes such as reverence for untouched landscapes, critique of urbanization and the interconnectedness of life are examined in light of India's pressing ecological crises, including river pollution, deforestation, climate change and biodiversity loss. By drawing parallels between the industrial era in England and contemporary industrial development in India, the paper argues that Romantic environmental thought retains significant relevance today. It concludes that the integration of Romantic ideals emotional attachment to nature, respect for natural processes and recognition of the intrinsic value of ecosystems can contribute to fostering ecological consciousness and sustainable practices in modern India.

1) Introduction

The relationship between human beings and the natural world has always been an essential part of literature. During the late 18th and early 19th centuries, English Romantic writers gave a new dimension to this relationship. They celebrated nature not only as a source of beauty and inspiration but also as a guide, a healer and a force that could shape human morality. The Romantic era arose in the backdrop of the Industrial Revolution, where mechanization and urbanization were rapidly altering landscapes and human interactions with the environment. Writers like William Wordsworth, Samuel Taylor Coleridge, Percy Bysshe Shelley, John Keats and even later figures like Charles Dickens and Thomas Hardy reflected upon these changes and expressed their concerns in poetry and prose.

In today's context especially in a rapidly developing country like India, environmental degradation has become one of the most urgent issues. India faces multiple crises: deforestation in the Western Ghats, severe river pollution in the Ganga and Yamuna, alarming levels of air pollution in cities like Delhi, the melting of Himalayan glaciers due to climate change and a continuous decline in biodiversity. By revisiting Romantic literature, we can explore how past literary expressions about nature may help us reflect upon current ecological challenges.

This paper attempts to analyze the Romantic perception of nature and relate its themes to the present environmental conditions in India through an eco-critical approach. It examines -key texts of major Romantic writers and evaluates their relevance to the ongoing crises of river pollution, climate change, deforestation and biodiversity loss in the Indian subcontinent.

2) Literature Review

The intersection between literature and the environment is the primary focus of a growing field called Eco-criticism. According to Cheryll Glotfelty, ecocriticism is "the study of the relationship between literature and the physical environment" (The Ecocriticism Reader). Scholars like Lawrence Buell have argued that literature plays a critical role in shaping ecological consciousness.

Research on Romantic literature often highlights its deep affinity with nature. Wordsworth's poetic philosophy, for instance views nature as "the nurse, the guide, the guardian of my heart and soul of all my moral being" (Lines Composed a Few Miles Above Tintern Abbey). Coleridge's "The Rime

of the Ancient Mariner” reflects on the sanctity of all living things, while Shelley and Keats explore the power and transience of the natural world.

In the Indian context, numerous studies have documented environmental degradation but only a few attempt to connect historical literary movements like Romanticism with modern environmental issues. This study aims to bridge that gap by employing ecocriticism to analyze Romantic works alongside India’s ecological concerns.

3) The Romantic View of Nature

The Romantic Movement in England was in many ways a reaction to industrialization. The poets emphasized emotion over reason, imagination over logic and above all, a return to nature. For Wordsworth, nature was not merely a backdrop but a living presence. In “Tintern Abbey” he wrote of the “tranquil restoration” that nature provided contrasting it with the noisy, polluted and restless cities of his time. His belief in the moral and spiritual influence of the natural world is reflected throughout The Prelude.

Coleridge in “The Rime of the Ancient Mariner” portrayed the disastrous consequences of disrespecting nature, where the killing of an albatross led to the suffering of an entire ship’s crew. This poem, with its famous line “He prayeth well, who loveth well both man and bird and beast” resonates even today as a warning against reckless exploitation of nature.

Shelley in “Ode to the West Wind” presented nature as a powerful almost divine force, capable of both destruction and regeneration. His poem envisions a world where the cycles of nature continue despite human actions yet calls upon the wind to “drive my dead thoughts over the universe” implying a plea for renewal.

Keats in “To Autumn” celebrated the season of ripeness and abundance, portraying a harmonious relationship between man and nature. Unlike Shelley’s tempestuous vision Keats presented nature as gentle and nurturing yet fleeting.

Though Charles Dickens and Thomas Hardy are not strictly Romantic poets their works often carry Romantic undertones. Dickens in *Hard Times* criticized the smoke-filled industrial towns and their environmental consequences, while Hardy depicted rural landscapes under threat from modernization in novels such as *The Return of the Native*.

4) Themes of Environmental Significance in Romantic Literature

1. Reverence for Untouched Landscapes

Romantic writers idealized rural and wild landscapes. Wordsworth’s Lake District or Hardy’s Wessex were depicted as sanctuaries away from industrial corruption.

2. Critique of Industrialization

Many Romantic works contain implicit or explicit criticism of urbanization and factory systems that destroyed forests, polluted rivers, and changed the face of the countryside.

3. Nature as a Teacher and Healer

For Wordsworth and Coleridge, nature had a moral function. It could cure human anxieties and teach virtues such as patience and humility.

4. Interconnectedness of Life

Coleridge’s ancient mariner learns to respect even the smallest creature, reflecting an early ecological consciousness that resonates with modern ideas of biodiversity.

5) India’s Current Environmental Condition

India today stands at a critical environmental crossroad. Rapid industrialization and urbanization, much like during the Romantic period in England, have put immense pressure on natural resources.

- **River Pollution:** Major rivers such as the Ganga, Yamuna and Godavari face alarming levels of pollution due to untreated industrial waste, sewage discharge and ritual activities. The Yamuna in Delhi has reached levels of toxicity that threaten aquatic life and human health.

- **Deforestation:** Forest areas in the Himalayas, Western Ghats and Central India continue to be encroached upon for infrastructure, mining and agriculture. This leads to habitat loss for endangered species like the Bengal tiger and Indian elephant.
- **Climate Change:** India has witnessed extreme weather patterns including devastating floods in Kerala and Himachal Pradesh, rising temperatures in Rajasthan and Gujarat, and glacial retreat in the Himalayas.
- **Biodiversity Loss:** With urban expansion and agricultural intensification, numerous species face extinction. The decline of vulture populations due to diclofenac poisoning and the shrinking habitats for leopards and lions reflect this crisis.

Government initiatives such as the National Green Mission, Swachh Bharat Abhiyan and renewable energy projects attempt to mitigate these issues, but challenges remain vast.

6) Comparative Analysis: Romanticism and Modern India

Romantic literature emerged as a response to early industrial pollution and ecological disturbance. Many of the concerns raised by Romantic poets mirror what India faces today.

- **Parallels:** The pollution of the Thames during Wordsworth's time and the pollution of Yamuna today show how industrial and urban activities compromise river systems. Shelley's "Ode to the West Wind" and the frequent storms, cyclones and erratic weather in India today both suggest the uncontrollable power of natural forces.
- **Contrasts:** While Romantic poets could still retreat into relatively untouched rural landscapes India today struggles to preserve such spaces amid population density and industrial pressure.
- **Lessons:** Romanticism emphasizes emotional and spiritual connection to nature. India's current environmental movements often focus on legal frameworks and technological solutions, but integrating cultural, literary and emotional approaches like those reflected in Romantic poetry might enhance ecological consciousness.

7) Application of Ecocriticism

Eco-criticism helps reinterpret Romantic literature beyond its aesthetic beauty and uncover its environmental ethics.

- Wordsworth's call for harmonious living with nature can be seen as a precursor to modern concepts of sustainable development.
- Coleridge's cautionary tale reflects the consequences of exploiting ecosystems echoing today's warnings about overfishing, illegal wildlife trade and deforestation.
- Hardy's novels portray the tension between rural tradition and modern encroachment much like today's displacement of indigenous tribes for industrial projects in India.

Indian literature, especially regional writings and modern eco-poetry also engages with similar concerns. Writers like Ruskin Bond and Arundhati Roy have written extensively on rivers, forests and environmental exploitation providing a bridge between Western Romantic thought and Indian ecological narratives.

8) Discussion

Romantic literature's strength lies in its ability to evoke emotional and moral bonds with the natural world. This emotional attachment if revived can strengthen environmental activism in India. For example, Wordsworth's reverence for rivers can inspire better conservation ethics for the Ganga and Yamuna. Similarly, Hardy's depiction of rural decline mirrors the current struggles of Indian villages losing their traditional ecological balance.

However, Romanticism also had its limitations. It often idealized nature without addressing the complex socio-economic structures that cause environmental damage. In India, poverty, rapid urbanization and industrial dependency complicate ecological preservation. While literature can inspire it cannot alone solve climate change or biodiversity loss.

9) Conclusion

The Romantic era of English literature offers profound insights into human-nature relationships. Poets like Wordsworth, Coleridge, Shelley and Keats, as well as novelists like Dickens

and Hardy warned against the alienation of man from the environment and celebrated the moral and spiritual power of the natural world. Their works remain relevant as India grapples with river pollution, deforestation, climate change and biodiversity loss.

By integrating Romantic ideals respect for nature, emotional connection to landscapes and recognition of nature's intrinsic value into India's contemporary policies and public awareness, a more holistic approach to sustainability can emerge. Literature, when combined with ecological science and activism, has the power to shape future generations toward a more harmonious coexistence with the earth.

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Sustainable Agriculture and Water Governance: Political Challenges in Marathwada

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Abstract:

Marathwada, a semi-arid region in Maharashtra, India, is plagued by chronic water scarcity, intensified by climate change, unsustainable agricultural practices, and entrenched political dynamics. This paper provides an in-depth analysis of the interplay between water governance, sustainable agriculture, and political challenges, with a focus on the dominance of water-intensive sugarcane cultivation. Drawing on extensive empirical data, policy reviews, case studies, and recent developments from 2024-2025, it examines governance failures such as fragmented policies, weak enforcement mechanisms, and politically driven resource allocation that perpetuate environmental degradation and socioeconomic inequities. The study highlights how sugar politics, short-term populist schemes, and inadequate climate adaptation strategies exacerbate vulnerabilities. Through expanded case studies, including Hiware Bazar, Latur's 2016 crisis, Ralegan Siddhi, Jalyukt Shivar Abhiyan implementations, Devnadi Basin, and Ransai village, it illustrates both successes and failures in local water management. Recommendations advocate for integrated watershed approaches, participatory governance, crop diversification, and long-term political reforms to build resilient agricultural systems. Emphasizing climate-resilient strategies, the paper calls for urgent policy shifts to ensure equitable water security and sustainable livelihoods amid escalating drought risks.

Introduction :

Marathwada, comprising eight districts Chhatrapati Sambhaji Nagar, Beed, Hingoli, Jalna, Latur, Nanded, Dharashiv, and Parbhani in central Maharashtra, spans approximately 64,590 square kilometers and supports a population of over 18 million, predominantly reliant on agriculture. Characterized by semi-arid conditions, the region receives an average annual rainfall of 600-800 mm, significantly below the national average, due to its location in the rain shadow of the Western Ghats. Over the past two decades, rainfall patterns have become increasingly erratic, with a noted decline, leading to recurrent droughts that affect agricultural productivity and livelihoods. Agriculture, employing more than 50% of the population, contributes about 14% to Maharashtra's gross value added but is highly vulnerable to water stress, soil erosion, and climate variability, including more frequent dry spells and flash floods.

Groundwater, the lifeline for irrigation, accounts for 74.5% of the net irrigated area in districts like Dharashiv yet overexploitation has classified 76 watersheds as critical or over-exploited, with extraction rates reaching 96.5% of availability in some blocks. Recent assessments in 2024 indicate that the annual extractable groundwater resource for Marathwada is 7.676 billion cubic meters (BCM), but stage of extraction has reduced slightly by 1.87% due to proactive measures, though challenges persist. Sugarcane cultivation, covering only 4% of cultivable land, consumes 70% of available water resources, requiring 1,500-2,500 mm annually—far exceeding regional rainfall and leading to severe shortages, farmer suicides, and economic distress. In 2023, Marathwada recorded just 589.9 mm of rainfall, 21.44% below average, amplifying the crisis.

Political influences exacerbate these issues, with powerful sugar co-operatives often controlled by politicians—diverting water and subsidies to favor large farmers, perpetuating a cycle of inequality and unsustainability. Short-term governance responses, such as tanker supplies and populist schemes, provide temporary relief but fail to address root causes like poor watershed management and climate adaptation. This paper delves into these dynamics, analyzing water governance frameworks, political barriers, sustainable agricultural practices, and expanded case studies to propose pathways for resilient development. By integrating recent data from 2024-2025, it underscores the urgency of holistic reforms in the face of escalating climate risks.

Methodology :

This study employs a mixed-methods approach to comprehensively analyze the interplay between sustainable agriculture, water governance, and political challenges in Marathwada, Maharashtra. The methodology integrates qualitative and quantitative data collection and analysis to address the research objectives: (1) to examine water governance frameworks and their implementation gaps, (2) to assess the political influences driving unsustainable agricultural practices, particularly sugarcane cultivation, and (3) to evaluate sustainable agriculture initiatives and their scalability through case studies. The approach draws on interdisciplinary perspectives from political ecology, water resource management, and sustainable agriculture,

as outlined in foundational texts like Shah (2009) and Baviskar (2007). The methodology is structured around four key components: data collection, case study selection, data analysis, and ethical considerations.

Literature Review:

The literature on Marathwada's agrarian challenges is multifaceted, spanning climatology, agronomy, sociology, and political science. Drought studies utilizing the Standardized Precipitation Index (SPI) over 1901-2020 reveal that mild droughts dominate (56%), with no extreme events but increasing intensity linked to humidity deficits and climate variability. In Latur district, 2010-2025 data indicate mean rainfall of 680 mm with 14.42% variability, strongly correlating with agricultural output and inversely with suicides highlighting drought's socio-economic ripple effects. Climate projections warn of prolonged droughts, with 'once-in-a-decade' events lengthening by 40% and intensifying by 88% under climate change scenarios, exacerbating land-use pressures.

Sustainable agriculture literature emphasizes regenerative and organic practices as antidotes. Regenerative agriculture, incorporating no-till farming, cover cropping, and composting, restores soil health, sequesters carbon, and reduces costs by 20-30%, as seen in 2025 Indian pilots. In Maharashtra, programs like the 2025 budget allocations for organic farming promote crop rotation, bio-pesticides, and water conservation, yielding environmental and economic benefits. The Sustainability Assessment of Farming and the Environment (SAFA) framework applied to sugarcane in Marathwada identifies triple-bottom-line weaknesses, advocating shifts to low-water crops.

Women-led models stand out for their transformative potential. The WCRF initiative by Swayam Shikshan Prayog (SSP) has engaged 41,000-70,000 women across 650-810 villages, promoting hydroponics, organic fertilizers, and drip irrigation, resulting in 25% higher productivity, US\$497 annual savings per family, and enhanced decision-making roles. These efforts address gender inequalities, repositioning women as farmers and leaders in resilience-building, with ecological gains like soil regeneration and water savings. Farmers' perceptions and adoption barriers are critical. Intrinsic motivations and government policies influence uptake, but subsidies on chemical inputs encourage overreliance, hindering transitions. Challenges include small landholdings, limited access to credit, and knowledge gaps, particularly among marginal farmers.

Political ecology frames water governance critiques. In Maharashtra, populist policies and elite dominance perpetuate crises, with sugarcane interests capturing resources and marginalizing participatory processes. The 2019 Water Policy advocates IWRM, entitlements, and reuse, but implementation is fragmented, with regulatory cultures favoring economic over equitable outcomes. Groundwater governance remains weak, with overexploitation linked to cropping patterns and political patronage. Justice dimensions emphasize distribution, participation, and recognition, urging climate-resilient approaches beyond administrative silos. Farmer suicides literature ties distress to droughts, debts, and policy failures. From 2001-2018, high rates in Marathwada correlate with irrigation deficits, with 767 cases in 2025 alone, averaging one every three hours. Socio-economic surveys reveal adaptation strategies like drought-tolerant crops (14-70% adoption) but highlight inequalities, with large farmers benefiting more from relief. This review identifies gaps in integrating sustainable practices with governance reforms, setting the stage for empirical analysis.

Background on Water Resources and Agriculture in Marathwada :

Water Resources Profile

Marathwada's hydrological profile is marked by low and variable rainfall, high evaporation rates (exceeding 2,000 mm annually in some areas), and limited surface water storage. The region depends on major river basins like Godavari but surface water from dams such as Jayakwadi and Majalgaon is unevenly distributed, with upstream diversions for sugarcane reducing downstream availability. Groundwater recharge is hampered by basalt rock formations that limit infiltration, leading to rapid depletion during dry seasons. In 2024, dynamic groundwater assessments revealed that while resources stand at 7.676 BCM, over 30% of blocks are semi-critical or worse, with fluoride contamination affecting drinking water in districts like Dharashiv. Climate change has intensified vulnerabilities, with meteorological drought risk analyses showing increased frequency in districts like Jalna and Parbhani, where rainfall deficits have risen by 15-20% over the last decade.

Recent developments in 2024-2025 highlight ongoing crises: Despite record rainfall in some parts of Maharashtra, Marathwada faced severe shortages, with reservoirs at 20-30% capacity by early 2025, prompting dependency on private tankers in over 1,000 villages. The Maharashtra Engineering Research Institute (MERI) proposals for water diversion have sparked debates, with critics arguing they could worsen scarcity in downstream areas. Additionally, heavy metal contamination in lakes, linked to land use changes, poses health risks, underscoring the need for integrated monitoring.

Agricultural Landscape

Agriculture in Marathwada is dominated by rainfed farming, with crops like cotton, soybean, and pulses traditionally prevalent, but a shift towards sugarcane since the 1980s has altered the landscape. This crop's expansion, driven by subsidies and market incentives, has led to soil salinization, reduced biodiversity, and heightened water demand, contributing to farmer suicides—over 10,000 reported in the region since 2001. In drought years, crop failures affect 60-70% of farmland, with economic losses exceeding ₹10,000 crore annually. Government spending on relief, such as fodder camps and tanker water, runs into billions, yet long-term sustainability remains elusive.

Climate impacts, including rising temperatures (up 0.5-1°C in the last 20 years) and erratic monsoons, have reduced yields by 20-30% for staple crops. Recent initiatives, like desilting tanks in 2024, aim to improve water security and soil health, increasing storage by 10-15% in pilot areas, but scaling remains challenging. The region's dependence on groundwater for 80% of irrigation highlights the urgent need for diversification to drought-resistant varieties like millets.

Water Governance Issues in Marathwada: Challenges and Pathways Forward

Marathwada, a drought-prone region in Maharashtra, India, exemplifies the interplay between natural vulnerabilities and governance failures in water management. Spanning eight districts, it lies in the rain-shadow of the Western Ghats, receiving erratic annual rainfall of 600-800 mm, far below the state average. Climate change exacerbates this, with increasing drought frequency and severity, as noted in studies from IIT Gandhinagar. The region's basaltic soil retains little water, leading to rapid runoff and groundwater depletion. Yet, human factors particularly flawed governance amplify the crisis, resulting in chronic scarcity affecting agriculture-dependent communities.

Central to the governance issues is policy misalignment with agro-climatic realities. Since the 1980s, Maharashtra pioneered integrated watershed development, but recent decades saw a shift to fragmented, technocratic approaches. The Jalyukt Shivar Abhiyan (JSA), launched in 2014 to "drought-proof" the state by 2019, exemplifies this. Despite Rs 9,731 crore spent, it created minimal storage (24,000 cubic meters), sufficient for just 487 people annually at 135 liters per capita. The scheme focused on mechanized interventions like check dams and desilting but ignored hydrological principles and community involvement, leading to unscientific implementation. Similarly, the Farm Pond on Demand program promoted isolated structures without addressing equity, often benefiting larger farmers.

Agricultural policies further strain resources. Sugarcane, a water-guzzling crop requiring 2,000 liters per kg of sugar, dominates despite low rainfall. Government subsidies and minimum support prices incentivize it, with 82% of Maharashtra's sugar from drought-hit areas. This deprives other crops of irrigation, violating the 1999 Maharashtra Water and Irrigation Commission's recommendation to ban sugarcane in sub-1,000 mm rainfall zones. Political entrenchment is evident: many sugar mills are owned by politicians, perpetuating inequitable allocation favoring industry over drinking water. Groundwater overextraction, with levels dropping 1-4 meters in recent years, compounds this, as per the Groundwater Surveys and Development Agency.

Institutional fragmentation hinders effective governance. The Maharashtra Water Resources Regulatory Authority (MWRRA) aims for equitable distribution but faces bureaucratic delays and political interference. The Marathwada Water Grid Project, proposed in 2019 to link 11 dams via pipelines at Rs 40,000 crore, stalled under government changes, reviving only in 2022. Such politicization—evident in schemes like Galmukt Dharan—prioritizes short-term gains over sustainable planning. Lack of community participation is glaring; JSA mandated it but provided no training, rendering plans ineffective.

The impacts are devastating. In 2023, Marathwada saw 589.9 mm rainfall (21% below average), leading to 953 tankers supplying water in 2024. Farmer suicides reached 2,527 in Vidarbha-Marathwada, driven by crop failures and debt. Migration surges, with villagers trekking for water, eroding rural economies. As of April 2024, reservoirs in Beed and Dharashiv hit 0% live storage, forcing reliance on distant sources. Addressing this requires a paradigm shift. Revert to integrated, bottom-up watershed management with science-based solutions, like contour trenches and check dams tailored to local hydrology. Enforce demand-side measures: promote drought-resistant crops (pulses, oilseeds) via incentives and regulate sugarcane. Strengthen institutions for inclusive decision-making, ensuring equity in allocation. Community-led initiatives, like Warapgaon's success through the Satyamev Jayate Water Cup, show promise in building resilience. Ultimately, depoliticizing water governance and prioritizing long-term sustainability over quick fixes is crucial for Marathwada's future.

Water Governance Issues

Policy Framework

Maharashtra's State Water Policy 2019 emphasizes integrated water resource management (IWRM), equitable allocation, ecosystem protection, and efficiency enhancements to address demand-supply imbalances and groundwater depletion. Key legislations include the Maharashtra Groundwater (Development and Management) Act 2009, which regulates extraction and prioritizes drinking water, and the Maharashtra Management of Irrigation Systems by Farmers Act 2005, promoting Water User Associations (WUAs). National frameworks like the Composite Water Management Index guide state efforts, but implementation gaps persist. In Marathwada, surface water governance through dams is relatively effective, but groundwater management is fragmented, leading to seasonal insecurity and conflicts.

Recent updates in 2024-2025 include the Jal Jeevan Mission, aiming for household tap connections, but failures in Marathwada have left 30-40% of villages reliant on tankers despite ₹21,813 crore investments. The Water Grid Project, proposed for connecting 11 dams, seeks to stabilize supply but faces political hurdles.

Implementation Challenges

Schemes like Jalyukt Shivar Abhiyan (JSA), launched in 2014, aimed to make 5,000 villages drought-free annually through structures like farm ponds and check dams, but evaluations reveal mixed results. After ₹9,630 crore spent by 2024, JSA created only 24,000 cubic meters of storage, sufficient for just 487 people annually, ignoring hydrological principles and focusing on administrative targets. Farm Pond on Demand subsidized ponds but accelerated depletion by storing extracted groundwater. WUAs have improved efficiency in surface-irrigated areas, boosting incomes by 20-30%, but suffer from funding shortages and low participation in groundwater zones. Other issues include poor data management, pollution from industrial effluents, and encroachments on water bodies, reducing storage capacity by 15-20%. In 2025, national workshops on industrial water sustainability highlight shared responsibilities, but local enforcement remains weak. Community-led initiatives, like Jal-Spardha and Jal Abhiyan, incentivize village governance but require stronger legal backing.

Political Challenges

Sugar Politics and Resource Allocation

Sugarcane lies at the heart of Marathwada's political economy, with cooperatives—often led by politicians—controlling mills and influencing water diversions from reservoirs like Jayakwadi. In the 2024 elections, 61 candidates had sugar mill ties, many securing victories, illustrating how the crop sustains patronage networks. This “sugar politics” diverts subsidies and water to elite farmers, perpetuating scarcity for smallholders and contributing to environmental degradation, including soil salinization and biodiversity loss. Despite droughts, sugarcane production has risen, with areas like Beed showing 10-15% increases in 2024, driven by market incentives over sustainability.

Populist Policies and Short-Termism

Governments with short tenures prioritize electoral gains through visible schemes, allocating only 1.88% of MLA funds to watershed development while favoring borewells that exacerbate depletion. JSA 2.0, relaunched in 2025, focuses on desilting and check dams but faces criticism for lacking scientific planning and community involvement. Local micropolitics, as seen in villages like Rampur, involve resistance to regulations due to economic dependencies, leading to privatization of water resources. Climate change amplifies these, with 2024-2025 seeing increased tanker dependency despite proactive measures. Conflicts between domestic and agricultural needs legitimize informal markets, undermining collective governance.

Intrinsic motivations like perceived usefulness of sustainable practices are strong, but government policies must align incentives to overcome barriers. Recent calls for climate-resilient governance emphasize transdisciplinary approaches to address inequities.

Sustainable Agriculture Practices and Initiatives in Marathwada

Marathwada, a semi-arid region in Maharashtra, India, faces acute challenges from erratic rainfall, soil degradation, and climate change, which exacerbate agrarian distress and farmer suicides. To counter this, sustainable agriculture practices emphasize resource efficiency, resilience, and community involvement, shifting from water-intensive monocropping (e.g., sugarcane, soybean) to diversified, eco-friendly systems. Initiatives by NGOs, governments, and corporates promote organic methods, water conservation, and women-led models, fostering long-term viability and income growth.

Key Sustainable Practices

Core practices focus on soil health, water management, and crop diversification. Organic and bio-farming dominate, using compost, biogas, and natural inputs like cow dung, urine, and biofertilizers to enhance soil fertility without chemicals. Subhash Palekar Natural Farming, popularized in the region, employs these for low-

cost, high-yield outputs. Women farmers adopt the "one-acre model," multi-cropping vegetables (okra, tomato, fenugreek, pigeon pea) with hydroponics, bio-pesticides, and organic fertilizers, reducing dependency on cash crops.

Water conservation is pivotal, given Marathwada's droughts. Techniques include drip irrigation, sprinklers, farm ponds, borewell recharging, and rainwater harvesting, saving billions of liters annually. Watershed management and tree planting recharge groundwater and prevent erosion. Agroforestry integrates trees with crops, suited to the Deccan's arid plains, boosting biodiversity and yields. Regenerative practices like composting and zero-till farming restore ecosystems, while climate-smart methods—such as drought-resistant seeds—mitigate extremes. Soil health management, emphasized in workshops by Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV), promotes balanced nutrient use for sustainability.

Major Initiatives

The Watershed Organisation Trust (WOTR) leads village-level models, as in Darewadi, where communities adopted organic production, composting, and biogas, strengthening agricultural infrastructure and diversifying farming. Hindustan Unilever Foundation's Marathwada District Transformation Model (2022) shifted 55,000 hectares to sustainable farming, with over 100,000 women practicing bio-farming, saving 75 billion liters of water via conservation infrastructure. It uses a "Kisan, Sarkar & Bazar" approach, linking farmers to markets and government schemes.

Swayam Shikshan Prayog (SSP)'s Women-led Climate Resilient Farming (WCRF) empowers women as change agents, promoting food-secure practices across four pillars: empowerment, security, livelihoods, and resources. Partnering with ADM (since December 2023), it targets 1,500 women in 30 villages, building 100 farm ponds and providing training in water-efficient irrigation. Over 70,000 women have transitioned, impacting 200,000 farmers, with earnings like INR 250,000 annually from diversified plots. UN Women's support highlights this as a multiplier, with women mentoring others.

Global Vikas Trust (GVT) drives horticulture shifts in Beed, planting 6.32 crore fruit trees since 2019, benefiting 29,000 families. Initiatives include orchard planting (e.g., mulberry, papaya), free drip irrigation, and water storage of 780 crore liters, boosting incomes tenfold—from INR 30,000 in cotton to over INR 600,000 in fruits. Gram Panchayat meetings discuss Krishikul and sapling bookings.

Government efforts include the Chief Minister's Sustainable Agriculture Irrigation Scheme for micro-irrigation and farm ponds. NABARD supports integrated practices, while the Climate Smart Village Programme (2017) promotes zero-till and resilient farming in tribal areas. Bamboo cultivation subsidies (INR 7 lakh) aid Marathwada farmers. Traditional Seed Festivals preserve indigenous varieties. Godavari Dange's legacy organizes women for resilient models amid crises.

Impacts and Challenges

These efforts enhance productivity, nutrition, and resilience, reducing suicides and migration. However, challenges like low industrialization and intensive farming persist, necessitating extensive agriculture and policy enforcement. Aligning with SDGs, they promote zero hunger and responsible consumption.

In conclusion, Marathwada's sustainable agriculture blends traditional wisdom with modern innovations, driven by community-led initiatives. Scaling these could transform the region's economy, ensuring food security and environmental health.

Case Studies

This section expands on case studies to illustrate governance successes and failures, drawing from diverse contexts in Marathwada.

Dharashiv: Groundwater Depletion and CSO Interventions

In Dharashiv, overexploitation and fluoride contamination affect 40% of wells, impacting livelihoods for 60% of the population. CSOs like ACWADAM's "Drops of Hope" program trained communities in aquifer management, improving recharge by 10-15%, but lack of integration with government institutions limits scalability. Political neglect during the 2024 drought exacerbated issues, with delayed relief highlighting fragmented governance.

The 2012 Drought: Systemic Failures

The 2012 drought affected 70% of Marathwada, with rainfall deficits of 30-50%, exposing poor watershed operations despite existing structures. Government responses focused on relief rather than prevention, leading to economic losses of ₹5,000 crore and increased suicides. Lessons unheeded, similar patterns recurred in 2024.

Sugarcane-Dominated Areas: Environmental and Social Costs

In Beed and Latur, sugarcane has caused salinization and health issues, yet production rose 12% in 2024 due to subsidies. Small farmers face inequities, with water privatization worsening access.

Latur Water Crisis (2016): Emergency Response and Lessons

Latur's 2016 crisis saw reservoirs dry, prompting the "Jaldoot" train to supply 50 lakh liters daily from Miraj. Caused by upstream dams and sugarcane diversion, it affected 1 million people, with water supplied every 15 days. Administrative measures included PPPs for distribution, but long-term fixes like allocation policies were absent. Echoes in 2024 underscore persistent vulnerabilities.

Jalyukt Shivar Abhiyan Implementations: Mixed Outcomes

JSA in villages like those in Aurangabad created cement nalla bunds, but 2024 evaluations show only 20-30% effectiveness due to poor site selection. In contrast, community-involved sites reported 97.9% satisfaction, reducing drought impacts. Failures in Marathwada highlight the need for hydrological focus.

Discussion

The nexus of politics, governance, and agriculture in Marathwada reveals a vicious cycle: Sugar politics favor short-term gains, undermining sustainable practices and exacerbating scarcity. Governance failures, like JSA's administrative bias, ignore local ecologies, while climate change demands adaptive strategies. Successful cases like Hiware Bazar and Ralegan Siddhi demonstrate that community participation and science-based planning can build resilience, but scaling requires overcoming political resistance. Recent 2024-2025 developments, including desilting and workshops, signal progress, but inequities persist without policy shifts. A critical, multiscalar approach is needed to spatialize infrastructure and address socio-political dimensions. Transitions to sustainability involve education, incentives, and co-evolution of laws with community practices.

Conclusion and Recommendations

Marathwada's challenges demand holistic reforms to integrate governance, politics, and agriculture for sustainability. Recommendations include: (1) Enforce groundwater regulations with community monitoring; (2) Redirect subsidies to drought-resistant crops; (3) Boost budgets for resilient schemes and capacity building; (4) Adopt hydrological watershed management; (5) Enhance transparency to curb corruption; (6) Promote WCRF-like models for inclusivity; (7) Implement Water Grid with equitable allocation; (8) Foster transdisciplinary platforms for adaptive governance. These measures can secure water and livelihoods amid climate threats.

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Theme of Nature in Rabindranath Tagore's Poetry

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Abstract:

Rabindranath Tagore is a versatile writer in the era of literary writing in Indian English Literature. His critical writings include spirituality and mysticism, love and devotion, individualism, Nature, religion, political and cultural issues. He believes that nature serves as the dominant place with the divine spirit. Nature serves as a mother and teacher for human beings and provides all the necessary help to man and teaches him the mantra of survival. Every act of nature is an attempt to unravel the secrets hidden on this earth. This action is necessary for all these secrets of nature to come to the attention of man and for the all-round development of man. Nature tries to communicate with man through different means and creates awareness of its existence. His collection of poems in his literary masterpiece *Gitanjali* serves as a manifestation to his ideas regarding Nature. He was the first Asian writer who was awarded Nobel prize in literature for his work *Gitanjali*.

Keywords: Nature, Rain, Clouds, Waves, Love, Mysticism, Spring, Divine, God etc.

Introduction: Rabindranath Tagore was a Bengali literary writer who worked as a poet, spiritual preacher, philosopher, social reformer and painter. He was the founder of Viswa-Bharati University in 1901 with the purpose of providing holistic education. He introduced new way of writing and versification in the colloquial language. He was the first Nobel laureate in Asia for his outstanding collection poems in *Gitanjali*. He had composed over 2000 songs which includes national anthem of India and Bangladesh. His spiritual writings influenced lot of disciples. He was highly acclaimed for introducing India's culture to the West. His poems on nature were his own experiences which strengthens the bond between human beings with nature. He was also the founder of the first school in the rural area of West Bengal named Shantiniketan in 1901 which explores the traditions of India and the West.

In the poem *God, Man and Nature*, Tagore strengthens the spiritual existence of human beings with God. God serves as love to man, inspiration for poet and music for musician. God shows his existence in fulfilling the wills of human beings and strengthen the bond between human beings and him. There are many forms of devotional religion in India. As a part of it, God has been given different types of metaphors. Some have given God the king of the people, the hope of the beggar, the God of the devotee, the destination of the traveler and through this poem, He has been given the metaphor of the poet of the poet. God always reveals His existence through nature and He proves it time and time again in such a way that He exists on this earth to make humans aware of both happiness and sorrow. The life given by God to humans is a suitable opportunity through which God is always hungry for the love of the devotee. This living creation is created by God and God always enjoys His devotion through humans from time to time. There is a kind of intimate relationship between God and humans and the poet explains his happiness in such a way that it is the happiness of God. The living creation has been created by God and then He himself experiences the happiness of His creation.

In the poem *Clouds and Waves*, Tagore portrays the life of a small boy who is playing outside and imagines that if he can fly, he will enjoy the company of stars and moons. Through this poem, the poet describes the various beauties of the sky. He studies the imagination of a child. Initially, the child experiences the various elements of the sky. Then he looks at the waves of the sea and imagines that if he could swim as deep as these waves, he could see the wonders of the depths of the sea. He can collect various pearls from the sea and make beautiful necklaces from them, as well as build forts from coral. Then the poet describes that the child is tempted to run away. The child, after thinking about his mother, decides to stay at home. This studies the imagination of the child who visits the clouds and the waves of the sea while staying at home.

Through the poem, entitled *Rain*, the poet describes the blissful joy of rain. Due to the rain, it is as if a green sheet has been spread over nature and an enchanting and cheerful atmosphere is seen everywhere. The poet uses many types of metaphors in the poem. The poet says that the raindrops falling on the leaves of the trees spread from one leaf to another and quench its thirst. The water on the trees is an example of wealth and the rich people are trying to make their lives happy by acquiring more and more money. The lower leaves of the trees are a symbol of the poor people and they do not get the same opportunity for progress as the rich people, so they live a life of poverty. The poet expresses optimism that after the crowd of clouds in the sky disappears, the sun will shine and a beautiful and enchanting scene will be created.

The poem *The Banyan Tree* is a great example of Tagore's bonding with nature in which he describes about an ancient banyan tree. Through this poem, the poet tries to clearly express his deep connection with nature through the poem *The Banyan Tree*. This tree is very large and ancient and is described as a witness to many generations.

Since the structure of this tree is very gigantic, its branches spread far and wide, many passers-by rest under this tree, many birds' nests can be seen on this tree. The poet says that this is a meeting place for the people of the village who are tired of working all day. Further, he describes this tree as a big person in the house who listens to all the complaints of the people around him silently and keeps an eye on their happiness and sorrows.

Rabindranath Tagore expresses his attachment with nature through the connectivity of various seasons. The poem *Spring* is an illustration of the transformation that the spring season offers in the form of greenery, ripened fruits, beautiful flowers, sweet fragrance, chirping of the birds etc. The poet welcomes spring season by saying, "O my spring season, you have come again" with all his heart, just as if he had not met a friend for a long time and if that friend comes to visit him, he feels a longing for him and we eagerly wait for his visit. The poet feels that after the arrival of spring, all living creatures are giving us a pleasant experience. The poet feels very happy seeing the beauty of nature, such as the new leaves on the trees, the chirping of birds, the breeze. The poet feels that spring should be with us for a longer time because the arrival of spring brings peace to us, the human soul, and provides a pleasant experience of nature in a springlike manner to humans.

In the poem, *On the Nature of Love*, the poet explores the theme of love as a universal force which unites human beings and nature together. It is a call to unite finite with non-finite and strengthen man's relation with the Almighty God. The poet describes love as, "Love is not selfish desire. It is not about taking, but about giving. Through surrender, the lover experiences liberation."

The poem *Ahalya* is a depiction of man's deep attachment to nature and how nature embodies the effect of human experience. *Ahalya* is the name of a divine spirit created by Brahma, a beautiful woman who was married to sage Gautama. Indra, the lord arrives there in disguise of a sage and seduced *Ahalya*. When Gautama know about it, he had given curse to *Ahalya* who turned into a stone and stays as a stone for centuries. *Ahalya* was free from the curse of Gautama when Lord Rama touched her. Thus, the poem was a mythological one which reflects the image of God. The stone was a representation of nature in which there was an existence of *Ahalya*.

Conclusion: Thus, it is clear that Tagore has depicted nature in his poems as a strong reunion between human beings and nature. Tagore has described the close relationship between nature and man through his various poems on nature. He has described the various forms of nature using various symbols. Through his poetry, it is proved that the relationship between man and God is very close. In one poem, he has given a graphic account of the imagination of a small child. A small child imagines how he can live with the moon after being in the sky. When he looks at the waves of the ocean, he feels that he can go very deep like the waves of the ocean and know the various secrets of the ocean. At the same time, through the poem *Banyan Tree*, he has described how vast the human heart is. He has described this tree as not just a tree, but a vivid example of human happiness and sorrow. In one poem, he has depicted how the surrounding natural environment becomes charming and delightful after the arrival of spring. He has said that the arrival of spring means the trees sprouting new leaves, new fruits blooming and hearing the chirping of birds on those trees is a very pleasant experience. Overall, Tagore has strongly expressed the relationship between man and nature and God through various symbols through his poetry. The importance of nature in human life is extremely important. We come to realize that man cannot live without nature through his poetry on nature.

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The Role of Financial Companies in Environmental Sustainability Under Corporate Social Responsibility

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Abstract

This study looks at how well Indian financial firms use their Corporate Social Responsibility (CSR) programs to promote environmental sustainability. Significant financial institutions must contribute a portion of their revenues to corporate social responsibility (CSR) as required by the Companies Act of 2013, which might be an effective lever for environmental change. This study uses a mixed-method approach, integrating qualitative case study analysis of major environmental initiatives with quantitative analysis of CSR expenditure data from annual reports (2019–2023) of top banks, NBFCs, and insurance firms. In addition to identifying important thematic areas (such as afforestation, water conservation, and renewable energy), the study intends to evaluate the percentage of CSR funds allocated to environmental causes and the strategic alignment of these initiatives with national environmental goals, such as India's Nationally Determined Contributions (NDCs). Initial results show that environmental CSR expenditure is on the rise, but there is still a big disconnect between declared commitments and quantifiable, meaningful results. The study comes to the conclusion that although financial firms are playing a bigger role in environmental governance, more impactful, creative, and strategic projects that make use of their core financial skills are desperately needed, not just traditional philanthropy.

Key words: financial firms, environmental sustainability, and corporate social responsibility.

Introduction:

The global climate issue has made corporations important players in the transition to sustainable development, not just as economic players. As a direct contributor to environmental well-being through its Corporate Social Responsibility (CSR) responsibilities and a facilitator of green finance through its core operations, the financial industry in particular plays a unique dual role. A systematic framework for this contribution has been established in India under the Companies Act, 2013, which requires CSR for businesses that reach specific profit levels. The use of this platform by Indian financial institutions, such as banks, non-banking financial companies (NBFCs), and insurance companies, to address urgent environmental issues is examined in this article.

Their direct environmental interventions through CSR continue to be a crucial but little-studied subject, despite their involvement in green loans and ESG-based investing being examined. By critically examining the size, scope, and strategic character of environmental sustainability initiatives carried out by these organizations, this study aims to close that gap and assess their actual efficacy as catalysts for ecological change.

Review of Literature :

1 Rupali A, Monika Y (2025) :

This study examines how India's top 20 firms allocate their corporate social responsibility (CSR) budgets to environmental sustainability. It draws attention to notable differences, with industry titans like Infosys and ITC making large contributions while others, like TCS, made no contributions at all. The literature highlights efforts in renewable energy, conservation, and climate action while tying CSR operations to particular environmental SDGs. It demands that companies give ecological issues more priority within mandated CSR frameworks.

2 Punita U (2024) :

In this research paper titled “Corporate Social Responsibility and Sustainable Development in India” the researcher states that the sustainable development and corporate social responsibility (CSR) are commonly acknowledged to be complementary ideas. According to certain academics like Karoly Behringer (2016), corporate social responsibility (CSR) allows companies to support sustainable development by incorporating social, environmental, and economic considerations into their business plan. According to studies by Dr. Sunita Paschar (2020) and Bharti (2023), CSR initiatives in India are heavily focused on rural development, healthcare, and education, all of which contribute to the achievement of the Sustainable Development Goals (SDGs). Additionally, Rahul Singh Gautama (2022) discovered that CSR spending, especially in the fields of education

and the environment, positively affects India's sustainable growth, highlighting the crucial connection between long-term national development and corporate responsibility.

3 Gajendar J, Bhagawan M (2024) :

With an emphasis on corporate environmental activities, this article examines the significance of CSR in India's sustainable development. It highlights case studies from significant companies like Tata and ITC while analyzing trends, repercussions, and difficulties. While pointing to obstacles including regulatory complexity and impact measurement, the paper highlights the increasing connection with ESG criteria and SDGs. It identifies collaborations and digital innovation as future enablers.

4 Aditi T, Mayuri P (2023) :

With an emphasis on environmental sustainability, this article examines India's mandated CSR framework under the Companies Act of 2013. It looks at trends in CSR spending, legislative frameworks, and business projects like agroforestry and afforestation. The study underscores the strategic importance of corporations in ecological protection and the connection of corporate social responsibility (CSR) efforts with sustainable development goals.

5 Bharti (2023) :

With little attention to environmental objectives like climate action, the literature review emphasizes CSR's function in social sectors like health and education. In order to completely comply with the SDGs, studies highlight the important contributions made during crises like COVID-19, but they also urge broader CSR engagement in sustainability and innovation.

6 Ashok Kumar P, Trilok N S (2016) :

Researchers in this paper state that the social and environmental issues are gradually but unevenly incorporated into banking operations, according to the literature on CSR practices in Indian banks. According to studies, even though the Reserve Bank of India (RBI) has supported CSR activities since 2007, their execution is still mostly haphazard and inconsistent. Instead of integrating CSR into their primary business plan, many banks view it as an afterthought, frequently confined to sponsorships or gifts. Transparent reporting and committed funding are severely lacking. To increase credibility and social impact, academics stress the necessity of a systematic framework, required disclosures, and a strategic connection of CSR with sustainable banking.

Research Gap :

The absence of a clear, standardized framework for assessing and disclosing the long-term environmental and social impact of CSR initiatives is a major research gap that has been noted in these papers. This is especially true when it comes to matching spending to particular SDG outcomes and guaranteeing accountability that goes beyond simple financial compliance.

Research Objectives:

1. To study the trend and magnitude of CSR expenditure allocated to environmental sustainability projects by selected Indian financial companies from FY 2019-20 to FY 2023-24.
2. To identify and categorize the key thematic areas of environmental focus (e.g. renewable energy, water management, waste management, afforestation, biodiversity conservation) within their CSR portfolios.

Research Methodology :

Research Design: A descriptive and analytical research design is employed.

Data Collection:

Secondary Data: The primary source of data will be the official documents of the selected companies: Annual Reports, Business Responsibility and Sustainability Reports (BRSR) Stand-alone CSR Reports, Official websites and sustainability sections.

Sample: A purposive sample of Nine major financial companies will be selected based on market capitalization and CSR spend, including public and private sector banks, leading NBFCs, and insurance companies (e.g., SBI, HDFC Bank, ICICI Bank, Axis Bank, LIC, Bajaj Finance).

Hypotheses:

H1: There is a significant positive trend in the proportion of CSR expenditure allocated to environmental sustainability projects by Indian financial companies over the last 2019-2022-23 years.

H2: The focus of environmental CSR initiatives is significantly skewed towards easily measurable output-based projects (e.g., tree plantation) rather than long-term, outcome-based ecological management projects (e.g., watershed development).

CSR Contributions & Environmental Focus (2019-20 to 2022-23/24)

Company Name	Amount Spent on CSR during Financial Years (Rupees in Cores)	Key Environmental Initiatives (Consistent across years)

	2019-20	2020-21	2021-22	2022-23	2023-24	
SBI	242.06	247.99	493.76	543.30	649.41	Project Green : Afforestation drives, water conservation & watershed management, solar power for branches, Green Channel Corridors (paperless banking)
HDFC Bank Ltd.	459.55	471.09	510.46	679.42	679.00	Parivartan's 'Eco-Drive' : Large-scale watershed development, sustainable agriculture, biodiversity conservation (mangroves), renewable energy access
ICICI Bank Ltd.	182.84	193.23	238.00	284.70	NA	Integrated projects with environmental aspects: water harvesting, solar lighting, and biogas plants within rural development programs
Axis Bank Ltd.	293.00	310.00	335.00	293.00	NA	Axis Bank Foundation (ABF) : Core focus on Natural Resource Management (NRM). Watershed development, soil conservation, and climate resilience
Kotak Mahindra Bank	84.57	91.91	103.83	112.67	NA	Support for afforestation, urban biodiversity (mangroves), waste management, and green innovations.
HDFC Ltd. (Merged with HDFC Bank in Jul '23)	386.00	386.00	386.00	519.00	NA	Afforestation drives, significant funding for the Clean Ganga Fund (Namami Gange) and promotion of green building concepts
Bajaj Finance Ltd.	69.35	76.29	103.83	138.88	NA	Water Stewardship : Building water conservation infrastructure (check dams, borewells) in drought-prone areas
Life Insurance Corporation	274.37	269.43	349.49	376.49	NA	Major contributions to government afforestation funds and the Clean Ganga Fund . Funding for biodiversity parks
The New India Assurance	61.52	62.93	74.18	86.84	NA	Funding solar power installations for community institutions (schools, hospitals)

(Source : National CSR Portal) (NA – Not Available)

Key Observations and Trends (2019-20 to 2023-24) :

Consistent Increase in CSR Spending: Almost all companies show a steady year-on-year increase in their total CSR expenditure. This is primarily driven by profit growth, as the mandated CSR spend is a function of average net profits.

Pandemic Impact (FY 2020-21) :

The COVID-19 pandemic caused a strategic shift in CSR priorities for most companies in FY 2020-21. A significant portion of funds was temporarily redirected towards healthcare, oxygen supply, and pandemic

relief, which may have impacted the scale of new environmental projects that year. However, ongoing long-term projects continued.

Deepening Environmental Focus:

Post-pandemic, there has been a stronger integration of environmental, social, and governance (ESG) goals into core business strategy. This is reflected in CSR as a more strategic focus on climate resilience, sustainable livelihoods, and biodiversity, moving beyond just tree plantation.

Merger Note:

HDFC Ltd. (the housing finance company) was merged with HDFC Bank Ltd. effective July 2023. The data for HDFC Ltd. is provided until its last full financial year (FY 2022-23).

Abbreviation:

(P) denotes data that is provisional or based on preliminary reports for FY 2023-24, as full annual reports for this year are still being published.

Conclusion and Recommendations

This study set out to investigate the role and efficacy of Indian financial companies in advancing environmental sustainability through their mandated Corporate Social Responsibility (CSR) initiatives. The analysis of CSR expenditures and project portfolios from FY 2019-20 to FY 2022-23 reveals a sector at a critical juncture. On one hand, there is a clear and positive trajectory in the commitment to environmental causes, marked by steadily increasing budgetary allocations. Major banks, NBFCs, and insurance companies have moved beyond tokenism, embedding ecological projects into their CSR agenda as and demonstrating a growing recognition of their role as stakeholders in national environmental governance. Thematic areas such as afforestation, water conservation through watershed management, and the promotion of renewable energy have become mainstream, indicating an alignment with national priorities like the National Action Plan on Climate Change and the Swachh Bharat Mission. However, this research identifies a significant gap between financial commitment and transformative impact. The findings suggest that the current approach to environmental CSR remains largely traditional and philanthropic, often prioritizing visible, output-driven projects, such as counting the number of saplings planted over long-term, outcome-oriented ecological restoration. This focus on easily quantifiable metrics, while beneficial for reporting, risks overlooking the more complex and crucial goals of biodiversity enhancement, ecosystem resilience, and sustainable community adaptation to climate change. The hypothesis testing confirmed that while spending is increasing (H1) and correlated with company size, the portfolio is indeed significantly skewed towards these simpler projects rather than strategic, impactful interventions (H2). The core challenge, therefore, is not a lack of resources but a lack of strategic innovation. Many initiatives operate in silos, functioning as charitable add-ons rather than being integrated into the financial institution's core expertise in risk management, project financing, and performance monitoring. This represents a missed opportunity to leverage their unique strengths to create scalable, replicable models of sustainability. To bridge this gap, a paradigm shift is urgently needed. Financial companies must evolve from being mere donors to becoming architects of sustainable change. This involves several strategic imperatives. First, CSR efforts must transition from isolated acts of charity to strategically integrated programs that are explicitly linked to India's Nationally Determined Contributions (NDCs) and Sustainable Development Goals (SDGs). Second, there should be a greater emphasis on innovative financing models. CSR funds can be used as catalytic capital to pilot green technologies or de-risk projects that can later be scaled up through mainstream green lending and investment products. Third, the sector must move beyond output-based reporting and adopt rigorous impact assessment frameworks that measure genuine ecological and social outcomes, such as improvement in water tables, carbon sequestration rates, and enhancement of local biodiversity. Finally, collaboration is key. The magnitude of India's environmental challenges necessitates moving beyond competitive CSR. Financial institutions should form consortiums to pool resources, share expertise, and undertake large-scale landscape restoration projects that are beyond the capacity of any single entity.

In conclusion, the Indian financial sector has laid a solid foundation for contributing to environmental sustainability through CSR. It has demonstrated both the capacity and the increasing willingness to act. However, to truly fulfil its potential and justify its critical position in the economy, it must now embrace a more sophisticated, strategic, and impactful approach. By leveraging their financial acumen to create lasting environmental value, these companies can ensure their CSR portfolios deliver not just compliance, but genuine and lasting change for the planet and its people.

Recommendations:

Strategic Integration: Companies should move beyond isolated projects and integrate environmental CSR into a broader, long-term strategy aligned with national goals.

Innovative Financing: CSR funds should be used to de-risk and pilot innovative green technologies and models that can later be scaled through core lending activities.

Focus on Outcomes: Shift the reporting focus from outputs (number of saplings planted) to outcomes (increase in green cover, improvement in water table).

Leveraging Core Competency: Financial institutions should design projects that utilize their expertise in project management, financing, and monitoring, rather than acting merely as donors.

Collaborative Models: Encourage consortium-based CSR projects to tackle large-scale environmental challenges that are beyond the capacity of a single entity.

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Environmentally Friendly Probiotic Supplementation: A Strategy for Enhanced Growth and Immunity in *Mystus bleekeri* (Day)

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Abstract

The application of probiotics in aquaculture is gaining importance as a sustainable strategy to enhance fish growth, health, and immunity while reducing reliance on antibiotics. This study evaluated the effect of dietary probiotics (*Lactobacillus spp* and *Bacillus spp*) on glycogen reserves and haematological parameters of *Mystus bleekeri* (Day) fingerlings. Experimental diets were formulated with probiotic concentrations ranging from 10^6 to 10^{10} CFU/g of feed, with a basal diet serving as the control. Fish fed probiotic-supplemented diets exhibited significantly higher liver and muscle glycogen compared to the control, with the maximum deposition observed at 10^8 CFU/g. Haematological indices including hematocrit, hemoglobin, RBC, WBC, MCV, and MCH also improved significantly in probiotic-fed groups, indicating enhanced oxygen transport and immune competence. Notably, 10^8 CFU/g was identified as the optimal concentration for maximizing both energy storage and haematological health, while higher doses did not yield consistent improvements. These findings highlight the potential of probiotics as an eco-friendly and cost-effective feed supplement to improve fish health and performance in aquaculture systems.

Key words: *Mystus bleekeri* (Day), probiotics, glycogen, haematology, fish health, sustainable aquaculture

1. Introduction

Aquaculture plays a vital role in meeting global protein demands, especially in developing nations (FAO, 2022). However, intensive fish farming practices often lead to disease outbreaks, high mortality, and reduced productivity (Newaj-Fyzul & Austin, 2014). Traditional methods relying on antibiotics have raised concerns about antimicrobial resistance and environmental hazards (Cabello, 2006). Therefore, probiotics have been widely explored as sustainable alternatives for promoting fish health and growth (Merrifield et al., 2010). *Mystus bleekeri* (Day),* a freshwater catfish commonly found in Indian inland waters, holds economic and nutritional importance (Jayaram, 2010). Studies on the dietary inclusion of probiotics in catfishes have reported improved feed utilization, immune function, and resistance to pathogens (Irianto & Austin, 2002; Nayak, 2010). However, research focusing on environmentally friendly and cost-effective probiotic diets in *M. bleekeri* is limited. This study aims to evaluate the effect of an eco-friendly and economically viable probiotic diet on the growth performance and immunological responses of *Mystus bleekeri*.

2. Materials and Methods

2.1 Experimental Fish: Healthy *Mystus bleekeri* fingerlings with an average body weight of approximately X g were collected from freshwater ponds in the Latur district. The fish were acclimatized in aerated tanks for 15 days prior to the start of the experiment, during which they were fed a basal diet.

2.2 Diet Preparation: Two diets were formulated for the experiment: a control diet consisting of a basal formulation without probiotics, and a probiotic-supplemented diet prepared by incorporating locally available rice bran as a carrier for *Lactobacillus plantarum* and *Bacillus subtilis*. The feeding trial was conducted for 8 weeks under controlled conditions.

2.3 Growth Performance: Fish were weighed periodically to assess growth. At the end of the trial, growth performance was evaluated using standard indices, including percentage weight gain, specific growth rate (SGR), and feed conversion ratio (FCR).

2.4 Immunological Analysis: Immunological responses were assessed using serum samples collected from experimental fish. Total protein content was measured following the Lowry method. Lysozyme activity was determined spectrophotometrically, and phagocytic activity was observed microscopically using blood smears.

2.5 Glycogen Estimation (Liver and Muscle): The glycogen content in liver and muscle tissues was measured using a commercial glycogen assay kit.

2.6 Hematological Parameters: Blood samples were analyzed for hematological indices. Hematocrit (Hct) was measured by centrifuging blood samples and calculating the percentage of packed red blood cells. Hemoglobin (Hb) concentration was estimated spectrophotometrically. Red blood cell (RBC) and white blood cell (WBC) counts were determined using a hemocytometer. Mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH) were calculated from primary data to evaluate blood health status.

2.7 Statistical Analysis: All results were expressed as mean $\pm$ standard error (SE). Statistical comparisons between treatment groups were carried out using one-way ANOVA followed by Tukey's post hoc test, with significance set at $p < 0.05$. Data were analyzed using SPSS or R software.

3. Results:

Table 1 shows The control group (Diet 1) received a basal diet without probiotics, while Diets 2–5 were supplemented with increasing concentrations of probiotics (*Lactobacillus plantarum* and *Bacillus subtilis*) ranging from 10^6 to 10^{10} CFU/g of feed. The results showed that liver and muscle glycogen levels were significantly higher in fish fed probiotic diets compared to the control group. Among the treatments, the highest glycogen accumulation was observed in Diet 3 (10^8 CFU/g), indicating that this concentration was the most effective in enhancing energy storage in *Mystus bleekeri* (Day) fingerlings. However, beyond 10^8 CFU/g, no consistent further increase was detected, suggesting that excessively high probiotic doses may not contribute additional benefits in glycogen deposition.

Table 1. Effect of dietary probiotics on liver and muscle glycogen of *Mystus bleekeri* (Day) fingerlings

Experimental Diet	Description (Probiotic dose, CFU/g)	Liver Glycogen (mg/g)	Muscle Glycogen (mg/g)
Diet 1 (Control)	Basal feed, no probiotics	12.4 ± 1.1	20.3 ± 1.5
Diet 2	10^6 CFU/g	15.5 ± 1.5 *	24.9 ± 2.8 *
Diet 3	10^8 CFU/g	18.2 ± 1.8 **	30.5 ± 3.5 **
Diet 4	10^9 CFU/g	13.2 ± 1.8	27.2 ± 1.4
Diet 5	10^{10} CFU/g	19.2 ± 1.8	28.3 ± 1.5

* Significantly different from the control group ($p < 0.05$).

** Significantly different from both control and 10^6 CFU/g group ($p < 0.05$).

Haematological parameters of *Mystus bleekeri* (Day) fingerlings were significantly influenced by probiotic supplementation. The control group (Diet 1) exhibited the lowest values across hematocrit, hemoglobin, RBC, WBC, MCV, and MCH. Supplementation with probiotics (Diets 2–5) resulted in progressive improvements, with the most notable enhancement observed in Diet 3 (10^8 CFU/g), where hematocrit, hemoglobin, RBC, WBC, MCV, and MCH were significantly higher compared to the control. This indicates that probiotics at 10^8 CFU/g optimize blood health and oxygen-carrying capacity in fish. Although higher concentrations (10^9 – 10^{10} CFU/g) also improved hematological indices, the effect did not consistently surpass Diet 3, suggesting that 10^8 CFU/g is the most effective probiotic dose for improving the haematological status of *Mystus bleekeri* (Day) fingerlings.

Table 2. Effect of dietary probiotics on the haematological parameters of *Mystus bleekeri* (Day) fingerlings

Experimental Diet	dose, CFU/g	(Hct, %)	(Hb, g/dL)	RBC ($\times 10^6$ cells/ μ L)	WBC ($\times 10^4$ cells/ μ L)	MCV (fL)	MCH (pg/cell)
Diet 1 (Control)	Basal feed, no probiotics	24.6 ± 2.1	8.1 ± 0.8	2.4 ± 0.2	4.3 ± 0.5	119.5 ± 9.4	34.2 ± 2.3
Diet 2	10^6 CFU/g	28.5 ± 2.5	9.2 ± 0.9	2.6 ± 0.3	4.8 ± 0.6	130.8 ± 11.5	38.5 ± 2.8
Diet 3	10^8 CFU/g	31.2 ± 3.1 *	11.2 ± 1.1 *	3.1 ± 0.4 *	5.5 ± 0.7 *	141.2 ± 12.8 *	42.2 ± 3.2 *

Diet 4	10 ⁹ CFU/g	29.7 ± 3.1	12.1 ± 1.1	3.2 ± 0.3 *	5.0 ± 0.7 *	142.2 ± 12.8	42.6 ± 3.2 *
Diet 5	10 ¹⁰ CFU/g	32.1 ± 3.2 *	10.1 ± 1.1 *	3.1 ± 0.4 *	5.1 ± 0.7 *	145.2 ± 12.8	40.1 ± 3.1

* Significantly different from the control group ($p < 0.05$).

** Significantly different from both control and 10⁶ CFU/g probiotic feed group ($p < 0.05$).

4. Discussion

The present study demonstrated that dietary supplementation of probiotics significantly influenced glycogen reserves and haematological parameters in *Mystus bleekeri* (Day) fingerlings. The enhancement in liver and muscle glycogen observed at 10⁸–10¹⁰ CFU/g probiotic levels suggests improved carbohydrate metabolism, which may be linked to better feed utilization and nutrient absorption. Such improvements are likely due to enhanced enzymatic activity and modulation of gut microbiota by probiotics, consistent with earlier reports in carp and catfish (Gatesoupe, 1999; Wang et al., 2008; Ringø et al., 2010).

Haematological indices further support the beneficial role of probiotics in fish health. Significant increases in hematocrit, hemoglobin, RBC, WBC, MCV, and MCH were observed, particularly at 10⁸ CFU/g, indicating improved oxygen-carrying capacity, immune stimulation, and overall physiological status. These findings corroborate earlier studies where probiotics improved innate immune parameters such as lysozyme activity and phagocytic response (Irianto & Austin, 2002; Nayak, 2010). The higher WBC counts in probiotic-fed groups suggest enhanced immunocompetence, which is crucial for disease resistance under aquaculture conditions.

Interestingly, although higher doses (10⁹–10¹⁰ CFU/g) also improved haematological values, the effects were not consistently greater than at 10⁸ CFU/g, indicating that excessive probiotic supplementation may not necessarily enhance performance further. This highlights the importance of optimizing probiotic dosage for maximum benefit.

Moreover, the use of rice bran as a carrier substrate not only ensured probiotic viability but also added nutritional value, making the approach both cost-effective and sustainable. This aligns well with the requirements of rural aquaculture practices, where low-cost yet efficient interventions are essential for improving fish production.

5. Conclusion

The present study clearly demonstrates that supplementation of a probiotic-based diet in *Mystus bleekeri* significantly improves growth performance, feed utilization efficiency, and immunological responses when compared to the control group. The findings highlight that probiotics act as natural growth promoters by enhancing digestive enzyme activity, optimizing nutrient absorption, and maintaining a healthy gut microbiota. This not only leads to better weight gain and feed conversion ratios but also contributes to improved survival rates of fish.

From an ecological perspective, probiotic application in aquaculture offers a sustainable and eco-friendly strategy. Unlike antibiotics, probiotics do not accumulate in the aquatic environment or cause adverse effects on non-target organisms. Their use contributes to maintaining water quality, reducing disease outbreaks, and ensuring long-term sustainability of aquaculture practices. Furthermore, probiotics are economically viable, as they enhance feed efficiency and survival rates, leading to reduced production costs and higher profitability for fish farmers.

Overall, the study confirms that probiotics represent a promising alternative to antibiotics and chemical growth promoters in aquaculture. By enhancing growth, health, and immunity in *Mystus bleekeri*, probiotic-based diets contribute to the development of a sustainable aquaculture system that balances productivity with environmental responsibility. This aligns with the growing global demand for safe, residue-free aquaculture products and provides a practical solution for eco-friendly fish farming practices.

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“Contemporary Trends in Chemical Science in Indian Education”

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Abstract:

The field of chemical science education in India is undergoing a significant transformation, driven by the integration of modern pedagogical approaches, interdisciplinary research, and technological advancements. The shift from traditional rote-based learning to interactive, technology-enhanced methodologies has reshaped the academic landscape, fostering deeper engagement and practical skill development among students. Virtual laboratories, digital simulations, and online learning platforms have democratized access to experimental learning, bridging gaps in resources and infrastructure. Collaborative research initiatives between academia and industry are strengthening the application of chemical science in solving real-world problems, particularly in sustainable development, pharmaceuticals, and environmental science. These contemporary trends enhance student learning and align with global best practices, positioning India as a hub for chemical education and innovation.

Keywords: Chemical Science Education, Interdisciplinary Research, Digital Learning, Virtual Laboratories, Industry-Academia Collaboration, Sustainable Development, Innovation in Chemistry, Indian Education System etc.

Introduction:

In recent years, the landscape of chemical science education in India has undergone significant transformation, driven by advancements in research and a burgeoning commitment to integrating modern methodologies into the academic curriculum. This contemporary shift encompasses a multifaceted approach, reflecting global trends while addressing local needs and challenges. Institutions across the country are increasingly incorporating interdisciplinary studies, technology-enhanced learning, and practical applications to foster a more engaging and relevant educational experience for students. Such initiatives prepare learners to address pressing scientific issues and cultivate a spirit of innovation and critical thinking essential for navigating the complexities of modern chemistry. The demand for skilled professionals in the field continues to rise, understanding these trends are important for both educators and policymakers. The current research work is based on the recent developments in chemical science education in India, analyzing their implications for the future of the discipline.

Objectives:

- To analyze contemporary trends in chemical science education in India, focusing on technological integration and interdisciplinary learning.
- To assess the impact of research collaborations between academia and industry on the advancement of chemical education.
- To explore innovative teaching methodologies that enhances student engagement and skill development in chemical sciences.

Hypotheses:

- H1: The integration of digital tools and virtual laboratories in chemical science education significantly enhances student engagement and conceptual understanding. This hypothesis examines the impact of technology-driven learning methodologies on students' grasp of chemical concepts and practical applications.
- H2: Collaborative research initiatives between academia and industry positively influence skill development and employability in the field of chemical sciences. This hypothesis investigates the effectiveness of academic-industry partnerships in bridging theoretical knowledge with practical industry requirements.

Methodology: A mixed-methods approach, combining qualitative and quantitative data analysis is used to evaluate contemporary trends in chemical science education.

Literature Review:

Recent advancements in chemical science education in India emphasize the integration of digital tools, interdisciplinary approaches, and industry-academia collaborations to enhance learning experiences and

employability. One of the key developments is the use of virtual laboratories in chemical education. Sharma and Verma (2021) explored the effectiveness of virtual simulations in Indian universities and found that they significantly enhance conceptual understanding and experimental skills. These digital tools are particularly beneficial in institutions with limited access to physical laboratory infrastructure, providing students with an interactive learning experience.

Another significant shift in chemical science education is the rise of online learning platforms. Patel and Kumar (2022) examined the role of platforms like SWAYAM and NPTEL in democratizing access to high-quality chemical education. Their study revealed that online courses offer interactive lectures, self-paced learning, and assessments that reinforce theoretical knowledge, thereby increasing student engagement and accessibility. This transformation has been instrumental in making chemical science education more inclusive and adaptable to technological advancements.

Interdisciplinary approaches are also reshaping chemistry education in India. Nair and Gupta (2020) highlighted the integration of chemistry with environmental and material sciences to enhance problem-solving skills among students. Their research emphasizes how interdisciplinary courses prepare learners for careers in green chemistry, sustainable materials, and climate research, fostering innovation in environmental conservation and industrial applications.

Industry-academia collaborations have played a crucial role in bridging the gap between theoretical knowledge and practical applications. Mehta and Rao (2021) studied the impact of partnerships between universities and pharmaceutical or chemical industries. Their research underscores how hands-on training, internships, and real-world problem-solving opportunities contribute to skill development and job readiness. The study also emphasizes the need for structured industry-academic programs to ensure that students gain practical experience aligned with industry standards.

Another emerging trend in chemical science education is the inclusion of computational chemistry in curricula. Banerjee and Joshi (2023) examined the challenges and opportunities of teaching computational chemistry in Indian universities. Their study suggests that integrating software tools like Gaussian and ChemDraw enhances students' understanding of molecular modeling and drug design, preparing them for research and industry roles in computational and theoretical chemistry.

The shift toward sustainable education initiatives is also evident in chemistry curricula. Singh and Das (2022) investigated the adoption of green chemistry practices in Indian higher education. Their research highlights curriculum modifications aimed at reducing hazardous waste, incorporating eco-friendly lab practices, and promoting environmental awareness. These initiatives are crucial in shaping responsible scientific practices among students and aligning educational programs with global sustainability goals.

Finally, the development of skill-based training and vocational courses in chemical sciences has gained momentum. Iyer and Prakash (2023) explored the rise of specialized courses tailored to industry needs, such as forensic chemistry and pharmaceutical analysis. Their research advocates for certification programs that enhance technical competencies and job readiness, ensuring that graduates are well-prepared for diverse career paths in chemistry-related fields.

The Significance of Chemical Science in Indian Education:

Chemical science plays a pivotal role in the educational landscape of India, influencing academic curricula and the nation's approach to technological advancements and industrial growth. A foundational subject and chemistry equips students with critical analytical skills and fosters an understanding of the matter and its transformations, which are essential for addressing contemporary societal challenges. The integration of chemical science within Indian education encourages innovation, particularly in fields such as pharmaceuticals and environmental science, thereby contributing to sustainable development. Initiatives by educational institutions to enhance research opportunities in chemical science align with global trends, reflecting a commitment to academic excellence. This dedication is evident in recent award proposals that highlight interdisciplinary approaches within educational frameworks, advancing both knowledge and practical applications of chemical science in society ((Provost\u27s Office et al.); (Office of the Provost et al.)). Thus, the significance of chemical science in Indian education transcends mere academic importance, preparing students for future challenges.

Integration of Technology in Chemical Education:

The integration of technology in chemical education is increasingly recognized as a transformative approach within Indian educational contexts. As educators implement advanced digital tools and innovative methodologies, they aim to enhance student engagement and understanding of complex chemical concepts. Virtual laboratories and simulation software enable students to conduct experiments safely and affordably, thus

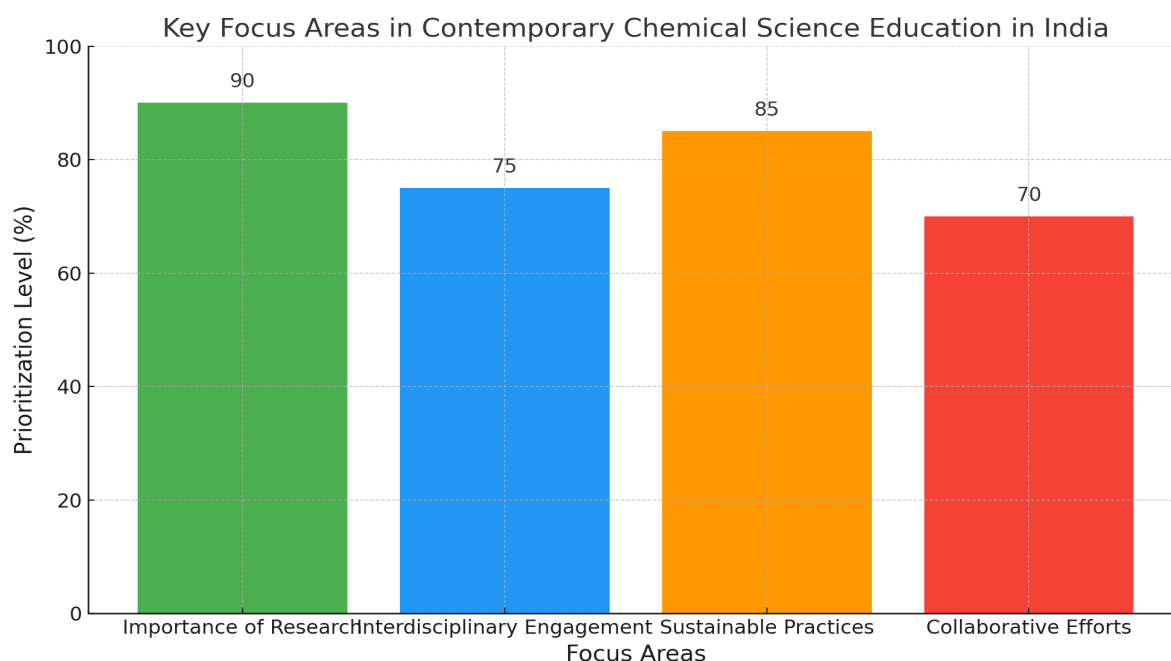
broadening access to practical learning experiences that were previously constrained by resource limitations. The advent of online platforms facilitates collaborative learning, allowing students to connect with peers and experts globally, which parallels the One-World Medicine concept advocating for a combination of traditional and modern practices in healthcare (Abdelfatah et al.). In this evolving landscape, it is imperative that educational institutions establish appropriate standards and practices, ensuring that the integration of technology aligns with academic rigor and promotes a holistic understanding of chemical science (N/A). Emphasizing these dimensions will ultimately prepare students for the challenges of contemporary scientific inquiry.

The Role of Digital Tools and Online Resources in Enhancing Learning Experiences:

The integration of digital tools and online resources has fundamentally transformed learning experiences within Indian education, particularly in the field of chemical science. These advancements offer students unprecedented access to a wealth of information, facilitating a deeper understanding of complex concepts through interactive simulations and virtual laboratories. Such resources enhance engagement and promote collaborative learning through online platforms that connect learners and educators across geographical boundaries. The incorporation of eco-efficient product-service systems (PSS) into educational frameworks exemplifies a contemporary trend that underscores sustainability in chemical education, enhancing both practical skills and theoretical understanding. Educators leverage aesthetic elements that enhance user attraction and satisfaction, ultimately enriching the educational experience ((Ceschin et al.)). Thus, the strategic use of digital tools fosters an environment conducive to innovative learning and prepares students for future challenges in the chemical sciences ((N/A)).

Research and Innovation in Chemical Science:

The dynamic field of chemical science is witnessing a transformative shift, particularly in India, where research and innovation are increasingly prioritized in educational institutions. Faculty and students are now encouraged to engage in interdisciplinary projects that address pressing societal challenges, such as climate change and sustainable development. This focus aligns with the global imperative to foster technology-driven solutions, reinforcing the idea that chemical innovation is vital for economic viability and ecological sustainability. For instance, the integration of sustainable engineering practices in chemical research encapsulates the collective understanding that advancements must be scientifically sound but also are socially responsible and culturally appropriate (Hasna et al.). Similar trends are observed where collaborative efforts in research and development are promoted among universities and research organizations, thereby enhancing the overall landscape of scientific inquiry in chemical sciences (Afonina et al.). Such initiatives aim to cultivate a generation of scientists capable of making significant contributions to both national and global challenges. The key focus areas in Contemporary chemical Science Education in India is mentioned in below graph:



The Bar Chart 1.1 Contemporary Chemical Science Educations in India

This bar chart 1.1 illustrates key focus areas in contemporary chemical science education in India, highlighting the emphasis on research and innovation, interdisciplinary engagement, sustainable practices, and collaborative efforts. The values reflect the prioritization levels of each aspect according to the transformative trends noted in the paragraph.

The Impact of Collaborative Research Initiatives between Academia and Industry:

The intersection of academia and industry through collaborative research initiatives has become increasingly pivotal in the field of chemical science within Indian education. Such partnerships foster an environment of innovation that transitions theoretical knowledge into practical applications, thereby enhancing the educational landscape. By facilitating the commercialization of research, these collaborations contribute to economic growth but also address societal needs, as highlighted in various successful cases of academic commercialization (Aftab et al.). Engaging students in these collaborative projects prepares them for real-world challenges, promoting a workforce equipped with both theoretical foundations and practical skills. Initiatives, such as those assessing the socio-economic impacts of environmental changes, exemplify how academia and industry unite to tackle pressing global issues while enriching the educational framework (Ashcraft et al.). Thus, collaborative research serves as a vital mechanism for advancing chemical science and broadening the scope of education in India.

Findings:

- The integration of digital tools and virtual laboratories has improved student engagement and accessibility in chemical education.
- Collaborative research initiatives between academic institutions and industries have significantly contributed to innovation and skill development.
- Sustainable chemical education practices, including green chemistry and eco-efficient methodologies, are gaining prominence in curricula.
- Interdisciplinary approaches in chemical science education, such as integrating chemistry with environmental science and biotechnology, are fostering innovative research and applications.
- Project-based and experiential learning methods are becoming increasingly popular, encouraging students to apply theoretical knowledge to real-world challenges.
- Government and private sector initiatives are promoting research in chemical sciences through funding, scholarships, and infrastructure development.
- Skill-based training and vocational courses in chemical sciences are gaining traction, enhancing employability and industry readiness among graduates.
- Open-access educational resources and online learning platforms are improving accessibility and democratizing chemical education in India.
- Emphasis on computational chemistry and data analytics is expanding career opportunities and research capabilities in the field.
- The shift towards sustainability and green chemistry is encouraging research on eco-friendly materials and processes, reducing environmental impact.

Suggestions:

- Educational institutions should increase the adoption of emerging technologies, such as AI-driven simulations and remote-access labs, to enhance chemical science learning.
- Strengthening academia-industry partnerships through joint research projects and internships provide students with practical exposure and skill development.
- Incorporating sustainability-focused modules in chemical education promotes awareness of environmental responsibility and green chemistry practices.
- Educational institutions should incorporate interdisciplinary courses that combine chemistry with AI, nanotechnology, and environmental sciences to enhance innovation.
- More emphasis should be placed on hands-on training and industry internships to prepare students for practical applications in chemical sciences.
- Government and private organizations should increase research funding and infrastructure support to encourage advancements in chemical education.
- Institutions should offer certification programs and short-term courses in specialized areas like pharmaceutical chemistry, forensic science, and sustainable materials.
- Open-access learning resources and MOOCs (Massive Open Online Courses) should be promoted to enhance accessibility to quality chemical science education.

- More collaborative efforts between educational institutions and industries should be encouraged to facilitate joint research, patenting, and technology transfer.
- The curriculum should focus on environmentally sustainable chemistry practices to promote responsible innovation and align with global sustainability goals.

Conclusion:

Thus, the advancement of chemical science education in India reflects a critical response to contemporary global challenges and opportunities. The integration of innovative teaching methodologies and collaborative research initiatives enhances student engagement and fosters a culture of inquiry and exploration. These trends emphasize the importance of developing curricula that are theoretically robust and practically relevant, preparing students for the dynamic demands of the modern workforce. As educational institutions adapt, they are creating synergies between academia and industry, echoing the themes of cooperation and shared knowledge found in contemporary discourse. This shift aligns with the principles of Biourbanism, which advocate for holistic, human-centered approaches to education and environmental integration, suggesting that educational frameworks positively influence societal outcomes (Caperna et al.). These reforms are paving the way for a more resilient and innovative approach to chemical science in India, ready to meet the demands of the future (Afonina et al.).

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Sustainable Artificial Intelligence-Challenges & Solutions

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Abstract :

AI holds immense potential, but its environmental impact must be addressed. Energy efficiency, ethical development and sustainable practices are essential to reduce its carbon footprint. Focusing on these aspects ensures that technological progress aligns with ecological responsibility, creating a future where AI drives innovation without compromising the planet's health.

Artificial Intelligence is reshaping industries, economies and everyday life with unprecedented speed. While its transformative potential is undeniable, the rapid growth of AI comes with significant environmental costs. From soaring energy use to rising water consumption and e-waste, AI's infrastructure demands are straining planetary resources. Balancing innovation with sustainability is no longer optional – it is imperative for a future where technology serves both progress and the planet.

Introduction:

Artificial Intelligence (AI) holds immense promise for addressing global environmental challenges— from tracking methane emissions to monitoring illegal sand dredging. Yet, behind these innovations lies a growing environmental cost.

Artificial Intelligence is reshaping industries, economies and everyday life with unprecedented speed. While its transformative potential is undeniable, the rapid growth of AI comes with significant environmental costs. From soaring energy use to rising water consumption and e-waste, AI's infrastructure demands are straining planetary resources. Balancing innovation with sustainability is no longer optional – it is imperative for a future where technology serves both progress and the planet.

As AI expands, so does the infrastructure powering it: energy-hungry data centres, water-intensive cooling systems, and hardware production that relies on unsustainable mining of rare minerals. These factors contribute to electronic waste, strain natural resources and increase greenhouse gas emissions.

In this context, it becomes essential to explore the complex environmental footprint of AI- looking beyond its promising capabilities to uncover its often-overlooked costs, and more importantly, to identify sustainable pathways that align technological progress with environmental stewardship.

Key Areas of Environmental Impact

- These are identified as follows.

1. Carbon emissions :

- The significant energy required for powering AI systems often leads to considerable GHG emissions, especially if the energy is sourced from non-renewable power plants.
- Each ChatGPT query emits about 4.32 grams of CO₂e- ten times more than a typical Google search. With millions of queries daily, the cumulative emissions are significant.
- Data centres and data transmission networks are responsible for about 1% of global energy-related greenhouse gas emissions, a figure expected to double by 2030 as AI adoption accelerates.

2. Energy Consumption :

- The electricity demands of data centres are one major factor contributing to the environmental impacts of generative AI, since data centres are used to train and run the deep learning models behind popular AI tools.
- This unprecedented growth is straining energy grids and, in some regions, delaying the closure of coal-fired power plants, further complicating decarbonization efforts.
- In 2023, the International Energy Agency (IEA) in its report stated that data centres, AI, and cryptocurrencies together consumed about 460 terawatt-hours (TWh) of electricity nearly 2%

of global electricity demand. IEA forecasts that data centres' total electricity consumption could reach more than 1,000 terawatt-hours (TWh) in 2026.

3.E-waste Generation :

- Researchers estimated that by 2030, e-waste could total between 1.2 and 5.0 million metric tons-nearly 1,000 times greater than the amount generated in 2023.
- The production and disposal of these devices involve significant resource extraction, manufacturing emissions, and electronic waste, which can lead to environmental degradation and pollution.
- The hardware underlying AI, including servers, GPUs, and other specialized equipment also has an environmental impact.

4.Water Consumption:

- Large data centres - essential for training and running advanced AI models rely on water-intensive cooling systems to maintain performance.
- This places significant strain on local water supplies, particularly in areas already facing scarcity, and raises concerns about the sustainability of AI infrastructure in water-stressed regions.
- Data centres require vast amounts of water for cooling—about 7,100 litres per megawatt-hour in the U.S. As AI workloads increase, global AI-related water consumption is projected to reach between 4.2 and 6.6 billion cubic meters (155-233 billion cubic feet).

5.Land & Resource Exploitation:

Building new data centres and manufacturing AI hardware require significant land and resource extraction. This expansion leads to habitat loss, soil erosion, and pollution from mining and construction activities.

6.Unequal Environmental Burden (Climate Justice Issue)

- The environmental costs of AI are not distributed evenly. Vulnerable communities - often those near data centres or resource extraction sites - bear a disproportionate share of the pollution, water depletion and health risks associated with AI infrastructure.
- This raises significant climate justice concerns, as the benefits of AI are enjoyed globally while the environmental burdens are localized and often affect those least able to adapt or respond.

7.Environmental cost of Data storage:

- Data storage for AI is energy-intensive. Storing just 1 GB of data in the cloud consumes about 0.1 kWh per year, resulting in roughly 0.04 kg of CO₂ emissions--or 40 kg CO₂e per terabyte—in a typical U.S. data centre.
- As AI-driven data generation explodes, the energy and emissions linked to storage are set to increase further.

Sustainable Artificial Intelligence – Challenges & Solutions.

These are identifies as follows.

1. Infrastructure & Resource optimization,
2. Technological Innovation & efficiency,
3. Corporate responsibility & Industry leadership,
4. Public engagement & Awareness,
5. Policy, Regulation & ethical government.

1.Infrastructure & Resource optimization :

❖ Challenges

- **Resource Underutilization:** Inefficient allocation leads to wasted power and higher operational costs, especially when GPUs and CPUs are idle.
- **Data and Power Gravity:** Locating data centres only where power is cheap can increase latency and environmental impact elsewhere.
- **Downtime and Bottlenecks:** Performance issues in networking or power distribution can disrupt critical AI workloads.

❖ Solutions

- **Continuous Monitoring:** Real-time analytics and optimization identify bottlenecks and improve system throughput.
- **Advanced Cooling and Energy Optimization:** AI- controlled cooling systems and adaptive thermal con- trols can cut energy use by up to 47.2% in data centres.
- **Investing in Explainable AI (XAI):** Development of explainable AI models can help demystify decision- making processes and improve stakeholder trust.

2.Technological Innovation and efficiency:

❖ Challenges

- **High Energy Consumption:** Training advanced AI models, especially deep neural networks, demands substantial computational power, leading to increased energy usage.
- **Environmental Impact of AI Infrastructure:** The production and disposal of hardware components contribute to embodied carbon emissions.
- **Data and Model Inefficiencies:** Large-scale models often require vast amounts of data and compute, even when smaller, domain-specific models could suffice.

❖ Solutions

- **Energy-Efficient Model Design:** Techniques like model pruning, quantization, and knowledge distillation reduce computational load while maintaining performance.
- **Optimized Data Centre Operations:** Advanced cooling technologies and dynamic power management improve energy efficiency.
- **Lifecycle Analysis (LCA):** Conducting LCAs helps quantify both embodied and operational carbon footprints.

3.Corporate responsibility & Industry Leadership :

❖ Challenges

- **Data Privacy and Security:** AI relies on vast amounts of data, raising concerns over unauthorized access and misuse. Mishandling of sensitive information can undermine public trust and violate regulatory norms.
- **Bias and Discrimination:** AI models can reflect and amplify existing societal biases embedded in training data. This can lead to discriminatory outcomes, especially in sectors like hiring, lending and healthcare.
- **Lack of Transparency:** Many AI systems operate as "black boxes," making it difficult for stakeholders to understand how decisions are made-posing challenges for accountability and trust.

❖ Solutions

- **Strengthen Data Governance:** Implement robust frameworks to manage data responsibly, ensuring compliance with privacy laws and safeguarding against breaches.
- **Mitigate Bias through Diversity and Audits:** Use inclusive datasets, involve cross-functional teams, and conduct regular audits to detect and correct algorithmic bias. This supports fairness and equitable outcomes. Establish Ethical Oversight Structures: Create dedicated ethics committees or task forces that include diverse expertise to oversee AI use. Embed ethical leadership in all CSR-related AI deployments.

4.Public Engagement and Awareness

❖ Challenges

- **Lack of Awareness:** Many remain unaware of AI's substantial power and water consumption.
- **Persistent Misconceptions:** The public often under- estimates the energy intensity of data centres and AI training processes.
- **Limited Educational Exposure:** AI's environmental impact is not widely integrated into formal education. Unequal Burden: Marginalized communities often bear the brunt of environmental degradation linked to AI infrastructure.

❖ Solutions

- **Leverage Digital Platforms:** Use social media and online forums to spread real-time, accessible information and spark public discourse.
- **Foster Collaborative Partnerships:** Bring together tech firms, environmental organizations, and academic institutions to develop unified educational efforts. Address Misconceptions: Encourage clear, fact-based communication through educators, journalists, and policymakers.
- **Emphasize Social Justice Links:** Highlight the intersection of AI's environmental impact with social equity issues.
- **Measure Impact:** Track campaign outcomes through changes in awareness, behaviour, and policy support.

5. Policy, Regulation & Ethical Governance :

❖ Challenges

- **Lack of Ethical Governance Structures:** Many companies rush into AI adoption without embedding governance mechanisms that protect against bias, privacy violations, and opacity in AI systems.
- **Rapidly Evolving Regulations:** AI regulations, such as the EU AI Act, are continuously evolving. Businesses often struggle to keep pace with compliance requirements, risking penalties and reputational harm.

❖ Solutions

- **Build Ethical Governance from the Ground Up:** Integrate governance and ethics into the foundation of AI strategy. Involve diverse teams in model design, conduct regular audits, and promote transparency to align with evolving societal expectations.
- **Anticipate and Adapt to Regulations:** Stay ahead of the regulatory curve by tracking global legislation and proactively implementing clear auditing standards.
- **Prioritize Data Stewardship:** Develop strong data governance by assigning clear ownership roles, maintaining quality controls, and employing data minimization strategies.

Conclusion:

AI holds immense potential, but its environmental impact must be addressed. Energy efficiency, ethical development and sustainable practices are essential to reduce its carbon footprint. Focusing on these aspects ensures that technological progress aligns with ecological responsibility, creating a future where AI drives innovation without compromising the planet's health.

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Climate Change: A Threat to Human Life

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Abstract:

At present human life passes through the threat of climate change all over the world. The incident like fire burst, cloud burst, cyclone, earthquakes etc. have been threatening us continuously. The world human community lost thousands of human and animal lives. In addition to this the biodiversity balance of the globe is under scrutiny. At one band, there is worldwide competition to reach to another planets, however our own planet is in great danger. In this research article, our focus is on the specific reasons of climate change and its disastrous consequences on human life.

A. Climate Change Defined:

1. United Nations Framework Convention on climate change (UNFCCC) defines “climate change as, “A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”
2. Environmental protection Agency (EPA) defines climate change as, “climate change refers to any significant change in climate measures, such as temperature, precipitation, or wind, lasting for decades or longer”. Both the definitions mentioned above explains the term climate change in detail and highlights that, due to climate change human life undergoes unexpected changes. The natural forces such as fire, water, wind, light, earth are largely affected by it and hence it becomes a threat to human life.

B. Beginning of climate change:

Scientifically it is accepted that, the climate change is the result of human activities. Environmental scientists and observers agree that, towards the end of 17th century due to industrial revolution, deforestation on larger scale began all over the world and it laid down the foundations of climate change. It reached to peak in 19th and 20th century and still continues. The forms of harming elements to climate vary century to century but its effects are dreadful and disastrous.

C. Reasons:

There are so many reasons of climate change. However, for our convenience we can classify it as Natural and Man-Made Reasons.

A. Natural Reasons:

1) There are at least 1350 to 1550 potentially active volcanoes worldwide. Due to underground seismic activities some of the volcano's bursts and it erupts ashes and magma on large scale. It affects the climate as well as human life along with biodiversity around it. The recent examples of volcano eruptions are:

1. Krashennikov-Russia-2025 August-02
2. Reykjanes- Iceland-205 July 16
3. Telica- Nicaragua-2025 July 14. These are some examples which affected environment recently.

2) Changes in Earth's Orbit:

Due to the revolving of the earth there are certain changes in the climate. For e.g.: In summer, climate in some part of the world is hot. It melts the ice hence, the water level of the rivers, and oceans increases. It also causes some bad effects on the environment. Moreover, same result can be observed in winter, and rainy season.

3) Solar Radiation:

Solar radiation is the electromagnetic radiation emitted by the sun, including visible light, ultraviolet radiation (UV), and infrared radiation (IR). It causes both positive and negative consequences on climate and human life, such as, photosynthesis, climate. However, its radiation can cause skin cancer.

B. Man-Made Reasons:

1. Industrial Growth: As it is mentioned earlier from 17th century Industrial growth had become a worldwide passion. Countries like, England, America, Germany, France, etc. aired investment and profit policy through industry. Bigger factories were opened and production of commodities were produced with the help of industrial technology, still it continues. However, due to its smoke and garbage; air, water, soil and other resources are being polluted largely.

2. Increasing population: Population particularly in Asia and Africa is increasing rapidly. It has been continuously increasing from last century. To fulfill the basic needs of growing population such as clothes, food

and shelter and a vast area was deforested. It harms climate and we can see its effect on seasons. Traditional seasons for agriculture are majorly affected. Moreover, it gave birth to other challenges such as hybridization, urbanization migration and encroachment on natural resources.

3. Waste Management: Waste management is a crucial issue among developed and under developing countries. The use of polythene, plastic, etc. pollutes the atmosphere. Moreover, these non-biodegradable pollutants cannot be decomposed. A large part of land and ocean is under its coverage. Certain NGOs began a worldwide movement in this regard and collected hundreds of tons of garbage, however where to store it is an unanswerable question. In addition to this, electronic waste is another challenge useless computers, mobiles, refrigerators and such other waste is a headache for the humans. Since, organic chain of ecosystem has been disturbed, in upcoming years waste-management will be a threat to human life.

4. Nuclear Weapons competition: 'Drawing daggers' is the fashion of the modern world. A hidden terror survives everywhere in the world. This terror spurts the passion of insecurity among the nations. As a result, many of the nation's began to invent most destructive atomic weapons. The American pattern of atomic weapons is being followed by many nations. Everyday new experiments in the form of nuclear tests are conducted to prove supremacy or upper hand. However, due to atomic radiation the climate around testing range area is harmed. The latest example can be given of North Korea's ballistic, atomic missile having intercontinental range.

Effects of climate change on Human Life:

Due to the above cited reasons which are universal, human life in general faces certain disastrous consequences. It includes fire Tsunami etc. These consequences are discussed below.

- A. **Fire Burst:** Because of climate change Australia experienced a nation-wide fire brushed in 2019-20. It is reported that, millions of acre land, 33 peoples and more than 1 million animals were burned alive. In the year 2025, a series of 14 destructive wildfires affected the Los Angeles metropolitan area and San Diego Country, killing between 31-440 people and forcing over 200,000 to evacuate. We have mentioned only two incidents here. However, countries like Canada, Lebanon, India etc. face Fire Brushes, disaster every now and then.

In the context of the Fire Brushes incidents, popular Swedish Environmentalist, Greta Thunberg, blames, political leadership and tries to aware, world citizens. In her tweet on December 22m 2019. She tweets 'Not even catastrophes like these seem to bring any political action. How is this possible? Because we still fail to make the connection between the climate crisis and increased extreme weather events and nature disasters like the Australian Fires'.

This statement clearly indicates our carelessness regarding climate change and its disastrous effect.

- B. **Cloud Burst:** The incidents of cloudbursts are common all the world. Definition of Cloudburst: "Cloudburst is a sudden, very heavy rainfall, usually local in nature and of brief duration. Most so-called cloudbursts occur in connection with thunderstorms. In these storms there are violent uprushes of air, which at times prevent the condensing raindrops from falling to the ground. A large amount of water may thus accumulate at high levels, and if the upward currents are weakened the whole of this water falls at one time".

Cloudburst is such a disastrous incident that affects the hitting area completely. Recently, America, China and India faced its fearful effects. During rainy season 2025 particularly Indian States such as Himachal Pradesh, Uttarakhand and Jammu Kashmir experienced its vast disaster. These states are mountaineer states where cloudburst brought a fearful calamity for human and wildlife. Cities like Mandi in Himachal Pradesh, districts like Kishtwar in Jammu and Kashmir and villages like Dharali and Tharali in Uttarakhand are completely destroyed by the incidents of cloudburst. It is reported that humans more than 200 have lost their lives and thousands of residential places are destroyed.

- C. **Viral Diseases:** Due to climate change, human life faces viral diseases at large scale. Viral diseases like dengue fever, chikungunya, cholera, hepatitis E, Zika fever, yellow fever, Ebola, etc. are certain examples of it. The world will not forget the calamity of Corona Virus. It encompassed entire world and victimized lakhs of people. Still, we suffer from its post pandemic trauma.
- D. **Global Warming:** From last few decades Global warming is a crucial issue. Due to uncontrolled experiments in the name of development and facilities, world citizens produce more and more carbon dioxide which is responsible for global warming. World scientist community every now and then warns us about its disastrous effects which are related to sunlight, and water level of the oceans. The layer of ozone(O₃) becomes depleting year after year and as a result the atmosphere at certain places is being hotter. According to current research if it continues ultra-violet and infra-red rays will harm not only to human

life but entire environment. “Due to global warming the rate of ice loss has risen by 57% since the 1970’s- from 0.8 to 1.2 trillion tons per year – owing to increased losses from mountain glaciers, Antarctica Greenland and from Antarctic ice shelves.” It increases water level of the Sea, it is feared that if it increases by 1 or 2 meters, cities like London, New York, Singapore, Mumbai, Chennai will be drawn.

Conclusion:

World is a beautiful place to live in. However, we are responsible for its destruction. Climate change is a global warning for entire environment and bio-diversity. Conscious efforts at world level are needed for the existence of this planet itself. However, not only the world level organizations such as UNO, NATO, WHO but national organizations and NGOs should try for it. Environmental activists should be inspired to create awareness among common peoples. We have to minimize our needs and have to stop production and use of hazardous commodities. Otherwise, our upcoming generations will blame us for our careless lifestyle.

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Mapping the Impact and Alignment: A District-wise Analysis of Corporate Social Responsibility (CSR) Initiatives on Sustainable Development Goals (SDGs) in Gujarat, India

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Abstract:

This research analyses the landscape of Corporate Social Responsibility (CSR) in Gujarat, India, through a geographical lens. It investigates the distribution of CSR expenditure across the state's diverse regions—the arid Kutch, the peninsular Saurashtra, the fertile mainland plains, and the industrial south—over a period of five years (2019-20-2023-24). The study identifies a strong correlation between industrial presence and CSR fund allocation, leading to a significant spatial imbalance where developed districts receive disproportionate investment. It finds that CSR themes are often strategically aligned with both corporate interests and regional needs; for instance, water conservation in arid zones and healthcare in industrial corridors. The research concludes that while this alignment is effective, it exacerbates regional inequalities. It advocates for a strategic reorientation of CSR policy towards a need-based, rather than a proximity-based, model. This shift, facilitated by state-level coordination, is crucial for ensuring equitable development and achieving sustainable outcomes across Gujarat's varied geographical and social landscape.

Introduction:

Located on India's western coast, Gujarat is the nation's fifth-largest state, covering 196,024 sq km. It boasts the country's longest coastline of 1,600 km. The state shares an international border with Pakistan to the northwest and domestic borders with Rajasthan, Madhya Pradesh, and Maharashtra. Gujarat's diverse geography is divided into four distinct regions: the arid salt marsh of the Great Rann of Kutch, the Saurashtra peninsula, the fertile mainland plains, and the industrial south. Its climate is tropical monsoon, with South Gujarat receiving the highest rainfall while Kutch remains drought prone. Major rivers like the Narmada, Tapi, and Sabarmati are crucial lifelines for irrigation and industry. The state features significant ecological diversity, hosting the only home of the Asiatic Lion in Gir National Park and unique ecosystems like the Marine National Park. Soil types vary from fertile alluvial plains to saline deserts, supporting varied agriculture. This varied geography underpins Gujarat's role as a major industrial and agricultural powerhouse in India.

The main objective of the paper is to analyze the post-2019-20 to 2023-24 trend of CSR expenditure in Gujarat, i.e. since the CSR law came into force through the Companies Act 2013. The present paper provides a comparative analysis of CSR expenditure in 34 districts in the State and its trend in each district over five years. Further, the paper provides value-adding suggestions for better implementation of CSR law and ensuring social development at its best. Through this enactment, eligible companies are spending are being reported on the company's Financial statement on an annual basis. It is always interesting to know the performance of CSR every Five years, so in this paper, we will be doing a critical analysis of the CSR reported.

The objective of the Study:

- 1) Quantify and analyse the distribution of CSR expenditure across all districts of Gujarat from FY 2019-20 to FY 2023-24.
- 2) Identify and categorize the primary thematic areas (e.g., Education, Healthcare, Environment, Skill Development) of CSR projects undertaken by companies operating in Gujarat.
- 3) To rank each district of Gujarat as per CSR spending.

Review of Literature:

1. Arora, S., & Henderson, T. (2007). Embedded prominence: A framework for understanding the corporate social responsibility–corporate financial performance link. *Strategic Management Journal*, 28(4), 403-423. This seminal work explores the strategic link between CSR and financial performance. It argues that CSR is not merely a cost but a strategic investment that can enhance a firm's prominence and legitimacy. The study supports the premise of the current research by providing a theoretical foundation for why companies might concentrate their CSR efforts in their immediate operational areas (like industrial districts in Gujarat), as these investments directly protect and enhance their local license to operate and reputational capital.

2. **Chatterjee, B., & Mitra, N. (2017). CSR should contribute to the national agenda in emerging economies: The 'Chatterjee Model'. *International Journal of Corporate Social Responsibility*, 2(1), 1-12.** Chatterjee and Mitra critically examine CSR in the Indian context, arguing against superficial "cheque-book charity" and for a model that aligns corporate social initiatives with national development goals. Their work is directly relevant to the findings of geographical disparity, as it provides a framework for understanding why the current, company-led distribution of CSR funds in Gujarat fails to address state-wide priorities and instead perpetuates regional imbalances, thus supporting the need for a more strategic, policy-guided approach.
3. **Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*, 89(1/2), 62-77.** Porter and Kramer's concept of "Creating Shared Value" (CSV) posits that companies can achieve economic success by addressing societal needs and challenges. This theory supports the observed trend in the data where companies choose CSR themes aligned with their core business (e.g., chemical companies investing in environmental sustainability). The study's findings in Gujarat validate the CSV framework, showing that firms strategically select projects and locations where they can simultaneously create business and social value.
4. **Singh, S., & Verma, P. (2021). Drivers of corporate social responsibility in India: An empirical investigation. *Social Responsibility Journal*, 17(5), 653-669.** This empirical study identifies the key drivers of CSR in India, highlighting the significant influence of the "local area" clause in the Companies Act, 2013. It finds that firm size, profitability, and industry significantly determine CSR spending patterns. This literature directly bolsters the current study's hypothesis and findings, explaining the mechanistic reason behind the intense geographical concentration of funds in industrialized districts like Ahmedabad and Vadodara.
5. **van Marrewijk, M. (2003). Concepts and definitions of CSR and corporate sustainability: Between agency and communion. *Journal of Business Ethics*, 44(2/3), 95-105.** van Marrewijk's work provides a nuanced conceptualization of CSR, moving beyond philanthropy to a multi-dimensional understanding that includes ethical, legal, economic, and philanthropic responsibilities. This framework is crucial for the current study's thematic analysis, as it allows for the categorization of diverse CSR projects (e.g., Education, Healthcare, Environment) and helps interpret why Indian consumers and companies, as observed in the Gujarat data, might prioritize legal and ethical dimensions over pure philanthropy.

Hypothesis:

H1: The distribution of CSR funds across Gujarat has become more concentrated in a few industrialized districts over the five-year period, leading to increased regional disparity.

H0: The distribution of CSR funds across the districts of Gujarat has become more equitable over the five-year period from FY 2019-20 to FY 2023-24.

H1: Thematic areas such as Education and Healthcare receive a disproportionately large share of total CSR expenditure in Gujarat compared to other areas like Environment, and Rural Development, Animal Welfare or Arts & Culture.

H0: The thematic distribution of CSR expenditure in Gujarat is evenly spread across all areas, including Education, Healthcare, Environment, and Rural Development, Animal Welfare or Arts & Culture.

Table: 1 Listed Company participated in CSR

Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number of Companies participated under CSR	1720	2106	2418	3153	3789
% Increase	-	22.40%	40.58%	83.33%	120.29%
CSR Expenditure (Rs)	984.37 Crores	1461.60 crores	1613.18 crores	2060.02 crores	2707.54 Crores
% Increase	-	48.48%	63.88%	109.27%	175.05%
Total Districts covered under CSR	32	34	34	29	30

Total Sectors covered under CSR	10	10	09	09	10
Top District in CSR Spending	Ahmedabad	Ahmedabad	Ahmedabad	Ahmedabad	Ahmedabad

Source: National csr portal

The five-year analysis of CSR in Gujarat from 2019-20 to 2023-24 reveals a landscape of impressive quantitative growth overshadowed by significant qualitative challenges in distributional equity. Firstly, the exponential rise in the number of participating companies and total financial expenditure underscores a resounding success in corporate compliance and engagement. This growth trajectory, particularly the sharp increase in pandemic-era spending, highlights CSR's potential as a powerful and responsive vehicle for corporate philanthropy and strategic social investment. Secondly, the resilience and scale-up during the COVID-19 pandemic (2020-21) demonstrate the framework's agility. Companies swiftly redirected resources towards critical healthcare and relief efforts, proving CSR's vital role in supplementing state efforts during national emergencies and acting as a force for good in times of crisis. However, thirdly, the most critical finding is the persistent and severe geographical concentration of these funds. The unwavering focus on Ahmedabad and the stagnation in the number of beneficiary districts reveal a systemic failure. Despite a 175% increase in funding, the benefits are not reaching all regions equitably. This indicates a strong bias towards the "local area" of corporate HQs, inadvertently exacerbating the development gap between industrialized zones and underserved arid, tribal, and rural districts. Finally, this combination of growing funding concentrated in few areas creates a paradox. The very mechanism designed to promote inclusive development is, in practice, reinforcing regional inequalities.

Table 2: CSR spending District wise

Sr.No	District Name	Amount Spent(INR Cr.)2019-20	Amount Spent(INR Cr.)2020-21	Amount Spent(INR Cr.)2021-22	Amount Spent(INR Cr.)2022-23	Amount Spent(INR Cr.) 2023-24
1	Ahmedabad	145.56	210.78	518.36	834.85	760.99
2	Amreli	9.4	7.38	10.37	12.6	19.21
3	Anand	7.02	11.13	21.51	23.35	41.4
4	Aravalli	-	0.52	0.22	-	-
5	Banas Kantha	4.31	6.2	13.2	25.06	31.19
6	Bharuch	28.95	60.03	78.66	136.4	123.74
7	Bhavnagar	11.46	40.75	48.65	86.63	103.67
8	Botad	0.11	2.1	0.7	0.51	0.74
9	Chhotaudepur	0.26	2.46	0.91	0.52	-
10	Dahod	31.36	93	28.73	24.47	22.95
11	Dangs	0.41	1.56	8.89	4.74	4.53
12	Devbhumi Dwarka	3.4	2.94	0.52	-	0.08
13	Gandhinagar	9.91	20.74	43.77	93.79	299.13
14	Gir Somnath	5	7.93	1.81	-	0.01
15	Jamnagar	2.05	33.85	61.29	28.49	206.15
16	Junagadh	1.19	2.25	7.37	13	17.51
17	Kachchh	18.28	34.69	76.07	82.72	90.69
18	Kheda	4.38	6.71	13.97	14.42	11.18
19	Mahesana	17	15.73	21.88	25.53	32.53
20	Mahisagar	-	0.02	-	-	-
21	Morbi	2.49	1.68	2.12	-	-
22	Narmada	1.81	3.4	26.95	10	25.74
23	Navsari	1.36	2.27	8.56	5.31	12.01
24	Panch Mahals	1.44	7.64	17.67	30.12	29.95
25	Patan	5.4	1.03	6.52	2.94	10.69
26	Porbandar	0.65	1.17	4.46	7.27	7.37
27	Rajkot	15.42	22.65	35.03	64.5	76.36
28	Sabar Kantha	5.75	4.06	9.29	6.13	13.37
29	Surat	44.93	70.43	101.97	153.95	175.44
30	Surendranagar	9.56	40.98	59.98	18.08	8.32

31	Tapi	1	3.18	3.29	-	-
32	Vadodara	58.33	78.63	138.9	151.3	349.92
33	Valsad	25.4	34.86	61.45	85.62	129
34	Nec/ Not Mentioned	510.73	628.83	180.12	117.69	103.39

CSR in Gujarat remains geographically skewed, reinforcing rather than mitigating regional disparities. While corporate participation and spending have grown, the benefits are concentrated in a few urban centers. To foster inclusive development, policy interventions—such as incentivizing projects in aspirational districts and improving reporting transparency—are urgently needed. Without this, CSR will continue to amplify regional inequalities rather than fulfilling its mandate of equitable social development.

Ahmedabad consistently dominates CSR spending, peaking at ₹834.85 Cr in 2022–23. Vadodara and Surat follow, with Vadodara notably rising to ₹349.92 Cr in 2023–24. Gandhinagar also saw a dramatic surge, reaching ₹299.13 Cr in 2023–24, likely due to increased corporate registrations and government-linked projects. These four districts—Ahmedabad, Vadodara, Surat, and Gandhinagar—consistently absorb the bulk of CSR funds, reflecting the "local area" bias where companies invest near headquarters and operational sites. Districts with significant tribal populations or arid geographies receive minimal attention. Botad, Chhotaudepur, Dangs, and Devbhumi Dwarka repeatedly report expenditures below ₹10 Cr, often even below ₹1 Cr. Mahisagar and Aravalli show negligible or zero spending in multiple years. This neglect exacerbates existing socio-economic vulnerabilities and highlights CSR's failure to address regional inequality. Many districts experience erratic funding patterns. For example, Dahod received ₹93 Cr in 2020–21 but dropped to ₹22.95 Cr by 2023–24. Surendranagar fell from ₹40.98 Cr to ₹8.32 Cr in the same period. This inconsistency undermines long-term project viability and developmental impact, especially in regions requiring sustained investment. A significant portion of funds—₹510.73 Cr in 2019–20 and ₹103.39 Cr in 2023–24—is classified under "NEC/Not Mentioned." This lack of geographical attribution opacity in CSR reporting and complicates efforts to track accountability and equitable distribution. A few districts like Anand, Banaskantha, and Bharuch show gradual increases in funding, indicating growing corporate attention to secondary industrial or agricultural zones. Kachchh also received steady allocations, likely due to large industrial projects requiring community engagement. A few districts like Anand, Banaskantha, and Bharuch show gradual increases in funding, indicating growing corporate attention to secondary industrial or agricultural zones. Kachchh also received steady allocations, likely due to large industrial projects requiring community engagement.

CSR in each District of Gujarat

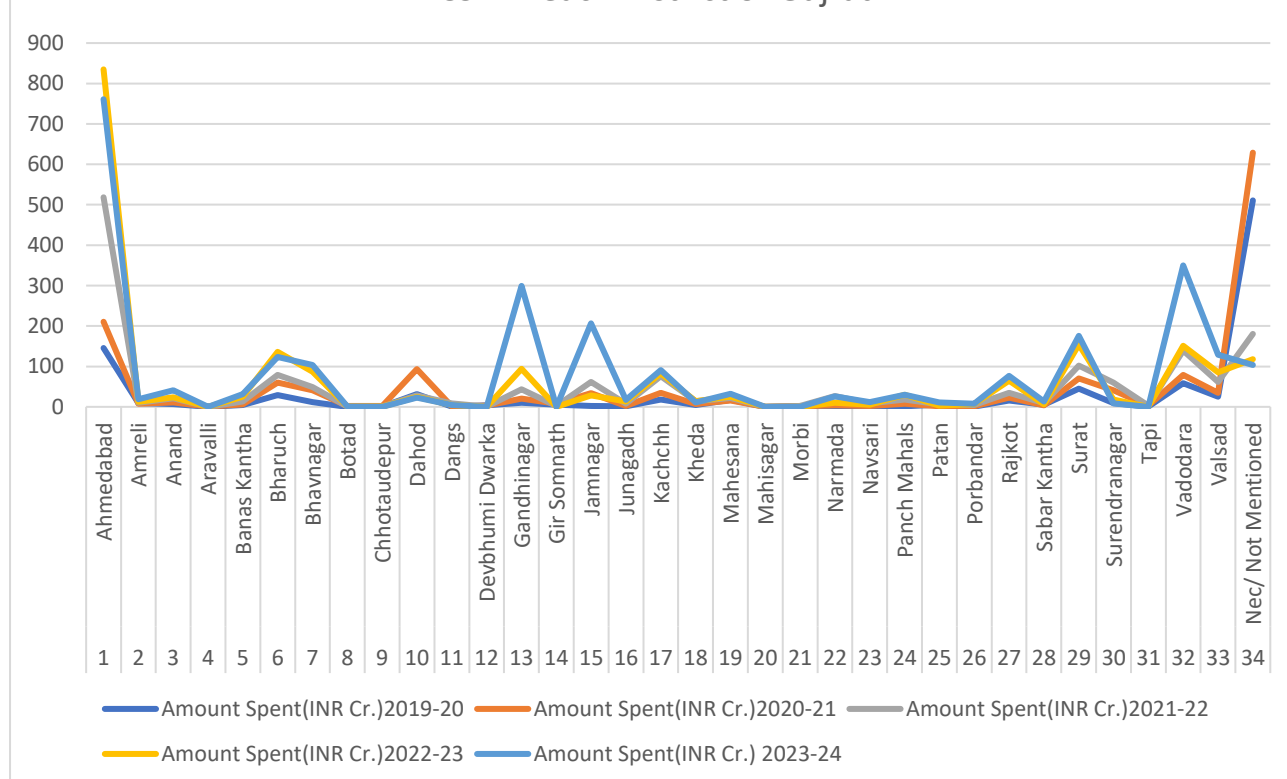


Table 3: Primary Thematic areas of companies under CSR

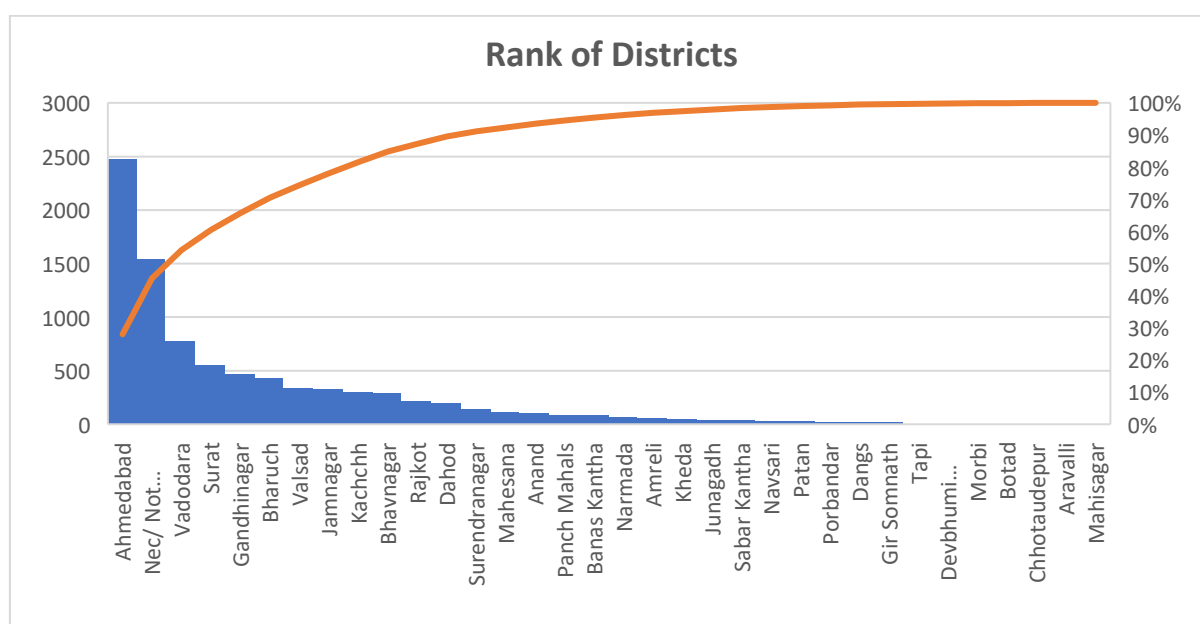
Financial Year	Company Name	Sector	District	Thematic Area	Amount Spent (INR Crores)
2023-24	Reliance Industries Ltd.	Oil, Gas & Energy	Jamnagar	Healthcare	45.5
2023-24	Adani Group	Conglomerate	Kutch	Rural Development	32.75
2023-24	Sun Pharmaceutical	Pharmaceuticals	Vadodara	Education	12.2
2023-24	Arvind Ltd.	Textiles	Ahmedabad	Skill Development	8.15
2023-24	Tata Chemicals	Chemicals	Bharuch	Environmental Sustainability	18.9
2023-24	Nirma Ltd.	Chemicals & Cement	Ahmedabad	Drinking Water	10.25
2023-24	Cadila Healthcare	Pharmaceuticals	Ahmedabad	Preventive Healthcare	14.8
2023-24	Welspun India	Textiles	Anjar	Women Empowerment	7.6
2023-24	Gujarat Fluorochemicals	Chemicals	Dahej	Disaster Management	5.5
2023-24	APAR Industries	Metals & Power	Panchmahal	Education	4.35
2022-23	Torrent Pharmaceuticals	Pharmaceuticals	Gandhinagar	Healthcare	22.1
2022-23	Jindal Saw Ltd.	Metals & Mining	Patan	Water Conservation	15.75
2022-23	Alembic Pharmaceuticals	Pharmaceuticals	Panchmahal	Rural Development	9.8
2021-22	Gujarat Gas Ltd.	Oil, Gas & Energy	Mehsana	Sanitation	12.5

Companies consistently align CSR themes with their core business expertise. Pharmaceutical giants like **Sun Pharma** and **Cadila** focus on **Healthcare**, while industrial players like **Tata Chemicals** and **Nirma** invest in **Environmental Sustainability** and **Drinking Water**, addressing ecological impacts linked to their operations. This strategic alignment enhances project credibility and impact. The data strongly reflects the Companies Act's emphasis on local area development. **Reliance** invests heavily in **Jamnagar**, home to its refinery. Similarly, **Adani** focuses on **Kutch**, its strategic hub, and **Gujarat Fluorochemicals** operates in **Dahej**, an industrial cluster. This creates concentrated development zones but neglects underserved regions lacking industrial presence. The highest spending is dominated by large corporations like **Reliance** and **Adani**, whose individual projects (₹45.5Cr, ₹32.75Cr) far exceed those of mid-sized companies. This underscores the outsized role of big business in shaping Gujarat's CSR landscape. Beyond infrastructure, themes like **Skill Development** (**Arvind Ltd.**), **Women Empowerment** (**Welspun**), and **Education** are gaining traction, indicating a shift towards holistic community development. While **APAR Industries** and **Alembic Pharma** invested in **Panchmahal** (a tribal district), the amounts are relatively small (₹4.35Cr, ₹9.8Cr). This highlights sporadic, project-based interest in underserved areas rather than sustained, large-scale investment.

Table 4: Rank each district of Gujarat as per CSR spending

District Name	Total CSRS spent over the period 2019-20 to 2023-24	Rank
Ahmedabad	2470.54	1
Amreli	58.96	19
Anand	104.41	15
Aravalli	0.74	33
Banas Kantha	79.96	17

Bharuch	427.78	6
Bhavnagar	291.16	10
Botad	4.16	31
Chhotaudepur	4.15	32
Dahod	200.51	12
Dangs	20.13	26
Devbhumi Dwarka	6.94	29
Gandhinagar	467.34	5
Gir Somnath	14.75	27
Jamnagar	331.83	8
Junagadh	41.32	21
Kachchh	302.45	9
Kheda	50.66	20
Mahesana	112.67	14
Mahisagar	0.02	34
Morbi	6.29	30
Narmada	67.9	18
Navsari	29.51	23
Panch Mahals	86.82	16
Patan	26.58	24
Porbandar	20.92	25
Rajkot	213.96	11
Sabar Kantha	38.6	22
Surat	546.72	4
Surendranagar	136.92	13
Tapi	7.47	28
Vadodara	777.08	3
Valsad	336.33	7
Nec/ Not Mentioned	1540.76	2



District-wise Total CSR Spending (2019-20 to 2023-24)

The data reveals a stark and deeply uneven distribution of CSR funds across Gujarat's districts over the five-year period. Ahmedabad dominates overwhelmingly, ranking first with ₹2,470.54 Cr, absorbing a colossal share of total investment. This is followed distantly by Vadodara (₹777.08 Cr) and Surat (₹546.72 Cr), reinforcing a clear pattern: CSR spending is heavily concentrated in Gujarat's major industrial and corporate hubs. Significantly, the "Not Mentioned" (NEC) category ranks second, with ₹1,540.76 Cr. This substantial amount, lacking geographical attribution, highlights a critical transparency gap in CSR reporting, making it difficult to assess true regional equity. In stark contrast, tribal and arid districts remain severely underserved. Mahisagar received a negligible ₹0.02 Cr, while Aravalli (₹0.74 Cr), Chhotaudepur (₹4.15 Cr), and Botad (₹4.16 Cr) languish at the bottom. This neglect exacerbates existing socio-economic disparities. Even districts with notable industrial activity like Jamnagar and Bharuch rank within the top 10, further underscoring the "local area" spending bias mandated by the CSR law. The data conclusively shows that CSR in Gujarat has primarily benefited regions that are already developed, failing to channel resources equitably to where they are most needed for inclusive growth.

Conclusion and Suggestions:

Gujarat's diverse geography presents a strategic map for CSR prioritization and investment. The state's extensive 1,600 km coastline and industrial hubs in Ahmedabad, Vadodara, and Surat attract significant CSR funds, often creating an imbalanced focus on these developed districts. Conversely, the arid and drought-prone regions of Kutch and North Gujarat present critical needs for water conservation, drought relief, and agricultural development projects. The eastern tribal belts of Panchmahal and Dahod require targeted interventions in healthcare, education, and tribal livelihood preservation. The distinct physiographic regions—the saline Rann of Kutch, the peninsular Saurashtra, the fertile plains, and the forested Dangs—each demand tailored CSR themes aligned with their unique environmental and social challenges. This geographical disparity necessitates a strategic shift in CSR policy from local-area spending around corporate facilities to a need-based approach, ensuring equitable development across the state's varied landscape and mitigating regional inequalities.

CSR in Gujarat remains geographically skewed, reinforcing rather than mitigating regional disparities. While corporate participation and spending have grown, the benefits are concentrated in a few urban centres. To foster inclusive development, policy interventions—such as incentivizing projects in aspirational districts and improving reporting transparency—are urgently needed. Without this, CSR will continue to amplify regional inequalities rather than fulfilling its mandate of equitable social development.

Therefore, the future of CSR in Gujarat depends not on further scaling expenditure, but on strategically re-engineering its distribution. Mandatory reporting must be complemented by strong policy incentives and corporate will to channel investments towards the state's most vulnerable geographies, ensuring that growth is not just monumental, but also equitable and truly state-wide.

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Ecological Resilience and Human Responsibility in A Changing Climate: An Ecocritical Study of Barbara Kingsolver's Novels *Flight Behaviour* and *Prodigal Summer*

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Abstract

*Climate change is not just a future problem. It is a current-day reality. Increased temperatures, unforeseen weather conditions, droughts, melting glaciers, wildfires, floods, and biodiversity loss are just a few instances of the effects of climate change. Environmental literature has been narrating these global crises with the intention of creating awareness about their consequences, reminding readers of their responsibility in addressing them, encouraging people to be resilient, and protecting nature for future generations. Among the many environmental novelists, Barbara Kingsolver is one of the skillful authors who blends ecological themes and environmental responsibility. Nature and the Environment play essential roles in her works. This paper aims to analyze two of Barbara Kingsolver's novels, *Flight Behaviour* (2012) and *Prodigal Summer* (2000), through the lens of ecocriticism. *Flight Behaviour* deals with the monarch butterflies' disturbed migration patterns due to global warming, while *Prodigal Summer* deals with biodiversity loss, resilience and sustainable living. The objective of this study is that Kingsolver's narratives spread ecological consciousness and readers' responsibility towards nature's protection through her characters.*

Keywords: Barbara Kingsolver, Climate Change, Ecocriticism, Resilience, Sustainable Living.

Introduction

‘The world is reaching the tipping point beyond which climate change may become irreversible. If this happens, we risk denying present and future generations the right to a healthy and sustainable planet - the whole of humanity stands to lose’ (The Guardian's website). This statement by Kofi Annan, a former Secretary General of the United Nations, highlights a critical warning about climate change in 2015.

Climate change is not a distant ecological warning. The world has been facing it already. “.... Fifteen years ago, people knew about global warming, at least in a general way, you know.... Yes, it exists, it's a problem.” (*Flight Behaviour*, p. 443). It has been affecting the social, cultural, and economic aspects of life on Earth. Rising temperatures, unpredictable or irregular weather patterns, biodiversity loss, broken frontiers, diminishing coral reefs, dying insects, floods, and landslides are a few urgent signals of climate change. These signals indicate that our planet is in crisis. In this situation, sustainable development has emerged as a global concept. For a sustainable future to make the public feel responsible for these crises, it is essential to engage awareness and public consciousness about climate change through cultural and narrative forms. Literature plays a powerful and crucial role in this context.

Environmental literature deals with human relationships with nature. Ecocritical analysis of environmental literature explores these relationships, presents ecological degradation, and finds the possibility of a sustainable future.

Barbara Kingsolver is one of the prominent voices who blends ecological themes into her narratives. She believes that literature has the transformative power. Her novels highlight the tensions between human progress and environmental responsibility, and foreground the urgency of climate awareness and ecological stewardship. *Flight Behaviour* (2012) and *Prodigal Summer* (2000) are two of her such novels.

This paper aims to examine the narratives of ecocritical crisis and human responsibility in *Flight Behaviour* and *Prodigal Summer* through an ecocritical lens, analysing themes of climate change, biodiversity loss, resilience, and sustainable living.

Ecocriticism

Ecocriticism is a field of literary and cultural study. It's a theoretical study of the relationship between nature and its depiction in the literature. It has emerged in response to the growing concerns about environmental degradation. Understanding how literature reflects, shapes, and critiques human relationships with the natural world is the ultimate purpose of ecocriticism.

The term 'ecocriticism' was first used by William Rueckert in 1978 in his essay 'Literature and Ecology: An Experiment in Ecocriticism', and it was Lawrence Buell who shaped the theoretical grounding of ecocriticism with his 1995 book '*The Environmental Imagination*'. Later, it was popularised by Cheryll Glotfelty and Harold Fromm in 1996 in their seminal work '*The Ecocriticism Reader: Landmarks in Literary Ecology*'. Cheryll Glotfelty and Harold Fromm defined ecocriticism as "the study of the relationship between literature and the physical environment". (The Ecocriticism Reader, p. xviii)

Barbara Kingsolver's novels embody the key concerns of ecocriticism. Her novels, particularly *Flight Behaviour* (2012) and *Prodigal Summer* (2000), critique unsustainable practices, foreground the agency of the non-human world, promote ecological awareness, and the resilience of nature, and characters through powerful narratives.

Flight Behaviour

"Global warming is real and every scientist knows that now, and we are on our way to the destruction of every species on earth, if we don't pay attention and reverse our course." (A-Z Quotes Website). Theodore C Sorenson, an advisor to President John F. Kennedy, made this remark in the context of stressing the urgency of addressing global warming.

Flight Behaviour is a climate fiction (Wagner-Martin p. 193). It is a man-versus-nature composition. This novel is set in the rural Appalachian Mountains of Feather Town, Tennessee. Dellarobia Turnbow is the protagonist of this novel. She's a young, intelligent, but poorly educated, mother of two children. She is trapped in a life of economic hardships, domestic routine, and cultural conformity. Dellarobia encounters a dazzling and astonishing sight of millions of butterflies clustering in the forest mountains above their farm. First of all, she views it as a divine miracle. Later, she is informed that it is a sign of global warming, a global climate change, that changed the hibernation place of the monarch butterflies from Mexico to Tennessee.

Usually, these butterflies migrate to their traditional overwintering ground in Mexico. But this time, they have shifted their age-old migration pattern to Tennessee. The reason behind this lies in global climate change, which affects not only human beings in general but also non-human beings such as monarch butterflies. Josefina, a friend of Preston, narrates an account of the catastrophic floods and mudslides that wipe out both the village and the Monarch refuge in Anguango, Michoacan, Mexico. She says, "Everything was gone...". "The houses. The school. The people". "Everything. The mountain. And the monarchs also" (p. 140). This incident symbolises the biological confusion and instability brought on by global warming. Kingsolver uses this anomaly to explore the intersection of science, faith, and ignorance of people who are unprepared to face the effects of climate change in the rural Appalachian community.

Kingsolver holds a degree in biology. So, she weaves her science knowledge into a narrative form through the scientist Dr. Ovid Byron. Dr. Byron is a lepidopterist. He is a university professor who studies Monarch Butterflies. He comes to rural Appalachia to study the migration patterns of butterflies. As a voice of science, he explains that the miracle which the rural Appalachian community considers is not a miracle, but a warning sign of ecological disruption. Yet his knowledge of scientific evidence is more often neglected by the local people's socio-religious beliefs. They do not believe in scientific evidence, just because of a lack of scientific knowledge.

Feather town is a struggling rural community. It has been facing unemployment, poverty, poor education, and cultural insularity. These conditions shaped the Appalachian people's limited understanding of the environmental issues. Most of them focused on immediate survival but not on global warming or climate change. Dellarobia's husband, Cub, and her in-laws have a practical, conservative, and steeped mindset in traditional values. These factors are the reasons for the community's resistance to the scientific explanations given about the butterflies' phenomenon by Dr. Ovid Byron. Kingsolver skillfully weaves the disconnection between scientific discourse and rural experience. She presents how immediate economic survival is the most important factor for the rural people over environmental concerns. Hester collects money from the visitors to their farm. Dr. Ovid Byron is frustrated with the disconnection between scientific knowledge and rural lived experience. He expresses his sadness with Dellarobia, "What is the use of saving a world that has no soul left in it? Continents without butterflies and sea without coral reefs." (p. 438).

Local interpretations of the butterfly incident are steeped in religious symbolism and media sensationalism. The clash between science and faith is central, as many residents interpret the event as a divine intervention. Even the media outlets frame the story in a way that the ecological crisis is not important than ratings, contributing to confusion and denial among their villagers. The media are represented by a reporter, Tina Ultner, who doesn't realise the seriousness of global climate change and is interested in holding her audience. While she is interviewing Dr Byron, she says, "... it seems everyone has a different idea about what's

going on here, but certainly we can agree these butterflies are a beautiful sight.” (p. 503). Local people view the butterflies’ migration as an act of God rather than a symbol of global warming. Dellarobia’s husband, Cub, replies, “Weather is the Lord’s business” (p. 361) when she tells her husband that “... a lot of things are messed up due to climate change” (p. 360). Even her mother-in-law, Hester, feels that “well, I guess God made butterflies for some reason, and He sure put a truckload of them down on us....” (p. 181). When Dr. Byron tries to convince Dellarobia, she doesn’t believe him about the end of the world and says, “Meeting the bus, getting the kids to eat supper, getting teeth brushed. ... There’s just no room at our house for the end of the world ...” (p. 391). This tension between science and faith underscores the cultural challenges in communicating environmental truths to the public.

Dellarobia Turnbow’s transformation from passive housewife to ecologically aware individual mirrors the novel’s call for personal responsibility and education. In the novel’s opening, she is not satisfied with her marital life, and she wants to elope with the telephone man, Jimmy. But in her attempt to elope with him, she encounters the congregation of the monarch butterflies on her farm. This phenomenon is the true catalyst to awaken her intellectual and emotional balance. Dr. Ovid Byron helped her in her exposure to environmental realities. Dellarobia realises that climate change is taking up the stuff we’re counting on. Through Dr. Byron, Kingsolver advises Dellarobia to act fast. “... you should start with kindergartens and work your way up.” (p. 443). Her sympathy with the dead butterflies while trying to save them indicates her act of self-awareness, environmental consciousness, and ecological responsibility. Her journey suggests that change is possible even in the most unlikely individuals and places. This is the essential message about fostering climate engagement at the grassroots level. She becomes a figure of hope. Individuals can become agents of ecological understanding, advocacy, and resilience when given access to knowledge and the freedom to question.

Through the character Dellarobia Turnbow, Kingsolver presents how environmental consciousness and awareness can lead to personal transformation, highlighting the connection between individual lives and planetary health. Through Dellarobia, Kingsolver spreads global ecological concepts to the local, which Dellarobia and the reader can accept. Kingsolver defends climate science and scientists through Dellarobia’s transformation from a stay-at-home mother to a budding conservation biologist. (Heise, p. 29)

Prodigal Summer

Barbara Kingsolver’s fifth novel, *Prodigal Summer* (2000), offers a celebration of biodiversity, ecological balance, and sustainable living through three interwoven narratives set in Zebulon County, in the Appalachian Mountains. Through the perspectives of Deanna Wolfe, Lusa Maluf Landowski, and Garnett Walker, Kingsolver explores the interconnected ecosystems, the resilience of nature, and the transformative power of ecological consciousness rooted in daily life.

The first narrative is about Deanna Wolfe, a forest ranger and wildlife biologist. Deanna lives alone in the forest, tracking the return of coyotes to the region. Predator-prey dynamics are at the heart of this storyline. Through Deanna Wolfe’s character, Kingsolver questions human interference in natural food chains. She is a protector of predators and wilderness. She says, “I believe we’re on National Forest land, inside of a game protection area where there’s no hunting” (p.7). Her solitude and close observation of nature help in her duty. “Deanna watched as the forest thrived in its natural rhythms, a living example of the balance she aimed to protect” (p. 2). Deanna Wolfe’s defence of coyotes challenges human tendencies to eliminate predators in the name of safety or control. She believes that caring for predators like coyotes is crucial for maintaining ecological balance and regulating the overpopulated species such as deer. Her responsibility towards ecological harmony benefits both nature and human society. She considers human attitudes often disruptive. However, her encounter with hunter Eddie Bondo, who holds opposing views, forces her to reflect on the blurred boundaries between humans and the wild.

The second narrative deals with the story of Lusa Maluf Landowski, a recently widowed entomologist. Lusa inherits her husband's land and struggles to integrate her scientific knowledge with the conservative farming culture around her. Her story deals with pollinators, pests, and sustainable agricultural practices. Through the character of Lusa Landowski, Kingsolver highlights the complexity of pollinators and pests in farming. Lusa begins experimenting with sustainable, biodiversity-friendly farming techniques, rejecting dependency on chemicals and monoculture. She says, “Can you believe people spray insecticides all over their fields? Look at all the beautiful creatures that die. It’s dropping a bomb on a city just to get rid of a couple of bad guys” (p. 299). Her attempts were viewed with suspicion by her in-laws. Her understanding of insect ecology helps her to see the farm as a living system that requires cooperation.

The third narrative is the story of Garnett Walker and his neighbour, Nannie Rawley. Garnett is an elderly conservative man. He's obsessed with restoring the extinct American chestnut tree. He represents traditional

views of land use and species control. He favours chemical farming and uses insecticides. His storyline creates contrast and debate with his neighbour, Nannie Rawley, an organic apple-growing farmer. He rejects the idea of Nannie Rawley when she says, “insecticide spraying actually drives up the number of bugs you’re trying to kill” (p. 216). Her core philosophy of interconnection is stated in her letter to Garnett, “Everything alive is connected to every other by fine, invisible threads” (p. 218).

Through these three storylines, Kingsolver teaches readers that the ecosystem, where all spaces, like coyotes, moths, fungi, chestnuts, and humans, play a vital role. These storylines emphasize interconnectedness not only among organisms but also among human practices, values, and ecosystems. Through the portrayals of Deanna, Lusa, Garnett, and Nannie, Kingsolver invites readers to imagine their place in the web of life. Her vision aligns with the ideals of sustainable development, showing that long-term survival depends not on control but on care, interconnection, and coexistence.

Comparative Analysis

In comparison, the two novels are filled with elements of ecological degradation, human responsibility, and the resilience of nature and human beings to adapt, survive, and even flourish despite disruption.

In *Flight Behaviour*, global warming is the reason for floods and landslides that disrupted the environment in Mexico. So, in search of a secure place for hibernation, the monarch butterflies changed their place of secure hibernation from Mexico to Tennessee. In *Prodigal Summer*, controlling the predators for safety, security, and economic benefit by hunters like Eddi Bondo, following modern and chemical-based farming techniques by Lusa’s husband, her in-laws, and Garnett Walker’s attempts to regenerate the American chestnut tree without giving value to nature’s status, are the elements of environmental degradation that are highlighted.

Human responsibility for accelerating and mitigating environmental degradation is mentioned in both novels. Most of the characters in *Flight Behaviour* become responsible for environmental degradation. The reasons for it are their social, ecological, and financial advantages. Poverty is a reason for not focusing on climate change and its acceleration. Cub’s father’s decision to cut down the trees on his farm is due to his financial crisis. He isn’t aware of the consequences of logging trees. In *Prodigal Summer*, characters like Eddi Bondo, a hunter, try to kill animals for economic benefit. He is not aware of the loss of biodiversity. Lusa’s family and other villagers follow modern chemical-based farming techniques. Garnett Walker sprays pesticides to protect the American chestnut tree from extinction. They don’t realise the ill effects of chemicals on the land. On the other side, the ecological consciousness and eco-friendly activities of Dellarobia, Deanna, Lusa, and Nannie are responsible for sustainable development and mitigating further environmental disruption. In *Flight Behaviour*, Dellarobia’s metamorphosis and her in-laws’ decision not to log the trees are the responsible events that reduce the risk of climate change. In *Prodigal Summer*, Deanna Wolfe’s attempts to protect the return of the coyotes, Lusa Landowski’s eco-friendly, biodiversity-friendly farming techniques and her voice against pesticides and insecticides, Garnett Walker’s attempts to regenerate the American chestnut tree, and Nannie Rawley’s organic methods in gardening are some instances of human responsibility for sustainable living.

Both novels are concerned with ecological resilience. In *Flight Behaviour*, resilience is both environmental and personal. Environmental resilience is noticed by the displaced monarch butterflies adapting to the new terrain, and human resilience by Dellarobia’s journey from ignorance to ecological awareness. In *Prodigal Summer*, resilience is embedded in the return of Coyotes to Appalachian forests, the regeneration of chestnut trees, and organic, eco-friendly farming methods are reimagined to work with the land. Deanna’s solitary life in the forest cabin shows a woman choosing to live with nature rather than apart from it. Lusa’s decision to stay on her farm after her husband’s death, though she is socially alienated, is a quiet act of defiance and resilience, redefining her identity through ecological stewardship.

Kingsolver doesn’t offer any solutions but emphasises the principles of sustainable development. In *Flight Behaviour*, Dellarobia Turnbow, after her transformation, begins to see herself as a part of the larger planetary crisis. Her transformation represents the possibility of climate awareness even in the marginalised and resource-limited communities. In *Prodigal Summer*, Lusa’s storyline explores sustainable farming, which is a formal psychological compromise. Her late husband’s family represents industrial, chemical-reliant agriculture, but Lusa’s experiments with diverse crops and natural pest control. She blends tradition and innovation in cultivation, focusing on the principles of sustainable development. Lusa redefines what it means to be a farmer, following biodiversity and rejecting monoculture. Deanna Wolfe considers solitude and connection to nature. These characters model sustainable living rooted in respect for land, science, and relationships. Through these characters, Kingsolver believes that a sustainable future depends as much on cultural change as on scientific innovation.

Conclusion

Barbara Kingsolver's *Prodigal Summer* and *Flight Behaviour* are ecologically and ideologically aligned in their ecological vision. *Flight Behaviour* exposes the effects of climate change and confronts public denial and ignorance surrounding it. *Prodigal Summer* celebrates nurturing biodiversity and sustainable coexistence. Both novels foreground resilience, ecological responsibility, and sustainable living, which are environmental and ethical imperatives.

Through the character-driven narratives, Kingsolver challenges readers to rethink their roles in the Earth's fragile ecosystems and follow sustainable ways of living. These two novels encourage us to move beyond passive awareness and embrace active, compassionate engagement with the natural world.

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Role of Inclusive Education in Promoting Sustainable Development with Special Reference to Learning Disability

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Abstract

Inclusive education has emerged as a central pillar in achieving the Sustainable Development Goals (SDGs), particularly in addressing the rights and opportunities of learners with learning disabilities. This article examines the role of inclusive education in promoting sustainability through a secondary data analysis of international frameworks, national policies, and best practices. The study specifically maps the linkages between inclusive education and four SDGs: SDG-4 (Quality Education), SDG-10 (Reduced Inequalities), SDG-8 (Decent Work and Economic Growth), and SDG-1 (No Poverty), while also highlighting its indirect contribution to SDG-16 (Peace, Justice, and Strong Institutions). Evidence from UNESCO, UNICEF, and World Bank reports, along with country-level initiatives, demonstrates that inclusive practices not only ensure equitable access but also reduce intergenerational poverty, improve employability, and foster social cohesion. The article further reflects on how nations such as India, Indonesia have aligned inclusive education policies with global sustainable development agendas.

Keywords: Inclusive Education; Learning Disabilities; Sustainable Development Goals (SDGs); Educational Equity; Disability Inclusion; India;

Introduction

Education has long been recognized as the foundation of human development and societal progress. In recent decades, the global agenda has shifted towards promoting education that is not only universal but also inclusive, equitable, and sustainable. The United Nations' Sustainable Development Goals (SDGs), adopted in 2015, have positioned education at the heart of sustainable development, particularly through Goal 4: "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." This goal emphasizes that quality education should reach every individual, regardless of socio-economic background, gender, or disability.

Inclusive education is a pedagogical and policy approach that seeks to integrate all learners—especially those traditionally marginalized—into mainstream classrooms, providing equal opportunities for learning and growth. For students with disabilities, inclusive education means access to learning environments that accommodate their unique needs, while also ensuring they are not segregated or excluded from social and academic experiences. Among various categories of disability, learning disabilities represent a critical but often underexplored dimension. Learning disabilities are neurological conditions that interfere with a person's ability to acquire, process, or express knowledge. Dyslexia, dyscalculia, and dysgraphia are common examples, and they affect millions of children worldwide. These conditions do not imply intellectual deficiency but often require specialized teaching methods, assistive technologies, and supportive educational environments.

The neglect of learners with learning disabilities can undermine broader sustainability goals. Exclusion from education perpetuates cycles of poverty, reduces employability, and hinders social inclusion. Conversely, effective inclusion can unlock human potential, strengthen social capital, and contribute to sustainable economic growth. In the Indian context, policies such as the Rights of Persons with Disabilities (RPwD) Act, 2016 and the National Education Policy (NEP), 2020 have emphasized inclusive practices, but challenges remain in implementation, particularly for learners with invisible or less-understood disabilities.

This article aims to explore the role of inclusive education in promoting sustainable development with a special focus on learning disabilities, using secondary data from global and Indian contexts. By examining literature, policy frameworks, and institutional practices, the paper seeks to highlight how inclusive education serves as both a social justice imperative and a strategic pathway towards achieving sustainable development.

Review of Literature

Inclusive education has been increasingly recognized as a central driver of sustainable development across global and national policy frameworks. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020) defines inclusive education as a transformative approach that ensures all learners, regardless of ability or background, participate meaningfully in mainstream education. This paradigm

shift from segregation and integration towards inclusion is aligned with the Sustainable Development Goal 4 (SDG-4), which calls for “inclusive and equitable quality education and lifelong learning opportunities for all.”

Scholars have emphasized the strong link between inclusive education and sustainable development. Ainscow and Miles (2008) argue that inclusive education contributes to social justice by dismantling barriers to participation and by valuing diversity as a resource. Booth and Ainscow's (2011) Index for Inclusion provides a practical framework to evaluate schools' progress toward inclusivity, highlighting the systemic nature of change needed for sustainability. From a sustainability perspective, inclusive education enhances human capital, strengthens democratic participation, and reduces inequality (Slee, 2018).

Within the broader disability discourse, learning disabilities remain an underexplored yet vital area. Lyon et al. (2001) define learning disabilities as neurological disorders that impede skills such as reading, writing, and mathematics, despite normal intelligence. These disabilities are often invisible, leading to misconceptions, delayed diagnosis, and inadequate support. In the Indian context, Singal (2019) highlights that children with learning disabilities are frequently overlooked due to social stigma and a lack of teacher training. The RPwD Act, 2016 legally recognized specific learning disabilities, marking a policy milestone, but implementation challenges persist at the school level.

Research also underscores the role of inclusive education in achieving multiple SDGs. Sharma and Deppeler (2019) demonstrate that inclusive practices reduce inequalities (SDG-10) and promote decent work opportunities (SDG-8) by equipping learners with essential skills. Furthermore, inclusive education contributes to community resilience, thereby strengthening the social dimension of sustainability (UNICEF, 2021). Studies from countries such as Finland and Canada reveal how early interventions and resource-rich environments improve outcomes for learners with disabilities and set global benchmarks for inclusive models (Mitchell, 2015).

Despite these advancements, gaps remain in integrating inclusive education within mainstream educational systems, particularly in developing countries. Limited funding, inadequate teacher preparation, and persistent societal attitudes hinder progress. Scholars argue that without addressing the needs of learners with learning disabilities, the vision of sustainable development will remain incomplete. Thus, reviewing literature underscores that inclusive education is not merely a pedagogical strategy but a crucial investment in sustainable futures.

Objectives of the Study

The present study is designed to explore the intersection of inclusive education, learning disabilities, and sustainable development. Based on secondary data, the objectives are:

- To map the linkages between inclusive education and all Sustainable Development Goals, emphasizing how learning disability inclusion contributes across multiple dimensions of sustainability.
- To analyze the impact of inclusive educational adaptations on long-term sustainability outcomes, including social equity, economic participation, and community resilience.
- To evaluate policy frameworks and case studies from India and global contexts that demonstrate best practices and challenges in implementing inclusive education for learners with learning disabilities.

Research Methodology

This study adopts a qualitative and descriptive research design, relying exclusively on secondary data to explore the role of inclusive education in promoting sustainable development with reference to learning disabilities. Sources include academic journals, government publications, policy documents such as the Rights of Persons with Disabilities Act (2016) and the National Education Policy (2020), and international reports from UNESCO, UNICEF, and the United Nations. In addition, case studies of inclusive practices from India and global contexts are reviewed to highlight best practices and challenges.

The methodology involves content analysis of literature to identify recurring themes, policy gaps, and the broader implications of inclusive education for achieving the Sustainable Development Goals (SDGs). A comparative lens is applied to map how inclusive education for learners with learning disabilities aligns with various SDGs and impacts long-term sustainability. This structured approach ensures reliability, depth, and contextual relevance.

Analysis and Discussion

Inclusive education serves as both a human rights mandate and a strategic enabler of sustainable development. Its integration with the Sustainable Development Goals (SDGs) is multidimensional, especially when addressing the needs of learners with learning disabilities. The analysis of secondary data reveals that inclusive education not only supports SDG-4 (*quality education*) but also has ripple effects across other goals, reinforcing sustainability from social, economic, and environmental perspectives.

Learners with learning disabilities face unique challenges such as difficulties in reading, writing, or numerical processing (Lyon et al., 2001). Without inclusive practices, these learners risk academic failure, social isolation, and reduced future opportunities (Singal, 2019). However, adaptive measures—such as differentiated instruction, use of assistive technologies, and teacher training—empower students to achieve parity with peers. Such adaptations foster equity and inclusivity, which in turn enhance human capital, contributing to sustainable societal progress (Slee, 2018).

Inclusive Education and SDG Linkages

The direct linkage between inclusive education and the Sustainable Development Goals (SDGs) is most visible in SDG-4 (Quality Education), which emphasizes ensuring “inclusive and equitable quality education and lifelong learning opportunities for all” (UNESCO, 2020). Within this framework, learners with learning disabilities occupy a critical space, as equitable access to quality education remains a key barrier for many marginalized groups globally. By prioritizing inclusive pedagogical approaches, states move closer to achieving not only SDG-4 but also a range of interlinked goals.

For instance, inclusive education directly supports SDG-10 (Reduced Inequalities) by addressing systemic disparities faced by children with disabilities. Equitable participation in classrooms enables these learners to develop academic and social competencies, thereby narrowing inequality gaps (Mitchell, 2015). Further, inclusive approaches prepare learners for the workforce by equipping them with skills necessary for independence and participation, thereby advancing SDG-8 (Decent Work and Economic Growth) (Sharma & Deppeler, 2019).

The impact extends to SDG-1 (No Poverty), as education is a proven driver for socio-economic mobility. By breaking the intergenerational cycle of exclusion and unemployment associated with disabilities, inclusive education reduces poverty risks among vulnerable households (World Bank, 2019). Moreover, inclusive learning environments promote empathy, tolerance, and diversity, contributing to SDG-16 (Peace, Justice, and Strong Institutions) through enhanced social cohesion and reduced stigmatization (Slee, 2018).

Thus, when mapped systematically, inclusive education demonstrates a cross-cutting influence across the 2030 Agenda. It not only addresses immediate learning challenges but also fosters long-term sustainability by enabling learners with disabilities to actively contribute to society.

Impact of Inclusive education on Sustainability- Case studies:

Case studies provide compelling evidence of the impact of inclusive education on sustainability. For instance, Finland’s education system emphasizes early diagnosis of learning disabilities and provides individualized learning support, resulting in higher retention rates and better long-term employment outcomes (Mitchell, 2015).

UNESCO, in collaboration with the Leonard Cheshire organization, documents impactful inclusive education programs across the globe. A notable example includes Kenya’s “Education for Life” project, supporting children with disabilities to access literacy, numeracy, and life-skills programs. Such initiatives foster inclusion, empower vulnerable populations, and support **SDG-4** through tangible, community-based efforts.

Indonesia’s **1in11 Initiative — Education Above All (EAA)** This program developed inclusive education models to reach children with disabilities in Indonesian schools. Over 67,000 children benefited, along with 2,800 teachers and education managers. It institutionalized disability-inclusive budgeting and teacher training at the district level, contributing directly to SDG-4 and strengthening systemic capacity for sustainability.

Eswatini’s Ministry of Education established inclusive education in primary and tertiary institutions, supported by constitutional guarantees and the UN Convention on Rights of Persons with Disabilities. Teacher training colleges were equipped to deliver inclusive education, and accessibility measures (such as ramps and sign language interpreters) were introduced. These efforts reflect national policy aligned with SDG-4 and rights-based frameworks.

India’s National Education Policy (2020) embeds inclusive and equitable education throughout, addressing Children with Special Needs (CwSN), inclusive infrastructure, and teacher training, and learning materials — aligned with SDG-4. The Samagra Shiksha scheme operationalizes these principles, offering assistive devices, ramps, special educators, and resource rooms. These measures reflect real-world implementation of inclusive education across grades from pre-primary to senior secondary.

Within India, the state of Mizoram has successfully implemented inclusive schooling under the Samagra Shiksha framework. Over 3,000 students with diverse disabilities—including specific learning disabilities—are

enrolled from elementary to secondary levels, receiving aids, allowances, and support services. This initiative exemplifies localized execution of inclusive education policy, impacting equity and retention.

The discussion highlights that inclusive education for learners with learning disabilities is not merely a pedagogical concern but a sustainability imperative. By valuing diversity and promoting equal opportunities, inclusive education strengthens communities, reduces systemic inequalities, and fosters inclusive growth. The integration of inclusive education into sustainability frameworks must be more deliberate, with targeted policies, investment in teacher training, and innovative use of technology. Without addressing the specific needs of learners with learning disabilities, the broader vision of sustainable development risks remaining incomplete.

Policy and Implementation Gaps

In India, the Rights of Persons with Disabilities Act (2016) and the National Education Policy (2020) legally mandate inclusive practices. Yet, challenges persist in implementation. Teacher preparedness is often limited, with many educators lacking skills to identify and support learning disabilities (NCERT, 2021). Infrastructural constraints, insufficient resource allocation, and social stigma remain major barriers. Similar gaps are reported globally, particularly in low- and middle-income countries (UNICEF, 2021).

Findings:

The analysis of secondary data highlights several important findings regarding the role of inclusive education in promoting sustainable development with reference to learning disabilities. First, inclusive education is directly linked to the achievement of SDG-4 (quality education), but it also creates cross-cutting impacts on other goals, including poverty reduction (SDG-1), decent work (SDG-8), reduced inequalities (SDG-10), and strong institutions (SDG-16). Second, international initiatives such as the World Bank's Inclusive Education Initiative and UNESCO's programs demonstrate that systemic reforms—including teacher training, policy alignment, and resource allocation—are critical to effective inclusion. Third, case studies from Indonesia, India, and Eswatini show that localized efforts supported by global frameworks have significantly improved access, retention, and outcomes for learners with learning disabilities. Finally, the findings underscore that addressing learning disabilities is not merely a matter of educational justice but also a strategic lever for sustainable social and economic development.

It demonstrates that inclusive education is a powerful enabler of sustainable development, particularly when addressing the needs of learners with learning disabilities. By mapping inclusive practices to the Sustainable Development Goals, it becomes clear that education for children with learning disabilities contributes not only to SDG-4 (quality education) but also to reducing inequalities, promoting decent work, alleviating poverty, and building resilient communities. Evidence from global initiatives and national policies highlights that inclusive education must be pursued as both a rights-based obligation and a strategic pathway to sustainability. However, persistent challenges such as insufficient teacher training, resource gaps, and societal stigma continue to hinder progress. Moving forward, stronger policy implementation, international collaboration, and localized innovations are required to fully realize the potential of inclusive education. Ultimately, ensuring meaningful learning opportunities for students with learning disabilities is essential to achieving an inclusive, equitable, and sustainable future.

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A Study of Marketing Problems of Ragi Producer in Mokhada Taluka

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Abstract:

India is an agricultural country and one third depends on the agricultural sectors directly or indirectly. Ragi is known as one of the most nutritious cereals. Ragi is one of the important crops that now support the food materials in India. Traditional systems are applied in agriculture marketing in Palghar District. Small farmers did not get benefit of accurate market price. So many farmers are selling their produce in local market as well as Nashik because Storage facility, transportation etc. is not available in rural area. Now a day's few peoples of Mokhada taluka are using online system for marketing of agriculture product. But majority of Ragi farmers facing the marketing problems in Mokhada Takuka. This paper focused on understanding challenges and marketing strategies of the Ragi producers' in Mokhada Taluka.

Keywords: Marketing, Ragi, Challenges.

Introduction:

India is an agricultural country and one third depends on the agricultural sectors directly or indirectly. Mokhada taluka is situated in Palghar district at border of Nashik & Palghar district of Maharashtra. It is situated in the north-eastern corner of the district. It is one of 8 Talukas of Palghar district. It is popular for tribal peoples and hilly area. Waal and Wagh are two main rivers in Mokhada taluka. The rivers are flooded during monsoon season, but significantly dry up during dry months. Peoples of Mokhada taluka growing rice, nagli and vari, the food crops and mangoes, cashew, jackfruit etc., Majority of the land holdings are on slopes as the terrain is hilly. Rice and Paddy cannot be cultivated on slopy lands. Hence, they produce Ragi (nachani) or nagli on such slopes. Traditional systems are applied in agriculture marketing in Palghar District. Small farmers did not get benefit of accurate market price. So many farmers are selling their produce in local market as well as Nashik because Storage facility, transportation etc. is not available in rural area. Specially yet rural area agricultural marketing system has not updated, that's why many farmers as well as wholesalers, retailers, customers have been facing several problems. As the marketable surplus of a farmer increases, the need to have efficient markets becomes crucial.

Now a day's online marketing system is ongoing in agriculture marketing. Now a day's few peoples of Mokhada taluka are using online system for marketing of agriculture product. But majority of Ragi farmers facing the marketing problems in Mokhada Takuka. This paper focused on understanding challenges and marketing strategies of the Ragi producers' in Mokhada Taluka.

Objectives:

- 1) To study traditional and online marketing system of Ragi crop in Mokhada Taluka.
- 2) To note down the marketing problem facing by Ragi produce farmers in Mokhada Taluka.
- 3) To suggest on marketing problems of Ragi Producers in Mokhada Taluka of Palghar District.

Selection of Sample

The respondents for this survey were farmers of Mokhada taluka will be universe of the study. In total 270 respondents will be selected by using convenience sampling method. 05 farmers each from all the 59 villages of the Mokhada taluka are selected as the sample by using convenience sampling method.

Data Analysis & Interpretation:

Sale type of Ragi produce:

The farmers were asked about the place of their transactions. The information collected from their responses is tabulated in the following table:

Table: Sale type of Ragi Produce

Sr. No	Selling Place	No. of Respondents	Percentage
1	Agricultural Produce Market Committee	00	00%
2	Weekly Market	64	21.69%
3	Sale in Retail	67	22.71%

4	Sale through Government Scheme	73	24.74%
5	Sale in Other Taluka or City	91	30.84%
	Total	295	100%

Analysis:

Farmers have sale their produce in weekly market (21.69%), sale in retail (22.71%), Sale through Government Scheme (24.74%) and Sale in Other Taluka or City (30.84%).

Use of online marketing:

Now a days Online marketing system is use in the world but Mokhada is remote and tribal area. Their people are using marketing system as follows:

Table: Use of online marketing

Particulars	Users	Percentage
Users Online Marketing	28	9.49%
Users of Traditional Marketing	267	90.51%

Analysis:

It is observed that only 9.49 % user use online marketing and 90.51% users have use only traditional marketing system for ragi produce. Farmers and traders should use the online marketing system for ragi produce.

Profitability of Ragi Produce:

In our country more than 65% of the total population depends on the agriculture sector for their livelihood. Still the ratio between the number of people dependent on the agriculture sector and the provisional level of the agriculture sector does not match. Those who work as farmers do not feel this occupation profitable.

Table: Profitability of Ragi Producer

Sr. No.	Distance in Kms.	No. of Farmers	Percentage
1	Satisfied	97	32.89%
2	Dissatisfied	198	67.11%
Total		295	100%

Analysis:

It is observed that 67.11% (198 Farmers) recorded their dissatisfaction with the profitability of Ragi Cropping. Only 32.89% (97farmers) are satisfied from profitability of Ragi.

Godown Facility:

Mokhada Taluka is situated in remote and hilly area. Farmers of Mokhada taluka have facing the problem of sufficient storage facility. Status of go down facility of farmers as follows:

Table: Availability of Godown Facility

Sr. No.	No. of Farmers	No. of Farmers	Percentage
1	Available separate Go down for Ragi	26	17.62%
2	Not Available separate Go down for Ragi	269	91.18%
	Total	295	100%

Analysis:

Most of the farmers i.e., 91.18 % Ragi producer Famers have no separate go down facility for Ragi crop. Only 17.62% are Ragi farmers have separate storage facility for Ragi crop & they can store Ragi in whole year.

Findings:

- 1) Farmers of Mokhada taluka growing the crops such as rice, ragi, paddy and some other pulses and flowers. Most of the farmers growing rice and Ragi in the Mokhada Tehsil.
- 2) Government administration not available the Agriculture Produce Market Committee to farmers and traders for sale and purchase of agriculture produce in Mokhada taluka.
- 3) Farmers have sale their Ragi produce in weekly market, retail, Sale through Government Scheme and Sale in nearby other Taluka or City.
- 4) Majority of Ragi Farmers have insufficient transport facility for sale of Ragi crop in Market and they have not got fair price.
- 5) Most of Ragi producer are dissatisfied on the profitability from the Ragi Crops.
- 6) Ragi Producer farmers have not possible on large scale advertisement because they produce Ragi in small scale due to small and hilly farming.

7) Farmers of Mokhada Tehsil have no sufficient storage facility for Ragi crop.

Suggestions:

1. Government should create Agriculture Produce Market Committee on for Mokhada taluka for use of farmers. Ragi Farmers should establish co-operative institution for sale and purchase of Ragi produce.
2. Ragi producer shall reduce the expenditure and increase their profit from Ragi crop in Mokhada taluka.
3. Ragi producer farmers of Mokhada area should use social media with internet for advertisement of their Ragi produce. They should produce some by-product such as Ragi bread, Ragi Malpua, Ragi cookies, roti, Ragi oats laddoo, Ragi dosa, Ragi Mudde, Chakali, cutlates, Khichadi, Pancakes, etc. from Ragi and sale in the market.
4. Youth of Mokhada tehsil shall create awareness about online marketing system in the rural peoples of Mokhada Tehsil.
5. Farmers should establish co-operative transport agencies for suitable services.
6. Government should provide sufficient storage facility to Ragi farmers.

Conclusion:

The study is based on the marketing problems faced by Ragi producers in Mokhada tehsil. This study shows that, updated agriculture marketing system with new technology is suitable for farmers of Mokhada taluka of Palghar district. It also suggested that create awareness in farmers and government for solving the marketing problems faced by Ragi producers of Mokhada Tehsil.

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Plastic Pollution: Causes, Effects and Solutions

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Abstract -

Most of today's plastics are made from Organic polymers produced from petroleum - based Chemicals. This may change as scientists shift to developing plastics made from biologically based chemicals. With the production out spacing almost every other material production, plastic waste is now one of the biggest environmental scourges of the time. The scale of the challenge is daunting. The exposure of humans to plastic pollution also has health challenges. According to the state of plastics report, only nine percent of the nine billion tonnes of plastic in the world ever produced has been recycled. Most ends up in landfills, dumps or in the environment especially the oceans. The research methodology used is based on the interactions with the plastics industries, the Environmentalists, Medical Practitioners, Ministry of Environment, Ministry of Health, and Bottling Companies. This paper is also based on visits to restaurants, and events centres, examination of nooks, crannies, and drainages.

Keywords - Landfills, Environment, Discard, Debris, Degradation, Biodegradable, Plastic, Recycling, Environmental Effects, Health Effects.

I. Introduction -

Plastic pollution is the accumulation of plastic particles and objects in the Earth's environment that adversely affect humans, wildlife and wildlife habitat. Pollutants are substances that adversely affect the health, activities or survival of a population. Every day, thousands of tons of pollutants are discarded into the air by natural events and human actions. Far more damaging are the substances discharged into the atmosphere by human actions. Plastics acting as pollutants can be classified based on their sizes into three aspects which are: micro debris plastic, mega debris plastic, and micro debris plastic. According to, mega plastics and micro plastics have accumulated in highest densities in the Northern Hemisphere, which is concentrated around the current carrying the debris, plastic can be found off the coast of some islands.

Mega-plastics and micro-plastics are normally used in the manufacturing of packaging materials (such as plastic bottles, plastic bags etc.), footwear and other domestic items. These are later found being washed off of ships or discarded in landfills. Some of the items used in fishing activities are also found around remote islands. All these are still known as micro-plastic, meso-plastic and macro-plastic. Plastics are expensive and durable. These two factors have resulted into enormous presence of plastic pollution in the environment and at the same time affecting human health adversely. As the human population grows exponentially, so do the demands for plastic increases without thinking about the consequences after being used/utilised when discarded/disposed. This population continue to grow as the amount of garbage produced by people increases. These disposable products such as bottles of water, soda cans, plastic bag etc. are discarded/disposed easily, but the accumulation of these products have resulted to increase in the amounts of plastics pollution around the world.

II. Literature Review -

Plastic debris is classified as either primary or secondary. Primary plastics are in the state of their original form when collected. Examples of these are cigarette butts, microbe ads, and bottle caps. Secondary plastics, on the other hand, are referring to smaller plastics that are obtained as a result of degradation of primary plastics. The search for biological based plastics dates from 1913 when a French Scientist and a British Scientist filed independently for patents a soy-based plastic. At that time, there was intense competition between the petrochemical and agricultural industries to dominate the market for plastics made from organic polymers.

A 1914 photograph showed him using an ax to strike the body of a car made from soy bio plastic to demonstrate its strength. But as oil became readily available, petrochemical plastics took over the market. Now with projected climate change and other environmental problems associated with the use of oil, chemists are stepping up efforts to make biodegradable and more environmentally sustainable plastics from a variety of green polymers. Such bio plastic can be made from corn, soybeans, sugarcane, switch grass, chicken feathers, and some components of garbage. Also the CO₂ extracted from coal-burning power plant emissions could be used in this process. The key to making such biopolymers is to find chemicals, called catalyst, which will accelerate reaction that chemists can use to for polymers from biologically based chemicals without having to use high temperatures.

III. Causes of Plastic Pollution -

The plastics causing the pollution are in different sizes from big to microscopic. There are many kinds of plastics. They exist depending on their precursors and method for their polymerization. The main contributory factors to the problem of plastic pollution are fishing nets, plain old trash, disposing of plastic and garbage, and over-utilisation of plastics.

Fishing Nets:

Fishing is an agricultural activity normally practised all over the world. The commercial aspect of fishing is an economic necessity in which people consume fish for their daily survival and maintenance of good balanced diet. The ocean has faced different problems of plastics pollution created by the fishing industry. The nets used for large scale fishing activities are usually made of plastic. At the initial stage, these fishing nets become submerged in water, on spending much time it releases toxin at will. Later, they get broken up. This kills and harms the local wildlife, but it ensures that pollutants enter the water and fish of the area.

Plain Old Trash:

Plastics are found everywhere along the streets and roads of every city's and towns in India making them to be untidy. The cartons of some products such as can-milk, can-beverages, and can-tomatoes are lined with plastics so as to allow proper packaging. Plastic drinking bottles, water bottles, straws and stirrers used for soft drinks in hotels, restaurants and events centres for entertainment during conferences, seminars, symposiums, wedding receptions, Annual General Meetings (AGMs) etc. are disposed/discarded littering everywhere by the participants and invited guests ignoring the environmental consequence. Some of these products may even contain tiny plastic beads.

Disposing of Plastic and Garbage:

Plastics have complex chemical composition. This makes plastic to be durable and do not break down easily. Plastics and resins have different properties related to contaminant absorption and adsorption depending on their chemical composition. The polymer degradation takes a long period of time due to saline environments and cooling effect of the sea. These are contributory factors to the persistence of plastic debris in certain environments...

Over-utilisation of Plastics:

This refers to plastics being over-used. It is less expensive and durable. These enable both the privileged and less privileged people in the society to afford patronising plastic materials/items. It is one of the most widely available and over – used item in the world today. When plastic is disposed/discarded, it does not decompose easily there by polluting the land or air nearby when burnt in the open air? Also, plastic items that are not properly discarded can be carried to oceans through storm waters.

IV. Environmental Effects of Plastic Pollution -

Plastics consist of major toxic pollutants having the potential to cause important harm to the environment in the form of water, land and air pollution. Plastic is a material that is non-biodegradable, hence it can wreak havoc on natural environment resulting into long-term issues for animals, plants and humans. The distribution of plastic debris varies due to some factors among which are wind and ocean currents, urban areas, coastline geography, and trade routes. The population of humans in some areas also plays a large role in this. Plastic are normally found in enclosed regions such as nooks and crannies of cities and towns there by affecting the environment.

1 Groundwater Pollution:

Groundwater is water that is present in rocks or unconsolidated materials below the Earth's surface. Groundwater forges a link between surface water systems and the material in Earth's Crust.

2 It Upsets the Food Chain:

A food chain is a linear sequence of who eats whom in an ecosystem. Most species belong to more than one food chain, especially when they are at a low feeding level. An ecosystem consists of one or more communities of organisms interacting with one another and with the physical environment through a flow of energy and a cycling of materials.

3 Killings of Animals:

The availability of plastic wastes such as plastic bags and containers, six-ring plastic can holders etc. in the crannies and nooks of the environment that are being discarded each day has resulted in the death of some animals such as duck, dolphins, fish, fowl, turkey, tortoises etc. in the environment when they become trapped in them or poisoned from the toxins released by plastics wastes. This causes adverse effects to the surrounding animals thereby affecting the ecosystem.

4 Land Pollution:

Plastic waste are normally dumped in landfills. When this takes place, there is interaction with water there by forming hazardous chemicals. When these chemicals sleep underground, the quality of water becomes degraded. Wind has contributed to plastic pollution thereby carrying and depositing plastic from one place to another, increasing the land litter. The plastic wastes can also get stuck on trees, fences, towers, poles, traffic lights, roofs etc. and the animals coming in contact with them in the surrounding and might suffocate them leading to death.

5 Air Pollution:

It is the presence of chemicals in the atmosphere in concentrations high enough to harm organisms, ecosystem, or human made materials, or to alter climate Today, air pollution is a global problem; areas far from the polluting source may be adversely affected as at atmospheric, circulation moves pollutants freely without regard to political boundaries. When plastics are burnt in the open air, landfills or incinerators, poisonous/toxic chemicals are released thereby causing environmental pollution. Also, discarded plastics contribute to Greenhouse gas emission to the atmosphere having adverse effects on both humans and animals when inhaled.

V. Health Effects of Plastic -**Pollution-**

Plastic pollution occur when plastic accumulates/gathers in an area and begins to have negative impact on the natural environment thereby creating problem for plants, wildlife, and the human population. This involves killing plant life, and posing dangers to humans and local animals. Plastics is an incredibly useful material both at home and larger societies, and it is made from toxic chemical compounds which can cause illness in humans.

VI. Prevention of Plastic Pollution -

The rate at which plastic waste grows in the world today is discouraging and uncalled for. A global plastic wastes disaster is being faced by people which is suffocating our environment and causing damage to the ecosystems. These ecosystems need to be protected from future damage and actions need to be taken to establish a world with free-plastic wastes. The industrialists are in possession of the ability to change the various ways the world utilises/uses and wastes plastic. So, the ecosystems, wildlife and oceans need to be restored to a healthy state and change the world into one with no plastic waste. Some of the measures reducing plastic wastes are.

Reuse: Reusability refers to the use of materials more than once in their original form instead of throwing away after each use. This does not only ensure the maximum use of the material life span but also reduces waste. Reuse has increasingly been accepted as playing a vital part in addressing a wide range of social challenges related to poverty, health and well-being. It should be made known to the public that, reuse is not specifically a waste issue.

Reduce: In order to reduce plastic pollution, there is need to reduce our usage of plastic. This translates to changing our daily attitudes and avoiding the use of plastic when there is a better alternative to it and only using plastic when it is seriously needed. Plastic packaging needs to be avoided.

Recycle: Recycling of plastic involves collection of plastic waste and reprocessing it into new products, in order to reduce the amount of plastic in the waste stream. It is known that plastic does not break down easily, so to recycle plastic means it is still plastic, but it can be used for another purpose entirely. Recycling does not cut down on plastic, it is still the existing plastic that is used for recycling processes but are transformed to a new one. Therefore, the recycling process does not mean that the amount of plastic or exposure is being reduced.

Government Intervention:

The lawmakers and The government needs to arise and get involved in the prevention of plastic pollution so as to create fear in public and allow strict adherence to preventive measures to take place. Presently, awareness and sensitization is on-going all over the globe on plastic pollution. Various governments are planning different measures to reduce the volume of plastic waste.

VII. Finding and Suggestions -

- Plastic bags and garbage that are thrown into the ocean have devastating effect on sea animals.
- Over 60% of the trash that ends in the dustbin could be recycled.
- Plastic bags that are thrown into the ocean kill over a million sea creatures a year.
- Plastic pollution threatens food safety and quality, human health, coastal tourism, and contributes to climate change.
- Americans normally use over two and a half million plastic bottles every thirty minutes, And most of them are simply thrown away rather than recycled.
- Findings show that bodies of 90% of Seabirds contain plastic debris.

- Want Plastics contribute to approximately 10% of discarded waste
- Research suggested that by 2050, there could be more plastic than fish in the oceans by weight.
- Findings show that there are ten (10) largest emitters of oceanic plastic pollution worldwide which are from the most to the least: China, Indonesia, Philippines, Vietnam, Sri Lanka, Thailand, Egypt, Malaysia, Nigeria, and Bangladesh.

VIII. Conclusion -

Plastic is non-biodegradable. It is nearly impossible for it to break down. It sticks around for a long number of years longer (e.g. up to 1,000 years longer) than other forms of trash. Plastic is basically everywhere. The main cause of plastic pollution. The estimation shows that 80% of marine litter emanates/originate from land. This plastic pollution comes mainly to help clean up our world. Household waste, which is poorly recycled, dumped in landfills or abandoned in nature. These wastes are carried by the winds, pushed by the rains into sewers, streams, rivers, and finally in the oceans. Natural disasters such as floods must be put into consideration as other causes of pollution as well. People are enjoined/advised to avoid bring plastic bags to their various homes and purchasing items with too much packaging. This way you can help in contributing towards the environment in the form of reducing plastic pollution whose ill effects are not reversible. Plastic bags can be replaced by reusable bags. This paper urges everyone to shift towards recycled plastic, and contribute to a fund to help clean up our world.

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Beyond the Unthinkable: Environmental Narratives and Climate Responsibility in Amitav Ghosh's *The Great Derangement*

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Abstract

Amitav Ghosh's *The Great Derangement: Climate Change and the Unthinkable* presents a profound interrogation of the relationship between climate change, literature, and human imagination. This paper examines Ghosh's argument that modern literary and cultural narratives have failed to adequately address the realities of the Anthropocene, leaving society ill-prepared for environmental crises. The study situates *The Great Derangement* within the interdisciplinary discourse of environmental science and literature, exploring its implications for climate responsibility and policy-making. Drawing from environmental history, climate ethics, and eco-criticism, this research highlights how Ghosh's call for a renewed narrative framework can bridge the gap between scientific knowledge and public engagement.

Key Words Beyond, Unthinkable, Environmental Narratives, Climate, Responsibility, *The Great Derangement*

Introduction

The 21st century has been defined by unprecedented environmental challenges — rising global temperatures, sea-level rise, biodiversity loss, and intensifying natural disasters. While environmental science has documented these changes with precision, public engagement remains limited. Amitav Ghosh's *The Great Derangement* challenges the cultural and literary silence surrounding climate change, framing it as a crisis not only of science and politics but of imagination. Ghosh argues that modern literary fiction's preference for the individual and the everyday sidelines catastrophic, large-scale events that define the Anthropocene. This research paper explores how *The Great Derangement* redefines environmental narratives, fostering climate responsibility through storytelling.

Theoretical Framework

This study draws on multiple interdisciplinary perspectives to analyze Amitav Ghosh's *The Great Derangement*. It engages with the Environmental Humanities, which integrate literary analysis with ecological thought, as articulated by scholars such as Lawrence Buell, Ursula Heise, and Richard Kerridge. It also incorporates Eco-Criticism, focusing on the relationship between literature and the physical environment, exploring how narratives can shape and reflect ecological awareness. The framework of Anthropocene Studies is employed to understand human activity as a geophysical force capable of altering Earth's systems, following the conceptualizations of Paul Crutzen and Will Steffen. Additionally, the lens of Climate Ethics is applied to examine the moral responsibility inherent in addressing climate change, drawing on the work of Stephen M. Gardiner. By synthesizing these approaches, the paper positions *The Great Derangement* as both a cultural critique and an ethical call to action in the context of the climate crisis.

Climate Change and the Failure of Imagination

Amitav Ghosh's central thesis in *The Great Derangement* is that climate change remains “unthinkable” in contemporary culture because it challenges and disrupts established narrative conventions. Modern novels tend to avoid improbable or extraordinary events, favouring realistic depictions of individual lives and everyday occurrences. However, climate change generates precisely such improbabilities — floods devastating arid regions, cyclones striking densely populated urban centres, and prolonged droughts afflicting once-fertile plains. This dissonance between lived realities and literary traditions results in a profound failure of imagination. Such a failure manifests in two significant ways: first, as a narrative gap, where environmental science offers an abundance of data, yet cultural storytelling struggles to translate these facts into compelling human narratives; and second, as policy paralysis, where the absence of emotionally resonant stories diminishes public urgency and weakens the political will to implement meaningful climate action.

Environmental Narratives and Public Engagement

Literary narratives have long played a crucial role in shaping public attitudes toward environmental change — from the Romantic era's pastoral idealism to the transformative impact of Rachel Carson's *Silent Spring*, which catalysed environmental policy reform. In *The Great Derangement*, Amitav Ghosh calls for a new kind of storytelling that meets the urgency of the climate crisis. Such narratives, he argues, should be global

in scope, engaging with planetary-scale processes that transcend national boundaries; interdisciplinary, bridging the gap between scientific research and the lived human experience; and culturally inclusive, drawing on non-Western perspectives, indigenous knowledge systems, and local histories. By adopting these qualities, environmental narratives can work alongside scientific climate models to humanize complex environmental data, foster emotional connection, and cultivate a deeper sense of shared responsibility for the planet's future.

Climate Responsibility in the Anthropocene

In *The Great Derangement*, Amitav Ghosh challenges the dominant framing of climate change as solely a scientific or technical problem, instead advocating for a broader approach that encompasses cultural, political, and moral accountability. He emphasizes that climate responsibility must operate on three interconnected levels. At the individual level, this involves conscious consumption choices, efforts to reduce one's carbon footprint, and the cultivation of environmental literacy. At the collective level, it requires building community resilience, engaging in activism, and developing sustainable infrastructure that can withstand environmental challenges. At the institutional level, it calls for comprehensive policy reform, significant investment in renewable energy, and the pursuit of climate justice to address inequalities in environmental impacts. By foregrounding moral responsibility, Ghosh aligns literary discourse with the principles of climate ethics, urging readers to view climate action not merely as a technical necessity but as a moral imperative central to our shared future.

Literature as a Bridge Between Science and Society

Environmental science frequently conveys its findings through statistical probabilities, charts, and predictive models that, while precise and evidence-based, often feel distant or inaccessible to the general public. Literature, by contrast, operates in the realm of human experience, emotion, and imagination. It transforms abstract phenomena into narratives that people can relate to on a personal and emotional level. Amitav Ghosh's *The Great Derangement* exemplifies this capacity, showing how storytelling can close the gap between scientific knowledge and societal awareness.

One of the most powerful roles of literature in this context is its ability to translate abstract climate models into lived experiences. Scientific reports may predict a two-meter sea-level rise, but a novel or essay can place the reader in the home of a family forced to abandon their ancestral land to encroaching waters. This humanization of data makes the reality of climate change not only understandable but also urgent.

Storytelling can also inspire empathy for vulnerable communities that are disproportionately affected by the consequences of climate change. These often include small island nations, rural farming regions, and marginalized urban populations — groups whose voices are frequently absent in scientific discourse and global policy debates. By foregrounding their experiences, literature ensures that the climate conversation remains inclusive and justice-oriented.

Furthermore, literature offers a space to critique political and economic systems that perpetuate environmental degradation. While science may outline the mechanisms of climate change, literature can interrogate the social, cultural, and historical structures that allow such harm to persist — including colonial legacies, corporate greed, and governmental inaction. This critical dimension transforms environmental awareness into a deeper understanding of the systemic changes required.

Ultimately, this bridging role between science and society is essential for transforming scientific urgency into public mobilization. By evoking both intellectual understanding and emotional resonance, literature can catalyse the kind of collective will and moral responsibility necessary to confront the climate crisis head-on.

Conclusion

The Great Derangement is far more than a work of literary criticism; it stands as a compelling manifesto that urges a fundamental reimagining of culture's role in confronting the climate crisis. Amitav Ghosh positions the book as both a warning and a call to action, emphasizing that the narratives we construct — whether in literature, art, or media — directly shape our capacity to perceive, understand, and respond to the environmental challenges of our time. By advocating for stories that are unafraid to embrace the improbable and the extraordinary, Ghosh confronts the limitations of conventional realism, which often excludes the very types of catastrophic events that define life in the Anthropocene.

In making this argument, Ghosh challenges writers to step beyond traditional narrative boundaries and to create works that reflect the interconnectedness, unpredictability, and vast scale of environmental change. At the same time, he calls upon readers to open themselves to narratives that disrupt their comfort zones, compelling them to grapple with the moral and existential dimensions of the climate crisis. This dual challenge — to both producers and consumers of culture — reframes climate change not merely as a scientific or political problem, but as a profound imaginative and ethical challenge.

Through this lens, Ghosh redefines climate responsibility as a shared cultural and ethical project. It is not solely the task of scientists to measure environmental decline or of policymakers to draft regulations; rather, it is the collective duty of society to integrate ecological awareness into the very fabric of its cultural expression. This shared responsibility unites the empirical rigor of environmental science — with its precise data, predictive models, and factual analysis — and the imaginative force of literature, which has the unique power to evoke empathy, provoke critical thought, and inspire collective action.

In essence, *The Great Derangement* insists that solving the climate crisis requires more than technological innovation or political will; it demands a transformation of cultural consciousness. Only when scientific truths are embedded within compelling narratives can they resonate deeply enough to inspire sustained public engagement and meaningful change. By bridging the realms of fact and imagination, Ghosh's vision offers a pathway toward a future where environmental responsibility is woven into the very identity of human culture.

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छायावाद के सुकुमार चितरे पन्त के काव्य में प्रकृतिचित्रण

प्रा. डॉ. मंगल मिलिंद कांबळे

विद्या प्रतिष्ठान का, कला, विज्ञान एवं वाणिज्य महाविद्यालय, विद्यानगरी बारामती, जिला - पुणे. 413133

किसी भी साहित्य धारा को समझने के लिए उसके युग का अध्ययन अनिवार्य होता है। व्यापक दृष्टि से देखने पर ज्ञात होता है कि छायावाद युग भारत के लिए अस्मिता की खोज का युग है। छायावादी युग को हिन्दी कविता के 'प्रकृति-चित्रण' के काव्य का स्वर्ण- युग' कह सकते हैं। छायावादी काव्यधारा की वृहत्त्रयी में से एक प्रमुख हस्ताक्षर कवि सुमित्रानंदन पंत हैं। उन्होंने हिन्दी साहित्य जगत में खड़ी बोली भाषा के प्रकृति-चित्रण का स्वर्ण-युग गढ़ा है। साहित्य में 'प्रकृति वर्णन' की बात की जाए तो हिन्दी संसार इन्हें प्रकृति के सुकुमार कवि और कोमल कल्पना के चितरे के रूप में जानते हैं। हिन्दी की छायावादी कविताओं में प्रकृति का चित्रण अत्यंत मनोहारी रहा है। पंत जी के काव्य में प्रकृति को एक सुंदरी की मनोहारी छवियों के रूप में अंकित किया गया है। सचमुच पंत केवल कल्पना तथा भावनाओं के कवि हैं, अपनी सुकुमार कल्पना के बल पर ही उन्होंने प्रकृति को ऐसा रूप प्रदान किया जैसे कि वह हमारे सामने हुबहु चलने फिरने लगती है। मानो ऐसा लगता है प्रकृति और पंत एक ही सिक्के के दो पहलू हैं। इसलिए यह कहना समीचीन रहेगा कि पंत छायावादी युग के सशक्त एवं श्रेष्ठतम हस्ताक्षर हैं। छायावादी प्रकृति काव्य को सर्वोच्च बनाने का श्रेय सुमित्रानंदन पंत को जाता है। पंत जी का प्रकृति के प्रति विशेष अनुराग रहा है।

कविवर पंत (1900-1920) का जन्म प्रकृति के सुरम्य वातावरण में बसे अल्मोड़ा के कौसानी ग्राम में 20 मई 1900 ई में हुआ। यह स्थान प्राकृतिक सौंदर्य से इतना ओतप्रोत भरा है कि इस स्थान को 'भारत का स्वीटजरलैंड' के रूप में देखा जाता है। पंत जी को अल्मोड़ा की प्राकृतिक सुषमा ने बचपन से अपनी ओर आकृष्ट किया और प्रकृति के उस मनोरम वातावरण का इनके व्यक्तित्व पर गंभीर प्रभाव पड़ा। उनके बारे में यह भी विख्यात है कि वे अपनी जन्मभूमि के प्राकृतिक सौंदर्य को एक एक जगह बैठकर घंटों निहारा करते थे। स्वयं कवि ने अपनी काव्य प्रेरणा के पीछे इस प्रकृति के अतुलनीय योगदान को स्वीकारा भी है। आधुनिक कवि की भूमिका में पंत ने लिखा है-" कविता करने की प्रेरणा मुझे।

सबसे पहले प्रकृति निरीक्षण से मिली। जिसका श्रेय मेरी जन्मभूमि कुमाँचल प्रदेश को है। कवि जीवन से पहले भी, मुझे याद है, मैं घंटों एकांत में बैठा, प्राकृतिक दृश्यों को एकटक देखा करता था और कोई अज्ञात आकर्षण मेरे भीतर, एक अव्यक्त सौंदर्य का जाल बुनकर मेरी चेतना को तन्मय कर देता था। जब कभी मैं आँख मूंदकर लेटता था तो वह दृश्यपट चुपचाप मेरी आँखों के सामने घुमा करता था।...और शायद यह पर्वत प्रांत के वातावरण का ही प्रभाव है कि मेरे भीतर विश्व और जीवन के प्रति एक गंभीर आश्चर्य की भावना, पर्वत ही की तरह निश्चल रूप से अव्यवस्थित है।" 1

सचमुच प्रकृति के हर पहलू को संसार से जोड़ने की कवि की लालसा उनके साहित्य से दृष्टिगोचर होती है। इनके मन में प्रकृति के प्रति इतना मोह पैदा हो गया था कि वह जीवन की नैसर्गिक व्यापकता और अनेक रूपता में पूर्णरूप से आसक्त न हो सके। प्रकृतिका रूपरंग उनकी कविताओं में इतना भास्वर है कि उसके आगे नारी का सौंदर्य भी तुच्छ हो जाता है :

"छोड़ हमों की मृदु छाया

तोड़ प्रकृति से भी माया,

बाले, तेरे बाल जाल में कैसे उलझा दूँ लोचन ?

छोड़ अभी से इस जग को " 2

इन पंक्तियों से यह प्रतीत होता है कि कवि रमणी के सौंदर्य की अपेक्षा प्रकृति के सौंदर्य को अधिक महत्वपूर्ण मानता है। उन्होंने हमेशा प्रकृति के कोमल एवं सुकुमार रूपरंग को अग्रस्थान दिया है। एक तरह से मानो ऐसा लगता है प्रकृति उनके लिए नवोन्मेष शालिनी हैं। पंतजी के काव्य रचना संसार पर एक दृष्टिक्षेप। पहली कविता 'गिरजे का घंटा' सन् 1916, 'उच्छवास' 1920 'ग्रंथि' 1920, 'बीणा' 1927, 'पल्लव' 1928, और 'गुंजन' 1932। 'गुंजन' उनका अंतिम छायावादी काव्यसंग्रह कहा जा सकता है। पंत के काव्य में प्रकृति के मनोरम रूपों का मधुर वर्णन द्रष्टव्य होता है। उनके प्रकृति वर्णन को निम्नलिखित बिंदुओं से हम जान सकते हैं :- आलंबन रूप, उद्दीपन रूप, रहस्य रूप, संवेदनात्मक रूप, मानवीकरण रूप, प्रतीकात्मक रूप, लोकशिक्षा रूप, और अलंकार रूप बीणा में संकलित 'प्रथम रश्मि' शीर्षक कविता के अंश में उन्होंने प्रकृति के विविध रूपों का चित्रण बखूबी किया है।

"प्रथम रश्मि का आना
तुने कैसे पहचाना?
कहाँ, कहाँ हे - बाला विहंगिनी!
पाया तुने यह गाना ? " 3

सूर्य की प्रथम रश्मि का आना, प्रहरी रुपी जुगनुओं का हट जाना। सूर्य के उगते ही नव कलियों का मुख मुस्कुराना आदि दृश्य कितना विलोभनीय लगता है। इसको पंत जी ने बहुत ही मार्मिकता से अभिव्यक्त किया है। प्रकृति का संबंध मानव जीवन के साथ कितना अभिन्न है, यह पंत जी काव्य के जरिए स्पष्ट करते हैं। पंत जी ने अपनी कविताओं में अपनी बात कहने के लिए विभिन्न प्रतीकों का प्रयोग किया है। पंत के काव्य संग्रह 'वीणा' 'गुंजन' और 'पल्लव' में प्रकृति प्रतीक रूप में वर्णित हुई है।

'गुंजन' कविता के जरिए :- "कलरव किसको नहीं सुहाता ?

कौन नहीं इसको अपनाता ?
यह शैशव का सरल हास है,
सहसा उर में है आ जाता।" 4

यहां 'कलरव' शब्द प्रतीक रूप में 'जीवन के उल्लास' के लिए प्रयुक्त हुआ है। पंत हिंदी काव्यकाश में छायावादी युग के दैदिप्यमान ऐसे भास्वर है जो जीवन के प्रत्येक कोने को स्पर्श करते हैं। इनकी कविताओं का संसार भारतीय संसार है। पंत ने प्रकृति के चेतन रूपको कविता के माध्यम से सहज रूप से अभिव्यक्त किया है। प्रकृति का मानव जीवन से कितना अन्योन्य संबंध है यह कवि के काव्य से झलकता है। सुमित्रानंदन पंत 'पल्लव' के माध्यम से 'पूर्व-सूधि' कविता में बादलों का अप्रतिम सौंदर्य प्रस्तुत करते हैं :-

"बादलों के छायामय मेल
घूमते हैं आँखों में फैल
अवनि औ अंबर के खेल
शैल में जलद-जलद शैल
शिखर पर विचर मरुत रखवाल वेणु में भरता था जब स्वर
मेमनों- से - मेघों के बाल
फुदकते थे प्रमुदित गिरि पर।" 5

पंत ने प्रकृति के हर तत्व को अपनी कलम की नोकसे अलंकृत किया है। मानो कवि की कविताओं का अध्ययन करने के बाद लगता है कि वह प्रकृति का सहचर रहा है। पंत जी की कई कविताएं मानव के जाति-पाति के दृष्टिकोण को नकारती हैं। उस संकुचित दृष्टिकोण को वह मनुष्य विकास में घातक मानते हैं। पंत की अंतिम कविताओं में मानव कल्याण, आस्था, निष्ठा, लोकमंगल की भावना है, जो कवि को प्रगतिपथ पर पहुँचाती है। उनके काव्य में निराशा की अभिव्यक्ति बहुत ही कम मिलती है। छायावादी, प्रगतिवादी, प्रयोगवादी काव्य प्रवृत्तियों इनके काव्य का केंद्रबिंदू रहा है। आपकी रचनाओं की कुछ बानगी प्रस्तुत है। प्रकृति की गूढ़ता को आप सहजता से कह जाते हैं।

"शशिकिरणों से उतर उतरकर भू पर कामरूप नभचर
चूम नवल कलियों का मृदुमुख सिखा रहे थे मुस्कान।।

पंतजी का भाषा पर पूर्णाधिकार था। उपमानों की लड़ी प्रस्तुत करने में आपका कोई सानी नहीं है। उन्होंने अपनी कविता में चमत्कार पैदा करने के लिए प्रकृति के विभिन्न उपकरणों को उपमान के रूप में प्रस्तुत किया है। 'आँसू' कविता तो उपमाओं का भण्डार है। 'ग्रंथि' का एक उदाहरण द्रष्टव्य है :-

"इन्द्र की छवि में, तिमिर के गर्भ में अनिल की ध्वनि में, सलिल की वीच में,
एक उत्सुकता विचरती थी, सरल सुमन की स्मिति में, लता के अधर में।
निज पलक, मेरी विकलता, साथ ही अवनिसे, उर से मृगाक्षि ने उठा,
एक पल, निज स्नेह श्यामल दृष्टि से स्निग्ध कर दी दृष्टि मेरी दीप-सी।" 6

मानो पंत जी का काव्य ज्ञान पाकर ऐसा लगता है उनका प्रकृति के साथ अटूट रिश्ता और आदमी बिंबों के नवनीत प्रयोग उनकी पहचान है। अपनी कलम की नकेल को संवेदनाओं के धरातल पर माँजकर जमीन-आकाश के बीच के सौंदर्य को अद्भूत ढंग से उद्घाटित करने में वे अग्रणी रहे हैं।

इस तरह पन्त जी को प्रकृति का चितेरा कहना अक्षरशः उचित है। उनके काव्य में हमें प्रकृति के विविध सुकुमार दृश्य दिखाई पड़ते हैं। आज भी साहित्य जगत में जब प्रकृति चित्रण की बात की जाती है तो पंत जी का नाम बड़े शान और सम्मान के साथ लिया जाता है। सचमुच जीवन के प्रति असीम आस्था के सूत्र अपनी रचनाओं के

माध्यम से पिरोना कवि समष्टिकेंद्री दृष्टि की पहचान कही जा सकती है। उनकी भाषा शैली और भाव प्रगतिवादी चेतना से प्रभावित है। कवि की भाषावक्रता और सांकेतिकता आदि को छोड़ सरलता और सपाटबयानी की ओर मुखर होती है। वैसे इन रचनाओं में अनुभूति के स्थान पर विचार को अधिक महत्व मिला है:-

तुम बहन कर सको जन-मनमें मेरे विचार,
वाणी मेरी, चाहिए तुम्हें क्या अलंकार !" 7

इसी कारण हिंदी जगत में उन्हें प्रकृति के सुकुमार कवि और कोमल कल्पना के चित्रे के नाम से जाना जाता है।

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शेती, पर्यावरण आणि राजकारण : हरित क्रांतीपासून ते जैविक शेतीपर्यंत

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प्रस्तावना

भारताची अर्थव्यवस्था प्रामुख्याने कृषिप्रधान असून देशातील सुमारे ५५ टक्क्यांहून अधिक लोकसंख्या आजही प्रत्यक्ष किंवा अप्रत्यक्षपणे शेतीवर अवलंबून आहे. शेती केवळ अन्नधान्य उत्पादनाचे साधन नसून ती भारताच्या सामाजिक, आर्थिक, पर्यावरणीय आणि राजकीय घडामोडींचा गाभा आहे. त्यामुळे शेतीचा अभ्यास करताना केवळ उत्पादनाच्या दृष्टीकोनातून नव्हे, तर पर्यावरण आणि राजकारण या दोन परस्पर पूरक घटकांचाही विचार करणे अनिवार्य ठरते. १९६० च्या दशकात देशात अन्नधान्याची कमतरता, उपासमार आणि दुष्काळ यामुळे निर्माण झालेल्या भीषण परिस्थितीतून बाहेर पडण्यासाठी भारत सरकारने 'हरित क्रांती' नावाचा एक महत्वाकांक्षी कार्यक्रम राबविला. डॉ. एम. एस. स्वामिनाथन यांच्यासारख्या वैज्ञानिकांच्या नेतृत्वात, नॉर्मन बोरलॉग यांच्या तांत्रिक साहाय्याने हरित क्रांती भारतात प्रत्यक्षात आली. उच्च उत्पादनक्षम बियाणे (HYV), रासायनिक खते, सिंचन सुविधा आणि यांत्रिक साधनांच्या वापरामुळे शेती उत्पादनात लक्षणीय वाढ झाली आणि भारत अन्नधान्याच्या बाबतीत आत्मनिर्भर झाला.

परंतु या उत्पादनवाढीच्या प्रक्रियेमध्ये निसर्गावर, मातीच्या सुपीकतेवर आणि पाण्याच्या स्रोतांवर मोठा ताण आला. रासायनिक खते व कीटकनाशकांच्या अतीव वापरामुळे पर्यावरणीय समतोल बिघडला, जैवविविधता कमी झाली, आणि आरोग्यावरही परिणाम झाला. दीर्घकालीन दृष्टीकोनातून पाहता हरित क्रांतीचे परिणाम सकारात्मक असूनही पर्यावरणीय व सामाजिक दृष्टीने काही गंभीर प्रश्न निर्माण झाले. विशेषतः लहान आणि सीमांत शेतकऱ्यांना या क्रांतीचा फारसा लाभ झाला नाही. या पार्श्वभूमीवर, अलीकडील काळात पर्यावरणक्षेत्री, नैसर्गिक आणि शाश्वत शेतीची गरज प्रकर्षाने जाणवू लागली आहे. या गरजेतूनच 'जैविक शेती'ची संकल्पना उदयास आली. जैविक शेती म्हणजे रासायनिक घटकांपासून मुक्त, सेंद्रिय घटकांवर आधारित शेती. ही शेती मातीचा पोत सुधारते, पाण्याचा वापर कमी करते, पर्यावरणाची हानी टाळते आणि आरोग्यदायी अन्न उपलब्ध करून देते.

शेती, पर्यावरण आणि राजकारण या तिन्ही घटकांचे परस्पर संबंध अत्यंत गुंतागुंतीचे आणि परिणामकारक आहेत. कृषी धोरणांची आखणी ही मुख्यत्वे राजकीय इच्छाशक्तीवर अवलंबून असते. पाण्याचे वाटप, शेतमालाचे किमान समर्थन मूल्य (MSP), कृषी अनुदाने, निर्यातीचे धोरण, WTO करार आणि कृषी बाजारपेठेतील सुधारणांचे परिणाम हे सर्व राजकीय पातळीवर ठरत असतात. त्यामुळे शेतीच्या विकासात राजकारणाची भूमिका अनन्यसाधारण ठरते.

आजच्या हवामान बदलाच्या पार्श्वभूमीवर शाश्वत शेतीचा विचार करणे अत्यावश्यक झाले आहे. नैसर्गिक आपत्ती, पर्जन्यमानातील अस्थिरता, भूजल पातळीतील घट आणि रासायनिक शेतीमुळे होणारे प्रदूषण यामुळे शेती अधिक असुरक्षित झाली आहे. ही असुरक्षा दूर करण्यासाठी नवे शेती मॉडेल आवश्यक आहेत, जे पर्यावरणपूरक आणि शाश्वत असतील. या संशोधन लेखात 'हरित क्रांतीपासून जैविक शेतीपर्यंत' या प्रवासाचा विविध अंगांनी अभ्यास केला आहे. यात शेतीतील तांत्रिक बदल, पर्यावरणावर झालेले परिणाम, शेतकऱ्यांच्या सामाजिक-आर्थिक स्थितीतील बदल, आणि धोरणात्मक राजकीय हस्तक्षेप यांचा समावेश आहे. तसेच, जैविक शेतीच्या अनुषंगाने पुढील दिशादर्शक मार्गदर्शनही या लेखातून दिले आहे.

हरित क्रांती : एक ऐतिहासिक टप्पा

भारतीय कृषी इतिहासात हरित क्रांती हा एक महत्वाचा आणि निर्णायक टप्पा ठरला आहे. 1960 च्या दशकात भारतात अन्नधान्याची तीव्र टंचाई, दुष्काळ, आणि वारंवार पडणाऱ्या अपयशी पावसाळ्यामुळे देश अन्न सुरक्षेच्या संकटात सापडला होता. दुसऱ्या बाजूला देशाची लोकसंख्या झपाट्याने वाढत होती. अशा परिस्थितीत भारत सरकारसमोर एक मोठे आव्हान होते – देशातील वाढत्या लोकसंख्येला उपाशी न ठेवता अन्नधान्याची पूर्तता करणे. या समस्येवर उपाय म्हणून 1965-66 च्या दरम्यान 'हरित क्रांती' या उपक्रमाची सुरुवात झाली.

हरित क्रांती ही एक कृषी उत्पादनवाढीची प्रक्रिया होती, जी उच्च उत्पादनक्षम बियाणे (High Yielding Varieties - HYV), रासायनिक खते व कीटकनाशके, सिंचन सुविधा आणि आधुनिक यंत्रसामग्री यांच्या वापरावर आधारित होती. या क्रांतीचे प्रमुख शिल्पकार डॉ. एम.एस. स्वामिनाथन हे होते. त्यांनी अमेरिकेचे कृषी वैज्ञानिक नॉर्मन बोरलॉग यांच्या तांत्रिक मार्गदर्शनाखाली HYV बियाण्यांचा भारतात प्रसार केला. विशेषतः गहू आणि तांदूळ उत्पादनासाठी ही तंत्रज्ञान मोठ्या प्रमाणावर वापरले गेले.

हरित क्रांतीचे मुख्य केंद्र पंजाब, हरियाणा आणि पश्चिम उत्तर प्रदेश हे होते. या भागांमध्ये सिंचनाची सोय, जमीन कसदार व सपाट, आणि शेतकऱ्यांची नव्या तंत्रज्ञानास अनुकूल मानसिकता यामुळे उत्पादनात अभूतपूर्व वाढ झाली. गहू उत्पादनात तर भारताने अल्पावधीतच आत्मनिर्भरता प्राप्त केली. 1965 पूर्वी भारत दरवर्षी लाखो टन अन्नधान्य अमेरिकेकडून 'PL-480' अंतर्गत आयात करत होता, तर 1971 पर्यंत भारताने अन्नधान्य निर्यातही सुरू केली.

हरित क्रांतीचे सकारात्मक परिणाम :

- अन्नधान्य उत्पादनात मोठी वाढ (विशेषतः गहू व तांदूळ).
- भारत अन्न सुरक्षेच्या दृष्टीने आत्मनिर्भर झाला.
- कृषी क्षेत्रात औद्योगिकीकरणास चालना मिळाली.
- काही राज्यांमध्ये ग्रामीण विकास, रस्ते, गोदामे, बँका व सहकारी संस्था यांचा प्रसार झाला.

हरित क्रांतीचे नकारात्मक परिणाम :

परंतु ही क्रांती सर्वसामान्य व लहान शेतकऱ्यांपर्यंत पोहोचली नाही. कारण HYV बियाणे, रासायनिक खते आणि सिंचनासाठी भांडवल लागे, जे गरिब शेतकऱ्यांना परवडणारे नव्हते. परिणामी:

- शेतीतील असमानता वाढली – श्रीमंत शेतकरी अधिक श्रीमंत, गरीब शेतकरी अधिक गरीब झाले.
- मातीचा ऱ्हास – रासायनिक खतांचा अतिवापरामुळे मातीचा पोत आणि जैवसांस्कृतिक जीवनशैलीवर प्रतिकूल परिणाम झाला.
- भूजलाची पातळी खालावली – जास्त पाणी लागणाऱ्या पिकांची लागवड वाढली.
- आरोग्य समस्यांचा उद्भव – कीटकनाशकांचा अवास्तव वापर आरोग्याच्या दृष्टिकोनातून धोकादायक ठरला.
- एकपिकी शेतीचा प्रसार – हरित क्रांतीने गहू आणि तांदळाच्या उत्पादनावर भर दिला, परिणामी इतर अन्नधान्य व डाळींची पिके दुर्लक्षित झाली.

याशिवाय हरित क्रांती ही मुख्यतः उत्तर भारतातील काही निवडक राज्यांपुरती मर्यादित राहिली. पूर्व भारत, विदर्भ, मराठवाडा, बुंदेलखंड सारख्या भागांमध्ये ही क्रांती फारशी प्रभावी ठरली नाही. यामुळे प्रदेशीय विषमता निर्माण झाली आणि सामाजिक असंतुलन वाढले.

राजकीय अर्थ :

हरित क्रांती केवळ वैज्ञानिक किंवा कृषी धोरण नव्हते, तर ती राजकीय हस्तक्षेपाची एक प्रक्रिया होती. केंद्र सरकार, राज्य सरकार, कृषी विद्यापीठे, आंतरराष्ट्रीय संस्था आणि जागतिक बँक या सगळ्यांच्या सहभागामुळेच हरित क्रांती शक्य झाली. त्यामुळे कृषी आणि राजकारण यांच्यातील नाते अधिक दृढ झाले.

पर्यावरणीय दुष्परिणाम आणि शेतीतील असंतुलन

हरित क्रांतीमुळे भारतात अन्नधान्य उत्पादनात जरी मोठी वाढ झाली असली, तरी दीर्घकालीन दृष्टीने तिचे अनेक पर्यावरणीय दुष्परिणाम समोर आले आहेत. शेती ही केवळ आर्थिक क्रिया नसून ती पर्यावरणाशी थेट संबंधित क्रिया आहे. निसर्गाच्या मूलभूत घटकांचा वापर शेतीसाठी होतो – जसे की माती, पाणी, हवामान, सजीव-जैविक घटक. त्यामुळे जेव्हा शेती पद्धतीत कृत्रिम हस्तक्षेप आणि अतीव तंत्रज्ञानाचा वापर होतो, तेव्हा पर्यावरणाच्या समतोलाने मोठा परिणाम होतो. हरित क्रांतीच्या पद्धतीमुळे याच प्रकारचा असमतोल निर्माण झाला आहे.

१. मातीची गुणवत्ता आणि सेंद्रिय पदार्थांची घट

हरित क्रांतीत रासायनिक खतांचा अतिवापर झाला. यामुळे मातीतील सेंद्रिय घटकांची मात्रा झपाट्याने कमी झाली. सेंद्रिय कार्बन, सूक्ष्मजीव, गांडुळे व मातीची सूक्ष्मजीवशृंखला यांचे प्रमाण घटल्यामुळे मातीचा पोत बिघडला. त्यामुळे मातीची जलधारण क्षमता कमी झाली आणि ती मुरमाड, कठीण झाली. याचा थेट परिणाम उत्पादनावर झाला.

२. जलप्रदूषण आणि भूजलाचे कमी होणे

हरित क्रांतीनंतर रासायनिक खते, कीटकनाशके, आणि शाकनाशकांचा मोठ्या प्रमाणावर वापर झाला. हे घटक अनेकदा अति सिंचनामुळे पाण्याच्या स्रोतांमध्ये मिसळतात आणि नद्या, विहिरी, तलाव, व भूमिगत जलप्रवाह प्रदूषित होतात. विशेषतः नायट्रेट आणि फॉस्फेटचे प्रमाण वाढल्यामुळे पाण्याच्या पाण्याचे प्रदूषण गंभीर स्वरूपात वाढले आहे. भूजलाची पातळीसुद्धा घटली आहे, कारण रब्बी पिकांसाठी आवश्यक असणारे जास्त पाणी हे पंपद्वारे भूजलातून घेतले जाते.

३. जैवविविधतेवर परिणाम

हरित क्रांतीच्या परिणामस्वरूप एकपिकी शेतीचा प्रसार झाला – म्हणजे शेतकरी गहू व तांदळासारख्या निवडक पिकांकडे वळले. त्यामुळे पारंपरिक, स्थानिक व बहुपिक प्रणाली नामशेष झाली. याशिवाय रासायनिक औषधांच्या वापरामुळे मधमाश्या, गांडुळे, पक्षी व इतर उपयोगी कीटक नष्ट झाले. नैसर्गिक कीटकनियंत्रण यंत्रणा कोलमडली आणि संपूर्ण जैविक साखळी बिघडली.

४. हवामान बदलाला चालना

रासायनिक खतांच्या उत्पादन व वापरामुळे हरितगृह वायूंचे (Greenhouse Gases) उत्सर्जन वाढले आहे. नायट्रस ऑक्साईड हे खतांमधून निघणारे वायू हवामान बदलासाठी जबाबदार आहे. याशिवाय मोठ्या प्रमाणावर पाण्याचा वापर, जळणासाठी जंगलतोड, व यांत्रिकीकरण यामुळे कार्बन डायऑक्साईड उत्सर्जन वाढले आहे. त्यामुळे हवामानातील अस्थिरता वाढली आहे, जी शेतीसाठी आणखी धोकादायक ठरते.

५. मानव आरोग्यावरील परिणाम

शेतीत वापरल्या जाणाऱ्या विषारी कीटकनाशकांचे उरलेले अंश अन्नधान्यात मिसळले जातात. हे अंश थेट मानवाच्या शरीरात जातात आणि त्यामुळे कर्करोग, अन्ननलिका विकार, संप्रेरक बिघाड, त्वचेचे आजार, आणि प्रजननक्षमतेवर परिणाम अशा गंभीर आरोग्य समस्या वाढल्या आहेत. ग्रामीण भागात शेतकऱ्यांनी योग्य माहितीविना औषधे वापरल्यामुळे विषबाधा व अपघाती मृत्यूंचे प्रमाण वाढले आहे.

६. शेतीतील आर्थिक असंतुलन

हरित क्रांतीमुळे शेतीत उत्पादन वाढले, पण त्याच वेळी खर्च देखील मोठ्या प्रमाणावर वाढला. रासायनिक खते, कीटकनाशके, मशीनरी, बीज आणि सिंचन यासाठी मोठे भांडवल लागू लागले. परिणामी, गरिब व अल्पभूधारक शेतकऱ्यांचे आर्थिक संकट वाढले. उत्पादन वाढले तरी नफा कमी झाला. यामुळे कर्जबाजारीपणा, आत्महत्या व स्थलांतर यासारख्या सामाजिक समस्या निर्माण झाल्या.

जैविक शेती : शाश्वत शेतीचे भविष्य

हरित क्रांतीने भारतात अन्नधान्य उत्पादनात अभूतपूर्व वाढ केली खरी, पण दीर्घकालीन पर्यावरणीय असमतोल, मातीचा ऱ्हास, जलप्रदूषण, कीटकनाशकांचा अतिरेक आणि शेतकऱ्यांचे आर्थिक कर्जबाजारीपण यांसारख्या समस्यांना तोंड द्यावे लागले. या पार्श्वभूमीवर पर्यावरणपूरक, आरोग्यदायी आणि शाश्वत शेतीचा शोध सुरू झाला आणि त्यातूनच "जैविक शेती" (Organic Farming) ही संकल्पना पुढे आली.

जैविक शेती ही अशी पद्धत आहे जिच्यामध्ये कोणत्याही प्रकारचे रासायनिक खते, कीटकनाशके, शाकनाशके अथवा जनुकीय सुधारित (GMO) बियाणे वापरले जात नाहीत. त्याऐवजी नैसर्गिक आणि सेंद्रिय घटकांचा वापर करून मातीचा पोत सुधारणे, पर्यावरणाचे संरक्षण करणे आणि आरोग्यदायी अन्नधान्य उत्पादन हे या शेतीचे उद्दिष्ट आहे.

जैविक शेतीची वैशिष्ट्ये :

१. सेंद्रिय खते व नैसर्गिक कीटकनियंत्रण: गांठीव शेणखत, कंपोस्ट, वर्मी कंपोस्ट, जीवामृत, पंचगव्य, दशपर्णी अर्क यांसारख्या घटकांचा वापर केला जातो.

2. **मातीच्या पोषणशक्तीचे संवर्धन:** जैविक शेती मातीतील सेंद्रिय कार्बनचे प्रमाण वाढवते, सूक्ष्मजीवसृष्टीला सक्रिय करते आणि जमिनीचा पोत सुधारते.
3. **पाण्याची बचत:** नैसर्गिक पद्धतीमुळे पाण्याचा अपव्यय होत नाही. ड्रिप सिंचन, मल्लिंग यासारख्या तंत्रांचा वापर केला जातो.
4. **हवामान बदलाच्या परिणामांवर नियंत्रण:** रासायनिक पदार्थांपासून मुक्त असल्यामुळे हरितगृह वायूंचे उत्सर्जन कमी होते.
5. **आरोग्यदायी उत्पादन:** अन्नधान्यात रासायनिक अंश नसल्यामुळे ते अधिक सुरक्षित आणि पौष्टिक असते.

भारतामधील जैविक शेतीचा वाढता कल :

भारत सरकारने जैविक शेतीला प्रोत्साहन देण्यासाठी विविध योजना राबविल्या आहेत. उदाहरणार्थ, 'परंपरागत कृषी विकास योजना' (PKVY), 'राष्ट्रीय जैविक शेती मिशन', 'मिशन ऑर्गेनिक व्हॅल्यू चेन डेव्हलपमेंट' (MOVCD) इत्यादी. सिक्कीम राज्य हे भारतातील पहिले 100% जैविक राज्य ठरले आहे. केरळ, मध्यप्रदेश, उत्तराखंड आणि महाराष्ट्रातील काही भागांमध्येही जैविक शेतीचा प्रसार झपाट्याने होत आहे.

अडचणी आणि उपाययोजना :

जरी जैविक शेतीचे फायदे स्पष्ट आहेत, तरीही त्याच्या अंमलबजावणीत काही अडचणी येतात, जसे की:

- सुरुवातीला उत्पादनात घट
- बाजारपेठेचा अभाव
- ग्राहकांमध्ये जागरूकतेचा अभाव
- प्रमाणित सेंद्रिय उत्पादक म्हणून नोंदणीची गुंतागुंत

या अडचणींवर मात करण्यासाठी शेतकरी गट, कृषी सहकारी संस्था, डिजिटल मार्केटिंग प्लॅटफॉर्म आणि सरकारचे प्रशिक्षण कार्यक्रम महत्वाची भूमिका बजावू शकतात.

राजकारणाचा प्रभाव व नवे शेती धोरण

शेती ही केवळ एक आर्थिक क्रिया नसून ती पर्यावरण, समाज आणि राजकारणाशी जवळून संबंधित आहे. विशेषतः भारतासारख्या लोकशाही देशात, जिथे शेतकरी वर्ग मोठ्या प्रमाणात मतदानावर परिणाम करू शकतो, तिथे शेती धोरणे राजकीय निर्णयांवर प्रभाव टाकतात आणि त्याचवेळी राजकीय विचार व अंमलबजावणी शेतीच्या दिशा ठरवतात. त्यामुळे शेती आणि राजकारण यांचे परस्पर संबंध अतिशय प्रभावी आणि गुंतागुंतीचे आहेत.

१. राजकारणातील शेतीचा अजेंडा

भारताच्या स्वातंत्र्यानंतर शेती विकासाला सर्वोच्च प्राधान्य देण्यात आले. पं. नेहरूंच्या काळात मोठ्या धरणांची निर्मिती 'धर्माचे मंदिर' म्हणून केली गेली. हरित क्रांतीच्या पार्श्वभूमीवरही कृषी क्षेत्राला मोठ्या प्रमाणावर सरकारच्या हस्तक्षेपाने चालना मिळाली. मात्र या धोरणांमध्ये राजकीय पोषण हाच केंद्रबिंदू बनू लागला. निवडणुका जवळ आल्या की शेतकऱ्यांना कर्जमाफी, सवलतीच्या दरातील वीज, खत-सामुग्रीवर अनुदान, किमान आधारभूत किंमत (MSP) व हमीभावाची घोषणा केली जाते. या घोषणांमागे शेतकऱ्यांच्या कल्याणाची भावना असली, तरी अंतर्गत राजकीय हेतू आणि अल्पकालीन यश यांमुळे दीर्घकालीन धोरणांची अंमलबजावणी अपूर्ण राहते.

२. कृषी धोरणातील राजकीय हस्तक्षेप

राजकीय स्तरावर केंद्र आणि राज्य शासनाच्या कृषी धोरणांमध्ये अनेक वेळा समन्वयाचा अभाव दिसून येतो. उदा. एखाद्या राज्यात एमएसपीची व्याप्ती मोठी असते, तर दुसऱ्या राज्यात शेतकरी खुले बाजारावर अवलंबून असतो. यामुळे राज्यदरम्यान असमानता आणि शेतकऱ्यांमध्ये असंतोष वाढतो.

पुढील मुद्दे लक्षात घेणे महत्वाचे:

- कृषी उत्पन्न बाजार समित्या (APMC) या राजकीय प्रभावाखाली असतात.
- अनुदान धोरणे अनेकदा शाश्वत शेतीसाठी नव्हे, तर रासायनिक, पारंपरिक शेतीसाठी दिली जातात.
- कर्जमाफी योजना अनेकदा केवळ निवडणुकीपुरत्या मर्यादित राहतात, दीर्घकालीन सशक्तीकरणाऐवजी.

३. नवे शेती धोरण आणि डिजिटल युग

आजच्या काळात शेतीविषयक समस्यांचा निवारण करण्यासाठी नवे धोरणात्मक बदल आवश्यक आहेत. खालील बाबी या नव्या धोरणात्मक दिशादर्शकांमध्ये मोडतात:

- **डिजिटल शेती आणि तंत्रज्ञानाचा वापर**

ड्रोनद्वारे कीटकनाशक फवारणी, सॅटेलाईट डेटा, मृदा आरोग्य कार्ड, मोबाईल ॲप्सद्वारे बाजारभाव माहिती — हे सर्व शेतकऱ्यांच्या सशक्तीकरणासाठी वापरण्यात येत आहेत. परंतु त्यांचा प्रसार अद्याप ग्रामीण स्तरावर कमी आहे.

- **शाश्वत आणि जैविक शेतीचे धोरण**

भारत सरकारने 'परंपरागत कृषी विकास योजना' (PKVY), 'राष्ट्रीय जैविक कृषी अभियान' यासारख्या योजना सुरू केल्या आहेत. पण प्रत्यक्ष अंमलबजावणीसाठी राजकीय इच्छाशक्ती, निधी वितरण आणि कार्यक्षम यंत्रणा आवश्यक आहेत.

- **शेतकरी बाजारपेठांशी जोडणे**

'ई-नाम' पोर्टल, शेतकरी उत्पादक कंपन्या (FPO), आणि कृषी स्टार्टअप्स हे नवे पर्याय असून, सरकारकडून त्यासाठी अनुदान व प्रशिक्षण दिले जाते. परंतु अनेक राज्यांमध्ये त्याचा प्रत्यक्ष प्रभाव कमी दिसतो.

४. आंतरराष्ट्रीय राजकारणाचा परिणाम

जागतिकीकरण आणि WTO करारांमुळे भारतीय शेती आंतरराष्ट्रीय बाजाराशी जोडली गेली आहे. परंतु यामुळे देशांतर्गत बाजारपेठेवर परिणाम होतो. विदेशी कंपन्यांचा बियाणे व खत बाजारात प्रवेश झाल्यामुळे स्थानिक शेतकरी त्यांच्या नियंत्रणात गेला आहे. ही एक नव्या प्रकारची 'कृषी वसाहतवादाची' रूपरेषा आहे.

आधुनिक काळात शाश्वत शेतीचे महत्त्व

२१ व्या शतकात मानवाला भेडसावणाऱ्या प्रमुख समस्यांमध्ये हवामान बदल, नैसर्गिक संसाधनांचा ऱ्हास, अन्नसुरक्षा आणि ग्रामीण भागातील आर्थिक असमानता या महत्त्वाच्या आहेत. या सर्व समस्यांचा केंद्रबिंदू म्हणजे शेती व पर्यावरणाचे परस्परसंबंध. त्यामुळे "शाश्वत शेती" (Sustainable Agriculture) ही संकल्पना आजच्या काळात अत्यंत महत्त्वाची ठरते. शाश्वत शेती म्हणजे अशी पद्धत जी सध्याच्या पिढीला पुरेसे उत्पादन देऊन पुढील पिढ्यांनाही नैसर्गिक संसाधनांचा समतोल राखून शेती करता येईल, अशी प्रक्रिया.

१. अन्नसुरक्षेसाठी शाश्वत शेती

जगाची लोकसंख्या वाढत असताना अन्नधान्याची मागणी वाढते आहे. पारंपरिक शेतीत उत्पादनासाठी रासायनिक खते, कीटकनाशके व पाण्याचा अतिवापर केला जातो, जो पर्यावरणाला मारक ठरतो. याउलट, शाश्वत शेतीत सेंद्रिय घटक, पीक फेरपालट, मिश्रपिके व स्थानिक बियाण्यांचा वापर केल्यामुळे अन्नधान्याचे उत्पादन कमी न करता त्याची गुणवत्ता राखली जाते. यामुळे आरोग्यदायी आणि पर्यावरणस्नेही अन्नसुरक्षा सुनिश्चित होते.

२. पर्यावरणाचे संरक्षण

माती, पाणी, हवा आणि जैवविविधता हे शेतीचे मूलभूत घटक आहेत. शाश्वत शेती ही या घटकांचा संतुलित व संवर्धनात्मक वापर करते. उदा. मृदासंवर्धन, सेंद्रिय खतांचा वापर, जलसंवर्धन तंत्र, आंतरपिके, आणि नैसर्गिक कीड नियंत्रणामुळे पर्यावरणावर ताण न पडता उत्पादन होते. त्यामुळे हवामान बदलाशी लढा देण्यास शाश्वत शेती महत्त्वाची भूमिका निभावते.

३. ग्रामीण अर्थव्यवस्था आणि शेतकरी सशक्तीकरण

भारतासारख्या कृषिप्रधान देशात शेती ही ग्रामीण अर्थव्यवस्थेचा कणा आहे. परंतु वाढते उत्पादन खर्च, कर्जबाजारीपणा आणि बाजारपेठेतील अस्थिरता यामुळे शेतकरी संकटात सापडलेला आहे. शाश्वत शेतीमुळे:

- उत्पादन खर्च कमी होतो (रासायनिक घटकांची आवश्यकता राहत नाही)
- बाजारात जैविक उत्पादनांना जास्त किंमत मिळते
- स्थानिक संसाधनांचा वापर वाढतो

यामुळे शेतकऱ्यांना आर्थिकदृष्ट्या अधिक सक्षम व स्वयंपूर्ण होण्यास मदत होते.

४. आरोग्यदायी अन्न उत्पादन

आजच्या काळात अनेक आजारांचा संबंध अन्नाच्या गुणवत्तेशी जोडला जातो. रासायनिक खते व कीटकनाशकांचे अंश अन्नात मिसळल्यामुळे कर्करोग, त्वचेचे विकार, संप्रेरक बिघाड यासारख्या समस्या वाढल्या आहेत. शाश्वत शेतीत उत्पादन

नैसर्गिक व सेंद्रिय पद्धतीने होत असल्याने हे अन्न अधिक सुरक्षित, चविष्ट आणि आरोग्यसंपन्न ठरते. त्यामुळे ग्राहकाच्या आरोग्याचे रक्षण देखील या शेतीतून शक्य होते.

५. हवामान बदलास अनुकूल धोरण

हवामान बदलाच्या पार्श्वभूमीवर अन्न उत्पादनात येणारी अस्थिरता ही मोठी समस्या आहे. पाऊस वेळेवर न होणे, दुष्काळ, पूर यांसारख्या नैसर्गिक संकटांमध्ये शाश्वत शेती टिकून राहू शकते. कारण ती बहुपिक, स्थानिक पद्धती व नैसर्गिक उपायांवर आधारित असते. त्यामुळे ही शेती लवचिकता (Resilience) प्रदान करते.

६. शाश्वत विकासाचे उद्दिष्ट साध्य करणारी पद्धत

संयुक्त राष्ट्रांनी निर्धारित केलेली SDG (Sustainable Development Goals) साध्य करण्यासाठी शाश्वत शेती एक प्रभावी माध्यम आहे. यात:

- उपासमार निर्मूलन (Zero Hunger)
- पर्यावरण संरक्षण (Climate Action)
- जैवविविधतेचे संवर्धन (Life on Land)
- शाश्वत अर्थव्यवस्था (Decent Work & Economic Growth)

यासारखी उद्दिष्टे साध्य होतात.

निष्कर्ष

भारतासारख्या कृषिप्रधान देशात शेती ही केवळ उत्पादनाचे साधन नसून ती सामाजिक, पर्यावरणीय आणि राजकीय घडामोडींचा केंद्रबिंदू ठरते. हरित क्रांतीने अन्नसुरक्षेचा प्रश्न सुटवून देशाला आत्मनिर्भर बनवले असले, तरी तिच्या पर्यावरणीय, आर्थिक आणि सामाजिक परिणामांचा विचार केल्यास ती क्रांती एक मर्यादित उपाय असल्याचे स्पष्ट होते. मातीचा ऱ्हास, भूजलाची पातळी घटणे, जैवविविधतेचा नाश आणि शेतकऱ्यांचे वाढते आर्थिक संकट ही त्याची गंभीर परिणती ठरली आहे. या पार्श्वभूमीवर, जैविक आणि शाश्वत शेती ही काळाची गरज बनली आहे. जैविक शेती ही केवळ पर्यावरणसुद्धे नव्हे, तर आरोग्यदायी, खर्चिकदृष्ट्या फायदेशीर आणि नैतिकदृष्ट्या स्वीकारार्ह आहे. आधुनिक काळात हवामान बदल, अन्न सुरक्षेचा प्रश्न, ग्रामीण बेरोजगारी आणि आरोग्याशी संबंधित संकटांच्या पार्श्वभूमीवर शाश्वत शेती ही सर्वसमावेशक उत्तर आहे.

या प्रक्रियेला यशस्वी करण्यासाठी केवळ शेतकऱ्यांनी नव्हे, तर शासन, धोरणकर्ते, शास्त्रज्ञ, नागरी समाज आणि ग्राहकांनीही पुढाकार घेणे आवश्यक आहे. पारंपरिक ज्ञान आणि आधुनिक तंत्रज्ञानाचा संगम करून, शेतीच्या नव्या दिशा ठरवाव्या लागतील. शेवटी, शेतीचे भवितव्य हे केवळ अन्न उत्पादनात नसून पर्यावरण व समाजाच्या टिकाऊतेत आहे, हे आपण विसरता कामा नये.

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राष्ट्रसंतांचे समाज परिवर्तन आणि अर्थ चिंतन.

डॉ. प्रशांत सूर्यवंशी

पुरुषोत्तम थोटे समाजकार्य महाविद्यालय नागपूर.

महाराष्ट्राला संतांची भूमी म्हटल्या जाते. या मराठी मातीने आजपर्यंत अनेक संतांना उपजविले आहे. त्यांच्या विचारांची चांदणे या मातीवर अंथरलेले आहेत. येथील साहित्य ही संत, तंत आणि पंथ या कुशीतच वाढलेले आहे. तेराव्या शतकनंतर वारकरी पंथ उदयास आला. या पंथातील संतांनी समाज सेवेची पायाभरणी केली त्यांचाच वारसा घेऊन पुढे राष्ट्रसंत तुकडोजी महाराज यांच्या समाज परिवर्तनाने महाराष्ट्रातील त्यातल्या त्यात विदर्भातील जनता सद्गतीत झाली. त्यांचे प्रबोधन कार्य लेखन, भजन, व्याख्यान इ. च्या माध्यमाद्वारे समाजापर्यंत पोहोचले. आपल्या खंजीरीच्या जोरावर त्यांनी अख्खा समाज सुधारून टाकला. वारकरी पंथातून पुढे आलेल्या भजनाचा त्यांच्या आयुष्यावरही थोडाफार परिणाम होताच. त्यांच्यातून त्यांनी स्वतःला समाजप्रबोधनात वाहून घेतले होते. यावर ते स्वतःच म्हणतात. “मानवी बुद्धीप्रमाणे माझ्याकडून समाजाची व सत्वाची सेवा घडावी. लोकांना आपल्या सत्य धर्माची जाणीव होऊन सध्याच्या समाजाची सांप्रदायिकतेतून होईल तेवढी सुटका करण्याचा आजीवन प्रयत्न करावा. दैवी शक्तीच्या व भौतिकतेच्या मार्गाने का होईना पण समाजात मनुष्य मनुष्याचा मित्र होऊन कसा राहिल. हेच साध्य करण्याचा प्रयत्न करणारा मी एक सेवक आहे.” राष्ट्रसंतांनी आपल्या तत्वज्ञानातून व्यक्तीच्या जन्मपूर्व अवस्थेपासून मृत्यूपर्यंतच्या जीवन प्रवासाबाबत सखोल चिंतन केले आहे. सर्व स्थितीत निर्माण होणाऱ्या समस्यांवर मार्गदर्शन व उपाय सूचविले आहेत. माणूस तयार करण्याचे सूत्र त्यांच्या उद्बोधनातून मिळते. तसेच त्यांच्या उद्बोधनातून बंधूभाव, लोकशाही, राष्ट्रप्रेम, ग्रामोन्नती या सर्वच बाबी दिसून येतात. ते ‘देवदर्शन’च्या पहिल्या अध्यायात म्हणतात,

“आकारे पृथ्वी असो विशाल।

नद्या पर्वतांनी महाप्रबल।

परी आमुचे गावचि मुलघटक ।

विशाल पृथ्वीचा ॥

गावचि जरी उत्तम नसले।

तरि देशाचे भवितव्य ढासळले ।

ऐसे मानावे जाणत्याने भले । हृदयामाजी॥”

राष्ट्राबद्दल आणि समाजशिक्षणाबद्दल राष्ट्रसंतांचे विचार उदात्त होते. महात्मा गांधींच्या विचारावर प्रभावित होऊन राष्ट्रसंत म्हणतात ‘मला असा विश्वास आहे की जनता समाज शिक्षणासाठी उमेदीने तयार होऊन,’ भारताचा राज्यकारभार भारतीय किसान-मजुरानेच चालविला पाहिजे’ ही राष्ट्रपिता महात्मजींची इच्छा पूर्ण करून दाखविल आणि तेव्हांच समाजशिक्षणाचे कार्य सफल कार्य झाले असे म्हणता येईल.

या देशाच्या शिक्षणाचाच त्यांनी विचार केला नाही तर राष्ट्रप्रेमाचा वारंवार उल्लेख त्यांच्या भजनातून येतो. प्रत्येक भजनाच्या आधी ते जनतेच्या तोंडून देशाचा जयघोष उद्बोधून घेत. त्यांना या देशात समतेची भावना, बंधू भावाची भावना या देशात रुजावी अशी त्यांची इच्छा होती म्हणूनच की काय त्यांना राष्ट्रसंतांची पदवी बहाल झाली. महाराज हे खरे राष्ट्रसंत होते. आपली भारत माता हीच खरी दैवत असे ते मानत. त्यांच्या प्रत्येक भजनात राष्ट्रप्रेम दिसून येते. ते म्हणतात-

“एकोनिशे बेचाळीस साली

स्वराज्य बोली बोलली

तरुणास द्याया वीरता

राष्ट्रीय भजने योजिले ॥"

१९४२ चा सत्याग्रह सर्वांच्या ध्यानात राहतो. स्वातंत्र्य पूर्व त्यांच्या रचना म्हणजे जनसामान्यांना स्फुरण चढविणारी आणि भारत भूला पारतंत्र्याच्या शृंखलेतून मुक्त करण्याची ती शपथ होती. त्यावेळी भारताची वीदारकता जाणवत होती, लोकांचे मनोबल खचले होते. त्यांच्यात आवेश भरणे, प्रतिकाराची जाणीव निर्माण करणे, १९४७ सालची प्रभात देशवाशीयांच्या कायमची लक्षात राहिल यात संदेह नाही. स्वातंत्र्यानंतर निर्माण झालेली भ्रष्टाचारी वृत्ती, स्वार्थी प्रलोभन, सत्ता पिपासूपणा बुवाबाजी, अन्याय, अनिती या विरुद्ध राष्ट्रसंतांनी वैचारिक शलाका हातात घेऊन समाज परिवर्तन घडविण्यासाठी अथक परिश्रम घेतले.

राष्ट्रसंतांची अर्थनीती :

आज समाजात जी गरीब-श्रीमतीची उलथापालथ झाली सरकारने घेतलेल्या नोटबंदीमुळे धनदांडग्यांचा हाहाकार उडाला या परिस्थितीची जाणीव त्या काळी महाराजांनाही होती म्हणून त्यांनी त्यावेळेस यावर भाष्य केलेले आहे. त्यांनी खेळाचे समर्पक उदा. देऊन गरीब - श्रीमंत ही दरी त्यांनी स्पष्ट केलेली आहे. ते म्हणतात-

“एकाकडे आले अधीक कंचे।
तो म्हणे माझ्याचि मालकीचे।
मग खेळणेही थांबले इतरांचे ।
एकाचिया लोभामुळे ।।
ऐसेचि झाले अर्थव्यवस्थेचे ।
हिस्सेदार सर्वचि धनाचे।
पण काहीच राहिले मानाचे ।
बाकी मेले भूकेने ॥

दोघांचा खेळ व्हावा म्हणून कंचे निर्माण केलेले असतात पण एकाने ते सर्व जिंकले की घरी घेऊन जातो आणि खेळ थांबतो अर्थ- व्यवस्थाही अशीच आहे म्हणून त्याचा कोणी अती संचय करुन ठेऊ नका, नाहीतर हा अर्थव्यवस्थेचा गाडा ही थांबून जाईन असा सल्ला राष्ट्रसंत देतात.

ज्या प्रमाणे गरिब श्रीमंत त्याच प्रमाणे गावगाडा चालण्यासाठी वर्णव्यवस्था निर्माण केलेली असावी पण काहींनी आपल्या जातीसाठी माती खाल्ली. आपलीच जात कशी श्रेष्ठ हे सांगण्याचा अट्टाहास सर्व धरु लागले आणि कोणिच काम करण्यास तयार होत नसे. शहरांकडे सर्व पळू लागले आणि या खोट्या नाट्या तोरा मिरवल्याने खेड्याची समाजाची वाताहात झाली. त्यासाठी ग्रामीण भागातील जातीचा अभिमान जबाबदार आहे असे त्यांना वाटत म्हणून राष्ट्रसंतांनी आपल्या ग्रामगितेतून आणि किर्तनांमधून जातीपाती पाळणाऱ्यावर, खोटा टेंभा मिरवणाऱ्यावर प्रहार केलेला दिसतो. पण असे प्रहारात्मक समाज परिवर्तन करतांना त्यांनी कुणाच्या भावनेला ठेच लागू दिली नाही हेही विशेष म्हणावे लागेल. जातीपाती पेश्वा देवदेवळांपेक्षा अंतरीची भक्ती आवश्यक आहे. प्रत्येकाने आपला देव विभागला आहे. तरी कर्मकांडे बाढली आहे. म्हणून राष्ट्रसंतांनी शेतकऱ्यांच्या मनगटात देव शोधला आहे. म्हणूनकी काय त्यांनी सांगितले की सोन्याच्या देवघरांमध्ये देव राहत नाही. सर्व देवळांवर ट्रॅक्टर फिरवावा असेही ते ग्रामगीतेत म्हणतात,

“यावरि एकाने केला प्रश्न ।
देवस्थानाचे मूळ तत्व कोण ?
ही मंदिरेचि भिन्न भिन्न ।
झाली काल पंथापेक्षा ॥
यांच्या बरोनि फिरवावा ट्रॅक्टर।

म्हणजे सर्वचि होतील एकाकार ।
काय मंदिरावाचूनि पडेल अंतर ।
भक्तीत काही ? याचे एका समाधान।

ऐक्य न साधे भावना दुखवून त्यासाठी मंदिराचे तत्वज्ञान। उजळणे हेचि उचित ॥

थोडक्यात असे म्हणावे लागेल की राष्ट्रसंतांची सामाजिक परिवर्तनावर निस्सिम निष्ठा होती. ही दृढ निष्ठा नव्या समाजाची पुर्नरचना करण्याच्या जाणिवेने अंतर्बाह्य भारलेली होती. म्हणून ग्रामगीता या क्रांतीकारी ग्रंथातून सामाजिक परिवर्तनाची भाषा जोमदारपणे, नियमितपणे व्यक्त झालेली आहे. सामाजिक परिवर्तनातून हिंसक समाजक्रांती न करता अहिंसक, बौद्धिक समाजक्रांतीचा आग्रह त्यांनी धरला आहे. राष्ट्रसंतांचे हे वैचारिक समाज परिवर्तन त्या काळी चालू होते तेव्हा नकळतच त्यांचे लाखो अनुयायी झाले होते. राष्ट्रसंतांचा ही नावलौकीक झाला. मोठे-मोठे सांसद त्यांच्या भेटीला येत असत. समाज परिवर्तनाच्या दिशेने वाटचाल करणारे राष्ट्रसंत काही दिवसातच लोकांच्या गळ्यातील तारित बनले होते. आणि आजही त्यांचा हा वसा त्यांचे खरे अनुयायी चालवत आहेत. त्यांच्या ग्रंथाच्या माध्यमातून त्यांच्या सर्व साहित्याच्या माध्यमातून त्यांचा समाजपरिवर्तनाचा वसा आजही चालूच आहे असे म्हणणे वावगे ठरणार नाही.

संदर्भ -

- १) ग्रामगीता - राष्ट्रसंत तुकडोजी महाराज
- २) मेरी जीवन यात्रा - राष्ट्रसंत तुकडोजी महाराज
- ३) राष्ट्रसंतांचे जीवनदर्शन - सुदाम सावरकर
- ४) श्रीगुरुदेव मासिक पत्रिका - गुरुकुंज आश्रम, श्रीगुरुदेव प्रकाशन

स्वातंत्र्योत्तर भारतातील पर्यावरण विषयक चळवळी : एक ऐतिहासिक अभ्यास

डॉ. शिवाजी ज्ञानोबा मुळे

इतिहास विभाग प्रमुख

पंडित दीनदयाल महाविद्यालय, देवणी, जि. लातूर

प्रस्तावना

भारत हा प्राचीन काळापासूनच निसर्गाभिमुख जीवनशैलीचा पुरस्कार करणारा देश मानला जातो. येथे नद्या, पर्वत, वृक्ष, वारे, सूर्य, चंद्र यांचे केवळ उपयोगच नव्हे, तर त्यांचे पूजनही केले जाते. भारतीय संस्कृतीमध्ये "वसुधैव कुटुंबकम्" आणि "पृथ्वी ही माता आहे" अशी भावनात्मक नाळ जोडलेली आहे. अशा या संस्कृतीत पर्यावरण हा जीवनाचा एक अविभाज्य भाग मानला जातो. मात्र स्वातंत्र्यानंतर देशात औद्योगिकरण, शहरीकरण आणि विकासाच्या नावाखाली निसर्गाचा समतोल बिघडू लागला. नद्या दूषित झाल्या, जंगलांची तोड झाली, मोठमोठ्या धरणांनी संपूर्ण खेडी विस्थापित झाली, वायू आणि ध्वनी प्रदूषणाने शहरांमध्ये आरोग्य धोक्यात आले.

स्वातंत्र्योत्तर काळात भारताने 'विकास' हा मुख्य ध्येय ठेवून विविध योजना, मोठे प्रकल्प राबवले. या योजनांमुळे आर्थिक प्रगती झाली, पण त्याचे पर्यावरणीय परिणाम गंभीर स्वरूपाचे होते. विशेषतः खाणकाम, औद्योगिक कारखाने, मोठे धरण प्रकल्प, जंगलतोड व नद्यांचे वळण बदलणे यामुळे अनेक नैसर्गिक परिसंस्था धोक्यात आल्या. यामुळे स्थानिक नागरिकांचे जीवनमान ढासळले, विशेषतः आदिवासी, शेतकरी, मच्छीमार व ग्रामीण भागातील लोकसंख्या यांच्यावर त्याचा थेट परिणाम झाला. परिणामी, त्यांनी आपला हक्क, पर्यावरणाचे संरक्षण आणि सामाजिक न्याय मिळवण्यासाठी विविध चळवळी सुरू केल्या.

या चळवळी स्थानिक स्वरूपाच्या होत्या, पण त्यांचे परिणाम व्यापक आणि दूरगामी ठरले. 'चिपको आंदोलन' हे या क्षेत्रातील पहिले प्रभावी जनआंदोलन ठरले. यानंतर 'नर्मदा बचाव आंदोलन', 'तेहरी धरण विरोध आंदोलन', 'अपिको चळवळ', 'प्लाचीमाडा कोका कोला विरोधी आंदोलन' अशा अनेक लक्षणीय चळवळी घडून आल्या. या चळवळींनी केवळ पर्यावरणाच्या रक्षणासाठी संघर्ष केला नाही, तर पर्यावरणाशी असलेले मानवी संबंध, स्त्रियांची भूमिका, स्थानिक अर्थव्यवस्था आणि संस्कृती यांची जाणीव समाजास दिली.

या संशोधन लेखात स्वातंत्र्योत्तर भारतातील पर्यावरण विषयक चळवळींचा सखोल ऐतिहासिक अभ्यास करण्यात येणार आहे. या चळवळींच्या मूळ कारणांचा, स्वरूपाचा, कार्यपद्धतीचा, परिणामांचा आणि त्यांच्यामुळे घडून आलेल्या धोरणात्मक बदलांचा अभ्यास करून आपण पर्यावरण रक्षणासाठी समाजातील विविध घटकांचे योगदान समजू शकतो. हे अभ्यास केवळ ऐतिहासिक मूल्य असलेले नसून, आजच्या हवामान बदलाच्या पार्श्वभूमीवरही अत्यंत महत्वाचे आणि प्रेरणादायी ठरतात. म्हणूनच या चळवळींना केवळ भूतकाळातील घटना म्हणून न पाहता, भावी धोरणांसाठी आदर्श म्हणून स्वीकारणे गरजेचे आहे.

पर्यावरणीय चळवळींची ऐतिहासिक पार्श्वभूमी

भारताची पर्यावरणीय चळवळींची परंपरा ही प्राचीन काळापासून चालत आलेली आहे. भारतीय संस्कृतीत निसर्गाचे पूजन हा एक धार्मिक व सामाजिक घटक आहे. *वृक्षवल्ली आम्हा सोयरे वनचरे* असे संत तुकारामांनी म्हटलेले आहे, तर *पृथ्वी ही माता आहे* अशी भावना *अथर्ववेदात* आढळते. पूर्वीच्या काळी निसर्ग व मानव यांच्यात समतोल नाते होते. जंगल, नदी, पर्वत, प्राणी हे केवळ संसाधन म्हणून नव्हे तर पूजनीय मानले जात होते. परंतु औपनिवेशिक काळात विशेषतः ब्रिटिश सत्तेच्या प्रभावाखाली, जंगलतोड, खाणकाम, आणि रेल्वे बांधणीसाठी मोठ्या प्रमाणावर निसर्गाचा विनाश झाला.

ब्रिटिशांनी शोषणात्मक धोरण राबवत स्थानिक समुदायांना त्यांच्या पारंपरिक वनसंपत्तीपासून वंचित केले. उदाहरणार्थ, मध्य भारतातील आदिवासी समाज व वनवासी हे पूर्वी जंगलावर अवलंबून होते, मात्र वन कायद्यांमुळे त्यांना त्याच जंगलात जाण्यासही बंदी घालण्यात आली. हे संकट स्वातंत्र्यानंतरही सुटले नाही. भारताने स्वातंत्र्यानंतर विकासाची नवी दिशा स्वीकारली ज्यात औद्योगिकीकरण, मोठे धरण प्रकल्प, आणि हरित क्रांतीसारख्या उपक्रमांचा समावेश होता. या

विकासनीतींमुळे देशाची अर्थव्यवस्था वाढली, पण त्याचा पर्यावरणावर मोठा परिणाम झाला. विशेषतः मोठ्या धरणांमुळे लाखो लोकांचे विस्थापन झाले, जंगलतोडीमुळे जैवविविधतेचा ऱ्हास झाला, आणि जलस्रोत दूषित होऊ लागले. हीच स्थिती १९६०-७० च्या दशकात अधिक तीव्र झाली आणि परिणामी लोकांमध्ये असंतोष निर्माण झाला. या असंतोषातूनच भारतात पर्यावरणीय चळवळींना सुरुवात झाली. या चळवळी केवळ पर्यावरण रक्षणासाठी नव्हे तर सामाजिक न्यायासाठीदेखील होत्या. स्थानिक समाज, विशेषतः आदिवासी, शेतकरी, महिला आणि विद्यार्थी वर्ग यांनी यामध्ये सक्रिय सहभाग घेतला. त्यांनी आपल्या हक्कांसाठी संघर्ष केला आणि पर्यावरण संवर्धनाच्या दिशेने ठोस पावले उचलली.

या पार्श्वभूमीवर 'चिपको आंदोलन' हे पहिले प्रभावी लोकचळवळीपैकी एक ठरले. त्यानंतर 'नर्मदा बचाव आंदोलन', 'तेहरी धरण विरोध चळवळ', 'अपिको आंदोलन' आदी चळवळींनी पर्यावरणीय जनजागृती आणि धोरणात्मक बदल घडवून आणले. त्यामुळे पर्यावरणीय चळवळींची ही पार्श्वभूमी भारतातील पर्यावरण संवर्धनाच्या ऐतिहासिक वाटचालीचा मूलगामी पाया आहे.

महत्त्वाच्या पर्यावरणीय चळवळींचा अभ्यास

स्वातंत्र्यानंतरच्या काळात भारताने औद्योगिक विकासाचा मार्ग स्वीकारला. धरणे, कारखाने, महामार्ग, खाणकाम, वनीकरण इत्यादी योजनांमुळे विकासास चालना मिळाली; पण दुसरीकडे यामुळे पर्यावरणाचा समतोल बिघडला. नद्या प्रदूषित झाल्या, जंगलतोड झाली, जैवविविधतेचा ऱ्हास झाला आणि लाखो लोकांचे विस्थापन झाले. या समस्यांचा प्रत्यक्ष फटका बसलेल्या स्थानिक समुदायांनी पर्यावरण रक्षणासाठी आवाज उठवला आणि त्यातून विविध चळवळी जन्माला आल्या. या चळवळींनी केवळ स्थानिक पातळीवरच नव्हे तर राष्ट्रीय आणि जागतिक स्तरावरही प्रभाव टाकला. खाली काही महत्त्वाच्या पर्यावरणीय चळवळींचा सखोल अभ्यास करण्यात येत आहे.

1. चिपको आंदोलनाचा (१९७३)

हे आंदोलन उत्तराखंडमध्ये सुरू झाले. या आंदोलनाचे नेतृत्व सुंदरलाल बहुगुणा, चंडीप्रसाद भट्ट आणि गौरा देवी यांनी केले. जंगलतोडीमुळे हिमालयीन भागात भूस्खलन, पूर, आणि पाणीटंचाई यासारख्या समस्या वाढत होत्या. यावर उपाय म्हणून गावातील महिलांनी झाडांना मिठी मारून झाडतोड रोखली. 'चिपको' या शब्दाचा अर्थच आहे झाडाला बिलगून त्याचे रक्षण करणे. हे आंदोलन स्त्री सहभागाचे प्रतीक ठरले. यामुळे सरकारने काही भागात जंगलतोडीवर बंदी घातली. हे आंदोलन केवळ भारतातच नव्हे, तर आंतरराष्ट्रीय पातळीवर पर्यावरण रक्षणासाठीचा आदर्श म्हणून मानले जाते.

2 नर्मदा बचाव आंदोलन (१९८५)

हे आंदोलन मध्यप्रदेश, महाराष्ट्र आणि गुजरात राज्यांत सुरू झाले. सरदार सरोवर धरणामुळे लाखो लोकांचे विस्थापन होणार होते आणि हजारो हेक्टर जंगल पाण्याखाली जाणार होते. या विरोधात मेधा पाटकर आणि बाबा आमटे यांच्या नेतृत्वाखाली हे आंदोलन उभे राहिले. आंदोलनाच्या मुख्य मागण्या होत्या – प्रकल्पग्रस्तांचे पुनर्वसन, पर्यावरणीय परिणामांचे मूल्यांकन, आणि धरणाचे पर्यायी पर्यावरणपूरक पर्याय. हे आंदोलन सरकारला प्रकल्पाचे सामाजिक आणि पर्यावरणीय परिणाम पुन्हा विचारात घ्यायला भाग पाडणारे ठरले.

3 अपिको चळवळ (१९८७)

कर्नाटकमधील पश्चिम घाटात उभी राहिलेली आणखी एक महत्त्वाची चळवळ होती. ही चळवळ चिपको आंदोलनाने प्रेरित होती. स्थानिक आदिवासी आणि शेतकरी वर्गाने जंगलतोडीला विरोध केला आणि झाडांना मिठी मारून संरक्षण दिले. पश्चिम घाट हा जैवविविधतेने समृद्ध भाग असल्याने या भागातील जंगलांचे रक्षण अत्यावश्यक होते. अपिको चळवळीतून स्थानिक लोकांचा पर्यावरणीय प्रश्नांतील सहभाग वाढला आणि त्यांनी आपल्या परिसराच्या नैसर्गिक संसाधनांचे रक्षण स्वतः करण्याचा निर्धार केला.

4 तेहरी धरण विरोध चळवळ

उत्तराखंडमध्ये उभी राहिली तेहरी भागात भूकंपप्रवण क्षेत्रात मोठ्या धरणाचे बांधकाम सुरू झाले होते. या धरणामुळे अनेक गावं पाण्याखाली जाणार होती आणि सांस्कृतिक व ऐतिहासिक वारसा नष्ट होण्याची भीती होती. या विरोधात सुंदरलाल बहुगुणा यांनी नेतृत्व केले. हे आंदोलन दीर्घकाळ चालले. धरणाच्या जागेचा पर्यावरणीय पुनर्विचार, विस्थापितांचे पुनर्वसन आणि भूकंपसुरक्षिततेची हमी या मुद्द्यांवर आंदोलकांनी जोर दिला. अंतिमतः सरकारने काही अटींसह प्रकल्प पूर्ण केला, परंतु यामुळे मोठी पर्यावरणीय जागरूकता निर्माण झाली.

5 प्लाचीमाडा कोका कोला विरोधी आंदोलन (२०००)

केरळ राज्यात घडलेली एक लक्षणीय घटना होती. या भागात कोका कोला कंपनीने पाण्याचा मोठ्या प्रमाणावर उपसा सुरू केला, ज्यामुळे भूगर्भजल पातळी खालावली आणि पाणी दूषित झाले. याचा थेट फटका स्थानिक शेतकरी, महिला आणि ग्रामस्थांना बसला. त्यांनी कंपनीविरोधात तीव्र आंदोलन छेडले. या आंदोलनाचे वैशिष्ट्य म्हणजे ग्रामीण महिलांचा मोठा सहभाग. दीर्घ लढ्यानंतर स्थानिक लोकांनी कंपनीच्या परवाना रद्द करण्यास सरकारला भाग पाडले.

या चळवळींमधून एक गोष्ट प्रकर्षाने जाणवते – पर्यावरण रक्षण ही केवळ कायद्याची जबाबदारी नाही, तर ती लोकांचीही सामूहिक जबाबदारी आहे. या चळवळींनी लोकसहभागाचे महत्त्व, स्थानिक ज्ञानाचे महत्त्व, स्त्रियांची निर्णायक भूमिका आणि पर्यावरणीय न्यायाचा मुद्दा देशभर पोचवला. आज हवामान बदल, पाणीटंचाई, जंगलतोड आणि जैवविविधतेचा ऱ्हास या समस्या समोर असताना या ऐतिहासिक चळवळी आपल्याला प्रेरणा देतात आणि भविष्यातील पर्यावरण संरक्षणाच्या वाटेवर दिशादर्शक ठरतात.

भारत सरकारचे पर्यावरण विषयक धोरण व कायदे

स्वातंत्र्योत्तर भारतात औद्योगिकीकरण, नागरीकरण, लोकसंख्येचा विस्फोट आणि तंत्रज्ञानाचा वाढता वापर यामुळे देशाच्या आर्थिक विकासाला वेग मिळाला, परंतु या प्रक्रियेत पर्यावरणाकडे दुर्लक्ष झाले. त्यामुळे वायू प्रदूषण, जलप्रदूषण, जंगलतोड, जैवविविधतेचा ऱ्हास, मातीची धूप, हवामान बदल, भूजलाच्या पातळीत घट, नद्यांचे मृत्यू अशा अनेक समस्या गंभीर स्वरूप धारण करू लागल्या. या पार्श्वभूमीवर भारत सरकारने पर्यावरण रक्षणासाठी विविध कायदे, धोरणे, यंत्रणा आणि जनजागृती मोहिमा राबवल्या. यांचा उद्देश म्हणजे पर्यावरणाचा समतोल राखणे, निसर्गाचे संरक्षण करणे आणि शाश्वत विकास सुनिश्चित करणे.

भारताच्या राज्यघटनेत ४२ व्या घटनादुरुस्तीद्वारे पर्यावरण रक्षणाची जबाबदारी स्पष्टपणे अधोरेखित करण्यात आली. १९७६ साली या दुरुस्तीतून दोन महत्वाची तरतुदी घालण्यात आल्या. पहिली म्हणजे कलम ४८-अ, ज्यात राज्य सरकारने पर्यावरणाचे, वने आणि वन्यजीवांचे संरक्षण करावे असे म्हटले आहे. दुसरी म्हणजे कलम ५१-अ (g), ज्यामध्ये प्रत्येक नागरिकाचे कर्तव्य आहे की तो नैसर्गिक पर्यावरणाचे संरक्षण करेल, जसे की जंगल, सरोवर, नद्या आणि वन्यजीव. या घटनात्मक तरतुदींमुळे पर्यावरण रक्षण हे केवळ शासनाचे नव्हे तर प्रत्येक नागरिकाचे कर्तव्य ठरले.

भारत सरकारने अनेक प्रभावी पर्यावरणीय कायदे अंमलात आणले आहेत. त्यातील एक महत्वाचा कायदा म्हणजे **वन्यजीव संरक्षण कायदा, 1972**. या कायद्यांतर्गत अनेक राष्ट्रीय उद्याने (National Parks), अभयारण्ये (Wildlife Sanctuaries) स्थापन करण्यात आली आहेत. बाघ प्रकल्प (Project Tiger) आणि हत्ती प्रकल्प (Project Elephant) यांसारख्या विशेष उपक्रमांची सुरुवात याच कायद्याच्या आधारे झाली. यामुळे अनेक संकटग्रस्त प्रजातींचे संरक्षण शक्य झाले.

दुसरा महत्वाचा कायदा म्हणजे **जल प्रदूषण नियंत्रण कायदा, 1974**. या कायद्याचा उद्देश म्हणजे जलस्रोतांचे रक्षण करणे आणि औद्योगिक व मलप्रवाहित पाण्याचे नियंत्रण करणे. या अंतर्गत राज्य व केंद्रीय पातळीवर प्रदूषण नियंत्रण मंडळे (Pollution Control Boards) स्थापन करण्यात आली. त्यानंतर **वायू प्रदूषण नियंत्रण कायदा, 1981** लागू करण्यात आला, ज्याद्वारे वायुप्रदूषण नियंत्रित करण्यासाठी मानके ठरवण्यात आली आणि कारखान्यांना शुद्धीकरण संयंत्रे (Pollution Control Equipment) बसवणे बंधनकारक करण्यात आले.

भारत सरकारने १९८४ च्या भोपाळ वायू दुर्घटनेनंतर **पर्यावरण संरक्षण कायदा, 1986** लागू केला. हा कायदा पर्यावरण रक्षणासाठी "अंत्रेला कायदा" मानला जातो, कारण यामध्ये जल, वायू, माती, ध्वनी आणि जैवविविधतेच्या सर्व बाबींना कव्हर करणारी व्यापक तरतूद आहे. या कायद्यानुसार सरकारला पर्यावरणविषयक नियम बनवण्याचा विशेष अधिकार आहे. याच अंतर्गत "EIA" (Environmental Impact Assessment) म्हणजे पर्यावरणीय प्रभाव मूल्यांकन प्रक्रिया सुरू करण्यात आली, ज्या अंतर्गत कोणताही नवीन प्रकल्प सुरू करण्याआधी त्याचा पर्यावरणावर होणारा परिणाम तपासला जातो.

१९९५ मध्ये **राष्ट्रीय पर्यावरण अपील प्राधिकरण** आणि नंतर **राष्ट्रीय हरित लवाद (National Green Tribunal - NGT)** ची स्थापना झाली. NGT हे पर्यावरणीय न्यायदानासाठी विशेष न्यायालय असून, पर्यावरणाशी संबंधित प्रकरणांमध्ये जलद निर्णय देण्याचा अधिकार त्याला आहे. हे लवाद औद्योगिक प्रदूषण, जंगलतोड, जलप्रदूषण, प्लास्टिक बंदी, शहर नियोजन, इ. विषयांवर जनहित याचिकांवर निर्णय देतात.

याशिवाय भारताने जैवविविधता कायदा, 2002, प्लास्टिक कचरा नियम, 2016, इलेक्ट्रॉनिक कचरा व्यवस्थापन नियम, आणि घनकचरा व्यवस्थापन नियम, 2016 अशा आधुनिक काळातील समस्यांवर उपाय करणारे कायदे तयार केले. यातून पर्यावरणाच्या संवर्धनासोबतच संसाधनांचा पुनर्वापर आणि शाश्वत वापर यावर भर देण्यात आला आहे.

पर्यावरण संरक्षणाच्या क्षेत्रात धोरणात्मक पातळीवर भारताने "राष्ट्रीय पर्यावरण धोरण 2006", "राष्ट्रीय जलनीती", "राष्ट्रीय हवामान धोरण", आणि "राष्ट्रीय ऊर्जा धोरण" तयार केले. यामध्ये शाश्वत विकास, जैवविविधता संवर्धन, पर्यावरणीय शिक्षण, पारंपरिक ज्ञानाचा वापर, आणि नैसर्गिक संसाधनांचे योग्य व्यवस्थापन यावर भर आहे.

एकंदरीत, भारत सरकारचे पर्यावरण विषयक कायदे आणि धोरणे हे पर्यावरण रक्षणाच्या दिशेने महत्वाची पावले ठरली आहेत. मात्र, या कायद्यांची अंमलबजावणी, जनसहभाग, आणि पारदर्शकता यावर अधिक भर दिला गेल्यासच हे धोरण प्रभावी ठरू शकते. आजच्या हवामान बदलाच्या काळात हे कायदे आणि धोरणे अधिक बळकट करणे ही काळाची गरज आहे.

स्त्रियांचा पर्यावरण चळवळीत सहभाग

स्त्रिया आणि पर्यावरण यांचा संबंध केवळ जैविक किंवा सामाजिक नाही, तर तो जीवनशैलीशी निगडित आहे. ग्रामीण, आदिवासी आणि डोंगराळ भागातील स्त्रिया प्रत्यक्ष निसर्गावर अवलंबून असतात – जसे की पाण्याची भांडी भरताना, जळणासाठी लाकूड गोळा करताना किंवा शेतीसाठी खत व बियाणे तयार करताना. म्हणूनच जेव्हा निसर्गावर संकट येते, तेव्हा स्त्रियाच सर्वात आधी त्याचा फटका अनुभवतात आणि पर्यावरण रक्षणासाठी पुढाकारही घेतात.

भारतातील अनेक पर्यावरणीय चळवळीत स्त्रियांची भूमिका अत्यंत मोलाची ठरलेली आहे. उदाहरणार्थ, **चिपको आंदोलनात** महिलांचा सहभाग निर्णायक ठरला. उत्तराखंडमधील गावांतील महिलांनी जंगलतोड रोखण्यासाठी झाडांना मिठी मारून अहिंसात्मक प्रतिकार केला. या चळवळीच्या माध्यमातून गौरा देवीसारख्या ग्रामीण महिलांनी संपूर्ण देशात आणि आंतरराष्ट्रीय स्तरावर पर्यावरण संवर्धनाचे प्रतीक निर्माण केले.

नर्मदा बचाव आंदोलनात देखील मेधा पाटकर यांचे नेतृत्व अत्यंत प्रभावी ठरले. विस्थापित स्त्रियांचे दुःख, त्यांचे जीवन आणि त्यांचा संघर्ष मेधाताईंनी राष्ट्रीय पटलावर आणला. त्यांनी धरणामुळे प्रभावित होणाऱ्या हजारो स्त्रियांचे प्रश्न राजकीय आणि सामाजिक वर्तुळात मांडले.

तसेच, **प्लाचीमाडा (केरळ) कोका कोला विरोधी चळवळीत** स्थानिक महिलांनी भूगर्भजलाच्या शोषणाविरोधात एकजुटीने आंदोलन उभं केलं. या चळवळीमुळे जागतिक कंपन्यांना देखील स्थानिक संसाधनांच्या शोषणाविरुद्धचा विरोध जाणवू लागला.

स्त्रियांचा पर्यावरण चळवळीत सहभाग केवळ प्रतिकारापुरता मर्यादित नाही, तर त्यांनी पर्यायी जीवनशैली, जैविक शेती, पाणलोट व्यवस्थापन, वृक्षारोपण, स्थानिक बियाणे संवर्धन अशा उपक्रमातही मोलाचे योगदान दिले आहे. अनेक स्वयंसेवी संस्थांमधून काम करणाऱ्या महिला पर्यावरण शिक्षण, स्वच्छता मोहिमा, हरित गाव योजना आणि कचरा व्यवस्थापन या क्षेत्रात सक्रीय आहेत. स्त्रियांनी पर्यावरण चळवळींमध्ये केवळ सहभाग घेतला नाही, तर नेतृत्वही केलं आहे. त्यांची संवेदनशीलता, संघर्षशक्ती आणि सहनशीलता पर्यावरण रक्षणासाठी अत्यंत प्रेरणादायी ठरली आहे. भविष्यातही स्त्रियांचा सहभाग हा पर्यावरणाच्या शाश्वत विकासाचा मूलाधार ठरेल, यात शंका नाही.

आधुनिक काळातील पर्यावरण चळवळी

२१ व्या शतकात जागतिक हवामान बदल, जैवविविधतेचा ऱ्हास, वायू व जलप्रदूषण, प्लास्टिकचा वाढता वापर, आणि अन्नसुरक्षेवरील धोके ही पर्यावरणासमोरील गंभीर आव्हाने ठरली आहेत. यामुळे आधुनिक काळात पर्यावरण रक्षणाच्या चळवळी नव्या स्वरूपात उदयास आल्या आहेत. या चळवळी केवळ सरकारविरोधात नारेबाजी करणे किंवा आंदोलन करण्यापुरत्या मर्यादित राहिलेल्या नाहीत, तर त्या शाश्वत विकास, तंत्रज्ञानाचा वापर, तरुणांचा सहभाग, आणि जागतिक सहकार्य अशा विविध पातळ्यांवर विकसित झालेल्या आहेत.

प्लास्टिक विरोधी मोहिमा ही आधुनिक काळातील महत्वाची चळवळ ठरली आहे. प्लास्टिकमुळे माती, जलस्रोत आणि समुद्रातील प्राण्यांचे प्रचंड नुकसान होत आहे. भारतात "प्लास्टिक बंदी" मोहिमांद्वारे अनेक राज्यांनी सिंगल युज प्लास्टिकवर बंदी घातली आहे. 'Say No to Plastic', 'Refuse the Straw' आणि 'Bring Your Own Bag' या चळवळी सोशल मीडियाच्या माध्यमातून मोठ्या प्रमाणात पसरल्या आहेत.

स्वच्छ भारत अभियान हा पर्यावरणीय दृष्टीने एक क्रांतिकारी उपक्रम ठरला. या अभियानातून केवळ स्वच्छता नव्हे, तर कचरा व्यवस्थापन, शौचालय बांधणी, आणि जनजागृती यावर भर देण्यात आला. शहरी आणि ग्रामीण भागातील नागरिकांनी या उपक्रमात मोठ्या प्रमाणावर भाग घेतला.

ग्रीन मूव्हमेंट, हरित ऊर्जा अभियान, सायकल टू वर्क, ट्री प्लांटेशन ड्राइव्हज, आणि शून्य कचरा उपक्रम (Zero Waste Initiatives) या सारख्या आधुनिक चळवळींमध्ये शहरी सुशिक्षित तरुणांचा सहभाग लक्षणीय आहे. काही ठिकाणी स्थानिक नागरिकांनी रस्त्याच्या साफसफाईपासून ते ओढ्यांचे पुनरुज्जीवन करण्यापर्यंत सक्रिय भूमिका घेतली आहे.

ग्रेटा थनबर्ग यासारख्या तरुण कार्यकर्त्यांच्या प्रेरणेतून 'Fridays for Future' आणि 'Climate Strike' सारख्या जागतिक चळवळी भारतातही रुजल्या आहेत. विद्यार्थी, पर्यावरण प्रेमी, NGOs आणि समाजमाध्यमांवर सक्रिय असलेली तरुण पिढी आज पर्यावरण विषयक समस्यांवर अधिक सजग आहे.

आधुनिक पर्यावरण चळवळी तंत्रज्ञान, शिक्षण, आणि जनसहभाग यांच्या आधारे कार्य करत असून त्या समाजमनात पर्यावरणाबद्दल नवे भान निर्माण करत आहेत. या चळवळी केवळ निसर्ग रक्षणासाठी नव्हे, तर भावी पिढ्यांसाठी सुरक्षित जग निर्माण करण्याचा प्रयत्न आहेत.

निष्कर्ष

स्वातंत्र्यानंतरच्या भारतात विकासाच्या नावाखाली निसर्गाचे शोषण मोठ्या प्रमाणात झाले. धरणे, कारखाने, रस्ते, खाणकाम आणि जंगलतोड यामुळे पर्यावरणीय संकट वाढत गेली. मात्र, या संकटांना तोंड देण्यासाठी विविध समाजघटकांनी, विशेषतः ग्रामीण व आदिवासी समाजाने, स्वबळावर पर्यावरण रक्षणाच्या चळवळी उभारल्या. चिपको, नर्मदा बचाव, अपिको, प्लाचीमाडा अशा चळवळींनी पर्यावरण रक्षणाबरोबरच सामाजिक न्यायाचा मुद्दाही पुढे आणला. या चळवळीत स्त्रियांचा सहभाग विशेष महत्वाचा राहिला असून त्यांनी नेतृत्व, सहभाग आणि पर्यायी विकासाचा संदेश दिला. भारत सरकारनेदेखील विविध कायदे व धोरणांच्या माध्यमातून पर्यावरण रक्षणासाठी प्रयत्न केले. वन्यजीव संरक्षण, प्रदूषण नियंत्रण, पर्यावरणीय प्रभाव मूल्यांकन, जैवविविधता कायदा, आणि राष्ट्रीय हरित लवाद यांसारख्या उपाययोजना राबवण्यात आल्या. तरीही अंमलबजावणीतील त्रुटी, जनजागृतीचा अभाव आणि शाश्वत विकासाबद्दलची अपुरी समज यामुळे अनेक प्रश्न आजही भेडसावत आहेत.

आधुनिक काळात तरुणाई, माध्यमे, शहरी संस्था, आणि शैक्षणिक क्षेत्रातून नवे पर्यावरण आंदोलन जन्म घेत आहेत. प्लास्टिक बंदी, स्वच्छ भारत, वृक्षलागवड, शाश्वत ऊर्जा, आणि हवामान बदलाविरुद्धच्या चळवळी या काळात अधिक जागरूक आणि माहितीपूर्ण होत आहेत. एकंदरीत, पर्यावरण चळवळी ही भारतातील लोकशाहीचा आणि सामाजिक जागृतीचा महत्वाचा भाग ठरल्या आहेत. या चळवळींनी केवळ संकटांविरुद्ध लढा दिला नाही, तर पर्यावरणाशी समरस होणारी, लोककेंद्रित, शाश्वत आणि सर्जनशील विकासदृष्टी देण्याचे काम केले आहे. भविष्यात पर्यावरण संवर्धन हे केवळ धोरणांचे नव्हे, तर प्रत्येक नागरिकांच्या जीवनशैलीचे अंग होणे आवश्यक आहे. हीच या चळवळींची खरी शिकवण आहे.

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मराठी कवितेतील सांस्कृतिक पर्यावरण

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प्रास्ताविक:

महाराष्ट्राला संपन्न असा सांस्कृतिक वारसा लाभलेला आहे. समकालीन मराठी कवितेने अनेक सांस्कृतिक घटकांचे चित्रण/पर्यावरण आपल्या कवितेतून केलेले दिसून येते. यामध्ये महाराष्ट्रातील संतांचे विचार, निसर्गातील देवतांचे पूजन, विविध सण-उत्सव, तीर्थक्षेत्रे, धार्मिक स्थळे, कृषी संस्कृती, शहरी संस्कृती आणि ग्रामीण संस्कृती यामधील तफावत तसेच यामध्ये होत असलेले परिवर्तन, विविध नद्या, पर्वत यांच्या परिसरात वसलेली लोक संस्कृती, पंढरपूर आणि पांडुरंग हे महाराष्ट्राचे सांस्कृतिक वैभव अशा अनेक विविध सांस्कृतिक बाबींचे चित्रण किंवा पर्यावरण दाखविण्याचे कामकाज मराठी कवितेने केलेले आहे. सदर शोधनिबंधामध्ये सांस्कृतिक पर्यावरणाचा विचार समोर ठेवून शोधनिबंध लिहिण्याचा प्रयत्न केलेला आहे. त्याचाच आपण यामध्ये आढावा घेणार आहोत.

भारतामध्ये साजरा केला जाणारा सर्वात प्रसिद्ध आणि महत्त्वाचा उत्सव म्हणजे दिवाळी होय. असे म्हटले जाते की दिवाळी रोषणाई, उल्हास, उत्सवाचा, प्रेमाने भरलेला मैत्रीचा आणि मानवतेने भरलेला उत्सव आहे. म्हणूनच कवी मनोहर टेकाडे आपल्या 'दीपावली संमेलन' या कवितेत म्हणतात,

“दीपावलीची खरेदी फार गर्दी हाटी
आनंदाने नाचतात मुले छोटी छोटी
रातराणी साहेबांना टिकल्यांची साडी
काळ्या पडद्यात त्यांना बसण्याची गोडी
निमित्ताने चांदण्यांच्या नभी भेटी गाठी
धरेवरी घोघरी उजळल्या ज्योती
अगतेने दिवाळीच्या आल्या सणासाठी
रोषणाईचीच दिसे स्वागताला दाटी
आभाळाच्या नील जली चंद्रिकेची होडी
सोडायस सज्ज उभा निसर्ग नावाडी
बीज दर्शनाने जन तिला हात जोडी
कुठे असो बंधू येतो भाऊबीज गाठी
आकाश दिव्यांची त्याशी आहे नाती गोती
दिवाळीला येती सारे संमेलनासाठी”^१

दिवाळीचा दिवस हा तोच दिवस मानला जातो, ज्या दिवशी भगवान श्रीराम हे रावणाचा वध करून माता सीतेसह अयोध्येमध्ये परतले होते. त्यांच्या स्वागतासाठी अयोध्या वासियांनी रोषणाई व दीपक लावून मोठ्या आनंदात तो दिवस साजरा केला होता. भारतातील वेगवेगळ्या धर्मांचे लोक आपल्या चालीरीतीप्रमाणे हा सण साजरा करतात. कवीने वरील कवितेतून दिवाळी सणाचे सांस्कृतिक पर्यावरण वर्णन केलेले आहे.

श्रावण महिन्यात येणारा पहिला सण म्हणजे नागपंचमी हा होय. या दिवशी सर्व स्त्रिया व मुली नागदेवतेची पूजा करून नागदेवतेला प्रसन्न करण्याचा प्रयत्न करताना दिसतात. म्हणून कवी प्रकाश किनगावकर आपल्या कवितेमध्ये म्हणतात,

“दर नागपंचमीला आम्ही वारुळात दूध - तूप वाहतो
चुकून शेपटीवर पाय पडला तर मृत्यू अटळ आहे
हे माहीत असूनही
साळूक्यांचा कल्कलाट ऐकू आला तरी
आम्ही तिचा शब्द पाळतो”^२

नागपंचमीच्या दिवशी वारुळात दूध टाकल्याने नागदेवतेची आपल्यावर कृपा राहते, असा लोकांचा समज असल्याने अनेक स्त्रिया व पुरुष वारुळामध्ये दूध टाकताना किंवा वाहतांना दिसून येतात. हे दूध तूप टाकत असताना जर चुकून नागाच्या शेपटीवर पाय पडला तर त्या दूध तूप टाकणाऱ्या व्यक्तीचा अंत निश्चित असतो. साळूक्यांचा कल्कलाट ऐकू आला की तेथे सापाचे अस्तित्व आहे. हा इशारा नायकाला कळाल्यावर ते तिचा शब्द पाळतात, असा महत्वपूर्ण आशय ही कविता व्यक्त करते.

हिंदू धर्मामध्ये अनेक देव देवतांच्या पूजा केल्या जातात. हिंदू संस्कृतीमध्ये इतर संस्कृतीपेक्षा अधिक देवता आढळून येतात. अनेक देव देवतांच्या कृपेने जणू आपण सुखी आहोत म्हणून या देवदेवतांचे स्मरण केले जाते. पूजा केली जाते. त्यांना शेंदूर फासला जातो. अशाच एका अनुभवाचे कथन करताना कवी वीरधवल परब आपल्या 'गिरोबा' या कवितेत म्हणतात,

“आई म्हणाली,
जाताना गिरोबाला नारळ ठेव
तो आपल्या शीम धड्याचा देव
कैक पिढ्यांचा रखवालदार
त्याच्याच मर्जीने तुझा हा शेर
खळखळ करू नकोस, जा, देवाला भेटून ये”^३

गिरोबा, मसोबा, बहिरोबा, ज्योतिबा असे अनेकविध देव देवतांच्या कृपेने आपल्याला सुख मिळत आहे. म्हणून त्यांची पूजा करणे, त्यांना प्रसन्न ठेवणे असा आटापिटा खेड्यापाड्यातील अनेक स्त्री आणि पुरुष करीत असतात. नायकाच्या पिढीचा गिरोबा हा देव रखवालदार आहे, असा त्याच्या आईचा समज असल्याने ती नायकाला गिरोबाला नारळ ठेवायला सांगत आहे. हिंदू संस्कृतीमध्ये अनेक देव, देवतांना महत्वाचे स्थान आहे. त्यापैकीच गिरोबाचे खेड्यापाड्यांमध्ये असलेले महत्त्व कवीने अधोरेखित केलेले आहे.

कवी ना. धो. महानोर यांनी आपल्या कवितेतून स्त्री जीवनाचा शोध आणि वेद घेतलेला दिसून येतो. ते म्हणतात,

“जात्याच्या पाळूत घीर घीर दाण्याचं पीठ होतांना
प्रत्येक समेला ओवी गातांना
तिचं मन भरून येतं... आभाळासारखं
जात्यातून गळणाऱ्या पिठासारखं
ती दररोज ओवी गाते सूर्यासाठी
संसारातल्या सुख - दुःखासाठी प्रकाश मागते
अंधारातल्या कडा पुसून टाकण्यासाठी”^४

ग्रामीण भागातील स्त्रिया या जात्यावरील ओव्या मोठ्या प्रमाणात म्हणत असतात. जीवनातील सुख दुःखाचे वर्णन या ओव्यातून व्यक्त होतांना दिसते. या ओव्यातून अनेक प्रकारचे दाखले दिले जात असतात. या ओव्यातून अनेक गोष्टींवर प्रकाश टाकण्याचा प्रयत्न होत असतो. महाराष्ट्राला लाभलेला ओवी हा सांस्कृतिक वारसा आहे. अनेक ओव्यातून स्त्री जीवनाचे दुःख व्यक्त होतांना दिसते.

ज्या व्यक्तींना मुलबाळ होत नाही ते परमेश्वराला अनेक प्रकारचा नवस करीत असतात. अरुणा ढेरे यांनी आपल्या कवितेतून अशाच नवसाचा वेध घेतलेला दिसून येतो. त्या आपल्या कवितेत म्हणतात,

“जलदैवतांसाठी ओटीत म्हणून
नवसाचे बाळ रंगीत टोपलीत घालून
सोडतात म्हणे पाण्यात, कुठल्याशा गावात”^५

कवयित्रीने आपल्या वरील कवितेतून परंपरा व संस्कृतीविषयक चिंतन मांडलेले दिसून येते. आजच्या औद्योगिक वैज्ञानिक युगातही धर्माच्या, संस्कृतीच्या नावाखाली रूढी, परंपरा अंधश्रद्धा पाळल्या जातात, याविषयी त्यांनी आपल्या कवितेत भाष्य केलेले आहे.

भारतीय भूमी ही सांस्कृतिक दृष्ट्या संपन्न अशी भूमी आहे. म्हणून कवी नारायण सुर्वे आपल्या कवितेत म्हणतात,

“ही कर्मभूमी शिवबांची
ज्ञानेशाची अमरापुरी
पूल उतरून इंद्रधनुचा
या मराठीचिये नगरी
या मेघांनो”^६

या महाराष्ट्राच्या भूमीत अनेक संत-महंत, राजे-महाराजे, थोर महापुरुष होऊन गेलेले आहेत. अशा थोरांच्या विचार व क्रमाने ही भूमी सुजलाम, सुफलाम झालेली आहे. या भारतीय भूमीला प्रचंड असा मोठा वैचारिक वारसा लाभलेला आहे. सांस्कृतिक दृष्ट्या संपन्न अशीच ही भूमी असल्याचे कवीने वरील कवितेतून वर्णन केलेले आहे.

प्रत्येक देशामध्ये अनेकविध ऋतू आहेत. हे ऋतू ज्या त्या देशाचे नैसर्गिक, सांस्कृतिक वैभव आहे. ‘ऋतुचक्र’ या कवितेत कवी ज्ञानेश्वर कुलकर्णी यांनी ऋतूंचे गुणगान गायलेले आहे. ते आपल्या कवितेत म्हणतात,

“बाल वसंतापासून होते

सहा ऋतूंची सुरुवात ॥
जीवनातला पाया भरतो
ग्रीष्मामधल्या शिकण्यात ॥१॥
शिणगाराचा रंग भरतो
ओल्या चिंब वर्षात ॥
जीवनातला अर्थही कळतो
शरदामधल्या रमण्यात ॥२॥
वार्धक्याप्रती शरीर झुकते
हेमंताच्या दिवसात ॥
शिषिरी सारे शिणून जाते
आयुष्याचा होतो अस्त ॥३॥
शिशिर ऋतूच्या वेलीवरती
वसंत कालिका गाली हसते,
नक्षत्रांचे, रविचंद्रांचे
ऋतुचक्र हे अखंड फिरते ॥४॥”^७

वसंत ऋतूपासून सहा ऋतूंची सुरुवात होते. महिने आणि ऋतू यांच्या समीकरणातून विविध सण, उत्सव आणि व्रते भारतीय परंपरेत साजरी केली जातांना दिसून येतात. वसंत ऋतू हा चैत्र-वैशाखमध्ये येतो. ग्रीष्म ऋतू ज्येष्ठ -आषाढ, वर्षा ऋतू श्रावण-भाद्रपदमध्ये येतो. शरद ऋतू अश्विन - कार्तिक मध्ये येतो. हेमंत ऋतू मार्गशीर्ष-पौषमध्ये येतो. तर शिशिर ऋतू माघ आणि फाल्गुन मध्ये येतो. वसंत ऋतूमध्ये गुढीपाडवा, राम नवमी, हनुमान जयंती, बुद्ध पौर्णिमा, वसंत पंचमी अशी व्रते येतात. ग्रीष्म ऋतूमध्ये वटपौर्णिमा, आषाढी एकादशी अशी व्रते येतात. वर्षा ऋतूमध्ये नारळी पौर्णिमा, रक्षाबंधन, हरितालिका, गणेश चतुर्थी अशी व्रते येतात. शरद ऋतूत नवरात्र, कोजागिरी पौर्णिमा, दीपावली इत्यादी सण येतात. हेमंत ऋतूमध्ये मार्गशीर्ष गुरुवार व्रत, दत्त जयंती, मकर संक्रांति इत्यादी व्रते केली जातात. शिशिर ऋतूमध्ये माघी गणेश जयंती, होळी, रंगपंचमी असे सण व व्रते साजरी केली जातात. कवीने आपल्या वरील कवितेतून भारतीय ऋतूंचे गोडवे गायलेले आहे.

भारतीय रूढी परंपरेमध्ये जुन्या काळापासून एक परंपरा आहे. आजही खेड्यापाड्यांमध्ये ती जोपासली जाताना दिसते. आजही सूर्यास्त झाला की तुळस शेजारी दिवा लावला जातो. म्हणूनच कवी ज्ञानोबा गुट्टे म्हणतात,

“सांज बुडताना डोही लावी तुळशीला दिवा”^८

खेड्यापाड्यांमध्ये संध्याकाळ होत आली तर दिवा लावला जातो. घरामध्येही लाईट नसेल तर दिवा लावला जातो. त्यासंदर्भात एक सांस्कृतिक कारणही सांगितले जाते. सांज झाल्यावर दिवा न लावल्यास घरामधील लक्ष्मी भंग पावते, अशी श्रद्धा आजही अनेक खेड्यापाड्यांमध्ये पाहायला मिळते.

नद्यांमुळे मानवी जीवन समृद्ध होते. नव्वद टक्के गावे ही नदीशेजारी वसलेली असतात. नद्या हे देशाचे वैभव आहे. या नद्यांनी अनेक प्रकारच्या संस्कृतीचा वारसा जतन केलेला आहे. म्हणूनच कवी सुरेश भट म्हणतात,

“जिथे गेलो, तिथे माझी
नद्यांनी कौतुके केली..
कधी इंद्रायणी होती ।
कधी गोदावरी होती ।”^९

नद्या हे महाराष्ट्राचे सांस्कृतिक वैभव सांगतात. नद्यांमुळे मानवी जीवनातील अमूल्य ठेवा जतन होत असतो. इंद्रायणी आणि गोदावरी या नद्यांना हिंदू धर्मियांच्या दृष्टीने धार्मिक आणि सांस्कृतिक असे महत्व आहे. याविषयीचे गुणगान कवीने आपल्या वरील कवितेतून केलेले आहे.

चंद्र, सूर्य, आकाश, दिवस, रात्र, पावसाळा, उन्हाळा, हिवाळा, नद्या, डोंगर, झरे अशा समृद्धतेनेही ही पृथ्वी भरलेली आहे. निसर्गचक्र या पृथ्वीभोवती आपल्या नैसर्गिक नियमाप्रमाणे फिरतांना दिसतात. म्हणून कवी मनोहर टेकाडे आपल्या ‘मनोगत’ या काव्यसंग्रहातील ‘नेत्राचे पारणे’ या कवितेत म्हणतात,

“आभाळाच्या मंडपाला
निळया रंगाचे हे छत
चंद्रसूर्याची झुंबरे
रात दिनी शोभतात

आत हिवाळा उन्हाळा
पावसाळा गीत गातो
आनंदाची बरसात
निसर्गही सुखावतो
नद्या, निर्झराचे गाणे
जीवनाचे देणे-सोने
लाभे समृद्धीचे लेणे
फिटे नेत्राचे पारणे”^{१०}

आभाळाकडे पाहिल्यावर जणू निळ्या रंगाचे छत लाभले आहे. चंद्र आणि सूर्य हे जणू रात्र आणि दिवसाचे आपले कर्तव्य या पृथ्वी तालावर बजावत असतांना दिसतात. पावसाळा, हिवाळा, उन्हाळा हे ऋतू पृथ्वीचे नाविन्य दाखविण्याचे कामकाज करतांना दिसतात. पावसाळा या पृथ्वीवर आनंदाचे गीत गात असल्याने नद्या, निर्झरही त्यामध्ये सहभागी होतात. ही पृथ्वी निसर्गाने समृद्ध असल्याचे दिसून आल्यावर आपल्या नेत्राचेही पारणे फिटते. असा महत्वपूर्ण गौरव कवीने निसर्गसौंदर्य फुलविणाऱ्या आभाळ, चंद्र, सूर्य, दिवस, रात्र, विविध ऋतू, नद्या, झरे इत्यादींचा केलेला आहे.

राजकीय नेते सण समारंभाचे निमित्त पाहून मस्तपैकी भाषण ठोकतात. म्हणूनच कवयित्री वृषाली किन्हाळकर म्हणतात,

“टोपीचा साधून कोण
सण असो व मसण
ठोकायचे मस्त भाषण
अरे मौत, लग्न, सण
हे तर आमचे साधन”^{११}

सांस्कृतिक सण, समारंभाचा उपयोग राजकीय नेते स्वतःच्या फायद्यासाठी कसा करून घेतात? याविषयी भाष्य वरील कविता करतांना दिसते. सांस्कृतिक सण, समारंभ हे मुख्यतः मानवी सांस्कृतिक ऐक्याचे प्रतिक असतात. परंतु त्या ऐक्यातूनच राजकारणी स्वतःची पोळी भाजतांना दिसतात असा महत्वपूर्ण आशय वरील कविता व्यक्त करते.

एकंदरीत मराठी कवितेने सांस्कृतिक पर्यावरणाचा सखोल असा आढावा आपल्या कवितेमध्ये घेतलेला दिसून येतो. महाराष्ट्रातील विविध सण आणि उत्सवामध्ये प्रतिबिंबित होणारी संस्कृती याचे यथार्थपणे दर्शन मराठी कवितेने आपल्या कवितेतून घडविले आहे. तसेच ढासळत चाललेली मानवी मूल्ये, स्त्री-पुरुषांचा पेहराव, सण उत्सवाला येणारे राजकीय स्वरूप, भारतातील विविध सांस्कृतिक आणि ऐतिहासिक स्थळे, तीर्थक्षेत्रातील महत्वाच्या नद्या, पर्वते, नैसर्गिक संस्कृतीचे वर्णन, नैसर्गिक चक्र इत्यादी महत्वपूर्ण बाबींचा आढावा आपल्या सांस्कृतिक पर्यावरणात या कवितेने घेतलेला दिसून येतो.

संदर्भ ग्रंथ :

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लोकसंख्या आणि पर्यावरण

प्रा. डॉ. माधव तुळशीराम मंदेवाड

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प्रस्तावना :-

कुठल्याही अर्थव्यवस्थेत उत्पादन करण्यासाठी उत्पादन घटकांची कामगिरी महत्वाची ठरते. यात महत्वाचा मानवी घटक म्हणून आपण श्रमाकडे पाहतो. ह्या श्रम घटकांचा जो पुरवठा होतो तो म्हणजे देशातील लोकसंख्येतून होत असतो. विशिष्ट पातळी पर्यंत वाढणारी लोकसंख्या ही अर्थव्यवस्थेला वरदान ठरते तर ही पातळी ओलांडली तर तीच लोकसंख्या अर्थव्यवस्थेला बोजा बनते. अशाच प्रकारच्या परिस्थितीतून आपली भारतीय अर्थव्यवस्था आज गुजरतांना दिसते. वाढती लोकसंख्या हा भारतीय अर्थव्यवस्थे समोरील एक यक्ष प्रश्न बनवून राहिला आहे. वाढत्या लोकसंख्येमुळे पर्यावरणावर देखील ताण पडत आहे. लोकसंख्या आणि पर्यावरण यांचा जवळचा संबंध आहे. वाढत्या लोकसंख्येमुळे नैसर्गिक साधन संपत्तीवर ताण पडत आहे. एकीकडे वाढत्या लोकसंख्येमुळे उत्पादनाच्या साधनावर ताण पडतो. तर दुसरीकडे पर्यावरणाचा ऱ्हास होताना दिसतो. वाढणाऱ्या लोकसंख्येला अन्न, वस्त्र, निवारा यासारख्या मूलभूत गरजा ही पुरेशा मिळत नाहीत. त्याच बरोबर नैसर्गिक संसाधनाचा वापर आणि अनिर्बंध होत असतो. त्यामुळे पर्यावरणाची हानी होताना दिसते. वाढणाऱ्या लोकसंख्येमुळे शहरीकरण, औद्योगीकरण, सांडपाणी, वायू प्रदूषण, घनकचरा, पाणीपुरवठा, ऊर्जा, वाहतूक अशा विविध बाबींचा प्रश्न निर्माण होतो. लोकसंख्या वाढीमुळे देशातील या वाढणाऱ्या लोकसंख्येला आवश्यक अशी संसाधने कशी पुरवायची याचा वापर असाच हा अनिर्बंधित होत राहिला तर एक दिवस या पृथ्वीवरील सर्व संसाधने वेगाने संपुष्टात येतील. वाढत्या लोकसंख्येमुळे जंगले व इतर अधिवास नष्ट केले जात आहेत. त्याच बरोबर शहरीक्षेत्र वेगाने वाढत आहेत. ज्यात निवासस्थाने, व्यवसाय आणि महामार्गांचा समावेश आहे. शिवाय लोकसंख्या वाढत असताना शेतीसाठी अधिक जमीन वापरले जाते. जसे की पशुधन आणि पिके वाढवणे यामुळे प्रजातीची लोकसंख्या, भौगोलिक श्रेणी, जैवविविधता आणि जीव जंतूंच्या परस्पर संवादात घट होत आहे.

मुख्य शब्द :- पर्यावरण, लोकसंख्या, औद्योगीकरण, प्रदूषण, नैसर्गिक संसाधने, तापमान वाढ.

गृहीतके :-

- 1) लोकसंख्या वाढीमुळे पर्यावरणीय प्रदूषण वाढत आहे.
- 2) शाश्वत विकासासाठी लोकसंख्या नियंत्रण आवश्यक आहे.
- 3) लोकसंख्येत वाढ झाल्यास नैसर्गिक संसाधनावर ताण वाढत आहे.
- 4) शिक्षण आणि जनजागृतीमुळे लोकसंख्या वाढ कमी होत आहे.

संशोधन पद्धती :-

प्रस्तुत शोधनिबंध हा पूर्णतः द्वितीयक सामग्रीवर अवलंबून आहे. यासाठी क्रमिक पुस्तके, संदर्भ ग्रंथ, मासिके इतर प्रकारची साहित्य सर्वेक्षण अहवाल, इंटरनेट माध्यमांचा आधार घेतला आहे.

जागतिक लोकसंख्या वाढ :-

लोकसंख्या म्हणजे मानव प्रजातीची एकूण संख्या लोकसंख्या वाढ ही एक अतिशय भीषण समस्या जगासमोर बनली आहे. जगभरात दर सेकंदाला चार पेक्षा जास्त बालके जन्माला येतात. 15 नोव्हेंबर 2022 रोजी जगाच्या लोकसंख्येने 800 कोटी चा पल्ला पार केला. जागतिक लोकसंख्या वाढीचा टप्पा जर आपण बघितला तर असे दिसून येते की 1804 मध्ये जगाची लोकसंख्या 100 कोटी होती. हे 100 कोटी लोकसंख्या 1927 मध्ये 200 कोटी झाली हा टप्पा पूर्ण करण्यास 123 वर्षांचा काळ लोटला गेला. जगाची लोकसंख्या 1960 मध्ये 300 कोटी झाली. यामध्ये 100 कोटी वाढ होण्यास केवळ 33 वर्षेच लागली. यापुढे काल जसा जसा सरकत गेला तसा तसा लोकसंख्या वाढीसाठी लागणारा कालावधी कमी कमी होत गेला. जगाची लोकसंख्या 1974 मध्ये ती 400 कोटी झाली. यासाठी केवळ 14 वर्षांच्या कालावधी लागला. 500 कोटी लोकसंख्या वाढण्यासाठी 11 जुलै 1987 हा दिवस उजाडला. ह्या दिवसाला “संयुक्त राष्ट्र विकास कार्यक्रम” (UNDP) ने 11 जुलै हा दिवस “जागतिक लोकसंख्या दिन” म्हणून साजरा केला जात आहे. पुढेही लोकसंख्या 1998 मध्ये 600 कोटी झाली. तर 2011 मध्ये 700 कोटी पर्यंत वाढली आणि 15 नोव्हेंबर 2022 ला ही लोकसंख्या 800 कोटी चापल्ला पूर्ण केला आहे. 2030 पर्यंत जगाची लोकसंख्या सुमारे 850 कोटी तर 2037 पर्यंत 900 कोटी आणि 2050 पर्यंतची लोकसंख्या 970 कोटी होण्याची तर

2058 पर्यंत ही लोकसंख्या 1000 कोटी लोकसंख्या होण्याची शक्यता वर्तवली जात आहे. त्यामुळे भविष्यात लोकसंख्या वाढीमुळे जगासमोर अनेक आव्हाने निर्माण होण्याची शक्यता आहे.

भारतातील लोकसंख्या वाढ :-

वाढती लोकसंख्या ही आशिया खंडातील विकसनशील राष्ट्रांना भेडसावणारी बाबा आहे. त्यातल्या त्यात भारताला ही समस्या गंभीरपणे भेडसावणारी आहे. भारत हा देश चीन सारख्या देशाला मागे टाकून जगात लोकसंख्ये बाबत क्रमांक एकचा देश बनला आहे. याबाबतचा अहवाल बिबिसीने मांडला आहे. त्यात त्यांनी एप्रिल 2023 मध्ये भारताची लोकसंख्या ही 142.86 कोटी होती. तर त्याच दिवशी चीनची लोकसंख्या ही 142.57 कोटी एवढी होती. यावरून भारत आज जगातील लोकसंख्ये बाबत नंबर एकचा देश बनला आहे. ह्या वाढत्या लोकसंख्येमुळे देशातील संसाधनावर प्रचंड ताण पडणार आहे. भारतातील लोकसंख्या वाढीचा दर बघितला तर असे दिसून येईल की 1891 मध्ये भारताची लोकसंख्या ही 23.6 कोटी होती तर 1901 मध्ये ही 23.8 झाली आणि 1911 मध्ये ती 25.2 कोटी पर्यंत वाढली. तर 1921 मध्ये 25.1 कोटी पर्यंत वाढली आहे. वरील ह्या तीन दशकांतील वाढ ही लोकसंख्या वाढीची प्रवृत्ती जर बघितली तर ती स्थिर स्वरूपाची दिसून येते. 1931 मध्ये भारताची लोकसंख्या ही 27.9 कोटी झाली तर 1941 मध्ये 31.9 कोटी पर्यंत वाढली. 1951 ला भारताची लोकसंख्या ही 36.1 कोटी पर्यंत वाढली. 1921 ते 1951 दरम्यान भारताची लोकसंख्या ही 25.1 कोटी वरून ती 36.1 कोटी पर्यंत वाढली. या काळात भारताची लोकसंख्या वाढ ही संथ गतीने वाढली आहे. 1961 मध्ये भारताची लोकसंख्या ही 43.9 कोटी पर्यंत वाढली तर 1971 मध्ये ती 54.8 कोटी झाली, तर 1981 ला ती 68.3 कोटी झाली. 1951 मध्ये ती 1981 दरम्यान लोकसंख्या ही 36.1 कोटी वरून ती 68.3 कोटी पर्यंत वाढली म्हणजेच केवळ 30 वर्षांमध्ये 89.36 टक्क्यांनी लोकसंख्या वाढली ह्या काळात लोकसंख्या वाढ ही वेगाने झालेली दिसते. ही प्रचंड लोकसंख्या वाढ ही आरोग्य सुविधांमध्ये सुधारणा आणि लोकांच्या राहणीमानाच्या दर्जात झालेली वाढीमुळे घडून आली. 1991 मध्ये भारताची लोकसंख्या 84.4 कोटी पर्यंत वाढली, तर 2001 मध्ये ती 102.7 कोटी झाली तर 2011 या दशकात ती 121 कोटी पर्यंत वाढली. 1981 साली 68.3 कोटीवर असलेली लोकसंख्या ही 2011 मध्ये ती 121 पर्यंत वाढली. 1981 ते 2011 या काळात जन्मदर वेगाने घसरला हि घसरण सरकारच्या अन्य नियंत्रणाचे सकारात्मक प्रयत्न आणि लोकांच्या छोट्या कुटुंबाकडे असलेला स्वतःचा कल, यांचा परिणाम आहे. भारताने चीनला मागे टाकत भारत जगातील सर्वाधिक लोकसंख्येचा देश झाला आहे. आज भारताची लोकसंख्या 145 कोटीच्या वर पोहोचली आहे. देशात जन्मदर वाढत असताना आरोग्याच्या सुविधेमुळे मृत्युदर घटला आहे. त्यामुळे आयुर्मान वाढून लोकसंख्येत भर पडत आहे. मुळात जगाच्या केवळ 2.4% क्षेत्रफळ असलेल्या आपल्या देशात जगाच्या 17.5% लोकसंख्या सामावली आहे. त्यामुळे येथील जल, जंगल, जमीन, वारा या नैसर्गिक संसाधना बरोबर ऊर्जा, इंधन, रस्ते, शिक्षण, आरोग्य अशा पायाभूत सुविधावर मुळातच ताण निर्माण होत आहे. लोकसंख्या वाढीतच सर्व समस्यांचे मूळ दडलेले आहे.

लोकसंख्या आणि पर्यावरण संबंध :-

लोकसंख्या आणि पर्यावरण यांचा जवळचा संबंध आहे. वाढत्या लोकसंख्येमुळे नैसर्गिक संसाधनावर ताण येतो. प्रदूषणात वाढ होते आणि पर्यावरणावर नकारात्मक परिणाम होतो. लोकसंख्येतील वाढीमुळे जागतिक हवामान आणि परिसंस्थावर त्याचा परिणाम होतो. वाढती लोकसंख्या ही शाश्वत आर्थिक विकासातील एक मोठा अडथळा निर्माण करत आहे. लोकसंख्या वाढीनुसार वस्तू व सेवांचे उत्पादने वाढत आहे. औद्योगिकीकरणाची गती वाढत आहे. औद्योगिकरणामुळे पर्यावरणाचा पर्यावरणाचा ऱ्हास होत आहे. भविष्यकाळासाठी पुढच्या पिढीच्या उत्थानासाठी व कल्याणा साठी आवश्यक नैसर्गिक साधन संपत्ती शिल्लक राहणार की नाही याचा प्रश्न निर्माण होत आहे. पर्यावरण प्रदूषणामुळे, पाणी, वने व भूमी इत्यादी घटकावर प्रतिकूल परिणाम घडवून येत आहे. पाण्याची पातळी खालावली आहे. मोठमोठ्या नद्या ह्या गटारांचे रूप धारण करीत आहेत. तलावांनी डबक्याचे रूप धारण केले आहे. खाणी व उत्खननामुळे जंगले उजाड बनली आहेत. लोकांचे विस्थापन होऊन हवेचे प्रदूषण वाढले आहे. लोकसंख्या वाढीचा प्रत्यक्ष परिणाम पर्यावरणावर होत आहे. भारतातील लोकसंख्या ही जगाच्या एकूण लोकसंख्येच्या 17.5 टक्के वास्तव्य करते. जगातील लोकसंख्येच्या क्रमवारीत आता भारत देश नंबर एकचा देश बनला आहे. वाढत्या लोकसंख्येमुळे पर्यावरणाचा वेगाने ऱ्हास होत असून पर्यावरणीय असमतोल निर्माण झाला आहे. वाढत्या लोकसंख्येबरोबर उत्पादन व उपभोगात वाढ होते. जसजसे औद्योगिकीकरण वाढते व नैसर्गिक संसाधनाचा अमर्याद वापर सुरू होतो. परंतु नैसर्गिक साधन संपत्तीचा पुरवठा हा विशिष्ट मर्यादेपर्यंतच आहे. भूमी, पाणी, तेल, गॅस खनिजे इत्यादी मानव त्यात कोणतेही वाढ घडवून आणू शकत नाही मनुष्य कोणतेही निसर्गनिर्मित वस्तू तयार करू शकत नाही. परंतु तो केवळ त्या वस्तूचे रूपांतर करू शकतो. त्यात वेगवेगळ्या उपयोगिता भरून ती विक्री योग्य वस्तू बनवू शकतो. म्हणजेच विनिमय

मूल्य असलेल्या उपयोगितांची निर्मिती म्हणजे उत्पादन होय. अशा प्रकारची उत्पादनाची व्याख्या केली जाते. हे उत्पादन करताना नैसर्गिक साधनाचा अमर्याद वापर व अपव्य होता कामा नये.

वाढती लोकसंख्या, नागरिकरण व वाढते औद्योगीकरण यामुळे मानवाचा पर्यावरणात हस्तक्षेप वाढत चालल्यामुळे जगातील अनेक प्रदेशातील नैसर्गिक साधन सामग्री झपाट्याने नष्ट होत चालली आहे. यामुळे पर्यावरणाचे रक्षण संवर्धन करण्यासाठी आज विविध उपाय व कार्यक्रम त्वरित आखण्याची गरज निर्माण झाली आहे. उच्च लोकसंख्या वाढीच्या दरामुळे गरीबीत राहणाऱ्या लोकांची संख्या वाढते लोकसंख्येची घनता वाढते आणि नैसर्गिक संसाधने वेगाने कमी होतात. देशातील लोकसंख्या विस्तार आणि गरीब देशाच्या मर्यादित आणि वेगाने खराब होत असलेल्या नैसर्गिक संसाधनाच्या आधारावर वाढता तान निर्माण करीत आहेत. जरी बहुसंख्य लोक प्राथमिक क्षेत्रातील उत्पादनावर जगत असली तरीही नैसर्गिक साधने कमी होत आहेत. वापराच्या सध्याच्या पातळीवरही वाढत्या लोकसंख्येच्या मूलभूत गरजा पूर्ण करणे अधिक आव्हानात्मक बनले आहे, आणि दरडोई संसाधनाचा वापर वाढल्यामुळे परिस्थिती आणखी विकट होत आहे. शेतीयोग्य जमिनीवरील लोकसंख्येचा दबाव जमिनीच्या ज्हासात योगदान देतो, ज्याचा अर्थव्यवस्थेत उत्पादन साधनावर परिणाम करीत आहे. भारतामध्ये वाढणाऱ्या लोकसंख्येमुळे आणि औद्योगीकरणामुळे ऊर्जेच्या वापरात लक्षणीय वाढ झाली आहे. आणि ही प्रवृत्ती भविष्यातील कायम राहण्याचा अंदाज आहे. वाढत्या वापरामुळे वायू प्रदूषण आणि जागतिक तापमान वाढ यासारखे पर्यावरणीय प्रश्न चिंताजनक होत आहेत. पर्यावरणीय प्रदूषण केवळ पर्यावरणाची परिस्थिती बिघडत नाही तर लोकांच्या दीर्घकालीन विकास आणि आरोग्यावरही नकारात्मक परिणाम करते. पर्यावरणातून संसाधनाचे उत्खनन वाढवणे या संसाधनांमध्ये जीवाश्म इंधन, जसे की तेल, वायू, कोळसा, खनिजे, झाडे, पाणी आणि वन्यजीव यांचा समावेश आहे. विशेषतः महासागरातील संसाधने वाढून टाकण्याच्या प्रक्रियेतून अनेकदा प्रदूषण आणि कचरा बाहेर पडतो त्यामुळे हवा आणि पाण्याची गुणवत्ता कमी होते. आणि मानव आणि इतर प्रजातींच्या आरोग्याला हानी पोहोचते. पर्यावरणावरील वाढत्या भारामुळे वाढत्या लोकसंख्येला सामावून घेण्यासाठी घरे, व्यवसाय आणि रस्ते बांधणे यासह शहरी वस्ती बांधण्यासाठी जंगले आणि इतर अधिवास नष्ट केले जातात. या व्यतिरिक्त लोकसंख्या वाढत असताना पिके वाढण्यासाठी आणि पशुधनाला आधार देण्यासाठी, कृषी उपक्रमासाठी अधिक जमीन वापरली जाते. यामुळे विशिष्ट प्रजातीची लोकसंख्या, भौगोलिक श्रेणी, जैव विविधता कमी होऊन जीवजंतू मधील परस्पर संवाद बदलत आहेत.

समारोप :-

लोकसंख्या वाढीमुळे पर्यावरणाचा ज्हास होत आहे. वाढता लोकसंख्येमुळे औद्योगीकरण, शहरीकरण याच्यात वाढ होत आहे. त्यामधून अनेक प्रश्न उद्भवत आहेत. जसे की पिण्याच्या पाण्याचा प्रश्न वाहतूक ऊर्जा, शेती योग्य जमीन, जंगले, मत्स्यपालन, निवास, अन्न, निवारा, शुद्ध हवा, सांडपाण्याची व्यवस्था इत्यादी अनेक प्रश्न निर्माण होत आहेत. ज्याचा प्रत्यक्ष प्रभाव पर्यावरणाच्या ज्हासात होत आहे. नैसर्गिक साधन संपत्तीचा बेमुसार वापर झाल्याने पर्यावरणात असमतोल निर्माण होत आहे. यासाठी आपणास लोकसंख्या नियंत्रण करण्यासाठी ठोस कार्यक्रम राबवणे गरजेचे आहे. वर्तमान पिढीही आपल्या अनावश्यक गरजा आणि चंगळवाद प्रवृत्ती थांबवली पाहिजे. भविष्यातील पिढीचा विचार करणे अगत्याचे आहे. तरच शाश्वत विकासाची स्वप्न साकार होईल. सर्व समावेशक वृद्धीच्या दिशेनेच आर्थिक विकास झाला पाहिजे. देशातील गरिबी, दरिद्री, बेरोजगारी अशा सारखी प्रश्न सोडवावी लागतील त्यातूनच मानवी कल्याणाची, समतेची आणि विश्व बंधुत्वाची भावना रुजेल व कल्याणकारी राज्य तयार होईल. जागतिक तापमान वाढ आणि पर्यावरण रक्षण यावर नियंत्रण ठेवण्यासाठी योग्य ती धोरणे आखणे आणि पृथ्वीवरील जीवसृष्टीला अबाधित ठेवण्यासाठी प्रयत्न करणे गरजेचे आहे.

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रमेश फिरोदिया कला, वाणिज्य व विज्ञान महाविद्यालय साकूर ता.संगमनेर, जि.अहिल्यानगर

प्रस्तावना-

पर्यावरणाचे होणारे नुकसान ही आधुनिक जगाची मोठी समस्या आहे. पर्यावरणाचे संरक्षण कसे करावे ही संपूर्ण जगाची दुसरी मोठी ज्वलंत समस्या आहे उत्पादनांच्या नवीन आणि सुधारित पद्धतीमुळे नैसर्गिक जग पूर्णपणे बदलले आहे. नैसर्गिक संसाधनांच्या जहासामुळे आणि पर्यावरण मानसिक जहासामुळे सध्या मानव जातीला गंभीर संकटांना तोंड द्यावे लागत आहे. यातून संपूर्ण मानव जातच धोक्यात आहे. त्यासाठी आज देशात नाही तर राष्ट्रीय आंतरराष्ट्रीय पातळीवर अनेक संस्था कार्यरत आहेत. भारतातही अनेक संस्था याविषयी गंभीरपणे कार्य करत आहे. पण या समस्या विषयी प्राचीन भारताच्या इतिहासामध्ये तत्कालीन तत्ववेत्ते जागृत होते. ही समस्या निर्माण होण्याच्या अगोदर त्यांनी त्यावर उपाय योजले होते. प्राचीन भारतीय साहित्याच्या काळातील लोकांना पर्यावरणीय जहासाचे अनिष्ट परिणाम मग ते नैसर्गिक घटकामुळे असो किंवा मानवी क्रियाकलापामुळे असो याबद्दल पूर्ण ज्ञान त्यांना होते. हिंदू तत्त्वज्ञान नेहमी पर्यावरण पूरक राहिले आहे. आणि ते पर्यावरणाबाबत खूप संवेदनशील होते.

त्यासाठी वेद, उपनिषदे, पुराणे, कौटिल्याचा अर्थशास्त्र पराशर ऋषींचे कृषी पराशर इत्यादी ग्रंथांमध्ये पर्यावरणाच्या संतुलनाचे रक्षण करण्याचे संदेश देण्यात आले. म्हणून ह्या संशोधन लेखात आपल्या विसरलेल्या अनमोल संस्कृतीचे परीक्षण करण्याचा प्रयत्न करण्यात आला आहे. जी पर्यावरणाबाबत अत्यंत संवेदनशील होती. ती खूप प्रेरणादायी होती, आहे आणि असणार आहे.

वेद ग्रंथांमध्ये पर्यावरण संरक्षण आणि शुद्धतेला महत्त्व देण्यात आले आहे. त्यात निवासस्थानाचे संरक्षण, वनीकरण आणि प्रदूषण न करण्यावर भर देण्यात आला आहे. वेदातील ऋचा लिहिणाऱ्या ऋषींना निसर्गाचा आदर होता. ऋग्वेदातील ६.४८.१७ मध्ये सांगितले आहे की, पर्यावरणाला हानी पोहोचवू नका. वनस्पती आणि पाणी यांना इजा पोहोचू नका. पृथ्वी माझी आई आहे. मी तिचा पुत्र आहे, पाणी ताजे राहो, पाण्याला हानी पोहोचवू नका. झाडे तोडू नका कारण ते प्रदूषण दूर करतात. १

तसेच ऋग्वेदात काही मंत्र हे वायु शुद्ध ठेवण्यासंदर्भात तसेच वायूचे महत्त्व विशद करणारे आहे.

वात आ वातु भेषजम्।

स नो जीवात्मे कृधी

या ऋचेतून वायु प्रदूषणाबाबत ते लोक किती सजग होते हे लक्षात येते. आद्य वेद ऋग्वेदात कोणत्या वस्तू जाळाय्यात किंवा जाळू नये यासाठी ऋचा देण्यात आल्या आहे. २ "ना मेध्य प्रक्षिपेदग्न" म्हणजे कोणतीही अशुद्ध वस्तू अग्नीत टाकू नये. अन्यथा ती वातावरण प्रदूषित करते. ३ आज लाखो टन कचरा प्लास्टिक जाळले जाते. यातून वायू प्रदूषण होते. म्हणून पर्यावरणाविषयी अनेक समस्या उत्पन्न झाल्या आहेत.

दुसरा वेद ग्रंथ यजुर्वेदात ५.१३ मध्ये म्हटले आहे की, अवकाशाला त्रास देऊ नका, वातावरण प्रदूषित करू नका. आज अवकाशही प्रदूषित झाले आहे. आधुनिकीकरणाच्या नावाखाली आजच्या माणसाने अवकाश प्रदूषित केले आहे. पण यजुर्वेदात अगदी अवकाशापासून तर तळापर्यंत वातावरण प्रदूषण विरहित राहावे यासाठी तत्कालीन जनता सजग होती. यासाठी शुक्ल यजुर्वेदात ऋषीमुनी प्रार्थना करताना म्हणतात की, "द्यौः शान्तीरन्तरिक्ष" म्हणजे पृथ्वीपासून तर अवकाशापर्यंत प्रदूषण करू नका. ४

सामवेदामध्ये प्रथम अध्यायात संदेश देण्यात आला आहे की,

द्यौः पृथिवी अन्तरिक्षं त्रयस्त्रयस्ते नाभिव्युच्छन्ति बहुधा जनतीरपो जाता उत यज्ञ।

चक्रतुमस्मभ्यं देवा दुष्टः स्वर्गं लोकं विश्वासं रुपाणि व्यचस्थिरे॥५

चौथा वेद ग्रंथ अथर्ववेदामध्ये वृक्षारोपण करण्याचे उपाय सांगितले आहे. ते आजच्या मानवासाठी उपयोगी आहे. अथर्ववेदामध्ये ३.२४.३-४ मध्ये स्वच्छ पर्यावरण हे कृषीसाठी आवश्यक आहे असे सांगितले आहे. ६ त्याशिवाय अथर्ववेदाच्या आरण्यानी सूक्तामध्ये पृथ्वी, नदी आणि वनस्पतीच्या संरक्षणासाठी आणि संवर्धनासाठी संदेश दिला आहे. आजच्या संदर्भात वैदिक तत्वे जागतिक पर्यावरणीय चळवळीशी जुळतात. ७ वैदिक ग्रंथ नद्यांचे पावित्र्य राखण्यासाठी संदेश देतात. आज भारताच्या नमामी गंगे अशा उपक्रमासाठी गंगा स्वच्छ करण्यासाठीचे जे उद्दिष्ट आहे, त्यासारखी उद्दिष्टे वैदिक काळात ठेवण्यात आले होती. त्याप्रमाणे चिपको आंदोलन, पुनर्नविकरण मोहिमा अशा अनेक मोहिमा आखल्या जात आहेत. पण वैदिक काळात अशा योजना झाडांचे महत्त्व जाणून आखण्यात आल्या होत्या. वैदिक ग्रंथ पर्यावरण पूरक जीवनशैली आणि जागतिक पर्यावरणीय चळवळीला प्रेरणा देतात. आपण वैदिक ज्ञानाचा स्वीकार करून आपण एका निरोगी जीवनाकडे वाटचाल करू शकतो. ज्यामुळे येणाऱ्या पिढ्यांसाठी पृथ्वीमाता आणि विश्वाचे कल्याण सुनिश्चित होईल.

वेदानंतर निर्माण झालेल्या उपनिषदांमध्ये पर्यावरणाच्या संवर्धनासाठी अनमोल असे मार्गदर्शन व संदेश देण्यात आले आहे. त्या लोकांना पर्यावरणामध्ये मानवाच्या होत असलेला हस्तक्षेपाची पूर्ण जाणीव होती. म्हणून पर्यावरणाच्या रक्षणासाठीची ही चळवळ निरंतर चालणारी प्रक्रिया होती. तैत्तिरीय उपनिषदामध्ये २.८.५. मध्ये वृक्षांचे महत्त्व सांगितले आहे. ८ तसेच छांदोग्य उपनिषदामध्ये ६.८.४. मध्ये वृक्षांबद्दल आदर दर्शवण्यात आला आहे. जो कार्बन शोषणाद्वारे हवामान बदलाशी लढण्यासाठी झाडांचे पर्यावरणीय महत्त्व अधोरेखित व प्रतिबिंबित करतो. ९ त्याशिवाय बृहदारण्य उपनिषदात म्हटले आहे की, "इमा आपःसर्वेषां भूतानां मध्वासामपांसर्वाणि भूतानि मधु" म्हणजे पाणी हे प्राण्यांसाठी अमृत आहे. अग्नि पाण्यात राहतो. म्हणून सचैल स्नान करण्यास मनाई आहे. १० पर्यावरणाच्या तसेच पाण्याच्या प्रदूषणाबाबत उपनिषदकालीन तत्ववेत्ते किती जागृत होते. हे यावरून आपल्या लक्षात येते

महाभारतात शांती पर्वामध्ये २५४.६-८ मध्ये वन आणि वन्यजीवांचे संरक्षण करण्यावर भर देण्यात आला आहे. यामध्ये पर्यावरणीय संतुलन राखण्यासाठी ते कसे उपयोगी आहे हे सांगितले आहे. ११

मत्स्यपुराणात म्हटले आहे की, "दसवापीसमोहदः दस हृदसमः पुत्रोसमो द्रुतः" म्हणजे एक विहीर बनवताना दहा विहिरीचे पुण्य लाभते, एक तळे बनवताना दहा छोट्या तळ्यांचे, एक मुलाकडून दहा तळी आणि झाड लावल्याने दहा पुत्रांचे पुण्य मिळते. यावरून आपल्या असे लक्षात येते की, झाडांचे महत्त्व ओळखून वृक्ष लागवडीसाठी पुराणांमध्ये प्रोत्साहित करण्याचा प्रयत्न केला जात असे. १२ तसेच भागवत पुराणात ११.७.९-१२ मध्ये भगवान श्रीकृष्णाच्या साधेपणाने जगण्याच्या आणि निसर्गाचा आदर करण्याच्या शिकवणीचे वर्णन केले आहे. १३ वराह पुराण मध्ये म्हटले आहे की जो व्यक्ती आपल्या जीवनात एक पिंपळ, एक कडू लिंबाचे, एक बोरीचे आणि दहा फुलांची झाडे लावावी तो नरकात जाणार नाही. १४ आज पर्यावरणाच्या संकटाचा सामना करण्यासाठी संपूर्ण जगाला आधुनिक उपायासह वैदिक तत्त्वज्ञानाची गरज आहे आणि ती सदैव राहिल हे आपल्या लक्षात येते.

मनुस्मृती हा भारतातील हिंदू धर्म ग्रंथांपैकी सर्वात अधिकृत असलेला धर्मग्रंथ आहे. या मनुस्मृतीमध्ये पर्यावरण आणि पर्यावरणीय संतुलनाचे रक्षण करण्याचे संदेश देण्यात आले आहे. औषधी वनस्पतींना इजा करणे, झाडे झुडपे तोडणे हे पाप आहे. असे मनु म्हणतो. १५

वैदिक काळानंतर संहिता ग्रंथ निर्माण झाले. या संहिताग्रंथांमध्ये पर्यावरणाविषयी जनजागृती पर संदेश देण्यात आले आहे. पर्यावरणाचे संतुलन आणि रक्षण करण्यासाठी तत्कालीन तत्त्ववेत्त्यांनी मोलाचे मार्गदर्शन केले आहे. चरक संहितेमध्ये लोकांना जनदोद्धवांश अध्यायामध्ये पर्यावरणीय ज्ञानामुळे होणाऱ्या रोगांचे विवेचन करण्यात आले आहे. या संहितेत कचरा, सांडपाणी व्यवस्थापनासाठी योग्य उपाययोजना करण्याची शिफारस केली आहे. जेणेकरून पाणी किंवा माती दूषित होणार नाही. १६ सुश्रुत संहितेमध्ये ३/७/८ मध्ये आचार्य सुश्रुतांनी अशुद्ध पाण्याचे लक्षण सांगितले आहे. कचरा व्यवस्थापन, पाणी आणि हवा

शुद्ध ठेवणे, तसेच नैसर्गिक संसाधनांचा जपून वापर करणे यासारख्या गोष्टीवर भर दिला आहे. रोगराई साथीचे आजार हे पर्यावरणीय बदलामुळे कसे पसरू शकतात याचे वर्णन केले आहे. १७ चरक संहिता आणि सुश्रुत संहिता या ग्रंथांमध्ये वैद्यकीय ज्ञानाबरोबर पर्यावरणाच्या संरक्षणाचा महत्त्व देण्यात आले आहे. आणि त्याद्वारे मानवी आरोग्याचे रक्षण कसे करावे हे शिकवणारा एक महत्त्वाचा स्रोत आहे.

कौटिल्याच्या अर्थशास्त्रात २.२६.१ मध्ये पर्यावरण रक्षणासाठी महत्त्व देण्यात आले होते. वृक्षतोड, प्राणी, पक्षी, हत्या करणे गुन्हा समजला असे. आणि त्या विरोधात शिक्षेची तरतूद केली आहे. पर्यावरणाच्या संतुलनासाठी या बाबी गरजेच्या आहे. याची कौटिल्यांना जाणिव होती.

सूनाध्याक्षःप्रदिष्टभयानामभयवनवासिनांच।

मृगपशुपक्षिमत्स्रानां बन्धवधर्हिंसायामुत्तमं दण्डं कारयेत्॥

या श्लोकावरून असे लक्षात येते की, 'संरक्षित राखीव वन' ही संकल्पना भारतात २००० वर्षांपेक्षा अधिक काळापासून अस्तित्वात आहे. आर्य चाणक्य त्याला अभय वन असे म्हणतात. जिथे प्राणी व पक्ष्यांची शिकार करण्यासाठी बंदी आहे. किती समर्पक असे नाव देण्यात आले होते? 'अभय वन' जिथे प्राणी पक्षी निर्भयपणे राहू शकत होते. अर्थशास्त्रात जंगल व्यवस्थापनासाठी नियम देखील सांगितले आहे. जंगलाचा नाश करणाऱ्यास शिक्षा होत असे. आर्य चाणक्यांची ही संकल्पना आजच्या राष्ट्रीय उद्यान, अभयारण्य संकल्पनेसारखी होती. पर्यावरण संतुलनासाठी हे आवश्यक आहे. त्यांना याची जाणिव होती. १८

द्रव्यवनच्छिद्रां ची देयम्। अत्यंत स्थापयेद् अन्यत्र आपद्भ्यः॥ २.१७.३

अर्थशास्त्र ग्रंथातील ४.११.२० मधील याच श्लोकावरून असे दिसून येते की, वृक्ष तोडणाऱ्यास शिक्षा होत असे. फळे, फुले, सावली देणारे वृक्ष औषधी वनस्पती तोडणाऱ्यास शिक्षा होत असे. आज विकासाच्या नावाखाली वृक्षतोड होत आहे. यातून जागतिक तापमान वाढ, कमी पर्जन्यमान अशा अनेक समस्या निर्माण झाल्या आहेत. यावर कौटिल्याच्या अर्थशास्त्रातील हा संदेश निश्चितच प्रेरणादायी आहे. १९

।त्याशिवाय पराशर ऋषींनी लिहिलेला कृषी पराशर हा ग्रंथ कृषी पर्यावरणाच्या दृष्टीने अत्यंत महत्त्वाचा ग्रंथ समजला जातो. या ग्रंथांमध्ये पराशर ऋषी जलसंधारणाचे महत्त्व सांगतात. पाण्याचे संवर्धन करण्यावर भर देतात. पावसाचे पाणी जमिनीत मुरवण्यासाठी उपाययोजना सांगतात. कमी खर्चात नैसर्गिकरीत्या उपलब्ध असलेल्या संसाधनांचा वापर करून आणि पर्यावरणाची काळजी घेऊन शेती केली पाहिजे याबद्दल मार्गदर्शन करतात. ऋषी पराशर हा ग्रंथ केवळ शेतीसाठीच नाही तर पर्यावरणाच्या दृष्टीने खूप महत्त्वाचा ग्रंथ आहे. यात शाश्वत शेती आणि नैसर्गिक संसाधनांचा योग्य वापरासाठी मार्गदर्शन केले आहे. ज्यामुळे पर्यावरण आणि शेती यांचा समतोल राखला जाईल. आज शेतीच्या अधुनिकिकरणाच्या नावाखाली शेतीमध्ये रासायनिक खतांचा, किटकनाशकांचा बेसुमारपणे वापर केला जात आहे. त्यामुळे मानवी आरोग्य धोक्यात आले आहे. त्याबरोबर जमिनीचा ऱ्हास होत आहे. शेती नापीक, क्षारयुक्त होत आहे. त्यावर उपाय कौटिल्याचा हा प्रेरणादायी संदेश आहे. २०

तसेच वराहमिहिर यांचा बृहत्संहिता नावाचा ग्रंथ पर्यावरण संवर्धना विषयी अत्यंत महत्त्वाचा आहे. वराह मिहिर यांना भूगर्भातील पाण्याचे पहिले अभ्यासक मानले जाते. त्यांनी बृहत्संहितेतील ५३ वा दकार्गलाध्याय नावाच्या अध्यायात भूगर्भातील पाण्याच्या शोधासाठी अनेक नैसर्गिक लक्षणांचा उल्लेख केला आहे. त्यात त्यांनी पर्यावरण, जल व्यवस्थापन व हवामान शास्त्र याविषयी मौल्यवान माहिती दिली आहे. बृहत् संहितेत वराहमिहिर यांनी पर्यावरणाचे महत्त्व ओळखून नैसर्गिक संसाधनाचे संरक्षण आणि व्यवस्थापनासाठी मार्गदर्शन केले आहे. त्यांचे हे कार्य आजही प्रेरणादायी व मार्गदर्शक ठरते. २१

समारोप-

भारताला पर्यावरणाचे रक्षण करण्याची प्राचीन परंपरा आहे. बहुतेक प्राचीन ग्रंथांमध्ये लोकांनी नेहमीच निसर्गाच्या वस्तूंची पूजा केली आहे. आपल्या प्राचीन ग्रंथांमध्ये झाडे, पाणी, जमीन आणि प्राणी यांचा महत्त्वाचा आणि त्यांच्या संवर्धनाचा उल्लेख आहे. हिंदू धर्मात आपल्याला आढळते की वेद, उपनिषदे पुराणे आणि इतर प्राचीन ग्रंथांनी झाडे, वनस्पती, वन्यजीवांना

आणि मानवांसाठी त्यांचे मूल्य यांना खूप महत्त्व दिले आहे. वेद, उपनिषदे, स्मृती, पुराणे, महाभारत हे हिंदूंचे धार्मिक ग्रंथ तसेच अर्थशास्त्र, चरक संहिता, सुश्रुत संहिता, बृहत् संहिता, कृषी पराशर इत्यादी ग्रंथांमधील पर्यावरण संवर्धन विषयक संदेश सर्वांनी त्यांच्या दैनंदिन जीवनात पाळावा. प्राचीन काळी आपल्या संस्कृतीत पर्यावरणाच्या रक्षणाबाबत सुविकसित यंत्रणा स्थापित करण्यात आली होती. पर्यावरणाच्या रक्षणाप्रमाणे मानवी वर्तन सुधारण्यात आले. वेद, उपनिषदे, पुराणे तसेच आपल्या प्राचीन कायदेशीर संहितांनी पर्यावरणाचे रक्षण केले. आपल्याला आपल्या प्राचीन पर्यावरण संरक्षण प्रणालीचा अवलंब करणे आवश्यक आहे. आज पर्यावरणाच्या संकटाचा सामना करण्यासाठी संपूर्ण जगाला आधुनिक उपायासह वैदिक तत्त्वज्ञानाची गरज आहे आणि सदैव राहिल. अशा या प्राचीन भारतीय धार्मिक, आर्थिक आणि कृषी ग्रंथांतील पर्यावरण रक्षणासाठीचे विचार आजच्या पर्यावरणीय ज्ञासाच्या समस्येच्या उपायांसाठी प्रेरणादायी आहे आणि पुढेही असणार आहे. आणि सध्याच्या पर्यावरणीय संकटाच्या काळात ते प्रत्यक्षात अमलात आणण्याची गरज आहे.

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संत साहत्यातील पर्यावरणीय दृष्टिकोन

सहा. प्रा. जाधव वैभव दिलीपराव

मराठी विभाग, कै.बापूसाहेब पाटील कला व विज्ञान, महाविद्यालय, हाणेगाव ता.देगलूर जि.नांदेड

मराठी संत साहित्य हे केवळ आध्यात्मिक मार्गदर्शनापुरते मर्यादित नसून त्यात पर्यावरण संरक्षणाची गहरी भावना आढळते. संत ज्ञानेश्वर, संत तुकाराम, संत एकनाथ, संत नामदेव, संत चोखामेळा आणि संत रामदास स्वामी यांच्या रचनांमध्ये निसर्गाशी असलेले नाते, पर्यावरणीय चेतना आणि जीव-जंतूबद्दलची संवेदना स्पष्टपणे दिसते. आजच्या परिवर्तनाच्या काळात हे संत विचार अधिकच प्रासंगिक झाले आहेत. आधुनिक पर्यावरण विषयक आव्हानांना तोंड देण्यासाठी या पारंपारिक ज्ञानाची गरज आहे. हा अभ्यास संत साहित्यातील पर्यावरणविषयक तत्त्वज्ञानाचे विश्लेषण करून आधुनिक काळातील त्याची उपादेयता तपासतो. मराठी संत साहित्यात निसर्गाचे अत्यंत सुंदर आणि गहन चित्रण आढळते.

संत तुकारामांच्या अभंगांत "वृक्षवल्ली आम्हा सोयरे वनचरे" अशी निसर्गाशी एकरूप होण्याची भावना व्यक्त होते. त्यांनी भंडारा डोंगरावरील साधनेतून निसर्गाच्या शांत वातावरणात आध्यात्मिक अनुभव घेतला. संत एकनाथ महाराजांनी सुळीभंजन डोंगरावर ध्यानावस्थेत असताना त्यांनी अनुभवलेली शांतता व भक्तिमय वातावरण हे निसर्गाशी त्यांचे एकरूप झालेल्या अवस्थेचे दर्शन घडवते. संत नामदेवाची पर्यावरणप्रीती त्यांच्या बालपणातील घटनेतून स्पष्ट होते - वृक्षाची साल काढताना त्यांनी स्वतःच्या पायाची कातडी काढून पाहिली की वृक्षाला किती त्रास होत असेल. या घटनेतून दुसऱ्यांच्या वेदनेची अनुभूती आणि जीवमात्राबद्दलची करुणा दिसते. संत ज्ञानेश्वरी मध्ये पंचमहाभूतांचे तत्त्वज्ञान सादर केले आहे - पृथ्वी, जल, अग्नी, वायू आणि आकाश या पाच घटकांचा समतोल जीवनासाठी आवश्यक असल्याचे त्यांनी स्पष्ट केले आहे. समर्थ रामदास स्वामींच्या दासबोधातील 'बाग' या विषयावरील २८ समासामध्ये पर्यावरणाचा सखोल अभ्यास आढळतो. त्यात ३०० वृक्षांची माहिती दिली आहे, जे त्यांच्या वनस्पति ज्ञानाची व्यापकता दर्शवते. रामदासांनी पृथ्वी, पाणी, उष्णता, आकाश, वनस्पती, अरण्य यांचे सविस्तर वर्णन केले आहे. त्यांच्या मते, निसर्गात राहून साधना केल्यास आध्यात्मिक प्रगती लवकर होते. वृक्षांच्या छायेत मन शांत होते आणि भगवंतची निकटता अनुभवता येते.

ज्ञानेश्वरीत संत ज्ञानेश्वरांच्या ओवी मधून पर्यावरणाबाबतही उल्लेख आढळतो. येथे त्यांनी निसर्गातील घटकांचे, कृषीशास्त्राचे आणि जिवंत सृष्टीच्या साक्षरतेचे महत्त्व व्यक्त केले आहे. त्यांनी तंत्रज्ञानाच्या योग्य वापराच्या माध्यमातून कसे सोने उगमू शकते, हे उदाहरण देऊन सांगितले आहे. याचा अर्थ असा की, विज्ञान आणि तंत्रज्ञानाचा सकारात्मक वापर करून निसर्गाचा समतोल राखला जाऊ शकतो ते म्हणतात..

"नगरे रचावीं। जळाशये निर्मावीं। महावने लावावीं। नानाविधें।"

यामध्ये त्यांनी लोकांनी नगरांचे रचन, जलाशयांची निर्मिती, आणि विविध प्रकारची मोठी जंगलं लावण्याचा सल्ला दिला आहे. ज्ञानेश्वरीतील ओवींमध्ये निसर्ग आणि मानव जीवन यांचा सुसंगत संबंध स्पष्ट होतो.

संत तुकाराम महाराजांच्या अभंगांमधून पर्यावरणीय दृष्टिकोन दिसून येतो... वृक्षवल्ली आम्हा सोयरे वनचरे। पक्षी ही सुस्वरें आळविती।। यातून ते हे सांगतात की वृक्ष, वेली आणि वनातील जनावरें आमचे आस आहेत; आस म्हणजे कुटुंबीय, मित्र. वनातील पक्षी गोड आवाजात गातात. ह्या अभंगातून तुकाराम महाराज निसर्गातील प्रत्येक घटकाशी स्नेहाचे नाते जोडतात. माणसाने वृक्ष, प्राणी आणि पक्ष्यांशी सख्यभावाने वागले पाहिजे. तसेच ते अभंगातून असेही सांगतात.

अहरे पिसारे रानाता। तेथे सुख चिंता विसरते।।

म्हणजे जिथे हिरवे गवत, झाडांची पाने-फुले आणि जंगल आहे तेथे मनाला शांती मिळते, चिंता विसरली जाते. निसर्गाच्या सान्निध्यात मानसिक समाधान आणि शांती मिळते, हे पर्यावरण रक्षणाचे महत्त्व अधोरेखित करते.

जल आणि वृक्ष संरक्षणाचे संदेश मराठी संतांनी दिल्याचे दिसून येते. संतानी जलाच्या महत्त्वावर भर दिला आहे. गंगा, यमुना, गोदावरी या नद्यांचे पवित्रीकरण केवळ धार्मिक कारणांसाठी नव्हे तर त्यांच्या पर्यावरणीय महत्त्वामुळे आहे. संत एकनाथांनी गोदावरी नदीच्या काठावर राहून जलाच्या शुद्धतेचे महत्त्व सांगितले. तुकारामांनी त्यांच्या अभंगात नदी, तळी, विहिरी यांच्या संरक्षणावर भर दिला आहे. पाण्याचा दुरुपयोग न करण्याचा संदेश त्यांच्या रचनांमध्ये आढळतो.

संत एकनाथांच्या अभंगांमध्ये निसर्गाचे निरीक्षण फक्त भौतिक दृष्टिकोनातून नाही, तर त्याचा आध्यात्मिक आणि नैतिक अर्थही खोलवर प्रतिबिंबित केला आहे. निसर्गातील घटकांना ते जीवनाचा आध्यात्मिक भाग मानून त्यांचा आदर करण्यास

वाटचाल करतात. त्यांचे अभंग निसर्गसंरक्षणाची प्रेरणा देणारे अमूल्य साहित्य मानले जातात, जे आजच्या काळात पर्यावरणीय जागृतीसाठी खूप उपयुक्त आहे. त्यांच्या अभंगांमध्ये “जे जे दिसते ते नाशवंत आहे” किंवा “देह हा काळाचा जाणार आहे” अशी ओळी निसर्ग आणि जीवनाच्या अंतर्गत चक्रांना अधोरेखित करतात, जे पर्यावरणीय जीवन चक्राला साक्ष देणारे आहे.

संत चोखामेळांनी दलित समाजाच्या संघर्षात निसर्गप्रेम आणि सामाजिक न्याय यांची जोड दिली. त्यांनी त्यांच्या अभंगातून हे दाखवले की नैसर्गिक न्याय आणि सामाजिक न्याय हे एकमेकांपासून वेगळे करता येत नाहीत. चोखामेळांच्या अभंगांत सामाजिक बहिष्कारामुळे झालेल्या दुःखाचे वर्णन करताना निसर्गाशी एकरूप होण्याची भावना दिसून येते. निसर्ग हा सर्वांना समानतेची वागणूक देऊन उच्च नीच भावनेला संपवतो. पर्यायानाकडून खूप काही शिकण्याची गरज आहे हे त्यांनी दाखवून दिले.

निष्कर्ष :

महाराष्ट्रातील संत परंपरेने आजपासून शतकानुशतकांपूर्वी पर्यावरणसंवर्धनाचे जे संदेश दिले, ते आजच्या जागतिक पर्यावरणीय संकटाला तोंड देण्यासाठी अत्यंत उपयुक्त आहेत. संत ज्ञानेश्वरांचे नगर नियोजन, तुकारामांची निसर्गसख्यता, एकनाथांची भूतदया, रामदासांचे निसर्गसंवर्धन, नामदेवांची आध्यात्मिक पारिस्थितिकी, चोखामेळांचा समावेशक पर्यावरणवाद आणि इतर सर्व संतांचे ग्रामीण पर्यावरणीय ज्ञान यांचे एकत्रित अवलंबन करता येईल तर टिकाऊ भविष्याचे दर्शन घडवता येऊ शकते. या संतांची शिकवण हे दर्शवते की पर्यावरणप्रेम ही केवळ आधुनिक संकल्पना नसून भारतीय संस्कृतीच्या मूळात असलेली जीवनदृष्टी आहे. “वसुधैव कुटुंबकम्” या तत्त्वाचा विस्तार करून “वसुधैव परिवारकम्” या भावनेने संपूर्ण पृथ्वीला, त्यावरील सर्व जीवांना आपले कुटुंब मानणे हाच या संतांचा मूळ संदेश आहे.

संदर्भ:

१. संत तुकाराम गाथा, संपादक: विष्णु सखाराम खांडेकर
२. दासबोध, लेखक: समर्थ रामदास स्वामी
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५. ज्ञानेश्वरी, लेखक: संत ज्ञानेश्वर
६. मराठी संत साहित्य आणि पर्यावरण, डॉ. प्रभाकर गणेश जोग.

पर्यावरण बालक आणि बाल साहित्य

संशोधक विद्यार्थी

मार्गदर्शक

सिताफुले अभिनंदन बाळू

डॉ. रामदिनवर जि. एस.

प्रस्तावना :

पर्यावरण बालक आणि साहित्य याचा एक दुसऱ्यांशी खोल संबंध आहे. बालसाहित्यामुळे बालकात निसर्ग विषयी जागृती आणि प्रेम वाढीस लागते. त्यामुळे भविष्यात चांगला विचार करून जबाबदारीयुक्त व जागरूक नागरिक बनू शकतो. बाल साहित्यात बालकाला पर्यावरण विषयक समस्या व त्या समस्या निराकरण करण्यासाठी, शंका समाधान शोधण्यासाठी व शाश्वत शुद्ध जीवन जगण्यासाठी प्रेरित करतात. या बऱ्याच गोष्टी बालसाहित्यात अभ्यास करून बालक ज्ञान मिळवू शकतो. शिक्षक ही अशी एक शक्तिशाली उपकरण आहे जो की बालकांमध्ये निसर्गाशी एकरूप होण्यासाठी प्रयत्न सतत करत असतो.

उद्देश :

बालकात पर्यावरण विषयक जागरूकता व प्रेम निर्माण करणे.

पर्यावरण संरक्षण मूल्य बालकाला समजावून सांगणे. पर्यावरण विषयक व्यवहार समजून सांगणे पर्यावरण विषयी सामाजिक भावनात्मक विकास वाढीस लावणे.

शिक्षक बालक व पर्यावरणाविषयी या गुपचा निर्माण करणारा दुवा आहे .

महत्त्व :

पर्यावरण बालक व बालसाहित्य एकमेकापासून वेगळे करताच येत नाही पर्यावरणाशी एकरूप व पर्यावरण विषयक मातीत रमणारा बालक आहे तो निसर्गात खेळतो, वागडतो असतो, नाचतो, गातो त्यामुळे निसर्गाशी गट्टी असते . बालक निसर्गामुळे सुंदर दिसतो तर निसर्ग बालकामुळे ही सुंदर दिसते निसर्गामध्ये बालकाला प्रमोच्य आनंद ब्रह्मानंद होते. आणखी असेही म्हटले जाते की जो जास्त निसर्गाच्या सानिध्यात राहील तो निरोगी आनंदी आणि दीर्घायुष्य जगेल म्हणून बाल साहित्य अभ्यासात पर्यावरण व बालक यांना महत्त्व आहे. महाराष्ट्रात निसर्ग वर्णन करणारे अनेक साहित्यिक कवी होऊन गेले आहेत त्यामध्ये बालकवी, प्र.के. अत्रे, गिरजा गीर एकनाथ आव्हाड ,मंगेश पाडगावकर, शांता शेळके इत्यादी कवी व लेखकांनी आपापल्या साहित्यातून पर्यावरण विषयक कविता लिहिल्या आहेत. पर्यावरण बालक व बाल साहित्याचा संबंध दर्शविला आहे. अलीकडील काळात ही उत्तम कांबळे ,महावीर जोंधळे, सुरेश सावंत, श. ल. नाईक वीरभद्र मिरेवाड ,लक्ष्मण मालगिरवार इत्यादी कवी व बालसाहित्यिक मराठवाड्यात आहेत .

संशोधन पद्धती :

पर्यावरण बालक व बालसाहित्य हा संशोधन लेख लिहिण्यासाठी संशोधकांनी वर्णनात्मक , संदर्भग्रंथसूची, मुलाखत व ऐतिहासिक संशोधन पद्धतीचा वापर करण्यात आलेला आहे .

विषय विस्तार :

पर्यावरण आणि बालक हे बालसाहित्याचे मुख्य विषय आहे. ज्याद्वारे मुलांना निसर्गाशी नाते जोडण्यास शाश्वत प्रोत्साहन देण्यास आणि पर्यावरण संवर्धनाची मूल्य शिकण्यास बालसाहित्य मदत होत असते. पर्यावरणीय बाबी विषयी साहित्य मुलांमध्ये आवड निर्माण करते. त्यामुळे यात निसर्गबद्दल प्रेम आणि आदर निर्माण होते .उदाहरणार्थ बाल कवितेतून निसर्ग सौंदर्य विषयक बालकाच्या मनाला मोहून टाकते. बालसाहित्य हे मुलांना बालकांना पर्यावरणाचे संरक्षण करणे आणि शाश्वत जीवनाचा आदर्श मार्ग स्वीकारायास भाग पाडते. कचरा व्यवस्थापन आणि पाणी वाचवणे झाडे लावणे पशु प्राण्यांना लळा लावणे यासारख्या बाबी बालकांना शिकायला मिळतात .

पर्यावरण आणि बालसाहित्य बालकांमध्ये पर्यावरणीय मधील प्रदूषण जंगलतोड समस्या बदल जागरूकता निर्माण करते. काही बाल साहित्यिकांची कविता ही रंजक आणि खेळकर भाषेत नैतिक मूल्याची पेरणी करतात बालमानात आशावाद रुजवतात. ध्येय गाठण्यासाठी स्वतःची ही स्पर्धा करायला लावतात. बालसाहित्यामुळे निसर्ग ही स्पर्धा करायला लावते . बालसाहित्यामुळे निसर्गप्रेम वाढ होऊन मार्गदर्शक ठरतात. निसर्गाशी मैत्री करत जगन शिकवणाऱ्या काही कविता पुस्तकांची व मानवतेची उंची वाढवतात .

पर्यावरणीय विषयावर आधारित कथा कविता आणि चित्रे मुलांना कल्पनाशक्ती वापरण्यास आणि नवीन कल्पना प्रतिभा विकसित करण्यास प्रोत्साहित करतात यामुळे मुलांची बौद्धिक पातळीत वाढ होते. रंगीबेरंगी चित्रांच्या माध्यमातून निसर्गाशी ओळख करून देणारी चित्रकथा बालसाहित्य मुलांमध्ये प्रभावी ठरते. मुलांसाठी तयार केलेली मासिके उदाहरणात (आनंद, किशोर) आणि विविध प्रकारची पुस्तके पर्यावरण आणि निसर्ग या विषयावर माहितीपूर्ण साहित्य देतात. पर्यावरण संवर्धन व संरक्षणाचे बीज बालमनामध्ये रुजावे या हेतूने निर्माण केलेले साहित्य हेच आहे. उदाहरणार्थ वीरण बुट्टी हे पर्यावरण कवी आहेत ते मल्याळम विभागाचे सहयोगी प्राध्यापक आहेत. 'पर्यावरण बचाना होगा' ही हिंदी बाल साहित्यातील राजा चौरासियाची कविता बालमनावर पर्यावरण विषयक सुसंस्कार करणारी आहे .

वाढत्या औद्योगिक क्रांतीमुळे आज पर्यावरण मानवी सभ्यता डोक्यात येत आहे. लोकसंख्या वाढ प्रदूषण, जलवायू परिवर्तन जैवविविधता इत्यादी कारणांमुळे ही एक संकटे उद्भवत आहेत. जमिनीचे भूसंखलन हे वृक्षतोडी कारणांमुळे जास्त प्रमाणात दिसून येत आहे . बालक जे बघतात तेच करतात पाण्याचं महत्त्व त्यांना माहित नाही ते पाण्याचं विचाराने जास्त प्रमाणात करतात पर्यावरण संरक्षण लक्षात घेऊन अनेक कवितात पाण्याविषयी पर्यावरण संरक्षण लक्षात घेऊन अनेक कविता पाण्याविषयी अनेक कथा कविता आलेल्या दिसून येते.

बच्चे जग के प्यारे प्यारे

घर आंगन में पौधे रोपे हम

सब ही है एक देश के धरती को कुछ

पौधे सोपे पौधे जग मे जादा होंगे हरियाली खुशी आली होगी अशा पद्धतीची वृक्षवल्ली आम्हा सोयरे झाडाची महती सांगणारे अनेक कविता बाल साहित्यात आहेत

बालकाला साहित्यातून बालकांना पर्यावरण विषयक माहिती दिली जाईल निसर्गातील जलवायू वृक्ष यांचे जीवनात महत्त्व त्याचे संरक्षण अभिप्रेरित केले पाहिजे त्यांना सज्जग मी पाहिजे कारण साहित्य हा समाजाचा आरसा आहे ते समाजाचा प्रतिनिधित्व करते त्या त्या काळानुसार सामाजिक राजकीय धार्मिक आर्थिक परिस्थितीचे चित्रण त्यामध्ये आलेलं असते म्हणून काळानुरूप बालकांना पर्यावरण विषयक आवड निर्माण करणे उचित ठरेल

सारांश

बाल साहित्याचे प्रयोजन म्हणजे मुलांना शिकवण उपदेश करणं तात्पर्य सांगणे

संस्कार करणं त्यांना घडवून नव्हे तर बालसाहित्यात प्रयोजन मुलांना दिव्यदृष्टी देणे मुलांना आनंद देणे मुलांना आनंद देणे त्यांच्या विविध संकल्पना बाबत कक्षा रुन्दावतात.

बाल साहित्य हे मुलांना शिकवत नाही तर शिकण्याच्या अनेक अनेक पद्धती विविध पर्याय बाल साहित्य हे मुलांना शिकवत नाही तर शिकण्याच्या अनेक अनेक पद्धती विविध मुलांसमोर उलगडून ठेवते

त्यांच्यातील सुस् गुण शक्ती ,सर्जनशीलता याची जाणीव करून देते .बालसाहित्यामुळे पर्यावरण व बालक यांचा एकमेकाशी चांगला संबंध निर्माण होते

पर्यावरण संरक्षणाची जबाबदारी स्वतः घेतो सांस्कृतिक मानदंड म्हणून तो भावनात्मक विचार करू लागतो पर्यावरणातील समस्या जाणून तो त्या जाणून तो त्या पद्धतीने निराकरण करतो पर्यावरणातील बाबी जीवनात किती महत्त्व

आहे असेही तो विचार करतो आपण समाजाचे काही देणे लागते म्हणून तो पर्यावरणातील दूषित किंवा चांगली माहिती ज्ञानाच्या माध्यमातून देतो आणि घेतो.

संदर्भ ग्रंथ :

- 1 बालकविता - रमेशचंद्र पंत (उत्कृष्ट प्रकाशन)
- 2 जीवन सुंदर करू श.ल. नाईक
- 3 आभाळमाया - डॉक्टर सुरेश सावंत
- 4 बालगीत एव कविता - प्रभा पंत
- 5 बालसाहित्य स्वरूप व वाटचाल- छाया कांबळे
- 6 जातकोपदेश - गो. वि. दुर्गे
- 7 बाल साहित्य विश्वविचार व प्रेरणा - लीला दीक्षित
- ८ बाल साहित्याचे इतिहास - दुर्गा भागवत

मानवी आरोग्य आणि पर्यावरण : एक अभ्यास

हर्षपाल विनायक खाडे

मिलिंद कला महाविद्यालय नागसेनवन छत्रपती संभाजीनगर

डॉ. वनमाला तडवी

सहाय्यक प्राध्यापक भूगोल विभाग मिलिंद कला महाविद्यालय नागसेनवन छत्रपती संभाजीनगर

प्रस्तावना

मानवी जीवनाची गुणवत्ता ही त्याच्या आरोग्यावर आणि आसपासच्या पर्यावरणावर अवलंबून असते. पर्यावरण म्हणजे आपल्या भोवतालची भौतिक, रासायनिक, जैविक आणि सामाजिक घटकांची एकत्रित रचना. यात हवा, पाणी, माती, वनस्पती, प्राणी, हवामान आणि मानवनिर्मित घटक यांचा समावेश होतो. अलीकडच्या दशकांत औद्योगिकीकरण, शहरीकरण, वाहतुकीची वाढ, जंगलतोड, प्रदूषण, हवामान बदल इत्यादींमुळे पर्यावरणावर नकारात्मक परिणाम झाला आहे. याचा थेट परिणाम मानवी आरोग्यावर दिसून येतो.

मानवी आरोग्य आणि पर्यावरण यांच्यातील संबंध अतिशय जवळचा आहे. स्वच्छ पाणी, शुद्ध हवा, पोषक आहार, सुरक्षित निवासस्थान हे चांगल्या आरोग्यासाठी अत्यावश्यक आहेत. दुसरीकडे, दूषित पाणी, प्रदूषित हवा, आवाज, कीटकनाशके, रसायने, धोकादायक कचरा आणि अस्वच्छ परिसर हे रोगांची वाढ आणि मृत्यू दर वाढवतात. \

पर्यावरणाविषयी खूप काही जागृती करून सुद्धा मानवी वर्तनात बदल होत नाही. या पृथ्वीवर सर्वात बुद्धीवान कोण तर मानवाने आपल्या बुद्धीचा वापर करून पर्यावरणाकडून जसा पाहिजे तसा विकास साधून घेतला आहे. मात्र तो आज परतफेड करण्याचे विसरला आहे त्याचा परिणाम मानवी आरोग्यावर झाला आहे. एखाद्या व्यक्तीकडून जेव्हा आपण मदत घेता तेव्हा त्याच्या प्रती आपण कृतज्ञ राहतो. हा नियम पर्यावरणाशी मानवाने कधीच पाळाला नाही. त्यामुळे आज पर्यावरण वाचवा, देश वाचवा, आरोग्य वाचवा अशी वाक्ये कानी पडत आहेत.

डॉ. रॉय पर्यावरणाबद्दल म्हणतात की, मानवी जीवनावर परिणाम करणारी कोणतीही बाह्यशक्ती म्हणजे पर्यावरण वनस्पतीपासून प्राण्यांमार्फत सगळ्यांच्या जीवनावर या पर्यावरणाचा प्रभाव आढळून येतो. पर्यावरणाशी जो योग्य प्रकारे समन्वय साधतो तोच या पर्यावरणात जिवंत राहू शकतो. मानवी जीवन सुद्धा याला अपवाद नाही. पर्यावरणाने मानवाला अन्न, वस्त्र, निवारा या मूलभूत सोयीसह अन्य अनेक सुविधा उपलब्ध करून दिल्या आहेत. परंतु मानवाच्या स्वार्थी वृत्तीने पर्यावरणाचा बेसुमार वापरामुळे अनेक जटील समस्या निर्माण झाल्या आहेत त्यामुळे पर्यावरणीय व्यवस्थेत असंतुलीतपणा निर्माण होवून प्राणीमात्रास धोका निर्माण आला आहे मानवाच्या अविचारी वागण्यामुळे विविध प्रकारचे प्रदूषणात वाढ झाली आहे. औद्योगिक व रासायनिक दूषित किरणामुळे विविध प्रकारची आजारे वाढत आहेत. ओझोनचा बर, आगलप्रर्जन्य, सागरी परिसंस्थेचा असमतोल, प्राणी व पक्षी यांचे नामशेष, नागरिकरण, वाळवंटीकरण इत्यादी समस्यांमुळे वातावरणात आकर्षक बदल होवून त्याचा परिणाम शेवटी मानवी आरोग्यावरच झाला आहे.

पर्यावरणातून आपणास हवा, पाणी आणि नैसर्गिक समृद्धी मिळते. ज्यामुळे आपण चांगले जीवन व्यतीत करू शकतो. या सर्व गोष्टीसाठी मानवाने पुढे आले पाहिजे. वनस्पती, वृक्षाची लागवड करून त्याचे संवर्धन केले पाहिजे हे प्रत्येक नागरिकांचे कर्तव्य आहे.

मुख्य कीवर्ड:

मानवी आरोग्य, पर्यावरण, प्रदूषण, हवामान बदल, पाणी गुणवत्ता, अन्न सुरक्षा, सार्वजनिक आरोग्य,

१) संशोधनाची गरज व महत्त्व

- १) प्रदूषण व हवामान बदलामुळे वाढणारे आरोग्यविषयक धोके ओळखणे.
- २) ग्रामीण व शहरी भागातील आरोग्य समस्यांमध्ये असलेला फरक अभ्यासणे.
- ३) पर्यावरण संरक्षण धोरणांचा परिणाम जाणून घेणे.

२. संशोधन उद्दिष्टे

- १) मानवी आरोग्य आणि पर्यावरणातील परस्परसंबंध अभ्यासणे.
- २) प्रदूषण, हवामान बदल, पाण्याची गुणवत्ता, अन्नसुरक्षा यांचा आरोग्यावर होणारा परिणाम तपासणे.
- ३) पर्यावरणपूरक जीवनशैली व आरोग्य संवर्धनासाठी उपाय सुचवणे.

३) संशोधन पद्धत

संशोधन प्रकार: वर्णनात्मक व विश्लेषणात्मक.

पर्यावरणाचा मानवी आरोग्यावर होणारा परिणाम

पर्यावरण म्हणजे आपल्या भोवतालच्या नैसर्गिक व मानवनिर्मित घटकांची एकत्रित रचना. यात हवा, पाणी, माती, हवामान, वनस्पती, प्राणी, तसेच सामाजिक व आर्थिक व्यवस्था यांचा समावेश होतो. मानवी आरोग्य आणि पर्यावरण यांचा संबंध अगदी जवळचा आहे. स्वच्छ हवा, पिण्यायोग्य पाणी, सुपीक माती आणि संतुलित हवामान हे चांगल्या आरोग्यासाठी आवश्यक घटक आहेत. परंतु मानवी हस्तक्षेपामुळे निर्माण होणारे प्रदूषण, हवामान बदल, जैवविविधतेची हानी आणि नैसर्गिक संसाधनांचे अतिरेकी शोषण यामुळे पर्यावरणाची गुणवत्ता कमी होते व याचा थेट परिणाम मानवी आरोग्यावर होतो.

१) हवेचे प्रदूषण व आरोग्य

हवेचे प्रदूषण हे आज जगातील प्रमुख आरोग्य धोक्यांपैकी एक आहे.

प्रमुख स्रोत: वाहनांचा धूर, औद्योगिक वायू, बांधकामातील धूळ, कृषी अवशेष जाळणे, घरगुती इंधन (लाकूड, कोळसा, गोवऱ्या).

• आरोग्यावर परिणाम:

श्वसन विकार: दमा, क्रॉनिक ब्रॉन्कायटिस, COPD.

हृदयविकार: हृदयविकाराचा झटका, उच्च रक्तदाब.

कर्करोग: विशेषतः फुफ्फुसांचा कर्करोग.

इतर परिणाम: थकवा, डोकेदुखी, डोळ्यांची जळजळ.

WHO च्या अहवालानुसार, दरवर्षी सुमारे ७० लाख मृत्यू हवेच्या प्रदूषणाशी संबंधित असतात.

पाण्याचे प्रदूषण व आरोग्य

पाणी हे जीवनासाठी आवश्यक घटक असून त्याची गुणवत्ता मानवी आरोग्यावर निर्णायक परिणाम करते.

प्रमुख स्रोत: औद्योगिक सांडपाणी, कृषी क्षेत्रातील रसायने, सांडपाणी नाल्यांतून सोडणे, प्लास्टिक प्रदूषण.

• आरोग्यावर परिणाम:

संसर्गजन्य रोग: टायफॉईड, कॉलरा, अतिसार, हेपॅटाइटिस-A व E.

रासायनिक प्रदूषणाचे परिणाम: फ्लोराइडची अतिरेक्यामुळे फ्लोरोसिस, आर्सेनिकमुळे त्वचारोग व कर्करोग, नायट्रेट्समुळे ब्लू बेबी सिंड्रोम.

परजीवी संसर्ग: जंत, अॅमीबा, गियार्डिया.

२) अन्न व माती प्रदूषणाचा परिणाम

मातीची गुणवत्ता थेट अन्नाच्या गुणवत्तेशी संबंधित असते.

प्रमुख कारणे: रासायनिक खते, कीटकनाशके, औद्योगिक कचरा, प्लास्टिक व धातू अवशेष.

• आरोग्यावर परिणाम:

कीटकनाशकांचे अवशेष: हार्मोनल असंतुलन, न्यूरोलॉजिकल समस्या, कर्करोग.

जड धातू (लेड, पारा, कॅडमियम): मूत्रपिंड विकार, मानसिक विकासात अडथळे.

• पोषणाची कमतरता: मातीची सुपीकता घटल्याने पोषक अन्नाचे प्रमाण कमी होते.**३) आवाज प्रदूषणाचा परिणाम**

आवाज प्रदूषण हा मानसिक व शारीरिक आरोग्यासाठी गंभीर धोका आहे.

स्रोत: वाहतूक, औद्योगिक यंत्रणा, फटाके, बांधकाम.

परिणाम:

श्रवणशक्ती कमी होणे किंवा बहिरेपणा.

निद्रानाश, चिडचिड, मानसिक तणाव.

हृदयविकार व उच्च रक्तदाबाची जोखीम वाढते.

४) हवामान बदलाचा परिणाम

जागतिक तापमानवाढ, पावसातील अनियमितता, पूर व दुष्काळ या हवामान बदलाच्या घटना थेट आरोग्यावर परिणाम करतात.

परिणाम:

उष्णतेमुळे होणारे आजार (heat stroke).
डासांद्वारे पसरणारे रोग (मलेरिया, डेंग्यू, चिकनगुनिया).
अन्न उत्पादन घटल्यामुळे कुपोषण.
मानसिक तणाव व नैराश्य.

५) पर्यावरणीय घटकांचा एकत्रित परिणाम

अनेक वेळा प्रदूषण, हवामान बदल आणि सामाजिक-आर्थिक घटक एकत्रितपणे आरोग्यावर परिणाम करतात. उदाहरणार्थ, गरीब वस्त्यांमध्ये हवेचे व पाण्याचे प्रदूषण, गर्दी, स्वच्छतेचा अभाव आणि अपुरी आरोग्यसेवा यामुळे रोगांचा प्रसार वेगाने होतो.

६) निष्कर्ष

पर्यावरणाची गुणवत्ता थेट मानवी आरोग्याशी निगडित आहे. पर्यावरण प्रदूषण कमी करण्यासाठी आणि नैसर्गिक संसाधनांचे संवर्धन करण्यासाठी तातडीने व प्रभावी उपाययोजना करणे आवश्यक आहे.

७) संदर्भ

- १) जागतिक आरोग्य संघटना (WHO) – Environmental health data
- २) भारत सरकार – पर्यावरण संरक्षण अधिनियम 1986
- ३) भारतीय वैद्यकीय संशोधन परिषद (ICMR) – Environmental pollution and human health reports
- ४) पर्यावरण मासिक – आरोग्य व पर्यावरण विशेषांक

पर्यावरण संवर्धनात हरित ग्रंथालयाची भूमिका

मंगेश वामनराव वागदे

ग्रंथपाल, गोपिकाबाई भुरे महिला महाविद्यालय, तुमसर, जि.भंडारा

सारांश:

पर्यावरण संवर्धन ही आजच्या काळातील अत्यंत महत्वाची गरज आहे. नैसर्गिक संसाधनांचा अतिरेकी वापर, प्रदूषण आणि हवामान बदलामुळे शाश्वत विकास धोक्यात आला आहे. अशा परिस्थितीत, हरित ग्रंथालय (Green Library) ही एक नावीन्यपूर्ण व पर्यावरणपूरक संकल्पना पुढे आली आहे. हरित ग्रंथालयाद्वारे ऊर्जा बचत, पाणी व कागद वाचवणे, कचरा व्यवस्थापन, शाश्वत वास्तुकला तसेच पर्यावरणविषयक जनजागृती अशा विविध उपक्रमांद्वारे पर्यावरण संवर्धन साधले जाते. तसेच विद्यार्थ्यांमध्ये व समाजात पर्यावरणपूरक जीवनशैलीचा प्रसार होतो. त्यामुळे हरित ग्रंथालये ही केवळ ज्ञानसंपादनाचे केंद्र नसून पर्यावरण संवर्धनाची प्रेरणास्थळे ठरतात. या लेखात पर्यावरण संकल्पना, पर्यावरणाचे प्रकार, महत्त्व, सध्याच्या समस्या, हरित ग्रंथालयाची संकल्पना, उद्देश, घटक, उपयोग, उदाहरणे फायदे, भारतातील उगम आणि हरित ग्रंथालयाची पर्यावरण संवर्धनातील भूमिका व योगदान यावर चर्चा करण्यात आली आहे.

बीज शब्द: पर्यावरण, ग्रंथालय शास्त्र, शाश्वत विकास, माहिती सेवा, जनजागृती, ग्रंथालय चळवळ

प्रस्तावना:

आजच्या औद्योगिकीकरण आणि तंत्रज्ञानाच्या युगात पर्यावरणाचे महत्त्व अधिक अधोरेखित झाले आहे. प्रदूषण, हवामान बदल, जैवविविधतेचा नाश या समस्या गंभीर बनत चालल्या आहेत. त्याचबरोबर, माहितीचा विस्फोट झाल्यामुळे ग्रंथालयांची भूमिका केवळ ज्ञानसंग्रहालयापुरती मर्यादित न राहता सामाजिक जबाबदारीपर्यंत वाढली आहे. पर्यावरण संवर्धनासाठी ग्रंथालये हे महत्वाचे केंद्र ठरू शकतात. आजच्या युगात वाढते औद्योगिकीकरण, शहरीकरण आणि तंत्रज्ञानाचा अतिरेकी वापर यामुळे पर्यावरणीय संतुलन धोक्यात आले आहे. हवामान बदल, पाणीटंचाई, ऊर्जा संकट, प्रदूषण यांसारख्या समस्या गंभीर बनल्या आहेत. अशा परिस्थितीत प्रत्येक क्षेत्राने पर्यावरणपूरक उपाययोजना स्वीकारणे गरजेचे आहे. ग्रंथालय शास्त्र हे ज्ञानवितरणाचे माध्यम असले तरी पर्यावरण संरक्षणातही त्याची महत्वाची भूमिका असू शकते. या पार्श्वभूमीवर उदयास आलेली संकल्पना म्हणजेच हरित ग्रंथालय (Green Library).

पर्यावरणाचे रक्षण ही आजची अत्यावश्यक गरज आहे आणि प्रत्येक क्षेत्राने या दिशेने योगदान देणे आवश्यक आहे. हरित ग्रंथालय ही संकल्पना पर्यावरण आणि ज्ञान या दोन महत्वाच्या घटकांना जोडते. ऊर्जा बचत, पाणी व्यवस्थापन, डिजिटल सेवा आणि जनजागृती उपक्रम यामुळे हरित ग्रंथालय केवळ वाचन व अध्ययनासाठी केंद्र न राहता पर्यावरण संवर्धनाचे प्रेरणास्थान ठरते. त्यामुळे भविष्यातील सर्व ग्रंथालयांनी पर्यावरणपूरक तत्वे स्वीकारून शाश्वत विकासासाठी हातभार लावणे ही काळाची गरज आहे.

पर्यावरण संकल्पना:

पर्यावरण हा आजच्या काळातील एक महत्वाचा व ज्वलंत विषय आहे. मानवाचे अस्तित्व आणि प्रगती ही पर्यावरणाशी घट्टपणे जोडलेली आहे. प्राचीन काळापासून मनुष्याने निसर्गाशी सुसंगत जीवन जगले; परंतु औद्योगिकीकरण, नागरीकरण आणि विज्ञान-तंत्रज्ञानाच्या प्रगतीमुळे पर्यावरणाचा समतोल बिघडू लागला. या पार्श्वभूमीवर पर्यावरण संकल्पना समजून घेणे अत्यावश्यक आहे. पर्यावरण या शब्दाचा अर्थ “जीव आणि त्याच्या सभोवतालच्या सर्व घटकांचा परस्परसंबंध” असा होतो. यात नैसर्गिक, जीवसृष्टी, सामाजिक, सांस्कृतिक आणि तांत्रिक घटकांचा समावेश होतो. मनुष्य, प्राणी, वनस्पती हे सर्व घटक पर्यावरणाचा एक भाग आहेत. पर्यावरण ही केवळ नैसर्गिक संपत्ती नसून मानवाच्या अस्तित्वाची मूलभूत गरज आहे. पर्यावरणाचे संतुलन राखणे, प्रदूषणावर नियंत्रण ठेवणे, वने व जलस्रोतांचे संवर्धन करणे ही प्रत्येक व्यक्तीची जबाबदारी आहे. शाश्वत विकास साधायचा असेल, तर पर्यावरणाचे योग्य संवर्धन करणे अनिवार्य आहे.

पर्यावरणाचे घटक

1. नैसर्गिक घटक: हवा, पाणी, माती, नद्या, पर्वत, समुद्र, हवामान इ.

2. जीवसृष्टी: मानव, प्राणी, पक्षी, वनस्पती, सूक्ष्मजीव.
3. सामाजिक सांस्कृतिक घटक: मानवी वस्ती, शेती, उद्योग, शिक्षण, कला व संस्कृती.
4. तांत्रिक घटक: यंत्रसामग्री, वाहतूक, उद्योग, माहिती-तंत्रज्ञान.

पर्यावरणाचे प्रकार

1. नैसर्गिक पर्यावरण: जंगल, डोंगर, समुद्र, नद्या, प्राणी, वनस्पती.
2. मानवनिर्मित पर्यावरण: शहर, वाहतूक व्यवस्था, तंत्रज्ञान, कारखाने.
3. सामाजिक पर्यावरण: प्रथा, परंपरा, संस्कृती, भाषा, धर्म.

पर्यावरणाचे महत्त्व

- जीवनासाठी आवश्यक हवा, पाणी, अन्न यांचा पुरवठा करते.
- जैवविविधतेचे संरक्षण करते.
- मानवी विकास आणि प्रगतीसाठी आवश्यक संसाधने उपलब्ध करून देते.
- हवामान व वातावरणीय समतोल राखते.

सध्याच्या समस्या

- प्रदूषण (हवा, पाणी, ध्वनी)
- जंगलतोड व जैवविविधतेचा नाश
- हवामान बदल
- प्लास्टिक व ई-कचरा

हरित ग्रंथालयाची संकल्पना

हरित ग्रंथालय म्हणजे असे ग्रंथालय जे पर्यावरणपूरक पद्धतीने बांधलेले, चालवलेले आणि वापरकर्त्यांना सेवा देणारे केंद्र असते. या ग्रंथालयात ऊर्जा बचत, पाणी व्यवस्थापन, पुनर्वापर, डिजिटल सेवा, प्रदूषण नियंत्रण आणि शाश्वत विकास यांवर विशेष भर दिला जातो. हरित ग्रंथालयाचा उद्देश केवळ पुस्तक व माहिती सेवा पुरवणे नसून, निसर्गाशी सुसंवाद राखून ज्ञानवितरण करणे हा असतो. पर्यावरण वाचवण्यासाठी प्रत्येक क्षेत्रातून प्रयत्न होणे आवश्यक आहे. ग्रंथालये ही शिक्षण व संशोधनाची केंद्रे असून ती समाजाला दिशा देऊ शकतात. हरित ग्रंथालयाची संकल्पना या संदर्भात अत्यंत उपयुक्त ठरते. भारतात अशा ग्रंथालयांची सुरुवात झाली असून भविष्यात अधिक प्रमाणात अंमलबजावणी करण्याची गरज आहे. शासन, शैक्षणिक संस्था व समाज यांच्या संयुक्त प्रयत्नातून हरित ग्रंथालयाचे जाळे निर्माण होऊ शकते.

हरित ग्रंथालयाचा भारतात उगम

भारतामध्ये हरित ग्रंथालय संकल्पना सुमारे 2000 नंतर प्रचलित होऊ लागली.

- IIT, IIM, NIT सारख्या उच्च शिक्षण संस्थांनी सर्वप्रथम ग्रीन बिल्डिंग संकल्पना स्वीकारून ग्रंथालयात सौरऊर्जा, ई-लायब्ररी, पावसाचे पाणी साठवण यांचा वापर सुरू केला.
- राष्ट्रीय डिजिटल लायब्ररी ऑफ इंडिया (NDLI) (2016, IIT खडगपूर) हे डिजिटल व पेपरलेस ग्रंथालय हे ग्रीन लायब्ररीच्या दिशेने मोठे पाऊल आहे.
- रु.सा. (RUSA), UGC, इन्फ्लिबनेट, ई-शोधसिंधु यांसारख्या शासकीय योजना पर्यावरणपूरक डिजिटल ग्रंथालये उभारण्यास साहाय्य करत आहेत.
- काही सार्वजनिक व विद्यापीठीय ग्रंथालयांनी GRIHA (Green Building Rating) निकषांनुसार बांधकाम व व्यवस्थापन सुरू केले आहे.

हरित ग्रंथालयाचे घटक

1. भौतिक घटक: ग्रीन बिल्डिंग, सौरऊर्जा, पाणी साठवण प्रणाली.
2. तांत्रिक घटक: ई-लायब्ररी, ऑनलाइन डेटाबेस, क्लाउड स्टोरेज.
3. व्यवस्थापन घटक: कचरा व्यवस्थापन, पुनर्वापर, कार्बन फूटप्रिंट कमी करणे.
4. शैक्षणिक घटक: पर्यावरण जनजागृती कार्यशाळा, शाश्वत विकास प्रशिक्षण.

हरित ग्रंथालयाचे उद्देश

- पर्यावरणपूरक व शाश्वत ग्रंथालय संस्कृती प्रस्थापित करणे.
- ऊर्जा व नैसर्गिक साधनांचा कार्यक्षम वापर करणे.
- वाचकांना आधुनिक व डिजिटल माहिती सहज उपलब्ध करून देणे.
- समाजात पर्यावरण रक्षणाबद्दल जागरूकता निर्माण करणे.
- पुढील पिढ्यांसाठी पर्यावरणाचे संवर्धन करणे.

समाजासाठी हरित ग्रंथालयाचा उपयोग

- ज्ञान व पर्यावरणाचा संगम: वाचनासोबत पर्यावरण रक्षणाचे संस्कार.
- डिजिटल समानता: सर्वांना ऑनलाईन संसाधनांचा वापर करण्याची सुविधा.
- पर्यावरणपूरक वाचन संस्कृती: पेपरलेस अभ्यास व डिजिटल शिक्षण.
- शैक्षणिक व सामाजिक कार्यक्रम: पर्यावरणाशी निगडित कार्यशाळा, व्याख्याने, प्रदर्शने.
- स्थानिक समाज विकास: शाळा, महाविद्यालये व समाजातील लोकांना शाश्वत जीवनशैलीबाबत प्रेरणा.

हरित ग्रंथालयाची पर्यावरण संवर्धनातील भूमिका

1. ऊर्जा बचत: नैसर्गिक प्रकाश व वायुविजनाचा (ventilation) वापर. सौरऊर्जा, LED दिवे व स्मार्ट इलेक्ट्रिकल प्रणालींचा अवलंब.
2. कागद बचत: ई-पुस्तके, ई-जर्नल्स, ई-रिपॉझिटरी यांचा वापर करून कागदाची मागणी कमी होते. "पेपरलेस वाचनालय" ही संकल्पना समाजात रुजवली जाते.
3. पाणी बचत: पावसाचे पाणी साठवणे. ग्रंथालय इमारतींमध्ये पुनर्वापर (Recycling) व पाणी वाचवणाऱ्या सुविधा.
4. कचरा व्यवस्थापन: प्लास्टिकमुक्त ग्रंथालय. जैविक व अजैविक कचऱ्याचे वर्गीकरण व पुनर्वापर.
5. पर्यावरणाविषयी जागृती: वाचक व विद्यार्थ्यांना पर्यावरणाशी संबंधित साहित्य, प्रदर्शन, कार्यशाळा उपलब्ध करून देणे. पर्यावरण दिन, वन महोत्सव यांसारखे उपक्रम ग्रंथालयाच्या माध्यमातून राबवणे.
6. शाश्वत वास्तुकला: पर्यावरणपूरक बांधकाम साहित्याचा वापर. हरित छत (Green Roof), झाडे व बागायती यांमुळे हवेची शुद्धता वाढते.
7. सामाजिक जबाबदारी: समाजातील लोकांना पर्यावरणपूरक जीवनशैलीचा संदेश देणे. "हरित ग्रंथालय = हरित समाज" ही संकल्पना रुजवणे.

हरित ग्रंथालयाचे विद्यार्थ्यांच्या व वाचकांच्या दृष्टिकोनातून फायदे

1. शैक्षणिक फायदे: डिजिटल साधनसंपत्ती उपलब्ध असल्यामुळे विद्यार्थ्यांना कोणत्याही वेळी, कुठूनही अभ्यास सामग्री मिळते. ई-पुस्तके, ई-जर्नल्स, ओपन ऍक्सेस डेटाबेस यामुळे अभ्यासासाठी अद्ययावत व भरपूर स्रोत मिळतात. पर्यावरणपूरक वातावरणात शिकण्यामुळे एकाग्रता वाढते.
2. आर्थिक फायदे: ई-संसाधनांमुळे पुस्तक खरेदी किंवा छपाईवरील खर्च कमी होतो. कागद, नोट्स, छायांकित प्रती यावरचा खर्च वाचतो. विद्यार्थ्यांना मोफत किंवा कमी खर्चात प्रचंड ज्ञानसंपत्ती मिळते.
3. आरोग्य व सुविधा फायदे: हरित ग्रंथालयाची वास्तू (हवेशीर जागा, हरित परिसर) मानसिक ताण कमी करते. शांत, स्वच्छ व नैसर्गिक वातावरण अभ्यासासाठी उत्तम ठरते. ग्रीन स्पेसमुळे आरोग्यदायी व प्रेरणादायी वातावरण मिळते.
4. पर्यावरणीय फायदे: कागदाचा वापर कमी झाल्याने झाडे वाचतात; विद्यार्थ्यांना "शाश्वत जीवनशैली"ची प्रेरणा मिळते. पुनर्वापर (Recycle, Reuse) पद्धती विद्यार्थ्यांना प्रत्यक्ष शिकायला मिळते. पर्यावरणपूरक उपक्रमांमध्ये (tree plantation, green awareness programs) विद्यार्थ्यांचा सहभाग वाढतो.
5. वेळ व सुलभता फायदे: ई-लायब्ररीमुळे रांगेत उभे राहण्याची किंवा पुस्तक शोधण्यासाठी वेळ वाया घालवण्याची गरज नाही. कीवर्ड शोध प्रणालीमुळे माहिती लवकर मिळते. ऑनलाईन साहित्य २४x७ उपलब्ध असल्याने अभ्यासाचे वेळापत्रक लवचिक बनते.

6. करिअर व संशोधन फायदे: जागतिक दर्जाचे संशोधन पेपर्स, थिसिसेस व ओपन ऍक्सेस जर्नल्स उपलब्ध असल्याने विद्यार्थी संशोधन करू शकतात. पर्यावरणपूरक ग्रंथालयातून विद्यार्थ्यांमध्ये शाश्वत विकासाविषयी जाणीव वाढते, जी भविष्यातील करिअरमध्ये उपयोगी पडते. ग्रीन लायब्ररी विषयक उपक्रमांतून नेतृत्वगुण, समाजाभिमुखता व संशोधनवृत्ती विकसित होते.

भारतातील हरित ग्रंथालयांची उदाहरणे

- इंदिरा गांधी राष्ट्रीय केंद्र, नवी दिल्ली – येथे शाश्वत विकास संकल्पनेवर आधारित ग्रंथालय सुविधा.
- अहमदाबाद व्यवस्थापन संस्था (IIM-A) – पर्यावरणपूरक अधोसंरचना.
- अण्णा विद्यापीठ, चेन्नई – सौरऊर्जा व डिजिटल सेवांवर भर.
- काही राज्य विद्यापीठांमध्ये "ई-लायब्ररी" संकल्पना राबवली जाते, जी पेपरलेस व्यवहारामुळे हरित उपक्रमाला हातभार लावते.

हरित ग्रंथालय निर्माण करण्यात भारत सरकारचे योगदान

1. राष्ट्रीय धोरणे व उपक्रम

- राष्ट्रीय शिक्षण धोरण 2020 (NEP 2020): डिजिटल लायब्ररी, ई-संसाधने, ई-लर्निंगवर भर देऊन *पेपरलेस शिक्षण प्रणाली* प्रोत्साहन दिले.
- स्वच्छ भारत अभियान (2014): सार्वजनिक ठिकाणे व संस्थांमध्ये स्वच्छता टिकवण्याच्या उपक्रमांतर्गत ग्रंथालयातही *स्वच्छता व कचरा व्यवस्थापन* यावर लक्ष.
- राष्ट्रीय हरित इमारत संहिता (GRIHA – Green Rating for Integrated Habitat Assessment): शासकीय इमारतींमध्ये पर्यावरणपूरक बांधकामाचे निकष अनिवार्य करण्यात आले. यामुळे नव्या ग्रंथालयांच्या बांधकामात *सौरऊर्जा, पावसाचे पाणी साठवण, नैसर्गिक वायुवीजन* यांचा वापर होतो.

2. ऊर्जा व पर्यावरणपूरक तंत्रज्ञान

- ऊर्जा कार्यक्षम भारत (Energy Efficiency Mission): अंतर्गत काही विद्यापीठीन ग्रंथालयांमध्ये सौर पॅनेल्स व LED लाइट्स बसवण्यात आल्या आहेत.
- नवीकरणीय ऊर्जा मंत्रालय : शासकीय निधीवर *सौरऊर्जेचा वापर* असलेली इमारती उभारल्या जात आहेत.

3. डिजिटल ग्रंथालय उपक्रम

- राष्ट्रीय डिजिटल लायब्ररी ऑफ इंडिया (NDLI): IIT खडगपूरच्या सहकार्याने सुरू केलेले प्रकल्प. यामुळे विद्यार्थ्यांना व संशोधकांना मोफत ई-पुस्तके, संशोधन लेख, ऑडिओ-व्हिडिओ सामग्री उपलब्ध. डिजिटल सेवा पर्यावरणपूरक ठरतात कारण त्यामुळे *कागदाचा वापर कमी* होतो.
- ई-शोधसिंधु, शोधनशीद, शैक्षणिक पोर्टल्स:UGC आणि INFLIBNET च्या मदतीने ई-संसाधनांची सुविधा.
- पर्यावरण, वन आणि हवामान बदल मंत्रालय विविध शासकीय व शैक्षणिक संस्थांना ग्रीन उपक्रमांवर प्रशिक्षण देते.
- लायब्ररी सायन्स क्षेत्रातील परिषदांमध्ये "ग्रीन लायब्ररी" या संकल्पनेवर विशेष भर दिला जातो.

4. निधी व पायाभूत सुविधा:

- UGC, RUSA अंतर्गत विद्यापीठीन ग्रंथालयांसाठी निधी उपलब्ध. या निधीतून ग्रीन बिल्डिंग डिझाईन, ई-लायब्ररी, सौरऊर्जा प्रणाली, डिजिटल संग्रह उभारले जात आहेत.

5. जनजागृती व प्रशिक्षण:

- पर्यावरण, वन आणि हवामान बदल मंत्रालय विविध शासकीय व शैक्षणिक संस्थांना ग्रीन उपक्रमांवर प्रशिक्षण देते.
- लायब्ररी सायन्स क्षेत्रातील परिषदांमध्ये "ग्रीन लायब्ररी" या संकल्पनेवर विशेष भर दिला जातो.

हरित ग्रंथालयाचे फायदे

- पर्यावरण संवर्धन: प्रदूषण कमी होते, नैसर्गिक साधनांचा समतोल वापर.
- ऊर्जा व खर्च बचत: सौरऊर्जा व कार्यक्षम साधनांमुळे खर्चात कपात.

- पेपरलेस संस्कृती: डिजिटल माध्यमामुळे कागदाचा वापर कमी होतो.
- आरोग्यदायी वातावरण: नैसर्गिक प्रकाश, स्वच्छ हवा व हरित परिसर.
- शाश्वत विकासाला चालना: पुढील पिढ्यांसाठी पर्यावरण सुरक्षित ठेवणे.
- आधुनिक सेवा: ई-संसाधनांमुळे जागतिक माहिती सहज उपलब्ध.

निष्कर्ष:

पर्यावरण व ग्रंथालय शास्त्र या दोन्ही क्षेत्रांचा परस्परसंबंध शाश्वत विकासासाठी महत्वाचा आहे. पर्यावरणपूरक ग्रंथालये निर्माण करून आणि पर्यावरण शिक्षणाला चालना देऊन समाजात पर्यावरणाबद्दल जागरूकता निर्माण होऊ शकते. त्यामुळे भविष्यातील पिढ्यांसाठी “हरित व ज्ञानसमृद्ध समाज” उभारणे शक्य आहे. हरित ग्रंथालय ही केवळ आधुनिक संकल्पना नसून ती आजच्या काळाची गरज आहे. ग्रंथालय ही केवळ ज्ञान व माहितीची केंद्रे राहिली नसून ती समाजासाठी पर्यावरणपूरक जीवनशैलीचे आदर्श केंद्र बनत आहेत. शाश्वत विकास, संसाधनांचा योग्य वापर आणि पर्यावरण संरक्षण या उद्दिष्टांसाठी ग्रीन ग्रंथालय महत्त्वपूर्ण ठरते. त्यामुळे भविष्यातील सर्व ग्रंथालयांनी ही संकल्पना स्वीकारून पर्यावरणपूरक व शाश्वत ग्रंथालये उभी करणे अत्यावश्यक आहे. भारत सरकारने थेट ग्रीन लायब्ररी योजना न राबवता विविध शासकीय धोरणे, शाश्वत विकास उपक्रम, डिजिटल शिक्षण योजना आणि ग्रीन बिल्डिंग निकषांद्वारे ग्रंथालयांना हरित संकल्पनेकडे वळवले आहे. राष्ट्रीय डिजिटल लायब्ररीसारखे प्रकल्प, सौरऊर्जा वापर, पावसाचे पाणी साठवण आणि ई-लायब्ररींचे जाळे या सर्वांमुळे भारतातील ग्रंथालये पर्यावरणपूरक व शाश्वत विकासाचे केंद्र बनत आहेत. पर्यावरण संवर्धनासाठी हरित ग्रंथालय हा प्रभावी पर्याय आहे. ग्रंथालये केवळ ज्ञानकेंद्र न राहता पर्यावरणपूरक उपक्रमांची आदर्श स्थळे बनू शकतात. भारतात याची सुरुवात झाली असली तरी भविष्यात सर्वत्र अंमलबजावणी करण्याची गरज आहे.

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अनुसूचित जमाती आणि शाश्वत विकास: विशेष संदर्भ-नाशिक जिल्हा

डॉ. सुनील भास्कर कर्डक

वाणिज्य विभागप्रमुख आणि सहयोगी प्राध्यापक,
गुरुवर्य मामासाहेब दांडेकर कला, भगवंतराव वाजे वाणिज्य आणि विज्ञान महाविद्यालय, सिन्नर, नाशिक.

सारांश:

भारतातील सामाजिक रचनेत अनुसूचित जमातींना ऐतिहासिकदृष्ट्या दुय्यम स्थान देण्यात आले. त्यांच्या आर्थिक, सामाजिक व सांस्कृतिक विकासासाठी शासन विविध योजना राबवत असले तरी अजूनही त्यांच्या समस्या कायम आहेत. यासाठी केवळ विकास नव्हे तर शाश्वत विकास गरजेचा आहे, जो त्यांच्या जीवनशैलीला धरून असेल. अनुसूचित जमाती म्हणजे भारतातील पारंपरिक, सामाजिक व आर्थिक दृष्ट्या वंचित समूह आहेत. त्यांचा सर्वांगीण विकास करण्यासाठी केवळ आर्थिक योजना नव्हे, तर सामाजिक न्याय, सांस्कृतिक जतन आणि पर्यावरणीय समतोल यांचाही विचार करणे अत्यावश्यक आहे. शाश्वत विकास म्हणजे भविष्यातील पिढ्यांच्या गरजा लक्षात घेऊन सध्याची विकास प्रक्रिया राबवणे होय. या शोधनिबंधात नाशिक जिल्ह्यातील अनुसूचित जमातींच्या समस्यांचा आढावा घेऊन, शाश्वत विकासाच्या दृष्टिकोनातून उपाययोजना सुचवण्यात आल्या आहेत.

मुख्य संकल्पना: अनुसूचित जमाती, शाश्वत विकास, नाशिक जिल्ह्यातील अनुसूचित जमाती- स्थानिक स्थिती, शाश्वत विकासाच्या दृष्टीने उपाययोजना आणि योजनांचा आढावा इ.

शोधनिबंधाचे उद्देश:

१. अनुसूचित जमातींच्या सध्याच्या परिस्थितीचा अभ्यास करणे.
२. अनुसूचित जमातींच्या विकासासाठी शाश्वत विकासाची संकल्पना कशी उपयुक्त आहे हे स्पष्ट करणे.
३. अनुसूचित जमातींच्या जीवनशैलीशी सुसंगत उपाययोजना सुचवणे.
४. शासनाच्या धोरणांचा आढावा घेणे व त्यावर सुधारणा सुचवणे.

अनुसूचित जमाती:

भारत सरकारने भारतीय राज्यघटनेच्या अनुसूचीमध्ये समाविष्ट केलेले ते समुदाय जे पारंपरिक जीवनशैली, जंगलावर अवलंबित्व, वंचितता आणि अल्पसंख्याकतेमुळे ओळखले जातात त्यांना अनुसूचित जमाती असे संबोधले जाते. भारताच्या विविध भागांत सुमारे ४१४ अनुसूचित जमाती आहेत. त्याचे प्रमाण एकूण लोकसंख्येच्या ८.६% इतके आहे. झारखंड, मध्य प्रदेश, ओडिशा, महाराष्ट्र, छत्तीसगड या राज्यांमध्ये त्यांची संख्या अधिक आहे. अनुसूचित जमातींचा मुख्य व्यवसाय शेती, जंगलावर आधारित उपजीविका, हस्तकला आणि मजुरी हे आहेत. शिक्षणाचा अभाव, अपुरी आरोग्यसेवा, जमीन व जंगलांवरील हक्कांबाबत असुरक्षितता ही मुख्य संकटे अनुसूचित जमाती समोर आहेत.

अनुसूचित जमाती व्याख्या:

१. भारतीय संविधान (कलम ३४२):

"अनुसूचित जमाती म्हणजे अशा जमाती, जमातींचे उपगट किंवा समुदाय, ज्यांची नावे राष्ट्रपती आदेशाद्वारे निश्चित केली गेली आहेत, आणि ज्यांना विशेष संरक्षणाची आवश्यकता आहे."

२. जी. एस. घुर्ये:

"अनुसूचित जमाती म्हणजे अशा समाजघटकांचा समूह ज्यांचा प्रमुख आधार नैसर्गिक संसाधने असून, त्यांची अर्थव्यवस्था व संस्कृती ही प्रामुख्याने स्थानिक वातावरणावर अवलंबून असते, आणि ज्यांना आधुनिक समाजव्यवस्थेशी संपर्क मर्यादित आहे."

३. दामोदर धर्मानंद कोसंबी:

"भारतातील अनुसूचित जमाती ही मूळ आदिवासी संस्कृतीची वारसदार आहे, जी भौगोलिकदृष्ट्या वेगळ्या भागात राहते आणि ऐतिहासिक प्रक्रियेत सामाजिक मुख्य प्रवाहापासून बाजूला राहिली आहे."

शाश्वत विकास:

शाश्वत विकास म्हणजे असा विकास जो पर्यावरण, समाज व अर्थव्यवस्थेच्या संतुलनात होतो आणि पुढील पिढ्यांवर परिणाम न करता सध्याच्या गरजा पूर्ण करतो. शाश्वत विकास पुढील मुद्द्याच्या आधारे स्पष्ट करता येईल.

१ . पर्यावरणीय नैसर्गिक संसाधनांचे रक्षण:

पर्यावरणाचे संतुलन राखणे हे शाश्वत विकासाचे मूलभूत तत्त्व आहे. जंगलतोड, जलप्रदूषण, जमिनीचा ऱ्हास यावर नियंत्रण ठेवून प्राकृतिक संसाधनांचे योग्य व्यवस्थापन करणे गरजेचे आहे. नवनवीन विकास प्रकल्प राबवताना पर्यावरणपूरक उपायांचा अवलंब केला पाहिजे.

२ . सामाजिक समान संधी व सामाजिक न्याय:

समाजातील सर्व घटकांना, विशेषतः वंचित आणि दुर्लक्षित समुदायांना, समान हक्क व संधी उपलब्ध करून देणे. शिक्षण, आरोग्य, सुरक्षितता आणि प्रतिनिधित्व यामध्ये समावेश वाढवणे. महिलांपासून अनुसूचित जमातींपर्यंत सर्वांना विकास प्रक्रियेत सामावून घेणे.

३. आर्थिक उत्पन्नाचे दीर्घकालीन स्रोत:

विकासाच्या योजना फक्त अल्पकालीन नफा न देता स्थिर आणि दीर्घकालीन उत्पन्नाची व्यवस्था करतात का? यावर शाश्वत विकासात भर दिला जातो. यामध्ये स्थानिक संसाधनांवर आधारित रोजगारनिर्मिती, शेती, हस्तकला, सेवा उद्योग यांना चालना देणे. दीर्घकालीन आर्थिक स्थैर्य हेच खरी शाश्वतता गाठण्यासाठी महत्वाचे आहे. या विकासाचा उद्देश म्हणजे, पर्यावरणाचे रक्षण करताना समाजातील प्रत्येक घटकाला विकासात सामावून घेणे, या घटकांचा समावेश होतो.

अनुसूचित जमाती आणि शाश्वत विकास:

अनुसूचित जमातींचा विकास करताना त्यांच्या पारंपरिक ज्ञानाचा आणि नैसर्गिक संसाधनांशी असलेल्या नात्याचा आदर करणे गरजेचे आहे. आदिवासींचे जंगल व्यवस्थापनाचे पारंपरिक ज्ञान, त्यांचे नैसर्गिक संसाधनांशी नाते हे शाश्वततेच्या मूळ तत्वाशी सुसंगत आहे. त्यामुळे, त्यांचा विकास करताना केवळ पायाभूत सुविधा नव्हे, तर सांस्कृतिक सुसंगती, पर्यावरणीय रक्षण व सामाजिक समावेश यावर भर दिला पाहिजे.

१. नाशिक जिल्ह्यातील अनुसूचित जमाती: स्थानिक स्थिती:**लोकसंख्या प्रमाण:**

नाशिक जिल्ह्यामध्ये अनुसूचित जमातींचे प्रमाण अंदाजे २५.६२% एवढे असून, महाराष्ट्रातील एक महत्वाचा अनुसूचित जमाती समूह म्हणून नाशिक जिल्हा ओळखला जातो.

२००१ च्या जनगणनेनुसार नाशिक जिल्ह्यात २३.९२ टक्के लोकसंख्या अनुसूचित जमातींची आहे. या जमाती प्रामुख्याने नाशिक, पेठ, दिंडोरी, इगतपुरी, त्र्यंबकेश्वर, कळवण, सुरगाणा, बागलाण या तालुक्यात आढळून येतात. इतर समाजाच्या तुलनेत अनुसूचित जमाती मागासलेल्या असल्यामुळे त्यांच्या विकासाकरिता एकात्मिक आदिवासी विकास कार्यक्रमांतर्गत विविध योजना राबविण्यात येतात.

प्रमुख जमाती:

नाशिक जिल्ह्यात असलेले प्रमुख आदिवासी समूहात, कोकना, कोकनी, कुंकणा, भील, भील गार्शिया, कोळी महादेव, ठाकूर, ढोंगर कोळी इत्यादी जमाती समाविष्ट आहेत.

भाषा व संस्कृती परिसंस्था:

अनुसूचित जमाती बिलात असलेल्या भाषांमध्ये आदिवासी भाषांचा समावेश होतो. उदा. भिली, कुंकणा, कोकणी इ. नाशिक जिल्ह्यात राहणाऱ्या अनुसूचित जमाती या बहुभाषिक आहेत.

शाळा व शिक्षण स्थिती:

अनुसूचित जमातींच्या अभ्यासक्रमाची तुलना अनुसूचित जाती समुदायाशी केल्यास, त्यांना शैक्षणिक सुविधा व शिक्षकांची उपलब्धता यामध्ये अजूनही अडचणीचा सामना करावा लागतो. नाशिक जिल्ह्यातील सुरगाणा तालुक्याच्या आदिवासी उपयोजना क्षेत्रात २६ आश्रमशाळा व २५ वसतिगृहे आहेत, त्र्यंबकमध्ये २३ आश्रमशाळा व ०३ वसतिगृहे आहेत. नाशिक जिल्ह्यात एकूण १३४ आश्रमशाळा असून ८८ वसतिगृहे आहेत. अनुसूचित जमातीची मुले शिक्षण घेतात पण अनुसूचित जमाती शिक्षणाबाबत जागरूक नाही.

२. शाश्वत विकासाच्या दृष्टीने उपाययोजना आणि योजनांचा आढावा:**मानव विकास मिशन:**

नाशिक जिल्ह्यामध्ये 'मानव विकास मिशन' अंतर्गत पुढील तालुक्यांमध्ये कार्यक्रम राबवण्यात येत आहेत: सुरगाणा, पेठ, कळवण, दिंडोरी, इगतपुरी, त्र्यंबकेश्वर, सटाणा व नांदगांव. यामध्ये शिक्षण, आरोग्य, स्वरोजगार व स्थानिक समितींना सामावून योजना आखणे हे प्राथमिक उद्दिष्ट आहे.

कृषि व शाश्वत शेती:

शासनाच्या "राष्ट्रीय शाश्वत शेती अभियान" अंतर्गत कोरडवाहू क्षेत्र विकास कार्यक्रम राबवला जातो. शेतकऱ्यांना शाश्वत पद्धतीने उत्पन्न वाढविण्यासाठी अनुदान दिले जात आहे. या योजनेचा लाभ अनुसूचित जमातींना देखील मिळत आहे. उदा. शेडनेट हाउसेस, मधुमक्षिका पालन, खत व काढणी तंत्रज्ञान यावर आधारित प्रकल्प इ.

आरोग्य आणि बाल कल्याण:

'महाआरोग्य अभियान', 'जागरूक पालक व सुदृढ बालक' मोहिमेअंतर्गत लाखो रुग्णांची मोफत तपासणी व उपाय केले जात आहेत. बालकांसाठी शाळा व अंगणवाडी याद्वारे आरोग्य तपासणीचे विशेष प्रयत्न हे शाश्वत विकासाचा मूळ भाग आहेत.

पर्यावरणीय संरक्षण:

'माझी वसुंधरा अभियान २.०' अंतर्गत प्रात्यक्षिक संरक्षण व वृक्षारोपणाच्या माध्यमातून पर्यावरणपोषणाला प्रोत्साहन देण्यात येते. स्थानिक संस्था व अधिकाऱ्यांना पुरस्कार देऊन हा उपक्रम प्रोत्साहित केला जातो.

औद्योगिक व कृषी क्लस्टर:

नाशिक जिल्ह्यामध्ये द्राक्ष क्लस्टरची योजना मंजूर करण्यात आली आहे, ज्याद्वारे स्थानिक उत्पन्नासाठी आर्थिक संधी निर्माण होत आहेत. दिंडोरी तालुका डी झोन म्हणून घोषित केला आहे. यामुळे औद्योगिक विकासास चालना मिळेल.

अनुसूचित जमातींचा शाश्वत विकास घडून आणण्यासाठी उपाययोजना:**१. शिक्षण व आरोग्य सेवांमध्ये सुधारणा:**

अनुसूचित जमातींमध्ये साक्षरतेचे प्रमाण आणि आरोग्य सुविधा अजूनही अत्यल्प आहेत. त्यामुळे मूलभूत शिक्षण व प्राथमिक आरोग्य सेवा पोहोचवणे आवश्यक आहे. एकलव्य मॉडेल शाळा (EMRS) हे केंद्र सरकारचे उपक्रम आदिवासी विद्यार्थ्यांसाठी विशेष शिक्षण सुविधा देतात. झारखंडमध्ये मोबाईल हेल्थ व्हॅन्सद्वारे दूरदूरच्या गावांत आरोग्य सेवा पोहोचवल्या जातात, यासारख्या योजना राबविल्यास आरोग्य सेवा सुविधांमध्ये सुधारणा होईल.

२. वनहक्क कायद्याची प्रभावी अंमलबजावणी:

आदिवासींचे जंगल, जमीन व संसाधनांवर पारंपरिक हक्क आहेत. हा कायदा त्यांना व्यक्तिगत व सामुदायिक अधिकार बहाल करतो. उदा. गोंड आणि कोरकू जमातींना मध्य प्रदेशात सामुदायिक वन हक्क प्रमाणपत्र मिळाल्याने त्यांनी जंगल व्यवस्थापनात सक्रिय सहभाग घेतला आहे.

३. स्थानिक संसाधनाधारित उद्योगांना प्रोत्साहन:

स्थानिक साधनांवर आधारित उद्योग म्हणजेच त्या समाजाच्या सांस्कृतिक व नैसर्गिक संसाधनांचा योग्य उपयोग करून आर्थिक विकास साधणे. उदा. गडचिरोली मध्ये बांबू क्लस्टर उद्योग सुरू करून आदिवासींना रोजगार देण्यात आला. छत्तीसगडमध्ये 'तेंदूपत्ता' संकलनावर आधारित सहकारी संस्था चालवल्या जातात.

४. आदिवासी नेतृत्वाची घडवणूक:

स्वतः आदिवासी समाजातील व्यक्तींना नेतृत्व भूमिकेत आणल्यास त्यांच्या गरजा आणि धोरण यामध्ये अधिक समजूतदारी निर्माण होईल. आदिवासी पंचायत प्रतिनिधींना विशेष प्रशिक्षण देऊन स्थानिक स्वराज्य संस्थांमध्ये त्यांचा सक्रिय सहभाग वाढवणे. उत्तर-पूर्व राज्यांमध्ये स्थानिक आदिवासींनी आपले सांस्कृतिक आणि पर्यावरणीय हित जपण्यासाठी स्वतंत्र प्रशासनिक परिषदांचे नेतृत्व केल्याचे दिसते आहे.

५. संपूर्ण सहभागी योजना आखणी:

योजना तयार करताना समाजातील सर्व घटकांचा सहभाग घेणे म्हणजेच (participatory planning) संपूर्ण सहभागी योजना आखणी होय. उदा. ग्रामसभा (village assembly) द्वारे जनजाती क्षेत्रातील योजना तयार होणे हे Forest Rights Act व PESA कायद्याने शक्य झाले आहे. ओडिशा मध्ये 'आम आदिवासी योजना' मध्ये स्थानिक लोक स्वतः निर्णय घेतात, की कोठे पाणी योजना करायची, कोणता व्यवसाय सुरू करायचा इ.

६. पर्यावरणपूरक विकास प्रकल्प:

शाश्वत विकासात पर्यावरणाचा समतोल राखणे आवश्यक आहे. आदिवासींच्या जीवनशैलीशी सुसंगत पर्यावरणपूरक उपक्रम राबविणे आवश्यक आहे. हनी मिशन अंतर्गत जंगलातील मध संकलन करून उत्पादन प्रक्रिया शिकवली जाते, ज्यामुळे जंगल नष्ट न करता उत्पन्न मिळते. बायो टॉयलेट्स, सौर ऊर्जा प्रकल्प, इको-टुरिझम प्रकल्प हे पर्यावरणपूरक उपाय आहेत.

निष्कर्ष:

नाशिक जिल्ह्यातील अनुसूचित जमाती या समाजघटकाचा सामाजिक, शैक्षणिक, आर्थिक व सांस्कृतिक विकास हा शाश्वत विकासाच्या दृष्टीने अत्यंत महत्वाचा आहे. या जमाती पारंपरिक ज्ञान, नैसर्गिक संसाधनांचा शाश्वत वापर, सामूहिक जीवनपद्धती व पर्यावरणाशी सुसंगत वर्तन यांमुळे "शाश्वतता" या संकल्पनेचे मूळ स्वरूप आपल्या जीवनात जगत आल्या आहेत. आजच्या बदलत्या सामाजिक-आर्थिक व्यवस्थेत त्यांना अनेक आव्हानांना सामोरे जावे लागत आहे. जसे की, गरिबी, शिक्षणाचा अभाव, आरोग्य समस्या, बेरोजगारी, स्थलांतर, शेतीवरील मर्यादित अवलंबित्व इ. शाश्वत विकास साध्य करण्यासाठी या जमातींचा सर्वांगीण व समावेशक विकास आवश्यक आहे. यासाठी गुणवत्तापूर्ण शिक्षण, कौशल्य विकास आणि तंत्रज्ञानाची उपलब्धता, नैसर्गिक संसाधनांचे संवर्धन व स्थानिक उद्योगांना प्रोत्साहन, आरोग्य व पोषण सुधारणा, स्त्री-पुरुष समानता व सामाजिक न्याय, सरकारी योजना आणि धोरणांची प्रभावी अंमलबजावणी या बाबींवर लक्ष केंद्रित करावे लागणार आहे. या माध्यमातूनच अनुसूचित जमातींचे जीवनमान उंचावून त्यांना आधुनिक समाजाच्या मुख्य प्रवाहात आणता येईल. अनुसूचित जमातींचा विकास हा केवळ सामाजिक कर्तव्य नसून तो शाश्वत विकासाच्या व्यापक उद्दीष्टांचा अविभाज्य भाग आहे. त्यांच्या समस्यांना केवळ आर्थिक दृष्टिकोनातून नव्हे तर सामाजिक, सांस्कृतिक आणि पर्यावरणीय दृष्टिकोनातून समजून घेणे गरजेचे आहे. अनुसूचित जमातींच्या स्थानिक परंपरा, संस्कृती व पर्यावरणपूरक जीवनपद्धती यांचा आदर राखून केलेला विकासच खऱ्या अर्थाने शाश्वत ठरेल.

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५. संयुक्त राष्ट्र संघ, शाश्वत विकास उद्दिष्टे

विकास आणि पर्यावरण

प्रा. डॉ. सौ. कल्पना माणिकराव कदम

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प्रस्तावना :

विकास आणि पर्यावरण हे एकाच नाण्याच्या दोन बाजू मानले जातात. पायाभूत विकास आणि पर्यावरण हे दोन्ही घटक एकमेकांशी जोडलेले आहेत. विकासांमुळे पर्यावरणावर परिणाम होतो आणि पर्यावरणाची स्थिती विकासावर परिणाम करते. संतुलित विकासासाठी, पर्यावरण आणि विकासाचा समतोल राखणे आवश्यक आहे. विकास म्हणजे मानवी जीवनाच्या गुणवत्तेत सुधारणा करणे. यात सामाजिक, आर्थिक आणि राजकीय क्षेत्रांमध्ये प्रगती करणे समाविष्ट आहे. उदा. चांगले जीवनमान, शिक्षण, आरोग्य सुविधा, आणि आर्थिक संधींमध्ये वाढ. विकास हा पर्यावरणाशी संबंधित आहे.

आपल्या सभोवतालची जीवसृष्टी आणि तिला आवश्यक घटक म्हणजे हवा, पाणी, जमीन, वनस्पती, पशु, पक्षी, कीटक, माणूस. या सर्वांनी आपले परी + आवरण अर्थात पर्यावरण बनत असते. त्यातील प्रत्येक घटक महत्वाचा आणि एकमेकांना पूरक आहे. प्रत्येक कडी महत्वाची आहे. कोणतीही एक जरी कडी नाहीशी झाली तर त्याचे दुरगामी परिणाम होतात. या साखळीमधला फक्त माणूस ही कडी अशी आहे की जो, आपल्या सभोवतालच्या पर्यावरणाला स्वतःच्या सोयीनुसार वापरतो. पर्यावरण ही एक वैश्विक संकल्पना आहे. केवळ पर्यावरणामुळेच जीवसृष्टीची उत्पत्ती झाली आहे. पर्यावरणाचे जतन हे मानवासाठी महत्वाचे आहे. पर्यावरण हे सर्व नैसर्गिक संसाधने आणि मूर्त कलाकृतींसह आपल्या जवळच्या परिसराचा संदर्भ देते. वातावरण, हायड्रोस्फियर, लिथोस्फियर आणि बायोस्फियरसह जीवनासाठी आवश्यक असलेले सर्व घटक समाविष्ट करतात.

पर्यावरण हा आपल्या ग्रहाचा सर्वात अमूल्य पैलू आहे. आपल्या ग्रहाच्या कल्याणासाठी पर्यावरणाचे संवर्धन आवश्यक आहे आणि आज कुठेतरी पर्यावरण रक्षण काळाची गरज हा विषय मांडण्याची निकड आपल्याला वाटते आहे. खरंच किती खेदाची गोष्ट आहे ना! ज्या वटवृक्षाखाली बसून ज्ञानेश्वरांनी ज्ञानेश्वरी लिहिली, औदुंबराच्या झाडाखाली बसून दत्तात्रेय यांनी साधना केली तर गौतमबुद्धांनी पिंपळाच्या झाडाखाली सिद्धी प्राप्त करून घेतली याच वृक्षाना आपण आज नष्ट करून एक प्रकारे पर्यावरण वर हानी पोहचवत आहोत. आज मानवांच्या अति हव्यासापोटी निसर्गाचा ऱ्हास होत आहे आणि आपण त्याला विकास होत आहे असे म्हणतो. मग पर्यावरण रक्षणासाठी प्रयत्न करणे ही काळाची गरज बनली आहे. आज मानवाने समस्त विश्वाला जिंकून घेतलेले आहे. प्रत्येक क्षेत्रात मानवाने प्रगतीकडे धाव घेतली आहे. वाढत्या प्रगतीबरोबर मानव असंख्य संकटांच्या खोल दरीत आज पडला आहे.

जर पर्यावरण समृद्ध असेल तर विकासाच्या शक्यता मुबलक असतात. विकासाचा आधार संसाधने आहेत आणि निसर्गाने संसाधने प्रदान केली आहेत. पर्यावरण आणि विकास यांचा जवळचा संबंध आहे. हे दोघेही एकमेकांना पूरक मानले जातात. आर्थिक विकास हा प्रति व्यक्ती वास्तविक उत्पन्न वाढीशी संबंधित आहे. म्हणूनच, हे मान्य केले जात आहे की विकासाच्या प्रक्रियेमुळे पर्यावरणाचे कोणत्याही प्रकारे नुकसान होऊ नये, तर विकास अशा प्रकारे केला पाहिजे की पर्यावरणाचे संरक्षण होईल आणि त्यात सतत वाढ होईल. जर विकास पर्यावरणाचे नुकसान करून केला गेला तर तो कायमस्वरूपी आणि शाश्वत राहणार नाही, उलट भविष्यात तो समाजासाठी घातक आणि विनाशकारी ठरेल.

विकास आणि पर्यावरण हे दोन महत्वाचे घटक आहेत. विकासांमुळे समाजाची प्रगती होते, तर पर्यावरणांमुळे जीवन जगण्याची नैसर्गिक परिस्थिती टिकून राहते. या दोन्ही गोष्टींमध्ये समतोल राखणे आवश्यक आहे, कारण एकाची हानी झाल्यास दुसऱ्यावर त्याचा परिणाम होतो. विकास ही एक सतत चालणारी प्रक्रिया आहे, तथापि प्रत्येक विकासाचे स्वतःचे सकारात्मक आणि नकारात्मक परिणाम असतात. परंतु जेव्हा विकास रहिवाशांच्या हितासाठी केला जात असेल तेव्हा पर्यावरणाची काळजी घेणे देखील तितकेच महत्वाचे आहे. जर पर्यावरणाची काळजी न घेता विकास केला गेला तर त्याचे पर्यावरणावर नकारात्मक परिणाम होतील, ज्यामुळे त्या ठिकाणी राहणाऱ्या रहिवाशांवरही त्याचा हानिकारक परिणाम होईल. म्हणूनच आज विकास व पर्यावरण यांमध्ये संतुलन ठेवणे काळाची गरज बनली आहे.

विकास व पर्यावरण:

पर्यावरण आणि विकास यांचा जवळचा संबंध आहे, पण हे नाते आजचे नाही. प्राचीन काळातही या दोघांमध्ये एक संबंध होता आणि प्लेटोला पर्यावरणाचे महत्त्व माहित होते आणि त्यांनी या संदर्भात आपले विचार व्यक्त केले होते. तथापि, सार्वजनिक

प्रशासनात पर्यावरणाचा अभ्यास करण्याची कल्पना प्रत्यक्षात वनस्पतिशास्त्रातून स्वीकारली गेली आहे. वनस्पतीसाठी योग्य हवामान, प्रकाश आणि बाह्य वातावरण आवश्यक आहे, त्याचप्रमाणे सामाजिक संस्थेच्या विकासासाठी पर्यावरण आवश्यक आहे. मार्क्सच्या काळापासून असे मानले जाते की व्यक्ती, समाज आणि प्रशासनाच्या सर्व क्रियाकलापांचे स्वरूप त्याच्या बाह्य परिस्थितींद्वारे निश्चित केले जाते. प्रशासकीय समस्या आणि विकासाशी संबंधित समस्यांबद्दल संपूर्ण माहितीसाठी, संबंधित प्रशासनाच्या बाह्य वातावरणाचा अभ्यास करणे आवश्यक होते. एका देशात यशस्वीरित्या काम करणाऱ्या प्रशासकीय संस्था दुसऱ्या देशात स्वीकारण्याचे प्रयत्न केले जातात. परंतु दुसऱ्या देशात ती प्रशासकीय व्यवस्था स्वीकारण्यापूर्वी, दोघांच्या पर्यावरणाचा तपशीलवार अभ्यास आणि विश्लेषण आवश्यक होते. पर्यावरणीय घटक केवळ समाजात प्रभावी बदल आणत नाहीत तर पर्यावरणीय घटक प्रशासन आणि त्याच्या विकास कार्यक्रमांवर देखील व्यापक परिणाम करतात. आज औद्योगिकीकरणामुळे विकासाच्या क्षेत्रात पर्यावरणाचे महत्त्व वाढले आहे आणि जगभरात पर्यावरणावर व्यापक चर्चा होत आहे आणि प्रदूषित पर्यावरण रोखण्यासाठी प्रयत्न केले जात आहेत.

दुसऱ्या महायुद्धापर्यंत पर्यावरणाची समस्या गंभीर नव्हती. पण दुसऱ्या महायुद्धानंतर, मोठ्या प्रमाणात औद्योगिकीकरण आणि जंगलांचा नाश इत्यादींमुळे, पर्यावरण ही आपल्या काळातील सर्वात गंभीर समस्यांपैकी एक बनली आहे. ही समस्या मानवनिर्मित आहे. आज, जीवाश्म इंधन, रसायने, अणुभट्ट्या, जंगलांची बेजबाबदारपणे कत्तल, निसर्गाचे शोषण इत्यादींचा वाढता वापर केवळ पर्यावरण प्रदूषित करत नाही तर मानवी आरोग्यासाठी गंभीर समस्या निर्माण करत आहे. जमिनीवरील वाढता दबाव, रसायनांचा अतिरेकी वापर, जंगलतोड आणि वाळवंटीकरणात वाढ यामुळे जगातील अनेक भागांमध्ये जमिनीची सुपीकता कमी झाली आहे. या संदर्भात, संयुक्त राष्ट्रांच्या गटाने आपल्या अहवालात म्हटले आहे: “संसाधनांचा ऱ्हास आणि पर्यावरणीय दबाव भविष्यात मानव आणि देशांच्या कल्याणासाठी खरे धोके आहेत यात शंका नाही.”

एकीकडे पर्यावरणाच्या बिघडत्या स्थितीला तोंड देण्यासाठी जगाचे लक्ष वेधण्याचे प्रयत्न सुरू असताना, दुसरीकडे निसर्ग आणि मानवांच्या स्वावलंबनाबद्दल जागरूकता वाढत आहे. या समजुतीमुळे, विकास आणि पर्यावरण अभ्यासाचे महत्त्व वाढले आहे आणि लोकांना हे समजले आहे की त्यांचे अस्तित्व मानव आणि पर्यावरण यांच्यातील चांगल्या संबंधांवर अवलंबून आहे.

आज, वाढती लोकसंख्या, विकासात्मक गरजा, उपभोगवाद संस्कृती आणि आपत्तींसह आपल्या युगातील एक महत्त्वाचे आव्हान आपल्यासमोर आहे, ते म्हणजे पर्यावरण संवर्धन आणि आर्थिक विकास यांच्यातील नाजूक संतुलन राखणे. ही चर्चा केवळ बौद्धिक व्यायाम नाही तर ग्रह आणि भावी पिढीप्रती असलेल्या आपल्या जबाबदाऱ्यांचे आत्मपरीक्षण आहे.

विविध अनुषंगाने विकासाचे महत्त्व:

मानवी विकास: विकासासोबत लोकांमध्ये ज्ञान आणि कौशल्ये वाढतात, ज्यामुळे ते अधिक सक्षम बनतात.

आर्थिक विकास: आर्थिक विकासांमुळे नवीन उद्योगधंदे आणि व्यवसाय सुरू होतात, ज्यामुळे लोकांना रोजगार मिळतो. आर्थिक वाढीमुळे लोकांचे उत्पन्न वाढते, ज्यामुळे त्यांचे जीवनमान सुधारते. आर्थिक विकासांमुळे देशात नवीन गुंतवणूक आकर्षित होते, ज्यामुळे अधिक विकास होतो.

सामाजिक विकास: विकासासोबत शिक्षणाच्या संधी वाढतात, ज्यामुळे लोकांमध्ये ज्ञान आणि कौशल्ये वाढतात. चांगल्या आरोग्याच्या सुविधा उपलब्ध होतात, ज्यामुळे लोकांचे आरोग्य सुधारते.

क्षमता विकास: विकासासोबत लोकांच्या क्षमतांचा विकास होतो, ज्यामुळे ते अधिक चांगले जीवन जगू शकतात. विकासासोबत लोकांमध्ये आत्मविश्वास वाढतो, ज्यामुळे ते नवीन गोष्टी करण्याचा प्रयत्न करतात.

सामाजिक समानता: विकासासोबत सामाजिक समानता वाढते, ज्यामुळे समाजातील प्रत्येक व्यक्तीला समान संधी मिळतात.

प्राचीन काळापासून भारतीय समाजात पर्यावरणाविषयी जागरूकता आहे. हजारो वर्षांपूर्वी भारतीय ऋषींनी नैसर्गिक व्यवस्थेला आत्मसात करण्याचा मार्ग स्वीकारला कारण निसर्गाशी छेडछाड करणे संपूर्ण जीवमंडळासाठी धोकादायक ठरू शकते. पाणी, पृथ्वी, वायु, अग्नी, आकाश आणि वनस्पती यासारख्या पर्यावरणीय घटकांबद्दल असीम आदर वेदांमध्ये देखील दिसून येतो. याशिवाय, पुराण, उपनिषदे, श्रीमद् भागवत गीता, रामायण, महाभारत इत्यादींमध्ये आपण नेहमीच निसर्गाची पूजा केली आहे याचे स्पष्ट पुरावे आहेत. अथर्ववेदाच्या पृथ्वीसूक्तात, ऋषींनी म्हटले आहे की, “हे पृथ्वीमाते, मी तुझ्याकडून जे काही घेईन तेवढेच असेल जे तू पुनरुत्पादित करू शकशील. मी माझ्या जीवनस्थानावर किंवा तुझ्या जीवनशक्तीवर कधीही हल्ला करणार नाही.”

आजही आपल्या देशात ग्रामीण महिला झाडे, विहिरी इत्यादींची पूजा करतात जे हे निसर्गावरील त्यांच्या प्रेमाचे आणि श्रद्धेचे प्रतीक आहे. ग्रामीण महिलांनी विविध उपक्रम आणि चळवळींद्वारे पर्यावरण प्रदूषण रोखण्यासाठी सतत प्रयत्न केले आहेत. परंतु विकासाच्या शर्यतीत आपण आपली मूल्ये विसरत आहोत, जी चिंतेची आणि चिंतनाची बाब आहे. विकासाच्या या युगात, सर्वात मोठे आव्हान म्हणजे पर्यावरणीय संकट, पर्यावरणाचे रक्षण करणे ही आज एक महत्त्वाची गरज बनली आहे. गावापासून शहरापर्यंत जलद विकास होत आहे. विकासाच्या या शर्यतीत जंगलांना सर्वाधिक फटका बसला आहे. जंगले ग्रामीण जीवनाशी

कोणत्या ना कोणत्या प्रकारे जोडलेली आहेत. ते गावकऱ्यांसाठी उपजीविकेचे साधन बनत असताना, पर्यावरणाचे रक्षण करण्यातही ती महत्वाची भूमिका बजावते.

पर्यावरणाचे महत्व :

सांस्कृतिक आणि मनोरंजनात्मक मूल्य: नैसर्गिक भूदृश्ये आणि जैवविविधता जगभरातील सांस्कृतिक ओळख, परंपरा आणि आध्यात्मिक पद्धतींमध्ये योगदान देतात. ते मनोरंजन, पर्यटन आणि सौंदर्याचा आनंद घेण्यासाठी संधी प्रदान करतात, मानवी जीवन समृद्ध करतात आणि मानसिक कल्याणाला प्रोत्साहन देतात.

जैवविविधता: विविध प्रजाती परिसंस्थेची लवचिकता आणि स्थिरता सुनिश्चित करतात. ते परागण, कीटक नियंत्रण आणि पोषक चक्रीकरण यासारख्या परिसंस्थेच्या कार्यांना समर्थन देते, जे अन्न उत्पादन आणि नैसर्गिक अधिवास टिकवून ठेवण्यासाठी महत्त्वपूर्ण आहेत.

हवामान नियमन : जागतिक हवामान पद्धतींचे नियमन करण्यात जंगले, महासागर आणि पाणथळ जागा यांसारखे नैसर्गिक वातावरण महत्त्वपूर्ण भूमिका बजावतात. ते कार्बन डायऑक्साइड सारख्या हरितगृह वायू शोषून घेतात, ज्यामुळे हवामान बदलाचे परिणाम कमी होण्यास आणि पृथ्वीची हवामान व्यवस्था स्थिर होण्यास मदत होते.

नैतिक विचार: अनेक संस्कृती आणि नैतिक चौकटी निसर्गाचे अंतर्गत मूल्य ओळखतात आणि व्यवस्थापन, जैवविविधतेचा आदर आणि आंतरपिढीय समतेच्या तत्वांवर आधारित त्याच्या संवर्धनाचे समर्थन करतात. सर्व सजीवांचे आणि भावी पिढ्यांचे कल्याण सुनिश्चित करण्यासाठी पर्यावरणाचे रक्षण करणे हे एक नैतिक कर्तव्य मानले जाते.

आर्थिक फायदे: शेती, मत्स्यपालन, वनीकरण आणि पर्यटन यासारखे उद्योग त्यांच्या आर्थिक क्रियाकलापांसाठी निरोगी परिसंस्थांवर मोठ्या प्रमाणात अवलंबून असतात. पर्यावरणीय न्हासामुळे उत्पादकता कमी होऊ शकते, खर्च वाढू शकतो आणि आर्थिक नुकसान होऊ शकते, जे शाश्वत संसाधन व्यवस्थापनाचे महत्त्व अधोरेखित करते.

मानवाला इतर पशुपेक्षा शारिरीक ताकद कमी असली , तरी परंतु मानवाला बुद्धीचे वरदान आहे. ह्या बुद्धीच्या वरदानामुळेच मानव आज त्याच्या आसपासच्या पर्यावरणावर मर्यादित प्रमाणात का होईना परंतु विजय मिळवू शकला आहे.ह्या पृथ्वीतलावर मानवाने त्याचे जीवन सुखकर व्हावे म्हणून खूप काही बदल घडवून आणले. पूर्वी तो शिकार करीत असे तेव्हा त्याला जागोजागी भटकावे लागे. परंतु लवकरच त्याने अग्नीचा शोध लावला, चाकांचा शोध लावला,आणि शेतीचाही शोध लावला. त्यामुळे एका ठिकाणी वस्ती करून, राहणे त्याला शक्य झाले. शेती करता यावी म्हणून त्याने जंगले तोडली आणि मिळालेल्या जमिनीच्या तुकड्यावर त्याला हव्या त्याच धान्याचे पीक घ्यायला सुरुवात केली. तसेच राहायला नगरे हवीत, रस्ते हवेत म्हणूनही त्याने जंगले तोडली. अशा तऱ्हेने मानवाने स्वतःच्या सोयीसाठी असपासच्या पर्यावरणाला वेठीस धरले.संसदेची नवी इमारत आणि मुंबईतील मेट्रो कारशेडची जागा या निमित्ताने पर्यावरणाचा प्रश्न नव्याने चर्चेत आला आहे. विकास आणि पर्यावरण यांचे संतुलन जागतिक स्तरावर कसे साधले जाते, हे त्यासाठी पाहावे लागे.

पण आज आपल्याकडे पर्यावरण आणि विकास या मुद्द्यांवर जेव्हा चर्चा होते, तेव्हा या दोन्ही मुद्द्यांना एकमेकांच्या विरोधातच उभे केले जाते. विकास हवा तर पर्यावरणाची हानी होईल आणि पर्यावरण वाचविण्याची भूमिका घेतली तर विकास खुंटेल, असा एक वाद उभा केला जातो. प्रत्यक्षात पाहिले तर, विकसित देश पर्यावरण रक्षणात आघाडीवर असतात. तेथील नागरिकांचा आरोग्य, आयुष्यमान निर्देशांक इतर देशांपेक्षा अधिक असतो. यांतून स्पष्ट होते की, विकास आणि पर्यावरणाला परस्परांच्या विरोधात उभे करण्याची गरज नाही., जिथे जनतेच्या आरोग्याला तिलांजली देत पर्यावरणाचे नियम डावलले जातात तिथे विकास आणि पर्यावरण एकमेकांच्या विरोधात उभे ठाकतात आणि यांत पर्यावरण व विकास या दोहोंची हानी होते.

बेपर्वाईने विकास केल्याने पर्यावरणावर विविध अनुषंगाने होणारा परिणाम :

प्रदूषण : शहरात तर हवा प्रदूषण रूपी राक्षसाने मांडलेले थैमान बलाढ्य आहे की आजपण शहरात ऑक्सिजन विकत घ्यायची वेळ आली आहे. आपल्याला ते लक्षात यायला हवं की कारखान्यातून होणारे जलप्रदूषण, वायू प्रदूषण नव-नवीन रोगांना आमंत्रण देत आहे. सर्व नदया आज कचरा वाहून नेणाऱ्या गटारगंगा बनत चालल्या आहेत. वृक्षतोडीमुळे प्राण्यांची नैसर्गिक निवासस्थान धोक्यात आले आहेत. विबट्या-सारखे जंगलीप्राणी थेट रस्त्यावर येत आहेत. या औद्योगिकीकरण, शहरीकरण, कारखानदारी, वाहने यांच्यामुळे वायू, जल, ध्वनी व भूमी प्रदूषण वाढत आहे. विज्ञानाची जशी जशी प्रगती होऊ लागली, तसतशी मानवाची सूखाची लालसा वाढू लागली. जमिनीचा कस वाढावा ,रासायनिक खतांचा अंदाजे वापर, पिकांवर कीड पडू नये म्हणून कीटकनाशकांची वाढती फवारणी वाढते औद्योगिकीकरण आणि ते करताना पर्यावरणाची केलेली अक्षम्य हेळसांड हे मानवाने केलेले मोठे गुन्हे आहेत. दरवर्षी अनेक रासायनिक संयुगांची निर्मिती होत असते. ही सर्व संयुगे हवेत, पाण्यात आणि जमिनीत मिसळतात. तिथून ती मानवी शरीरात जातात: त्यामुळे कर्करोगासारख्या प्राणघातक रोगांचे प्रमाणही वाढले झाले.

वारंवार येणाऱ्या आपत्ती: माती उत्खनन, पर्वत फोडणे आणि नद्यांना लगाम घालणे यांसारख्या पायाभूत सुविधांच्या विकासासारख्या विकासात्मक प्रकल्पांमुळे नैसर्गिक तसेच मानवनिर्मित आपत्तींमुळे होणाऱ्या नुकसानाची तीव्रता वाढली आहे. उदा . अलिकडच्या काळात अतिवृष्टीच्या घटनांमध्ये वाढ झाली आहे आणि २०२३ मध्ये हिमाचल प्रदेशातील पूर आणि गेल्या काही वर्षांत हैदराबाद आणि चेन्नईसारख्या शहरांमध्ये आलेल्या पूर या स्वरूपात त्याचे प्रकोप दिसून येत आहे.

प्रदूषणात वाढ: विकासाशी संबंधित एक प्रमुख चिंता म्हणजे आपल्या पर्यावरणाला हानी पोहोचवणाऱ्या सर्व प्रकारच्या प्रदूषणाचे कारण. उदा . शिकागो विद्यापीठाच्या ऊर्जा धोरण संस्थेच्या २०२३ च्या एअर क्वालिटी लाइफ इंडेक्स (AQLI) अहवालातील आकडेवारीनुसार, वायू प्रदूषणामुळे दिल्लीतील रहिवाशांचे आयुष्य सुमारे ११.९ वर्षांनी कमी होते.

डिजिटल प्रगती: पर्यावरण हा सध्या कळीचा मुद्दा आहे. झाडे, जंगले वाचवण्यासाठी, हवा, पाणी यांचं प्रदूषण रोखण्यासाठी आपण प्रयत्न करत आहोत. झाडांची तोड थांबवण्यासाठी डिजिटल व्हायचा प्रयत्न करत आहोत. पण खरंच का डिजिटल म्हणजे ग्रीन? कार्यालय पेपरलेस केले -कागदाचा वापर थांबवला म्हणजे आपण पर्यावरण वाचवले, असे सरसकटपणे म्हणता येईल का? वैज्ञानिक दृष्टिकोनातून या प्रश्नाचा आपण विचार केला पाहिजे.

पर्यावरणाचा ऱ्हास: निसर्ग मुक्त असल्याने, आपण अनेकदा त्याला गृहीत धरतो आणि त्याचा अतिरेकी वापर करतो. विकासात्मक उपक्रमांमुळे अधिवासाचे नुकसान आणि ऱ्हास झाला आहे . ज्यामुळे जंगलतोड, मानव-प्राणी संघर्ष आणि प्राणीजन्य आजार यासारख्या समस्या वाढल्या आहेत.

जागतिक तापमानवाढ: आज जगासमोर असलेल्या प्रमुख समस्यांपैकी एक म्हणजे जागतिक तापमानवाढीमुळे होणारा हवामान बदल. ग्रीनहाऊस वायूंच्या अत्यधिक उत्सर्जनामुळे जलद औद्योगिकीकरणाला चालना मिळाली आहे आणि त्यामुळे जागतिक तापमानवाढीला हातभार लागला आहे.

वृक्षतोड : सध्या वाढत्या शहरांसाठी बेलगाम वृक्षतोड होत आहे. झाडे स्वतःचे अन्न तयार करताना कार्बन वायू घेतात आणि ऑक्सिजन बाहेर सोडतात. परंतु झाडेच कमी झाल्याने हवेतील शुद्धताही कमी होते, सूर्याची अतिनील किरणे थेट जमिनीवर येत आहेत. पृथ्वीवरील सजीवांसाठी ते अत्यंत धोकादायक आहे. खरोखर, पर्यावरणाचा हा -हास आपल्याला विनाशाच्या काठावर तर नेऊन ठेवत नाहीये ना? आपली ही अमर्याद सुखलालसा आपण आवरली नाही तर आपल्या पुढच्या पिढ्यांसाठी ही पृथ्वी शिल्लकच नसेल.

ओला आणि कोरडा दुष्काळ: प्रदीर्घ काळापासून हळूहळू निर्माण होणारी दुष्काळी परिस्थिती सध्या अचानक निर्माण होते आहे. याबद्दल आपण काही विचार केला आहे का ? अचानक दुष्काळाच्या घटना पूर्वीपेक्षा कितीतरी गंभीर होत आहेत. या संदर्भात केलेल्या संशोधनात असे सिद्ध झाले आहे की, जमिनीचा पॅटर्न अर्थात पोत, यामध्ये मानवी निर्मित गोष्टींमुळे झालेला बिघाड. यामुळे हवामान तसेच (Bio Diversity) जैव विविधता यावर विपरीत परिणाम होतो आहे. परिणामी जगात दुष्काळी परिस्थिती वेगाने विकसित होत असून दरवर्षी सुमारे ०.१२ दिवस आधी दुष्काळी परिस्थिती निर्माण होत असल्याचे उघड झाले आहे. एकंदर जमिनीच्या पॅटर्नमध्ये बदल होतो आहे. आर्द्र, गवताळ जमीन, शुष्क आणि कोरडी, तसेच बर्फाळ जमीन जलसंपृक्त होते आहे. तथापि, कुठे अतिवृष्टी, कुठे कोरडा दुष्काळ ! टेक्सास विद्यापीठातील संशोधना नुसार जमिनीतील आर्द्रता आणि वातावरण यांच्यातील एकमेकांतील प्रक्रियेमुळे कोरड्या परिस्थितीत देखील ढगफुटी आणि अतिवृष्टी होत आहे .

जंगलातील वणवा: जगातील सर्वात मोठे जंगल म्हणून ओळखल्या जाणाऱ्या अ‍ॅमेझॉन रेन फॉरेस्टमध्ये लागलेला वणवा आणि त्यात जळून राख झालेली वर्षानुवर्ष जतन केलेली वनसंपत्ती सर्वानाच ज्ञात आहे. जगाला २०% ऑक्सिजन पुरवणाऱ्या अ‍ॅमेझॉन पर्जन्य वनात २०२३ मध्ये लागलेल्या आगीत सुमारे ७०० चौरस किलोमीटरचे वनक्षेत्र नाहीसे झाले आहे. पृथ्वीचे फुफ्फुस म्हणून ओळखल्या जाणाऱ्या वनातील हा वणवा ९९ % मानवनिर्मित कारणांनी लागला होता, हे कळल्यावर आपल्याला मोठाच धक्का बसेल.

वाढते तापमान : संशोधकांनी गेल्या दोन दशकातील भारतातील १४१ प्रमुख शहरांतील तापमान वाढीचा अभ्यास केला. या अभ्यासामध्ये सॅटेलाईट आकडेवारीचा वापर करून तापमान वाढीवर शहरीकरण आणि हवामान बदल या निकषांवर हे सिद्ध झाले आहे की, जमिनीच्या पृष्ठभागावरचे तापमान दिवसेंदिवस वाढते आहे. संशोधकांच्या मते ग्रामीण आणि शहरेतर भागात तापमान वाढीचे प्रमुख कारण स्थानिक हवामान बदल हे असून शहरी भागात काँक्रीट आणि जमिनीच्या वापरातील बदल हे तापमान वाढीचे प्रमुख कारण असल्याचे दिसते आहे. सध्याचे दिल्ली, मुंबई, भुवनेश्वर, जमशेदपूर हे तापमान वाढीच्या माऱ्याने प्रभावित झालेली शहरे आहे.

समतोल विकास अन् संतुलित पर्यावरण:

पर्यावरणावर झालेले सध्याचे परिणाम पाहता संशोधनांती असे लक्षात आले आहे, की वाढते तापमान, कोरडे दुष्काळ, अतिवृष्टी, ग्लोबल वॉर्मिंग. वाढती पूर परिस्थिती या सर्वांना हवामानातील बदल तसेच मानवाद्वारे केला गेलेला नैसर्गिक

संसाधनांचा बेसुमार वापर आणि त्यावर न घातलेले प्रतिबंधात्मक आणि भरपाई स्वरूप प्रयत्न जबाबदार आहेत, असे म्हणावे लागेल. पर्यावरण रक्षण ही वैश्विक जबाबदारी आहे. ज्या जबाबदारीची धुरा आपोआप आपल्यातल्या प्रत्येकाने उचलायची आहे. यासाठी महत्वाचा घटक आहे तो म्हणजे Environmental wisdom. अर्थातच पर्यावरण विषयक अर्थपूर्ण शहाणपण! भारतामध्ये तसे पण एक प्रकारचे traditional environmental wisdom आहेच. ज्यामध्ये आपसूकच conservation म्हणजेच “जपणूक” ही आहे.

शाश्वत विकास पद्धतीसाठी सार्वजनिक जागरूकता आणि समुदायाचा सहभाग आवश्यक आहे. स्थानिक पातळीवर अक्षय ऊर्जेचा अवलंब आणि पर्यावरण संवर्धनाला स्थानिक पातळीवर पुढाकार प्रोत्साहन देतात. पर्यावरणीय विकास म्हणजे नैसर्गिक संसाधनांचा शाश्वत आणि जबाबदार वापर करण्यास प्रोत्साहन देण्याची प्रक्रिया आहे आणि त्याचबरोबर पर्यावरण आणि परिसंस्थांवर होणारे नकारात्मक परिणाम कमी करून निरोगी आणि लवचिक ग्रह आणि जग निर्माण करणे. विकास आणि पर्यावरण हे अनेकदा दोन विरुद्ध आणि विसंगत घटक म्हणून सादर केले जातात. सर्व मानवी क्रियाकलापांसाठी संसाधनांचा प्राथमिक स्रोत पृथ्वीवरून येतो. मग तो वीज प्रकल्पांमध्ये वापरला जाणारा कोळसा असो किंवा शर्ट बनवण्यासाठी वापरला जाणारा कापूस असो. पृथ्वीवरील संसाधनांचा कार्यक्षमतेने वापर करणे ही विकासाची गुरुकिल्ली आहे. १८ व्या शतकापासून, औद्योगिक विकासाच्या गतीमुळे उदासीन नैसर्गिक संसाधनांचे मोठ्या प्रमाणात शोषण झाले आहे. भांडवलशाही व्यवस्थेत अधिक संपत्ती जमा करण्याच्या वाढत्या लोभामुळेही या अविचारी विकासाचा चालना मिळाली आहे. तथापि, औद्योगिक विकासाच्या फायद्यांनी अब्जावधी लोकांना चांगली आर्थिक परिस्थिती प्रदान करून प्रभावित केले आहे. म्हणून विकास आणि पर्यावरण यांच्यात संतुलन राखणे आवश्यक आहे.

आता ही गोष्ट पाहण्याची आणि समजून घेण्याची गरज आहे की, आपण करत असलेला विकास हा पर्यावरणाच्या आड तर येत नाही ना ? आणि जर असेल तर तो विकास थांबवावा की पर्यावरणाचा ज्हास होऊ द्यावा? वाढत्या लोकसंख्येच्या वाढत्या गरजा पूर्ण करण्यासाठी विकासाचा पर्याय नाही. फक्त विकास हा पर्यावरणाचा शत्रू आहे, अशी मानसिकता न ठेवता विकास sustainable हवा. रस्ते बांधणी असो किंवा सदनिका बांधण्याचा प्रकल्प, कॉलनीमधील नवीन सार्वजनिक बागवगीचा तयार करावयाचा असो किंवा एखादा मोठा शॉपिंग मॉल बांधायचा असो, कोणताही नवीन प्रकल्प सुरू करताना हा प्रकल्प ecologically sustainable आहे की नाही, याचा अभ्यासपूर्ण आढावा ecological survey द्वारे व्हायला हवा. विकासाचा कोणताही प्रकल्प उभारताना या ना त्या प्रकारे पर्यावरणाची हानी होणारच आहे. पण ती हानी कमीत कमी कशी करता येईल, हे पाहायला हवं.

विकासाचं मूळ समीकरण जे बनलय की विकास म्हणजे infrastructural development + कॉन्क्रीटकरण आणि तेही खूप इंधन वापरून किंवा इंधनासाठी ! वर्षानुवर्षे विकासाची हीच व्याख्या आपल्या मनात ठसवली गेली आहे. ही व्याख्या जर आपण बदलू शकलो तर पर्यावरण विरुद्ध विकास, हा प्रश्न बहुतांशी सुटेल. पण वर्षानुवर्षे बनलेली, ठसलेली ही विकासाची व्याख्या बदलायची तर पावले ही तशीच उचलावी लागतील. गोष्टीचे पर्याय शोधावे लागतील, मेहनत करावी लागेल, मानसिकता बदलावी लागेल. वर्षातून एकदा येणाऱ्या पावसाच्या पाण्याचे व्यवस्थापन अर्थात Rain water Harvesting चा गंभीरतेने विचार करायला हवा. सिमेंटचे रस्ते हा पाणी जमिनीत मुरण्याच्या प्रक्रियेमधला प्रमुख अडसर आहे. ठीकठिकाणी जमिनीमध्ये पाणी मुरण्याची व्यवस्था केली जावी.

नव्या पिढीसाठी आपण पूर्वज म्हणून कोणता वसा देणार. आज जी घरती उघडी- बोडकी दिसत आहे. ती एकेकाळी हिरव्यागार वृक्षांनी नटलेली असे त्यांनी फक्त पुस्तकांमध्येच वाचायचे का? आज प्रत्येकाने ठरवले की ज्याप्रमाणे मी माझ्या मुलाचे संगोपन करीत आहे त्याचप्रमाणे माझ्या आयुष्यभरात एका तरी वृक्षाचे संगोपन करेन. नेहमीच्या बिल्लिंगऐवजी ग्रीन बिल्लिंगचा विचार करता येईल. सर्वात महत्वाचं म्हणजे एक झाड तोडलं तर त्याऐवजी दहा झाडे लावून, त्याची साधारण दहा वर्षे जोपासना करावी. जास्तीत जास्त ऑक्सिजन देणाऱ्या पर्यायी अर्थातच कडुनिंब, वड, पिंपळ, चंदनासारख्या झाडांची लागवड करावी. मग पहा सृष्टीत पुन्हा एकदा नवा बदल पाहायला मिळेल. प्रत्येकाने एक पाऊल पुढे उचलायचे मग पूर्ण धरती सुजलाम सुफलाम बनेल आणि मग आम्हाला या विषयावर बोलायची गरजच भासणार नाही.

वन व्यवस्थापन, अपरंपरागत ऊर्जेचा वापर, सौर शहरांचा विकास, बायो इंधन निर्मितीचे प्रयत्न अशी पर्यावरण पूरक धोरणे सरकारमार्फत राबवली जात आहेत. तरीही, देश पातळीवर निर्माण झालेल्या पर्यावरण विषयक धोक्यांबाबत पुरेशी सजगता दिसून येत नाही. म्हणूनच चुकीचे औद्योगिकीकरण आणि वाढते शहरीकरण यामुळे खालावलेल्या हवेच्या गुणवत्तेत फरक पडावा यासाठी परिणामकारक उपाययोजना आखण्यात प्रशासन अयशस्वी ठरते, जैवविविधता राखण्यात आपल्याला यश येत नाही. विकास आणि पर्यावरण संतुलन यांचा समतोल साधताना कायद्याची अंमलबजावणी आणि भ्रष्टाचाराला थारा न देणे याबाबत शासन-प्रशासन सतर्क राहिले तरच भारत पर्यावरणीय समस्येतून डोकं वर काढू शकतो.

विकासात्मक उपक्रमांसाठी नैसर्गिक संसाधनांच्या गरजा अपारंपरिक संसाधनांच्या भरपाईपेक्षा जास्त होणार नाहीत याची खात्री करणे महत्वाचे आहे. बेसुमार उपभोगवाद, अविवेकी विकास आणि वाढती लोकसंख्या हे सर्व घटक नैसर्गिक संसाधनांचे प्रमाण कमी करतात. पर्यावरणाच्या वहन क्षमतेची संकल्पना खरोखरच महत्वाची आहे. जर एखाद्या भागातील लोकसंख्या एका मर्यादेपेक्षा जास्त वाढली तर त्या भागातील नैसर्गिक संसाधने पुरेशी राहणार नाहीत. या कमतरतेमुळे लोकसंख्या कमी होईल. परंतु विविध समाजांच्या वाहतुकीतील वाढ आणि परस्परावलंबन पाहता, सध्याच्या जगात पर्यावरणाची वहन क्षमता खरोखरच महत्वाची नाही. तथापि, संपूर्ण पृथ्वीवर आणि जीवनाच्या पालनपोषणावर त्याचे मोठे परिणाम आहेत. शाश्वत विकास असा विकास जो पर्यावरणाची काळजी घेतो आणि भविष्यातील पिढ्यांसाठी नैसर्गिक संसाधने जपतो. पारंपारिक आर्थिक वाढीच्या संकल्पनेला विकास म्हणून पुन्हा आकार देण्याचे उद्दिष्ट आहे. ते नियोजन, संवर्धन आणि पर्यावरणपूरक विकासावर अवलंबून आहे. १९९२ मध्ये रियो दि जानेरो येथे आयोजित करण्यात आलेली UNCED (संयुक्त राष्ट्र पर्यावरण आणि विकास परिषद) ही शाश्वत विकासाचा मुद्दा मांडणारी पहिली आंतरराष्ट्रीय शिखर परिषद होती.

पर्यावरण आणि विकास यांचा समतोल आपण छोट्या छोट्या बाबीद्वारे करू शकतो. विकास आणि पर्यावरण हे दोन्ही घटक एकमेकांसाठी आवश्यक आहेत. विकासासोबतच पर्यावरणाची काळजी घेणे आवश्यक आहे. शाश्वत विकासाच्या माध्यमातून आपण पर्यावरण आणि विकास यांचा समतोल साधू शकतो. प्रदूषण कमी करण्यासाठी पर्यावरणपूरक तंत्रज्ञानाचा वापर करणे आवश्यक आहे. पर्यावरण संरक्षण कायदे तयार करणे आणि त्यांची कठोर अंमलबजावणी करणे आवश्यक आहे. जेणेकरून योग्य समतोल साधला जाईल. लोकांमध्ये पर्यावरण संरक्षणाबद्दल जागरूकता निर्माण करणे आवश्यक आहे.

शाश्वत विकास उद्दिष्टे साध्य करण्यासाठी प्रभावी पर्यावरणीय धोरणे, प्रशासन आणि पर्यावरणीय मंजूरी अत्यंत महत्वाची आहे. उदाहरणार्थ, चार धाम प्रकल्प हा विकास प्रकल्पांपेक्षा पर्यावरणाला हानी पोहोचवणारा प्रकल्प असल्याने न्यायालयांमध्ये त्यावर प्रश्नचिन्ह उपस्थित करण्यात आले आहे कारण त्यात मोठ्या प्रमाणात वृक्षतोड, पर्वत तोडणे आणि कचरा टाकणे यांचा समावेश होता. म्हणून, विकासासाठी अशा प्रकारे तयार केलेल्या धोरणांमध्ये सर्व भागधारकांशी सल्लामसलत करणे आवश्यक आहे आणि विशेषतः पर्यावरणीय संवेदनशील क्षेत्रांमध्ये विकासाच्या केंद्रस्थानी पर्यावरणीय चिंता ठेवणे आवश्यक आहे.

सर्वात महत्वाचे म्हणजे कोणताही विकास प्रकल्प हाती घेताना त्या प्रकल्पाचे carbon foot print काय होतील आणि त्या कशा reserve करता येतील, याचा विचार तो प्रकल्प सुरू करण्याआधीच केला जावा. पर्यावरण हे जैव विविधतेने नटलेले आहे तर कोणताही नवा प्रकल्प सुरू करताना नैसर्गिक जमीन क्षेत्र आणि नैसर्गिक अधिवास यांची कमीत कमी हानी करण्याकडे कल असावा. एखादी नवीन बाग निर्माण करायची असेल तरी ecological landscaping च्या आधारे करावी. जेणेकरून स्थानिक जमिनीचा पोत, स्थानिक वृक्ष आणि आपसूकच त्यावर जगणारे प्राणी, पक्षी, कीटक आणि पर्यायाने जैव साखळी देखील अबाधित ठेवता येईल. माती आणि पाणी यांचे ecological restoration होईल. पर्यावरण आणि विकास या दोन परस्पर विरोधी संकल्पना नसून त्या दोन समांतर रेषांप्रमाणे हातात घालून चालणाऱ्या कशा करता येतील, याकडे आपला कल असावा.

विकास की पर्यावरण असे न म्हणता विकास आणि पर्यावरण हे म्हणण्याचे स्वातंत्र्य यावे. म्हणजेच पर्यावरणाविरुद्ध विकास असे चित्र न राहता विकास आणि पर्यावरण ही दोन एका रथाची चाके असल्याप्रमाणे काम करतील. आपल्याला पर्यावरण किंवा विकास यापैकी एकाची निवड करण्याची वेळ येणार नाही. पर्यावरणाच्या आव्हानांना तोंड देण्यासाठी उत्पादन आणि वापराच्या पद्धतींकडे लक्ष देण्याची गरज आहे. यासोबतच जीवनशैलीशी संबंधित मुद्द्यांकडेही लक्ष देण्याची गरज आहे. जगातील सर्व देशांनी कार्बन आणि जैवइंधनावर आधारित उत्पादन आणि वापराच्या पद्धती एकात्मिक पद्धतीने बदलून अक्षय ऊर्जेवर आधारित प्रणालीला प्रोत्साहन देण्याची गरज आहे.

विकास हवा पण तितकंच पर्यावरण पण महत्वाचे आहे. पर्यावरणाच्या बाबतीत आपण सेन्सिटिव्ह भूमिका ठेवली पाहिजे, कारण पर्यावरण पाहिजे पण बाकीचे काहीच नको असा दृष्टीकोन ठेवणे हे चुकीचे आहे, आपले जीवन हे स्वच्छ आणि संतुलित पर्यावरणावर अवलंबून आहे. नैसर्गिक जग हे मानवाला मिळालेली देणगी आहे आणि पर्यावरण हा त्यातील एकमेव असा घटक आहे, ज्यामुळे मानवी जीवन सुखकर होणे शक्य होते. हवामान बदलामुळे वेगवेगळी महत्वाची आव्हाने उभी राहतात, ज्यासाठी तातडीने शमन आणि अनुकूलन उपायांची आवश्यकता असते. हवामान बदलाच्या घटनांच्या अनिश्चिततेला कमी करण्यासाठी आणि त्यांच्याशी जुळवून घेण्यासाठी सर्व स्तरांवर समग्र दृष्टिकोनाची आवश्यकता आहे. जेणेकरून विकास आणि पर्यावरण संवर्धन एकत्र येतील.

विकास आणि पर्यावरण परस्परविरोधी नाहीत, या दोन्ही संकल्पना परस्परांना पूरक ठरण्याकरता संबंधित कायद्याचे पालन करणे अनिवार्य ठरते. पर्यावरण संरक्षणात प्रत्येक व्यक्तीला महत्वाची भूमिका बजावावी लागेल. विशेषतः जे लोक ऊर्जेचा

खर्च सहज परवडू शकतात. पर्यावरणपूरक तंत्रज्ञानाचा अवलंब करून कार्बन उत्सर्जन कमी करता येते. खाजगी मोटार वाहनांच्या वापरात संयम ठेवावा लागेल. स्वच्छ इंधनांचा वापर वाढवताना, सौर ऊर्जा, पवन ऊर्जा यासारख्या पारंपारिक ऊर्जा स्रोतांचा अवलंब करावा लागेल. कचरा वस्तूंचा पुनर्वापर करून पुनर्वापर करणाऱ्या आणि कचऱ्याचे उर्जेत रूपांतर करणाऱ्या तंत्रज्ञानाला व्यावहारिक स्वरूप द्यावे लागेल. हरित किंवा स्वच्छ तंत्रज्ञान विकसित करावे लागेल आणि अधिकाधिक लोकप्रिय करावे लागेल. आपल्याला पर्यायी स्रोत विकसित करावे लागतील. कारण पर्यायी स्रोतांद्वारेच आपण विकासाची गती वाढवू शकतो आणि प्रगतीच्या मार्गावर वाटचाल करताना आपण विकासासोबतच पर्यावरणाचे रक्षण करू शकतो.

विकास योजना आणि कार्यक्रमांच्या निर्मितीसाठी पर्यावरणाचे संरक्षण, सुधारणा आणि संसाधनांचा वापर ही मार्गदर्शक तत्त्वे राहिली आहेत. खरंच, असे कोणतेही विकास कार्यक्रम आणि प्रकल्प नाहीत ज्यांचा पर्यावरणावर परिणाम होत नाही. पर्यावरणाचे दोन प्रकार आहेत – नैसर्गिक आणि मानवनिर्मित. दोन्ही मानवी कल्याण आणि मूलभूत हक्कांसाठी आवश्यक आहेत. पर्यावरण ही संकल्पना मानवी पर्यावरणाच्या सर्व घटकांची संपूर्णता आहे. पर्यावरण म्हणजे मानवी पर्यावरण तयार करणाऱ्या सामाजिक, जैविक, भौतिक आणि रासायनिक घटकांचा योग आहे. पर्यावरणाच्या या प्रत्येक घटकातून मानवी कल्याण आणि त्याचे अस्तित्व अवलंबून असलेल्या संसाधनांची निर्मिती होते. पर्यावरणात सर्व मानवी संबंधित क्रियाकलाप वापरले जातात.

“समतोल विकास संतुलित पर्यावरण निरोगी मानव...” अशी आपली साखळी असावी. आपली जीवनशैली पर्यावरणपूरक असली पाहिजे. मानवी अस्तित्व आणि विकास यामध्ये पर्यावरणाची भूमिका महत्वाची आहे. पर्यावरण संरक्षणाला प्रोत्साहन देण्यासाठी जागतिक पर्यावरण दिन हा विकास व पर्यावरण या दोन्ही बाबतीत जागरूकता निर्माण करतो. पर्यावरण हा कोणत्याही एका व्यक्तीचा वारसा नसला तरीही प्रत्येकांसाठी सुरक्षित असणे, आवश्यक आहे. जर आपण निसर्ग आणि पर्यावरणाप्रती असलेल्या आपल्या जबाबदाऱ्यांकडे दुर्लक्ष करत राहिलो, तर निसर्गाच्या कोपाच्या रूपात आपल्याला हादरवून टाकणाऱ्या आंशिक आपत्ती संपूर्ण आपत्तीचे रूप धारण करतील आणि आपल्याला गिळंकृत करतील. जर आपण अजूनही शाश्वत विकासाचा मार्ग अवलंबला नाही तर जर आपण पर्यावरण संतुलन आणि संवर्धनाकडे लक्ष देऊन निसर्गाच्या जखमा भरून काढायला सुरुवात केली तर आपण भविष्यातील विनाशापासून स्वतःला वाचवू शकतो. विकास आणि पर्यावरण हे दोन्ही एकमेकांसाठी आवश्यक आहेत ह्या दोन्हीमध्ये आपण संतुलन साधल्यास एक चांगले भविष्य निर्माण करू शकतो.

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- 2) सगळं डिजिटल हे पर्यावरण पूरक आहे? लेखक : ख्रिस्तोफ मॅण्डेलेन रूपांतर: संजीवनी आफळे
- 3) पर्यावरण शास्त्र: सोलापूर विद्यापीठ, सोलापूर
- 4) मराठी विश्वकोश: पर्यावरण शिक्षण
- 5) पर्यावरण परिस्थितिकी : डॉ. तुषार घोरपडे

पर्यावरणीय राजकारण याचा एक अभ्यास

Dr. Jijaram Shrikrishna Bagal

प्रस्तावना:

मानव आणि पर्यावरण यांचा घनिष्ठ संबंध आहे. मानवी जीवन हे नैसर्गिक अवस्थेमध्ये अत्यंत आनंदी असे होते. त्याच्यावर कोणतेही प्रकारची बंधने नव्हती. असे मत रूसो या विचारवंतांनी व्यक्त केले आहे. त्यामुळे मानवाच्या अस्तित्वासाठी पर्यावरणीय घटक जसे की हवा पाणी, माती, वनस्पती प्राणी खनिजे हे अत्यंत महत्वाचे आहेत. परंतु औद्योगिकीकरण शहरीकरण तंत्रज्ञानाचा अतिरेकी वापर आणि जागतिकीकरणामुळे पर्यावरणावर प्रचंड दबाव आला आहे. त्यामुळे प्रचंड प्रमाणात हवा प्रदूषण जल प्रदूषण व माती प्रदूषण झाले आहे. निसर्गातील अनेक जैवविविधता रास पाऊस आहेत व नैसर्गिक साधनांचा तुटवडा निर्माण होत आहे. जगामध्ये विकसित विकसनशील व अविकसित देशांमध्ये औद्योगिकीकरण व इतर प्रचंड स्पर्धा असल्यामुळे प्रचंड प्रमाणात प्रदूषण निर्माण होत आहे. याची जबाबदारी कोणीही घेण्यास तयार नाही. विकसित राष्ट्र विकसनशील राष्ट्रांवर आरोप करत आहेत. तो विकसित राष्ट्र अविकसित व विकसित राष्ट्रांवर आरोप करत आहेत.

भारतात सुद्धा भांडवलदार आपल्या स्वार्थासाठी प्रचंड प्रमाणात जंगलतोड हवा प्रदूषण व माती परीक्षण करत आहेत. याचा फायदा गरीब सामान्य लोकांना बसत आहे. म्हणून पर्यावरण हा केवळ वैज्ञानिक व सामाजिक विषय न राहता तो एक राजकीय विषय म्हणून उदयाला आला आहे. राज्याची धोरणे कायदे राजकीय पक्ष जागतिक संस्था नागरी समाज यांची भूमिका या प्रश्नाचे जोडले आहे.

संसोधनाचा उद्देश :

- 1) पर्यावरणाचा अभ्यास करणे
- 2) पर्यावरण परिषदेचा अभ्यास करणे
- 3) पर्यावरणीय राजकारणाचा अभ्यास करणे
- 4) प्रदूषणाच्या कारणांचा अभ्यास करणे
- 5) प्रदूषणावर उपाययोजना सुचवणे

ऐतिहासिक पार्श्वभूमी:

पर्यावरणीय राजकारण हा विषय जागतिक पातळीवर अत्यंत महत्वाचा विषय मानला जातो. कारण यामुळे ग्लोबल वॉर्मिंग यामध्ये वाढ होत आहे. जागतिक अस्तित्व धोक्यात आले आहे काय असे बऱ्याच वेळा वाटते त्यामुळे पर्यावरणाचा अभ्यास जागतिक पातळीवर करण्यासाठी वेगवेगळ्या परीक्षा घेण्यात आल्या. 1972 साली स्टॉक होम परिषद घेण्यात आली यात पर्यावरण हा आंतरराष्ट्रीय विषय म्हणून मान्यता देण्यात आली. 1987 साली ब्रँड लँड अहवाल प्रसिद्ध झाला व या परिषदेमध्ये पर्यावरणावर शाश्वत विकास ही संकल्पना पुढे आली. म्हणजे पर्यावरणाला कोणताही धोका न पोहोचता आपण विकास साधला पाहिजे यावर लक्ष दिले गेले. तसेच 1992 मध्ये रियो अर्थ समिट ही परिषद घेण्यात आली यामध्ये जैवविविधता हवामान बदल जंगल संरक्षण यावर जागतिक करण्यात आले प्रत्येक राष्ट्रांनी या कराराचे पालन केलं पाहिजे असे ठरवले. कोटा प्रोटोकॉल 1997 साली परिषद घेण्यात आली यात कार्बन उत्सर्जन कमी करण्यासाठी वेगवेगळे करार करण्यात आले. 1915 साली पॅरिस करार हा करण्यात आला या करारामध्ये जागतिक तापमान वाढ दोन सेंटीमीटर खाली ठेवण्याचा प्रयत्न करण्यात आला. कारण जागतिक तापमानामध्ये दिवसेंदिवस वाढ होत आहे अशीच वाढ होत राहिली तर अंटार्क्टिका खंडावरील बर्फ होते व यामुळे जागतिक समस्या निर्माण होईल.

भारतामध्ये सुद्धा पर्यावरण संरक्षण साठी वेगवेगळ्या चळवळी करण्यात आल्या त्यामध्ये 1973 मध्ये चिपको आंदोलन उत्तराखंडामध्ये करण्यात आले व यात जंगल संरक्षणासाठी प्रचंड लढा देण्यात आला. सामाजिक कार्यकर्त्या मेघा पाटकर यांनी नर्मदा बचाव आंदोलन सुरू केले. यात नर्मदा धरणामुळे विस्थापित झालेले आहेत व त्यामुळे पर्यावरणीय हानी झाली आहे यांना वाचवण्यासाठी लढा देण्यात आला. त्यामुळे ती समस्या राष्ट्रीय पातळीवर ओळखली जाऊ लागली. सायलेंट व्हॅली आंदोलन केरळमधील जंगल संरक्षण साठी करण्यात आले. तसेच भारतीय राज्यघटनेमध्ये सुद्धा अनुच्छेद 48 अ यामध्ये राज्याने पर्यावरणाचे संरक्षण व सुधारणा करावी असे सांगितले आहे.

अनुच्छेद 51 अ (g) मध्ये प्रत्येक नागरिकाची कर्तव्य आहे की तो पर्यावरणाचे रक्षण करेल असा मूलभूत अधिकार घटनेने दिलेला आहे. भारतीय न्यायव्यवस्था देखील पर्यावरणीय संरक्षणासाठी सक्रिय असते. अलीकडच्या काळामध्ये तेलंगणामध्ये आयटी पार्क साठी प्रचंड प्रमाणात जंगल तोड करण्यात आली व त्यामुळे अनेक वृक्ष व प्राण्याची हानी झाली याची दखल होऊन सर्वोच्च न्यायालयाने त्यावर बंदी घातली केंद्र व राज्य सरकार पर्यावरण मंत्रालय प्रदूषण नियंत्रण मंडळ, विविध कायदे उदाहरणार्थ वन्यजीव संरक्षण कायदा १९७२ या पद्धतीने कायदे केलेले आहेत. राष्ट्रीय व आंतरराष्ट्रीय पातळीवर पर्यावरण जनजागृती

आंतरराष्ट्रीय पातळीवर पर्यावरणीय आव्हाने (Environmental Challenges at International Level):

हे आजच्या काळातील अतिशय गंभीर आणि जटिल प्रश्न आहेत. तंत्रज्ञान, औद्योगिकीकरण, लोकसंख्या वाढ, शहरीकरण, नैसर्गिक संसाधनांचा अतिरेकी वापर यामुळे पृथ्वीसमोर अनेक गंभीर संकटे उभी राहिली आहेत. खाली याची सविस्तर माहिती दिली आहे:

१) हवामान बदल (Climate Change)

औद्योगिक क्रांतीपासून वाढलेले हरितगृह वायू (GHG) उत्सर्जन हे जागतिक तापमानवाढीचे मुख्य कारण आहे.

हिमनद्या वितळणे, समुद्राची पातळी वाढणे, वाळवंटीकरण, चक्रीवादळे, पूर, दुष्काळ या स्वरूपात परिणाम होत आहेत.

पॅरिस करार (Paris Agreement 2015) हा हवामान बदलाशी लढण्यासाठी आंतरराष्ट्रीय स्तरावरील एक मोठा प्रयत्न आहे.

२) प्रदूषण (Pollution)

हवाप्रदूषण: चीन, भारत, अमेरिका यांसारख्या औद्योगिक देशांमध्ये प्रचंड प्रमाणावर पाण्याचे प्रदूषण: औद्योगिक सांडपाणी, तेलगळती, प्लास्टिक प्रदूषणामुळे महासागर धोक्यात. ध्वनी व प्रकाश प्रदूषणही मानवी आरोग्यासाठी आव्हानात्मक. यामुळे जागतिक आरोग्य संघटना (WHO) सतत चेतावणी देत असते.

३) जैवविविधतेचा न्हास (Loss of Biodiversity)

जंगलतोड, औद्योगिकीकरण, अवैध शिकार, प्रदूषण यामुळे प्रजाती नष्ट होत आहेत. अंदाजे दररोज १०० प्रजाती पृथ्वीवरून नाहीशा होत आहेत. जैवविविधता करार (Convention on Biological Diversity, 1992) अंतर्गत आंतरराष्ट्रीय प्रयत्न सुरू आहेत.

४) वाळवंटीकरण व भूमी न्हास (Desertification and Land Degradation)

शेतजमिनीचा अतिरेकी वापर, जंगलतोड, पाण्याचा दुरुपयोग यामुळे भूमी वाळवंटी होत आहे. आफ्रिका, आशिया आणि दक्षिण अमेरिकेत याचा सर्वाधिक परिणाम. UNCCD (United Nations Convention to Combat Desertification, 1994) हे महत्वाचे पाऊल.

५) नैसर्गिक संसाधनांचा अतिरेकी वापर (Overexploitation of Natural Resources)

पाणीटंचाई: 2050 पर्यंत अर्ध्या जगाला पाण्याचे गंभीर संकट. खनिजसंपत्तीचा अति वापर: तेल, गॅस, कोळसा यांचा असमतोल वापर. त्यामुळे टिकाऊ विकासाची गरज अधोरेखित होते.

६) समुद्र व महासागर संकटे (Marine and Oceanic Issues)

प्लास्टिक प्रदूषणामुळे ग्रेट पॅसिफिक गार्वेज पॅचसारख्या प्रचंड कचऱ्याचे ढीग तयार झाले आहेत. अति मासेमारीमुळे सागरी जीवसृष्टीचा समतोल बिघडला आहे. (Coral Reefs) उष्णतेमुळे नष्ट होत आहेत.

७) अणु व औद्योगिक कचरा (Nuclear & Industrial Waste)

अणुशक्ती प्रकल्प व रासायनिक उद्योगातून निर्माण होणारा कचरा सुरक्षितपणे व्यवस्थापित करण्याचे मोठे आव्हान. चर्नोबिल (1986), फुकुशिमा (2011) यांसारख्या दुर्घटनांनी मानवजातीला धक्का दिला.

८) जागतिक सहकार्याची गरज (Need for International Cooperation)

पर्यावरणीय समस्या सीमारेषा ओलांडणाऱ्या असल्याने जागतिक सहकार्य अनिवार्य आहे. UNEP (United Nations Environment Programme), IPCC (Intergovernmental Panel on Climate Change) यांसारख्या संस्था

महत्वाची भूमिका बजावतात. टिकाऊ विकास ध्येये (SDGs 2030) हे जागतिक पर्यावरणीय समस्यांवरील उपायांचे एक महत्वाचे साधन.

पर्यावरणीय संरक्षणासाठी उपाय योजना (Measures for Environmental Protection) :

विविध पातळ्यांवर – व्यक्तिगत, सामाजिक, राष्ट्रीय आणि आंतरराष्ट्रीय – राबविल्या जाऊ शकतात. खाली महत्वाच्या उपाययोजना दिल्या आहेत:

१. वैयक्तिक पातळीवरील उपाय

झाडे लावणे व संवर्धन करणे

पाणी व विजेची बचत करणेप्लास्टिकचा वापर टाळणे व पुनर्वापर (Recycle) करणेसार्वजनिक वाहतूक साधनांचा वापर करणेपर्यावरणपूरक वस्तू व ऊर्जेचा (Solar, Wind) वापर वाढवणे

२. सामाजिक पातळीवरील उपाय

स्वच्छता मोहिमा राबविणे (उदा. स्वच्छ भारत अभियान)ग्रामपातळीवर जलसंवर्धन प्रकल्प उभारणेशाळा व महाविद्यालयांत पर्यावरण विषयक शिक्षण व जनजागृती करणेसंस्था (NGOs) द्वारे लोकांना पर्यावरण संरक्षणाचे प्रशिक्षण देणे

३. राष्ट्रीय पातळीवरील उपाय

औद्योगिक प्रदूषणावर नियंत्रण ठेवण्यासाठी कठोर कायदे लागू करणेपाणी व वायू प्रदूषण नियंत्रण मंडळे अधिक सक्षम करणेजैवविविधता संवर्धनासाठी राष्ट्रीय उद्याने, अभयारण्ये, टायगर प्रोजेक्ट्स वाढवणेनवीकरणीय उर्जेच्या (Renewable Energy) प्रकल्पांना प्रोत्साहन देणेशाश्वत शेती पद्धती (Sustainable Agriculture) वापरणे

४. आंतरराष्ट्रीय पातळीवरील उपाय

पॅरिस हवामान करार, क्योटो प्रोटोकॉल सारख्या आंतरराष्ट्रीय करारांचे पालन करणेविकसित व विकसनशील देशांनी एकत्रितपणे हरितगृह वायूंचे प्रमाण कमी करणेआंतरराष्ट्रीय पातळीवर स्वच्छ ऊर्जा संशोधनासाठीसहकार्य करणेजागतिक स्वयंसेवी संस्था व युनोच्या (UNO) पर्यावरणीय कार्यक्रमांत सक्रिय सहभाग

समारोप :

जागतिक पातळीवर पर्यावरणीय राजकारण हा महत्वाचा विषय झालेला आहे. राज्यगाव मध्ये अनेक राष्ट्रांमध्ये युद्ध चालू आहे. या विद्या मध्ये प्रचंड प्रमाणात मानवी व भौतिक हानी झालेले आहे. यामध्ये पर्यावरणाची सुद्धा प्रचंड प्रमाणात हानी झालेली आहे. वाढत्या जागतिक शस्त्रास्त्र स्पर्धेमुळे प्रचंड प्रमाणात शस्त्रास्त्र निर्माण करण्याची स्पर्धा निर्माण झालेली आहे. यामुळे प्रचंड प्रमाणात प्रदूषणामध्ये वाढ होत आहे. जगातील बडीराष्ट्र स्वतःच्या फायद्यासाठी प्रदूषण मध्ये वाढ करून गरीब राष्ट्रावर आरोप लावत आहेत. यामुळे विकसित व विकसित विकसनशील राष्ट्रांमध्ये दरी निर्माण झालेली आहे.

जेव्हा आज प्रत्येक व्यक्तीवर पर्यावरण संरक्षण करण्याची जबाबदारी येऊन पडलेली आहे. कारण पर्यावरण टिकली तरच मानवी जीवन टिकू शकते. आज प्रचंड प्रमाणात तापमान मध्ये वाढ होत आहे. यामुळे ग्लोबल वॉर्मिंगचा धोका निर्माण झाला आहे. यामुळे व्यक्तीने जीवन जगत असताना कमी गरजा निर्माण करून जीवन जगले पाहिजे त्यामुळे प्रदूषणाची हानी होणार नाही व जग आनंदाने जगेन

गृहनिर्माण क्षेत्रातील विविध उद्योगात पर्यावरणाची भूमिका

श्री. बर्वे गणेश चंद्रकांत

Researcher Scholer

डॉ. साहेबराव काळू मोरे

Researcher Guide

(K.T.H.M. College, Nashik) सावित्रीबाई फुले पुणे विद्यापीठ पुणे.

गोषवारा (Abstract) :

या संशोधन लेखात गृहनिर्माण क्षेत्रातील विविध उद्योगांमध्ये पर्यावरणीय घटकांचे महत्त्व स्पष्ट केले आहे. वाढत्या औद्योगिकीकरणामुळे आणि शहरीकरणामुळे पर्यावरणावर होणारे परिणाम व त्यांची तीव्रता लक्षात घेऊन शाश्वत गृहनिर्माणाच्या दिशेने उपाययोजना सुचविल्या आहेत. या लेखात उद्योगांचे पर्यावरणपूरक मॉडेल्स, उर्जेची बचत, हरित बांधकाम साहित्य, कचरा व्यवस्थापन व पर्यावरणीय नियमन यांचा अभ्यास करण्यात आला आहे.

2. प्रस्तावना (Introduction) :

गृहनिर्माण क्षेत्र हे कोणत्याही देशाच्या सामाजिक आणि आर्थिक प्रगतीसाठी अत्यावश्यक घटक आहे. शहरीकरणाच्या झपाट्याने वाढणाऱ्या प्रक्रियेमुळे बांधकाम उद्योग, सिमेंट, स्टील, लाकूड, रंग, ऊर्जा उत्पादन, पाणीपुरवठा आणि कचरा व्यवस्थापन यांसारखे पूरक उद्योग मोठ्या प्रमाणावर विकसित झाले आहेत. या उद्योगांचा विकास जीवनमान उंचावण्यासाठी आवश्यक असला, तरी त्याचा पर्यावरणावर होणारा परिणामही लक्षणीय आहे.

बांधकाम प्रक्रियेदरम्यान होणारे प्रदूषण, नैसर्गिक संसाधनांचा जास्तीचा वापर, हरितगृह वायू उत्सर्जन, कचरा निर्मिती आणि जैवविविधतेवर होणारे दुष्परिणाम हे या क्षेत्रातील प्रमुख पर्यावरणीय आव्हाने आहेत. दुसरीकडे, पर्यावरणपूरक बांधकाम साहित्य, उर्जासंवर्धन तंत्रज्ञान, हरित वास्तुकला आणि कचरा पुनर्वापर यांच्या वापरामुळे शाश्वत गृहनिर्माणाचा मार्ग मोकळा होऊ शकतो. या संशोधन लेखात गृहनिर्माण क्षेत्रातील विविध उद्योगांमध्ये पर्यावरणाची भूमिका, तसेच शाश्वत विकासासाठी आवश्यक उपाययोजना यांचा सखोल अभ्यास करण्यात येणार आहे.

3. अभ्यासाचे महत्त्व (Significance of Study) :

- ✓ पर्यावरणपूरक बांधकाम साहित्याच्या वापराची गरज ओळखणे.
- ✓ हरित उद्योग तंत्रज्ञानाद्वारे प्रदूषण कमी करणे.
- ✓ कचरा व्यवस्थापन, ऊर्जा बचत व जलसंधारणाच्या उपायांची अंमलबजावणी करणे.
- ✓ शाश्वत विकासासाठी उद्योगांचे योगदान तपासणे.

4. उद्देश (Objectives) :

- ✓ गृहनिर्माण क्षेत्रातील उद्योगांचे पर्यावरणावर होणारे परिणाम अभ्यासणे.
- ✓ पर्यावरणपूरक बांधकाम साहित्य व तंत्रज्ञानाची माहिती मिळवणे.
- ✓ प्रदूषण नियंत्रणासाठी आवश्यक धोरणे व नियम जाणून घेणे.
- ✓ शाश्वत गृहनिर्माणासाठी उद्योगांमध्ये आवश्यक बदल सुचवणे.

5. समस्या अभ्यास (Problem Statement) :

गृहनिर्माण उद्योगांमुळे पर्यावरणावर होणारा प्रतिकूल परिणाम, बांधकामातील संसाधनांचा अपव्यय आणि प्रदूषण नियंत्रणासाठी असलेल्या अपुऱ्या उपाययोजना ही एक गंभीर समस्या आहे.

6. गृहीतके (Hypotheses) :

- ✓ गृहनिर्माण क्षेत्रात पर्यावरणपूरक तंत्रज्ञानाचा वापर वाढल्यास प्रदूषणाची पातळी कमी होईल.
- ✓ हरित उद्योग पद्धतीचा अवलंब केल्यास ऊर्जा वापर व कचरा निर्मिती कमी होऊ शकते.
- ✓ शासन व खाजगी क्षेत्राच्या संयुक्त प्रयत्नांनी शाश्वत गृहनिर्माण शक्य आहे.

7. संशोधन पद्धती (Research Methodology) :

प्रस्तुत शोधनिबंध तयार करण्यासाठी दुय्यम माहिती स्रोतांचा आधार घेण्यात आला आहे. या मध्ये सरकारी अहवाल, औद्योगिक अहवाल व पर्यावरणीय धोरणांचा अभ्यास, जर्नल्स व ऑनलाईन डेटाबेस व संदर्भ ग्रंथ यातून सदरमाहिती घेण्यात आली आहे.

8. पूर्व संशोधनाचा आढावा (Review of Literature) :

राष्ट्रीय बांधकाम विकास मंडळाचे हरित इमारत मार्गदर्शक तत्त्वे. पर्यावरण, वन आणि हवामान बदल मंत्रालयाचे विविध अहवाल. भारतीय गृहनिर्माण महासंघाचे शाश्वत गृहनिर्माणविषयक अभ्यास, आंतरराष्ट्रीय जर्नल्समधील हरित बांधकाम व इको-फ्रेंडली इंडस्ट्रीवरचे संशोधन इ. घटकांचा पूर्व संशोधनात आढावा घेण्यात आला. त्यातील काही जर्नल्स खालीलप्रमाणे ,

Adopting circular economy in construction: a review - या लेखात निर्माण उद्योगात परिपत्रक अर्थव्यवस्था (Circular Economy) अंगीकारण्याचे तत्त्व स्पष्ट केले आहे. यात 3R (Reduce, Reuse, Recycle) सारख्या तत्त्वांचा वापर करून संसाधन बचत, कचरा कमी करणे आणि सस्टेनेबिलिटी कशी साधायची याचे वर्णन आहे.

A Critical Success Factor Framework for Implementing Sustainable Innovative and Affordable Housing (MDPI) - या संशोधनात घरबांधणीत टिकाऊ, नाविन्यपूर्ण व स्वस्त उपाय अंमलात आणताना यशस्वी घटक (Success Factors) कोणते हे विश्लेषित केले आहे. यात आर्थिक, पर्यावरणीय, सामाजिक आणि तांत्रिक घटकांचा समावेश असलेले 35 CSFs (Critical Success Factors) मोडेल माध्यमातून समजावले आहेत.

Green and Sustainable Construction Industry: A Systematic Literature Review of the Contractor's Green Construction Capability (MDPI) -या समीक्षा लेखात बांधकाम उद्योगातील ग्रीन क्षमता (Green Capability) कशी विकसित करावी, संशोधनातील प्रवाह, प्रमुख जर्नल्स व प्रकाशनांची समीक्षा दिली आहे.

A review of extant literature and recent trends in residential construction waste reduction - हा लेख घरबांधणीतील कचरा कमी करण्याच्या तंत्रांवर केंद्रित आहे. प्रीफॅब्रिकेशन, LCA (Life Cycle Assessment), BIM वापर, 3D प्रिंटिंग आणि ऑप्टिमाइझ्ड डिझाइन या उपायांचा उल्लेख आहे.

9. गृहनिर्माण क्षेत्र आणि पर्यावरण यातील संबंध :

गृहनिर्माण क्षेत्र (Housing Sector) हे समाजाच्या मूलभूत गरजांपैकी एक असले तरी त्याचा पर्यावरणावर खोलवर परिणाम होतो. हा संबंध खालील प्रकारे स्पष्ट करता येतो :

संसाधनांचा वापर (Use of Natural Resources) बांधकामासाठी माती, वाळू, दगड, सिमेंट, लोखंड, लाकूड यांसारख्या नैसर्गिक संसाधनांचा मोठ्या प्रमाणात वापर होतो. यामुळे नैसर्गिक साठे कमी होतात आणि पर्यावरणीय संतुलन बिघडते.

प्रदूषण (Pollution) बांधकाम प्रक्रियेत धूळ, ध्वनी, रासायनिक वायू यांमुळे वायू व ध्वनी प्रदूषण वाढते. कचऱ्याचे अयोग्य व्यवस्थापन केल्यास जलप्रदूषण आणि मृदा प्रदूषणही होते.

ऊर्जा वापर (Energy Consumption) इमारतींच्या बांधकामात आणि वापरात मोठ्या प्रमाणात वीज व इंधन खर्च होते. यामुळे हरितगृह वायू उत्सर्जन वाढून हवामान बदलाची समस्या तीव्र होते.

पर्यावरणपूरक बांधकाम तंत्रज्ञान (Eco-friendly Construction Technology) सौरऊर्जा, पावसाचे पाणी साठवणे, उष्मा नियंत्रित भिंती, पुनर्वापरित साहित्य यांचा वापर करून पर्यावरणावर होणारा परिणाम कमी करता येतो. हरित इमारती (Green Buildings) हे शाश्वत गृहनिर्माणाचे उत्तम उदाहरण आहे.

कायदे व धोरणे (Policies and Regulations) शासनाकडून पर्यावरणीय प्रभाव मूल्यांकन (EIA), हरित प्रमाणपत्रे (IGBC, GRIHA) व ऊर्जा बचत मानके लागू केली जातात. यामुळे गृहनिर्माण क्षेत्र पर्यावरणपूरक होण्यासाठी प्रोत्साहन मिळते.

10. अभ्यासाचे महत्त्व -

- पर्यावरण पूरक बांधकाम साहित्याच्या वापराची गरज -

बांधकाम क्षेत्र हे नैसर्गिक संसाधनांचा मोठ्या प्रमाणात वापर करणारे क्षेत्र आहे. परंपरागत बांधकाम साहित्य (सिमेंट, विटा, स्टील इ.) तयार करण्यासाठी प्रचंड उर्जा खर्च होते व ग्रीनहाऊस वायूंचे उत्सर्जनही मोठ्या प्रमाणात होते. त्यामुळे पर्यावरण पूरक बांधकाम साहित्य (Eco-friendly Construction Materials) वापरण्याची गरज वाढत आहे.

१. नैसर्गिक संसाधनांचे संवर्धन - पुनर्वापरित (Recycled) साहित्य, फ्लायअॅश विटा, मातीचे ब्लॉक्स इत्यादींचा वापर केल्याने खाणींचा कमी वापर होतो. वृक्षतोड कमी करून जैवविविधतेचे संरक्षण होते.

२. ऊर्जा बचत व कार्बन फूटप्रिंट कमी करणे - कमी उर्जा खर्च होणाऱ्या उत्पादन प्रक्रियेमुळे कार्बन डायऑक्साइड उत्सर्जन कमी होते. इन्सुलेटिव्ह साहित्यामुळे घरामध्ये ऊर्जेचा (एसी, हीटर) वापर कमी होतो.

३. कचरा व्यवस्थापन - औद्योगिक कचरा (फ्लायअॅश, प्लास्टिक, स्टील स्कॅप) बांधकामात वापरल्यास पर्यावरणातील प्रदूषण कमी होते.

४. आरोग्यदायी जीवनमान - हानिकारक रसायने नसलेले साहित्य घरातील हवा शुद्ध ठेवतात. नैसर्गिक साहित्यामुळे उष्णता संतुलित राहते, आर्द्रता नियंत्रित होते.

५. शाश्वत विकासासाठी आवश्यक - पर्यावरण पूरक साहित्य वापरल्याने भविष्यातील पिढ्यांसाठी संसाधने टिकून राहतात. ग्रीन बिल्डिंग मानके (LEED, GRIHA) पूर्ण करण्यास मदत होते.

हरित उद्योग तंत्रज्ञानाद्वारे प्रदूषण कमी करणे-

हरित उद्योग तंत्रज्ञान (Green Industrial Technology) म्हणजे अशा तंत्रज्ञानांचा वापर जो उत्पादन प्रक्रियेतून होणारे वायू, पाणी व मृदा प्रदूषण कमी करतो आणि संसाधनांचा कार्यक्षम वापर सुनिश्चित करतो.

१. स्वच्छ उत्पादन प्रक्रिया (Clean Production Process)-ऊर्जा कार्यक्षम यंत्रसामग्री वापरणे. कमी उत्सर्जन करणारे इंधन (CNG, हायड्रोजन, बायोगॅस) वापरणे. उत्पादन प्रक्रियेतून निघणाऱ्या कचऱ्याचा पुनर्वापर करणे.

२. नवीकरणीय ऊर्जा वापर - सौर ऊर्जा, पवन ऊर्जा, जैवइंधन यांचा वापर करून कार्बन उत्सर्जन घटवणे. पारंपरिक जीवाश्म इंधनांवरील अवलंबन कमी करणे.

३. प्रदूषण नियंत्रण उपकरणे - धूर फिल्टर, स्क्रबर, इलेक्ट्रोस्टॅटिक प्रीसिपिटेटर यांसारखी साधने बसवणे. औद्योगिक सांडपाणी प्रक्रिया संयंत्रे (ETP/STP) वापरणे.

४. हरित रसायने व जैवतंत्रज्ञान - हानिकारक रसायनांच्या जागी पर्यावरणपूरक रसायनांचा वापर. सूक्ष्मजीवांचा वापर करून औद्योगिक सांडपाण्यातील हानिकारक घटक कमी करणे.

५. डिजिटल मॉनिटरिंग व ऑटोमेशन - सेन्सर्स व IoT तंत्रज्ञानाद्वारे उत्सर्जनाचे थेट निरीक्षण. रिअल-टाईम डेटाद्वारे प्रदूषण नियंत्रण उपाय तात्काळ राबवणे.

कचरा व्यवस्थापन, ऊर्जा बचत व जलसंधारणाच्या उपायांची अंमलबजावणी –

१. कचरा व्यवस्थापन - कमी निर्माण करा (Reduce) -उत्पादन प्रक्रियेतून निर्माण होणारा कचरा कमी करण्यासाठी स्वच्छ तंत्रज्ञानाचा वापर करणे. पुनर्वापर (Reuse): औद्योगिक कचरा (धातू, प्लास्टिक, लाकूड) इतर उत्पादनांमध्ये वापरणे. पुनर्नवीनीकरण (Recycle): फ्लायअॅश, प्लास्टिक कचरा, बांधकामाचा मलबा इ. पुनर्नवीनीकरण करून नवीन साहित्य तयार करणे.

कंपोस्टिंग: सेंद्रिय कचऱ्यापासून खत निर्मिती करणे.

२. ऊर्जा बचत - ऊर्जा कार्यक्षम यंत्रसामग्री, LED प्रकाश व्यवस्था, आणि स्मार्ट सेन्सर्स वापरणे. नवीकरणीय ऊर्जा स्रोतांचा (सौर, पवन, बायोगॅस) वापर करणे. इमारतींमध्ये उष्णता इन्सुलेशन करून ऊर्जा खर्च कमी करणे. उष्णता पुनर्प्राप्ती प्रणाली (Heat Recovery System) बसवणे.

३. जलसंधारण - पावसाचे पाणी साठवणे (Rainwater Harvesting) व जमिनीत पुनर्भरण. सांडपाणी शुद्ध करून पुन्हा वापरणे (Recycling & Reuse of Wastewater). पाणी वापरात कार्यक्षम उपकरणे बसवणे (Low-flow taps, dual flush systems). औद्योगिक प्रक्रियेत पाण्याचा परिपत्रक वापर (Circular Use of Water)

• शाश्वत विकासासाठी उद्योगांचे योगदान तपासणे -

१. पर्यावरणीय योगदान - स्वच्छ तंत्रज्ञानाद्वारे प्रदूषण कमी करणे. नवीकरणीय ऊर्जा स्रोतांचा वापर वाढवणे. कचरा व्यवस्थापन, पुनर्वापर व पुनर्नवीनीकरण तंत्रज्ञान अवलंबणे.

२. आर्थिक योगदान - हरित तंत्रज्ञानामुळे उत्पादनक्षमता वाढवणे. रोजगार निर्मिती व स्थानिक अर्थव्यवस्थेचा विकास करणे. टिकाऊ उद्योग मॉडेल्समुळे दीर्घकालीन नफा सुनिश्चित करणे.

३. सामाजिक योगदान - सुरक्षित व आरोग्यदायी कामाची परिस्थिती निर्माण करणे. स्थानिक समुदाय विकास प्रकल्प (शिक्षण, पाणीपुरवठा, आरोग्य सुविधा), कॉर्पोरेट सामाजिक जबाबदारी (CSR) उपक्रमाद्वारे सामाजिक कल्याण करणे.

४. तंत्रज्ञानातील सुधारणा - पर्यावरणपूरक उत्पादने आणि प्रक्रिया विकसित करणे. डिजिटल मॉनिटरिंग व स्वयंचलित प्रदूषण नियंत्रण प्रणाली वापरणे. संशोधन आणि नवकल्पनांवर भर देणे.

11. अभ्यास व विश्लेषण (Discussion & Analysis) :

गृहनिर्माण क्षेत्रातील उद्योगांचे पर्यावरणावर होणारे परिणाम-- गृहनिर्माण क्षेत्रातील उद्योगांमुळे नैसर्गिक संसाधनांचा प्रचंड वापर होतो, ज्याचा पर्यावरणावर थेट आणि अप्रत्यक्ष परिणाम होतो. बांधकामासाठी लागणारी वाळू, दगड, सिमेंट आणि लाकूड यांची खाणकामातून प्राप्ती होत असल्याने मृदा-अपक्षय, जंगलतोड आणि परिसंस्थेचे नुकसान होते. औद्योगिक प्रक्रियांमधून निर्माण होणारे धूळकण, सिमेंटचा धूर, रासायनिक रंग आणि प्लास्टिकमुळे हवेचे व पाण्याचे प्रदूषण वाढते. बांधकामातील ऊर्जा वापरामुळे हरितगृह वायूंचे प्रमाण वाढून हवामान बदल तीव्र होतो. सांडपाणी व कचऱ्याचे योग्य व्यवस्थापन नसल्यास मातीचे प्रदूषण आणि भूजल दूषित होण्याची शक्यता वाढते. अभ्यासातून असे निष्पन्न होते की गृहनिर्माण क्षेत्रात पर्यावरणपूरक बांधकाम पद्धती, ऊर्जा कार्यक्षम तंत्रज्ञान आणि कचरा व्यवस्थापनाची अंमलबजावणी केल्यास शाश्वत विकास साधता येतो.

पर्यावरणपूरक बांधकाम साहित्य व तंत्रज्ञानाची माहिती - पर्यावरणपूरक बांधकाम साहित्य आणि तंत्रज्ञानामुळे गृहनिर्माण क्षेत्रातील पर्यावरणीय परिणाम कमी करता येतात. अशा साहित्यामध्ये फ्लाय अॅश विटा, होलो ब्लॉक्स, पुनर्वापरित स्टील, बॅम्बू, मातीचे ब्लॉक्स आणि कमी सिमेंट वापर असलेले कॉंक्रीट यांचा समावेश होतो. सौर पॅनेल्स, पावसाचे पाणी संकलन प्रणाली, उष्णता-रोधक छत, ऊर्जा कार्यक्षम खिडक्या व नैसर्गिक वायुवीजन ही तंत्रज्ञानातील महत्त्वाची उदाहरणे आहेत. या साहित्य आणि तंत्रज्ञानामुळे ऊर्जा वापर कमी होतो, कार्बन उत्सर्जन घटते आणि कचऱ्याचा पुनर्वापर साध्य होतो. अभ्यास दर्शवितो की अशा उपाययोजना केवळ पर्यावरणपूरकच नाहीत तर दीर्घकालीन दृष्टीने आर्थिकदृष्ट्याही फायदेशीर ठरतात.

प्रदूषण नियंत्रणासाठी आवश्यक धोरणे व नियम - प्रदूषण नियंत्रणासाठी योग्य धोरणे व नियमांची अंमलबजावणी अत्यावश्यक आहे. औद्योगिक क्षेत्र, गृहनिर्माण व वाहतूक क्षेत्रातील प्रदूषण कमी करण्यासाठी पर्यावरण संरक्षण कायदे, जल व वायू प्रदूषण नियंत्रण अधिनियम, ध्वनी प्रदूषण प्रतिबंध नियम यांचा काटेकोरपणे वापर आवश्यक आहे. हरित तंत्रज्ञानाचा अवलंब, कचरा पुनर्वापर व व्यवस्थापन, ऊर्जा कार्यक्षम उपकरणांचा वापर आणि औद्योगिक उत्सर्जनांवर मर्यादा घालणे ही महत्त्वाची धोरणात्मक पावले आहेत. पर्यावरणीय प्रभाव मूल्यांकन (EIA) प्रक्रिया सर्व प्रकल्पांसाठी बंधनकारक करणे, तसेच सार्वजनिक जनजागृती आणि स्थानिक स्वराज्य संस्थांचा सहभाग वाढवणे गरजेचे आहे. या उपाययोजनांमुळे प्रदूषणावर नियंत्रण ठेवून शाश्वत विकास साध्य करता येतो.

शाश्वत गृहनिर्माणासाठी उद्योगांमध्ये आवश्यक बदल सुचवणे - शाश्वत गृहनिर्माण साध्य करण्यासाठी उद्योगांमध्ये मूलभूत बदल आवश्यक आहेत. बांधकाम प्रक्रियेत ऊर्जा कार्यक्षम यंत्रणा, कमी कार्बन उत्सर्जन करणारे साहित्य आणि स्थानिक स्तरावर उपलब्ध संसाधनांचा वापर प्रोत्साहित करणे गरजेचे आहे. सांडपाणी पुनर्वापर, घनकचरा व्यवस्थापन व पुनर्नवीनीकरण तंत्रज्ञानाची अंमलबजावणी उद्योगांनी करावी. बांधकामाच्या डिझाइनमध्ये नैसर्गिक प्रकाश, वायुवीजन आणि अक्षय ऊर्जा स्रोतांचा वापर वाढवावा. ग्रीन बिल्डिंग मानके (IGBC, GRIHA) अंगीकारून उद्योगांनी पर्यावरणीय प्रभाव कमी करण्यावर भर द्यावा. या बदलांमुळे पर्यावरणपूरक, ऊर्जा बचत करणारे व आर्थिकदृष्ट्या फायदेशीर गृहनिर्माण साध्य होऊ शकते.

वरील बाबींचा अभ्यास व विश्लेषण केल्यानंतर खालील निष्कर्ष निघतात.

12. निष्कर्ष (Findings) :

- ✓ गृहनिर्माण उद्योगात पर्यावरणपूरक तंत्रज्ञानाचा वापर अजून मर्यादित आहे.
- ✓ कचरा व्यवस्थापन व ऊर्जा बचत उपायांची अंमलबजावणी होत असली तरी ती सर्वत्र प्रभावी नाही.

- ✓ शासनाने हरित इमारतीसाठी प्रोत्साहन योजना जाहीर केल्या आहेत, परंतु जागरूकता व अंमलबजावणी अधिक गरजेची आहे.

13. समारोप (Conclusion) :

पर्यावरणपूरक गृहनिर्माण हा भविष्यातील एकमेव शाश्वत मार्ग आहे. उद्योगांनी पर्यावरणीय जबाबदारी स्वीकारून नवतंत्रज्ञान, पुनर्वापर व संसाधन बचत यांवर भर द्यावा. शासन, उद्योग आणि समाज यांचे संयुक्त प्रयत्न या क्षेत्राला शाश्वत व पर्यावरणपूरक बनवतील.

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पर्यावरण आणि पर्यटन

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प्रस्तावना :-

पर्यटन हा सध्या जगातला सर्वात वेगाने वाढणारा व्यवसाय आहे. जगातील काही देशांची तर बहुतांशी अर्थव्यवस्थाच तेथील पर्यटनावर अवलंबून आहे. भारतासारख्या विकसनशील देशातील पर्यटनही गेल्या दशकभरात २५ ते ३० टक्क्यांनी वाढले आहे आणि त्यामुळे मिळणाऱ्या परकीय चलनात ४० टक्क्यांनी वाढ झाली आहे. या पर्यटन वाढीचे एक मुख्य कारण आहे त्या त्या देशातील निसर्ग संपन्न प्रदेश, वैभवशाली इतिहास आणि स्थानिक संस्कृती! तस बघायला गेलं तर उंचसखल डोंगरांच्या, समृद्ध जंगले, शांतरम्य समुद्रकिनारे, वैशिष्ट्यपूर्ण जैवविविधता, पर्यावरण जीवनदायिनी नद्या, फेसाळ धबधबे, वाळूची पुळण व खाड्या, कांदळवने, छोटी मोठी बेटे, गवतांचे गालिचे पसरलेली पठारे, पाण्याचे तलाव, अंधाऱ्या गुहा आणि पूर्वापार देवराया म्हणजे पर्यटकांसाठी पर्वणीच! निसर्गाची ही सर्व रूपे पर्यटकांसाठी तर आकर्षणाचा बिंदू आहेतच, पण त्याही पुढे जाऊन त्या ठिकाणच्या स्थानिक जैवविविधतेसाठी अधिवास म्हणून त्यांचे महत्त्व खूपच जास्त आहे. अनेक प्राणी, पक्षी, छोटे कीटक, सरीसृप, अन्नसाखळीतील छोटे मोठे घटक यांचे जीवन या अधिवासांवर अवलंबून आहे. निसर्गाचे संतुलन कायम राखण्यामध्ये या घटकांचा वाटा फार मोठा आहे. त्यामुळेच पर्यटनाचा आनंद घेतानाच या अधिवासांची म्हणजेच तेथील पर्यावरणाची काळजी घेऊनही तेवढच अत्यावश्यक आहे. पण सद्यपरिस्थितीत चालू असलेल्या पर्यटनावर एक नजर फिरवली तर या अधिवासांची व पर्यायाने तेथील पर्यावरणाची मोठ्या प्रमाणात हानी होताना दिसून येते आहे.

अनियंत्रित पर्यटन व योग्य नियोजनाच्या अभावामुळे एकेकाळी सौंदर्यपूर्ण व निसर्गसंपन्न असलेली ही पर्यटनस्थळे आता बकाल होऊ लागली आहेत. परिणामतः या ठिकाणी अस्वच्छता, वृक्षतोड, वाढती गर्दी, पर्यटनस्थळांची नासधूस, नैसर्गिक साधनसंपत्तीचा न्हास अशा अनेक समस्या निर्माण झाल्या आहेत. यांत्रिकीकरण व आधुनिकीकरणाच्या वेगात हे प्रमाण जास्तच वाढले आहे. या सगळ्याला वेळीच आवर घातला नाही तर निसर्गाचा हा सगळा अनमोल ठेवाच नाहीसा होण्याची शक्यता आहे. पर्यटनाच्या प्रगतीबरोबरच स्थानिक पर्यावरणाची काळजी घेऊनही तेवढच गरजेच आहे. यासाठी अनियंत्रित व बकाल पर्यटनाऐवजी सुनियोजित व शाश्वत अशी 'निसर्ग पर्यटन' ही संकल्पना राबविणे अत्यावश्यक बनले आहे. 'निसर्गाची हानी न होता केले जाणारे पर्यटन' म्हणजे निसर्ग पर्यटन अशी निसर्ग पर्यटनाची साधी सोपी व्याख्या आपल्याला करता येईल. पर्यटनाच्या माध्यमातून पर्यावरणाचे संरक्षण, नैसर्गिक साधनसंपत्तीचा सुज व कमीतकमी वापर आणि स्थानिक लोकांचा आर्थिक-सामाजिक विकास ही निसर्ग पर्यटनाची मुख्य उद्दिष्टे होत. निसर्गाची धारणक्षमता ओळखून, स्थानिकांच्या शाश्वत विकासासाठी व पर्यटकांच्या आनंदासाठी निसर्ग पर्यटन राबविणे गरजेचे असून पर्यटक, व्यावसायिक व स्थानिक लोक या सर्वांची यात महत्त्वाची भूमिका आहे. एखाद्या पर्यटन स्थळी जाताना फक्त मौजमजा करायला न जाता, तेथील निसर्ग अभ्यासपूर्वक जाणून घेतला तर त्याचा खरा आस्वाद आपल्याला घेता येईल. आपल्या कोणत्याही कृतीमुळे स्थानिक पर्यटनास बाधा पोचणार नाही, पर्यटन स्थळी स्वच्छता राहील व तेथील सौंदर्य अबाधित राहील याची दक्षता पर्यटकांनी घेतली पाहिजे. पर्यटन व्यावसायिकांनी फक्त आपल्या जलद फायद्यासाठी नैसर्गिक साधनसंपत्ती ओरबाडली तर उद्या हेच व्यवसाय बुडीत निघायला वेळ लागणार नाही व याची गत सोन्याच अंड देणाऱ्या कोंबडी सारखी होईल. यासाठी त्यांनी आपल्या व्यवसायामुळे नैसर्गिक साधनसंपत्तीवर ताण पडणार नाही तसेच स्थानिक पर्यावरणाचे प्रदूषण होणार नाही याकडे कटाक्षाने लक्ष दिले पाहिजे.

स्थानिक लोक हे या साधनसंपत्तीवर मोठ्या प्रमाणावर अवलंबून असतात. त्यामुळे त्यांनीही आपल्या परिसरात पर्यटनामुळे होणारे दुष्परिणाम टाळून विकास कसा साधता येईल हे पहिले पाहिजे व त्यासाठी जाणीवपूर्वक प्रयत्न केले पाहिजेत. निसर्ग पर्यटन राबविण्यासाठी या क्षेत्रातील तज्ञांनी काही मार्गदर्शक तत्त्वे सांगितली आहेत. कोणत्याही पर्यटन स्थळाच्या नैसर्गिक ठेवणीमध्ये बदल करू नये हे त्यात प्रामुख्याने सांगितले आहे. उलट ही भूरूपे, जैवविविधता यांचा पर्यटनासाठी वापर करून निसर्गभ्रमंती, जंगलभेटी, गिर्यारोहण, प्रस्तरारोहण, नौकानयन, जंगली श्वापदांचा मागोवा, पक्षीनिरीक्षण, औषधी वनस्पतींचा अभ्यास, वननिवास अशा अनेक संकल्पना राबविता येतील ज्याद्वारे तेथील निसर्गाचे संरक्षण व संवर्धन होईल. तसेच कृषी पर्यटन व ग्रामिण पर्यटनाच्या माध्यमातून स्थानिक लोकांचा आर्थिक व सामाजिक विकास साधता येईल. शहरातील

चकचकीत झगमगाटापेक्षा खेड्यातील साधे राहणीमान, स्थानिक परंपरा व खाद्यसंस्कृती याबद्दल पर्यटकांना कुतूहल असते. शेतीच्या विविध पद्धती, जेवणात शेतात पिकलेली ताजी भाजी, ताजी फळे, शेतीकामात सहभाग याद्वारा पर्यटकांना एक वेगळा अनुभव मिळू शकतो. या जराशा 'हटके' उपक्रमांचे व संकल्पनांचे पर्यटक स्वागतच करतात, एव्हाना त्यासाठी जादाचे पैसे मोजायलाही तयार असतात. यामध्ये बाहेरून आलेल्या व्यवसायांपेक्षा मुख्यत्वेकरून स्थानिक लोकांचाच आर्थिक फायदा जास्त होईल तसेच तेथील निसर्गशी स्थानिकांची नाळ जोडलेली असल्याकारणाने पर्यावरणाचेही संरक्षण, संवर्धन होईल. गरज आहे ती फक्त चंगळवादी वृत्ती बदलण्याची, काही सवयी अंगी बानवण्याची व डोळसपणे निसर्गाकडे बघण्याची. या समृद्ध नैसर्गिक ठेव्याचा आपण आनंद घेतानाच उद्याच्या पिढीलाही त्याची गोडी चाखायला मिळावी एवढीच काळजी एक जागरूक पर्यटक म्हणून घेऊया.

पर्यटनामुळे संवर्धन होऊ शकते

जेव्हा पर्यटनाचे व्यवस्थापन जबाबदारीने केले जाते, तेव्हा ते केवळ नुकसान कमी करण्यापेक्षा बरेच काही करू शकते, तर ते लोक ज्या ठिकाणी भेट देण्यासाठी जातात त्यांचे सक्रियपणे संरक्षण करू शकते. महसूल निर्माण करून आणि जागरूकता निर्माण करून, पर्यटन संवर्धन प्रयत्नांना निधी देण्यास, स्थानिक समुदायांना पाठिंबा देण्यास आणि निसर्ग आणि संस्कृतीचे जतन करण्यासाठी शक्तिशाली प्रोत्साहने निर्माण करण्यास मदत करू शकते. बहुतेकदा एखाद्या स्थळाच्या नैसर्गिक सौंदर्याचे किंवा जैवविविधतेचे आर्थिक मूल्य त्याच्या संरक्षणाचे समर्थन करते. उदाहरणार्थ, ग्रेट बॅरियर रीफ च्या. ऑस्ट्रेलियन अर्थव्यवस्थेत पर्यटन दरवर्षी \$6 अब्ज पेक्षा जास्त AUD चे योगदान देते आणि सुमारे 64,000 नोकऱ्यांना आधार देते - रीफचे जतन करण्यासाठी एक मजबूत आर्थिक आधार. रीफ दूरद्वारे गोळा केलेले अभ्यागत शुल्क कोरल पुनर्संचयित करणे, रीफ आरोग्य देखरेख आणि क्राउन-ऑफ-थॉर्न स्टारफिश नियंत्रण यासारख्या उपक्रमांमध्ये पुन्हा गुंतवले जाते - कोरल कव्हरसाठी एक प्रमुख धोका. ऑस्ट्रेलियाच्या पलीकडे, कोस्टा रिका, तिबेट आणि भूतान सारख्या देशांनी आणि प्रदेशांनी संवर्धनाभोवती संपूर्ण पर्यटन मॉडेल तयार केले आहेत. कोस्टा रिकामध्ये, संरक्षित क्षेत्रे देशाच्या २५% पेक्षा जास्त भूभाग व्यापतात, त्यापैकी अनेकांना इको-टुरिझमद्वारे निधी दिला जातो. दरम्यान, भूतान पर्यटकांची संख्या मर्यादित करतो आणि दररोज शुल्क आकारतो जे पर्यावरण संरक्षण आणि सांस्कृतिक संवर्धनात थेट योगदान देते. योग्य पद्धतीने केले तर, पर्यटन असा मार्ग देऊ शकते जिथे आर्थिक वाढ आणि पर्यावरणीय व्यवस्थापन एकमेकांशी जोडलेले असते, परस्परविरोधी नसते.

पण मोठ्या प्रमाणात पर्यटनामुळे परिसंस्थांवर ताण येतो :-

पर्यटन एखाद्या ठिकाणी जीवन आणू शकते, परंतु त्याचा अतिरेक एखाद्या जागेला खराब करू शकतो. जगभरातील शहरे आणि नैसर्गिक स्थळांमध्ये, मोठ्या प्रमाणात पर्यटनाचा दबाव पर्यावरण, पायाभूत सुविधा आणि रहिवाशांना संकटाच्या उंबरठ्यावर ढकलत आहे. व्हेनिसमध्ये, अरुंद कालवे आणि प्राचीन रस्ते आता स्थानिकांपेक्षा जास्त पर्यटकांना भेट देतात. याचा सामना करण्यासाठी, शहराने २०२५ मध्ये दररोज प्रवेश शुल्क सुरू केले, जे अभ्यागत किती आगाऊ बुकिंग करतात यावर अवलंबून ५ ते १० आकारले जात होते. दूर गटांचे आकार मर्यादित आहेत आणि संदेश स्पष्ट आहे: या, पण सावकाश चालत जा. इतर ठिकाणेही अशीच पावले उचलत आहेत. रोम ट्रेव्ही फाउंटनसारख्या प्रतिष्ठित स्थळांच्या प्रवेशासाठी शुल्क आकारत आहे. पर्यटक आतापर्यंत पाहण्यासाठी ज्या नैसर्गिक लँडस्केप्सना भेट देतात त्यांचे संरक्षण करण्यासाठी न्यूझीलंडने अभ्यागत शुल्क वाढवले आहे. काय करावे? पर्यटनाला सीमा ह्या असतात. मर्यादा नसलेल्या, लोक ज्या गोष्टींसाठी प्रवास करतात त्या गमावण्याचा धोका असतो.

हवामान बदलामुळे पर्यटनाचे भविष्य धोक्यात आले आहे

पर्यटन हे केवळ हवामान बदलाला कारणीभूत ठरत नाही तर त्याचे अनेक बळीपैकी एक आहे. जगभरातील प्रवाशांना आकर्षित करणारी ठिकाणेच वाढत्या समुद्राच्या पातळी, तीव्र हवामान आणि परिसंस्थेच्या न्हासामुळे वाढत्या धोक्यात आहेत. मालदीव, तुवालू आणि सेशेल्स सारख्या बेट राष्ट्रांना समुद्राच्या पातळीत वाढ झाल्यामुळे पाण्याखाली जाण्याचा धोका आहे. ऑस्ट्रेलियामध्ये, ग्रेट बॅरियर रीफमध्ये वारंवार समुद्राच्या तापमानवाढीमुळे ब्लीचिंगच्या घटना घडल्या आहेत, ज्यामुळे जगातील सर्वात प्रतिष्ठित नैसर्गिक आश्चर्यांपैकी एक धोक्यात आले आहे. दरम्यान, आल्प्सपासून रॉकीजपर्यंत स्की रिसॉर्ट्स कमी हंगाम आणि अविश्वसनीय बर्फवृष्टीचा सामना करत आहेत, ज्यामुळे हिवाळी पर्यटनाची व्यवहार्यता पूर्णपणे धोक्यात

आली आहे.हवामान-प्रभावित स्थळांची ही वाढती यादी एक भयानक चित्र रंगवते: संकटात असलेल्या ग्रहावर पर्यटन वाढू शकत नाही. उत्सर्जन कमी करण्यासाठी आणि लवचिकता निर्माण करण्यासाठी अर्थपूर्ण प्रयत्नांशिवाय, उद्योग स्वतःचे भविष्य धोक्यात आणण्याचा धोका पत्करतो.

पर्यटन हे चांगल्यासाठी एक शक्ती असू शकते का?

पर्यटनावर त्याच्या पर्यावरणीय प्रभावासाठी अनेकदा टीका केली जाते, परंतु जगाच्या अनेक भागांमध्ये ते एक जीवनरेखा देखील आहे . जबाबदारीने व्यवस्थापित केल्यास, ते केवळ उत्पन्नापेक्षा जास्त काही मिळवू शकते. ते संवर्धनासाठी निधी देऊ शकते, समुदायांना सक्षम बनवू शकते आणि नैसर्गिक आणि सांस्कृतिक वारशाचे संरक्षण करण्यायोग्य मालमत्तेत रूपांतर करू शकते.

शोषण नाही तर संरक्षण करण्याचे कारण :-

मर्यादित औद्योगिक क्षमता असलेल्या देशांमध्ये, खाणकाम किंवा लाकूडतोड यासारख्या पर्यावरणाला हानी पोहोचवणाऱ्या उद्योगांना पर्यटन एक शक्तिशाली आर्थिक पर्याय प्रदान करते. निसर्ग नष्ट होण्यापेक्षा अखंड राहून अधिक मौल्यवान बनतो.उदाहरणार्थ, केनिया घ्या. सिंह, हत्ती, गेंडे आणि बरेच काही असलेले राष्ट्रीय उद्याने - देशाच्या अर्थव्यवस्थेचा केंद्रबिंदू आहेत. प्रवेश शुल्क, सफारी टूर आणि लॉज स्टे यातून केवळ वन्यजीव संवर्धनच नाही तर स्थानिक उपजीविकेलाही चालना मिळते. पर्यटकांना या प्राण्यांची दृश्यमानता काही प्रकरणांमध्ये त्यांना शिकारीपासून सुरक्षित बनवते - जिवंत, ते ट्रॉफी किंवा व्यापार म्हणून कधीही नसलेल्यापेक्षा जास्त मूल्य आणतात.

सामुदायिक फायदे आणि स्थानिक नोकऱ्या :-

पर्यटनामुळे दुर्गम किंवा ग्रामीण भागात रोजगार निर्माण होतात जिथे मार्गदर्शन आणि आदरातिथ्य ते वाहतूक आणि हस्तकला अशा इतर संधी दुर्मिळ असू शकतात. महत्त्वाचे म्हणजे, या नोकऱ्या बहुतेकदा निरोगी परिसंस्था आणि सांस्कृतिक अखंडतेवर अवलंबून असतात, ज्यामुळे त्यांचे जतन होण्यास प्रोत्साहन मिळते. समुदाय-आधारित पर्यटन मॉडेल, जिथे स्थानिक लोक थेट सहभागी असतात आणि पर्यटन कार्यातून फायदा घेतात, ते नेपाळ, नामिबिया आणि लॅटिन अमेरिकेच्या काही भागांमध्ये विशेषतः प्रभावी सिद्ध होत आहेत.

जागरूकतेचे एक साधन :-डॉलर्सच्या पलीकडे, पर्यटन पर्यावरण जागरूकता निर्माण करू शकते . आर्किटेक, अमेझॉन किंवा कोरल रीफची सहूल प्रवाशांना काय धोक्यात आहे याची प्रत्यक्ष समज देते आणि कधीकधी कृती करण्याची इच्छा निर्माण करते. देणग्या, वकिली आणि धोरणातील बदल बहुतेकदा वैयक्तिक अनुभवाचे अनुसरण करतात.

संदर्भ ग्रंथ :

1. पर्यावरण भूगोल - शेते, केचे, फुले, शहापूरकर
- 2 पर्यावरण आकलन आणि आचरण - पल्लवी चाफेकर
3. पर्यावरण अभ्यास - डॉ. सुरेश फुले
- 4 पर्यावरण आणि संस्कृती - डॉ. मधुकर ढवळीकर
5. पर्यटन भूगोल - डॉ. विठ्ठल धारपुरे
6. पर्यावरण आणि परिस्थितीकी - डॉ. विजयकुमार तिवारी

मराठी वर्तमानपत्रातील व्यंगचित्रांचा प्रारंभ व प्रकार

करुणा वाघमारे

संशोधन विद्यार्थिनी, जनसंवाद व वृत्तपत्रविद्या विभाग, डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, छत्रपती संभाजीनगर

प्रा. डॉ. नामदेव सानप

संशोधन मार्गदर्शक, जनसंवाद व वृत्तपत्रविद्या विभाग, डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, छत्रपती संभाजीनगर

सारांश :

व्यंगचित्रे ही घटना-प्रसंग व सभोवतालच्या वातावरणाचे मार्मिक दर्शन घडवतात. तर कधी थट्टामस्करी, तर कधी उपरोध-उपाहास यांचा यथोचित उपयोग करून चित्ररसिकांचे, वाचकांचे प्रबोधन करतात. योग्य-अयोग्य यांचे वाचकांना भान आणून देते. काही व्यंगचित्रे निखळ, निर्मळ हास्य निर्माण करतात, तर काही हसवता-हसवता अंतर्मुख बनवतात तर काही उघड संदेश देणारी असतात.

व्यंगचित्रे ही आपल्या सभोवतालच्या सामाजिक समस्या, राजकीय घडामोडी, डावपेच, आर्थिक चढ-उतार, शैक्षणिक, सांस्कृतिक, भौगोलिक, क्रीडा अशा सर्वच क्षेत्रात विसंगत अशा घटना, प्रसंगावर लक्ष केंद्रित करून त्यावर हास्यरूपात भाष्य करते. हे एक त्याचे वैशिष्ट्य म्हणावे लागेल. 'व्यंगचित्र' या नुसत्या शब्दावरून नवक्या व्यक्तीला त्यामागील अर्थ व त्यांचे वैशिष्ट्य लक्षात येत नाही. नियमित व्यंगचित्र पाहणारे व वाचणारे असे वर्तमानपत्रांचे वाचकच त्यामागील वैशिष्ट्य व गांभीर्य समजून घेतात व व्यंगचित्राचे महत्त्व त्यांच्या लक्षात येते.

प्रस्तावना :

'व्यंगचित्र' या कलाप्रकारामध्ये 'चित्र' या कलेने महत्त्वाची भूमिका बजावली आहे. म्हणून उत्तम व्यंगचित्रात रेषा, आकार व त्याच्या साहाय्याने बनणारी रचना या दृश्य माध्यमातील घटकांच्या अंगभूत कौशल्याने उपयोग केलेला असतो. चित्रातील व्यक्तीचे विशिष्ट चेहरेपट्टी, चेहऱ्यावरील विशिष्ट हावभाव व शारीरिक हावभाव, पोषाख इत्यादी गोष्टी प्रसंगानुसार, विषयानुसार अचूक निवडण्यावर भर दिलेला असतो.

'व्यंगचित्र' या चित्राच्या नावातच व्यंग आहे हे लक्षात येते. नुसते व्यंगच नसून गंभीर व अनपेक्षित अशा घटना प्रसंगावरील रोख-ठोक बोलण्याचे व भाष्य करण्याचे वैशिष्ट्य या व्यंगात दडलेले आहे. 'व्यंगचित्र' हे चित्र व शब्द यांचे संयुक्त माध्यम आहे. बहुतेक व्यंगचित्रे आपला आशय चित्र व शब्द या दोन्हीच्या साहाय्याने व्यक्त करतात. 'व्यंगचित्र' हसवणारे असेल किंवा नसेल पण सुप्त वा उघड आक्रमकता त्यात जरूर असतेच. आक्रमकता हे व्यंगचित्राचे अविभाज्य अंग आहे.

व्यंगचित्राची सर्वसामान्य व महत्त्वाची वस्तू म्हणजे लोक, समाज, सरकार आणि मानव गुण या रेषांवर जोर देऊन व्यंगचित्रकार एखाद्या विशिष्ट संदर्भात जागरूकता निर्माण करण्यास किंवा बदल घडविण्याची इच्छा व्यक्त करतो. या अर्थाने उपाहास एक रचनात्मक टीका म्हणून करणे हा एक हेतु आहे. म्हणूनच व्यंगचित्र आता चित्रपट आणि टिव्हीवरील कार्यक्रमात ही पाहू शकतो.

चांगल्या आणि उत्कृष्ट व्यंगचित्रात उत्कृष्ट विडंबन चित्र व अर्कचित्र समाविष्ट असतात. उत्तम व्यंगचित्रात शब्दालाही तेवढेच महत्त्व असते. अचूक शब्द रचना व संवाद दाखवतांना अचूक बोलीभाषेचा व्यंगचित्रकार उपयोग करतात. तरच ते व्यंगचित्र वाचनीय व आकर्षक बनते, व्यंगचित्र ही उत्कृष्ट भाषा आहे. भाषांच्या सीमा ओलांडून जाण्याची क्षमता व्यंगचित्रात आहे. व्यंगचित्राविषयी अधिक जाणून घेण्यासाठी सचिन बत्रा यांच्या लेखाचा अभ्यास करू. ते आपल्या लेखात म्हणतात, की, "कार्टून एक शब्दविहीन संवाद है। तो कभी चंद शब्दों के सहारे बहुत कुछ कहने की कला है। वही यह आड़ी तिरछी रेखाओं के माध्यम से संप्रेषित होने वाला व्यंग भी है।"¹ म्हणजेच सचिन बत्रा आपल्या लेखात व्यंगचित्र हे शब्दांची गरज न भासणारा एक संवाद आहे. कधी-कधी ते थोडक्या शब्दात बरेच काही सांगून जाते. तसेच व्यंगचित्र म्हणजे आडव्या- तिरप्या रेषांमधून प्रसारित केला जाणारा संवाद आहे. असे ते म्हणतात.

व्यंगचित्र आणि चित्रकला यामध्ये मूलभूत फरक कोणता असेल, तर ते आहे विचारांचा, चित्रकार कोणतेही चित्र रेखाटतांना त्यातील सौंदर्यस्थळांचा शोध घेईल. याउलट व्यंगचित्रकार त्यातील विसंगतीचा प्राधान्याने विचार करेल. रंग हा चित्रकलेचा आत्मा आहे, तर विसंगती हा व्यंगचित्राचा आत्मा आहे. असे असले तरी व्यंगचित्रातून काव्यात्म आशय, सार्वकालिन सत्य समर्थपणे चितारता येते. जगण्या-वागण्यातील विसंगती अचूकपणे टिपण्याची ताकद व्यंगचित्रात असते. "सार्वजनिक जीवनात जगणाऱ्यांना व्यंगचित्र ही एक महान सामाजिक कला आहे. याची जाणीव असली पाहिजे."² सर्वसामान्य व्यक्तींना व्यंगचित्र ही एक सामाजिक कला आहे. हे समजून घेतल पाहिजे, असे राजू परळेकर

हे आपल्या ग्रंथात लिहितात. वृत्तपत्रातून प्रसिद्ध होणारी काही व्यंगचित्रे ही तात्कालिक असली तरी त्या-त्या काळातील म्हणजेच समाजजीवनाचे, त्यातील अंतरविरोधाचे, संघर्षाचे दर्शन त्यातून होत असते. व्यंगचित्रांला विषयाचे बंधन नसते, व्यंगचित्रांना अंत नसतो, मुक्काम नसतो. जुन्या दिवाळी अंकातील, वृत्तपत्रातील व्यंगचित्रांचे विषय पाहिल्यास आपल्याला ते लक्षात येते.

शोध निबंधाचा उद्देश :

- 1) व्यंगचित्रांचा इतिहास अभ्यासणे.
- २) मराठी वर्तमानपत्रातील व्यंगचित्रांचा इतिहास जाणून घेणे.
- 3) वर्तमानपत्रातून प्रसिद्ध होणाऱ्या व्यंगचित्रांचे प्रकार अभ्यासणे.

संशोधन आराखडा /पद्धती :

संबंधित शोधनिबंध विषयाच्या अध्ययनासाठी विविध ग्रंथ, संदर्भ ग्रंथ इत्यादी दुय्यम तथ्य संकलनाचा वापर यात केला आहे. कोणत्याही विषयाचे किंवा घटनेचे अध्ययन करत असताना ते वैज्ञानिक पद्धतीने होणे गरजेचे असते. या दृष्टीने प्रस्तुत संशोधन करण्यात आले आहे. सामाजिक संशोधन पद्धतीत सर्वात महत्वाचे कार्य म्हणजे तथ्य संकलन करणे होय. प्रस्तुत संशोधनासाठी 'मराठी वर्तमानपत्रातून प्रसिद्ध होणाऱ्या व्यंगचित्रांचा अभ्यास करण्यासाठी हा विषय निश्चित करण्यात आला आहे. प्रस्तुत संशोधनात द्वितीयक स्रोतांद्वारे तथ्य संकलन करण्यात आले आहे. द्वितीयक तथ्य संकलनासोबतच विशेषतः प्राथमिक तथ्य संकलन आणि निरीक्षण पद्धतीवर अधिक भर देण्यात आला आहे. 'मराठी वर्तमानपत्रातील व्यंगचित्रांचा इतिहास व प्रकारांचे अध्ययन पुढील मुद्यांच्या आधारे स्पष्ट करण्यात आले आहे.

वर्तमानपत्रातील व्यंगचित्रांचा प्रारंभ :

व्यंगचित्र ही एक चित्रकलाच आहे. हास्यचित्र किंवा हास्यरेषां असेही त्याला प्राचीन काळी संबोधले जात होते. अशा हास्यचित्रकलेचा म्हणजेच व्यंगचित्रांचा इतिहास अतिप्राचीन आहे. म्हणजेच प्राचीन काळी बौद्धलेणी, गुहा इत्यादीवर ती कोरलेली आढळतात. यावरून हे लक्षात येईल की बौद्ध लेणी ही कोणत्या दशकात कोरली गेली. तेच दशक व्यंगचित्रांच्या प्रारंभाचे असू शकते. असे म्हणता येईल. बौद्ध भिक्खु यांनी या लेण्या निवासासाठी कोरल्या होत्या. त्यांचा एका देशातून दुसऱ्या देशात प्रवास व बौद्ध धर्माचा प्रचार चालू असायचा त्या दरम्यान ही व्यंगचित्रे कोरली गेली असावीत असा इतिहास सांगतो. याविषयी सविस्तर जाणून घेण्यासाठी पुढील संदर्भ अभ्यासू. "खुदाई में मिली प्राचीन काल की मूर्तियों और खिलोनों को देखने से इस बात की पूर्ष्टि होती है। अजंता की दो हजार से भी अधिक वर्ष प्राचीन गुफाओं की चित्रावली ऐसे व्यंग्य - चित्रों का ज्वलंत उदाहरण है।"³ प्रस्तुत संदर्भावरून हे स्पष्ट होते की, 'खोद कामात अतिप्राचीन काळातील मूर्ती आणि काही खेळणी आढळून आली. तसेच अजिंठा येथील दोन हजाराहून अधिक वर्ष प्राचीन गुफांमध्ये काही चित्रावली दिसून येते. ती काही व्यंगचित्रांची ज्वलंत उदाहरणे असल्याचे संदर्भ हर्षदेव आपल्या 'उत्तर आधुनिक मिडीया तकनीक' या ग्रंथात लिहितात. परंतु व्यंगचित्रांच्या प्रारंभाविषयी काही जनांमध्ये संभ्रम आहेत. म्हणजेच व्यंगचित्रांचा प्रारंभ हा परदेशात सर्वप्रथम झाला असे काही ग्रंथात पुरावे आहेत. त्याविषयी सविस्तर जाणून घेऊ, "पहिला प्रयोग इटली में संभवतः 17 वी शताब्दी में हुआ था"⁴ वरिल पुराव्या नुसार 17 व्या शतकात इटली मध्ये व्यंगचित्रांचा पहिला प्रयोग झाला असे सचिन बत्रा आपल्या 'आडी तिरछी रेखाओं के माध्यम से संप्रेषित होने वाला व्यंग्य.' या लेखात स्पष्ट करतात. प्रस्तुत ग्रंथात सचिन बत्रा व्यंगचित्रांविषयी म्हणतात, ते म्हणजे, "रोमन अकादमी के अध्यक्ष ऐनीवाल केरास्त ने पोप के विरुद्ध चित्र बनाए। केरीकेचर शब्द इटालियन भाषा के कैरेक्टर और स्पेनिश भाषा के कारा से उपजा है; जिसका अर्थ है चेहरे। इटालियन भाषा में इन्हें केरिकेचर कहा गया है, जो चित्र या मूर्ति को विकृत रेखाओं में बनाकर अपना विरोध जताते थे।"⁵ सचिन बत्रा आपल्या लेखात लिहितात की, इटलीमधील रोमन अकादमीचे अध्यक्ष ऐनीवाल केरास्त यांनी पोपच्या विरोधात एक चित्र काढले, तेव्हा पासून त्याला इटालियन भाषेत केरिकेचर म्हणून ओळखले जाऊ लागले. याच घटनेपासून केरीकेचर या व्यंगचित्रकाराचा जन्म झाला असे म्हणावे लागेल. केरिकेचर हा शब्द इटालियन भाषेमध्ये याला केरीकेचर म्हटले जाऊ लागले. इटालियन भाषेतील कैरेक्टर आणि स्पेनिश भाषेमधील कारा या दोन शब्दापासून केरिकेचर हे नाव पडले. केरीकेचर म्हणजे चेहरे असा त्याचा अर्थ होतो. याच केरीकेचरच्या अनुसार सम्पूर्ण जगात याचा उपयोग केला जाऊ लागला. इतर देशात याला कार्टून म्हणून संबोधले जाऊ लागले. परंतु या दोन्हीचे अर्थ वेगवेगळे आहेत. कार्टून प्रकारात विविध विषयांवर व्यंग रूपात टीका केली जाते. याविषयी पुढील संदर्भ पाहू. "ब्रिटीश इतिहास में कटाक्ष चित्रों के पिता माने जाने वाले विलीयम होनार्थ 1679 में भी कार्टून के सफर में अपना पहला कीर्तिमान दर्ज किया।"⁶ अशा प्रकारे कार्टून हा प्रकार ब्रिटीश देशातील पितामह म्हणून ओळखले जाणारे विलीयम होनार्थ यांनी इ.स. 1679 मध्ये कार्टूनच्या प्रवासातील आपला पहिला कीर्तिमान नोंदवला. म्हणूनच 1679 हा ब्रिटीश मधील कार्टूनचा इतिहास काळ समजला जातो. 1700 च्या दशकात सुरुवातीच्या काळात व्यंगचित्रण (बऱ्याचदा राजकीय वाक्यासह) आणि प्रसिद्ध लोकांचे व्यंगचित्र युरोपमध्ये लोकप्रिय झाले.

18 च्या काळात 'द यलो किड' हे पट्टी कार्टून न्यूयॉर्कच्या एका प्रसिद्ध कॉमिक्समध्ये छापून आले आणि खूप प्रसिद्ध झाले. या 'यलो किड' कार्टून मुळे जगाला कार्टून हा प्रकार ओळखीचा झाला असे म्हणता येईल. कार्टून प्रकारातले 'द यलो किड' हे पहिले कार्टून म्हणून नावारुपाला आले. याविषयी अधिक जाणून घेण्यासाठी पुढील संदर्भ अभ्यासू. "Although several cartoon characteres apperted in American newspaper in the early 1890s the strip "The yellow kid," created by Richared Outeault is often cited as the first true comic strip. first published in 1895 in the New York world, the color strip was the first to use speech bubbles and adefined series of Panels to Create Comic narratives."⁷ 19 व्या दशकात अमेरिकेच्या वर्तमानपत्रामध्ये अनेक व्यंगचित्रे व व्यंगचित्रांची पात्रे दिसू लागली. तरी रिचर्ड आऊटकोस्टने बनवलेल्या, "द यलो किड" या कार्टून पट्टीला प्रथम कॉमिक्स स्ट्रिप असल्याचा उल्लेख केला जातो. "द यलो किड"च्या कार्टून नंतरच कार्टून कॉमिक्सला सुरुवात झाली.

20 व्या शतकाच्या मध्यात वृत्तपत्रातील कॉमिक्सचा सुवर्णकाळ मानला जातो. कारण पट्ट्या लांबलचक झाल्या आणि कागदाची भरभराट झाली. 1931 मध्ये डिटेक्टिव्ह "डिक ट्रेसी" चे पदार्पण झाले. "ब्रेन्डा स्टारर" या महिलेने लिहीलेली कार्टून पट्टी 1940 मध्ये प्रकाशित झाली.

लियोनार्दो दा विंची आणि लोरेन्सो बेनिनी यांच्यासारख्या कलाकारांनी त्यांच्या विषयातील वैशिष्ट्यांना निश्चित आकार आणि स्वरूप देण्यासाठी व्यंगचित्रांचा वापर केला तथापि, विल्यम हॉगर्थ यांनीच चित्रमय व्यंग विकसित केले जे राजकीय आणि संपादकीय व्यंगचित्रांच्या विकासाचे अग्रदूत बनले.

मराठी वर्तमानपत्रातील व्यंगचित्रांचा प्रारंभ :

व्यंगचित्रांना पत्रकारिता क्षेत्रात महत्त्व प्राप्त झाले. प्रत्येक वर्तमानपत्रातून व्यंगचित्र ज्याला सुरुवातीला हास्य रस पत्रिका म्हणून संबोधले जात होते. या हास्यरस पत्रिका प्रत्येक शहरातून आणि भाषेतून प्रकाशित होऊ लागली. आणि वाचकांच्या पसंतीस उतरू लागली. याठिकाणी आपण व्यंगचित्रांचा इतिहास वरिलप्रमाणे अभ्यासला आता मराठी वर्तमानपत्रातील मराठी व्यंगचित्रांचा इतिहास अभ्यासू.

मानवी इतिहासाच्या ज्या आधुनिक कलांना अनन्यसाधारण महत्त्व आहे, त्यात व्यंगचित्रं या कलेचा समावेश होतो. पाश्चात्य जगतात व्यंगचित्रांना महत्त्वाचं स्थान आणि आकार देण्याचं काम एका नियतकालिकाने केले. ते म्हणजे 'पंच' त्याची जन्मकथा रंजक आहे, "एडिन बर्ग कॅसेल येथे झालेल्या बैठकीत व्यंगचित्र असणारे नियतकालिक सुरू करण्याचे ठरले आणि मेह्यूने त्याचे नामकरण 'पंच' असे केले. 'पंच' म्हणजे ठोसा, या पंचच्या ठोशाने पुढे अनेक दशके राजघराण्यातून राजनेत्यांपर्यंत कोणालाही सोडले नाही. व्यंगचित्रांची ताकद म्हणून हा 'पंच' व्यंगचित्रांचा इतिहास अमर झाला."⁸ या नियतकालिकाने व्यंगचित्रांच्या इतिहासात अद्वितीय अशी भर घातली. तसेच जगाच्या सामाजिक आणि राजकीय पटलावर व्यंगचित्रांना प्रतिष्ठा प्राप्त करून दिली.

मराठी वर्तमानपत्रातील व्यंगचित्रांचा नेमका उगम सांगायचा झाला तर काही पुरावे अभ्यासणे गरजेचे आहे. त्यासाठी मधुकर धर्मापुरीकर यांनी लिहीलेल्या आणि मैजेस्टिक पब्लिशिंग हाऊस यांनी प्रसिद्ध केलेल्या लेखांचा अभ्यास करू, "1950 च्या सुमारास मराठी नियतकालिकांचा सुवर्णयोग आला. त्या अनुषंगाने व्यंगचित्रकला बहरली. व्यंगचित्रांचे जे साहित्यिक रूप आहे ते या काळात खऱ्या अर्थाने विकसित झाले. वसंत सरवटे, शि. द. फडणीस, नागेश आर्डे, प्रभाकर ठोकळ यांची चित्रे गाजली. मराठी व्यंगचित्रकलेला आकार आला, तो 'वसुधा', 'मौज', 'वीणा' 'सत्यकथा', 'आवाज', 'हंस', 'मोहिनी', या मासिकांच्या सुवर्ण काळात."⁹ काही नेमक्या व्यंगचित्रकारांमुळे मराठी वर्तमानपत्रात व्यंगचित्रकला बहरली. त्यात शंकर पिल्लई, व. आर. के. लक्ष्मण यांचे राजकीय व्यंगचित्रे देशभर पसरली व प्रसिद्ध झाली.

मराठी वर्तमानपत्रातील व्यंगचित्रांचा इतिहास अभ्यासतांना त्यांची मराठी मासिकातून कशी भरभराट झाली. आणि व्यंगचित्रांच्या मासिकातील प्रसिद्धीमुळे वर्तमानपत्रांना व्यंगचित्रांचा मोह आवरता आला नाही. आणि वर्तमानपत्रातून व्यंगचित्रांची सुरुवात झाली. असे म्हणता येईल. असे म्हणतात की, प्राचीन काळापासूनच चित्र, व्यंगचित्र भिंतीवर कोरली जात होती. परंतु त्याला व्यंगचित्र किंवा हास्यचित्र संबोधले जात नव्हते. त्याचप्रमाणे दिवाळी अंकाच्या मुखपृष्ठावर व्यंगचित्रे छापण्याची प्रथा सुद्धा याच काळात सुरू झाली. दिवाळी अंक हा मराठी संस्कृतीचा मानबिंदूच आहे. दिवाळी अंकाच्या मुखपृष्ठावर व्यंगचित्र झळकविण्याचे श्रेय शि. द. फडणीस यांना जाते.

1888 मध्ये मराठी भाषेतून ग्वालियर मधून 'सद्दिचारिणी' साप्ताहिक प्रकाशनास सुरुवात झाली. सद्दिचारिणी हे एक हास्य-व्यंग चित्रांचे साप्ताहिक होते. मुंबई मधून हास्य-विनोद साप्ताहिक 'अबुल पंच' इ.स. 1896 मध्ये निघाले. त्याचबरोबर 'अरुणोदय' आणि सूर्योदय ही हास्य- विनोदाची दर्जेदार साप्ताहिक होती. 'सूर्योदय' या साप्ताहिकानंतर 'हिंदूपंच' हे पत्र त्याच्या वैशिष्ट्यामुळे गाजले व त्याची स्मृती आजही कायम आहे. व्यंगात्मक वृत्तपत्रांचा इतिहास अभ्यासतांना पुढील संदर्भ अभ्यासणे महत्त्वाचे ठरते. "उपहास, उपरोध, विसंगती, अतिशयोक्ती युक्त लेखन व तेही सचित्र प्रसिद्ध करणारे वृत्तपत्र निघावे, हे चमत्कारिक वाटणारे आहे. अर्थात अशा लिखाणाचा उद्देश लोकांच्या

व्यंगावर बोट ठेवून, क्वचित हसत-हसत त्यांची रेवडी उडवून सुधारणेचा पाठपुरावा करण्याचाच होता. या पत्रासारखी इतरही अनेक पत्रे पुढे निघाली, पण नाव शिल्लक राहिले आहे ते 'हिंदुपंच' या पत्रांचे.¹⁰ हिंदुपंच पत्राचा मुख्य उद्देश एखाद्या विषयाची रूपकाद्वारे थट्टा करून तिचे दुबेहुब स्वरूप वाचणाऱ्याच्या लक्षात बिंबवण्याचा होता.

जानेवारी 1910 मध्ये सचित्र मराठी मासिक पत्र 'चित्रमय जगत' छापण्यास सुरुवात झाली याचे प्रकाशक चित्रशाला स्टीम प्रेस पुणे येथील व्यं. र. देवगिरीकर हे होते. 'चित्रमय जगत' मध्ये 'साहित्यिक, सामाजिक, राजनीतिक, ऐतिहासिक, धार्मिक, आध्यात्मिक इत्यादी विषयांवर चिंतनात्मक लेख, टिप्पणी आणि समीक्षा प्रकाशित होत असे. प्रसंगानुरूप चित्र आणि कार्टूनचा प्रयोग या मासिकात केला जात होता.

व्यंगचित्रांची लोकप्रियता वाढतच होती. अशाच प्रकारचे एक मासिक पत्र इ.स. 1920 मध्ये मराठी भाषेत सर्वस्वी व्यंगचित्रासाठी छापण्यात येऊ लागले. त्याविषयी पुढीलप्रमाणे संदर्भ अभ्यासू, 'किलोस्कर' ने आरम्भ से ही सामाजिक बुराडियों और कुरीतियों पर प्रहार करने के साथ-साथ व्यंग्य चित्रों का प्रयोग सामाजिक चेतना जागृत करने के उद्देश्य से किया।"¹¹ सुरुवातीला 'किलोस्कर खबर' नावाचे चार पाणी मासिक पत्रिका छापण्यास सुरुवात झाली. कालांतराने 'खबर' हे नाव हटवून फक्त 'किलोस्कर' ठेवण्यात आले. 'शंकरराव किलोस्कर' या पत्रिकेचे मुख्य संपादक होते.

त्याचबरोबर व्यंगचित्र मासिकामध्ये सर्वात जास्त गाजलेल्या मासिका वद्दल बोलायच झाले तर 'मौज' या मासिकाचे नाव आवर्जून घ्यावे लागेल. अनेक नामवंत लेखकांची कारकीर्द 'मौज' मधून सुरु झाली. साप्ताहिक भविष्य ठेवण्याची प्रथा ही 'मौज'ने सुरु केली. "चित्रपटांचा जमाना सुरु झाल्यावर त्यांचाही परामर्श घेण्यास 'मौज' ने सुरुवात केली. विनोदी लेख व चित्रे, विशेषतः राजकीय व्यंगचित्रे ही 'मौज' चा एक विशेष होता, "विलायती सुधारणेचा ओम्फस' असे एक सदर त्यात येई. 'न्यूज ऑफ दि वर्ल्ड' मध्ये येणाऱ्या युरोपियन स्त्री-पुरुषांच्या वैवाहिक जीवनासंबंधी विचित्र खटले, घटस्फोट मागणीचे दावे आणि मराठी रंगभूमीवर चमकणाऱ्या नटनटंतीची माहिती वगैरे (मौजेत) भरपूर येत असे."¹² मौज म्हणजे खरीखुरी मौज, गंमत, हलकीफुलकी रंगत, नाटक मंडळ्यांच्या व नटनाटके यांच्या संबंधी रंगेल लेखांची खिरापत असा धडाका अनंत अंतरकरांनी लावला यामुळे वृत्तपत्रसृष्टी अगदी हादरून गेली 'मौज' या पत्राचे अनुकरण होणे साहजिकच होते. मौजनंतर असे एक साप्ताहिक म्हणजे 'करमणूक' सचित्र करमणूक म्हणूनही हे पत्र परिचित होते. हरिभाऊ आपटे यांचे करमणूक पत्र 1917 साली बंद पडले होते. ते पुण्यातून निघत होते. अशा तऱ्हेचे दुसरे एक पत्र निघण्यास सुरुवात झाली. ते म्हणजे 'सचित्र रविवार' (The Sunday pictorial) हे होय. हे पत्र 12 एप्रिल 1925 रोजी सुरु झाले. व त्यातही मनोरंजनावर भर देण्याचा प्रयत्न होता. अशाच व्यंगचित्रांची ओळख आपल्याला 1929 साली मराठी भाषेतून निघणाऱ्या 'नागरिक' या साप्ताहिकाने करून दिली. हैदराबाद येथून प्रकाशित होणाऱ्या 'नागरिक' या साप्ताहिकाचे संपादक वासुदेव कृष्णराव हे होते. 8 ऑगस्ट 1931 मध्ये नागरिकचा शेवटचा अंक प्रकाशित झालेला पाहायला मिळतो. अनंतराव गंधे यांनी नव्या उद्देशाने नव्या उम्मेदीने 'निर्भिड' साप्ताहिक छापण्यास सुरुवात केली. निर्भिड साप्ताहिकाचा पहिला अंक 24 सप्टेंबर 1933 रोजी निघाला होता. खुमासदार विवेचन, वेधक मथळे आणि जाहिरातीत नवनवीन कल्पना वापरून त्यांची केलेली मांडणी इत्यादी निर्भिडची वैशिष्ट्ये होती. निर्भिड नंतर 1935 साली नव्या रंगाचे व ढगांचे नवे मराठी साप्ताहिक मुंबईतून 'चित्रा' प्रकाशित होण्यास सुरुवात झाली. 'चित्रा'ची लोकप्रियता आणि प्रसार संख्या वाढली ती त्यातील विशेष व्यंगचित्रांमुळे आणि विशेष म्हणजे बाळासाहेब ठाकरे यांची उत्कृष्ट अशी विविध विषयांवरील व्यंगचित्रे या साप्ताहिकात लोकप्रिय ठरली. इ.स 1940 मध्ये 'चित्रा' चा विलय दैनिक 'नवभारत' असे झाले.

कोल्हापूर जिल्हा पातळीवर सर्वप्रथम वर्तमानपत्रातून व्यंगचित्र प्रकाशित करण्याचा मान 'पुढारीला' जातो. 1 जानेवारी 1939 मध्ये पुढारी दैनिक समाचारपत्र म्हणून प्रकाशित होण्यास सुरुवात झाली.

संपूर्णपणे व्यंगचित्रांना वाहिलेले कोणते साप्ताहिक असेल तर 'मार्मिक' या साप्ताहिकाचे सर्वप्रथम नाव घ्यावे लागेल. 'मार्मिक' च्या पहिल्या अंकाचे प्रकाशन तत्कालिन मुख्यमंत्री 'यशवंतराव चव्हाण' यांच्या हस्ते झाले. 1960 मध्ये मार्मिक हे व्यंगात्मक साप्ताहिक सुरु झाले. या साप्ताहिकातील प्रमुख आकर्षण म्हणजे बाळ ठाकरे यांची व्यंगचित्रे हे होते. कालांतराने 'मार्मिक' ला राजकीय रंग चढलेला दिसून येता.

वर्तमानपत्रातील व्यंगचित्रांचे प्रकार :

वर्तमानपत्रात अनेक प्रकारचे व्यंगचित्रे छापून येतात. तसे पाहता विशेषतः व्यंगचित्रांचे दोनच प्रकार पडतात एक म्हणजे कॅप्शन असलेले व्यंगचित्र व कॅप्शन नसलेली व्यंगचित्र. परंतु सभोवताली घडणाऱ्या घटनांच्या आधारे व्यंगचित्रे काढली जातात. त्यांच्या विषयानुसार व्यंगचित्रांचे प्रकार पडतात. ती आपण पुढील प्रमाणे अभ्यासू.

1. राजकीय व्यंगचित्रे (Political cartoons):-

राजकीय व्यंगचित्रांच्या प्रकारामध्ये राजकीय नेते, राजकीय घटना, प्रसंग, समस्यांवर आधारित भाष्य केले जाते. ही व्यंगचित्रे विनोद, उपहास आणि व्यंग्यात्मक पद्धतीने राजकीय आणि सामाजिक परिस्थिती दर्शवितात. अनेकदा ही व्यंगचित्रे वर्तमानपत्रांच्या संपादकीय पृष्ठांवर प्रकाशित असतात. म्हणून त्यांना संपादकीय व्यंगचित्रे' असेही म्हणतात.

2) गॅग कार्टून (Gag Cartoons) :-

या प्रकारात एकच चित्र आणि त्यावर एक मजेदार ओळ किंवा संवाद असते, गॅग कार्टूनचा उद्देश वाचकांना हसवणे आणि विचार करायला प्रवृत्त करणे असतो. गॅग कार्टून अनेकदा, सामाजिक, राजकीय किंवा दैनंदिन जीवनातील घटनांवर आधारित असतात.

3) कॉमिक स्ट्रिप्स (comic strips)

या व्यंगचित्र प्रकारामध्ये एकापेक्षा जास्त चित्रे वापरून एक कथा सांगितली जाते. कॉमिक स्ट्रिप्स या प्रकारामध्ये बऱ्याच वेळेस काल्पनिक पात्रे आणि कथा असतात. यामधून विनोद, साहस आणि सामाजिक संदेश देण्याचा प्रयत्न केला जातो.

4) व्यंगरेखने (इलस्ट्रेशन्स) :

व्यंगरेखने या प्रकाराचा उपयोग हा नियतकालिकातील लेखांसाठी किंवा पुस्तकातील मजकुरासाठी किंवा जाहिरातीसाठी केला जातो. व्यंगरेखने हे सोबतच्या मजकुराला पूरक आणि उपयुक्त असतात.

5) सचेतन व्यंगचित्रे : (अॅनिमेटेड कार्टून्स) :

चित्रपट तंत्राच्या शोधानंतरच चालत्या-बोलल्या स्थितीतील व्यक्ताचित्रे रुपेरी पडद्यावर सादर करण्यात सुरुवात झाली. वॉल्ट डिझनी (1901-1966) हा सचेतन व्यंगचित्रे कलेचा आद्य जनक मानला जातो. त्याने निर्माण केलेल्या 'मिकी माऊस', 'डोनाल्ड डक', 'टॉम आणि जेरी' या व्यक्तिरेखा आज जगभर प्रसिद्ध आहेत.

7) पॉकेट कार्टून :-

पॉकेट कार्टून हा कार्टूनचा एक प्रकार आहे. यामध्ये एक राजकीय विनोद असतो. आणि तो सिंगल कॉलम ड्रॉइंगच्या स्वरूपात असतो. पॉकेट कार्टून संपादकीय कार्टूनपेक्षा वेगळे आहे. पॉकेट कार्टून लहान आणि अधिक व्यापक प्रेक्षकांसाठी असते. कॉमिक स्ट्रिप्सप्रमाणे, पॉकेट कार्टूनमध्ये सततची कथा नसते. एकाच चित्रात विनोद किंवा विचार मांडलेला असतो. 1986 मध्ये शंकर पिल्लई यांनी 'द इंडियन एक्सप्रेस'च्या बंगळूर संस्करणासाठी पॉकेट कार्टून बनवण्यास सुरुवात केली.

व्यंगचित्रांच्या प्रकारामध्ये बरील प्रमाणे विविध प्रकार पडतात. परंतु मुख्यतः वर्तमानपत्रातील व्यंगचित्रांच्या प्रकारांचा विचार केला तर, राजकीय किंवा संपादकीय व्यंगचित्रे, सामाजिक व्यंगचित्रे, क्रिडा व्यंगचित्रे, ऐतिहासिक व्यंगचित्रे आणि पॉकेट कार्टून इत्यादी व्यंगचित्रांचे प्रकार पाहायला मिळतात.

समारोप :

वर्तमानपत्रातील व्यंगचित्रे' हा प्रकारच मुळात खूप प्रभावी आणि परिणामकारक मानला जातो. वाचकांना समाजाची आरशाप्रमाणे हास्यरूपात पण बोचरी ओळख करून देणारा हा प्रकार आहे. टिका करण्याचे व सद्यःस्थिती सांगण्याचे प्रभाव माध्यम म्हणून वर्तमानपत्रातील व्यंगचित्राकडे पाहता येईल. व्यंगचित्रे हे विचार करण्यास भाग पाडतात. काळापरत्वे जसे जसे माध्यमांमध्ये बदल झाले तसेच व्यंगचित्र प्रकारातही काळानुरूप व माध्यमांपरत्वे बदल होत गेले असे लक्षात येते. बदल ही काळाची गरजच आहे. माध्यमानुसार कॉमिक स्ट्रिप्स, हा व्यंगचित्राचा प्रभावी प्रकार म्हणता येईल. त्याच बरोबर वर्तमानपत्रात कॅरिकेचर हा एक प्रसिद्ध प्रकार आहे. आणि वर्तमानपत्रातील जागे अभावी रूढ झालेला प्रकार म्हणजे पॉकेट कार्टून होय. वर्तमानपत्रातील पॉकेट कार्टूनची देखील लोकप्रियता वाढलेली पाहायला मिळते.

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जागतिक हवामान बदल आणि भारत : एकदृष्टीक्षेप

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प्रस्तावना

ग्लोबल वार्मिंग आणि हवामानबदलाच्या संकल्पनांचा सध्या बराच बोलबाला आहे. जगाला भेडसावणाऱ्या ज्या काही सर्वात भीषण समस्या आहेत, त्यापैकी एक म्हणजे जागतिक हवामानातील होत असलेला बदल होय. मानवाने स्वतःच्या उन्नतीसाठी निसर्गावर आपले नियंत्रण मिळवण्यास सुरुवात केली आहे. भरमसाठ जंगल तोड, मोठ्या प्रमाणात झालेले औद्योगिकीकरण, वाहनांच्या संख्येत झालेली अमर्याद वाढ यामुळे प्रचंड प्रमाणात प्रदूषण वाढले आहे. कार्बन डाय-ऑक्साईड, मिथेन, सल्फर डाय ऑक्साईड, कार्बन या वायूच्या वाढीमुळे तापमानात दिवसेंदिवस वाढ होत आहे. नैसर्गिक आपत्तीचे प्रमाण वाढले आहे. जैवसंपदेची हानी, वायू व जल प्रदूषणामध्ये वाढ झाल्याने आरोग्य विषयक समस्यांमध्ये वाढ झालेली आहे.

हवामानाचा प्रभाव झेलत असताना माणसाने आता वेगळ्या टप्प्यात प्रवेश केला आहे. आपल्या विविध उद्योगाद्वारे माणूसच हवामानाला प्रभावित करू लागला आहे. गेल्या दोनशे वर्षांमध्ये जगभर झालेली औद्योगिक प्रगती, मोठ्या प्रमाणावर वापरली जाणारी ऊर्जा स्रोत, राहणीमानातील बदल, नैसर्गिक साधन संपत्तीवर पडत असलेला बोझ यामुळे वातावरणातील प्रदूषणात वाढ होत आहे. त्यातूनच तापमान वाढ होत असल्याचे दिसून येते. वाढते तापमान ही समस्या केवळ मानवप्राण्यासाठीच गंभीर नसून पृथ्वीतलावरील सर्व प्राणीमात्रांसाठी गंभीर बनली आहे. कालओघात अनेक जीवसृष्टी नामशेष झाली आहे. काहीचे अस्तित्व धोक्यात आले आहे. त्यामुळे जागतिक स्तरावर पर्यावरण विषयक मुद्दे चिंतेचा विषय बनत आहे. अनेक देशांचे जागतिक तापमान कमी करण्याच्या विषयावर एकमत झाले असून त्या दृष्टीने पावले उचलली जात आहेत. अनेक परिषदा, संमेलने, जागतिक करार तसेच विविध संस्था स्थापन करून पर्यावरण अवनती रोखण्याचा दृष्टीने प्रयत्न सुरू आहेत. यामुळे भारतापुढे आव्हान आहे. ते हवामान बदलाची प्रक्रिया आणि विकासाच्या गरजा यांच्यात संतुलन साधण्याचे.

२. शोधनिबंधाचे महत्व:

- २.१. हवामान बदल ही समस्या दिवसेंदिवस गंभीर बनत चालली आहे, त्या दृष्टीने अध्ययन महत्वपूर्ण आहे.
- २.२. हवामान बदलामुळे मानव व वन्यजिव यांच्या आरोग्यास गंभीर धोका निर्माण झाला आहे.
- 2.3 हवामान बदलाच्या गंभीर वास्तवस्थितीचे आकलन होण्याच्या दृष्टीने अध्ययनाची आवश्यकता आहे.
- 2.4 जागतीक हवामान बदल आणि भारत यासंबंधीचे अध्ययन करणे.

३. संशोधन पद्धती :

प्रस्तुत शोध अध्ययनासाठी दुय्यम स्रोतांचा अवलंब करून तथ्यांचे संकलन करण्यात आलेले आहे. अध्ययन विषयाशी अनुषंगिक तथ्य संकलीत करण्यासाठी विषयाशी निगडित प्रकाशित, अप्रकाशित असलेले शोध अध्ययन साहित्य, संदर्भग्रंथ, साप्ताहिके, वृत्तपत्रे, संशोधन पत्रिका, संकेत स्थळे आदी दुय्यम साधनांच्या माध्यमातून तथ्य संकलित करण्यात आलेले आहे.

4. आशय विश्लेषण :

हवामानातील पर्जन्य, सूर्यप्रकाशाचा कालावधी, वाऱ्याचा वेग, बाष्पीभवन यांच्यामध्ये नेहमीपेक्षा मोठ्या प्रमाणात बदल होणे व तो बदल जाणवण्याइतपत असणे यास हवामान बदल असे म्हणतात. पर्यावरणातील मानवी हस्तक्षेपांमुळे वातावरणातील हरितगृह वायूंचे प्रमाण वाढत आहे. परिणामी पृथ्वीवर हरितगृह वायूंची तीव्रता वाढून तापमान वाढत आहे. यालाच हवामानबदल असे म्हणतात.

सूर्याचे प्रचारण हा हवामानबदलाचा महत्वपूर्ण भाग आहे. सूर्याच्या बाह्यपृष्ठभागाकडून येणाऱ्या उर्जेमध्ये चढउतार होण्याच्या स्वरूपावरून ऊर्जाविनिमय, वातावरणातील ऊर्जेचे अभिसरण व तापमान ठरत असते. सूर्याच्या विद्युत चुंबकीय लहरींतील बदल, पृथ्वी व सूर्य यांच्या अंतरामध्ये होणारा बदल, सूर्याकडून पृथ्वीने शोषलेल्या ऊर्जेचे प्रमाण, पृथ्वीच्या

पृष्ठभागावरील आच्छादनात होणारे बदल तसेच सूर्याच्या प्रचाराणात होणारे दीर्घकालीन बदल यामुळे तापमान वाढून हिमनग, हिमनद्या वितळतात. सूर्याकडूनही ऊर्जेचा वापर होतो त्यामुळे ऊर्जा कमी प्रमाणात उत्सर्जित होते.

पृथ्वी तिच्या कक्षेच्या काटकोनातील २३.५० कोनात कललेली आहे. या कलण्याच्या बदलांमुळे ऋतूंच्या तीव्रतेवर परिणाम होतो. कलणे जास्त असेल तर तीव्र उन्हाळा आणि तीव्र हिवाळा आणि कलणे कमी असेल तर थंड उन्हाळे व सौम्य हिवाळे येतात. त्याचबरोबर सध्या माहित असलेले खंड अनेक लक्ष वर्षांपूर्वी जमिनीचे मोठमोठे सलग भाग होते. त्यावेळी भारतीय द्वीपकल्प अंटार्क्टिकाशी जोडलेला होता पण सरकण्याच्या प्रक्रियेमुळे सध्या भारत उष्णकटिबंधीय प्रदेशात मोडतो. आजही अरवली पर्वतावर अंटार्क्टिकावरील हिमनगांचे अवशेष सापडतात.

समुद्र हा हवामानावर प्रभाव पाडणारा सर्वात महत्वाचा घटक आहे. पृथ्वीचा ७१% भाग समुद्राने व्यापलेला असल्याने सूर्याकडून येणाऱ्या किरणोत्सर्गाचे वातावरण व पृथ्वीचा पृष्ठभाग यांच्यापेक्षा दुपटीने शोषण करतो. सागरी प्रवाह हे पृथ्वीवरील उष्णतावाहनाचे नैसर्गिक माध्यम आहे. सागरी प्रवाहांमुळे उष्णतावाहन होते. ताहीती व डार्वीन या दोन ठिकाणांमधील हवेच्या/वातावरणातील दाबाच्या फरकामुळे अलनीनो व ला निना या सागरी क्रिया प्रशांत महासागरात दिसून येतात. या प्रक्रियांमध्ये पूर्व किनाऱ्याजवळ थंड सागरी प्रवाहांचे विस्थापन उष्ण सागरी प्रवाहांत केले जाते. परिणामी अमेरिका, चिली, पेरू, ऑस्ट्रेलिया व एलनिनोमुळे भारताच्या हवामानावर अनुकूल व प्रतिकूल परिणाम दिसून येतो.

धूळकण, धूळ, काजळी, ज्वालामुखीय धूळ व राख यांचे मोठ्या प्रमाणात वातावरणामध्ये निलंबन असते. हे कण सूर्यापासून पृथ्वीवर येणाऱ्या किरणांना अटकाव करतात. सूर्याकडून उत्सर्जित होणाऱ्या ऊर्जेपैकी २.३% ऊर्जा ही धुलीकण व धुक्यामुळे इतरत्र विखुरली जाते. त्यापैकी ६% किरणे अवकाशात परत पाठवले जातात. यानंतर फक्त १७% ऊर्जा पृथ्वीतलावर प्रकाशाच्या स्वरूपात येते. ज्वालामुखीच्या उद्रेकानंतर अचानक हवेतील धुळीच्या प्रमाणामध्ये मोठ्या प्रमाणात वाढ होते. ज्वालामुखीच्या उद्रेकाचा काळ कमी असला तरी वायू आणि राख यांचा परिणाम वातावरणामध्ये दीर्घकाळ टिकणारा असतो. यामुळे सूर्यकिरणांना अटकाव होतो व तापमानात लक्षणीयरीत्या घट होते. यांच्या मापनासाठी 'ज्वालामुखी उद्रेक निर्देशांक' (Volcanic Explosive Index) व Dust Veil Index बनवण्यात आला आहे.

सूर्याची पृथ्वीवरील परावर्तित होणारी किरणे वातावरणातील वायू शोषतात. त्यामुळे तापमानात वाढ होते. कार्बन डायऑक्साईड, मिथेन, क्लोरोफ्लूरोकार्बन, नायट्रस ऑक्साईड, ओझोन हे हरितगृह वायू आहेत. नागरिकीकरण, औद्योगिकीकरण, कोळशावर आधारित विद्युत घट, वाहनांच्या संख्येतील वाढ, मानवाच्या राहणीमानातील बदल, कृषी क्षेत्रात होणारा रासायनिक पदार्थांचा वापर तसेच जीवाश्म इंधनाच्या ज्वलनामुळे कार्बन डायऑक्साईड व इतर हरितगृह वायूंचे मोठ्या प्रमाणामध्ये उत्सर्जन होत आहे. परिणामी तापमानामध्ये देखील वाढ होत आहे.

वर्ल्ड रिसोर्स इन्स्टिट्यूटच्या अहवालानुसार व्यापक प्रमाणात झालेल्या वृक्षतोडीमुळे हवामानबदलांमध्ये फरक पडला आहे. १९५० ते १९८३ च्या मध्यापर्यंत अमेरिकेतील ३८%, आफ्रिकेतील २४% वने नष्ट करण्यात आली. नायजेरिया ५%, पॅराग्वे ४.६%, जमैका, श्रीलंका ६.५%, नेपाळमधील ३% वने प्रत्येक दशकात कापली जात आहेत. ही वने कार्बन डायऑक्साईडचे मोठ्या प्रमाणात शोषण करतात. वातावरणातील २०% कार्बनवाढीस मोठी जंगलतोड असल्याचे तज्ज्ञांचे म्हणणे आहे. जंगलतोडीमुळे जमिनीची धूप होत असून भूजलपातळीही खालावली आहे.

हवामानबदलाच्या संकटाबरोबर भारताला आपल्या वेगाने विकसित होणाऱ्या अर्थव्यवस्थेस टिकवून ठेवण्याचे आव्हान आहे. भारताद्वारे आंतरराष्ट्रीय समुदायांबरोबर सामूहिक आणि सहयोगाने पर्यावरणीय समस्यांचा सामना करण्याचे प्रयत्न होत आहेत. देशातील औद्योगिक क्षेत्राची चांगली कामगिरी, इलेक्ट्रॉनिक, माहिती तंत्रज्ञान, औषधनिर्मिती आणि मूलभूत रसायनांचा समावेश असणाऱ्या क्षेत्रांची चांगली कामगिरी यांच्या बळावर भारतीय अर्थव्यवस्थेचा विकास साधला गेला आहे. पण औद्योगिक क्रांतीपूर्व काळाच्या तुलनेत २१ व्या शतकाअखेर ५० सेल्सिअसनी वाढ होण्याची शक्यता आहे. पण कितीही चांगले प्रयत्न केले तरी २० ने तरी तापमानवाढ होईलच. त्यामुळे भारतापुढे आव्हान आहे ते विकासाच्या गरजा आणि हवामानबदलाची प्रक्रिया यांच्यात संतुलन साधण्याचे.

(१) भारतीय संविधानामध्ये पर्यावरण संवर्धनास अनन्यसाधारण महत्त्व आहे. भारतीय संविधानाच्या अनुच्छेद ४८ (A) व ५१ A (G) नीती निर्देशक तत्वानुसार 'राज्य देशाच्या पर्यावरणाचे संरक्षण आणि संवर्धन तसेच वन्यजीवांची रक्षा करेल' तसेच भारतीय नागरिकांवरही ही जबाबदारी सोपवण्यात आली आहे. ४२ व्या संविधान संशोधनाद्वारे वन्य आणि वन्यजीव संरक्षण मुद्दा संविधानाच्या समवर्ती सूचीमध्ये समाविष्ट करण्यात आला.

(२) भारत जगभरातील तीन देशांपैकी एक आहे जेथे केवळ पर्यावरणविषयक प्रकरणे हाताळण्यासाठी (Green Tribunal) हरित लवादाची स्थापना करण्यात आली आहे.

(३) अकराव्या पंचवार्षिक योजनेत शासनाने सागर किनाऱ्यांची नियोजन आणि धोकादायक घनकचऱ्यांचे परिणामकारक व्यवस्थापन करण्यात एकात्मिक आणि समावेशक ध्येयधोरणे अंगिकारण्याचे नियम जारी केले आहेत. वाघांसारखे प्राणी नष्ट होण्याचा धोका असलेल्या वन्यजीवांच्या संरक्षणासाठी वन्यजीव गुन्हे नियंत्रण ब्यूरो स्थापन केला आहे.

(४) पंतप्रधानांच्या हवामानातील बदलविषयक राष्ट्रीय परिषदेने जून २००८ मध्ये देशाचा पहिला सर्वसमावेशक राष्ट्रीय कृती आराखडा जारी केला.

(५) कोपनहेगन परिषदेपूर्वी भारताने स्वेच्छेने २०२० पर्यंत हरितगृह (कार्बन डायऑक्साईड) उत्सर्जन २००५ सालच्या तुलनेत २०-२५% ने कमी करण्याची घोषणा केली आहे. हे उद्दिष्ट साध्य करण्यासाठी अल्प कार्बन विकासविषयक गट स्थापन केला आहे.

(६) केंद्रीय पर्यावरण व वन मंत्रालय आणि पर्यावरण संरक्षणविषयक काही कायदे.

पर्यावरण अवनती रोखण्यासाठी मंत्रालयाने १९७४ साली प्रदूषण नियंत्रणात यावे म्हणून जल कायदा केला. तसेच देशातील जलस्रोत सुरक्षित आणि पुनर्जीवित करण्यासाठी सुद्धा हा कायदा करण्यात आला.

वायूप्रदूषण प्रतिबंध नियंत्रण कायदा १९८१ साली करण्यात आला आणि १९८७ मध्ये त्यात दुरुस्ती करून भारतात हवेचे प्रदूषण रोखणे, त्यावर नियंत्रण ठेवणे व वायूप्रदूषणास तरतुदी करण्यात आल्या.

१९९२ मधील संयुक्त राष्ट्रांच्या जैवविविधता ठरावाची उद्दिष्टे नजरेसमोर ठेवून २००२ साली जैवविविधता कायदा करण्यात आला.

देशातील वनसंपदेचे संरक्षण व जतन करण्याच्या उद्देशाने १९८० साली केंद्र सरकारने धोकादायक पदार्थांना हाताळताना घडलेल्या अपघातांमुळे झालेल्या हानीची जबाबदारी निश्चित करण्यासाठी 'राष्ट्रीय पर्यावरण न्यायाधिकरण' स्थापन केले.

पर्यावरणावर होणाऱ्या संभाव्य परिणामांचे मूल्यमापन बंधनकारक बनवणारी मार्गदर्शक सूचना केंद्रीय पर्यावरण व वन मंत्रालयाने जारी केली आहे. यानुसार पर्यावरणावर होणाऱ्या संभाव्य हानीची जबाबदारी प्रकल्प कालावधीत पर्यावरण व्यवस्था प्रस्ताव कार्यान्वित करावा की नाही याबाबत वैधानिक प्रक्रियेत योगदान इत्यादी बाबतीत विकासकांवर बंधने टाकण्यात आली आहेत.

वने ही मुळातच विविधतेची भंडारे आहेत. तसेच परिस्थितीकीचे संतुलन टिकवण्यामध्ये मदत करतात. वनाद्वारे/वने देशाच्या एकूण ऊर्जेपैकी ४०% ऊर्जेच्या गरजा व ३०% ग्रामीण गरजा पूर्ण करतात. राष्ट्रीय हरित भारत कृती कार्यक्रमांमध्ये वनांच्या प्रमाणात वाढ करणे व जैवविविधतेचे रक्षण करणे हे दोन ध्येय आहेत.

(१) वनांमध्ये वृद्धी ११ व्या पंचवार्षिक योजनेत वनांशी संबंधित कार्यकारी गटाने वृक्षारोपणाची १.६ मिलियन हेक्टर वार्षिक वाढ करण्याचे निश्चित केले आहे. अकरावी पंचवार्षिक योजना संपेपर्यंत ३.३ मिलियन हेक्टर इतकी वाढ करण्याचे निश्चित करण्यात आले आहे. भारताच्या भौगोलिक क्षेत्राच्या एक तृतीयांश भाग वनक्षेत्राखाली आणण्याचे लक्ष ठेवण्यात आले आहे.

वेगाने वाढणाऱ्या व कोणत्याही हवामानात टिकणाऱ्या वनस्पतींचे रोपण.

वनस्पती व जीवांच्या प्रजातींसाठी मार्गिकांची व्यवस्था करून वनांचे विखंडन कमी करणे.

वनीकरण व त्याच्या सघनतेमध्ये वाढ

करण्यासाठी सार्वजनिक गुंतवणूकदारांना प्रोत्साहन देणे.

संयुक्त वन प्रबंधन व समित्यांचे पुनर्निर्माण करणे.

(२) जैवविविधतेचे संरक्षण - जैवविविधता हॉटस्पॉट व वन्यजीव संरक्षण महत्वाचे आहे. यामध्ये प्राणीजात व मनुष्यजात यांच्या आरोग्याचे संरक्षण करणे. जिल्हा व स्थानिक स्तरावर पारंपरिक ज्ञानाला लेखनबद्ध करून जैवविविधतेचे रजिस्टर बनवणे. वन्यजीव संरक्षण कायद्यांतर्गत सुरक्षित क्षेत्र प्रणालीचे प्रभावी कार्यान्वयन करणे. तसेच जैव विविधता संरक्षण कायदा २००१ चे प्रभावी कार्यान्वयन करणे. वातावरण बदलासाठी कृती आराखड्यामध्ये विकास कार्यक्रमांना साथ देतानाच वातावरणातील बदलांना प्रभावीपणे तोंड देवू शकणाऱ्या उपायांचा समावेश आहे.

5. निष्कर्ष :

ग्लोबल वार्मिंग अर्थात तापमान वाढ झाल्यामुळे जगावर आणि भारतावर कोणती संकटे येऊ शकतात याचा आढावा घेतला परंतु तापमान वाढीची प्रक्रिया तातडीने रोखणे आपल्या हातात नाही. कारण आता वातावरणात सोडला जाणारा कार्बन डाय-ऑक्साईड वायु तब्बल 100 ते 200 वर्षांपर्यंत वातावरणात कायम राहणार आहे. या वायूला असलेली दीर्घ आयुष्य आपल्यासाठी त्रासदायक ठरणार आहे. असे असले तरीही वातावरण बदल आणि याचे दुष्परिणाम याबाबत भारत सरकार फार

गंभीर आहे. तसेच भारतीय आणि आपली संस्कृती कित्येक पिढ्यांपासून पर्यावरण रक्षणाला हातभार लावत असते. परंतु आज वाढते औद्योगीकरण, वृक्षतोड, प्रदूषण आणि नैसर्गिक साधन संपत्तीचा अमर्याद वापर यामुळे निसर्गाचा समतोल ढासाळला आहे. त्यातून तापमान वाढ आणि त्यांचे गंभीर परिणाम समाजास भोगावे लागत आहेत. असे असले तरी भारत सरकार तापमान वाढ रोखण्यासाठी आणि जैवविविधतेचे रक्षण करण्यासाठी प्रभावी असा कृती आराखडा तयार करून उपाय योजना आखत आहे.

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नदीष्ट कादंबरीतील पर्यावरणाचे चित्रण

प्रा. डॉ. आशा सोपान गिरी

मराठी विभाग

कै. सौ. कमलताई जामकर, महिला महाविद्यालय परभणी

सध्याच्या काळात पर्यावरणाचा समतोल ढासळणे ही आंतरराष्ट्रीय समस्या होऊन बसलेली आहे. आणि मानवाचा विकास साधायचा असेल तर पर्यावरणाचा समतोल राखणे आवश्यक आहे आणि हेच मानवाकडून होत नाही. मानवाकडूनच पर्यावरण संतुलन बिघडवले जात आहे, त्याच्या वाढत्या अपेक्षा आणि हव्यासापोटी तो पर्यावरणाचा ऱ्हास घडवून आणत आहे. या पर्यावरण ऱ्हासाचे चित्रण मराठी साहित्यामध्ये सुद्धा आलेले आहे. नदीष्ट या कादंबरीमध्ये नदीचा समतोल बिघडविण्याचे काम मानव कशा प्रकारे करत आहे आणि पर्यावरणाचे संतुलन कसे बिघडत आहे हे अनेक घटनेतून लेखकाने दाखवून दिले आहे. मानवी जीवनात पाण्याला अत्यंत महत्त्व आहे पाण्याला जीवन असे म्हटले जाते. भारतातील अनेक गावे शहरे नदी काठावरच बसलेले आहेत. बऱ्याच उद्योगधंद्याची वाढ ही नदीकाठावर झालेली आहे. माणूस आणि नदी यांचे आदिम नाते आहे आणि हेच नाते लेखकाने नदीष्ट मध्येही मांडले आहे. नदीची अनेक रूपे त्याने या कादंबरीतून चित्रित केलेली आहेत.

नदीष्ट ही प्राध्यापक मनोज बोरगावकर यांची लोकप्रिय कादंबरी आहे. या कादंबरीला अनेक पुरस्कारही प्राप्त झाले आहेत. आपण नाद लागलेले नदीष्ट ऐकलेले असते. परंतु नदीष्ट हे नाव नाविन्यपूर्ण वाटते. ते वाचकांचे लक्ष वेधून घेते. नदीचा नाद लागलेला नायक म्हणजेच नदीष्ट असा याचा अर्थ आपल्याला उमगतो. गोदावरी नदीला मध्यवर्ती ठेवून उलगडत जाणारी ही कादंबरी आहे. नायक आणि नदीचे नाते त्याचबरोबर नदीचे निगडित इतर पात्रांचे नाते कसे जिव्हाळ्याचे आहे हे या कादंबरीतून दाखवून दिले आहे. इतर पात्रांच्या व नायकाच्या माध्यमातून विकासाच्या नावामुळे नदीचा होणारा ऱ्हास तिचे आकसत जाणे. हा चिंतेचा विषय दाखविण्यात आला आहे. लेखकाच्या प्रथम पुरुषी निवेदनातून कादंबरी उलगडत जाते त्याचबरोबर निसर्गातील प्राणी, पक्षी यांचाही मनोवेधक गोष्टी या कादंबरीमध्ये लेखकाने सांगितलेल्या आहेत.

नदीष्ट कादंबरीतील नायकाला नदीवर पोहण्याचा छंद जडतो आणि तो कायमचा नदीशी जोडला जातो. तब्बल दहा वर्षांपासून त्याचे नदीवर येणे नियमित असते. नदीवर येणाऱ्या विषयी एक प्रकारची आपुलकी नदीवर नियमित येणाऱ्यांना एकमेकांबद्दल निर्माण झालेली असते. त्यांचे जिव्हाळ्याचे नाते एकमेकांविषयी तयार झालेले असते.

उन्हाळ्याच्या दिवसातील नायकाने नदीचे वर्णन केले आहे तो म्हणतो की "नदी रोडावत आणि परिसर खंगत चालला होता. बाळंतिणीची नीट वज झाली नाही की ती जशी खंगून खंगून जाते बरेचसे त्यागतच. दाटीवाटीने एकमेकात निर्धोक पसरलेली झाडेझुडपे देखील विरळ विरळ होत गेलेली. नुसत्या हातांनी काडकाड असा आवाज अधिकच रखरखीत करीत होता. (पृष्ठ क्र. ११) पडलेल्या दुष्काळाने अटक केलेली नदी आणि उन्हाळ्यात तिला पाहणे फारच नायकाला अस्वस्थ करते आणि जेव्हा त्या नदीकडे पाहतो त्याला नदीविषयी वाटते की "रोडावलेली नदी उगीच अस्वस्थ करीत राहते. या दिवसात अविरत तिथे वाळूचा उपसा चालू असायचा. नदीच्या गाभ्यापर्यंत जखम करणारा. किती खोलवर इजा होत असेल नदीला! अबाॅर्शनमुळे स्त्रीला होणाऱ्या इजेसारखीच" (पृष्ठ क्रं ४०) प्रत्येक नदीवर सध्याच्या परिस्थितीमध्ये वाळू उपसा हा जोरदार सुरू असतो आणि नदीची होणारी झीज यामुळे भरून येणार नाही हे कोणी लक्षातच घेत नाही. परंतु अतिशय संवेदनशीलपणे लेखकाने स्त्रीच्या गर्भपाताशी हा विषय जोडून अतिशय संवेदनशील रीतीने हा वाळू उपसा घातक आहे हे दाखवून दिले आहे. पुढे पाऊस जोरदार पडल्यामुळे नदी भरून वाहायला लागते तेव्हा तिच्या विशाल पात्राकडे डोळाभर पाहून तो म्हणतो की "उपशात नदीला झालेली जखम पूर्णपणे भरलेली नसली तरी बऱ्यापैकी भरत आलेली असते. (पृष्ठ क्रं ४१) नदीचे ते भरलेलं रूप पाहून सुद्धा लेखकाला नदीची पूर्वी मानवाने केलेली अवस्था व ती पूर्वर्त झालेली नाही हे आठवते.

या कादंबरीत नियमित नदीवर येणारे व अनेकांना पोहायला शिकविणारे दादाराव, सकीनाबी ही भिकारीण, मासे पकडणारा बामणवाड, मंदिरातील पुजारी, नदीच्या परिसराकडे आपुलकीच्या भावनेतून पाहणारा कल्लूराम आणि त्याची प्रेयसी, तृतीयपंथी सगुणा, भिकाजी हा भिकारी, सर्पमित्र प्रसाद, एवढेच नाही तर माकडं, हरिण, मोर ही सगळी नदीमुळे जोडली गेलेली माणसे, प्राणी आणि पक्षी आणि प्रत्येकाच्या जगण्यात नदी अविभाज्य घटक झालेली. या सर्वांचे चित्रण कादंबरीमध्ये आलेले आहे.

नदीला एकदा महापूर येतो. त्यावेळेचे चित्रण पुढीलप्रमाणे आहे. "गोदामाय आता गावातही शिरली होती. दिसेल तो अडथळा नेस्तनाभूत करीत होती. ती उगमापासूनच थयथयाट करीत होती. पाऊस अजूनही कोसळत होता. जणू आभाळच फाटले होते. गोदामाय कशालाही आणि कुणालाही जुमानण्याच्या मनःस्थितीत नव्हती. साऱ्या परिसराला तिने हादरवून टाकले

होते. परिसराला कुशीत घेण्याचा मक्ता असणारी गोदामाय परिसराला गिळंकृत करून टाकण्याच्या मनस्थितीत होती जणू" (पृष्ठ क्रं ७८) या महापुरामुळे अनेकांचे संसार उघड्यावर पडले. अनेक झोपड्या वाहून गेल्या. नदीच्या अतिशय रौद्र रूपाची प्रचिती या महापुराने दिलेली होती. आणि त्यानंतर जेव्हा काल्लूभैय्या म्हणतो की आपले मां नाम को उसने बट्टा लगाया. त्यावेळेस दादाराव त्याला अधिकारवाणीने बोलतात त्याला समजावून सांगताना म्हणतात "नदीला आलेला महापूर म्हणजे तिची भडास आहे. वर्षानुवर्षांपासून साठवून राहिलेली माणसाची पापं तीने तरी किती दिवस साठवून ठेवावीत. अजीर्ण झाली असतील. तिलाही. काय काय खेळ नाही करत आपण तिच्या आयुष्याशी.. तिच्या खळखळणाऱ्या प्रवाहाला जागोजागी बांध घालून आपण तिला व्यसन घालतो. बांध घालायलाही तिची हरकत नसते पण तिच्या सोयीने तिच्या अंगोपांगाला, वाहण्याला इजा होणार नाही किमान याची तरी दखल आपण घेतली पाहिजे. आपण तेही करत नाही. तिच्या पाण्याचा आपण व्यापार करतो. शतकानुशतकांपासून जे पाणी ती मोफत उधळत गेली त्याच पाण्याचा माणसाने बाजार मांडला. या पाण्याच्या वाटपासाठी राज्याराज्यात तंटे बखेडे लागले. तिचा जराही विचार न करता ते पाणी आपण ओरबाडून घेतले. वाहण्यावर अफार विश्वास असणारी ही गोदामाय आहे. या गोदामायला जागोजागी बंधाऱ्याचे लगाम घातले गेले. ती हिरमुसली झाली. जागोजागी साचून राहू लागली. युगानुयुगापासून अमाप आणि फुकट असणाऱ्या या पाण्यावरही टॅक्स लागला. तिच्या गाभ्याला इजा होईपर्यंत वाळूचा उपसा केला. काय करायचे बाकी ठेवले आहे आपण?" (पृष्ठ क्रं ७९) दादाराव च्या तोंडून लेखकाने आपण नैसर्गिक साधन संपत्तीचा कसा बेसुमार उपसा करत आहोत. अक्षरशः ती ओरबाडून घेत आहोत आणि त्यामुळे मग अशी संकटे कोसळत राहतात हे यातून दाखवून दिलेले आहे. महापुराने जरी विनाश घडून आणला तरी त्यातून मानवाचे काही प्रमाणात इतर साधले जाते हे सांगताना दादाराव म्हणतात की "वरकरणी वाटणाऱ्या विनाशातही ती जीवन पेरत राहते बाबांनो तिच्या या महापुरामुळे सभोवतालच्या जमिनीत खोल गेलेली पाण्याची पातळी वाढते. माशांचे अमाप पीक येते. शेतातल्या मातीत या नदीच्या पाण्याचे गुणधर्म मिसळतात. आणि ती पुन्हा ताजीतवानी होते. म्हणजे महापुरातही ती आपल्याकडून जे घेऊन जाते त्याच्या दाम दुपटीत जीवन पेरून जाते (पृष्ठ क्रं. ८०) या सर्वातून एक लक्षात येते की नदी ही वाहती राहिली तरच जीवन वाहते राहिल हे त्यांना सांगायचे होते. खरंच आपण पर्यावरणाचा समतोल नाही ठेवला तर एखाद्या वेळेस महाभयंकर सगळा सत्यनाश होऊन जाईल आणि ती वेळ लवकरच येईल. हा विचार करायला आपल्याला दादाराव चे विचार भाग पाडतात. खरंतर अशा नैसर्गिक आपत्ती मधून आपण शहाणे होऊन त्यासाठी उपाययोजना करायला पाहिजे परंतु हे असे घडत नाही.

वाळू उपसाबाबत एका ठिकाणी नायक म्हणतो की "वाहते पाणी नेहमी शुद्धच असते. आपली जबाबदारी एवढीच की नदीच्या गर्भातली वाळू शाबूत ठेवली पाहिजे. वाळूच्या भरमसाठ उपशाने तिची शुद्धीकरणाची प्रक्रिया खंडित होत असेल ... आपण तिची हिस्ट्रेक्टॉमी करायला निघालोत. पाणी हे आपल्या जगण्याचे मूलश्रोत. या मूलश्रोतांच्या शुद्धीकरणातच अडथळे निर्माण करून आपण आपल्याच पायावर धोंडा पाडून घेत आहोत" (पृष्ठ क्रं ११४) या कादंबरीतील प्रसाद या सर्पमित्रांने नायकाला एक वेळेस सांगितले होते की जंगल आणि प्राणी वरकरणी विपरीत वागायला लागले की समजून घ्यावे ती विपरीत वागत नसून माणसाने जसे वागायला हवे अगदी तसेच वागत आहेत.

एकंदरीत नदिष्ट या कादंबरीमध्ये लेखकाने बेसुमार होणारा वाळूउपसा आणि त्यातून मानवाचेच होणारे अपरिमित नुकसान महापुरासारख्या उडवणाऱ्या समस्या यावर भाष्य केले आहे.

संदर्भ ग्रंथ

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पर्यावरण व मानवी आरोग्य

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प्रस्तावना:

मानवी जीवनामध्ये आरोग्य व पर्यावरण यांचा घनिष्ठ संबंध आहे. अतिशय जवळचा संबंध आहे. मानवी आरोग्यावर पर्यावरणाचा परिणाम होत असतो. चांगल्या शुद्ध पर्यावरणातील मानवाचे आरोग्य चांगले निरोगी राहते. परंतु प्रदूषित पर्यावरणातील मानवास कोणत्या ना तरी रोगाने विकार होत असतो. निरोगी जीवन जगण्यासाठी निरोगी पर्यावरणाची आवश्यकता असते. पर्यावरण दूषित असल्यावर निरोगी मानवाच्या आरोग्यावर परिणाम होऊन अनेक व्याधी होत असतात. पर्यावरणाचा ऱ्हास झाल्यावर मानवाच्या आरोग्यावर त्याचा वाईट परिणाम होतो. जनतेचे आरोग्य डॉक्टरच्या संख्येवर व दवाखान्याच्या अस्तित्वावर अवलंबून राहत नसते. आरोग्य हे पर्यावरणावर अवलंबून असते. पर्यावरण जेवढे स्वच्छ तेवढे तेवढे मानवी आरोग्य चांगले राहते. आपल्या सभोवतालचा पर्यावरणाचा परिणाम माणसाच्या आरोग्यावर होत असल्याने तो अनेक रोगांना प्रतिबंधित करतो. तेवढाच तो अनेक रोगांना निमंत्रण देत असतो. आपले आरोग्य चांगले ठेवण्यासाठी पर्यावरणाची भूमिका अतिशय महत्वाची आहे. पर्यावरण स्वच्छ ठेवण्याचे काम मानवाचेच आहे. निसर्गाचा व मानवाचा संबंध प्राचीन काळापासून आहे. परंतु सध्या परिस्थितीत मानवाने या संबंधाला बाधा आणली. मानव निसर्गाला प्रदूषित केले आहे. निसर्ग आपल्या क्रिया-प्रक्रियांनी पर्यावरण स्वच्छ ठेवण्याचा प्रयत्न करीत असतो. मानवाच्या विकासात्मक क्रियेमुळे प्रदूषणाचा जन्म झाला. गेल्या दोन तीन दशकात प्रदूषण या शब्दांचा वापर अधिकाधिक होत असलेला दिसून येतो. प्रदूषणाचे घोर परिणाम सर्वत्र चर्चा होत आहे. प्रदूषणाचा प्रश्न केवळ जगातील एखाद्या देशापुरता मर्यादित नसून तो संपूर्ण मानव जातीसाठी अस्तित्वाचा आहे. पर्यावरणाच्या प्रश्नाच्या यशस्वी सोडून किंवा भविष्यातील मानवाचे अस्तित्व सातत्य किंवा विनाश अवलंबून आहे. जीवनात आपणास प्रत्येक गोष्टीची किंमत मोजावी लागते. वेगवान औद्योगीकरणाची वाढत्या जीवन राणीमानाच्या रूपाने चांगली फळे चाकावयास मिळाली आता प्रदूषणाच्या रूपाने त्या फळाची किंमत मोजण्याची वेळ माणसावर आलेली दिसून येते. मानव भौतिक सुखाच्या लालसे फुटी नैसर्गिक संपत्तीचा मानवाने आजपर्यंत बेशुमार उपयोग केला आहे. त्यामुळे एका बाजूस अरुण्य, खनिजेतल, दगडी कोळसा इत्यादी संपत आली आहे. आणि दुसरीकडे त्याचा उपयोग करताना हवा पाणी आणण्याची मी या अत्यावश्यक घटकाची प्रदूषण करून मानवाने आपला नास स्वतःहून करून घेतला आहे.

व्याख्या:

पी. डी. शर्मा "प्रदूषण म्हणजे हवा, पाणी मृदा इ. च्या भौतिक रासायनिक किंवा जैविक गुणधर्मातील अत्यंत हानिकारक बदल होय. जो सामान्यतः अनुभवला जातो आणि सजीवाच्या जीवनावर हानिकारक परिणाम करून सजीवांचे जीवन त्रासदायक बनवितो"

एस पी. कौशिक: "प्रदूषण म्हणजे हवा पाणी आणि जमिनीच्या भौतिक, रासायनिक किंवा जैविक गुणधर्मात आरोग्य बदल होय. जो मानव आणि प्राणी व त्यांना आवश्यक असणाऱ्या नैसर्गिक साधन संपत्तीला नुकसान पोहोचत असतो".

मानव करत असलेल्या विविध व्यवसायांचा पर्यावरणावर विपरीत परिणाम होऊन जी अनेक प्रकारची प्रदर्शनी होतात त्या मार्फत प्रत्यक्ष वा अप्रत्यक्षरीत्या मानवी आरोग्यावर पुढीलप्रमाणे परिणाम होतात.

वाहतूक आणि दळणवळण: वाहतूक प्रकारामुळे खूप वाहतूक सुविधा उपलब्ध होत आहे. वाहतूक करण्यासाठी वापरल्या जाणाऱ्या इंजापासूनच्या ज्वलनामुळे विषारी वायूची निर्मिती झाली. त्यामुळे हवेचे प्रदूषण मोठ्या प्रमाणात वाढ झाली. वाहनाच्या आवाजामुळे ध्वनी प्रदूषण वाढले. वाहनातील इंधन गळती होऊन मोठ्या प्रमाणात जलप्रदूषण झाले. अशा प्रकारे

वाहतूक दळणवळण विकासाबरोबर सर्व प्रकारच्या प्रदूषणात वाढ होत गेली. ही प्रदूषणे न त्यातून निर्माण होणारी प्रदूषके यांचा मानवी आरोग्यावर विपरीत परिणाम होऊन श्वसन संस्था चेतासंस्था, पचनसंस्था, डोळे, नाक, त्वचा इत्यादी ज्ञानेंद्रियावर विपरीत परिणाम होऊन मानवी आरोग्याच्या संदर्भात गंभीर प्रश्न निर्माण होतात. उदा. ध्वनी प्रदूषणामुळे बहिरेपणा, निद्रानाश, मेंदू विकार धुरामुळे श्वसन आणि चेतासंस्थाचे विकार उदाहरणा टी. बी, दमा इत्यादी इंधनमिश्रित पाण्यामुळे पचनसंस्थेचे कावीळ, विषमज्वर असे आजार होतात. अशा प्रकारे पर्यावरणाचा वाहतूक आणि दळणवळण यामुळे मानवी आरोग्यावर विपरीत परिणाम होताना आणून येतात.

पशुपालन व्यवसाय: अलीकडील काळात या व्यवसायात मोठ्या प्रमाणात वाढ झालेली दिसून येते. या विषयातील अनेक विविध प्राण्याकडून तसेच त्यांच्यापासून मिळणाऱ्या विविध उत्पादनाच्या वापरातून आणि विषाणूजन्य आजार मानवाकडे सहकारणीत होत असून अशा नवनवीन आजारांचे प्रमाण अलीकडील काळात वाढत आहे. उदा. एड्स, मॅडकाऊ, बर्लडफ्ल्यू, हेंडू विषाणू, निपाह इत्यादी आजार गाई, कोंबड्या, वराह आणि इतर काही प्राण्याकडून मानवाकडे संक्रमित झालेले दिसतात. मानवाने प्राण्यांच्या वस्तीस्थानावर केलेले आक्रमण नको तितकी प्राण्यांची जवळीक मांसाराचे वाढते प्रमाण व दैनंदिन स्वच्छतेकडे दुर्लक्ष या व इतर कारणामुळे अशा साथीच्या रोगांची प्रमाण वाढत असून त्यांची वेळीच दखल घेऊन खबरदारीचे उपाय न केल्यास अनेक महाभयंकर रोगांच्या साथीला तोंड देण्याची वेळ मानवावर येऊ शकते. पशूंचे निवारे पशुखाद्य पशू औषधे पशू उत्पादने यांची प्रत त्यांच्यातील भेसळ त्यांच्याही मानवी आरोग्यावर घातक परिणाम होताना आढळून येतात. अशा प्रकारे पर्यावरणातील पशुपालन व्यवसायामुळे मानवी आरोग्यावर घातक परिणाम होत असतात.

वसाहती: वाढत्या लोकसंख्येमुळे निवाराची गरज वाढवून वसाहतीची संख्या व विस्तार वाढत गेली. शहरांची संख्या वाढून त्यांची अमर्याद वाढ होऊ लागली. त्यांच्या शरीर वस्तीच्या सुविधांच्या उपलब्धीवर विपरीत परिणाम होऊ लागला. स्वच्छ, शुद्ध, पुरेसे पिण्याचे पाणी, पुरेसे सांडपाणी, सांडपाणी विल्हेवाटिची पुरेशी व्यवस्था, पुरेसे प्रशस्त रस्ते, हवा व प्रकाशयुक्त घरे, कचरा विल्हेवाटीची सुविधा अशा मानवी आरोग्याशी संबंधित असलेल्या व आरोग्यासाठी आवश्यक असलेल्या घटकांची पूर्तता, शहरी वस्तीच्या अमर्याद वाढीमुळे आभावानेच वाढ होऊ लागले. त्यामुळे शहरी दिवसेंदिवस गलिच्छ होऊ लागली. शहरातील लोकांना कावीळ, डायरिया फ्ल्यू विषमज्वर मलेरिया, क्षय दमा अनेक प्रकारचे कॅन्सर तसेच विविध मेंदू विकार आणि इतर ज्ञानेंद्रियांच्या विविध आजारावर दिवसेंदिवस वाढत्या प्रमाणात सामोरे जावे लागत आहे. अशाप्रकारे वसाहती आणि मानवी आरोग्य यांच्या परस्परसंबंध अनेक भीषण समस्येमध्ये होऊ लागला आहे.

कृषी: वाढत्या लोकसंख्येच्या गरजा पूर्ण करण्यासाठी कृषी उत्पादनाचे प्रमाण वाढविण्याचे प्रयत्न सुरू आहेत. त्यामुळेच पर्यावरणावर अनेक प्रकारे परिणाम होऊन त्याचा मानवी आरोग्यावर विपरीत परिणाम होत आहे. उदा. कृषी मालाचे उत्पादन वाढविण्यासाठी जी अनेक प्रकारची कीटक व जंतू औषधे, रासायनिक खते, आधुनिक बी-बियाणे, जलसिंचन इत्यादीचा वापर मोठ्या प्रमाणावर होत आहे. त्यामुळे अनेक रसायने, जंतुनाशके यांचे अवशेष, फळे, भाज्या, विविध धान्य इत्यादी कृषी उत्पादित अन्नपदार्थमार्फत मानवी शरीरात जाऊन पचनसंस्था, चेतासंस्था, श्वसनसंस्था इत्यादींचा अनेक आजार व व्यादिना मानवाला सामोरे जावे लागत आहे. कृषीतील जल सिंचनामुळे निर्माण होणाऱ्या पाणथळ, दलदलीच्या भागामुळे डास, माशा, इतर अनेक किटाणू यांची निर्मिती व वाढ होऊन अनेक रोग व साथीच्या रोगांचा प्रादुर्भाव होत आहे. शेतीत वापरल्या जाणाऱ्या विषारी औषधामुळे अनेक प्रकारचे प्रदूषणे व विषबाधा होऊन त्यामुळेही मानवी आरोग्यावरील घातक परिणाम होतात.

कारखानदारी: अनेक प्रकारच्या कच्च्या मालावर क्रिया- प्रक्रिया करून कारखान्यामध्ये तयार मालाचे उत्पादन केले जाते. खनिज तेल, नैसर्गिक वायू, दगडी कोळसा, औष्णिक व अणुवीज इत्यादींचा शक्ती साधन म्हणून वापर केल्यामुळे व उत्पादनाचा काही प्रक्रियेमुळे कार्बनडाय-ऑक्साईड, सल्फर डाय, ऑक्साईड, इत्यादी अनेक हवा प्रदूषण, सांडपाण्यामुळे जलप्रदूषण, टाकाऊ पदार्थांमुळे कचरा प्रदूषण, यंत्र अवजारांच्या वापरामधून होणाऱ्या ध्वनी प्रदूषणामुळे मोठ्या प्रमाणावर मानवी आरोग्यावर विपरीत परिणाम होतात. श्वसन संस्था, पचनसंस्था, चेतासंस्था, तसेच विविध ज्ञानेंद्रिय उदा. डोळे, कान, नाक, त्वचा इत्यादी

विकार, आजार उद्या. क्षय फ्ल्यू, कावीळ सर्दी दमा मेंदू विकार तसेच डोळे कान त्वचा इत्यादीचे विकार होऊन मानवी आरोग्याबाबत कारखानादारीमुळे गंभीर प्रश्न निर्वाण होतात.

खाणकाम: या व्यवसायातून जी खनिजे व शक्तिसाधने खणून काढली जातात व त्यांचा वापर केला जातो त्यामुळे अनेक प्रदूषके निर्माण होऊन हवा, पाणी, ध्वनी इत्यादी प्रदूषण होऊन त्याद्वारे मानवी आरोग्यावर विपरीत परिणाम होत आहेत.

याशिवाय पर्यावरणातील वाढत्या मानवी हस्तक्षेपामुळे आम्लजन्य, हवामान परिवर्तन ओझोन क्षय, भोपाळ वायू दुर्घटनेसारख्या अनेक भयानक वायू दुर्घटना तसेच रशियातील चनोबिल अनुविज प्रकल्पातील दुर्घटनेसारख्या दुर्घटना नेहमी अनेक काळात घडत आहेत. उदा. ओझोन क्षत्रामुळे सूर्यातील अतिनिल किरणे मोठ्या प्रमाणावर भूपृष्ठावर येऊ लागल्याने कॅन्सर सारख्या आजारांचे प्रमाण वाढत आहे. अलीकडील काळात जैविक नवनवीन सोशल दलातून अनेक आजारावर औषधउपचार उपलब्ध झाले असले तरी दिवसेंदिवस पर्यावरणातील वाढत्या मानवी हस्तक्षेपामुळे अनेक जुन्या आजारांचे प्रमाण वाढत असून त्यात आणखी काही नवीन आजारांची भर पडत आहे. यावरून मानवी आरोग्याची पर्यावरणाचा किती कनिष्ठ संबंध आहे आणि पर्यावरणाच्या गुणवत्तेवरच मानवी आरोग्याची गुणवत्ता कशी व किती अवलंबून आहे हे लक्षात येते. थोडक्यात दूषित पर्यावरण शुद्ध कसे करता येईल यासाठी प्रत्येकाने प्रयत्न करणे आवश्यक आहे. स्वच्छ व शुद्ध पर्यावरणातच निरोगी व सुदृढ आरोग्य लाभू शकते.

अशाप्रकारे मानवी आरोग्यावर पर्यावरणाचा मोठ्या प्रमाणावर परिणाम होत असतो. जसे आपण आपल्या आरोग्याच्या संदर्भात वेल्थ इज हेल्थ आरोग्य हीच संपत्ती आहे. तसेच पर्यावरण ही आधुनिक काळामध्ये पर्यावरण हीच आपली आरोग्याची खरी संपत्ती आहे. पर्यावरण ही काळाची गरज आहे. म्हणून प्रत्येकाने पर्यावरण स्वच्छ सुंदर कसे राहील याबद्दल डोळसपणाने आपल्याला विचार करण्याची वेळ आलेली आहे.

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- 4) पर्यावरण आकलन आणि आचरण: पल्लवी चाफेकर
- 5) पर्यावरण प्रदूषण: रवींद्र भावसार

"पर्यावरणीय संकल्पनांच्या आधारे प्राथमिक विद्यार्थ्यांमध्ये गणितीय कौशल्यांचा विकास"

सावित्रा भगवान पतंगे

सहयोग सेवाभावी संस्था अध्यापक महाविद्यालय विष्णुपुरी नांदेड

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गोष्टवारा (Abstract)

या संशोधनाचा उद्देश प्राथमिक शाळेतील मुलांमध्ये गणित शिकवताना पर्यावरणातील संकल्पना आणि उदाहरणांचा वापर केल्यास त्यांच्या गणितीय कौशल्यांचा विकास होतो का हे तपासणे आहे. गणित हा विषय बहुतेक विद्यार्थ्यांना अवघड वाटतो. पण मुलं त्यांच्या आजूबाजूच्या पर्यावरणाशी थेट जोडलेली असतात. झाडं, पाणी, माती, प्राणी, शेती, कचरा, हवामान या सगळ्याचा त्यांना प्रत्यक्ष अनुभव असतो. जर ह्याच अनुभवांमधून गणित शिकवले, तर मुलांना गणित सोपं, आनंददायी आणि लक्षात राहणारं होतं.

या संशोधनात प्रायोगिक पद्धत वापरली. इयत्ता ३री ते ५वीच्या विद्यार्थ्यांवर प्रयोग घेतला. नियंत्रण गटाला पारंपरिक पद्धतीने गणित शिकवले आणि प्रायोगिक गटाला पर्यावरणाशी संबंधित उदाहरणं वापरून शिकवलं. परिणाम असा दिसून आला की प्रायोगिक गटाच्या मुलांचे गणिताचे गुण जास्त होते, त्यांची तर्कशक्ती, समस्यासोडवणूक आणि सहभाग अधिक चांगला होता.

यावरून असे दिसते की गणित व पर्यावरण एकत्र शिकवल्यास विद्यार्थ्यांचा सर्वांगीण विकास होतो. त्यांना गणिताबरोबरच पर्यावरणाबद्दलही संवेदनशीलता येते. त्यामुळे प्राथमिक स्तरावर अशा प्रकारचे एकात्मिक अध्यापन आवश्यक आहे.

कीवर्ड्स: गणित, पर्यावरण, प्राथमिक शिक्षण, कौशल्य, तर्कशक्ती

प्रस्तावना (Introduction)

गणित हा विषय प्रत्येक विद्यार्थ्यासाठी आवश्यक आहे. दैनंदिन जीवनातील मोजमाप, व्यवहार, वेळेची गणना, क्षेत्रफळ, आकडेवारी या सगळ्यांत गणिताचा वापर होतो. पण अनेक विद्यार्थ्यांना गणित कठीण वाटते. संकल्पना अमूर्त असल्यामुळे मुलांना त्या नीट समजत नाहीत. त्यामुळे त्यांना गणित शिकण्याची भीती वाटते.

मात्र, दुसरीकडे पर्यावरण हा त्यांच्या आयुष्याचा नैसर्गिक भाग आहे. मुलं झाडं पाहतात, पाणी वापरतात, शेतं पाहतात, प्राणी-पक्ष्यांशी खेळतात. या सगळ्या गोष्टी त्यांना जवळच्या आहेत. जर शिक्षकांनी या पर्यावरणातील गोष्टींचा वापर करून गणित शिकवले, तर ते मुलांना पटकन समजते.

उदाहरणार्थ –

झाडांवरील पानं मोजून बेरीज व वजाबाकी शिकवणे

पाण्याची बाटली मोजून लिटर आणि मिलीलीटर समजावणे

कचरा वेगळा करून आकडेवारी व टक्केवारी समजावणे

शेतातील मोजमापातून क्षेत्रफळ आणि परिमिती समजावणे

अशा उदाहरणांमुळे गणित ही फक्त पुस्तकातील गोष्ट राहात नाही तर मुलांच्या अनुभवांशी जोडलेली जिवंत शास्त्र बनते.

संशोधनाची गरज व महत्त्व

1. गणित शिकवताना मुलांचा सक्रिय सहभाग कमी असतो.
2. पर्यावरणाशी निगडित उदाहरणं दिल्यास मुलं शिकण्यात रस घेतात.
3. मुलांना पर्यावरण संवर्धनाची जाणीव होते.
4. गणित व पर्यावरण एकत्र शिकवल्यास तर्कशक्ती, निरीक्षणशक्ती व विश्लेषणशक्ती वाढते.
5. मुलांना शिकलेलं गणित त्यांच्या दैनंदिन आयुष्यात वापरता येतं.

उद्दिष्टे

1. पर्यावरणीय संकल्पनांचा वापर करून गणितीय कौशल्यांचा विकास करणे.

2. विद्यार्थ्यांच्या तर्कशक्ती आणि समस्यासोडवणूक क्षमतेचा अभ्यास करणे.
3. गणित शिकताना पर्यावरणाशी निगडित क्रियाकलापांचा परिणाम तपासणे.
4. विद्यार्थ्यांच्या शिकण्याविषयीची रुची व सहभाग वाढतो का हे पाहणे.

गृहितके

1. पर्यावरणीय उदाहरणांच्या आधारे शिकवलेले गणित विद्यार्थ्यांच्या गणितीय कौशल्यांच्या विकासास अधिक परिणामकारक ठरेल.
2. या पद्धतीमुळे विद्यार्थ्यांची समस्यासोडवणूक व तर्कशक्ती वाढेल.

संबंधित साहित्याचा आढावा

पियाजे (Piaget) यांनी सांगितले की मुलं ठोस अनुभवांमधून शिकतात.
ब्रुनर (Bruner) यांनी "learning by doing" वर भर दिला आहे.
NCTM (2000) नुसार गणित शिकवताना जीवनाशी संबंधित उदाहरणांचा वापर करणे आवश्यक आहे.
अनेक भारतीय संशोधकांनी अनुभवाधारित शिक्षण मुलांसाठी जास्त परिणामकारक असल्याचे नमूद केले आहे.

संशोधन पद्धती

पद्धत: प्रायोगिक संशोधन

नमुना: इयत्ता ३री ते ५वी मधील ६० विद्यार्थी

गट: ३० नियंत्रण गट, ३० प्रायोगिक गट

साधन: Pre-test, Post-test, कार्यपत्रिका

प्रक्रिया:

- नियंत्रण गटाला पारंपरिक पद्धतीने गणित शिकवले.
- प्रायोगिक गटाला पर्यावरणीय संकल्पनांचा वापर करून शिकवले.

उदाहरणार्थ – पाण्याचे मोजमाप, झाडांची मोजणी, कचरा वर्गीकरण, शेतातील मोजमाप.

विश्लेषण: t-test व गुणांची तुलना करून निकाल काढला.

निष्कर्ष

1. प्रायोगिक गटाच्या मुलांची गणितीय समज स्पष्ट झाली.
2. त्यांचे गुण नियंत्रण गटापेक्षा जास्त होते.
3. विद्यार्थ्यांची तर्कशक्ती व समस्यासोडवणूक क्षमता वाढली.
4. गणित आनंददायी व सोपे वाटले.
5. पर्यावरणाबद्दल संवेदनशीलता व जागरूकता निर्माण झाली.

शिफारसी

1. प्राथमिक स्तरावर गणित शिकवताना पर्यावरणीय उदाहरणांचा वापर करावा.
2. शिक्षकांना या पद्धतीबाबत प्रशिक्षण द्यावे.
3. शालेय अभ्यासक्रमात गणित व पर्यावरण यांचे एकीकरण करावे.
4. प्रकल्प कार्य व सहशालेय उपक्रमांमध्ये पर्यावरणपूरक गणितीय क्रियाकलापांचा समावेश करावा.

समारोप (Conclusion)

या संशोधनातून स्पष्ट झाले की पर्यावरणीय संकल्पनांच्या आधारे गणित शिकविल्यास विद्यार्थ्यांना गणित अधिक सोपं आणि आनंददायी वाटतं. त्यांची गणितीय कौशल्यं, तर्कशक्ती आणि समस्यासोडवणूक क्षमता वाढते. शिवाय, मुलांमध्ये पर्यावरणाविषयी जागरूकता देखील निर्माण होते. त्यामुळे प्राथमिक स्तरावर गणित व पर्यावरण यांचे एकात्मिक अध्यापन हे आजच्या शिक्षण व्यवस्थेसाठी आवश्यक आहे.

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चंद्रपूर जिल्हा नियोजन मंडळ व पशुवैद्यकीय योजना : एक आर्थिक व वाणिज्यिक अभ्यास

मोनाली सदानंद बोरकर

संशोधक विद्यार्थिनी

पदव्युत्तर शैक्षणिक वाणिज्य विभाग गोंडवाना विद्यापीठ, गडचिरोली

डॉ. उत्तमचंद तु. कांबळे

प्राध्यापक तथा विभाग प्रमुख पदव्युत्तर शैक्षणिक वाणिज्य विभाग गोंडवाना विद्यापीठ, गडचिरोली

सारांश

चंद्रपूर जिल्हा हा विदर्भातील एक महत्वाचा जिल्हा असून, येथील अर्थव्यवस्थेचे मुख्य अधिष्ठान म्हणजे शेती व पशुपालन आहे. जिल्ह्याची भौगोलिक रचना, हवामान, गवताळ कुरणे आणि नैसर्गिक संसाधनांची उपलब्धता या सर्व घटकांमुळे पशुपालन हा येथील ग्रामीण समाजाच्या उपजीविकेचा एक आधारस्तंभ ठरलेला आहे. विशेषतः अल्पभूधारक शेतकरी, भूमिहीन व आदिवासी समुदायांसाठी पशुधन हे आर्थिक स्थैर्य प्राप्त करण्याचे महत्वाचे साधन ठरते. पशुधनाच्या साहाय्याने दुग्ध व्यवसाय, शेतीस पूरक उत्पादन, जनावरांचा व्यापार, शेणखत निर्मिती इत्यादी विविध व्यवसाय शक्य होतात. याच पार्श्वभूमीवर, ग्रामीण पशुधन क्षेत्राच्या विकासासाठी जिल्हा नियोजन मंडळ (District Planning Committee – DPC) हे स्थानिक स्वराज्य यंत्रणेतील महत्वाचे नियोजन व वित्तपुरवठा करणारे संस्थात्मक अंग मानले जाते. ही समिती जिल्हा स्तरावर विविध क्षेत्रांसाठी योजनांचे नियोजन, निधीचे वितरण, अंमलबजावणीची कार्यवाही व मूल्यांकन यासाठी कार्य करते. पशुसंवर्धन विभागाच्या सहकार्याने जिल्हा नियोजन मंडळ दरवर्षी पशुवैद्यकीय सेवा, जनावरांच्या आरोग्यविषयक उपाययोजना, लसीकरण मोहीम, कृत्रिम रेतन सुविधा, पशुधन विमा, चारा विकास व प्रशिक्षण केंद्रे अशा विविध योजनांसाठी निधी वितरित करते.

२०२०-२१ व २०२१-२०२२ या वर्षांच्या कालखंडात जिल्हा नियोजन मंडळाच्या माध्यमातून राबविण्यात आलेल्या पशुवैद्यकीय योजनांनी जिल्ह्यातील पशुधन व्यवसायात विविध पातळींवर सकारात्मक बदल घडवून आणले आहेत. दुग्ध उत्पादनात वाढ, जनावरांच्या मृत्यूदरात घट, स्थानिक बाजारपेठांचा विस्तार, ग्रामीण रोजगार निर्मिती आणि महिलांच्या सहभागात वाढ अशा अनेक बाबींकडे या योजनांनी सकारात्मक परिणाम घडवून आणले आहेत. या संशोधन पेपर मध्ये या सर्व योजनांचा वाणिज्यिक दृष्टिकोनातून (Commercial Perspective) अभ्यास केला जाणार असून, अशा योजनांचे स्थानिक व व्यापक आर्थिक परिणाम, उपयुक्तता, योजनांमुळे निर्माण झालेले व्यवसाय व उद्यमी संधी, तसेच लाभार्थींच्या दृष्टिकोनातून योजनांची प्रभावीता यांचे सखोल विश्लेषण करण्यात येणार आहे. विशेषतः आर्थिक भांडवली गुंतवणूक व प्रतिफळ दर (Return on Investment), बाजारसंकल्पनांच्या वापरातून पशुपालन व्यवसायाची शाश्वतता, सहकार संस्था व दूध संकलन केंद्रांवर झालेला परिणाम आदी पैलू या संशोधनाच्या केंद्रस्थानी राहणार आहेत. जिल्हा नियोजन मंडळ (DPC) आणि पशुवैद्यकीय योजनांच्या माध्यमातून आर्थिक विकासासोबतच पर्यावरणीय टिकाऊपणा साधणे अत्यंत आवश्यक आहे. या संशोधन पेपरात २०२०-२१ ते २०२१-२२ या कालावधीतील डीपीसीच्या पशुवैद्यकीय योजनांचा आर्थिक, वाणिज्यिक आणि पर्यावरणीय परिणामांचा तुलनात्मक अभ्यास केला आहे.

बीजशब्द- जिल्हा नियोजन मंडळ, पशुवैद्यकीय योजना, ग्रामीण अर्थव्यवस्था, दुग्ध व्यवसाय, वाणिज्यिक विश्लेषण, पर्यावरण प्रस्तावना

चंद्रपूर जिल्हा हा महाराष्ट्राच्या पूर्व विदर्भात वसलेला एक महत्वाचा जिल्हा आहे. तो वनसंपन्न, खनिज समृद्ध व कृषीप्रधान जिल्हा मानला जातो. त्यामध्ये ताडोबा अभयारण्य, घनदाट जंगले, खनिज संपत्ती आणि आर्थिक रचना (कृषी, पशुपालन, औद्योगिक क्षेत्र) यांमुळे हा जिल्हा पर्यावरण आणि विकास या द्वैत समस्येचा उत्तम उदाहरण आहे. पशुपालन हा ग्रामीण उपजीविकेचा मुख्य स्तंभ असला तरी, त्याचा पर्यावरणावर परिणाम (चराईच्या जमिनीचा न्हास, जलप्रदूषण,

जैवविविधतेचा धोका) मोठा आहे. जिल्ह्यात गोंड, कोरकू, प्रभावित आदिवासी जमाती, तसेच दलित व अन्य मागासवर्गीय समाजाचे लक्षणीय प्रमाण आहे. या समाजांच्या उपजीविकेचा मुख्य आधार म्हणजे शेती, मजुरी, पशुपालन व लघुउद्योग. पशुधन हा या जिल्ह्याच्या ग्रामीण अर्थव्यवस्थेतील एक महत्वाचा घटक आहे. गायी, म्हशी, शेळ्या, मेंढ्या तसेच कुक्कुटपालन हे व्यवसाय केवळ दूध, मांस किंवा अंडीपुरते मर्यादित नसून, स्थानिक रोजगारनिर्मिती, मूलधन निर्मिती आणि कर्ज परतफेड क्षमतेसाठी उपयुक्त घटक ठरतात.

भारतीय राज्यघटनेच्या २४३ ZD कलमाअंतर्गत स्थापन झालेल्या जिल्हा नियोजन मंडळाचे मुख्य कार्य म्हणजे जिल्हास्तरावरील समावेशी विकासासाठी निधीचे योग्य नियोजन करणे. DPC मध्ये जिल्हा परिषद सदस्य, आमदार, खासदार, पालकमंत्री, अधिकृत अधिकारी हे सदस्य म्हणून सहभागी असतात. प्राथमिक आरोग्य, शिक्षण, कृषी, जलसंधारण, पशुसंवर्धन इ. क्षेत्रांमध्ये निधी वाटप. ग्रामीण व आदिवासी क्षेत्राच्या गरजेनुसार प्राधान्यक्रम निश्चित करणे. प्रकल्पांच्या आर्थिक-तांत्रिक व्यवहार्यतेचा अभ्यास करून मंजुरी देणे. पशुवैद्यकीय योजना ही पूर्वी फक्त जनावरांच्या आरोग्य संरक्षणापुरती मर्यादित होती. मात्र, मागील दशकात या योजनांचे स्वरूप बदलून त्या व्यवसाय विकास, ग्रामीण रोजगार निर्मिती व आर्थिक सक्षमीकरणाचे साधन बनल्या आहेत.

संशोधनाची उद्दिष्टे

- चंद्रपूर जिल्हा नियोजन मंडळाची रचना व पशुवैद्यकीय योजनांतील भूमिका समजून घेणे.
- जिल्ह्यात राबविल्या जाणाऱ्या प्रमुख पशुवैद्यकीय योजनांचे स्वरूप व त्यांचे आर्थिक मूल्यांकन करणे.
- स्थानिक पशुपालक व व्यवसायिकांवर या योजनांचा परिणाम अभ्यासणे.
- योजनांमधील अंमलबजावणीतील अडचणी व धोरणात्मक उणिवा ओळखणे.
- पशुधन आधारित व्यवसायवाढीसाठी उपाययोजना सुचवणे.
- पर्यावरणीय, सामाजिक व आर्थिक दृष्टीने पशु संवर्धनाचे महत्व स्पष्ट करणे.

साहित्य समीक्षा (Literature Review)

२०१२ ची पशुगणना (Livestock Census of India, 2012) ही देशातील आणि प्रत्येक राज्य/जिल्ह्यातील गार्ड, म्हशी, बकऱ्या, मेंढ्या, कुक्कुटपालन आदींची सर्वेकष आकडेवारी देते. याच अहवालातून कळते की देशात देशी गायींची संख्या घटत असली तरी म्हशी व संकरित गायी वाढत आहेत, ज्यामुळे दूध उत्पादनाचे स्वरूप बदलले आहे. राष्ट्रीय स्तरावर दाखवलेला कलः भारतात दूध उत्पादन वाढते आहे, परंतु त्यात म्हशींचे योगदान जास्त आणि देशी गायींचे कमी आहे. चंद्रपूरसारख्या जिल्ह्यात २०१२ आकडेवारीतून देशी गायींचे प्राबल्य पण कमी उत्पादनक्षमता लक्षात येते, ज्यामुळे “प्रदेशीय उत्पादनात असमतोल” हा मुद्दा दिसतो.

दुग्ध विकासावर NDDB, NABARD आदी संस्था प्रकाशित केलेले अभ्यास NDDB (National Dairy Development Board) Operation Flood (1970–1996) ही जगातील सर्वात मोठी दुग्ध क्रांती योजना होती. त्यामुळे भारत “दुग्ध उत्पादक देश” म्हणून पहिल्या क्रमांकावर पोहोचला. NDDB ने दाखवून दिले की संघटित सहकारी रचना, योग्य बाजारपेठ, व शीतसाखळी सुविधा मिळाल्यास दुग्ध उत्पादन स्थिरपणे वाढते. त्यांच्याकडून प्रकाशित अहवाल दुग्ध विकासासाठी Institutional Infrastructure का महत्वाचे आहे हे अधोरेखित करतात. NABARD (National Bank for Agriculture and Rural Development) ने ग्रामीण कर्ज व आर्थिक सहाय्याच्या माध्यमातून दुग्ध पशुपालन व डेअरी उद्योजकतावरील विशेष योजना राबवल्या. त्यांच्या अभ्यासात दिसते की बँकिंग क्रेडिट + शासकीय योजना + सहकारी संस्था या त्रिसूत्रीमुळे दुग्ध व्यवसाय नफ्यात येऊ शकतो. NABARD च्या “Dairy Entrepreneurship Development Scheme (DEDS)” या योजनेच्या analysis मध्ये अनेक राज्यांत शेतकऱ्यांचे उत्पन्न २५% ते ३०% ने वाढल्याचा उल्लेख आहे. तसेच ग्रामीण कर्ज आणि शासकीय योजनांमुळे दुग्ध व्यवसाय नफ्यात येऊ शकतो, परंतु पर्यावरण-अनुकूल तंत्रज्ञान (बायोगॅस, जैविक शेती) विकसित न केल्यास टिकाव लागत नाही.

जिल्हा नियोजनाचा ग्रामीण व्यवसायांवर होणारा परिणाम यावरील आधीचे अभ्यास (राज्य व देशपातळीवर) महाराष्ट्रात जिल्हा नियोजन मंडळ (District Planning Committees – DPC) विविध क्षेत्रांना निधी देते. उपलब्ध

अभ्यासातून दिसते की बहुतेक वेळा निधी तरतूद व प्रत्यक्ष वापर यात मोठ्या प्रमाणावर दरी आहे. उदाहरणार्थ, काही अभ्यास (Planning Department reports, Maharashtra) दर्शवतात की ग्रामीण पायाभूत सुविधा, दवाखाने व सहकारी संस्था यासाठी दिलेल्या निधीचा फक्त ६०-७०%च खर्च होतो. ग्रामीण व्यवसायांमध्ये योजनांचा परिणाम हा स्थानिक पातळीवरील सक्रियता संस्थात्मक व्यवस्थापन यावर अवलंबून असतो. उदा. कोल्हापूर जिल्हा: सहकारी साखर कारखाने व दुग्ध संघटनांमुळे स्थानिक शेतकऱ्यांना स्थिर बाजारपेठ व उत्पन्न मिळते.

विदर्भ मधील जिल्हामध्ये तुलनेने संस्थामध्ये सातत्य दिसून येत नाही, यामध्ये निधी विलंब, परिणामी योजनांचे व्यापारी परिणाम (commercial viability) कमी असते. अन्य जिल्ह्यांमध्ये यशस्वी झालेल्या योजनांमध्ये चंद्रपूरची तुलना केल्यास अहमदनगर जिल्हा दुग्ध विकासासाठी सहकारी संस्था व शीतगृह व्यवस्थापन यशस्वी झाली आहे. शेतकऱ्यांना दुधाची योग्य किंमत व वेळेवर पैसा मिळत असल्यामुळे दुग्ध क्षेत्र व्यापारीदृष्ट्या लाभदायक झाले. कोल्हापूर जिल्हा 'गार्डन सिटी' सोबतच ते 'दूध सिटी' म्हणून प्रसिद्ध आहे. सहकारी दूध संघ (गोकुळ दूध संघ) शेतकरी ते ग्राहक थेट दुग्ध पुरवठा प्रणाली आहे. त्यामुळे दुग्ध क्षेत्राने स्थानिक GDP व रोजगार दोन्ही वाढवले. पुणे जिल्ह्यात शेतकऱ्यांशी थेट जोडलेल्या "प्रायव्हेट डेअरीज" (उदा. चितळे डेअरी कार्यक्षम उत्पादन-प्रक्रिया-संग्रहण साखळीमुळे यश तसेच सहकारी मॉडेल खाजगी उद्यम मॉडेल दोन्ही मध्ये व्यापारी यश मिळाले आहे.)

चंद्रपूर जिल्ह्यात ११३ दुग्ध सहकारी संस्था असून, फक्त १२ चालू आहेत. म्हणजे ९०% सहकारी संस्था बंद आहेत ही व्यवस्थापकीय व व्यापारी अपयशाची खूण आहे. बजेट utilization (६२%) कमी आहे त्यामुळे व्यावसायिक अंमलबजावणी झालेली नाही. म्हणजे इतर जिल्ह्यांत यशस्वी झालेले घटक (संघटनात्मक बळ, शीतसाखळी, एका ब्रँडखाली विक्री) चंद्रपूरमध्ये अनुपस्थित आहे. एकत्रित परिणाम राष्ट्रीय स्तरावर दूध उत्पादन वाढले, पण चंद्रपूरमध्ये स्थानिक संस्थात्मक कमतरता आढळते. NDDDB/NABARD यांनी सिद्ध केले की संघटित पायाभूत सुविधा त्यामुळे व्यापारामध्ये यश मिळते. इतर जिल्ह्यांत (कोल्हापूर, अहमदनगर) सहकारी रचना यशस्वी झाल्या आहेत, पण चंद्रपूरमध्ये ९०% संस्था मृतप्राय आहेत. त्यामुळे "चंद्रपूरमध्ये समस्या ही निधीच्या अभावाची नसून व्यवस्थापन व व्यापारी मॉडेलच्या अपयशाची आहे.

अभ्यासपद्धती (Methodology)

सदर संशोधन पेपर मध्ये पशुगणना २०१२ यांचा अभ्यास केलेला आहे, तसेच जिल्हा वार्षिक योजना अहवाल मार्च २०२० ते २०२२ राज्य शासनाची आकडेवारी घेतलेली हे आहे, तसेच वर्णनात्मक सांख्यिकीय विश्लेषण (Descriptive statistics), गुणोत्तर तुलना (Allocation vs Utilization ratio), उत्पादन विरुद्ध संस्था/पायाभूत सुविधा यांचा तुलनात्मक अभ्यास डेटा २०१२ व २०१९-२० ते २०२१-२२ पर्यंत मर्यादित घेतलेला आहे. तसेच पर्यावरणीय मूल्यांकन अहवाल (NEERI, MPCB) यांचाही अभ्यास केलेला आहे.

जिल्हा नियोजन मंडळाच्या पशुवैद्यकीय योजना

महाराष्ट्रातील चंद्रपूर जिल्हा हा एक आदिवासीबहुल प्रदेश असून, येथे पशुपालन हे शेतकऱ्यांच्या जीवनयापनाचे एक प्रमुख साधन आहे. यामध्ये जिल्हा नियोजन मंडळाची भूमिका महत्वाची असून त्यात पशुसंवर्धन विभाग, जिल्हा परिषद चंद्रपूर महत्वाची भूमिका बजावत आहे. या समितीमध्ये ९ सदस्य असतात, कलम २३४ नुसार जिल्हातील सर्व पशुवैद्यकीय दवाखाने व केंद्रांमध्ये तांत्रिक ३, अतांत्रिक व वर्ग ४ चे अधिकारी कर्मचारी असतात. जिल्हा पशुसंवर्धन विभागाचे प्रमुख अधिकारी हे पशुवैद्यकीय समितीचे अध्यक्ष असतात. जिल्हा परिषदेच्या सर्वसाधारण सभामध्ये पशुवैद्यकीय योजनेसंबंधीत ठराव संमत करण्यात येतात. जिल्हा परिषद अंतर्गत अल्प, अत्यल्प व भुमिहीन शेतमजुरांना ५० टक्के अनुदानावर दोन गायी किंवा दोन म्हशी देण्यात येतात या दोन्ही जनावरांच्या वितरणामध्ये सहा महिनांचा कालावधी असतो. संकरित गायीची किंमत १४००० हजार रुपये व म्हशींची किंमत १६००० हजार रुपये असते. तसेच भुधारक व भुमिहीन शेतमजुरांना ६६.६६ टक्के अनुदानावर पशुखाद्याचा पुरवठा करण्यात येतो.

कामधेनू दत्तक ग्राम योजना ही जिल्हा नियोजन मंडळाच्या अधिपत्याखाली राबविण्यात येणारी एक लक्षवेधी योजना आहे, जी दुधाळ जनावरांच्या संख्येत वाढ, उत्पादकतेत सुधारणा आणि दुग्धव्यवसायाचे व्यावसायिकरण यावर केंद्रित आहे. योजनेच्या अंमलबजावणीसाठी गाव निवडीचे स्पष्ट निकष (जसे की दूध संकलन केंद्राच्या मार्गावर असणे, किमान ३०० दुधाळ

जनावरे), पशुधन नोंदणी, जनजागृती अभियाने आणि सहकारी संस्थांचा सहभाग यासारखे उपाययोजना आखण्यात आले आहेत. परंतु, योजनेच्या उद्दिष्टांशी तुलना करता प्रत्यक्षात त्याचा अपेक्षित परिणाम साध्य होऊ शकलेला नाही.

योजनेचे उद्दिष्टे (Objectives of the Scheme):

- दुधाळ जनावरांच्या संख्येत वाढ करून दूध उत्पादन वाढवणे.
- शेतकऱ्यांना उच्च दर्जाचे पशुवैद्यकीय सेवा उपलब्ध करून देणे.
- सहकारी संस्थांच्या माध्यमातून दूध संकलन, प्रक्रिया आणि बाजारपेठ व्यवस्था सक्षम करणे.
- शेतकऱ्यांचे उत्पन्न वाढवून पशुपालन क्षेत्राला आर्थिक स्थिरता देणे.

गाव निवडीचे निकष (Criteria for Village Selection):

योजनेअंतर्गत दत्तक गाव निवडण्यासाठी खालील निकष लागू केले जातात, गाव दूध संकलन केंद्राच्या मार्गावर असावे. गावात किमान ३०० दुधाळ जनावरे (गाई, म्हैशी) असावीत. ज्या गावात दुधाळ जनावरांची संख्या सर्वात जास्त असेल, त्याला प्राधान्य देण्यात येते तसेच स्थानिक स्वराज्य संस्था, सहकारी संघटना आणि गावकऱ्यांचा सहभाग असल्यास प्राधान्य असते.

अंमलबजावणी उपक्रम (Implementation Initiatives):

योजनेच्या अंमलबजावणीसाठी कार्यक्रम राबविण्यात येतात जसे की, पशुधन नोंदणी गावातील दुधाळ गाई, म्हैशी, संकरीत जाती, देशी गावी व वंध्यत्वग्रस्त जनावरांची गणना व नोंदणी केली जाते. जनजागृती अभियाने यामध्ये ग्रामसभांद्वारे पशुवैद्यकीय योजना, लसीकरण शिबिरे व मोहिमा याची माहिती देणे. रोग नियंत्रण उपाय: जंतुनाशक शिबिरे यामार्फत गावातील सर्व जनावरांना (गाई, बैल, म्हैशी, रेडे, वासरे) नियमितपणे जंतुनाशक औषधांचे डोस देण्यासाठी उपक्रम दिला जातो. रोगप्रतिकारक लसीकरण विशेषतः आदिवासी लाभार्थ्यांसाठी १००% अनुदानावर लसीकरण देण्यात येते. तसेच वंध्यत्व निवारण शिबिरे घेतली जातात गाई-म्हैशीची तपासणी करून वंध्यत्वाचे निदान व उपचार करण्यात येतात.

चंद्रपूर जिल्ह्याची पशुधन आकडेवारी (Livestock Population of Chandrapur District):

चंद्रपूर जिल्हा पशुसंवर्धन विभाग: २०२०-२१ ते २०२१-२२ चा तुलनात्मक विश्लेषण

१. पशुधन संख्या (Livestock Population):

वर्ष	गायी व बैल	म्हैश व रेडे	मेंढ्या	शेळ्या	कुकुट	एकूण
२०२०-२१	३,९५,९१४	६४,०३८	५०,४६५	२,४०,१८८	५८,७८६३	१३,३८,४६८
२०२१-२२	३,८१,०५४	५८,००६	४९,३९२	२,१९,१३७	३८,४३९१	१०,९१,९८०

(संदर्भ, चंद्रपूर जिल्हा वार्षिक प्रशासन अहवाल सन २०२१-२२ यांच्या आकडेवारीवरून)

विश्लेषण:

गायी व बैल: २०२०-२१ मधील ३.९५ लाखांवरून २०२१-२२ मध्ये ३.८१ लाखांवर आले घट १.४% (कारण: रोग, वंध्यत्व, वधशाळा).

म्हैश व रेडे: ६४,०३८ वरून ५८,००६ घट ९.४% (संभाव्य कारणे: खाद्य अभाव, आरोग्य समस्या).

मेंढ्या व शेळ्या: मोठी घट मेंढ्यांमध्ये २.१%, शेळ्यांमध्ये ८.८% (कदाचित चारा अभाव, व्यापारी विक्री).

कुकुट पक्षी: २०२१-२२ मध्येच नोंदवले गेले ३८.४३ लाख, जिला अर्थव्यवस्थेसाठी महत्वाचे आहे.

एकूण पशुधनात ६.५% ची घट दिसून आली, विशेषतः गायी, म्हैशी व शेळ्यांमध्ये याचे कारणे रोगप्रादुर्भाव, चारा अभाव आणि वंध्यत्व यासारखी समस्या असू शकतात.

२. पशुवैद्यकीय सुविधा (Veterinary Infrastructure):

सुविधा	२०२०-२१	२०२१-२२	बदल
जिल्हा पशुवैद्यकीय सर्वचिकित्सालय	१	१	स्थिर
तालुका लघु पशुवैद्यकीय सर्वचिकित्सालय	६	६	स्थिर
पशुवैद्यकीय दवाखाने श्रेणी १	३७	३७	स्थिर

सुविधा	२०२०-२१	२०२१-२२	बदल
पशुवैद्यकीय दवाखाने श्रेणी २	११८	११८	स्थिर
कृत्रिम रेतन केंद्रे	१५५	१५५	स्थिर
फिरते दवाखाने / महाविद्यालये	६	६	स्थिर

(संदर्भ, चंद्रपुर वार्षिक प्रशासन अहवाल सन २०२०-२२ यांच्या आकडेवारीवरून)

विश्लेषण:

- सर्व सुविधा स्थिर — नवीन विकासाचा अभाव.
- श्रेणी १ व २ दवाखान्यांची संख्या जिल्ह्याच्या गरजांपेक्षा कमी (एकूण गावांची संख्या १५००+).
- कृत्रिम रेतन केंद्रे (१५५) ही संकरित जनावरांच्या वाढीसाठी महत्वाची, परंतु त्यांची कार्यक्षमता कशी आहे?

निष्कर्ष: अवसरंक्षेते सुधारणा न झाल्याने, लहान शेतकऱ्यांना दर्जेदार सेवा मिळत नाहीत.

३. लसीकरण कार्यक्रम (Vaccination Drive):

वर्ष	तोंडखुरी व पायखुरी लस वाटप (मात्रा)
२०२०-२१	३,७८,०००
२०२१-२२	४,२३,०००

(संदर्भ, चंद्रपुर जिल्हा वार्षिक योजना सर्वसाधारण सन २०२०-२२ मासिक अहवाल माहे, मार्च २०२०-२२)

विश्लेषण:

लस वाटपात ४५,००० ची वाढ (११.९%) — सरकारचा रोग नियंत्रणावर भर.

परंतु, ही संख्या जिल्ह्यातील एकूण पशुधनाच्या तुलनेत कमी (२०२१-२२ मधील एकूण पशुधन ४८.३१ लाख, लसीकृत ४.२३ लाख — ८.७% कवरेज). लसीकरणाची गुणवत्तापूर्ण वितरण व्यवस्था नसल्याने रोगांचा प्रसार होत आहे.

निष्कर्ष: लसीकरणात वाढ झाली, परंतु ती पुरेशी नाही.

४. पशुखाद्य वाटप योजना (Fodder Distribution Scheme):

वर्ष	लाभार्थी संख्या	तपशील
२०२०-२१	२०२	(अपूर्ण आकडेवारी)
२०२१-२२	४६२	OTSP: २३२, SCP: २३०

(संदर्भ, चंद्रपुर जिल्हा वार्षिक योजना सर्वसाधारण सन २०२०-२२ मासिक अहवाल माहे, मार्च २०२०-२२)

विश्लेषण:

- २०२०-२१ मधील आकडेवारी अपुरी — २०२१-२२ मध्ये ४६२ पर्यंत वाढ.
- OTSP (Other Tribal Sub-Plan) व SCP (Scheduled Caste Plan) या योजनेअंतर्गत लाभार्थी वाढले.
- परंतु, एकूण दुधाळ जनावरांच्या तुलनेत (२०२१-२२ मधील दुधाळ गायी-म्हशी अंदाजे ७८,०००+), फक्त ४६२ लाभार्थी — ०.५% कवरेज!

निष्कर्ष: पशुखाद्य वाटपाची गुणवत्तापूर्ण अंमलबजावणी नाही; बहुसंख्य गरजू शेतकऱ्यांना याचा लाभ मिळत नाही.

५. अर्थसंकल्पीय वितरण (Budget Allocation & Expenditure):

वर्ष	तरतूद (लक्ष रु.)	खर्च (लक्ष रु.)	खर्चाची टक्केवारी
२०२०-२१	७३४.१५	४८१.६८	६५.६%
२०२१-२२	७४७.०३	७४८.९५	१००.२५% (उर्वरित २०२०-२१ मधून)

(संदर्भ, चंद्रपुर जिल्हा वार्षिक योजना सर्वसाधारण सन २०२०-२२ मासिक अहवाल माहे, मार्च २०२०-२२)

विश्लेषण:

- २०२०-२१: तरतूद ७३४.१५ लक्ष, खर्च फक्त ४८१.६८ लक्ष (६५.६%) खर्च करण्यात आली.

- २०२१-२२: तरतूद ७४७.०३ लक्ष, खर्च ७४८.९५ लक्ष (उर्वरित खर्च २०२०-२१ मधील दायित्वातून) १००% पेक्षा जास्त वापर.

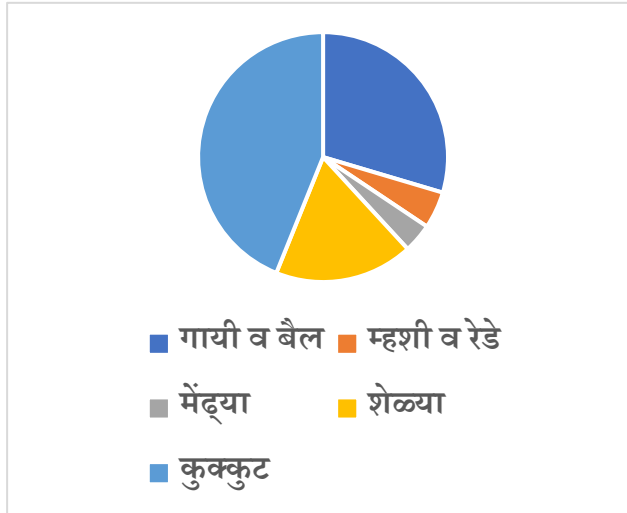
खर्चाची मुख्य बाबी: लस, पशुखाद्य, कृत्रिम रेतन, दवाखान्यांचे बांधकाम दुरुस्ती व नुतनीकरण

निष्कर्ष: २०२०-२१ मधील निधीचा अपूर्ण वापर, तर २०२१-२२ मध्ये कार्यक्षमता आली.

पशुधन प्रकारानुसार वाटप (२०२०-२१)

पशुधन प्रकार	संख्या	टक्केवारी
गायी व बैल	३,९५,९१४	२९.६०%
म्हैश व रेडे	६४,०३८	४.७९%
मेंढ्या	५०,४६५	३.७७%
शेळ्या	२,४०,१८८	१७.९६%
कुकुट पक्षी	५,८७,८६३	४३.९०%
एकूण	१३,३८,४६८	१००%

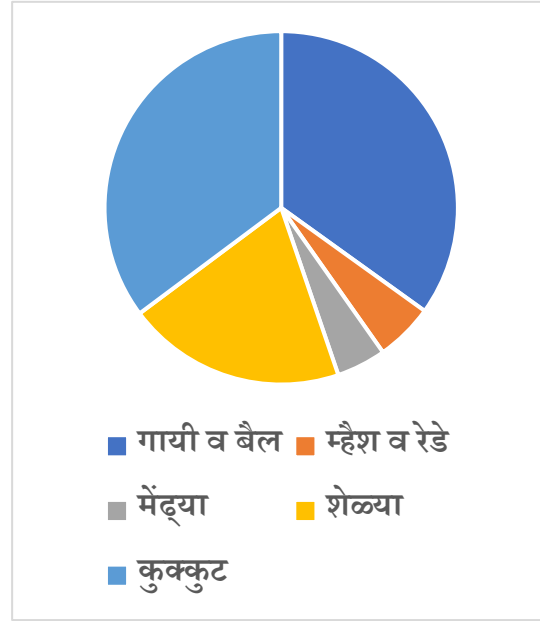
(संदर्भ, चंद्रपुर वार्षिक प्रशासन अहवाल सन २०२१-२२ यांच्या आकडेवारीवरून)



पशुधन प्रकारानुसार वाटप (२०२१-२२)

पशुधन प्रकार	संख्या	टक्केवारी
गायी व बैल	३,८१,०५४	३४.९१%
म्हैश व रेडे	५८,००६	५.३१%
मेंढ्या	४९,३९२	४.५३%
शेळ्या	२,१९,१३७	२०.०८%
कुकुट पक्षी	३,८४,३९१	३५.१९%
एकूण	१०,९१,९८०	१००%

(संदर्भ, चंद्रपुर वार्षिक प्रशासन अहवाल सन २०२१-२२ यांच्या आकडेवारीवरून)



सारांश (Conclusion):

- पशुधनात घट: गायी, म्हैशी व शेळ्यांच्या संख्येत मोठी घट याचे कारण रोग, चारा अभाव व वंध्यत्व.
- अवसंरचनेची स्थिरता: पशुवैद्यकीय सुविधा (दवाखाने, केंद्रे) स्थिर विकासाचा अभाव.
- लसीकरणात सुधारणा: २०२१-२२ मध्ये लस वाटपात ११.९% वाढ, परंतु ती पुरेशी नाही.
- पशुखाद्य योजनेची मर्यादा: लाभार्थी संख्या कमी असून, वितरणात अडथळे.
- अर्थसंकल्पीय कार्यक्षमता: २०२०-२१ मधील निधीचा अपूर्ण वापर, तर २०२१-२२ मध्ये १००% पेक्षा जास्त खर्च.
- अनुदान योजनेतील त्रुटी: गायी-म्हैशींच्या किमती बाजारपेठेपेक्षा कमी; वाटप प्रक्रियेतील विलंब.

शिफारसी (Recommendations):

1. पशुधन संवर्धनाला प्रोत्साहन: संकरित गायींच्या लागवडीसाठी अधिक अनुदान; चारा लागवडीवर भर.
2. पशुवैद्यकीय सुविधा वाढवणे: दवाखान्यांची संख्या वाढवून ग्रामीण भागात पोहोच सुनिश्चित करावी.
3. लसीकरणाचा विस्तार: जिल्ह्यातील सर्व दुधाळ जनावरांना कवरेज देण्यासाठी मोहिम राबवावीत.
4. पशुखाद्य योजनेचे व्यापककरण: अधिक लाभार्थींना जोडून गुणवत्तापूर्ण खाद्य पुरवठा करावा.
5. अर्थसंकल्पीय नियोजन: निधीच्या वेळेवर वापरासाठी कार्यक्षम मॉनिटरिंग सिस्टम विकसित करावी.

वाणिज्यिक परिणामांचे विश्लेषण (Commercial Impact Analysis):

जनावरांची संख्या घटूनही दूध उत्पादनवाढीची ओळख या आकडेवारीत नाही; म्हणजेच उत्पादकतेपेक्षा संरचनात्मक संस्थेवर भर दिला गेला. २०२०-२१ मध्ये निधी कमी वापरल्यामुळे योजना अपुरी राहिल्या; २०२१-२२ मध्ये मात्र दायित्वांमुळे जवळपास full utilization झाला. याचा अर्थ आर्थिक प्रवाहात स्थिरता पण नियोजनात विसंगती दाखवते. दवाखाने व कृत्रिम रेतन केंद्रे वाढली, याचा सकारात्मक परिणाम लसीकरण व आरोग्य संरक्षणावर झाला. दुग्ध सहकारी संस्था २०१९-२० मध्ये सुषुप्तावस्थेत, तर २०२०-२१ व २०२१-२२ डेटामध्ये त्यांचा उल्लेख नाही म्हणजेच दूध बाजारपेठेत संस्था अप्रभावी आहेत. कुक्कुटक्षेत्राची झपाट्याने वाढ हे दर्शवते की शेतकऱ्यांनी दुधाळ पशुपालनापासून जोखीम कमी करण्यासाठी बहुआयामी उद्यम स्वीकारले आहे, जे वाणिज्यिक दृष्टीने बुद्धिमान निर्णय म्हणता येईल. दुधाळ जनावरांच्या उत्पादकतेत अपेक्षित वाढ न झाल्याने शेतकऱ्यांचे उत्पन्न स्थिर राहिले आहे. सहकारी संस्थांच्या बंद पडल्याने शेतकऱ्यांना थेट खाजगी बाजारपेठेत दूध विकाने लागते, ज्यामध्ये मोबदला कमी मिळतो. निधीच्या अपूर्ण वापरामुळे योजनांचे उद्दिष्ट साध्य होत नाही. संकरित गायींच्या लागवडीवर भर न देणे आणि देशी गायींच्या उत्पादकतेत सुधारणा न होणे यामुळे दूध उत्पादनात मोठी घट

झालेली आहे. दूध संकलन, शीतसाखळी आणि प्रक्रिया यंत्रणेच्या अभावामुळे गुणवत्तापूर्ण दूध बाजारात पोहोचवता येत नाही. खाजगी व्यापाऱ्यांचे वर्चस्व असल्याने शेतकऱ्यांना योग्य किंमतीत दूध विकता येत नाही. कमी सुविधा आणि अल्पसंख्यक कर्मचारी यामुळे जनावरांच्या आरोग्यावर परिणाम होऊन उत्पादकता कमी होते. लसीकरण मोहिमांमध्ये आदिवासी भागातील शेतकऱ्यांचा सहभाग नसल्याने रोग नियंत्रण अपुरी आहे.

ग्रामीण अर्थव्यवस्था, जैवविविधता व पर्यावरणीय शाश्वततेच्या संदर्भातील विश्लेषण

चंद्रपूर जिल्हा हा विदर्भातील महत्त्वाचा कृषी व पशुपालन प्रधान जिल्हा असून येथील ग्रामीण अर्थव्यवस्थेचा गाभा शेती व दुग्ध व्यवसाय आहे. जिल्हा नियोजन मंडळाच्या पशुवैद्यकीय योजना या ग्रामीण भागातील शेतकऱ्यांना पशुधनाचे आरोग्य, उत्पादनक्षमता आणि उत्पन्न वाढवण्यासाठी सहाय्य करतात. मात्र या योजनांचा अभ्यास केवळ आर्थिक दृष्टीकोनातून न करता जैवविविधता आणि पर्यावरणीय शाश्वततेच्या संदर्भातही करणे आवश्यक आहे.

ग्रामीण अर्थव्यवस्था

पशुवैद्यकीय योजनांमुळे दुग्ध उत्पादनात वाढ होऊन शेतकऱ्यांचे उत्पन्न काही प्रमाणात वाढले आहे. तथापि, संकरित गायींच्या प्रसारामुळे मोठ्या शेतकऱ्यांना उत्पादनक्षमता वाढवता आली, परंतु लहान शेतकऱ्यांना खर्चीक तंत्रज्ञान व देखभाल परवडत नाही. यामुळे ग्रामीण अर्थव्यवस्थेत विषमता निर्माण होत आहे. तसेच पाण्याची कमतरता, चाऱ्याचा तुटवडा आणि हवामान बदल यामुळे या अर्थव्यवस्थेची असुरक्षितता वाढली आहे.

जैवविविधता

संकरित गायींच्या वाढत्या वापरामुळे स्थानिक देशी गायींच्या जातींचा ऱ्हास होतो आहे. देशी गायी स्थानिक हवामानाशी जुळवून घेतात, कमी देखभाल खर्चात टिकतात आणि रोगप्रतिकारक असतात. त्यांचा नाश झाल्यास केवळ सांस्कृतिकच नव्हे तर पर्यावरणीय संतुलन बिघडण्याचा धोका निर्माण होतो. चराईसाठी जंगलांवर होणारा दबाव देखील स्थानिक जैवविविधतेला हानी पोहोचवत आहे.

पर्यावरणीय शाश्वतता

दुग्ध व्यवसायाच्या विस्तारामुळे गोठ्यातून निर्माण होणारे सांडपाणी, वायू प्रदूषण आणि शेंकट्याचे व्यवस्थापन ही मोठी समस्या ठरत आहे. बायोगॅस, कंपोस्ट खत, सांडपाणी शुद्धीकरण यांसारखे उपाय शाश्वत पर्याय असले तरी ते खर्चीक असल्याने लहान शेतकऱ्यांना सहज उपलब्ध होत नाहीत. पर्यावरणीय नियमांची अंमलबजावणी अनेकदा कागदोपत्री मर्यादित राहते, ज्यामुळे जलप्रदूषण आणि मृदा प्रदूषण वाढते. चंद्रपूर जिल्ह्यातील ग्रामीण अर्थव्यवस्था सक्षम करण्यासाठी पशुवैद्यकीय योजना महत्त्वपूर्ण ठरत असल्या तरी त्यांचा जैवविविधता आणि पर्यावरणीय शाश्वततेवर होणारा परिणामही लक्षात घेणे गरजेचे आहे. आर्थिक वृद्धी, पर्यावरण संवर्धन आणि सामाजिक समावेशकता या तिन्ही घटकांचा संतुलित विचार केल्याशिवाय शाश्वत विकास साध्य होऊ शकत नाही.

निष्कर्ष व शिफारसी (Conclusions & Recommendations)

पशुधनघटी: गायी-बैल व म्हशींची संख्या घटली.

कुक्कुट विस्तार: दूध देणाऱ्या पशुधनात घट झाली असताना कुक्कुटपालन झपाट्याने वाढले.

संस्थात्मक सुधारणा: दवाखाने, लसीकरण, कृत्रिम रेतन यामध्ये सुधारणा झाली.

निधी व्यवस्थापन सुधारले पण नियोजन विसंगत: खर्च ६२% वरून १००% पर्यंत आला, याचा अर्थ कार्यक्षमता सुधारते आहे.

व्यापारी दृष्टीने अपूर्ण परिणाम: दूध सहकारी संस्था कार्यक्षम नसल्याने दुधोत्पादक शेतकऱ्याला फारसा व्यापारी फायदा मिळत नाही.

शिफारसी:

- देशी गायींच्या संख्येत घट टाळण्यासाठी वंध्यत्व निवारण कार्यक्रम बळकट करणे.
- म्हशी व संकरित गायींच्या संख्येत वाढ करणे.
- सहकारी संस्था वा खाजगी भागीदारीद्वारे दुध संकलन व विपणन शृंखला प्रभावी करणे.
- निधीचे खर्च नियोजन व अंमलबजावणी पूर्ण पारदर्शक पद्धतीने करणे.
- लसीकरण व आरोग्यसेवा चालू ठेवत व्यापारी उत्पादकतेवर थेट लक्ष द्यावे.

दुग्ध व्यवसायासोबतच कुक्कुटपालन व शेळ्यापालन यांना एकात्मिक ग्रामीण उद्योग मॉडेल म्हणून विकसित करणे. इको-सेन्सिटिव्ह झोन ताडोबा या अभयारण्याभोवती ५ किमी रांगेत पशुपालनावर निर्बंध आणि वैकल्पिक उपजीविका (पर्यटन, मधमाशी पालन) विकसित कराव्यात.

जैवविविधता संरक्षण देशी गायींच्या संवर्धनासाठी विशेष अनुदान देऊन जनुकीय संवर्धन करावे.

प्रदूषण नियंत्रणासाठी गोठ्यांसाठी शुद्धीकरण युनिट्स अनिवार्य करून जलप्रदूषण रोखावे.

या दोन वर्षांच्या तुलनात्मक विश्लेषणावरून स्पष्ट होते की जिल्हा नियोजन मंडळाच्या योजना पशुवैद्यकीय सेवा सुधारण्यात यशस्वी झाल्या, पण त्यांचा थेट व्यावसायिक फायदा दुग्ध व्यवसायास अपेक्षित प्रमाणात मिळाला नाही. निधी वापर व्यवस्थेत सुधारणा झाली खरी, परंतु दुग्ध सहकारी संस्था व दूध विपणनाचा कमकुवतपणा दूर न करता "उत्पन्न वाढ" साध्य होत नाही.

संदर्भ

1. चंद्रपुर जिल्हा वार्षिक योजना सर्वसाधारण सन २०१९-२० मासिक अहवाल माहे, मार्च २०२०
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झाडाझडती कादंबरीची पर्यावरणीय सक्षीक्षा

ज्ञानेश्वर नामदेव खिलारी

संशोधक विद्यार्थी, रा.ब.नारायणराव बोरावके महाविद्यालय, श्रीरामपूर ता. श्रीरामपूर, जि.अहिल्यानगर.

प्रा. डॉ. बाळू पांडूरंग गार्डी

मार्गदर्शक, मराठी विभाग प्रमुख, रयत शिक्षण संस्थेचे अण्णासाहेब आवटे कला, वाणिज्य आणि हुतात्मा बाबू गेनू विज्ञान महाविद्यालय मंचर, ता. आंबेगाव, जि.पुणे

प्रास्ताविक:-

विश्वास पाटील यांच्या 'झाडाझडती' या कादंबरीची पर्यावरणीय समीक्षा म्हणजे धरणामुळे विस्थापित होणाऱ्या लोकांच्या जीवनातील दुःख, त्यांच्या पारंपरिक जीवनाची होणारी हानी आणि या प्रकल्पांमुळे निसर्गावर होणारे परिणाम यावर ही कादंबरी प्रकाश टाकते. धरणामुळे होणारे सामाजिक बदल, नव्या शहरी व्यवस्थेत जुळवून घेताना धरणग्रस्तांना येणारे अनुभव आणि त्यांनी गमावलेले सर्वस्व याचं वास्तववादी चित्रण या कादंबरीत आहे. पर्यावरण आणि विकास यामधील संघर्षाचे एक महत्त्वाचे उदाहरण म्हणून या कादंबरीकडे पाहिले जाते.

जांभळीगाव फार संपन्न नव्हते पण खाऊन-पिऊन सुखी होते. या गावात जांभळी धरण बांधण्याचा निर्णय शासन घेते, आणि या गावाला झडती लागते. झाडाझडतीचा अर्थ झाडांना दिलेली झडती, पूर्व जन्मीची पापे या जन्मी फेडणे, झाड ही संज्ञाच दुःख या अर्थी वापरली आहे. खेड्यात झाड धरणे याचा अर्थ भुताने वा अज्ञात शक्तीने झपाटणे, न संपणारे दुःख देणे, हा अर्थ स्वतः विश्वास पाटील यांनी प्रादेशिक शब्दार्थात दिला आहे.

कादंबरीतील पर्यावरणीय पैलू

१. निसर्गाचा न्हास:-

धरणामुळे लाखो हेक्टर जमीन पाण्याखाली जाते, त्यामुळे मोठ्या प्रमाणात वृक्षतोड केली जाते ज्यामुळे पर्यावरणाचा समतोल बिघडतो. कादंबरीमध्ये या पर्यावरणीय हानीचे चित्रण आहे, जिथे पूर्वीचे हिरवेगार गाव आणि निसर्ग पाण्याखाली जातो. त्यामुळे लोकांचे जीवन उद्ध्वस्त होते आणि त्यांना स्थलांतर करावे लागते.

जांभळी धरणाला गावातील लोक विरोध करतात. तीन वेळा जांभळी धरणाचे भूमीपूजन होते, गावातील आवडाई धरणाला विरोध करून संताप व्यक्त करते. गावात असणारे खैरमोडे गुरुजी जांभळी धरणाला विरोध करतात, कारण त्यांना गावातील लोकांची चिंता वाटत असते. गुरुजींनी कोयना धरणाने विस्थापित झालेले लोक पाहिले होते, त्या लोकांचे हाल त्यांनी अनुभवले होते, आजचे मालक उद्या गुलाम होणार असे अनुभवाचे बोल ते लोकांना सांगतात. धरणाला विरोध केल्यामुळे त्यांच्या पदरी अटक तुरुंगवास येतो. असे हे खैरमोडे गुरुजी संपूर्ण गावाची काळजी करतात.

२. जैवविविधतेवर परिणाम:-

जांभळीगावात जांभळी धरण बांधण्याचा निर्णय शासन घेते आणि नदीच्या काठावरचे जंगल, शेती आणि नैसर्गिक अधिवास नष्ट होतो, धरणामुळे लाखो हेक्टर जमीन पाण्याखाली जाते. लोकांना विस्थापित व्हावे लागते त्यामुळे जैवविविधतेवर नकारात्मक परिणाम होतो. आणि जैवविविधता धोक्यात येते.

३. मानवी जीवनावर परिणाम:-

जांभळीगाव फार संपन्न नव्हते पण खाऊन-पिऊन सुखी होते, या गावात जांभळी धरण बांधण्याचा निर्णय शासन घेते आणि धरणग्रस्तांना त्यांचे मूळ गाव, जमीन आणि झाडे गुरेढोरे सोडावी लागतात, त्यामुळे या लोकांच्या आयुष्यात मोठे बदल होतात. त्यांच्या पारंपरिक जीवनशैलीचा नाश होतो आणि नवीन, परके वातावरण नाईलाजाने स्वीकारावे लागते.

४. असंतुलित विकास:-

झाडाझडती ही कादंबरी विकास आणि पर्यावरणाच्या संतुलनावर प्रश्नचिन्ह निर्माण करते. धरणामुळे काही लोक सुखी समाधानी होतात आणि त्यांना पाणी मिळते त्यामुळे त्यांची शेती बागायती होऊन ते लोक संपन्न होतात, पण ज्यांच्या जमिनी धरणात गेल्या त्या लोकांचे फार हाल होतात त्यांना विस्थापित व्हावे लागते, त्यांचे सर्वस्व गमावून ते स्थलांतरीत होतात,

त्यांच्या आयुष्याची राखरांगोळी होते. मुलांना शाळा नाही, राहण्यासाठी घर नाही, गावासाठी स्मशानभूमी नाही, गावाला रस्ता नाही, पिण्याचे पाणी नाही त्यामुळे यातून विकासाचे हे असंतुलित स्वरूप दिसते.

५.निसर्गाचे 'दुःख':-

जांभळी धरणामुळे लाखो हेक्टर जमीन पाण्याखाली जाते आणि समृद्ध निसर्गाचा नाश होतो. विश्वास पाटील यांनी 'झाडाझडती' या शीर्षकातून झाडांना दुःखाचे प्रतीक मानले आहे. धरण बांधताना होणारी झाडांची तोड आणि त्यामुळे निसर्गाला होणारे कष्ट हे या शीर्षकातून स्पष्ट होते.

समारोप

या कादंबरीतून, धरण प्रकल्पामुळे होणारे पर्यावरण आणि समाजावरील गंभीर परिणामांचे वास्तववादी चित्रण केले आहे. देशाच्या विकासासाठी मोठमोठी धरणे बांधली गेली, अनेक खेडी गावे आणि वस्त्या पाण्याखाली गेल्या परंतु लोकांचे योग्य पुनर्वसन झाले नाही. एकूणच या कादंबरीत धरणग्रस्तांच्या वेदना त्यांच्या पुनर्वसनातील समस्या आणि त्यातून निर्माण झालेले प्रश्न यावर ही कादंबरी प्रकाश टाकते. झाडाझडती या कादंबरीच्या माध्यमातून विश्वास पाटील यांनी पर्यावरणीय प्रबोधन केलेले दिसून येते. निसर्ग संपत्ती जैवविविधता व पर्यावरणीय संतुलन या बाबतीत जागरुकता निर्माण करण्यासाठी झाडाझडती एक प्रभावी माध्यम ठरते.

संदर्भ

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संत साहित्यातील पर्यावरण : एक समाजशास्त्रीय व साहित्यिक अभ्यास

डॉ. अंजली जोशी- टेंभूर्णीकर

उपप्राचार्य आणि विभागप्रमुख, समाजशास्त्र विभाग, दयानंद कला महाविद्यालय, लातूर.

प्रस्तावना

मानव आणि निसर्ग यांचे नाते आदिम काळापासून अखंड आहे. मानवाने सभ्यतेच्या प्रवासात प्रगती साधली, परंतु या प्रगतीसोबत पर्यावरणावर मोठा ताण आला. आज औद्योगिकीकरण, शहरीकरण आणि तंत्रज्ञानामुळे निसर्गाचे संतुलन ढासळले आहे. अशा वेळी आपल्याला आध्यात्मिक आणि नैतिक मूल्यांची आठवण करून देणारे संत साहित्य महत्वाचे ठरते.

मराठी संत साहित्य केवळ अध्यात्म किंवा भक्ति यापुरते मर्यादित नाही तर ते मानवतावाद, सामाजिक समता, नैतिकता आणि पर्यावरण जपणुकीचे धडेही देते. संत ज्ञानेश्वर, संत तुकाराम, संत नामदेव, संत एकनाथ आणि इतर अनेक संतांनी मानव आणि निसर्ग यांच्यातील परस्परसंबंध स्पष्ट केला. त्यांनी माती, पाणी, वृक्ष, प्राणी, पक्षी यांच्यातील पवित्रतेचा गौरव केला.

आज जागतिक तापमानवाढ, प्रदूषण, जलसंकट यांसारख्या समस्या गंभीर होत असताना संत साहित्याचे संदेश अधिक सुसंगत वाटतात.

कीवर्ड्स (Keywords)

संत साहित्य, पर्यावरण, संत वचने, निसर्ग, समाजशास्त्र, शाश्वत विकास, पर्यावरण-जागृती, भक्ति, मानवतावाद.

अभ्यासाचे उद्देश (Objectives of the Study)

1. मराठी संत साहित्यामध्ये पर्यावरणविषयक विचार शोधणे व त्यांचे समाजशास्त्रीय विश्लेषण करणे.
2. संतांच्या वचनांमधून मानव आणि निसर्गसंबंध समजून घेणे.
3. आधुनिक पर्यावरणीय समस्यांच्या संदर्भात संत साहित्याचे महत्त्व स्पष्ट करणे.
4. संत साहित्याचा पर्यावरण-जागृतीसाठी वापर कसा होऊ शकतो हे तपासणे.
5. मानवतेला संतांच्या शिकवणीद्वारे पर्यावरण संरक्षणाचे नैतिक बळ देणे.

अभ्यासाची पद्धत (Research Methodology)

हा अभ्यास साहित्य समीक्षणात्मक (literary review) आणि समाजशास्त्रीय विश्लेषणात्मक पद्धतीने लिहिला आहे. प्राथमिक स्रोत: संत ज्ञानेश्वरांची ज्ञानेश्वरी, अमृतानुभव, संत तुकारामांची गाथा, संत नामदेवांचे अभंग, संत एकनाथांचे भावार्थ रामायण व भारुडे.

द्वितीयक स्रोत: संत साहित्यावरील संशोधनग्रंथ, पर्यावरणविषयक समाजशास्त्रीय लेख, विविध प्रबंध व आधुनिक संदर्भग्रंथ.

पद्धत: वाङ्मयातील उद्धरणांचा संग्रह, त्यांचे वर्गीकरण (निसर्ग, जल, वृक्ष, प्राणी, नैतिक मूल्ये), तौलनिक अभ्यास आणि निष्कर्ष काढणे.

संत वचने आणि पर्यावरण

1. संत ज्ञानेश्वर

"आकाश पाताळें भेदिला सखा जनार्दना" – निसर्गातील प्रत्येक घटकात दैवी शक्ती पाहण्याची दृष्टी.

"जगीं सर्वत्रि देव पाहावा" – सृष्टीतील सर्वत्र देवत्व असल्याने निसर्गाचा अनादर करणे म्हणजे ईश्वराचा अनादर.

2. संत नामदेव

"देव पडिला पानांत" – नामदेवांनी प्रत्येक पान, फुल, काडीमध्ये देव पाहिला.

पर्यावरणातील लहानात लहान घटकही पवित्र असल्याचे त्यांनी स्पष्ट केले.

3. संत तुकाराम

"पाणी वाचवा, पाप टाळा" असा थेट संदेश देणारे अभंग आढळतात.

"आकाशी फडां फड, जमिनीवरी बैल" – निसर्गाच्या चक्रातील प्रत्येक घटक परस्परावलंबी आहे हे त्यांनी सांगितले.

"वृक्षवल्ली आम्हां सोयरे वनचरे" – संत तुकारामांनी वृक्ष-पक्षी-प्राणी यांना सख्खे नातेवाईक मानले.

4. संत एकनाथ

"सर्वभूतांमध्ये देव पाहावा" – सृष्टीतील सर्व प्राणी, जल, वनस्पतींमध्ये एकाच परमेश्वराचे दर्शन घडवणे.

"जन्मोजन्मीचे पातक जाई, जे नाम घेती ते पावन होई" – नावामधील पावित्र्याने पर्यावरणशुद्धीचा बोध.

निरीक्षणे (Observations)

1. संत साहित्य मानवकेंद्री नसून सृष्टीकेंद्री आहे. मानव हे निसर्गाचे स्वामी नाहीत तर एक घटक आहेत. निसर्गाच्या आधीन राहूनच माणसाची प्रगती होऊ शकते. निसर्गाच्या विरोधात जाऊन नव्हे.
2. नैतिकता आणि पर्यावरण संरक्षण एकत्र जोडलेले आहे. पाप, लोभ, अन्याय हे निसर्गावरील आघातांशी समांतर मानले गेले आहेत.
3. पर्यावरणीय समतेची शिकवण: सर्व प्राणी-पक्षी-पाण्याचे थेंब हे देवस्वरूप आहेत.
4. शाश्वत विकासाचा संकेत: निसर्गाचा शोषणाऐवजी सन्मान करण्याचा संदेश संतांनी 13व्या-17व्या शतकात दिला.
5. आधुनिक संदर्भ: औद्योगिकीकरण, जंगलतोड, जलप्रदूषण यासारख्या समस्या सोडवण्यासाठी संत साहित्य नैतिक मार्गदर्शक ठरू शकते

संत साहित्याचे पर्यावरण विषयक मूल्य व महत्त्व :

1. आध्यात्मिक मूल्य

सृष्टीतील सर्वत्र देवत्व पाहण्याची दृष्टी दिल्यामुळे पर्यावरणाचे पावित्र्य अधोरेखित होते.

2. सामाजिक मूल्य

संतांनी मानवी समाजातील समतेसोबतच निसर्गातील समतेवरही भर दिला. मानव, प्राणी, वृक्ष यांच्यातील परस्परसंबंध अधोरेखित झाला. सर्व जैव विविधता ही परस्परावलंबी आहे. प्राणी, पक्षी, माणूस, वनस्पती यांचे जीवन एकमेकांवर अवलंबून आहे.

3. नैतिक मूल्य

साधेपणा, संयम, लोभत्याग आणि प्रामाणिक श्रम यांद्वारे पर्यावरणाचा आदर राखला जातो.

4. शैक्षणिक व व्यावहारिक महत्त्व

संत साहित्य पर्यावरण-जागृतीसाठी शिक्षणपद्धतीत समाविष्ट करता येते. शिक्षणाच्या विविध घटकांमधून पर्यावरणाचे संवर्धन शिकवता येते.

शाळांमध्ये संतवचनांवर आधारित पर्यावरण शिक्षण विद्यार्थ्यांमध्ये संवेदनशीलता निर्माण करू शकते.

5. आधुनिक काळातील उपयोगिता

- जलसंधारण, वृक्षारोपण, प्रदूषणनियंत्रण यांसारख्या चळवळींना संतवचनांचे नैतिक बळ देता येते.
- संत तत्त्वज्ञान शाश्वत विकासासाठी आवश्यक असलेले संयम व निसर्गाभिमुखता शिकवते.

निष्कर्ष (Findings & Conclusion)

- संत साहित्य निसर्गप्रेम आणि पर्यावरण संरक्षणाचे मूळ तत्त्वज्ञान आहे.
- हे साहित्य आजच्या Environmental Ethics च्या संकल्पनांशी सुसंगत आहे.
- संतांच्या शिकवणीतून शाश्वत जीवनशैलीचे संकेत मिळतात.
- "वृक्षवल्ली आम्हां सोयरे वनचरे" हा तुकारामांचा संदेश पर्यावरणसंवर्धनाचा अत्यंत सुंदर आदर्श आहे.
- जर संतांचे विचार आचरणात आणले तर जागतिक तापमानवाढ, जलसंकट, प्रदूषण यांसारख्या समस्या कमी करता येतील.
- म्हणूनच संत साहित्याचा अभ्यास केवळ भक्ति वा अध्यात्मासाठी नाही, तर सामाजिक व पर्यावरणीय पुनर्निर्मितीसाठी आवश्यक आहे.

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पर्यावरण आणि मराठी साहित्य

प्रा. सुचित्रा संग्राम सोलनकर

विश्वकर्मा कॉलेज ऑफ आर्ट्स कॉमर्स आणि सायन्स, कोढवा ब्रु, पुणे

प्रस्तावना

आजचा युग म्हणजे विज्ञान आणि तंत्रज्ञानाचा युग. मानवी जीवनाच्या प्रत्येक क्षेत्रात प्रगती झपाट्याने घडत आहे. परंतु या प्रगतीसोबतच पर्यावरणाचा ऱ्हासही मोठ्या प्रमाणावर होतो आहे. जंगलतोड, औद्योगिक प्रदूषण, हवामान बदल, जैवविविधतेचा ऱ्हास, जलप्रदूषण आणि ओझोन थरातील भोक या गंभीर समस्या जगासमोर उभ्या ठाकलेल्या आहेत. अशा काळात साहित्य ही केवळ कल्पनाशक्तीची अभिव्यक्ती नसून समाजप्रबोधनाचे प्रभावी माध्यम आहे. मराठी साहित्यातही पर्यावरणाची जाणीव वेगवेगळ्या साहित्यप्रकारांतून उमटलेली दिसते—संत काव्य, ललित लेखन, कादंबऱ्या, विज्ञानपर लेखन, काव्य आणि समीक्षण. पर्यावरण म्हणजे आपल्याभोवतालचं नैसर्गिक जग—झाडं, प्राणी, नद्या, पर्वत, हवा आणि संपूर्ण जीवसृष्टी. आज या पर्यावरणावर मानवी हस्तक्षेपामुळे गंभीर संकट उभी राहिली आहेत. त्यामुळे पर्यावरण संरक्षण ही एक जागतिक गरज बनली आहे. या संदर्भात साहित्याची भूमिका फार महत्त्वाची आहे. साहित्य हे केवळ अभिव्यक्तीचं माध्यम नसून समाज परिवर्तनाचं सामर्थ्य असलेलं अस्त्र आहे. मराठी साहित्याने पर्यावरणीय चिंतनाला अनेक पातळ्यांवर स्पर्श केला आहे. संत साहित्यापासून ते आधुनिक विज्ञानपर लेखनापर्यंत. या शोधनिबंधात प्राचीन संत साहित्य, आधुनिक काव्य, कादंबरी, ललित लेख, समालोचन आणि पर्यावरण विषयक मराठी लेखक व ग्रंथांचा सखोल अभ्यास करणार आहोत.

१ मराठी संत साहित्य आणि पर्यावरण

पर्यावरण म्हणजे आपल्या आजूबाजूचं संपूर्ण नैसर्गिक जग—हवा, पाणी, माती, वृक्ष, प्राणी, पक्षी, नद्या, डोंगर, आकाश आणि सूर्यचंद्र. ही सारी सृष्टी मानवाच्या अस्तित्वाशी निगडित आहे. आधुनिक काळात आपण पर्यावरणाच्या रक्षणाची गरज जाणीवपूर्वक मान्य करत असलो, तरी मराठी संतांनी अनेक शतकांपूर्वीच निसर्गाच्या पावित्र्याची आणि त्याच्या संवर्धनाची शिकवण दिली होती. मराठी संत साहित्य केवळ अध्यात्म, भक्ति वा मोक्षावर केंद्रित नव्हतं, तर त्यात निसर्गाशी समरस जीवन जगण्याची शिकवण होती. त्यांच्या रचनांमध्ये निसर्ग ही केवळ पार्श्वभूमी नाही, तर तो सजीव, संवादशील, आत्मभाव असलेला घटक आहे.

संत तुकारामांचे अभंग पर्यावरणप्रेमाची उत्तम उदाहरण आहेत. ते निसर्गाला आपलं “सोयरे” मानतात.

उदाहरण:

“वृक्षवल्ली आम्हा सोयरे वनचरे। पक्षीही सुस्वरें बोलती...” (तुकाराम गाथा)

या अभंगातून तुकारामांचा निसर्गाशी असलेला गाढ आत्मीय संबंध दिसतो. झाडं, प्राणी, पक्षी हे त्यांच्या दृष्टीने आत्मा आहेत—शोषणासाठी नाही, तर सहजीवनासाठी आहेत. त्यांचं जगणं साधं, स्वावलंबी होतं. त्यांनी आपल्या अभंगांतून “प्रकृतीशी समरस राहणं” हीच खरी आध्यात्मिक प्रगती असल्याचं प्रतिपादन केलं. या अभंगातून निसर्गाशी असलेली आपुलकी, आपलेपणा, आणि आत्मियता स्पष्ट होते. समर्थ रामदास स्वामींच्या ‘दासबोध’ मध्ये अनेक ठिकाणी वृक्ष, नद्या, वारे, पावसाचे उल्लेख आढळतात. हे साहित्य निसर्गाला पूजनीय मानतं आणि मानवी जीवनाचा अविभाज्य भाग समजतं.

२. मध्ययुगीन मराठी साहित्य

पर्यावरण आणि मध्ययुगीन मराठी साहित्य हे मुख्यतः धार्मिक-भक्तीप्रधान असले तरी, त्यात निसर्गवर्णन आणि शेतकरी जीवनाशी संबंधित पर्यावरण जाणिवा स्पष्टपणे आढळतात.

भारुड, लावणी, पोवाडा यांमधून ग्रामीण जीवन, शेती, पावसाळी ऋतू, मातीचा गंध, बैल, नांगर यांचा गौरव केलेला आढळतो. यातून निसर्ग आणि मानवी जीवनाचा नातेसंबंध सशक्तपणे समोर येतो.

३ आधुनिक साहित्यातील पर्यावरणदृष्टी

निसर्ग आणि मानवी जीवन यांचं अतूट नातं प्राचीन काळापासून चालत आलं आहे. कालानुक्रमानुसार साहित्याने समाजातील बदल टिपले असून पर्यावरणाच्या संदर्भातही ही जाणीव साहित्यात ठळकपणे व्यक्त झालेली आहे. मध्यकालीन मराठी साहित्यात निसर्गाला अध्यात्मिक पवित्रता लाभलेली आहे, तर आधुनिक साहित्यात पर्यावरण संकटांवर चिंतन, विरोध आणि जनजागृती यांचा ठसा आढळतो. मराठीतील पहिल्या आधुनिक कवींपैकी केशवसुत आणि बालकवी यांच्या कवितांमध्ये निसर्गाचे सौंदर्य आणि मनोहरता यांचे सुंदर चित्रण आहे. बालकवींची 'फुलराणी', 'झाड', 'पाऊस' अशा कविता निसर्गप्रेमाचे उदाहरण आहेत. केशवसुतांच्या "सागर" कवितेतही निसर्गाच्या शक्तीचे वर्णन आहे. आधुनिक मराठी साहित्य हे केवळ सौंदर्यदृष्टिकोनावर आधारित नसून, ते सामाजिक, राजकीय, आर्थिक आणि पर्यावरणीय प्रश्नांवर भाष्य करणारे आहे. विसाव्या शतकाच्या पूर्वार्धात आणि नंतरचे लेखक निसर्गाशी केवळ रमणीयतेचं नातं न ठेवता, त्याचं वास्तविक आणि संकटग्रस्त स्वरूप अधोरेखित करतात. मो. द. हातखंडे आणि बाळ सोंगडे मर्ढेकर हे दोन महत्वाचे लेखक अशा आधुनिक दृष्टिकोनाचे प्रतिनिधी मानले जातात.

वि. स. खांडेकर, वा. र. तांबे, म. रा. कुलकर्णी यांच्या साहित्यात निसर्गाचे वर्णन सौंदर्यदृष्टिकोनातून झाले आहे. मो. द. हातखंडे यांच्या लेखनात निसर्गाच्या बदलत्या रूपाचे सशक्त चित्रण दिसते. बोरकर, मर्ढेकर यांनी निसर्गातील सौंदर्य आणि सामाजिक दुःख यांचं मिश्रण केलं आहे.

उदाहरणार्थ : मो. द. हातखंडे यांचे 'मातीच्या माणसांचा देश' हे त्यांचे लेखन माणूस आणि निसर्ग यांच्यातील परस्परावलंबित्व दाखवतं. त्यांच्या कथांमधून जमिनीवरचे श्रमिक, पावसाचे अनिश्चित चक्र, दुष्काळ, जंगलतोड अशा वास्तववादी समस्यांवर प्रकाश पडतो. तसेच बाळ सोंगडे मर्ढेकर त्यांच्या "झाली फुले फळे सरीसारखी", "काही बोलायचं आहे", "पावसाचे पाणी हिरवं" यांसारख्या कवितांमध्ये निसर्ग कधी स्तब्ध, कधी उद्ध्वस्त, तर कधी सूचक स्वरूपात येतो.

४ समकालीन मराठी साहित्य आणि पर्यावरण जागरूकता

२१ व्या शतकात पर्यावरण ही संकल्पना केवळ वैज्ञानिक चर्चेपुरती मर्यादित न राहता, ती मानवी अस्तित्वाच्या केंद्रस्थानी आली आहे. वाढते औद्योगिकीकरण, शहरीकरण, वनोत्पादन, हवामान बदल, पाण्याची कमतरता, प्रदूषण आणि जैवविविधतेचा ऱ्हास या साऱ्यामुळे पर्यावरणाचा समतोल ढासळू लागला आहे. या पार्श्वभूमीवर समकालीन मराठी साहित्य हे पर्यावरण जागरूकतेसाठी एक प्रभावी माध्यम ठरत आहे. आधुनिक मराठी लेखक, कवी, कथाकार, लघुनिबंधकार आणि समीक्षक पर्यावरणीय विषयांचे सखोल विश्लेषण करत आहेत. पर्यावरणाच्या प्रश्नांवर साहित्यिक दृष्टीकोनातून भाष्य करताना, ते समाजात विचारप्रवृत्ती निर्माण करतात आणि संवेदनशीलतेचा उदय घडवतात. समकालीन कालखंड सामान्यतः १९९० नंतरचा मानला जातो. जागतिकीकरण, औद्योगिकीकरण, माहिती तंत्रज्ञान आणि पर्यावरणीय असमतोल या मुद्द्यांचा प्रबळ प्रभाव साहित्यावर पडू लागला. याच दरम्यान अनेक नव्या लेखकांनी पर्यावरणाचे विविध पैलू त्यांच्या साहित्यातून अधोरेखित केले.

समकालीन लेखकांचे पर्यावरणविषयक योगदान

१ मारुती चितमपल्ली

मराठी साहित्यातील एक अद्वितीय नाव म्हणजे मारुती चितमपल्ली. त्यांचे लेखन जंगल, वन्यजीव, पक्षी आणि जैवविविधतेभोवती केंद्रित आहे. त्यांनी 'रणसंग्राम', 'रानवाटा', 'सिंहगर्जना', 'वनस्पतींच्या कथा' यांसारखी अनेक पुस्तके लिहिली आहेत. त्यांच्या लेखनातून जंगलाचे जीवन उलगडते. ते निसर्गाच्या अंतर्मुख अनुभवाची आणि वैज्ञानिक निरीक्षणाची सांगड घालतात.

२. किशोर रिठ

हे एक प्रसिद्ध पक्षीमित्र, पर्यावरण कार्यकर्ते आणि लेखक आहेत. त्यांच्या 'हिरवा संघर्ष' या पुस्तकातून महाराष्ट्रातील जंगलांचे, वनस्पतींचे आणि प्राणीविश्वाचे सखोल विश्लेषण केले आहे. त्यांनी जैवविविधतेच्या

संवर्धनासाठी ग्रामीण भागात काम केले असून त्याचे प्रतिबिंब त्यांच्या लेखनात प्रकर्षाने दिसते.

३. नंदा खरे

‘इति निघालय’ या विज्ञानकथेत त्यांनी भविष्यातील पर्यावरणीय संकटकाळाचे चित्रण केले आहे. तंत्रज्ञानाचा अनियंत्रित वापर, निसर्गाची हानी आणि मानवी जीवनशैलीतील बदल याचे चिंतन त्यांनी केले आहे. त्यांच्या कथा विज्ञान, पर्यावरण आणि समाज यांची त्रिसूत्री रचतात.

४. प्रसाद कुमठेकर –

‘बगळा’ या कादंबरीत एका ग्रामीण भागातील नैसर्गिक परिसंस्थेचे सुंदर चित्रण आहे. ग्रामीण संस्कृती, पर्यावरणीय समस्यांचा संदर्भ, आणि स्थानिक भाषेचा वापर यामुळे ही कादंबरी पर्यावरणप्रेमाचा मूर्त स्वरूप बनते. विशेष म्हणजे या कादंबरीचे प्रकाशनही पर्यावरणपूरक पद्धतीने झाले होते.

५. डॉ. सुहास पुजारी –

‘सृष्टी आणि दृष्टी’ हा समीक्षात्मक ग्रंथ मराठी साहित्यातील निसर्गदृष्टीचा अभ्यास आहे. लेखकाने सुमारे ५०हून अधिक साहित्यिकांच्या लेखनात निसर्गविषयक चिंतनाचा शोध घेतला आहे. पर्यावरण संवेदनशीलता, निसर्गाची अनुभूती, आणि भोगवादी जीवनशैलीवरील टीका ही या ग्रंथाची वैशिष्ट्ये आहेत.

निष्कर्ष: मराठी साहित्य हे केवळ भाषेचे सौंदर्य न सांगता पर्यावरण, निसर्ग आणि माणसातील नात्यांचे दृश्य व अदृश्य धागे प्रगल्भतेने उलगडते. संत साहित्यापासून ते आधुनिक लेखनापर्यंत पर्यावरण ही संकल्पना नानाविध रूपात अवतरलेली आहे – कधी भक्तिरसात, कधी तत्त्वज्ञानात, तर कधी विद्रोही सामाजिक भानात. आजच्या काळात, जेव्हा पर्यावरण रक्षण एक जागतिक संकटावर उपाय ठरत आहे, तेव्हा मराठी साहित्य त्याची सजग भूमिका घेत आहे. वाचकांमध्ये निसर्गप्रेम आणि संरक्षणाची भावना जागृत करून पर्यावरणीय समतोल राखण्याचा प्रयत्न करते. मराठी साहित्याचे पर्यावरणाशी असलेले नाते हे केवळ सौंदर्यदृष्टीतून पाहिले गेलेले नाही, तर ते मानव-निसर्ग सहअस्तित्व, जैविक समतोल, आणि सांस्कृतिक चेतनेच्या पातळीवर पोहोचलेले आहे. संतकाव्यातून आलेली निसर्गप्रेमाची संस्कृती ही आजच्या विज्ञानाधिष्ठित युगातही आपल्याला शाश्वततेचा मार्ग दाखवते. समकालीन लेखकांनी पर्यावरणीय विषयांना केवळ वर्णनापुरते न ठेवता, त्यावर प्रश्न उभे केले, चिंतन मांडले. मराठी साहित्यातून आजही ‘पर्यावरण हा एक भावनिक, सामाजिक आणि राजकीय विषय’ म्हणून चर्चेत येतो आहे. पर्यावरण संवर्धनासाठी फक्त तांत्रिक उपाय नव्हे, तर माणसाच्या मनात जागृती घडवणारी साहित्यिक शक्ती आवश्यक आहे. यासाठी मराठी साहित्य हे एक प्रभावी माध्यम आहे. हीच साहित्यिक शक्ती भविष्यात पर्यावरणाशी सुसंवाद साधणाऱ्या सामाजिक बांधिलकीची पायाभरणी करेल, हे निश्चित.

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संत तुकाराम महाराजांच्या अभंगातील पर्यावरणीय दृष्टिकोन

लेफ्ट. डॉ. पावडे खोब्राजी वामनराव

शिक्षण महर्षी ज्ञानदेव मोहेकर महाविद्यालय कळंब, ता. कळंब, जी. धारशिव.

प्रस्तावना :-

"जे का रंजले गांजले । त्यासी म्हणे जो आपले ॥

तोचि साधू ओळखवा । देव तेथेचि जाणावा ॥" संत तुकाराम

भारत देशाला प्राचीन काळापासूनच फार मोठी संत परंपरा लाभली आहे, या संत परंपरेत महाराष्ट्रातील अनेक संतांनी आपल्या अमूल्य कार्याचा ठेवा हा देशाच्या इतिहासाला दिला आहे. या संत परंपरेमध्ये महाराष्ट्रातील महान संत संत तुकाराम महाराज यांचे नाव मोठ्या आदराने भारतभर घेतले जाते. संत तुकाराम महाराजांचा जन्म 1608 साली महाराष्ट्रातील पुणे जिल्ह्यातील देहू गावी झाला होता. पंढरपूरच्या विठोबाला ते आराध्य दैवत मानत, भारतात वारकरी संप्रदायाची अखंड परंपरा त्यांनी निर्माण केली, सामाजिक प्रबोधनाची 17 व्या शतकामध्ये मुहूर्तमेढ रोवणारे विद्रोही संत म्हणून तुकारामांचा उल्लेख केला जातो. निर्भीड व वास्तववादी वेळ प्रसंगी समाजातील दाभिकपणावर रोखठोक शब्दामध्ये प्रहार करणारे संत म्हणून त्यांना ओळखल्या जाते. त्यांच्या या कार्याची पावती म्हणून वारकरी संप्रदायांनी त्यांना 'जगद्गुरु' ही पदवी बहाल केली आहे. त्यांनी विविध स्वरूपाच्या अभंगाची रचना केली आहे, या अभंगात निसर्गात वावरताना अवतीभवती दिसणारे जाणवणारे पर्यावरणाचे घटक सर्वसामान्यांना परिचित, नदी, फुले, फळे, वृक्ष, वल्ली, डोंगर, वारा, सूर्य, पक्षी, पशु, गुरे, गायी, कीटक, अरण्य, वने, पाऊस, इत्यादी घटकाबाबत आपल्या अभंगातून दृष्टांत रूपात मांडणी करून तत्कालीन समाजाला पर्यावरणाची एक नवी दृष्टी दिल्याचे अनेक अभंग आपणास पहावयास मिळतात प्रस्तुत शोधन निबंधातून 'संत तुकाराम महाराजांच्या अभंगातील पर्यावरणीय दृष्टिकोन' वर प्रकाश टाकण्यात आला आहे.

संत तुकाराम महाराजांच्या अभंगातील पर्यावरणीय दृष्टिकोन :-

वृक्ष वल्ली आम्हा सोयरी वनचरे । पक्षीही सुस्वर आळविती ॥

येणे सुखी रुचे एकांताचा वास । नाही गुणदोष अंग येत ॥

आकाश मंडप पृथ्वी असंन । रम्य तेथे मन क्रीडा करी ॥

कंथाकमांडोलू देहउपचारा । जाणवितो वारा अवसरू ॥

हरीकथा भोजन परवडी विस्तार । करुनी प्रकार सेवू रूची ॥

तुका म्हणे होय मनाशी संवाद । आपलीच वाद आपणासी ॥ 1

प्रस्तुत अभंगातून तुकाराम महाराज म्हणतात वृक्ष, वल्ली, वनात चरणारे तसेच सुस्वर कंठाने आळवणारे पक्षी हे आमचे सर्व सोयरे आहेत. एकांतात त्यांच्या बरोबर मला राहणे आवडते, येथे कोणतेही गुणदोष अंगाला लागत नाहीत. आकाशाचा मंडप आणि पृथ्वीचे आसन असते. जेथे मन रमते अशा ठिकाणी तेथे क्रीडा करतो. प्रसंगी वारा जाणवतो. तुकाराम महाराज म्हणतात येथे मनाशी संवाद होतो. त्यात आपला आपल्याशी वादविवाद होतो. वृक्षाच्या सानिध्यात मन रमून गेले की, आपणच आपल्या मनाशी संवाद होतो बाह्यदोष नाहीशी होतात. म्हणूनच ही वसुंधरा हा निसर्ग याला जपणे आपले आद्य कर्तव्य आहे. ज्ञानेश्वर महाराजाप्रमाणे तुकाराम महाराजांनी देखील अवच्ये विश्वची माझे घर, याप्रमाणे पर्यावरणाकडे पाहिल्याचे स्पष्टपणे या अभंगातून दिसून येते. संत तुकाराम महाराजांना या पर्यावरणात वावरणाऱ्या, आरण्यात राहणाऱ्या वनचर, जलचर यांना लोकांकडून होणारी पीडा पाहवत नाही, त्यांची व्यथा ते पुढील अभंगातून मांडतात.....

'काय केले जळचरी । ढीवर त्याच्या घातवारी ॥1॥

हा तो ठायीचा विचार । आहे यातीवैराकार ॥2॥

श्रापदाते वधी । निरपराधे पारधी ॥3॥

तुका म्हणे खळ । संता पीडिती चांडाळ ॥4॥' 2

या अभंगात तुकाराम महाराज म्हणतात पाण्यात राहणाऱ्या माशांनी कोळ्याचा काय अपराध केला, का तो कोळी जाळे टाकून या माशांना पकडतो. तसेच आरण्यातील स्वतःचे जीवन मुक्तपणे जगणाऱ्या श्वानाणी तरी पारध्यांचे असे काय नुकसान केले आहे? की त्यामुळे पारध्यांनी त्यांची शिकार करावी व त्याला ठार मारून वन्यजीवन नष्ट करून टाकावे. प्रस्तुत अभंगातून तुकाराम महाराजांना वन्य जीवनाविषयी असणारी तळमळ स्पष्टपणे दिसून येते.

पुढील अभंगात तुकाराम महाराज म्हणतात.....

मारू नये सर्प संताची दृष्टी । होतील ते कष्टी व्यापकपणे ॥

एकसूत्र जीवी शिवी ऐक्यता । रोम उपडीता अंग कापे ॥

नाही साहो येत दुःखाची ते जाती । परपीडा भूती साम्य झाली ॥

तुका म्हणे दिला नीतीचा संकेत । पूजा नावे चित्त सुखी तेणे ॥ 3

मानवी शरीरावरील एक केस जरी उपटला तरी, अंगाला त्रास होतो. त्याप्रमाणे शिव आणि प्रत्येक जीव यांचा अनन्य अतूट एकरूप संबंध आहे. म्हणून सर्प मारू नये, कारण त्यामुळे व्यापक विश्व रूप कष्टी होते. प्रत्येक जीवाचा विश्वातील पर्यावरण साखळीशी अनन्य नाते असल्यामुळे कोणालाही, कोणत्याही प्रकारे दुःख झाले, तरी स्वतःच्या अंतःकरणात संवेदना जागृत व्हाव्यात कारण यथार्थ ज्ञानविज्ञानाने, सर्व भुते सामने योग्य तिची आहेत. हा नीतीचा संकेत सर्वांना प्रस्तुत अभंगातून उपदेश तुकाराम महाराज सांगतात.

'शुद्ध बीजा पोटी । फळ रसाळ गोमटी ॥1॥

मुखि अमृताची वाणी । देह वेचावा कारणी ॥2॥

सर्वांगी निर्मळ । चित्त जैसे गंगा जळ ॥3॥

तुका म्हणे जाती । ताप दर्शना विश्रांती ॥4॥ 4

संत तुकाराम महाराजांचा हा अभंग, मूर्तिमंत निसर्ग सत्तेचे दर्शन घडविणारा हा नितांत रमणी अभंग, श्रोत्यांच्या व वाचकांच्या हृदयावर अधिराज्य गाजविल्या शिवाय राहत नाही. शेतकऱ्यांनी जर शेतामध्ये निर्दोष, शुद्ध, न किडलेली, टपोरी, कसदार, उत्तम गुणधर्म युक्त असे बियाणे पेरले. तर त्यांच्या शेतामध्ये मिळणारे धान्य, फळे ही देखील रसाळ, निर्दोष, शुद्ध, देखणी मिळतात. जे बीज शुद्ध असते, त्याचा वंश विस्तार झाल्यानंतर त्याला येणारी फळे ही तशी शुद्ध, रसाळ आणि सुंदर असतात. 4 आपल्याकडून ज्याप्रमाणे पर्यावरणामध्ये पेरणी होणार आहे. त्या पद्धतीनेच आपल्याला त्याची फळे देखील मिळणार आहेत. या अभंगातून तुकाराम महाराजांनी पर्यावरणातून मिळणाऱ्या फलप्राप्ती विषयी मत व्यक्त केले आहे. आपण योग्य बीजाची पेरणी केल्यास आपणास फळ देखील योग्य मिळणार आहे या शुद्ध बीजाला पर्यावरण नाची देखील साथ मिळणार आहे, याचे वर्णन संत तुकाराम महाराज पुढील अभंगातून करतात.....

पर्जन्य पडावे आपल्या स्वभावे । आपल्याला दैवे पिके भूमी ॥

बीज तेची कळ येईल शेवटी । लाभ हानी तूटी ज्याची तया ॥

दीपाचिये अंगी नाही पूजा भाव । धरणी चोर साव सारेखेची ॥

काउळे ढोपरा तितीरा । राजहंस चारा मुक्त फळे ॥

तुका म्हणे येथे आवडी कारण । पिकला नारायण तैसा ॥ 5

पर्जन्य अर्थात पाऊस आपल्या स्वभावाप्रमाणे पडतो. परंतु आपआपल्या प्रारब्धाने शेतात पीक येतात, जे पेराले असेल तेच बीज फलदुक्ती होते. लाभ आणि ज्याच्या त्याच्या प्रारब्धाने घडते. प्रकाशा सर्वांना सारखेच लाभतो त्याला, साव किंवा चोर यास भेदभाव नसतो. कावळ्याचे खाणे जनावराचे ढोपर असते, तर तित्तर पक्षाचे खाणे खर आहे. मोत्याचे खाणे राजहंसाचे असते. वरील अभंगात तुकाराम महाराज म्हणतात, प्रत्येकाची आवड वेगवेगळी असते, जसा त्याचा भाव असेल तसा त्याला फळ नारायण देतो. त्यामुळे आपण पर्यावरणास संदर्भाने चांगला भाव झोपला पाहिजे. पर्यावरणाकडे दुर्लक्ष केल्यास पर्यावरणाचा

ऱ्हास होईल म्हणून पर्यावरणाच्या संवर्धनासाठी वृक्ष लावूनच भागणार नाही, तर त्याला पाणी घातले पाहिजे.या संदर्भाने तुकाराम महाराज पुढील अभंगात म्हणतात....

सिंपिले ते रोप वरीवरी बरे ।

बळलिया पुरे कुंभ नये । किंवा

"बिजाचे अंकुर दग्ध होती"।⁶

नुसती रोप लावले आणि त्याला पाणी दिले नाही तर ? या संदर्भाने वरील अभंगात तुकाराम महाराजनी, लहान रोपट्याला लहानपणीच भरपूर पाणी घालून, त्याची निगा राखण्याचा सल्ला दिला आहे. असे केले नाही तर त्या वाळलेल्या कष्टीला काय परत कोंब फुटणार आहे.? असाही प्रश्न त्यांनी या अभंगातून विचारला आहे. म्हणूनच वृक्षाच्या मुळाला भरपूर पाणी घातल्यावरच वृक्ष वाढणार आहे. पुढील अभंगात तुकाराम महाराज म्हणतात,

फळ देठीहुन झडे । मग मागूते न जोडे ॥1॥

म्हणूनी तातडी खोटी । कारण उचिताचे पोटी ॥2॥

पुढे चढे हात । त्याग मागीला उचित ॥3॥

तुका म्हणे रणी । नये पाहो परतोनी ॥4॥⁷

या अभंगात तुकाराम महाराज म्हणतात, वृक्ष वाढल्यानंतर त्याला आलेल्या फळाला तोडण्याची घाई करू नये, कच्चे फळ झाडापासून वेगळे केल्यास पुन्हा ते झाडाला लावता येत नाही. त्यामुळे त्याचा उपभोग आपणास योग्य प्रकारे मिळत नाही. एकंदरीत आज भौतिक सुख सुविधांसाठी आपण पर्यावरणाचा जो नाश करत आहोत. त्या संबंधाने हा अभंग दिशादर्शक ठरतो. याच संदर्भाने तुकाराम महाराज पुढील अभंगात म्हणतात,

तोडूनि पुष्कावाटिका फळवृक्षया ती । बाभळा राखीती करूनि सार ॥1॥

कोण हिता तिणे देखीले आपुले । आणीक पाहिले सुख काई ॥2॥

धान्य बीजे जेणे जाळोनि या सकळे । पेरितो फळे जिरे बीज ॥3॥

मोडोनिया वाटा पुढीलांची सोय । आड राने पाय घेऊन लोक ॥4॥

विषयाचे अमृत ठेवुनिया नाम । करितो अधम ब्रह्महत्या ॥5॥

तूका म्हणे त्यास नाइके सांगता । तया हाल करिता पाप नाही ॥6॥⁸

या अभंगात तुकाराम महाराज म्हणतात, सुगंधी फुलाचे उद्याने,अनेक जातीच्या मधुर फळांची झाडे तोडून बाभळींना महत्त्व देणे. गहू तांदूळ इत्यादी धान्याची रोपे जाळून टाकून. जिरे, कऱ्हाळ यांचे बीजे पेरणे म्हणजे पर्यावरणातील रुजलेल्या एका रोपट्याला उपटून दुसऱ्या रोपट्याची जोपासना करणे. यात कोणते हित नाही पुढच्या पिढीची सोय करण्याकरता मागील वाट मोडणे यात कोणतेही हित? असे करणे म्हणजे लोकांना आडरानाने घेऊन जाणे. विषाला अमृत नाव ठेवणे आहे. असे कृत्य करणारा ब्रह्महत्यारी, पातकी,अधर्मी असून त्याची किती फजिती केली तर ही पाप लागत नाही असे तुकाराम महाराजांनी प्रस्तुत अभंगातून मांडले आहे.

सारांश रुपाने आपणास असे म्हणता येईल की संत तुकाराम महाराजांनी अनेक अभंगातून पर्यावरण विषयक संदेश आपणास दिला आहे. जसे की वृक्षवल्ली आम्हा सोयरे वनचरे.... या अभंगाच्या माध्यमातून पर्यावरणातील वृक्षवल्ली, पशुपक्षी, डोंगर आदी यांच्याशी नाते जोडत या ठिकाणी मन शांती होऊन स्वतःची आत्मचिंतन साधता येते. पर्यावरणाचा समतोल असल्यास मन शांत ठेवून आत्मचिंतन करण्यास वावा मिळतो. हे या अभंगाच्या माध्यमातून त्यांनी अधोरेखित केले आहे. पुढे तुकाराम महाराज म्हणतात की आरण्यात राहणाऱ्या पशु,पक्ष्यांना, वृक्षांना, झाडांना, वेलींना, माशांना आपण त्रास देऊ नये. यामुळे निसर्गाचे संतुलन ढासळू शकते व मानवी जीवनासाठी कष्ट निर्माण होऊ शकतात. आपल्या अंगावरील एक केस जरी उपटला तरी त्याची पीडा आपल्या शरीराला होते. त्याचप्रमाणे निसर्गात राहणाऱ्या या वन्यजीवांना आपण नाहीसे केल्यास. जे निसर्ग चक्र आहे ते, बाधित होण्याची शक्यता आहे, त्यामुळे आपण या प्रण्याची हत्या करू नये असे, त्यांना त्यांना वाटते. त्यांनी पर्यावरणातील घटकणा विश्व स्वरूप सबोधले आहे. पर्यावरण संवर्धनासाठी महत्त्वपूर्ण म्हणून वृक्षांना ना संबोधले जाते. या वृक्ष लागवडीसाठी चांगल्या बियाची लागवड आपण केली पाहिजे असे शुद्ध बीजापोटी फळे रसाळ गोमटी..... या अभंगातून तुकाराम

महाराज म्हणतात, शुद्ध, निर्दोष, न किडलेले, कसदार, टपोरी बियाची लागवड आपण जर केली तर त्यापासून आपणास चांगले वृक्ष तर येतील, त्याचबरोबर चांगल्या प्रतीचे सुंदर असे फळे देखील उपभोगण्यास मिळतील असे त्यांनी या अभंगातून मांडले आहे. योग्य बियाची पेरणी केल्यास पर्जन्यमान तर स्वाभाविकपणे सर्वासाठीच सारखेच असणार आहे. ते कोणालाही दुजाभाव करत नाही. त्यामुळे पर्यावरणाची वृद्धी व संवर्धन होणार आहे. एक प्रकारे या कार्यासाठी आपणास परमेश्वरा सुद्धा साथ मिळून, हे निसर्गचक्र अबाधित राहणार आहे. वृक्षाची रोप लावूनच आपणास न थांबता त्याला योग्य प्रमाणात पाणी देऊन, त्याचे योग्य ते संगोपन करावे लागणार आहे. आपण जर नुसते रोप लावले व त्याचे योग्य असे संगोपन केले नाही. अर्थात त्याला योग्य प्रमाणात पाणी दिले नाही, तर ते रोप करपून जाऊन एक प्रकारे पर्यावरणाची हानी होणार आहे. असाच आशयाचा अभंग तुकाराम महाराजांनी रचला आहे. आपण जर पर्यावरणासंदर्भात अविवेकीपणा अंगीकारला तर काय परिणाम होतात, यासंबंधी फळ देठी हुन झडे..... या अभंगात ते म्हणतात एकदा का पर्यावरणाचा जहास झाला तर पुन्हा त्याचे संतुलन साधने अशक्य आहे. जसे की अपरिपक्व फळ झाडापासून वेगळे केल्यास, त्या फळाची हानी होणार आहे, त्याप्रमाणेच आपण जर पर्यावरणाविषयी जागरूकता न बाळगता त्यामध्ये वारंवार हस्तक्षेप केल्यास. त्याचे परिणाम देखील हानिकारक होणार आहेत. असे या अभंगावरून दिसून येते. एकंदरीत संत तुकाराम महाराजांनी पर्यावरण वाढ, जतन, संवर्धन व त्याचे रक्षण यासंबंधीच्या पर्यावरण विषयी अनेक अभंगातून, काळाच्या पुढे असणारा दृष्टिकोन आपल्या अभंगातून मांडलेला आपणास अनेक ठिकाणी स्पष्टपणे दिसून येतो.

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जगामध्ये लोकसंख्येच्या बाबतीत भारताचा दुसरा क्रमांक लागतो. येणाऱ्या काही वर्षात आपण जगामध्ये एक नंबरचा देश होऊ. भारतामध्ये जे चित्र आहे ते जगात देखील आहे. आधुनिकतेच्या नावाखाली प्रचंड प्रमाणात निसर्गाशी प्रताडणा करण्यात येत आहे. शहरांमधून आणि गावांमधून होणारे बेसुमार प्रदूषण ही अत्यंत अवघड, गुंतागुंतीची आणि अतिशय गंभीर वैश्विक समस्या झाली आहे. भारताच्या दृष्टीने विचार केला पर्यावरणाविषयी अज्ञान आणि कमालीची अस्वच्छता दोन्ही कारणांनी रोगराई आणि दारिद्र्य यांनाच खतपाणी मिळते. मनुष्याच्या मृत्यूनंतर नद्यांमध्ये टाकण्यात येणारी रक्षा.तसेच अस्वच्छता,

महाराष्ट्रात दर दिवशी साधारणपणे १३५० दशलक्ष लिटर मैला निर्माण होतो. आणि त्यापैकी जवळजवळ १८१४ मैला कुठल्याही प्रक्रियेशिवाय सरळ सरळ महाराष्ट्रातील नद्यांमध्ये सोडला जातो आणि हेच पाणी प्रदूषणाचे सर्वात मोठे कारण आहे. शेतीसाठी प्रचंड प्रमाणामध्ये वापरला जात असलेला खतांचा व किटकनाशकांच्या स्वरूपात वापर, आती प्रमाणात रासायनिक द्रव्ये पर्यावरणास प्रदूषित करत असतात. कारखान्यामधून नद्यांमध्ये कुठल्याही शुध्दीकरणाशिवाय रोज घाण ओतली जाते. रासायनिक कारखाने, साखर कारखाने, जमिनीत पाण्याबरोबर मुरलेली घातक द्रव्ये हे सगळे या प्रदूषणाला जबाबदार आहेत. नद्यांमधील रेतीच्या भरमसाठ उपशामुळे भुजलाची पातळी झपाट्याने कमी होत आहे. बेसुमार होणारी जंगलतोड, कारखान्यांमधून सोडला जाणारा कार्बन डाय-ऑक्साइड, हवेत मिसळणारा घातक विषारी वायू. वाहनांमधून उत्सर्जित होणारा धूर, अंतराळातील प्रदूषण, पाण्यातील प्रदूषण, भूगर्भातील प्रदूषण, ध्वनीचे प्रदूषण, कितीतरी गोष्टी सांगण्यासारखी आहेत ज्या मानवी हस्तक्षेपामुळे पर्यावरणाला घातक ठरत आहेत. डोंगराचं सपाटीकरण करून शेती करण्यात येत आहे व इतर गोष्टीसाठी कोरले जाणारे माळ जमिनी. कोळसा कारखान्यासाठी अत्यंत घातक खोदल्या जाणाऱ्या खाणी. रस्त्याचे निर्माण कार्य. विकासाच्या नावाखाली होणारी पर्यावरणाची लूट यातून होणारे राजकारण शासनाचे दुर्लक्ष यामुळे येणाऱ्या काळामध्ये आपण एका घातक परिस्थितीला सामोरे जाणार आहोत. वाढत्या लोकसंख्येसाठी अन्नधान्याची गरज वाढते, ज्यामुळे शेतीखालील जमीन वाढते आणि नैसर्गिक अधिवासांचा ऱ्हास होतो. रासायनिक खताच्या माऱ्यामुळे तसेच अतिरिक्त वापरामुळे मोठ्या प्रमाणामध्ये वाईट परिणाम संपूर्ण एन्व्हायरमेंट वर होत आहे. खाद्यपदार्थांमध्ये रासायनिक खतामुळे अन्नपदार्थ देखील प्रदूषित झाले आहेत. कीटकनाशकांचा अतिरिक्त वापर यामुळे भाजीपाला हा देखील सुरक्षित राहीला नाही. याचे दुर्गामी परिणाम संपूर्ण मानवी शरीरावर होत आहेत. आरोग्यावर होत आहेत मानवी आरोग्य धोक्यात आले आहे. असाध्य रोगांना लोकांना सामोरे जावे लागत आहे. कॅन्सरचे प्रमाण आणि हृदयविकाराचे, मधुमेहाचे मोठ्या प्रमाणामध्ये रुग्णांमध्ये वाढ झाली आहे.

पर्यावरण विषय जागृती झाली नाही तर

येणाऱ्या काळ भयंकर असूनदेखील, समजून सुद्धा, छोट्या अल्पसंतुष्ट स्वार्थासाठी आज आपण पर्यावरणाची मोठ्या प्रमाणामध्ये हानी करत आहोत. देशामध्ये भूस्खलनाचे प्रमाण मोठ्या प्रमाणामध्ये वाढले आहे ढगफुटीचे प्रमाण पूर्वपेक्षा मोठ्या प्रमाणामध्ये वाढले आहे हे सर्व पर्यावरणाच्या असंतुलनाचा परिणाम आपणास पाहायला मिळत आहे. यामध्ये सुधारणा करण्यासाठी शासन व आपल्या राजकीय प्रमुखांची मानसिकता बदलणे अत्यंत आवश्यक आहे. तसेच समाजाची मानसिकता देखील मोठ्या प्रमाणामध्ये बदलणे आवश्यक आहे. विज्ञानाच्या प्रगतीमुळे मानव आपल्या सुखी समाधाना साठी जो निसर्गामध्ये होत चाललेला रहास किंवा प्रदूषण याकडे दुर्लक्ष करत आहे. याचा आज परिणाम आज संपूर्ण मानव जातीस भोगाव लागत आहे. मानव जातीने जर निसर्गाकडे कानाडोळा केला तर निसर्ग असंतुलित होणारच आहे. आणि हा प्रकोप मानवाच्या ऱ्हासाला देखील कारण ठरेल. कारण असे वाईट भविष्य सर्वांना दिसत आहे. याची प्रचिती थोड्या मोठ्या प्रमाणामध्ये येत आहे. नैसर्गिक

चक्राद्वारे निर्माण होणारी साधनसंपत्ती मानवाच्या प्रदूषणामुळे या साधन संपत्तीच्या निर्मिती चक्रात सतत अडथळे निर्माण होत आहेत.

साधनसंपत्तीचे वर्गीकरण आपल्याला खालील प्रमाणे करता येते

१) जैविक साधनसंपत्ती (Biotic or Living Resources):

जैविक साधनसंपत्तीलाच सजीव साधनसंपत्ती देखील म्हटले जाते. या साधनसंपत्तीत वनस्पती, प्राणी व सूक्ष्म इ. साधनसंपत्तीचा समावेश केला जातो

२) अजैविक साधनसंपत्ती (Abiotic or Non-Living Resources)

अजैविक साधनसंपत्तीलाच निर्जिव साधनसंपत्ती असे देखील म्हटले जाते. या साधनसंपत्तीत जमीन, हवा, पाणी, सूर्यप्रकाश, खनिजे इ. साधनसंपत्तीचा समावेश केला जातो.

साधनसंपत्तीचे खालील प्रमाणे आणखीन दोन प्रकार पाडता येतात.

१) अक्षय साधनसंपत्ती (Non exhaustible Resources):

ज्या साधनसंपत्तीचा एकदा वापर केल्यास ती कायमची नष्ट होत नाही अशा साधनसंपत्तीला अक्षय साधनसंपत्ती असे म्हणतात. उदा. सूर्यप्रकाश, हवा, पाणी इ.

२) क्षय साधनसंपत्ती (Exhaustible Resources):

किंवा नपत्तीला ला तरी शकतो. क्सीजनधी धनसंपत्ती

ज्या साधनसंपत्तीचा एकदा वापर केल्यास ती कायमची नष्ट होत असते अशा साधनसंपत्तीला क्षय साधनसंपत्ती असे म्हणतात. उदा. दगडी कोळसा, खनिज तेल, नैसर्गिक वायू इ. आज मानवाच्या बेकी बेफिकी वरती मुळे पृथ्वीवरील अनेक वनस्पतींच्या व प्राण्यांच्या जाती कायमच्या नष्ट झाल्या आहेत सध्या जंगलतोडीच्या मानाने वृक्ष लागवडीचे प्रमाण फार कमी आहे मानवाच्या मृत्यू प्रमाणात घट झाली आहे जन्म प्रमाणात वाढ झाली आहे आणि याचा परिणाम पर्यावरणाच्या आरोग्यावर होत आहे. आज मोठ्या प्रमाणात पर्यावरणामध्ये बदल होताना दिसत आहेत. पृथ्वीचे तापमान वाढत आहे. यामुळे हिमालया बर्फ पृथ्वीवरील वितळत आहे. यामुळे समुद्राच्या पाण्याची उंची वाढत आहे. बर्फ वितळण्याची कारण म्हणजेच मोठ्या प्रमाणात वेगवेगळ्या कारखान्यातून निघणारा कार्बन डाय-ऑक्साइड आहे. नद्या, माती, हवा, समुद्र, आकाश, सर्वकाही आजच्या काळामध्ये मानवी हस्तक्षेपामुळे प्रदूषित झाले आहे. जागतिक शस्त्रास्त्र स्पर्धा यामुळे देखील मोठ्या प्रमाणात नैसर्गिक साधनांचा न्हास होत चालला आहे. शस्त्रास्त्र स्पर्धा ही जीवघेणी झाली आहे शस्त्र निर्माण करणे त्याच्यासाठी बाजारपेठ निर्माण करणे आणि बाजारपेठ ठिकण्यासाठी जगामध्ये अस्थिरता व युद्धमय परिस्थिती सदैव राहणे हे शस्त्रास्त्र व्यापार करणारे देश यांचे उद्दिष्ट बनले आहे. याचा दुर्गामी परिणाम वाईट परिणाम आता सर्वत्र दिसायला सुरुवात झाली आहे.

पर्यावरण जनजागृती संदर्भात सहभाग वाढावा. यासाठी संस्था संघटना निर्माण करून त्यांस निश्चित तत्वाधरित नैसर्गिक साधनांचा वापर कसा करायचा एक आचारसंहिता ठरवून हक्क दिला जाईल. संघटना अधिक चांगले नियोजन व व्यवस्थापन करू शकतील. हक्क ठरविण्या साठी वेगळा नियमन प्राधिकरणाचा कायदा असेल. कोणाचाही वापर हक एकतर्फी काढून ठाकला जाणार नाही. त्यासाठी काही कार्यपद्धती असेल. हक्काचे वार्षिक वा हंगामी हस्तांतरण करता येण्याची सोय आहे. हस्तांतरण नियमन प्राधिकरणाच्या देखरेखी खाली होईल. प्रदूषण थांबवायचे असेल त्यासाठी विशेषत ग्रामीण भागात जनतेची मानसिकता बदलणे यावर मोठ्या प्रमाणावर भर द्यायला हवा. स्त्रियांचे व मुलींचे यांचे विशेषतः प्रबोधन होणे अनिवार्य आहे. कारण कुटुंबामध्ये संस्कार देण्याचे कार्य मोठ्या प्रमाणात स्त्रिया करून होत असते या जाणीवा आणि गरज कौटुंबिक सामाजिक आणि व जागतिक पातळीवर प्रभावी मांडण्यासाठी स्त्रिया अधिक समजून घेवू शकतात. त्यामुळे प्रदूषणामुळे होणारा धोका संभव कमी होऊ शकतात. पर्यावरण संवर्धनाच्या दृष्टीने भारतात पर्यावरणासंबंधी अनेक कायदे अस्तित्वात आहेत या

कायद्यातील अधिनियमांची व्यवस्थित अंमलबजावणी करणे हे महत्वाचे आहे. पर्यावरणासंदर्भात देशांमध्ये प्रचलित कायद्याविषयी आपण माहिती घेऊ.

१) हवा प्रदूषण नियंत्रण कायदा, १९८१: या कायद्यानुसार पर्यावरणाचे संवर्धन करण्याची योजना आखण्यात आली. हवेची गुणवत्ता चांगली ठेवण्यासाठी आणि प्रदूषण नियंत्रण करण्यासाठी भारत सरकारने १६ मे १९८१ पासून हा कायदा अंमलात आणला. वायू प्रदूषण आणि नियंत्रण अधिनियम १९८१ अंतर्गत राष्ट्रीय स्तरावर केंद्रीय मंडळाच्या रुपाने व राज्य स्तरावर राज्य मंडळाच्या रुपाने स्वच्छ वायू प्रबंध संस्थाची निर्मिती करता येते. राज्यस्तरावरदेखील हवा प्रदूषण नियंत्रक कायद्यातील कार्यक्रम व नियमावली तयार करण्यात आली आहे. या कायद्यात खालील गोष्टीचा समावेश केला आहे तसेच या नुसार हवा प्रदूषण नियंत्रण कायदा १९८१ मधील कलम ५ मधील तरतुदीनुसार राज्य प्रदूषण नियंत्रण मंडळात एकूण १७ सभासद आहेत. यामध्ये एक पूर्णवेळ किंवा अर्धवेळ पर्यावरणातील तज्ज्ञ अशा व्यक्तीची अध्यक्ष म्हणून नियुक्त राज्य सरकार करते. राज्य सरकारचे ५ कार्यालयीन सदस्य, कंपन्या व राज्य शासन मालकीच्या महामंडळाचे दोन सदस्य एक पूर्णवेळ सदस्य सचिव या पदावर नियुक्ती केले आहेत

02) पर्यावरणाच्या संरक्षणार्थ भारत सरकारने एक कायदा १९८६ मध्ये लागू केला तो म्हणजे पर्यावरण संरक्षण धोरण १९८६ नावानं ओळखला जातो. या कायद्याचा हेतू पर्यावरण संवर्धन करणे आणि पर्यावरणाची गुणवत्ता सुधारण या संदर्भात विविध कार्यक्रम आखणे, या संदर्भात मध्यवर्ती शासनाला काही अधिकार देण्यात आलेले आहेत.

पर्यावरण संवर्धन व प्रदूषण नियंत्रणासाठी राष्ट्रीय कार्यक्रमांचे नियोजन करून कायदे अंमलात आणणे. स्वयंचलित वाहनांतून निघणाऱ्या धुराचे मानके ठरविणे, घातक रसायनांची हाताळणी, पर्यावरणात होणारे अपघात टाळणे, प्रदूषण टाळण्यासाठी संशोधन करणे, प्रदूषण करणाऱ्या कारखान्यांची तपासणी करणे. प्रयोगशाळाची स्थापना करणे. विविध प्रकारच्या प्रदूषणांची मानके ठरविणे. उदा. हवा प्रदूषण, ध्वनी प्रदूषण, मृदा प्रदूषण, जल प्रदूषण इ. साठी निश्चित मानके ठरविणे. या कायद्यान्वये केंद्र शासनाच्या पर्यावरण व वनविभागांना अनेक अधिकार आहेत. त्यात राज्यांमध्ये समन्वय ठेवणे, पर्यावरणाची गुणवत्ता राखण्यासाठी घालून दिलेल्या मर्यादांचे पालन करणे, उद्योगधंदे, कारखाने उभारण्यावर बंधन घालण्याचे अधिकार या कायद्यामुळे त्या विभागाला आहेत. या कायद्याचे उल्लंघन करणाऱ्यास कडक सजा व दंडाची शिक्षा होऊ शकते.

३) जल प्रदूषण नियंत्रण कायदा, १९७४: भारत सरकारने पर्यावरण संरक्षण व

सार्वजनिक आरोग्याच्या दृष्टीने भारतातील पाणी प्रदूषण / जल प्रदूषण नियंत्रण करण्याच्या दृष्टीने १९७४ मध्ये पाणी प्रदूषण प्रतिबंध व नियंत्रण कायदा केला. कायद्याचे उद्देश पुढीलप्रमाणे आहेत.

१. पाण्याची गुणवत्ता टिकविणे व वाढविणे.

२. पाणी प्रदूषणास प्रतिबंध व नियंत्रण करण्यासाठी मंडळाची स्थापना करणे.

३. पाणी प्रदूषणास प्रतिबंध व नियंत्रण करण्याची तरतूद करणे.

४. या कायद्याने मंडळास त्यांची कर्तव्ये बजावण्यासाठी अधिकार दिले आहेत. या कायद्यातील तरतूदीचा किंवा त्याखालील दिलेल्या आदेशांचा भंग केल्यास तो शिक्षापात्र गुन्हा समजण्यात येतो.

४) वन्यजीव संरक्षण कायदा, १९७२: पर्यावरण संरक्षणाचाच एक भाग म्हणजे वन्यप्राणी यांचे अस्तित्व टिकविणे होय. भारतात अनेक वन्य प्राणी नष्ट होत आहेत. वन्य प्राणी, पक्षी यांचा शिकार मोठ्या प्रमाणात होत असून त्यातील काही जाती नामशेष होत आहेत. यामुळेच निसर्गाचा समतोल ढासळू लागल्याने वन्यजीव संरक्षण कायदा करण्याची गरज भासू लागली. वन्य जीवांमध्ये सर्व भूतलावरचे प्राणी, माश्या, फुलपाखरे, कवचधारी प्राणी, जलचर, जमिनीवर असणारे प्राणी इ. चा समावेश होतो. वन्यजीव (संरक्षण) कायदा १९७२ या कायद्यान्वये केंद्र शासनाच्या पर्यावरण आणि वनविभागांना अनेक अधिकार दिले गेले. देशभर राबविण्यात येणाऱ्या कार्यक्रमांचे नियोजन करणे, त्यांची कार्यवाही करणे तसेच राज्यांमध्ये समन्वय ठेवणे, वन्यजीवांच्या संरक्षणासाठी घालून दिलेल्या मर्यादांचे पालन करणे इ. अधिकार ठरवून दिले गेले. देशातील वन्य क्षेत्राच्या ४

टक्क्यांपेक्षा जास्त भागाला अभयारण्य किया राष्ट्रीय उद्यान म्हणून घोषित करण्यात आले असून या संरक्षित क्षेत्राची व्यवस्था वन्यजीव (संरक्षण) कायद्यांच्या तरतुदीत केली आहे.

या कायद्यानुसार एखाद्या व्यक्तीने कायद्याचे उल्लंघन केल्यास म्हणजेच वन्यजीवांना त्रास दिल्यास, जखमी केल्यास, त्यांची शिकार केल्यास. वन्य जीव्यांपासून तयार केलेल्या वस्तू, वन्यजीवांचे अवयव यांच्या विक्री व्यापाराला प्रतिबंध करण्यात आला आहे. म्हणजेच असे कृत्य केलेले आढळल्यास सदर व्यक्तीस जबर शिक्षा भोगावी लागते आणि दंडही बसू केला जातो. पर्यावरणावर कमी परिणाम करणारे विकास प्रकल्प राबवणे, ज्यामुळे आर्थिक विकास आणि पर्यावरणाचे संरक्षण दोन्ही शक्य होईल. उदाहरणार्थ सौर ऊर्जा, जैविक खत इथेनॉल अशाप्रकारे निसर्गाला हानिकारक नसणारे साधन वापरून आपण आपली गरज भागवू शकतो. यासाठी शासनाने प्रयत्न करणे आवश्यक आहे. शाश्वत टिकासासाठी पर्यावरण पूरक गोष्टी निर्माण करण्यासाठी संशोधन होणे आवश्यक आहे. यासाठी संशोधनाला प्रोत्साहन दिले पाहिजे. मोठ्या प्रमाणामध्ये निधी उपलब्ध करून दिला पाहिजे. व असे साधन निर्माण करून शाश्वत विकास साधला पाहिजे.

प्रदूषण नियंत्रण:

प्रदूषण कमी करण्यासाठी कठोर कायदे करणे आणि प्रदूषण कमी करणाऱ्या तंत्रज्ञानाचा वापर करणे आवश्यक आहे. कायद्याची व्यवस्थित अंमलबजावणी केली पाहिजे.

जागरूकता:

लोकांना पर्यावरणाचे महत्त्व समजावून सांगणे आणि त्यांना पर्यावरणास अनुकूल जीवनशैली स्वीकारण्यास प्रवृत्त करणे. जनजागृती हा फार मोठा यावर उपाय आहे.

पुनर्वापर आणि कचरा व्यवस्थापन:

टाकाऊ वस्तू पासून टिकाऊ वस्तू बनवणे यासाठी नवनवीन संकल्पना पुढे आणणे, प्रोत्साहन देणे, आवश्यक आहे.

कचरा कमी करण्यासाठी पुनर्वापर आणि कचरा व्यवस्थापनाचे योग्य नियोजन करणे आवश्यक आहे.

हरित ऊर्जा:

जीवाश्म इंधनाऐवजी सौर ऊर्जा, पवन ऊर्जा यांसारख्या स्वच्छ ऊर्जा स्रोतांचा वापर करणे. वापरामध्ये वाढ करणे गरजेचे आहे.

समारोप :- भारतात पर्यावरण संवर्धनाची मोठ्या प्रमाणात गरज निर्माण झाली आहे. याला अनुसरूनच राजकीय धोरणे आखली जात आहेत. परंतु तो जबाबदारी पार पाडण्यासाठी आज सर्वच स्तरातून प्रयत्नांची गरज असल्याचे दिसून येते. पर्यावरणाचे संरक्षण व पर्यावरण समस्यांची सोडवणूक हे केवळ सरकारचेच नव्हे तर प्रत्येक मानवाचे व नागरिकाचे केवळ स्वतःच्याच पिढीसाठी नव्हे तर भावी पिढ्यांसाठीचेही कर्तव्य आहे. त्यामुळे समाजातील प्रत्येकाने या महत्वाच्या कार्यास शक्य त्याप्रकारे व प्रमाणात हातभार लावला पाहिजे. त्यांच्याकडूनही प्रयत्नांची अपेक्षा आहे. आपल्या देशातील बहुसंख्य लोकांना पर्यावरणाचा अर्थ माहिती नाही. अशा परिस्थितीत आपल्याला त्यांच्या स्थानिक गरजा, स्थानिक पर्यावरण यांचा अभ्यास करून योजना तयार कराव्या लागतील. भारतातील प्रत्येक नागरिकाने वृक्ष लागवड करून पर्यावरण संवर्धनाचे काम केले पाहिजे. यावर जागतिक पातळीवर मंथन होत आहे. त्यानुसार भारतात पर्यावरण धोरणाची अंमलबजावणी होतांना दिसून येते.

संदर्भ सूची :-

- 1) डॉ. दुर्गा दास बसु भारत का संविधान एक परिचय
- 2) एम. वी. पायली भारतीय संविधान
- 3) जवाहर चौधरी, मेजर गोडसे पर्यावरण
- 4) हेमराज शहा- मासिक पत्रिका, पर्यावरण विशेषांक
- 5) भारतीय अर्थव्यवस्था प्राध्यापक जाधवर गीते अथर्व प्रकाशन पुणे
- 6) पर्यावरण शिक्षण, डॉक्टर प्रकाश सावंत, फडके प्रकाशन कोल्हापूर

राजनीती आणि पर्यावरण

संशोधक विद्यार्थी

सायली विजय भंडारे

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मार्गदर्शक

प्रा. डॉ. दत्तात्रय लक्ष्मण फलके

पीएच.डी मराठी संशोधन केंद्र के.टी.एच.एम महाविद्यालय, नाशिक.

प्रस्तावना

आज पर्यावरण संवर्धन व संरक्षण करणे काळाची गरज झाली आहे. म्हणून ही केवळ स्थानिक किंवा देशांतर्गत समस्या नसून जागतिक पातळीवर चर्चेचा मुद्दा झाला आहे. म्हणून पर्यावरण हा घटक जागतिक राजकारणामध्ये एक महत्वाचा भाग म्हणून पुढे येत आहे. अनेक राजकीय पक्ष अनेक राष्ट्रीय व आंतरराष्ट्रीय राजकारणामध्ये आपली महत्वाची भूमिका बजावत आहे.

सृष्टीतील सजीवांना जोडण्याचे महत्वाचे कार्य निसर्गातील हवा, पाणी, जंगले, पर्वत याद्वारे केले जाते त्यामुळे पर्यावरणाच्या या घटकाला कृत्रिम पद्धतीने बंदिस्त करणे अवघड आहे. पर्यावरणाच्या प्रदूषणाची समस्या ही आज वैश्विक समस्या बनली आहे आणि म्हणूनच आज बऱ्या राष्ट्रापासून ते छोट्या राष्ट्रांपर्यंत प्रत्येक राष्ट्राला पर्यावरण प्रदूषणाच्या संकटाला तोंड द्यावे लागत आहे. जगभर झालेली औद्योगिक क्रांती याचा परिणाम हा पर्यावरणावर होत असून अनेक पर्यावरणीय समस्या निर्माण होऊन मोठ्या प्रमाणावर जीवित आणि वित्तहानी होत आहे. पर्यावरणावर मानवाच्या हस्तक्षेपामुळे वेगवेगळ्या प्रकारचे प्रदूषण निर्माण होऊन त्याचा परिणाम म्हणजे निसर्गाचे समतोल बिघडले असून त्याचा परिणाम हा मानवालाच भोगावे लागत आहे. निसर्गाचे समतोल राखणे अत्यंत महत्वाचे आहे याची जाणीव आज अनेक देशांना झाली आहे त्यामुळे पर्यावरण समस्या ही जागतिक पातळीवर चर्चेचा विषय बनला आहे. त्यासाठी अनेक देशांनी पुढाकार घेऊन पर्यावरणाचा समतोल कसा राखला जाईल यासाठी नैसर्गिक साधन संपत्तीचे संरक्षण व संवर्धन करण्यासाठी राजकीय पातळीवर विविध उपाययोजना राबवण्यात येत आहे.

पर्यावरण प्रदूषण एक जागतिक समस्या –

पर्यावरणाच्या प्रदूषणाच्या गंभीर समस्येला आज प्रत्येक राष्ट्राला तोंड द्यावे लागत आहे. प्रदूषणाची समस्या ही वैश्विक समस्या बनली आहे. त्यामुळे राजकीय क्षेत्रे धोरणे राबवल्याशिवाय पर्यावरणावरील समस्या सोडविणे अशक्य आहे तेव्हा आज पर्यावरण हा घटक राजकारणात जोर धरू लागला आहे कारण स्थानिक पातळीवर ही समस्या सोडविणे तितके सोपे नव्हे त्यासाठी शासकीय पातळीवर कडक निर्बंध घालून कायदे करणे महत्वाचे आहे. त्यासाठी राष्ट्रा राष्ट्रातील विविध राजकीय पक्ष आज ही जबाबदारी पार पाडताना दिसत आहे. पर्यावरणातील नैसर्गिक साधनसंपत्तीच्या प्राप्तीसाठी राष्ट्रा राष्ट्रांमध्ये चढाओढ निर्माण झाली आहे. यावरून तिसरे महायुद्ध हे पाण्याच्या प्रश्नावरून होऊ शकते असा अंदाज आंतरराष्ट्रीय राजकारणाचे अभ्यासकांनी वर्तविला आहे.

आज पर्यावरण प्रदूषण ही समस्या गंभीर बनली आहे त्याला कारण म्हणजे शहरी भागातील घडून आलेले औद्योगीकरण, नागरीकरण, वाहनांचा अतिरिक्त वापर, जंगलतोड, कचरा इत्यादी मुळे पर्यावरणावर विपरीत परिणाम होऊन हवा, जल, ध्वनी इत्यादी प्रदूषणाच्या समस्या निर्माण झाल्या आहेत. आज जगभरातील वाढती लोकसंख्या ही पर्यावरणाच्या न्हासाला कारणीभूत ठरत आहे. रासायनिक खते, कीटकनाशके, वाढते किरणोत्सर्गी पदार्थ यामुळे प्रदूषण वाढत असून केवळ एका राष्ट्राचे प्रदूषण वाढते असे नाही तर दुसऱ्या राष्ट्रालाही त्याचे परिणाम भोगावे लागतात.

उदाहरणार्थ 'अमेरिकेतील औद्योगीकरणामुळे वाढत्या प्रदूषणाचे परिणाम शेजारील कॅनडासारख्या राष्ट्रांना आम्ल पर्जन्याच्या रूपाने भोगावे लागत आहे'.¹ तसेच एक नदी ही अनेक राष्ट्रांमधून वाहत जात असते त्यामुळे एखाद्या राष्ट्राकडून होणारी चूक ही दुसऱ्या राष्ट्रालाही भोगावी लागते. अणुचाचणीतून होणारे किरणोत्सर्जन हे इतर शेजारील देशांना सहन करावे लागते त्यामुळे पर्यावरण प्रदूषणाची समस्या ही केवळ त्या देशा पूर्वीच मर्यादित नसून इतर देशांवरही त्याचा परिणाम होत असतो.

पर्यावरणाचे संरक्षण व संवर्धन करण्याची जबाबदारी ही राजकीय बनली आहे व त्यासाठी अनेक राष्ट्रीय व आंतरराष्ट्रीय पातळीवर राजकीय क्षेत्रे धोरणे ही ठरविले जात आहे म्हणून राजनीती आणि पर्यावरण यांचा संबंध परस्परपूरक आहे असे म्हणता येईल.

पर्यावरणाचे प्रदूषण वाढण्यास राजकीय सत्ता जबाबदार कशी –

जागतिक औद्योगिक क्रांतीनंतर महासत्ता बनण्याच्या चढाओढीमध्ये राष्ट्रांमधील स्पर्धा वाढत चालली आहे. दुसऱ्या महायुद्धानंतरचे पर्यावरणावर झालेले परिणाम बघता नैसर्गिक साधन संपत्तीचे अमर्याद लूट केली गेली. आर्थिक, औद्योगिक विकासाच्या प्रक्रियेतून हवा, जमीन व पाण्याचे प्रदूषण वाढले. शीतयुद्धाच्या राजकारणाचा परिणाम म्हणून अमेरिका, सोवियत रशियासारख्या महासत्ता भरमसाठ शस्त्रास्त्र निर्मिती करू लागले. जमिनीखाली, पाण्यामध्ये आणि अवकाशात अण्वस्त्रांचे परीक्षण करण्यासाठी अमेरिका व सोवियत रशियाकडून तंत्रज्ञान विकसित केले गेले यातून पर्यावरणाचे प्रदूषण वाढले. दुसऱ्या महायुद्धानंतर आर्थिक विकास हे राष्ट्रीय धोरण बनले. विकासाच्या योजनांमुळे खरंतर पर्यावरणाच्या संवर्धन व संरक्षणाकडे राजकीय हस्तक्षेपामुळे दुर्लक्ष झाले. राजकारणात विकासाच्या, औद्योगिकीकरणाच्या नावाखाली जंगलतोड, खाणकाम यामुळे पर्यावरणाचे नुकसान होते. राजकारणात यासंबंधी धोरणे आखतांना विकासाबरोबर पर्यावरणाचा समतोल कसा राखता येईल याचाही विचार करणे गरजेचे आहे. 2.

भारताचा विचार करता वर्षभरामध्ये अनेक सण उत्सव साजरे होत असतात. या सण - उत्सवांचा व राजकारणाचा घनिष्ठ संबंध आहे असे म्हणता येईल कारण आज या उत्सवांना राजकीय स्वरूप प्राप्त झाले आहे. हे उत्सव साजरे होत असताना प्रचंड प्रमाणात (डि.जे चा वापर) ध्वनी प्रदूषण होत असते हा विचार आपल्या भारतात होतच नाही असे वाटते याला कुठेतरी राजकीय शक्तीच जबाबदार आहे असे म्हणता येईल तेव्हा पर्यावरणाचा विचार करता ध्वनी प्रदूषणामुळे मानव तसेच इतर पशुपक्षी यांच्या आरोग्यालाही धोका निर्माण होतो. त्याला आळा घालण्यासाठी राजकीय पक्षांनीच स्वतः निर्बंध घातले तर ते पर्यावरणाच्या हिताचे ठरेल.

त्याचप्रमाणे भारतात नद्यांचे प्रदूषण ही एक गंभीर समस्या बनली आहे. आपल्या देशातील संस्कृती, परंपरा यांचे जतन करणे काही चुकीचे नाही परंतु नद्यांना आपण माते समान मानतो तेव्हा अशा पवित्र स्थानाला आपल्या चुकीच्या सवयींमुळे अधिकाधिक अस्वच्छ करत आहोत हे कितपत योग्य आहे. जर त्यांना आपण पवित्र मानतो तर त्या स्वच्छ व निर्मळ ठेवणे हे प्रत्येक भारतीय नागरिकाची जबाबदारी आहे. आणि इथे नागरिकांनी आपली जबाबदारी पार पाडली नाही तर शासकीय पातळीवर कठोर कायदे करणे गरजेचे आहे.

पर्यावरणवाद एक विचारसरणी –

पर्यावरणाच्या ज्हासाला कारणीभूत ठरलेली युद्धविरोधी मानसिकता विकसित होऊन पर्यावरण संरक्षणासाठी पर्यावरणवाद ही विचारसरणी पुढे आली व आज सर्वच राष्ट्रांमध्ये एक महत्त्वाचे राजकीय शक्ती म्हणून ओळखले जाऊ लागले. आज अनेक राजकीय पक्ष व दबाव गट पर्यावरण संरक्षणासाठी युरोपियन राष्ट्रांच्या राजकारणामध्ये सक्रिय सहभाग घेतात. पर्यावरणवाद ही विचारसरणी हरित चळवळ व हरित राजकीय विचार म्हणूनही ओळखली जाते.

पर्यावरणवादावर आधारित राजकीय पक्षांनी सन १९९० च्या दशकामध्ये अनेक पश्चिम युरोपीय राष्ट्रांच्या कायदेमंडळात स्थान मिळवले. आज अनेक युरोपीय राष्ट्रांमधून संघटित ग्रीन राजकीय पक्ष असून या ग्रीन राजकीय पक्षांची भूमिका प्रभावी ठरली आहे.

विसाव्या शतकाच्या उत्तरार्धात आंतरराष्ट्रीय राजकारणामध्ये उदयाला आलेली पर्यावरणवाद ही एक महत्वपूर्ण विचारसरणी आहे. गेल्या काही दशकांमध्ये आंतरराष्ट्रीय पातळीवर जोर धरत असणारी हरित चळवळ हे पर्यावरणवादावर आधारित आहे. 3.

पर्यावरणशास्त्र

अलीकडच्या काळात 'पर्यावरणीय प्रभाव परीक्षण' ही एक पर्यावरणीय अभियांत्रिक शाखा विकसित झाली आहे. या शाखेमार्फत जगात सर्वत्र विकसित प्रकल्प उभारताना तेथे पर्यावरणीय प्रभाव परीक्षण करून विचारात घेतले जातात. या प्रकल्पांमुळे पर्यावरणावर व मानवी जीवनावर कोणते परिणाम होतील याचा चिकित्सक अभ्यास केला जातो. या शाखेमार्फत पर्यावरण संदर्भातील राजकीय धोरणांना पाठबळ मिळते. जसे की शासकीय पर्यावरणीय निर्णय प्रक्रियेत जनतेचा सहभाग वाढविणे, विविध शासकीय संस्थेमार्फत पर्यावरणात्मक घटकांच्या संदर्भात निर्णय घेताना सहकार्य करणे. साधनसंपत्तीचे संवर्धन करण्यासाठी शासन व जनता यांना मार्गदर्शन करणे. 4.

कचऱ्याची योग्य विल्हेवाट-

भारतातील कचरा व्यवस्थापनातील समस्या लक्षात घेऊन देशभरातील मुख्यत्वे मोठ्या शहरातील घनकचऱ्यापासून ऊर्जा निर्मिती शक्य आहे का? या पडताळणीसाठी भूतपूर्व प्रधानमंत्री डॉ. मनमोहन सिंग यांच्या आदेशानुसार एका अभ्यास गटाची स्थापना जून २०१३ मध्ये झाली. यातून देशभरातील घनकचरा व्यवस्थापन व तंत्रज्ञानाचा वापर यासंबंधी अहवाल

सादर करण्यात आले. मे, जून २०१४ मध्ये हा अहवाल स्वीकारून आजचे पंतप्रधान नरेंद्र मोदींच्या सरकारने देशभर या अहवालाची कार्यवाही करता येईल अशी नियमावली तयार करून केंद्रीय नगर विकास मंत्रालयामार्फत अंमलबजावणी सुरू केली.

नव्या नागरी घनकचऱ्याच्या व्यवस्थापनेबद्दल २०१६ चा कायदा याच अहवालातील तत्त्व व तंत्रज्ञानावर आधारित आहे. आज पंतप्रधान नरेंद्र मोदींनी 'स्वच्छ भारत अभियान' हा कार्यक्रम देशभर चालविण्यास सुरुवात केली आहे. तसेच केंद्र व राज्य सरकारनेही 'स्मार्ट सिटी' इत्यादी योजना आखून पर्यावरण पूरक योजनांना हातभार लावणारे असे उपक्रमांसाठी प्रोत्साहन मिळत आहे. 5.

अशा विविध योजनांच्या अंमलबजावणीमध्ये राजकीय पाठबळ मिळाले तर पर्यावरणाचे संरक्षण व संवर्धन करणे ही प्रत्येक नागरिकाची जबाबदारी आहे हे या उपक्रमांमधून साध्य होईल.

पर्यावरण विषयक चळवळी –

आपल्या देशामध्ये अनेक चळवळी झाल्या विविध मागण्यांसाठी या चळवळी उभ्या राहिल्या परंतु अलीकडच्या काळात म्हणजे विसाव्या शतकापासून वाढते प्रदूषण, हवामानातील बदल व त्याचा मानव व इतर सजीव सृष्टीवर परिणाम बघता पर्यावरण प्रेमी, विविध संस्था संघटना जागरूक होऊन या समस्येचे निवारण करण्यासाठी अनेक पर्यावरण विषयक चळवळी उभ्या केल्या आहेत आणि समाजात त्याद्वारे जनजागृती करण्याचे कार्य करत आहे.

आज राष्ट्रा-राष्ट्रांमधील चढाओढ यामुळे होणारी महायुद्धे याचा परिणाम पर्यावरणावर होऊन मानवाचेच अस्तित्व धोक्यात आले आहे. आज महाशक्तिशाली राष्ट्र बनण्याच्या इर्ष्येने (स्पर्धेने) आंतरराष्ट्रीय राजकारणामुळे पर्यावरणाच्या संरक्षणाकडे दुर्लक्ष होत असून नैसर्गिक साधन संपत्तीचे संरक्षण करण्यासाठी जबाबदारी या चळवळींनी उचलली आहे.

1. सुंदरलाल बहुगुणा व चिपको आंदोलन
2. पश्चिम घाट बचाव योजना
3. महाराष्ट्रातील सामाजिक वनीकरण

मेधा पाटकर, अण्णा हजारे, सुनिता नारायण अशा पर्यावरण प्रेमी समाज सुधारकांनी पर्यावरण विषयक चळवळी प्रथम व्यक्तिगत पातळीपासून सुरुवात करून नंतर त्याचे संस्थात्मक, सहकारी पातळीपर्यंत जाऊन पोहोचले व त्यांना सरकारची ही मदत होत असते.

अशा चळवळींना राजकीय पाठिंबा मिळाला तर नक्कीच पर्यावरणाच्या संरक्षणाला हातभार लागेल. जागतिक पातळीवरील करार –

पर्यावरण प्रदूषणाची समस्या ही केवळ त्या देशांपुरतीच मर्यादित नसून इतर देशांवरही त्याचा परिणाम होत असतो म्हणून यावर उपयोजना ही तशा स्वरूपात करणे गरजेचे आहे त्यासाठी अमेरिका, कॅनडा, पश्चिम व पूर्व युरोपीय राष्ट्रांनी विभागीय पातळीवर अनेक करार केले आहेत. तेव्हा या राष्ट्रांनी राजकीय निर्णय प्रक्रियेमध्ये काही महत्त्वाचे करार करून त्याद्वारे हवामान बदल थांबवण्यासाठी हे करार महत्त्वाचे आहेत. त्यातील काही महत्त्वाचे करार पुढील प्रमाणे :

- १) पॅरिस करार
- २) क्योटो करार (१९९७)
- ३) अंटार्क्टिका संरक्षण करार (१९५९)
- ४) आम्ल पर्जन्य विषयीचा करार (१९८८)
- तसेच १) रिओ ची वसुंधरा परिषद (१९९२)
- २) स्टॉकहोम पर्यावरण परिषद (१९७२)
- त्याचप्रमाणे भारतातही पर्यावरण संरक्षण काही तरतुदी करण्यात आल्या त्यातीलच
- १) वन्यजीवन संरक्षण कायदा (१९७२)
- २) वायू प्रदूषण कायदा (१९८६)
- ३) पर्यावरण व्यवस्थापन व समन्वयासाठी राष्ट्रीय समिती
- ४) पर्यावरण संरक्षण कलमाचा राज्यघटनेमध्ये समावेश
- ५) पर्यावरण संरक्षणासाठी केंद्रीय समिती
- ६) पर्यावरण संरक्षण कायदा (१९८६)
- ७) जलप्रदूषण नियंत्रण कायदा (१९७४) 6.

समारोप

अशाप्रकारे आंतरराष्ट्रीय पातळीपासून ते स्थानिक (स्वराज्य संस्था) पातळीपर्यंत जसे की पंचायत, नगरपालिका या संस्थांच्या मार्फत कचरा व्यवस्थापन, पाणी संरक्षण तसेच हरीत क्षेत्र वाढविणे याबाबतीत राजकीय पक्षांनीही महत्वाची भूमिका बजावणे हे पर्यावरण संरक्षणासाठी गरजेचे आहे. तसेच राजकीय इच्छाशक्ती असल्याशिवाय वरील करार, परिषदांमधील उपाय योजना अमलात येऊ शकत नाही. जर राजकीय इच्छाशक्ती कमी असेल तर पर्यावरण धोरणे केवळ कागदावरच राहतात.

म्हणून पर्यावरणाच्या संरक्षण व संवर्धनासाठी राजनीती महत्वाची भूमिका बजावत असते त्यासाठी पर्यावरणाशी निगडित निर्णय घेऊन पर्यावरणीय धोरणे ठरविले जातात. सुजाण नागरिक व सशक्त पर्यावरण धोरणे यामध्ये राजकारणाचा समतोल राखणे हाच शाश्वत विकासाचा पाया आहे.

संदर्भ ग्रंथ

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2. त्रैव पान नं. ३२५
3. त्रैव पान नं. ३३१, ३३२.
4. 'पर्यावरणशास्त्र' प्रा.डॉ.टी.एन.घोलप, निशिकांत प्रकाशन पुणे, प्रथम आवृत्ती डिसेंबर २००० पान नं. ५१
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6. 'समकालीन जागतिक राजकारण' डॉ.शैलेंद्र देवळाणकर विद्या बुक्स पब्लिशर्स, छत्रपती संभाजी नगर, तिसरी आवृत्ती २०११. पान नं. ३३३ ते ३३९.

संत साहित्यातील पर्यावरण विषयक दृष्टिकोन

प्रा. जयश्री भाऊसाहेब चव्हाण

सहाय्यक प्राध्यापक (मराठी विभाग)

प्रागतिक शिक्षण संस्थेचे. नूतन कला महाविद्यालय राजापूर, ता.- संगमनेर जिल्हा- अहिल्यानगर

प्रस्तावना -

आज आपण पाहतो की, आपल्या अवतीभवती जैवविविधतेची नासाडी माणसाच्या हातून किती मोठ्या प्रमाणावर होत आहे. त्याचे परिणाम म्हणून कोठे पूर, वनवे, दरड कोसळणे, वैश्विक तापमान, भरपूर मोठ्या प्रमाणात झालेल्या जंगलतोडीतून आपल्या संतांनी सातशे वर्षांपूर्वी जे समकालीन विचार मांडले ते आजच्या आधुनिक युगाकरता खूप पूरक आहेत. त्यातून त्यांची दूरदृष्टी आणि दूरगामी विचारांचा परिचय आपणास येतो. साधारणतः सहा-सात शतकांपूर्वी मांडलेले विचार आपण फक्त ग्रंथरूपाने छापत आलो परंतु त्याचा अवलंब अजूनही केलेला नाही; निसर्ग विषयाची तात्त्विक मांडणी ही दैववादाशी भक्ती मार्गाशी जोडून आपण तिथेच न थांबता या विचारांचा अंमल लवकरात लवकर अंगी बाळगून संतांच्या मार्गदर्शनाने आपले पर्यावरण आणि आपले आरोग्य आपण सुरक्षित करणे गरजेचे आहे, किंबहुना करायलाच हवे मराठी संतांनी त्यांच्या साहित्यातून पर्यावरण व निसर्गाबद्दल खूप सुंदर विचार व्यक्त केले आहे. संतांनी पर्यावरणाला केवळ एक भौतिक घटक न मानता त्याला अध्यात्मिक आणि नैतिक दृष्टिकोनातून पाहिले त्यांनी निसर्गातील प्रत्येक गोष्टीमध्ये ईश्वराचे रूप पाहिले आणि पर्यावरणाचे महत्त्व लोकांना समजावून सांगितले.

स्पष्टीकरण- मराठी संत साहित्यात पर्यावरण आणि निसर्गाबद्दल खूप सुंदर विचार आणि जाणीव व्यक्त झाली आहे. संतांनी पर्यावरणाला केवळ एक भोवती घटक न मानता त्याला अध्यात्मिक आणि नैतिक दृष्टिकोनातून पाहिले. त्यांनी निसर्गातील प्रत्येक गोष्टीमध्ये ईश्वराचे रूप पाहिले आणि पर्यावरणाचे महत्त्व लोकांना समजून सांगितले. संत ज्ञानेश्वर, संत नामदेव, संत तुकाराम, संत एकनाथ, यासारख्या संतांनी निसर्गातील प्रत्येक गोष्टीत दैवत्व पाहिले, झाडे फुले नद्या डोंगर वारा आकाश यांना संतांनी आदराने पाहिली तसेच संतांनी लोकांना निसर्गावर प्रेम करायला शिकवले संतांनी आपल्या अभंग ओवी यामधून पर्यावरणाचे महत्त्व समजावून सांगितले.

संत ज्ञानेश्वर यांच्या साहित्यातील पर्यावरण –

संत ज्ञानेश्वरांनी त्यांच्या साहित्यातून पर्यावरणाचे महत्त्व विशद केले, त्यांनी निसर्गाला आपल्या साहित्यातून अत्यंत महत्त्वाचे स्थान दिले. आणि मानवी जीवनात त्याची आवश्यकता विशद केली. ज्ञानेश्वरी आणि अमृतानुभव या संत ज्ञानेश्वर यांच्या साहित्यामधून निसर्गाचे सौंदर्य आणि अध्यात्मिक महत्त्व यांचे वर्णन केले आहे. ज्ञानेश्वरीतून त्यांनी नद्या, पर्वत, डोंगर, आकाश, वृक्ष, पक्षी यांचे वर्णन करताना ते ईश्वराचे दर्शन घडवितात उदाहरणार्थ त्यांच्या ओवीतून

पर्वतांचे कड्यावरी | फुले फुलती गंधारी |

तेथे नाचती मोरचारी | विठ्ठल दर्शन ||

या ओवीतून निसर्गातील सौंदर्य आणि अध्यात्म यांचा संगम दिसतो. संत ज्ञानेश्वरांनी आपल्या साहित्यातून समाजाला निसर्गावर प्रेम करायला व पर्यावरणाचे महत्त्व समाजाला सांगितले.

संत तुकाराम यांच्या अभंगातील पर्यावरण –

संत तुकाराम महाराजांनी पर्यावरणाबद्दल खूप सुंदर विचार मांडले आहेत ते म्हणतात की, वृक्षवेली प्राणी पक्षी हे आपले आहेत याचाच अर्थ निसर्गातील प्रत्येक घटक हा मानवाचा मित्र आहे आणि त्याच्याशी आपले नाते असायला हवे त्यांच्या मते निसर्गाच्या सानिध्यात राहिल्यास मन शांत आणि आनंदी होते. त्यांच्यासाठी आकाश छत आणि पृथ्वी असं नाही तुकाराम महाराजांनी सुमारे चारशे वर्षांपूर्वी पर्यावरणाचे महत्त्व ओळखले होते आणि त्यांनी निसर्गाच्या संरक्षणाबद्दल आपल्या अभंगातून सांगितले, त्यांच्या अभंगातून निसर्गाशी असलेली आत्मीयता आणि पर्यावरण संरक्षणाचे विचार त्यांच्या प्रसिद्ध अभंगातून दिसते

“वृक्षवल्ली आम्हा सोयरे वनचरो | पक्षीही सुस्वरे आळवीती”

संत तुकाराम महाराजांनी आपल्या या अभंगातून निसर्गातील प्रत्येक सजीवाला त्यांनी आपले जवळचे सोयरे मांडले व जंगल प्राणी पक्षी यांच्याशी मैत्रीपूर्ण संबंध ठेवण्याचे त्यांनी आपल्या या अभंगातून निसर्गाला जपण्याची शिकवण दिली तसेच,

“येणे सुखे रुचे एकांताचा वास। नाही गुणदोष अंगार येता।।

आकाश मंडप पृथ्वी आसना। रमे तेथे मन क्रीडा करू।।”

या विचाराचा माणसाने अंगीकार करावा कारण माणसाचे मन निसर्गाच्या सानिध्यात गेल्यानंतर एकांत व शांतता लाभते. बाह्य गोष्टीपेक्षा निसर्गाचे चैतन्य संत तुकारामांना जास्त मोहित करते व पर्यावरण माणसाला प्रसन्न करते .संत तुकारामांचे अभंग सामान्य माणसाला निसर्गाशी जोडण्याचे आणि त्यांचे संरक्षण करण्याचे आवाहन करतात.

संत एकनाथ यांच्या यांचे पर्यावरण विषयक विचार -

संत एकनाथ महाराजांच्या साहित्यात पर्यावरण विषयी फार सुंदर विचार आढळतात. त्यांनी निसर्गाला महत्त्व दिले आहे. संत एकनाथांनी मानवी जीवनावर निसर्गाचे अनंत उपकार आहेत असे म्हंटले आहे. पर्वत, नद्या, झाडे आणि इतर नैसर्गिक गोष्टी पासून मानवाला खूप काही मिळते आणि त्या बदल्यात त्याबद्दल कृतज्ञ असायला पाहिजे, असा त्यांचा दृष्टिकोन होता. त्यांच्या साहित्यात निसर्गातील समतोलालाचे महत्त्व सांगितले आहे त्यांनी सांगितले आहे की, निसर्गातील प्रत्येक गोष्ट एकमेकांशी जोडलेली आहे आणि मानवी जीवनात त्याचा समतोल राखणे आवश्यक आहे. संत एकनाथ यांनी भावार्थ रामायण आणि भारुड यामधून सामाजिक प्रबोधना बरोबरच पर्यावरण संरक्षणाचे विचार मांडले त्यांनी प्राणिमात्रांवर दया आणि भूतदया यांचे महत्त्व सांगितले आहे.

उदाहरणार्थ

“भूतदया हे भांडवल संता। प्राणीमात्रांवर करावी दया।।”

हा विचार पर्यावरण संरक्षणाशी थेट निगडित आहे .कारण प्राणी आणि निसर्ग यांचे नाते अविभाज्य आहे. एकनाथांनी सामाजिक प्रदूषण दूर करण्याचा प्रयत्न केला ज्यामुळे पर्यावरण संतुलन राखण्यातही मनात राखण्यातही मदत झाली .त्यांनी नद्यांचे पावित्र्य आणि जलसंवर्धनाच्या संरक्षणावर भर दिला.

संत रामदास यांचे पर्यावरण विषयक विचार-

संत रामदास यांना समर्थ म्हणूनही ओळखले जाते, त्यांनी पर्यावरण संरक्षणाबद्दल खूप महत्वाचे विचार मांडले आहेत. त्यांनी त्यांच्या मनाचे श्लोक व दासबोध या ग्रंथातून निसर्गाचे महत्त्व पटवून दिले आहे. मानवी हस्तक्षेप कमी करून निसर्गाशी एकरूप होण्याचा संदेश त्यांनी दिला असे अनेक संत साहित्याच्या अभ्यासातून समोर येते. रामदास स्वामींच्या काळातील साहित्य संत साहित्य हे अध्यात्म आणि पर्यावरण यांच्यातील सखोल नाते संबंध उघडते. रामदासांनी निसर्गातील प्राणी, पक्षी, वनस्पती व इतर घटकांचा सहज सुंदर दाखला देऊन त्यांच्यातील वैशिष्ट्य स्पष्ट केली. समर्थांनी त्यांच्या प्रबोधनाद्वारे लोकांमध्ये निसर्गाबद्दलची जागरूकता निर्माण केली. ते कृष्णा कोयना नदीच्या परिसरात फिरले जिथे निसर्ग संपन्न होता .तसेच त्यांनी त्यांच्या दासबोध या ग्रंथातून पंचमहाभूतांचे महत्त्व सविस्तरपणे मांडले आहे. रामदासांनी शिवथरघळ येथील निसर्गरम्य सुंदरमठ निवडून निसर्गाशी आपले नाते दर्शवले. त्यांनी शिवाजी महाराजांना स्वराज्याच्या उभारणीसाठी निसर्गाचा वापर करताना त्याचे संरक्षण करण्याचा सल्ला दिला.

उदाहरणार्थ

“ वृक्ष लावावे, जल राखावे। निसर्ग संतुलन साधावे।। ”

हा विचार आजच्या वृक्षारोपण व पर्यावरणाच्या ज्या मोहिमा राबवल्या जातात त्यावर आधारित आहे.

संत सावतामाळी यांच्या अभंगातील पर्यावरण -

संत सावता माळी यांनी थेटपणे पर्यावरणाचे काही नियम मांडले नसले, तरी त्यांच्या कार्यामुळे आणि विचारामुळे निसर्गप्रती आदर आणि प्रेम व्यक्त होते .त्यांच्या मते ,निसर्गातील प्रत्येक गोष्टीत ईश्वरी तत्त्व आहे आणि म्हणून प्रत्येक गोष्टीत प्रेम आणि आदरभाव असला पाहिजे. त्यांच्या पुढील अभंगातूनच आपल्याला दिसून येईल.

उदाहरणार्थ

“कांदा मुळा भाजी अवघी विठाबाई माझी

लसूण मिरची कोथिंबीरा अवघा झाला माझा हरी॥“

त्यांनी या अभंगातून निसर्गाशी आणि पृथ्वीशी एकरूप होऊन काम करण्याची शिकवण दिली आहे. त्यांनी आपल्या शेतीच्या पारंपारिक कामातच ईश्वर शोधला जो निसर्गाशी जोडलेला आहे. त्याच्यासाठी निसर्ग हा केवळ व्यवसाय नव्हता तर तो ईश्वराचा अनुभव घेण्याचा एक मार्ग होता. त्यांच्या या विचारामुळेच पर्यावरणाशी सुसंगत जीवन जगण्याची प्रेरणा मिळते. त्यांचे गाव पंढरपूर पासून अडीच मैल अंतरावर होते. तरीही कधीही ते पंढरपूरला गेले नव्हते, तर त्यांनी देव हा निसर्गात पाहिला होता.

स्त्री संतांचे पर्यावरणीय विचार-

संत साहित्यातील संत जनाबाई, संत मुक्ताबाई यांनी त्यांच्या अभंगामध्ये निसर्गाचा आणि पर्यावरणाचा अप्रत्यक्षपणे उल्लेख मिळतो. विशेषता 'मुंगी उडाली आकाशी' या अभंगात निसर्गातील घटनांचा दाखला देऊन जीवनातील गुढ आणि आध्यात्मिक सत्यांचा उलगडा करण्याचा प्रयत्न मुक्ताबाईंनी केला. थोडक्यात संत मुक्ताबाईंनी पर्यावरणाचा उल्लेख थेटपणे केला नसला तरी निसर्गातील घटकांचा वापर करून आपल्या अभंगातून विचार व्यक्त केले आहे. संत जनाबाईंनी 'कांदा मुळा भाजी । अवघी विठाई माझी' असे म्हणत निसर्गातील प्रत्येक गोष्टीत देव पाहण्याचा संदेश त्यांनी दिला आहे.

निष्कर्ष -

- १) संत साहित्य निसर्गावर प्रेम करायला व पर्यावरणाचे रक्षण करण्याचे संदेश देते.
- २) त्यांच्या विचारातून पर्यावरण संरक्षणाची शिकवण मिळते.
- ३) प्रत्येक सजीव आणि निसर्गाचा आदर करणे आवश्यक आहे.
- ४) संत साहित्य हे फक्त भक्ती आणि आध्यात्मिक विचारापुरतेच मर्यादित नाही तर पर्यावरण संवर्धनाचे विचार मांडले आहेत.

संदर्भ-

- १) ऑनलाइन
- २) संत साहित्यातील पर्यावरण विचार – डॉ. रामचंद्र देखणे
- ३) विशेष संत साहित्यातील निसर्गप्रेम – डॉ. अशोक लिंगेकर

संत ज्ञानेश्वरांची निसर्गदृष्टी

प्रा. डॉ. विलास अण्णाराव गाजरे

सहयोगी प्राध्यापक, मराठी विभाग प्रमुख, कै.बापूसाहेब पाटील एकंदेकर महाविद्यालय, उदगीर जि. लातूर

प्रस्तावना:

निसर्ग हा मानवाच्या अस्तित्वाचा पाया आहे. पृथ्वी, जल, वायू, अग्नी व आकाश ही पंचमहाभूते मिळून सृष्टीचा मुलाधार घडवतात. भारतीय तत्त्वज्ञानात निसर्गाला सदैव दैवी महत्त्व देण्यात आले आहे. उपनिषद, वेद, पुराणे तसेच भगवत् गीते मध्ये निसर्गाचा उल्लेख वारंवार दिसतो. महाराष्ट्रातील संतपरंपरेत निसर्गाचे स्थान अत्यंत महत्त्वाचे आहे. संतांनी निसर्गाला देवत्व दिले, त्याला उपमे व रूपकांचा आधार बनवला आणि मानवी जीवनासाठी तोच मार्गदर्शक असल्याचे सांगितले. आजच्या काळात मानवाने निसर्ग शोषणाला विकृत स्वरूप दिले आहे. तेव्हा संत ज्ञानेश्वरांनी (1275-1296) आपल्या 'भावार्थ दीपिका' (ज्ञानेश्वरी) आणि 'अमृतानुभव' या ग्रंथात निसर्गदृष्टी अत्यंत संवेदनशीलतेने मांडली. त्यांच्या निसर्गदृष्टीत वैज्ञानिकता, काव्यात्मकता, अध्यात्मिकता आणि पर्यावरणीय मूल्ये याचे सुंदर मिश्रण आढळते.

संत ज्ञानेश्वर : जीवन व कार्य :

संत ज्ञानेश्वरांचा जन्म इस 1275 मध्ये पुणे जिल्ह्यातील आळंदी येथे झाला. त्यांचे वडील विठ्ठल पंथ हे अलोरे (पैठण) येथील रहिवासी व एक संत स्वाभाविक पुरुष होते. आईचे नाव रुक्मीनबाई, कुटुंब धार्मिक व भक्ती मार्गाची निष्ठावंत होते. त्यांना निवृत्तीनाथ, सोपानदेव व मुक्ताबाई अशी भावंडे होती.

संत ज्ञानेश्वर लहानपणीच अत्यंत बुद्धिमान व अभ्यासू होते. अल्पवयातच त्यांनी भगवद्गीतेचे तत्त्वज्ञान आत्मसात केले. भावार्थ दीपिका (ज्ञानेश्वरी) मराठीतील पहिला महाकाव्यात्मक ग्रंथ लिहिला. यात त्यांनी गीतेचे तत्त्वज्ञान लोकभाषेत स्पष्ट केले, तर अमृतानुभव हा द्वैत तत्त्वज्ञानावर आधारित अत्यंत गंभीर व तात्विक ग्रंथ लिहिला आहे. ज्ञानेश्वरांनी सर्वसामान्य जनतेसाठी अध्यात्म उपलब्ध करून दिले. त्यांनी जातीभेद, रुढीपरंपरा याचा विरोध केला व समतेचा संदेश दिला. निसर्गाशी ऐक्य साधेपणा सहजीवन यांचा पुरस्कार केला. इस 1296 मध्ये वयाच्या अवघ्या 21 व्या वर्षी ज्ञानेश्वरांनी आळंदी येथे जिवंत समाधी घेतली.

संत ज्ञानेश्वरांची निसर्गदृष्टी :

1) विश्वांचे दैवी स्वरूप :

ज्ञानेश्वरांच्या मते संपूर्ण विश्वच हा ईश्वराचा अवतार आहे. सृष्टीतील प्रत्येक घटक हा परमेश्वराचा प्रतिबिंब आहे. सूर्य, चंद्र, पृथ्वी, नद्या पर्वत वृक्ष प्राणी पक्षी हे सर्व देवत्वाने ओतप्रोत भरलेले आहेत. त्यामुळे निसर्ग हा केवळ उपभोगाचा साधनसाठा नसून पूज्य स्वरूपाचा आहे. हा दृष्टिकोन मानवाला निसर्गाशी आदर समन्वय आणि सहजीवनाचे मूल्य शिकवतो.

2) पंचमहाभूतांची समज :

संत ज्ञानेश्वरांच्या निसर्गदृष्टीत पंच महाभूतांना (पृथ्वी, जल, अग्नी, वायू, आकाश) विशेष महत्त्व आहे. त्यांच्या मते संपूर्ण सृष्टी या पंचतत्त्वापासून निर्मिली गेली असून प्रत्येक तत्व हे दैवी आहे. पृथ्वी स्थैर्य देते. जल जीवन पोसते, अग्नी ऊर्जा निर्माण करते, वायु प्राणवायू देतो तर आकाश सर्वांना व्यापून राहतो. या पंचमहाभूतातील संतुलन बिघडल्यास जीवन धोक्यात येते. म्हणून मानवाने त्यांचा आदर संवर्धन व योग्य उपयोग करावा हा संदेश ज्ञानेश्वरांच्या तत्त्वज्ञानातून अधोरेखित होतो.

3) निसर्गातील समन्वय :

ज्ञानेश्वर सांगतात की, जसे शरीरातील अवयव परस्परांवर अवलंबून असतात, तसेच पृथ्वी, जल, वायू, अग्नी व आकाश हे एकमेकांना पूरक आहेत. जर यापैकी एखाद्या असंतुलन निर्माण झाले तर संपूर्ण जीवन धोक्यात येते. म्हणून मानवाने निसर्गाचा आदर करून त्याचा संयमी वापर केला पाहिजे. ते म्हणतात निसर्गाशी सुसंवाद साधने हेच अध्यात्म आणि शाश्वत जीवन आहे.

ज्ञानेश्वरीतील निसर्ग रूपके :

ज्ञानेश्वरी हा ग्रंथ रूपकांचा खजिना आहे. निसर्गाची उदाहरणे देऊन ज्ञानेश्वरांनी तत्त्वज्ञान स्पष्ट केले. ही रूपके लोकांना समजण्यास सोपी, जीवनाशी निगडित आणि अध्यात्मिक जवळ नेणारी आहेत. त्यातून त्यांची निसर्गावरील आत्मीयता व गाढ नाते दिसून येते. काही महत्त्वाची निसर्ग रूपके पुढीलप्रमाणे आहेत.

बीज व वृक्ष – विजामध्ये संपूर्ण वृक्ष दडलेला असतो. त्याचप्रमाणे जीवांमध्ये परमात्म्याचे बीज दडलेले आहे.

नद्या व समुद्रे – सर्व नद्या अखेरीस समुद्रात विलीन होतात; त्याचप्रमाणे सर्व जीव अखेरीस परमात्म्यात एकरूप होतात.

सूर्य व किरणे – सूर्यापासून किरणे वेगळी नाहीत, तसेच आत्मा आणि परमात्मा यात द्वैत नाही.

अग्नी व उष्णता – अग्नीपासून उष्णता अविभाज्य आहे. जीव व ब्रह्म हे ही तसंच अविभाज्य आहेत.

पृथ्वी व अंकुर – जशी पृथ्वीच्या आधारे बीज अंकुरते तशीच परमात्म्याच्या आधारे सृष्टी विकसित होते.

आकाश व घटकाश – माठातले आकाश आणि बाहेरचे आकाश वेगळे नाहीत; तसेच जीवात्मा व परमात्मा हेही वेगळे नाहीत.

फुल व सुगंध – फुलापासून सुगंध वेगळा नसतो त्याचप्रमाणे विश्व व ईश्वर वेगळे नाहीत.

या रूपकातून ज्ञानेश्वरांनी अद्वैत समन्वय सर्व व्यापकता व परमात्म्याची एकरूपतेचे तत्व सहज सुंदरपणे स्पष्ट केले. त्यांच्या निसर्गरूपकांमुळे तत्त्वज्ञान सर्वसामान्याला समजण्यास सुलभ झाले.

अमृतानुभवातील निसर्गदृष्टी :

संत ज्ञानेश्वरांचा अमृत अनुभव हा अद्वैत तत्त्वज्ञानाचा अत्यंत गंभीर आणि तात्विक ग्रंथ आहे. हा ग्रंथ दर्शनीक स्वरूपाचा असला तरी त्यातील निसर्गदृष्टी विलक्षण सुंदर आहे.

1) निसर्ग एकरूपतेचे प्रतिक :

‘अमृतानुभवात’ निसर्गातील अनेक रूपकांचा वापर करून त्यांनी आत्मा व परमात्म्याच्या एकात्मतेचे दर्शन घडविले आहे. जसे समुद्र व लाटा, सूर्य व किरणे, फुल व सुगंध, अग्नी व उष्णता हे सर्व निसर्गातील घटक ते दैवी एकात्मतेचे प्रतिक मानतात.

2) परस्पर संबंधाचे दर्शन :

निसर्गातील प्रत्येक घटक इतरांशी जोडलेला आहे. जसे वाऱ्यामुळे मेघ फिरतात, पाऊस पडतो, नद्या वाहतात, शेती फुलते हा सर्व क्रम एकमेकांशी बांधलेला आहे.

3) दैवित्वाचे प्रतिबिंब :

ज्ञानेश्वरांच्या मते निसर्ग हा केवळ भौतिक नसून त्यात परमेश्वराचे प्रतिबिंब दडलेले आहे. झाड, पाणी, आकाश, प्राणी, पक्षी हे सारे दैवी सत्याचे साक्षात स्वरूप आहे.

4) मानवाला दिलेला संदेश :

निसर्गातील सुसंवाद व संतुलन हेच जीवनाचे तत्व आहे. जर मानवाने निसर्गाचा आदर केला तरच त्याला खरे अध्यात्म गाठता येते.

पर्यावरणीय मूल्ये :

पर्यावरणीय मूल्ये म्हणजे मानवाने निसर्गाशी केलेले नाते. त्यातील समन्वय आणि जपणूक यांना दिलेले महत्त्व. संत साहित्याच्या संदर्भात पर्यावरणीय मूल्ये केवळ भौतिक जगण्यापूर्वी मर्यादित नसून त्यांना आध्यात्मिक अधिष्ठान लाभलेले आहे.

1) निसर्गाचा आदर :

नद्या, पर्वत, झाडे, प्राणी हे सर्व दैवी रूप मानले गेले. त्यांच्याशी आदराने वागणे हे धर्माचे लक्षण मानले.

2) सहजीवन :

मानव हा निसर्गातील एक घटक आहे. त्याने इतर घटकाबरोबर (प्राणी, वनस्पती, जल, वायू) समन्वय साधावा ही शिकवण दिली.

3) संयम व संतुलन :

निसर्ग संपत्तीचा अतिरेकाने वापर न करता संयमाने व शाश्वत दृष्टिकोनातून उपयोग करणे ही मूल्य व्यवस्था होती.

4) शुद्धतेचे मूल्य :

जल, वायू, पृथ्वी यांची शुद्धता टिकवणे हे जीवनासाठी आवश्यक मानले गेले.

5) सौंदर्य दृष्टी :

निसर्गातील ऋतुचक्र, फुले, फळे, नद्या, आकाश यात सौंदर्य पाहण्याची व त्यातून प्रेरणा घेण्याची वृत्ती ही देखील एक पर्यावरणीय मूल्य आहे.

6) समानतेचे मूल्य :

झाड सावली देताना भेद करत नाही; नदी पाणी देताना भेद करत नाही. निसर्गाच्या या वृत्ती मधून मानवानेही समता शिकावी, हा संदेश आहे.

या पर्यावरणीय मूल्यांमुळे संत साहित्य निसर्ग संवर्धन संतुलन आणि मानव निसर्गातील शाश्वत नाते याबाबत आजही मार्गदर्शक ठरते.

आजच्या काळातील संदर्भ :

संतांच्या निसर्गसृष्टीचा अभ्यास केल्यास ती आजच्या काळासाठी फारच उपयुक्त व मार्गदर्शक ठरते. औद्योगीकरण, शहरीकरण व उपभोक्ता वादामुळे निसर्गाचा ऱ्हास मोठ्या प्रमाणावर झाला आहे. संतांनी मांडलेली शिकवण या समस्यावर उपाय म्हणून उपयोगी पडू शकते.

1) हवामान बदलाचा संदर्भ :

वाढते तापमान, पर्जन्यमानातील अनिश्चितता, पूर, दुष्काळ या समस्या सोडवण्यासाठी संतांची निसर्गशी ऐक्य साधण्याची शिकवण अत्यावश्यक आहे.

2) प्रदूषण नियंत्रण :

संतांनी जल, वायू, माती यांना दैवी मानले. आजच्या प्रदूषणग्रस्त वातावरणात त्यांची शुद्धता टिकवणे हेच खरी पर्यावरण संवर्धनाची किल्ली आहे.

3) जंगलतोड व संसाधनांचा अतिरेक :

झाडे व प्राणी यांना देवत्व दिल्यामुळे त्यांचा आदर व संवर्धन करण्याची जाणीव निर्माण होते हे आजच्या वनसंवर्धनासाठी महत्वाचे तत्व आहे.

4) शाश्वत विकास :

संयम साधेपणा व संतुलन यांचा पुरस्कार संतांनी केला. आजच्या काळात शाश्वत विकासासाठी ही मूल्ये मूलभूत ठरतात.

5) समता व पर्यावरणीय न्याय :

निसर्ग सर्वांना समानपणे लाभ देतो; मानवाने ही त्यातील लाभाचे समान वाटप करणे आवश्यक आहे. हे आधुनिक पर्यावरणीय न्यायाशी सुसंगत आहे.

6) आध्यात्मिक दृष्टिकोन :

निसर्गाकडे केवळ भौतिक संपत्ती म्हणून न पाहता त्यात दैवी शक्ती आहे हा दृष्टिकोन आजही पर्यावरण पूरक जीवनशैलीसाठी प्रेरणादायी ठरते.

आजच्या पर्यावरणीय संकटाच्या पार्श्वभूमीवर संतांची निसर्गदृष्टी ही केवळ ऐतिहासिक व धार्मिक नव्हे, तर आधुनिक विज्ञान, शाश्वतता व मानव कल्याणाशी निगडित व्यवहारिक मार्गदर्शक भूमिका बजावते.

निष्कर्ष :

संत ज्ञानेश्वरांची निसर्गदृष्टी ही केवळ काव्यात्मक किंवा तात्त्विक नाही तर जीवन मार्गदर्शक आहे. त्यांच्या लेखनात निसर्गाला देवत्व दिलेले आहे. नद्या, वृक्ष, सूर्य, चंद्र, पृथ्वी या घटकातून त्यांनी गहन तत्त्वज्ञान स्पष्ट केले. आजच्या पर्यावरणीय संकटग्रस्त काळात त्यांची शिकवण अधिकच महत्त्वाची ठरते. मानवाने निसर्गाशी संतुलन साधले तरच खरे अध्यात्म आणि खरे जीवन शक्य होईल. संत ज्ञानेश्वरांची निसर्गदृष्टी ही विज्ञानाशी सुसंगत असून भविष्यातील शाश्वत विकासासाठी प्रेरणादायी ठरते.

संदर्भ ग्रंथ :

- 1) संत ज्ञानेश्वर – भावार्थ दीपिका (ज्ञानेश्वरी), संपादित आवृत्ती, विविध प्रकाशन
- 2) देशपांडे र.ग. – ज्ञानेश्वर व त्यांचे तत्त्वज्ञान, कॉन्टिनेंटल प्रकाशन, पुणे
- 3) कुलकर्णी स.ग. – मराठी संत साहित्य व पर्यावरणदृष्टी, महाराष्ट्र साहित्य परिषद प्रकाशन
- 4) रा.चि. ढेरे – संत ज्ञानेश्वर : व्यक्ती व कृतित्व, श्रीविद्या प्रकाशन
- 5) पटवर्धन र.द. – संत ज्ञानेश्वरांची जीवनदृष्टी, मौज प्रकाशन, मुंबई
- 6) संत साहित्य व पर्यावरणीय मूल्ये – संशोधन लेख, विद्या परिषद मासिके
- 7) गाडगीळ, माधव व सप्रे, राधा – पर्यावरण व संस्कृती, लोकवाङ्मय गृह, मुंबई
- 8) पांडूरंगराव देशमुख – ज्ञानेश्वरीतील तत्त्वज्ञान, विद्या प्रकाशन, नागपूर

"पर्यावरण, लोकसंख्यावाढ व मानवाच्या शाश्वत विकासातील समस्या"

संशोधक

प्रा. डॉ. मेघराज कपुरडेरीया

सहयोगी प्राध्यापक,

जवाहरलाल नेहरू समाजकार्य महाविद्यालय व संशोधन केंद्र, नवीन नांदेड

शाश्वत विकास लोकांच्या जीवनमानाच्या गुणवत्तेसाठी महत्वाचे आहे. मानवी आरोग्यासाठी आणि पर्यावरणासाठी घातक असलेल्या रसायनांचे नकारात्मक परिणाम कमी, ज्यामध्ये पर्यावरणीयदृष्ट्या योग्य व्यवस्थापन आणि रसायनांचा सुरक्षित वापर, कचऱ्याचे कमी करणे आणि पुनर्वापर करणे आणि पाणी आणि ऊर्जेचा अधिक कार्यक्षम वापर यांचा समावेश आहे. २०३० पर्यंत, शाश्वत विकासासाठी आवश्यक असलेले फायदे प्रदान करण्याची त्यांची क्षमता वाढविण्यासाठी परिसंस्थांचे, त्यांच्या जैवविविधतेसह संवर्धन सुनिश्चित करण्याचे ध्येय आहे. नैसर्गिक संसाधनांचा जहास आणि पर्यावरणीय जहासाचे प्रतिकूल परिणाम, ज्यामध्ये वाळवंटीकरण, दुष्काळ, जमिनीचा जहास, गोड्या पाण्याची कमतरता आणि जैवविविधतेचा नाश यांचा समावेश आहे. शाश्वत पद्धतीने जगू शकू यासाठी आपल्या संसाधनांची आणि आपल्या लोकांची काळजी घेतली पाहिजे लोकसंख्यावाढीचा दर अधिक असल्यामुळे बेरोजगारी दारिद्र्य वाढते व समाजात आर्थिक असमानता तीव्र होते. अजूनही भारतातील सुमारे २२% लोकसंख्या दारिद्र्यरेषेखाली जीवन जगते. स्वच्छतेचा व शुद्ध पाण्याचा अभाव असल्याने मुलांमध्ये कुपोषण व बालमृत्यू जास्त आहेत. शाश्वत विकास साध्य करायचा असेल तर पर्यावरण व लोकसंख्या यामधील संतुलन राखणे अत्यावश्यक आहे. या प्रक्रियेत सामाजिक कार्यकर्त्यांची भूमिका अत्यंत महत्वाची आहे.

मुख्य शब्द: शाश्वत विकास, पर्यावरण, लोकसंख्यावाढ, सामाजिक कार्यकर्ता

प्रस्तावना

मानवाच्या शाश्वत विकासासमोरील प्रचंड आव्हानांच्या काळात आपण उभे आहोत. आपले अब्जावधी नागरिक गरिबीत जगत आहेत आणि त्यांना सन्मानाचे जीवन नाकारले जात आहे. देशांमध्ये वाढती असमानता आहे. संधी, संपत्ती आणि सत्तेची प्रचंड विषमता आहे. लिंग असमानता अजूनही एक प्रमुख आव्हान आहे. बेरोजगारी, विशेषतः तरुणांची बेरोजगारी ही एक प्रमुख चिंता आहे. जागतिक आरोग्य धोके, वारंवार आणि तीव्र नैसर्गिक आपत्ती, वाढता संघर्ष, हिंसक अतिरेकीपणा, दहशतवाद आणि संबंधित मानवतावादी संकटे आणि लोकांचे सक्तीने विस्थापन हे अलिकडच्या दशकात झालेल्या विकास प्रगतीचा बराचसा भाग उलटा करण्याचा धोका आहे.

नैसर्गिक संसाधनांचा जहास आणि पर्यावरणीय जहासाचे प्रतिकूल परिणाम, ज्यामध्ये वाळवंटीकरण, दुष्काळ, जमिनीचा जहास, गोड्या पाण्याची कमतरता आणि जैवविविधतेचा नाश यांचा समावेश आहे, मानवतेला भेडसावणाऱ्या आव्हानांची यादी वाढवतात. हवामान बदल हे आपल्या काळातील सर्वात मोठ्या आव्हानांपैकी एक आहे आणि त्याचे प्रतिकूल परिणाम सर्व देशांच्या शाश्वत विकास साध्य करण्याच्या क्षमतेला कमकुवत करतात. जागतिक तापमानात वाढ, समुद्र पातळी वाढ, महासागर आम्लीकरण आणि इतर हवामान बदलाचे परिणाम किनारी क्षेत्रे आणि सखल किनारी देशांवर गंभीरपणे परिणाम करत आहेत, ज्यामध्ये अनेक कमी विकसित देश आणि लहान बेटे विकसनशील राज्ये यांचा समावेश आहे. अनेक समाजांचे आणि ग्रहाच्या जैविक आधार प्रणालींचे अस्तित्व धोक्यात आहे.

अभ्यासाचे महत्व व आवश्यकता

मानव विकास ही केवळ आर्थिक प्रगतीची संकल्पना नसून व्यक्तीच्या सर्वांगीण उन्नतीशी निगडित आहे. शिक्षण, आरोग्य, जीवनमान, सामाजिक समानता व संधी यांचा विकास म्हणजे मानव विकास. परंतु हा विकास जर पर्यावरणीय संतुलन राखून साध्य झाला नाही तर तो अल्पकाळ टिकणारा ठरतो. पर्यावरण म्हणजे भौतिक, जैविक व सामाजिक घटकांचा एकत्रित परिणाम. हवा, पाणी, माती, जंगल, प्राणी, पक्षी, सूक्ष्मजीव आणि मानव यांचे परस्परावलंबन हेच पर्यावरणाचे वैशिष्ट्य आहे.

आजच्या औद्योगिकीकरण, शहरीकरण, जागतिकीकरण व तंत्रज्ञानाच्या युगात मानव विकासाला वेग आला आहे. मात्र या विकासांमुळे पर्यावरणीय समस्या जसे की प्रदूषण, हवामानबदल, वनतोड, पाण्याचा तुटवडा आणि जैवविविधतेचा जहास

निर्माण झाला आहे. त्यामुळे “मानव विकास” आणि “पर्यावरण” आणि “लोकसंख्यावढ” यांचा परस्परसंबंध शाश्वत विकासाच्या दृष्टीने अभ्यासणे आवश्यक ठरते.

संशोधन उद्देश

1. पर्यावरणाची सध्याची स्थिती आणि मानवी विकास प्रक्रियेमध्ये उद्भवणाऱ्या प्रमुख समस्या अभ्यासणे.
2. लोकसंख्यावाढीचा नैसर्गिक संसाधनांवर, पर्यावरणीय संतुलनावर आणि शाश्वत विकासावर होणारा परिणाम तपासणे.
3. मानवी विकास आणि पर्यावरणीय हानी यामधील संबंध शोधणे.
4. शाश्वत विकास साध्य करण्यासाठी आवश्यक उपाययोजना व धोरणांचा अभ्यास करणे.
5. पर्यावरण व लोकसंख्या संरक्षणाबाबत समाजाची भूमिका, जबाबदारी आणि जागरूकता यांचा अभ्यास करणे.

अध्ययन पद्धत

प्रस्तुत संशोधन हे दुय्यम स्त्रोतांचा वापर करून करण्यात आले आहे. सदरील संशोधन वर्णनात्मक व विश्लेषणात्मक स्वरूपाचे असून, याकरिता विविध सरकारी अहवाल, शैक्षणिक लेख, पुस्तके, संशोधन प्रबंध, वृत्तपत्रे व संकेतस्थळे इत्यादींचा वापर करण्यात आला आहे.

शाश्वत विकास

"शाश्वत विकास म्हणजे असा विकास जो भविष्यातील पिढ्यांच्या स्वतःच्या गरजा पूर्ण करण्याच्या क्षमतेशी तडजोड न करता वर्तमानाच्या गरजा पूर्ण करतो." याचा अर्थ असा की आपण शाश्वत पद्धतीने जगू शकू यासाठी आपल्या संसाधनांची आणि आपल्या लोकांची काळजी घेतली पाहिजे. शाश्वतता साध्य करण्यासाठी आपण आर्थिक, पर्यावरणीय आणि सामाजिक घटकांमध्ये समान सुसंगततेचे संतुलन राखले पाहिजे.

पर्यावरणीय शाश्वत विकास

पर्यावरणीय शाश्वतता म्हणजे आपण आपल्या नैसर्गिक संसाधनांच्या साधनांमध्ये जगत आहोत. खऱ्या पर्यावरणीय शाश्वततेत जगण्यासाठी, आपण आपल्या नैसर्गिक संसाधनांचा, जसे की साहित्य, ऊर्जा इंधन, जमीन, पाणी... इत्यादींचा शाश्वत दराने वापर करत आहोत याची खात्री करणे आवश्यक आहे. पर्यावरणीय शाश्वतता ही संपूर्ण शाश्वततेची गोंधळून जाऊ नये, ज्यासाठी आर्थिक आणि सामाजिक घटकांचे संतुलन देखील आवश्यक आहे.

मानवाचा विकास हा केवळ आर्थिक वाढ, तंत्रज्ञानाचा वापर किंवा औद्योगिक प्रगतीपुरता मर्यादित नाही. विकास म्हणजे समाजातील प्रत्येक घटकाचे जीवनमान उंचावणे, गरजा भागवणे आणि भविष्यकालीन पिढ्यांसाठीही संसाधनांचा पुरेसा साठा राखणे होय. या संकल्पनेलाच शाश्वत विकास (Sustainable Development) असे म्हटले जाते. परंतु आजच्या घडीला झपाट्याने वाढणारी लोकसंख्या, नैसर्गिक संसाधनांचा अतिरेकाने वापर, प्रदूषण, हवामान बदल व वनतोड या गोष्टींमुळे पर्यावरणाचा समतोल ढासळला असून मानवाच्या शाश्वत विकासास मोठे संकट निर्माण झाले आहे. WHO च्या (2022) अहवालानुसार, जगातील सर्वाधिक प्रदूषित शहरांमध्ये भारतातील अनेक शहरांचा समावेश आहे. हवा प्रदूषणामुळे श्वसनविकार, दमा, फुफ्फुसांचे आजार व हृदयविकार वाढत आहेत. नद्या, तलाव आणि भूजल औद्योगिक सांडपाणी, शेतीतील रासायनिक खत-कीटकनाशके आणि शहरी घनकचऱ्यामुळे दूषित झाले आहेत. नॅशनल ग्रीन ट्रिब्युनल (NGT) च्या अहवालानुसार गंगेतील आणि यमुनेतील पाण्याची गुणवत्ता बहुतांश ठिकाणी "अयोग्य" श्रेणीत आहे. जलस्रोतांचे अयोग्य व्यवस्थापन व हवामान बदलामुळे अनेक भागात पिण्याच्या पाण्याची टंचाई निर्माण झाली आहे. FAO (2020) च्या अहवालानुसार दरवर्षी जगभरात सुमारे १० दशलक्ष हेक्टर जंगलांचा न्हास होतो. भारतातसुद्धा औद्योगिकरण, रस्ते/धरणे प्रकल्प, शहरीकरणामुळे जंगलाचा मोठ्या प्रमाणावर न्हास होत आहे. वन्यजीवांचे अधिवास नष्ट होऊन जैवविविधतेचे प्रमाण घटत आहे. 2023 मध्ये IPCC (Intergovernmental Panel on Climate Change) ने जाहीर केले की, जागतिक तापमानवाढ 1.5°C पेक्षा जास्त होण्याची शक्यता आहे. भारतात याचे परिणाम म्हणजे अनियमित पावसाळा, वारंवार दुष्काळ, पूरस्थिती, उष्णतेच्या लाटा (Heatwaves) वाढणे. शेतकऱ्यांचे पीक उत्पादन कमी होत असून अन्नसुरक्षेला धोका निर्माण होत आहे. शहरी भागात घनकचऱ्याचे प्रमाण प्रचंड वाढले असून त्यातील बहुसंख्य प्लास्टिकचा आहे. CPCB

(Central Pollution Control Board) च्या अहवालानुसार भारतात दरवर्षी सुमारे 3.4 दशलक्ष टन प्लास्टिक कचरा तयार होतो, परंतु त्यातील फक्त 60% पुनर्वापर केला जातो.

लोकसंख्यावाढीचा मानवी जीवनावर होणारे दुष्परिणाम

लोकसंख्यावाढ ही 21 व्या शतकातील सर्वात मोठ्या सामाजिक, आर्थिक आणि पर्यावरणीय समस्यांपैकी एक आहे. लोकसंख्या वाढ ही नैसर्गिक आहे, पण तिचा वेग जेव्हा अत्याधिक होतो तेव्हा संसाधनांचा तुटवडा, दारिद्र्य, बेरोजगारी, प्रदूषण यांसारख्या समस्यांना सामोरे जावे लागते. संयुक्त राष्ट्र लोकसंख्या निधी (UNFPA, 2023) च्या अहवालानुसार भारताची लोकसंख्या सुमारे 142 कोटींवर पोहोचली आहे व चीनलाही मागे टाकले आहे. एवढ्या प्रचंड लोकसंख्येमुळे संसाधनांवर अभूतपूर्व दबाव आला आहे. झपाट्याने वाढणारी लोकसंख्या नैसर्गिक संसाधनांवर ताण निर्माण करत आहे. लोकसंख्यावाढ ही केवळ आकडेवारीतील बदल नाही, तर ती मानवी जीवनाच्या प्रत्येक घटकाला स्पर्श करणारी प्रक्रिया आहे.

लोकसंख्या वाढत गेली की पाणी, जमीन, जंगल, ऊर्जा यासारख्या मर्यादित नैसर्गिक संसाधनांवर प्रचंड ताण निर्माण होतो. भारतातील अनेक नद्या औद्योगिक व शहरी सांडपाणीमुळे दूषित झाल्या आहेत. ग्रामीण भागात भूजल झपाट्याने कमी होत आहे. शेतजमिनीचे क्षेत्र झपाट्याने औद्योगिक व निवासी प्रकल्पांसाठी वापरले जाते. परिणामी अन्नधान्य उत्पादनावर परिणाम होतो. इमारती, रस्ते व शेतीसाठी होणाऱ्या जंगलतोडीमुळे जैवविविधता नष्ट होत आहे.

लोकसंख्या जितकी वाढते तितकी अन्नधान्याची मागणीही वाढते. शेतजमिनीवरील दबावामुळे जमिनीची उत्पादनक्षमता घटते. शेतीमध्ये रासायनिक खतांचा व कीटकनाशकांचा अतिरेक होऊन मातीचा ऱ्हास होतो. यामुळे अन्नधान्याची कमतरता निर्माण होते आणि कुपोषणाचा प्रश्न गंभीर बनतो. FAO (2021) च्या अहवालानुसार भारतातील सुमारे 19 कोटी लोक कुपोषित आहेत. लोकसंख्या वाढ म्हणजे वाढलेले शहरीकरण, औद्योगिकीकरण आणि वाहनांची संख्या. महानगरांतील AQI धोकादायक पातळीवर आहे. WHO (2022) नुसार जगातील 20 सर्वाधिक प्रदूषित शहरांपैकी 14 भारतात आहेत. पाणी प्रदूषण: नद्यांमध्ये औद्योगिक व शहरी सांडपाणी मिसळल्याने पाण्याचा दर्जा खालावला आहे. कचरा समस्या: दररोज कोट्यवधी टन प्लास्टिक व इतर घनकचरा निर्माण होतो; त्याची विल्हेवाट मोठी समस्या ठरली आहे.

रोजगारनिर्मितीचा वेग लोकसंख्यावाढीपेक्षा खूपच कमी असल्यामुळे बेरोजगारी वाढते. बेरोजगारीमुळे दारिद्र्य वाढते व समाजात आर्थिक असमानता तीव्र होते. NITI Aayog (2020) नुसार अजूनही भारतातील सुमारे 22% लोकसंख्या बहुआयामी दारिद्र्यरेषेखाली जीवन जगते. गर्दीमुळे संसर्गजन्य रोगांचा प्रसार झपाट्याने होतो (उदा. क्षयरोग, डेंग्यू, मलेरिया). शहरी झोपडपट्ट्यांमध्ये स्वच्छतेचा व शुद्ध पाण्याचा अभाव असल्याने मुलांमध्ये कुपोषण व बालमृत्यू जास्त आहेत. हवा व पाणी प्रदूषणामुळे श्वसनविकार, हृदयविकार व त्वचारोग वाढत आहेत.

झपाट्याने वाढणाऱ्या लोकसंख्येमुळे गावे रिकामी होऊन शहरांमध्ये लोकसंख्या प्रचंड वाढते. परिणामी झोपडपट्ट्या, वाहतूक कोंडी, पाणी-स्वच्छता समस्या निर्माण होतात. मुंबई, दिल्लीसारख्या शहरांतील झोपडपट्ट्यांमध्ये लाखो लोक अतिशय कमी जागेत राहतात. लोकसंख्यावाढीमुळे शाळा व महाविद्यालयांवर ताण वाढतो. शिक्षकांची संख्या अपुरी असल्याने गुणवत्तापूर्ण शिक्षणाचा अभाव निर्माण होतो. परिणामी बेरोजगारी व दारिद्र्याचे चक्र आणखी गडद होते.

तथापि, आज आपण गरिबी निर्मूलन, आरोग्य, शिक्षण आणि अन्न सुरक्षा आणि पोषण यासारख्या सततच्या विकासाच्या प्राधान्यांसोबतच, ते आर्थिक, सामाजिक आणि पर्यावरणीय उद्दिष्टांची विस्तृत श्रेणी निश्चित करते. ते अधिक शांततापूर्ण आणि समावेशक समाजांचे आश्वासन देखील देते. ते अंमलबजावणीचे मार्ग देखील महत्त्वपूर्णपणे परिभाषित करते. आम्ही ठरवलेल्या एकात्मिक दृष्टिकोनाचे प्रतिबिंबित करताना, नवीन उद्दिष्टे आणि लक्ष्यांमध्ये खोलवरचे परस्परसंबंध आणि अनेक परस्पर घटक आहेत.

मानवाच्या शाश्वत विकासासाठी पर्यावरण व लोकसंख्या संतुलनात सामाजिक कार्यकर्त्यांची भूमिका

21 व्या शतकात लोकसंख्यावाढ आणि पर्यावरणीय हानी या दोन गंभीर समस्या मानवी जीवनासमोर उभ्या आहेत. लोकसंख्या जितकी वाढते तितका नैसर्गिक संसाधनांवर ताण वाढतो. परिणामी पाणीटंचाई, जंगलतोड, प्रदूषण, अन्नधान्याची कमतरता यांसारख्या समस्या तीव्र होतात. शाश्वत विकास (Sustainable Development) साध्य करायचा असेल तर पर्यावरण व लोकसंख्या यामधील संतुलन राखणे अत्यावश्यक आहे. या प्रक्रियेत सामाजिक कार्यकर्त्यांची भूमिका अत्यंत

महत्वाची आहे. ते लोकजागृती, धोरणे अंमलबजावणी, शिक्षण, महिलांचे सक्षमीकरण, पर्यावरण संरक्षण आणि कुटुंब नियोजन मोहिमा राबवण्यात सक्रिय भूमिका बजावतात.

शाश्वत विकास आणि लोकसंख्या-पर्यावरण संतुलन

शाश्वत विकास म्हणजे सध्याच्या पिढीच्या गरजा भागवताना भावी पिढ्यांच्या गरजांवर परिणाम होणार नाही असा विकास. (Brundtland Report, 1987) लोकसंख्या वाढीचा थेट परिणाम पाणी, जमीन, जंगल, ऊर्जा यासारख्या संसाधनांवर होतो. जर लोकसंख्या नियंत्रणात नसेल, तर शाश्वत विकास शक्य नाही. त्यामुळे लोकसंख्या नियंत्रण आणि पर्यावरण संवर्धन हे परस्परपूरक घटक आहेत.

सामाजिक कार्यकर्त्यांची भूमिका

• लोकजागृती व शिक्षण

लोकसंख्या नियंत्रण, कुटुंब नियोजन आणि पर्यावरणीय संतुलन या विषयांवर जागृती मोहीम राबवणे. ग्रामीण व शहरी भागातील लोकांना शाश्वत जीवनशैली (उदा. वृक्षलागवड, पाणी बचत, कचरा व्यवस्थापन) याबद्दल मार्गदर्शन करणे. शाळा-महाविद्यालयांमध्ये पर्यावरण शिक्षण कार्यक्रम आयोजित करणे.

• महिला सक्षमीकरण

महिला शिक्षणाला प्रोत्साहन देणे, कारण साक्षर व स्वावलंबी महिला कुटुंब नियोजन व आरोग्य निर्णयांमध्ये महत्वाची भूमिका निभावते. स्वयं-सहायता गटांद्वारे (Self Help Groups) महिलांना आर्थिक व सामाजिक सशक्तीकरण मिळवून देणे. बालविवाह रोखण्यासाठी जनजागृती करणे.

• कुटुंब नियोजनाचा प्रचार

कुटुंब नियोजन पद्धती, लहान कुटुंबाचे फायदे याबाबत माहिती देणे. प्राथमिक आरोग्य केंद्रांबरोबर समन्वय साधून गर्भनिरोधक साधने व सेवा उपलब्ध करून देणे. युवक व किशोरवयीन मुलांमध्ये लैंगिक व प्रजनन आरोग्याविषयी जागरूकता वाढवणे.

• पर्यावरण संवर्धन

वृक्षलागवड, जलसंधारण, कचरा व्यवस्थापन, प्लास्टिक विरोधी मोहिमा राबवणे. स्थानिक समुदायाला पर्यावरणपूरक शेती, सेंद्रिय शेती याबाबत मार्गदर्शन करणे. उद्योग-संस्थांना प्रदूषण नियंत्रणासाठी जनदबाव गट तयार करणे.

• धोरण अंमलबजावणी व जनसहभाग

शासनाच्या राष्ट्रीय लोकसंख्या धोरण (2000), राष्ट्रीय पर्यावरण धोरण (2006), SDG उद्दिष्टे (2030) यांची माहिती लोकांपर्यंत पोहोचवणे. स्थानिक लोकांच्या सहभागातून (Participatory Approach) विकासकामे राबवणे. आदिवासी व ग्रामीण समाजाच्या पारंपरिक पर्यावरणीय ज्ञानाचा उपयोग करून शाश्वत उपजीविकेचे मार्ग सुचवणे.

• संशोधन व मार्गदर्शन

लोकसंख्या व पर्यावरण समस्यांवर स्थानिक पातळीवरील अभ्यास व सर्वेक्षण करणे. त्या आधारे शासन व स्वयंसेवी संस्थांना शिफारसी करणे. युवकांना स्वयंसेवक म्हणून घडवणे.

निष्कर्ष

मानवाच्या शाश्वत विकासातील सर्वात मोठे आव्हान म्हणजे पर्यावरणीय हानी व लोकसंख्यावाढ. आजची स्थिती चिंताजनक आहे – हवा व पाणी प्रदूषण, हवामान बदल, वनतोड, संसाधनांचा तुटवडा या समस्या मानवी जीवनमानावर थेट परिणाम घडवत आहेत. लोकसंख्यावाढीचे दुष्परिणाम बहुआयामी आहेत. ती मानवी जीवनाच्या प्रत्येक क्षेत्राला – अन्न, पाणी, आरोग्य, रोजगार, शिक्षण, पर्यावरण – थेट बाधित करते. शाश्वत विकास साध्य करायचा असेल तर लोकसंख्यावाढीवर नियंत्रण आणणे, संसाधनांचा विवेकपूर्ण वापर करणे, महिला शिक्षण व सक्षमीकरण करणे, ग्रामीण विकास व रोजगारनिर्मितीला प्रोत्साहन देणे आवश्यक आहे. मानवाच्या शाश्वत विकासासाठी लोकसंख्या वाढ नियंत्रणात ठेवणे आणि पर्यावरणाचे संरक्षण करणे अत्यंत महत्वाचे आहे. या संतुलनासाठी सामाजिक कार्यकर्त्यांची भूमिका केंद्रस्थानी आहे. ते केवळ जनजागृती करीत नाहीत, तर धोरणे लोकांपर्यंत पोहोचवणे, महिला व युवकांना सशक्त करणे, पर्यावरणपूरक उपक्रम राबवणे, आणि समाजाला शाश्वत विकासाच्या दिशेने नेणे हे त्यांचे मुख्य कार्य आहे. शाश्वत विकासासाठी पुढील बाबी अत्यावश्यक आहेत –

उपाययोजना (शिफारसी)

1. कुटुंब नियोजन कार्यक्रम बळकट करणे.
2. महिला शिक्षण व सक्षमीकरण वाढवणे.
3. ग्रामीण भागात रोजगारनिर्मिती करून शहरी स्थलांतर कमी करणे.
4. नवीकरणीय ऊर्जेचा वापर वाढवणे.
5. पर्यावरण संरक्षण कायद्यांची काटेकोर अंमलबजावणी.
6. जनजागृती मोहिमा राबवून नागरिकांना जबाबदार बनवणे.
7. नवीकरणीय ऊर्जा साधनांचा वापर
8. पर्यावरणपूरक तंत्रज्ञान
9. पर्यावरण शिक्षण व जनजागृती
10. प्रभावी धोरणे व कायद्यांची काटेकोर अंमलबजावणी

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पाण्याचे वाढते संकट व त्याच्यावरील उपाय : एक आढावा

प्रा. डॉ. नंदा पंढरीनाथ कंधारे

कै. न्हानाभाऊ म. तु. पाटील कला महाविद्यालय मारवड ता.अमळनेर जि. जळगांव

गोष्टवारा -

पाण्याची टंचाई ही जागतिक पातळीवर एक गंभीर समस्या आहे. भारतासारख्या जलसंपन्न असणाऱ्या देशात सुद्धा गंभीर परिणाम होत आहेत. भारतामध्ये लोकसंख्या वाढ होत आहे. वाढत्या लोकसंख्येचे परिणाम प्रत्येक घटकावर होत आहेत लोकसंख्या वाढीचा परिणाम भूजल पातळीवर देखील होत आहे. त्यामुळे भारतातील अनेक ठिकाणी पाणीटंचाई निर्माण झाली आहे.

जगातील पाणीसाठ्यापैकी फक्त 4% पाणी भारताकडे आहे व जगाच्या लोकसंख्येच्या 18% लोकसंख्या भारताची आहे. पाण्याची समस्या खूप गंभीर होत चाललेली आहे. जागतिक तापमान खूप वाढलेले असल्यामुळे भूजल पातळी खालावत आहे. भारतामध्ये औद्योगीकरण, शहरीकरण, पावसाचे प्रमाण कमी, भूजलाचा जास्त उपसा, हवामान बदल अशा अनेक कारणांमुळे पाण्याची टंचाई निर्माण होत आहे.

प्रस्तावना -

भूजल ही नैसर्गिक संपत्ती आहे. पाणी मातीतून आणि खडकातून खाली झिरपते आणि तेच पाणी नंतर विहिरीमध्ये आणि बोरवेल (कुपनलिका) मध्ये येते. भूजल हे पाण्याचे पाणी व सिंचन करण्यासाठी तसेच उत्पादन यासाठी वापरले जाते. पूर्वी भूजलाचा उपयोग मर्यादित होता. पाण्याचा उपसा मानव किंवा प्राण्यांच्या शक्तीच्या आधारावर केला जात होता. बैल, घोडे, गाढव, उंट हे पाणी रहाट ओढण्याचे काम किंवा पाणी आणण्याचे काम करत असत. परंतु जेव्हा मानवाने प्रगती केली तेव्हा पाण्याचा आणि भूजल असा वापर वाढला. त्यामुळे पाण्याची टंचाई जाणवू लागली. 19 व्या शतकानंतर औद्योगिकीकरणामुळे तंत्रज्ञानात वाढ झाली आणि तंत्रज्ञानाच्या सहाय्याने पाण्याचा उपसा वाढला त्यामुळे भूजल पातळी कमी होण्यास सुरुवात झाली.

भारतामध्ये भूजलाचा उपसा जास्त प्रमाणात होतो. भारतामध्ये शेतीसाठी पाण्याचा उपसा केला जातो. शेतकऱ्यांनी आपापल्या शेतीसाठी विहीर खोदण्यास सुरुवात केली. कोरडवाहू शेतीचे रूपांतर भूजल शेतीवर आधारित झाले. 1980 नंतर बोरवेल, स्टेपवेल, ट्युबवेलची संख्या वाढली. ड्रिलिंग तंत्रज्ञानाच्या मदतीने भूजलासाठी खोलवर जाण्याचे प्रमाण वाढले. तसतसे जमिनीतील पाणी कमी होण्यास सुरुवात झाली.

भूजलाचे स्रोत विहीर बोरवेल झरा हे स्रोत आहेत. या स्रोतांना भूजलामधून पाणी मिळत असते. हे स्रोत वेगवेगळे असले तरी या स्रोतांना भूजलामधून पाणी मिळत असते आणि ते वेगवेगळ्या ठिकाणी असले तरी ते परस्पर पूरक आहेत. याचा विचार होणे गरजेचे आहे तरच भूजलाचे व्यवस्थापन करता येईल.

पाणी पृथ्वीतलावरील सर्व सजीवांसाठी अत्यावश्यक नैसर्गिक घटक आहे. पाणी जीवसृष्टीला आवश्यक आहे तसेच उद्योगधंद्यासाठी, आर्थिक विकासासाठी, शेतीसाठी आवश्यक आहे. त्यासाठी जलसंवर्धन आवश्यक आहे.

सुचक शब्द -

पाणीटंचाई, भूजल पातळी, पाण्याचे व्यवस्थापन, भूजल साठा, नैसर्गिक घटक, जलसंवर्धन.

संशोधनाचा उद्देश -

- 1) पाण्याच्या वाढत्या संकटाचे अध्ययन करणे.
- 2) पाणीटंचाई कमी करण्यासाठी उपाययोजनांचे अध्ययन करणे.

गृहीतकृत्ये -

- 1) भारतातील अनेक भागात पाणीटंचाईची समस्या जाणवत आहे.
- 2) भूजल अत्यंत महत्वाचा स्रोत आहे.
- 3) पावसाच्या पाण्याचा संचय करून जमिनीत मुरण्याची व्यवस्था केली तर भूजल पातळी वाढेल

संशोधन पद्धती -

पाण्याचे वाढते संकट व त्यावरील उपाय या विषयावर अध्ययन करत असताना दुय्यम स्रोताचा उपयोग केलेला आहे त्यामध्ये संदर्भग्रंथ, वर्तमानपत्रे, मासिके, इंटरनेटवरील माहिती यासारख्या साधनांचा उपयोग केलेला आहे.

संशोधनाचे महत्व -

प्रस्तुत शोधनिबंधाचा उद्देश पाण्याच्या वाढत्या संकटावर उपाययोजना करणे आहे. पाण्याची टंचाई ही एक गंभीर समस्या आहे. त्यासाठी भूजलाचे व्यवस्थापन करावे, बोरवेल आधारे पाणी उपसा टाळावा तसेच जल स्रोताचे संरक्षण करणे गरजेचे आहे. पावसाच्या पाण्याचा संचय करावा इत्यादी अशा अनेक उपाय योजना करून पाण्याच्या समस्येची टंचाई कमी

करता येऊ शकते. पाण्याच्या वाढत्या संकटावर उपाययोजना याचे अध्ययन केले आहे. याचा उपयोग समाजातील सर्वसामान्य अभ्यासक, समाजातील लोकांना होऊ शकेल म्हणून हा विषय महत्वाचा वाटतो.

पाणीटंचाई कमी करण्यासाठी उपाय योजना -

1) भूजलाचे सुप्रशासन आणि व्यवस्थापन -

भूमीतील पाण्याचे व्यवस्थापन होणे गरजेचे आहे. पाण्याच्या बाबतीत आणीबाणीची स्थिती येते त्यावेळी शासकीय यंत्रणा कार्यान्वित होऊन विहिर, बोरवेल सार्वजनिक कामांसाठी वापरत असल्याचे आपल्याला दिसते. गावातील सर्व जमीन मालकांनी एकत्र येऊन सामूहिक निर्णय घेतले तरच पाण्याचे व्यवस्थापन होईल. भूजल व्यवस्थापनामध्ये भूजलाचा साठा वाढवणे आणि त्यांच्या उपशावर नियंत्रण ठेवणे या दोन गोष्टी महत्वाच्या आहेत.

भारतामध्ये भूजलाच्या व्यवस्थापनाबद्दल 2000 पासून चर्चा सुरू झाली. सरकारने काही चांगले निर्णय घेतले आहे. मनरेगामध्ये, भूजलधारक, पुनर्भरणाचा समावेश कसा करता येईल. अटल जल कार्यक्रम, नैसर्गिक शेती, जलजीवन मिशन प्रत्येक घरामध्ये आणणे या सर्व गोष्टींमध्ये भूजल अंतर्भूत आहे. याचा अर्थ आपण भूजलाच्या सुशासनाकडे आलेलो आहोत. परंतु यानंतर भूजल व्यवस्थापनाकडे लक्ष देणे आवश्यक आहे.

2) बोअरवेल आधारे पाणी उपसा करणे टाळावे -

भूजल अत्यंत महत्वाचा स्रोत आहे त्यासाठी त्याचा वापर मर्यादित व्हायला हवा. जास्त प्रमाणात बोअरवेल निर्माण करून पाण्याचा भरमसाठ उपसा झाला तर भूजल पातळीला धोका निर्माण होऊ शकतो. अलीकडच्या काळात पाण्याची मागणी प्रचंड वाढली आहे. ती पूर्ण करण्यासाठी सरकारी यंत्रणा कमी पडत आहे, म्हणून बोअरवेलद्वारे पाणी काढण्याचे प्रमाण वाढलेले आहे. यामुळे भूजल साठा वापरण्याचे प्रमाणही दरवर्षी वाढत आहे. त्यासाठी ज्या पद्धतीने भूजल साठ्याचा वापर होत आहे त्या प्रमाणात पावसाचे पाणी जमिनीत मुरत नाही. त्यामुळे भूजल पातळी कमी झालेली आहे त्यासाठी रेन वॉटर हार्वेस्टिंग केले जावे. त्याचबरोबर बोअरवेल आधारे जास्त पाणी उपसा करण्याची टाळावे.

3) जल स्रोतांचे संरक्षण -

जलस्रोत नदी, नाले, तळे हे आहेत. या जलस्रोतांचे संरक्षण होणे आवश्यक असते आज अनेक अलग जलस्रोत नाहीसे होत आहेत. औद्योगिकीकरणामुळे, शहरीकरणामुळे विकास होत आहे. परंतु विकासामुळे अनेक जलस्रोतांच्या ठिकाणी इमारती बांधल्या जातात. तसेच जलस्रोतांच्या ठिकाणी प्रदूषण वाढले आहे त्यामुळे जलस्रोतांचे प्रमाण कमी होत आहे. त्यासाठी जलस्रोताचे जतन केले पाहिजे. जल स्रोतातील होणारे प्रदूषण टाळले पाहिजे.

4) भूजलाचे व्यवस्थापन -

भारतातील झपाट्याने होणारे औद्योगिकीकरण नागरीकरण यामुळे वृक्षतोड खूप मोठ्या प्रमाणात वाढलेली आहे. वृक्षतोडीमुळे जमिनीत पाणी जिरपण्याचे प्रमाण खूप कमी झाले आहे. यामुळे भूजल पातळी झपाट्याने कमी होत आहे प्रत्येक कुपनलिकेवर रेन वॉटर हार्वेस्टिंगची यंत्रणा लावणे आवश्यक आहे. तसेच छतावरील पावसाच्या पाण्याचे नियोजन करणे गरजेचे आहे कुपनलिकेद्वारा भूजलाचा उपसा मोठ्या प्रमाणात होत आहे. ग्रामीण भागात 85% पाणी पुरवठा भूजलावर अवलंबून आहे तर 60 टक्के पाणीपुरवठा भूजलावर अवलंबून आहे. शेतीसाठी ही भूजलाचा वापर होतो यामुळे भूजलाचे व्यवस्थापन करणे गरजेचे आहे.

5) जल संरक्षण -

जल संरक्षण करणे अत्यंत आवश्यक आहे जर पाण्याची गळती होत असेल तर खूप मोठ्या प्रमाणात पाणी वाया जाते दैनंदिन जीवन जगत असताना अतिरिक्त पाण्याचा वापर टाळावा, पाणी वाया जाणार नाही याची काळजी घ्यावी व पाणी बचत करणे आवश्यक आहे. अशाप्रकारे जल संरक्षण केले तर त्यातून पाण्याची बचत होऊ शकते.

6) पर्जन्य जलसाठा करणे -

भारतामध्ये पाण्याचे साठे कमी आहेत. त्यासाठी शासनाद्वारे पावसाच्या पाण्याच्या साठ्या संदर्भात विविध योजना कार्यान्वित केल्या जात आहेत. केंद्र सरकारद्वारे विहिरी सुधारणा कार्यक्रम राबविण्यात येत आहे तसेच ठिकठिकाणी पाझर तलाव, मोठ-मोठे खडे करून पावसाचे पाणी अडवण्याचे काम सुरू आहे. परंतु अजूनही भारतातील पाण्याची टंचाई कमी झालेली नाही त्यासाठी प्रत्येक गावातील प्रत्येक व्यक्तीने पावसाचे पाणी आपल्या शेतात किंवा घरी अडविण्याचे व जमिनीत कसे मुरेल यासाठी प्रयत्न करणे गरजेचे आहे. त्यामुळे भूगर्भातील जलसाठा वाढेल आणि भारतातील पाण्याची टंचाई कमी होईल.

7) पावसाच्या पाण्याचा संचय करणे

पावसाचे पाणी जमिनीवर पडल्यावर वाहून जाते हे वाहणारे पाणी अडवून ते जास्तीत जास्त जमिनीत कसे मुरेल अशी व्यवस्था आवश्यक आहे त्यामुळे भूजल पातळीत वाढ होईल.

घरावर पडणारे पावसाचे पाणी साठवण्यासाठी घराजवळ खड्डा खोदून पाण्याची साठवण करावी आणि साठवलेले पाणी घरगुती वापरासाठी उपयोगात आणावे. तसेच घराशेजारी विहीर खोदून किंवा आड करून त्यात पावसाचे पाणी गोळा करावे

आणि त्याचा वापर घरासाठी करावा. ग्रामीण भागात शेतामध्ये शेततळे निर्माण करून पावसाच्या पाण्याचा साठा करावा व ते पाणी उन्हाळ्यात शेतीसाठी वापरावे.

अति पावसाच्या प्रदेशामध्ये डोंगर माथ्यावर पावसाच्या पाण्याची साठवण करून हेच पाणी नंतर शेतीसाठी वापरता येईल.

8) शेतीसाठी पाण्याचा वापर विचारपूर्वक करावा -

शेतीच्या पिकांना पाणी बऱ्याच ठिकाणी पाटाने दिले जाते त्याऐवजी ठिबक सिंचन तुषार सिंचन किंवा मडका सिंचन या द्वारे शेतीसाठी पाण्याचा वापर करावा

9) पाण्यासंदर्भात कडक कायदे केले जावेत -

सध्याच्या काळात बोरवेलची संख्या झपाटाने वाढत आहे. दोनशे ते चारशे फूट खोलीपर्यंत जाऊन पाणी उपसा केला जातो. त्यामुळे भूजलाची पातळी खालावत आहे त्यासाठी पाण्यासंदर्भात कडक कायदे केले जावे.

10) पाणलोट व्यवस्थापन करावे -

पाणलोट व्यवस्थापन म्हणजे पाणलोट क्षेत्रात पडणारे पावसाचे पाणी बांधबंधाऱ्यांच्या साहाय्याने अडवणे व अडवलेले पाणी जमिनीत मुरवणे, वृक्षारोपण करून पावसाचे पाणी अडवणे होय.

पाणलोट व्यवस्थापन केले तर जमिनीची पाणी साठवण्याची क्षमता वाढते त्यामुळे उत्पादनात वाढ होण्यास मदत होते. ज्या ठिकाणी पावसाचे प्रमाण खूप कमी असते त्या ठिकाणी पाण्याची तीव्र टंचाई निर्माण होते. तेथे पाणलोट व्यवस्थापनाच्या माध्यमातून पाण्याचा संचय करावा तसेच पावसाची पाणी जमिनीमध्ये मुरवावे यामुळे भूजल पातळी वाढते. पाणलोट व्यवस्थापनामुळे पिण्याच्या पाण्याची समस्या निर्माण होणार नाही तसेच ओसाड भागांमध्ये सामाजिक वनीकरण करता येईल.

निष्कर्ष -

1. भारतातील अनेक भागात पाणीटंचाईची समस्या निर्माण झालेली आहे.
2. भारतातील लोकसंख्या वाढीचा परिणाम भूजल पातळीवर होत आहे.
3. भारतामध्ये औद्योगीकरण, शहरीकरण, पावसाचे प्रमाण कमी, भूजलाचा जास्त उपसा, हवामान बदल अशा अनेक कारणांमुळे पाण्याची टंचाई निर्माण होत आहे.
4. बोअरवेल, स्टेपवेल, ट्यूबवेलची संख्या वाढली. ड्रिलिंग तंत्रज्ञानाच्या मदतीने भूजलासाठी खोलवर जाण्याचे प्रमाण वाढले. त्यामुळे जमिनीतील पाणी कमी झाले.
5. पाणी पृथ्वीतलावरील सर्व सजीवांसाठी आवश्यक घटक आहे.
6. पाणी उद्योगधंद्यांसाठी, शेतीसाठी, आर्थिक विकासासाठी आवश्यक आहे.
7. भूजल साठ्याचा वापर दरवर्षी वाढत आहे. परंतु त्या प्रमाणात पावसाचे पाणी जमिनीत मुरत नाही.
8. जलस्त्रोत हे औद्योगीकरणामुळे शहरीकरणामुळे कमी होत आहे.
9. पाण्याची समस्या कमी करण्यासाठी सर्वच स्तरावर प्रयत्न सुरू आहेत, तरी पाणीटंचाईची समस्या वाढतच आहे.

शिफारशी -

1. भूजलाचा उपसा करणे बंद करावा
2. पाणी सर्व सजीवांसाठी आवश्यक घटक आहे त्यासाठी जलसंवर्धन आवश्यक आहे.
3. भूजलाचे व्यवस्थापन करावे त्यामध्ये भूजलाचा साठा वाढवणे आणि त्याच्या उपशावर नियंत्रण ठेवणे गरजेचे आहे.
4. बोअरवेल आधारे पाणी उपसा करणे टाळावे.
5. पावसाचे पाणी जमिनीत मुरण्यासाठी रेन वॉटर हार्वेस्टिंग केले जावे.
6. जलस्त्रोत नदी, नाले, तळे हे आहेत त्यांचे संरक्षण होणे आवश्यक आहे.
7. लोकांमध्ये पाणी संवर्धनाबद्दल जागरूकता वाढवणे.
8. भूगर्भातील जलसाठा वाढविण्यासाठी प्रयत्न होणे गरजेचे आहे.
9. शेतीसाठी ठिबक सिंचन, तुषार सिंचन, मडका सिंचन याद्वारे पाण्याचा वापर करावा.
10. पाणलोट व्यवस्थापन करावे
11. पाण्यासंदर्भात कडक कायदे केले जावेत.

सारांश -

पाण्याची उपयुक्तता सर्व सजीवांसाठी, शेतीसाठी व उद्योगधंद्यांसाठी आहे. त्यामुळे पाणी हा घटक महत्वाचा आहे. भारतातील वाढत्या लोकसंख्येची वाढती समस्या पाण्याचा वाढता वापर लक्षात घेता पाण्याचे नियोजन अत्यावश्यक आहे.

पाण्याच्या समस्या निराकरणासाठी सर्वच क्षेत्रात सर्वच स्तरावर निरनिराळे प्रयत्न सुरू आहेत. राष्ट्रीय पातळीवर नदीजोड प्रकल्पाचा आराखडा सुरू होत आहे. भारतातील नद्यांतील जलसाठ्याचे प्रमाण विषम असल्याने नदी जोड प्रकल्प आवश्यक झालेला आहे.

पाणी आडवा पाणी जिरवा योजनेअंतर्गत भूजलाची विहिरीची पाणी पातळी उंचावण्याचे प्रयोग सुरू आहेत त्यासाठी मोठ्या प्रमाणात पाझर तलावांची निर्मिती झालेली आहे. दुष्काळाचा सामना करण्यासाठी पाझर तलाव निर्माण करण्यात आले आहे अजूनही पाझर तलावांची कामे सुरू आहे. असे असले तरी भारतातील पाणीटंचाईची समस्या वाढतच आहे त्यासाठी भूजल पाण्याचा उपसा करणे टाळले पाहिजे तसेच जलसंवर्धन करणे गरजेचे आहे. जलसंवर्धन म्हणजे जे पाणी उपलब्ध आहे त्याचे संरक्षण करणे आणि पाण्याचा अपव्यय टाळणे आवश्यक आहे.

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महात्मा गांधीजींचे पर्यावरण विषयक विचार – एक समाजशास्त्रीय अध्ययन

प्रा. डॉ. चव्हाण सुखदेव गोविंदराव

समाजशास्त्र विभाग तथा सदस्य समाजशास्त्र अभ्यास मंडळ, स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड माधवराव पाटील महाविद्यालय, पालम, जि. परभणी.

सारांश गोष्टवारा :-

महात्मा गांधीजींच्या लेखनात भाषणात आणि व्यवहारात विकासाचा पर्यायी मार्ग कसा असावा आणि महत्वाचे म्हणजे मानवाचे पर्यावरणाशी संबंध कसे असावेत याविषयी अनेक मूलभूत तत्वे दिसून येतात. खऱ्या अर्थाने महात्मा गांधीजींनी विकासाचा जो पर्यायी मार्ग सुचविलेला आहे, तो मानवाची नैतिक आणि आध्यात्मिक उन्नती, विकेंद्रीत आर्थिक विकास, ग्रामस्वराज्याची संकल्पना, सत्याग्रहाची संकल्पना, जागतिक शांतता आणि संघर्षाचे शांततापूर्ण समाधान या प्रमुख तत्त्वावर आधारलेली आहे. आज त्या पर्यावरणात महात्मा गांधीजींनी केलेल्या लिखाणात आढळून येते. महात्मा गांधीजींचे पर्यावरण विषयक नितीशास्त्र खालील विधानातून अत्यंत स्पष्टपणे व्यक्त झाले आहे. मानवाच्या मूलभूत गरजा भागविण्याचे साधने निसर्गात भरपूर प्रमाणात उपलब्ध आहेत. पण प्रत्येकांच्या लोभी वृत्तीची पूर्ती करण्याची साधने मात्र पुरेशी उपलब्ध नाहीत. लोभी वृत्तीने मानवाने निसर्गातील साधनसंपत्तीची लूट करू नये, असे गांधीजींचे स्पष्ट मत होते. अन्न, हवा, पाणी या निसर्गातून उपलब्ध होणाऱ्या आहेत, पण मानवाने आपल्या गरजा वाढवित गेल्यास, निसर्गाची साधन संपत्ती पुरेशी पडणार नाही. त्यामुळे आपल्या गरजा मर्यादित ठेवण्यावर मनुष्याने भर द्यावा असे गांधीजींनी म्हटले आहे. गांधीजींचे विचार चिरंजीवी विकासाच्या प्रक्रियेचा पुरस्कार करणारे होते. खेड्याचा विकास म्हणजेच देशाचा विकास अशी त्यांची प्रेरणा होती. विकासाच्या प्रक्रियेत नागरीकरण आणि औद्योगिकरण यावर भर दिला गेल्यास खेड्याचे शोषण होत जाईल असे गांधीजींचे स्पष्ट मत होते. त्याचबरोबर खेड्याच्या विकासासाठी गांधीजींनी राजकीय आणि आर्थिक सत्तेच्या विकेंद्रीकरणावर मोठ्या प्रमाणात भर दिलेला आहे.

प्रस्तावना :-

21व्या शतकातील दुसरी महत्त्वपूर्ण समस्या म्हणजे दिवसेंदिवस पर्यावरणाचा होणारा ऱ्हास होय. मानवी जीवन जगताना त्यावर योग्य नियंत्रण ठेवू शकतो आणि सोबतच पर्यावरणाचा समतोल विकास साधने या गोष्टी पर्यावरण पूरक शाश्वत विकासाचा इ.स. 1987च्या ब्रुडलँड रिपोर्टच्या अहवालानुसार भविष्यकालीन पिढीच्या गरजांना धक्का न लावता वर्तमान काळातील पिढीच्या गरजा पूर्ण करणे याला शाश्वत विकास म्हटले आहे. आर्थिक, सामाजिक आणि पर्यावरणीय व्यवस्थेचा दर्जा राखून माणूस आणि समाजाच्या सर्व आशा आकांक्षांची पूर्तता करणे हे शाश्वत विकासाचे उद्दिष्ट राहिले आहे. येथे सामाजिक, आर्थिक आणि पर्यावरणीय व्यवस्था असा त्रिकोणीय विचार सांगितला आहे. महात्मा गांधीजींनी त्या काळात आपल्या विचारातून, कार्यातून व कृतीतून जगासमोर पर्यावरणाचा स्वसंरक्षणाचा, संवर्धनाचा विचार जगासमोर ठेवला आहे तो आज उपयुक्त ठरतो. अर्थव्यवस्थेचा विकास हा माणसाचे आयुष्य अधिकाधिक सुखद करण्याचा प्रयत्न करतो हे करताना एकूणच संपूर्ण समाजाचा विचार एकात्मपणे होणे गरजेचे आहे. या दोन घटकांबरोबर पर्यावरणाचा समतोल देखील राखला जाणे अपेक्षित आहे. मनुष्यकेंद्रीत पर्यावरण पूरक विकास अर्थात शाश्वत विकास ही गांधीजींची विकास विषयक संकल्पना होती. पर्यावरणाचा असमतोल झाल्यास मनुष्य जातीचे अस्तित्व धोक्यात येईल. निसर्गाचे शोषण करून एकाच व्यक्तीचा विकास न करता निसर्गासोबत राहून सर्वांचा विकास साधणारी सर्वोदय समाज ही संकल्पना गांधीजींनी मांडली. पर्यावरण ऱ्हास प्रदूषणाचे संकट दिवसेंदिवस वाढत आहे. पर्यावरण स्नेही जीवनशैली हा शब्द वारंवार वापरली जाते. शालेय अभ्यासक्रमात पर्यावरण हा विषय समावेश करण्यात आलेला आहे. या संकटाची वेळीच दखल घेतली नाही तर मानवाचे भवितव्य अंधारमय होईल. या संकटाचे

मूळ शोधून त्यांचे निराकरण करता येईल. त्याची मूळ कारण म्हणजे आजची बदलती जीवनशैली होय. नव्या जीवनशैलीचा शोध घेताना गांधीजींच्या दिशेने वाटचाल करावी लागणार आहे. म. गांधींचा “खेड्याकडे परत चला” हा नारा पर्यावरणाच्या रक्षणासाठी अनुकूल ठरणारा आहे. त्याचे हे म्हणणे पर्यावरणीय संरक्षणासाठी मार्गदर्शक व उपयोगी ठरणारे आहे.

प्रस्तुत शोधनिबंधाचे उद्देश :-

1. महात्मा गांधीजींचे पर्यावरणीय विचार आणि नितीशास्त्र समजून घेणे.
2. महात्मा गांधीजींचे ग्रामीण विकासाविषयीचे विचार आणि ग्रामीण पुनर्रचनेविषयीचे विचार जाणून घेणे.
3. महात्मा गांधीजींचे शाश्वत पर्यावरणाबद्दलचे विचार किती व्यापक होते याचा आढावा घेणे.
4. सद्यःस्थितीत गांधीजींचे पर्यावरण विषयक विचार किती उपयुक्त आहेत हे यांचा अभ्यास करणे.

प्रस्तुत शोधनिबंधाचे गृहीतके :-

1. महात्मा गांधीजींचे पर्यावरणविषयक विचार सद्यःस्थितीत अत्यंत उपयोगी आहेत.
2. महात्मा गांधीजींचे पर्यावरण विषयक विचार भावी पिढीसाठी मार्गदर्शक ठरणारे आहेत.

संशोधन पद्धती :-

प्रस्तुत शोधनिबंधासाठी विश्लेषणात्मक संशोधन पद्धतीचा उपयोग करण्यात आलेला आहे. तथ्यसंकलनासाठी द्वितीय स्रोतांचा उपयोग करण्यात आला असून त्यामध्ये प्रामुख्याने संदर्भ ग्रंथ, विविध तज्ञांचे शोधनिबंध, मासिके, पाक्षिके, संकेतस्थळे अशा प्रकारच्या विविध माध्यमांचा उपयोग करण्यात आला आहे. प्रस्तुत शोधनिबंध सारांशरूपाने खालीलप्रमाणे आहे.

महात्मा गांधीजींचे पर्यावरणविषयक विचार :-

प्रामुख्याने “हिंद स्वराज्य” 1909 या ग्रंथात महात्मा गांधीजींनी पाश्चात्य आधुनिक संस्कृतीवर कडाडून टिका केली आहे. पाश्चात्य संस्कृती ही केवळ तार्किकतेवर आणि उपयुक्तवादी विचारसरणीवर आधारलेली आहे. आध्यात्मिक-नैतिक विकासाला कोणतेही स्थान पाश्चात्य संस्कृतीत नाही. “हिंद स्वराज्य” हा ग्रंथ महात्मा गांधीजींनी दक्षिण आफ्रिकेत असताना लिहिला होता. पण पाश्चात्य संस्कृतीची, त्यातील मूल्यांची आधुनिकीकरणाच्या प्रक्रियेची आणि औद्योगिकीकरणाच्या दुष्परिणामाची जवळून ओळख गांधीजींनी ते भारतात आल्यावर झाले. 1914 साली ते भारतात परत आल्यावर त्यांनी भारतातील खेड्याची सामाजिक आर्थिक स्थिती समजून घेण्याचा प्रयत्न केला. त्यांनी भारत भ्रमण केले आणि चंपारण्य आणि खेडा येथे शेतकऱ्यांची लढाई संघटीत केली. त्यावेळेस गांधीजींना वसाहतवाद ही केवळ वर्णविरोधाची व्यवस्था नसून ती आर्थिक शोषणाची व्यवस्था आहे हे उमगले. म्हणूनच त्यांनी ब्रिटीशांच्या जुलमी आणि शोषणात्मक राज्यव्यवस्थेविरुद्ध लढा उभारला. महात्मा गांधीजींचा लंडन आणि अमेरिकेच्या पद्धतीच्या औद्योगिकीकरणावर आधारीत विकास मार्गाला प्रचंड विरोध होता. 20 डिसेंबर 1928च्या “यंग इंडिया” या नियतकालिकेत गांधीजींनी असे म्हटले होते की, भारतात पाश्चात्यांच्या धरतीवरील औद्योगिकीकरण कधीच होऊ नये. एका लहानशा बेटावरील आर्थिक वसाहतवादी व्यवस्थेने संपूर्ण जगाला बांधून ठेवले आहे. जगातील देशांचे शोषण केले आहे. भारतही जर आर्थिक शोषणाच्या याच व्यवस्थेचा अवलंब केले तर पृथ्वीवरील नैसर्गिक साधनसंपत्तीचा प्रचंड विनाश घडून येईल. म्हणूनच पाश्चात्य पद्धतीच्या औद्योगिकीकरणाला आणि आधुनिकीकरणाच्या प्रक्रियेला गांधीजींनी विरोध केला. या विकासाच्या मार्गात प्रचंड उत्पादन वाढवण्यावर भर आहे. माणसाचे केवळ भौतिक जीवन अधिक संपन्न करण्यावर भर आहे. या सध्याच्या गरजांवर भर आहे. पण भविष्यकालीन गरजांचा विचार नाही. त्यामुळे पाश्चात्य विकास मार्ग हा मानवाकडून इतर मानवाकडे शोषण करण्यावर भर देणारा आहे. असे गांधीजींचे प्रतिपादन होते. महात्मा गांधीजींचे पाश्चिमात्तीकरण पाश्चात्य पद्धतीचे औद्योगिकीकरण आणि आधुनिकीकरण तसेच एकंदर पाश्चात्य संस्कृती या बाबीकडे मानवी शोषणाच्या व्यवस्था तसेच त्याचा अवलंब म्हणजे नैसर्गिक ज्ञासाच्या प्रक्रियेला चालना देणाऱ्या मार्गाचा अवलंब या दृष्टीने पाहिले. दुर्दैवाने स्वातंत्र्योत्तर भारतात पाश्चात्य विकास मार्गाचा औद्योगिकीकरणाचा मार्ग अवलंबण्यात आला आणि त्यामुळेच भारतातील पर्यावरण विषयक समस्यांनी उग्ररूप धारण केले आहे.

गांधीजींचे ग्रामीण विकासाविषयीचे विचार आणि ग्रामीण पुरचनेविषयीचे विचार :-

महत्मा गांधीजींच्या विकासाच्या संकल्पनेत खेड्याच्या विकासाला त्यांनी अधिक प्राधान्य दिले होते, खेड्याचा विकास म्हणजेच देशाचा विकास अशी त्यांची प्रेरणा होती. विकासाच्या प्रक्रियेत नागरीकरण आणि औद्योगिकरण यावर भर दिला गेल्यास खेड्याचे शोषण होत जाईल असे त्यांचे स्पष्ट मत होते. खेड्याच्या विकासासाठी त्यांनी राजकीय, आर्थिक सत्तेच्या विकेंद्रीकरणावर भर दिला. त्यांनी ग्रामस्वराज्याचा संकल्पना या विचारावर भर देणारी आहे. खेड्यांचे तेथील लोकांचेच तिथल्या आर्थिक, राजकीय आणि सामाजिक बाबींवर नियंत्रण असावे असे त्यांना वाटत होते. 1937 साली हरिजनमध्ये त्यांनी स्वतःच्या संकल्पनेतील आदर्श भारतीय खेड्याचे चित्र रेखाटले आहे. आदर्श भारतीय खेड्याबद्दल ते लिहितात, आदर्श खेड्याबाबतच्या विचारात पर्यावरणाची गुणवत्ता टिकून ठेवण्याविषयीचे तसेच पर्यावरण व्यवस्थापनाबद्दलचे विचार प्रकर्षाने जाणवतात. त्यांनी स्थानिक पातळीवरील खेड्याच्या आत्मनिर्भरतेला महत्त्व दिलेले आहे. पाणी आणि चराऊ करणे यासारख्या नैसर्गिक साधनसंपत्तीचे सामुहिक व्यवस्थापन केले जावे असे म्हटले आहे. महत्मा गांधीजींचे पर्यावरण विषयक नितीशास्त्र खालील विधानातून अत्यंत स्पष्टपणे व्यक्त झाले आहे. मानवाच्या मूलभूत गरजा भागविण्याची साधने निसर्गात भरपूर प्रमाणात उपलब्ध आहेत. पण प्रत्येकाच्या लोभी वृत्तीने माणसाने विसर्गातील साधनसंपत्तीची लूट करू नये असे गांधीजींना सुचवावयाचे होते. अन्न, पणी, हवा या निसर्गातूनच उपलब्ध होणाऱ्या आहेत. पण मानवाने आपल्या गरजा वाढवित गेल्यास निसर्गाची साधनसंपत्ती पुरेशी पडणार नाही. त्यामुळे आपल्या गरजा मर्यादित ठेवण्यावर लोकांनी भर द्यावा असे गांधीजींचे मत होते. आधुनिक पर्यावरणवाद्यांनी पर्यावरण संरक्षणासाठी महत्त्वपूर्ण अशा विविध बाबी सांगितल्या आहेत. त्यात विकेंद्रीत स्थानिक पातळीवरील विविध वस्तूंचे उत्पादन, यंत्रांचा शक्य तितका मर्यादित वापर, प्रादेशिक आणि स्थानिक पातळीवर लोकांना आर्थिक स्वायत्तता असावी, उत्पादन आणि उत्पादन प्रक्रियेवर उत्पादन आणि उपभोक्ते यांचे संयुक्त नियंत्रण युगाला विरोध आणि अण्विक शास्त्राच्या वापराला विरोध या ठळक बाबींचा समावेश होतो. खऱ्या अर्थाने आजच्या भारतातील चिपको आंदोलन, नर्मदा बचाव आंदोलन, यासारख्या आंदोलनातील कार्यकर्त्यांनी पर्यावरण संरक्षणासाठी पर्यावरणाचा होत असलेल्या न्हासाला विरोध करण्यासाठी याच शांततामय मार्गाचा अवलंब केला.

प्रस्तुत शोधनिबंधाचे निष्कर्ष :-

वरील सर्व विवेचनातून स्पष्ट होते की गांधीजींचे पर्यावरण विषयक विचार हे शाश्वत विचार आहेत. प्रदुषण व पर्यावरणाचा न्हास ही समस्या आजच निर्माण झाली असे नाही तर फार पूर्वीपासून मानवजातीला भेडसावीत आहे. त्यासंबंधी वेळोवेळी चिंतनही झालेले आहे. परंतु पर्यावरणाचे प्रश्न सुटू शकले नाहीत. उलट पूर्वीच्या समस्येपेक्षा अधिक भीतीदायक समस्या आज दिसून येत आहेत. म्हणून पर्यावरणाच्या संदर्भात पर्यावरणीय परिषदेत चर्चा करण्याबरोबरच गांधीजींच्या विचारानुसार संयम आणि हव्यासापेक्षा आवश्यकतेला प्राधान्य दिल्यास आज निर्माण झालेल्या पर्यावरणीय समस्या पासून संपूर्ण मानवतेची सुटका होईल. म्हणून आजच्या चंगळवादी भोगवादी जीवनाला नियंत्रित करण्यासाठी महत्मा गांधीजींचे विचार महत्त्वाचे आहेत. पर्यावरणीय समस्येच्या संदर्भात आंतरराष्ट्रीय स्तरावर प्रयत्न करणे गरजेचे झाले आहे. व्यक्तिगत जीवन जगताना गांधीजींच्या विचार संपूर्ण मानव जातीने स्वीकार करणे काळाची गरज आहे. जर सर्व स्तरातून गांधीजींच्या विचारांचे आचरण झाले तर भारतीय पर्यावरण व्यवस्थेत मोठ्या प्रमाणात परिवर्तन होणार यात कोणतेही दुमत नाही.

संदर्भ ग्रंथ सूची :-

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प्रस्तावना

मानव जीवन जगत असताना स्वतःचा उदरनिर्वाह करण्यासाठी वेगवेगळ्या आर्थिक क्रिया करत असतो. तसेच स्वतःचे जीवन सुखकर करण्यासाठी प्रयत्न करत असतो. या सुकर जीवन पद्धतीमध्ये वेगवेगळ्या आर्थिक क्रियांमध्ये प्राथमिक आर्थिक क्रिया, द्वितीय कार्तिक क्रिया, तृतीय व चतुर्थक अशा आर्थिक क्रियांचा समावेश होतो. त्यापैकी संशोधनासाठी घेतलेल्या सेवा व्यवसाय हा तृतीय आर्थिक क्रियांचा भाग आहे. हा अनुत्पादक असा व्यवसाय असून या व्यवसायात प्रत्यक्षरीत्या कुठलेही कच्चा माल प्रक्रिया करणे, यासारख्या क्रिया होत नाहीत.

परंतु ज्या प्रदेशांमध्ये सेवा व्यवसाय अधिक असतात. त्या प्रदेशाचा आर्थिक विकास हा मोठ्या प्रमाणात होत असतो. हा आर्थिक विकास करण्यासाठी किंवा होण्यासाठी त्यावर पर्यावरणीय घटकांचा प्रभाव पडत असतो. म्हणजेच अशा सेवा केंद्रांच्या विकासात आर्थिक घटक व पर्यावरणीय घटक हे महत्वाचे ठरतात म्हणून सदरील शोध पत्रिकेमध्ये सेवा केंद्रावर परिणाम करणाऱ्या आर्थिक व पर्यावरणीय घटकांचा अभ्यास करण्यात आलेला आहे. प्रामुख्याने हिंगोली जिल्ह्यातील सेवा केंद्रांचा भौगोलिक अभ्यास करण्याच्या दृष्टिकोनातून सुरुवात केली असता. प्रथमता येथील सेवा केंद्रांवर परिणाम करणाऱ्या घटकांचा अभ्यास करीत असताना असे लक्षात आले की सेवा केंद्रावर परिणाम करणाऱ्या वेगवेगळ्या घटकांपैकी आर्थिक व पर्यावरणीय घटक अभ्यासणे गरजेचे आहे.

1) अभ्यासाची उद्दिष्टे.

- हिंगोली जिल्ह्यातील सेवा केंद्राची सद्यस्थिती जाणून घेणे.
- आर्थिक घटक (उत्पन्न, रोजगार शेती, उत्पादन) यांचा सहभाग केंद्रावर होणारा परिणाम अभ्यासणे.
- पर्यावरणीय घटक (हवामान, पर्जन्य, दुष्काळ,) यांचा सेवा केंद्रावरील परिणाम अभ्यासणे.
- हिंगोली जिल्ह्यातील तालुका निहाय सेवा केंद्रांचे वितरण अभ्यासणे
- भविष्यासाठी शिफारशी व सुधारणा सुचवणे.

2) अभ्यासाची गरज व महत्त्व.

- हिंगोली जिल्ह्यातील ग्रामीण लोकसंख्या ही आर्थिक विकासासाठी सेवा केंद्रांवर आधारित आहे.
- हिंगोली जिल्ह्याच्या आर्थिक विकास पर्यावरणीय घटकांचा परिणाम आहे.
- नवीन धोरण आखणे व अंमलबजावणीसाठी अभ्यासाची गरज आहे.

४) संशोधन पद्धती.

माहिती संकलन पद्धती

अ) प्राथमिक तथ्य संकलन

ग्रामीण वसाहतीचे सर्वेक्षण, निरीक्षण पद्धत, व प्रश्नावली चा आधार सदरील शोध पत्रिकेसाठी घेण्यात आला आहे.

ब) दुय्यम तथ्य संकलन.

दुय्यम स्वरूपाचे तथ्य संकलन करण्यासाठी शासकीय स्तरावरील आकडेवारी व हिंगोली जिल्ह्याचे सांख्यिकीय कार्यालय व कृषी विभाग यांच्या अहवालाचा आधार तसेच दैनिक पत्रे, मासिके इत्यादींचा आधार घेण्यात आला आहे.

५) विश्लेषण

आर्थिक घटक.

अ) शेती

शेती हा हिंगोली जिल्ह्यातील महत्त्वाचा आर्थिक व्यवसाय आहे. परंतु शेती हा व्यवसाय पूर्णतः निसर्गावर आधारित असल्यामुळे त्यातून मिळणारे उत्पन्न हे शाश्वत स्वरूपात नाही. येथील शेती केवळ उदरनिर्वाह स्वरूपात अधिक प्रमाणात केलेली दिसून आलेली आहे. शेतीच्या उत्पन्न जसे अनिश्चित आहे तसेच शेतीतून मिळालेल्या उत्पन्नाला मिळणारा भाव म्हणजे त्याची खरेदी विक्री ही सुद्धा शेती उत्पादकाच्या अतिरिक्त नसून त्याची किंमत कृषी उत्पन्न बाजार समिती अथवा व्यापारी ठरवतात त्यामुळे शेतकऱ्याचा झालेला खर्च वगळता त्यातून मिळणाऱ्या नफा हा नगण्य स्वरूपाचा आहे. त्यासाठी शेती व्यवसायाच्या विकासास चालना मिळावी म्हणून खरेदी विक्री सेवा केंद्र हे अधिक प्रबळ आणि सक्षम स्वरूपाची आणि व्यापक स्वरूपाचे बनवणे गरजेचे आहे ज्यामध्ये खाजगी वाटा हा कमी प्रमाणात असायला हवा, तर सरकारी हस्तक्षेप हा अधिक असेल तोही योग्य रास्त भाव देणार आहे तरच शेती व्यवस्थापन हे चांगल्या प्रकारे होऊ शकेल किंवा शेती करणाऱ्या योग्य उत्पन्नाचा नफा मिळू शकेल. म्हणून हिंगोली जिल्ह्यातील सेवा केंद्रावर परिणाम करणारा शेती हा महत्त्वाचा असा आर्थिक घटक आहे. जिल्ह्यातील अधिक शेती मान्सूनवर अवलंबून असल्यामुळे अनियमित पाऊस व दुष्का यामुळे शेतकऱ्याचे उत्पन्न कमी होते. अतिवृष्टी झाल्यास पिकांचे मोठ्या प्रमाणात नुकसान होते. यामुळे हा शेती विषयक खरेदी विक्री सेवा केंद्रावर परिणाम करणारा महत्त्वाचा आर्थिक घटक ठरतो.

ब) वाहतूक

सेवा केंद्रावर परिणाम करणारा दुसरा महत्त्वाचा आर्थिक घटक म्हणजे वाहतूक होय. हिंगोली जिल्ह्यामध्ये आजही बऱ्याच भागात कच्चे रस्ते आहेत ग्रामीण भाग शहरी भागाशी पूर्णतः जोडलेले नाहीत वर्षातील अनेक दिवस हे ग्रामीण भाग शहरापासून दूर राहतात. विशेषतः पावसाळा ऋतू म्हणजेच जून ते सप्टेंबर या कालावधीमध्ये मोठ्या प्रमाणात ग्रामीण भाग शहरी भाग हे एकमेकांपासून नैसर्गिक आपत्तीमुळे विलग होतात. लोहमार्ग या जिल्ह्यात केवळ एकशे आठ किलोमीटर अंतराचा आहे. जलमार्गाचा विकास या जिल्ह्यामध्ये झालेला नाही. केवळ राष्ट्रीय मार्ग हे दोन गेलेले आहेत. त्याचा फारसा उपयोग होत असल्या दिसून येत नाही. म्हणजेच आपण या ठिकाणी असे स्पष्टपणे नमूद करू शकतो की हिंगोली जिल्ह्यामध्ये वाहतूक व दळणवळण व्यवस्थित चा फारसा विकास झालेला नाही त्यामुळे येथील वाहतूक सेवा केंद्रावर त्याचा परिणाम झालेला दिसून येतो.

क) नागरीकरण

कोणत्याही प्रदेशाच्या विकासात चालना मिळण्यासाठी त्या प्रदेशातील नागरीकरणाचा वेग हा अधिक असेल, तर तेथील रोजगार प्राप्ती. औद्योगिक विकास, शैक्षणिक विकास, आरोग्य विकास यासारख्या सुविधांची कमतरता राहत नाही. त्यामुळे अधिक लोक हे शहरी भागाशी जोडले जाऊ शकतात. परंतु हिंगोली जिल्ह्यातील नागरिकरण प्रक्रिया ही खूप संथ गतीने होत आहे. त्यामुळे येथील आरोग्य सेवा केंद्र शैक्षणिक सेवा केंद्र औद्योगिक सेवा केंद्र यांचा विकास झालेला नाही.

ड) बाजार भावातील अस्थिरता

शेतीतून मिळालेल्या उत्पन्नास बाजारामध्ये योग्य भाव मिळेलच याची खात्री देता येत नाही. कधी शेतीमालाचे भाव वधारलेले असतात. तर कधी अचानक खाली कोसळले असतात. त्यामुळे शाश्वत स्वरूपात असा बाजारभाव मिळेल याची खात्री देता येत नाही. सतत बाजारात असलेली अस्थिरता त्यामुळे बाजार सेवा केंद्रावर परिणाम होतो. येथील आर्थिक उलाढाली काही प्रमाणात कमी होते

इ) आधुनिक तंत्रज्ञानाचा अभाव

हिंगोली जिल्ह्यातील सेवा केंद्रावर परिणाम करणारा महत्त्वाचा आर्थिक घटक म्हणजे येथील सेवा केंद्राला आधुनिक तंत्रज्ञानाची जोड लाभली नाही. मग ते शालेय सेवा केंद्र, असेल शेती खरेदी विक्री बाबतची सेवा केंद्र असेल, आरोग्य सेवा केंद्र,

वाहतूक -दळणवळण मध्ये डाक सेवा केंद्र तसेच आठवडी बाजार सेवा केंद्र यांना आधुनिक तंत्रज्ञानाची सांगड फारशी घालता आलेली नाही. उद. संगणकीय बिलाची निर्मिती. वाहतुकीसाठी अत्याधुनिक साधने. शित करण्याची व्यवस्था. अत्याधुनिक गोदामी, इत्यादी त्यामुळे येथील सेवा केंद्राचा विकाससावर परिणाम करणारा हा महत्वाचा आर्थिक घटक ठरतो.

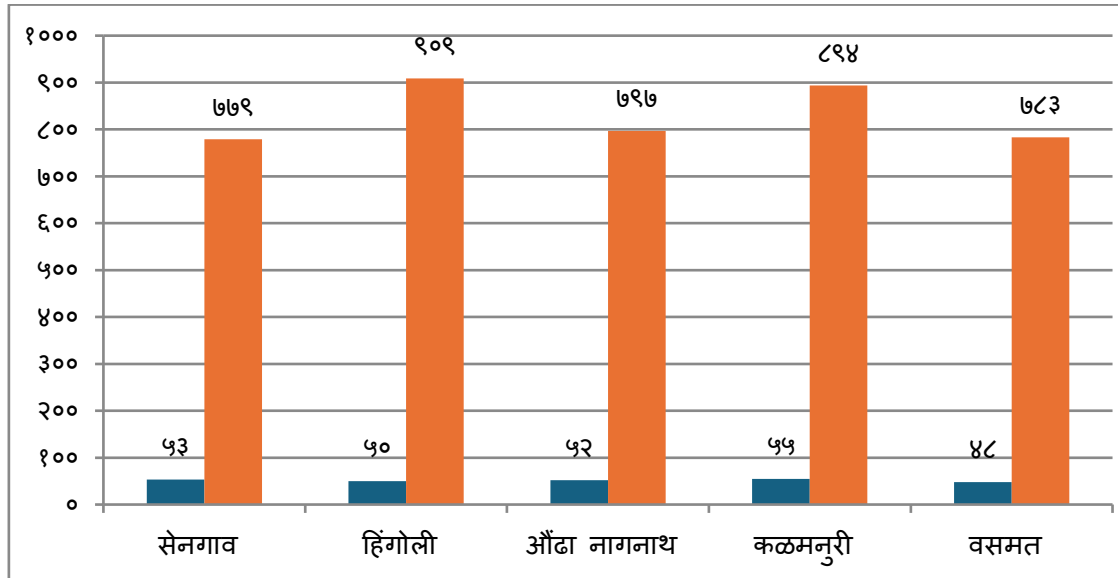
६) पर्यावरणीय घटक.

१) पर्जन्य.

हिंगोली जिल्ह्यातील पर्जन्यमानाची स्थिती ही अनिश्चित स्वरूपाची आहे. त्यामुळे येथील शेतीचा विकास फारसा झालेला नाही. त्याचबरोबर ओसाड प्रदेश व दुष्काळग्रस्त प्रदेशात मोठ्या प्रमाणात वाढ झालेली आहे. इसवी सन 2023 24 च्या पर्जन्य स्थितीची माहिती तालुका निहाय खालील प्रमाणे आहे. साधारणपणे खालील तक्त्याचे निरीक्षण केले असता असे निदर्शनास येते की, सर्वाधिक पर्जन्य हे हिंगोली तालुक्यात त पडत असून सर्वात कमी पर्जन्यमान हे वसमत तालुक्यामध्ये आहे. परंतु वसमत तालुक्यामध्ये सिंचन व्यवस्था म्हणजेच कालव्यांची व्यवस्था असल्यामुळे तेथे लागवडीखालील क्षेत्र अधिक आहे.

हिंगोली जिल्ह्यातील तालुका निहाय पर्जन्य दिवसांची संख्या व एकूण पर्जन्य. 2023-2024

अ.क्र.	तालुका	पर्जन्य दिवसांची संख्या	पर्जन्य मि.मी मध्ये
1	सेनगाव	53	789
2	हिंगोली	50	909
3	औंढा नागनाथ	52	797
4	कळमनुरी	55	894
5	वसमत	48	783
	जिल्हा एकूण सरासरी	52	834



तालुका निहाय पर्जन्य वितरण..2023-2024

वरील आलेखाचे निरीक्षण केले असता आपणास लक्षात येते की हिंगोली जिल्ह्यातील सेवा केंद्रावर पर्जन्यमान या पर्यावरणीय घटकाचा कसा विपरीत परिणाम होतो. अनिश्चित पर्जन्य व अनिश्चित कालावधी त्यामुळे येथील सेवा केंद्र प्रामुख्याने खरेदी विक्री बाबतचे त्यामध्ये नियमित राहत नाही म्हणून हिंगोली जिल्ह्यातील सेवा केंद्रावर पर्जन्य वितरणाचा प्रभाव पडतो.

2) तापमान

हा सेवा केंद्रावर परिणाम करणारा पर्यावरणीय महत्वाचा असा घटक आहे. हिंगोली जिल्ह्यातील तापमान उन्हाळा ऋतूमध्ये सरासरीपेक्षा अधिक असते जवळपास 45 ते 49 अंशापर्यंत येथील तापमान गेलेले आढळून आले आहे. त्यामुळे येथील मानवी जीवनावर त्याचा विपरीत परिणाम होताना निरीक्षणास येते. उन्हाळ्यामध्ये उष्माघाताचे प्रमाण काही प्रमाणात वाढलेले आढळून आले आहे. अति उष्णतेमुळे अनेक त्वचेचे आजार वाढलेले आहेत. त्यामुळे येथील आरोग्य सेवा केंद्रावर अतिरिक्त ताण पडत आहे तसेच आरोग्य सेवा केंद्रामध्ये आधुनिक तंत्रज्ञानाचा अभाव असल्यामुळे कमी वेळेत योग्य असे आजारांची निदान होत नाही. त्याचा विपरीत परिणाम म्हणून आरोग्यविषयक समस्यांचे निराकरण लवकर होणे शक्य होत नाही.

३) प्रदूषण.

दिवसेंदिवस वाढलेल्या प्रदूषण जसे की हवा प्रदूषण, जलप्रदूषण, भू प्रदूषण याचा विपरीत परिणाम हिंगोली जिल्ह्यातील सेवा केंद्रावर होताना दिसून येतो. प्रामुख्याने कृषीमध्ये रासायनिक खतांचा वाढलेला वापर यामुळे हे खते जमिनीत विरघळून जमिनीतील उत्पादकता व सूक्ष्मजीव नष्ट करत आहेत. म्हणजेच कालांतराने ही जमीन नापीक होण्याच्या मार्गावर आहे. याच शेतीतील पाणी ज्यामध्ये रसायने मिसळले हे ओढ्या नाल्यांच्या साह्याने नद्यांना मी स्वतः चालल्यामुळे नद्यातील जैवविविधता नष्ट होण्याच्या मार्गावर आहे. वाढत्या वाहनांची संख्या व वाढते औद्योगीकरण यामुळे होणारे हवा प्रदूषण ज्यातून मानवी आरोग्यात वर त्याचे विपरीत परिणाम होत आहेत, श्वसनाचे आजार दिवसेंदिवस वाढताना दिसून येत आहेत. त्याचा थेट परिणाम आरोग्य सेवा केंद्रावर झालेला दिसून येतो.

४) जैवविविधता.

मानवाने स्वतःच्या स्वार्थासाठी मोठ्या प्रमाणात केलेली जंगलतोड व जमिनीचा केलेला वापर जसे की घरे बांधणे, रस्ते तयार करणे यासाठी केवळ भौतिक सुविधा मिळाव्यात, म्हणून वनसंपत्तीचा ऱ्हास केलेला आहे. त्यामुळे वनातील वनौषधी असतील त्याचबरोबर वेगवेगळे वन्य जीव, प्राणी यांचा अधिवास नष्ट झाल्यामुळे, काही प्राणी हे नामशेष होण्याच्या मार्गावर आहेत. त्याचबरोबर विटा तयार करणाऱ्या उद्योगांनी जमिनीची मोठ्या प्रमाणात धूप केलेली आहे. जमिनीवरील माती ही वीट उद्योगांना वापरल्यामुळे अनेक जमिनी या खडकाळ बनलेले आहेत त्यामुळे कृषी सेवा केंद्र व वनांच्या साह्याने होणारे पर्यटन सेवा केंद्र यांच्यावर पर्यावरणीय घटकांचा परिणाम झालेला दिसून येतो.

निष्कर्ष.

वरील विषयाचा संशोधनात्मक अभ्यास केला असता असे निदर्शनास येते की हिंगोली जिल्ह्यातील सेवा केंद्रावर आर्थिक व पर्यावरणीय घटकांचा थेट परिणाम झालेला दिसून येतो.

- 1) हिंगोली जिल्ह्यातील आरोग्य सेवा केंद्रावर अतिरिक्त ताण पडतो.
- 2) कृषी सेवा केंद्राचा फारसा विकास झालेला नसल्यामुळे हिंगोली जिल्ह्यातील व्यक्तीचे दरडोई उत्पन्न कमी आहे
- 3) हिंगोली जिल्ह्यातील मानवी आरोग्य निर्देशांक निम्न स्वरूपाचा आहे.
- 4) हिंगोली जिल्ह्यातील वाहतूक सेवा केंद्राचा फारसा विकास झालेला नाही.
- 5) तेथील व्यक्तीचे दरडोई उत्पन्न कमी असल्यामुळे विद्यार्थ्यांच्या उच्चशिक्षणावरती खर्च कमी केला जातो. म्हणजेच शिक्षण सेवा केंद्रावर सुद्धा आर्थिक घटकांचा परिणाम होतो.

संदर्भ.

- १) जिल्हा सांख्यिकी कार्यालय अहवाल -2024हिंगोली
- २) कृषी पणन मित्र मासिक
- ३) कृषी दैनंदिनी
- ४) जिल्हा परिषद हिंगोली. आरोग्य विभाग माहिती पत्रक
- ५) संगणकीय महाजाल.

मानव विकास आणि पर्यावरण

डॉ. साबणे अशोक गंगाराम

इतिहास विभाग प्रमुख, कै. बापूसाहेब पाटील एकंबेकर महाविद्यालय, हाणेगाव ता देगलूर जि नांदेड

गोषवारा

मानव विकास हा मानवी जीवनाचा केंद्रबिंदू असून तो शिक्षण, आरोग्य, उत्पन्न, सामाजिक सुरक्षा आणि जीवनमान यांवर आधारित असतो. दुसरीकडे पर्यावरण हे मानवी अस्तित्वाचे मूलाधार आहे. सध्याच्या जागतिक परिस्थितीत हवामान बदल, प्रदूषण, संसाधनांची नासाडी व जैवविविधतेचा ऱ्हास या समस्या मानव विकासास गंभीर आव्हान निर्माण करतात. मानव विकास आणि पर्यावरण यांचा संबंध परस्परावलंबी असून शाश्वत विकासाची संकल्पना या दोन्हीचा समतोल राखण्याचा प्रयत्न करते. पर्यावरणीय ऱ्हासामुळे आरोग्यावर नकारात्मक परिणाम, कृषी उत्पादनातील घट, शहरी जीवनमानातील असमतोल आणि सामाजिक संरचनेत बदल घडतो. या संशोधन लेखात मानव विकास आणि पर्यावरण यांचा परस्परसंबंध, जागतिक आणि भारतीय परिप्रेक्ष्यातील आव्हाने तसेच शाश्वत उपाययोजना यांचा विचार करण्यात आला आहे. पर्यावरण शिक्षण, नूतनीकरणीय ऊर्जा वापर, हरित अर्थव्यवस्था, आंतरराष्ट्रीय करारांचे पालन आणि पारंपरिक भारतीय संसाधन व्यवस्थापन पद्धती या घटकांद्वारे मानव विकास व पर्यावरण संरक्षण यांचा संतुलित मार्ग शोधता येतो. त्यामुळे भावी पिढ्यांसाठी आरोग्यदायी, सुरक्षित आणि शाश्वत जीवनमान सुनिश्चित करण्यासाठी पर्यावरणपूरक धोरणे अवलंबणे ही काळाची गरज आहे.

मुख्य शब्द : मानव विकास, पर्यावरण, शाश्वत विकास, हवामान बदल, पर्यावरणीय ऱ्हास, हरित अर्थव्यवस्था, संसाधन व्यवस्थापन, सामाजिक सुरक्षितता, आरोग्य, शिक्षण.

प्रस्तावना

मानव विकास हा केवळ आर्थिक वाढीशी निगडित नसून तो मानवी जीवनाच्या सर्वांगीण प्रगतीचा सूचक आहे. शिक्षण, आरोग्य, जीवनमान, उत्पन्न, सामाजिक सुरक्षा, पर्यावरणीय संतुलन व सांस्कृतिक मूल्ये हे घटक एकत्र येऊन मानव विकासाची व्याप्ती निश्चित करतात. संयुक्त राष्ट्र संघाने मांडलेला *Human Development Index (HDI)* हा मानवी प्रगतीचा महत्त्वपूर्ण निर्देशक आहे. परंतु, या निर्देशकात केवळ आर्थिक परिमाण विचारात घेतले जात नाहीत, तर आरोग्य, ज्ञान व जीवनमान या घटकांचा देखील समावेश होतो.

पर्यावरण हा मानव अस्तित्वाचा पाया आहे. हवा, पाणी, माती, जंगल, खनिजे, ऊर्जा यांसारख्या नैसर्गिक संसाधनांचा योग्य वापर झाल्यास मानव विकासाची गती वेगवान होते. परंतु या संसाधनांचा अतिरेकी वापर, औद्योगिकीकरण, शहरीकरण, वनोंत्पादन, प्रदूषण आणि हवामान बदलामुळे पर्यावरणीय असंतुलन निर्माण होत आहे. परिणामी आरोग्याच्या समस्या, कृषी उत्पादनातील घट, पिण्याच्या पाण्याची कमतरता, नैसर्गिक आपत्ती, आणि जैवविविधतेचा ऱ्हास वाढत आहे. ही परिस्थिती मानवी जीवनमानावर प्रतिकूल परिणाम घडवते.

आजच्या घडीला “मानव विकास” आणि “पर्यावरण संरक्षण” हे दोन स्वतंत्र घटक न मानता त्यांचा एकात्मिक अभ्यास करणे आवश्यक आहे. शाश्वत विकास (Sustainable Development) ही संकल्पना या पार्श्वभूमीवर उदयास आली. ब्रंटलँड आयोगाने (1987) दिलेल्या व्याख्येनुसार – “शाश्वत विकास म्हणजे वर्तमान पिढीच्या गरजा भागवताना भावी पिढ्यांच्या गरजा धोक्यात न आणणे.” म्हणजेच मानव विकास साधताना पर्यावरणीय संसाधनांचे संरक्षण व संवर्धन करणे अनिवार्य आहे.

भारतीय परिप्रेक्ष्यात पारंपरिक पाणी व्यवस्थापन, वृक्षसंवर्धन, ग्रामसहभाग, लोकसाहित्य आणि संस्कृतीमध्ये पर्यावरणपूरक जीवनशैलीचे दर्शन घडते. परंतु आधुनिक विकास प्रक्रियेमुळे ही जीवनशैली मागे पडली आहे. परिणामी विकासाचा वेग वाढला असला तरी पर्यावरणीय संकटे तीव्र झाली आहेत.

यामुळे मानव विकासाच्या धोरणांमध्ये पर्यावरणीय दृष्टिकोनाचा समावेश करणे ही काळाची गरज आहे. या संशोधनातून मानव विकास आणि पर्यावरण यांचा परस्परसंबंध, त्यातील आव्हाने आणि शाश्वत उपाययोजना यांचा सखोल अभ्यास करण्यात येणार आहे.

संशोधन उद्दिष्टे

1. मानव विकास आणि पर्यावरण यांतील परस्पर संबंधांचा अभ्यास करणे.

2. शाश्वत विकास (Sustainable Development) या संकल्पनेच्या पार्श्वभूमीवर मानव विकासाचा विचार करणे.
3. पर्यावरणीय ज्ञासाचा शिक्षण, आरोग्य व जीवनमानावर होणारा परिणाम मांडणे.
4. शाश्वत मानव विकासासाठी पर्यावरण संरक्षणाची भूमिका स्पष्ट करणे.

साहित्य समीक्षा

मानव विकास आणि पर्यावरण यांतील नातेसंबंधाबद्दल गेल्या काही दशकांत अनेक संशोधक, विचारवंत आणि आंतरराष्ट्रीय संस्थांनी महत्त्वपूर्ण कार्य केले आहे. या अभ्यासांचा आढावा घेतल्यास मानव विकास हा केवळ आर्थिक प्रगतीचा मुद्दा नसून तो पर्यावरणीय सुसंवादावर अवलंबून असल्याचे स्पष्ट होते.

1. अमर्त्य सेन यांचे योगदान :

अर्थशास्त्रज्ञ अमर्त्य सेन (1999) यांनी “Development as Freedom” या ग्रंथात मानवी विकासाला स्वातंत्र्य आणि क्षमता यांच्याशी जोडले आहे. त्यांचे *Capability Approach* असे सांगते की खरी प्रगती म्हणजे लोकांना त्यांचे जीवनमान सुधारण्यासाठी निवडी व संधी उपलब्ध करून देणे. पर्यावरणीय संसाधनांचा अभाव ही मानवी क्षमतांच्या विस्तारात अडथळा ठरते.

2. UNDP व मानवी विकास अहवाल :

1990 पासून UNDP ने *Human Development Report* प्रकाशित करून मानव विकास सूचकांक (HDI) जगासमोर ठेवला. या अहवालांमध्ये स्पष्ट केले आहे की शिक्षण, आरोग्य व उत्पन्न यांसोबत पर्यावरणीय शाश्वतता हा घटकही मानव विकासात निर्णायक आहे. 2011 च्या Human Development Report मध्ये हवामान बदल व पर्यावरणीय धोके हे मानवी विकासासाठी मोठे आव्हान असल्याचे नमूद करण्यात आले आहे.

3. ब्रंटलँड आयोग व शाश्वत विकास :

ब्रंटलँड आयोगाच्या (1987) “Our Common Future” या अहवालाने शाश्वत विकासाची संकल्पना मांडली. या संकल्पनेनुसार – “वर्तमान पिढीच्या गरजा पूर्ण करताना भावी पिढ्यांच्या गरजा धोक्यात न आणणे” हेच खरे विकासाचे तत्त्व आहे. यात पर्यावरण संरक्षण आणि मानव विकासाचा समन्वय साधण्यावर भर देण्यात आला आहे.

4. भारतीय परिप्रेक्ष्यातील अभ्यास :

भारतातील गाडगीळ आणि गुहा (1995) यांच्या *Ecology and Equity* या ग्रंथात विकास प्रक्रियेतील पर्यावरणीय असमानता अधोरेखित करण्यात आली आहे. ग्रामीण व आदिवासी समाजांवर पर्यावरणीय ज्ञासाचे परिणाम अधिक तीव्र होतात, असे त्यांनी स्पष्ट केले. योजना आयोग व निती आयोगाच्या अहवालांमध्येही आरोग्य, शिक्षण व रोजगारावर पर्यावरणीय संकटांचा थेट प्रभाव दाखवण्यात आला आहे.

5. औद्योगिकीकरण व शहरीकरणावरील अभ्यास :

विविध संशोधनांनुसार, औद्योगिकीकरण आणि शहरीकरणामुळे रोजगारनिर्मिती वाढली असली तरी प्रदूषण, जलसंकट आणि संसाधनांची नासाडी प्रचंड वाढली आहे. यामुळे मानव विकासाचे काही पैलू वेगवान झाले तर काहींवर प्रतिकूल परिणाम झाला.

6. आंतरराष्ट्रीय सहकार्य :

पॅरिस करार (2015), क्योटो प्रोटोकॉल (1997) यांसारख्या आंतरराष्ट्रीय करारांद्वारे जगभरात पर्यावरण संरक्षण आणि मानव विकासाचा समन्वय साधण्याचा प्रयत्न होत आहे. अनेक संशोधन अहवालांमध्ये असे नमूद आहे की आंतरराष्ट्रीय सहकार्याशिवाय पर्यावरणीय समस्या सोडवणे अशक्य आहे.

मानव विकास आणि पर्यावरणीय परस्पर संबंध

मानव विकास आणि पर्यावरण यांचा संबंध परस्परावलंबी आहे. मानवाच्या अस्तित्वासाठी हवा, पाणी, अन्न, ऊर्जा, जमीन, जंगल आणि जैवविविधता या घटकांची आवश्यकता असते. या संसाधनांवर मानव विकासाची पायाभरणी होते. परंतु या संसाधनांचा अतिरेकी वापर व नासाडी झाली तर पर्यावरणीय संतुलन बिघडते आणि त्याचा प्रत्यक्ष परिणाम मानव विकासावर होतो.

आरोग्य व पर्यावरण

स्वच्छ हवा आणि पाणी हे मानवी आरोग्यासाठी मूलभूत आहेत. वायुप्रदूषणामुळे श्वसनाचे विकार, हृदयविकार आणि कर्करोग यांसारखे आजार वाढतात. जलप्रदूषणामुळे पोटाचे आजार, कुपोषण व बालमृत्यूचे प्रमाण वाढते. त्यामुळे आरोग्य निर्देशांक खालावतो व मानव विकास सूचकांकावर नकारात्मक परिणाम होतो.

शिक्षण व पर्यावरण

पर्यावरणीय आपत्ती – पूर, दुष्काळ, भूकंप, वादळ – यामुळे शैक्षणिक पायाभूत सुविधा उद्ध्वस्त होतात. शाळा व महाविद्यालये बंद पडतात. मुलांचे शिक्षण खंडित होते. परिणामी मानवी भांडवलाची निर्मिती कमी होते.

अर्थव्यवस्था व पर्यावरण

औद्योगिकीकरण, शहरीकरण आणि तंत्रज्ञान यांमुळे रोजगारनिर्मिती व उत्पन्न वाढते, पण याच वेळी प्रदूषण, जंगलतोड व संसाधनांचा ऱ्हास होतो. नैसर्गिक संसाधनांवरील दबाव वाढल्याने कृषी उत्पादन घटते, किंमतवाढ होते आणि गरीब व ग्रामीण समाजावर सर्वाधिक परिणाम होतो.

सामाजिक सुरक्षितता व पर्यावरण

पर्यावरणीय असंतुलनामुळे स्थलांतर, दारिद्र्य व सामाजिक असमानता वाढते. दुष्काळग्रस्त किंवा पूरग्रस्त भागातील लोकांना रोजगार व सुरक्षिततेसाठी स्थलांतर करावे लागते. त्यामुळे सामाजिक संरचनेत अस्थिरता निर्माण होते.

यावरून स्पष्ट होते की –

- पर्यावरणीय संतुलन असल्यास मानव विकासाची गती वेगवान होते.
- पर्यावरणीय ऱ्हास झाल्यास आरोग्य, शिक्षण, अर्थव्यवस्था व सामाजिक सुरक्षितता या सर्वांवर नकारात्मक परिणाम होतो.
- शाश्वत विकासाचे तत्त्व म्हणजे या परस्परसंबंधाचा तोल राखणे.

अशा प्रकारे मानव विकास आणि पर्यावरण हे स्वतंत्र नसून एकमेकांचे पूरक आहेत. जर पर्यावरणाचे संवर्धन झाले तरच मानवी जीवनमानाची गुणवत्ता सुधारू शकते.

पर्यावरणीय ऱ्हास व मानव विकासावरील परिणाम

पर्यावरणीय ऱ्हास हा आजच्या काळातील सर्वात गंभीर प्रश्न मानला जातो. नैसर्गिक संसाधनांचा अतिरेकी वापर, औद्योगिकीकरण, शहरीकरण, लोकसंख्या वाढ, प्रदूषण आणि हवामान बदल या घटकांमुळे पर्यावरणीय संकटे तीव्र होत आहेत. या ऱ्हासाचा थेट व अप्रत्यक्ष परिणाम मानव विकासाच्या सर्व क्षेत्रांवर – आरोग्य, शिक्षण, अर्थव्यवस्था, जीवनमान व सामाजिक सुरक्षितता – यांवर होतो.

१. आरोग्यावर परिणाम

पर्यावरणीय ऱ्हासामुळे सर्वात गंभीर परिणाम आरोग्यावर होतो.

- वायुप्रदूषणामुळे दमा, ब्रॉन्कायटिस, हृदयविकार आणि कर्करोगासारख्या आजारांची वाढ होते.
 - जलप्रदूषणामुळे अतिसार, कॉलरा, टायफॉईड यांसारख्या आजारांचे प्रमाण वाढते.
 - हवामान बदलामुळे मलेरिया, डेंग्यूसारख्या रोगांचे प्रमाण वाढते कारण डासांचे प्रजननक्षेत्र वाढते.
- यामुळे आरोग्य निर्देशांक खालावतो आणि मानव विकास सूचकांकात घसरण होते.

२. शिक्षणावर परिणाम

नैसर्गिक आपत्ती – पूर, दुष्काळ, भूकंप – यामुळे शाळा व महाविद्यालयांचे नुकसान होते. कुटुंबांवर आर्थिक संकट आल्याने मुले शाळा सोडून श्रमकामात गुंततात. शिक्षण खंडित झाल्यास मानवी भांडवल निर्मितीला अडथळा निर्माण होतो, ज्यामुळे मानव विकासाची दिशा कमकुवत होते.

३. आर्थिक परिणाम

पर्यावरणीय ऱ्हासाचा थेट परिणाम कृषी व उद्योगांवर होतो.

- दुष्काळामुळे पिके नष्ट होऊन शेतकऱ्यांची आर्थिक हानी होते.
 - पूर व वादळांमुळे पायाभूत सुविधांचे नुकसान होऊन औद्योगिक उत्पादन ठप्प होते.
 - ऊर्जा व पाण्याचा तुटवडा निर्माण होऊन उत्पादन खर्च वाढतो.
- अर्थव्यवस्था खालावत असल्यास रोजगाराच्या संधी कमी होतात आणि दारिद्र्य वाढते.

४. सामाजिक व सांस्कृतिक परिणाम

पर्यावरणीय संकटांमुळे स्थलांतर वाढते. दुष्काळ किंवा पूरग्रस्त भागातील लोकांना रोजगारासाठी शहरांकडे स्थलांतर करावे लागते. त्यामुळे झोपडपट्ट्या वाढतात, सामाजिक असमानता तीव्र होते आणि सांस्कृतिक ओळखही धोक्यात येते.

५. जीवनमानावर परिणाम

शुद्ध पाणी, स्वच्छ हवा, हरित क्षेत्र आणि आरोग्यदायी अन्न यांचा अभाव झाल्यास जीवनमान खालावते. लोकांच्या उत्पन्नात वाढ झाली तरी पर्यावरणीय गुणवत्तेत घट झाली तर जीवनमानावर नकारात्मक परिणाम होतो.

शाश्वत विकास आणि उपाययोजना

शाश्वत विकास (Sustainable Development) ही संकल्पना 1987 मध्ये ब्रंटलँड आयोगाने मांडली. त्यानुसार – “सध्याच्या पिढीच्या गरजा भागविताना भावी पिढ्यांच्या गरजा धोक्यात न आणणे” हा शाश्वत विकासाचा मूलमंत्र आहे. ही संकल्पना मानवी प्रगती आणि पर्यावरणीय संतुलन या दोन घटकांचा समन्वय साधते. आर्थिक प्रगती घडवून आणतानाच पर्यावरणाचे रक्षण व संवर्धन करणे आवश्यक आहे. शाश्वत विकास हे उद्दिष्ट साध्य करण्यासाठी विविध उपाययोजना गरजेच्या आहेत.

१. पर्यावरण शिक्षण व जनजागृती

शालेय स्तरापासूनच पर्यावरण विषयक शिक्षण अनिवार्य करणे आवश्यक आहे. पर्यावरणपूरक जीवनशैली, संसाधनांची बचत, पुनर्वापर आणि वृक्षारोपण याबाबत मुलांमध्ये व समाजात जागृती निर्माण झाली तर दीर्घकालीन सकारात्मक परिणाम दिसून येतील.

२. नूतनीकरणीय ऊर्जेचा वापर

कोळसा, पेट्रोल, डिझेल यांसारख्या जीवाश्म इंधनांचा अतिरेकी वापर प्रदूषण आणि हवामान बदलाला कारणीभूत ठरतो. त्याऐवजी सौरऊर्जा, पवनऊर्जा, जैवगॅस, जलऊर्जा यांसारख्या नूतनीकरणीय ऊर्जास्त्रोतांचा वापर वाढवणे गरजेचे आहे. भारतासारख्या उष्णकटिबंधीय देशात सौरऊर्जा वापराची क्षमता मोठी आहे.

३. जलसंधारण आणि पाण्याचे व्यवस्थापन

पाणी हे मानव जीवनाचे मूलभूत साधन आहे. दुष्काळ, अनियमित पर्जन्य व पाण्याची नासाडी ही गंभीर समस्या आहे. जलसंधारण, बोअरबंदी, टाकीबांध, पावसाचे पाणी साठवणे अशा उपाययोजना आवश्यक आहेत. ग्रामीण भागातील पारंपरिक पाणी व्यवस्थापन पद्धतींना आधुनिक तंत्रज्ञानासोबत जोडल्यास पाण्याची समस्या सोडवता येऊ शकते.

४. हरित अर्थव्यवस्था (Green Economy)

औद्योगिक विकासासोबत प्रदूषण नियंत्रण, कचरा व्यवस्थापन, वृक्षसंवर्धन आणि स्वच्छ ऊर्जा यांचा वापर करून हरित अर्थव्यवस्था निर्माण करणे आवश्यक आहे. शाश्वत कृषी पद्धती, जैविक शेती आणि स्थानिक संसाधनांचा समतोल वापर यामुळे आर्थिक विकास आणि पर्यावरण संवर्धन दोन्ही साध्य होऊ शकते.

५. आंतरराष्ट्रीय सहकार्य

हवामान बदलासारख्या समस्या जागतिक स्तरावर सोडवाव्या लागतात. पॅरिस करार (2015), क्योटो प्रोटोकॉल (1997), मॉन्ट्रियल प्रोटोकॉल (1987) यांसारख्या करारांद्वारे जगातील देशांनी एकत्रित पावले उचलली आहेत. भारताने “सौर उर्जा आघाडी” (International Solar Alliance) स्थापन करून जगभरात सौरऊर्जेचा वापर वाढवण्याचे नेतृत्व केले आहे.

६. भारतीय पारंपरिक पद्धतींचा अवलंब

भारतीय संस्कृतीत पर्यावरणाशी सुसंवाद साधणाऱ्या अनेक परंपरा आहेत. वृक्षपूजन, जलतलाव, गोचर जमीन, ग्रामसहभाग आधारित संसाधन व्यवस्थापन या पद्धती आजही परिणामकारक ठरू शकतात. या पद्धती आधुनिक विज्ञानाशी जोडल्यास शाश्वत विकासासाठी प्रभावी मॉडेल तयार होऊ शकते.

निष्कर्ष

मानव विकास आणि पर्यावरण यांचा परस्परसंबंध अतूट आहे. एका बाजूला आर्थिक वाढ, शिक्षण, आरोग्य, तंत्रज्ञान आणि सामाजिक प्रगती यामुळे मानव विकास साध्य होतो; तर दुसऱ्या बाजूला या प्रक्रियेमुळे संसाधनांवर दबाव वाढून पर्यावरणीय ऱ्हास घडतो. पर्यावरणाचे संतुलन बिघडल्यास मानव विकासाचे सर्व पैलू प्रभावित होतात. त्यामुळे शाश्वत विकास हा एकमेव उपाय आहे.

पर्यावरणीय संतुलन राखत विकासाची गती वाढवणे, स्वच्छ ऊर्जा, जलसंधारण, हरित अर्थव्यवस्था, शिक्षण व आंतरराष्ट्रीय सहकार्य यांचा प्रभावी अवलंब केल्यास वर्तमान व भावी पिढ्यांचे जीवनमान सुरक्षित राहील. भारतीय परंपरा व आधुनिक विज्ञान यांचा संगम साधून शाश्वत विकासाचा मार्ग अधिक प्रभावी ठरू शकतो. म्हणूनच मानव विकासाचे खरे मापन केवळ आर्थिक वाढीने नव्हे तर पर्यावरणीय संवर्धन, सामाजिक समता आणि जीवनमानाच्या गुणवत्तेने केले पाहिजे.

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सहाय्यक प्राध्यापक

वाणिज्य आणि व्यवस्थापन विभाग, राष्ट्रपिता महात्मा गांधी कला, वाणिज्य आणि विज्ञान महाविद्यालय, सावली, जिल्हा-चंद्रपूर, महाराष्ट्र.

सारांश

आज अशा व्यवसायाची मागणी आहे जो व्यवसाय चालविण्यातील कोणत्याही चढउतारांना प्रतिसाद देण्यासाठी पुरेसा लवचिक असेल. मागणीनुसार व्यवसाय आणि त्याच्या स्पर्धेमध्ये फरक करणारी गोष्ट म्हणजे तो घटना घडत असताना रिअल टाइममध्ये प्रतिसाद देतो. हे शक्य आहे कारण त्याच्या सर्व व्यवसाय प्रक्रिया पूर्णपणे एकत्रित केल्या आहेत आणि आयटी पायाभूत सुविधा मागणीनुसार ऑपरेटिंग वातावरणात अस्तित्वात आहेत. हा एक संशोधन पेपर आहे जो भारतातील सध्याच्या ई-व्यवसाय परिस्थितीचे थोडक्यात सादरीकरण केल्यानंतर. भारतातील ई-व्यवसायाची व्याप्ती, कामगिरी आणि समस्यांचे विश्लेषण करतो. या पेपरचे प्राथमिक उद्दिष्टे आहेत

- भारतातील ई-व्यवसायाची सध्याची स्थिती अभ्यासणे.
- भारतातील इलेक्ट्रॉनिक व्यवसायाच्या भविष्याचे विश्लेषण करणे.
- भारतातील ई-व्यवसाय खेळाडूंसमोरील आव्हानांचा अभ्यास करणे.

इलेक्ट्रॉनिक व्यवसाय म्हणजे केवळ ऑनलाइन उत्पादने खरेदी करणे आणि विकणे नाही. त्यात उत्पादने आणि सेवांचा विकास, विपणन, विक्री, वितरण, सेवा आणि पैसे देण्याची संपूर्ण ऑनलाइन प्रक्रिया देखील समाविष्ट आहे. भारत ई-व्यवसायात प्रचंड वाढ दर्शवित आहे. भारताकडे १०० दशलक्षाहून अधिक वापरकर्त्यांचा इंटरनेट वापरकर्ता आधार आहे. अमेरिका आणि यूके सारख्या बाजारपेठांच्या तुलनेत ई-व्यवसायाचा प्रवेश कमी आहे परंतु मोठ्या संख्येने नवीन प्रवेशकर्त्यांसह तो खूप वेगाने वाढत आहे. भारताने अद्याप ऑनलाइन रिटेलमध्ये ई-कॉमर्सच्या यशाची कहाणी पाहिलेली नाही. ई-कॉमर्स व्यवसायाच्या नवीन संधी निर्माण करतो; ते शिक्षण आणि शैक्षणिक क्षेत्रात नवीन संधी देखील निर्माण करतो. ते ई-कॉमर्सशी संबंधित ग्राहकांसमोरील प्रमुख आव्हाने जसे की, नैतिक समस्या, ई-सेवा एन्कोउटरमधील जोखमीची धारणा, ई-व्यवसाय शिक्षणासाठी आव्हाने आणि कायदेशीर प्रणाली उपस्थित करते.

कीवर्ड: इलेक्ट्रॉनिक व्यवसाय, समस्या, आव्हाने, विपणन, ई-कॉमर्स, भारत.

प्रस्तावना

ई-कॉमर्स म्हणजे ऑनलाइन व्यवहाराचा समावेश असलेली कोणतीही गोष्ट. यामध्ये ऑनलाइन ऑर्डर करणे, पेड कंटेन्टची ऑनलाइन डिलिव्हरी करणे, बँक खात्यांमध्ये पैशांची हालचाल करणे यासारख्या आर्थिक व्यवहारांचा समावेश असू शकतो. ई-व्यवसाय ही भारतीय व्यवसायात मोठी भर घालणारी सर्वात मोठी गोष्ट आहे. ती एक संपूर्ण नवीन अर्थव्यवस्था निर्माण करत आहे. ज्यामध्ये प्रचंड क्षमता आहे आणि व्यवसाय करण्याच्या पद्धतीत मूलभूत बदल घडवून आणत आहे. खरेदीदार तसेच विक्रेते दोघांसाठीही त्याचे फायदे आहेत आणि ही विन-विन परिस्थिती त्याच्या अभूतपूर्व वाढीच्या केंद्रस्थानी आहे.

वाढती उत्पन्न आणि इंटरनेटरून खरेदी करता येणाऱ्या वस्तू आणि सेवांची विविधता यामुळे देशभरातील ग्राहकांसाठी ऑनलाइन खरेदी अधिक आकर्षक आणि सोयीस्कर होत आहे. इलेक्ट्रॉनिक कमर्स हा सध्या भारताच्या व्यापार सुलभीकरण धोरणाचा एक आवश्यक घटक आहे. १९९१ पासून, जागतिक अर्थव्यवस्थेशी एकरूप होण्याच्या उद्देशाने अर्थव्यवस्था खुली झाल्यामुळे भारतात आर्थिक सुधारणा स्पष्टपणे घडल्यानंतर, धोरण आणि प्रक्रिया सुधारणांद्वारे आंतरराष्ट्रीय व्यापार सुलभ

करण्याची गरज ही भारतीय व्यापार आणि राजकोषीय धोरणांचा पाया बनली आहे. परिणामी, गेल्या काही वर्षांत इंटरनेट, वेब तंत्रज्ञान आणि त्यांच्या अनुप्रयोगांच्या व्यापक वापरासह तांत्रिक क्रांती झाली आहे. इन्फर्मेशन टेक्नॉलॉजी क्रांतीचा एक भाग म्हणून इलेक्ट्रॉनिक व्यवसायाचा वापर जागतिक व्यापारात आणि विशेषतः भारतीय अर्थव्यवस्थेत मोठ्या प्रमाणात होऊ लागला. जागतिकीकरणाचे प्रतीक म्हणून, ई-व्यवसाय या डिजिटल युगात यशाच्या अत्याधुनिक कडेचे प्रतिनिधित्व करतो आणि तो बदलला आहे आणि अजूनही जगभरात व्यवसाय कसा चालवला जातो ते बदलत आहे. इंटरनेटच्या व्यापारीकरणामुळे इलेक्ट्रॉनिक कॉमर्स आंतर-संघटनात्मक व्यवसाय प्रक्रियांसाठी सर्वात सक्षम माध्यमांपैकी एक बनला आहे.

भारतातील व्यवसायांना ई-कॉमर्सचे फायदे

भारतातील व्यवसायांमध्ये ई-कॉमर्सद्वारे मिळणाऱ्या संधींबद्दल जागरूकता वाढत आहे. इंटरनेट प्रवेशाची सुलभता ही एक महत्त्वाची बाब आहे ज्यामुळे नेट कॉमर्सचा जलद अवलंब होईल. सुरक्षित आणि सुरक्षित पेमेंट पद्धती मूलभूत आहेत आणि त्याचबरोबर मोबाइल कॉमर्ससारख्या नवकल्पनांचा शोध आणि लोकप्रियता आवश्यक आहे. ई-कॉमर्स ग्राहकांशी जोडण्यासाठी आणि व्यवहार करण्यासाठी एक नवीन जागा प्रदान करते. व्हर्च्युअल स्टोअर्स आठवड्याचे 7 दिवस, 24 तास कार्यरत असतात. अनेक व्हर्च्युअल रिटेलर्स एकाच कंपनीचे प्रतिनिधित्व करतात तर इतर, जसे की टॉप ऑनलाइन शॉपिंग, कंपन्यांच्या संघटनेचे प्रतिनिधित्व करतात.

जागतिक व्यापार

व्यवसायाच्या जागतिकीकरणात ई-व्यवसाय हा एक प्रमुख घटक आहे. इतर घटकांमध्ये व्यापार अडथळ्यांमध्ये घट, भांडवली बाजाराचे जागतिकीकरण यांचा समावेश आहे. भारतीय ई-व्यवसाय आर्थिक वर्ष ०९ पासून ३०% च्या चक्रवाढ वार्षिक वाढीच्या दराने वाढला आहे आणि आर्थिक वर्ष १५ पर्यंत तो १८ अब्ज डॉलर्सच्या संधीचा होण्याची अपेक्षा आहे.

आभासी व्यवसाय

ई-कॉमर्स व्यवसाय कंपन्यांना आता आभासी व्यवसाय बनण्याची क्षमता मिळाली आहे. व्हर्च्युअल व्यवसाय व्यवसाय करण्यासाठी इलेक्ट्रॉनिक माध्यमांचा वापर करतो, समोरासमोर व्यवहार करण्याच्या पारंपारिक पद्धतीऐवजी.

कमी शोध खर्च

इंटरनेटमुळे कमी शोध खर्च आणि उच्च किंमत स्पष्टता येते. ई-बिझनेस व्यवसायिक समस्यांसाठी अत्यंत किफायतशीर असल्याचे सिद्ध झाले आहे कारण ते मार्केटिंग, प्रक्रिया, इन्व्हेंटरी व्यवस्थापन, ग्राहक सेवा इत्यादींचा खर्च कमी करते. ते व्यवसाय करण्यासाठी आवश्यक असलेल्या पायाभूत सुविधांचा भार देखील कमी करते.

२४ तास

ग्राहक कोणत्याही वेळी, कुठेही, कोणत्याही ठिकाणाहून उत्पादनासाठी व्यवहार करू शकतात किंवा कंपनीने प्रदान केलेल्या कोणत्याही उत्पादन/सेवांबद्दल चौकशी करू शकतात.

अधिक आर्थिक कार्यक्षमता

इलेक्ट्रॉनिक व्यवसायाच्या मदतीने आम्ही अधिक आर्थिक कार्यक्षमता आणि अधिक जलद देवाणघेवाण (हाय स्पीड, ऑक्सिलरेटेड किंवा रियल टाइम इंटरॅक्शन) साध्य केले आहे. भारतीय ई-कॉमर्समधील प्रमुख घटक म्हणजे:

- १) ब्रॉडबैंड इंटरनेटमध्ये वाढ (२०% मासिक दराने वाढ) आणि 4जी प्रवेश.
- २) वाढती राहणीमान आणि उच्च डिस्पोजेबल उत्पन्नासह वाढता, वरच्या दिशेने मोबाइल मध्यमवर्ग.
- ३) विटा आणि मोटार किरकोळ विक्रेत्यांकडे उपलब्ध असलेल्या तुलनेत खूप विस्तृत उत्पादन श्रेणीची उपलब्धता.
- ४) व्यस्त जीवनशैली, शहरी वाहतूक कोंडी आणि ऑफलाइन खरेदीसाठी वेळेचा अभाव.
- ५) विटा आणि मोटार किरकोळ विक्रेत्यांपेक्षा कमी किमती, विटांच्या मध्यस्थीमुळे चालणारे आणि इन्व्हेंटरी आणि रियल इस्टेट खर्च कमी करणे.

६) ऑनलाइन वर्गीकृत साइट्सचा वापर वाढला आहे, ज्यामुळे ग्राहकांनी सेकंड-हँड वस्तू खरेदी आणि विक्री अधिक करत आहेत.
७) eBay Flipcard, Snapdeal, Amezan, Infibeam in आणि Tradus सारख्या साइट्ससह ऑनलाइन मार्केटप्लेस मॉडेलची उत्क्रांती. ई-व्यवसायाच्या उत्क्रांतीने पूर्ण वर्तुळात प्रवेश केला आहे आणि मार्केटप्लेस मॉडेलस पुन्हा एकदा केंद्रस्थानी आले आहेत.

साहित्य आढावा

जून २०१४ पर्यंत भारतात इंटरनेट वापरकर्ते सुमारे १८५ दशलक्ष होते. यूके आणि अमेरिका सारख्या बाजारपेठांच्या तुलनेत ई-व्यवसायाची उपलब्धता कमी आहे. परंतु मोठ्या संख्येने नवीन प्रवेशकर्त्यांसह ते खूप वेगाने वाढत आहे. कॅश ऑन डिलिव्हरी ही भारतासाठी एक अद्वितीय गोष्ट आहे आणि ती एक पसंतीची पेमेंट पद्धत आहे. भारतात एक गतिमान रोख अर्थव्यवस्था आहे ज्यामुळे सुमारे ८०% भारतीय ई-व्यवसाय कॅश ऑन डिलिव्हरीकडे झुकतो.

भारतातील ई-व्यवसाय अजूनही प्रगतीच्या टप्प्यात आहे परंतु भारतासारख्या विकसनशील देशांमध्ये तो व्यापक संधी प्रदान करतो. उच्च साक्षरता दरासह अत्यंत तीव्र शहरी भाग, वेगाने वाढणारी साक्षरता दरासह प्रचंड ग्रामीण लोकसंख्या, वेगाने वाढणारा इंटरनेट वापरकर्ता आधार, तंत्रज्ञानाची प्रगती आणि अवलंब आणि अशा इतर घटकांमुळे भारत ई-व्यवसाय खेळाडूसाठी एक स्वप्रवत ठिकाण बनला आहे. शिवाय, वैयक्तिक संगणकांचा खर्च, इंटरनेट वापरासाठी स्थापित केलेला उदयोन्मुख आधार आणि उत्तरोत्तर अधिक व्यावसायिक इंटरनेट सेवा प्रदात्या बाजारपेठेमुळे आशियातील दुसऱ्या क्रमांकाच्या सर्वाधिक लोकसंख्या असलेल्या देशात ई-कॉमर्स वाढीला चालना मिळाली आहे. भारताचा ई-व्यवसाय उद्योग वाढीच्या वळणावर आहे आणि वाढीचा अनुभव घेत आहे. ऑनलाइन प्रवास उद्योग हा ई-व्यवसायातील सर्वात मोठा विभाग आहे आणि इंटरनेट जाणकार शहरी लोकसंख्येमुळे तो मोठ्या प्रमाणात भरभराटीला येत आहे. ऑनलाइन नॉन ट्रॅव्हल इंडस्ट्री अंतर्गत वर्गीकृत केलेल्या या विभागात ई-टेलिंग, ऑनलाइन क्लासिफाईड आणि डिजिटल डाउनलोड यांचा समावेश आहे. ऑनलाइन ट्रॅव्हल इंडस्ट्रीमध्ये मेकमायट्रिप, क्लेरट्रिप आणि यात्रा यासारख्या काही खाजगी कंपन्या आहेत तसेच आयआरसीटीसीच्या बाबतीत सरकारची मजबूत उपस्थिती आहे, जी एक यशस्वी भारतीय रेल्वे उपक्रम आहे. ऑनलाइन क्लासिफाईड सेगमेंट तीन क्षेत्रांमध्ये विभागले गेले आहे; नोकरी, वैवाहिक आणि रियल इस्टेट. इंटरनेट आणि मोबाइल असोसिएशन ऑफ इंडियाने केलेल्या एका निर्यातानुसार भारतातील ई-व्यवसाय बाजारपेठ दरवर्षी सरासरी ७० टक्के दराने वाढत आहे आणि २००७ पासून ५०० टक्क्यांहून अधिक वाढली आहे. २०१० साठी ६.७९ अब्ज अमेरिकन डॉलर्सचा सध्याचा अंदाज २००७ मध्ये १.७५ अब्ज अमेरिकन डॉलर्सच्या बाजारपेठेच्या आकारापेक्षा खूपच पुढे आहे.

असे दिसून येते की, भारतातील अधिकाधिक ऑनलाइन वापरकर्ते इंटरनेटद्वारे खरेदी करण्यास इच्छुक आहेत. एकंदरीत ई-कॉमर्स उद्योग पुढील काही वर्षांत उच्च वाढीच्या मार्गावर आहे. भारतातील ई-कॉमर्स बाजारपेठेत ऑनलाइन ट्रॅव्हल उद्योगाचे वर्चस्व होते ज्याचा बाजार हिस्सा ८०% होता तर इलेक्ट्रॉनिक रिटेल ६.४८% बाजार हिस्सा घेऊन दुसऱ्या क्रमांकावर होता. ई-टेलिंग आणि डिजिटल डाउनलोड्समध्ये जलद गतीने वाढ होण्याची अपेक्षा आहे, तर ऑनलाइन माहिती बाजारपेठेतील मोठ्या प्रमाणात वर्चस्व गाजवत राहील. ई-कॉमर्स उपक्रमांमध्ये वाढ आणि ब्रँड्सकडून जागरूकता यामुळे, ई-टेलिंगमध्ये चांगली वाढ झाली आहे. इंटरनेट आणि मोबाइल असोसिएशन आणि आयएमआरबी इंटरनॅशनलने जारी केलेल्या भारतीय आर्थिक अहवालानुसार, २००६-२००७ मध्ये भारतात एकूण ऑनलाइन व्यवहार ७०८० कोटी रुपये होते आणि २००७-२००८ मध्ये ते ३०% वाढून ९२१० कोटी रुपये झाले.

डिजिटल मीडिया आणि तंत्रज्ञान क्षेत्रात विशेषज्ञता असलेल्या आघाडीच्या भारतीय गुंतवणूक बँकेच्या "इंडिया गोज डिजिटल" या अहवालानुसार, २०११ मध्ये भारतीय ई-कॉमर्स बाजारपेठ २८५०० कोटी रुपयांची होती. ऑनलाइन प्रवास या बाजारपेठेचा एक मोठा भाग (८७%) आहे. २०१५ पर्यंत भारतातील ऑनलाइन प्रवास बाजारपेठ ५४८०० कोटी रुपयांपर्यंत पोहोचण्याची अपेक्षा आहे. २०१५ मध्ये भारतीय ई-टेलिंग उद्योग ५३००० कोटी रुपयांपर्यंत वाढण्याचा अंदाज आहे. २०१५

पर्यंत एकूण ई-कॉमर्स बाजारपेठ १०७८०० कोटी रुपयांपर्यंत पोहोचण्याची अपेक्षा आहे ज्यामध्ये ऑनलाइन प्रवास आणि ई-टेलिंग दोन्ही समान योगदान देत आहेत. ई-कॉमर्समधील एक मोठा विभाग म्हणजे मोबाइल / डीटीएच रिचार्ज, ज्यामध्ये ऑपरेटर वेबसाइट्सद्वारे दररोज सुमारे १० लाख व्यवहार होतात.

निष्कर्ष

गेल्या सात वर्षांत भारतातील ई-कॉमर्स बाजारपेठ ३४ टक्क्यांनी वाढली आहे, २०१६ पर्यंत ती सुमारे ९ अब्ज अमेरिकन डॉलर्स आणि २०२० पर्यंत ७००० अब्ज अमेरिकन डॉलर्स होती. फॉरेस्टरच्या मते, २०१२ ते २०१६ दरम्यान भारतीय ई-कॉमर्स बाजारपेठ ५७ टक्क्यांहून अधिक सीएजीआरने वाढण्याची अपेक्षा आहे, जी आशिया-पॅसिफिक प्रदेशातील सर्वात वेगवान बाजारपेठ आहे. या वाढीला चालना देणारे प्रमुख घटक म्हणजे इंटरनेट वापराचा धोका आणि ३जी प्रवेश आणि मोबाईल फोनवर इंटरनेट उपलब्ध असल्याने स्मार्टफोन वापरकर्त्यांची वाढती संख्या. असा अंदाज आहे की सध्या भारतात २७ दशलक्ष इंटरनेट वापरकर्ते आहेत ज्यापैकी ४ टक्के लोक मोबाईलवर उत्पादन खरेदी करतात.

भारतात ई-व्यवसायाचे फायदे असूनही, काही आव्हानांना तोंड द्यावे लागते जे खालीलप्रमाणे आहेत.

१) कॅश ऑन डिलिव्हरी हा पसंतीचा पेमेंट मार्ग आहे.

कमी क्रेडिट कार्ड प्रवेश आणि ऑनलाइन व्यवहारांवर कमी विश्वास यामुळे भारतात कॅश ऑन डिलिव्हरी हा पसंतीचा पेमेंट पर्याय बनला आहे. इलेक्ट्रॉनिक पेमेंटच्या विपरीत, मॅन्युअल कॅश कलेक्शन हे कष्टाचे, धोकादायक आणि महागडे आहे.

२) भारतीय ग्राहक ऑनलाइन खरेदी केलेल्या बहुतेक वस्तू परत करतात.

भारतातील ई-व्यवसायात पहिल्यांदाच खरेदी करणारे अनेक लोक आहेत. याचा अर्थ असा की त्यांनी ई-व्यवसाय वेबसाइट्सकडून काय अपेक्षा करावी याबद्दल अद्याप निर्णय घेतलेला नाही. परिणामी, खरेदीदार कधीकधी कठोर विक्रीला बळी पडतात. परंतु उत्पादन प्रत्यक्षात वितरित होईपर्यंत ते पश्चात्ताप व्यक्त करतात आणि वस्तू परत करतात. जरी ग्राहकांचा पश्चात्ताप ही एक जागतिक समस्या असली तरी भारतासारख्या देशात ती अधिक प्रचलित आहे. जिथे बरीच वाढ नवीन खरेदीदारांकडून होते. ई-व्यवसाय कंपन्यांसाठी परतावा महाग असतो कारण रिव्हर्स लॉजिस्टिक्स अद्वितीय आव्हाने सादर करतात. क्रॉसबॉर्डर ई-व्यवसायात हे अधिक गुंतागुंतीचे होते.

३) पेमेंट गेटवेजमध्ये अपयशाचे प्रमाण जास्त असते

जणू काही कॅश ऑन डिलिव्हरीला प्राधान्य देणे पुरेसे वाईट नव्हते, तर जागतिक मानकांनुसार भारतीय पेमेंट गेटवेजमध्ये अपयशाचे प्रमाण खूपच जास्त आहे. भारतीय पेमेंट गेटवेज वापरणाऱ्या ई-बिझिनेस कंपन्यांचा व्यवसाय तोट्यात जात आहे, कारण अनेक ग्राहक व्यवहार अयशस्वी झाल्यानंतर पुन्हा पैसे देण्याचा प्रयत्न करत नाहीत.

४) इंटरनेटचा वापर कमी आहे

भारतातील इंटरनेटचा वापर अजूनही पश्चिमेकडील अनेक देशांच्या तुलनेत खूपच कमी आहे. त्याशिवाय, अनेक प्रदेशांमध्ये कनेक्टिव्हिटीची गुणवत्ता कमकुवत आहे. परंतु या दोन्ही समस्या शेवटच्या टप्प्यात आहेत. तो दिवस दूर नाही जेव्हा भारतातील ई-व्यवसायासमोरील आव्हानांच्या यादीत कनेक्टिव्हिटीचा प्रश्न उपस्थित होणार नाही.

५) फीचर फोन अजूनही लोकसंख्येत आघाडीवर आहेत

मला असे वाटते की भारतात मोबाईल फोन वापरकर्त्यांची एकूण संख्या खूप जास्त आहे. एक मोठा बहुसंख्य लोक अजूनही स्मार्टफोन वापरत नाहीत तर फीचर फोन वापरतात. परिणामी हा ग्राहक गट ई-बिझिनेस खरेदी करण्यास असमर्थ आहे. स्मार्टफोनच्या बाजूने घसरणाऱ्या स्केलपासून भारत अजूनही काही वर्षे दूर आहे, असे मानले जात होते, एंट्री लेव्हल स्मार्टफोनच्या किमतीत होणारी जलद घसरण ही एक उत्साहवर्धक संकेत आहे. मला अपेक्षा आहे की पुढील काही तिमाहीत भारतात \$30-40 च्या किमतीत काही स्मार्टफोनची घोषणा होईल. यामुळे स्मार्टफोन मालकीमध्ये वाढ होईल. परिणामी ई-बिझिनेस मार्केट देखील आणखी वाढेल.

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प्राचीन भारतातील आर्थिक व कृषी ग्रंथामध्ये पर्यावरणाचे स्थान

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बिटको महाविद्यालय, नाशिकरोड, नाशिक

प्रस्तावना

प्राचीन भारतातील आर्थिक व कृषी ग्रंथांमध्ये पर्यावरणाला महत्वाचे स्थान होते. या ग्रंथांमध्ये मातीची सुपीकता टिकवून ठेवण्यासाठी पीक फेरपालट, पाण्याचे व्यवस्थापन जमीन पिकांचे नियोजन आणि पर्यावरणीय समतोल साधणाऱ्या पद्धतींवर भर दिला गेला होता. याशिवाय पर्यावरणाचा आदर आणि त्याचे महत्त्व विशद करणारे अनेक संदर्भ कृषी परंपरेचा भाग होते. जे आजच्या शाश्वत शेतीसाठीही मार्गदर्शक ठरतात. प्राचीन भारतातील शेतकऱ्यांनी एक फेरपालट यासारख्या पद्धतींचा वापर करून मातेची सुपीकता टिकवून ठेवली. यामुळे मातीची झीज रोखली गेली आणि जमिनीची उत्पादकता वाढली. कृषी ग्रंथांमध्ये पाण्याचे योग्य नियोजन करण्यावर जोर दिला गेला होता. जेणे करून पाण्याची बचत होईल. काही ग्रंथांमध्ये विशिष्ट वृक्षांचे जसे की, आवळा आणि औदुंब रमहत्त्व सांगण्यात आले होते. त्यामुळे नैसर्गिक साधनसंपत्तीचे जतन करता येत होते. प्राचीन भारतात शेतीला केवळ एक व्यवसाय म्हणून नव्हे तर एक आध्यात्मिक प्रथा म्हणून ही पाहिले जात असे. यामुळे निसर्गाचा आदर करण्याची भावना जोपासली जात होती. उदाहरणार्थ हा ग्रंथ भारतीय कृषी वारसाचा एक महत्वाचा भाग आहे आणि त्यात पर्यावरण व शेतीशी संबंधित अनेक बाबींचा उल्लेख आढळतो. कौशल्याच्या या ग्रंथात जमिनीचे प्रकार आणि त्यानुसार कोणते पिके घ्यावे त्याचे विस्तृत वर्णन आहे. ज्यामध्ये पर्यावरणाचा विचार केलेला दिसतो. थोडक्यात प्राचीन भारतीय कृषी ग्रंथांमध्ये पर्यावरणाचे स्थान अविभाज्य घटक म्हणून होते. शाश्वत शेती आणि निसर्गाशी सुसंवाद साधण्यावर भर दिला गेला होता. त्याचा प्रभाव आजच्या काळातही जाणवतो.

भारत जितका प्राचीन आहे तितकाच आजची शेती आणि अन्न यासंबंधीची तत्व आणि अनुभवही प्राचीन आहेत. भारतीय कृषी परंपरेत विज्ञान आणि तर्कशास्त्राला प्राधान्य दिले गेले आहे. आज जगात अन्न व पौष्टिकतेबाबत घोषणाबाबत खूप चिंता व्यक्त आहेत परंतु हजारो वर्षांपूर्वी आपल्या धर्मग्रंथात म्हटले आहे "अन्न महीभूतानम जेष्ठ मतस्मात् सर्वौषधाम् उच्चते." म्हणजेच अन्न हे सर्व पदार्थांमध्ये श्रेष्ठ आहे म्हणूनच अण्णाला सर्व औषधांचे स्वरूप आणि मूळ म्हटले गेले आहे. आपले अन्न औषधी परिणामांस वापरण्याचे ज्ञान संपूर्ण आयुर्वेद शास्त्रात आहे हे पारंपरिक ज्ञान प्रणाली भारताच्या सामाजिक जीवनाचा एक भाग आहे. जेवण आणि अन्न याविषयीचे हजारो वर्षांपूर्वीचे भारतीय ज्ञान आहे. याच ज्ञानाच्या जोरावर भारतातील शेती विकसित झाली आहे. भारतात सुमारे दोन हजार वर्षांपूर्वी लिहिलेला "कृषीपराशर" नावाचा ग्रंथ संपूर्ण मानवी इतिहासाचा वारसा आहे. भारतात शेतीशी संबंधित शिक्षण आणि संशोधनाची एक मजबूत परिसंस्था आहे. भारतीय संशोधन परिषदेच्याच शंभरहून अधिक संशोधन संस्था आहेत. कृषी आणि संबंधित विषयांचा अभ्यास करण्यासाठी भारतात पाचशेहून अधिक महाविद्यालय आहेत. शेतकऱ्यांना नवीन तंत्रज्ञान प्रदान करण्यात मदत करणारी सातशेहून अधिक कृषी विज्ञान केंद्र भारतात आहेत. भारतीय शेतीचे आणखी एक वैशिष्ट्य म्हणजे आजही भारतात सहा ऋतू डोळ्यासमोर ठेवून सर्व काही आखणी केली जाते. कृषी मान्य प्रदेशाची स्वतंत्र अशी वैशिष्ट्ये आहेत. भारतात काही 100 किलोमीटरचा प्रवास केला तर शेती बदलते. मैदानी प्रदेशातील शेती वेगळी, हिमालयातील शेती वेगळी, वाळवंटातील शेती वेगळी, कोरडे वाळवंट वेगळे, जिथे पाणी कमी आहे तिथली शेती वेगळी, व किनारपट्टीतील शेती वेगळी आहे. हे विविधता भारताला जागतिक अन्न सुरक्षेसाठी अशेच किरण बनवते. प्राचीन भारतातील आर्थिक व कृषी ग्रंथांमध्ये पर्यावरणाचे स्थान शाश्वत शेती, निसर्गाचे जतन आणि पर्यावरणाशी सुसंवाद साधण्यावर केंद्रित होते. कारण जमीन, जलसंपत्ती आणि जैव विविधतेचा उपयोग शेतीसाठी आवश्यक होता. त्याचे कारण जमिनीची सुपीकता राखणे, जलसंधारण आणि नैसर्गिक संसाधनांचा योग्य वापर करण्याच्या पद्धतींवर भर दिला जात असे जेणे करून नैसर्गिक संतुलन टिकून राहील आणि दीर्घ काळ शेती करता येईल.

भारताचा आर्थिक विकास :

भारताचा आर्थिक विकास सिंधू संस्कृती पासून सुरू झाला असे मानले जाते. सिंधू संस्कृतीची अर्थव्यवस्था प्रामुख्याने व्यापारावर आधारित असल्याचे दिसून येते. ज्याचा अंदाज वाहतुकीतील प्रगतीवरून करता येतो. सुमारे 600 वर्षांपूर्वी महाजनपदांनी विशेष चिन्हांकित नाणी टाकण्यास सुरुवात केली. हा काळ तीव्र व्यावसायिक आणि शहरी विकासाने

ओळखला जातो. ३०० इ.स.वी सन वर्षापूर्वी पासून मौर्य काळात भारतीय उपखंडाचे एकीकरण झाले. राजकीय एकीकरण आणि लष्करी सुरक्षा वाढत्या उत्पादकतेसह व्यापार आणि वाणिज्य द्वारे सामान्य आर्थिक व्यवस्थेला चालना मिळाली.

पुढील १५०० वर्षांतराप्रकट, होयसळ आणि पश्चिम गंगा यासारख्या प्रमुख संस्कृती भारतात विकसित झाल्या. या काळात १७ व्या शतकापर्यंत भारताची अर्थव्यवस्था प्राचीन आणि मध्ययुगीन जगातील सर्वात मोठी अर्थव्यवस्था होती असा अंदाज आहे. मराठा साम्राज्याकडे जगातील एकूण संपत्तीच्या एक तृतीयांश ते एक चतुर्थांश संपत्ती होती जे युरोपियन वसाहतवादाच्या काळात वेगाने कमी होत गेली. आर्थिक इतिहासकार अँगसन मॅडिसन यांच्या "द वर्ल्ड इकॉनॉमी: अ मिलेनियल पर्सपेक्टिव्ह" या पुस्तकानुसार भारत हा १७ व्या शतकापर्यंत जगातील सर्वात श्रीमंत देश होता आणि त्याची अर्थव्यवस्था सर्वात मोठी होती.

सिंधू संस्कृती :

सिंधू संस्कृती ही कायमस्वरूपी प्रामुख्याने शहरी वसाहतीचे जगातील सर्वात जुने उदाहरण आहे ते इ.स.वी सन पूर्व ३५०० ते १८०० पर्यंत विकसित झाले ज्यामुळे एक प्रगत आणि भरभराटीची आर्थिक व्यवस्था निर्माण झाली. येथील नागरिक शेती करू लागले, प्राणी पाळू लागले आणि तांबे, कांस्य, कथीलपासून तीक्ष्ण हत्यारे आणि शस्त्रे बनवू लागले व इतर शहरांशी त्यांचा व्यापार करू लागले. प्राचीन भारतात शहरी लोकसंख्या लक्षणीय होती. तरी बहुसंख्य भारतीय लोकसंख्या खेड्यांमध्ये राहत होती ज्यांची अर्थव्यवस्था मोठ्या प्रमाणात एकाकी आणि स्वयंपूर्ण होती. लोकसंख्येचा मुख्य व्यवसाय शेती होता आणि तो कापड, अन्नप्रक्रिया व हस्तकला यासारख्या हस्तनिर्मित उद्योगांसाठी कच्चा माल पुरवण्या व्यतिरिक्त अन्न गरजा पूर्ण करत असे. शेतकऱ्यां व्यतिरिक्त इतर वर्गातील लोक न्हावी, सुतार, वैद्य, आयुर्वेद चिकित्सक किंवा वैद्य, सोनार, विणकर इत्यादी म्हणून काम करत होते. आर्थिक घडामोडींना आकार देण्यात प्रामुख्याने हिंदू धर्म आणि जैन धर्माची प्रभावी भूमिका आहे. प्रयागराज, बनारस, नाशिक व पुरी ही तीर्थक्षेत्रे जी बहुतेक नदीकाठावर वसलेले होती ती व्यापार आणि वाणिज्य केंद्र म्हणून विकसित झाली. धार्मिक उत्सव व तीर्थयात्रेच्या पद्धतीमुळे तीर्थक्षेत्राची अर्थव्यवस्था भरभराटीला आली. जैन धर्माच्या अर्थव्यवस्थेवर तीर्थकर महावीर आणि त्यांच्या तत्त्वांचा व तत्त्वज्ञानाचा प्रभाव होता यामागील इतिहास त्यांच्या तत्त्वज्ञानातून स्पष्ट केला आहे. जैन धर्माचा प्रसार करणारे ते शेवटचे आणि २४ वे तीर्थकर होते. आर्थिक संदर्भात त्यांनी अनेकात तटस्थतावादचे तत्त्व स्पष्ट केले.

प्राचीन भारतातील आर्थिक परिस्थिती :

प्राचीन भारताची अर्थव्यवस्था प्रामुख्याने कृषी प्रधान होती. ज्यात शेतीला महत्त्व होते व समाजाचा मोठा भाग शेतीवर अवलंबून होता. या काळात कृषी, व्यापार आणि उद्योग यांचाही विकास झाला होता. मौर्य व गुप्त साम्राज्याच्या काळात जगाच्या जीडीपी पदे भारताचे योगदान लक्षणीय होते.

अर्थव्यवस्थेची प्रमुख वैशिष्ट्ये :

- 1) कृषी प्रधान अर्थव्यवस्था.
- 2) वैविध्यपूर्ण उद्योग आणि व्यापार.
- 3) शहरांचा विकास.
- 4) जाती व्यवस्था आणि आर्थिक भूमिका.
- 5) जागतिक अर्थव्यवस्थेत महत्त्वाचे स्थान.
- 6) आर्थिक विचार आणि व्यवस्थापन.
- 7) प्रगत आर्थिक क्षेत्र.

प्राचीन भारतातील अर्थव्यवस्था ही प्रामुख्याने कृषी प्रधान होती. जिथे शेती हा मुख्य व्यवसाय होता. जमिनीला खूप महत्त्व होते आणि शेती हा लोकांच्या उपजीविकेचा प्रमुख स्रोत होता. कृषी व्यतिरिक्त प्राचीन भारतात अनेक उद्योग आणि व्यापारही केले जात असे. कापूस रेशीम आणि इतर अनेक वस्तूंचे निर्यात केली जात होती. या काळात अनेक मोठ्या शहरांचा विकास झाला जे व्यापार व वाणिज्य केंद्र म्हणून काम करत असे त्या समाजाचे वर्णव्यवस्थेमध्ये विभागणी करण्यात आली होती. ज्यात वैश्य वर्गातील लोक शेती व्यापार आणि उद्योगात सक्रिय होते. प्राचीन भारतात विशेषतः मौर्य आणि गुप्त साम्राज्यांच्या काळात भारताने जागतिक अर्थव्यवस्थेत महत्त्वपूर्ण योगदान दिले होते. प्राचीन भारतातील धार्मिक ग्रंथांमध्ये जसे की मनुस्मृति शासकांसाठी आर्थिक व्यवस्थापन आणि संपत्तीच्या वितरणाबाबत मार्गदर्शन दिलेले आढळते. सिंचन, तंत्रज्ञान, पिके, आणि जमिनीचे व्यवस्थापन यासारख्या कृषी क्षेत्रामध्ये प्रगती झाली होती. थोडक्यात प्राचीन भारताची अर्थव्यवस्था कृषी व्यापार आणि उद्योगांवर आधारित होती ज्यात समाजातील विविध घटकांनी महत्त्वपूर्ण भूमिका बजावली आणि जागतिक स्तरावर भारताची आर्थिक स्थिती मजबूत केली.

प्राचीन भारतातील सामाजिक - आर्थिक परिस्थिती :

प्राचीन भारतात शतकानुशतके विकसित झालेली एक वैविध्यपूर्ण आणि गुंतागुंतीची सामाजिक आर्थिक रचना होती. समाज वेगवेगळ्या वर्णांमध्ये किंवा सामाजिक वर्गांमध्ये विभागलेला होता ज्यात ब्राह्मण (पुजारी आणि विद्वान), क्षत्रिय (योग्य आणि शासक), वैश्य (पारे आणि शेतकरी) आणि शूद्र (कामगार आणि नोकर) यांचा समावेश होता. जातीव्यवस्था म्हणून ओळखल्या जाणाऱ्या या व्यवस्थेने प्राचीन भारतीय समाजाच्या सामाजिक -आर्थिक रचलेला आकार देण्यात महत्त्वपूर्ण भूमिका बजावली. प्राचीन भारताची अर्थव्यवस्था प्रामुख्याने कृषीप्रदान होती. बहुतेक लोकसंख्येचा मुख्य व्यवसाय शेती होता. शेतकरी तांदूळ, गहू आणि बाजरी यासारखी पिके घेत असत व शेतीला आधार देण्यासाठी सिंचन व्यवस्था विकसित केल्या गेल्या. प्राचीन भारतीय अर्थव्यवस्थेत व्यापार आणि वाणिज्य यांनीही महत्त्वाची भूमिका बजावली. सिंधू संस्कृती ही एका समृद्ध व्यापारी समाजाच्या सुरुवातीच्या उदाहरणांपैकी एक होती. प्राचीन भारत हा समृद्ध संसाधनांसाठी ओळखला जात होता ज्यामध्ये सोने आणि रत्ने यासारख्या मौल्यवान धातूंचा समावेश होता. जगाच्या विविध भागातील व्यापारी आकर्षित होत असत. भारताला मध्य अशिया व युरोपने जोडणारा एक प्राचीन मार्ग, रेशीम मार्ग, वस्तू, कल्पना आणि संस्कृतीची देवाण-घेवाण सुलभ करत असे. समाजाचे स्तरीकरण करण्यात आले होते ज्यामध्ये उच्च वर्गांना विशेष अधिकार आणि संपत्ती होती तर खालच्या वर्गांना अधिक आव्हानांचा सामना करावा लागला. तथापि, हे लक्षात घेणे महत्त्वाचे आहे की सामाजिक अगतिशीलता काही प्रमाणात शक्य होती. व्यक्ती त्यांच्या क्षमता, कौशल्य आणि कामगिरीच्या आधारे सामाजिक शिडीवर वर किंवा खाली जाऊ शकत होत्या.

प्राचीन भारतीय समाजात शिक्षण आणि शिक्षणाला खूप महत्त्व होते. गुरुकुल पद्धत प्रचलित होती. जिथे विद्यार्थी त्यांच्या शिक्षकांसोबत रहात असत आणि विविध विषयांचे शिक्षण घेत असत. प्राचीन भारतीयांनी गणित, खगोलशास्त्र, वैद्यकशास्त्र आणि तत्त्वज्ञान यासारख्या क्षेत्रात महत्त्वपूर्ण योगदान दिले होते. जे त्या काळातील बौद्धिक चैतन्य दर्शवते. प्राचीन भारताच्या सामाजिक-आर्थिक परिस्थितीला आकार देण्यात धर्माची महत्त्वपूर्ण भूमिका होती. हिंदू, बौद्ध आणि जैन धर्म हे प्रमुख होते व त्यांनी लोकांच्या श्रद्धा, मूल्य आणि सामाजिक पद्धतींवर प्रभाव पाडला. धार्मिक संस्था व मंदिरांनी समुदायाला शिक्षण, आरोग्यसेवा व सामाजिक कल्याण प्रदान करण्यात महत्त्वाची भूमिका बजावली. प्राचीन भारतात सामाजिक -आर्थिक विषमता असतानाही समाजाने करुणा, दान आणि सामाजिक जबाबदारीच्या तत्त्वांवरही भर दिला. धर्म (कर्तव्य) आणि कर्म (कृती आणि परिणाम) यासारख्या संकल्पना लोकांच्या वर्तनाचे आणि इतरांशी संवादाचे मार्गदर्शन करतात. प्राचीन भारताची सामाजिक -आर्थिक परिस्थिती समजून घेतल्याने आपल्याला इतिहासातील गुंतागुंत व त्याच्या विकासाला आकार देणाऱ्या घटकांची जाणीव होण्यास मदत होते.

प्राचीन भारतातील आर्थिक व कृषी क्षेत्रातील ग्रंथांची मुख्य भूमिका :

प्राचीन भारतातील आर्थिक व कृषी क्षेत्रातील ग्रंथांची भूमिका अत्यंत महत्त्वाची मानली जाते. हे ग्रंथ केवळ शेती, व्यापार, सिंचन व पशुपालनाविषयी मार्गदर्शन करत नाहीत तर सामाजिक, धार्मिक व सांस्कृतिक जीवनातही कृषी व अर्थकारणाचे स्थान स्पष्ट करतात.

१) वेदकालीन साहित्य :

ऋग्वेद, अथर्ववेद इत्यादींमध्ये शेती, पर्जन्य, नांगर पशुपालन यांचा उल्लेख आढळतो. कृषीला धार्मिक विधींशी जोडले गेले होते. "अन्नं ब्रह्म" ही संकल्पना अन्नधान्याच्या पवित्रतेचे व महत्त्वाचे स्थान दर्शवते.

२) धर्मशास्त्र व गृह्यतंत्र ग्रंथ :

मनुस्मृती, नारदस्मृती, याज्ञवल्क्यस्मृती यामध्ये भूमीमापन, शेतीतील श्रमविभाजन, करव्यवस्था आणि समाज रचना नमूद आहेत. जमिनीचे हक्क, शेतकऱ्यांचे कर्तव्य व करप्रणाली स्पष्ट केली आहे.

३) अर्थशास्त्र (कौटिल्याचे अर्थशास्त्र) :

प्राचीन भारतातील सर्वात महत्त्वाचा आर्थिक ग्रंथ मानला जातो. कृषी, व्यापार, करप्रणाली, बाजारनियंत्रण, सिंचन, पिके व धान्यसाठवण याविषयी यामध्ये विस्तृत विवेचन केलेले आहे. शेती हा राज्याच्या उत्पन्नाचा मुख्य स्रोत असल्याने या ग्रंथामध्ये त्याचे सविस्तर वर्णन केलेले आहे.

४) कृषीशास्त्रीय ग्रंथ :

'कृषीपराशर'- शेतीत वापरल्या जाणाऱ्या साधनांचा, पिकांच्या चक्राचा व योग्य हंगामाचा उल्लेख कृषीपराशर या ग्रंथामध्ये केलेला आहे. वृक्षायुर्वेद (सुरपाल) या ग्रंथात झाडांची लागवड, रोगनियंत्रण, औषधी गुणधर्म यांचा अभ्यास केलेला आहे. कौटिल्याचे अर्थशास्त्र आणि कृषीपराशर यात कृषी व राज्यव्यवस्था परस्परावलंबी असल्याचे सांगितले आहे.

५) आयुर्वेद व अन्य ग्रंथ :

चरकसंहिता, सुश्रुतसंहिता यामध्ये अन्नधान्याचे पोषणमूल्य, शेती व आरोग्य यांचा परस्परसंबंध मांडलेला आहे . तसेच अन्न व औषध निर्मितीत कृषी उत्पादनाचे महत्त्व अधिक स्पष्ट केले आहे.

६) जैन व बौद्ध साहित्य :

व्यापार, धनवितरण, श्रमविभाजन व ग्राम जीवनामध्ये शेतीचे केंद्रस्थान यामध्ये स्पष्ट केले आहे. बौद्ध जातककथा, शेतकरी, व्यापारी, कारागीर यांच्या आर्थिक जीवनाचे चित्र जैन व बौद्ध साहित्य या ग्रंथामध्ये मांडलेले आहे.

प्राचीन भारतातील आर्थिक व कृषीग्रंथांनी शेतीची वैज्ञानिक पद्धती (पिकांचे प्रकार, हंगाम, सिंचन) सांगितले आहे. कर व अर्थव्यवस्था यांचा पाया घातलेला आहे . सामाजिक व आर्थिक जीवनाशी कृषीशी सांगड घातली आहे. राज्यव्यवस्थेसाठी कृषी व व्यापारांचे महत्त्व अधोरेखित केले आहे . त्यामुळे हे ग्रंथ आजही भारतीय कृषी व आर्थिक विचारांच्या मुळाशी असलेले मौल्यवान दस्तऐवज मानले जातात. तसेच या ग्रंथांनी भारतीय समाजाला वैज्ञानिक कृषिपद्धती, शाश्वत अर्थव्यवस्था व राज्यव्यवस्थेची चौकट दिली. वेदांमध्ये अन्न व कृषीचे पावित्र, धर्मशास्त्रातील फायदे, अर्थशास्त्रातील राज्यनीती, कृषीशास्त्रातील तांत्रिक माहिती, तसेच बौद्ध- जैन ग्रंथातील सामाजिक वास्तव या सर्वांनी मिळून एक सुसंगठित आर्थिक व कृषी तत्त्वज्ञान उभे केले. आजच्या आधुनिक कृषी संशोधनातही या ग्रंथाचे ऐतिहासिक महत्त्व आणि प्रेरणास्थान मान्य केले जाते. 'कौटिल्याचे धान्यविज्ञान व कोषागार व्यवस्था' या ग्रंथामध्ये कृषीउत्पन्न हे राज्याच्या महसुलाचे मुख्य साधन असल्याने धान्य साठवणूक, कोठारे, आपत्ती व्यवस्थापन, दुष्काळ नियंत्रण याची माहिती आढळते. स्मृतीग्रंथ, मनुस्मृती, नारदस्मृति या ग्रंथात कृषीभूमीचे हक्क, जमीनमोजणी सिंचनाच्या हक्कांवर माहिती आहे. जमीन कोणाची ? तिच्या मालकीच्या हक्क, कर्ज भाडे यांची माहिती या ग्रंथामध्ये मिळते. दुष्काळात करसवलत देण्याची शिफारसही या ग्रंथांमध्ये केली आहे. अग्निपुराण, ब्रम्हांडपुराण, गरुडपुुराण या पुराणांमध्ये शेतीच्या पद्धती, बियाण्यांची निवड, पाणी व्यवस्थापन व वनेसंवर्धन याविषयी मार्गदर्शन केलेले आहे. शेती व पर्यावरणातील परस्पर संबंध या ग्रंथामध्ये देखील सांगितलेले आहे. अन्य कृषीग्रंथ व शास्त्रज्ञ वराहमिहीर (बृहत्संहिता) कृषी व हवामानशास्त्र, पर्जन्यमापन, खगोलशास्त्राच्या आधारे शेतीचे मार्गदर्शन तसेच सुरपाल, लोकमान्य तांत्रिकग्रंथ औषधे वनस्पती, फळझाडे, बागायती याबद्दल माहिती आहे. काश्यपसंहिता मध्ये पिकांचे रोग उपचार, पशुपालन याविषयी माहिती दिलेली आहे.

प्राचीन भारतातील आर्थिक व कृषी ग्रंथ केवळ शेतकऱ्यांसाठी मार्गदर्शक नव्हते तर ते शासन, समाज, पर्यावरण आणि अर्थव्यवस्था यांचा आरसा होता. आजच्या आधुनिक कृषीशास्त्राच्या अनेक संकल्पना- शेतीलागवड, सिंचन, हवामानशास्त्रावर आधारित शेती, साठवण व व्यवस्थापन या सर्वांचा पाया प्राचीन ग्रंथांमध्ये आढळतो.

प्राचीन भारतातील आर्थिक व कृषी क्षेत्रातील पर्यावरणाचे महत्त्व :

१) शेती हा प्रमुख आर्थिक आधार :

- प्राचीन भारताची अर्थव्यवस्था प्रामुख्याने कृषीप्रधान होती.
- शेतीचे यश पूर्णपणे पर्यावरणीय घटकांवर (पाऊस, ऋतू, माती, हवामान) अवलंबून होते.
- त्यामुळे पर्यावरणाशी सुसंगत शेती पद्धती अवलंबणे आवश्यक होते.

२) जलस्रोतांचे महत्त्व :

पावसावर आधारित शेती, तसेच तलाव, विहिरी, कालवे यांच्या साहाय्याने सिंचन. *कौटिल्याच्या अर्थशास्त्रात राज्याने सिंचन व्यवस्था पुरवावी असे सांगितले आहे. जलस्रोत स्वच्छ ठेवण्याचे नियम स्मृतीग्रंथात दिले आहेत.

३) भूमी व मातीचे संरक्षण :

- भूमीला माता मानले गेले; तिची सुपीकता टिकवणे हे शेतकऱ्यांचे कर्तव्य मानले गेले.
- शेती लागवड पद्धत वापरून जमिनीची शक्ती टिकवली आहे.

- सेंद्रिय खतांचा (शेणखत, हिरवळीची खते)वापर.

४) हवामान व खगोलशास्त्र :

- वराहमिहीराच्या बृहत्संहितेत पावसाचे व हवामानाचे अंदाज शेतीसाठी उपयोगी केले.
- नक्षत्र व ऋतुचक्रानुसार पेरणी व कापणी केली जात असे.
- नैसर्गिक संकेतांवर आधारित हवामानाचे भाकीत ही महत्वाची पर्यावरणीय पद्धत.

६) पशुपालन व जैवविविधता :

- गायी व बैल हे शेतीसाठी आवश्यक- नांगरणी, खत, दूध, श्रम .
- पक्षी व प्राण्यांचे पर्यावरणीय संतुलन राखणे आवश्यक मानले. *औषधी वनस्पती व फळझाडे यांचा विकास.

७) आर्थिक क्षेत्रातील परिणाम :

- कृषी उत्पादनावर व्यापार व राज्याचा महसूल अवलंबून.
- दुष्काळ किंवा अतिवृष्टी यामुळे उत्पादन घटले की संपूर्ण अर्थव्यवस्थेवर परिणाम होत असे.
- त्यामुळे पर्यावरणीय संतुलन राखणे म्हणजेच आर्थिक स्थैर्य राखणे असे मानले गेले.
- प्राचीन भारतातील आर्थिक व कृषी क्षेत्रात पर्यावरणाचे स्थान मूलभूत व अत्यावश्यक होते. पाणी, माती, जंगल, हवामान व जैवविविधता यांचा सन्मान करूनच शेती व अर्थव्यवस्था चालवली जात होती. आज ज्या संकल्पना शाश्वत विकास व पर्यावरण पूरक शेती म्हणून मांडल्या जातात त्यांची मुळे प्राचीन भारतीय ग्रंथांमध्ये खोलवर रुजलेली आहेत.

आधुनिक भारतातील आर्थिक व कृषी क्षेत्रातील महत्त्व :

१) कृषी हा भारतीय अर्थव्यवस्थेचा कणा :

भारतात लोकसंख्या सुमारे ४२-४५ टक्के लोकसंख्या थेट शेतीवर अवलंबून आहे(२०२२-२४ च्या आकडेवारीनुसार) कृषी व संलग्न क्षेत्रांचा (दुग्धोत्पादन, पशुपालन, मत्स्यव्यवसाय) एकत्रित जीडीपीतील वाटा १८ ते २०% आहे. ग्रामीण भारताचे जीवनमान, रोजगार व अर्थकारण हे शेतीशी निगडित आहे.

२) रोजगारनिर्मिती :

शेती हा भारतातील सर्वात मोठा रोजगार क्षेत्र आहे. शेतमजूर, कृषी कामगार, कृषी उपकरणे बनवणारे उद्योग, कृषी व्यापार यामध्ये मोठ्या प्रमाणावर रोजगार उपलब्ध होतो. महिला कामगारांची मोठी संख्या कृषी क्षेत्रात कार्यरत आहे.

३) अन्नसुरक्षा :

भारत हा जगातील दुसऱ्या क्रमांकाचा धान्य उत्पादक देश आहे .भात ,गहू ,डाळी, ऊस, कापूस, फळे-भाज्या यांचे प्रचंड उत्पादन, कृषीमुळे देशाच्या वाढत्या लोकसंख्येची अन्नधान्याची गरज पूर्ण होते. "अन्नसुरक्षा अधिनियम २०१३"(National Food Security Act)द्वारे गरीब व गरजूपर्यंत अन्यधान्य पोहोचवले जाते.

४) निर्यात व परकीय चलन :

कृषी उत्पादने जसे की चहा, कॉफी, मसाले, तांदूळ ,कापूस, साखर ही भारताची प्रमुख निर्यात उत्पादने आहेत. कृषीमुळे देशाला मोठ्या प्रमाणावर परकीय चलनाची कमाई होते.

६) ग्रामीण विकास व सामाजिक स्थैर्य :

ग्रामीण भागातील रस्ते, बाजारपेठा, बँका ,सहकारी संस्था, या सर्वांचा विकास कृषीभोवतीच झाला आहे. कृषी हा ग्रामीण जीवनाचा आर्थिक व सामाजिक आधार आहे. शेतीमुळे शिक्षण आरोग्य रोजगार सेवांना चालना मिळते.

७) तंत्रज्ञान व आधुनिक सुधारणा-

हरितक्रांती (Green Revolution)श्वेतक्रांती (दुग्धोत्पादन) निळी क्रांती (मत्स्यव्यवसाय)यांनी भारताची उत्पादन क्षमता वाढवली. जैवतंत्रज्ञान, सिंचन, तंत्र, ड्रोनशेती, स्मार्ट फार्मिंग, ई- नाम बाजारपेठ यांनी कृषीक्षेत्र अधिक आधुनिक केले. आधुनिक काळात शाश्वत शेती (SustainableAgriculture)व सेंद्रिय शेती यावर भर दिला जात आहे.

८) पर्यावरण व जैवविविधता :

आधुनिक कृषीक्षेत्र शाश्वत विकासाच्या दृष्टीने महत्त्वाचे आहे. जलसंधारण, वृक्षारोपण, जैवविविधतेचे रक्षण हे शेतीशी संबंधित मुद्दे आहेत. योग्य व्यवस्थापन नसेल तर जमिनीचा ऱ्हास, पाणीटंचाई, हवामानबदल यांचा थेट परिणाम अर्थव्यवस्थेवर होतो.

आधुनिक भारतात कृषीक्षेत्र हे केवळ अन्नधान्याचे उत्पादन करणारे क्षेत्र नाहीतर ते रोजगार, औद्योगिक विकास, व्यापार, निर्यात व ग्रामीण विकासाचा पाया आहे. भारताच्या आर्थिक प्रगतीत कृषीचे महत्त्व आजही मोठे आहे. भविष्यात शाश्वतत्व आधुनिक शेती हेच भारताच्या अन्नसुरक्षा व आर्थिक समृद्धीची गुरुकिल्ली ठरेल.

आधुनिक भारतातील आर्थिक व कृषी विषयक ग्रंथांचे योगदान :

१) आधुनिक काळात भारतासारख्या विकसनशील देशांमध्ये अर्थकारण व कृषी या दोन क्षेत्रांचे महत्त्व प्रचंड आहे. शेतकरी, धोरणकर्ते, संशोधक, अर्थशास्त्रज्ञ यांना मार्गदर्शन करण्यासाठी ग्रंथ हे प्रमुख साधन ठरले आहे. हे ग्रंथ ज्ञान, धोरणे, तंत्रज्ञान व शाश्वत विकासाचा मार्ग दाखवतात.

२) कृषीविषयक ग्रंथांचे योगदान :

शेती तंत्रज्ञान व उत्पादनक्षमता- आधुनिक कृषी तंत्रज्ञान, उच्च उत्पादनक्षम बियाणे, सिंचन प्रणाली, खतांचा योग्य वापर या विषयांवर असंख्य ग्रंथ प्रकाशित झाले आहेत. उदा. ICAR व कृषी विद्यापीठांचे संशोधन ग्रंथ.

कीड व रोग व्यवस्थापन -कीटकनाशक, जैविक कीड नियंत्रण, पिकांचे रोग यावरील मार्गदर्शक पुस्तके.

शाश्वत व सेंद्रिय शेती-Organic Farming in India, Sustainable Agriculture यासारखे ग्रंथ शेतकऱ्यांना

पर्यावरणपूरक शेतीची दिशा देतात. जलसंधारण, सेंद्रिय खतांचे महत्त्व, शेतीलागवड याविषयी या ग्रंथांमध्ये अधोरेखित केले आहे.

हवामान बदल व शेती-हवामानबदलाचा कृषी उत्पादनावर परिणाम व त्यावरील उपाय सुचवणारे ग्रंथ.

३) आर्थिक विषयक ग्रंथांचे योगदान:

ग्रामीण अर्थव्यवस्था व सहकार-ग्रामीण भागाच्या विकासासाठी सहकार चळवळीवर आधारित असंख्य ग्रंथ, सूक्ष्म वित्त (Microfinance) व स्वयं- सहाय्यता गटांवर संशोधनात्मक पुस्तके.

अर्थशास्त्र व विकास :

अमर्त्य सेन (Development as Freedom) रघुराम राजन (I Do What I Do) यासारख्या अर्थशास्त्रज्ञांचे ग्रंथ समाजातील विषमता, गरिबी निर्मूलन, कृषी विकास स्पष्ट करतात.

धोरणात्मक ग्रंथ-पंचवार्षिक योजनांचे अहवाल NITI Aayog व कृषी आयोगांचे अहवाल हे आधुनिक "ग्रंथसंपदा" म्हणून उपयोगी ठरले आहे.

४) शेतकऱ्यांसाठी ग्रंथांचे महत्त्व :

कृषी पंचांग, शेती मार्गदर्शिका, मासिके (उदा कृषी विज्ञान पत्रिका, शेतकरी दर्पण) स्थानिक भाषातील पुस्तके व मार्गदर्शक शेतकऱ्यांसाठी थेट उपयुक्त, पिकांची वेळ, खतांचा वापर, सिंचन पद्धती, बाजारभाव याविषयी माहिती.

५) शिक्षण व संशोधनातील योगदान :

कृषी विद्यापीठे, संशोधन संस्थात तयार होणारे पाठ्यपुस्तके व संशोधन अहवाल, नवे शास्त्रज्ञ व कृषी अर्थतज्ज्ञ घडविण्यात महत्त्वाचे योगदान.

६) डिजिटल ग्रंथ व माहिती तंत्रज्ञान-ई-बुक्स ऑनलाइन डेटाबेस, कृषी ॲप्स हे आधुनिक काळातील 'डिजिटल ग्रंथ' झाले आहेत. ICAR, FAO, कृषी मंत्रालय यांच्या वेबसाईटवरील ई-ग्रंथ व अहवाल. ग्रामीण भागात सुद्धा मोबाईल व इंटरनेट द्वारे माहिती सहज उपलब्ध होते.

७) एकूण परिणाम-ग्रंथामुळे शेतकऱ्यांना वैज्ञानिक शेती शिकता आली. धोरणकर्ते यांना कृषी सुधारणा व अर्थव्यवस्थेची दिशा मिळाली. संशोधकांना नवीन संशोधन करण्यासाठी आधार मिळाला आणि अर्थकारणात शाश्वत विकास व सामाजिक न्याय यांचा पाया रचण्यात ग्रंथांनी मोठे योगदान दिले आहे.

आधुनिक काळातील आर्थिक व कृषी विषयक ग्रंथ हे केवळ माहितीपुरते नाहीत तर ते ज्ञान, धोरण, संशोधन व मार्गदर्शनाचे मुख्य साधन आहेत. हे ग्रंथ शेतकरी, संशोधक व शासन या तिन्ही स्तरांवर उपयोगी पडतात. त्यामुळे आधुनिक काळातील प्रगती, अन्नसुरक्षा, ग्रामीण विकास व शाश्वत अर्थव्यवस्थेचे श्रेय या ग्रंथपरंपरेला दिले जाऊ शकते.

आधुनिक भारतातील आर्थिक व कृषी विषयक ग्रंथांमध्ये पर्यावरणाचे महत्त्व :

भारत हा कृषिप्रधान देश असून येथे लोकसंख्येच्या सुमारे ६०% लोकांचा उपजीविकेचा प्रमुख आधार म्हणजे शेती आहे. कृषी आणि अर्थव्यवस्था या दोन्हींचा थेट संबंध पर्यावरणाशी असून माती, पाणी, हवामान, जंगल आणि नैसर्गिक साधनसंपत्ती याशिवाय शेती उत्पादन शक्य नाही. आधुनिक भारतातील अनेक आर्थिक व कृषी विषयक ग्रंथांनी या वास्तवाची जाणीव करून दिली आणि ग्रंथांमधून पर्यावरणाचे संवर्धन शाश्वत शेती व संतुलित आर्थिक विकास यावर भर दिला आहे.

कृषी विषयक ग्रंथांमध्ये पर्यावरणाचे स्थान:

आधुनिक कृषीविज्ञानातील ग्रंथांमध्ये मातीचे संवर्धन, जलव्यवस्थापन, हवामान बदल आणि सेंद्रिय शेती या मुद्द्यांवर सविस्तर माहिती दिली आहे. मृदा संवर्धनावरील पुस्तके शेतकऱ्यांना मातीची धूप, क्षारीकरण व पोषक घटकांची कमतरता टाळण्यासाठी मार्गदर्शन Climate Change and Indian Agriculture सारख्या ग्रंथांमध्ये हवामान बदलाचा शेतीवर होणारा परिणाम दाखवून त्यावर उपाययोजना सांगितल्या आहेत. तसेच सेंद्रिय शेतीवरील साहित्य रासायनिक खतांच्या वापरामुळे निर्माण होणाऱ्या प्रदूषणाला पर्याय म्हणून जैविक खत व कंपोस्टिंगची माहिती देतात.

आर्थिक ग्रंथांमध्ये पर्यावरणाचे स्थान :

आधुनिक आर्थिक विचारवंतांनी अर्थव्यवस्था व पर्यावरण यातील संतुलनावर भर दिला Environment Economics सारख्या ग्रंथांमध्ये हरित अर्थव्यवस्था, प्रदूषण नियंत्रण व कार्बन क्रेडिट्स यांची चर्चा केली जाते. अमर्त्य सेन या सारख्या अर्थशास्त्रज्ञांनी पर्यावरणीय हानीचा परिणाम गरीब शेतकरी व ग्रामीण समाजावर कसा होतो हे स्पष्ट केले असून औद्योगिकरणामुळे होणारे प्रदूषण व नैसर्गिक संसाधनांचा अतिरेक टाळणे यावर आधारित धोरणात्मक ग्रंथ अर्थव्यवस्थेला शाश्वततेकडे वळवतात.

धोरणात्मक ग्रंथांमधील पर्यावरण:

पाच वर्षांच्या योजना, राष्ट्रीय कृषी धोरण, NITI Aayog अहवाल यामध्ये पर्यावरण संरक्षण व शाश्वत विकासाला विशेष महत्त्व दिले आहे National Environmental Policy (२००६), National Mission On Sustainable Agriculture यासारखे अधिकृत ग्रंथ पर्यावरण व कृषी विकास यांच्यातील संबंध स्पष्ट करतात यामुळे धोरणकर्ते यांना पर्यावरणीय संतुलन राखत आर्थिक प्रगती साधता येते.

शैक्षणिक व संशोधन ग्रंथ: कृषी विद्यापीठांमध्ये अभ्यासल्या जाणाऱ्या संशोधनग्रंथांमध्ये पर्यावरण विज्ञान, मृदाशास्त्र, पाणी व्यवस्थापन, हवामान बदल यांचा विशेष अभ्यास केला जात असून या ग्रंथांच्या माध्यमातून नवीन पिढीला पर्यावरण पूरक शेती व शाश्वत विकासाचे शिक्षण मिळते.

आधुनिक भारतातील आर्थिक व कृषी विषयक ग्रंथांमध्ये पर्यावरणाचे स्थान अत्यंत महत्त्वाचे आहे. हे ग्रंथ दाखवतात की पर्यावरणाचे संवर्धन हे केवळ शेतीच्या टिकावासाठीच नव्हे तर अर्थव्यवस्थेच्या शाश्वत प्रगतीसाठी ही आवश्यक आहे. पर्यावरणाशिवाय शेती नाही आणि शेतीशिवाय अर्थव्यवस्था नाही ही जाणीव या ग्रंथांच्या अभ्यासातून होते त्यामुळे आधुनिक काळात पर्यावरणाला केवळ पुरत नव्हे तर केंद्रस्थानी स्थान दिले गेले आहे.

प्राचीन व आधुनिक भारतातील आर्थिक व कृषी ग्रंथांमध्ये पर्यावरणीय विचार-तुलना :

- 1) निसर्गाचे स्थान-(प्राचीन काळातील विचार)-निसर्ग देवतास्वरूप- सूर्य, पर्जन्य, वायू, पृथ्वीचे पूजन(आधुनिक काळातील विचार)-निसर्ग विज्ञानावर आधारित -पर्यावरणाचे वैज्ञानिक अभ्यास.
- 2) कृषी व ऋतुचक्र-"कृषी पराशर बृहदसंहिता -नक्षत्र, ऋतू, पर्जन्य यावर आधारित शेती""हवामान अंदाज, उपग्रह तंत्रज्ञान, हवामान मॉडेल्स".
- 3) मृदा व जलसंपत्ती-"मातीची उर्वरता, सिंचनासाठी नद्यांचा उपयोग ,जलसंवर्धनाचे निर्देश". "मृदा परीक्षण प्रयोगशाळा, ड्रिप सिंचन, जलसंधारण तंत्रज्ञान".
- 4) जैवविविधता-"पिकांचे वैविध्य, मिश्रपीक पद्धती, जनावरांचा महत्त्वपूर्ण वापर". "HYV बियाणे, GMO, सेंद्रिय व शाश्वत शेतीवर भर".

- 5) पर्यावरणीय संतुलन-"निसर्गाशी संतुलन साधण्याची संकल्पना". "शाश्वत विकास (Sustainable development), पर्यावरणीय कायदे".
- 6) वनस्पती-"वनसंवर्धन व औषधी वनस्पतीचे ज्ञान". "सामाजिक वर्गीकरण, जैवविविधता कायदा, संरक्षण प्रकल्प".
- 7) अर्थव्यवस्था व पर्यावरण-"भूमी, जल, पशु हे संपत्तीचे मूलभूत स्रोत". "कृषी -उद्योग हरित अर्थव्यवस्था, कार्बन क्रेडिट".
- 8) शेतकऱ्यांचे मार्गदर्शन-"धार्मिक -आध्यात्मिक मूल्यांवर आधारित सूचना". "कृषी संशोधन संस्था, विद्यापीठे, धोरणात्मक अहवाल".

प्राचीन काळात पर्यावरण हे धार्मिक व सांस्कृतिक कर्तव्य म्हणून पाहिले गेलेतर आधुनिक काळात ते वैज्ञानिक संशोधन व धोरणात्मक नियोजनाचा केंद्रबिंदू झाले आहे. दोन्ही काळांमध्ये शाश्वतता व निसर्गाशी संतुलन हा समान धागा आहे.

सारांश :

भारताची सभ्यता ही कृषीप्रधान व नैसर्गिक संसाधनांवर आधारित आहे. वेद, उपनिषदे, पुराणे, अर्थशास्त्र, कृषीपराशर, बृहदसंहिता यासारख्या ग्रंथांमध्ये आर्थिक व कृषी विचार मांडताना पर्यावरणीय घटकांना केंद्रस्थानी ठेवण्यात आले आहे. यामधून त्या काळातील लोकांचे पर्यावरणाशी असलेले निकटचे नाते व शाश्वत विकासाचे भान दिसून येते.

अभ्यासाचा हेतू :

1. प्राचीनआर्थिककृषीग्रंथांमध्येपर्यावरणाचेस्वरूपवमहत्त्वशोधणे.
2. नैसर्गिकघटक (माती, पाणी, ऋतू, वारे, जैवविविधता) यांचा आर्थिक व कृषी जीवनावर होणारा परिणाम उलगडणे.
3. आधुनिकपर्यावरणीयविचारांशीप्राचीन संकल्पनाची तुलना करणे.

संशोधन सामग्री व पद्धत :

प्राथमिक स्रोत: वेद, स्मृती, कौटिल्याचे अर्थशास्त्र, कृषीपराशर, बृहदसंहिता.

द्वितीय स्रोत: पर्यावरण विषयक आधुनिक संशोधन ग्रंथ, लेख, जर्नल्स.

पद्धत: तुलनात्मक विश्लेषण व ऐतिहासिक पद्धतीचा वापर.

मुख्य निष्कर्ष:

पर्यावरणीय घटकांचे वर्णन:

ऋग्वेद व यजुर्वेद : पर्जन्य, वायू, सूर्य, जल ही शेतीसाठी देवतास्वरूप मानली गेली.

अथर्ववेद: माती व पाण्याच्या शुद्धतेचे महत्त्व सांगितले आहे.

कृषीपराशर: पिकांच्या वाढीसाठी ऋतू, नक्षत्र, पर्जन्यमान यांचा अभ्यास.

बृहदसंहिता (वराहमिहीर): हवामानशास्त्र, पावसाचे भाकीत, ग्रह- नक्षत्रांचा कृषी परिणाम.

कृषी व्यवस्थापनातील पर्यावरण:

- नद्यांच्या पाण्यावर आधारित सिंचन पद्धती.
- जंगल संवर्धन व भूमी- उपयोगाची जाणीव.
- शेती व पशुपालनात जैवविविधतेचा संतुलित वापर.

आर्थिक जीवनातील पर्यावरण:

- भूमी ही संपत्तीचे प्रमुख साधन.
- कृषी अधिशेषावर व्यापार व कर व्यवस्था आधारित.
- कौटिल्याचे अर्थशास्त्र- मृदा परीक्षण, जलस्रोतांचे निगा, वनस्पती व पशुसंवर्धनाचे आर्थिक मूल्य.

शाश्वत विकासाचा दृष्टिकोन:

"ऋतू" (नैसर्गिक नियम) ही संकल्पना मानव व निसर्ग यांचे संतुलित नाते. संसाधनांचा सातत्याने पण संयमाने वापर. प्राचीन ग्रंथात आधुनिक पर्यावरणीय तत्त्वज्ञानाची बीजे.

निष्कर्ष: प्राचीन भारतीय आर्थिक व कृषी ग्रंथांमध्ये पर्यावरण हे फक्त उपयुक्त साधन नसून जीवनाचा पाया म्हणून मांडले गेले आहे. माती, पाणी, सूर्य, पर्जन्य यांना देवत्व दिले गेले आणि त्यांचे संरक्षण व संवर्धन हे धार्मिक व सामाजिक कर्तव्य मानले गेले. आजच्या सस्टेनेबल डेव्हलपमेंट संकल्पनेची मूळं ह्याच ग्रंथांमध्ये आढळतात.

"आधुनिक कुटुंबातील जीवनशैली व पर्यावरणीय परिणामांचे समाजशास्त्रीय अध्ययन"

संशोधक

हर्षा विष्णु महाजन

समाजशास्त्र विभाग, मू.जे. महाविद्यालय, (स्वायत्त) जळगाव
मार्गदर्शक

डॉ. बडगे सागर लोकनाथ

समाजशास्त्र विभाग प्रमुख मू.जे. महाविद्यालय, (स्वायत्त) जळगाव.

सारांश -

जीवनशैलीतील बदलाने समाजातील मूलभूत घटक असलेल्या कुटुंब व्यवस्थेत संपूर्णपणे क्रांती केली आहे. संयुक्त कुटुंबपद्धतीपासून स्वतंत्र "विभक्त कुटुंब" या कडे वळल्यामुळे उपभोगप्रधान संस्कृतीचा उगम झाला आहे. तंत्रज्ञानाचा वापर, औद्योगिकीकरण, शहरीकरण व जागतिकीकरणामुळे कुटुंबाच्या दैनंदिन आयुष्यात संसाधनांच्या अत्याधिक वापराचे प्रमाण वाढले आहे. त्याचा पर्यावरणीय प्रभावही वाढत आहे, ज्यामुळे नैसर्गिक संसाधनांचा क्षय, ऊर्जा दाम्पत्याचा वाढीव वापर, प्लास्टिक व कचऱ्याचे प्रमाण यामुळे पर्यावरणीय तणाव वाढला आहे. समाजशास्त्रीय दृष्टिने या विषयाचा अभ्यास करणे आवश्यक आहे कारण कुटुंब जीवनशैलीचे बदल समाजाचा पर्यावरणावर होणारा परिणाम ह्याचा मागोवा घेणे आवश्यक आहे. असे बदल केवळ सामाजिक संस्थांमध्ये नव्हे, तर पर्यावरणीय शाश्वततेवर देखील मोठे परिणाम करतात.

केंद्रीय प्रदूषण नियंत्रण मंडळ आणि Centre for Science and Environment चे हवामान आणि कचरा अहवाल तसेच विद्यापीठीन संशोधनांनी वक्तव्य केले आहे की आधुनिक कुटुंब जीवनशैलीच्या पर्यावरणीय परिणामांतून समाजशास्त्रीय उपाय शोधणे हे प्रादेशिक तसेच राष्ट्रीय स्तरावर गरजेचे आहे.

की वर्ड – आधुनिक कुटुंब, जीवनशैली, उपभोक्तावाद, पर्यावरणीय परिणाम, शहरीकरण, जीवनशैली, शाश्वतता, संसाधन व्यवस्थापन.

प्रस्तावना –

मानव समाजातील कुटुंब ही समाजाची पहिली व मूलभूत सामाजिक संस्था आहे. परंतु गेल्या काही दशकांत औद्योगिकीकरण, तंत्रज्ञानाचा विकास, जागतिकीकरण आणि शहरीकरणामुळे जीवनशैलीत मोठे बदल झाले आहेत. परंपरागत संयुक्त कुटुंबसंस्थेचे स्वरूप बदलून आधुनिक काळात बहुतेक ठिकाणी न्यूक्लियर किंवा लहान कुटुंब अधिक प्रमाणात दिसू लागले आहे (मराठी विश्वकोश: कुटुंबसंस्था). यामुळे संसाधनांचा वापर वेगाने वाढला असून, उपभोक्तावादाच्या वाढत्या संस्कृतीमुळे पर्यावरणीय दबाव अत्यंत वाढला आहे.

आधुनिक कुटुंबांमध्ये घरगुती उपकरणे, वाहने, इलेक्ट्रॉनिक वस्तू आणि प्लास्टिकचा वापर मोठ्या प्रमाणावर असून, याचा परिणामपूर्ण नैसर्गिक संसाधनांचा प्रचंड अपव्यय आणि प्रदूषण वाढीस लागलेले आहे. शहरांतील कुटुंबांमध्ये ऊर्जा आणि पाण्याचा वापर ग्रामीण भागांच्या तुलनेत दुप्पट आहे, जे पर्यावरणाचा ताण वाढवित असल्याचे निष्पन्न झाले आहे (भारत की पर्यावरण स्थिति रीपोर्ट, 2023).

तांत्रिक प्रगती आणि डिजिटल युगाच्या प्रभावाने ई-कचऱ्याचे प्रमाणही घनकचऱ्याच्या पलीकडे जाऊन वाढले आहे, ज्याचा परिसरावर नकारात्मक परिणाम होतो आहे (Centre for Science and Environment, २०२३). जागतिक स्तरावर पाहता, कुटुंबांच्या जीवनशैलीत होणाऱ्या बदलांचा हवामान बदलावर मोठा प्रभाव आहे. ह्याच पार्श्वभूमीवर, आधुनिक कुटुंबातील जीवनशैली व त्याचा पर्यावरणावर होणारा प्रभाव याचा समाजशास्त्रीय दृष्टिकोनातून सखोल अभ्यास करणे गरजेचे आहे (Gadgil & Guha, २०००).

या परीस्थितीत पर्यावरणीय संकटाच्या जोखमीशी सामना करण्यासाठी आणि शाश्वत विकासासाठी सामाजिक संस्था म्हणून कुटुंबाची भूमिका महत्त्वाची आहे. कुटुंब हे एकत्रितपणे संसाधनांचा संयमी वापर करा, पुनर्वापर आणि कचरा व्यवस्थापन यासाठी जागरूकता निर्माण करा, ही वेळेची आवश्यकता आहे (Drishti IAS, २०२५). ही संशोधन प्रस्तावना या क्षेत्रातील ज्ञान वाढविण्यासाठी आणि सामाजिक व पर्यावरणीय भागीदारी सुधारण्यासाठी मार्गदर्शन करेल.

उद्दिष्टे :

1. आधुनिक कुटुंबातील उपभोक्तावादी जीवनशैलीमुळे पर्यावरणीय तणावाचा अभ्यास करणे.
2. पर्यावरणीय नैसर्गिक साधनांचा वापर अभ्यासणे.

गृहितके :

1. आधुनिक कुटुंबातील उपभोक्तावादी जीवनशैलीमुळे पर्यावरणीय तणाव वाढत आहे.
2. पर्यावरणीय संवेदनशीलता कमी झाल्यामुळे नैसर्गिक संसाधनांचा वापर अनियोजित व वाढत्या प्रमाणात होतो आहे.

संशोधन पद्धती :

प्रस्तुत शोधनिबंध हा पर्यावरणात्मक समाजशास्त्र या अंतर्गत येत असल्यामुळे संशोधन करत असताना अभ्यास पद्धती ही अन्वेषणात्मक, परिचयात्मक, वर्णनात्मक व निरीक्षणात्मक पद्धतीचा वापर करण्यात आला आहे.

तथ्य संकलन –

प्रस्तुत शोधनिबंधामध्ये संशोधन करत असताना दुय्यम स्रोताचा वापर करण्यात आला आहे. पुस्तक, वर्तमान पत्रातील लेख, संशोधन अहवाल, इंटरनेट, इत्यादीचा वापर करण्यात आला आहे.

परिणाम**1. ऊर्जा आणि संसाधनांचा अतिवापर :**

आधुनिक कुटुंबांमध्ये घरगुती रोजच्या वापरातील उपकरणे (उदा.- टि. व्ही. ,ए सी, इलेक्ट्रॉनिक उपकरणे ,इ.), वाहने(उदा -कार, दुचाकी,इ.), इलेक्ट्रॉनिक(उदा. – मोबाईल, डिजिटल वॉच,इ.) वस्तू यांचा वापर जोरात वाढला असून यामुळे विजेचा आणि नैसर्गिक संसाधनांचा अतिवापर होत आहे. म्हणजेच जंगले तोडून त्या जागी इमारती बांधल्या जात आहेत . डोंगरे कोरून महामार्ग बनवले जात आहे. कागदाचा अति वापर त्यामुळे झाडे तोडली जात आहेत .याचा थेट परिणाम प्रदूषण वाढ, नैसर्गिक संपत्तीवर होणाऱ्या ताणामुळे पर्यावरणीय ताण वाढणे आणि हवामान बदल यावर होत आहे . INTOSAI कार्यगट (2016)

2. कचरा निर्मिती आणि व्यवस्थापन समस्या :

कचरा निर्मिती आणि व्यवस्थापन समस्येमुळे हवा ,पाणी आणि जमीन प्रदूषण होते. शहरांतील आधुनिक घरांच्या जीवनशैलीत प्लास्टिकचा वापर होत आहे आणि प्लॅस्टिक हे लवकर कुजत नाही मग ते भटके जनावरे खातात आणि मारतात. ई-कचरा व घनकचरा वाढलेला असून, त्याचा निवारण न झाल्यामुळे प्रदूषण वाढत आहे. प्लास्टिक कचऱ्यामुळे जमीन आणि जल प्रदूषणाची तीव्र समस्या निर्माण झाली आहे. हा कचरा वर्षानुवर्ष कुजत नाही त्यामुळे लोक त्याला जळतात आणि त्यातून निघणाऱ्या विषारी वायु मुळे वायु प्रदूषण होत. (भारत की पर्यावरण स्थिति रीपोर्ट, 2023). पर्यावरणीय लेखापरीक्षणावरील INTOSAI कार्यगट (2016)

3. पाण्याचा अपव्यय आणि प्रदूषण :

पृथ्वीवर पाण्याचा पाण्याचा साठा हा कमी आहे . त्यात ही आपण पाण्याचा वापार अति प्रमाणात करतो . शहरी कुटुंबांमध्ये पाण्याचा वापर ग्रामीण क्षेत्रांच्या तुलनेत दुगुणित असून अनेक वेळा कचऱ्याने जलस्रोत प्रदूषित होतात. उदा .- प्लॅस्टिक अडकलामुळे गटारी तुमतात आणि सडतात त्यामुळे वायु प्रदूषण होते. तसेच कारखान्यातील विषारी द्रव्य मिश्रित सांडपाणी ह नदी, नाले ,समुद्र यांत सोडल्या जातात . त्यामुळे जलप्रदूषण होतेच पण ते पाणी शेतीसाठी वापल्यास मृदा प्रदूषण सुद्धा होते . (Centre for Science and Environment, २०२३).

4. पर्यावरणीय संवेदनशीलतेचा अभाव :

मानवी क्रियातून पर्यावरणाचा ऱ्हास होत आहे हे आपल्याला माहीत असून सुद्धा आणि अनेक कुटुंबांमध्ये पर्यावरणीय समस्यांविषयी जागरूकता असतानाही, प्रत्यक्ष जीवनशैलीमध्ये पर्यावरणपूरक व्यवहार फारसे दिसत नाहीत.कारण आपण निसर्गाचे संतुलन ज्या प्रमाणे बिघडवले आहे . डिजिटल उपकरणांचा वापर वाढल्याने ऊर्जा व कचऱ्याचा मोठा प्रभाव जाणवतो (Gadgil & Guha, २०००).(उदा.- अति प्रमाणात वीज निर्मिती, जंगल तोड,प्राण्यांची हत्या, रसायन युक्त शेती, प्रदूषित पाणी, जमिनीची धूप ,इ.)

5. शहरी व ग्रामीण फरक :

शहरी आणि ग्रामीण जीवनात खूप फरक आहे . ग्रामीण भागातील जीवन हे निसर्गरम्य असते. आणि शहरी जीवन हे धावपळीचे असते. तसेच ग्रामीण भागातील कुटुंब सांस्कृतिक जोपासनांमुळे संसाधनांच्या वापरात अधिक संयम आढळतो ; परंतु

शहरातील जीवनशैली अधिक वैशिष्ट्यपूर्ण आणि पर्यावरणीय दृष्टिकोनातून चिंताजनक आहे. जसे अति प्रमाणात संसाधनाचा वापर, सिमेंटचे जंगल, दूषित हवा, पाणी.

उपाययोजना

1. शैक्षणिक व जनजागृती कार्यक्रम :

पर्यावरणीय जागरूकता आणि संयमाच्या मूल्यांची शाळा-महाविद्यालयांमधून सुरुवात करणे आवश्यक आहे. कारण कुटुंबांना पर्यावरणपूरक जीवनशैलीचा अवलंब करण्यासाठी प्रोत्साहन देणे गरजेचे आहे. (भारत की पर्यावरण स्थिति रीपोर्ट, 2023). शाळेतून जाणारी सहूल म्हणजे निसर्गाचा आनंद म्हणजे काय हे कृतीतून समजाऊन सांगणे त्यातून जंगले, नद्या, निसर्ग का महत्वाचा आहे हे मुलांना समजावणे. वृक्ष रोपण करणे का? गरजेचे आहे हे समजाऊन सांगून त्यांना एका कृतीतून झाड कसे लावावे हे समजाऊन देता येईल तसेच आवड निर्माण होईल.

2. पर्यावरण स्नेही तंत्रज्ञानाचा वापर :

ग्रामीण भागात घरात गाय, बैल असतात. त्यांच्या शेणापसून घरगुती पातळीवर सौर ऊर्जा, बायोगॅस यांसारख्या नवीकरणीय ऊर्जा स्रोतांचा वापर वाढवावा. शेती ही सेंद्रिय पद्धतीने करावी. तसेच शहरी भागात सौर कुकर, सौर उर्जेचा वापर वीज निर्मिती साठी तसेच इलेक्ट्रॉनिक कचरा व्यावस्थित व्यवस्थापनासाठी तंत्रज्ञानाचा प्रभावी वापर करावा. वायु प्रदूषण रोखण्यासाठी इलेक्ट्रिक वाहनांचा वापर करावा. INTOSAI कार्यगट (2016)

3. कचरा व्यवस्थापन व पुनर्वापर :

कुटुंबांमध्ये कचरा वर्गीकरण (ओला कचरा, कोरडा कचरा), प्लास्टिकच्या ऐवजी एन्व्हायर्नमेंट-फ्रेंडली वस्तू वापरणे (कापडाच्या पिशव्या, बांबूच्या वस्तू) आणि कचरा पुनर्वापरावर भर द्यावा. म्हणजे कंपोस्ट खत स्वयंपाक घरातील काचान्यापासून बनवता येतील, स्थानिक स्व-शासन संघटना तसेच सरकारी यंत्रणांनी यावर कठोर उपाययोजना कराव्यात (भारत की पर्यावरण स्थिति रीपोर्ट, 2023). घरातील स्टील, किंवा धातूच्या भांड्यां पेक्षा मातीची भांडी वापरवीत.

4. संसाधनांची बचत व संयम :

पाणी हे गरजे नुसार वापरावे आणि वापरात आलेले पाणी जमिनीत मुरण्याची सोय करावी, वीज, तसेच इंधनाचे बचाव करणाऱ्या सवयी जसे की दिवसा सूर्य प्रकाशचा वापर करवा काम नसतांना वीज बंद करणे, पाणी योग्य प्रकारे वापरणे, वाहनांचा संयमित वापर करावा पायी चालावे किंवा सायकलचा वापर यांना प्रोत्साहन द्यावे. हे कुटुंबांमध्ये मूलगामी बदल करतील (Gadgil & Guha, २०००). पावसाचे पाणी हे गटारीत वाहून न जाऊ देता जमिनीत मुरवावे.

5. सामाजिक व मानसिक बदल :

कुटुंबाच्या मूल्यप्रणालीत पर्यावरणपूरक बदल घडवून आणण्यासाठी सामाजिक अभियान (झाडे लावा झाडे जगावा, मीडिया मार्फत गच्ची वरील बाग कशी फुलवावी हे सांगावे आणि स्थानिक नेते यांनी वृक्ष रोपणाचा कार्यक्रम, सौर ऊर्जा प्रकल्प चे महत्व सांगणारे कार्यक्रम कार्यरत करावेत जेणेकरून जीवनशैलीतील बदलांचा पाया मजबूत करता येईल (Centre for Science and Environment, २०२३).

जीवनशैली बदलून प्रदूषण कमी करण्याची तंत्रे

1. ऊर्जा बचत आणि नवीकरणीय ऊर्जा वापर :

घरगुती विजेचा वापर संयमित करणे जसे की LED बल्ब चा वापर करणे, ऊर्जा बचत उपकरणे वापरणे. सौरऊर्जा प्रकल्प चा उपयोग करून वीज निर्मिती, बायोगॅस यांसारखे पर्यावरणपूरक नवीकरणीय ऊर्जा स्रोत वापरणे.

2. वाहन वापरात बदल :

वाहनामुळे प्रदूषण टाळण्यासाठी सार्वजनिक परिवहनाचा आणि सायकलिंगचा अधिक वापर करणे. तसेच एकाच कार्यालयात जाण्यासाठी जवळ पासच्या किंवा मार्गावरील सहकाऱ्यांना घेऊन एकाच वाहनात जाणे त्याला कार पुलिंग करणे. इलेक्ट्रिक वाहनांचा वापर करणे. परंतु शक्य तेवढे पायी चालणे किंवा सायकल चावापर जास्त प्रमाणात करणे.

3. कचरा व्यवस्थापन आणि पुनर्वापर :

प्लास्टिक वापर कमी करणे कपड्यांच्या पिशव्या वापरावे, बांबू पासून बनवलेले उपकरणे वापरणे. स्वयंपाक घरातील काचान्यातून कंपोस्ट खत तयार करणे. कागदाचा वापर कमी करणे जसे टिशू पेपर त्या जागी पाणी किंवा कापड वापरावे. इलेक्ट्रॉनिक व प्लॅस्टिक कचऱ्याचे पुनरुत्पादन करावे जसे की त्याचा परत वापर करणे, सध्या त्यापासून विटा, किंवा रस्त्या साठी डांबरच्या ऐवजी या या मिश्रणाचा वापर केला जाऊ शकतो.

4. पाणी बचत :

पाण्याचा वापर हा नेहमी कमीत कमी करावा तसेच जर कपडे धुण्यासाठी ,भांडे घासण्यासाठी नैसर्गिक साधनांचा वापर करावा त्यामुळे ते पाणी झाडांना टाकले जाऊ शकेल .नळ वगळत असेल तर ते दुरुस्त करून घेणे.

घरच्या घरी पावसाचे पाणी साठवण्याचे तंत्र वापरणे व पाणी जमिनीत मुरण्याची सोय करणे.

5. सेंद्रिय आणि स्थानिक उत्पादन वापर :

शेती ही सेंद्रिय पद्धतीने करणे रासायनिक पदार्थांचा वापर न करणे . अन्नपदार्थ आणि भाजी पाला हे स्थानिक उत्पादका कडून खरेदी करणे जेणेकरून वाहतूक प्रदूषण कमी होईल.खाण्याच्या पदार्थांच्या पॅकेजिंगसाठी पर्यावरणपूरक साहित्य वापरणे जसे प्लॅस्टिक ऐवजी कागदाच्या पिशव्या किंवा कापडी पिशव्या वापरल्यात.

6. सामाजिक आणि मानसिक बदल :

समाजात पर्यावरण जागरूकतेसाठी वृक्षारोपण, मातीच्या वस्तु बनवणारे प्रशिक्षण ,गच्ची वरील बाग प्रशिक्षण देणे अशा प्रकारे विविध उपक्रम घेऊन प्रोत्साहन देणे. तसेच हरित जीवनशैली स्वीकारणे, ज्यामध्ये कमीत कमी वापर व पुनर्वापर व जास्तीत जास्त पर्यावरणपूरक उपाय समाविष्ट असतात.

उद्धिष्टे व गृहीतकाची पडताळणी –

आधुनिक कुटुंबातील जीवनशैली आणि पर्यावरणीय परिणाम करणारी उद्धिष्टे ही कशा प्रकारे आधुनिक कुटुंबातील उपभोक्तावादी जीवनशैलीमुळे पर्यावरणावर कसा ताण पडतो व पर्यावरणीय नैसर्गिक साधनांचा वापर कशा प्रकारे केला जात आहे. हे परिणामा मध्ये साध्य होत आहे .

आधुनिक कुटुंबातील जीवनशैली आणि पर्यावरणीय परिणाम यांची गृहितके ही आधुनिक कुटुंबातील उपभोक्तावादी जीवनशैलीमुळे पर्यावरणीय तणाव वाढत आहे. आणि पर्यावरणीय संवेदनशीलता कमी झाल्यामुळे नैसर्गिक संसाधनांचा वापर अनियोजित व वाढत्या प्रमाणात होतो आहे. हे परिणाम मध्ये दिसून येते की कशा प्रकारे आधुनिक कुटुंबातील जीवनशैली मुळे पर्यावरणावर परिणाम होतो.

निष्कर्ष –

आधुनिक कुटुंबातील जीवनशैलीने पर्यावरणावर खोल परिणाम घडवले आहेत. शहरीकरण, औद्योगिकीकरण, तंत्रज्ञानाचा प्रचंड वापर आणि उपभोक्तावादामुळे कुटुंबातील सदस्यांच्या जीवनशैलीत झालेल्या बदलांमुळे नैसर्गिक संसाधनांचा अतिवापर, कचरा निर्मिती आणि प्रदूषण वाढत आहे.

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सारांश:

वातावरणाचा शारीरिक आणि सामाजिक परिमाणांच्या बाबतीत विचार केला जाऊ शकतो. सामाजिक वातावरणामध्ये आपण ज्या गटात आहोत त्या गट, आपण ज्या अतिपरिचित क्षेत्रामध्ये राहतो, आपल्या कार्यस्थळांची संस्था आणि आपल्या जीवनाची ऑर्डर देण्यासाठी आपण तयार केलेली धोरणे समाविष्ट करतात. साहित्यात अलीकडील अहवाल आले आहेत की सामाजिक वातावरण रोग आणि मृत्यूच्या जोखमीशी संबंधित आहे, वैयक्तिक जोखीम घटकांपेक्षा स्वतंत्र. हे निष्कर्ष सूचित करतात की सामाजिक वातावरण रोगाच्या मार्गावर परिणाम करते. तरीही ते कसे समजून घ्यावे, परिभाषित करावे आणि मोजावे यासह सामाजिक वातावरणाबद्दल बरेच काही शिकले जाणे बाकी आहे. शहरी वातावरण, सामाजिक क्षेत्रे, सामाजिक अव्यवस्थितपणा आणि सामाजिक नियंत्रणाची तपासणी करणाऱ्या समाजशास्त्र आणि समाजशास्त्रीय संशोधनातील दीर्घ परंपरेचा फायदा होऊ शकेल. आम्ही या समाजशास्त्रीय साहित्याचा सारांश देतो आणि महामारीविज्ञानाच्या संशोधनाशी त्याच्या प्रासंगिकतेवर चर्चा करतो.

मानवासभोवतीचे सर्व मानवनिर्मित भौतिक, सामाजिक, सांस्कृतिक आणि राजकीय घटक यांतील परस्परसंबंध आणि आंतरक्रिया यांतून तयार होणाऱ्या सर्वंकश आवरणास सामाजिक पर्यावरण असे संबोधण्यात येते. मानव नैसर्गिक व सामाजिक अशा दोन प्रकारच्या पर्यावरणात वावरत असतो. अर्थात सामाजिक पर्यावरण ही परिपूर्ण स्वतंत्र संकल्पना नसून ती नैसर्गिक पर्यावरणावर आधारित आहे. त्यामुळे स्थलकालपरत्वे तीत फरक आढळतो. नैसर्गिक पर्यावरण जसे गतिशील आहे, तसेच सामाजिक पर्यावरणही गतिशील आहे. त्यात सातत्याने बदल होत असतात.

कीवर्ड: सामाजिक वातावरण, सामाजिक -सांस्कृतिक वातावरणाचे घटक, निरोगी सामाजिक वातावरणाच्या टिपा

परिचय: -

सामाजिक वातावरण, सामाजिक संदर्भ, सामाजिक -सांस्कृतिक संदर्भ किंवा मिलियू त्वरित शारीरिक आणि सामाजिक सेटिंगचा संदर्भ देतात ज्यामध्ये लोक राहतात किंवा ज्यामध्ये काहीतरी घडते किंवा विकसित होते. त्यामध्ये एखादी व्यक्ती शिक्षित किंवा राहते अशा संस्कृतीचा समावेश आहे आणि ज्यांच्याशी ते संवाद साधतात. अगदी अज्ञात किंवा एक मार्ग आणि सामाजिक स्थितीची समानता सूचित करू शकत नाही. सामाजिक वातावरण ही सामाजिक वर्ग किंवा सामाजिक मंडळाची व्यापक संकल्पना आहे. हे खरे आहे की माणूस विशिष्ट भौगोलिक परिस्थितीत राहतो आणि त्याच्या समाजात आर्थिक क्रियाकलापांचा एक निश्चित नमुना आहे, तरीही सामाजिक मनुष्य त्याच्या सामाजिक वातावरणाचे जितके उत्पादन आहे तितकेच ते भौतिक वातावरण आणि आर्थिक परिस्थितीचे आहे. सामाजिक वातावरणात संस्कृती आहे आणि ग्रॅहम वालस यांच्यासारख्या लेखकांनी त्याचा सामाजिक वारसा म्हणून संबोधले आहे.

सामाजिक पर्यावरणाचे भौतिक, सामाजिक, सांस्कृतिक आणि राजकीय असे प्रमुख चार घटक मानले जातात. भौतिक घटकामध्ये भौगोलिक प्रदेश, जमीन, निवास, निवासाचे स्थान, इमारती, वसाहती, संस्था, रस्ते, लोहमार्ग, हवाईमार्ग, जलमार्ग, वाहतुकीची साधने, दळणवळणाची साधने, करमणुकीची साधने, निरनिराळी भांडी, हत्यारे, उपकरणे, यंत्रे, पैसा, व्यवसाय, वस्त्रप्रावरणे, फर्निचर, कागदपत्रे, लेखनसामग्री, पुस्तके इत्यादींचा समावेश होतो. सामाजिक घटकामध्ये व्यक्ती, कुटुंब, समुदाय, समाज, जातिव्यवस्था, सामाजिक स्तर, सामाजिक संस्था इ. अंतर्भूत होतात. सांस्कृतिक घटकामध्ये संस्कृती म्हणजेच समाजाची सर्वच क्षेत्रांतील वैकासिक प्रगती, ज्ञानाची पातळी, अभ्यासकम, शिक्षण, शिक्षणपद्धती, शिक्षणसंस्था, विद्यापीठे, धर्म, धार्मिक विचार, धार्मिक संस्था, धार्मिक ग्रंथ, धार्मिक रीतिरिवाज, अर्चना, प्रार्थना, अध्यात्म, योग, चालीरीती, साधना, परंपरा, रुढी, विविध कला, कलाविष्कार वगैरेंचा समावेश होतो.

मानवी पर्यावरणाचा एक प्रमुख प्रकार. आपल्या परिसरातील प्राकृतिक आणि सामाजिक घटकांशी मानवाच्या सतत आंतरक्रिया घडत असतात. हे सर्व घटक मिळून 'सामाजिक पर्यावरण' तयार होते. सामाजिक पर्यावरणात मानव ज्या संस्कृतीमध्ये राहतो व वाढतो ती संस्कृती, ते लोक अथवा संस्था यांच्याशी होणाऱ्या गोष्टींचा समावेश होतो. अशा आंतरक्रिया

प्रत्यक्ष व्यक्तीबरोबर अथवा संदेशवहनाच्या माध्यमातून होत असतात आणि एकतर्फी अथवा ओळखीशिवाय होत असतात. अशा आंतरक्रिया ज्यांच्यामध्ये घडतात त्या घटकांचे सामाजिक स्तर विभिन्न असू शकतात. सामाजिक पर्यावरण ही संकल्पना समाजगट, समाजवर्ग यांपेक्षा भिन्न आहे.

नैसर्गिक पर्यावरण हा पर्यावरणाचा प्रमुख प्रकार आहे. या नैसर्गिक पर्यावरणावर सामाजिक पर्यावरण आधारित असते. स्थल-कालानुसार सामाजिक पर्यावरण बदलत असते. नैसर्गिक पर्यावरण गतिमान असल्याने सामाजिक पर्यावरणही गतिमान असते. मानव ज्या पर्यावरणात राहतो, तेथील जैव-अजैव घटकांचा त्याच्यावर परिणाम होतो. त्याच्या जीवनावर नैसर्गिक पर्यावरणाबरोबर मानवकृत पर्यावरणाचाही प्रभाव होत असतो. हे मानवकृत पर्यावरण म्हणजेच सामाजिक पर्यावरण होय.

सामाजिक पर्यावरणाचे प्राकृतिक, सामाजिक, सांस्कृतिक आणि राजकीय असे चार मुख्य घटक आहेत. सामाजिक पर्यावरणात अधःसंरचना, औद्योगिक संरचना, व्यावसायिक संरचना, मजूर, बाजारपेठ, सामाजिक व आर्थिक प्रक्रिया, संपत्ती, संसाधने, मानवी सेवा, आरोग्य, सत्तासंबंध, शासन, वांशिक संबंध, सामाजिक विषमता, सांस्कृतिक रूढी, परंपरा, कला, धार्मिक संस्था, प्रचलित पद्धती, स्थळ-समूहाबाबतची श्रद्धा इ. बाबींचा समावेश होतो. अनेकदा राजकीय, आर्थिक आणि धार्मिक संस्था या सामाजिक पर्यावरणाची महत्त्वाची अंगे मानली जातात. यावरून सामाजिक पर्यावरण ही अत्यंत जटिल संकल्पना आहे, हे दिसून येते.

सामाजिक पर्यावरण समाजाच्या संरचनात्मक मांडणीनुसार लक्षात घेणे आवश्यक असते. समाज संरचना ही सामाजिक संस्थांच्या जालकातून तयार झालेली असते. मानवी समाज हा लोकसमूह आदी संस्था यांच्या जटिल जालकांचा असतो. समाजाच्या अस्तित्वासाठी विशिष्ट समाजरचना, समाज मांडणी असावी लागते; ज्यामुळे विविध लोकसमूह, गट, संस्था यांच्या संबंधाचे प्रारूप ठरते. सामाजिक संरचनेसाठी पुढील बाबी आवश्यक असतात :

(१) आर्थिक प्रणाली – वस्तू उत्पादन आणि वितरण.

(२) संदेशवहन प्रणाली – माहितीचा प्रवाह समाजातील एका भागातून दुसऱ्या भागात व्हावा लागतो. यासाठी भाषा आणि तंत्रज्ञान यांचा विकास व्हावा लागतो.

(३) कुटुंब प्रणाली – कुटुंबातील प्रत्येकाची शारीरिक व बौद्धिक वाढ करून संपूर्ण कुटुंबाचा समतोल विकास साधणे आवश्यक असते.

(४) सत्ता व अधिकार प्रणाली – राजकीय तसेच शासकीय संस्थाकडून सार्वजनिक हितांची ध्येये साध्य करण्यासाठी ही प्रणाली आवश्यकता असते.

(५) कर्मकांड प्रणाली – सामाजिक संलग्नता वाढवणे आणि टिकवणे यासाठी कर्मकांडांचा उपयोग केला जातो. जन्म, साहचर्य, लग्न, मृत्यू अशा विविध वैयक्तिक घटनांना महत्त्व असल्याने त्याला सामाजिक मान्यता दिली जाते.

प्रमुख संस्था आणि लोकसमूह हे सामाजिक संस्थांसाठी मूलभूत घटक असतात. हे सर्व मिळून सामाजिक पर्यावरण बनते. सामाजिक पर्यावरणावर काही घटकांचा परिणाम होत असतो. त्यात प्रामुख्याने कुटुंब संस्कृती, अर्थव्यवस्था आणि न्यायसंस्था इत्यादींचा समावेश होतो.

कुटुंब : ही सामाजिक संघटनाची मूलभूत संस्था आहे. सामाजिक-सांस्कृतिक पर्यावरणाच्या व्यापक संदर्भात कुटुंब संस्था महत्त्वाची असते. प्रजनन, बालसंगोपन, सांस्कृतिक मूल्यांचे पुढील पिढ्यात अंतरण इत्यादींसाठी कुटुंबाला महत्त्व असते. अनेक कुटुंबांचा गट एकत्रित राहतो, त्यातून समाज निर्माण होतो. ठराविक भौगोलिक एकाकातील लोकांचे व्यवसाय, धार्मिक श्रद्धा इ. एकत्रित येऊन समाजसंस्था तयार होतात. विशिष्ट भौगोलिक क्षेत्रातील समाजसंस्थेमधील लोकांचा गट, त्यांतील व्यक्ती यांच्यात परस्पर आंतरक्रिया होतात, हे संघटितपणे व सहकार्यातून होते आणि यातून समान संस्कृती वाढीला लागते.

संस्कृती : हा पर्यावरणाचा मानवकृत महत्त्वाचा घटक आहे. संस्कृतीमुळे सामाजिक कृती आणि सामाजिक पर्यावरण ठरते. तसेच व्यक्तिवर्तनाचे स्वरूप ठरते. संस्कृती ही अत्यंत गुंतागुंतीची संकल्पना आहे. यात एखाद्या समाजगटातील त्या गटाचे विशिष्ट असे ज्ञान, श्रद्धा, कला, नीती, कायदा, रूढी, व्यक्तींच्या सवयी, क्षमता इत्यादींचा समावेश होतो.

अर्थव्यवस्था : सामाजिक स्थितीचा परिणाम पर्यावरणीय संसाधनांच्या वापरावर होत असतो. संसाधने किती प्रमाणात आणि कशा प्रकारे वापरायची, हे सामाजिक स्थितीवर अवलंबून असते.

न्यायसंस्था : सामाजिक नैतिकता नियमित करण्यासाठी, नागरिकांचे हक्क आणि अधिकार देण्यासाठी न्यायसंस्था मार्गदर्शन करते. नैसर्गिक अधिवासाचे संधारण करण्यास न्यायसंस्था उपयुक्त ठरते.

समान सामाजिक पर्यावरणीय जनतेमध्ये सामाजिक दृढतेचा व ऐक्याचा दृष्टिकोण विकसित होतो. समाजगटातील लोक परस्परांवर विश्वास ठेवतात. समाजात एकरूपता व एकसंधता वाढते. एखाद्या निर्णयात विसंगती आली, तरी त्यांचा विचार समान पद्धतीचा व प्रारूपाचा असतो.

मानव आपल्या विशिष्ट भौगोलिक स्थितीत राहत असतो. त्याच्या समाजाच्या आर्थिक क्रियांचे ठरावीक प्रारूप असते. प्राकृतिक घटक आणि आर्थिक कार्ये यांमुळे त्याचे जीवन विकसित होत असते. त्यावर सामाजिक पर्यावरणाचाही प्रभाव असतो. त्याचे सामाजिक पर्यावरण त्याच्या संस्कृतीशी जोडले जाते. त्याची एक समाज परंपरा असते, एक सामाजिक वारसा असतो. मैदानी किंवा डोंगरी प्रदेशात राहणारा समाज असो अथवा शेती किंवा औद्योगिक क्षेत्रांत कार्यरत असलेला समाज असो, त्यांचे जीवन त्यांच्या सामाजिक परंपरेने प्रभावित झालेले असते. मानव वास्तवतः 'संपूर्ण पर्यावरणात' राहत असतो. हे संपूर्ण पर्यावरण त्याच्या पारिस्थितिकीचा भाग असतो.

मानव वैयक्तिक, एकटा, एकाकी कधीच राहत नाही. तो एखाद्या समाजाचा घटक असतो. त्याचे त्यातून सामाजिकीकरण होत असते. त्याच्या सामाजिक व आर्थिक स्थितीवर त्याचे सामाजिकीकरण आधारित असते. सामाजिक पर्यावरणात प्रत्येक व्यक्तीला सामाजिक घटकांशी तडजोड करावी लागते. अप्रगत समाजातील मानवाला अशी तडजोड करणे शक्य होते; परंतु आधुनिक, प्रगत, प्रगतशील राष्ट्रांतील सामाजिक पर्यावरणात तडजोड करून राहणे कठीण होत आहे. प्रगत व प्रगतशील राष्ट्रांतील सामाजिक पर्यावरणाच्या असंख्य समस्या निर्माण झाल्या आहेत. सामाजिक पर्यावरण प्रदूषणमुक्त होण्यासाठी समाजाचा सर्वांगीण, समन्यायी, समान विकास होणे गरजेचे आहे. नैसर्गिक पर्यावरणातील घटकांच्या प्रदूषणाच्या घातक परिणामांइतकेच घातक परिणाम सामाजिक पर्यावरणातील घटकांच्या प्रदूषणाचे होतात. समाजस्वास्थ्य, सामाजिक स्थैर्य, सामाजिक विकास यांसाठी न्यायसंस्था, शासन, प्रशासन आणि इतर मानवकृत संस्थांचे योगदान मोलाचे व महत्त्वाचे ठरते.

निरोगी सामाजिक वातावरण:-

निरोगी अन्न सुरक्षित गृहनिर्माण वेतन सभ्य शाळा, आरोग्य सेवा आणि इतर सार्वजनिक आणि खाजगी वस्तू आणि सेवांमध्ये सहाय्यक सोशल नेटवर्क प्रवेश हे गंभीर वातावरण आहे जे गंभीर आजार आणि अकाली मृत्यूसाठी सर्वोच्च सार्वजनिक आरोग्याचा धोका आहे. सामाजिक वातावरणाचे आरोग्य कसे ठेवावे - 5tips 1. नियमितपणे नवीन लोकांना भेटा. आपल्या सामाजिक वातावरणासह आपल्याला शांततेत वाटेल, त्याचा विस्तार करण्याचा प्रयत्न करणे थांबविणे सोपे आहे. 2. वर्षातून बऱ्याच वेळा आपल्या विद्यमान मैत्रीचा साठा घ्या. 3. प्रयत्न करा 4. स्वतःशी प्रामाणिक रहा 5. धडा नवीन गोष्टी.

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पर्यावरण व मानवी आरोग्य यांच्यातील संबंधांची संकल्पनात्मक मांडणी

डॉ. विजय संतू पाटोळे

सहयोगी प्राध्यापक

रयत शिक्षण संस्थेचे, स्वामी सहजानंद भारती कॉलेज ऑफ एज्युकेशन, श्रीरामपूर

सारांश:

निसर्गाशी निगडित प्रत्येक घटकावर पर्यावरणीय बदलाचा प्रत्यक्ष किंवा अप्रत्यक्षरित्या परिणाम होत असतो. मग तो शारीरिक असो, मानसिक किंवा सामाजिक. निसर्गातील कोणताच घटक पर्यावरणीय बदलांकडे दुर्लक्ष करून आपले जीवन सुरळीतपणे व्यतीत करू शकत नाही, हे एक स्थापित सत्य आहे. वातावरण अनुकूल असल्यास एखादी व्यक्ती आपल्या शारीरिक व मानसिक क्षमतांचा पूर्ण वापर करू शकते. उलटपक्षी, प्रदूषित वातावरणामुळे मनुष्याच्या आरोग्यावर विपरीत परिणाम होतो. आपण जे अन्न खातो, जे हवा आपण श्वास घेतो आणि जे पाणी आपण पितो, त्याद्वारे आपण निसर्गाशी जवळून जोडलेले असतो आणि त्या बदल्यात रसायने आणि पदार्थांच्या मिश्रणाच्या संपर्कात येतो. या सर्वांचे आपल्या आरोग्यावर विविध परिणाम होत आहेत. पाणी, हवा आणि माती प्रदूषणामुळे मानव, वन्य आणि पाळीव प्राणी आणि वनस्पतींमध्ये लक्षणीय प्रतिकूल आरोग्य परिणाम होऊ शकतात. नैसर्गिक संसाधने ही मानवी जीवनास देणगी आहे. हवा, पाणी, माती आणि जैव विविधतेच्या चांगल्या स्थितीमुळे मनुष्याचे स्वास्थ्य व आरोग्य सुधारते. जेव्हा ही संसाधने ऱ्हास पावतात तेव्हा आरोग्याच्या समस्या व विकृती वाढतात आणि आयुष्यमान कमी होते. म्हणून पर्यावरण व आरोग्य यांची उत्तम सांगड घालणे आपले प्रथम कर्तव्य असले पाहिजे.

सूचक शब्द: पर्यावरण, मानवी आरोग्य, प्रदूषण, नैसर्गिक साधनसंपत्ती, आपत्ती, कायदे, आजार, पर्यावरणीय मुल्ये.

प्रस्तावना:

मानव बुद्धिवादी असल्याने त्याने आज विविध क्षेत्रात नेत्रदीपक असे यश मिळविले आहे आणि त्याची धडपड अजूनही चालू आहे. हे सर्व करत असताना त्याच्या सभोवताली असणारा निसर्ग यातही विलक्षण असा बदल आपल्याला घडून आलेला दिसतो व तो जाणवतोही. कधी काळी अति स्वार्थासाठी निसर्गाचा त्याने जाणूनबुजून नाश केलेला किंवा त्याकडे दुर्लक्ष केलेला दिसून येते. त्याचे काही दुष्परिणाम आज भोगण्याची वेळ आलेली आहे, कदाचित येणारी पिढी आपल्याला शाप दिल्याशिवाय राहणार नाही हे ही सत्य नाकारून चालणार नाही कारण आपण त्यांना उत्तम निसर्ग, पर्यावरण ठेवलेले नाही. आज वर्तमान स्थितीत अनेक गंभीर प्रश्न तयार झालेले आहेत. नैसर्गिक साधन संपत्तीचा मोठ्या प्रमाणात ऱ्हास झालेला दिसून येत आहे. मानवाने सुरुवातीपासूनच निसर्गात अति हस्तक्षेप केल्याने त्याच्याबरोबर इतरही प्राणी, पक्षी, वनस्पती एकूणच सर्वांना धोका निर्माण झाला आहे. आज जगात सर्व लोक, शास्त्रज्ञ, अभ्यासक, पर्यावरण तज्ञ यांच्या समोर एकच प्रश्न आहे तो म्हणजे आपण पर्यावरण व मानवाचे कसे रक्षण करू शकू? आज आपण पाहतो की, नैसर्गिक साधनसंपदा, विद्यान तंत्रज्ञान, जीवशास्त्र, भौतिकशास्त्र, रसायन शास्त्र, औषधनिर्माणशास्त्र, मानववंश शास्त्र, वैद्यकशास्त्र, सागरशास्त्र, मृदाशास्त्र, शरीरक्रिया शास्त्र, आरोग्यशास्त्र, हवामान शास्त्र इ. सर्व बाबी आपल्याला चांगले जीवन देत आहेत ते म्हणजे पर्यावरणामुळे, ज्यामुळे मानवाची प्रगती व सर्वांगीण विकास झालेला दिसून येतो.

पर्यावरण संकल्पना:

ऋग्वेदामध्ये 'वसुधैव कुटुंबकम्' असे म्हटले आहे, म्हणजेच आकाश हे वडील आहे, आई पृथ्वी आहे, निसर्ग बहिण आहे, पाणी भाऊ आहे. पर्यावरण ही संकल्पना फार व्यापक स्वरूपाची आपल्याला दिसून येते. पर्यावरण ही संकल्पना इंग्रजीमध्ये Environment या नावाने ओळखली जाते, फ्रेंच भाषेत Environ म्हणजे To surround सभोवताली असणे म्हणजेच पर्यावरण म्हणजे सभोवताल. मराठी भाषेत पर्यावरण म्हणजे परि+आवरण होय. पर्यावरण म्हणजे सभोवतालची परिस्थिती. पर्यावरण हे स्थळ व कालसापेक्ष आहे. त्यामध्ये वेगवेगळ्या घटकांचा समावेश होतो. पर्यावरणाचे त्याच्या अस्तित्वानुसार दोन प्रकार आहेत, नैसर्गिक पर्यावरण आणि सांस्कृतिक पर्यावरण.

व्याख्या: "पर्यावरण शास्त्र म्हणजे पृथ्वीवरील पर्यावरणाचे आकलन व मानवी जीवनाचा पर्यावरणावर असणारा प्रभाव म्हणजे पर्यावरण होय."- जॉनटर्क

पर्यावरण शास्त्राचे स्वरूप:

१. पर्यावरणशास्त्र हे मानव व पर्यावरण यांच्या आंतरसंबंधाचा अभ्यास करणारे शास्त्र आहे.
२. पर्यावरणशास्त्र हे गतिशील शास्त्र आहे.
३. पर्यावरणशास्त्र हे अचूक व तंतोतंत आहे.

४. पर्यावरणशास्त्र हे अनुभवाधिष्ठीत शास्त्र आहे.

पर्यावरण व मानवी आरोग्य :

प्रत्येक व्यक्तीला निसर्गतः शरीर लाभते, शरीर सुदृढ ठेवायचे की रोगग्रस्त हे प्रत्येक व्यक्तीवर निर्भर असते. पर्यावरणाचे संरक्षण करून मानवी आरोग्य जोपासता येते. मानवी विकास हा केवळ आर्थिक विकासाशी संबंधित नसून चांगले राहणीमान, शिक्षण व आरोग्य या प्रमुख घटकांशी मानवी विकास संबंधित आहे. जागतिक आरोग्य संघटनेने (WHO) आरोग्याची व्याख्या "पूर्ण शारीरिक, मानसिक आणि सामाजिक कल्याणाची अवस्था आहे आणि केवळ रोग किंवा दुर्बलतेचा अभाव नाही" अशी केली होती. आज मात्र प्रत्येकाचे आरोग्य सुधारून आयुष्य, आनंदी, दीर्घकालीन जास्त उत्पादक आणि समाधानाचे होण्यासाठी प्रयत्नशील असणे आवश्यक आहे. मानव व पर्यावरण या दोन्हींच्या आरोग्यावर एकमेकांचा प्रभाव आढळतो. आरोग्यपूर्ण जीवन होण्यासाठी उत्तम पर्यावरणाची गरज असते. पर्यावरणात जर बिघाड झाला तर नवनवीन रोगांचा फैलाव वाढत जातो, दुषित हवा, पाणी, अन्न, जमीन, ध्वनी प्रदूषण, वाढते तापमान, ओझोनच्या थराचा क्षय, अमल पर्जन्य, विषारी पदार्थ, वातावरणातील बदल इ. घटकांमुळे वाढत आहे.

पर्यावरणाचे मानवी आरोग्यावरील परिणाम खालीलप्रमाणे;

अ) हवा प्रदूषण व मानवी आरोग्य: जागतिक स्तरावर, दरवर्षी वायू प्रदूषणामुळे सुमारे ८.१ दशलक्ष अकाली मृत्यू होतात, ज्यामुळे व्यक्तीचे सरासरी आयुष्य १ वर्ष आणि ८ महिन्यांनी कमी होते. भारतात तर परिस्थिती गंभीर आहे; जगातील सर्वाधिक प्रदूषित शहरांपैकी अनेक शहरे भारतात असून, येथील जवळपास १००% लोकसंख्या जागतिक आरोग्य संघटनेच्या (WHO) सुरक्षित हवा गुणवत्ता मानकांपेक्षा अधिक प्रदूषित हवा श्वास घेतात. दिवसेंदिवस वृक्षांची संख्या कमी होत असल्याने हवेतील प्रदूषण वाढत आहे, हवेत कार्बन डाय ऑक्साईड, कार्बन मोनॉक्साईड, नायट्रोजन, धूर, धूळ, धातुरूप कण यांचा प्रभाव मानवी अयोग्यावर जाणवतो, श्वसनाचे विविध आजार, कर्करोग, न्युमोनिया असे अनेक गंभीर आजार होतात. १९८१ मध्ये वायू प्रदूषणाचे नियमन करण्यासाठी हवा (प्रदूषण प्रतिबंध आणि नियंत्रण) कायदा मंजूर करण्यात आला परंतु नियमांच्या कमकुवत अंमलबजावणीमुळे प्रदूषण कमी करण्यात तो अपयशी ठरला आहे.

आ) जलप्रदूषण व मानवी आरोग्य: पाण्यावरच मानवी जीवन अवलंबून असते, हेच पाणी मानवाच्या कृत्यांमुळे दुषित होते आणि तेच मानवी आरोग्यावर परिणाम करते हे सर्वांना ज्ञात आहे. घरगुती सांडपाणी, कारखान्यातून सोडलेले दुषित पाणी, शेतीतील रासायनिक खते, कीटकनाशके यांचा प्रभाव वाढला असून कावीळ, कॉलरा, विषमज्वर, पोट व पचनसंस्थेचे आजार, मेंदू, किडनी विकार, त्वचा, कान, नाक, घसा यांचे गंभीर आजार वाढलेले दिसून येतात. जागतिक आरोग्य संघटना (WHO) म्हणते की प्रदूषित पाणी म्हणजे असे पाणी ज्याची रचना इतकी बदलली आहे की ती वापरण्यायोग्य नाही. दुसऱ्या शब्दांत सांगायचे तर, ते विषारी पाणी आहे जे पिऊ शकत नाही किंवा शेतीसारख्या आवश्यक कारणांसाठी वापरता येत नाही आणि त्यामुळे अतिसार, कॉलरा, अमांश, टायफॉइड आणि पोलिओमायलाईटिस सारखे आजार देखील होतात ज्यामुळे दरवर्षी जगभरात ५,००,००० हून अधिक लोकांचा मृत्यू होतो. जल प्रदूषणामुळे जलीय परिसंस्था क्षीण होतात आणि तलावांमध्ये फायटोप्लॅक्टनचा अनियंत्रित प्रसार होतो. प्रदूषित पाण्यात मासेमारी करणे आणि पशुधन आणि शेतीसाठी सांडपाण्याचा वापर केल्याने अन्नात विषारी पदार्थ मिसळू शकतात जे खाल्ल्यावर आपल्या आरोग्यासाठी हानिकारक असतात. जलप्रदूषण हे एका विशिष्ट प्रदेशापुरते मर्यादित नाही; तो जगभरात एक गंभीर चिंतेचा विषय बनला आहे. कॅनडा, चीन, भारत, जपान आणि अमेरिका यांसारखे देश या गंभीर पर्यावरणीय आव्हानाला तोंड देत आहेत. समस्येच्या तीव्रतेमुळे आपल्या जलस्रोतांचे रक्षण करण्यासाठी आणि शाश्वत भविष्य सुरक्षित करण्यासाठी त्वरित कृती आणि सर्वसमावेशक उपाय आवश्यक आहेत.

इ) ध्वनी प्रदूषण व मानवी आरोग्य: ध्वनिप्रदूषण म्हणजे प्राणी, मनुष्य, यंत्र यांच्यामुळे वातावरणात निर्माण झालेल्या व इतर मनुष्य किंवा प्राणी यांना बाधा पोचविणाऱ्या आवाजामुळे निर्माण झालेली स्थिती. ध्वनिप्रदूषणाचे मुख्य स्रोत परिवहन प्रणाली, आवाज करणारी यंत्रसामग्री, लोकांचा गोंगाट, वाद्यांचे आवाज वगैरे असे आहे. या व्यतिरिक्त गाड्यांचे हॉर्न, सायरन, फटाके, गिरण्यांचे भोंगे, ध्वनिवर्धकांचे आवाज, रेडिओ-दूरचित्रवाणी संचांतून बाहेर पडलेले आवाज या सर्व गोष्टी ध्वनिप्रदूषण वाढण्यास मदत करतात. विविध मीडियांमुळे आवाजाचा गोंगाट वाढला आहे आणि त्याचा विपरित परिणाम दिसून येतो. ध्वनी प्रदूषणाच्या संदर्भात हे लक्षात ठेवणे महत्वाचे आहे की ७० डीबी पेक्षा जास्त आवाजाच्या पातळीला दीर्घकाळ संपर्कात राहिल्याने कालांतराने श्रवणशक्ती कमी होऊ शकते. शिवाय, ८५ डेसिबल (डीबी) पेक्षा जास्त आवाजाची

पातळी काही तासांच्या संपर्कात राहिल्यानंतर धोकादायक ठरू शकते, तर १०० डेसिबल (डीबी) पेक्षा जास्त आवाजाची पातळी जलद श्रवणशक्ती कमी करू शकते. तुमचे श्रवण आणि एकूण आरोग्य सुरक्षित ठेवण्यासाठी, आवाजाच्या पातळीचे निरीक्षण करणे आणि घरात ध्वनी प्रदूषण मर्यादित करण्यासाठी प्रयत्न करणे अत्यंत महत्वाचे आहे. औद्योगिकीकरणामुळे ध्वनी प्रदूषणात वाढ झाली आहे कारण जनरेटर, गिरण्या, मोठे एक्झॉस्ट पंखे यासारख्या जड यंत्रसामग्रीचा वापर केला जातो, ज्यामुळे अवांछित आवाज निर्माण होतो. स्थावरील वाहनांची वाढती संख्या हे ध्वनी प्रदूषणाचे दुसरे कारण आहे. लग्न, सार्वजनिक मेळाव्यांमध्ये संगीत वाजवण्यासाठी लाऊडस्पीकरचा वापर केला जातो ज्यामुळे परिसरात अवांछित आवाज निर्माण होतो. खाणकाम, इमारतींचे बांधकाम इत्यादींमुळे ध्वनी प्रदूषणात भर पडते. **उच्च रक्तदाब:** हा ध्वनी प्रदूषणाचा थेट परिणाम आहे जो दीर्घकाळापर्यंत रक्तातील पातळी वाढल्यामुळे होतो.

श्रवणशक्ती कमी होणे: मानवी कानांच्या आवाजाच्या मर्यादाबाहेरील मोठ्या आवाजाच्या संपर्कात राहिल्याने कानाच्या पडद्यांना नुकसान होते, ज्यामुळे श्रवणशक्ती कमी होते.

झोपेचे विकार: झोपेच्या कमतरतेमुळे दिवसभर थकवा आणि कमी ऊर्जा पातळी येऊ शकते ज्यामुळे दैनंदिन कामांवर परिणाम होऊ शकतो. ध्वनी प्रदूषणामुळे झोपेच्या चक्रात अडथळा येतो ज्यामुळे चिडचिड होते आणि मन अस्वस्थ होते.

हृदयरोग: रक्तदाब पातळी, ताण आणि हृदयरोग यासारख्या हृदयाशी संबंधित समस्या सामान्य व्यक्तीमध्ये उद्भवू शकतात आणि यापैकी कोणत्याही आजाराने ग्रस्त असलेल्या व्यक्तीला पातळी अचानक वाढल्यासारखे वाटू शकते.

ई) प्रदूषित अन्न व मानवी आरोग्य: प्रदूषित अन्नाने मानवी आरोग्याला गंभीर धोका निर्माण होतो, कारण त्यात जीवाणू, विषाणू, विषारी रसायने आणि जड धातू असू शकतात. अशा दूषित अन्नाच्या सेवनाने अन्न विषबाधा, अतिसार, उलट्या, ताप, पोटदुखी यांसारखे आजार होतात आणि दीर्घकाळात कर्करोग व हृदयविकार यांसारखे गंभीर आजारही होऊ शकतात. अन्न दूषित होण्याचे मुख्य कारण म्हणजे औद्योगिक आणि कृषी क्षेत्रातील प्रदूषण, जसे की कीटकनाशकांचा वापर आणि सांडपाण्याचा सिंचनासाठी वापर. दूषित अन्नात साल्मोनेला, ई. कोलाय आणि कॅम्पिलोबॅक्टर सारखे जीवाणू असू शकतात, ज्यामुळे पोटदुखी, अतिसार, मळमळ आणि उलट्या होतात. शेतीतील कीटकनाशके आणि औद्योगिक कचरा अन्नमध्ये मिसळतो, ज्यामुळे जड धातू व इतर विषारी रसायने शरीरात जातात आणि आरोग्यावर गंभीर परिणाम करतात. अंदाजे ६०० दशलक्ष - जगात जवळजवळ १० पैकी १ व्यक्ती - दूषित अन्न खाल्ल्यानंतर आजारी पडतात आणि दरवर्षी ४,२०,००० लोक मृत्युमुखी पडतात. अन्नजन्य आजारांचा ४०% भार ५ वर्षांखालील मुलांवर असतो, दरवर्षी १२५,००० मृत्यू होतात. साल्मोनेलोसिसच्या प्रादुर्भावात अधिक वेळा सहभागी असलेल्या अन्नांमध्ये अंडी, कुक्कुटपालन आणि प्राण्यांच्या उत्पत्तीचे इतर पदार्थ समाविष्ट असतात. कॅम्पिलोबॅक्टरमुळे होणारे अन्नजन्य प्रकरणे *प्रामुख्याने* कच्चे दूध, कच्चे किंवा कमी शिजवलेले कोंबडी आणि पिण्याच्या पाण्यामुळे होतात. *लिस्टेरिया* संसर्गामुळे गर्भवती महिलांमध्ये गर्भपात होऊ शकतो किंवा नवजात बालकांचा मृत्यू होऊ शकतो. जरी रोगाचे प्रमाण तुलनेने कमी असले तरी, *लिस्टेरिया*चे गंभीर आणि कधीकधी घातक आरोग्य परिणाम, विशेषतः अर्भकांमध्ये, मुले आणि वृद्धांमध्ये, ते सर्वात गंभीर अन्नजन्य संसर्गांमध्ये गणले जातात. भारतातील अन्न प्रदूषण ही एक गंभीर समस्या असून, त्यात कीटकनाशके, जड धातू व इतर हानिकारक रसायनांचा अन्नसाखळीत प्रवेश, दूषित पाणी आणि अस्वच्छ प्रक्रिया पद्धतींचा समावेश आहे. यामुळे मानवी आरोग्य, पर्यावरण आणि अन्न सुरक्षा धोक्यात येते. यावर नियंत्रण ठेवण्यासाठी भारतीय अन्न सुरक्षा आणि मानक प्राधिकरण (FSSAI) आणि केंद्रीय प्रदूषण नियंत्रण मंडळ (CPCB) सारख्या संस्था कार्यरत असून, अन्न गुणवत्ता आणि सुरक्षिततेसाठी कायदे व नियम तयार केले जात आहेत.

उ) पर्यावरणीय आपत्ती व मानवी आरोग्य : सर्वसाधारणपणे आम्सल पर्जन्य तापमान वाढ, अणु अपघात, ओझोन थराचा क्षय, भूकंप, ज्वालामुखी, त्सुनामी लाटा, पूर, अवर्षण या निसर्गनिर्मित पर्यावरणीय आपत्तीचा मानवी आरोग्यावर परिणाम होतो. भोपाळ आपत्ती , १९८४ - मिथाइल आयसोसायनेट वायू आणि इतर रसायनांचे उत्सर्जन . काहींचा अंदाज आहे की दोन आठवड्यात ८,००० लोकांचा मृत्यू झाला. २००६ मध्ये सरकारी प्रतिज्ञापत्रात असे म्हटले होते की गळतीमुळे

५,५८,१२५ लोक जखमी झाले होते ज्यात ३८,४७८ तात्पुरते आंशिक आणि अंदाजे ३,९०० गंभीर आणि कायमचे अपंगत्व आले होते. चेर्नोबिल आपत्ती , १९८६ - सोव्हिएत युनियनमध्ये ३१ जणांच्या मृत्यूची अधिकृत संख्या वादग्रस्त आहे. २००८ पर्यंत, UNSCEAR च्या अहवालात रेडिएशनमुळे एकूण ६४ जणांचा मृत्यू झाल्याचे म्हटले आहे. अखेर मृतांची संख्या ४,००० पर्यंत पोहोचू शकते. सुमारे ५० आपत्कालीन कर्मचारी तीव्र रेडिएशन सिंड्रोममुळे मरण पावले. १९९८ ते २०१७ दरम्यान, भूकंपांमुळे जगभरात सुमारे ७,५०,००० लोकांचा मृत्यू झाला, जे नैसर्गिक आपत्तींशी संबंधित एकूण मृत्यूंपैकी निम्म्याहून अधिक होते. या काळात १२.५ कोटींहून अधिक लोक भूकंपामुळे प्रभावित झाले, म्हणजेच आपत्तीच्या आणीबाणीच्या टप्प्यात ते जखमी झाले, बेघर झाले, विस्थापित झाले किंवा स्थलांतरित झाले. भूकंपामुळे इमारती कोसळणे, किनाऱ्यावर किंवा किनाऱ्यावर सोडलेल्या त्सुनामी साठ्यांमुळे बुडणे आणि गाडणे आणि कोसळणाऱ्या इमारतींमध्ये अडकणे आणि त्सुनामीच्या धावपळीच्या आणि मागील टप्प्यात गंभीर दुखापत होणे, किरकोळ जखमा आणि जखमांपासून ते गंभीर फ्रॅक्चर, चिरडून जखमा आणि भाजणे यांचा समावेश आहे. भूकंपातून वाचलेल्यांच्या मानसिक आरोग्यावर होणाऱ्या परिणामांबद्दल, भूकंपातून वाचलेल्यांमध्ये आढळणाऱ्या सर्वात सामान्य मानसिक आजार म्हणजे पोस्ट-ट्रॉमॅटिक स्ट्रेस डिसऑर्डर (PTSD) आणि मेजर डिप्रेशन (MD) भूकंपानंतर PTSD चे प्रमाण 1.20% आणि 87% दरम्यान असल्याचे नोंदवले गेले आहे, जे विविध सांस्कृतिक आणि सामाजिक-लोकसंख्याशास्त्रीय वैशिष्ट्यांवर अवलंबून आहे.

निष्कर्ष :

संभावतालच्या परिस्थितीचा परिणाम आरोग्यावर होतो. व्यक्तीच्या कौटुंबिक, सामाजिक, सांस्कृतिक, सामाजिक स्थिती समतोलाची राहू शकेल असे पर्यावरण लाभल्यास आरोग्याचा दर्जा उंचावतो अशाप्रकारे व्यक्तीचे आरोग्य जपण्यासाठी किंवा व्यक्तीच्या आरोग्यासाठी वरील घटक महत्त्वपूर्ण असतात. जर व्यक्तीस आरोग्याने साथ दिली तर त्या व्यक्तीस ते काम करण्यास सांगेल ते काम करता येणार नाही. शरीर व मन निरोगी असणे ही व्यक्तीच्या दृष्टीने चांगले समजले जाते. कोणत्याही प्रकारचा वैद्यकीय उपचार न घेता व्यक्ती आपले जीवन जगतो. तिच व्यक्ती खऱ्या अर्थाने सर्व बाबतींमध्ये श्रीमंत असते. ज्या व्यक्तीजवळ खूप पैसा आहे व त्यास रोगाने जर जर केले तर अशा व्यक्तीस जीवन जगणे कठीण जाते एखादी व्यक्ती जर निरोगी असेल तर संपूर्ण समाज सुद्धा निरोगी असावा लागतो. पण सर्व समाजामधील माणसे हे या ना त्या रोगाने आजारी पडलेले असतात. त्यामुळेच देशाच्या सर्वांगीण प्रगतीवर यांचा परिणाम पडतो. ज्या देशातील समाज हा निरोगी असतो तो देश हा प्रगतीचा शेवटच्या बिंदूवर जावून पोहोचतो म्हणून या सर्व बाबींसाठी आरोग्य महत्त्वाचे असते. म्हणून दैनंदिन जीवनामध्ये आरोग्याला विशेष महत्त्व आहे व आपण त्याची काळजी घेतली पाहिजे.

आपली भूमिका व मूल्ये जोपासना:

आपली पर्यावरणीय मालमत्ता समजून घेणे आणि त्याच्या जतनासाठी कृती करणे या प्रक्रियेतून पर्यावरणीय मूल्ये लोकांच्या मनावर ठसवली गेली पाहिजेत. आपण आर्थिक वाढ सर्वात जास्त महत्त्वाची मानतो. ही मानसिकता बदलली पाहिजे आणि प्रत्येकाने शाश्वत विकासाबद्दल विचार केला पाहिजे आणि कृती केली पाहिजे. प्रत्येक माणसाला त्याच्या किंवा तिच्या परिसराच्या विविध पैलूंबद्दल संवेदनशीलता आणि आदर वाटला पाहिजे. नैसर्गिक स्रोतांची मूल्ये ही केवळ उपयोगितावादाच्या महत्त्वाची नसावीत. एखाद्या नदीचे मूल्य केवळ पाण्यासाठी, जंगलाचे इमारती लाकूड व इतर गोष्टींसाठी आणि सागराचे ही केवळ माशांसाठी पाणी खरी पर्यावरणीय मूल्ये नसून ती त्याच्या ही पलीकडील आहेत. संपूर्ण निसर्गाचे जतन करण्यासाठीची संवेदनशीलता पर्यावरणीय मूल्यांमुळे यायला हवी. रोजची कामे करताना पर्यावरणाचे संवर्धन करणारी आपली कृती असेल अशी पर्यावरणीय मूल्ये असावीत. आपल्या बऱ्याच कृती पर्यावरणावर प्रतिकूल परिणाम करणाऱ्या असतात. आपण जाणीवपूर्वक त्या टाळल्या पाहिजेत.

संदर्भ:

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मराठी कवितेतून चित्रीत झालेला निसर्ग

प्रा. डॉ. संभाजी बाबाराव सावंत

मराठी विभाग प्रमुख

राणी लक्ष्मीबाई महाविद्यालय पारोळा जि.जळगाव

सारांश –

मराठी साहित्यातील अत्यंत संवेदनशील असा कविता हा वाङ्मय प्रकार आहे. कविता हा निसर्गाला अनुभवण्याचा आणि पर्यावरणाबद्दल जागरूकता निर्माण करण्याचा एक प्रभावी मार्ग आहे. कविता आणि पर्यावरण यांचा खूप जवळचा संबंध आहे. असे म्हटले जाते की, साहित्य हे समाजाचा आरसा आहे. साहित्यात समाजाचे प्रतिबिंब उमटत असते. मराठी कवींनी आपल्या कवितेतून पर्यावरणाचा समतोल राखण्यासाठी आपल्या कवितेतून पर्यावरणाचे महत्त्व, निसर्गाची सुंदरता, वृक्षारोपण, जलसंधारण आणि निसर्गाचा ज्ञास यासारखे विषय मांडले आहेत. त्यांनी आपल्या कवितेतून निसर्गाबद्दल प्रेम आणि त्याचे संवर्धन करणे आवश्यक हे सूचित केले आहे.

बीजशब्द – निसर्ग, शेती, पशु, पक्षी, वनस्पती

जागतिक पातळीवर पर्यावरण संवर्धन हा ज्वलंत प्रश्न निर्माण झाला आहे. मानवी जीवनच नव्हे तर संपूर्ण जीवसृष्टीच पर्यावरणातील विघातक बदलामुळे हादरून गेली आहे. निसर्गात मानवी हस्तक्षेप मोठ्या प्रमाणात वाढलेला आहे माणूस हा निसर्गाचा एक घटक आहे. त्यामुळे त्याचे भाव विश्व निसर्गापासून अलिप्त राहू शकत नाही. शेतीचा शोध लागल्यापासून माणूस निसर्गाच्या सानिध्यात वास करतो आहे. माती, हवा पाणी पशु पक्षी डोंगर नदी नाले दर्या खोरे वनस्पती आदी सर्व घटकांचा समावेश निसर्ग या संकल्पनेत होतो. निसर्गाचा मानवी जीवनावर जसा परिणाम होतो तसा मानवी जीवनाचा परिणाम निसर्गावर देखील होत असतो. “माणसाच्या जैविक आणि सांस्कृतिक पर्यावरणाचे कलात्मक, क्रीडात्मक संवेदना म्हणजे त्याचे ललित संवेदन अशा प्रकारचे ललित संवेदन व्यक्त करणारी निर्मिती म्हणजे पर्यावरणीय ललित साहित्य असे म्हणता येईल”.

महाराष्ट्र ही संतांची भूमी आहे. संत ज्ञानेश्वर, संत तुकाराम, संत नामदेव, संत एकनाथ, संत गाडगेबाबा, संत तुकडोजी महाराज, संत जनाबाई, संत चोखामेळा आदी संतांनी लोकांमध्ये जागरूकता निर्माण करण्यासाठी अभंग रचना केली. संत तुकारामांनी आपल्या गाथेत निसर्ग संवर्धनाचा संदेश दिला आहे.

वृक्षवल्ली आम्हा सोयरे वनचरे |

पक्षी ही सुस्वरे आळविती |

येणे सुखे रचे एकांताचा वास |

नाही गुण दोष अंगा येत |

आकाश मंडप पृथ्वी आसन |

रमे तेथे मन क्रिडा करी |

(अभंग गाथा क्रमांक २४८१)

मराठी काव्यात विविध विषयावर कविता लिहिल्या आहेत. त्याप्रमाणे निसर्गावर ही मोठ्या प्रमाणात कविता लेखन झालेले आहे कवी केशवसुत यांनी पर्यावरणीय संवेदनात सामाजिक उद्बोधनाचा सूर उमटवला आहे बालकवींनी एक स्वतंत्र निसर्गदृष्टी त्यांच्या अंतर्गत कलहाच्या दाबातून निर्माण केली आहे बालकवींनी ‘फुलराणी’, ‘श्रावणमास’, ‘औदुंबर’, ‘आनंदी आनंद गडे’, ‘पारवा’ आदी कवितेतून निसर्गाचे मनोहरी चित्रण केले आहे. बालकवी श्रावण महिन्याचे वर्णन करताना श्रावण महिन्यातल्या निसर्गाचे चित्रण अत्यंत मनोहारी केले आहे.

“श्रावणमासी हर्ष मानसी हिरवळ दाटे चोहिकडे

क्षणात येते सरसर शिरवे क्षणात फिरुनी ऊन पडे”

असे निसर्गाचे सुंदर वर्णन बालकवी आपल्या ‘श्रावणमास’ या कवितेत करतात. ‘बालकवी मूळ निसर्गावर मानवी भावनांचा आरोप करून निसर्गदृश्य चित्रित करतात. त्यामुळे त्यांच्या कवितेतील निसर्ग हा काल्पनिक होत नाही पण मूळ निसर्ग आकार बदलून त्यांच्या कवितेत आहे. म्हणून बालकवीच्या कवितेतील निसर्ग हा प्रति निसर्ग आहे’ असे द.भी. कुलकर्णी म्हणतात. बालकवींनी निसर्ग घटकांवर मानवी भावनांचा आरोप करून निसर्गदृश्य चित्रित केली. त्यामुळे त्यांच्या कवितेला एक वेगळे सौंदर्य प्राप्त झाले. परंतु निसर्गावर मानवी भावनांचा आरोप त्यांनी का केला? याचे परखड उत्तर पदनाभ टोळे बालकवीवर नवा प्रकाश या लेखात देतात ‘निसर्गाच्या मूक जीवनावर बालकवीने जो मानवतेचा साज चढवीला आहे त्याचे मर्म त्यांच्या चुरगळलेल्या स्वप्न चित्रातच आहे व्यवहारात जे असावे असे वाटले परंतु जे मिळू शकले नाही. ते व्यवहारापासून दूर पळून जाऊन निसर्गातील अमानवी वस्तूंना मानवी करून त्यांनी अनुभवून घेतले’.

हिरवे हिरवे गार गालिचे | हरित तृणाच्या मखमालीचे |

चोहीकडे लसलशीत बहरल्या हिरवळी छान |

पांघरली जरतार जांभळी वनमाला शाल |

त्यांच्या कवितेत या सृष्टीतील सूर्य, चंद्र, तारे, साखर, सरिता, सरोवर, निर्झर, डोह, वृक्ष, वेली, कळया, फुले, हिरवळ, डोंगर, दर्या, आदि चे वर्णन आले आहे. निसर्गाची लिपी वाचणाऱ्या निसर्गकन्या बहिणाबाई यांचे समर्ग काव्य निसर्ग देवतेलाच अर्पण. त्यांचे निसर्ग आणि मातीवर अपार प्रेम आहे. ‘वडे नांगर वखर, नहीं कष्टाले गनती’ या जाणीवेतून त्यांच्या कवितेत शेती, शेतकरी यांचे दारिद्र्य, कौटुंबिक जीवन, सभोवतालचा निसर्ग, पावसाची प्रतीक्षा, कष्टाळूपणा, शेतातील कामे, दारिद्र्यातही मातीवर प्रेम आपल्या कवितेतून व्यक्त केले आहे.

“आता होऊ दे रे शेत,

आला पाऊस पाऊस,

वऱ्हे येऊ दे रे रोप,

देवा पाऊस पाऊस”

पाऊस, शेती, पीक, मळणी, खुरपणी यांचे वर्णन करीत असताना निसर्गातील पशु पक्षी ही सुटत नाहीत. रा.ग. जाधव म्हणतात, “बहिणाबाई च्या निसर्ग कविता ऋग्वेद काळातही काळाची आठवण होते. निसर्ग शक्तींना देवाची रूपे देऊन पुजा करत सूर्य, वरुण, अग्नी, इंद्र, वायू इ. वर्णन ते निसर्गातून करतात”.

रानकवी ना. धों. महानोर यांनी रानातल्या कविता, वही, पावसाळी कविता, अजिंठा, प्रार्थना दयाघना, पक्ष्यांचे थवे, पानझड, गाथा शिवरायाची, तिची कहाणी यासारखे कवितासंग्रह प्रसिद्ध आहेत त्यांची कविता अनेक पातळीवरील असूनही तिचा मूळ गाभा हा रान-निसर्ग हाच आहे. महानोर हे प्रामुख्याने निसर्ग कवी म्हणून ओळखले जातात. रानातल्या कविता हा त्यांचा पहिला काव्यसंग्रह बालकवी पासून ते आज पर्यंतच्या कवींनी जशी भावगर्भ निसर्ग दृश्य चित्रित केले आहेत.. तशा प्रकारची निसर्ग दृश्य महानोरांच्या कवितेत दिसून येतात.

‘केशर भिजली पिवळी उन्हे झाडावर

सांझून गेली पाण्यावर

ज्वारी मधल्या पिंगट पिवळ्या पानावर

पोपटी पक्ष्यांच्या पंखावर भिरभिर

भिरकत गेली आभाळभर’

महानोर हे रानाशी शेतीशी एकरूप होऊन जातात त्यामुळे त्यांच्या कवितांमधून त्यांचे व्यक्तिमत्व पहावयास मिळते ग्रामीण परिसरातील निसर्ग आणि शेती हे एकच आहेत. हाच ग्रामीण परिसरातील निसर्ग महानोर यांच्या कवितेत रसरशीत पणे आणि जिवंतपणे उतरलेला दिसतो.

‘ह्या शेताने लळा लाविला असा की

सुखदुःखाला परस्पराशी हसलो रडलो

**आता तर हा जीवच अवघा असा जखडला
मी त्याच्या हिरव्या बोलीचा शब्द झाला'**

वरील ओळीतून कवीचे शेतीशी संबंध स्पष्ट होतात. शेतीचा लढा लागल्याने जीवनाच्या सुखदुःखाच्या प्रसंगी परस्परांशी हसता रडता आले. त्याची तीव्रता कमी करता आली. ही तीव्रता कमी झाल्यावर अवघा जीवच जसा जखडला की कविता हिरव्या बोलीचा शब्द झाला कवीने कवीचे व्यक्तिमत्व ज्ञानाशी शेतीशी एकरूप होऊन गेले आहे महानोर यांच्या कवितेच्या आणि निसर्ग कवितेच्या केंद्रस्थानी शेती विषयक प्रेम आहे. शेत, शेतीतील पिके, पशु, पक्षी, माती, झाडे, पाने, फुले, फळे यांच्या वर्णनांनी महानोर यांची कविता लढबढलेली दिसते. ग्रामीण परिसरातील निसर्ग महानोरांच्या कवितेत रसरशीतपणे आणि जिवंतपणे उतरलेला दिसतो. महानोर यांच्या कवितेतील निसर्गही ग्राम जीवनाचा अपरिहार्य घटक म्हणून येत नाही. निसर्गाचे ही केवळ निसर्ग म्हणून अवतरण नाही तर निसर्गाची विविध रूपे स्त्री-पुरुष प्रतिमा म्हणून वावरतात. कधी निसर्ग प्रतिमाच स्त्री रूपे घेऊन येतात उदा. नभ भुई या प्रतिमा मधून शृंगार प्रेरणा यांच्या नात्याचा प्रत्यय येतो.

**ह्या नभाने या भुईला दान द्यावे
आणि या मातीतून चैतन्य गावे
कोणती पुण्य अशी येते फळाला
जोधळ्याला चांदणे लखळून जावे**

नभ आणि भुई यांचे नाते ही पुरुष आणि स्त्रियांच्या नात्यासारखेच नभ ही प्रतिमा पुरुषोत्त्वासाठी आणि भुई रान ही प्रतिमा स्त्रीत्वासाठी वापरलेली आहे.

**पिकातून पाखरांचा धिंगाणा मनमानी
केसरात नाही कोणी मैना गोजिरवाणी**

कवितेच्या सुरुवातीला येणारे निसर्ग वर्णन सहजपणे स्त्रीच्या मानसिक अवस्था कवितेतून साकार होत जातात हा एक महत्वाच्या कवितेचा वेगळेपणा आहे. इंद्रजीत भालेराव यांच्या 'पीकपाणी' या कवितासंग्रहातून नैसर्गिक पर्यावरणाचे अस्सल रूप चित्रित झाले आहे. शेतकऱ्याच्या जीवनातील निसर्गाला विशेष महत्त्व आहे. निसर्ग हा लहरी आहे त्याचे परिणाम मानवी जीवनावर होत असतात निसर्गाच्या या लहरीपणाविषयी कवी म्हणतात

**आलं आलं हे आभाळ
नाही वारं वावधान
वऱ्ही बसलय हाटून
खाली फुलोऱ्यात धान
आलं आलं आभाळ**

मनावर ठसा उमटवणारी कविता आहे. निसर्ग चित्रणात महत्वाचे विविध ऋतू व विविध प्रहर म्हणजे उन्हाळा, पावसाळा, हिवाळा, दुपार, सायंकाळ, रात्र, पाणी, पशु, पक्षी, डोंगर, नदी, नाले, दर्या- खोरे, वनस्पती, शेत, शेतीतील पिके, पशु, पक्षी, माती, झाडे, पाने, फुले, फळे यांच्या वर्णनांनी महानोर यांची कविता लढबढलेली दिसते. गाव, शिवार आणि माणूस यांचा अनुबंध व्यक्त करणारी कविता श्रीकांत देशमुख यांनी लिहली आहे. त्यांचे बळीवंत, आषाढमाती हे अतिशय महत्वाचे कवितासंग्रह आहेत. निसर्गावर अवलंबून असणारे शेती आणि दुष्काळाने होरपळून जाणारा शेतकरी याचे अत्यंत वास्तवदर्शी चित्र श्रीकांत देशमुख यांच्या कवितेतून आढळते. ग्रामीण संस्कृतीचे सूक्ष्मचिंतन त्यांच्या कवितेतून अनुभवास येते शेतकरी ओल्या मातीत बिया सोबत आपले स्वप्नही पेरत असतो कधी ओला दुष्काळ तर कधी कोरडा दुष्काळाने त्याचे भाव विश्वस्त होते त्या शेतकऱ्याचे आभाळवेढे डोळे चातकाप्रमाणे पावसाची वाट पाहत असतात .

**असे पेटले आभाळ
दाही दिशा ओस झाल्या
पानगळती झालेल्या
खाली उदास सावल्या
पायी बांधला दुष्काळ
हाती मनगटी तोडे
चिमण्याच्या चोचीतून**

रीते झाले गावगाडे
डोहाडोहाच्या गाळात
उमटल्या खूरवाटा
बनबोभाट पायात
रुते बाभळीचा काटा

शेतीत काबाडकष्ट करून अहोरात्र घाम गाळून कोरड्या दुष्काळाने उध्वस्त झालेल्या शेतकऱ्याचे वर्णन या कवितेतून आले आहे. कोरड्या दुष्काळाने माणसा सोबतच निसर्गही उदास होऊन जातो. अशा परिस्थितीची कुठे तक्रारही करता येत नाही. ते निमुटपणे सहन करण्याशिवाय पर्याय नसतो.

नारायण सुमंत यांच्या वृक्षवेद, सातबारा या कवितासंग्रह मधून पर्यावरणाचे चित्रण आले आहे. पर्यावरण नैसर्गिक स्थिती याच्या अवनतीला जबाबदार असलेल्या सर्वच घटकांचा तीव्र शब्दात समाचार घेतला आहे. वृक्षवेद या मध्ये वृक्षाची नानाविध रूपे वृक्ष आणि माणूस यांचा अनुबंध वृक्षाचे उपयोग त्यांचे मानवी जीवनातील स्थान त्यांचे स्वयंभू अस्तित्व याशिवाय त्यांच्या स्वयंभू अस्तित्वावर मानवाने केलेला हल्ला त्यांच्यावरील अन्याय यांचे चित्रण आले आहे. झाडांचे नैसर्गिक जगणे माणसाने कृत्रिम बनवले आहे. त्यांना आपल्या कैदेत ठेवण्याचा प्रयत्न केला म्हणूनच वृक्षाची भावना मांडताना कवी वृक्षांना मानवी रूप देताना म्हणतात,

आता प्रत्येक आघाडीवर
मोर्चे बंद असतील झाडे
प्रत्येक शिवबंदी आणि रसद
तोडून टाकतील खोडे
लेकरासाठी ही आता
पान्हावणार नाहीत झाडे
हळव्या नाजूक ओठासाठीही
फळे देणार नाहीत झाडे
तमाम ओठांच्या भुकेचा प्रश्न
आता खिंडीत धरणार आहेत झाडे

कवीने आपल्या कवितेतून निसर्गाची भूमिका विशद केली आहे. मराठी कवितेतून निसर्गाचे मनोहरी चित्रण आले आहे. मराठी कवींनी आपल्या कवितेतून पर्यावरणाचा समतोल राखण्यासाठी आपल्या कवितेतून पर्यावरणाचे महत्त्व, निसर्गाची सुंदरता, वृक्षारोपण, जलसंधारण आणि निसर्गाचा ज्ञास यासारखे विषय मांडले आहेत. त्यांनी आपल्या कवितेतून निसर्गाबद्दल प्रेम आणि त्याचे संवर्धन करणे आवश्यक हे सूचित केले आहे.

संदर्भ-

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२. नागनाथ कोत्तापल्ले, ग्रामीण स्वरूप आणि शोध, स्वरूप प्रकाशन, औरंगाबाद
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५. डॉ. कैलास सार्वेकर, मराठी कवितेचा इतिहास, मेहता पब्लिकेशन्स, पुणे.

राष्ट्रसंत तुकडोजी महाराजांच्या ग्रामगीतेतील पर्यावरण

डॉ. हेमराज निखाडे

सहायक प्राध्यापक, पदव्युत्तर शैक्षणिक मराठी विभाग, गोंडवाना विद्यापीठ गडचिरोली

प्रस्तावना

२१ व्या शतकात पर्यावरणाचा प्रश्न अत्यंत गंभीर होत आहे. अलीकडे औद्योगिकीकरण, नागरीकरण, तंत्रज्ञानाचा अतिरेक, निसर्गसंपत्तीचा अमर्याद शोषण, जंगलतोड, प्रदूषण, पाणीटंचाई, हवामानबदल यामुळे मानवी अस्तित्व धोक्यात आले आहे. आज जागतिक पातळीवर शाश्वत विकास आणि पर्यावरण संवर्धन यांची हाक दिली जात आहे. मात्र, या तत्वांचा पाया गेल्या शतकभरापूर्वीच राष्ट्रसंत तुकडोजी महाराज यांनी आपल्या “ग्रामगीता” या अद्वितीय ग्रंथातून घातला होता. राष्ट्रसंत तुकडोजी महाराजांनी ग्रामव्यवस्थेतील मूल्यहीनता आणि संस्कारहीनतेबद्दलही वास्तव मांडले होते. मंदिरांच्या नावाखाली गावे विकण्याची प्रवृत्ती, राजकारणात शिष्टाचाराच्या आडून होणारा भ्रष्टाचार, तरुण पिढीत सांस्कृतिक मूल्यांचा ऱ्हास या समस्या त्यांनी सामाजिक निरीक्षणातून मांडल्या होत्या. त्यावर उपाययोजना म्हणून त्यांनी संस्कारक्षम समाजनिर्मिती, व्यसनमुक्ती, निसर्गस्नेही जीवनशैली आणि सामुदायिक सौहार्द यावर विशेष भर दिला.

संत साहित्य आणि पर्यावरण

ग्रामगीता हा ग्रंथ केवळ आध्यात्मिक ग्रंथ नाही. तर तो स्वतंत्र भारताचा ग्रामविकासाचा मुलग्रंथ ठरावा इतका तो समर्पक आहे. बाराव्या शतकात संत ज्ञानदेवांनी ज्ञानेश्वरीत निसर्गाला पूज्य स्थान दिले होते. नद्या, पर्वत, समुद्र, वृक्ष, लता, वने, उपवने, पशुपक्षी, चंद्र, सूर्य, तारे या सर्वांना ते “जीवसृष्टी” आणि “भूतसृष्टी” या संकल्पनांत सामावून घेतले. निसर्गातील प्रत्येक घटक हे सृष्टीच्या संतुलनाचे अविभाज्य अंग आहे असे मत व्यक्त केले होते. त्यांनी निसर्ग म्हणजे केवळ मानवी जीवनाला उपयोगासाठी नाही, तर आदर, प्रेम आणि कृतज्ञतेने पाहिले आहे. “यापरी माझा भावी। है जीवसृष्टि आहे आघवी।” असा भाव व्यक्त केला होता. संत साहित्याचा विचार करता एकूणच त्यामध्ये पर्यावरण अंतर्भूत आहे.

पंधराव्या शतकात संत तुकाराम महाराजांनी मानवी जीवनाचे निसर्गाशी असणारे नाते किती जवळचे आहे याचा पुरावा दिला यासंदर्भात डॉ. अनिल गवळी म्हणतात की, “संत तुकाराम महाराज एकांतवासात आणि निसर्ग सहवासात विठ्ठलाचा शोध घेऊ लागले. एकांतवासाचे सुख ते भोगू लागले, वृक्षवल्ली आम्हां सोयरी वनचरें। पक्षी ही सुस्वरें आळविते। येणें सुखें रुचे एकांताचा वास। नाहीं गुणदोष अंगा येत। आकाश मंडप पृथिवी आसन। रमें तेथें मन क्रीडा करी। कथा कुमंडलु देहउपचारा। जाणवितो वारा अवसर। हरिकथा भोजन परवडी विस्तार। करोनि प्रकार सेवू रुची। तुका म्हणे होय मनासी संवाद। आपुलाचि वाद आपणांसी।”^१ हा स्वतःच्या मनाशी संवाद साधण्यात तुकाराम तल्लीन होऊ लागले. त्यांचे मन आता हरिकथेची आवड धरू लागले. आकाशाचा मंडप आणि पृथ्वीचे आसन असा निसर्गाचा वास त्यांना रमवू लागला. वेली, वृक्ष, पक्षी हेच त्यांचे आप्तस्वकीय बनले. इतक निसर्गप्रेम त्यांच्या एकूणच जगण्याचा भाग होता.

एकोणविसाव्या शतकात भारतीय स्वातंत्र्याच्या पर्वावर ग्रामविकासाचा, पर्यावरणस्नेही जीवनाचा आणि स्वावलंबी भारताचा आराखडा राष्ट्रसंत तुकडोजी महाराजांनी मांडला. भारताचे भविष्य हे ग्रामीण भागात असून ग्रामराज्य सुराज्य व्हावे, यासाठी आयुष्याचा कण न कण झिजवला. वाणी आणि लेखणीतून आयुष्यभर प्रबोधनाचे कार्य त्यांनी केले. राष्ट्रसंतांनी ग्रामजीवनाचे सर्वांगीण चित्र रंगविताना पर्यावरण संरक्षण, स्वच्छता, जलसंपत्ती संवर्धन, वृक्षसंवर्धन, आरोग्य, कचरा व्यवस्थापन अशा अनेक बाबी त्यांच्या साहित्यात अंतर्भूत आहेत. आजच्या पर्यावरणीय संकटात असलेल्या काळात तुकडोजी महाराजांचे विचार अधिकाधिक महत्त्वाचे आणि मार्गदर्शक ठरतात.

राष्ट्रसंतांच्या साहित्यातील पर्यावरण

राष्ट्रसंत तुकडोजी महाराजांचे पर्यावरणविषयक विचार ग्रामगीतेतील स्पष्टपणे प्रतिबिंबित होतात. त्यांच्या दृष्टीने पर्यावरण म्हणजे झाडे, नद्या, प्राणी किंवा हवा एवढेच नसून गावातील भौतिक, सामाजिक, मानसिक, सांस्कृतिक आणि आध्यात्मिक वातावरणाचा संतुलित समन्वय होय. त्यांच्या समग्र साहित्य विचारांनुसार, पर्यावरणाचे रक्षण ही शासनाची जबाबदारी नसून हे विश्वची माझे घर म्हणणाऱ्या प्रत्येक ग्रामस्थाची, प्रत्येक नागरिकाची नैतिक जबाबदारी आहे. महाराजांनी आपल्या कार्यातून दुसऱ्या पंचवार्षिक योजनेपासूनच ग्रामविकासाच्या संकल्पनेला महत्व दिले. या संदर्भात डॉ. प्रमोद मुनघाटे म्हणतात की, राष्ट्रसंतांच्या विचारात “ग्रामव्यवस्थेचे नवनिर्माण हे भारतीय विकासाचे केंद्र आहे. परंतु आज जागतिकीकरणामुळे ‘ग्लोबल विलेज’ ही संकल्पना पुढे आली आहे आणि ती ग्रामव्यवस्थेसमोर मोठे आव्हान ठरली आहे. खुल्या बाजारपेठेच्या व मुक्त अर्थव्यवस्थेच्या युगात शहर आणि गाव यांतील अंतर मिटत असले, तरी गावांचे झपाट्याने शहरीकरण होत आहे. तरीही वेढबिगारी, सावकारशाही, जातीव्यवस्था आणि मानसिक दडपशाही यांचा पूर्णतः अंत झालेला नाही.”^२ जागतिकीकरणामुळे गावातील बाजारपेठा आणि आर्थिक व्यवहार स्थानिकांच्या हाती राहिलेले नाहीत. बहुराष्ट्रीय कंपन्यांनी ग्रामीण बाजारपेठांवर ताबा मिळवला असून, यामुळे ग्रामीण जीवनशैलीत मोठे बदल घडले आहेत. आज आर्थिक संकटे निर्माण होऊन शेतकऱ्यांच्या आत्महत्यांचे प्रमाण वाढले आहे. पर्यावरणाचा समतोल बिघडून मानवी जीवनाला त्याचे परिणाम भोगावे लागत आहे. आज ग्रामीण बेरोजगारीने भयावह रूप घेतले असून, मिळेल ते काम आणि मिळेल तो रोजगार याच्या शोधात तरुणाईचे लोंढे शहराकडे स्थलांतरित होत आहेत. अशा परिस्थितीत ग्रामगीतेतील स्थानिक उत्पन्नवृद्धी व रोजगारनिर्मितीचा दृष्टिकोन आजही अत्यंत उपयुक्त ठरतो. तुकडोजी महाराजांनी ग्रामपातळीवर उत्पन्नाची साधने, रोजगाराचे नियोजन, स्वावलंबी अर्थव्यवस्था आणि समाजातील समन्वय साधून ग्रामीण पर्यावरण या संकल्पनांवर भर दिला होता. परंतु नव्या युगातील बहुराष्ट्रीय कंपन्यांचा हस्तक्षेप आणि खुल्या बाजारपेठेचा ताण यामुळे नवीन सामाजिक-आर्थिक प्रश्न निर्माण झाले आहेत. त्यामुळे राष्ट्रसंतांच्या आदर्श ग्राम जीवनाचे प्रारूप महत्वाचे ठरते.

१. ग्रामस्वच्छता हा ग्रामविकासाचा पाया

भारत स्वतंत्र झाल्यावर देशाच्या पुढे अनेक ग्रामीण समस्या आ वासून उभ्या होत्या. मुलभूत पायाभूत सुविधांचा अभाव होता. ग्रामस्थांमध्ये पर्यावरणीय जाणीव जागृतीचा अभाव होता. अशा महत्वाच्या क्षणी राष्ट्रसंत तुकडोजी महाराजांनी स्वच्छतेवर विशेष भर दिला. त्यांनी ग्राम स्वच्छता, व्यक्तिगत स्वच्छता, नद्या व तळी स्वच्छ ठेवणे एकूणच पर्यावरणाच्या दृष्टीने किती महत्वाचे आहे. हे प्रबोधन रूपाने सांगून ग्रामस्वच्छतेचा मंत्र दिला. एवढेच नव्हे तर त्यांनी ग्रामीण जनमानसाचा विविध उपक्रमात सहभाग करून घेतला. ग्रामीण स्वच्छतेचा दूरदृष्टीकोण ठेवून ते ग्रामगीतेमध्ये म्हणतात की, “शौचगृहेहि नव्या प्रकारे । निर्मावी सर्वासाठी ॥६८॥”^३ ही ओवी घर तिथे शौचालय निर्मितीची संकल्पना स्पष्ट करते. आज जसे स्वच्छ भारत अभियान राबविले जाते, तसे विचार महाराजांनी दशकांपूर्वीच मांडले होते. त्यांनी फक्त घरांची नव्हे तर गावातील रस्ते, विहिरी, नाले, घाट, बाजारपेठा स्वच्छ ठेवण्याची आवश्यकता स्पष्ट केली. आजही गावागावात राष्ट्रसंतांच्या या विचाराचा प्रचार प्रसार करावा लागत आहे. शासन स्तरावरून ग्रामपंचायत मार्फत प्रत्येक कुटुंबाला सुलभ शौचालयाकरिता योजना राबवीत आहे. नागरिकांच्या कर्तव्याबद्दल राष्ट्रसंतांचा संदेश अत्यंत मोलाचा होता.

“नदी, तळयाकाठची स्वच्छता । तेथे पार, घाट आदींची व्यवस्था

उत्पादन वाढवया तत्वता उपयोग घ्यावा जलाचा ॥६९॥”^४

ही ओवी पाण्याच्या योग्य वापराची, संरक्षणाची आणि उत्पादनक्षमतेत वाढ करण्याची दिशा दाखवते. आज जल जीवन मिशन अंतर्गत जे उद्दिष्ट ठेवले जाते, तेच उद्दिष्ट तुकडोजी महाराजांनी ग्रामगीतेतून सूचित केलेले आहे. गावातील जलस्रोत स्वच्छ ठेवणे हे महाराजांच्या दृष्टीने आरोग्यदायी जीवनाचे पहिले पाऊल होते. म्हणून त्यांनी गावागावात सामुहिकरित्या नैसर्गिक साधन संपत्तीचे रक्षण करणे, नैसर्गिक संसाधनांचा सुव्यवस्थित वापर करणे हिताचे असते, असा संदेश दिला. आपल्या कुटुंबाला

सुदृढ आरोग्य लाभले तर आपली प्रगती होईल, अर्थात प्रत्येक कुटुंबाची प्रगती ही गावाची प्रगती असा त्यांचा आदर्श ग्राम संकल्पनेतील पर्यावरणीय विचार होता. एकविसाव्या शतकातील ग्रामीण भारताचे स्वरूप बदलत असताना, राष्ट्रसंत तुकडोजी महाराजांच्या ग्रामगीतेतील ग्रामविकासाच्या तत्वांचा आणि महात्मा गांधींच्या ग्रामस्वराज्य संकल्पनेचा नव्याने पुनर्विचार करावा लागेल असे दिसते. महात्मा गांधीजींची आणि राष्ट्रसंतांची विचारसरणी आजही प्रभावी आहेत. स्वावलंबन, स्थानिक साधनसंपत्तीचा उपयोग, शिक्षण, आरोग्य, स्वच्छता, रोजगार आणि सामाजिक समन्वय या मूल्यांचा अंगीकार केल्याशिवाय ग्रामविकास साध्य होऊ शकत नाही. अर्थात ग्रामीण पर्यावरण सक्षम होऊ शकत नाही.

३. वृक्षसंवर्धन आणि हरितग्राम संकल्पना

वृक्षवल्ली आम्हां सोयरी वनचरें। पक्षी ही सुस्वरें आळविती । असे म्हणून संत तुकाराम महाराजांनी पर्यावरणीय अनेक घटकांशी मानवाचे असलेले नाते सांगितले होते. तर राष्ट्रसंत तुकडोजी महाराजांनी वृक्षारोपण हे पर्यावरण संवर्धनाचे सर्वात महत्वाचे साधन मानले. आणि प्रत्येक गावागावात वृक्ष संवर्धन झाले पाहिजे असेही त्यांनी सुतोवत केले. गावातील प्रत्येक रस्त्याच्या दुतर्फा वृक्षारोपणाची सूचना करताना ते म्हणतात की,

“सडकांचिया दुतर्फा छान । सर्वांनी करावे वृक्षारोपण

ढोले ठेवावे मधामधातून कचरा त्यात टाकावया ॥७९॥”^५

पर्यावरणात वृक्षाचे महत्त्व फार मोठे आहे. वृक्ष म्हणजे केवळ छाया, सावलीसाठी किंवा सौंदर्यासाठी नाही. पर्यावरणाचे संतुलन राखताना हवा शुद्ध ठेवण्यासाठी, पावसाचे प्रमाण वाढवण्यासाठी, याशिवाय औषधी झाडांचा उपयोग आरोग्यासाठी होतो. असे विविध उपयोग राष्ट्रसंतानी सांगितले होते. सजीव सृष्टीत वृक्षाचे स्थान अनन्य साधारण आहे. वृक्ष वातावरणातील कार्बन डायऑक्साईड शोषून घेतात आणि ऑक्सिजन बाहेर टाकतात, ज्यामुळे हवा शुद्ध राहते. ते मातीची धूप थांबवतात, पाण्याची पातळी नियंत्रित ठेवतात आणि हवामानातील बदल कमी करण्यास मदत करतात. जंगले अनेक वन्यजीवांचे नैसर्गिक अधिवास आहेत. वृक्षतोड केल्यामुळे या वन्यजीवांचे अस्तित्व धोक्यात येते. वृक्षसंवर्धनामुळे या वन्यजीवांचे संरक्षण केले जाऊ शकते. वृक्ष नैसर्गिक आपत्ती जसे की पूर, दुष्काळ, भूस्खलन इत्यादींपासून संरक्षण देतात. त्यांची मुळे मातीला धरून ठेवतात, ज्यामुळे जमीन खचण्याची शक्यता कमी होते. वृक्ष लाकूड, फळे, फुले, औषधी वनस्पती इत्यादी नैसर्गिक संसाधने पुरवतात. त्यांचा उपयोग अनेक उद्योगांमध्ये होतो. तसेच, वृक्षामुळे पर्यटनालाही चालना मिळते. म्हणूनच राष्ट्रसंतानी वृक्षसंवर्धनावर भर दिला. शिवाय मानवी आरोग्यात वृक्षाचे महत्त्व सांगताना ते म्हणतात की, “आपल्याच गावची वृक्षवल्ली । कंदमुळे आणोनि औषधे केली ॥११०॥”^६ ही राष्ट्रसंतांची दृष्टी आजच्या जैवविविधतेच्या संवर्धनाशी किती सुसंगत आहे हे लक्षात येते.

४. कचरा व्यवस्थापन आणि आरोग्य

आज आपण घनकचरा व्यवस्थापन, कचरा वर्गीकरण याबद्दल शासन स्तरावर मोहीम राबविली जात आहे. कचरा व्यवस्थापन आणि आरोग्य याबाबत राष्ट्रसंत तुकडोजी महाराजांनी तत्कालीन काळाची परिस्थिती लक्षात घेऊन मांडली होती. ते आजच्याही ग्रामीण समाजाला हितावह ठरत आहे. “श्रमदानाचे सप्ताह घेवोनी । रस्ते दुरुस्त करावे सर्वांनी ।

शोषक खड्डे, मोऱ्या करोनी । सांडपाणी थांबवावे” ॥६६॥”^७

प्रत्येक गावात कृषी संस्कृती आणि कृषीवर आधारित अनेक उद्योग असल्याने पर्यावरणीय दृष्ट्या जाणीव जागृती झाली पाहिजे. कचरा व्यवस्थापनाकरिता शोष-खड्डे निर्माण करणे, यासाठी प्रत्येक गावाने श्रमदान सप्ताहाचे आयोजन केले पाहिजे. अलीकडे श्रमदान केले जात नाही. फारसे सार्वजनिक समाजहिताच्या कामात कोणी पुढे येत नाही. परंतु तत्कालीन काळात राष्ट्रसंत तुकडोजी महाराजांनी दिलेला संदेश आजही मोलाचा वाटतो. गावगाड्याच्या संस्कृतीला जपायचे असेल, ग्रामीण विकास साधायचा असेल तर सामुहिक समाजमन तयार होणे गरजेचे आहे, याची जाणीव राष्ट्रसंताना होती. याशिवाय आज अनेक गावात ग्रामपंचायत मार्फत सांडपाणी व्यवस्था केली जाते. परंतु बहुतेक गावात पाऊसाचे पाणी रस्त्यावरून वाहताना दिसते. स्वातंत्र्याच्या अमृतमहोत्सवी वाटचालीनंतरही खेड्याची दुरवस्था संपली नाही. अशावेळी तुकडोजी महाराजांनी

ग्रामवासियांना दिलेला श्रमसप्ताहाचा सल्ला अधिक मोलाचा वाटतो. पर्यावरण संतुलन राखताना अनेक जबाबदाऱ्या राष्ट्रसंतानी ग्रामगीतेत सांगितल्या आहेत. राष्ट्रसंत तुकडोजी महाराजांनी तत्कालीन दुरावस्थेत असलेल्या खेड्याचे अत्यंत सूक्ष्म निरीक्षण करून आदर्श ग्राम संकल्पना मांडली. ही संकल्पना मांडताना त्यांच्या मुळशी पर्यावरण होते. तुकडोजी महाराजांच्या विचारांचे, तत्त्वज्ञानाचे आणि कार्यधोरणाचे सार म्हणजे 'ग्रामगीता' हा ग्रंथ होय. या ग्रंथात गाव केंद्रस्थानी ठेवून त्यांनी भारतीय समाजव्यवस्थेचे चिंतन केले आहे. ग्रामगीतेत त्यांनी सर्वधर्मसमभाव, विवेकनिष्ठ जीवनदृष्टी, मानव कल्याणाचे सूत्र आणि सहजीवनाची तत्त्वे स्पष्ट केली आहेत. त्यांच्या विचारसरणीची तुलना महात्मा गांधींच्या ग्रामस्वराज्याच्या संकल्पनेशी करता येते. ग्रामगीतेत म्हटले आहे, "गाव हा विश्वाचा नकाशा, गावावरून देशाची परीक्षा" म्हणजेच, गावाचे स्वरूप हे देशाच्या प्रगतीचे प्रतिबिंब असते.

५. पर्यावरणपूरक ग्रामीण जीवन

राष्ट्रसंत तुकडोजी महाराजांनी कल्पिलेलं 'आदर्श गाव' हे केवळ सौंदर्यपूर्णच नव्हे, तर सुसूत्र, शिस्तबद्ध, स्वावलंबी आणि सांस्कृतिक दृष्ट्या समृद्ध असावे. त्यांच्या संकल्पनेनुसार गावात स्वच्छता महत्त्वाची आहे. गावात दुतर्फा झाडे, सुंदर बागा, लताकुंजांनी सजलेली हिरवळ असावी. वाचनालये, समाजमंडळे, व्याख्यानमाला अशा सामाजिक संस्था गावागावात स्थापन व्हाव्यात. आरोग्यसेवा, औषधोपचार, शाळा, क्रीडांगणे, स्वच्छ विहिरी, सांडपाणी व्यवस्थापन, उत्तम प्रकाशयोजना, वाचनालये, उद्योगधंदे आणि सांस्कृतिक चैतन्यपूर्ण उपक्रम ही आदर्श गावाची लक्षणे आहेत. निसर्गरम्य वातावरणात त्यांच्या आदर्श ग्राम संकल्पनेतील पर्यावरण पूरक गावं कसे असावे, हे सांगताना ते म्हणतात की,

“ऐसे गाव होता आदर्शपूर्ण, शहराहूनी नंदनवन।

सर्वांचे करील आकर्षण । सुंदर जीवन तुकड्या म्हणे ॥११७॥” ९

तुकडोजी महाराजांचे संपूर्ण जीवन आणि कार्य भारतीय ग्रामसंस्कृतीच्या पुनरुज्जीवनासाठी वाहिले गेले. त्यांनी ग्रामगीतेच्या माध्यमातून ग्रामजीवनाचे आदर्श मांडले, जे आजच्या ग्रामीण विकास धोरणांसाठीही उपयुक्त आहेत. त्यांच्या विचारांतून आपल्याला स्वावलंबी, सुसंस्कृत, स्वच्छ, सौहार्दपूर्ण आणि चैतन्यमय गावे या देशाचे भविष्य ठरेल. राष्ट्रसंत तुकडोजी महाराजांचे आदर्श ग्रामाचे स्वप्न स्वावलंबी, स्वच्छ, आरोग्यदायी आणि पर्यावरणपूरक गावाचे होते. त्यांनी रस्त्यांची रुंदी, नाल्यांची बांधणी, वायुवीजन, बाजारपेठांची शिस्त, औषधी बाग, सार्वजनिक विहिरी, वाचनालय, शाळा, विश्रामगृहे, क्रीडांगणे यांचा राष्ट्रसंतांच्या साहित्यात अनुबंध दिसून येतो. त्यांच्या मानवतेच्या विशाल विश्वात पर्यावरण महत्त्वाचे आहे. त्यांच्या आदर्श ग्राम संकल्पनेत

“चहू दिशांनी गाव सुंदर । वारे करोत जीवनसंचार

कोठेही घाण, कोणी घर पाहताना न दिसावे ॥७२॥” १०

हा पर्यावरणीय विचार त्यांच्या ग्राम संकल्पनेत आहे. म्हणून पर्यावरणाचा विचार करून त्यांनी गावाची संपूर्ण ग्रामरचना असावी हा भाव आजही तितकाच महत्त्वाचा वाटतो. राष्ट्रसंत तुकडोजी महाराजांचा विचार ग्रामीण भारताला निरंतर उपयोगी राहील. “गाव सुधारा, देश घडवा, मानवधर्म जपा, आणि मानवतेचे बंध मजबूत करा.” शास्त्र, अत्याधुनिक तंत्रज्ञान आणि प्रसारमाध्यमे सहज उपलब्ध असूनही, स्वच्छता, आरोग्य, रोजगार व शिक्षणाच्या प्रश्नांवर शासनाला एकविसाव्या शतकातही विशेष प्रयत्न करावे लागत आहेत. ग्रामगीतेतील विचार पाहिले, तर त्यामध्ये या प्रश्नांवरील सुसंबद्ध नियोजन आढळते. कारण राष्ट्रसंतांच्या कार्याचे केंद्र 'ग्राम' हेच होते. राष्ट्रीय प्रगती साधायची असेल, तर ग्रामव्यवस्थेला केंद्रस्थानी ठेवूनच परिणामकारक बदल घडवून आणता येतो, हे त्यांनी सिद्ध करून दाखवले आहे. मानवी समाजाचे अनेक मुलभूत प्रश्न सोडविणे हा कोणत्याही आदर्श विचारसरणीचा प्रमुख उद्देश असतो. आजच्या नव-भांडवलशाहीच्या साम्राज्यात राष्ट्रसंतांच्या स्वप्नातील स्वावलंबी, समतावादी ग्रामव्यवस्था कोलमडलेली दिसते. म्हणूनच, आज जागतिकीकरण आणि नवभांडवलशाहीच्या आव्हानांमध्ये टिकून

राहण्यासाठी स्थानिक उत्पादन व स्वावलंबनाचा मार्ग स्वीकारून ग्रामीण पर्यावरण समृद्ध करणे गरजेचे आहे. ग्रामगीतेच्या मार्गदर्शनानेच स्वच्छ, समतावादी, आत्मनिर्भर आणि समृद्ध भारताची कल्पना साकार होऊ शकते.

समारोप

अलीकडे भारत सरकार राबवीत असलेले स्वच्छ भारत अभियान, जल जीवन मिशन – पाण्याच्या शाश्वत वापराचे तत्त्व राष्ट्रसंतांच्या आदर्श ग्रामसंकल्पनेतील आहे. हरितक्रांती – वृक्षसंवर्धनाचे महत्त्व नाकारता येत नाही. घनकचरा व्यवस्थापन – कचरा व्यवस्थापनाच्या संकल्पना ग्रामगीतेत स्पष्ट असून शासनस्तरावर अनेक उपक्रम राबविले जात आहे. शाश्वत विकास उद्दिष्टे लक्षात घेता, तुकडोजी महाराजांचे विचार आजच्या जागतिक शाश्वत उद्दिष्टांशी पूर्णपणे सुसंगत आहेत. म्हणून राष्ट्रसंत तुकडोजी महाराज हे केवळ अध्यात्मिक संत नव्हते, तर सामाजिक जाणिवेचे कर्ते सुधारक, पर्यावरणवादी आणि शाश्वत विकासाचे दूरदर्शी तत्त्वज्ञ होते. त्यांच्या ग्रामगीतेतील विचार आजच्या आधुनिक जगासाठी अधिक सुसंगत, उपयुक्त आणि मार्गदर्शक आहेत. त्यामुळे आजच्या पर्यावरणीय संकटात राष्ट्रसंत तुकडोजी महाराजांची पर्यावरणीय शिकवण भविष्यासाठी दीपस्तंभ ठरेल. आजच्या यंत्रयुगात आणि अतिवेगवान दळणवळणाच्या साधनांच्या काळात मानवी मूल्यांची जपणूक करणे हे अत्यंत आव्हानात्मक झाले आहे. यंत्र आणि मानव यांच्यातील स्पर्धा पराकोटीला पोहोचली असताना, ग्रामस्वराज्याचे स्वप्न साकार करण्यासाठी राष्ट्रसंत तुकडोजी महाराजांच्या ग्रामगीतासारख्या मार्गदर्शक ग्रंथाची आजही तितकीच आवश्यकता आहे. ग्रामीण आरोग्य, शिक्षण, रोजगार या समस्या आज अधिक गंभीर झालेल्या आहेत. या समस्यांचे निराकरण करण्यासाठी ग्रामगीतेमध्ये दिलेले मार्गदर्शन आजही अत्यंत सुसंगत ठरते. आदर्श ग्रामव्यवस्थेची संकल्पना भारतीय समाजव्यवस्थेचा कणा म्हणजे ग्रामव्यवस्था. महात्मा गांधींनी ज्या प्रकारे “भारताचा आत्मा खेड्यात वसतो” असे प्रतिपादन केले, त्याच विचारधारेचा पुढाकार घेत राष्ट्रसंत तुकडोजी महाराजांनी भारतीय ग्रामसंस्कृतीला नवा जीवनदृष्टीकोन दिला. त्यांना खात्री होती की भारतीय जीवनमूल्ये, बहुसांस्कृतिक एकात्मता आणि मानवतावादी अधिष्ठान हे खेड्यांच्या जडणघडणीतूनच बळकट होऊ शकते. म्हणूनच त्यांनी आयुष्यभर ग्रामोन्नती, समाजप्रबोधन आणि लोकशाही मूल्यांची रुजवण या कार्यासाठी स्वतःला अर्पण केले. तुकडोजी महाराजांच्या मते, ग्रामसंस्कृती टिकविल्याशिवाय नवभारताची निर्मिती अशक्य आहे. परंपरा आणि आधुनिकतेच्या सांध्यावर उभ्या असलेल्या भारतीय खेड्यांनी आपली निसर्गस्नेही जीवनशैली, आध्यात्मिक मूल्ये आणि सामूहिक सौहार्द जपणे आवश्यक आहे. ‘बहुजन हिताय बहुजन सुखाय’ हेच त्यांचे ध्येय होते. त्यांच्या विचारांतून खेड्यांचा विकास केवळ भौतिक प्रगतीपुरता मर्यादित नसून सांस्कृतिक, सामाजिक, आध्यात्मिक आणि नैतिक उन्नयनाचा संगम आहे. तुकडोजी महाराजांनी आपले प्रबोधनकार्य केवळ भाषण-प्रवचनापुरते मर्यादित ठेवले नाही, तर त्याला संघटित आणि कृतीप्रधान स्वरूप दिले. त्यांनी स्थापन केलेल्या गुरुदेव सेवा मंडळाच्या शाखांमधून सामुदायिक प्रार्थना, प्रभातफेऱ्या, ग्रामसफाई, व्यसनमुक्तीचे अभियान, सर्वधर्मसमभावाची शिकवण, जनजागृती, व्याख्याने व युवकांना सामाजिक चळवळीत सहभागी करण्याचे प्रोत्साहन अशा विविध उपक्रमांची मांडणी केली. या कार्यामुळे गावोगावी धार्मिक सौहार्द, राष्ट्रीय एकात्मता आणि नैतिक मूल्यांचे बळकटीकरण झाले. आजही गुरुदेव सेवा मंडळाचे कार्य ग्रामीण समाजाच्या सामूहिक जीवनाला चैतन्यपूर्ण बनविते.

संदर्भ

१. अनिल गवळी, सर्वात्मभावी तुकाराम सायन पब्लिकेशन्स प्र. आ. १५ एप्रिल २०१६ पृ.क्र. २९
२. प्रमोद मुनघाटे, भारतीय साहित्याचे निर्माते राष्ट्रसंत तुकडोजी महाराज, साहित्य अकादमी प्र. आ. २०२४ पृ.क्र. ९२
३. संपा. स्व. सुदाम सावरकर, राष्ट्रसंत तुकडोजी महाराज विरचित – ग्रामगीता साहित्य प्रकाशन समिती, गुरुकुंज अमरावती, दि. १२ मार्च २०१७ पृ.क्र. १२०
४. तत्रैव, पृ.क्र. १२०
५. तत्रैव, पृ.क्र. १२०
६. तत्रैव, पृ.क्र. १२३
७. तत्रैव, पृ.क्र. ११९

आरोग्य आणि पर्यावरण

डॉ. अंशुमती राजेंद्र काहाणे

पर्यावरणीय आरोग्य म्हणजे काय ?

पर्यावरणाचा आपल्या आरोग्यावर आणि कल्याणावर प्रत्यक्ष किंवा अप्रत्यक्ष परिणाम होऊ शकतो. पर्यावरणीय आरोग्य हे पर्यावरण आणि आपल्या आरोग्यातील परस्परसंवादाचे परीक्षण करते.

- पर्यावरणीय आरोग्य म्हणजे मानवी आरोग्याच्या (जीवनाच्या गुणवत्तेसह) पैलूंचा संदर्भ आहे जे पर्यावरणातील भौतिक, रासायनिक, जैविक, सामाजिक आणि मानसिक-सामाजिक घटकांद्वारे निश्चित केले जातात.
- पर्यावरणात आपल्या बाह्य सर्व गोष्टींचा समावेश होतो, ज्यामध्ये भौतिक, नैसर्गिक, सामाजिक आणि वर्तणुकीय वातावरण यांचा समावेश होतो.
- आरोग्य म्हणजे संपूर्ण शारीरिक, मानसिक आणि सामाजिक कल्याणाची अवस्था, आणि ती केवळ रोग किंवा आजाराची अनुपस्थिती नाही.

आरोग्यासाठी पर्यावरण का महत्वाचे आहे?

चांगल्या आरोग्यासाठी आपल्याला सुरक्षित, निरोगी आणि आश्वासक वातावरणाची आवश्यकता आहे. आपण ज्या वातावरणात राहतो ते आपल्या आरोग्यासाठी आणि कल्याणासाठी एक प्रमुख निर्धारक आहे. आपण ऊर्जा आणि जीवन टिकवून ठेवण्यासाठी आवश्यक असलेल्या साहित्यासाठी पर्यावरणावर अवलंबून असतो, जसे की:

- स्वच्छ हवा
- सुरक्षित पिण्याचे पाणी
- पौष्टिक अन्न
- राहण्यासाठी सुरक्षित ठिकाणे.

आपल्या पर्यावरणाचे अनेक पैलू - बांधलेले आणि नैसर्गिक वातावरण - आपल्या आरोग्यावर परिणाम करू शकतात. आपल्या पर्यावरणाच्या आणि आपण जिथे राहतो त्या जागेच्या व्यापक संदर्भात आपण आरोग्य समस्यांचा अर्थ लावणे महत्वाचे आहे.

पर्यावरणाशी संबंधित आरोग्य परिणाम

पर्यावरणाचे अनेक पैलू आपल्या आरोग्यावर परिणाम करू शकतात. पर्यावरणीय धोके कर्करोग, हृदयरोग आणि दमा यासारख्या आजारांचा धोका वाढवू शकतात. पर्यावरणाचे वेगवेगळे पैलू आपल्या आरोग्यावर कसा परिणाम करू शकतात याची उदाहरणे दिली आहेत.

पन्नास वर्षांपूर्वी, जागतिक आरोग्य संघटनेने (WHO) आरोग्याची व्याख्या "पूर्ण शारीरिक, मानसिक आणि सामाजिक कल्याणाची अवस्था आहे आणि केवळ रोग किंवा दुर्बलतेचा अभाव नाही" अशी केली होती. ही व्याख्या आपल्याला आठवण करून देईल की पर्यावरणीय आरोग्य आणि नैसर्गिक पर्यावरणाच्या दृष्टिकोनाची पुनर्परिभाषा करण्यासाठी विचारसरणीत अनेक बदल आवश्यक आहेत, तसेच विविध दृष्टिकोनांचा अवलंब करण्याची तयारी देखील आवश्यक आहे. पर्यावरणीय आरोग्याच्या क्षेत्रातील प्रगतीमुळे आपल्याला मानवी आरोग्य धोक्यांबद्दल बरेच काही शिकायला मिळाले आहे; नैसर्गिक वातावरण आरोग्य देखील वाढवू शकते, उदाहरणार्थ, अनेक औषधे वनस्पती आणि प्राण्यांपासून मिळवली जातात, जी जैवविविधतेचे जतन करण्यासाठी एक ठोस युक्तिवाद प्रदान करतात. याव्यतिरिक्त, नैसर्गिक जगाशी संपर्क थेट आरोग्यासाठी फायदेशीर ठरू शकतो. जर तसे असेल, तर पर्यावरणीय आरोग्याचे क्षेत्र केवळ विषारीपणाच्या विचारांच्या पलीकडे वाढले पाहिजे.

पर्यावरणीय प्रभाव	आरोग्य परिणामांची उदाहरणे
बाहेरील वायू प्रदूषण	श्वसनाचे आजार, हृदय व रक्तवाहिन्यासंबंधी रोग, फुफ्फुसांचा कर्करोग
असुरक्षित पिण्याचे पाणी	अतिसार (जठरांत्रीय) आजार
दूषित मनोरंजनाचे पाणी	अतिसार (जठरांत्रीय) आजार; डोळे, कान, नाक आणि घशाचे संक्रमण
डास, टिक्स आणि इतर वाहक	मलेरिया, डेंग्यू ताप, रिकेट्सियल रोग
अतिनील (अल्ट्राव्हायोलेट प्रकाश) एक्सपोजर	खूप जास्त: मेलेनोमा, मेलेनोमा नसलेला त्वचा कर्करोग, डोळ्यांचा मोतीबिंदू खूप कमी: विटॅमिन डीची कमतरता, ज्यामुळे रिकेट्स, ऑस्टियोपोरोसिस आणि ऑस्टियोमॅलेशिया होतो.
दुसऱ्या हाताच्या धुराचा संपर्क	नवजात मुलांमध्ये: कमी जन्माचे वजन, बालपणात अचानक अनपेक्षित मृत्यू (SUDI) मुलांमध्ये: दमा, खालच्या श्वसनमार्गाचे संक्रमण, मधल्या कानाचे संक्रमण प्रौढांमध्ये: इस्केमिक हृदयरोग, स्ट्रोक, फुफ्फुसांचा कर्करोग
घरातील गर्दी	संसर्गजन्य रोग, ज्यामध्ये खालच्या श्वसनमार्गाचे संक्रमण समाविष्ट आहे.
थंड आणि ओलसर घरे	अति मृत्युदर
हवामान बदल	संसर्गजन्य रोग, ज्यात जिआर्डियासिस, क्रिप्टोस्पोरिडिओसिस आणि साल्मोनेलोसिस यांचा समावेश आहे; उष्माघात
घातक पदार्थ	विषबाधा, भाजणे, त्वचारोग
शिसे	मुलांमध्ये: विकासात्मक विलंब, वर्तणुकीशी संबंधित समस्या प्रौढांमध्ये: रक्तदाब वाढणे
एस्बेस्टोस	श्वास घेण्यास त्रास, फुफ्फुसांचा कर्करोग, मेसोथेलिओमा
आवाज	श्रवणशक्ती कमी होणे, हृदय व रक्तवाहिन्यासंबंधी समस्या, निद्रानाश, मानसिक शारीरिक समस्या

निसर्गशील संपर्क साधण्याचे महत्त्व

निसर्गशील संपर्क फायदेशीर आहे या कल्पनेचा सैद्धांतिक आधार ईओ विल्सन यांनी दिला आहे, ज्यांनी जवळजवळ २० वर्षांपूर्वी *बायोफिलिया* हा शब्द सादर केला होता, ज्याची व्याख्या मानवाचे इतर सजीवांशी जन्मजात भावनिक संबंध अशी केली जाते. उत्क्रांतीच्या दृष्टिकोनातून, नैसर्गिक जगाशी खोलवरचे नाते आश्चर्यकारक नसावे. मानव २० लाख वर्षांहून अधिक काळ उत्क्रांत होत आहेत, तरीही गेल्या १०,००० वर्षांपासून ते निसर्गापासून तुलनेने अलिप्त राहिले आहेत. विल्सन (१९९३) यांनी नमूद केल्याप्रमाणे, "हे शोधणे खूपच विलक्षण ठरेल की नैसर्गिक जगाशी संबंधित सर्व शिक्षण नियम काही हजार वर्षांत नष्ट झाले आहेत. मानवी जीवनात प्राण्यांनी नेहमीच महत्त्वाची भूमिका बजावली आहे. आज, दरवर्षी सर्व व्यावसायिक क्रीडा स्पर्धापेक्षा जास्त लोक प्राणिसंग्रहालयात जातात. अमेरिकेतील अध्याह्न अधिक कुटुंबांकडे पाळीव प्राणी आहेत. मुलांच्या प्रीस्कूल पुस्तकांमध्ये भाषा आत्मसात करण्यासाठी आणि मोजण्यासाठी वापरल्या जाणाऱ्या पात्रांपैकी ९० टक्क्यांहून अधिक पात्रांमध्ये प्राण्यांचा समावेश आहे. प्राण्यांशी संपर्क मानवी आरोग्याशी जोडणारे अनेक पुरावे आहेत. फ्रमकिनच्या मते, चांगले पोषण आणि व्यायामाला प्रोत्साहन देणे यासारखे लोक आणि त्यांच्या प्राण्यांमधील बंध जपणे हे सार्वजनिक आरोग्याशी संबंधित

असलेल्यांच्या हिताचे असल्याचे दिसून येते. वनस्पती आणि फुलांच्या संपर्कात राहिल्याने आपल्या कल्याणाची भावना देखील वाढते. १९९८ मध्ये २००० हून अधिक घरांमध्ये यादृच्छिकपणे निवडलेल्या राष्ट्रीय बागकाम सर्वेक्षणात, अर्ध्या प्रतिसादकर्त्यांनी थीम पार्क, ऐतिहासिक स्थळे, गोल्फ कोर्स आणि रेस्टॉरंट्समधील फुले आणि झाडे या ठिकाणांचा आनंद घेण्यासाठी महत्वाची आहेत या विधानाशी सहमती दर्शविली आणि ४० टक्के लोक वनस्पतींभोवती राहिल्याने त्यांना शांत आणि अधिक आरामदायी वाटते या विधानाशी सहमत झाले. कार्यालयीन कर्मचारी अशाच प्रकारच्या भावना नोंदवतात, असे सांगतात की वनस्पती असलेले कार्यालय काम करण्यासाठी अधिक इच्छित ठिकाण आहे. मानसशास्त्रज्ञ मायकेल पर्लमन यांनी पौराणिक कथा, स्वप्ने आणि स्वतः नोंदवलेल्या भावनिक प्रतिक्रियांद्वारे पुराव्यांनुसार झाडांच्या मानसिक शक्तीबद्दल लिहिले आहे. खरंच, मानसिक आरोग्यात वनस्पतींची भूमिका असते ही संकल्पना बरीच स्थापित आहे, असे फ्रमकिन म्हणाले. लक्षात ठेवा, रुग्णालयांमध्ये पारंपारिकपणे पुनर्प्राप्ती आणि उपचारांसाठी बागा होत्या. कदाचित ही काळाची सन्मानित पद्धत ही ओळख दर्शवते की वनस्पतींशी जवळीक, जसे की प्राण्यांशी जवळीक, काही परिस्थितीत आरोग्य वाढवू शकते

डॉक्टर डेव्हिड क्यूम्स यांनी "रानटी आनंद" चे वर्णन केले आहे, ज्यामध्ये आत्म-जागरूकता; विस्मय, आश्चर्य आणि नम्रतेच्या भावना; निसर्गात आराम आणि त्यांच्याशी जोडण्याची भावना; इतरांबद्दल वाढलेली प्रशंसा; आणि नूतनीकरण आणि जोमाची भावना (क्यूम्स, १९९८) यांचा समावेश आहे. हे परिणाम अनेकदा विविध मानसिक, सेंद्रिय आणि भावनिक विकारांसाठी तथाकथित वन्यजीव उपचारांच्या अनुकूल अहवालांमध्ये उद्धृत केले जातात. बहुतेक प्रकाशित अभ्यास मानसिक आरोग्याच्या अंतिम बिंदूशी संबंधित आहेत आणि जरी ते मर्यादित असले तरी, बरेच जण वन्यजीव अनुभवांमधून काही फायदे सुचवतात. मानसिक आरोग्याचा शारीरिक स्थितीपेक्षा जास्त अभ्यास केला गेला आहे आणि दीर्घकालीन फायद्यापेक्षा अल्पकालीन फायदा अधिक दिसून आला आहे.

जैवविविधता आणि मानवी आरोग्य

पृथ्वीवरील विविध जीवन आणि आपल्या स्वतःच्या कल्याणामध्ये एक शक्तिशाली संबंध आहे, उदाहरणार्थ, फार्माकोपिया, संशोधन आणि निदान साधनांमध्ये नैसर्गिक उत्पादनांचे योगदान आणि प्रदूषण-संबंधित रोगांचे सूचक म्हणून. संशोधन आणि निदान साधनांमध्ये नैसर्गिक उत्पादने अनेकदा आवश्यक असतात, असे लव्हजॉय म्हणाले. याचे प्रमुख उदाहरण म्हणजे पॉलिमरेझ चेन रिअॅक्शन, जी रिअॅक्शन सुरू करण्यासाठी नैसर्गिकरित्या उद्धवणाऱ्या पदार्थावर अवलंबून असते. दुसरे उदाहरण म्हणजे हॉर्सशू खेकडे, ज्यांचे रक्त औषधांमधील काही अशुद्धता शोधण्यासाठी उपयुक्त आहे. इतर प्रजाती देखील आपल्या स्वतःच्या जीवशास्त्रात अनपेक्षित अंतर्दृष्टी प्रदान करू शकतात; उदाहरणार्थ, दक्षिण अमेरिकेतील पिट व्हायपरमध्ये एक विष असते ज्यामुळे बळींचा रक्तदाब कायमचा शून्यावर येतो. २० ते ३० वर्षांपूर्वी या सापाचा अभ्यास करणाऱ्या ब्राझिलियन शास्त्रज्ञांनी रक्तदाब नियमनाच्या अँजिओटेन्सिन प्रणालीचा शोध लावला. या संशोधनामुळे अखेर ACE (अँजिओटेन्सिन-कन्व्हर्टिंग एन्झाइम) इनहिबिटर म्हणून ओळखल्या जाणाऱ्या औषधांचा एक वर्ग विकसित झाला.

जैविक विविधता पर्यावरणीय बदलांच्या निर्देशकांचा एक संच म्हणून देखील काम करते, उदाहरणार्थ, वन्य प्रजातींमध्ये अंतःस्त्रावी-विघटनकारी रसायनांचा अभ्यास आणि जगातील उभयचर प्रजातींचा त्हास आणि लुप्त होणे. जैविक विविधता सजीव प्रणालींवर परिणाम करणाऱ्या सर्व गोष्टींचे अंतिम एकत्रीकरण बनते, असे लव्हजॉय म्हणाले. जैविक विविधता मानवी आरोग्याशी जोडण्याचा एक अतिरिक्त मार्ग म्हणजे पर्यावरणामुळे होणारे रोग कमी करणे. पर्यावरणातील विषारी कचरा समस्या, विशेषतः पीसीबी, तेल गळती आणि जड धातू साफ करण्यासाठी जैविक प्रणाली, प्रामुख्याने सूक्ष्मजंतूंचा वापर करणारे एक सक्रिय क्षेत्र आहे. पाणलोट क्षेत्रांच्या पुनर्संचयनाद्वारे पाणीपुरवठा स्वच्छ करण्याचे संभाव्य साधन म्हणून जैविक प्रणालींकडे वाढत्या प्रमाणात पाहिले जात आहे.

पर्यावरणीय आरोग्यांशी संवाद साधताना अन्न स्रोताची खात्री करणे

शेतीचा मानवी आरोग्यावर थेट दोन प्रमुख मार्गांनी परिणाम होतो: (१) शेती उत्पादनातील पर्यावरणीय आणि परिसंस्थेतील बदलांद्वारे आणि (२) अन्नाच्या उपलब्ध आणि पौष्टिक पुरवठ्याद्वारे. यूएस डिपार्टमेंट ऑफ ॲग्रीकल्चर (यूएसडीए) चे उपसचिव रिचर्ड रोमिंगर यांच्या मते, यूएसडीए पोषण कार्यक्रम दरमहा सहापैकी एका अमेरिकन व्यक्तीला अन्न पुरवण्यास मदत करतात. कमी जोखीम असलेल्या कीटकनाशके किंवा कीटकनाशकांच्या पर्यायांकडे वळून आणि जागतिक हवामान बदलावर परिणाम करणाऱ्या हरितगृह वायू आणि कार्बन साठवणुकीवर संशोधन करून पर्यावरणाचे रक्षण करण्यासाठी नवीन तंत्रज्ञान विकसित करण्याचे उद्दिष्ट संघीय कृषी उपक्रमांचे आहे. स्थानिक पातळीवर, यूएसडीए शाश्वत विकासाचा चालना देण्यासाठी खाजगी जमीन मालकांना संवर्धन पद्धतींमध्ये मदत करण्यासाठी तांत्रिक सहाय्य प्रदान करते. शाश्वतता ओळखते की शेतकरी उत्पादक आणि फायदेशीर असू शकतात आणि तरीही त्यांच्या जमिनी आणि पर्यावरणाचे सुज्ञ कारभारी असू शकतात. शाश्वतता हे ओळखते की शेतकरी त्यांच्या जमिनीचे आणि पर्यावरणाचे सुज्ञ कारभारी असताना उत्पादक आणि फायदेशीर असू शकतात.

- रिचर्ड रोमिंगर

१९९६ च्या शेती विधेयकातील तरतुदींचा उद्देश पर्यावरणीय फायदे साध्य करणे आहे ज्यामध्ये माती, हवा, पाणी आणि वन्यजीव अधिवास संवर्धन तसेच नद्या आणि ओढ्यांचे आरोग्य जपण्यासाठी लक्षित प्रयत्नांचा समावेश आहे. २००० च्या सुरुवातीला, राष्ट्राध्यक्ष क्लिंटन यांनी आर्थिक-पर्यावरणीय संबंध अधिक मजबूत करण्यासाठी संवर्धन सुरक्षा कार्यक्रम प्रस्तावित केला. व्यापक संवर्धन योजनांसह शेतकऱ्यांना थेट व्यवस्थापन देयके देऊन, हा कार्यक्रम खाजगी जमीन संवर्धन प्रयत्नांच्या स्वयंसेवी आणि स्थानिक पातळीवर नेतृत्वाखालील पैलूवर प्रकाश टाकतो. हे केवळ शेतीच्या समस्येपेक्षा खूप मोठे आहे. निरोगी वातावरण आणि त्यातून निर्माण होणाऱ्या मुबलक अन्नाचा समाजाला फायदा होतो. या कार्यक्रमातील एक प्रमुख तरतूद म्हणजे उत्पादकांना पोषक व्यवस्थापनात मदत करण्यासाठी निधी वाढवणे. उदाहरणार्थ, अयोग्यरित्या व्यवस्थापित केलेल्या प्राण्यांच्या आहाराच्या ऑपरेशन्समुळे जल प्रदूषण, चेसापीक पाणलोट क्षेत्रात फायस्टेरिया सारखे उद्रेक किंवा दुग्धव्यवसायातून जास्त प्रमाणात पाणी वाहून जाण्यास हातभार लागू शकतो.

शेतीसाठी, हरितगृह वायू उत्सर्जन काही आव्हाने आणि कदाचित काही संधी निर्माण करते. यूएस ग्लोबल चेंज रिसर्च प्रोग्रामने अहवाल दिला आहे की जागतिक तापमानवाढीमुळे प्रमुख पिकांचे उत्पादन वाढण्याची शक्यता आहे, परंतु कीटकनाशकांच्या वापरात २० टक्के वाढ देखील होऊ शकते, ज्याचा पर्यावरणावर मोठा परिणाम होऊ शकतो. सध्याचे संशोधन कार्बन शोषून घेण्यासाठी आणि साठवण्यासाठी शेतीच्या क्षमतेवर केंद्रित आहे. कृषी मातीत कार्बन साठवून, आपण वातावरणातून कार्बन डायऑक्साइड बाहेर काढण्यापेक्षा आणि जागतिक तापमानवाढीचा दर कमी करण्यापेक्षा बरेच काही साध्य करू शकतो, असे रोमिंगर म्हणाले. मातीतील सेंद्रिय घटक वाढवल्याने तिची पाणी धरून ठेवण्याची क्षमता, सुपीकता आणि उत्पादकता सुधारेल.

जागतिक हवामान बदलावर कृषी प्रणालींचा प्रभाव विचारात घेताना, आपण सूक्ष्मजीवशास्त्रीय रोगजनक आणि अन्न सुरक्षितता यांच्यातील संबंधांवर देखील लक्ष केंद्रित केले पाहिजे. असा अंदाज आहे की दरवर्षी अन्नजन्य आजारांमुळे 5,000 लोक मरतात आणि 76 दशलक्ष आजारी पडतात. रोमिंगर म्हणाले की, गेल्या 7 वर्षांत, देशाच्या विज्ञान-आधारित तपासणी प्रणालीमुळे कच्च्या मांस आणि कुक्कुटपालनात साल्मोनेलाच्या प्रादुर्भावात मोठी घट झाली आहे. भविष्यातील अन्न सुरक्षा आव्हानांविरुद्ध विज्ञान आणि तंत्रज्ञान हे संरक्षणाचे पहिले पाऊल आहे, उदाहरणार्थ, फूडनेट आणि पल्सनेटद्वारे. तथापि, काही रोगजनक आणि इतर सूक्ष्मजंतू जागतिक स्तरावर पारंपारिक नियंत्रण पद्धतींना, ज्यात ॲंटीबायोटिक्सचा समावेश आहे, प्रतिकार विकसित करत आहेत. अन्न सुरक्षा ही अन्न-सुरक्षित जगाचा एक महत्त्वाचा पैलू असली तरी, ती व्याख्येचाच एक भाग आहे. जर अन्न उपलब्ध नसेल आणि मुबलक प्रमाणात असेल आणि पौष्टिक गरजा पूर्ण झाल्या नाहीत तर सुरक्षितता असू शकत नाही. रोमिंगर म्हणाले, "आपले शेतकरी जगातील सर्वात मुबलक आणि पौष्टिक उत्पादन घेऊ शकतात, परंतु जर अमेरिकन

लोकांनी नव्याने जाहीर केलेल्या आहार मार्गदर्शक तत्वांच्या सल्ल्याचे पालन केले नाही, तर त्यांच्या आहाराला अजूनही अपयशी दर्जा मिळेल." हा शेती आणि कृषी धोरणापेक्षा शिक्षणाचा विषय आहे. हे शेतीवरील संवर्धन उपाय आणि सूक्ष्मदर्शकाखाली रोगजनकांच्या एकूण पर्यावरणीय आरोग्य संबंधात तितकेच केंद्रस्थानी आहे.

सारांश

सामान्य ज्ञान आपल्याला सांगते की निरोगी वातावरण मानवी आरोग्यासाठी महत्वाचे आहे. तथापि, अलिकडच्या वर्षांतच विज्ञान आणि तंत्रज्ञानाने आपल्याला निरोगी वातावरण आणि निरोगी शरीर यांच्यातील सहसंबंध मोजण्याचे मार्ग उपलब्ध करून दिले आहेत. आपण ज्या नैसर्गिक वातावरणात आपले दिवस घालवतो आणि ज्या राष्ट्रीय आणि आंतरराष्ट्रीय समुदायात पर्यावरणीय संरक्षणाची वाटाघाटी केली पाहिजे ते पर्यावरणीय आरोग्याचा विचार करण्यासाठी स्थानिक आणि जागतिक दृष्टिकोन प्रदान करतात. सार्वजनिक आरोग्य आणि पर्यावरण यांच्यात स्पष्टपणे परस्परावलंबन असले तरी, कार्यशाळेतील सहभागींनी असे नमूद केले की आरोग्यासमोरील आव्हाने ओळखण्यासाठी आणि समजून घेण्यासाठी किंवा हस्तक्षेप घोरणे अंमलात आणण्यासाठी आपल्याकडे मर्यादित संसाधने आहेत. चांगले आरोग्य साध्य करायचे असेल तर शाश्वतता यासारख्या काही उच्च-स्तरीय समस्यांवर लक्ष केंद्रित करणे आवश्यक आहे, असे रॅफे पोमेरेन्स यांनी नमूद केले. आणखी एक केंद्रीय अडचण म्हणजे कच्च्याची घट आणि विल्हेवाट लावणे. आपण आपल्या परिसंस्थांच्या उत्पादन क्षमतेपेक्षा जास्त वापर चालू ठेवू शकत नाही आणि नकारात्मक परिणामांशिवाय परिसंस्थांमध्ये परत आत्मसात करण्याच्या आपल्या क्षमतेपेक्षा जास्त वेगाने कचरा निर्माण करू शकत नाही, असे विल्यम मॅकडोनो म्हणाले. दुसरे आव्हान म्हणजे विविध पर्यावरणीय ताणतणावांवर आधारभूत डेटा विकसित करणे. खराब वातावरणाचे सार्वजनिक आरोग्यावर होणारे परिणाम प्रत्यक्ष किंवा अप्रत्यक्ष असू शकतात. वक्त्यांनी नमूद केले की आपण ऐतिहासिकदृष्ट्या प्रदूषणाच्या सार्वजनिक आरोग्यावर होणाऱ्या थेट परिणामांवर लक्ष केंद्रित केले आहे - उदाहरणार्थ, विषारीपणा किंवा प्रतिकूल आरोग्य परिणाम - आणि पर्यावरणीय प्रणालींवरील परिणामांद्वारे प्रत्यक्ष आणि अप्रत्यक्ष परिणाम मोजू शकणाऱ्या जैव निर्देशकांवर कमी लक्ष केंद्रित केले आहे. या आव्हानांना तोंड देण्यासाठी, कार्यशाळेतील अनेक सहभागींनी सांगितले की आपल्याला पर्यावरणीय आरोग्यासाठी अधिक समग्र आणि एकात्मिक दृष्टिकोन विकसित करण्याची आवश्यकता आहे ज्यामध्ये मानवी जैविक आणि पर्यावरणीय आरोग्याचे विचार समाविष्ट आहेत आणि या परस्परसंबंधांची चांगली समज प्राप्त करणे आवश्यक आहे. पर्यावरणीय आरोग्य शास्त्रज्ञांसाठी पर्यावरणशास्त्रज्ञांचा प्रणालीगत दृष्टिकोन एक नवीन आदर्श म्हणून स्वीकारला पाहिजे.

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रमेश मंत्री यांच्या पाश्चात्य प्रवासवर्णनांतील पर्यावरण आणि पर्यटन

सोनल लक्ष्मण इचाळे

संशोधक विद्यार्थिनी

संशोधन केंद्र- के. टी. एच. एम. महाविद्यालय गंगापूर रोड, नाशिक. विद्यापीठ- सावित्रीबाई फुले पुणे विद्यापीठ पुणे.

डॉ. सुरेखा हरी जाधव

संशोधन मार्गदर्शक, संशोधन केंद्र- के. टी. एच. एम. महाविद्यालय गंगापूर रोड, नाशिक. विद्यापीठ- सावित्रीबाई फुले पुणे विद्यापीठ पुणे.

प्रस्तावना:-

मनुष्य हा समाजशील प्राणी आहे. त्यामुळे उद्योग, व्यापार, नोकरी, सामाजिक व धार्मिक कामाच्या निमित्ताने मनुष्य सतत एका ठिकाणाहून दुसऱ्या ठिकाणी प्रवास करताना दिसतो. प्रवास करणे हे मनुष्याला खूपच आवडते. काही कामानिमित्त मनुष्य ज्या ठिकाणी जातो, तेथे निसर्ग मनुष्याला आकर्षित करीत असतो. त्यामुळे मनुष्याच्या ठिकाणी पर्यटनाविषयी महत्वाकांक्षा निर्माण होते व तो विविध ठिकाणी भेटी देण्यास, तेथील पर्यावरणाचा आस्वाद घेण्यास तत्पर होतो. आपले जीवन सुखी आणि समृद्ध करण्याच्या हेतूने मानव हा प्रवास करीत असतो. मानवाच्या या प्रवास करण्याच्या आवडीतूनच नवीन उद्योग उदयास आला तो म्हणजे 'पर्यटन' होय. पर्यटन म्हटले की प्रवाशांच्या येण्याजाण्याची, राहण्याची, जेवणाची व मनोरंजनाची व्यवस्था यांसारख्या सेवा- सुविधा पर्यटनाशी संबंधित असल्याने त्यांचाही पर्यायाने विकास झालेला दिसून येतो.

आज प्रचंड वाढत चाललेल्या पर्यटनामुळे मानवाला विकासाच्या अनेक संधी उपलब्ध झाल्या आहेत. पर्यटन हे केवळ सुट्टीसाठी किंवा मनोरंजनासाठीच नसते तर व्यवसाय, तीर्थयात्रा, वैद्यकीय सेवा किंवा शैक्षणिक हेतूसाठी केलेले प्रवासही पर्यटनात येतात. मुख्यतः पर्यावरण व पर्यटन या दोन्ही संकल्पना परस्पर पूरक अशा आहेत. जिथे पर्यावरण संपन्न असते तेथे पर्यटन आपसूकच येताना दिसते. म्हणजेच पर्यावरण व पर्यटन या परस्पर पूरक अशा संकल्पना आहेत.

शोधनिबंधाची उद्दिष्टे -

- १) पर्यावरण आणि पर्यटन या संकल्पनांचा अभ्यास करणे.
- २) पर्यावरण आणि पर्यटन या संकल्पनांचा परस्पर संबंध जाणून घेणे.
- ३) रमेश मंत्री यांच्या पाश्चात्य प्रवासवर्णनांतील पर्यावरण व पर्यटन या घटकांचा अभ्यास करणे.

शोधनिबंधाची गृहितके-

- १) मानवी विकासाच्या दृष्टीने पर्यावरण व पर्यटन यांना अतिशय महत्वाचे स्थान आहे.
- २) पर्यावरण व पर्यटन या परस्परावलंबी संकल्पना आहेत
- ३) रमेश मंत्री यांच्या पाश्चात्य प्रवासवर्णनांमध्ये पर्यावरण व पर्यटन हे अतिशय महत्वाचे घटक आहेत.

रमेश मंत्री यांच्या पाश्चात्य प्रवासवर्णनांतील पर्यावरण व पर्यटन या घटकांचा अभ्यास करण्यापूर्वी प्रथम 'पर्यावरण' व 'पर्यटन' या संकल्पना समजून घेऊया.

पर्यावरण :- 'पर्यावरण' ही संज्ञा Environment या इंग्रजी संज्ञेला पारिभाषिक म्हणून वापरली जाते. "Environment हा शब्द फ्रेंच भाषेतील Environ या शब्दापासून निर्माण झाला आहे व त्याचा अर्थ To surround म्हणजेच सभोवतालची स्थिती किंवा घटक होय."१ तसेच मराठी भाषेत 'पर्यावरण' म्हणजे 'परी + आवरण' म्हणजे सभोवतालची स्थिती किंवा घटक असाच होतो.

पर्यावरण या संकल्पनेच्या व्याख्या पुढीलप्रमाणे पाहू:-

- १) एखाद्या सजीवाचा विकास, वाढ, त्याचा जन्म व मृत्यू, सजीवांची प्रजाती किंवा वंश यांच्यावर परिणाम करणाऱ्या सर्व घटकांना व घटनांना पर्यावरण असे म्हणतात. - युनिव्हर्सल विश्वकोश.

२) वाढ व विकासावर प्रभाव टाकणारी सभोवतालची परिस्थिती म्हणजे पर्यावरण होय.

वरील माहितीवरून पर्यावरण म्हणजे काय हे लक्षात येते. याप्रमाणेच पर्यटन म्हणजे काय ते पुढील प्रमाणे पाहू

पर्यटन:- पर्यटनाचा इतिहास पाहता आपणास असे दिसते की, प्राचीन काळापासून माणसाला प्रवासाविषयी आकर्षण आहे. काहीतरी उद्दिष्ट डोळ्यासमोर ठेवून मानव सतत प्रवास करीत असतो. त्यामध्ये यात्रेकरू, अभ्यासक, खलाशी, व्यापारी, शास्त्रज्ञ व विद्यार्थी देखील असतात. प्रवासासाठी लागणारी साधने, राहण्याची व खाण्याची सोय म्हणून हॉटेल्स, लॉज, रेस्टॉरंट, करमणूकीची साधने आली. यातूनच पर्यटनाचा विकास होत गेलेला दिसून येतो.

पर्यटनाच्या काही व्याख्या पुढीलप्रमाणे आहेत.

१) मानवाच्या प्रवास करण्याच्या आवडीतून जो नवीन उद्योग-व्यवसाय उदयास आला तो म्हणजे 'पर्यटन' होय.

२) प्रवासाला सहाय्यभूत अशा सुविधांनी युक्त असा उद्योग, व्यवसाय म्हणजे 'पर्यटन' होय

वरील माहितीवरून पर्यटन म्हणजे काय हे लक्षात येते.

रमेश मंत्री यांच्या पाश्चात्य प्रवासवर्णनांतील पर्यावरण व पर्यटन पुढीलप्रमाणे आहेत.

१) 'थंडीचे दिवस' या प्रवासवर्णनातील पर्यावरण व पर्यटन - रमेश मंत्री वृत्तपत्र विद्येचे शिक्षण घेण्यासाठी इंग्लंड येथे वास्तव्यास असताना तेथील अनुभव, संस्कृती व पर्यावरण यांविषयीची माहिती थंडीचे दिवस या प्रवासवर्णनामध्ये सांगितलेली आहे. रमेश मंत्री यांनी केलेल्या वर्णनावरून असे समजते की, इंग्लंडमध्ये पडणारा पाऊस हा धो-धो पडत नाही तर सतत हलकेसे शिरकावे देत असतो. त्यामुळे वृक्षवेळींवरील पाने, फुले टवटवीत, टपोरी दिसतात. पाऊस पडून गेला की हवेत अल्हाददायी गारवा तयार होतो व संपूर्ण वातावरण प्रसन्न होते.

रमेश मंत्री नाताळाच्या सुट्टीत जेव्हा 'जॉर्डन्स' या छोट्या खेड्यात गेले होते तेव्हा त्यांनी त्या खेड्याचे वर्णन पुढीलप्रमाणे केले आहे. "जॉर्डन्स हे छोटेसे, अद्भुत गाव आहे. एखादा परीकथेतील हे गाव वाटते. त्यातील घरे लहानशी, सुशोभित वृक्षवेळींनी सजलेले आहेत. रस्ते निर्मळ आहेत."^२ यावरून असे समजते की, इंग्लंडमध्ये पर्यावरणाला अतिशय सुरक्षित ठेवले जाते कुठेही पर्यावरणाला हानी पोचू दिली जात नाही. स्वच्छता व टापटीपण हे इंग्लंडमधील पर्यावरणाचे विशेष गमक असल्याचे दिसून येते. सुट्टीचा दिवस आनंदाने व्यतीत करण्यासाठी वेगवेगळ्या बगीच्यांमध्ये निसर्गाच्या सानिध्यात कॉफी किंवा बिअर घेत आनंदाने घालवतात. इंग्लंडमध्ये देखील पर्यटन अतिशय वेगाने विकसित झालेले दिसून येते. प्रवाशांसाठी रेल्वे, बस, टॅक्सी सुविधा तसेच जेवणासाठी हॉटेल्स, राहण्यासाठी रेस्टॉरंट, लॉज व पर्यटकांच्या मनोरंजनासाठी नाईट क्लब, चित्रपट व नाट्यगृहांची व्यवस्था तसेच जुगारी खेळ असल्याने पर्यटन व्यवसाय देखील विकसित झालेले आहेत.

२) नवरंग या प्रवासवर्णनातील पर्यावरण व पर्यटन:- रमेश मंत्री यांनी इंग्लंडमधील पत्रकारितेचा अभ्यासक्रम पूर्ण करून भारतात परतताना युरोपातील छोट्या-मोठ्या दहा देशांना भेटी दिल्या होत्या. त्या देशांचे वर्णन नवरंग या प्रवासवर्णनामध्ये केलेले आहे. रमेश मंत्री इंग्लंडहून निघाल्यावर हॉलंडला गेले. तेथील 'अॅमस्टर डॅम', 'रोटरडॅम', 'हेग' ही प्रमुख ठिकाणे पाहिली. रमेश मंत्री यांनी 'हेग' या शहराचे केलेले वर्णन पुढील प्रमाणे केलेले आहे. "हेग ही हॉलंडची जणू राजधानीच वाटते. समुद्राच्याकाठी असलेल्या या रमणीय ठिकाणी ओघळत्या लाटांत स्नान करावे आणि तेथील अल्हाददायक उपहारगृहात खाना घ्यावा, असा मोह कोणालाही होईल. हॉलंडमध्ये बऱ्याच शहरांत इंडोनेशियन उपहारगृहे देखील आहेत. तेथे कसली गडबड नाही, गोंधळ नाही. येथील लोक आपल्या लहान- मोठ्या व्यवसायात रमलेले, समाधानी दिसतात."^३ रमेश मंत्री यांनी हॉलंडच्या इतर अनेक पर्यावरणीय गोष्टींचा देखील उल्लेख केलेला आहे उपवनांमध्ये छोटी रंगीबेरंगी फुले, पवन चक्क्या दिसतात कालवे, दुभती जनावरे, हिरवळी व एकूण शांतताप्रिय असा हॉलंड देश असल्याचे रमेश मंत्री यांनी सांगितलेले आहे.

रमेश मंत्री यांनी वर्णन केले आहे की, फ्रान्सची राजधानी 'पॅरिस' या नावातच जादू आहे. हे नाव ऐकताच स्वप्नगरीची आठवण होते. तिथे उंच उंच चेंसनटची झाडे, तेन नदीचे धावते फाटे, त्यांवरील गजबजलेले फुल, सौंदर्यवती स्त्रिया, त्यांचा आधुनिक पोशाख, माणसांच्या स्वभावातील मनमोकळेपणा, बगीच्यांमधील शुभ्र पुतळे, मति गुंग करणारी अवाढव्य स्मारके

साऱ्या जगाला साद घालताना दिसतात . याशिवाय 'व्हरसाय'ची बाग ही जगातील सर्वात सुंदर बाग पाहून डोळ्यांचे पारणेच फिटते.

वरील पर्यावरणाबरोबरच अनेक पर्यटन सुरू झालेले दिसून येते. रात्रीचे गड्ड भरून जाणारे नाईट क्लब, २४ तास चालणारी नाना प्रकारची उपहारगृहे, वेश्या व्यवसाय, वाहनांची वर्दळ, इत्यादी असे अनेक पर्यटन व्यवसाय पर्यायाने विकसित झालेले दिसून येतात.

३) 'सुखाचे दिवस' या प्रवासवर्णनातील पर्यावरण व पर्यटन:- रमेश मंत्री यांना कचेरी तर्फे अमेरिकेच्या दौऱ्यावर एका लहानशा शिक्षणक्रमासाठी पाठवले होते. तेव्हा मंत्री यांनी अमेरिकेतील दौऱ्यावर आधारित 'सुखाचे दिवस' हे प्रवासवर्णन लिहिलेले आहे. या प्रवासवर्णनामध्ये इतर अनेक घटकांबरोबर अमेरिकेतील पर्यावरण व पर्यटन याविषयी देखील वर्णन केलेले दिसून येते. रमेश मंत्री यांनी वर्णन केल्याप्रमाणे "अमेरिकेत पाहण्यासारखं सर्वात आकर्षक स्थळ म्हणजे 'डिस्नेलॅण्ड' होय. लॉस एंजलिस पासून २८ मैलांवर ही स्वप्ननगरी आहे. व्यंगचित्रपटांचा जनक 'वॉल्ट डिस्ने' यांनी या अद्भुत शहराची कल्पना काढलेली आहे. ही नगरी २०० एकरवर वसलेली असून, तिचे सहा प्रमुख भाग पाडलेले आहेत. बराचसा भाग आगगाडीने दाखवला जातो व नंतर काही भाग गट करून गार्ड लोक एकेक भाग दाखवतात. 'फॅन्टसी लँड' या विभागात किल्ले, पऱ्या, डिस्नेच्या चित्रपटांतील अनेक व्यक्ती यांचा समावेश आहे."^४ एडवेंचर पार्कमध्ये हत्ती, सिंह, वाघ, गेंडे यांनी भरलेलं जंगल, सुसरींनी भरलेल्या नद्यांतून फेरी मारता येते. यामध्ये टुमारो लँड देखील आहे. तेथे चंद्रावर सफर करता येते.

सेंट फ्रान्सिसको येथे देखील रस्त्याच्या बाजूने असलेले बगीचे, त्यांतील पाण्याचे विविध फवारे, हिरवेगार गालीचे व त्यावर बसून तासनतास रममाण होणारी माणसं या धकाधकीच्या जगातून थोडा आल्हाद मिळाल्याने मन हलकफुलक होऊन घरी जातात.

याशिवाय व्हाईट हाऊस, ब्लेअर हाऊस या जगप्रसिद्ध इमारती देखील बघण्यासारख्या असल्याचे मंत्री यांनी सांगितलेले आहे. वरील पर्यावरणाबरोबरच अमेरिकेत अनेक पर्यटन देखील विकसित झालेले दिसून येते. पर्यटकांच्या खाण्याची, राहण्याची सोय म्हणून हॉटेल व्यवसायांची प्रगती झालेली आहे. त्याचबरोबर पर्यटन स्थळांपर्यंत पोहोचण्यासाठी रेल्वे, आलिशान कार, दूरच्या प्रवासासाठी विमान सेवा इत्यादींचा पर्यायाने विकास झाला व त्यामुळे पर्यटकांसाठी सुविधा पुरविल्या गेल्या. पर्यटकांच्या मनोरंजनासाठी नाईट क्लब, जुगारी अड्डे, नाट्य हाऊस इत्यादी पर्यटनांची संख्या वाढली.

४) सूर्यपुजांचा देश जपान या प्रवासवर्णनातील पर्यावरण व पर्यटन:-रमेश मंत्री यांनी जपानचा प्रवास केल्यावर 'सूर्यपुत्रांचा देश जपान' या प्रवास वर्णनामध्ये अनेक घटकांचे वर्णन केलेले दिसून येते. त्यामध्ये जपानचे पर्यावरण व पर्यटन या घटकांचे देखील वर्णन केलेले आहे. जपान हा छोट्या छोट्या बेटांचा बनलेला धनुष्याकृती असा हा देश आहे. जपानच्या एकूण जमिनीपैकी ऐंशी टक्के जमीन पर्वतांनी व्यापलेली आहे. याशिवाय दऱ्याखोऱ्या, ज्वालामुखी, अनेक उंच उंच पर्वत, छोटी-मोठी बेटे आहेत. जपानमध्ये सतत छोटे-मोठे भूकंप होत असतात. रमेश मंत्री यांनी जपानमधील पर्यावरणाचा उल्लेख पुढील प्रमाणे केलेला आहे. "जपानचे हवामान काहीसे भारतासारखेच आहे ऋतूंचे कालखंड मात्र भारतापेक्षा वेगळे आहेत जुलैच्या अखेरीस उन्हाळा सुरू होतो आणि त्यानंतर महिन्याभराने पावसाळा सुरू होतो. सप्टेंबर हा पावसाळ्याचा उच्चांकाचा महिना असतो पावसाबरोबरच चक्रीवादळांनी ही बेटे झोडपली जातात. जपानचा उत्तर भागात हिवाळ्यात जोरदार बर्फवृष्टी होते. टोकियोच्या आसपास मात्र हिवाळा एवढा कडक नसतो. मार्च नंतरचे तीन-चार महिने जपानला भेट देण्यासाठी उत्कृष्ट असतात. यावेळी हवामान सुखद असते. जपानमध्ये आधीच झाडे, वेली व जंगले मुबलक त्यातच उत्तम सौंदर्यदृष्टीच्या जपानी लोकांनी लक्षावधी फुल झाडांची जाणीवपूर्वक केलेली लागवड, आणखीन खास जपानी धरतीची उद्याने यामुळे हा देश अतिशय लोभसवाना दिसतो"^५ रमेश मंत्री यांनी सांगितलेल्या पर्यावरणानुसार तेथील पर्यटन देखील विकसित झालेले दिसून येते. प्रवाशांना राहण्यासाठी गेस्ट हाऊस, हॉटेल्स, रेस्टॉरंट, जेवण्यासाठी विविध उपहारगृहे, टॅक्सी, बस, आधुनिक पद्धतीच्या रेल्वे सेवा, पर्यटन क्षेत्रांची स्वच्छता हे सर्व पर्यटन व्यवसाय जपानमध्ये झालेले आहेत.

५) 'तरंगणारे शहर' या प्रवासवर्णनातील पर्यावरण व पर्यटन:-रमेश मंत्री यांनी इतर प्रवास वर्णनाप्रमाणेच 'तरंगणारे शहर' या प्रवासवर्णनामध्ये देखील पर्यावरण व पर्यटन या घटकांविषयी माहिती सांगितलेली आहे. रमेश मंत्री जेव्हा रेल्वेने व्हेनिस या ठिकाणी उतरले तेव्हा त्यांना स्टेशन बाहेर रस्ता नाही तर मोठा कालवा दिसला. तो कालवा विशाल नदीसारखा पसरलेला होता. त्यात अनेक बोटीवाले बोटी घेऊन प्रवाशांच्या स्वागताला हजर होते रमेश मंत्री यांनी व्हेनिस येथील पर्यावरणाचे व पर्यटनाचे केलेले वर्णन असे आहे. "तेथील वातावरण अतिशय प्रसन्न होते विशाल कालव्यावर अनेक उत्साही प्रवासी वेगाने जा-ये करीत होते. हायवेवर वाहनांची वाहतूक चालावी तशी त्या जलमार्गावर नावांची धावपळ चालली होती. प्रेमात पडलेल्या युगूलांना हळुवारपणे येणाऱ्या गोंडवलापासून तर अगदी आंतरराष्ट्रीय मोटार अशा विजेच्या वेगाने सुसाट जाणाऱ्या मोटार लाँचेसपर्यंत वेगांच्या अनेक प्रकारच्या नावा कालव्यातून चालल्या होत्या. लग्नानंतर वरातीच्या मोटारी सजवतात तशा काही नावा सजवलेल्या होत्या. हवेत गारवा होता, वाऱ्यात उत्साह होता, मनात संगीत होते आणि सभोवार पसरलेल्या पाण्यात तारुण्य होते."६ रमेश मंत्री यांनी केलेल्या वर्णनावरून समजते की, व्हेनिस हे एक शहर नसून एक बैठक आहे. त्या मोठ्या कॅनलच्या किनाऱ्यावर टेबल खुर्च्या व प्रचंड मोठ्या रंगीबेरंगी छत्र्या टाकून लोक आरामात बसून बिअर किंवा कॉफी घेतात. निवांत बसलेली दिसतात. स्पर्धेच्या जगापासून पूर्णपणे अलिप्त निवांत असे व्हेनिस शहर हे तरंगणारे शहर आहे.

व्हेनिसच्या या पर्यावरणामुळे तेथे पर्यटन देखील अतिशय विकसित झालेले दिसून येते. तेथे जलवाहतूक स्वस्त होती. परंतु हॉटेल्सचे रेट प्रचंड होते. प्रवाशांना जेवणाची, राहण्याची सोय म्हणून तेथे प्रचंड किंमतीने हॉटेल्स, रेस्टॉरंट उपलब्ध करून दिली जात होती. सर्वजण पाणी असल्याने अनेक पर्यटक तेथे भेट देतात. पर्यायाने तेथील पर्यटन व्यवसाय जोरात चालतो हॉटेलसाठी लागणारे साहित्य वनविण्यासाठी बेकरीतील पदार्थ, भाजीपाला, बोटी चालवणे हे पर्यटन व्यवसाय तिथे जास्त चालत असल्याचे दिसून येते.

निष्कर्ष:-

- १) पर्यावरण व पर्यटन यांना मानवी विकासात अतिशय महत्वाचे स्थान प्राप्त झालेले आहे.
- २) पर्यावरण व पर्यटन या परस्परावलंबी संकल्पना आहेत.
- ३) रमेश मंत्री यांच्या पाश्चात्य प्रवासवर्णनांमध्ये पर्यावरण व पर्यटन या दोन्ही संकल्पना अतिशय समर्पकरीत्या मांडलेल्या आहेत.
- ४) पर्यटनाच्या संधी मिळविण्यासाठी प्रथम पर्यावरण संरक्षण व संवर्धन अतिशय महत्वाचे आहे.

थोडक्यात पर्यावर व पर्यटन या दोन्ही संकल्पना मानवी जीवनात दिवसेंदिवस अतिशय महत्वाच्या ठरत आहेत. पर्यावरण संरक्षण व संवर्धन केले तरच पर्यटनाला देखील महत्व राहणार आहे. म्हणजेच पर्यावरण व पर्यटन या दोन्ही संकल्पना परस्परावलंबी आहेत.

संदर्भ ग्रंथ

- १) पर्यावरण अध्ययन, डॉ. पोपट कुदणर डॉ. शैलेश निकम, डॉ.बाबासाहेब वाणी, डॉ. नितीनकुमार पाटील.प्रशांत पब्लिकेशन, पृष्ठ क्रमांक १४.
- २) थंडीचे दिवस, मंत्री रमेश, मेनका प्रकाशन, मुंबई. पृष्ठ क्रमांक १२५.
- ३) नवरंग, मंत्री रमेश, विश्वमोहिनी प्रकाशन, पुणे. पृष्ठ क्रमांक १३.
- ४) सुखाचे दिवस, मंत्री रमेश, पृष्ठ क्रमांक २७
- ५) सूर्यपुत्रांचा देश जापान, मंत्री रमेश, उत्कर्ष प्रकाशन पुणे, पृष्ठ क्रमांक ९ व १०.
- ६) तरंगणारे शहर, मंत्री रमेश, मेनका प्रकाशन, मुंबई. पृष्ठ क्रमांक ७.

संतसाहित्यात पर्यावरण

स. प्रा. आशिका अशोक देसाई

श्री मल्लिकार्जुन आणि श्री चेतन मंजू देसाई महाविद्यालय देळे काणकोण गोवा.

प्रस्तावना

मानवाच्या जीवनात पर्यावरणाला अनन्यसाधारण महत्त्व आहे. पाणी, वायू, माती, वृक्ष, प्राणी, पक्षी अशा सर्व घटकांमुळे जीवनाचे चक्र अखंड सुरू राहते. यातील एकही घटकात काही बदल वा खंड पडला तर मानवाचे अस्तित्व धोक्यात येऊ शकते. आजच्या काळात पर्यावरणसंवर्धनाची चर्चा जगभर होत असली तरी भारतीय संतपरंपरेने शेकडो वर्षांपूर्वीच निसर्गप्रेम, पर्यावरणसंवर्धन व सहजीवन या संकल्पना आपल्या साहित्यातून मांडल्या आहेत. संतसाहित्य हे अध्यात्म, भक्ति आणि समाजप्रबोधनाचे द्योतक असून त्यातून निसर्गशी सुसंवाद साधण्याचा संदेश दिला आहे. संतांनी आपल्या साहित्यातून भावना व्यक्त केल्या, तर कधी समाजातील रूढी परंपरावर भाष्य केले, पण हे सारे करताना देखील त्यांनी निसर्गाचा आसरा घेतला. निसर्गातून जी त्यांनी शिकवण घेतली त्यातून त्यांनी आपले साहित्य रचले अन् ते साहित्य रचतानाही प्रतीक, प्रतिमा, उपमांचा वापर करताना निसर्गातील रूपके वापरली.

मराठी संत साहित्य म्हणजे महाराष्ट्रातील वारकरी संप्रदायातील संतांनी रचलेले साहित्य होय, ज्यात अभंग, पाध्यरचना आणि ग्रंथाचा समावेश आहे. महाराष्ट्रातील संतसाहित्य प्रामुख्याने भक्तीपर साहित्य असून ते सर्वसामान्य जनतेला समजेल, रुचेल आणि पचेल अशा साध्या, सोप्या भाषेत रचले गेले. ज्ञानेश्वर, तुकाराम, नामदेव, एकनाथ, जनाबाई, बहिणाबाई, चोखामेळा अशा संतांनी भक्तीच्या माध्यमातून समाजाला एकत्र आणले. हे साहित्य केवळ अध्यात्माचे दालन नव्हते, तर त्यातून नैतिकता, सामाजिक समता, श्रमप्रतिष्ठा, सदाचारी आचरण, स्त्री-पुरुष समता, पर्यावरणप्रेम इत्यादी जीवनमूल्ये अधोरेखित झाली. संतसाहित्याच्या गाभ्यात "सर्वांगीण जीवनमूल्ये" आहेत, ज्यात पर्यावरण हा महत्त्वाचा घटक ठरतो.

पर्यावरणाची संकल्पना संतांच्या दृष्टीने

संतांच्या मते सृष्टीतील प्रत्येक घटक हा ईश्वराचा अंश आहे. निसर्गातील प्राणी, पक्षी, झाडे, नद्या, पर्वत, वारे हे केवळ भौतिक साधन नसून ते दैवी आहेत. म्हणून त्यांचे रक्षण, संगोपन आणि जतन करणे ही मानवाची जबाबदारी आहे. संत साहित्य हे भारतीय अध्यात्मिक व सांस्कृतिक परंपरेचे एक महत्त्वपूर्ण अंग आहे. विविध संतांनी, विशेषतः महाराष्ट्रातील संतांनी, आपल्या शिकवणीद्वारे समाजाला एका नवा दृष्टिकोन दिला. पर्यावरणावरील संतांचा दृष्टिकोन आणि त्यांचा सजीव सृष्टीवरील आदर याचा प्रकट होणारा संदेश ओवीतून आलेला आहे. या ओवींमध्ये संतांचे विचार, नैतिकतेचे संदेश, आणि पर्यावरणाचे संरक्षण याबद्दलचे विचार स्पष्टपणे व्यक्त झाले आहेत.

पर्यावरण संदर्भात संत साहित्यातील ओवी आणि त्याचे विश्लेषण

संत ज्ञानेश्वर

ज्ञानेश्वरी आणि अभंगांमध्ये निसर्गाचे अनेक सुंदर वर्णन आढळते. ज्ञानेश्वरांनी आत्मसाक्षात्कार आणि वैश्विक सहजीवन या दोन्ही बाबींना जोडले. त्यांचे साहित्य निसर्गात देवशक्तीच्या उपस्थितीवर भर देते — पर्वत, नद्या, वृक्ष हेही अध्यात्मिक उपकरणे आहेत. त्यांच्या अभंगांमध्ये साधेपण व नैसर्गिकतेला महत्त्व आहे, ज्यामुळे पर्यावरणीय संवेदना निर्माण होते.

“आकाश पाऊस झरे, पृथ्वी अंकुरे धरे । वायू सर्वत्र पसरे, तैसा पांडुरंगु ॥” (ज्ञानेश्वरी, अध्याय ९)

या ओवीच्या माध्यमातून आकाशातून पाऊस पडतो, पृथ्वी अंकुर धारण करते, वायू सर्वत्र पसरलेला आहे; त्याचप्रमाणे परमेश्वरही संपूर्ण सृष्टीत व्यापलेला आहे असे सांगण्यात आले आहे. येथे निसर्गघटकांना देवाचे रूप मानले आहे — म्हणजेच निसर्गाचा आदर करणे हीच भक्ती आहे.

“झाडे वेली औषधी, जनांसि करती उपकारी। आपुली फळे धरी, त्यासी काय अपेक्षा ॥

या ओवीचा अर्थ असा की झाडे, वेली, औषधी हे माणसांना उपकारच करतात. ते स्वतःची फळे देतात, पण त्यांना बदल्यात काही अपेक्षा नसते. वृक्षसंवर्धन, पर्यावरणप्रेम याचा हा स्पष्ट संदेश आहे. आज आपण सर्वत्र पाहू शकतो की पूर्ण पृथ्वी ही प्लास्टिक

रुपी राक्षसने व्यापलेली आहे आणि त्यामुळेच अनेक औषधी झाडे जी आपसूकच राना वनात होत होती त्यांच्या वाढीवरदेखील दुष्परिणाम होत चालेले आहेत. संत साहित्यात या झाडांना महत्व दिले जात असे याची प्रचिती आपल्याला या ओव्यातून येते.

ज्ञानेश्वरांनी भावार्थदीपिका (ज्ञानेश्वरी) मध्ये विश्वातील सर्व प्राणी, वनस्पती, जड-चेतन यांना ब्रह्मस्वरूप मानले. त्यांनी "सर्वात्मा एक" या तत्त्वज्ञानातून सृष्टीतील सर्व घटकांतील एकात्मता अधोरेखित केली. पर्यावरणातील संतुलन टिकविण्यासाठी मानवाने निसर्गाशी एकरूप होऊन जगावे, हा त्यांचा संदेश होता.

संत तुकाराम

तुकारामांचे अभंग प्रत्यक्षात जनमानसाशी जोडलेले होते. ते समाजातील विषमता, निंदा व अंधश्रद्धा यांच्याविरुद्ध होते, परंतु त्यांच्या अभंगांमध्ये निसर्गप्रतिभूती—नदी, पाऊस, सूर्य, चंद्र—अनेकदा लक्ष्ये ठरतात. तुकारामांच्या अभंगात मानवी अहंकार कमी करून निसर्गाच्या गोड-ध्वनीला ऐकण्याचे आवाहन आहे.

“वृक्षवल्ली आम्हां सोयरी वनचरे, पक्षीही सुस्वरे आळविती ।”

संत तुकाराम आपल्या ओव्यातून निसर्गाशी अतूट नाते असल्याचे सांगतात. ते म्हणतात वृक्ष, वेली हे आमचे नातेवाईक आहेत; वनातील प्राणी व पक्षीही आमचे सोबती आहेत. इथे संत तुकाराम मानव-निसर्गातील नात्याची समानता सांगतात. वृक्ष व जीवसृष्टीला माणसाच्या कुटुंबाचा भाग मानतात.

“पाऊस आला आनंदिला गावा । अन्नधन संपत्ती वर्धिली सरीं ॥”

पाऊस जर योग्य प्रकारे पडला नाही तर आपल्याला धान्य मिळण कठीण असते आणि याविषयीची शेतकऱ्यांच्या मनातील पाऊस आल्याचा आनंद संत तुकाराम आपल्या ओवीतून व्यक्त करतात. पाऊस आला की गाव आनंदित होतो; अन्नधान्य, संपत्ती पावसाच्या सरींमुळे वाढते. जलस्रोत व पावसाचे महत्व तुकारामांनी लोकांना जाणवून दिले आहे.

तुकाराम महाराजांचे अभंग निसर्गप्रेमाने ओथंबलेले आहेत. त्यांनी पक्षी, वृक्ष, नद्या, पर्वत यांचे महत्त्व अधोरेखित केले. त्यांच्या मते "देवळातला दगड जिवंत नाही, पण वृक्षामध्ये ईश्वर वास करतो." तुकारामांच्या वचनांमधून वृक्षसंवर्धन, जलसंवर्धन आणि प्राणीमात्रांप्रती करुणा यांचा स्पष्ट संदेश मिळतो.

संत एकनाथ

एकनाथ महाराजांनी "एकनाथी भागवत" मधून जीवनमूल्ये प्रतिपादित केली. त्यांनी स्वच्छता, शुद्धता, नैसर्गिक संतुलन या गोष्टींवर भर दिला. त्यांच्या अभंगांमधून जलसंवर्धन महत्त्व स्पष्ट होते.

संत बहिणाबाई

संत बहिणाबाई चौधरी यांच्या गाण्यात निसर्ग, शेती, जमीन, पाऊस, नदी, झाडे, जनावरां यांचा वारंवार उल्लेख दिसतो. त्या स्वतः शेतकरी कुटुंबातील असल्याने त्यांना निसर्गाशी असलेले नाते अधिक जवळचे होते. त्यांच्या गाण्यातून पर्यावरण, शेतीसंस्कृती आणि सहजीवन यांचे सुंदर चित्र दिसते.

“धरनी ही जननी, फळे फुले धान्य देई ।

तिचे करावे रक्षण, उपकार कधी न विसरूनी ॥”

ह्या ओळी आजच्या जगात घडत असलेल्या घटनांना समर्पक आहेत कारण खरोखरच धरतीचे रक्षण करणे गरजेचे आहे जो तो आपल्या फायद्यासाठी जमिनीचे तुकडे करत चालेलेला आहे. कुणी डोंगर खोदून प्लॉट्स तयार करून विकण्याच्या नादात लागलेला आहे. शेत जमीन जिथे होती त्यात आता इमारती आणि विज्ञापनाचे मोठमोठे बोर्ड दिसू लागलेले आहेत. जिला आपण भूमाता म्हणतो त्याच्या वाटणीसाठीच तिच्याच लेकरामध्ये खून खराब्या पर्यंतची भांडणे होताना दिसतात. तिचे उपकार आपण कधीच विसरू नयेत असे या ओळीतून सांगण्यात आले आहे. पण आपण या कलयुगात पैशांच्या आणि म्हणण्याजोग्या विकसित भारताच्या स्वप्नाकडे चाललोय म्हणत डोंगर कापत दरी कोसळण्या सारख्या नैसर्गिक आपत्तींना आमंत्रण देत आहोत. धरती माता सर्वांना धान्य व फळे देते, तिचे रक्षण करणे हे आपले कर्तव्य आहे हे आपल्याला संत साहित्यातून सांगण्यात आलेले आहे.

“बैल, गाई, म्हशी, पिकाला देती साहाय्य ।

त्यांचेही करावे रक्षण, हेच खरे धर्माचे कार्य ॥”

संत बहिणाबाई म्हणतात शेतीत जनावरांची मदत अमूल्य आहे. त्यांचे रक्षण करणे हेही आपले कर्तव्य आहे. पशुपालन आणि पर्यावरण यांचा परस्परसंबंध दाखवला आहे. आताच्या जगात माणूस बंगल्यात बंदिस्त झाला आहे. प्रत्येक पशु पक्षी आपल्यासाठी महत्वाचा आहे हेही तो कुठे तरी विसरत चाललेला दिसतो. हातातील मोबाईल सोडल्यास इतरत्र उघड्या

डोळ्यांनी बघण्याची सवड माणसाला असलेली दिसत नाही. त्यामुळे पशु पक्षाची दया येणे त्यांच्यावर माया करणे हे चुकून माणूस करताना दृष्टीस पडतो. अनेक गोष्टीची जागा वेगवेगळ्या यंत्रांनी घेतली आहे त्यामुळे शेतकऱ्यांसाठी गुरांची गरज भासत नाही आणि त्यामुळे पिढीजात गुरे ज्यांच्याकडे होती त्याही लोकांनी त्यांना रस्त्यावर सोडलेले आपण पाहू शकतो. त्यांना कुणीच आश्रय देत नाहीत. कुठे काही मिळालेले खाऊन रस्त्यावर राहण्याशिवाय त्यांच्याकडे पर्याय राहिलेला नाही. मग याचा दुष्परिणाम म्हणून गाड्यांचा अपघात होऊन कधी गुरे तर कधी वाहन चालक आपला जीव गमावून बसल्याचे दिसते माणसाला देवाने जास्त बुद्धी दिलेली आहे असे आपण म्हणतो आणि त्या बुद्धीचा योग्य वापर करून या समस्यावर तोड काढणे गरजेचे आहे. माणुसकीच्या नात्याने पशु पक्षांच्या भावना समजून घेऊन फक्त पाळीव प्राणी म्हणून हायब्रीड कुत्रे घरात आणून पाळणे हा देखावा करण्यापेक्षा एखाद्या उपाशी प्राण्याला चार घास वाढणे, पाऊसात भिजत असलेल्या कुत्र्याला जरा वेळेसाठी आसरा देणे महत्वाचे आहे. पशु-पक्षांची रक्षा हे आपले कर्तव्य आहे हे समजून घेऊन प्रत्येक जनावराची काळजी घेणे, आपल्या कोणत्याच कृतीने त्यांना त्रास होणार नाही याची दक्षता घेणे गरजेचे आहे.

संत नामदेव व इतर संत

नामदेवांनी समाजातील सर्वांसाठी एकत्रित भक्तीचे संदेश दिले. त्यांच्या अभंगांमध्ये स्त्रियांचा, गरीबांचा सहवास व निसर्गाशी जोडलेले जीवन हे स्पष्ट दिसते. त्यांची साधी भाषा आणि निसर्गाचे उदाहरणे लोकांना पर्यावरणाबद्दल जागरूक करतात. नामदेव, जनाबाई, बहिणाबाई, चोखामेळा यांच्या साहित्यातही श्रमप्रतिष्ठा, निसर्गाशी सहजीवन, प्राणीमात्रांवरील दया हे विचार आढळतात. विशेषतः जनाबाईने दैनंदिन कामांमध्ये पर्यावरणाशी निगडित असलेली श्रमसंस्कृती उलगडली आहे.

संतविचारांतून पर्यावरणसंवर्धन

संतसाहित्यातून पर्यावरणाशी संबंधित काही मुख्य तत्त्वे पुढीलप्रमाणे दिसून येतात –

1. **वृक्षसंवर्धन** – वृक्ष हे जीवनाचे मूळ आहेत. तुकारामांनी वृक्षपूजेचा संदेश दिला. अनेक संतांनी वनस्पतीत औषधी गुणधर्म असल्यामुळे त्यांच्याविषयीची उपकाराची भावना आपल्या ओव्यातून मांडली.
2. **जलसंवर्धन** – नद्या, तलाव, विहिरी यांचे जतन करणे आवश्यक आहे. संतांनी नद्यांना माता मानून त्यांचा सन्मान केला. पाण्याशिवाय जगणं अशक्य आहे त्यामुळे आपण आज प्लास्टिक, वापरलेली फुले, एखाद्या कारखान्यातील पाणी सोडून पाणी दूषित करताना शंभर वेळा विचार करणे गरजेचे आहे.
3. **प्राणीमात्रांवरील दया** – प्राणी व पक्षी हेही सृष्टीचे अविभाज्य घटक आहेत. त्यांच्याशी करुणा व सहअस्तित्व राखणे हे संतांचे तत्त्व होते.
4. **स्वच्छता व शुद्धता** – एकनाथांनी गाव, नदी, घरे स्वच्छ ठेवण्यावर भर दिला. स्वच्छतेतूनच आरोग्य व पर्यावरण रक्षण शक्य आहे, हा त्यांचा संदेश.
5. **समत्वभाव** – जड-चेतन सर्वांमध्ये ईश्वर आहे. म्हणून निसर्गाशी एकात्मता राखणे आवश्यक आहे. संत ज्ञानेश्वरांनी विश्वातील एकात्मतेवर भर दिला: “आकाश पाताळे एकचि झाले, पंढरीनाथा भेटीला आला.

समकालीन आव्हाने आणि संतपरंपरेचा वापर

आज संपूर्ण जगासमोर पर्यावरणाचा गंभीर प्रश्न आहे. जागतिक तापमानवाढ, प्रदूषण, वृक्षतोड, पाणीटंचाई, जैवविविधतेचा ह्रास यामुळे मानवाचे अस्तित्व धोक्यात आले आहे. अशा वेळी संतविचार आपल्याला मार्गदर्शक ठरतात. आजच्या काळात संतपरंपरेचा वापर केवळ धार्मिक किंवा सांस्कृतिक वापरापुरताच मर्यादित न ठेवता, शैक्षणिक आणि सार्वजनिक धोरणांमध्येही करता येईल:

1. **शाळा-शिक्षणात समावेश**: संतांच्या ओवींमधील पर्यावरणीय तत्त्वे शाळांमध्ये समाविष्ट करणे — लहान वयात पर्यावरणसंवेदनशीलता वाढवेल. वृक्षारोपण, पाणी बचत, प्लास्टिकविरहित जीवन, प्राणीमात्रांवर दया, प्रदूषणमुक्त जीवन या उपक्रमांत संतांचा संदेश प्रेरणादायी आहे.
2. **स्थानीक चळवळींना प्रेरणा**: ग्रामस्तरावरील जलसंधारण, वृक्षारोपण योजनेत संतपरंपरेचा आध्यात्मिक संदेश वापरणे लोकप्रवाह निर्माण करेल.

3. सांस्कृतिक संमेलन आणि कार्यशाळा: संतसाहित्याच्या माध्यमातून पर्यावरणीय कार्यशाळा आयोजित करून लोकांना पारंपरिक व आधुनिक दृष्टीकोनाची जोड देणे.
4. आधुनिक विज्ञान व संतविचार यांचा मेळ घालून शाश्वत विकास शक्य आहे.
5. पर्यावरण हे केवळ आर्थिक वा तांत्रिक समस्या नसून आध्यात्मिक व नैतिक मूल्यांशी निगडित आहे, हे संतसाहित्यातून स्पष्ट होते.

समारोप

संतसाहित्य हे केवळ भक्तीपर नव्हे तर जीवनोपयोगी मार्गदर्शन करणारे साहित्य आहे. संतांनी आपल्या ओवी, अभंग, गाणी यामधून निसर्गाशी सुसंवाद साधण्याचे तत्त्व मांडले. पर्यावरणाचे संरक्षण हे मानवी जीवनासाठी किती महत्त्वाचे आहे हे त्यांनी अत्यंत सोप्या भाषेत पटवून दिले. नदी, झाडे, प्राणी, पक्षी, पर्वत, आकाश या सर्वांमध्ये त्यांनी ईश्वराचे दर्शन केले. संत ज्ञानेश्वरांनी विश्वातील प्रत्येक घटकाला परमेश्वराचे रूप मानले, तर संत तुकारामांनी निसर्गाशी जुळवून घेत जगण्याचे तत्त्वज्ञान दिले. बहिणाबाईंच्या गाण्यांत ग्रामीण जीवनातील शेती, पाणी, पिके व त्यांचा निसर्गाशी असलेला संबंध प्रतिबिंबित होतो. आजच्या पर्यावरणीय संकटाच्या पार्श्वभूमीवर संतसाहित्य आपल्याला निसर्गप्रेम, पर्यावरणपूरक जीवनशैली आणि संतुलित विकासाची शिकवण देते. म्हणून संतवाङ्मय हे पर्यावरण रक्षणासाठी मार्गदर्शक दीप ठरते.

निष्कर्ष

1. निसर्गातील दैवीत्व : संतांनी नदी, झाडे, पक्षी, प्राणी यांना ईश्वराचे रूप मानून पर्यावरणाला आध्यात्मिक मूल्य दिले.
2. पर्यावरणपूरक जीवनशैली : संतसाहित्यात साधेपणा, मितव्ययिता आणि निसर्गाशी सुसंवाद राखून जगण्याचे तत्त्वज्ञान दिसते.
3. नैसर्गिक साधनांचा योग्य उपयोग : पाणी, जमीन, अन्नधान्य यांचा अपव्यय न करता योग्य वापर करावा असा संदेश संतांनी दिला.
4. समतोल दृष्टिकोन : निसर्गातील प्रत्येक घटक हा आवश्यक आहे व त्याचा समतोल राखणे हे मानवी कर्तव्य असल्याचे संतांनी अधोरेखित केले.
5. सामाजिक आणि पर्यावरणीय संबंध : संतांच्या ओवी व अभंगांमधून निसर्ग आणि समाजजीवन यांचा अविभाज्य संबंध स्पष्ट होतो.
6. पर्यावरण संवर्धनाची प्रेरणा : आजच्या पर्यावरणीय संकटाच्या पार्श्वभूमीवर संतसाहित्य आपल्याला पर्यावरण संरक्षणाची दिशा दाखवते.
7. ग्रामीण व कृषिसंस्कृतीचे चित्रण : संत बहिणाबाईंसारख्या संतांनी शेती, पीक, पाणी यांद्वारे पर्यावरणाशी निगडित जीवन अधोरेखित केले.
8. आधुनिक काळातील उपयुक्तता : संतसाहित्यातील पर्यावरणविषयक शिकवण आजच्या शाश्वत विकास आणि पर्यावरण संतुलनासाठी मार्गदर्शक ठरते.

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वाढती लोकसंख्या आणि पर्यावरणावर होणारा परिणाम

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श्री साईबाबा लोक प्रबोधन कला व विज्ञान महाविद्यालय वडनेर, ता. हिंगणघाट, जि. वर्धा - ४४२३०७.

सारांश -

मानव हा पर्यावरणाचा अविभाज्य असा महत्वाचा घटक आहे. पर्यावरणाचा ज्ञास होण्यामागे वाढती लोकसंख्या होय. पर्यावरणात जलद गतीने बदल घडवून आणणारा घटक म्हणून पर्यावरणशास्त्रात मानवाचा अभ्यास केला जातो. म्हणून पर्यावरण आणि लोकसंख्या यांचा जवळचा संबंध आहे. एकंदरीत मानवाच्या आवश्यक गरजा पर्यावरणातूनच पूर्ण केल्या जातात. वाढत्या लोकसंख्येमुळे पर्यावरणावर अधिकचा ताण पडत आहे. संसाधनांचा वापर वाढतो आणि पर्यावरणात प्रदूषण वाढते, ज्यामुळे अनेक पर्यावरणीय समस्या निर्माण होतात. पर्यावरणीय समस्यांशी जवळून जोडलेली ही लोकसंख्येची समस्या आहे. जिथे वाढत्या लोकसंख्येमुळे अन्नटंचाई, बेरोजगारी आणि ग्रामीण भागातून सतत येणाऱ्या लोकसंख्येमुळे शहरी झोपडपट्ट्या वाढत आहे. या देशांमध्ये लोकसंख्या वाढ आर्थिक आणि सामाजिक विकासात अडथळा निर्माण करते, हिरव्यागार जमिनीचे वाळवंटीकरण, जागतिक तापमानात वाढ आणि इतर जागतिक पर्यावरणीय समस्यांना कारणीभूत ठरते.

बीजशब्द: लोकसंख्या घटकांचे पर्यावरणीय परिणाम, लोकसंख्या वाढीचे पर्यावरणावर होणारे परिणाम.

प्रस्तावना:

लोकसंख्या वाढ म्हणजे एखाद्या विशिष्ट प्रदेशात किंवा जगात लोकांची संख्या वाढ होणे होय. मानवी इतिहासातील बहुतांश काळात लोकसंख्या तुलनेने स्थिर होती, परंतु अलीकडील काळात औद्योगिकीकरणानंतर, लोकसंख्या झपाट्याने वाढली आहे. यामुळे संसाधने, पर्यावरण आणि लोकांच्या जीवनशैलीवर परिणाम होत आहे, ज्यामुळे अनेक समस्या निर्माण झाल्या आहेत. लोकसंख्या" हा शब्द मुळात एखाद्या विशिष्ट क्षेत्रात राहणाऱ्या लोकांची संख्या दर्शवितो, जसे की शहर किंवा गाव, देश, प्रदेश, खंड किंवा संपूर्ण जग. जनगणना, जी लोकसंख्येबद्दल आकडेवारी गोळा करणे, विश्लेषण करणे, एकत्र करणे आणि प्रसारित करणे आहे, ती सामान्यतः सरकार त्यांच्या अधिकारक्षेत्रातील रहिवासी लोकांची संख्या निश्चित करण्यासाठी वापरते. मानवी समाजाची काही वैशिष्ट्ये लोकसंख्येचा आकार, रचना आणि बदलाचा दर या इतकी महत्वाची आहेत. लोकसंख्येतील बदलांचा आरोग्य, आर्थिक समृद्धी, कुटुंब रचना, शिक्षण, गुन्हेगारीचे प्रकार, भाषा, संस्कृती आणि मानवी समाजाच्या जवळजवळ प्रत्येक पैलूवर परिणाम होतो.

शोधनिबंधाचे उद्देश :

१. लोकसंख्या वाढीचा पर्यावरणावर होत असलेल्या परिणामाचा अभ्यास करणे.
२. लोकसंख्या वाढीचा पर्यावरणावर असलेल्या जागृतीचा अभ्यास करणे.

गृहितके :

१. लोकसंख्या वाढीचा परिणाम पर्यावरणावर होत आहे.
२. लोकसंख्या वाढीचा पर्यावरणावर होत असलेल्या परिणामाची लोकांना जाणीव होत आहे.

लोकसंख्या घटकांचे पर्यावरणीय परिणाम-

लोकसंख्येचा आकार :-

लोकसंख्येचा आकार आणि पर्यावरणाचा परस्परंशी फार जवळचा संबंध आहे. लोकसंख्या वाढल्यास नैसर्गिक संसाधनांचा वापर वाढतो, प्रदूषण वाढते आणि त्याचा पर्यावरणावर नकारात्मक परिणाम होतो. वाढत्या लोकसंख्येमुळे पाणी, जमीन, खनिजे आणि इतर नैसर्गिक संसाधनांचा वापर वाढतो, ज्यामुळे त्यांचे प्रमाण कमी होते. जास्त लोकसंख्या म्हणजे जास्त कचरा, सांडपाणी आणि औद्योगिक उत्सर्जन, ज्यामुळे हवा, पाणी आणि मातीचे प्रदूषण वाढते. अन्न, निवारा आणि इतर आवश्यक गरजा पूर्ण करण्यासाठी जंगले तोडली जातात, ज्यामुळे जैवविविधता कमी होऊन हवामानावर वाईट परिणाम होतो.

लोकसंख्या वितरण :-

लोकसंख्या वितरण आणि पर्यावरण यांचा जवळचा संबंध आहे. लोकसंख्या वाढल्याने नैसर्गिक संसाधनांवर ताण येऊन पर्यावरणावर नकारात्मक परिणाम होत असतो. काही ठिकाणी लोक खूप दाटीदाटने राहतात, तर काही ठिकाणी लोकसंख्या विरळ असते. लोकसंख्या वाढल्याने नैसर्गिक संसाधनांचा म्हणजेच पाणी, जमीन, खनिजे यांचा अती प्रमाणात वापर होत असतो. यामुळे प्रदूषणात वाढ होते, जंगले कमी होतात लोकसंख्या वाढल्यास पर्यावरणावर ताण येतो आणि पर्यावरणाची गुणवत्ता घटल्यास लोकांचे जीवनमान कमी होते. दाट लोकवस्ती असलेल्या शहरांमध्ये प्रदूषण जास्त असते, तर अती दुर्गम भागात संसाधनांची कमतरता असू शकते.

लोकसंख्या रचना :-

लोकसंख्या आणि पर्यावरण यांचा संबंध खूप गुंतागुंतीचा आहे. लोकसंख्येची वाढ, वितरण आणि रचना यांचा पर्यावरणावर मोठा परिणाम होतो. वाढत्या लोकसंख्येमुळे नैसर्गिक संसाधनांवर ताण येतो, प्रदूषण वाढते आणि हवामान बदलण्याची शक्यता असते. लोकसंख्या वाढल्याने नैसर्गिक संसाधनांचा वापर मोठ्या प्रमाणात होतो. शहरीकरणामुळे अधिक जमीन आणि संसाधनांची आवश्यकता असते, ज्यामुळे जंगल आणि गवताळ प्रदेश नष्ट होण्याची शक्यता अधिक असते त्यामुळे प्रदूषणात वाढ होते. लोकसंख्येची वय आणि लिंग रचना देखील पर्यावरणावर परिणाम करू शकते. जास्त प्रमाणात तरुण लोकसंख्या असलेल्या समाजात शिक्षण आणि रोजगाराच्या संधींची अधिक गरज असते त्यामुळे तरुण पिढी रोजगारासाठी स्थलांतरण करित असतो. स्थलांतरणाचा पर्यावरणावर परिणाम होतो, कारण स्थलांतरित लोक नवीन ठिकाणी संसाधनांवर ताण आणू शकतात.

लोकसंख्या वाढीचे पर्यावरणावर होणारे परिणाम:**नैसर्गिक संसाधनांचा ऱ्हास:**

निसर्गात उपलब्ध असणाऱ्या विविध वस्तूंचा वापर करून मानवाने आपल्या अन्न, वस्त्र, निवारा या मूलभूत गरजा पूर्ण केल्या आहे. वाढत्या लोकसंख्येमुळे पाणी, जमीन, खनिजे आणि ऊर्जा यांसारख्या नैसर्गिक संसाधनांचा वापर मोठ्या प्रमाणात वाढला आहे, ज्यामुळे त्यांचे प्रमाण कमी होत आहे.

प्रदूषण:

वाढत्या लोकसंख्येमुळे पर्यावरण प्रदूषणाची समस्या गंभीर होत चालली आहे. कारखान्याची होत चाललेली वाढ, जंगलतोड, कचरा, सांडपाणी आणि वायू प्रदूषण वाढले आहे. यामुळे हवा, पाणी आणि माती दूषित होत आहे, ज्यामुळे मानवी आरोग्य आणि पर्यावरणावर गंभीर परिणाम होत आहे.

जंगलतोड:

लोकसंख्या वाढीमुळे मानवाने इंधन, चारा, इमारती, लाकूड, घरांसाठी, शेतीसाठी आणि उद्योगांसाठी जागा उपलब्ध करून देण्यासाठी मोठ्या प्रमाणात जंगलतोड होत आहे. त्यामुळे जंगलात राहणाऱ्या प्राण्यांची घरे नष्ट झाली. ससा, हरीण, कोल्हा, वाघ इत्यादींची अन्नसाखळी नष्ट झाली. यामुळे नैसर्गिक अधिवासांचा ऱ्हास होऊन अनेक वनस्पती आणि प्राणी धोक्यात आले आहेत. लोकसंख्या वाढीचा परिणाम निसर्गावर झाल्यामुळे पर्यावरणाचे संतुलन बिघडले. याचा परिणाम पाऊस वेळेत न पडण्यावर झाला.

हवामानात बदल:

हवामान हा पर्यावरणाचा एक महत्वाचा भाग आहे. बदलत्या हवामानामुळे निर्माण झालेल्या विविध समस्या म्हणजे तापमानात वाढ, ओझोन थराचा क्षय, वाढत्या लोकसंख्येमुळे जीवाश्म इंधनाचा वापर वाढला आहे, ज्यामुळे ग्रीनहाउस वायूंचे उत्सर्जन वाढले आहे. यामुळे समुद्राची पातळी वाढणे आणि हवामान बदलासारख्या समस्या निर्माण होत आहेत.

जैवविविधतेचे नुकसान:

जैवविविधता ही निसर्गाने मानवाला दिलेली देणगी असून मानवाच्या विकासासाठी आवश्यक आहे. मानवाच्या सभोवताली विविध प्रकारच्या वनस्पती, प्राणी आणि सूक्ष्म जिव यांचा समावेश होतो. वाढती लोकसंख्या, नैसर्गिक साधनसंपदेचा अमर्यादित वापर, जंगलतोड, प्रदूषण आणि अधिवासांचा ऱ्हास यामुळे अनेक वनस्पती आणि प्राणी नामशेष होण्याच्या मार्गावर आहेत, ज्यामुळे जैवविविधता कमी होत आहे.

पाण्याची उपलब्धता आणि गुणवत्ता:

पाण्याची उपलब्धता आणि गुणवत्ता ह्या दोन महत्वाच्या गोष्टी आहेत ज्या मानवी जीवनासाठी आणि पर्यावरणासाठी आवश्यक आहेत. पाण्याची उपलब्धता म्हणजे पिण्यासाठी, सिंचनासाठी, औद्योगिक वापरासाठी आणि इतर गरजांसाठी पाणी उपलब्ध असणे. पाण्याची गुणवत्ता म्हणजे पाणी किती स्वच्छ आहे, ते पिण्यासाठी योग्य आहे की नाही, आणि त्यात हानिकारक घटक किती आहेत. मानवी हस्तक्षेपामुळे नद्या आणि जलाशयांमध्ये प्रदूषण वाढत आहे, लोकांना पिण्यासाठी स्वच्छ पाणी मिळत नाही स्वच्छ पाण्या अभावी अनेक लोक आजारी पडतात. पाण्याची उपलब्धता आणि गुणवत्ता एकमेकांशी जोडलेली आहेत. पाण्याची उपलब्धता कमी झाल्यास, पाण्याच्या गुणवत्तेकडे दुर्लक्ष होण्याची शक्यता वाढते.

जमिनीची धूप:

जमिनीची धूप ही एक नैसर्गिक प्रक्रिया आहे. मानवाला जमीन शेती व्यवसायासाठी आवश्यक आहे. शेती उत्पादन वाढावे म्हणून शेतीत जास्त प्रमाणात वापरण्यात येणारी रासायनिक खते, तननाशके, किटकनाशके इत्यादीमुळे जमिनीत रसायनांचे प्रमाण वाढून ती जमीन नापीक बनते. जंगलतोड आणि शेतीमधील चुकीच्या पद्धतीमुळे मातीची धूप वाढत आहे, ज्यामुळे जमिनीची सुपीकता कमी होत आहे आणि शेतीवर परिणाम होत आहे.

नैसर्गिक आपत्ती:

नैसर्गिक आपत्ती म्हणजे नैसर्गिक आपत्तीच्या घटनेनंतर समाज किंवा समुदायावर होणारा अत्यंत हानिकारक परिणाम. नैसर्गिक आपत्तीच्या घटना म्हणजे हिमस्खलन, दुष्काळ, भूकंप, पूर, उष्णतेच्या लाटा, भूस्खलन, चक्रीवादळे, ज्वालामुखी आणि वणवे यांचा समावेश आहे. अतिरिक्त नैसर्गिक आपत्तींमध्ये हिमवादळे, धुळीचे वादळ, आगीचे वादळ, गारपीट, बर्फाचे वादळ, सिंखोल, वादळ, चक्रीवादळ आणि त्सुनामी यांचा समावेश आहे. नैसर्गिक आपत्तीमुळे जीवितहानी किंवा मालमत्तेचे नुकसान होऊ शकते. त्यामुळे सामान्यतः आर्थिक नुकसान होते. लोक आपत्तींसाठी किती तयार आहेत आणि इमारती, रस्ते आणि इतर संरचना किती मजबूत आहेत यावर नुकसान किती गंभीर आहे हे अवलंबून असते.

निष्कर्ष:

वाढत्या लोकसंख्येमुळे लागवडीयोग्य जमीनीचा स्तर खालावलेला आहे. लोकसंख्येचा आकार आणि वाढ, नैसर्गिक संसाधने आणि पर्यावरणावर या मानवी प्रभावांना वाढवत आणि वेगवान करत आहे. या सर्वांमुळे प्रदूषण पातळीमध्ये वाढ होत आहे. पर्यावरणीय प्रदूषणामुळे केवळ पर्यावरणीय परिस्थिती बिघडत नाही तर लोकांच्या विकासावर आणि आरोग्यावरही विपरीत परिणाम होत आहे. भविष्यात लोकसंख्या अशीच वाढत राहिली तर नैसर्गिक संसाधनाची कमतरता भासेल. वाढत्या लोकसंख्येमुळे हवा, जमीन आणि जलसंपत्तीचा ऱ्हास, संसाधनांच्या वाढत्या मागण्या आणि सतत वाढत जाणारे प्रदूषण दिसून येईल. लोकसंख्येचा आकार आणि लोकसंख्या वाढीचा दर हे पर्यावरणीय बदलातील प्रमुख घटक आहेत. विकासाच्या कोणत्याही स्तरावर, वाढत्या लोकसंख्येमुळे ऊर्जेचा वापर, संसाधनांचा वापर आणि पर्यावरणीय ताण वाढतो. कोणतेही धोरण भूतकाळ बदलू शकत नाही. परंतु मानवी जीवन टिकवून ठेवण्यासाठी चांगल्या पर्यावरणीय परिस्थिती प्रदान करण्यासाठी लोकांच्या गरजेनुसार सध्याच्या लोकसंख्या धोरणात बदल करणे आवश्यक आहे. लोक स्वतःवर नियंत्रण ठेवू शकतात त्यापेक्षा सरकार लोकसंख्या नियंत्रित करू शकत नाही.

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कल्पतेश भिकनराव देशमुख

सहाय्यक प्राध्यापक (इतिहास विभाग)

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Abstract (सारांश)

मानवाच्या उत्क्रांतीचा प्रवास हा नैसर्गिक संसाधनांच्या वापरावर आधारित राहिला आहे. प्रागैतिहासिक काळातील शिकारी-संकलक भटक्या जीवनशैलीपासून कृषी क्रांतीतील स्थिरावलेल्या जीवनशैली पासून, औद्योगिक क्रांतीतील संपन्न अशी झालेली भरभराट, युद्धोत्तर जागतिकीकरण आणि आजच्या डिजिटल युगापर्यंत संसाधनांचा शोध, शोषण आणि व्यवस्थापन यामुळे समाजरचना, राजकारण, अर्थव्यवस्था आणि संस्कृती यामध्ये आमूलाग्र बदल झाले. या अमुलाग्र बदलांचा मानवी जीवनावर महत्वपूर्ण परिणाम झाला संसाधनांनी मानवाला प्रगती दिली मानवी जीवन एका नवीन उंचीवर नेवून ठेवले अनेक सुविधा निर्माण झाल्या विज्ञान आणि त्यात झालेल्या संशोधनातून भौतिक प्रगती मोठ्या प्रमाणावर झाली संवाद आणि संचार क्षेत्रात अमुलाग्र बदल घडून आले, पण त्याच वेळी असमानता, पर्यावरणीय हानी आणि भूराजकीय संघर्षही निर्माण केले. हा पेपर संसाधनांच्या वापराचा टप्प्याटप्प्याने आढावा घेतो आणि भविष्यात शाश्वततेकडे संक्रमण करण्याची आवश्यकता अधोरेखित करतो.

प्रस्तावना

आदिम काळातील मानवाच्या उत्क्रांतीचा इतिहास अभ्यासताना सृष्टीच्या निर्मिती पासून ते सजीव अस्तित्वात येई पर्यंत आणि मानवाची निर्मिती पासून ते विविध टप्प्यांतील मानवी विकास आणि वर्तन याचा अभ्यास करत असताना मानवी इतिहास ही केवळ उत्क्रांतीची कहाणी नसून संसाधनांशी असलेल्या परस्पर संबंधांची नोंद आहे. मानवाने प्रारंभी निसर्गातून फक्त जगण्यासाठी लागणारे इतकेच घेतले. सुरवातीच्या काळात मानवाने स्वताच्या गरजा भागविण्यासाठी तो निसर्गात उपलब्ध असलेल्या संसाधने त्याने वापरली ती सर्व प्रथमिक स्वरूपाची संसाधने होती जसे की भूक लागल्यावर उपलब्ध मांस, कंदमुळे, फळे इत्यादी सेवन करणे अंग झाकण्यासाठी पाला किंवा झाडाची साल यांचा वापर करणे निवासासाठी गुहा यांचा वापर करणे यात एक गोष्ट सिद्ध होते की या कालखंडात मानवाने स्वताच्या गरजा भागवत असताना त्याने उपलब्ध पर्याय यांच्या मध्ये कोणतीही प्रक्रिया केली नाही आहे तसे ते वापरण्याचा प्रयत्न केला. तथापि, जसजसा तो बुद्धिमान होत गेला त्याप्रमाणे मानवाच्या दैनंदिन जीवन शैलीत मोठा बदल होत गेला मानवाच्या गरजा वाढत गेल्या त्या गरजा पूर्ण करण्यासाठी तसतसा संसाधनांचा शोध व वापर वाढत गेला. शेतीमुळे स्थिर समाजव्यवस्था निर्माण झाली मानवाची भटकंती थांबली तो स्थिर झाला. नद्यांच्या सुपीक खोऱ्यात मानवा स्थिरावला आणि त्यातून एक नागरी समजाची निर्मिती झाली. नागरी समजाच्या निर्मिती बरोबर मालकी हक्क, सत्ता, आणि हित संबंध यांची निर्मिती झाली. व्यापार व संस्कृती विकसित झाली, तर औद्योगिक क्रांतीमुळे उत्पादन व तंत्रज्ञानामध्ये प्रचंड वाढ झाली. परिणामी उत्पादनाच्या साधनात झालेल्या अमुलाग्र बदलामुळे उत्पादन झपाट्याने वाढले. त्याचा परिणाम मानवाच्या आर्थिक सामाजिक सांस्कृतिक जीवनावर झाला. वाढलेले उत्पादनासाठी आवश्यक नवनवीन बाजारपेठा शोधण्याचे आवाहन प्रगत राष्ट्रासमोर निर्माण झाले. त्यातून नवनवीन जल मार्ग शोधले गेले आणि व्यापारी स्पर्धा सुरु झाली. पुढे जावून २० व्या शतकातील दोन महायुद्धांनी संसाधनांचे महत्त्व नव्या पद्धतीने दाखवून दिले. तेल, पोलाद, अन्नधान्य हे युद्धातील शस्त्र ठरले ज्याचाकडे संसाधने अधिक तो बलवान समजला गेला. याच स्पर्धेतून विकासाच्या नावाखाली नैसर्गिक संसाधनांचा मोठ्या प्रमाणात वापर करण्यात आला. यात निसर्ग पर्यावरण यांचे संतुलन याचे भान देखील वापरकर्त्या मानवाला राहिले नाही. त्यातून आता २१ व्या शतकात मानवाला पर्यावरणाचा ढासळलेला समतोल, हवामान बदल, जलसंकट, प्रदूषण आणि शाश्वत विकासासारख्या समस्यांना सामोरे जावे लागत आहे.

१. प्रागैतिहासिक आणि प्राचीन अर्थव्यवस्था (पूर्व इ.स. १०,००० - इ.स. ५००)

शिकारी-संकलक समाज

या समाजात मानव पूर्णपणे निसर्गावर अवलंबून होता. प्राणी, मासे, फळे, मुळे आणि पाण्याचे झरे हेच मुख्य साधन होते. दगड, लाकूड आणि हाडांपासून बनवलेली साधने वापरली जात. मालकी हक्क ही संकल्पना अस्तित्वात नव्हती. जमिनीवर, जंगलावर किंवा पाण्यावर कोणाचाही व्यक्तिगत हक्क नसे; गटाने मिळून ते वापरत. ही सामूहिकता समाजातील समता टिकवून

ठेवत होती. मात्र उत्पादनक्षमता मर्यादित असल्यामुळे लोकसंख्या कमी राहिली. लोक स्थलांतरित जीवन जगत होते, कारण एका ठिकाणी संसाधने संपल्यावर दुसऱ्या ठिकाणी जावे लागत असे.

कृषी क्रांती (Neolithic Revolution)

सुमारे पूर्व इ.स. १०,००० मध्ये कृषी क्रांतीने मानवाचा चेहरामोहरा बदलला. गहू, बार्ली, तांदूळ यांसारखी पिके लागवड केली गेली. प्राणी पाळले गेले. मानवाने पहिल्यांदाच स्थायिक जीवन जगायला सुरुवात केली. जमिनीवर हक्क निर्माण झाले. शेतीमुळे *surplus production* झाले, ज्यामुळे व्यापार सुरू झाला. समाजात वर्गरचना निर्माण झाली. शेतकरी, कारागीर, व्यापारी आणि शासक याच काळात गाव, शहरे, मंदिरे उभी राहिली. सिंधू खोऱ्यातील हडप्पा-सिंधू संस्कृती किंवा इजिप्तची नाईल सभ्यता ही कृषी क्रांतीची ठोस उदाहरणे आहेत.

प्राचीन सभ्यता

मेसोपोटेमिया, इजिप्त, ग्रीस, रोम आणि सिंधू खोऱ्याने संसाधनांच्या वापरामध्ये अभूतपूर्व प्रगती केली. या संस्कृतींनी सिंचन प्रणाली, जलव्यवस्था, धातुकाम यांत उल्लेखनीय कामगिरी केली. कांस्य व लोखंडामुळे शेतीची उत्पादकता वाढली, युद्धसामग्री सुधारली. संसाधनांचे केंद्रीकरण हे राजे आणि धार्मिक संस्था यांच्या हातात होते. त्यामुळे सत्ता व संपत्ती केंद्रित झाली आणि विषमता निर्माण झाली. संसाधन हे केवळ जगण्यासाठी नाही तर राजकीय सत्तेचे प्रतीक बनले.

२. मध्ययुगीन आणि पूर्व-आधुनिक काळ (इ.स. ५०० - इ.स. १७५०)

जमीनवादी व्यवस्था (Feudalism)

मध्ययुगीन युरोपात जमीन ही संपत्ती, सन्मान आणि राजकीय सामर्थ्याचे प्रतीक होती. जमीनदार वर्ग (lords) आणि शेतकरी वर्ग (serfs) यांच्यात स्पष्ट विभागणी झाली. शेतकरी जमिनीवर काम करत, पण मालकी जमीनदारांकडे असे. शेतकऱ्यांना उत्पादनाचा फक्त काही भाग मिळे. भारतातही जमीन ही प्रतिष्ठेचे साधन बनली आणि जमीनदार-उमराव वर्ग उदयास आला. या प्रणालीमुळे विषमता वाढली, पण कृषी उत्पादनाला स्थैर्य आले.

व्यापारी मार्ग आणि आंतरराष्ट्रीय देवाणघेवाण

रेशीम मार्ग (Silk Road) चीनला युरोपशी जोडत होता. मसाला मार्ग (Spice Route) भारत व आग्नेय आशियाला युरोपशी जोडत होता. या मार्गांवरून मसाले, रेशीम, मौल्यवान धातू, कापड यांचा व्यापार झाला. यामुळे संसाधनांवर नियंत्रणासाठी स्पर्धा निर्माण झाली. व्यापारामुळे शहरांची वाढ झाली, सांस्कृतिक देवाणघेवाण झाली, पण काहीवेळा संघर्षही निर्माण झाले.

साम्राज्यवादाची सुरुवात

१५व्या शतकानंतर युरोपियन देशांनी (स्पेन, पोर्तुगाल, इंग्लंड, फ्रान्स, नेदरलँड्स) नवीन समुद्री मार्ग शोधले. कोलंबसच्या अमेरिकेतील प्रवासामुळे सोने-चांदी युरोपात वाहून आले. अमेरिकेतून आलेले मका, बटाटा, टोमॅटो यांसारखे पिके युरोपात पसरले (Columbian Exchange). गुलामगिरीवर आधारित अर्थव्यवस्था अमेरिकेत आणि कॅरिबियन वेटांवर उभी राहिली. युरोपातील सत्तांनी आफ्रिका व आशियातील संसाधनांचे शोषण करून वसाहतवादाचा पाया घातला.

३. औद्योगिक क्रांती: उर्जेचे युग (इ.स. १७५० - इ.स. १९४५)

कोळसा आणि वाफेचे इंजिन

औद्योगिक क्रांती इंग्लंडमध्ये सुरू झाली. कोळसा हा ऊर्जा स्रोत बनला आणि वाफेचे इंजिन शोधले गेले. यामुळे कारखाने, वस्त्रोद्योग आणि रेल्वे यांचा वेगाने विकास झाला. “मँचेस्टर” शहर यामुळे “Cottonopolis” म्हणून ओळखले जाऊ लागले. उत्पादन क्षमतेत अभूतपूर्व वाढ झाली.

लोखंड, पोलाद आणि तंत्रज्ञान

औद्योगिक प्रगतीसाठी पोलाद महत्वाचे ठरले. स्वस्त व मोठ्या प्रमाणावर उत्पादन झाल्यामुळे पूल, रेल्वे जाळे, मोठ्या इमारती उभारल्या गेल्या. पोलादामुळे युद्धशक्ती वाढली. ब्रिटन, जर्मनी आणि अमेरिकेने या काळात औद्योगिकीकरणात आघाडी घेतली.

पेट्रोलियम आणि रासायनिक क्रांती

१९ व्या शतकाच्या उत्तरार्धात पेट्रोलियम हे प्रमुख साधन झाले. त्यापासून प्लास्टिक, औषधे, खते तयार झाली. कारच्या शोधनंतर पेट्रोलियमची मागणी प्रचंड वाढली. २० व्या शतकात तेलाचे महत्त्व युद्ध, राजकारण आणि अर्थव्यवस्थेत ठळक झाले.

मानवकेंद्रित दृष्टीकोन आणि परिणाम

या काळात निसर्ग हा अमर्याद साठा आहे अशी धारणा निर्माण झाली. संसाधनांचे अमर्याद शोषण झाले. नागरीकरण आणि औद्योगिकीकरणामुळे प्रदूषण, जंगलतोड आणि पर्यावरणीय संकटे निर्माण झाली. ही संकटे पुढील शतकांमध्ये तीव्र झाली.

४. युद्धोत्तर काळ व जागतिकीकरण (इ.स. १९४५ - इ.स. २०००)

हरित क्रांती

दुसऱ्या महायुद्धानंतर अनेक देशांना अन्नटंचाईचा सामना करावा लागत होता. १९६० च्या दशकात हरित क्रांती भारत, मेक्सिको, फिलिपाईन्ससारख्या देशांमध्ये राबवली गेली. उच्च उत्पादनक्षम बियाणे, रासायनिक खते, सिंचन प्रणाली वापरल्यामुळे अन्नधान्य उत्पादन प्रचंड वाढले. अन्नटंचाई टळली, परंतु जमिनीची सुपीकता कमी झाली, पाण्याचा अतिवापर झाला आणि कीटकनाशकांमुळे प्रदूषण वाढले.

तेल आणि OPEC

१९७३ च्या तेलधारणेमुळे (Oil Embargo) तेलाचे रणनीतिक महत्त्व जगाला उमगले. OPEC (Organization of Petroleum Exporting Countries) ने तेलाच्या पुरवठ्यावर नियंत्रण ठेवून जागतिक अर्थव्यवस्थेला धक्का दिला. तेल हे केवळ इंधन नसून राजकारणाचे शस्त्र बनले.

पर्यावरणीय चळवळी

रेचेल कार्सनच्या *Silent Spring* (१९६२) पुस्तकामुळे रासायनिक कीटकनाशकांचे दुष्परिणाम उघड झाले. १९७२ मध्ये Club of Rome च्या *Limits to Growth* अहवालाने आर्थिक वाढीच्या मर्यादांवर लक्ष वेधले. ग्लोबल वॉर्मिंग, आम्ल पाऊस, ओझोन थर कमी होणे या समस्या चर्चेत आल्या. संयुक्त राष्ट्रांनी *Environment Programme* सुरू केले.

५. २१ वे शतक: शाश्वततेकडे संक्रमण (२००० - सध्यापर्यंत)

हवामान बदल

आजच्या काळातील सर्वात गंभीर समस्या म्हणजे हवामान बदल. जीवाश्म इंधनांच्या वापरामुळे हरितगृह वायूंचे उत्सर्जन वाढले. जागतिक तापमान वाढल्याने हिमनद्या वितळत आहेत, समुद्राची पातळी वाढत आहे आणि हवामान पद्धती बदलत आहेत. पॅरिस करार (2015) सारख्या आंतरराष्ट्रीय करारांनी या समस्येवर उपाय शोधण्याचा प्रयत्न केला आहे.

दुर्मिळ खनिजे आणि डिजिटल अर्थव्यवस्था

लिथियम, कोबाल्ट, Rare Earth Elements हे स्मार्टफोन, संगणक, इलेक्ट्रिक वाहनांसाठी अत्यावश्यक ठरले आहेत. त्यामुळे आफ्रिका व दक्षिण अमेरिका याठिकाणी संसाधनांसाठी नवीन संघर्ष सुरू झाले आहेत. चीन या खनिजांवर मोठ्या प्रमाणात नियंत्रण ठेवतो. ज्यामुळे भू-राजकीय तणाव वाढत आहे.

वर्तुळाकार अर्थव्यवस्था (Circular Economy)

पारंपरिक "Take, Make, Dispose" पद्धतीऐवजी आता "Reuse, Recycle, Repair" यावर भर दिला जात आहे. अनेक देशांनी कचरा व्यवस्थापन आणि पुनर्वापरासाठी धोरणे आखली आहेत. हे शाश्वत विकासाकडे नेणारे महत्वाचे पाऊल आहे.

नवीकरणीय ऊर्जा

सौर, वारा, जलविद्युत यांसारख्या स्वच्छ ऊर्जास्त्रोतांकडे संक्रमण वेगाने होत आहे. भारत, चीन, युरोप आणि अमेरिका यांनी नवीकरणीय ऊर्जेमध्ये मोठ्या प्रमाणात गुंतवणूक केली आहे. हे संक्रमण हवामान बदलावर उपाय म्हणून महत्वाचे आहे.

जलसंकट आणि सामाजिक आव्हाने

२१ व्या शतकातील सर्वात गंभीर आव्हानांपैकी एक म्हणजे पाण्याची टंचाई. आफ्रिका, मध्यपूर्व, दक्षिण आशियात पाण्यावरून संघर्ष निर्माण होत आहेत. स्वच्छ पिण्याच्या पाण्याची उपलब्धता ही सामाजिक व राजकीय स्थैर्याशी जोडलेली आहे.

निष्कर्ष

संसाधनांचा इतिहास हा मानवाच्या प्रगतीचा तसेच लोभाचा प्रवास आहे. शिकारी आणि संकलक समाजापासून डिजिटल युगापर्यंत संसाधनांचीच मानवी समाजाची रचना ठरवली. औद्योगिक क्रांतीने प्रगती दिली, पण पर्यावरणीय हानीही केली. आजचे सर्वात मोठे आव्हान म्हणजे आर्थिक विकास आणि पर्यावरणीय शाश्वतता यांचा समतोल साधणे. भविष्यातील इतिहासकार हे पाहतील की आपण संसाधनांचे संरक्षण केले की त्यांचा विनाश केला.

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संत साहित्य : पर्यावरणीय संदर्भाचा अभ्यास

डॉ. शिवाजी आनंदराव सूर्यवंशी

मराठी विभाग, यशवंत महाविद्यालय, नांदेड.

मराठी संत साहित्य विविध जाणीवांनी समृद्ध आहे. अध्यात्मिक कास धरताना संतांनी सामाजिक सलोखा, सामाजिक बांधिलकी, सामाजिक समता रुजवण्याबरोबरच पर्यावरण विषयक विचार सुद्धा मांडले. त्यामुळे संतांचे अभंग केवळ अध्यात्म रुजवणारे होते, असे मत मांडणे योग्य वाटणारे नाही. वारकरी संप्रदाय असो किंवा अन्य सर्व संप्रदायांमधून भक्ती भावना रुजवत असतानाच सामाजिक चिंतन सुद्धा संतांनी व्यक्त केलेले दिसून येते. त्यामध्ये अनेक संतांनी पर्यावरणीय संदर्भ आपल्या अभंगाच्या माध्यमातून रुजविण्याचा प्रयत्न केलेला दिसून येतो. बाराव्या शतकापासून आजतागायत जे जे संत झाले त्यांनी भक्तीची पाळेमुळे खोलवर रुजवली. परंतु त्याबरोबरच संतांनी व्यक्तीशी संबंधित असलेल्या अनेक क्षेत्रांना आपल्या विचारांच्या माध्यमातून न्याय देण्याचा प्रयत्न केलेला दिसून येतो. अध्यात्म हा त्यामधील एक भाव असावा. परंतु अध्यात्माबरोबरच संतांनी आपली अभंगवाणी व्यक्तीशी संबंधित असलेल्या विविध घटकांसाठी झिजवलेली दिसून येते.

महाराष्ट्रामधील सर्व संप्रदायांनी पर्यावरणाचा विचार मोठ्या आस्थेने मांडलेला दिसून येतो. वारकरी संप्रदायामध्ये संत ज्ञानेश्वरांपासून ते संत तुकोबारायांपर्यंत सर्वांनीच आपल्या अभंगाच्या माध्यमातून पर्यावरणाचा विचार रुजविलेला दिसून येतो. संतांनी अध्यात्माला तर महत्व दिलेच परंतु त्याबरोबरच व्यक्तीचे जीवन सुखी व्हावे अशी चिंता करीत असताना या सुखी जीवनासाठी चांगल्या पर्यावरणाची आवश्यकता आहे, असा विचार सुद्धा त्यांनी रुजविला. सर्वप्रथम नाथ संप्रदायाने बाराव्या शतकात महाराष्ट्राच्या भारतीय साधनेला बळकटी दिलेली दिसून येते. “सर्व हिंदुस्थानात पसरलेल्या पुरातन अशा नाथपंथान बाराव्या शतकात महाराष्ट्रातही आपले भारतीय साधनेच्या शुद्धीकरणाचे व धर्मजागृतीचे कार्य नेटाने व यशस्वीपणाने केले असे दिसते.”^१

नाथ संप्रदायाने देखील महाराष्ट्रामध्ये भक्तीभाव रुजवत असताना पर्यावरणाचे संवर्धन करणारे, काळजी दाखवणारे अभंग लिहिलेले दिसून येतात. अमरनाथ संवाद या ग्रंथांमध्ये असाच एक संदर्भ आलेला दिसतो.

“वृक्षाची पाने झडती ! आणि माघौति निगति! परि तेचि म्हणू नयेति किं!

मग निगालीये नदी उदके अनित्ये! परि प्रवाही नित्य जाणावी किं!”

यासारख्या ओळींच्या माध्यमातून वृक्षांचे, नदीचे वर्णन करून पर्यावरणाची जाणीव करून देण्याचा प्रयत्न नाथ संप्रदायातील संतांनी सुद्धा केलेला दिसून येतो. निसर्गाचे देखणं रूप दाखवत असताना पाने गेल्यानंतर परत ते उगवतात आणि निसर्गाला पुन्हा भरून टाकतात, याची जाणीव नाथ संप्रदायांनी आपल्या ओव्यांमधून करून देत असतानाच निसर्गामुळे सृष्टी कशी समृद्ध होते, ही भावना मांडून नदीचा प्रवाह हा नेहमी वाहणारा असतो आणि तो सर्वसृष्टीला सुजलाम-सुफलाम करतो ही भावना अशा काही ओव्यांमधून व्यक्त केलेली दिसून येते.

महानुभाव संप्रदायाच्या तत्त्वज्ञानाचा अभ्यास केला असता त्यांनी तर झाडांच्या सानिध्यामध्ये आपले अस्तित्व असू द्यावे, असा नियम लावताना निसर्गाशी नाते घट्ट होण्याबरोबर समाजाशी आपले नाते घट्ट व्हावे, अशीच जाणीव करून देण्याचा प्रयत्न महानुभाव संप्रदायाने केलेला दिसून येतो. महानुभाव संप्रदायाचा आचारधर्म समजून घेत असताना संप्रदायाच्या तत्त्वज्ञानातील अनेक महत्त्वपूर्ण मुद्दे आहेत, त्यापैकी एक महत्त्वाचा मुद्दा म्हणजे “झाडातळी : विजन कीजे” हा आहे. हा एकच मुद्दा संप्रदायाचे निसर्गाशी जोडलेले नाते स्पष्टपणे व्यक्त करतो. रुक्मिणी स्वयंवर या ग्रंथामध्ये सुद्धा निसर्ग वर्णन व त्या माध्यमातून पर्यावरणाची जाणीव कवी नरेंद्र यांनी केलेली दिसून येते.

“पूर्ण चंद्राचेनि अमृते उत्तरे: स्वातिचा मेघीं धरे

तें पाउसासवें गर्भी भरे : माणिक सिंपीचां

यासारख्या ओळींमधून पर्यावरणाचे काही संदर्भ आलेले दिसून येतात. वारकरी संप्रदायातील असंख्य संतांनी आपल्या अभंगाच्या माध्यमातून पर्यावरणाची जाणीव व्यक्त करून दिली आहे. संतांच्या अभंगांमध्ये त्याचे संदर्भ ठळकपणाने दिसून येतात. वारकरी संप्रदायाच्या पाया ज्या संत ज्ञानेश्वरांनी रोवला त्यांनीच मुळात ज्ञानेश्वरी असो की अन्य आपल्या सर्व रचनांमध्ये पर्यावरणाचे संदर्भ झाड, पुष्प, वेली, पाणी या माध्यमांतून वापरलेले दिसून येतात. संत ज्ञानेश्वरांनी आपल्या ज्ञानेश्वरी या ग्रंथासह अभंग व अन्य ओव्यांच्या माध्यमातून पर्यावरणाचे संदर्भ वापरलेले दिसून येतात. झाडाचे महत्त्व विशद करीत असताना झाडे तोडणाऱ्या व्यक्तीला व पाणी टाकणाऱ्या व्यक्तीला समान सावली झाडे देतात असे सांगितले आहे. याचा अर्थ झाडे समानता शिकवतात, अशी भूमिका त्यांनी पुढील ओव्यांमधून मांडलेली दिसून येते.

“जो खांडावया घावो घाली ! का लावणी ज्याने केली !!

दोघा एकचि साऊली ! वृक्षू दे जैसा !!”

यासारख्या रचनेमधून संत ज्ञानेश्वरांनी पर्यावरणाचे संदर्भ वापरलेले दिसतात. त्याचबरोबर त्यांनी

“आदित्याची झाडे! सदा सन्मुख सूर्याकडे!!

तेवी समोर शत्रूपुढे! होणे जे का !!”

यासारख्या नित्य व्यवहारातील दृष्टांताचा वापर करून पर्यावरणाचे संदर्भ वेळोवेळी संत ज्ञानेश्वरांनी आपल्या ग्रंथासह अभंगांमध्ये वापरलेले दिसून येतात. त्याशिवाय संत ज्ञानेश्वरांनी

“पैल तो गे काऊ कोकताहे ।

शकूनगे माये सांगतसे ॥१॥

उडरे उडरे काऊ तुझे सोन्यानें

मढीन पाऊ । पाहुणे पंढरीराऊ घरा कै येती ॥२॥

भारतीय संस्कृतीतील संकेत सांगत असताना पशु-पाखरांचा वापर करून संत ज्ञानेश्वरांनी पर्यावरणामध्ये अत्यंत महत्त्वाची भूमिका बजावणाऱ्या पाखरांचा पर्यावरणीय संदर्भ म्हणून वापर केलेला दिसून येतो. भारतीय समाजामध्ये विविध प्रकारचे संकेत पाळले जातात. त्यातीलच कावळ्याचे ओरडणे किंवा दिसणे म्हणजे अतिथींचे येणे असा एक संकेत भारतीय समाजामध्ये पाळला जातो, त्याचा संदर्भ वापरून संत ज्ञानेश्वर यांनी केलेली रचना ही पर्यावरण संदर्भ अधोरेखित करते.

"जो मेघ आपुलिये प्रौढी | जगाची आरती दवडी |

वाचूनि चातकाची तहान केवढी | तो वर्षावो पाहूनी”

ज्ञानेश्वरीच्या नवव्या अध्यायामध्ये संत ज्ञानेश्वरांनी चातक पक्षी मेघांची वाट पाहतो, असे सांगत असतानाच मेघाप्रमाणे परमेश्वर सुद्धा आपणाला उदार अंतःकरणाने सुख देतो ही भावना या अभंगाच्या ओव्यांच्या माध्यमातून त्यांनी मांडली. या माध्यमातून त्यांनी पर्यावरणीय संदर्भ सुद्धा वापरलेले दिसून येतात.

“कमळावरील भ्रमर ! पाय ठेवी हळुवार ! कुचंबेल केसर ! इया शंका!!” यासारखा संदर्भ वापरून सुकुमार आणि माधुरी युक्त शब्दकळा वापरून त्यांनी ज्ञानी मनुष्य चालतो कसा हे समजावून सांगण्याचा प्रयत्न केला व त्यानिमित्ताने पर्यावरणातील अतिशय महत्त्वाच्या असलेल्या भ्रमराचा व कमळाचा वापर केलेला दिसून येतो. गुरु आणि सूर्य यांची तुलना करताना त्यांनी पर्यावरणीय संदर्भ वापरलेले दिसून येतात. “आधीची देखणी दिठी! वरी सूर्य पूरवी पाठी! तै न दिसे ऐसी गोठी! केंही आहे!! या ओव्यांमधून त्यांनी गुरुसाठी सूर्याची वापरलेली उपमा पर्यावरणाशी नाते सांगणारी आहे. “गुरुस त्यांनी चित्सूर्य म्हटले आहे. गुरुकृपेमुळे काहीही अशक्य नाही, असा विश्वास ते व्यक्त करतात”२

संत नामदेवांनी सुद्धा आपल्या अभंगांमध्ये पर्यावरणाचे संदर्भ वापरलेले दिसून येतात. “नदीचिया माशा घातलें माजवण! तैसें जनवन कालवलें!! संत ज्ञानेश्वरांच्या वियोगामुळे भक्तांची होणारी अवस्था कशा प्रकारची होती, याचे वर्णन

करताना हा पर्यावरणीय संदर्भ संत नामदेवांनी वापरलेला दिसतो. “नामदेव या हृदयाला पीळ पाडणाऱ्या प्रसंगांचे वर्णन करतो. जानोबाच्या मागोमाग मार्गदर्शक दिनकरच लोपून गेला.”३

“उडाली पक्षिणी गेली अंतराळी ! चित्त बाळाजवळी ठेवोनिया !!

यासारख्या रचनेमध्ये सुद्धा संत नामदेवांनी पक्ष्यांचा संदर्भ घेऊन पर्यावरणाचे संदर्भ वापरलेले दिसतात.

संत एकनाथांनी सुद्धा आपल्या विविध रचनांमधून पर्यावरणाचे संदर्भ वापरलेले दिसून येतात. झाडे, पुष्प, वेली, पाणी, फळे, पर्वत या सर्व घटकांचा वापर करून त्यांनी पर्यावरणाचे संदर्भ आपल्या रचनेमध्ये वापरलेले दिसून येतात. मेघापरिस उदार संत । मनोगत पुरविती ॥१॥ यासारख्या रचनांचा वापर करून त्यांनी पर्यावरणाशी निगडित असलेले अनेक संदर्भ वापरलेले दिसतात. या माध्यमातून त्यांनी संतांचे मानवी जीवनातील महत्त्व व्यक्त केले आहे.

संत तुकारामांनी पर्यावरणासाठी वृक्षवल्लीचे रक्षण अतिशय महत्त्वाचे आहे, असे समजावून सांगितले आहे. काही लोकं ही बाभळीसारखी असतात, वाटेमध्ये काटे पेरतात. पण काही झाडे ही फळे देण्याचे काम करतात, असे सांगताना त्यांनी पर्यावरणाचे संदर्भ वापरलेले दिसून येतात. पुढील अभंगात ते म्हणतात की,

"तोडूनी पुष्पवाटिका ! फळं वृक्षयाती !

बाभळा राखीती करुनी सार !!"

यापुढेही जाऊन संत तुकाराम म्हणतात की,

“वृक्षवल्ली आम्हा सोयरी वनचरे। पक्षी ही सुस्वरे आळविती॥ धृ ॥

येण सुखे रुचे एकांताचा वास। नाही गुणदोष अंगा येत॥ 1 ॥

आकाश मंडप पृथिवी आसन। रमे तेथे मन क्रिडा करी॥ 2 ॥

जगद्गुरु संत तुकोबारायांनी आपल्या अभंगांमध्ये पर्यावरणीय संदर्भांचा विविध ठिकाणी खऱ्या अर्थाने वापर केलेला दिसून येतो. मुळात तुकोबांच्या अभंगांमध्ये भक्तीभाव असण्याबरोबरच असंख्य विषयाची मांडणी झालेली दिसून येते. जनसामान्यांच्या न्यायाला वाचा फोडण्याबरोबरच स्वतःवर झालेल्या अन्याय मांडतानाच एक भक्कम सक्षम समाज उभा राहावा ही अपेक्षा ठेवून त्यांनी पर्यावरणाचे महत्त्व सुद्धा आपले अभंगातून पटवून देण्याचे काम केले.

संत सावता माळी यांनी आपल्या कामांमध्येच विठ्ठलाचा शोध घेतला. भक्तीचा ध्यास धरताना अन्य संतांबरोबरच सावता माळी यांनी सुद्धा सामाजिकतेची कास धरलेली दिसते. “सावता माळी यांच्या आयुष्यातील चमत्कारांपेक्षा त्यांच्या अभंगातून प्रकट होणारी सामाजिक जाणीव आणि भक्तीची तीव्रता यांचेच मोल अधिक मानावे लागेल.”४ सावता माळी यांनी आपला मळा विठ्ठलाच्या रूपाने फुलला असल्याचा भास व्यक्त करताना शेतातील अनेक पर्यावरणीय संदर्भ वापरण्याचा प्रयत्न केलेला आहे. आपल्या अभंगात म्हणतात,

“कांदा मुळा भाजी । .

अवघी विठाबाई माझी ॥ १ ॥

लसूण मिरची कोथिंबिरी ।

अवघा झाला माझा हरी ॥ २ ॥

संत सावता माळी यांनी विठ्ठलाविषयीचा भाव अशा पद्धतीने सांगतानाच आपल्या शेतामध्येच निसर्गाचे सानिध्य व पर्यायाने ईश्वर कसा आहे याची जाणीव करून देण्याचा प्रयत्न त्यांनी केला आहे. “आपल्या कर्तव्यकर्मावर निष्ठा ठेवणारे आणि संबंध व्यवसायच हरिरूप मानणारे एक थोर संत म्हणून मोडलिंबाजवळील अरणभेंडी येथील सावतामाळी प्रसिद्ध आहेत.”५

समर्थ रामदासांनी दासबोध या ग्रंथामध्ये पर्यावरणीय संदर्भांचा वापर केलेला दिसून येतो. ते एका ठिकाणी लिहितात की,

“नानावली मध्ये जीवन! नाना फळी फुली जीवन

नाना कंदमुळी जीवन! गुणकारके.”

असे म्हणत असतानाच पाऊस नसल्यामुळे पृथ्वीवर उष्णतेचा कहर होऊन पर्यावरणाचा समतोल बिघडत असतो, असे सांगत असताना संत रामदास लिहितात,

“शतरूपे मेघ जाती ! तेथे प्राणी मृत्यू पावती !

असंभाव्य तडके क्षिती मयदि वेगळी!!

सूर्य तो बारा कळी! तेणे पृथ्वीची होय होळी!!

अग्नी पावतां पाताळी ! शेष विष वही!” असे वर्णन त्यांनी केले आहे. नाथ संप्रदायापासून ते पुढील समर्थ संप्रदायांपर्यंत किंबहुना त्याही पुढे अनेक रचनांमध्ये पर्यावरणाचे संदर्भ मोठ्या प्रमाणात आलेले दिसून येतात. जनसामान्यांची काळजी वाहत असताना संतांनी परोपकाराची भावना व्यक्त केली. परंतु त्याबरोबरच व्यक्तीचे जीवन समृद्ध होण्यासाठी पर्यावरणाचे संतुलन आवश्यक आहे, ही भावना वेळोवेळी व्यक्त केली. पशु-पाखरांसह विविध घटक पर्यावरणासाठी कसे आवश्यक असतात व त्यामुळे माणूस आपले जीवन कसे चांगल्या पद्धतीने जगू शकतो याची भावना सुद्धा व्यक्त केलेली दिसून येते. अनेक संतांनी तर निसर्गाच्या सानिध्यामध्येच मानवाची जीवन सुखी आहे, अशी भावना व्यक्त केलेली दिसून येते. अनेक संतांच्या अभंगांमध्ये पर्यावरणाचे संदर्भ या ना त्या कारणाने आलेले दिसून येतात.

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मराठी साहित्यात पर्यावरण

प्रतिक्षा शंकर जाधव

मराठी विभाग, मुंबई विद्यापीठ

प्रस्तावना

साठोत्तरी म्हणजे १९६० नंतरचा मराठी साहित्य प्रवाह हा सामाजिक, राजकीय, सांस्कृतिक आणि वैज्ञानिक बदलांच्या प्रभावाखाली आकाराला आलेला आहे. या काळात औद्योगिकीकरण, शहरीकरण, जलद लोकसंख्या वाढ, रासायनिक शेती, अणुशक्तीचा वापर, आणि पर्यावरणीय प्रदूषण ही गंभीर आव्हाने समोर आली. यामुळे साहित्यकारही संवेदनशील झाले आणि त्यांनी आपल्या लेखणीतून पर्यावरणीय संकटे, निसर्गाशी नातं, तसेच मानवाच्या स्वार्थी भूमिकेवर भाष्य केले. साठोत्तरीनंतरच्या मराठी कवितेत, कादंबरीत, कथेत आणि ललित लेखनात पर्यावरण एक प्रभावी विषय म्हणून उदयास आलेले दिसते.

१. मराठी कवितेत पर्यावरण

साठोत्तरीनंतरच्या मराठी कवितेत ग्रामीण वास्तव, शहरी ताणतणाव, प्रदूषण, जंगलतोड, दुष्काळ, आणि पर्यावरणीय हानी हे प्रमुख विषय ठरले.

ना. धों. महानोर यांच्या विषयी मराठी विश्वकोश या वेबसाईटवर कवयित्री अरुणा ढेरे यांनी ना.धों. महानोर यांची ओळख करून देताना म्हटले आहे की, महानोरांनी गद्य लेखन केलेले असले, तरी रसरशीत निसर्गभान जागे होणारे कवी म्हणूनच मुख्यतः ते प्रसिद्ध आहेत. जिला अस्सल संपन्न आणि तरल अशी ग्रामीण संवेदनशीलता म्हणता येईल. तिचा अपूर्व असा प्रत्येक त्यांच्या कवितेतून येतो म्हणूनच पूर्वकालीन व समकालीन कवींना प्रभावापासून ही कविता मुक्त आहे. तसेच लोकगीतातील छंद लय जिवंत उत्स्फूर्तता आपल्या मातीशी आणि बोलीभाषेच्या सहजतेशी नाते सांगणारी जिवंत शब्दकला ही महानोर यांच्या कवितेचे लक्षणीय वैशिष्ट्य त्यांच्या या खास संवेदनशीलतेतून स्वाभाविकपणे आलेली आहे. रानातील कविता या संग्रहात शेतकरी, रान, पाणी, शेती, बियाणं आणि निसर्गाचा संघर्ष याचं सुंदर चित्रण आहे. त्यांच्या कवितेतून निसर्ग हा केवळ दृश्यरम्य घटक नसून शेतकऱ्याच्या जगण्याचा अविभाज्य भाग म्हणून समोर येतो.

निरंजन भावे, मंगेश पाडगावकर यांच्या कवितेत शहरी प्रदूषणाविरुद्ध वेदना आणि नैसर्गिक जीवनावरील ओढ स्पष्ट होते. सुरेश भट यांच्या कवितेत निसर्गरम्यता नाही, तर आधुनिक जीवनाच्या कृत्रिमतेविरुद्ध असलेला आक्रोश आहे. यातून अप्रत्यक्षपणे पर्यावरणीय अधःपतनाचे प्रतिबिंब दिसते. ग्रेस यांच्या कवितेत निसर्गाचे अत्यंत सूक्ष्म निरीक्षण, संवेदनशीलतेने केलेले चित्रण आहे. ग्रेस म्हणजे निसर्ग कृपेचे भावविभक्ती मध्ये शब्दांतरीचे गृहात्मक संदर्भ शोधू पाहणारी काव्यवृत्ति, ग्रेस म्हणजे मराठी काव्याचे मर्मबंध उलगडणारा अभिज्ञ शब्दप्रभू आत्म मग्न तेथून संवेदना प्रधान आशयाचे पैलू पडणारा पाडणारा काव्य महर्षी.त्यांच्या काव्यात निसर्ग ठासून भरलेला दिसतो.

एकूणच, साठोत्तरी कवितेने पर्यावरणीय संवेदनाला सामाजिक वास्तवाशी जोडण्याचा प्रयत्न केलेला दिसतो.

२. मराठी कादंबरीत पर्यावरण

या काळातील कादंबरीकारांनी ग्रामीण-शहरी संक्रमणाच्या प्रक्रियेतून पर्यावरणीय संदर्भ मांडले.ग्रामीण कादंबऱ्यांत पाणी, पाऊस, शेत, ओसाड जमिनी, दुष्काळ यांचे जिवंत चित्रण आढळते. आनंद यादव यांच्या झाड वाटा भूमीकन्या नांगरणी झोंबी या कादंबऱ्यांमध्ये वन्यजीव, जंगल आणि माणूस यांच्यातील नातं प्रभावीपणे मांडलेले आहे. या लेखनामध्ये प्राधान्याने ग्रामीण अनुभवाचा निसर्गाचा आविष्कार झाला आहे या संदर्भात “यादवांच्या रूपाने ग्रामीण साहित्याला एक चांगला भाष्यकार मिळाला” असा निर्देश गो.म कुलकर्णी यांनी केला.१

भालचंद्र नेमाडे यांच्या हिंदू आणि जरीला या कादंबऱ्यांत शहरीकरणामुळे बदललेली ग्रामीण जीवनशैली, औद्योगिकीकरणामुळे ढासळणारे निसर्गाचे संतुलन यांची सूचक नोंद दिसते. वसंत पवार यांच्या पाणी या कादंबरीत पाण्याच्या टंचाईमुळे ग्रामीण समाजातील बदल, स्थलांतर, आणि संघर्ष मांडले आहेत.

उद्धव शेळके यांच्या कादंबऱ्यांतून पर्यावरण हा केवळ पार्श्वभूमी न राहता कथानकाचा केंद्रबिंदू बनलेला आहे. त्यांनी विदर्भातील सामाजिक, सांस्कृतिक, पर्यावरण कवेत घेणाऱ्या संग्रहातील कथांमधून तळपातळीवरील ग्रामीण जीवनाचा वेध घेतला. विदर्भातील गावगाड्यातील माणसाच्या जगण्याचा ताणेबाणे अत्यंत उत्कटपणे गंभीरपणे या कथांमधून अभिव्यक्त झालेला आहे. तसेच शेळके यांच्या या कथा निसर्गाच्या वेदनांचे विविध पैलू उलगडून दाखवणाऱ्या आहेत.

३. मराठी कथेत पर्यावरण

लघुकथेतील निसर्गवर्णन याचे ग्रामीण व नागरी जीवनाशी नाते जोडले गेले. शंकर पाटील हे मराठीतील एक प्रसिद्ध कथाकार साठोत्तरी कालखंडात उदयास आलेल्या नवकथेचे शिलेदार ग्रामीण जीवन आणि गावगाड्यातील सामाजिक व आत्मिक संघर्ष यांचे यथार्थ चित्रांच्या कथांमधून आलेले आपल्याला पाहायला मिळते कोल्हापुरी भाषा महाराष्ट्र कर्नाटक सीमा भागातील

प्रादेशिक बोली भाषेचा वापर असलेल्या त्यांच्या कथा आजही लोकप्रिय व वाचनिय आहेत. यांच्या कथांमध्ये शेती, पाऊस, जमीन, पिके यांची हकीकत येते. पर्यावरणाशी जोडलेल्या ग्रामीण वास्तवाची झलक त्यांच्या लेखनात ठळक आहे. तसेच व्यंकटेश माडगूळकर यांच्या कथांमध्ये शेतकरी जीवनातील ओढाताण, दुष्काळ आणि पर्यावरणीय संकटे ही महत्वाची पाश्र्वभूमी आहे. माणसासोबतच त्यांनी हस्तराचा पाऊस, गावाकडच्या गोष्टी, माणदेशी माणसं यासारख्या पुस्तकांमध्ये निसर्ग आणि माणसाचा संबंध जवळून दाखवला आहे. गंगाधर गाडगीळ यांच्या नागरी कथांमध्ये प्रदूषण, शहरी जीवनाची घुसमट, आणि पर्यावरणाचा न्हास दिसतो.

मारुती चितमपल्ली यांच्या कथांमध्ये जंगल, पक्षी, वन्यजीव, झाडे यांचा सजीव संवाद आहे. त्यांनी जंगलाशी असलेले नाते केवळ साहित्यिक नाही तर शास्त्रीय निरीक्षणातूनही मांडले.

४. आदिवासी साहित्य आणि पर्यावरण

मराठी साहित्याचा विचार करत असताना आदिवासी साहित्य हे नव्याने उदयास आलेले दिसून येते. भारतीय समाजात आदिवासी समाज हा सर्वात निसर्गनिष्ठ आणि पर्यावरणाशी एकरूप झालेला घटक आहे. आदिवासींचे जीवनमान, संस्कृती, परंपरा, कला आणि श्रद्धा या सर्वांचा मूळ गाभा जंगल, नदी, डोंगर, झाडे, प्राणी-पक्षी यांच्याशी घट्ट जोडलेला आहे. आदिवासी जीवन म्हणजे 'निसर्गाशी तादात्म्य' असे वर्णन करता येईल. म्हणूनच आदिवासी साहित्य हे पर्यावरण अभ्यासासाठी महत्वाचे साधन ठरते.

आदिवासी लोकगीतांमध्ये शेती, पाऊस, नदी, वने, जनावरं यांचं गौरवपूर्ण वर्णन आढळतं. लग्नगीते, हरण ओव्या, निसर्गगीतं यातून निसर्ग देवतेप्रमाणे पूजला जातो. निसर्गातील प्रत्येक घटक आदिवासींसाठी पवित्र मानला जातो. उदाहरणार्थ, बैलपोळा, नागपंचमी, कडुलिंब पूजा इत्यादी उत्सवांमधून पर्यावरणाशी असलेलं नातं स्पष्ट होतं. आदिवासी साहित्य हे केवळ लोकपरंपरेपुरतं मर्यादित राहिलेलं नाही. आधुनिक मराठी आदिवासी साहित्यकारांनी देखील पर्यावरणाचा प्रश्न ठळकपणे मांडला आहे. नंदा खरे यांच्या उपसंहार या कादंबरीत औद्योगिकीकरणामुळे निसर्गाचा आणि ग्रामीण-आदिवासी जीवनाचा झालेला विध्वंस मांडलेला आहे. रामचंद्र जाधव यांच्या कथालेखनात जंगलतोड, जलविद्युत प्रकल्पांमुळे झालेलं विस्थापन दिसून येतं.

आदिवासी समाजाचा पर्यावरणाशी असलेला सहजीवनाचा संबंध विकासाच्या नावाखाली उद्ध्वस्त होत चालला आहे. खाणींचा विस्तार, धरणं, रस्ते, कारखाने या प्रकल्पांमुळे आदिवासी समाज त्यांच्या परंपरागत जंगलांपासून वंचित झाला आहे. त्यामुळे आदिवासी साहित्यामध्ये निसर्गाचे स्तवन जरी असले, तरी विस्थापन, शोषण आणि पर्यावरणीय हानी यांचे तीव्र स्वरही उमटले आहेत. समीक्षक शरणकुमार लिंबाळे यांच्या मते, "आदिवासी साहित्य हे फक्त सांस्कृतिक नव्हे तर पर्यावरणीय संघर्षाचं जिवंत दस्तऐवजीकरण आहे." त्यामुळे आदिवासी साहित्याचा अभ्यास केवळ समाजशास्त्रीय न राहता पर्यावरणशास्त्रीयही ठरतो.

अशा रीतीने, आदिवासी साहित्य हे पर्यावरणाशी एकरूप झालेलं असून निसर्गसंवर्धनाच्या दृष्टिकोनातून ते अत्यंत महत्वाचं आहे. आधुनिक साहित्यिक प्रवाहांत पर्यावरणचिंतेंसाठी आदिवासी साहित्य प्रेरणादायी ठरतं.

५. ललित लेखनातील पर्यावरण

ललित लेखन हा साठोत्तरी पर्यावरण संवेदनांचा महत्वाचा भाग ठरतो. ज्याप्रमाणे कथा कादंबऱ्या कविता यामध्ये पर्यावरणाचा विचार केलेला दिसून येतो त्याचप्रमाणे ललित लेखनामध्ये सुद्धा पर्यावरण आणि साहित्य यांचा जवळून संबंध दिसून येतो. मारुती चितमपल्ली यांनी रानवाटा, जंगलाची दुनिया, घरट्यापलीकडचे इ. पुस्तकांत जंगलातील बदलणारे ऋतू, पक्ष्यांचे जीवन, वन्यजीव आणि निसर्गातील सूक्ष्म बदल यांचे सूक्ष्म निरीक्षण केले. द. मा. मिरासदार यांच्या विनोदी लेखनातसुद्धा कधी कधी ग्रामीण पर्यावरणाशी असलेले नाते दिसते. शंकर पाटील यांच्या काळवंट मधून दुष्काळ, जमीन, पाण्याचा संघर्ष स्पष्ट होतो. ललित लेखनाच्या माध्यमातून वाचकांना निसर्गाची खरी ओळख पटवून देण्यात आली. अशाप्रकारे विविध लेखनाच्या माध्यमातून आपणास कळते की साठोत्तरी साहित्यामध्येही पर्यावरणाच्या दृष्टीने मोठ्या प्रमाणात लिखाण केलेलं आपण पाहिले.

समारोप

मराठी साहित्याने पर्यावरणाकडे पाहण्याची दृष्टी व्यापक केली. संतसाहित्यातील निसर्गप्रेम हे जरी तात्त्विक व अध्यात्मिक असले, तरी १९६० नंतरचे साहित्य वास्तववादी आणि समस्याभिमुख झाले. ग्रामीण जीवनातील दुष्काळ, पाणीटंचाई, जंगलतोड, औद्योगिकीकरणामुळे होणारे प्रदूषण, शहरी जीवनाची घुसमट, आणि जैवविविधतेचे संकट या सर्व गोष्टी साहित्यकारांनी शब्दबद्ध केल्या.

निष्कर्ष

१. साठोत्तरी कवितेत निसर्ग हा शेतकऱ्याच्या जगण्याचा भाग म्हणून ठळकपणे येतो.
२. कादंबरीत ग्रामीण-शहरी जीवनातील संक्रमणातून पर्यावरणीय प्रश्न प्रकट होतात.
३. लघुकथेत मानवी-निसर्ग नातं संवेदनशीलतेने चित्रित होतं.
४. ललित लेखनातून निसर्गाचे वैज्ञानिक व सौंदर्यदृष्टीने केलेले वर्णन समाजाला जागृत करते.

५.या साहित्यातून समाजात पर्यावरणीय जाणीव दृढ करण्याचे कार्य झालेले दिसते.

६.पर्यावरण विषय साहित्याचा भाग झाल्यामुळे वाचकांमध्ये पर्यावरण-जाणीव रुजली.

संदर्भ

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- २.भालचंद्र नेमाडे – हिंदू, लोकवाङ्मय गृह, मुंबई.
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- ९.गो. म. कुलकर्णी – साहित्य व समाज

मानवी आरोग्यासाठी पर्यावरणाचे महत्त्व: एक दृष्टीक्षेप

प्रा. डॉ. चंद्रकांत गजेवाड

कै. मधुकरराव बापूराव पाटील खतगावकर कला वाणिज्य विज्ञान महाविद्यालय, शंकरनगर. ता. बिलोली जि.नांदेड

प्रस्तावना

पर्यावरणाची मानवी जीवनात अनन्यसाधारण महत्त्व आहे. पर्यावरणात काही मूलभूत घटक आहेत हवा, पाणी, भूमी, वृक्ष, ध्वनी नैसर्गिक वातावरणातील ऋतुमानानुसार होत असलेले बदल ही सर्व घटक समाविष्ट आहेत. याचा अनुकूल परिणाम हा मानवी जीवनाला सशक्त करण्यासाठी उपयुक्त आहेत, परंतु जर सभोवतालच्या वातावरणातील प्रतिकूल परिस्थितीजन्य बदल झाले तर याचा घातक परिणाम मानवी जीवनावर झाल्याशिवाय राहत नाही. विज्ञान आणि तंत्रज्ञान या क्षेत्रात होत असलेली प्रचंड प्रगती लक्षात घेता याचा पर्यावरणावर खूप मोठा प्रतिकूल परिणाम होताना दिसून येत आहेत. मानवी जीवनासाठी पर्यावरणात्मक घटकांची मोलाची भूमिका असते तथापि मानवाच्या हव्यासापोटी जंगलतोड, वाढते प्रदूषण, हवामान बदल, वाढती कारखानदारी, टाकाऊ पदार्थ रासायनिक युक्त पाणी यामुळे पर्यावरणाच्या न्हास होत आहे. केवळ मानवाच्याच नव्हे तर पृथ्वीवरील सर्व सजीवांच्या अस्तित्वासाठी पर्यावरणाचे रक्षण करणे गरजेचे आहे. कारण मानवी आरोग्यासाठी पर्यावरणाचे महत्त्व आहे.

मनुष्याला सर्वांगीण विकास करावयाचा असेल तर त्यांनी पर्यावरणाचा समतोल राखणे गरजेचे आहे. याच पर्यावरणावर आरोग्य आणि मानवी जीवन अवलंबून असते. पर्यावरणाच्या असंतुलनात लोकसंख्या वाढ, वृक्षतोड, औद्योगिकीकरण, वाढते शहरीकरण या कारणामुळे पर्यावरणाची संतुलन बिघडत चालले आहे हे तितकेच खरे आहे. मानवी जीवनाचा मूलभूत घटकांमध्ये शुद्ध अन्न, पाणी, हवा आणि आरोग्य समावेश याचा समावेश होतो. या घटकांच्या शुद्धतेवर मानवी आरोग्य अवलंबून आहे. सभोवतालचे पर्यावरण तेथील मानवी जीवनाची समृद्धी दाखवून देत असतो. साधारणपणे विचार केला तर भारतीय ऋतू चक्राप्रमाणे निसर्गात होत चाललेले बदल यावर चिंतन करणे गरजेचे आहे. पर्यावरणावर मानवी अतिक्रमण वाढत जात आहे. याचाच परिणाम सध्याच्या मानवी जीवनावर होत असताना दिसून येतो, म्हणूनच पर्यावरणाची मानवी जीवनात अत्यंत मोलाचे योगदान आहे.

संशोधनाची उद्दिष्टे

- 1) मानवी आरोग्य आणि पर्यावरण याचा समतोल अभ्यासणे 2) मानवी आरोग्यासाठी पर्यावरणाचे महत्त्व विचारात घेणे 3) पर्यावरणाचे मानवी आरोग्यावरील परिणामाचा अभ्यास करणे

गृहीतके:

- 1 मानवी आरोग्यात पर्यावरणाचे महत्त्व आहे
- 2 मानवी आरोग्यावर पर्यावरणाचे परिणाम होतात.

संशोधन पद्धती

प्रस्तुत संशोधन कार्यासाठी संशोधन पद्धतीतील विश्लेषणात्मक संशोधन पद्धतीचा उपयोग करण्यात आला आहे. यामध्ये दुर्यम माहिती या स्रोताचा उपयोग केला आहे. यामध्ये वृत्तपत्रे, मासिके, शोधनिबंध, संदर्भग्रंथ, इत्यादी घटकांचा वापर करण्यात आला आहे.

मानवी आरोग्य आणि पर्यावरणाचा समतोल:

मानवी आरोग्य ही पर्यावरणावर अवलंबून असते. जसे पर्यावरण असेल तसे मानवी आरोग्य असते. निसर्गातील हवा, पाणी, जमीन, भूभाग यानुसार पर्यावरणातील बदल होत असतात. भौगोलिक पर्यावरणातील घटक हे त्या ठिकाणाच्या

मानवी आरोग्याची क्षमता निश्चित करत असतात पर्यावरण आणि मानवी आरोग्याच्या विशिष्ट असा समतोल आहे. मनुष्य शुद्ध पर्यावरणात सुदृढ व निरोगी असतो तर प्रदूषित पर्यावरणामुळे तो आजारी होतो. लोकसंख्या वाढ, वृक्षतोड, औद्योगिकरण, नागरिकरण या मनुष्याने निसर्गाची संतुलन बिघडवली हे तितकेच सत्य आहे. जसे पर्यावरण असेल त्यानुसार तेथील मानवी आरोग्य राहत असते म्हणूनच मानवी आरोग्यात पर्यावरणाचे महत्त्व राहिले आहे.

मानवी आरोग्यासाठी पर्यावरणाचे महत्त्व:

पर्यावरण आणि मानवी आरोग्य हे एकमेकांशी संबंधित आहेत. मानवी आरोग्याच्या सुदृढतेसाठी आणि आरोग्यमय जीवन जगण्यासाठी प्रदूषण मुक्त पर्यावरण असणे आवश्यक आहे. पर्यावरणशास्त्र एक जागतिक विज्ञान म्हणून कार्य करत आहे. यामध्ये आरोग्याच्या दृष्टीने अनेक बदल, नवीन संशोधन, औषधी वनस्पती, हवा शुद्धता, प्रदूषणाची मुक्तता यासारख्या क्षेत्रात संशोधन होत आहेत पर्यावरणाचा मानवी जीवनात गरजा भागविण्यासाठी खूप मोठा फायदा आहे म्हणूनच निसर्गाचे रक्षण केली पाहिजे जेणेकरून पर्यावरणाचा ऱ्हास होणार नाही. औद्योगिक क्षेत्रात वातावरणात सोडल्या जाणाऱ्या वायुवर नियंत्रण ठेवणे आवश्यक आहे कारण अनियंत्रित वायू प्रदूषण उत्सर्जित करतात यामुळे मानवी आरोग्याला धोका पोहोचू शकतो. शुद्ध हवा हीच मानवी आरोग्यासाठी अत्यंत आवश्यक आहे म्हणूनच शारीरिक व भौगोलिक शुद्धतीसाठी पर्यावरणाचे योगदान मानवी आरोग्यासाठी राहिले आहे.

जागतिक आरोग्य संघटनेने असे म्हटले आहे की, स्वच्छ हवा, स्थिर हवामान, पुरेसे पाणी, स्वच्छता आणि रसायनाचा सुरक्षित वापर, किरणोत्सर्गापासून संरक्षण, निरोगी आणि सुरक्षित कामाची ठिकाण, चांगल्या शेती पद्धती, आरोग्यासाठी सहाय्य करणारी औद्योगिक वसाहत, शहरे आणि संरक्षित निसर्ग या सर्व बाबी मानवी आरोग्यासाठी महत्त्वाची आहेत. 1993 च्या "सिक्स सिटीज" अभ्यासात असे दिसून आले आहे की, कणाच्या व धुळीच्या संपर्कात आल्याने फुफुसाचा कर्करोग आणि हृदय रोगामुळे व्यक्तीचा मृत्यू होऊ शकतो हा धोका निदर्शनास आलेला आहे.

सार्वजनिक आरोग्यासाठी सुरक्षित पिण्याचे पाणी आणि आरोग्यासाठी योग्य सांडपाणी व स्वच्छता या सुविधा अत्यंत महत्त्वाच्या आहेत. पर्यावरणातील सुरक्षा आणि पर्यावरण संवर्धन रासायनिक पदार्थांचा अत्यल्प वापर, कीटकनाशकाचा कमी वापर, नैसर्गिक व सेंद्रिय शेती पासून खाद्य निर्मिती याबाबत समाजामध्ये जाणीव जागृती करणे गरजेचे आहे. याच्या अभावामुळेच मानवी आयुष्यमान कमी होत असताना दिसून येत आहे.

मानवी आरोग्यावर परिणाम:

वाढते तापमान उष्णतेच्या लाटा जंगलातील आग दुष्काळ पूर भूस्खलन चक्रीवादळ यासारख्या समस्या पर्यावरणाच्या असंतुलनामुळे निर्माण होत आहे या समस्येमुळे शेती शेतातील कमी उत्पन्न मानवी जीवनातील जैविक आजारांचे प्रसारण दूषित हवा असे अनेक परिणाम मानवी आरोग्यावर होताना दिसून येतात अवेळी निसर्गात होत असलेले बदल हेच मानवी जीवनावर प्रतिकूल परिणाम करत असतात. अशुद्ध हवा, पाणी यामुळे कित्येक आजार निर्माण होत आहेत. पर्यावरणातील असंतुलनामुळे होत असलेल्या प्रदूषित वातावरणामुळे मानवी आयुष्यमान देखील घटत चालले आहे.

वायु प्रदूषणाचा मानवी आयुष्यमानावरील परिणाम

जगभरात वायू प्रदूषणामुळे सरासरी आयुर्मान 2.2 वर्षांनी कमी होत आहेतसेच दररोज जवळजवळ 2000 मुलं वायू प्रदूषणामुळे मरण पावतात. तसेच आरोग्यावरील परिणाम उत्पादकता कमी होणे यामुळे आयुर्मान कमी होणे तसेच जागतिक सकल राष्ट्रीय उत्पन्नात 5 टक्के घट होताना दिसून येते. जगभरातील 85% वायू प्रदूषण जीवाश्म इंधन आणि बायोमास जाळण्यामुळे होते, त्यामुळे वायू प्रदूषण कमी करण्यासाठी शासन स्तरावर व औद्योगिक क्षेत्रातील समूहावर वायु शुद्धीकरणाचे निर्बंध असणे महत्त्वाचे आहेत. जेणेकरून वायू प्रदूषणाचा मानवी आरोग्यावर होणारा परिणाम टाळता येईल.

सारांश

मानवी उत्पत्तीच खऱ्या अर्थाने निसर्गाच्या सानिध्यात झालेली आहे. पर्यावरणातील सर्व घटक हे मानवी जीवन सुदृढ

करण्यासाठी उपयुक्त आहेत. प्रत्येक प्रांतात तेथील पर्यावरणानुसार व भौगोलिक वातावरणांनुसार जीवनमान घडत असते, म्हणूनच पर्यावरणाची संतुलन काळाची गरज बनली आहे. मानवी आरोग्य सुरक्षित व निरोगी राहण्यासाठी सर्वच स्तरावरून विविध संस्थांच्या माध्यमातून प्रबोधन, कार्यशाळा, चर्चासत्र, समाज प्रबोधन अशा माध्यमातून पर्यावरणाची संवर्धन करणे काळाची गरज बनली आहे.

संदर्भग्रंथ:

1. श्री नवनाथ गोरे; पर्यावरण आणि विकास, सह्याद्री प्रकाशन, पुणे.
2. श्री अभिजीत; घोरपडे गाथा पर्यावरणाची, निराली प्रकाशन, औरंगाबाद.
3. अब्दुल मलिक; पर्यावरण आणि मानवी आरोग्य,
4. प्रदीप आगलावे; भारतीय समाज प्रश्न आणि परिवर्तन, साईनाथ प्रकाशन, नागपूर .
5. प्रवीण सप्तर्ष; भूगोल व नैसर्गिक आपत्ती , विधा प्रकाशन पुणे .
6. जितेंद्र अहिरराव; पर्यावरण विज्ञान, निराली प्रकाशन औरंगाबाद.
7. पी.पी मराठे ; कृतीबद्ध आपत्ती व्यवस्थापन; डायमंड पब्लिकेशन.

कृतीतून पर्यावरणाचा मंत्र: संत गाडगे महाराजांचे साहित्य आणि स्वच्छतेचे तत्त्वज्ञान

पाटील शीतल अविनाश

संशोधिका, सामाजिक शास्त्रे संकुल, स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

सारांश (Abstract):

संत गाडगे महाराज हे महाराष्ट्राच्या संत परंपरेतील एक अद्वितीय व्यक्तिमत्त्व होते, ज्यांनी अध्यात्माच्या जोडीने सामाजिक परिवर्तन आणि पर्यावरणीय जागरूकतेचे कार्य हाती घेतले. त्यांच्या कीर्तनात केवळ भक्ती किंवा धार्मिक उपदेश नव्हते, तर स्वच्छता, श्रम, शिक्षण, करुणा आणि पर्यावरण संवर्धन यांचा ठोस संदेश होता. त्यांनी "श्रम हीच पूजा", "स्वच्छता हीच सेवा", आणि "पर्यावरण हीच देवता" ही मूल्यं आचरणात आणून समाजाला कृतीतून शिकवले. या शोध निबंधात त्यांच्या साहित्याचा आणि कृतीचा सखोल अभ्यास करून पर्यावरण रक्षणाचा प्रभावी संदेश उलगडून दाखवला आहे.

महत्वाचे शब्द: कृती, पर्यावरण, मंत्र, संत गाडगे महाराज, साहित्य, स्वच्छता, तत्त्वज्ञान

प्रस्तावना

पर्यावरणाच्या रक्षणाची गरज ही आधुनिक काळातील सर्वात गंभीर आणि ज्वलंत समस्यांपैकी एक मानली जाते. गेल्या काही दशकांमध्ये मानवी हस्तक्षेपामुळे नैसर्गिक समतोल बिघडत चालला आहे. वाढते औद्योगिकीकरण, रासायनिक खतांचा आणि कीटकनाशकांचा अतिरेकी वापर, प्लास्टिक प्रदूषण, जंगलतोड, पाण्याचे आणि हवेचे प्रदूषण, तसेच नैसर्गिक संसाधनांचा अंधाधुंद ऱ्हास यामुळे पृथ्वीवरील जैवविविधतेला अभूतपूर्व धोका निर्माण झाला आहे. याशिवाय हवामान बदलामुळे अनियमित पर्जन्यमान, उष्णतेच्या लाटा, चक्रीवादळे, दुष्काळ आणि पूर यांसारख्या तीव्र नैसर्गिक आपत्तींची तीव्रता व वारंवारता वाढली आहे. परिणामी मानवी जीवन, प्राणीजीवन आणि वनस्पती जीवनाचा अस्तित्व संकटात आला आहे.

अशा परिस्थितीत, पर्यावरण संवर्धनाचे तत्त्वज्ञान केवळ वैज्ञानिक किंवा तांत्रिक अभ्यासापुरते मर्यादित राहू नये, तर ते सामाजिक, सांस्कृतिक आणि आध्यात्मिक जीवनात रुजविणे अत्यंत आवश्यक आहे. यासाठी आपल्या संत साहित्याचा अभ्यास फार महत्वाचा ठरतो. संत साहित्य हे केवळ धार्मिक किंवा आध्यात्मिक विचारांचे प्रतिबिंब नसून, ते समाजहित, निसर्गप्रेम, स्वच्छता, आणि मानवतावादी मूल्ये जोपासणारे विचारमूल्यांचे भांडार आहे.

विशेषतः संत गाडगे महाराज यांचे साहित्य, विचार आणि कृती हे पर्यावरण रक्षण आणि संवर्धनाच्या दृष्टीने आदर्शवत आहेत. त्यांनी आपल्या कीर्तन, प्रवचन, आणि प्रत्यक्ष कृतीतून स्वच्छता, साधेपणा, अनाठाई दिखावा टाळणे, पाणी वाचविणे, आणि संसाधनांचा विवेकपूर्ण वापर यावर भर दिला. गाडगे महाराजांची कार्यपद्धती ही फक्त उपदेशापुरती मर्यादित नव्हती, तर त्यांनी स्वतः झाडू घेऊन रस्ते साफ करणे, विहिरी व तलावांची स्वच्छता करणे, आणि सार्वजनिक ठिकाणी स्वच्छतेचे महत्त्व पटवून देणे यांसारखी कृती प्रत्यक्ष केली.

आजच्या काळात पर्यावरणीय संकटाच्या पार्श्वभूमीवर संत गाडगे महाराजांचे विचार अधिकच सुसंगत ठरतात. त्यांचे तत्त्वज्ञान केवळ पर्यावरण संवर्धनासाठी मार्गदर्शक नसून, समाजाच्या सर्वांगीण विकासासाठीही प्रेरणादायी आहे. त्यामुळे संत साहित्यातील पर्यावरणीय तत्त्वज्ञानाचा आणि विशेषतः गाडगे महाराजांच्या विचारांचा अभ्यास हा केवळ साहित्यिक दृष्टिकोनातूनच नव्हे, तर पर्यावरण विज्ञान, समाजशास्त्र आणि सांस्कृतिक अभ्यासाच्या दृष्टीनेही अत्यंत महत्वाचा ठरतो.

संत गाडगे महाराज: संक्षिप्त परिचय

- जन्म: 23 फेब्रुवारी 1876, शेंडगाव, (अमरावती जिल्हा)
- खरे नाव: देबूजी झिंगराजी जानोरकर
- मृत्यु: 20 डिसेंबर 1956, वलगाव, (अमरावती जिल्हा)

गाडगे महाराज हे आधुनिक काळातील कृतीशील संत होते. ते धार्मिक कर्मकांडापेक्षा प्रत्यक्ष सेवा आणि सामाजिक सुधारणांवर भर देणारे होते. त्यांनी कीर्तनाच्या माध्यमातून समाजाला जागृत केले, आणि कीर्तन झाल्यावर स्वतः झाडू घेऊन सार्वजनिक ठिकाणी साफसफाई करत समाजात पर्यावरणाबद्दल संवेदनशीलता निर्माण केली.

गाडगे महाराजांचे कीर्तन साहित्य: एक सामाजिक आरसा

गाडगे महाराजांचे कीर्तन हे केवळ धार्मिक कार्यक्रम किंवा आध्यात्मिक साधना नसून, ते लोकप्रबोधन, नैतिक शिक्षण आणि सामाजिक जागृतीचे प्रभावी व व्यापक माध्यम होते. त्यांच्या कीर्तनांमध्ये धार्मिक ग्रंथांची मांडणी असली, तरी ती केवळ अध्यात्मापुरती मर्यादित न राहता, समाजातील वास्तव, समस्या, आणि त्यावरील उपाय यांचा थेट व स्पष्ट ऊहापोह होत असे. त्यामुळे त्यांचे कीर्तन हे त्या काळातील समाजाचे जणू आरसेच होते, ज्यात लोकांना स्वतःच्या चुका, अंधश्रद्धा आणि अन्याय दिसून येत.

गाडगे महाराजांच्या कीर्तनांतील प्रमुख मुद्दे समाजाच्या सर्वांगीण प्रगतीसाठी उपयुक्त होते. त्यांनी स्वच्छता आणि आरोग्य यावर विशेष भर दिला. गाव स्वच्छ ठेवणे, विहिरी, तलाव, आणि सार्वजनिक ठिकाणांची साफसफाई करणे ही त्यांची कार्यपद्धती होती. त्याचबरोबर अंधश्रद्धा निर्मूलन हाही त्यांचा मुख्य ध्यास होता; निरर्थक विधी, अनाठायी खर्च, आणि मूढ परंपरांविरुद्ध ते निर्भीडपणे बोलत.

शिक्षणाचे महत्त्व हे गाडगे महाराज नेहमीच अधोरेखित करत. त्यांच्या मते, समाजातील अज्ञान, गरीबी आणि विषमता दूर करण्यासाठी शिक्षण हेच प्रमुख साधन आहे. त्यांनी **श्रमप्रतिष्ठा** म्हणजेच श्रमाचे महत्त्व लोकांना पटवून दिले, कारण त्यांच्या मते प्रत्यक्ष श्रमाशिवाय स्वावलंबन शक्य नाही. पर्यावरणाच्या दृष्टीने त्यांनी पर्यावरण रक्षण या संकल्पनेलाही लोकांमध्ये रुजविले — पाणी वाचविणे, झाडे लावणे, आणि निसर्गाशी सुसंवाद ठेवणे यावर त्यांनी भर दिला. त्याचबरोबर प्राणीमात्रांवर दया हा मानवी मूल्यांचा अत्यंत महत्त्वाचा भाग असल्याचे त्यांनी स्पष्ट केले.

उदाहरणार्थ, एका कीर्तनात त्यांनी स्पष्ट सांगितले: "देव देव करायचं बंद करा, आधी गाव झाडा! मंदीरात नाही, मनात देव शोध!" या वाक्यातून गाडगे महाराजांनी लोकांना दिलेला संदेश अत्यंत स्पष्ट आहे — खरी ईश्वर सेवा म्हणजे निसर्ग आणि समाजाची सेवा. त्यांनी प्रत्यक्ष कृतीतून दाखवून दिले की समाजहित, पर्यावरण संवर्धन आणि मानवी मूल्ये जोपासणे हेच खरी भक्ती आणि धर्माची खरी ओळख आहे.

स्वच्छता आणि पर्यावरण: संत गाडगे महाराजांचे तत्त्वज्ञान

संत गाडगे महाराजांच्या कार्यपद्धतीत आणि विचारांत स्वच्छतेला अत्यंत महत्त्वाचे स्थान होते, आणि ही स्वच्छतेची संकल्पना केवळ आरोग्यापुरती मर्यादित न राहता पर्यावरण रक्षणाशीही घट्ट जोडलेली होती. त्यांच्या मते, ज्या समाजात स्वच्छतेला प्राधान्य दिले जाते, तेथे रोगराई कमी होते, माणसांमध्ये शिस्त व जबाबदारीची भावना निर्माण होते आणि नैसर्गिक साधनसंपत्तीचे योग्य रक्षण होते.

गाडगे महाराजांनी वारंवार लोकांना उपदेश केला की सार्वजनिक ठिकाणे स्वच्छ ठेवणे ही प्रत्येकाची सामूहिक जबाबदारी आहे. गावातील रस्ते, चौक, शाळा, देवळाभोवतालची जागा, बाजारपेठ — ही सर्व ठिकाणे कचरामुक्त असावीत, कारण अस्वच्छता ही रोगांचे मूळ कारण आहे. त्यांनी गटारे, विहिरी आणि पाणवठे स्वच्छ ठेवण्याचे महत्त्व लोकांना पटवून दिले. पिण्याचे पाणी हे आरोग्याचा पाया असल्याने त्यात कोणत्याही प्रकारची घाण किंवा दूषित पदार्थ मिसळणे हे पाप आहे, असे ते ठामपणे सांगत. यात्रास्थळांवर स्वच्छता पाळणे हा देखील त्यांच्या उपदेशाचा महत्त्वाचा भाग होता. ते म्हणत की "यात्रास्थळी गटारदुखी नको, तिथेही स्वच्छता पाळा", कारण पवित्र स्थळे केवळ धार्मिक विधींसाठी नसतात, तर ती सामाजिक आणि सांस्कृतिक एकात्मतेचे केंद्र असतात.

पर्यावरण संवर्धनाच्या दृष्टीने गाडगे महाराजांनी झाडे लावण्यास आणि निसर्गाची पूजा करण्यास प्रोत्साहन दिले. त्यांच्या दृष्टीने निसर्ग हा देवाचा मूर्त रूप होता, त्यामुळे निसर्गाचे रक्षण हेच खरी पूजा आहे. त्यांनी स्पष्टपणे सांगितले की "स्वच्छतेशिवाय देव सापडत नाही", ज्यातून त्यांचा संदेश स्पष्ट होतो — स्वच्छता ही केवळ आरोग्याची हमी नसून ती एक आध्यात्मिक मूल्य आणि पर्यावरणीय जबाबदारी आहे. अशा प्रकारे, गाडगे महाराजांचे तत्त्वज्ञान आजच्या पर्यावरणीय संकटाच्या काळात अधिक सुसंगत वाटते. त्यांच्या विचारांतून आपल्याला कळते की स्वच्छता आणि पर्यावरण रक्षण ही दोन्ही गोष्टी परस्परांशी जोडलेल्या आहेत आणि त्या पाळल्याशिवाय समाजाचा खरा विकास साधता येत नाही.

कृतीशील पर्यावरण शिक्षण: गाडगे महाराजांचा अनोखा मार्ग

गाडगे महाराजांनी आपल्या कार्यातून दाखवून दिले की, पर्यावरणाचे संवर्धन केवळ भाषणातून किंवा लेखातून होत नाही, तर प्रत्यक्ष कृतीतूनच त्याची खरी जपणूक होते. त्यांनी कीर्तन, प्रवचन किंवा धार्मिक कार्यक्रमांनंतर केवळ उपदेश न करता

थेट झाडू हातात घेतली आणि सार्वजनिक ठिकाणे स्वच्छ करण्याचे काम केले. ही कृती लोकांसाठी जणू जिवंत धडा ठरली. स्वच्छता ही देवपूजेइतकीच पवित्र आहे, हा संदेश त्यांच्या प्रत्येक कृतीतून स्पष्ट दिसत होता.

मंदिरांच्या उभारणीपेक्षा शाळा, वसतिगृह आणि विद्यार्थ्यांसाठी उपयुक्त सुविधा उभारणे अधिक महत्वाचे आहे, असा त्यांचा ठाम विश्वास होता. त्यामुळे त्यांनी अनेक ठिकाणी शैक्षणिक संस्था निर्माण केल्या. त्यांना वाटत होते की, शिक्षणच समाजाला अंधश्रद्धा, मागासलेपणा आणि पर्यावरणावरील अन्याय यापासून मुक्त करू शकते.

गाडगे महाराजांनी अंधश्रद्धा, कर्मकांड आणि अयोग्य धार्मिक प्रथांना ठाम विरोध केला. त्यांनी लोकांना प्रगतीशील, वैज्ञानिक आणि पर्यावरणस्नेही विचारसरणीकडे वळवले. त्यांच्या कीर्तनांमध्ये केवळ धार्मिक गोष्टीच नव्हत्या, तर स्वच्छता, पाण्याची बचत, वृक्षसंवर्धन आणि संसाधनांचा योग्य वापर यांसारख्या विषयांवरही भर असे.

पर्यावरणपूरक जीवनशैली स्वीकारणे हेच भविष्यातील पिढ्यांसाठी सर्वात मोठे दान आहे, असा त्यांचा संदेश होता. साधेपणा, स्वावलंबन आणि निसर्गाशी सुसंगत राहण्याची शिकवण त्यांनी आपल्या जीवनातूनच दिली. आजच्या काळात, जेव्हा पर्यावरणीय संकट अधिक तीव्र होत आहे, गाडगे महाराजांचा हा कृतीशील दृष्टिकोन शाश्वत विकासासाठी आणि जनजागृतीसाठी मार्गदर्शक ठरतो.

संत साहित्य, हरित दृष्टी आणि समकालीन सुसंगती

संत परंपरेत निसर्गपूजा, निसर्गसंवर्धन व पर्यावरणीय समतोल यांना सदैव मानाचे स्थान आहे. संतांची दृष्टि केवळ अध्यात्मिक उन्नतीपुरती मर्यादित नव्हती, तर ती जीवनाच्या सर्व क्षेत्रांवर – विशेषतः निसर्गाशी असलेल्या मानवी नात्यांवर – खोलवर प्रकाश टाकणारी होती. संत तुकाराम महाराजांनी आपल्या अभंगांत स्पष्टपणे म्हटले आहे: "वृक्षवल्ली आम्हा सोयरे वनचरे"

ही ओळ फक्त काव्यात्मक अलंकार नाही, तर मानवी जीवनाच्या मूलभूत तत्त्वज्ञानाची घोषणा आहे. यातून निसर्गातील प्रत्येक घटकाबद्दल आत्मीयता, स्नेह व जबाबदारीची जाणीव व्यक्त होते. संतांच्या दृष्टीने निसर्ग हा केवळ भौतिक संपत्तीचा साठा नसून, तो जीवनाचा सहचर, सहनिर्माता आणि आध्यात्मिक साधनेसाठी प्रेरणास्त्रोत होता.

गाडगे महाराज या परंपरेचे आधुनिक काळातील खरे प्रतिनिधी होते. त्यांच्या वाणी, कीर्तन, प्रवचन, तसेच त्यांच्या प्रत्यक्ष कृतींमधून निसर्गप्रेम, स्वच्छता, प्रदूषणमुक्ती आणि पर्यावरणीय संतुलन यांसारखी मूल्ये समाजात रुजवली गेली. गाडगे महाराजांनी यात्रास्थळे, गावातील रस्ते, सार्वजनिक विहिरी, तलाव यांची स्वच्छता केली, कचरा व घाण दूर केली आणि लोकांना "पर्यावरणाची काळजी घेणे ही आपली नैतिक व सामाजिक जबाबदारी आहे" हे पटवून दिले. त्यांची पर्यावरणीय दृष्टी फक्त स्वच्छतेपुरती मर्यादित नव्हती. त्यांनी पाणी वाचवणे, नैसर्गिक साधनसंपत्तीचा संयमी वापर, झाडांचे संरक्षण आणि सार्वजनिक ठिकाणांची निगा राखणे या गोष्टींवर भर दिला. गाडगे महाराजांचे जीवन हे पर्यावरणीय नैतिकतेचे सजीव उदाहरण होते.

निष्कर्ष

संत गाडगे महाराज हे विसाव्या शतकातील समाजसंस्कृती परिवर्तनाचे अद्वितीय पुरस्कर्ते होते. त्यांनी केवळ धार्मिक उपदेशापुरते मर्यादित न राहता प्रत्यक्ष कृतीतून समाजाला मार्गदर्शन केले. त्यांच्या कार्यात स्वच्छता, पर्यावरण संवर्धन, श्रमप्रतिष्ठा आणि सामाजिक समता यांचे अद्वितीय संगम आढळतो. ते मानत की स्वच्छ परिसर, स्वच्छ जलस्रोत आणि प्रदूषणमुक्त वातावरण हीच खरी ईश्वरी उपासना आहे. यात्रास्थळे, गावे आणि शहरी भागात त्यांनी प्रत्यक्ष झाडू हातात घेऊन लोकांना जागृत केले, ही बाब त्यांच्या पर्यावरण-जागरूकतेची प्रखर साक्ष देते.

संत साहित्याच्या परंपरेत गाडगे महाराजांचे योगदान हे केवळ अध्यात्मिक नव्हे, तर शाश्वत विकासाच्या संकल्पनेशीही निगडीत आहे. त्यांचा दृष्टिकोन हा पर्यावरण संरक्षणाला केवळ कर्तव्य म्हणून नव्हे, तर जीवनमूल्य म्हणून स्वीकारण्याचा होता. या अर्थाने त्यांना 'हरित संत' म्हणून गौरवणे ही काळाची गरज आहे. त्यांच्या विचारांचा अभ्यास आजच्या हवामान बदल आणि पर्यावरणीय संकटांच्या पार्श्वभूमीवर अधिकच महत्वाचा ठरतो.

अशा संतांचा आदर्श अंगीकारल्यास, पर्यावरण संवर्धन हे केवळ धोरणात्मक किंवा तांत्रिक उपक्रम न राहता समाजजीवनातील एक सजीव आणि नैतिक संस्कार बनू शकतो. म्हणूनच, संत गाडगे महाराजांचा जीवनमंत्र — "स्वच्छता हीच सेवा, पर्यावरणसंवर्धन हीच साधना" — आजही तितकाच प्रेरणादायी आणि मार्गदर्शक आहे.

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अनुराधा पाटील यांच्या कवितेतील निसर्ग प्रतिमा

प्रा. डॉ. रवींद्र कांबळे

मराठी विभाग, श्री. एम.डी. शाह महिला महाविद्यालय मालाड पश्चिम मुंबई

मराठी साहित्यात एक महत्त्वपूर्ण योगदान देणाऱ्या कवयित्री म्हणजे अनुराधा पाटील होय. त्यांच्या काव्य प्रतिभेचा प्रत्यय त्यांच्या विविध कविता संग्रहाच्या माध्यमातून येतो. त्यांच्या कविता या स्त्री मनाचे प्रतिबिंब तर व्यक्त करतातच. पण त्याचबरोबर मनातील सहवेदना, निसर्गातील विविध अनुभव, निसर्गाचे विविध रूप अगदी त्या सहजपणे आपल्या कवितेच्या माध्यमातून व्यक्त करताना दिसून येतात. अनुराधा पाटील या खानदेशातील जळगाव जिल्ह्यामधील पहुर या गावच्या आहेत. शेतकरी कुटुंबातील असल्याने सहाजिकच त्यांच्या मनावर कृषी जीवनाचा, निसर्गाचा, खूप मोठा प्रभाव पडलेला आहे आणि त्यामुळेच त्यांच्या काव्यामध्ये लेखनामध्ये निसर्गाची एक वेगळी जाणीव कवितेच्या माध्यमातून व्यक्त होताना दिसून येते.

दिगंत, तरीही, दिवसेंदिवस, वाळूच्या पात्रात मांडलेला खेळ हे त्यांचे काही कवितासंग्रह अतिशय प्रसिद्ध आहेत. दिगंत हा त्यांचा पहिला कवितासंग्रह. या कवितासंग्रहात त्यांनी आपल्या जाणिवा, आपले भावविश्व सुंदर पद्धतीने व्यक्त केलेले आहे. परंतु त्यानंतर त्यांचे पुढील कविता संग्रह अतिशय प्रगल्भ होत गेलेले आपल्याला दिसून येतात. सुरुवातीच्या काही कवितांमध्ये नवखेपणा जाणवतो. पण नंतरच्या कवितासंग्रहांमध्ये ती जाणीव अधिक समृद्ध होत गेलेली दिसून येते. कवितेतील भाव, प्रतिमा, शैली, अभिव्यक्ती, आशय अशी विविध वैशिष्ट्ये त्यांच्या कवितेत अगदी स्पष्टपणे उठावदार झालेले दिसून येतात. कवितेच्या माध्यमातून त्या स्त्री मनाचे दर्शन तर घडवतातच. त्याचबरोबर त्या स्व स्वताशी संवाद साधताना दिसतात. त्याला त्या काव्यात्म चिंतनाची जोड देतात आणि हे करत असताना त्याला त्यांनी निसर्गाची अगदी बरोबर जोड दिलेले आहे. निसर्गातील प्रतिमा, प्रतीकांच्या सहाय्याने त्या आपल्या भावना व्यक्त करताना दिसून येतात.

अनुराधा पाटील यांची कविता ही व्यवहारिक सुखदुःखाच्या पलीकडे झेपावणारी आहे. फक्त ती दुःख कुरवाळत बसत नाही. तर ती दुःखाचा शोध घेण्याचा प्रयत्न करते. त्यातून ती बाहेर पडण्याचा प्रयत्न करते. इथे प्रत्येकाला संघर्ष करावा लागतो. म्हणून त्या आपले दुःख कुरवाळत बसत नाहीत. तर त्यातून त्या बाहेर पडताना दिसून येतात. म्हणूनच त्यांची कविता ही येथील प्रत्येक घटकाचे प्रतिनिधित्व करताना दिसते.

दिगंत हा त्यांचा पहिला कवितासंग्रह. दिगंत म्हणजे दिशेच्या अंतिम टोकापर्यंत म्हणजेच जीवनाच्या अंतिम टोकापर्यंत जो प्रवास करावा लागतो. त्याचे प्रतिबिंब त्यांच्या कविता संग्रहातून अधोरेखित होते. जीवनाला प्रवाहित करण्यासाठी ज्या वाटा शोधाव्या लागतात, ज्या गोष्टी साठी संघर्ष करावा लागतो त्याचे चित्र त्यांच्या कवितेतून पाहायला मिळते. म्हणून जीवनाच्या या व्यथित व प्रामाणिक, शोकात्म अनुभवाची कारणे त्या या निसर्गाच्या प्रतिमांच्या माध्यमातून व्यक्त करताना दिसतात. त्या म्हणतात..

“पालवी फुटावी स्वप्नांना असा तू डोळ्यात बुडत जाणारा

उजळत जाताहेत दिशादिशा पाऊस आभाळभर झालेला” दिगंत

पावसाशिवाय मातीचे अस्तित्व असत नाही आणि रुजल्या शिवाय कोंब हि येत नाही. बी मातीत रुजणे, पालवी फुटणे याचा संदर्भ त्या या कवितेतून देतात त्यापुढे म्हणतात..

“माझ्या मातीच्या हातात जळतात, हिरवे फुलारलेले मोहोळ” दिगंत

मनाच्या वेदना कशा खोलवर रुजलेल्या असतात आणि त्याची आठवण कशी सतत येत राहते याची जाणीव करून देणारी ही कविता आहे. जीवनाचे प्रतिबिंब करताना त्यांनी वर्तमानकाळ आणि भूतकाळ यांचा सुंदर मेळ साधलेला आहे. पावसाचे आणि विविध ऋतूंच्या माध्यमातून आपल्या कविता त्यांनी व्यक्त केलेल्या आहेत. ‘पाऊस’ आणि ‘काळोख’ या केवळ त्यांच्या प्रतिमा नाहीत तर त्यांच्या कवितेचा तो प्राणच आहे. त्या म्हणतात...

“अखंड कोसळतोय पाऊस काय काय आठवत जाते
सहज धूसर होते जग जुळते कुठे अनाम नाते” (दिगंत)

गत जीवनातील आठवणींचे प्रतिबिंब पावसाच्या माध्यमातून त्यांनी व्यक्त केलेले आहे. कधी कधी पावसाच्या आठवणीने निसर्गाचे एक वेगळे स्वरूप त्या व्यक्त करताना दिसून येतात. त्या म्हणतात...

“पाऊस पडत असताना, मला आठवतात
छोटी उजाड खेडी, जिथली घर आणि मन, सारखीच भिजलेली” (दिगंत)

पावसाचे अस्तित्व आणि पावसाचे महत्त्व सांगणारी ही कविता अतिशय मनाला स्पर्श करून जाते. निसर्गातील प्रतिमांचा मेळ साधताना त्या केवळ यमक साधत नाहीत तर आपले अंतरंग निसर्गातील प्रतिमांच्या माध्यमातून त्या व्यक्त करतात. त्यामुळेच त्यांची कविता अतिशय लयबद्ध झालेली दिसून येते त्या म्हणतात...

“आभाळाच्या कुशीत रडू पाहणारे, हे उजाड जंगलाचे सुनसान डोंगरमाथे
जिथून आताच उठून गेलीय, एक हिरवी वस्ती” (दिगंत)

या कवितेतून त्यांनी निसर्गाचे रम्य असे चित्र व्यक्त केले आहे. आपला जगण्याला निसर्गाच्या प्रक्रियेशी त्या जोडून घेताना दिसून येतात. तेव्हा त्या म्हणतात..

“आणि या मातीत पाय रोवून, उभ राहावं म्हटलं,
पण फुटत नाहीत देहाला माझ्या, इतकी जिवंत मुळं” (दिगंत)

निसर्गाच्या प्रतिमांशी जोडलेली ही त्यांची कविता त्यांचे अस्तित्व सिद्ध करताना दिसून येते. ‘तरीही’ हा त्यांचा दुसरा कवितासंग्रह स्त्रीच्या आदीम तत्वांचा शोध घेण्याचा प्रयत्न त्यांनी या कवितेतून केलेला आहे. ‘दिगंत’ हा त्यांचा पहिला कवितासंग्रह पण त्याहीपेक्षा त्यांची जाणीव अधिक समृद्ध करणारा हा कवितासंग्रह आहे. गत जीवनातील आठवणी आणि वास्तव जीवन यांचा सुंदर मेळ त्यांनी काही कवितांतून घातलेला आहे. एकाकीपणाची जाणीव त्या उत्कटपणे व्यक्त करताना दिसतात. त्या म्हणतात..

“झाडावर एकाकी बसलेल्या, पाखरासारखे निमूट,
आता दिवस पडत जातात पाठीमाग, आणि आपणच आपल्याला परक होऊन,
उघड्या डोळ्यांनी पहाते मी,
सगळ्यात उत्कटतेला लागलेल्या मुंग्या” (तरीही)

एकाकी पडल्यावर मनात निर्माण होणारी शोकात्म भावना, दुभंगलेपणाची जाणीव त्या या कवितेच्या माध्यमातून व्यक्त करतात. एकटेपणाची जाणीव व्यक्त करताना त्या म्हणतात ..

“मी चालते आता अफाट आकाशाखाली, आपल्यात सावलीमधून
तेव्हा काहीच नसतं आसपास, माझ्या पावलांच्या आवाजाखेरीज,
बाकी तर सगळ्याच दूरच्या गोष्टी, आणखी दूर गेल्या आहेत” (तरीही)

यांच्या मनावर ग्रामीण भागातील संस्कार झालेले असल्यामुळे गावातील माणसे, तेथील निसर्ग त्यांचा आपलेपणा, आता त्यांच्यापासून दूर गेलेला आहे. त्या आता एकट्याच वावरताना दिसत आहेत. म्हणून त्यांनी अशा प्रकारची खंत या कवितेतून व्यक्त केलेली आहे. त्यांच्या कविता मधून विविध निसर्ग प्रतिमांच्या माध्यमातून स्वतःच्या चिंतनशील वृत्तीचे, आत्मशोधाचे, आठवणींचे प्रतिबिंब त्या अधिक व्यक्त करताना दिसतात.

“झाडामधून माझ्या अंगणात उतरणाऱ्या, पहाटेच्या उजळ उन्हात
तू अजून हसतोस .. जशी माझीच मला आठवण यावी” (तरीही)

यासारख्या कवितातून त्या गत जीवनातील आठवणींना उजाळा देताना पाहायला मिळतात. आठवणीवर आधारित त्यांची अशीच एक कविता आहे. ती म्हणजे 'सायंकाळ'. ग्रामीण जीवनात त्यांचे गेलेले बालपण आणि त्या काळातल्या रम्य काही आठवणी त्या या निसर्ग प्रतिमांच्या माध्यमातून व्यक्त करतात.

“दिवसाच्या उरलेल्या विषयांचे काही थेंब

ओठावर खेळवत, एखाद्या शोकमग्न धुनेसारखी, संध्याकाळ.” (तरीही)

एका सायंकाळी गत जीवनातील झालेली आठवण त्यांनी या कवितेतून व्यक्त केलेली आहे. निसर्गाशी असले त्यांचे एक वेगळे नाते यातून त्या व्यक्त करताना दिसून येतात. प्रतिमा, प्रतीके, शब्द यातील गहनता अधिक समृद्ध होताना दिसते. ग्रामीण भागाचा प्रदेश तेथील निसर्ग त्यांच्या कवितेच्या माध्यमातून अधिक फुलताना दिसून येतो.

‘दिवसेंदिवस’ हा त्यांचा तिसरा कवितासंग्रह यातील त्यांची कविता पूर्वीच्या दोन कविता संग्रहांपेक्षा अधिक समृद्ध झालेली दिसून येते. आपल्या उत्कट भावनेला वैश्विक परिणाम परिमाण देणारी ही कविता आहे. आपल्या चिंतनाला, भावविश्वाला त्यांनी अध्यात्माशी जोडलेले आहे. ईश्वराच्या अथांग शक्तीचे रूप, त्याची किमया अगाध आहे. हे व्यक्त करताना त्या म्हणतात .. “ईश्वरा, वाचताच येत नाही, अशा अक्षरांचा तू ग्रंथ आहेस.” (दिवसेंदिवस)

ईश्वराचे हे रूप त्यांनी आपल्या चिंतनातून व्यक्त केलेले आहे. दिवसेंदिवस मधील कविता या नियती, प्रारब्ध, भोग, नशीब या प्रवृत्तींची ओळख करून देणाऱ्या आहेत. चिंतन, दुःख यांचा संबंध त्या अध्यात्माशी जोडताना दिसतात. तेव्हा त्या म्हणतात...

“मातीत मन घातलं तर ते होकारा देते, पण कळत नाही,

हे माणसाच्या जातीला, नुसताच पै पाहुणा तो संसाराचा, आपणच पुढे व्हावं” (दिवसेंदिवस)

स्वतःला ‘माती’ आणि पुरुषाला ‘पाहुणा’ असा एक दृष्टिकोन ही त्यांनी या कवितेच्या माध्यमातून व्यक्त केलेला आहे. अनुराधा पाटील यांनी आपल्या कवितेला अध्यात्माशी जोडलेले आहे. आयुष्यामध्ये जे काही घडते ते ईश्वराने आधीच ते रचून ठेवलेले आहे. अशी त्यांची भावना आहे. तरीही नियतीने दिलेल्या वाटेवरून चालत जावेच लागते. खाच खळग्यातून मार्ग काढत मार्गक्रमण करावेच लागते.

“आपल्या या मातीत तर, आधीच पेरलेल्या असतात त्याने,

विषारी बिया, ज्या रुजून येतात जन्मासोबतच” (दिवसेंदिवस)

म्हणजेच नियती कितीही कठोर असली तरी त्यातून मार्ग काढणं, एवढंच आपल्या हातात असतं. त्यांनी काही कवितातून ईश्वराशी नाते जोडण्याचा प्रयत्न देखील केलेला आहे. त्या म्हणतात... “वाजू दे मुर्गाची पावलं, आमच्या ओसाड भूमीवर,

मिटू दे, थोडीशी रखरख, जन्मापासूनच तू सोबत दिलेली” (दिवसेंदिवस)

परमेश्वराजवळ दुःख व्यक्त करताना आणि त्याच्याशी जवळीक साधताना त्यांनी व्यक्त केलेली भावना, अंतर्मुख करते. स्त्रियांच्या जीवनातील दुःखाला, एकाकीपणाला, सोशिकतेला उद्गार देणारी त्यांची कविता स्वतःच्या सशक्त शैलीत व्यक्त होते,

‘काळ्या कातळाच्या छातीत घुसमटणा-या, मातीच्या कणांनाही ओढ लागते

मुळं रुजवत नव्या कोंबातून, प्रकाश पाहण्याची आणि मी देईन,

तेवढाच अर्थ उरतो मग तुझ्या असण्याला, जगण्याच्या संदर्भात.’ (दिवसेंदिवस)

दिवसेंदिवस या त्यांच्या गाजलेल्या संग्रहातील ‘काळ्या कातळाच्या छातीत’ ही त्यांची कविता अत्यंत मनाला स्पर्शून जाते ‘वाळूच्या पात्रात मांडेला खेळ’ हा त्यांचा चौथा कवितासंग्रह. यातील त्यांची कविता ही अनन्यसाधारण आहे. निसर्ग प्रतिमा, प्रतीकांच्या सहाय्याने यातील कविता या अधिकच बोलक्या झालेल्या आहेत. ‘वाळूच्या पात्रात मांडेला खेळ’ या शीर्षकातून कवयित्री आपल्या शोकात्म आणि भावविश्वाचे चिंतन मांडताना दिसून येतात त्या म्हणतात ...

“पण थांबवा आता, टाळ मृदंगांचे घोष, पडू दान ओस पंढरपूर”

विठ्ठलाची ओढ ही प्रत्येक वारकऱ्याला भक्ताला असले दिसून येते. पण कधी कधी विठ्ठल भेट होत नाही. तेव्हा तक्रारीच्या सुरात त्या म्हणतात ..

“ना मोसम सुगीचा, ना पीक ना पाणी, पण वाहा खांद्यावर,
पालखीचं ओझं, दर कोस दर मुक्काम, मग नुसतीच ओसाडीची वारी”

एखाद्या वारकऱ्याच्या भक्ताच्या मनातील ही खंत त्यांनी निसर्गप्रतिमांच्या माध्यमातून व्यक्त केलेली आहे. कवयित्रीच्या वाट्याला आलेली संकट दुःख जाणिवेला त्यांनी निसर्गातील प्रतिमा प्रतीकांच्या सहाय्यातून कलात्मक पद्धतीने व्यक्त केलेली आहेत. त्या म्हणतात ...

“आणि वाळलेल्या फांदीला, मातीत रोवून,
पान फुटण्याची वाट पाहता पाहता, गोष्ट सरत आलेली”

झाडाच्या फांदीत जीवनसत्त्व असते. पण ते झाड मातीत रुजल्याशिवाय त्या पानांना अंकुर येत नाही. त्या फांदीच्या रूपातून कवयित्री स्वतःच्या अस्तित्वाचा जीवनाचा शोध घेताना दिसून येतात. अनुराधा पाटील यांच्या कवितेतील उदासीनता आत्मपरता एकाकीपणा अशा विविध भावना व्यक्त करताना त्या निसर्गातील प्रतिमा प्रतीकांचा सुंदर पद्धतीने आश्रय घेतात. एकूणच अनुराधा पाटील यांची कविता ही जीवनाचा वेध घेत असताना निसर्गाशी एकरूप होताना दिसते.

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शेती आणि पर्यावरण

संशोधक विद्यार्थिनी

कु. प्राची माणिकराव जहागिरदार

प्रस्तावना :

शेती आणि पर्यावरण ह्या दोन्ही परस्पर पूरक गोष्टी आहेत. शेतीवर वातावरणाचा प्रत्यक्ष प्रभाव पडत असतो, किंबहुना वातावरणावरती शेतीचे उत्पन्न अवलंबून असते असे म्हणणे वावगे ठरणार नाही. पिकांच्या सुदृढ वाढीसाठी आणि अधिक उत्पादनासाठी पर्यावरण समतोल राहणे अत्यंत महत्वाचे आहे. नैसर्गिक शेती ही पूर्णतः निसर्गावर अवलंबून असते. शेतीचा पर्यावरणावर आणि पर्यावरणाचा शेतीवर हा परिणाम होतोच. आजची आधुनिक शेती ही किती घातक आहे हे आपण जाणतोच. विविध रासायनिक खाते आणि कीटकनाशके यामुळे जमिनीची सुपीकता कमी होते जमिनीचा कस तर कमी होतोच शिवाय विविध औषधांमुळे आपल्याला नैसर्गिक पिक मिळत नाही त्यामुळे पोषक द्रव्यांची कमतरता होते पर्यायाने विविध आजारांना लोक बळी पडतात. शेतकरी शेतीमधील पिक वाढवण्यासाठी, आपली व्यावसायिकता वाढवण्यासाठी आधुनिक शेतीचा उपयोग करत आहेत. शेती आधुनिक व्हावी पण रासायनिक खत आणि कीटकनाशकांच्या अतिरिक्त वापरामुळे पर्यावरणाचा समतोल साधला जात नाहीये त्यामुळे जल प्रदूषण, वायू प्रदूषण, मृदा प्रदूषण होत आहे आणि त्याचा परिणाम हा शेतीवरच होत आहे. शेती व्यवसाय किंवा पिकांची व्यवस्थित वाढ व कमी खर्चात अधिक उत्पादन मिळवण्यासाठी पर्यावरणाची समृद्धी असणे अत्यंत गरजेचे आहे. यासाठी गावोगावी पर्यावरणाचे रक्षण करणे हे शेती क्षेत्रासाठी व सर्वांसाठी अत्यंत महत्वपूर्ण गोष्ट बनली आहे.

– पर्यावरण म्हणजे आपल्या सभोवती असलेली प्रत्येक गोष्ट म्हणजेच माती, पाणी, प्राणी वनस्पती यासारख्या सजीव आणि निर्जीव गोष्टींचा समावेश होतो. जे त्यांच्या सभोवतालच्या परिस्थितीशी जळवून घेतात. ही आपल्याला मिळालेली देणगी आहे. ही पृथ्वीवरील जीवनाचे पोषण करण्यास मदत करतात. शेतीच्या अस्तित्वात पर्यावरणाची भूमिका अत्यंत महत्वाची मानली जाते. पर्यावरण हा शब्द फ्रेंच “ Environ” पासून आला आहे. ज्याचा अर्थ “सभोवताल” असा होतो. निरोगी जीवन आणि पृथ्वीवरील जीवनाच्या अस्तित्वात शेती आणि पर्यावरण यांच्या महत्वाचा वाटा आहे. म्हणून आधुनिक शेतीकडे न वळता सर्व शेतकऱ्यांनी पारंपारिक शेती करून पर्यावरणाचा ज्हास होण्यापासून वाचवले पाहिजे

मुख्य शब्द – शेती, पर्यावरण, शेतीपूरक व्यवसाय, रासायनिक खते, कीटकनाशके

शोधनिबंधाची उद्दिष्टे : शेतीचा पर्यावरणावर होणारा घटक परिणाम रोखण्यासाठी काही उद्दिष्ट ठरवणे अत्यंत गरजेचे आहे.

१) भारतीय शेती आणि पर्यावरणाचा अभ्यास करणे

२) भारतीय शेतीची पद्धती आणि शेतीपूरक व्यवसायावर पर्यावरणाच्या पडणाऱ्या प्रभावाचे अध्ययन करणे

गृहीतकृत्य : १) भारतीय कृषिक्षेत्रावर पर्यावरणाचा अनुकूल आणि प्रतिकूल असा दुहेरी प्रभाव आढळतो.

पद्धतीशास्त्र : संशोधन करत असताना अत्यंत काळजी घेतली जाते. कारण संशोधन हे अत्यंत महत्वाचे तंत्र असून त्याद्वारे तथ्य शोधून काढली जातात. सामाजिक घटना आणि समस्या ह्याबाबत नवीन ज्ञान प्राप्त केले.

कोणत्याही वस्तू, विषय किंवा घटनांचे ज्ञान मिळवायचे असेल तर वैज्ञानिक पद्धतीचा अवलंब करणे गरजेचे असते. त्या शिवाय त्या वस्तू, विषय किंवा घटनांचे ज्ञान प्राप्त होणार नाही. याचाच अर्थ वैज्ञानिक पद्धत महत्वाची आहे. कारण वैज्ञानिक पद्धतीनेच त्या विषयीचे क्रमबद्ध (Systematic Knowledge) ज्ञान मिळविले जाते. शास्त्र किंवा विज्ञानाची अतिशय प्रसिद्ध व्याख्या “क्रमबद्ध ज्ञान”(systematic Knowledge) अशी आहे. विज्ञान किंवा शास्त्र म्हणजेच क्रमबद्ध ज्ञान होय.

प्रस्तुत शोधनिबंधाचा अभ्यास करण्यासाठी द्वितीयक साहित्याचा उपयोग करण्यात आला असून त्यात प्रकशित मासिके वर्तमानपत्रे आणि संदर्भ पुस्तकांचा उपयोग करण्यात आला आहे.

शेती आणि पर्यावरण यांचा परस्पर संबद्ध हा गुंतागुंतीचा आहे. जैवविविधतेचा नाश तसेच हवामान बदलामुळे शेतीसाठी समस्या येऊ शकतात तर पर्यावर बदलामुळे शेतीची सुपीकता यावर परिणाम होतो आधुनिक शेतीचा परनाम हा पर्यावरणाचे नुकसान ठरत आहे. पर्यावरण शास्त्रतः ठेवण्यासाठी तांत्रिक शेती सोडून पारंपारिक आणि सेंद्रिय शेतीकडे शेतकऱ्यांचा कल असला पाहिजे. अधुनील शेतीमुळे मातीचा अवनयन होतो. जमिनीची सुपीकता खराब होण्यासाठी रासायनिक खताचा खूप मोठा वाटा आहे. जंगलतोडीमुळे जैवविविधतेचा नाश होतो. कीटकनाशकामुळे जलप्रदूषण होते.

निष्कर्ष विवेचन :

१) आधुनिक शेतीमुळे पर्यावरणाचा ऱ्हास होत आहे. आधुनिक शेतीमुळे पर्यावरणात अमुलाग्र बदल होत आहे. रासायनिक खतामुळे, कीटकनाशकांमुळे शेती उपजाऊ राहत नाही. कीटकनाशक तसेच रासायनिक खतांच्या अतिरिक्त वापरामुळे जमिनीचा पोत बिघडत आहे. पर्यावरणाच्या असुरक्षतेमुळे आरोग्याच्या तक्रारीमध्ये वाढ झालेली दिसून येते. तसेच तापमान वाढीमुळे ऋतूचक्रात अमुलाग्र बदल होत आहेत. शेतकऱ्यांमध्ये कीटकनाशक फवारणी तंत्रज्ञान प्रगतशील करणे गरजेचे आहे.

संदर्भ सूची

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- 3) आगलावे प्रदीप, संशोधन पद्धतीशास्त्रे व तंत्रे
- 4) विकिपीडिया
- 5) मात्रेयी कृष्णराज, अरुणा कंची २०१३ भारताच्या महिला शेतकरी , न्याशनल बुक ट्रस्ट. इंडिया.
- 6) अन्नदाते शशिकांत व अन्नदाते स्वाती, २०१९, संशोधन पद्धती, के सागर पब्लीकेशन, पुणे

मराठी बालकवितेतील पर्यावरण : एक दृष्टिक्षेप

प्रा. सदाशिव गंगाधर चुकेवाड

मराठी विभाग

बॅ. बाळासाहेब खर्डेकर महाविद्यालय, वेंगुर्ला ता. वेंगुर्ला जिल्हा सिंधुदुर्ग. पिन कोड ४१६५१६

प्रस्तावना :

लहान मुलं आणि पर्यावरण यांचा खूप जवळचा संबंध आहे. मुलांच्या मनात पर्यावरणाबद्दल जागरूकता निर्माण करणे खूप गरजेचे आहे. पर्यावरणामुळे मुलांना निसर्गाचे महत्त्व आणि सौंदर्य समजते. बालसाहित्य पर्यावरणाबद्दल मुलांमध्ये प्रेम वाढवते आणि सभोवतालच्या परिसराची ओळख आणि पर्यावरणाची गरज समजून घेऊन त्याबद्दल कुतूहल निर्माण करीत असते. निसर्गाबद्दलची आवड आणि पर्यावरणाबद्दलची समज निर्माण करण्यासाठी बालसाहित्य खूप महत्त्वाचे आहे.

बालकवीने लहान मुलांना आनंद देण्यासाठी पर्यावरणाचा आधार घेऊन पर्यावरणातील विविध घटकावर बालकवितांची रचना केली त्यातून लहान मुलांचे आनंद, मज्जा व मनोरंजन तर होतेच त्यासोबतच नकळतपणे पर्यावरण संवर्धन व पर्यावरणाबद्दल आपुलकी ही निर्माण होते.

मराठी साहित्यामध्ये बालसाहित्य हा स्वतंत्र साहित्य प्रकार आहे. बालसाहित्याचे विविध प्रकार पडतात बालकथा, बालकादंबरी, बालनाटक आणि लहान मुलांना खूप आवडणारा साहित्यप्रकार म्हणजे बालकविता होय. बालकविता हा साहित्यप्रकार मात्र सर्व वयोगटातील मुलांना आवडतो वयोगटानुसार त्या कविता मधील शब्दांची निवड, विषय आणि आशय बदलतात पण कवितेची आवड सर्व वयोगटातल्या मुलांना असते. काव्याची आवड मुलांना बालवयातच असते लहान मुलं आईच्या अंगाई गीत ऐकून मोठे होत असते. काही अंगाई गीतांमध्ये अंगणाचा उल्लेख असतो जिथे बाळ खेळू शकते हे अंगण म्हणजे निसर्गाचा एक भाग आहे. अनेक मराठी बालसाहित्यकारांनी आपल्या बालकवितेतून पर्यावरणाचे वर्णन केले आहे.

मराठी बालकवितेतून व्यक्त होणारे पर्यावरण

मराठी बालसाहित्यात विविध विषयावर कविता आहेत. त्याचप्रमाणे निसर्गावर ही मोठ्या प्रमाणात कविता केलेल्या दिसून येतात ग. ह. पाटील यांनी लहान मुलांची तुलना झाडे, वेली, फुले यांच्याशी केली आहे. तर साने गुरुजी यांनी भोवतालच्या सृष्टीविषयी मुलांचे कुतूहल शमवले जाते. परिसराचे निसर्गातल्या विविध घडामोडीचे ज्ञान मुलांना करून दिले जाते. ल. म. कडू यांनी निसर्गाच्या उत्पत्तीकामावर बालकविता लिहिल्या मुलं झाडे लहानाचे मोठे होतात हे पाहतात परंतु झाडे मोठे कसे होतात हे जाणून घेण्याची त्यांची खूप तीव्र इच्छा असते हे पाहून कवी म्हणतात की,

एक पक्षी उडत आला
चोचीतले बी टाकून गेला
जमिनीन बी झेलून घेतलं
एका कप्प्यात ठेवून दिलं

ही निसर्गाची किमया आहे. पक्षाने टाकलेला बी जेव्हा जमिनीत जाते त्यापासून एक रोपटे वर येते. त्या झाडाला लागणारे फुले, फळे त्याचा आस्वाद घेणारी पशु-पक्षी याचे सुंदर वर्णन कवीने या कवितेत केले आहे.

भा. रा. तांबे यांनी 'वारा' या बालकवितेतून आपल्या सभोवताली घडणाऱ्या घटना घडामोडीचे वर्णन करताना ते म्हणतात की,

नदीच्या शेजारी झाडांच्या ओळीत
दिवसा दुपारी मोडके देऊळ

या कवितेतून तांबे यांनी झाडे, देऊळ, नदी, शीळ, वेली याचे वर्णन केले आहे. 'माझे घर' या कवितेत कवी गणेश कुडे यांनी बांधलेले घर त्या घराभोवती आसणारे झाड त्या झाडात लपलेले घर त्या घराजवळ असलेले डोलदार पिंपळाचे झाड त्या घरात मोहक अशी तुळस असे निसर्गाचे सुंदर वर्णन कवीने या कवितेतून केले आहे.

पलीकडे ओढ्यावर
माझे गाव ते सुंदर
झाडाझुडपात आहे
लपलेले माझे घर

मुलांचे निसर्गाशी खूपच जवळचे नाते असते. झाडे, झुडपे प्राण्यांच्या सहवासात मुले राहण्यास पसंती देत असतात याचे सुंदर वर्णन या कवितेतून कवीने केले आहे. तसेच वा. ना. टिळक यांनी 'रानात एकटेच पडलेले फुल' या कवितेतून मोगरा,

गुलाब, शेवंती या फुलाचा सुगंध जंगलातून जाताना मुलांच्या मनाला आनंदून टाकणारा आहे. याचे सुंदर चित्रण करताना कवी म्हणतात की,

वन सर्व सुगंधित झाले
मन माझे मोहून गेले
मी सारे वन हुडकीले

फुल कोठे नकळे फुलले! मज तरी स्वगात

मनात दीर्घकाळ रूजी घालणारी अत्यंत मधुर अशी ही कविता आहे. या कवितेत निसर्गातील फुलणारे फूल या कवितेतील फुलाचा आशय कवीने खूप मोठा आणि सुंदर निर्माण केला आहे. शांता शेळके यांनी त्यांच्या बालगीतातून मुलांचे निसर्गशी नाते जोडले आहे. त्या म्हणतात की,

किलबिल किलबिल पक्षी बोलती
झुळझुळ झुळझुळ झरे वाहती
पानो पाणी फुले बहरती
फुलपाखरे वर भिरभिरती

या गाण्यातील बारकावे पाहिले तर आपल्याला काही गोष्टी लक्षात येतात गाण्याची सुरुवात एक सुंदर निसर्गवर्णनाने होते पण हे वर्णन वास्तवातल्या निसर्गाचे आहे. पक्षी, झरे, फुलपाखरे हे सर्व पर्यावरणाशी निगडित असणारे दृश्य आहेत. तसेच अतिशय उत्कटतेने पर्यावरणाशी समरस होणारी इंदिरा संतांची बालकविता आहे. त्यांच्या 'बाभळी' या कवितेतून हिरवेगार झालेली झाडे त्याचे फुललेले सुंदर रूप सांगताना कवयित्री म्हणतात की,

“लवलव हिरवीगार पालवी
काढ्यांची वर मोहक जाळी
घरघर करती लोलक पिवळे
फांदीवर काळोखी काळी”

कवीने निसर्गाचे लोभवणे रंगीविरंगी रूप दाखवले आहे. या कवितेतून बाभळीच्या पायथ्याशी शेंगा खाणाऱ्या शेळ्या, गुरे यांचा तिला मिळणारा सहवास व्यक्त झाला आहे. मुलांना आकाश, ढग, पाऊस, वारा, हिरवी धरणी यांची ओळख अत्यंत लहानपणापासून होते. याचा प्रत्यय इंदिरा संत यांच्या बालकवितेतून येतो यासंदर्भात 'काळे काळे ढग आले' ही कविता विचारात घेण्यासारखी आहे.

डॉ. सुरेश सावंत यांनी 'हिरवे हिरवे झाड' या कवितेतून झाडाचे महत्त्व मुलांना सांगितले आहे. वृक्ष आपल्याला ऑक्सिजन देते त्या ऑक्सिजनवर आपले जीवन आहे. झाडामुळे पशू-पक्षी आपले जीवन आनंदाने जगतात आणि झाडाखाली विसावा घेतात. झाडामुळे पृथ्वी थंडगार होते. पुढे कवी म्हणतात की,

“हिरव हिरव झाड
काय बरं करत
पोळलेल्या जमिनीवर
माया पांघरत”

परंतु वारा, वादळ, उन्ह, धुके, पाऊस या सर्वांचा मारा झाड सहन करते. झाडाचे सुंदर चित्रण कवी या कवितेत करतो आहे. लहान मूल आपल्या आई-वडिलांना वेगवेगळे प्रश्न विचारतात कधीकधी त्यांना निसर्गात घडणाऱ्या गोष्टीविषयी आश्चर्य वाटते. निसर्गात वेगवेगळ्या चमत्कारिक घटना घडतात. त्याचे रहस्य बाळांना जाणून घ्यावे वाटते. आई-वडीलांना प्रश्न विचारतात. आकाशातून पाऊस कसा पडतो हिरव्या झाडाला रंग कोणी दिला. पहाटे दव बिंदूचा सडा कोण टाकतो तर फळांमध्ये साखरेची गोडी कोण आणते? असे अनेक प्रश्न मुलांना पडतात. त्याचे चित्रण कवी डॉ. सुरेश सावंत 'सांगना ग आई' या कवितेत केले आहे.

सांगना ग आई, कुठून वाहतो वारा?
काळ्याभोर ढगातून येती कसा?

हिरव्यागार झाडाना कुणी दिला रंग?

पाण्याच्या पोटांमध्ये साठले किती तरंग?

'झाड' या कवितेतून कवी निसर्गाचे विलोभनीय सौंदर्य टिपतो आहे. वृक्षाचे महत्त्व खूपच आहे. वृक्ष हा माणसाच्या जीवनातील अविभाज्य घटक आहे. घरातील सर्ववस्तू वृक्षापासून बनवलेल्या असतात. गोड गोड फळे, जनावरांना चारा, वाहनाचे इंधन, आजारांचे औषध, घर बांधकाम करताना मिळणारे लाकूड तर सर्वांच्या जीवनातील महत्त्वाचे आहे. वृक्षामुळे पाऊसाचे प्रमाण वाढते आणि निसर्ग प्रफुल्लित होऊन वातावरण पोषक बनते. असे वृक्षाचे वर्णन या कवितेतून कवी माधव

चुकेवाड यांनी केले आहे. तसेच त्यांच्या 'अवतीभवती' या कवितेत निसर्गाचे सौंदर्याचे आहे. हिरवे वृक्ष, सुंदर नदी, पशू-पक्षी, डोंगर, दग्रा, असा सुंदर नजराणा ते पुढे म्हणतात

अवतीभवती हिरवे रान
कसे दिसते छान छान
अवतीभवती उंच टेकडी
हिरवी हिरवी सुंदर झाडी

आपल्या अवतीभवती असणारे निसर्ग डोळ्यांना तृप्त करून जाते. इतके सुरेख वैभव निसर्गाला लाभलेले असते निसर्ग म्हटला की लहान मुलांना पाहण्यास खूप आवडतो.

'गुलाब' या कवितेतून कवी माधव चुकेवाड यांनी गुलाब या फुलाचे गुण मुलांना सांगू इच्छितो. काट्यात फुलणाऱ्या गुलाबाचा रुबाव किती आदरणीय आहे. असे कवीला वाटते. गुलाब काट्याला दूर सारून सुंदर फुलतो. त्याच्या जीवनात काट्याच साम्राज्य असून तो प्रफुल्लित जीवन जगतो. अशा या झाडावेलीत पानासोबत फुलणाऱ्या गुलाब फुलाचा सुगंध खूपच असतो कोणत्याही कार्यक्रमाची सुरुवात काट्यात मानाने जगणाऱ्या गुलाबाशिवाय होत नाही. असे कवी मुलांना गुलाबाचे किती महत्त्व आहे. हे पटवून देतो आहे.

काट्यात वाढतो
पहा सुंदर गुलाब
तरी दिसतो
पहा कसा लाजवाब
बाळगू नका
कशाची ही भीती

कवी मुलांना सांगतो तुम्ही घाबरू नका आलेल्या संकटवर मात करायला शिका आपण सुंदर जीवन जगले पाहिजे. असे कवी मुलांना सांगतो.

'मोहर' या कवितेतून लहान मुलांना निसर्ग खूप आवडतो आंब्यांचा मोहोर फुललेला पाहून मुलांच्या मनात एक वेगळाच आनंद निर्माण होतो रंगीत फुलाचा मोहर वाऱ्याची झुळूक सुटताच इकडे तिकडे गंधच गंध पसरतो हा मोसम पाहून हर्षमय होऊया आणि निसर्गाचे गाणे गाऊया निसर्गाच्या कुशित आनंदी होऊया असे वर्णन कवी मुलांसमोर करतो.

केशव बा. वसेकर यांच्या 'रानवारा' या कवितेतून कवीने शहरात वाढत चाललेल्या प्रदूषण व गलिच्छपणावर रानवारा नाराज होऊन रानात राहण्यास पसंती देतो अश्या उनाड वाऱ्याचे वर्णन कवीने केलेले आहे.

रानात तो निर्मळ असतो
गावात येताच गढूळ होतो
म्हणून आपल्या वर्तनावर
रानवारा नाराज असतो

या कवितेत वारा सुध्दा पर्यावरणाचे रक्षण करू पाहतो. निसर्गाने सर्वांना जगण्याचा अधिकार दिला आहे. माणसाने माणसासारखे राहिले पाहिजे तर प्राण्यांनी प्राण्यासारखे जगले पाहिजे, वनस्पतीने आपल्या आवाक्यात राहून फुलले पाहिजे. झाडावर व वेलीवर कळ्या फुलतात वाऱ्यावर झुलतात काही कळ्या पाना फांद्यांच्या कुशीत निवांत झोपतात आणि सूर्याची किरणे पडताच ताजे तवाने होतात. माणसांचे आकर्षण वाढवतात कळी जेव्हा फुलते तेव्हा त्यातील पराग कण हवेत दरवळतो आणि खूप सुंदर सुगंध पसरतो मनाला भावून टाकतो अशा कळ्यांचे वर्णन कवी रमेश चिल्ले यांनी 'एक कळी' या कवितेतून केले आहे.

एक कळी पानाफांद्यांच्या कुशीत
गाढ झोपी गेली
पुनवेची चांदणे
भाळी लेवून बसली

बबन शिंदे यांनी 'डोळा भरून पाहू' या कवितेत मुलं निसर्गाच्या सहवासात राहून निसर्गाशी नाते जोडू पाहतात. वाटते हिरवेगार डोंगर, खळखळ वाहणारी नदी, नदीत दिसणारे आकाशाचे प्रतिबिंब, वाळूतील शिंपले हा निसर्ग मुलांना खूपच मोहित करतो.

चलचल ताई भाऊ
रानावनात जाऊ

या कवितेतील भाषाशैली खूपच साधी, सोपी आहे. या कवितेत कवी मुलांना निसर्गाने दिलेला रानमेव्याची ओळख करून देतो. रानातील पशु-पक्ष्यांचे सुंदर रूपाचे वर्णन करतो.

त्याच बरोबर पर्यावरणात येणारा महत्त्वाचा भाग म्हणजे पशुपक्षी आणि प्राणी यांचे जग बालकविने फार सुंदर पद्धतीने आपल्यासमोर मांडले आहे निसर्गातील पशुपक्ष्यांचे माहोल पाहून आपण अक्षरशः थक्क होतो हे गजबजलेले जग अगदी पाहण्यासारखे आहे मुलांना हे जग खूपच सुखावून जाते. चिमणीचा सुरेख आवाज तिने गायलेले मधुर गाणे मुलांना मोहून टाकतात. मुलांना आपल्या सारखे शाळेत पशु-पक्षी, प्राणी यावेत असे वाटते. निसर्गाने त्यांना दिलेल्या रूप मुलांना खूप आवडते पक्ष्यांच्या अवयव याबद्दल मुलांना कुतुहल हिरवे रंग राघोचे परंतु त्याची चोच किती लाल असते. ही निसर्गाची देणगी आहे. असे कवी 'चिवचिव चिमणी' या कवितेतून सांगतो.

**चिव चिव चिमणी
ऐकव ना गाणे
काव काव कावळा
खातोस का आवळा?"**

पर्यावरणात नैसर्गिक घटक जसे की हवा, पाणी, माती, पर्वत, समुद्र, नदी, जंगल तसेच प्राणी, वनस्पती आणि मानवी घटक, सामाजिक-सांस्कृतिक विचारधारा आणि नैतिक-धार्मिक मूल्यांचा सहभाग असतो. हे घटक बालसाहित्यात कथा, कादंबरी, नाटक, कविता, चित्र पुस्तके आणि इतर साहित्य प्रकारांमधून मुलांपर्यंत पोहोचवले जातात, ज्याद्वारे त्यांना पर्यावरणाबद्दल जागरूकता आणि संवेदनशीलता निर्माण करता येते.

सारांश

या शोधनिबंधात आपण बालकवितेतील पर्यावरण पाहिली आहे.

- 1) या बालकवितांद्वारे लहान मुलांना निसर्गाचे महत्त्व, झाडे लावण्याचे फायदे आणि पर्यावरणाचे संवर्धन का महत्त्वाचे आहे, हे सोप्या भाषेत पाहिले आहे.
- 2) तसेच या कवितांमधून पर्यावरणाशी मैत्रीपूर्ण सवयी रुजवल्या जातात आणि निसर्गाप्रती प्रेमभावना जागृत कसे केले आहे. हे पाहिले आहे.
- 3) बालकवींच्या कवितेत आलेले झाडे, नदी, पशु-पक्षी, प्राणी, झुडपे, पर्वत, आकाश, ढग, पाऊस, वारा कशा पद्धतीने आले आहेत हे पाहिले आहेत
- 4) वारा, माझे घर, रानात एकटेच पडलेले फुल, बाभळी, हिरवे हिरवे झाड, सांगना ग आई, झाड, गुलाब, मोहर, रानवारा, एक कळी, डोळा भरून पाहू, आणि चिऊ चिऊ चिमणी या कवितेतील पर्यावरण पाहिले आहे.
- 5) मोगरा, शेवंती, गुलाब अशा फुलांचे चित्रण या कवितेतून पाहिले आहे.
- 6) ग.ह. पाटील, साने गुरुजी, ल. म. लाडू, भा. रा. तांबे, गणेश कुडे, वा. ना. टिळक, शांता शेळके, इंदिरा संत, डॉ. सुरेश सावंत, माधव चुकेवाड, रमेश चिल्ले, बबन शिंदे, केशव बा वसेकर यांच्या कवितेतील पर्यावरण पाहिले आहे.
- 7) बालवाचकांची कवितेबद्दलची उत्कंठा वाढवण्यासाठी मुलांना आवडेल असेच बालकवितेचा विषय बालकवीने घेतला आहे.
- 8) तसेच बालकवितेत पर्यावरण जरी असले तरी त्यातील भाषेची श्रुतीमधुरता, छोटी, साधी, सुटसुटीत वाक्यरचना, अचूक शब्दयोजना इत्यादी या कवितेतील वैशिष्ट्ये आपण पाहिली.
- 9) पुनरावर्ती, एखादा स्वर लांबणे, एखाद्या स्वरावर विराम, उद्गार, प्रश्न या गोष्टीनाही बालसाहित्याच्या भाषेत महत्त्व आहे. हे पाहिले आहे.

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2. डॉ. सुलभा शाह, : स्वरूप आणि अपेक्षा, लिलावती
3. अरूण वि.देशपांडे,: बालसाहित्य मराठवाड्याचे: नव्या वाटा-नवे स्वरूप
4. डॉ. प्रभाकर घोडके: इंदिरा संत यांचे काव्य सौंदर्य

संत साहित्यातील पर्यावरणीय जाणीवा

प्रा. डॉ. कांबळे सुनिता शंकरराव

मराठी विभाग, कै. बापूसाहेब पाटील एकांकेकर महाविद्यालय, हणेगाव ता. देगलूर जि. नांदेड.

प्रस्तावना :

आपल्या आजूबाजूला असणाऱ्या सर्व गोष्टी जसे की, पशु, पक्षी, डोंगर, नद्या, वारा, वनस्पती, आणि मानवनिर्मित गोष्टीचा समावेश होतो. पर्यावरण आपल्या जीवनासाठी आवश्यक आहे. ते आपल्याला पिण्यासाठी पाणी, श्वास घेण्यासाठी हवा, जीवन जगण्यासाठी अन्नाची उपलब्धता करून देते. या सर्व गोष्टी म्हणजे पर्यावरण. पर्यावरण म्हणजे आपल्या सभोवतालची परिस्थिती किंवा आपण ज्या जगात राहतो ते म्हणजे पर्यावरण. अशी पर्यावरणाबद्दल संकल्पना केली जाते. मानव हा पर्यावरणाचा एक घटक आहे आणि मानवी जीवनाच्या जडणघडणीत पर्यावरणाचा महत्वाचा वाटा राहिलेला आहे. मानवाची बोलीभाषा, संस्कृती, सामाजिक रूढी परंपरा, जीवन जाणिव, सर्वच पर्यावरणाशी निगडित असतात. पर्यावरण आणि साहित्य याचा परस्पर संबंध आहे. तसेच साहित्य आणि समाज याचाही परस्पर संबंध आहे. साहित्य हा समाजाचा आरसा आहे. तर समाजात घडणाऱ्या सामाजिक, आर्थिक, सांस्कृतिक, धार्मिक व राजकीय परिस्थितीचे वर्णन साहित्यातून घडत असते. मनुष्य हा इतर सजीवांपेक्षा बुद्धिजीवी प्राणी आहे. आपल्या अनुभवातील ज्ञानाचा उपयोग करून स्वतःचे दैनंदिन जीवन अधिक सुखकर करण्याकडे त्याचा अधिक कल असतो. अशावेळी तो निसर्गातील अनेक साधनांची मोडतोड करून वापर करून घेतो. निसर्गाची मोडतोड केल्यामुळे पर्यावरणाचा समतोल ढासाळत असतो. याचा परिणाम सजीव सृष्टीवर उमटत असतात आणि एकूणच सजीव सृष्टी धोक्यात येत असते. म्हणून संबंध मानव जातीने पर्यावरणाकडे दुर्लक्ष करून चालणार नाही. पर्यावरण टिकले तरच सजीव सृष्टी चिरकाल टिकेल.

सृष्टी ही ईश्वर निर्मित आहे. ही आध्यात्मिक संकल्पना असली तरी सृष्टीचे संगोपन करणे हे मनुष्याच्या हाती असते. निसर्गातील हवा, पाणी, माती, प्राणी, पशु, पक्षी, झाडे, लता, वृक्षवेली, फुले, फळे, कीटक, जंतू, आकाश, तारे, नदी, नाले, डोंगराच्या, वादळावारे इत्यादी घटकांना मिळून सृष्टी अथवा निसर्ग म्हटले जाते. विश्वाचा व्यापक अर्थ सामावणारा तो निसर्ग असतो. निसर्ग हे सजीवांचे लक्षण असते म्हणून सजीवांच्या सभोवतालच्या नैसर्गिक परिसरास पर्यावरण म्हणतात. ऊन, वारा, पाणी, सूर्य, तापमान, पर्जन्य, इत्यादी घटकांचा समतोल राखण्यासाठी पर्यावरणीय जाणीव संवेदना मनुष्याने नेहमी जाग्या ठेवल्या पाहिजेत. परिवर्तन हा नैसर्गिक नियम आहे. या परिवर्तनाशी जो जुळवून घेतो तोच भविष्यात टिकून राहतो. पर्यावरणाचा आणि परिवर्तनाचा अन्योन्य संबंध आहे. समाज परिवर्तनशील असतो. म्हणून मानव आणि पर्यावरण यांचा परस्पर संबंध नेहमी बदलत असतो. परिस्थितीनुसार बदल स्वीकारा लागतो. परिवर्तनीय पर्यावरणाचे रक्षण करणे ही काळाची गरज आहे.

समाजाच्या विकासाचा पाया म्हणजे निसर्ग आणि मानव या एकाच नाण्याच्या दोन बाजू आहेत निसर्गाशिवाय मानवाचे अस्तित्व शून्य आहे निसर्गाने मानवाला विकसनशील बनविले मानवाचा श्वास आणि अन्न म्हणजेच निसर्ग. मानवाचा सर्वांगीण विकास म्हणजे निसर्ग. व्यक्तीच्या विकासासाठी अनेक साधनांचा डोंगर म्हणजे निसर्ग. अल्हाद शांती आणि सृजनशीलता ही मानवातील ऊर्जा शक्ती निसर्गाप्रती असते. नैराश्य आणि ग्रासलेला मनुष्य निसर्गाच्या सानिध्यात गेला तर त्याच्यात बदल होऊन तो शांतीच्या मार्गाने आनंदी बनू शकतो. अशी चमत्कारिक ऊर्जा निसर्गामध्ये सामावलेली आहे. प्राचीन काळात ऋषीमुनींनी एकाग्रतेसाठी अध्यात्मशक्ती नवचैतन्य ज्ञान मिळवण्यासाठी निसर्ग शोधला डोंगराच्या कपाऱ्यात जाऊन निर्मनुष्य स्थळी विद्या ग्रहण केली. ऋषीमुनींची आश्रम गुरुकुल निसर्गाच्या सानिध्यातच होते त्या काळातही पर्यावरण संवर्धनाचे संस्कार बालवयातच मिळत असत. वृक्षवल्लीचे रक्षण संवर्धन करणे ही बालवयात शिकवले जात होते आश्रम गुरुकुलाच्या परिसरात वड, चिंच, पिंपळ यासारख्या अनेक वृक्षवेली गुरुकुलातील विद्यार्थी लावत आणि त्याच वृक्षाखाली झोपत असत. अशी पर्यावरण संवर्धनाची परंपरा अनादिकालापासून चालत आलेली आहे.

साहित्य पर्यावरणाचा एक भाग आहे निसर्ग आणि मानव यांचे दृढ संबंध असल्यामुळे सातत्याने प्राचीन साहित्यापासून ते अर्वाचीन साहित्य पर्यंत कवी लेखकांनी कथा, कादंबऱ्या, कविता, नाटक व प्रवासवर्णने या साहित्य प्रकारा द्वारे मराठी संत साहित्यात संतांनी निसर्गाचे सुंदर रमणीय मनोहरी वेदक चित्रण केले आहे. याबरोबरच पर्यावरणातून आकार घेणारे मानवी जीवन निसर्गातून उदयास आलेली संस्कृती पर्यावरणाचा सामाजिक जीवनावर पडणारा प्रभाव इत्यादी प्रमुख घटकांचा संत साहित्यातही अभ्यास झालेला आहे निसर्ग आणि मानव व मानव आणि साहित्य, पर्यावरण आणि संत साहित्य यांचे जिऱ्हाळयाचे

अतूट नाते उलगडून सांगताना अखिल भारतीय मराठी साहित्य संमेलनात अध्यक्षीय भाषण करताना फादर दि ब्रिटो म्हणतात, "मी निसर्गाच्या सानिध्यात वाढलो आहे, निसर्गांनी मला घडविले आहे. आपले पर्यावरण आपल्याला घडवत असते. त्यामुळे मी निसर्गाच्या प्रेमात आहे निसर्ग वाचला तरच माणूस वाचणार आहे." ¹ पर्यावरणाचे संवर्धन करणे पर्यावरणाचा समतोल राखणे ही सर्वस्वी जबाबदारी मानवावर अवलंबून आहे. हे फादर दिब्रिटो पटवून सांगतात. अशी पर्यावरण संवर्धनाची परंपरा अनादी कालापासून चालत आलेली आहे. मानवाच्या जीवनातील पर्यावरणाच्या मौलिक योगदा नाची जाणीव होत नाही. म्हणूनच आजचा मानव आपल्या हव्यासापाई निसर्गाचा शोषक बनला आहे. परिणामी पर्यावरणाचे संतुलन बिघडून प्रदूषणाच्या समस्या निर्माण होत आहेत. ही जाणीव ऋषींमुनींनी व संतांनी करून दिली. प्रस्तुत शोधनिबंधात संत साहित्यातील पर्यावरणीय जाणीवा मांडण्याचा प्रयत्न केलेला आहे.

संत साहित्याची सुरुवात तेराव्या शतकापासून सुरू होऊन ती सतराव्या शतकापर्यंत प्रवाहित राहिली आहे. या संत परंपरेत महानुभाव, वारकरी, नाथ, समर्थ इत्यादी संप्रदाय निर्माण झाले. या संप्रदायांनी मानव आणि मानवता, निसर्ग आणि समाज यांची सांगड घालून मानवी जीवनमूल्यांची पेरणी संतांनी आपल्या ओवीतून अभंगातून केली आहे. संत साहित्यातून पर्यावरणविषयी विचार पेरवा असा उद्देश नसला तरी सृष्टीतील सर्व सजीवाविषयी सहृदयी संवाद संत साहित्यातून वाचायला मिळतो. 'ज्ञानदेवे रचिला पाया तुका झालासे कळस' या ओवी प्रमाणे ज्ञानदेवांनी संत साहित्याचा पाया रचला म्हणून ज्ञानदेव माऊली तुकाराम या महापुरुषांच्या नामघोषणाने संत साहित्य फळाला आले. त्यांच्याविषयी कृतज्ञता आजही मानवी मनात टिकून आहे. या संतांनी जगाला दिलेले विचारधन आजरामार आहेत. ज्ञानदेवांच्या व्यक्तिमत्त्वात भक्ति तत्त्वज्ञ आणि कवी अशी रूपे दिसतात. तत्त्व ज्ञानेश्वर जेव्हा कवी होऊन ओवी शब्दबद्ध करतात. "तेव्हा आदित्याची झाडे सन्मुख सूर्याकडे" या सारख्या ओळीतून दैनंदिन जीवनातील तत्त्वज्ञान मांडत असतात. ज्ञानेश्वरीच्या आठराव्या अध्यायातून निसर्गामध्ये होणाऱ्या बदलांचा चमत्कार ओवीतून शब्दबद्ध होतो.

"नेणो कैसी वसंत संगे । अवचितिया वृक्षांची अंगे ।

फुटती तै हे तयाही जोगे धरणे नो हे? " ²

असा निसर्गातील चमत्कार वाचायला मिळतो. निसर्गातील ऋतू विशेषतः वसंत ऋतूत निसर्ग फुलून येतो झाडांच्या फांद्यांना चमत्कारिक पालवी फुटते निसर्ग बहरून येतो तेव्हा झाडांची इच्छा नसली तरी पालवी फुटणे न फुटणे त्यांच्या हाती नसते. ती नैसर्गिक प्रक्रिया घडतच जाते. हे निसर्गातील पर्यावरणीय जाणीव सहजतेतून प्रकटते. 'हे विश्वची माझे घर' म्हणणारे संत ज्ञानेश्वर संबंध सजीवांच्या कल्याणासाठी

"दुरितांचे तिमिर जावो । विश्व स्वधर्म सूर्य पाहो ।

जो जे वांछील तो ते लाहो प्राणी जात ।" ³

असे पसायदान लिहितात आणि विश्वव्यापी कल्याणाची संकल्पना मांडतात. हे त्यांचे मोठेपण दिसून येते. पंढरपूर पासून ते पंजाब पर्यंत ज्यांनी भागवत धर्माची पताका नेली आणि आपल्या सगुण भाव वेड्या भक्तीत रमून समाजाला मानवतेची उपासना शिकवितात ते संत संत नामदेव, संत नामदेवांच्या अभंग वाणीतून अत्यंत निष्ठेने ईश्वर भक्ती आलेली आहे. ही परमेश्वराविषयीची श्रद्धा अभिव्यक्त करताना त्यांनी अनेक निसर्ग प्रतिमांचा उपयोग आपल्या अभंगातून ओवीतून केलेला आहे.

'जैसा वृक्ष नेणे मान अपमान । तैसे ते सज्जन वर्तताती ।'

मनुष्याच्या जीवनात संत हे वृक्षाप्रमाणे सावली देतात. सज्जन मनुष्य हा झाड वेलीप्रमाणे असतो व्यक्तीच्या मानापमानाच्या पलीकडे जाऊन आचरण धर्म शुद्ध व परोपकारी असावा ही संकल्पना संत नामदेवांनी वृक्षाची उपमा देऊन स्पष्ट केली आहे. आपली संस्कृती पर्यावरण पूजक आहे आपण वृक्षाची मातीची आकाश सूर्य चंद्र तारे इत्यादी घटकांची पूजा करतो कारण निसर्गाचे अनंत उपकार सजीव सृष्टीवर आहेत.

'येऊनिया पूजा प्राणी जे करिती । त्याचे सुख चित्ती तया नाही ।' पर्यावरणाचा समतोल राखणे आपले कर्तव्य असूनही त्याचा आपल्याला विसर पडलेला आहे मात्र संत नामदेवांनी निसर्गाचे महत्त्व अप्रत्यक्षपणे अधोरेखित केले आहे. निसर्ग हा संबंध जीवमात्रांना आनंद सुख देणारा आहे म्हणून निसर्गपूजनीय असतो. याची जाणीव संत नामदेव करून देतात. सोळाव्या शतकात संत तुकारामांनी मानवी जीवनात पर्यावरणाचे असलेले महत्त्व स्पष्ट केले आहे व वृक्षसंवर्धनाचा सल्लाही दिला आहे. संत तुकाराम हे सामान्यतील सामान्यांना समजणारे उमजणारे संत आहेत ते आपल्या दैनंदिन जीवनातील दृष्टांत सांगून समाजातील वाईट प्रवृत्ती नष्ट करून पाहतात प्रापंचिक माणसाला नेहमी उद्याची चिंता सतावीत असते परंतु पशुपक्षी मानवोत्तर प्राणी कधीही अन्न पाण्याचा साठा जतन न करताही चिंतामुक्त असतात. संपूर्ण सृष्टीच त्यांचे विश्व असल्यामुळे त्यांना चारापाण्याची चिंता नसते. माणूस मात्र नेहमी वर्तमानातील दुःख व्यतीत करीत असतो.

“पाषाणाचे पोटी बैसला दर्दूर । तया मूखी चारा कोण घाली ॥

पक्षी अजगर न करी संचित । तयाशी अनंत प्रतिपाळी ॥”⁴

पावसाळ्यात ओरडणारा बेडूक पावसाळा संपला की कुठे निघून जातो? तर तो खोल जमिनीच्या कुशीत अन्न पाणी न घेता विश्रांती घेत असतो. ही त्यांच्या जगण्याची नैसर्गिक रचना आहे. ही रचना प्रत्येक प्राणी पक्ष्यांची व वृक्षांची वेगवेगळी असते. ते आपापल्या नैसर्गिक रचनेप्रमाणे आयुष्य आनंदाने जगत असतात. त्यांच्या जगण्यात अडथळे येऊ नयेत म्हणून मानवाने पर्यावरणाचा समतोल ठेवला पाहिजे. स्वतःच्या स्वार्थासाठी माणूस निसर्गाची मोडतोड करतो आहे याचे दुष्परिणाम सर्वत्र प्राणीमात्रांना भोगावे लागत आहेत. उंबराच्या फळात असंख्ये किडे असतात आणि उंबर हेच जणू त्याचे जग असते. बाहेरील विश्वाच्या पसाऱ्याची त्यांना कल्पनाही नसते मानवी समाजातही अशा काही व्यक्ती असतात जे त्यांच्या आसपासच्या अवकाशाला विश्व समजतात त्यांना तुकाराम महाराज उपदेश करतात. उंबरातील किटका हेची ब्रह्मांड ऐसे लेखा ॥ ऐशी उंबरे किती झाडी ऐशी झाडे किती नवखंडी ॥ या ठिकाणी गदिमांच्या ‘जग हे बंदिशाला’ या गीतातील उंबरातले किडे मकोडे उंबरी करती लिला या ओळीची सहजच आठवण येते. तुकाराम महाराजांच्या वृक्षवल्ली आम्हा सोयरी वनचरे। पक्षीही सुस्वरे आळवीती हा अभंग सर्व परिचित आहे. ज्ञानेश्वरांनी ही ज्ञानेश्वरीच्या सहाव्या अध्यायात योगाभ्यासास योग्य स्थान कसे असावे याचे वर्णन केले आहे. येथे माऊली म्हणतात.

जेथं अमृताचेनि पाडे । मुळेही सकट गोडे । जोडती दाटे झाडे । सदाफळती ॥

पाऊला पाऊला उदके । वर्षा काळी ही परीचोखे । निझरि का विशेषे सुलभे जेथं ॥⁵

निसर्गाच्या सानिध्यात जनापासून दूर वीजनात माणसाचे मन शांत होते माणूस स्वतःशी संवाद साधू शकतो. निसर्गात गेल्याने माणसाला आलेला ताणतणाव दूर होतो. तुकाराम महाराजांच्या काळात आजच्यासारखी परिस्थिती नव्हती तरी निरोगी मनासाठी वनाची पशुपक्ष्यांच्या सहवासाची, पर्यावरणाची आवश्यकता कशी असते. हे त्यांनी या अभंगातून स्पष्ट केले आहे.

वृक्षवल्ली आम्हा सोयरी वनचरे। पक्षीही सुस्वरे आळवीती ॥ नाही गुणदोष अ अंगा येत ॥

आकाश मंडप पृथ्वी आसन । रमे तेथे मन क्रीडा करू ॥ कथा कमंडलू देह उपचारा । जाणवीतो वारा अवतारू ॥ तुका म्हणे होय मनाशी संवाद । आपुलाची याद आपणाशी ॥”⁶

संत तुकाराम महाराज चित्तशुद्धीसाठी निसर्गाच्या सानिध्यात जातात निसर्गाशी एकरूप होऊन अंतर्मुख पावतात जीवनातील सुख दुःख मानसिक ताणतणाव निसर्गातील पावित्र्य रम्य वातावरणांनी मनुष्य दूर करू शकतो. एक प्रकारचा निसर्ग हा अनादी काळापासून मानवाचा सखाच आहे हे संत तुकारामांनी आपल्या अभंगातून मान्य केले आहे. संत तुकोबारायांचा अभंग पर्यावरण रक्षणाची घोषवाक्य बंदी आहे. सृष्टीतील चैतन्य नाविन्य आणि अल्हाददायी वातावरण म्हणजे दुःखी कष्टी माणसाचा प्राण्यांचा विसावा आहे. तर संत परंपरेतील संत गोरा कुंभार हे अनुभवानी मोठे आहेत त्यांनी ज्ञानविस्तारासह स्वानुभवातील भक्तीरसातून काही अभंग रचना केली आहे. ती साधी सरळ सोपी असून त्यात सात्विक असा ज्ञानानुभव प्रकटलेला आहे. संत सावतामाळी यांनी हरिनाम आपलेसे करून आपला व्यवसाय हीच आपुली पंढरी असल्याचे शेतमळ्यातील भाजीपाल्यातून सांगितले आहेत.

‘ कांदा मुळा भाजी । अवघी विठाबाई माझी ॥

लसूण मिरची कोथिंबीर । अवघा झाला माझा हरी’ ॥ ‘

यातून मनुष्याला जगण्याची ऊर्जा शक्ती देणाऱ्या निसर्गाचे चित्रण येते तर चोखामेळा शीतमळ्यातील उसाची उपमा देऊन मानवातील वृत्ती प्रवृत्तीचे दर्शन घडवितात.

‘ ऊस डोंगा परी रस नव्हे डोंगा । काय भुललासी वरलिया रंगा’ ॥

ऊस जरी वाकडा तिकडा ओबडधोबड असला तरी त्यातील त्याचे रसत्व गोडच असते म्हणून रंगाला बाह्य अंगाला महत्त्व देऊ नये असा अर्थ इथे अभिप्रेत असला तरी निसर्गातील गोडत्वाचा साक्षात्कार होऊन जातो. तर मुक्ताईच्या अभंगातून निसर्गाचे सानिध्य लाभलेले दिसते.

‘मुंगी उडाली आकाशी । तिने गिळले सूर्याशी’ ॥

या मुक्ताईच्या अभंगातून निसर्गातील मुंगी आकाश सूर्य विंचू शेष माशी इत्यादी सजीव निर्जीव घटकांच्या प्रतिमेतून मानवी वृत्ती प्रवृत्तीतील कूटनितीचे दर्शन घडते. संत साहित्याचा मुख्य विषय हा आहे की, आध्यात्मिक परमेश्वराची भक्ती श्रद्धा, नाम स्मरण हा होता. आणि तो निसर्गाशी एकरूप आहे. मनुष्य आणि निसर्ग यांचा अन्य संबंध असल्यामुळे संत साहित्यातून

अनेक निसर्ग वर्णने आलेली आहेत दासबोधकार समर्थ रामदासांनी अनेक स्थळी भटकंती केली होती. त्या त्या स्थळांची तेथील निसर्ग वर्णनाची चित्रण त्यांच्या काव्यातून आलेले आहे शिवधर घडीचे वर्णन करताना ते लिहितात.

"गिरीचे मस्तकी गंगा तेथूनी चालली बळे ॥

धबाबां लोटल्या धारा धबाबां तोय सगळे ॥"⁷

यातून सृष्टीचे सौंदर्य समर्थानी रेखाटले आहे.

" भोस बरू वाळा मोठा । ऊस कास देवळा । वेतकळकी चिवरी ॥"

यातून समर्थांच्या सूक्ष्म निरीक्षणाची विलक्षणता दिसून येते. समर्थांना झाडे वेली, फुले, फळे, गवतांचे प्रकार इत्यादी निसर्गातील वनस्पतींचे सूक्ष्मज्ञान होते. संतपरंपरेतील ज्ञानदेव, नामदेव, तुकाराम, एकनाथ, समर्थ रामदास गोरा कुंभार, सावता माळी इत्यादी संतांच्या लेखनाचा विषय निसर्ग पर्यावरण नसला तरीही समाज मानव आणि निसर्ग यांचा परस्पराशी घनिष्ठ संबंध असल्यामुळे या विषयाला वगळून काव्य निर्मिती करणे कठीण असते.

एकूणच मराठी संत साहित्यात पर्यावरणाचे स्थान अनाधिकालापासून अभाधित आहे मग ते मानवाच्या सामाजिक जीवनात असो की संस्कृतिक जीवनात असू मानवाच्या संस्कृतीलाही पर्यावरणाचे संदर्भ आहेत संस्कृती ही मानवा द्वारेच निर्माण होत असते भोवतालच्या भौगोलिक परिसरानुसार एक विचार पद्धती जन्माला येते आणि यातूनच सांस्कृतिक जीवनशैलीचा उदय होतो पर्यावरणाचा जसा सामाजिक जीवनावर परिणाम होतो तसा सांस्कृतिक जीवनावरही प्रभाव पडतो संत साहित्यात ज्ञानेश्वरांनी जगाच्या कल्याणासाठी पसायदानातून विश्वकल्याणाची व प्राणीमात्राच्या हिताची तळमळ त्यांच्या ओवीतून स्पष्ट केली आहे. 'जे खळांची व्यंकटी सांडो। तया सत्कर्मी रती वाढो। भुता परस्परे जडो। मैत्र जीवांचे.' ज्ञानेश्वरांचा संदेश पुन्हा निसर्गाकडे चला व निसर्गाप्रती पुज्यभाव ठेवून पर्यावरणाचा हळुवारपणे आस्वाद किंबहुना उपभोग घ्यावा. त्यासाठी अहिंसा, सत्य, त्याग, व दया, क्षमा, शांती, अनासकी मैत्री सौजन्य इत्यादी नैतिक मूल्यांची जोपासना करून आचरणात आणण्याचा प्रयत्न केला तर निसर्गाचे पर्यायाने पर्यावरणाचे संवर्धन होईल. सर्वच संतांनी या नैतिक मूल्यांना आणि गीतेतही देवी संपत्तीचे गुण असे संबोध दिले आहे जगा आणि जगू द्या हा संदेशही संतांनी आपल्या अभंगातून प्रकट केला आहे या जगातील दुरित नष्ट होवो व सर्व प्राणीमात्रांचे कल्याण होवो, त्यांची सत्कर्माकडे वाटचाल होवो अशी प्रार्थना ते करतात जीवातली अंधरितू आपला जीव या जाणिवेने निसर्गाकडे पाहिले जाते एकूणच संत साहित्यातील पर्यावरण संबंधीचे जे चिंतन झालेले आहे त्याला परमार्थिक तत्त्वज्ञानाची बैठक आहे त्यांच्या काळी पर्यावरणाच्या समस्या नव्हत्या त्या समस्या आज ज्या आहेत परंतु पर्यावरणाकडे किंवा जीव सृष्टीकडे पाहण्याचा त्यांचा दृष्टिकोन हा अद्वैति भक्तीचा आहे. हा दृष्टिकोन स्वीकारून संतांनी जगाच्या कल्याणासाठी पर्यावरणाचा समतोल सांभाळण्यासाठी संत साहित्यातून मानवांना संदेश दिलेला आहे. जीवसृष्टी किंवा पर्यावरण निरोगी राहणे हे भावी पिढ्यांच्या अस्तित्वासाठी अत्यावश्यक आहे अशी जीवसृष्टीच्या कल्याणाची तळमळ या पृथ्वीवरील सर्वांमध्ये निर्माण होऊन त्यादृष्टीने लोकशिक्षणाची लोक जागृतीची गरज अत्यावश्यक आहे. यासाठी विविध ग्रंथांचा पर्यावरणाच्या दृष्टीने महत्त्वाचा ठरेल. पर्यावरणाचा जसा सामाजिक जीवनावर परिणाम होतो तसाच सांस्कृतिक जीवनावरही प्रभाव पडतो. संत साहित्यात समाजाच्या जडणघडणीत पर्यावरणाचा मोठा वाटा आहे. भौगोलिक प्रदेशानुसार पर्यावरणातील जीवनातही विविधता आढळून येते याचे प्रत्यक्ष दर्शन संत साहित्यातूनही दिसून येते

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पर्यावरण संवर्धनाचे व्यक्तिगत दायित्व : एक चिकित्सक अभ्यास

प्रा. डॉ. आनंद शिंदे

सहयोगी प्राध्यापक, लोकप्रशासन विभाग, कै.बापूसाहेब पाटील एकंबेकर महाविद्यालय, हणेगांव

प्रस्तावना

जलद आर्थिक विकासासाठी औद्योगिक विकासाशिवाय पर्याय नाही. हे जरी सत्य असले तरी हा वर्तमान विकास भावी पिढ्यांसाठी ऱ्हास ठरणार असेल तर शाश्वत विकासाची संकल्पना ही केवळ कल्पनाच राहणार आहे. औद्योगिक क्रांतीनंतर माणूस निसर्गपेक्षा स्वतःला श्रेष्ठ समजू लागला. निसर्गापासून दूर जाऊन निसर्गावर मात करण्याचे अनेक क्षेत्रातील मानवाचे प्रयत्न मानवाला पर्यावरणापासून दूर नेताना दिसतो. आपण निसर्गापासून वेगळे आहोत; ही मानवाची भावनाच मुळी चुकीची आहे. माणसाने निसर्गाच्या चक्रात ढवळाढवळ केली तर निसर्ग माफ करणार नाही. भूकंप, महापूर दुष्काळ ज्वालामुखी उद्रेक, त्सुनामी, अतिवृष्टी किंवा कमी वृष्टी अशा अनेक मार्गांनी निसर्ग आपला बदला घेणार हे त्रिकालाबाधित सत्य आहे. अर्थात अशा परिस्थितीत निसर्गाशी हातमिळवणी करून त्याचा ढळलेला समतोल राखत त्यासाठी पुढकार घेणे गरजेचे आहे. किमान पुढच्या पिढीसाठी तरी आपण पर्यावरणाकडे लक्ष हे एक जबाबदार नागरिक म्हणून गरजेचे आहे. पर्यावरण संवर्धन ही आता जागतिक समस्या आहे त्यामुळे संस्थात्मक पातळीवर अनेक आघाड्यांवर आंतरराष्ट्रीय संस्था आणि देश त्यासाठी प्रयत्नशील आहेत तथापि निसर्गाने आपले जीवन सुसह्य होण्यासाठी अनेक संसाधने आपनाला बहाल केलेली आहेत, आपण त्यांचा यथेच्छ वापर करीत असतो परंतु माणूस म्हणून आपली जबाबदारी सुध्दा निसर्गप्रति काही परत देण्याची आहे. या पृथ्वीतलावर अक्षय असे काहीच नाही, जन्माला येणारा प्रत्येक जीव हा मरणारा आहे. मनुष्य ही त्यासाठी अपवाद नाही. अर्थात प्रत्येक जीवांसाठी ही सृष्टी ही एक प्रकारे भाड्याने मिळालेली जागा आहे. त्यामुळे मनुष्यानेही सहजीवनाची संकल्पना लक्षात घेऊन निसर्गाच्या या अनादीकालाचे जीवनचक्र समजून घेणे गरजेचे ठरते.

मुख्य शब्द: पर्यावरण संवर्धन, शाश्वत विकास, व्यक्तिगत दायित्व, पूर्णवापर

विषय ओळख

मराठी शब्दकोषातील पर्यावरण या शब्दाचा अर्थ सजीवांच्या नैसर्गिक परिसंस्थेस पर्यावरण असे म्हणतात. वैज्ञानिक दृष्टीने पर्यावरण या संज्ञेत वनस्पती अथवा प्राणी ज्या नैसर्गिक परिसरात जगतात, वाढतात तेथील हवा, जमीन, पाणी, इतर सजीव, पर्जन्यमान, उंची, तपमान, इत्यादी सर्वांचा समावेश यामध्ये होत असतो. मराठी शब्दकोशानुसार व्याख्येनुसार पर्यावरण म्हणजे शिलावरण, जलावरण, जीवावरण व वातावरण या मुख्य भूवैज्ञानिक घटकांतील सतत चालू असणाऱ्या प्रक्रिया व आंतरक्रिया यांचा परिणाम होय.

सजीवांना त्यांच्या जीवनसंघर्षासाठी तथा टिकवून राहण्यासाठी भोवालतच्या पर्यावरणीय परिस्थितीशी जुळवून घ्यावे लागते. अर्थात जे सजीव परिस्थिती अनुकूल आपल्यात बदल घडवून आणू शकत नाहीत त्यांना आपल्या जीवास मुकावे लागते. कारण जो बदल स्वीकारतो तोच येथे टिकवून राहू शकतो. पर्यावरण आणि सजीव यांचा हा हजारो वर्षांचा इतिहास राहीलेला आहे. पर्यावरणानुकूल जे सजीव स्वतःला बदलून घेतले तेच या ठिकाणी राहीले आहेत. कालोघात असे अनेक सजीव आणि वनस्पती हे नष्ट झालेले दिसतात. डायनोसोर सारखे महाकाय प्राणी या पृथ्वीतलावरून नष्ट होण्यासाठी अशीच परिस्थिती जबाबदार असल्याची दिसते. अर्थात अजूनही दिवसागणिक शेकडो प्रकारची जैवविविधता नष्ट होताना दिसून येत आहे. यांचे कारणही पर्यावरण हे एकमेव आहे.

उद्दिष्टं

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गृहितके

1. पर्यावरण संवर्धन ही सामुहिक तशीच वैयक्तिक जबाबदारी आहे.

तथ्य संकलन आणि संशोधन पद्धती

प्रस्तुत शोध लेखासाठी वर्णनात्मक आणि अन्वेषणात्मक संशोधन पद्धतीचा वापर करण्यात आला असून संशोधन लेखाचा हेतू हा पर्यावरण संवर्धनासाठी शाश्वत उपाययोजना शोधण्याचा असल्याने निदानात्मक संशोधन पद्धतीचाही अवलंब करण्यात आला आहे. सदरील शोध लेखासाठी तथ्य स्रोतातील मुख्यत्वे द्वितीयक स्रोतातील संदर्भ ग्रंथ, शोध निबंध, अधिकृत संकेतस्थळावरील उपलब्ध माहिती यांचा आधार घेण्यात आला आहे. शिवाय प्राथमिक स्रोतातील निरीक्षण तंत्राचा वापर करण्यात आला आहे.

विषय विवेचन

निसर्ग आणि मानव यांचा सहसंबंध अगदी प्राचीन काळापासून राहिलेला आहे. आपल्या प्राचीन ग्रंथांमध्ये निसर्ग आणि पर्यावरणास सर्वोच्च स्थान राहिलेले आहे. प्राचीन भारतीय जीवनपद्धती आणि संस्कृती ही निसर्गानुकूल मैत्रीची राहिलेली आहे. किंबहुना निसर्गाला देव मानण्याची शिकवण येथील ग्रंथ आणि ऋषीमुनींनी दिलेली आहे. परंतु अलिकडच्या काळात पाश्चिमात्य देशांमधील जीवन पद्धती व चंगळवाद हा प्रगतीचा परिमाण असल्याचा गैरसमज पुढारलेल्या समाज घटकाळा झाल्यामुळे व्यक्तीगत पातळीवर आपलेही पर्यावरण संवर्धनासाठी काही कर्तव्य आहे याची जाणीव विसरताना दिसते. वस्तुतः पृथ्वीतलावर केवळ मनुष्यच एकटा सजीव आहे जो या पृथ्वीवरील सर्व उपभोग्य वस्तूंचा उपभोग घेण्याचा अधिकार केवळ त्याचाच आहे; हा स्वार्थी विचार रुढ झाल्यामुळे या सजिव सृष्टीतील अगणित जैवविविधता आपण नष्ट करत आहोत याची जाणीव कदाचित अजूनही झालेली नाही. परंतु ही जैवविविधता नष्ट झाली तर भविष्यात मानवी जीवनाचे अस्तित्व धोक्यात येऊ शकते ही शक्यता अजूनही गांभीर्याने संस्थात्मक आणि व्यक्तीगत पातळीवर आपणांस झालेली नाही. अर्थात ही बेपर्वाई आपल्या येणाऱ्या पिढ्यांसाठी धोक्याची घंटा आहे.

पर्यावरण आणि मानव यांचा परस्पर संबंध हा दैनंदिन स्वरूपाचा आहे. अर्थात आपण पर्यावरणासाठी काय करतो त्या बदल्यात आपणांस पर्यावरण सुखी जीवन प्रदान करीत असते. पर्यावरण संवर्धन आणि संरक्षण ही आता स्थानिक संकल्पना राहिलेली नाही. आंतरराष्ट्रीय पातळीवर ही संज्ञा आता इतकी बहुप्रचलित झाली की, कोणत्याही आंतरराष्ट्रीय करार-मदार अथवा बहुपक्षीय संबंधात हीचा अपवाद करून प्रक्रिया पार पडू शकत नाही. आंतरराष्ट्रीय पातळीवरील अनेक संस्था आणि संघटनांच्या अजेंड्यावरील अग्रक्रमाचा हा विषय राहिलेला. पर्यावरण संवर्धन ही आता जागतिक समस्या म्हणून विचार केली जात आहे. परंतु आंतरराष्ट्रीय राजकारण, विकसित राष्ट्रांचे हितसंबंध, जागतिक व्यापार, शस्त्र अस्त्रनिर्मिती उद्योग अशा अनेक घटना आणि घडामोडी या पर्यावरण संवर्धन चळवळीला बाधा निर्माण करताना दिसून येतात. कार्बन उत्सर्जन आणि पर्यावरण संवर्धन या नावाखाली विकसित राष्ट्रे विकसनशील राष्ट्रांचा विकासाची गती रोखण्याचे राजकारण करीत असल्याचा आरोप होताना दिसून येतो. अर्थात ही एक आंतरराष्ट्रीय आणि दीर्घ स्वरूपाची प्रक्रिया असल्यामुळे दैनंदिन जीवनात व्यक्तीगत पातळीवर पर्यावरण संवर्धनासाठी आपण काय करू शकतो याचा शोध घेण्याचा प्रयत्न या लेखातून करण्यात आला आहे. एक नागरिक म्हणून वैयक्तिक स्तरावर आपण निसर्ग संवर्धनासाठी काय कर्तव्य पार पाडू शकतो याचा मागोवा घेणे या लेखाचा उद्देश आहे.

पर्यावरण संवर्धनासाठी वैयक्तिक दायित्व

अलीकडे शाश्वत विकासाच्या संकल्पनेची फार मोठ्या प्रमाणात चर्चा होताना दिसते. त्यासाठी राष्ट्रीय व आंतरराष्ट्रीय पातळीवर विविध संस्था आणि सरकारे उद्दिष्ट निश्चित करताना दिसतात. विविध संमेलन आणि व्यासपीठावरून त्यासाठी पर्यावरण संवर्धनाची गरज अधोरेखित करीत आहेत. पर्यावरण संवर्धन ही तशी सामुदायिक आणि दीर्घकालीन प्रक्रिया आहे. त्यासाठी संघटीत प्रयत्नांची गरज आहे. तथापि व्यक्तीगत पातळीवर प्रत्येकांनी निसर्ग आणि पर्यावरण संवर्धनासाठी पुढाकार घेतल्यास तथा आपल्या वैयक्तिक स्तरावर दैनंदिन जीवनात त्याचा अंमल केल्यास ही प्रक्रिया आणि चळवळ अधिक गतिमान व जोमाने पुढे जाऊ शकते. किंबहुना पर्यावरण संवर्धन ही प्रत्येकाची वैयक्तिक जबाबदारी सुद्धा आहे. या प्रक्रियेला प्रत्येकांनी स्वतःपासून सुरुवात केल्यास पर्यावरण संवर्धनाची निम्मी जबाबदारी पूर्ण होऊ शकते शिवाय या चळवळीला खऱ्या अर्थाने अर्थ प्राप्त होऊ शकतो.

1. जगा आणि जगू द्या प्रवृत्तीचा सन्मान करणे

नैसर्गिक साधनसंपत्तीचा उपभोग घेत असताना इतर सजीव सृष्टीचे हक्क आपण नाकारू शकत नाही. निसर्गाने जगण्याचा हक्क नैसर्गिकदृष्ट्या प्रत्येक सजिवाला दिलेला आहे. परंतु आपल्या हव्यासापोटी अशा अनेक जैवविविधता आता नामशेष होण्याच्या मार्गावर आहेत.

2. गरजांना मर्यादित करणे.

मानवाच्या गरजा अमर्यादित असल्याने त्यासाठी उपलब्ध साधनांचा वापर सुध्दा अमर्याद होत असतो. त्यामुळे आपल्या गरजा पूर्ण करीत असताना किमान साधनांचा वापर करणे व ही संसाधने पुढील पिढ्यांसाठी राखून ठेवणे ही आपली जबाबदारी ठरते. क्षय उर्जा साधनांच्या बाबतीत विचार करता याच पद्धतीने आपला वापर होत राहीला तर कोळसा, नैसर्गिक तेल वायू सारख्या संपणारा उर्जा स्रोत येणाऱ्या पिढ्यांसाठी काहीही शिल्लक राहणार नाही. त्यासाठी अक्षय उर्जा स्रोतांचा शोध आणि उपलब्धता निर्माण करण्याची जबाबदारी संस्था आणि सरकारची असली तरी तोपर्यंत व्यक्ती म्हणून या उपलब्ध उर्जेचा मर्यादित आणि सचोटीने वापर करणे ही आपली जबाबदारी ठरते.

3. प्लास्टिक वापर टाळणे.

आवर वर्ल्ड इन डेटा" नुसार , १९५० मध्ये जगात दरवर्षी फक्त २० लाख टन प्लास्टिकचे उत्पादन होत होते. २०१९ पर्यंत ते वाढत जाऊन ९.५ अब्ज टन प्लास्टिकचे उत्पादन होत आहे. प्लास्टिक हे जैवविघटनशील नसल्यामुळे पृथ्वीवरील प्रत्येक जीव घटकांसाठी ती गंभीर समस्या आहे. प्लास्टिक हे पेट्रोलियम उप-उत्पादनांपासून बनवलेले कृत्रिम पॉलिमर आहेत. प्लास्टिक तयार करण्यासाठी, पेट्रोलियममधून मिळवलेले मोनोमर मिसळले जातात, ज्याला पॉलिमरायझेशन म्हणतात. प्लास्टिक बायोडिग्रेडेबल नसते कारण सूक्ष्मजीव हे पॉलिमरिक संयुगे पचवू शकत नाहीत. प्लास्टिकचे सूक्ष्म प्लास्टिकमध्ये रूपांतर होऊ शकते, ज्यामुळे मातीची भौतिक रचना बदलते आणि पाणी धरून ठेवण्याची क्षमता कमी होते. प्लास्टिकचे पदार्थ मातीत गळू शकतात, ज्यामुळे अन्न प्रणाली आणि मानवी आरोग्यावर परिणाम होऊ शकतो. जेव्हा प्लास्टिक मातीमध्ये विषारी रसायने सोडते तेव्हा ते भूजल आणि इतर पाणीपुरवठा दूषित करू शकते. यामुळे परिसंस्थेचे आणि पाण्याचे सेवन करणाऱ्या प्राण्यांचे नुकसान होऊ शकते. प्लास्टिक हे जमीन, पाणी, हवा या सर्वच घटकांसाठी धोकादायक असून जैवविविधतेसह मानवी आरोग्याच्या दृष्टीने ते घातक आहे. अशा स्थितीत बाजारात एक सजग नागरिक म्हणून आपण प्लास्टिक पिशव्या, प्लास्टिक पॅकिंग यांचा आग्रह सोडून दिला पाहिजे. शासनाने यांच्या निर्मिती आणि वापरावर बंदी आणावी शिवाय व्यक्ती म्हणून आपण याचा वापर थांबवला तर आपोआप यांची निर्मिती थांबू शकते.

4. टाकावू पासून टिकाऊ

पर्यावरणाचा विचार करता टाकावू पासून टिकाऊ ही संकल्पना उपयुक्त ठरणारी आहे. खराब झालेल्या वस्तू फेकून देऊन त्यांचा कचरा करण्यापेक्षा त्यापासून नवीन वस्तू बनवता येऊ शकते. यामुळे पुनर्वापर, पूर्णप्रक्रिया आणि सृजनशीलता या पर्यावरणानुकूल बाबींचा अवलंब केला जाऊ शकतो.

5. पुनर्वापराच्या सवयी

पर्यावरणाचा न्हास रोखण्यासाठी आहे त्या वस्तू व साहित्यांचा पुनर्वापर करणे व तशी सवय अंगिकृत करणे आवश्यक ठरते. पुनर्वापरामुळे कचऱ्याचे प्रमाण कमी होते, ज्यामुळे प्रदूषण कमी होते आणि पर्यावरणाचे संरक्षण होते. पुनर्वापरामुळे नैसर्गिक संसाधनांची वारेमाप उधळपट्टी होत नाही. कागद, धातू आणि प्लास्टिक यांसारख्या वस्तू पुनर्वापर करून नवीन उत्पादने बनवण्यासाठी केला जाऊ शकतो. शिवाय ऊर्जेची बचत होऊ शकते. पुनर्वापर प्रक्रियेत नवीन वस्तू बनवण्यासाठी लागणारी उर्जा बचत करता येऊ शकते पुनर्वापर केल्याने हवा आणि पाणी स्वच्छ राहण्यास मदत होते. पुनर्वापराच्या चांगल्या सवयींमुळे आपण आपल्या घराला आणि पर्यावरणाला स्वच्छ, आरोग्यदायी आणि अधिक समृद्ध बनवू शकतो. रिसायकलिंग कंटेनरमध्ये फक्त योग्य साहित्य ठेवा, जसे की कागद, पुठ्या, धातूचे कॅन आणि प्लास्टिकच्या बाटल्या आणि जग. तुमचे पुनर्वापर करण्यायोग्य साहित्य रिकामे, स्वच्छ आणि कोरडे असल्याची खात्री करा. तुमचे पुनर्वापर करण्यायोग्य साहित्य कधीही कंटेनर किंवा पिशव्यांमध्ये ठेवू नका. प्लास्टिक पिशव्या स्वतंत्रपणे रीसायकल करा

6. पाण्याची बचत

पाणी बचतीचा पर्यावरण संवर्धनाचा थेट संबंध आहे, कारण पाणी वाचवून आपण मर्यादित जलस्रोतांचे जतन करतो, ज्यामुळे परिसंस्थेतील संतुलन राखले जाते आणि पर्यावरणाची गुणवत्ता सुधारते. पाणी वाचवल्याने ऊर्जेचा वापर कमी होतो कारण पाणी हे पिण्यायोग्य आणि वापरायोग्य करण्यासाठी उर्जेची गरज लागते. शिवाय मर्यादित पाणी वापराने जलप्रदूषणही घटते. दैनंदिन जीवनात पाणी वाचवण्यासाठी काही उपाय या ठिकाणी नमुद करता येतील. घरातील वापरामध्ये आंघोळ करताना किंवा भांडी धुताना पाण्याचा प्रवाह अनावश्यकपणे चालू न ठेवणे. सिंचन पद्धतीमध्ये शेतीमध्ये ठिबक सिंचन पद्धतीचा

वापर करणे. पावसाचे पाणी साठवणे, छतावरील पावसाचे पाणी साठवून ते बोअरवेलमध्ये किंवा इतर ठिकाणी वापरणे. पाण्याचा पुनर्वापर करणे, झाडांना पाणी देण्यासाठी किंवा इतर कामांसाठी ट्रेनमध्ये टाकण्याऐवजी पाणी वापरणे.

7. सांडपाण्याची विल्हेवाट व पुनर्वापराची पद्धती

शहरांसह ग्रामीण भागात सांडपाण्यामुळे जलप्रदूषण आणि आरोग्य विषयक समस्या निर्माण होताना दिसतात. सांडपाण्याची विल्हेवाट लावण्याच्या शास्त्रीय पद्धतीचा अवलंब करून त्यास पुन्हा वापरायोग्य करता येते. शोषखड्डे किंवा सेप्टिक टाक्या वापरणे. सांडपाण्याचा पुनर्वापर करण्यासाठी जैविक, रासायनिक, भौतिक प्रक्रियांचा वापर करून पाणी शुद्ध करणे आणि ते सिंचन, कारखाने आणि इतर बिगर-पिण्याच्या कामांसाठी वापरता येऊ शकते.

8. सार्वजनिक वाहतूक व्यवस्थेचा वापर

पृथ्वीच्या तापमान वाढीत कार्बन उत्सर्जन आणि हरितगृह वायूचा मोठा वाटा आहे. कार्बन उत्सर्जनात कारखान्यांच्या पाठोपाठ वाहनांमधून निघणारा धूर हा मुख्य घटक आहे. दळणवळण आणि वाहतूकीच्या साधनात झालेली मोठी वाढ ही यासाठी जबाबदार आहे. अर्थात व्यक्तिगत वाहनांचा वापर टाळून सार्वजनिक वाहतूक व्यवस्थेचा वापर केल्यास हे कार्बन उत्सर्जन कमी करता येते शिवाय जिवाश्म इंधनाची बचतही करता येऊ शकते. २०३० पर्यंत जीवाश्म इंधनावरील अवलंबित्व कमी करणे आणि २०५० पर्यंत कार्बन उत्सर्जन शून्य करणे हे जागतिक उद्दिष्ट आहे.

9. रासायनिक खतांचा अत्याधिक वापर टाळणे

पर्यावरणातील अनेक घटकांना व मानवी आरोग्याला बाधित करणाऱ्या प्रक्रियेत शेतीत रासायनिक खतांचा वापर हा अत्याधिक प्रभावित करणारा घटक आहे. उत्पन्न वाढीसाठी रासायनिक खतांचा वापर शेतीसाठी दीर्घकालीन उपयोगाचा नाही त्यामुळे या खतांचा वापर टा सेंद्रिय खते, हिरवळीची खते, कंपोस्ट खत व जीवाणू संवर्धकांचा वापर करणे आवश्यक ठरते, पिकांच्या अवशेष व कचऱ्याचा पुनर्वापर करून सेंद्रिय पदार्थांचे प्रमाण वाढवले तर मातीची गुणवत्ता टिकून राहते, पर्यावरणाचे संतुलन राखले जाते आणि शेतीचा खर्चही कमी होतो.

10. मुलांमध्ये मूल्य शिक्षणासोबत पर्यावरण मूल्य रुजविणे

शाळा महाविद्यालयातून दिल्या जाणाऱ्या मूल्य शिक्षणासोबतच पर्यावरण संवर्धनाचे महत्व पटवून देणे आवश्यक ठरते. कौटुंबिक संस्कारातही पालकांनी आपल्या मुलांना पर्यावरण संवर्धनाची शिकवण देऊन आपले वैयक्तिक कर्तव्य पार पाडता येऊ शकते.

समारोप व निष्कर्ष

पर्यावरण संवर्धनाची ही व्यक्तिगत आणि वैयक्तिक प्रयत्नांची संकल्पना ही व्याप्ती आणि आकाराच्या दृष्टीने लहान जरी वाटत असली तरी समाजातील प्रत्येकांचे या अनुषंगाने दायित्व निश्चित करू शकते. असा विचार समाजातील प्रत्येक व्यक्ती मध्ये रुजल्यास ही वैयक्तिक संकल्पना सामुहिक आणि सार्वजनिक बनू शकते. पर्यावरण संवर्धन ही समाजातील सर्वच घटकांची सामाजिक जबाबदारी असून तिला चळवळीचे स्वरूप प्राप्त करून देणे व्यक्ती, समाज, संस्था आणि राष्ट्र अशा सर्वच घटकांचे कर्तव्ये आहे.

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विकास आणि पर्यावरण

प्रो. डॉ. मानवते उत्तम हुसनाजी

राज्यशास्त्र विभागप्रमुख, कै.बापूसाहेब पाटील एक्वेकर महाविद्यालय, हणेगाव ता.देगलूर जि.नांदेड

प्रस्तावना:

विकास आणि पर्यावरण या दोन्ही संकल्पना परस्पर विरोधी आहेत असे दाखविण्याचा प्रयत्न केला जातो. कारण जेव्हा विकास करावयाचा असेल तर पर्यावरणाची हानी होईल आणि पर्यावरण वाचवायचे असेल तर विकास खुंटून जाईल अशा प्रकारचे विचार व्यक्त केले जातात; परंतु आपण प्रत्यक्षात पाहिले तर विकसित देश पर्यावरण रक्षणात सुद्धा आघाडीवर असल्याचे दिसून येते. तेथील नागरिकांचा आरोग्य, आयुष्यमान निर्देशांक इतर देशापेक्षा जास्त असतो. त्यामुळे असे म्हणता येईल की, विकास व पर्यावरणाला एकमेकांच्या विरोधी दाखविण्याची गरज नाही. भारताचे उदाहरण घेतले तर आताच झालेल्या स्टर्लाईट प्रकरणामध्ये पर्यावरण कायद्याचे उल्लंघन होताना दिसते. जनतेच्या आरोग्याची काळजी न घेता पर्यावरणाचे नियम डावलून देतात. त्याठिकाणी विकास व पर्यावरण एकमेकांच्या विरोधात उभे टाकतात त्यामुळे विकासाची हानी तर होतेच परंतु पर्यावरणाची सुद्धा हानी होते. प्रस्तुत लेखामध्ये विकास आणि पर्यावरण एकमेकांस पूरक कसे आहेत हे दाखविण्याचा प्रयत्न केला आहे.

उद्देश:

- 1)विकास म्हणजे काय ते समजून घेणे.
- 2)पर्यावरण म्हणजे काय ते समजून घेणे.
- 3)विकासाचे निर्देशांक समजून घेणे.
- 4)विकास व पर्यावरण समजून घेणे.
- 5)विकास व पर्यावरणाचे महत्त्व समजून घेणे.
- 6)मानवी हस्तक्षेपाचे परिणाम जाणून घेणे.

विषयवस्तु :

(1)पर्यावरण म्हणजे काय?

पर्यावरण ही निसर्गाने मानवाला दिलेली अमूल्य देणगी आहे. पर्यावरण म्हणजे आपण ज्या परिसरात राहतो यामध्ये जैविक व अजैविक असे दोन्ही घटक येतात. पर्यावरणामध्ये आपल्या आजूबाजूचे वातावरण, पर्यावरण म्हणजे आपल्या सभोवताली असलेल्या निसर्ग आहे. आपल्याभोवती हवा, पाणी, माती म्हणजेच नैसर्गिक पर्यावरण असे म्हणता येईल. तसेच सजीवांच्या नैसर्गिक परिसराला पर्यावरण असे म्हणतात. मनुष्याला जीवन जगण्यासाठी या पर्यावरणाची अत्यंत आवश्यकता असते. मनुष्याच्या मूलभूत गरजा ह्या पर्यावरणातूनच पूर्ण केल्या जातात.

(2)विकास म्हणजे काय?

विकासाचा अर्थ म्हणजे मोजक्या शब्दात सांगावयाचे झाले तर असे म्हणता येईल की, वाढ किंवा प्रगती होय. तसेच विकास म्हणजे काळानुसार कोणत्याही गोष्टीमध्ये जे काही गुणात्मक प्रकारात्मक आणि दर्जात्मक बदल होतात, त्यास विकास असे म्हणता येईल. विकास ही एक व्यापक स्वरूपाची संकल्पना आहे. खेळते भांडवल आल्याने होणाऱ्या विकासाला आर्थिक विकास म्हणतात. विकासाच्या संदर्भात सेन यांनी क्षमतेची संकल्पना विकसित केली आहे. 'इक्वालिटी ऑफ व्हॉट' या त्यांच्या लेखात त्यांनी विकासाची भूमिका मांडली आहे. लोकांच्या क्षमता वाढवायच्या असतील तर त्यांचे हक्क अबाधित राहिले पाहिजेत

आणि ते बजाविण्याचे स्वातंत्र्य व योग्य त्या सोयी-सुविधा दिल्या गेल्या पाहिजेत. उदा : लोकांना मतदानाचा निव्वळ हक्क देऊन फायदा नाही तर तो त्यांना बजावण्याचे योग्य व चांगले शिक्षण मिळाले पाहिजे तरच विकास साध्य होतो.

(3) विकासाचे निर्देशांक :

- 1) लोकांच्या जीवन जगण्याच्या परिस्थितीत किंवा स्तरात बदल सुधारणा होणे.
- 2) दारिद्र्याचा नायनाट करणे.
- 3) रोजगाराच्या संधी उपलब्ध करून देणे, लोकांना सारख्या प्रमाणात संधी उपलब्ध असणे.
- 4) दुर्बल घटकांची आर्थिक उन्नती होणे.
- 5) जीवनात घडणाऱ्या घटकांपासून लोकांना सामाजिक सुरक्षा प्रदान होणे.
- 6) सर्व प्रकारचे भेदभाव नष्ट होणे, विषमता नष्ट होणे.
- 7) सर्वांना समान प्रमाणात शिक्षणाची संधी उपलब्ध होणे.
- 8) समाजातील सर्व घटकांचे आरोग्य संवर्धन आणि संरक्षण होणे.
- 9) पर्यावरणाचे संवर्धन व संरक्षण होणे.
- 10) लोकशाही कारभारात सर्व लोकांचा सहभाग होणे.

(4) विकास आणि पर्यावरण

पर्यावरण आणि विकास म्हणजे आर्थिक वाढीसोबतच पर्यावरणाचे संरक्षण करून नैसर्गिक साधनसंपत्तीचा विचारपूर्वक वापर करून भावी पिढ्यांसाठी पृथ्वीवरील जीवन टिकवून ठेवणारे शाश्वत धोरण आहे, यालाच 'शाश्वत विकास' असे म्हणतात. पर्यावरण विकासाची गरज का आहे याचा अभ्यास करावयाचा तर तो आपणास पुढील मुद्यांआधारे स्पष्ट करता येईल.

1) नैसर्गिक संसाधनाचे जतन : पृथ्वीवरील नैसर्गिक संसाधने मर्यादित आहेत. त्यामुळे या संसाधनांचा वापर जपून करणे आवश्यक आहे.

2) जैविक विविधता संरक्षण : हवा, पाणी आणि जमीन या सारख्या गोष्टींवर सर्व सजीव अवलंबून असतात. पर्यावरणीय विकासामुळेच सर्व जैविक विविधता टिकून राहते.

3) भावी पिढ्यांसाठी : आपल्या गरजा पूर्ण करताना भविष्यातील पिढ्यांच्या गरजाही पूर्ण होतील असा विकास साधणे महत्त्वाचे आहे. यालाच 'पर्यावरण विकास' असे म्हणता येईल.

(6) पर्यावरणातील मानवी हस्तक्षेप

पर्यावरणामध्ये झालेल्या अतिमानवी हस्तक्षेपामुळे पर्यावरणाची मोठ्या प्रमाणात हान झाली आहे. मानवनिर्मित पर्यावरणामुळे नैसर्गिक पर्यावरणाला हानी पोहोचत आहे. त्यामुळे पर्यावरणावर वेगळे परिणाम दिसून येतात. समाजाच्या गरजा पूर्ण करण्यासाठी पर्यावरणात बदल केल्यामुळे गंभीर परिणामांना सामोरे जावे लागत आहे. नैसर्गिक संसाधनांमध्ये होणारे बदल हे मानवांनी प्रत्यक्ष किंवा अप्रत्यक्ष केले आहेत. समाजाच्या गरजा पूर्ण करण्यासाठी केलेल्या प्रयत्नांमुळे गंभीर परिणामाला सामोरे जावे लागत आहे. ज्यात जागतिक तापमानात वाढ, पर्यावरणीय ङ्हास, महासागरातील आम्लीयकरण, मोठ्या प्रमाणात विलोपन, जैवविविधतेचे नुकसान, पर्यावरणीय संकट, पर्यावरणीय नुकसान, लोकसंख्या वाढ, नवउदारवादी आर्थिक धोरणे, जलद आर्थिक वाढ, अतिवापर अतिशोषण, प्रदूषण, जंगलतोड यांचा समावेश आहे.

(7) पर्यावरणाचे महत्त्व :

पर्यावरणाचे महत्त्व हे जीवसृष्टीच्या अस्तित्वासाठी आणि मानवाच्या निरोगी जीवनासाठी अत्यंत महत्त्वाचे आहे. कारण पर्यावरण आपल्याला हवा, पाणी, अन्न आणि इतर अत्यंत महत्त्वपूर्ण गरजा पूर्ण करते. मानवाच्या प्रगतीमध्ये पर्यावरण हा एक महत्त्वपूर्ण असा भाग आहे. जो सजीव आणि नैसर्गिक परिसरातील घटकांशी संवाद साधून पृथ्वीवरील जीवनाला आधार देतो.

थोडक्यात, पर्यावरण हे सजीव आणि निर्जीव घटकांचे एक जटिल जाळे आहे. जे पृथ्वीवरील जीवसृष्टीला आधार देते आणि टिकवून ठेवे त्यामुळे त्याचे महत्त्व अनमोल आहे.

संदर्भ सूची

- 1) पर्यावरण शिक्षण-I डॉ.किशोर पवार, प्रा.सौ.नलिनी पवार, निर्मल प्रकाशन, नांदेड
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- 4) पर्यावरण अध्ययन-रमा माथूर, संजय प्रकाश पब्लिकेशन, दिल्ली
- 5) पर्यावरण अध्ययन : एक विश्लेषण-डॉ.सुमन गुप्ता, सुल्तानचंद अँड सन्स पब्लिकेशन्स

पर्यावरण व भूगोल

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प्रस्तावना –

पर्यावरण हा आपल्या जीवनाशी निगडित अत्यंत महत्वाचा विषय आहे. पर्यावरण या संकल्पनेचा अर्थ केवळ झाडे, नद्या, हवा किंवा पृथ्वी एवढाच मर्यादित नाही. तर मानवी जीवनाशी संबंधित सर्व भौतिक, सामाजिक, सांस्कृतिक व जैविक घटकांचा समुच्चय म्हणजेच पर्यावरण होय. विज्ञान - तंत्रज्ञान, औद्योगिकीकरण आणि नागरी करणाच्या वाढत्या लाटेमुळे पर्यावरण पर्यावरणातील समतोल धोक्यात आला आहे. मानवी जीवनाच्या अस्तित्वासाठी शुद्ध हवा, स्वच्छ पाणी, सुपीक माती, हरित अरण्ये व सुसंकृत समाजाची आवश्यकता आहे. पर्यावरणाची आपण जपणूक करणे आवश्यक आहे. पर्यावरणाची जपणूक न झाल्यास पृथ्वीवरील जीवन संकटात येईल.

पर्यावरणाची संकल्पना व व्याख्या –

पर्यावरण ही एक व्यापक संकल्पना आहे. मानवी जीवनाला आवश्यक असलेल्या सर्व गोष्टी म्हणजेच पर्यावरण यात सजीव घटक (मानव, प्राणी, वनस्पती, सूक्ष्मजीव) तसेच निर्जीव घटक (हवा पाणी, माती, खनिजे, हवामान) यांचा समावेश होतो. हे सर्व घटक परस्परांशी निगडित असतात आणि त्यांचा थेट परिणाम सजीवांच्या अस्तित्वावर, विकासावर व जीवनशैलीवर होतो.

एन्स्टर्न हकेल : “पर्यावरण म्हणजे सजीव व त्यांच्याशी निगडित असलेल्या भौतिक घटकांचा परस्पर संबंध.”

डग्लस मिलर : “मानवाच्या आजूबाजूला असणाऱ्या सर्व गोष्टी व परिस्थिती म्हणजे पर्यावरण.”

वेब्सटरच्या शब्दकोशानुसार : “एखाद्या व्यक्तीभोवती असणारे सामाजिक, सांस्कृतिक व भौतिक घटकांचा समूह.”

भूगोल आणि पर्यावरण यांचा संबंध :

भूगोल आणि पर्यावरण यांचा संबंध अगदी जवळचा व परस्परावलंबी आहे. भूगोल ठिकाणांचा अभ्यास आहे. तर पर्यावरण म्हणजे आपल्या सभोवतालची प्रत्येक घटक भूगोल आपल्याला वेगवेगळ्या ठिकाणची भौतिक आणि मानवी वैशिष्ट्ये आणि त्यांचा एकमेकांवर परिणाम होतो. हे समजून घेण्यास मदत करते.

१. परिभाषा व संकल्पना

भूगोल म्हणजे पृथ्वीचा अभ्यास – तिचे भूपृष्ठ, जल, वायुमंडळ, सजीव, मानवी जीवन व मानवनिर्मित क्रिया. पर्यावरण म्हणजे माणूस व इतर सजीवांना वेढून असलेले नैसर्गिक व मानवनिर्मित घटकांचे एकत्रित स्वरूप.

२. नैसर्गिक घटकांचा संबंध –

भूगोलातील भूआकृती, हवामान, माती, जलस्रोत हेच पर्यावरणाचा पाया आहेत. पर्यावरणातील बदल (उदा. हवामान बदल, दुष्काळ, पूर) हे भूगोलातील नैसर्गिक प्रक्रियांमुळे घडतात.

३. मानवी क्रियांचा परिणाम –

मानवी क्रियाकलाप जसे की औद्योगिकीकरण, शहरीकरण, जंगलतोड, खनिजसंपत्तीचा अतिवापर यांचा अभ्यास भूगोल करतो आणि हे पर्यावरणावर थेट परिणाम घडवतात. त्यामुळे पर्यावरणातील असंतुलन समजण्यासाठी भूगोल हा महत्वाचा विषय आहे.

४. शाश्वत विकासासाठी महत्त्व -

भूगोल पर्यावरण संवर्धनासाठी नकाशे, उपग्रह प्रतिमा, GIS, रिमोट सेन्सिंग या तंत्रज्ञानांचा वापर करून माहिती पुरवतो. पर्यावरणीय समस्या (जसे प्रदूषण, हवामान बदल) यावर उपाय शोधण्यासाठी भूगोलाचे योगदान फार मोठे आहे.

५. उदाहरणे जलस्रोत व्यवस्थापन-

- नदी खोऱ्यांचा भूगोल अभ्यासून पाणी संवर्धन करता येते.
- हवामान अंदाज : हवामान शास्त्र हा भूगोलाचा भाग असून तो शेती व मानवी जीवनासाठी उपयुक्त आहे.
- जैवविविधता संरक्षण : जंगल व प्राणी अधिवासांचा अभ्यास करून संरक्षण करता येते.

थोडक्यात, भूगोल हे पर्यावरण समजून घेण्याचे शास्त्र आहे, आणि पर्यावरणाचे संतुलन राखण्यासाठी भूगोलाचा अभ्यास अपरिहार्य आहे.

मानवी जीवनात पर्यावरण आणि भूगोलाचे महत्त्व –

मानवी जीवनात पर्यावरण आणि भूगोलाचे महत्त्व खूप मोठे आहे. दोन्हीही माणसाच्या अस्तित्वाशी, विकासाशी आणि शाश्वत भविष्यासोबत निगडित आहेत.

मानवी जीवनात पर्यावरणाचे महत्त्व -

1. आवश्यक गरजा पुरवते – हवा, पाणी, अन्न, निवारा या सर्व मूलभूत गरजा पर्यावरणातूनच मिळतात.
2. आरोग्यावर परिणाम – शुद्ध हवा, पाणी व स्वच्छ वातावरण माणसाच्या आरोग्यासाठी आवश्यक आहे.
3. आर्थिक साधने – शेती, उद्योग, खनिज, वने यांद्वारे रोजगार व उत्पन्नाचे स्रोत मिळतात.
4. सांस्कृतिक महत्त्व – अनेक परंपरा, सण, लोकसंस्कृती या नैसर्गिक पर्यावरणाशी जोडलेल्या आहेत.
5. जैवविविधतेचे रक्षण – पर्यावरणातील सजीव-निर्जीव घटकांचा समतोल माणसाच्या जीवनासाठी आवश्यक आहे.

मानवी जीवनात भूगोलाचे महत्त्व :

1. भौगोलिक परिस्थितीचा परिणाम – हवामान, माती, जलस्रोत यावर मानवी वस्ती, शेती व अर्थव्यवस्था अवलंबून असते.
2. नकाशे व दिशा – प्रवास, वसाहत, विकास योजना यासाठी नकाशांचा वापर होतो.
3. नैसर्गिक आपत्ती व्यवस्थापन – भूकंप, पूर, चक्रीवादळ यांचा अभ्यास भूगोलातून होतो व त्यावर उपाययोजना आखता येतात.
4. शाश्वत विकास – जलव्यवस्थापन, मृदासंवर्धन, ऊर्जा वापर यामध्ये भूगोल महत्त्वाचा आहे.
5. मानव व निसर्ग संबंध – भूगोल मानवाने पर्यावरणाशी जुळवून घेतलेले जीवनशैलीचे प्रकार समजावतो.

थोडक्यात पर्यावरण माणसाला जगण्यासाठी साधनसंपत्ती देते, तर भूगोल या साधनांचा वापर, व्यवस्थापन आणि संवर्धन कसे करावे हे शिकवतो. दोन्ही मानवी जीवनासाठी अपरिहार्य आहेत.

भारतातील प्रमुख पर्यावरणीय समस्या -

भारत हा विशाल परंपरेने व विविधतेने नटलेला देश आहे. पण वाढती लोकसंख्या, औद्योगिकीकरण, शहरीकरण यामुळे भारतात अनेक पर्यावरणीय समस्या निर्माण झाल्या आहेत.

भारतातील प्रमुख पर्यावरणीय समस्या व उपाययोजना -

1. वायू प्रदूषण - वाहनांचे धूर, कारखान्यांचा उत्सर्जन, धूळकण यामुळे शहरे प्रदूषित होत आहेत. याचा परिणाम श्वसनाचे आजार, हवामान बदल यावर होतो.
2. पाणी प्रदूषण : औद्योगिक सांडपाणी, कृषी रसायने, घरगुती सांडपाणी नद्यांत मिसळल्यामुळे पिण्यायोग्य पाणी कमी होत आहे.
3. जंगलतोड व जैवविविधता नाश – शेती, औद्योगिक क्षेत्र व रस्ते बांधकामासाठी मोठ्या प्रमाणावर वने तोडली जात आहेत. त्यामुळे प्राणी-अधिवास नष्ट होऊन जैवविविधतेवर धोका निर्माण झाला आहे.
4. हवामान बदल - तापमानवाढ, अनियमित पाऊस, दुष्काळ, पूर या समस्या हवामान बदलामुळे वाढत आहेत.
5. घनकचरा व प्लास्टिक समस्या – शहरे व गावांत प्लास्टिक कचरा साचतो, ज्यामुळे माती व पाणी दोन्ही दूषित होतात.
6. जमिनीची धूप व मृदा-अपक्षय – अतिरेकी शेती, पाण्याचा चुकीचा वापर व जंगलतोड यामुळे जमिनीची सुपीकता कमी होत आहे.

उपाय योजना -

1. वायू प्रदूषण नियंत्रण - इलेक्ट्रिक वाहनांचा वापर वाढवणे. औद्योगिक उत्सर्जनावर नियंत्रण. सार्वजनिक वाहतुकीला प्रोत्साहन.
2. पाणी प्रदूषण नियंत्रण – सांडपाण्याचे शुद्धीकरण. नद्या व तळी स्वच्छ ठेवणे (उदा. “नमामी गंगे योजना”). पाण्याचा काटकसरीने वापर.

3. वनसंवर्धन – मोठ्या प्रमाणावर वृक्षलागवड. जंगलतोड रोखण्यासाठी कायदे कडक करणे. स्थानिक लोकांचा सहभाग वाढवणे.
4. हवामान बदलासाठी उपाय – अक्षय ऊर्जा (सौर, पवन, जलविद्युत) वापर वाढवणे. ऊर्जा बचत तंत्रज्ञान. कार्बन उत्सर्जन कमी करणे.
5. कचरा व्यवस्थापन – “Reduce, Reuse, Recycle” धोरण. प्लास्टिक बंदी व पर्यायांचा वापर. घनकचऱ्याचे वर्गीकरण करून त्यावर प्रक्रिया.
6. मृदासंवर्धन – पाणी व मृदा संवर्धनाच्या योजना (नाला बंधारे, शेततळी), सेंद्रिय शेतीला प्रोत्साहन. रासायनिक खते व कीटकनाशके यांचा कमी वापर.

थोडक्यात, भारतातील पर्यावरणीय समस्या गंभीर आहेत, परंतु योग्य उपाययोजना, शासकीय धोरणे आणि लोकसहभाग यामुळे त्या सोडवता येऊ शकतात. “शाश्वत विकास” हाच दीर्घकालीन उपाय आहे.

पर्यावरण संवर्धनामध्ये भूगोलाची भूमिका :

भूगोल हा विज्ञानाचा अशी शाखा आहे ज्यामध्ये पृथ्वीवरील भूपृष्ठ, हवामान, संसाधने, मानवी क्रियाकलाप व निसर्ग यांचा परस्पर संबंध अभ्यासला जातो. पर्यावरण संवर्धनासाठी भूगोलाचे योगदान अत्यंत महत्वाचे आहे कारण पर्यावरणाशी संबंधित समस्या समजून घेणे, त्यांचे विश्लेषण करणे आणि उपाययोजना आखणे यासाठी भूगोल आवश्यक साधने उपलब्ध करून देते.

भूगोलाची पर्यावरण संवर्धनातील भूमिका :

1. नैसर्गिक संसाधनांचा अभ्यास - मृदा, जल, वनस्पती, खनिजे यांचा साठा व उपयोग यांचा अभ्यास. संसाधनांचे शाश्वत वापरासाठी नियोजन.
2. हवामान व वातावरणाचा अभ्यास- हवामान बदल, जागतिक तापमानवाढ, पर्जन्यमानातील बदल समजण्यासाठी हवामान भूगोल महत्वाचे आहे.
3. नकाशे व GIS तंत्रज्ञान – नकाशे, रिमोट सेंसिंग, GIS च्या मदतीने जंगलतोड, जलप्रदूषण, शहरीकरणाचा अभ्यास. पर्यावरणीय व्यवस्थापनासाठी अचूक डेटा.
4. नैसर्गिक आपत्ती व्यवस्थापन- भूकंप, पूर, दुष्काळ, वादळ यांचे स्वरूप व परिणाम समजावून घेणे. सुरक्षित व शाश्वत नियोजनासाठी मार्गदर्शन.
5. जैवविविधतेचे संरक्षण- विविध पर्यावरणीय प्रदेश व त्यातील सजीवसृष्टीचा अभ्यास. नष्ट होणाऱ्या प्रजातींचे संवर्धन.
6. लोकसंख्या व शहरीकरणाचा अभ्यास - लोकसंख्येच्या घनतेचा व शहरीकरणाचा पर्यावरणावर होणारा परिणाम. शाश्वत शहर नियोजनासाठी मार्गदर्शन.
7. शाश्वत विकासासाठी धोरणे- "मानव व निसर्ग" यांचा संतुलित विकास साधण्यासाठी भूगोलातून दिशा. पर्यावरणपूरक विकास धोरणे तयार करण्यात मदत. थोडक्यात भूगोल हे पर्यावरण संवर्धनाचे वैज्ञानिक आधार आहे. नैसर्गिक संसाधनांचा शाश्वत वापर, हवामान बदलाचे विश्लेषण, नकाशे व GIS तंत्रज्ञान, तसेच आपत्ती व्यवस्थापन या माध्यमातून भूगोल पर्यावरणाचे रक्षण करतो.

पर्यावरण व भूगोल यातून शाश्वत विकास -

पर्यावरण (Environment) आणि भूगोल (Geography) यांचा परस्पर संबंध अत्यंत घनिष्ठ आहे. मानवी जीवनाचा विकास, संसाधनांचा वापर, तसेच शाश्वततेचा पाया हाच या दोन्ही घटकांवर आधारित आहे. शाश्वत विकास म्हणजे वर्तमानकाळातील गरजा भागवताना भविष्यातील पिढ्यांच्या गरजांवर परिणाम न होऊ देता विकास करणे.

1. भूगोल व पर्यावरणाचा संबंध :

भौतिक भूगोल : जलस्रोत, हवामान, जमीन, वनस्पती यांचा अभ्यास करून संसाधनांचा योग्य वापर करता येतो.

मानवी भूगोल : लोकसंख्या, शेती, उद्योग, शहरीकरण यांचा पर्यावरणावर होणारा परिणाम समजतो.

पर्यावरणीय भूगोल : मानव-निसर्ग संबंधातील संतुलन टिकवून ठेवण्याचे मार्गदर्शन मिळते.

2. शाश्वत विकास साधण्यात भूगोलाची भूमिका :

1. जलस्रोत व्यवस्थापन -भूगोलाच्या अभ्यासातून नद्या, भूजल, पर्जन्यमान या घटकांचा ताळमेळ साधून जलसंवर्धन करता येते.

उदाहरण : जलसंधारण, पावसाचे पाणी साठवण.

2. जमिनीचा योग्य वापर – जमीन वापराचे नकाशे, मृदा प्रकार, सुपीकता यांचा अभ्यास करून शेती व उद्योग यांचे नियोजन.

3. ऊर्जा साधनांचा शाश्वत वापर- भूगोलातून अक्षय ऊर्जा स्रोत (सौर, वारा, जलविद्युत) ओळखून वापर वाढवणे.

4. जैवविविधतेचे संरक्षण –

अभयारण्ये, राष्ट्रीय उद्याने यांचे स्थान व महत्त्व भूगोलातून स्पष्ट होते. यामुळे प्राणी व वनस्पतींचे संवर्धन शक्य होते.

5. हवामान बदल व्यवस्थापन – हवामान नोंदी व भूगोल नकाशांमुळे दुष्काळ, पूर, वादळ यांचा अंदाज घेऊन आपत्ती व्यवस्थापन.

6. शहरी व ग्रामीण विकासाचे नियोजन –भूगोलाचा उपयोग करून पर्यावरणपूरक शहररचना, हरित क्षेत्रे, परिवहन नियोजन करता येते.

7. शाश्वत विकासासाठी उपाय योजना-

शाश्वत शेती : सेंद्रिय शेती, मिश्र पीक पद्धती, पाण्याची कार्यक्षम वापर पद्धती.

नवीन ऊर्जा साधने : सौर ऊर्जा, पवन ऊर्जा, बायोगॅस.

पर्यावरण शिक्षण : लोकांमध्ये जागृती करून संसाधनांचा संयमी वापर.

वनीकरण व जैवविविधता संवर्धन : वृक्षलागवड, जंगलतोडीवर नियंत्रण.

स्वच्छ तंत्रज्ञान : प्रदूषण नियंत्रण साधने, कचऱ्याचा पुनर्वापर.

थोडक्यात पर्यावरण आणि भूगोल यांच्या परस्पर संबंधातून शाश्वत विकासाचा मार्ग मोकळा होतो. भूगोल आपल्याला संसाधनांचा योग्य वापर, पर्यावरण संरक्षण, व मानव विकास यामध्ये संतुलन साधण्याचे मार्गदर्शन करतो. त्यामुळे “भूगोलाचा अभ्यास हा शाश्वत विकासाचा पाया आहे” असे म्हणता येईल.

सारांश –

भूगोल व पर्यावरण यांचा अभ्यास मानवी जीवनाच्या प्रगतीत तसेच शाश्वत विकास साधण्यासाठी अत्यंत महत्वाचा आहे. भूगोल व पर्यावरणाचा संबंध अधिक निकटचा आहे. भूगोल पृथ्वीच्या भूपृष्ठ, हवामान, संसाधने आणि मानव- पर्यावरण संबंधांचा अभ्यास करते. पर्यावरण म्हणजे सजीव आणि निर्जीव घटकांचा आणि त्यांच्या परस्परावर होणाऱ्या परिणामांचा समूह. भूगोल व पर्यावरण हे दोन्ही विषय मानवी क्रिया व नैसर्गिक संसाधनांचा परस्पर परिणाम समजून घेण्यास मदत करतात शाश्वत विकास म्हणजे वर्तमान पिढीच्या गरजा भागवताना पुढील पिढ्यांच्या गरजा धोक्यात न आणणे. यामध्ये पर्यावरणीय संतुलन, आर्थिक प्रगती आणि सामाजिक समता यांचा समन्वय साधणे आवश्यक आहे. भूगोल व पर्यावरणाच्या सामाजिक अभ्यासाची भूमिकाही शाश्वत विकासाला महत्वाची आहे. नैसर्गिक संसाधनांचा शाश्वत वापर (जल, मृदा, खनिज, वन) कसा करावा हे भूगोल शिकवते. पर्यावरणशास्त्र प्रदूषण, हवामान बदल, जैवविविधता नाश यावर उपाययोजना सुचवते. भूप्रदेशीय नियोजन, नागरीकरण नियंत्रण, शेती पद्धती, अक्षय ऊर्जेचा वापर हे मार्ग शाश्वत विकासाच्या दृष्टीने महत्वाचे आहेत. आपल्या देशातील पर्यावरणीय समस्यांच्या विचार केला तर उदा. लोकसंख्या वाढ, जल टंचाई, जंगलतोड, औद्योगिकीकरण या समस्यांचे निराकरण शाश्वत विकासातून शक्य होईल. एकात्मिक ग्रामीण विकास स्वच्छ भारत अभियान नवीकरणीय ऊर्जा धोरण या योजना भूगोल व पर्यावरणाच्या अभ्यासावर आधारलेल्या आहेत.

थोडक्यात, भूगोल व पर्यावरणाच्या अभ्यास शाश्वत विकासासाठी दिशादर्शक आहे. मानवी प्रगती आणि नैसर्गिक संसाधनांचे संवर्धन या दोन्हीचा समतोल राखणे हेच या अभ्यासाचे ध्येय आहे.

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१.१ प्रस्तावना:

सध्याचे युग डिजीटल युग आहे. समाजमाध्यमे वापरण्यास साधी, सोपी आणि सहज परवडणारी आहेत. आजघडीला भारतीय समाजात संपर्क आणि दळणवळणाच्या विविध माध्यमांचा प्रभाव आहे. महाराष्ट्र सरकारने २८ जुलै २०२५ रोजी सरकारी कर्मचारी यांना सोशल मिडीयाचा वापर करण्यासंदर्भात निर्बंध घातले आहेत. वैयक्तिक सोशल मिडीया खात्यावर केवळ प्रोफाईल फोटो वगळता सरकारी पदनामाचा लोगो किंवा गणवेश तसेच सरकारी मालमत्ता यामध्ये वाहन, सरकारी इमारत इत्यादींचा वापर फोटो, रिल किंवा व्हिडीओ अशा गोष्टींसाठी करणे टाळावे, बदलीनंतर कार्यालयीन सोशल मिडीया खाते योग्य प्रकारे हस्तांतरीत करावे अशा सूचना दिलेल्या दिसून येतात. सोशल मिडीयाच्या अतिरेकी वापरावर महाराष्ट्र नागरी सेवा इ. स. १९८९ नुसार अनेक बंधने घालण्यात आलेली आहेत. यामध्ये विशेषतः तंत्रज्ञानाने प्रभावीत फेसबुक, स्नॅपचॅट, व्हॉट्सअॅप, इंस्टाग्राम, ईमेल, एसएमएस, लिंकडइन अशा समाजमाध्यमांच्या व्यासपिठांचा समावेश होतो. समाजशास्त्रीय दृष्टिने समाजमाध्यमे म्हणजे सामाजिक संपर्क किंवा विचारांची देवाणघेवाण करणारे माध्यम आहे. विविध माहिती, कल्पना, स्वतःचा दृष्टिकोन, विचार, कल्पनासामुग्री, फोटो, साहित्याची देवाणघेवाण करणारे माध्यम म्हणजे सामाजिक माध्यमे होत. सामाजिक माध्यमाद्वारे लोक एकत्र येतात, संवाद साधतात, प्रतिक्रिया व्यक्त करतात, एखाद्या सामाजिक घटनेच्या अनुषंगाने व्यक्त होतात. म्हणूनच समाजशास्त्रीय दृष्टिकोनातून सोशल मिडीया आणि सामाजिक पर्यावरणाचा जवळचा संबंध आहे, असे म्हणता येते.

‘सोशल मिडीया’ हे मनोरंजनावर आधारीत वैचारिक देवाणघेवाणीचे केंद्र आहे. सामाजिक माध्यमे आधुनिक संवादाचा एक अविभाज्य घटक आहे. सोशल मिडीया इंटरनेटवर आधारीत एक संवादाचा प्रकार आहे. संपूर्ण जगात ४.७ अब्ज लोक सोशल मिडीयाचा वापर करताना आढळतात. सोशल मिडीयाची सुरुवात इ. स. १९९७ मध्ये ‘Six Diggrees’ या साईटवरून करण्यात आली. इ. स. १९७८ मध्ये BBS (Bulletin Board System) ची सुरुवात झाली. पहिली सोशल नेटवर्क साईट ‘Friendster’ इ. स. २००० सुरू झाली. इ. स. २००४ मध्ये हॉवर्ड विद्यापीठात विद्यार्थ्यांशी संवाद साधण्यासाठी ‘फेसबुक’ सुरू करण्यात आले. तसेच मित्र, नातेवाईक आणि अनोळखी लोकांशी संपर्क करण्यासाठी ‘Twitter’ या सोशल मिडीयाचा उदय झाला.

मुख्यशब्द: समाजमाध्यमे, परिवर्तन, फेसबुक, स्नॅपचॅट, सामाजिक पर्यावरण, सोशल मिडीया आदि.

१.२ शोधनिबंधाची उद्दिष्टे:

१. आधुनिक भारतीय समाजात समाजमाध्यमांच्या सामाजिक, मानसिक आणि भावनिक प्रभावाचे अध्ययन करणे.
२. समाजमाध्यमे आणि सामाजिक परिवर्तन यांतील सहसंबंध सामाजिक पर्यावरणाच्या दृष्टिने अभ्यासणे.

१.३ शोधनिबंधाचे पद्धतीशास्त्र:

प्रस्तुत शोधनिबंधाच्या तथ्य संकलनासाठी ‘सामाजिक माध्यमे’ आणि ‘सामाजिक परिवर्तन’ या संकल्पनांचा सहसंबंध अभ्यासण्यासाठी द्वितीयक तंत्राचा अवलंब करण्यात आलेला आहे. प्रामुख्याने यामध्ये सामाजिक माध्यमांच्या प्रभावाचा अभ्यास करण्यासाठी विविध व्यासपिठांचा आधार घेण्यात आलेला आहे. अहवाल, पाक्षिके, दैनिके, स्मरणिका, विशेषांक, मासिके, संदर्भ पुस्तके आणि क्रमिक पुस्तके आदिंचा उपयोग करून तथ्यांची मांडणी करण्यात आलेली आहे.

१.४ समाजमाध्यमे आणि सामाजिक पर्यावरण सहसंबंध:

समाजमाध्यमे आणि सामाजिक पर्यावरणाचा जवळचा संबंध आहे. कारण सोशल मिडीया लोकांना मित्र, कुटुंब आणि जगातील इतर लोकांशी संपर्क करण्यास सहकार्य करते. सोशल मिडीयाच्या माध्यमातून बातम्या, लोकवार्ता, जागतिक घडामोडी, विविध विषयावरील अद्यावत माहिती सहज उपलब्ध होते. विविध ब्लॉग, साईट्स, रिल्स, शॉर्ट फिल्मस् आणि इलेक्टॉनिक मिडीयाच्या माध्यमातून समाजातील प्रत्येक व्यक्ती जागरूक झालेला दिसतो. सोशल मिडीयावर येणाऱ्या विविध बातम्या आणि मतप्रवाह यामुळे लोकांचे प्रौढ सामाजिककरण होते. प्रत्येक व्यक्तीच्या विचारकक्षा रुंदावून सदृशद्विवेकाने निर्णय घेण्यास सोईचे जाते. मनोरंजन आणि माहिती देवाणघेवाणीचे एक प्रभावशील केंद्र म्हणून सोशल मिडीयाच्या उल्लेख होतो, कारण

फेसबुक, व्हॉट्सअप, इंस्टाग्राम यासारख्या प्लॅटफॉर्मचा उपयोग व्यवसायवृद्धी करणे, उत्पादनांची विक्री करणे, सेवांचा प्रचार करणे, शैक्षणिक सामुग्री आणि माहितीचा प्रसार करण्यासाठी केला जातो.

१.५ भारतीय समाज आणि समाजमाध्यमांचा प्रभाव:

सोशल मिडीयाच्या माध्यमातून आपण एकमेकांशी नाते निर्माण करून संपर्क करून राहतो. नवीन लोकांशी संवाद साधणे आणि सामाजिक व्यवहाराच्या नवीन कक्षेत प्रवेश करण्याचे साधन आहे. बातम्यांचा प्रसार करणे, ग्राहकांचा अनुभव वाढविणे, सर्जनशीलतेचा विकास करणे, उद्योगशीलतेचा विकास करणे, मार्केटिंगचे कौशल्य वृद्धिगंत करणे याबाबी समाजाच्या विकासात महत्वाच्या ठरत आहेत. तंत्रकुशल नवीन पिढीला योग्य मार्गदर्शन करण्याचे उद्दिष्ट सामाजिक माध्यमांच्या माध्यमातून साध्य होताना दिसते. सर्जनशीलतेच्या विकासाबरोबर नवसाक्षरतेचे एक प्रभावी माध्यम म्हणून सोशल मिडीयाचा उल्लेख होतो. एकाच वेळी अनेक लोकांशी संपर्क करून डिजीटल—ई—मार्केटिंगसाठी याचा उपयोग होतो. सोशल मिडीयाद्वारे आधुनिकीकरणाचा विकास साध्य करण्याबरोबर नवीन समाजाची निर्मिती करण्याचा हेतू साध्य होताना आढळतो. जागतिक संपर्काचे माध्यम असल्याने कामाच्या गतीत वाढ होवून उद्योजगतेचा विकास परिणामकारण स्वरूपात वाढला आहे. माहितीच्या देवाणघेवाणीचे लोकशाहीकरण होत असल्याने ज्ञान आणि अनुभवात वाढ होताना दिसते. सोशल मिडीया आणि सोशल नेटवर्किंग या दोन संकल्पना एकमेकांना भिडणाऱ्या आहेत. सामाजिक माध्यमांचा प्रभाव समाजातील आचारविचार, संस्कृती, राहाणीमान, खानपान, धर्मश्रद्धा आणि सांस्कृतिक परंपरा यावर पडत चालला आहे. मुळ भारतीय संस्कृतीचे स्वरूप बदलत आहे. तरूण—तरूणींचा जीवन जगण्याचा दृष्टिकोन संस्कृतीबाह्य स्वरूपाचा बनत आहे.

एकंदरीत सोशल मिडीयाचे सकारात्मक परिणाम पडण्याऐवजी नकारात्मक परिणाम होताना दिसतो. जसे की, सायबर काईम, ऑनलाईन फसवणूक, ब्लॅकमेलिंग, बालगुन्हयांत वाढ, लैंगिक विकृतीत वाढ, आभासी स्वरूपाची मैत्री, आत्मसन्मानाच्या मुददयांचा प्रश्न वाढतो आहे. तरूणांमध्ये आयुष्याची तुलना आभासी जगाशी होत असल्याने नैराश्य आणि चिंतेचे प्रमाण वाढून सामाजिक पर्यावरण दुषित होत आहे. अधिकच्या माहिती भांडारामुळे तरूणांतील सैरभैरता वाढली आहे.

समाजमाध्यमांचा चुकीचा वापर टाळण्यासाठी भारतीय दंड संहिता १५३ ए , ५०० आणि ५०९ अशा कलमांची तरतुद करण्यात आलेली आहे. तसेच इ. स. २००० चा माहिती तंत्रज्ञान कायदा, इ. स. २०२५ चा डिजीटल वैयक्तिक माहिती संरक्षण कायदा आणि इ. स. २०२१ मध्ये सायबर गुन्हांशी संबंधित माहिती तंत्रज्ञान कायदा करण्यात आलेला आहे. कलम ५०० कलम ५०० हे सामाजिक माध्यमाद्वारे खोटी माहित प्रकाशित करणे अथवा एखाद्याचे नाव बदनाम करणे याच्याशी संबंधित आहे. एखाद्या व्यक्ती अथवा संस्था यांच्याबद्दल खोटी माहिती प्रकाशित करणे, बदनामीकारक माहिती पुरविणे किंवा एखाद्याची प्रतिमा खराब होईल असे वर्तन करणे या कलमांतर्गत येते. सामाजिक पर्यावरण अधिक निकोप आणि सुदृढ राहण्याच्या दृष्टिने सदरील कलमाचा प्रभाव समाजावर असलेला दिसून येतो. कलम ५०९ सोशल मिडीयाशी संबंधित कलम ५०९ हे आहे. या कलमाला अर्थ जर व्हॉट्सअप, इंस्टाग्राम, किंवा इतर सोशल मिडीयाच्या द्वारे आपण काही विचित्र माहिती प्रकाशित केली किंवा ईतरांना पाठविली तर ५०९ कलम लागू शकते. कलम ५०९ हे स्त्रीचा विनयभंग करणे, विनयभंग करणारी भाषा बोलणे, वाईट हावभाव करणे, टिका करणे याच्याशी संबंधित आहे. आज आपण पाहतो की, सोशल मिडीयाद्वारे स्त्रीयाविषयी टिका केली जाते, अपमान केला जातो, विचित्र हावभाव केले जातात. यावर बंदी घालण्यासाठी कलम ५०९ ची तरतुद करण्यात आलेली आहे. वरील कायद्याद्वारे स्त्रीयांचे शोषण थांबविणे. स्त्रीयांच्या हक्कांचे संरक्षण करणे. स्त्रीयांची मानसिक कुचंबणा थांबविणे. स्त्रीयांचा विनयभंग होणार नाही याची काळजी घेणे.

१.६ निष्कर्ष विवेचन: समाजमाध्यमे आणि सामाजिक परिवर्तन या संकल्पनांचा जवळचा संबंध आहे. आधुनिक काळात सोशल मिडीयाच्या प्रभावापासून कोणताही मानवी समूह, जातीव्यवस्था, धार्मिक समूह, वर्गव्यवस्था, सांस्कृतिक समूह, उद्योगक्षेत्र अलिप्त राहिलेले नाही. सोशल मिडीयाचा प्रभाव मानवी वर्तनाच्या प्रत्येक क्षेत्रावर पडलेला दिसतो. मानवी जीवनाकडे पाहण्याचा दृष्टिकोन बदलत चालला आहे, यामध्ये पारमार्थिक सुखापेक्षा ऐहिक आणि भौतिक सुखाची अधिक ओढ निर्माण झाल्याचे दिसून येते. डिजीटल साक्षरता, वेळेचे व्यवस्थापन, माहिती संकलन आणि विस्तारा वर भर, डिजीटल ई मार्केटिंग, ए.आय. वर आधारित नवसाक्षरता आणि जागतिक संपर्काचे प्रभावी माध्यम म्हणून सोशल मिडीयाकडे पाहिले जाते.

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सामाजिक शाश्वततेसाठी पर्यावरणीय अर्थशास्त्र

डॉ. जी. एस. पाटील

प्राध्यापक

इतिहास विभाग प्रमुख, इंदिरा गांधी वरिष्ठ महाविद्यालय सिडको, नांदेड. (M.S)

मानव आणि निसर्ग यांचे संबंध प्राचीन काळापासून परस्परावलंबी आहेत. पृथ्वी ही केवळ भौतिक अस्तित्व नसून मानवी संस्कृती, समाज आणि अर्थव्यवस्थेचे मूळ आधारस्थान आहे. औद्योगिक क्रांतीनंतर तंत्रज्ञान आणि उत्पादन वेगाने वाढले, परंतु त्याचबरोबर प्रदूषण, संसाधनांचा अतिरेक आणि हवामान बदल यांसारख्या समस्या उद्भवल्या. आजच्या घडीला शाश्वत विकास हा जागतिक पातळीवर चर्चेचा केंद्रबिंदू बनला आहे. विकासाच्या प्रक्रियेत पर्यावरणाची उपेक्षा केल्यास भविष्यातील पिढ्यांसाठी गंभीर संकटे निर्माण होऊ शकतात. म्हणूनच पर्यावरणीय अर्थशास्त्र ही शाखा सामाजिक शाश्वततेसाठी अपरिहार्य ठरते.

पर्यावरणीय अर्थशास्त्राची भूमिका

पर्यावरणीय अर्थशास्त्र हे असे शास्त्र आहे जे नैसर्गिक संसाधनांच्या कार्यक्षम वापरावर, पर्यावरणीय हानीच्या आर्थिक मूल्यांकनावर आणि प्रदूषण नियंत्रणासाठी धोरणात्मक उपायांवर भर देते. पारंपरिक अर्थशास्त्र केवळ उत्पादन, वितरण आणि उपभोग या प्रक्रियांवर लक्ष केंद्रित करत होते; परंतु पर्यावरणीय अर्थशास्त्र या प्रक्रियांमध्ये निसर्गाचा सहभाग आणि त्याच्या संरक्षणाचे महत्त्व अधोरेखित करते.

उद्योग आणि तंत्रज्ञानामुळे जरी अर्थव्यवस्था वाढत असली तरी त्याचवेळी प्रदूषणाची किंमत समाजालाच मोजावी लागते. कार्बन उत्सर्जनामुळे होणारा हवामान बदल, वायू व जलप्रदूषणामुळे होणारे आरोग्याचे प्रश्न, तसेच जंगलतोडीमुळे जैवविविधतेचा न्हास – ही सर्व उदाहरणे बाह्य परिणामांची आहेत. पर्यावरणीय अर्थशास्त्र असे सांगते की या हानिकारक परिणामांची आर्थिक किंमत ठरवून ती प्रदूषण करणाऱ्या घटकांकडून वसूल करणे आवश्यक आहे. त्यामुळेच कार्बन कर, प्रदूषण शुल्क, स्वच्छ ऊर्जा प्रोत्साहन यांसारखे उपाय प्रभावी ठरतात.

परिसंस्था सेवा या मानवी जीवनाचा अविभाज्य भाग आहेत. जंगल, नद्या, समुद्र, पर्वतरांगा या केवळ भौगोलिक घटक नाहीत, तर त्या आपल्याला अन्नधान्य, पाणी, औषधी वनस्पती, परागण, हवामान नियंत्रण, सांस्कृतिक आणि अध्यात्मिक मूल्ये अशा अनेक सेवा पुरवतात. या सेवांचे मूल्य थेट GDP मध्ये मोजले जात नाही, परंतु त्या नसल्या तर अर्थव्यवस्था आणि समाज यांचा पाया कोलमडेल. त्यामुळे परिसंस्था सेवा आर्थिक मूल्यांकनात समाविष्ट करणे ही आजची महत्त्वाची गरज आहे.

भारतीय परिप्रेक्ष्य

भारत हा जगातील सर्वाधिक जैवविविधतेने समृद्ध देशांपैकी एक आहे. पश्चिम घाट, हिमालय, सुंदरबन, राजस्थानचे वाळवंट, तसेच गंगेची खोरे ही परिसंस्था वैश्विक महत्त्वाची आहेत. मात्र वाढते शहरीकरण, औद्योगिकीकरण आणि लोकसंख्येचा ताण यामुळे संसाधनांवर अभूतपूर्व दबाव निर्माण झाला आहे.

भारतामध्ये वायू प्रदूषण ही सर्वात गंभीर समस्या मानली जाते. जागतिक आरोग्य संघटनेच्या आकडेवारीनुसार दरवर्षी लाखो लोक अकाली मृत्यूमुखी पडतात. दिल्लीसारख्या महानगरात हवेची गुणवत्ता अनेकदा आरोग्याला घातक ठरते. याशिवाय गंगा व यमुना नद्यांमधील प्रदूषण, भूमीची धूप, भूजलाचा अतिवापर, तसेच जंगलतोड ही समस्याही दिवसेंदिवस तीव्र होत आहेत.

या पार्श्वभूमीवर भारत सरकारने अनेक पावले उचलली आहेत. राष्ट्रीय हरित लवाद (NGT) पर्यावरणीय न्यायासाठी कार्यरत आहे. राष्ट्रीय हवामान बदल कृती आराखडा (NAPCC) अंतर्गत सौर ऊर्जा, ऊर्जा कार्यक्षमता, शाश्वत कृषी अशा मिशनची अंमलबजावणी केली जात आहे. 'स्वच्छ भारत अभियान', 'नदी पुनरुज्जीवन प्रकल्प', तसेच 'नवीकरणीय ऊर्जेतील गुंतवणूक' या उपक्रमांमध्येही पर्यावरणीय अर्थशास्त्राचे सिद्धांत वापरले जातात.

सैद्धांतिक आधार

पर्यावरणीय अर्थशास्त्र काही महत्त्वाच्या सिद्धांतांवर आधारलेले आहे. पिंगू कर या संकल्पनेनुसार बाह्य परिणामांचे दुष्परिणाम दुरुस्त करण्यासाठी कर लावला जातो. उदाहरणार्थ, कार्बन करामुळे उद्योगांना स्वच्छ तंत्रज्ञान स्वीकारण्याची प्रेरणा

मिळते. कोस सिद्धांतानुसार जर मालकी हक्क स्पष्ट असतील आणि चर्चेची संधी उपलब्ध असेल, तर प्रदूषणाचे निराकरण दोन्ही पक्षांमध्ये परस्पर संमतीने होऊ शकते. तसेच नैसर्गिक भांडवल संकल्पना सांगते की निसर्गालाही भांडवलाचा दर्जा दिला पाहिजे. जमीन, पाणी, हवा आणि जंगल या संसाधनांचे मूल्य आर्थिक नियोजनात समाविष्ट केले नाही, तर दीर्घकालीन विकास शक्य नाही.

निष्कर्ष

पर्यावरणीय अर्थशास्त्र हे केवळ आर्थिक व्यवहारांचा अभ्यास करणारे शास्त्र नाही, तर समाजाच्या शाश्वततेचे महत्त्वाचे साधन आहे. वाढत्या प्रदूषण व हवामान बदलाच्या पार्श्वभूमीवर पर्यावरणाचे योग्य मूल्यांकन करणे, संसाधनांचे शाश्वत व्यवस्थापन करणे आणि परिसंस्थेच्या सेवांना आर्थिक परिभाषा देणे ही काळाची गरज आहे. सामाजिक शाश्वतता फक्त आर्थिक विकासाने साध्य होत नाही, तर विकासासोबत पर्यावरणीय न्याय व संसाधनांचे समतोल यांची हमी मिळाल्यासच ती खरी होते.

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पर्यावरण आणि वैदिक संस्कृती

सुर्यवाड किशोर जळबा

सहाय्यक प्राध्यापक वसंतराव नाईक महाविद्यालय, वसरणी, नांदेड. मु.पो. उस्मान नगर ता. कंधार जि. नांदेड.

भारतीय संस्कृती ही जगातील सर्वात प्राचीन संस्कृतींपैकी एक मानली जाते. तिच्या मूळात असलेला वैदिक कालखंड साधारण इ.स.पू. १५०० ते इ.स.पू. ६०० पर्यंतचा मानला जातो. या काळात मानवाचे जीवन पूर्णपणे निसर्गावर आधारित होते. शेती, पशुपालन, नदीकाठी वस्ती, ऋतुचक्रानुसार जीवनशैली – हे त्यांचे दैनंदिन जीवन होते. त्या काळात आधुनिक यंत्रणा वा औद्योगिक साधनांचा अभाव असल्याने निसर्गाशी असलेला संबंध हा अधिक घनिष्ठ होता. वैदिक साहित्याचा अभ्यास केला तर दिसते की निसर्ग हा त्यांच्या धर्माचा, तत्त्वज्ञानाचा आणि साहित्याचा केंद्रबिंदू होता. गंगा, यमुना, सरस्वती नद्या, गाई, जंगल, सूर्य, वायू, अग्नी – हे सर्व त्यांच्यासाठी दैवताचे रूप होते. त्यामुळे वैदिक संस्कृती ही पर्यावरणाशी एकात्म झालेली व पर्यावरणपूरक संस्कृती होती. आजच्या काळात जेव्हा मानव पर्यावरणाशी विसंगत वर्तन करत आहे, तेव्हा वैदिक संस्कृतीकडून शिकण्यासारखे बरेच काही आहे.

१) वैदिक संस्कृतीतील पर्यावरणाचा पाया

वैदिक समाज शेतीप्रधान होता. सुपीक जमीन, पाणी, नद्या व पावसाचे चक्र हे त्यांच्या जीवनाचे मुख्य आधार होते. गंगा, यमुना, सरस्वती नद्यांच्या काठावर वसलेल्या वस्तीमुळे त्यांना अन्नधान्य, पाणी व वाहतुकीची सोय झाली. गाईला माता मानण्यात आली कारण ती दूध, शेण, मूत्र अशा विविध स्वरूपात उपयुक्त होती. गाईला “अघ्न्या” (कधीही न मारावयाची) असे संबोधले आहे. ऋग्वेदात पर्जन्य देवतेसाठी विशेष प्रार्थना आहे – “पर्जन्यो वृष्टिमायंसत” (ऋ.वे. ५.८३.४) ऋतुचक्राशी सुसंगत अशी त्यांची जीवनपद्धती होती. पावसाळ्यात पेरणी, हिवाळ्यात कापणी आणि उन्हाळ्यात साठवणूक अशी त्यांची कृषिपद्धती होती. यावरून दिसते की वैदिक समाजाचा पाया हा पूर्णतः निसर्गावर आधारित होता.

२) निसर्ग देवता आणि पर्यावरण

वैदिक लोकांनी निसर्गशक्तींना देवतारूप दिले. इंद्र हा पावसाचा व वज्राचा देव होता. पावसाशिवाय शेती होऊ शकत नसल्यामुळे इंद्राला सर्वोच्च स्थान मिळाले. वरुण हा जलदेवता मानला गेला. तो नद्या, समुद्र व पाण्याच्या साठ्यांचा अधिपती मानला गेला. अग्नी हा शुद्धी व उर्जेचे प्रतीक होता; यज्ञांचा केंद्रबिंदू म्हणून त्याला मान्यता होती. सूर्य सविता जीवनदाता मानला गेला कारण प्रकाशाशिवाय जीवन शक्य नाही. वायू देव श्वास व जीवनाचा आधार मानला गेला. पृथ्वीला माता म्हणून पूजले गेले, तिच्या रक्षणासाठी पृथ्वीसूक्तात प्रार्थना आहे. या सर्व देवता प्रत्यक्षात पर्यावरणाचे घटकच होते. त्यामुळे त्यांची पूजा म्हणजे पर्यावरणाचा सन्मान करणे होय.

३) वैदिक साहित्य आणि पर्यावरण

वैदिक साहित्य हे पर्यावरणीय दृष्टिकोनाचे दर्पण आहे. ऋग्वेदात नदीसूक्त (ऋ.वे. १०.७५) मध्ये गंगा, यमुना, सरस्वती व इतर नद्यांची स्तुती केली आहे. पृथ्वीसूक्तात पृथ्वीला माता मानून तिच्या रक्षणाची प्रार्थना आहे. यजुर्वेदात यज्ञसंस्कृतीचा उल्लेख असून त्यातून वायू शुद्ध होतो, वातावरण प्रसन्न राहते असा विश्वास आहे. अथर्ववेदात औषधी वनस्पती, अन्नधान्य, जल यांचा सविस्तर उल्लेख आहे. “ओषधीः शं नो भवन्तु” – औषधी आपल्यासाठी मंगलकारी ठराव्यात अशी प्रार्थना आहे (अथर्व. ५.२८). सामवेद संगीताशी निगडित असून निसर्गातील गोडवा व समन्वय व्यक्त करतो. या सर्व ग्रंथांतून दिसते की वेद हे केवळ धार्मिक ग्रंथ नसून पर्यावरणीय ज्ञानकोश होते.

४) जीवनशैली आणि पर्यावरण

वैदिक लोकांची जीवनशैली निसर्गाशी सुसंगत होती. गुरुकुल पद्धतीत विद्यार्थी जंगलात राहून निसर्गाच्या सहवासात शिक्षण घेत. ऋषींचे आश्रम अरण्यात असल्याने विद्यार्थ्यांना निसर्गाचा थेट अनुभव मिळे. शेती नैसर्गिक पद्धतीने केली जाई; गाईच्या शेणाचा वापर खत म्हणून तर शेणकुट्टीचा वापर इंधन म्हणून होत असे. वने औषधांचा, लाकडाचा व पशुखाद्याचा स्रोत होती. त्यामुळे वने केवळ उपभोगाचा साधन नसून रक्षण करण्याचे साधन होती. पाण्याला पवित्र मानले जाई, नद्या व तलाव

यांची पूजा केली जाई. वायू, अग्नी, जल, पृथ्वी या सर्वांचे रक्षण हे धार्मिक कर्तव्य मानले गेले. जीवनशैली साधी, मितव्ययी आणि पर्यावरणपूरक होती.

५) पर्यावरण संरक्षणाच्या संकल्पना

वैदिक संस्कृतीत पर्यावरण संरक्षण हे धार्मिक व सामाजिक कर्तव्य मानले गेले. निसर्ग देवतांची पूजा केल्यामुळे त्यांचा अपव्यय करणे हे पाप मानले गेले. “अहिंसा परमो धर्मः” या तत्त्वामुळे प्राणीहिंसा मर्यादित होती. यज्ञसंस्कृतीचा उद्देश केवळ धार्मिक नव्हेता तर सामाजिक व पर्यावरणीय होता. ऋतुचक्रानुसार आहार-विहाराचे नियम पाळले जात. उन्हाळ्यात हलका आहार, हिवाळ्यात पौष्टिक आहार – असे नियम होते. पाणी, हवा, जमीन, औषधी यांचा मितव्ययी वापर केला जाई. या संकल्पना आजच्या भाषेत शाश्वत विकास (Sustainable Development) म्हणून ओळखल्या जातात. त्यामुळे वैदिक संस्कृतीत पर्यावरण संवर्धन ही केवळ नैतिक संकल्पना नव्हे तर एक सामाजिक जबाबदारी होती.

६) वैदिक संस्कृतीचा आजच्या काळातील प्रभाव

आजही भारतीय समाजात वैदिक संस्कृतीचा प्रभाव दिसतो. गंगेची पूजा, यमुनेची आरती, नद्यांचे पावित्र्य आजही जपले जाते. पीपळ, वड या झाडांना पवित्र मानले जाते; त्यांची पूजा केली जाते कारण ते दीर्घायुष्य व आरोग्याचे प्रतीक मानले गेले आहेत. ऋतुचक्राशी निगडित सण – मकरसंक्रांत, होळी, वसंतपंचमी – हे आजही साजरे होतात. आयुर्वेद परंपरेत औषधी वनस्पतींवर भर दिला जातो, ही परंपरा वैदिक काळापासून आलेली आहे. साधेपणा, निसर्गाशी जुळवून घेणे, सर्व जीवांचा सन्मान करणे ही मूल्ये आजही भारतीय संस्कृतीत महत्त्वाची मानली जातात. त्यामुळे वैदिक संस्कृती हा पर्यावरणपूरक जीवनपद्धतीचा आदर्श आहे.

निष्कर्ष

१. वैदिक संस्कृती ही पर्यावरणाशी एकात्म झालेली संस्कृती होती.
२. त्या काळात निसर्गाला देवतास्वरूप मानून त्याचे संरक्षण केले जात असे.
३. वैदिक ग्रंथांमध्ये पर्यावरणपूरक विचार व शाश्वत जीवनपद्धतीचे मार्गदर्शन आढळते.
४. वैदिक लोकांची जीवनशैली नैसर्गिक साधनसंपत्तीचा मितव्ययी व संतुलित वापर करणारी होती.
५. आजच्या पर्यावरणीय संकटांचा सामना करण्यासाठी वैदिक संस्कृतीतील शहाणपण आधुनिक समाजासाठी मार्गदर्शक ठरू शकते.

संदर्भ ग्रंथ:-

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ओझोन क्षय आणि जागतिक तापमानवाढ

डॉ. सूर्यकांत नागनाथ कळसकर

भूगोल विभाग प्रमुख, संशोधक मार्गदर्शक, कै. बापूसाहेब पाटील एंक्वेकर कॉलेज, हणेगाव ता. देगलूर जि. नांदेड

प्रस्तावना (Introduction):

आजचे युग म्हणजे विज्ञान आणि तंत्रज्ञानाचे युग आहे. मात्र, या प्रगतीमुळे निसर्गाचे संतुलन ढासळले आहे. पर्यावरणावर विविध प्रकारचे परिणाम होत असून, त्यातील दोन सर्वात गंभीर समस्या म्हणजे ओझोन थराचा क्षय आणि जागतिक तापमानवाढ (Global Warming). या पर्यावरणीय समस्या मानवी अस्तित्वासाठी मोठे आव्हान बनल्या आहेत. तसेच या समस्या जागतिक स्तरावर चिंतेचा विषय ठरल्या आहेत. जरी या दोन्ही समस्या वेगवेगळ्या वाटत असल्या, तरी त्या एकमेकांशी घनिष्ट संबंधित आहेत.

ओझोन थर (Ozone Layer):

पृथ्वी पृष्ठभागापासून वातावरणाच्या उंची विषयी जगात सर्वात पहिल्यांदा सन १७१४ मध्ये ब्रिटीश खगोलशास्त्रज्ञ टॅली यांनी वातावरणाची उंची ७५ कि.मी. आहे असे सांगितले. दुसऱ्या महायुद्धापर्यंत भूपृष्ठापासून वातावरणाचा विस्तार ९६० ते १२२० कि.मी. पर्यंत असावा. असे मानले जात होते. आधुनिक युगात रडार, गुब्बारे, रेडीओ तरंग, रॉकेट, उपग्रह इत्यादीच्या मार्फत वातावरणाची उंची निर्धारित करण्याचे प्रयत्न केले. आधुनिक अंतरिक्ष युगात (Space Age) वातावरणाचा अधिकतम विस्तार ८०००० कि.मी. पेक्षा जास्त असल्याचे स्पष्ट झाले आहे. मात्र अधिक उंचीवर वातावरण विरळ व क्षीण आहे.

स्थितांबराच्या थरामध्ये ओझोनांबर हा थर पृथ्वीच्या पृष्ठभागापासून सुमारे २५ ते ४० कि.मी. उंचीवर आहे. ओझोनांबरातील ओझोन वायुमुळे सूर्याकडून भूपृष्ठाकडे येणारे अल्ट्राव्हायोलेट अदृश्य किरण जे सजीव सृष्टीला हानिकारक असतात त्या किरणांना अडविण्याचे कार्य करतात. ऑक्सिजनच्या परमाणुपी (O_2) ऑक्सिजनच्या मुक्त आणुचा संयोग होऊन ओझोन वायू तयार होतो. $O_2 + O \rightarrow O_3$

जागतिक तापमान वृद्धी (Global Warming)

सूर्यापासून सूर्यमालेतील ग्रहाना उष्णता मिळते. सूर्याकडून दर सेकंदाला सुमारे ३ लक्ष कि.मी. वेगाने प्रवास करणाऱ्या विद्युत चुंबकीय लघुलहरी द्वारे उत्सर्जित होणाऱ्या उर्जेला सौरशक्ती किंवा सौर ऊर्जा (Insolation) असे म्हणतात. या लहरी वातावरणाच्या बाह्य सीमेपाशी येतात तेव्हा त्यांचा ४१% प्रकाशकिरणांचा (सूर्यप्रकाश), सुमारे ९% भाग अतिनिल किरणे (Ultra Violet Rays), गॅमा किरण व क्ष-किरणांचा असतो. हे सर्व किरण लघुलहरीच्या स्वरूपात असतात. सौरशक्तीचा उरलेला ५०% भाग उपारुन किंवा अवरक्त किरणांचा (Infra Red Rays) असतो. उपारुण किरणे दीर्घ लहरीच्या स्वरूपात असतात. ते वातावरणातच शोषले जातात. सामान्यपणे सूर्यापासून उत्सर्जित होणाऱ्या सौरशक्ती पैकी ज्या लघुलहरींची तरंग लांबी (Wave Length) ०.४ ते ०.७ मायक्रॉन (एक मायक्रॉन म्हणजे एका सें. मीटरचा दहा हजारवा भाग) असतो. त्या लहरी वातावरणातून पृथ्वीपर्यंत पोहोचतात त्यांच्यामुळे पृथ्वीच्या पृष्ठभाग तापतो.

बीज संज्ञा :

ओझोन थर, ओझोन क्षय, जागतिक तापमान वाढ, जागतिक तापमान वाढीची कारणे आणि परिणाम.

संशोधनाची उद्दिष्टे (Objectives of Research):

१. ओझोन थराचे स्वरूप आणि त्यावरील मानवी कृतींचा परिणाम समजून घेणे.
२. जागतिक तापमानवाढीची कारणे आणि त्याचे परिणाम विशद करणे.
३. या समस्यांवर उपाय शोधणे व शाश्वत विकासासाठी मार्ग सुचवणे.

विषय विवेचन :

आजचे युग म्हणजे विज्ञान आणि तंत्रज्ञानाचे युग आहे. मात्र, या प्रगतीमुळे निसर्गाचे संतुलन ढासळले आहे. पर्यावरणावर विविध प्रकारचे परिणाम होत असून, त्यातील दोन सर्वात गंभीर समस्या म्हणजे ओझोन थराचा क्षय आणि जागतिक

तापमानवाढ (Global Warming). या पर्यावरणीय समस्या मानवी अस्तित्वासाठी मोठे आव्हान बनल्या आहेत. ओझोन क्षय आणि जागतिक तापमान वाढ याचा जवळचा संबंध आहे.

ओझोन थर आणि त्याचा क्षय (Ozone Layer and Depletion):

जागतिक हवामानशास्त्र संघटना (WMO) ने १९५२ मध्ये वातावरणाच्या विविध थरांची विभागणी करणाऱ्या सीमा निश्चित केलेल्या आहेत. त्या आधारे वातावरणाचे विविध थर त्यामध्ये १. तपांबर २. स्थितांबर ३. आयनांबर ४. बह्यांबर हे आहेत. स्थितांबराच्या थरामध्ये ओझोनांबर हा थर पृथ्वीच्या पृष्ठभागापासून सुमारे २५ ते ४० कि.मी. उंचीवर आहे. ओझोनांबरातील ओझोन वायुमुळे सूर्याकडून भूपृष्ठाकडे येणारे अल्ट्राव्हायोलेट अदृश्य किरण जे सजीव सृष्टीला हानिकारक असतात त्या किरणांना अडविण्याचे कार्य करतात. हे अल्ट्राव्हायोलेट किरण इतके विध्वंसक असतात की त्यांच्यामुळे भूपृष्ठावरील जीवसृष्टी तासाभरात नाहीसी होऊ शकते. म्हणून ओझोन वायूच्या थरास पृथ्वीचे संरक्षण कवच किंवा संरक्षण छत्री म्हणतात. कॅलिफोर्निया विद्यापीठातील मोलिना आणि रोलॅंड या शास्त्रज्ञांनी १९७४-७५ साली ओझोनचा क्षय होत असल्याचे स्पष्ट केले.

मानवी क्रियाकलापांमुळे (विशेषतः CFCs, हॅलॉन, मिथाईल ब्रोमाईड) ओझोन थर नष्ट होऊ लागला आहे. उदाहरणार्थ, अंटार्क्टिक ओझोन छिद्र ही एक जागतिक समस्या बनली आहे. पाश्चिमात्य देशात मोठ्या प्रमाणात रेफ्रिजरेटर, वातानुकूलित यंत्रणा, हेअर ड्रायर्स, कॉस्मेटिक, आगरोधक इ. वस्तूच्या निर्मितीसाठी वापरण्यात येणाऱ्या क्लोरोफ्लुरो कार्बन या रासायनिक संयुगांमुळे ओझोनचा क्षय होतो.

सन १९६० पासून संयुक्त संस्थाने, रशिया, फ्रान्स ही राष्ट्रे अनुस्फोट घडवून आणतात. त्यांच्यातील नायट्रस ऑक्साईडमुळे ओझोनचा क्षय होतो. ही घटना निबंस ३.४ व एक्सलोरर ५, टायरोस ४ या उपग्रहाने पुरविलेल्या माहितीवरून निश्चित झाले होते. ब्रिटिशांच्या अंटार्क्टिका मोहिमेत सन १९८५ साली ४०% ओझोनचा क्षय झाल्याचे लक्षात आले. सन १९८७ सालच्या ब्रिटिशांच्या दुसऱ्या अंटार्क्टिका मोहिमेच्या वेळी संयुक्त संस्थानासारख्या दुष्पट क्षेत्रात ५०% ओझोन वायूच क्षय झाल्याचे लक्षात आले. त्याच मोहिमे दरम्यान काही ठिकाणी ओझोन थरास छिद्र पडल्याचे (१००% ओझोनक्षय) दिसून आले.

वरील प्रकारच्या धोकादायक माहितीचा परिणाम म्हणून १९८७ च्या सप्टेंबर महिन्यात माँट्रियल येथे विकसित देशांची बैठक होवून ओझोन थराच्या क्षयासंबंधित करारावर ३५ देशांनी सह्या केल्या व ओझोनचा क्षय घडवून आणणाऱ्या क्लोरो फ्लुरो कार्बनच्या उत्पादनावर आणि वापरावर बंदी घालण्यात आली. १९८९ च्या लंडन कॉन्फरन्समध्ये ओझोन क्षयासंबंधित अनेक बंधने घातली आहे.

जागतिक तापमानवाढ (Global Warming) :

जागतिक तापमानवाढ म्हणजे पृथ्वीच्या सरासरी तापमानात वाढ होणे. पृथ्वीच्या पृष्ठभागाचे तापमान सरासरी १५° से. आहे. पृथ्वीने सौरशक्तीचे केवळ ग्रहण अथवा शोषण केले असते तर पृथ्वीचे तापमान प्रचंड प्रमाणात वाढले असते. परंतु तसे होत नाही. पृथ्वीने ग्रहण केलेली सौरशक्ती भौतिक उर्जेत रुपांतरीत केली जाते व भूपृष्ठावरून वातावरणात दीर्घ लहरीच्या (Long Waves) स्वरूपात उत्सर्जित केली जाते. अशा प्रकारे पृथ्वीने ग्रहण केलेली सौरशक्ती व उत्सर्जित केलेली उष्णता यांचे प्रमाण समान असते. म्हणूनच पृथ्वीचे तापमान स्थिर राहते. पृथ्वीपासून उत्सर्जित होणाऱ्या उष्णतेमुळे वातावरण तापते. त्यामुळे वातावरणाच्या तपांबर थरात तापमान भूपृष्ठापासून जसजसे उंच जावे तसतसे कमी होत जाते.

जागतिक तापमान वृद्धीची कारणे (Causes of Global Warming):

जागतिक तापमानवृद्धीस वातावरणातील हरीतगृह परिणाम वायूंचे वाढते प्रमाण व ओझोन थराचा क्षय या दोन गोष्टी प्रामुख्याने कारणीभूत आहेत. कार्बन डाय ऑक्साईड, पाण्याची वाफ, मिथेन, नायट्रस ऑक्साईड, ओझोन आणि CFC यांचा हरितगृह परिणाम साधणाऱ्या वायूत समावेश होतो. या सर्वांना "हरितगृह वायू" (Green House Gases) असे म्हणतात.

हरितगृह वायूंचे वाढते प्रमाण :

हरितगृह वायूंच्या वाढत जाणाऱ्या प्रमाणामुळे पृथ्वीच्या तापमानात वाढ होते.

१. कार्बन डाय ऑक्साईड (CO₂): पृथ्वीवर गिरण्या, कारखाने व स्वयंचलीत वाहनात दगडी कोळसा खनिजतेल, नैसर्गिक वायू इत्यादी इंधनांचा वापर प्रचंड प्रमाणात वाढला आहे. त्यामुळे वातावरणात फार मोठ्या प्रमाणात कार्बनडाय ऑक्साईड वायू सोडला जातो. विविध मानवी क्रियांमुळे वातावरणात मिसळणाऱ्या कार्बनडाय ऑक्साईडची उगमस्थाने पुढील प्रमाणे आहेत.

i) औष्णिक वीज निर्मिती केंद्रे ii) स्वयंचलीत वाहनातील इंधन ज्वलन iii) कारखाने iv) वणवे

v) इतर कारणे : घरगुती इंधनाचा वापर, दगडी कोळशाच्या खाणींना लागणाऱ्या आगी, जंगल तोडीमुळे वनस्पतीकडून कार्बन डाय ऑक्साईड ग्रहणात घट व मानवाच्या व प्राण्याच्या श्वसन या कारणामुळे वातावरणात कार्बन डाय ऑक्साईडचे प्रमाण वाढते.

२. क्लोरोफ्ल्युरो कार्बन (CFC) :

क्लोरोफ्ल्युरो कार्बन या द्रव्यांचा उपयोग शीत पेठ्या (रिफ्रीजरेटर्स), एरोस्प्रे व अग्निशामक द्रव्यांमध्ये केला जातो. CFC द्रव्ये भूपृष्ठावर निरुपद्रवी आहेत. ती स्वस्त सहज उत्पादन करून साठवून ठेवता येण्याजोगी बिनविषारी व उपयुक्त आहेत. इ.स.न १९५० मध्ये CFC युक्त हेअर स्प्रेचे उत्पादन सुरु झाले. आज एरोसोल स्प्रे उद्योगात प्रतिवर्षी सुमारे १ दशलक्ष टनापेक्षा जास्त CFC वापरला जातो. तपांब्रामध्ये CFC चे रासायनिक अथवा जैविक विघटन होत नाही. त्यामुळे त्याचे वातावरणात प्रमाण वाढत जाते. हरीतगृह वायू म्हणून CFC अतिशय उपद्रवकारक आहे. कार्बन डाय ऑक्साईडच्या १०,००० परमाणूमुळे (Molecule) जितकी तापमान वृद्धी होते तितकी CFC च्या केवळ एका परमाणू मुळे होते. इ.स. १९८६ मध्ये CFC-११ व CFC-१२ यांचे प्रमाण अनुक्रमे २३०PPt व ४००PPt आढळलेले आहे. (PPt -Parts Per Trillion पदमातील भाग). CFC चे वातावरणातील प्रमाण प्रतिवर्षी ५ टक्केनी वाढत आहे.

३. मिथेन (CH) :

मिथेन वायूचा इंधनवायू म्हणून वापर केला जातो. औद्योगिक क्रांती पूर्वी त्याचे वातावरणातील प्रमाण नगण्य म्हणजे ०.७५PPM होते. इ.स. १९८६ मध्ये ते १६५ PPM झाले. मिथेनची तापमान वृद्धी क्षमता CO₂ च्या २० ते ३० पट जास्त आहे.

४. नायट्रस ऑक्साईड (N₂O):

नायट्रोजन युक्त रासायनिक खातांच्या वापरामुळे शेतातून वातावरणात मिसळणाऱ्या नायट्रस ऑक्साईड वायूचे प्रमाण सुध्दा वाढत आहे.

जागतिक तापमान वृद्धीचे परिणाम : (Effects of Global Warming)

IPCC (Inter Governmental Panel on Climatic Change) च्या अंदाजानुसार दर दशकात ०.२° से. तापमान वृद्धी दराने २१व्या शतकाच्या मध्यावर १° ते १.५° से पृथ्वीच्या सरासरी तापमानात वृद्धी होईल. ती सुध्दा पृथ्वीवर अनिष्ट परिणाम घडवून आणण्यास पुरेशी असेल. हे अनिष्ट परिणाम पुढील प्रमाणे असतील.

१. ध्रुवीय प्रदेशातील व उंच पर्वतीय प्रदेशातील बर्फ वितळू लागेल.
२. समुद्रपातळी वाढ, सागराची अम्लता वाढून सागरी जीवसृष्टीवर परिणाम.
३. दुष्काळ, अतिवृष्टी, पूर, वायुभार स्थिती, वारे यामध्ये बदल.
४. शेती व अन्नसुरक्षेवर परिणाम, अन्न धान्य टंचाई व पाणी टंचाई
५. जैवविविधतेचा ऱ्हास, सूक्ष्म जीवाणू व विषाणू च्या प्रमाणात वाढ आणि साथ रोगाचे प्रमाणात वाढ.

ओझोन क्षय आणि जागतिक तापमान वाढीचा परस्परसंबंध (Correlation Between Ozone Depletion and Global Warming):

1. CFCs हे रसायन ओझोन थर नष्ट करण्यास जबाबदार असले तरी ते हरितगृह वायूंसारखेही कार्य करतात.
2. ओझोन थर नष्ट झाल्यास अतिनील किरणांची तीव्रता वाढते, त्यामुळे जमिनीच्या पृष्ठभागाचे तापमानही वाढते.
3. वातावरणातील असमतोल हवामान चक्रात गोंधळ निर्माण करतो – यामुळे हवामान बदल अधिक तीव्र होतो.
4. तापमानवाढीचा परिणाम वायुमंडळातील रासायनिक प्रक्रियांवर होतो, ज्यामुळे ओझोन थराची पुनर्बांधणी (recovery) देखील प्रभावित होते.

5. आकडेवारी (Data & Statistics):

घटक	1980 मध्ये	2020 मध्ये
ओझोन थर जाडी	(Dobson Units)~300 DU	काही भागात < 220 DU
CO ₂ चे प्रमाण	(ppm)338 ppm	~415 ppm
पृथ्वीचे सरासरी तापमान	13.8°C	14.9°C

उपाययोजना (Solutions & Mitigation Strategies):

1. मॉन्ट्रियल करार (1987): CFCs आणि इतर ओझोन-विघातक रसायनांवर आंतरराष्ट्रीय बंदी.
2. पॅरिस करार (2015): जागतिक तापमानवाढ 1.5°C च्या खाली ठेवण्याचे उद्दिष्ट.
3. नवीकरणीय ऊर्जा वापर: सौर, पवन आणि जलविद्युताचा प्राधान्याने वापर.
4. वनसंवर्धन: वृक्षारोपण, जंगलतोड रोखणे.
5. जनजागृती व पर्यावरण शिक्षण: शाळांमध्ये, महाविद्यालयांमध्ये व समाजात पर्यावरण संरक्षणाची जाणीव निर्माण करणे.

निष्कर्ष (Conclusion):

ओझोन क्षय आणि जागतिक तापमानवाढ ही केवळ वैज्ञानिक किंवा राजकीय समस्या नसून मानवी अस्तित्वाशी संबंधित वैश्विक संकटे आहेत. या दोन्ही संकटांना हाताळण्यासाठी जागतिक स्तरावर तसेच स्थानिक स्तरावर सामूहिक प्रयत्न, शाश्वत विकास आणि जबाबदार जीवनशैली यांची नितांत गरज आहे.

"आपले पर्यावरण वाचवणे म्हणजे आपले भविष्य वाचवणे होय."

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6. डॉ. सुभाषचंद्र सारंग, पर्यावरण भूगोल, विद्या प्रकाशन नागपूर.
7. डॉ. तु. या. वराट आणि प्रा. श. अं. बोरुडे, पर्यावरण भूगोल विद्या बॉक्स पब्लिशर्स औरंगाबाद

नैसर्गिक संसाधनांच्या वापराचा आर्थिक इतिहास

सुभाष ज्ञानेश्वरराव गोटफोडे

संशोधक विद्यार्थी

संशोधन केंद्र :

श्री शिवाजी कला व वाणिज्य

महाविद्यालय, अमरावती

प्रा. डॉ. किशोर वि. साबळे

सहा. प्राध्यापक

अर्थशास्त्र विभाग प्रमुख

श्री शिवाजी कला व वाणिज्य

महाविद्यालय, अमरावती

शोधनिबंधाचा सारांश

या संशोधनात भारतातील नैसर्गिक संसाधनांच्या वापराचा ऐतिहासिक दृष्टिकोनातून अभ्यास केला आहे. औपनिवेशिक काळापासून ते आजपर्यंत कोळसा, लोखंड, वन संपदा, जल संसाधने आणि इतर खनिजांचे शोषण आणि वापर यांचा आर्थिक विकासावरील प्रभाव तपासला आहे. संशोधनात असे दिसून आले आहे की ब्रिटिश काळात भारताचे औद्योगिकीकरण रोखले गेले परंतु स्वातंत्र्यानंतर योग्य धोरणे राबवून संसाधनांचा वापर करून आर्थिक प्रगती साधली गेली. तथापि, पर्यावरणीय हानी आणि शाश्वत विकासाच्या आव्हानांकडे लक्ष देणे आवश्यक आहे. भारताच्या नैसर्गिक संसाधनांचा आर्थिक इतिहास हा मानवी सभ्यतेच्या विकासाची एक जटिल गाथा आहे जी औपनिवेशिक शोषणापासून ते आधुनिक स्वतंत्र भारतातील स्थिर विकासापर्यंतच्या प्रवासाचे चित्रण करते. या संशोधन प्रबंधात प्राकृतिक संसाधनांच्या वापराने भारतीय अर्थव्यवस्थेवर कसा प्रभाव पाडला याचे सविस्तर विश्लेषण केले आहे. ब्रिटिश काळातील ४५ ट्रिलियन डॉलरच्या संपत्तीचे शोषण ते आजच्या काळातील १०४७ दशलक्ष टन कोळसा उत्पादनापर्यंतची ही यात्रा भारताच्या आर्थिक परिवर्तनाची साक्ष देते.

बीज शब्द :- नैसर्गिक संसाधने, आर्थिक इतिहास, औपनिवेशिक शोषण, कोळसा उत्पादन, शाश्वत विकास, खनिज धोरण, जल व्यवस्थापन

प्रास्ताविक :-

भारत हा जगातील सर्वात मोठ्या नैसर्गिक संसाधन भांडारांपैकी एक आहे. जगाच्या केवळ २.४% भूभागावर असूनही भारताकडे विविध प्रकारचे खनिज, जंगले, जल संसाधने आणि कृषीयोग्य जमीन आहे. कोळशाच्या साठ्यांमध्ये जगात चौथे स्थान, लोखंडाच्या साठ्यांमध्ये सातवे स्थान आणि बॉक्साईटमध्ये पाचवे स्थान असलेला भारत संसाधनांच्या दृष्टीने एक संपन्न राष्ट्र आहे; परंतु या संसाधनांचा वापर केवळ भौगोलिक उपलब्धतेवर अवलंबून नाही तर त्याचा ऐतिहासिक, राजकीय आणि आर्थिक संदर्भ महत्वाचा आहे. औपनिवेशिक काळापूर्वी भारत जगातील एकूण औद्योगिक उत्पादनाच्या २५% भागाची निर्मिती करत होता, परंतु १९०० पर्यंत हा आकडा केवळ २% पर्यंत घसरला. या घसरणीमागे ब्रिटिशांच्या नैसर्गिक संसाधनांचे शोषण आणि भारतीय उद्योगांचे उद्ध्वंस हे प्रमुख कारण होते.

शोध निबंध लिहिण्याची पद्धत :-

या संशोधनासाठी द्वितीयक माहितीचा वापर करण्यात आला आहे. सरकारी अहवाल, आकडेवारी, शैक्षणिक पुस्तके, संशोधन पत्रिका, ऐतिहासिक दस्तऐवज आणि आंतरराष्ट्रीय संस्थांचे अहवाल यांचा समावेश करण्यात आला आहे. भारतीय खाण ब्युरो, कोळसा मंत्रालय, पर्यावरण मंत्रालय आणि योजना आयोगाचे दस्तऐवज यांचा विशेष उपयोग केला आहे. तुलनात्मक पद्धतीचा वापर करून औपनिवेशिक काळ आणि स्वातंत्र्योत्तर काळातील संसाधन वापराचे विश्लेषण केले आहे.

गृहितके :-

- 1) औपनिवेशिक काळात भारतातील नैसर्गिक संसाधनांचा वापर मुख्यतः ब्रिटिश साम्राज्याच्या हितासाठी झाला आणि भारतीय अर्थव्यवस्थेच्या विकासास बाधक ठरला.

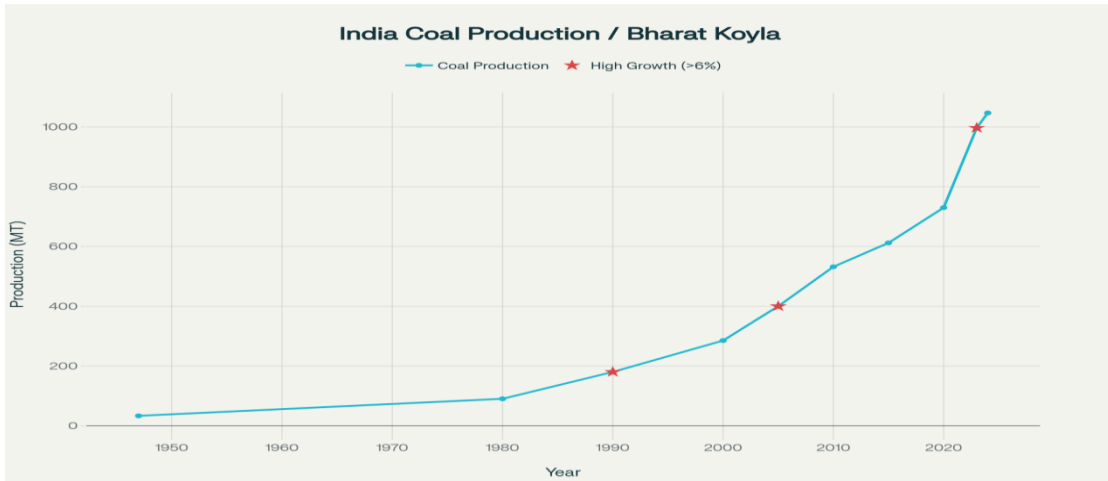
- 2) स्वातंत्र्यानंतर योजनाबद्ध आर्थिक धोरणे आणि राष्ट्रीय खनिज नीती यामुळे संसाधनांचा अधिक प्रभावी वापर झाला आणि आर्थिक वृद्धी साधली गेली.
- 3) नैसर्गिक संसाधनांचे अनियंत्रित शोषण पर्यावरणीय हानी आणि शाश्वत विकासातील अडथळे निर्माण करते.

शोधनिबंधाची उद्दिष्टे :-

- 1) भारतातील नैसर्गिक संसाधनांच्या वापराचा ऐतिहासिक विकास आणि त्याचा आर्थिक प्रभाव यांचे विश्लेषण करणे.
- 2) औपनिवेशिक काळ आणि स्वातंत्र्यानंतरच्या काळातील संसाधन व्यवस्थापन धोरणांची तुलना करणे.
- 3) नैसर्गिक संसाधनांचे शोषण, आर्थिक विकास आणि पर्यावरणीय प्रभाव यांच्यातील संबंध तपासणे.
- 4) भविष्यातील शाश्वत संसाधन व्यवस्थापनासाठी धोरणात्मक शिफारशी देणे.

औपनिवेशिक काळातील संसाधन शोषणाचा इतिहास :-

ब्रिटिश राजवटीत भारतातील नैसर्गिक संसाधनांचे शोषण हे साम्राज्यवादी धोरणाचा मुख्य आधार होता. उत्सा पटनाईक यांच्या संशोधनानुसार १७६५ ते १९३८ पर्यंत ब्रिटनने भारतातून सुमारे ४५ ट्रिलियन डॉलर मूल्याची संपत्ती काढली. ऑक्सफॅमच्या अहवालानुसार १७६५ ते १९०० दरम्यान ६४.८२ ट्रिलियन डॉलर मूल्याची संपत्ती काढली गेली, त्यातील ५२% ब्रिटनच्या सर्वात श्रीमंत १०% लोकांकडे गेली.



भारतातील कोळसा उत्पादन (1947-2024) - India's Coal Production Historical Trends

- राज्यनिहाय खनिज उत्पादन, ओडिशा ४४.११%, छत्तीसगढ १७.३४%
- पर्यावरणीय नुकसान, वार्षिक ६०,५०० कोटी रुपये
- रोजगार आकडे, ४४ लाख लोकांना रोजगार (प्रत्यक्ष + अप्रत्यक्ष)
- कोळसा उत्पादन १९४७-२०२४, ३३ मे.टन ते १०४७ मे.टन (३०७२.७% वाढ)

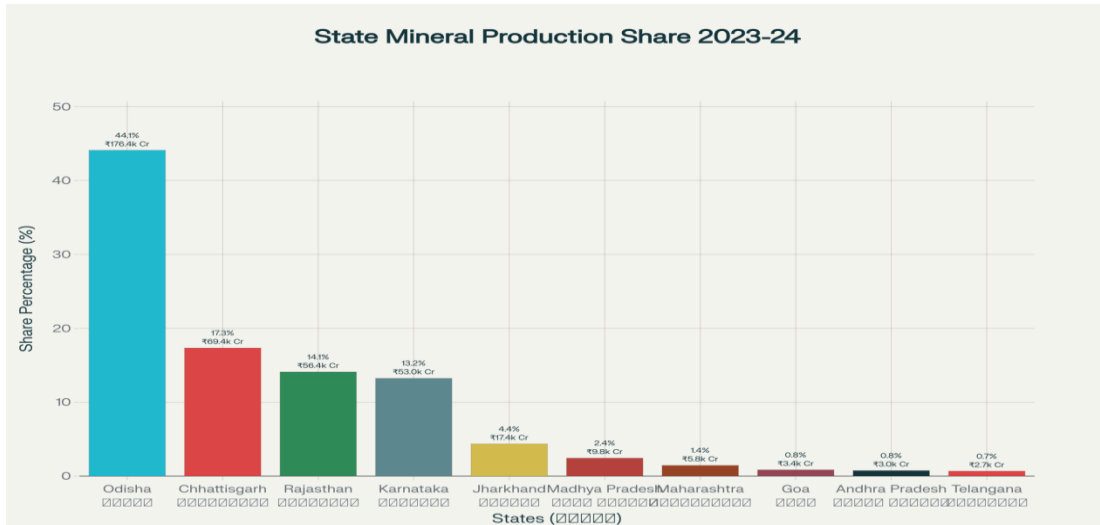
ईस्ट इंडिया कंपनीने १७७४ पासून कोळशाचे व्यावसायिक उत्पादन सुरू केले. रानीगंज कोळसाखाणीतून सुरू झालेले हे उत्पादन मुख्यतः रेल्वे आणि पोत वाहतुकीसाठी होते. १८५३ मध्ये भारतात पहिली रेल्वे सुरू झाल्यानंतर कोळशाची मागणी वाढली आणि १९४६ पर्यंत उत्पादन ३० दशलक्ष टन पर्यंत पोहोचले; परंतु हे सर्व उत्पादन ब्रिटिश हितासाठी होते आणि भारतीय अर्थव्यवस्थेचा फायदा कमी होता. वन संसाधनांच्या बाबतीत ब्रिटिशांनी भारतीय वनांचे मोठ्या प्रमाणावर तोड केले. रेल्वेच्या पटरीसाठी, जहाज बांधणीसाठी आणि इतर औद्योगिक गरजांसाठी जंगलांची कत्तल केली गेली. औपनिवेशिक वन धोरण ही मूळ भारतीय वन पारिस्थितिकी तंत्राचा नाश करणारी होती. स्थानिक समुदायांना त्यांच्या पारंपारिक वन हक्कांपासून वंचित केले गेले.

स्वातंत्र्यानंतरच्या संसाधन विकास धोरणांचा उदय :-

१९४७ नंतर भारताने संसाधन विकासासाठी नियोजित दृष्टिकोन स्वीकारला. खनिज संसाधनांच्या विकासासाठी १९४८ मध्ये माइन्स अँड मिनरल्स अॅक्ट लागू केला गेला. तसेच भारतीय खाण ब्यूरोची (IBM) स्थापना करण्यात आली. १९५० च्या दशकात राष्ट्रीय खनिज विकास महामंडळ (NMDC) आणि स्टील अथॉरिटी ऑफ इंडिया (SAIL) सारख्या सार्वजनिक संस्थांची निर्मिती केली गेली. या संस्थांनी भारताच्या औद्योगिकीकरणात महत्वाची भूमिका बजावली. भाखरा नागल, हीराकुड, दामोदर व्हॅली सारख्या मोठ्या प्रकल्पांमुळे सिंचन क्षमता वाढली आणि वीज निर्मिती वाढली. कोळसा उद्योगाचे १९७३ मध्ये राष्ट्रीयीकरण करण्यात आले. कोकिंग कोळशाची खाणी १९७१-७२ मध्ये आणि नॉन-कोकिंग कोळशाची खाणी १९७३ मध्ये राष्ट्रीयीकृत केली गेली. या निर्णयामुळे कोळसा उत्पादनावर सरकारचे पूर्ण नियंत्रण आले आणि कोळसा इंडिया लिमिटेडची स्थापना झाली.

आर्थिक उदारीकरण आणि संसाधन व्यवस्थापनातील बदल :-

१९९१ च्या आर्थिक उदारीकरणानंतर भारतीय खनिज क्षेत्रात खाजगी गुंतवणुकीस परवानगी देण्यात आली. १९९३ मध्ये पहिली राष्ट्रीय खनिज नीति जाहीर करण्यात आली जी खाजगी क्षेत्राला प्रोत्साहन देणारी होती. या धोरणामुळे रिओ टिटो, डी बिअर्स, बीएचपी बिलिटन सारख्या आंतरराष्ट्रीय कंपन्यांनी भारतात गुंतवणूक केली. २००८ मध्ये दुसरी राष्ट्रीय खनिज नीति आली आणि २०१९ मध्ये सर्वात अद्ययावत राष्ट्रीय खनिज नीति लागू करण्यात आली. २०१९ च्या नीतीत खाणकामाला उद्योगाचा दर्जा देण्यात आला, पारदर्शी लिलावी प्रक्रिया, पर्यावरणीय शाश्वतता आणि प्रभावित समुदायांच्या कल्याणावर भर देण्यात आला.

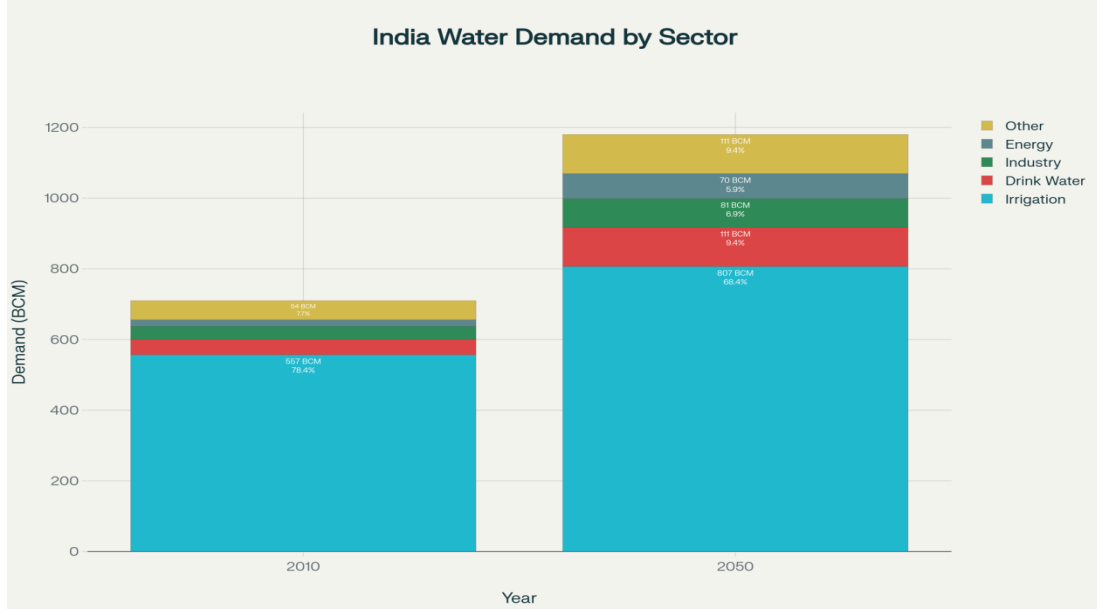
कोळसा क्षेत्राची प्रगती आणि आव्हाने :-**भारतातील राज्यनिहाय खनिज उत्पादन (२०२३-२४) - State-wise Mineral Production in India**

भारताचे कोळसा उत्पादन स्वातंत्र्यानंतर झपाट्याने वाढले आहे. १९४७ मध्ये ३३ दशलक्ष टन उत्पादन होते जे २०२४ मध्ये १०४७ दशलक्ष टन पर्यंत पोहोचले आहे. भारत आता चीननंतर जगातील दुसरा सर्वात मोठा कोळसा उत्पादक आहे. कोळसा उत्पादनाची वाढ भारताच्या ऊर्जा सुरक्षिततेसाठी महत्वाची आहे. भारतात ७४% वीज निर्मिती कोळश्यावर आधारित आहे. तथापि, कोळसा खाणकामामुळे गंभीर पर्यावरणीय समस्या निर्माण झाल्या आहेत. कॅंग च्या अहवालानुसार २८ कोळसा खाणींपैकी ८ खाण्यांमध्ये जल प्रदूषण निर्धारित मर्यादा ओलांडले आहे. वायु प्रदूषणाच्या बाबतीत ६ खाण्यांमध्ये PM10 आणि PM2.5 चे प्रमाण राष्ट्रीय मानकांपेक्षा जास्त आहे. छत्तीसगढ आणि मध्य प्रदेशातील तीन कोळसा खाण्यांच्या अभ्यासात असे दिसून आले आहे की ३५% मूळ भू-आच्छादन नष्ट झाले आहे.

●राज्यनिहाय खनिज उत्पादन, ओडिशा ४४.११%, छत्तीसगढ १७.३४%

- पर्यावरणीय नुकसान, वार्षिक ६०,५०० कोटी रुपये
- रोजगार आकडे, ४४ लाख लोकांना रोजगार (प्रत्यक्ष + अप्रत्यक्ष)
- कोळसा उत्पादन १९४७-२०२४, ३३ मे.टन ते १०४७ मे.टन (३०७२.७% वाढ)

जल संसाधन व्यवस्थापनाची आव्हाने :-



भारतातील जल संसाधन मागणी प्रक्षेपण (2010-2050) - India's Water Resources Demand Projections

भारताकडे जगातील केवळ ४% जल संसाधने आहेत परंतु जगाची १८% लोकसंख्या आहे. हे असंतुलन भारतासमोर गंभीर जल संकट निर्माण करते. २०५० पर्यंत भारताची एकूण जल मागणी ११८० अब्ज घनमीटर होईल, जी २०१० च्या ७१० अब्ज घनमीटरच्या तुलनेत ६६% वाढ दर्शवते. सर्वात चिंताजनक बाब म्हणजे ऊर्जा क्षेत्राची जल मागणी २००७५ मध्ये २८९% वाढेल. यामध्ये कोळसा आधारित वीज निर्मिती प्रकल्प मुख्य भूमिका बजावतात. सिंचनाचा वाटा ७८.४% वरून ६८.४% पर्यंत कमी होईल परंतु पिण्याच्या पाण्याची मागणी १५८% वाढेल. भूगर्भीय जलाचे अतिशोषण हा आणखी एक मोठा प्रश्न आहे. पंजाब, हरयाणा, राजस्थान आणि तामिळनाडू सारख्या राज्यांमध्ये भूगर्भीय जलाचे शोषण ७०% पेक्षा जास्त आहे. जागतिक बँकेच्या अतल भुजल योजनेअंतर्गत समुदाय आधारित जल व्यवस्थापनाचे प्रयत्न सुरू आहेत.

वन संसाधनांचे संरक्षण आणि निकृष्टीकरण :-

भारतातील वन क्षेत्र २००० ते २०१० दरम्यान ०.७% वार्षिक वाढीने वाढले. २०१९ मध्ये एकूण वन आच्छादन २४.५६% होते. तथापि, वनांच्या गुणवत्तेत घट होत आहे. २०१९ ते २०२१ दरम्यान १५,१८३ चौरस किलोमीटर वन क्षेत्राची गुणवत्ता बिघडली आहे. यातील ९,११७ चौरस किलोमीटर वन क्षेत्र पूर्णपणे नष्ट झाले आहे. २०१५ ते २०२१ दरम्यान ७४,४५७ चौरस किलोमीटर वन क्षेत्राचे निकृष्टीकरण झाले आहे. हे तेलंगणा राज्याच्या अर्ध्या क्षेत्रफळाइतके आहे. खाणकामामुळे वनांचे सर्वात जास्त नुकसान होते. विशेषतः पूर्व भारतातील कोळसा पट्टीत वन आच्छादन कमी होत आहे. कोळसा खाण्यांमुळे ७.३२% ते १७.६१% वन आच्छादन कमी झाले आहे.

खनिज संपदा आणि आर्थिक विकास :-

भारताच्या खनिज संपत्तीचे राष्ट्रीय अर्थव्यवस्थेत महत्वाचे योगदान आहे. २०२३ मध्ये प्रमुख खनिजांचे उत्पादन लक्षणीय होते, कोळसा ९९७ दशलक्ष टन, लोखंड २७० दशलक्ष टन, बॉक्साईट २६ दशलक्ष टन, मँगनीज ४.२ दशलक्ष टन [calculated from web sources]. महाराष्ट्र राज्याचा उदाहरण घेतल्यास, तेथे नैसर्गिक संसाधनांचा आर्थिक विकासातील योगदान स्पष्ट

दिसतो. विदर्भ प्रदेशात कोळशाचे मोठे साठे आहेत. मुंबई हाय तेल क्षेत्र भारताच्या कच्चा तेल उत्पादनात महत्वाचा वाटा उचलते. राज्यात ४४,००० मेगावॅट वीज निर्मिती क्षमता आहे.

पर्यावरणीय प्रभाव आणि शाश्वत विकासाची आवश्यकता :-

नैसर्गिक संसाधनांचे अनियंत्रित शोषण गंभीर पर्यावरणीय समस्या निर्माण करते. कोळसा खाणकामामुळे वायु प्रदूषण, जल प्रदूषण आणि मातीचे क्षरण होते. खाणकामामुळे प्रभावित जमिनीचे पुनर्वसन करणे आवश्यक आहे परंतु सध्याच्या मार्गदर्शक तत्वांमध्ये व्यापक कानूनी आणि परिमाणात्मक फ्रेमवर्कचा अभाव आहे. राष्ट्रीय खनिज नीति २०१९ मध्ये शाश्वत विकासावर भर देण्यात आला आहे. आंतरपिढी समानता (Intergenerational Equality) ची संकल्पना मांडून वर्तमान आणि भविष्यातील पिढ्यांचे कल्याण लक्षात घेण्यात आले आहे.

मूल्यमापन :-

या संशोधनातून असे स्पष्ट होते की भारतातील नैसर्गिक संसाधनांच्या वापराचा आर्थिक इतिहास तीन मुख्य टप्प्यांत विभागला जाऊ शकतो, औपनिवेशिक शोषणाचा काळ, स्वातंत्र्यानंतरचा नियोजित विकासाचा काळ आणि उदारीकरणानंतरचा बाजार आधारित विकासाचा काळ. औपनिवेशिक काळात संसाधनांचे शोषण हे मुख्यतः ब्रिटिश साम्राज्याच्या हितासाठी झाले. भारतीय अर्थव्यवस्थेचे औद्योगिकरण रोखले गेले आणि कच्च्या मालाचा निर्यातक बनवले गेले. स्वातंत्र्यानंतर राष्ट्रीय हितासाठी संसाधनांचा वापर सुरू झाला आणि औद्योगिकीकरण वेग घेतले. १९९१ नंतर खाजगी क्षेत्राच्या सहभागामुळे उत्पादनात लक्षणीय वाढ झाली. तथापि, पर्यावरणीय हानी ही एक मोठी चिंता आहे. शाश्वत विकासाचे मॉडेल अवलंबणे आवश्यक आहे. राष्ट्रीय खनिज नीति २०१९ या दिशेने पहिले पाऊल आहे परंतु अजून भरपूर कार्य करावे लागेल.

निष्कर्ष :-

- 1) औपनिवेशिक शोषण, ४५ ट्रिलियन डॉलर
- 2) कोळसा वाढ, ३३ मे.टन ते १०४७ मे.टन (३१७२.७% वाढ)
- 3) रोजगार, ४४ लाख लोकांना रोजगार
- 4) पर्यावरणीय नुकसान, ६०,५०० कोटी/वर्षी
- 5) राज्य वितरण, ओडिशा ४४.११% वाटा
- 6) पर्यावरणीय चिंता, ३५% मूळ भूमी आच्छादन नष्ट
- 7) भविष्यातील आव्हाने, २०५० पर्यंत जल मागणी ६६% वाढ

नैसर्गिक संसाधनांचा आर्थिक इतिहास हा शोषणापासून विकासाकडे आणि आता शाश्वततेकडे जाण्याची गाथा आहे. औपनिवेशिक काळातील ४५ ट्रिलियन डॉलरचे शोषण भारताच्या आर्थिक विकासावर दीर्घकाळ परिणाम करत राहिले. स्वातंत्र्यानंतर योजनाबद्ध विकासांमुळे संसाधनांचा राष्ट्रीय हितासाठी वापर सुरू झाला. कोळसा उत्पादन ३३ दशलक्ष टन (१९४७) वरून १०४७ दशलक्ष टन (२०२४) पर्यंत पोहोचणे हे भारताच्या औद्योगिक प्रगतीचे प्रतिबिंब आहे. तथापि, ३५% मूळ भूमी आच्छादन नष्ट, वन आच्छादनाचे निकृष्टीकरण, जल संकट आणि वायु प्रदूषण या समस्या गंभीर आहेत. भविष्यात भारताला आर्थिक विकास आणि पर्यावरण संरक्षण यामध्ये समतोल साधावा लागेल. नवीकरणीय ऊर्जा, वृत्तीय अर्थव्यवस्था आणि हरित तंत्रज्ञानाचा अवलंब करावा लागेल.

उपाययोजना :-

- 1) धोरणात्मक सुधारणा, राष्ट्रीय खनिज नीति २०१९ च्या प्रभावी अंमलबजावणी करून पर्यावरणीय मानकांचे कडक पालन करावे. खाणकामानंतर जमिनीच्या पुनर्वसनासाठी कडक कायदे बनवावेत.
- 2) तंत्रज्ञान सुधारणा, स्वच्छ कोळसा तंत्रज्ञान, कार्बन कॅप्चर आणि स्टोरेज तंत्रज्ञान यांचा वापर वाढवावा. नवीकरणीय ऊर्जेकडे हळूहळू संक्रमण करावे.

- 3) जल व्यवस्थापन, समुदाय आधारित जल संरक्षण, भूगर्भीय जल पुनर्भरण आणि कार्यक्षम सिंचन पद्धती वापराव्यात. जल पुनर्वापर आणि वर्षाव जल संचयन वाढवावे.
- 4) वन संरक्षण, मूळ वृक्ष प्रजातींचे संरक्षण करावे. खाणकामामुळे नष्ट झालेल्या वनांच्या जागी मूळ पारिस्थितिकी तंत्र पुनर्स्थापित करावे.

समारोप :-

नैसर्गिक संसाधनांचा आर्थिक इतिहास भारताच्या संपूर्ण विकास प्रवासाचा आधार आहे. औपनिवेशिक शोषणाच्या काळातून बाहेर पडून भारताने स्वतःच्या संसाधनांचा उपयोग करून आर्थिक प्रगती साधली आहे. आज भारत जगातील दुसरा सर्वात मोठा कोळसा उत्पादक आणि वेगाने वाढणारी अर्थव्यवस्था आहे; परंतु भविष्यातील आव्हाने अधिक गुंतागुंतीची आहेत. हवामान बदल, पर्यावरण निकृष्टीकरण आणि संसाधन न्हास या आव्हानांना तोंड देण्यासाठी भारताला शाश्वत विकासाचा मार्ग स्वीकारावा लागेल. आर्थिक वृद्धी, सामाजिक न्याय आणि पर्यावरणीय संरक्षण या तिन्ही उद्दिष्टांमध्ये समतोल साधणे हेच भविष्यातील विकासाचे मूलमंत्र असावे.

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- 10) नीति आयोग (२०१९), खनिज व खाणकामाचा सामाजिक-आर्थिक प्रभाव अभ्यास. नवी दिल्ली, नीति आयोग.
- 11) भारतीय भूगर्भ सर्वेक्षण (२०२२), वार्षिक अहवाल २०२१-२२. कोलकाता, GSI प्रकाशन.
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- 14) केंग (२०२४), कोळसा खाणकामामुळे होणारे प्रदूषणाचे मूल्यांकन. नवी दिल्ली, भारताचे नियंत्रक व महालेखापरीक्षक.
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पर्यावरण आणि शाश्वत विकास

डॉ. कोंडीबा रामराव कांदे

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प्रस्तावना-

अनादी काळापासून मानव हा पर्यावरणावर अवलंबून होता. त्यामुळे त्याचा पर्यावरणाशी अगदी जवळचा संबंध आला आहे. निसर्गामध्ये बदल घडविणे, नियंत्रण ठेवणे यासाठी मानव प्रयत्नशील होता. मानव हा निसर्गनिर्मित करणारा होता असा समज होता. उलट मानव हा निसर्गाशी तडजाडे करतो व होणाऱ्या आघातामध्ये टाकाऊ पदार्थांचा स्त्रोत, वृक्षतोड, सखोल कृषीपद्धती, शहरीकरण यांचा समावेश होतो. तो वातावरणात प्रचंड प्रमाणात विषारी पदार्थांचे पसरतो. विकासाच्या नावांखाली तो जंगलतोड करतो. जंतुनाशकांच्या मिश्रणामुळे सरोवरे पदूषित करत आहे. विषारी वायुमुळे हवा पदूषित केली जाते. त्यामुळे पर्यावरणाचा समतोल बिघडत चालला आहे. त्यामुळे आज पर्यावरणाच्या अभ्यासाची गरज वाढू लागली आहे. पर्यावरणाविषयी आपल्या पूर्वजांना जाण होती. निसर्गातील प्रणी व वनस्पती यांची निगा व वापर याबाबतीत ते जागृत झाले. शिकारी व वनसंपदाचे संकलन करणारे लोकांना त्यांच्या परिसराची चांगली माहिती होती. त्यांना जलस्त्रोत, वनस्पती, प्रण्यांचा अन्न व औषधी वापर माहित होता. अग्नी, विविध अवजारे व हत्यारे यामुळे त्यांचे जीवन सोपे झाले. पर्यावरणाचा वापर ते आपल्या गरजा भागविण्यासाठी करित असतात. वृक्षतोडीसाठी कु-हाड वापरत असतात. विरळ लोकसंख्या, भटक्या पद्धतीची जीवनपद्धती व मागासलेले तंत्रज्ञान यामुळे त्यांच्याकडून पर्यावरणास फार मोठा धोका निर्माण झाला नव्हता. सुमारे १०००० वर्षांपूर्वी शेतीची कला अवगत झाल्यानंतर प्रणी व वनस्पती यांचे सहाय्याने मानवी वस्त्या मोठ्या प्रमाणावर विकसित झाल्या. औद्योगिक क्रांतीनंतर नैसर्गिक संपदा, कच्चा माल म्हणून वापरावयास सुरुवात झाल्यामुळे मागणी वाढली. आधुनिक औजारे, खते, किटकनाशके व जास्त उत्पादन देणारी बी-बियांणे यामुळे कृषी उत्पादना मध्ये प्रचंड वाढ झाली. नविन पत्र त औषधांचा शोध, सुधारित आरोग्य सुविधांमुळे, मृत्युदरात घट झाल्यामुळे लोकसंख्या वेगाने वाढली. त्यामुळे निसर्गाचा तोल ढासळला. असंतलुनामुळे अनेक समस्या निर्माण झाल्या. या समस्या सोडविण्यासाठी पर्यावरणशास्त्राचा उगम झाला. समृद्ध व समतोल पर्यावरण ही काळाची गरज जाणवू लागल्या. पर्यावरणाचा तोल सावरण्यासाठी पर्यावरणशास्त्राचा उगम झाला. सखोल पर्यावरण शास्त्राच्या अभ्यासाची गरज निर्माण झाली. विकसित देशांमध्ये औद्योगिक काळी प्रथम सुरु झाल्यामुळे पर्यावरणीय समस्यांना तोंड द्यावे लागले. संशोधन पद्धती-कोणत्याही विषयांचे संशोधन वस्तुनिष्ठ व्हावे म्हणून संशोधन पद्धतीचा अंवलंब करून संशोधन केले जाते. शोधनिबंधासाठी ‘पर्यावरण आणि माहिती तंत्रज्ञानाची भूमिका’ या विषयाची निवड केलेली आहे. संशोधन विषय निवड- मानवाने विज्ञानाची पत्र ती केल्यामुळे तंत्रज्ञान विकसित होत गेले. विज्ञानाला प्रत्यक्ष व्यवहारामध्ये उपयोग म्हणजे तंत्रज्ञान, तंत्रज्ञानाने मानवाचे जीवन सुखी, समाधाधी होण्यासाठी योग्य साधने दिली आहेत. श्रमशक्तीच्या ऐवजी यंत्राचा वापर प्रत्येक घरात होऊ उदा. वाशिंग मशिन, मिक्सर, फ्रीज, टि.व्ही, कुलर, पंखा, एसी, दोन-चार चाकी वाहणे, संगणक, संध्याच्या काळात इंटरनेटची सुविधा, इत्यादी विज्ञानातील शोधांच्या, नियमांच्या आधारे मानवाने तांत्रिक पर्यावरण विकसित केले. मानवाची बुद्धी म्हणजे अन्य सजिव आणि मानव यांच्यातील महत्वाचा फरक आहे. बुद्धीच्या जोरावर त्याने निसर्गावर मात करण्याचा, निसर्गापेक्षा श्रेष्ठ बनण्याचा प्रयत्न केला आहे. प्रस्तुत संशोधनात शोधनिबंधासाठी ‘पर्यावरण आणि माहिती तंत्रज्ञानाची भूमिका’ या विषयांची संशोधकांनी निवड केलेली आहे.

संशोधनाचे क्षेत्र- प्रस्तुत शोधनिबंधासाठी संशोधन क्षेत्र म्हणून नरखेड शहराची निवड केली आहे.

संशोधन विश्व- प्रस्तुत शोधनिबंधासाठी संशोधन विश्व म्हणून नरखेड शहरातील उत्तरदाते हे अध्ययनाचे विश्व म्हणून घेण्यात आलेले आहेत.

संशोधन समस्यासुत्र-

१. नैसर्गिक जैविक व अजैविक घटकावरित पर्यावरण अभ्यासणे.
२. मानवनिर्मित पर्यावरण, समाजिक, आर्थिक, सांस्कृतिक स्थिती अभ्यासणे.
३. उद्घातांत्रिक, सौंदर्यात्मक, माहिती तंत्रज्ञानाची भूमिका अभ्यासणे.
४. पर्यावरणातील उपलब्ध साधनसामुग्रीचा वापर जाणून घेणे.
५. पर्यावरण समस्या, व्यवस्थापन, व नियोजनाबाबत माहिती घेणे.

उद्देश-

१. जैविक व अजैविक घटकांच्या परस्पर संबंधाचा नियोजनपूर्वक अभ्यास करणे.
२. पृथ्वीवरिल पर्यावरणाचे आंकलन व मानवी जीवनाचा पर्यावरणावर पडणारा प्रभाव यांचा अभ्यास करणे.
३. पर्यावरणातील नैसर्गिक व सांस्कृतिक घटकांचा मानवी जीवनावर, जीवनपद्धतीवर होणारा प्रभाव अभ्यासणे,

संशोधन गृहितके-

- १.जीवनसृष्टीतील जीवाची निर्मिती वाढ होण्यासाठी उर्जेची गरज आहे.
- २.मानवाने स्वतःच्या बुद्धीकौसल्यावर जीवन सुखद करण्याचा पयत्न केला आहे.
- ३.विषारी वायुमुळे हवा पदूषित होऊन प्यावरणाचा समतोल बिघडला आहे.
- ४.व्यक्तींचे आरोग्य व रोगावर नियंत्रण ठेवणारा घटक म्हणून सामाजिक पर्यावरण महत्वाचे आहे.

नमुना निवड पद्धती-

प्रस्तुत शोधनिबंधात गैरसंभ्यावना नमुना निवड पद्धतीतील सोईस्कर नमुना निवड पद्धतीचा अवलंब करण्यात आलेला आहे.

संशोधन आराखडा-

प्रस्तुत शोधनिबंधात अंशतः निदानात्मक व अंशतः वर्णनात्मक आराखडयाचा वापर करण्यात आलेला आहे.

तथ्य संकलन-

प्रस्तुत शोधनिबंधात तथ्य सकं लनासाठी प्राथमिक स्त्रोतामधील मुलाखत अनुसुची व निरीक्षण या तंत्राचा वापर करून दुय्यम स्त्रोतामधील पुस्तके, मासिके, योजना, वर्तमानपत्रे, इंटरनेट, शासकिय जिआर, ईत्यादी तंत्राचा वापर करण्यात आलेला आहे.

माहिती तंत्रज्ञानाची भुमिका-

माहिती तंत्रज्ञान हे माहितीशास्त्र, संगणकशास्त्र, दूरसंचार तंत्रज्ञान आणि व्यवस्थापनशास्त्र यांचे एकत्रीकरण आहे. २० व्या शतकाच्या शवे टी मानवी बुद्धीची या जगाला मिळालेली देणगी म्हणजेच माहिती तंत्रज्ञान होय, सर्वच क्षेत्रामध्ये चाललेल्या अत्याधुनिकतेचा विचार केला तर आत संपुर्ण जगावर माहिती तंत्रज्ञानाचे राज्य आले आहे. सर्व जगाला गतिमान करण्याचे काम माहिती तंत्रज्ञानाने केले आहे. पर्यावरण आणि माहिती तंत्रज्ञानाची भुमिका यामधील बदलांचे वैशिष्टे खालीप्रमाणे.

१. विचार व आचारात बदल - माहिती तंत्रज्ञानाने प्रत्येक क्षेत्रच व्यापलेले नसून, त्याने मानवी मेदूचा ताबाच मिळविला. माहितीचे जाळे व्यापार उद्योगावरच पसरलेले नसून त्याने भौगोलिक सिमा ओलाडून आपल्या महाजालातून गुरफटून घेतले आहे. उद्योगक्षेत्रामध्ये परिवर्तन घडून आले आहे. सरकारी कार्यालये, रेल्वे सेवा, विमानसेवा, दूरसंचार, दूरदर्शन, नित्योपयोगी सेवा इ. मध्येही प्रचंड बदल झाले आहे.मानवांची जीवन जगण्याची शैली बदलली. अशाप्रकारे आचार-विचारांत बदल झाले.

२. मानवाच्या हातांतील हत्यार म्हणून उपयोग - माहिती हा घटक प्रत्येक काळात महत्वपूर्णच मानला गेला आहे. अश्मयुगावर लोहयुगाची मात, लोहयुगावर तामयुगाची मात ही माहितीच्या आदान-पद्रातून पुर्णत्वाकडे गेलेली दिसून येतात.ज्यापत्राणे एखादी हत्यार चालविण्याचे तंत्रज्ञान माहित नसेल तर ते निरुपयोगी ठरते. त्यांचप्रमाणे माहिती तंत्रज्ञान हे सध्याच्या काळातील मानवांच्या हातांतील सर्वोच्च शास्त्र बनले आहे.

३. वातावरणातील वेव्हजवर ताबा - माहिती तंत्रज्ञानाच्या सांधनामध्ये मानव दिवसोदिवस गुंतत चालला आहे. प्रत्येक घरामध्ये दूरदर्शन सेट उपलब्ध आहे. मोबाईलच्या वापरामुळे वातावरणातील वेव्हज देखील पकडून ठेवल्या आहेत. आता ईमेल, इंटरनेट, यांची भर पडली आहे. उपलब्ध माहितीच्या आधारावर मानवाने लेटेस्ट माहिती प्राप्त करण्याची कितीतरी सांधणे निर्माण करून ठेवली आहेत. मानवाने माहिती तंत्रज्ञानाच्या आधारावरच वातावरणातील वेव्हजवर प्रभुत्व मिळविले आहे.

४. इंटरनेटमुळे मानवात समन्वय - औद्योगिक क्रांतीने मानवाचा यंत्ररूपी पाया मजबूत केला. संगणक क्रांतीने त्यांच्या डोक्यावर यशस्वीतेचा मुकुट चढविला. इंटरनेटमुळे जगाचे स्वरूपच पालटले आहे. माहितीचे आदान-पद्रान करण्याची साधने बदलून टाकली. माहितीचे महत्त्वच आवश्यक आहे. तंत्रज्ञानाने जणू काही काळावरही मात केली आहे.तर इंटरनेटमुळे मानवात समन्वय साधला आहे.

५. कृत्रिम मानवनिर्मिती पर्यावरण - माहितीशास्त्रामुळे मानवाला जागतिक माहिती प्राप्तततत होते. मानवाने केलेल्या प्रगतीचा आढावा घेऊ शकतो. त्याने नविन शोध लावून स्वतःची प्रगती केली आहे. तसचे शहरी समुदायापर्यंत पर्यावरण हे कृत्रीम मानव निर्मित बनले आहे.

६. मानवी जीवनासाठी आवश्यक कार्य- सध्याच्या काळात मान स्वतःचा गरतांवर अवलंबून राहू लागला. दैनंदिन जीवनामध्ये माहितीला महत्व प्राप्त झाले आहे. ज्ञानामध्ये वाढ होते. निर्णय घेण्यासाठी त्याचा उपयोग होतो. कार्यपुर्ततेसाठी माहितीची मदत होत. माहितीशास्त्र आपले उद्देश पुर्ण करण्यास सहाय्यभुत ठरते.

७. ज्ञानार्जन - माहितीचे दुसरे नाव म्हणजे ज्ञान. समाजाची एक नविन रचनाच ज्ञानाधारित होऊ पाहात आहे. माहिती ही पुर्वी सुध्दा महत्वाची होती. आजही मौल्यवान आहे. उद्या सुध्दा ती आधारस्तंभ ठरणार आहे. अन्न,वस्त्र,निवारा, या मानवांच्या तीन मुलभुत गरजामध्ये माहितीशास्त्र महत्वाची भुमिका पार पाडत आहे.

माहिती तंत्रज्ञानाने प्रत्येक क्षेत्रामध्ये यशस्वी पदार्पण केलेले दिसते. जगामधील सर्वच देश इतके जवळ आलेले आहेत की संपुर्ण जग हे एकत्र खेडयासारखे असल्याचा भास निर्माण होतो. यातूनच जागतिक खेडे ही संकल्पना

पुढे आली. माहिती तंत्रज्ञान म्हणजे मानवाला मिळालेले वरदान ठरते. माहिती तंत्रज्ञानाने पर्यावरणाच्या दृष्टीने महत्व असते.

पर्यावरणशास्त्राचं महत्व- अभ्यासक्रम जरवनाचा अविभाज्य घटक म्हणजे पर्यावरणीय अध्ययन होय. कारण तो एक जरवनविषयक दुष्टीकोण आहे. पोषक ठरणारी अशी त्यांचे उद्दिष्ट्ये आहेत. पर्यावरणशास्त्रांच्या अभ्यासाचे महत्व खालीलप्रमाणे-

१. पर्यावरणशास्त्राचे स्वरूप आंतरविद्याशाखीय आहेत. त्यामळे त्यांच्या विविध विद्याशाखा आहेत. त्यामुळे वैज्ञानिक सकल्पनामाहित होतात.
२. मानव हा बुद्धीजिवी प्राणी असल्याने त्याने स्वतःचा स्वार्थ साधण्यासाठी पर्यावरणास वेठीस धरले आहे.
३. पर्यावरणातील निरनिराळ्या समस्यांची उकल करणे, त्यांचे मुळ कारण, समस्येमुळे प्रभावित झालेले क्षेत्र व त्या समस्येवरित उपाय शोधणे, पर्यावरण अभ्यासाने सहज शक्य होते.
४. पर्यावरण शास्त्रांचा अभ्यास निरीक्षण पद्धतीद्वारा करावा लागतो. निरीक्षण क्षमतेमध्ये वाढ होते. संशोधन वृत्ती चिकित्सक बनते.
५. पर्यावरण व्यवस्थापनाच्या अभावी निसर्गातील साधनसंपदेचा गैरवापर होतो. त्यामधून पर्यावरणाची अवनती व पद्रूषण समस्या उदभवतात.
६. पर्यावरणासंबंधीच्या समस्या लोकासमोर आणण्यासाठी पर्यावरण भुगोल किंवा पर्यावरणशास्त्र या सारख्या ज्ञानशाखांची आवश्यकता आहे.

संशोधन निष्कर्ष -

नैसर्गिक पर्यावरणामध्ये वनस्पती, पाणी, मुद्रा, प्राणी, हवा, पर्वत, असे घटक आहेत. नैसर्गिक पर्यावरणात निसर्गनिर्मित घटकांचा समावेश होतो. सजिवांना वाढीसाठी निसर्गनिर्मित घटकांची आवश्यकता असते. मानवांशी समाज या शब्दाचा संबंध येतो. मानव हा कधीच एकटा राहत नाही. तो कुटुंबामध्ये राहतो. अनेक कुटुंब मिळून समाज तयार होतो. निरनिराळे जाती, धर्म, पंथामुळे समाजामध्ये अनेक प्रकारचे स्तर मयार होतात. त्यांचा विकास व्हावा म्हणून प्रत्येक समाज काही नियम तयार करतो. मानव हा सामाजिक पर्यावरणात अतिशय महत्वाचा समजला जाणारा घटक आहे. सभोवतालची परिस्थिती म्हणजे सामाजिक पर्यावरण समाजातील नियम काटेकोर पाळले जात नसतील तर त्या ठिकाणी परिस्थिती बिघडते.

एखाद्या समाजाची आर्थिक परिस्थिती म्हणजे आर्थिक पर्यावरण होय. त्यानुसार समाजाचे स्तर दिसून येतात. प्रत्येक समाजामध्ये श्रीमंत, गरिब, उच्च, निच, असे स्तर दिसतात. समाजाची आर्थिक परिस्थिती उंचावण्यासाठी दरडोई उत्पन्नात वाढ आवश्यक आहे. मानवाने विज्ञानात पग्री ती केल्यामुळे तंत्रज्ञान विकसित होत गेले. विज्ञानाचा प्रत्यक्ष व्यवहारामध्ये उपयोग म्हणजे तंत्रज्ञान, तंत्रज्ञानाने मानवाचे जीवन सुखावह होण्यासाठी योग्य साधने दिली आहेत. वैयक्तिक सौंदर्य मिळविण्यासाठी पोषाख, विविध प्रकारचे अत्तर, तेल, अशा गोष्टींचा वापर केला जातो. प्रत्येक क्षेत्रातील संस्कृतीचा प्रभाव लोकांच्या जीवनशैलीवर पडतो. आपल्या संस्कृतीचे वैशिष्ट्ये म्हणजे साधी राहणी, एकत्र कुटुंब पद्धती, परमेश्वरावर श्रद्धा, मोठ्यांचा आदर, लहान मुलांचे संगोपन, ही आहेत. यावर आधारलेली भारतीय संस्कृती आहे.

संदर्भ सूची :-

१. आगलावे प्रदिप 'सामाजिक संशोधन पद्धती व तंत्रे' साईनाथ प्रकाशन, नागपूर.
२. आगलावे प्रदिप 'ग्रामिण समाजशास्त्र' साईनाथ प्रकाशन, नागपूर.
३. बोधनकर सुधिर 'सामाजिक संशोधन पद्धती' साईनाथ प्रकाशन, नागपूर.
४. भरुचा एरक 'पर्यावरण विज्ञान' ओरिएंट लॉगमन, मुंबई.
५. दुभाषी पदमाकर 'जागतिकीकरण, उदारीकरण, अर्थकरण' श्री विद्या प्रकाशन, पुणे.
६. कुलकर्णी शिल्पा 'पर्यावरण आणि समाज' डायमंड पब्लिकेशन, पुणे.
७. मगर जयकुमार 'पर्यावरणशास्त्र' विद्या प्रकाशन, नागपूर.
८. पांगुळ नंदा 'शहरी, ग्रामिण समुदाय विकास' पिंपळापुरे पब्लिकेशन, नागपूर
९. सांरग सुभाषचंद्र 'पर्यावरण भुगोल' विद्या प्रकाशन, नागपूर.
१०. शिंदे देवा 'व्यावसायिक समाजकार्य' डायमंड पब्लिकेशन, पुणे.

“चित्रकला माध्यम से पर्यावरण संरक्षण दृष्टिकोण”

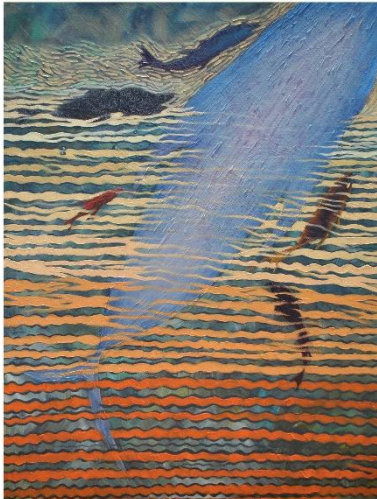
श्री. धनंजय विजय टाकलीकर

संशोधक विद्यार्थी, निर्वाण विश्वविद्यालय, जयपूर

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सारांश: पर्यावरण शब्द 'परि+आवरण' के संयोग से बना है। 'परि' का आशय चारों ओर तथा 'आवरण' का आशय परिवेश है।



48"x36" Sea scape - II Oil on Canvas

दूसरे शब्दों में कहें तो पर्यावरण अर्थात वनस्पतियों, प्राणियों, और मानव जाति सहित सभी सजीवों और उनके साथ संबंधित भौतिक परिसर को पर्यावरण कहते हैं वास्तव में पर्यावरण में वायु, जल, भूमि, पेड़-पौधे, जीव-जन्तु, मानव और उसकी विविध गतिविधियों के परिणाम आदि सभी का समावेश होता है। कला के दृष्टिकोण से पर्यावरण संरक्षण एक बहुआयामी विषय है जिसमें कलाकार अपनी रचनाओं के माध्यम से पर्यावरण के महत्व, उसके संरक्षण और जैव विविधता की रक्षा का संदेश समाज तक पहुँचाते हैं।

(Art by- Mr. Dhananjay Takalikar) कला का पर्यावरण संरक्षण में योगदान: कई कलाकार अपनी कलात्मक अभिव्यक्तियों, चित्रों, कहानियों, प्रदर्शनियों, और संवाद गतिविधियों के माध्यम से पर्यावरण की समस्याओं व समाधान को उजागर करते हैं वे प्रदूषण, जैव विविधता की हानि और संस्कृति के विलुप्त होने जैसे मुद्दों पर लोगों को संवेदनशील बनाते हैं और सामाजिक संवाद को बढ़ावा देते हैं। मल्टीडिसिप्लिनरी दृष्टिकोण: कला सिर्फ सौंदर्य या अभिव्यक्ति तक सीमित नहीं रहती, बल्कि यह

पर्यावरणीय शिक्षा, नीति, समाजशास्त्र, संस्कृति और विज्ञान से भी जुड़ी है। पर्यावरण अध्ययन एक बहुविषयक दृष्टिकोण अपनाता है जिसमें नैतिकता, कानून, नीति, और समाज के विभिन्न पहलुओं को कला के माध्यम से समझाया और प्रचारित किया जाता है।

प्रस्तावना: कला-आधारित पर्यावरण शिक्षा कला शिक्षा और पर्यावरण शिक्षा को एक ही उपक्रम में साथ लाती है। इस दृष्टिकोण की दो आवश्यक विशेषताएँ हैं। पहली यह कि यह एक विशिष्ट प्रकार की पर्यावरण शिक्षा को संदर्भित करती है जो एक कलात्मक दृष्टिकोण से शुरू होती है। अन्य प्रकार की आउटडोर या पर्यावरण शिक्षा से अलग, जो सौंदर्य अनुभवों के लिए जगह प्रदान करती

हैं, एक मौलिक तरीके से स्थिति को बदल देती है। कला कोई अतिरिक्त गुण या सोने पर सुहागा नहीं है; बल्कि यह लोगों को अपने पर्यावरण से जोड़ने के तरीके खोजने के प्रयास में एक प्रस्थान बिंदु है। दूसरी मूलभूत विशेषता यह है कि कलात्मक अभ्यास और पर्यावरण शिक्षा को एक साथ लाने वाले पहले समकालीन दृष्टिकोणों में से एक है जिसमें चिकित्सकों ने एक ज्ञानमीमांसा तैयार करने का भी प्रयास किया। समुदाय और शिक्षा में भूमिका कला पर्यावरण संरक्षण के संदेश को स्कूलों, समुदायों और बच्चों तक पहुँचाती है, जिससे स्थानीय स्तर पर जागरूकता बढ़ती है। पारंपरिक और आधुनिक कलात्मक तरीकों से लोग (Art by- Mr. Dhananjay Takalikar)



48"x36" Sea scape - III Acrylic on Canvas

अपशिष्ट प्रबंधन, पौधारोपण, पुनर्चक्रण और प्राकृतिक संसाधनों के सही उपयोग के लिए प्रेरित होते हैं। उदाहरण: कोलकाता वेटलैंड्स में कलाकारों ने बच्चों व समुदाय के साथ आर्द्रभूमि की जैव विविधता व संवेदनशीलता को समझाने के लिए चित्रात्मक कहानी और हस्तशिल्प कार्यशालाएँ आयोजित की।

केले के तने से हस्तनिर्मित कागज और घरेलू कचरे से संगीत वाद्ययंत्र जैसे क्रियात्मक प्रयासों द्वारा पुनर्चक्रण का महत्व बताया

गया। कला के माध्यम से पर्यावरण संरक्षण का दृष्टिकोण न सिर्फ दृश्यात्मकता, बल्कि सामाजिक शिक्षा, संवाद और सामूहिक



Seascape 2 35" x 40" Oil on Canvas

जागरूकता का सशक्त साधन साबित होता है। "एक पर्यावरणविद् और एक कला शिक्षक के रूप में मैं क्या करता हूँ? इसे सीधे शब्दों में कहें तो मैं नई धारणा, दुनिया को दिल से देखने के नज़दीकी, व्यक्तिगत आनंद और खुशी का समर्थन करने की कोशिश करता हूँ। इसे प्राप्त करने के लिए, रुकना, शांत होना, समय निकालना और अज्ञात, कभी-कभी जंगली और अप्रत्याशित को समझने के लिए मनोवैज्ञानिक रूप से सुरक्षित महसूस करना आवश्यक है। कभी-कभी इंद्रियों के सचेत प्रशिक्षण, स्टीरियोटाइप को डिकोड करने की आवश्यकता होती है। मेरा लक्ष्य संवेदनशीलता के प्रति खुलापन, अपने पर्यावरणीय अनुभवों को स्पष्ट और साझा करने के नए और व्यक्तिगत तरीके हैं, जो सुंदर, घृणित, शांतिपूर्ण या खतरनाक हो सकते हैं। मैं पर्यावरण के साथ बातचीत का समर्थन और सुविधा प्रदान करता हूँ।" संक्षेप में अवधारणा

इस विश्वास पर आधारित है कि कलात्मक गतिविधियों से पर्यावरण के प्रति संवेदनशीलता विकसित की जा सकती है। एक कलाकार, और एक शिक्षिका और चिकित्सक के रूप में, उन्होंने पाया कि प्रक्रिया और धारणा के कौशल की मूल बातों पर वापस जाना अधिक से अधिक महत्वपूर्ण है। यहाँ, यह प्रश्न कि हम पर्यावरण के संदेशों को कैसे देखते हैं और कैसे प्राप्त करते हैं या अस्वीकार करते हैं, केंद्रीय है। रेखांकित करना महत्वपूर्ण है क्योंकि यह प्रकृति के अत्यधिक रोमांटिक दृष्टिकोण को अपनाने के संभावित आरोपों का खंडन करता है कि अनुभव के "छाया" पक्ष के लिए भी जगह है, घृणा, भय और पीड़ा की भावनाओं के लिए।

फिनलैंड में विकसित कला-आधारित पर्यावरण शिक्षा के ऐतिहासिक पूर्ववर्ती १९७१ तक जाते हैं, जिस वर्ष उस देश में पहला यूरोपीय क्षेत्रीय सम्मेलन आयोजित किया गया था। फिनिश कला शिक्षकों ने इस बैठक को "कला शिक्षा में पर्यावरण संरक्षण" विषय के साथ आयोजित करने के लिए अपने प्रयासों को एकत्र किया था। पिरको पोहजाकलियो १९७० के दशक से फिनिश कला शिक्षा के संदर्भ में पर्यावरण शिक्षा के लिए बहु-विषयक दृष्टिकोणों की विशेषज्ञ हैं। कौपिनेन (१९७२) को उद्धृत करते हुए, वह उस समय कांग्रेस के लिए तर्क प्रदान करती हैं "विषय बनाने का एक कारण हमारी पर्यावरणीय समस्याओं की बहुलता और विविधता पर जोर देने की इच्छा थी वे विशुद्ध रूप से जैविक, आर्थिक और सामाजिक नहीं हैं, बल्कि सौंदर्य संबंधी भी हैं, और परिणामस्वरूप कला शिक्षा का हिस्सा हैं उस समय से ही, जैसा कि मेरी-हेल्गा मांटेरे ने बताया, कला शिक्षकों की शिक्षा और फिनिश स्कूलों के पाठ्यक्रम, दोनों में पर्यावरण के सौंदर्यपरक और आलोचनात्मक अवलोकन पर ध्यान दिया जा रहा था। पहले दशक में, फिनलैंड में कला शिक्षा के एक भाग के रूप में जिस प्रकार की पर्यावरण शिक्षा दी जाती थी, उसका मुख्य ध्यान मानव निर्मित पर्यावरण पर था। विषय थे पर्यावरण प्रदूषण और प्रकृति का दोहन। शिक्षण में पर्यावरण की समस्याओं को नुकसान के प्रकारों और स्तरों की पहचान, वर्गीकरण और सूची बनाकर दृष्टिगत रूप से देखा जाता था। जैसा कि मांटेरे संक्षेप में कहती हैं, "पर्यावरण पर उतना ज़ोर नहीं दिया गया जितना राजनीति पर।

न तो 'शुद्ध' पर्यावरण शिक्षा, न ही 'शुद्ध' कला शिक्षा: कला-आधारित पर्यावरण शिक्षा जैसा मिश्रित दृष्टिकोण अनिवार्य रूप से हमेशा दो पाटों के बीच फँसा हुआ प्रतीत होता है: यह न तो वास्तविक पर्यावरण शिक्षा है (क्योंकि यह विज्ञान-आधारित दृष्टिकोण के बजाय कला-आधारित दृष्टिकोण से शुरू होती है), और न ही इसे कला शिक्षा के एक उपक्षेत्र के रूप में विश्वसनीय रूप से वर्गीकृत किया जा सकता है, क्योंकि यह कला-निर्माण से हटकर एक मुख्यतः आत्म-संदर्भित अनुशासन ("ला आर्ट पोर ला आर्ट") के रूप में कार्य करता है। वास्तव में, यह कहा जा सकता है कि कला शिक्षकों और पर्यावरण शिक्षकों के दो अलग-अलग समुदाय मौजूद हैं, जो अक्सर एक-दूसरे के विमर्श को नहीं समझते (या अक्सर उससे अवगत नहीं होते), और इस प्रकार उन प्रतिमानों की असंगति की समस्या को जन्म देते हैं जिनसे वे शिक्षा की ओर रुख करते (Art by- Mr. Dhananjay Takalikar) हैं।

२००७ में जान वैन बोएकेल ने मांटेरे के साथ एक साक्षात्कार में उन्हें कला शिक्षा और पर्यावरण शिक्षा के संयोजन की अपनी

अवधारणा को और विस्तार देने के लिए आमंत्रित किया, तथा बताया कि वे किस प्रकार प्रतिभागियों को कला के माध्यम से पर्यावरण के बारे में सिखाना चाहती हैं। "बाह्य और आंतरिक के बीच के संबंध को देखकर व्यक्ति सीखता है। इंद्रियों का उपयोग करके व्यक्ति सीखता है। जब व्यक्ति यह सीखता है कि सभी इंद्रियाँ शामिल हैं (या हो सकती हैं) तो वह संवेदनशील हो जाता है। जब वे शामिल होती हैं, सजीव होती हैं या खुलती हैं, तो आपको अधिक मौलिक भावनाएँ या अवलोकन भी प्राप्त होते हैं। कला, प्रकृति, अन्य लोगों और स्वयं के, पर्यावरण या किसी भी चीज़ के बारे में व्यक्ति जो अवलोकन करता है, वह ज्ञान, सीखने के सिद्धांतों आदि द्वारा निर्देशित हो सकता है, और यह अवलोकन का एक तरीका है। ऐसे मामलों में व्यक्ति के पास पहले से ही किसी प्रकार का ढाँचा या अवधारणाएँ होती हैं। लेकिन इस मामले में सीखना अपनी इंद्रियों के प्रति खुलेपन और उनके माध्यम से सीखने से आता है। ऐसे क्षणों में कोई तैयार शब्द, अवधारणाएँ और संरचनाएँ नहीं होतीं। कलात्मक शिक्षा, या कलात्मक दृष्टिकोण, इंद्रियों और भावनाओं की मूल बातों तक, नए संपर्क और उपस्थिति तक जाता है। एक कलात्मक दृष्टिकोण में व्यक्ति के शरीर की गति और इंद्रियों की संवेदनशीलता शामिल होती है। दृष्टि या स्पर्श के माध्यम से आप पर्यावरण का अध्ययन करते हैं, लेकिन यदि आप इसे नाम देने में जल्दबाजी करते हैं तो आप नयापन खो देते हैं। आपको स्पर्श मिलता है, आपको गंध मिलती है, आपको गति मिलती है, आप सुनते हैं आपके परिवेश के बारे में। और जब यह बिना किसी नामकरण, पहले से तैयार अवधारणाओं और दोहराव के होता है, तो आपको हमेशा एक नया अनुभव मिलता है। हर समय ताज़ा, अशाब्दिक जानकारी प्राप्त करना संभव है। इसलिए इंद्रियाँ और अवलोकन रचनात्मक हो सकते हैं और वे आपकी अपनी छवियों, शब्दों और अवधारणाओं को सामने लाते हैं।

पर्यावरण कला की भूमिका: जागरूकता बढ़ाना: पर्यावरण कला, जैसे भूमि कला, परिदृश्यों में विशाल और भावनात्मक कलाकृतियों का निर्माण करके लोगों में प्रकृति के प्रति भावनाएँ जगाती है। **भावनात्मक जुड़ाव:** यह कला सीधे प्रकृति से जुड़ी होती है और लोगों को प्राकृतिक तत्वों से जुड़ने व उन्हें महसूस करने का अवसर देती है। **पर्यावरण शिक्षा, महत्व, ज्ञान और समझ:** पर्यावरण शिक्षा व्यक्तियों को पर्यावरण से जुड़े मुद्दों के बारे में ज्ञान प्रदान करती है और उनके महत्व को समझने में मदद करती है। **समस्या-समाधान कौशल:** यह लोगों को पर्यावरणीय समस्याओं का विश्लेषण करने, गंभीर रूप से सोचने और समाधान खोजने के लिए आवश्यक कौशल विकसित करने में मदद करती है। **सकारात्मक व्यवहार:** पर्यावरण शिक्षा व्यक्तियों में पर्यावरण के प्रति संवेदनशीलता और सकारात्मक दृष्टिकोण विकसित करती है, जिससे वे संरक्षण के लिए प्रेरित होते हैं। **स्थायी जीवन:** पर्यावरण शिक्षा टिकाऊ जीवन जीने के तरीकों के बारे में जागरूक करती है, जिससे भावी पीढ़ियों के लिए संसाधनों का उचित उपयोग सुनिश्चित हो सके। **जागरूकता और ज्ञान:** पर्यावरण शिक्षा लोगों को पर्यावरण की जटिलताओं और मानवीय गतिविधियों के प्रभावों के बारे में ज्ञान प्रदान करती है, जिससे वे प्रदूषण, जलवायु परिवर्तन और अन्य पर्यावरणीय समस्याओं को समझ पाते हैं। **कौशल और योग्यताएँ:** यह व्यक्ति को पर्यावरण की समस्याओं का समाधान करने और उन्हें रोकने के लिए आवश्यक कौशल, योग्यताएँ और दृष्टिकोण विकसित करने में सक्षम बनाती है। **मूल्य और दृष्टिकोण:** यह लोगों में पर्यावरण के प्रति संवेदनशील दृष्टिकोण विकसित करती है और उन्हें प्रकृति का सम्मान करने तथा पर्यावरण संरक्षण के प्रति जिम्मेदार बनने के लिए प्रेरित करती है।

निष्कर्ष: पर्यावरण जागरूकता एक स्वच्छ और अनुकूल प्राकृतिक परिवेश को बढ़ावा देने में महत्वपूर्ण है जो पेड़-पौधे, जल-जीव, जानवरों सभी जीवों के लिए उपयुक्त है। हालाँकि, ऐसी पहल के लिए वैश्विक जनसांख्यिकी के सामूहिक प्रयास की आवश्यकता है, जिन्हें इस मामले में स्वच्छ पर्यावरण की आवश्यकता के प्रति संवेदनशील बनाया जाना चाहिए। पर्यावरण कला और शिक्षा एक-दूसरे के पूरक हैं। कला पर्यावरण के प्रति प्रेम और जुड़ाव पैदा करती है, जबकि शिक्षा उस जुड़ाव को वास्तविक ज्ञान और क्रियात्मकता में बदलती है। पर्यावरण कला भावनात्मक और संज्ञानात्मक स्तर पर जागरूकता पैदा करती है, और पर्यावरण शिक्षा उस जागरूकता को ज्ञान, कौशल और समाधान खोजने की क्षमता में विकसित करती है, जिससे स्थायी पर्यावरणीय सुधार संभव होता है। पर्यावरण कला से पर्यावरण शिक्षा तक का निष्कर्ष यह है कि कला के माध्यम से पर्यावरण के प्रति संवेदनशीलता और जागरूकता को बढ़ावा मिलता है, जिससे व्यक्तियों में पर्यावरण के प्रति सकारात्मक दृष्टिकोण विकसित होता है और वे पर्यावरण की समस्याओं को समझने व उन्हें हल करने के लिए प्रेरित होते हैं। कला एक शक्तिशाली माध्यम है जो प्राकृतिक सौंदर्य

को उजागर करती है और लोगों को प्रकृति से जोड़ती है, जबकि पर्यावरण शिक्षा उस भावनात्मक जुड़ाव को ज्ञान और कौशल से जोड़कर सक्रिय भागीदारी और स्थायी समाधान की ओर ले जाती है।

संदर्भ सूची:

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शुभेच्छा संदेश



मी अभिनव भारत शिक्षण संस्थेच्या नेताजी सुभाषचंद्र बोस महाविद्यालयाचे मनःपूर्वक अभिनंदन करतो की, त्यांनी या ज्ञानयज्ञाची जाज्वल्य परंपरा पुढे नेत राष्ट्रीय स्तरावरील परिषद आयोजित करण्याचे श्रेष्ठ कार्य हाती घेतले आहे. शैक्षणिक तेजोदीप पेटवून समाजमनाला दिशा देणारे हे कार्य म्हणजेच खरेतर राष्ट्रसेवेचे एक स्वरूप आहे. 'पर्यावरण व अर्थशास्त्र : शाश्वत विकासाचा दृष्टिकोन' हा विषय म्हणजे आधुनिक युगातील चिंतनाचा ध्रुवतारा आहे. विकासाच्या या दुतर्फा प्रवाहात 'शाश्वततेचा सेतू' बांधणे हीच खरी काळाची गरज आहे.

ही परिषद म्हणजे पर्यावरणाच्या पवित्र श्वासांना आणि अर्थशास्त्राच्या गतिमान विचारांना एका सूत्रात गुंफण्याचा पवित्र शैक्षणिक वैचारिक सोहळाच आहे. येथे अभिव्यक्त होणारे विचार म्हणजे भविष्यासाठी मार्गदर्शक दीपस्तंभ; येथे होणारे संशोधन म्हणजे समाजाला दिलेली अमूल्य ज्ञानअर्पणे. या चिंतनातून निश्चितच शाश्वत विकासाच्या दिशेने नवी दृष्टी, नवा मार्ग व नवे स्वप्न आकार घेईल, असा मला ठाम विश्वास आहे.

स्वातंत्र्यवीर नेताजी सुभाषचंद्र बोस यांच्या नावाने नावलौकिक मिळालेल्या या महाविद्यालयात परिषद होत असल्याने तिच्या विचारमंथनाला प्रेरणादायी इतिहासाची उर्जा लाभली आहे. नेताजींच्या 'त्याग, धैर्य आणि राष्ट्रनिष्ठा' या मूल्यांचे तेज या परिषदेच्या यज्ञकुंडात मार्गदर्शनाचा अखंड ज्योतस्तंभ ठरेल. या परिषदेच्या यशस्वी आयोजनासाठी परिश्रम घेतलेल्या सर्व आयोजकांचे मी मनःपूर्वक अभिनंदन करतो. सहभागी मान्यवर तज्ज्ञ व संशोधकांना आणि उत्सुक विद्यार्थीवर्गाला माझ्या हार्दिक शुभेच्छा! आपण घडवलेले विचार, मांडलेले निष्कर्ष आणि विणलेले स्वप्न हे केवळ शैक्षणिक भितीपुरते मर्यादित न राहता संपूर्ण समाजाच्या भविष्याला दिशा देतील, अशी मला खात्री आहे.

(मनोहर चासकर)

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प्र-कुलगुरु



**SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY,**

NANDED-431 606, Maharashtra State

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ,

नांदेड-४३१ ६०६, महाराष्ट्र राज्य

Established by Govt. of Maharashtra on 17th September 1994, Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited 'B++' grade, a State University

Date : 30/8/2025



MESSAGE

I am delighted to know that Netaji Subhashchandra Bose Arts, Commerce and Science College, Nanded, in collaboration with Swami Ramanand Teerth Marathwada University, Nanded, is organizing a National Conference on “Environment and Economics: A Perspective of Sustainable Development.” to be held on 16/09/2025.

In today's rapidly changing world, the pursuit of sustainable development has become an indispensable priority. The challenges of climate change, ecological imbalance, and economic inequality require us to explore innovative solutions that integrate environmental concerns with economic planning. This conference, by bringing together scholars and practitioners from across the country, provides a vital forum for dialogue and interdisciplinary exchange of ideas.

I firmly believe that such academic initiatives encourage critical thinking, foster meaningful collaborations, and inspire young researchers to contribute effectively to society's progress. The efforts of the organizing team in conceptualizing and hosting this conference are highly commendable.

I extend my best wishes to the organizers, delegates, and participants for the success of this important event. May the conference proceedings generate fruitful insights and pave the way towards building a sustainable, prosperous, and inclusive future.

(Prof. Ashok Mahajan)

Pro-Vice Chancellor

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[Phone : (+91-2462) 215524, Fax : 215245] [दूरध्वनी: (०२४६२) २१५५२४ फॅक्स: २१५२४५ Website : www.srtmun.ac.in]

Message for the Workshop on “Environment and Economics: A Perspective of Sustainable Development



It is my privilege to share a message for this important workshop on *Environment and Economics: A Perspective of Sustainable Development. The theme is especially relevant for India, a nation that aspires to high economic growth while also facing the urgent realities of climate change, pollution, biodiversity loss, and resource scarcity.

India’s civilizational ethos has always emphasized harmony with nature—whether through the principle of *Vasudhaiva Kutumbakam* or India’s traditional nature friendly living. Today, we must translate these values into policies and practices that ensure growth without ecological compromise. Encouragingly, India has taken major steps: ambitious renewable energy targets, the Swachh Bharat Mission, Namami Gange, and the LiFE movement reflect our determination to integrate environment and development with social inclusion. Initiatives in net zero targets, circular economy, green finance, and extended producer responsibility also show how economics can drive sustainability.

Yet challenges remain. Our cities struggle with waste and air quality; rural areas face declining soil health and water scarcity. These are not merely environmental issues—they represent economic and social costs. Protecting natural resources is therefore not a burden but the foundation of future prosperity.

Workshop like this create vital platforms for dialogue between scholars, policy-makers, and practitioners. They help us chart pathways where economic progress is inclusive, equitable, and aligned with ecological well-being.

Let us remember: for India, environment and economics are not competing priorities but complementary pillars of sustainable development. Together, we can build a future that is greener, resilient, and just.

Ajay A. Deshpande
Member Inspection Panel, World Bank

:: शुभेच्छा संदेश ::



अधिकांश शिक्षण संस्था या राजकीय दृष्ट्या प्रेरित आणि एकल विचाराच्या असल्याने समाजात राष्ट्रभक्तीचा दिवा तेवत ठेवण्यासाठी, राष्ट्रीय विचारांचे महाविद्यालयातील तरुणांवर संस्कार होण्यासाठी एक महाविद्यालय असावे. या उद्देशाने प्रेरित होऊन संस्थेची व महाविद्यालयाची स्थापना करण्यात आली. याला समाजातून भरभरून प्रेम व मदत प्राप्त झाली. म्हणूनच आमच्या संकल्पनेला मूर्त स्वरूप आले.

संस्थेचे नावं काय असावे हा विचार करताना प्रखर राष्ट्रप्रेमी असलेले स्वा. सावरकरांनी स्थापन केलेली अभिनव भारत या क्रांतिकारी संघटनेचेच नावं संस्थेला दिले गेले जी आज "अभिनव भारत शिक्षण संस्था, नांदेड" या नावाने कार्यरत आहे. स्वा. सावरकरांच्या मते, रणाविना स्वातंत्र्य कोणा मिळाले या धारनेला साजेसे असे एक व्यक्तिमत्त्व डोळ्यासमोर आले ते म्हणजे नेताजी सुभाषचंद्र बोस होय. म्हणून नेताजी सुभाषचंद्र बोस महाविद्यालय हे नाव महाविद्यालयास देण्यात आले.

महान क्रांतिकारक सरदार भगतसिंग यांच्या मातोश्री श्रीमती विद्यावतीदेवी यांच्या शुभ हस्ते भूमी पूजन करून महाविद्यालयाची पायाभरणी करण्यात आली. राष्ट्रप्रेम व राष्ट्रासाठी समर्पनाची भावना असलेला विद्यार्थी घडविणे हा हेतू लक्षात घेऊन आजतागयत संस्था कार्यरत आहे.

महाविद्यालयातील पर्यावरणशास्त्र व अर्थशास्त्र विभागातर्फे नाविन्यपूर्ण असा उपक्रम नेहमीच घेतला जातो. त्याचाच एक भाग म्हणून आज या विभागामार्फत पर्यावरण सारख्या आतिशय महत्त्वपूर्ण विषयावर "पर्यावरण व अर्थशास्त्र : शाश्वत विकासाचा दृष्टिकोण" या विषयावर एकदिवसीय आंतरविद्याशाखीय राष्ट्रीय परिषदाचे आयोजन केले आहे. त्यांच्या या कार्यास माझ्या हार्दिक शुभेच्छा...!

मा. बालासाहेब बापूराव पांडे

अध्यक्ष

अभिनव भारत शिक्षण संस्था, नांदेड. (महाराष्ट्रराज्य)

:: मनोगत ::



स्वातंत्र्यवीर सावरकरांची अभिनव भारत ही संकल्पना डोळ्यासमोर ठेवून राष्ट्रप्रेमी व्यक्तींनी राष्ट्रीय विचाराने प्रेरित होऊन अभिनव भारत शिक्षण संस्थेची 1970 मध्ये स्थापना केली. या संस्थेने नेताजी सुभाषचंद्र बोस यांची शिस्त, कणखर बाणा, अभ्यासवृत्ती डोळ्यासमोर ठेवून, त्यांच्या व्यक्तिमत्त्वा सारख्या विद्यार्थ्यांच्या पीढ्या निर्माण करण्याच्या हेतूने 1971 मध्ये नेताजी सुभाषचंद्र बोस महाविद्यालयाची स्थापना केली. नेताजी सुभाषचंद्र बोस महाविद्यालयाचे वैशिष्ट्य म्हणजे, या महाविद्यालयाची पायाभरणी शहीद भगतसिंग यांच्या मातोश्री विद्यावती देवी यांच्या शुभहस्ते झाली.

तेव्हा पासून आतापर्यंत महाविद्यालयाने दैदीप्यमान अशी प्रगती केली. महाविद्यालयात शैक्षणिक गुणवत्ते बरोबरच एक आदर्श असा विद्यार्थी घडविण्याचे कार्य अविरतपणे चालू आहे. महाविद्यालयात विविध कार्यक्रमांचे आयोजन दरवर्षी केले जाते. त्याचाच एक भाग म्हणून महाविद्यालयातील पर्यावरणशास्त्र व अर्थशास्त्र विभागाने दि. 16 सप्टेंबर 2025 रोजी **"पर्यावरण व अर्थशास्त्र : शाश्वत विकासाचा दृष्टिकोण"** या विषयावर एकदिवसीय आंतरविद्याशाखीय राष्ट्रीय परिषदेचे आयोजन केले आहे. निश्चितच या परिषदेद्वारे पर्यावरण जनजागृती होईल. पर्यावरणाच्या दिशेने वाटचाल करताना समाजात एक सकारात्मकता निर्माण होईल. त्या दृष्टीने टाकलेले हे एक पाऊल आहे. या एका नव्या व अत्यावश्यक विषयावर पर्यावरणशास्त्र व अर्थशास्त्र विभागाने परिषदेचे आयोजन केल्याबद्दल मी या विभागाचे कौतुक करू इच्छितो आणि त्यांच्या या कार्यास हार्दिक शुभेच्छा....

प्राचार्य

प्र. डॉ. एम. वाय. कुलकर्णी

नेताजी सुभाषचंद्र बोस कला, वाणिज्य व विज्ञान महाविद्यालय,
नांदेड. (महाराष्ट्रराज्य)

संपादकीय



डॉ. आनंद रेणुकादास आपटुरकर
संपादक



डॉ. राजेश गंगाधरराव उंबरकर
सहसंपादक

प्रिय आदरणीय शिक्षक, प्राध्यापक, सहकारी मित्र, अभ्यासक, संशोधक व वाचक मित्रांनो !

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड व अभिनव भारत शिक्षण संस्था संचलित नेताजी सुभाषचंद्र बोस कला, वाणिज्य व विज्ञान महाविद्यालय, नांदेड, पर्यावरणशास्त्र व अर्थशास्त्र विभागाच्या संयुक्त विद्यमाने दि. 16 सप्टेंबर 2025 रोजी "पर्यावरण व अर्थशास्त्र : शाश्वत विकासाचा दृष्टिकोण" या विषयावर झालेल्या एकदिवसीय राष्ट्रीय परिषदेच्या निमित्ताने चर्चासत्रात सादर झालेल्या आणि संकलित केलेल्या शोधनिबंध संग्रहाचा हा सुबक आणि आखीवरेखीव असा संशोधनमूल्य व संदर्भमूल्य लाभलेला दर्जेदार संपादित ग्रंथ आपल्या हाती देताना आम्हाला मनापासून आनंद होत आहे. यासाठी आपण आम्हाला जे भरभरून सहकार्य केले त्याबद्दल आम्ही आपले सर्वप्रथम आभारी आहोत.

"पर्यावरण व अर्थशास्त्र : शाश्वत विकासाचा दृष्टिकोण " या विषयावर व्यापक अशी चर्चा घडवून आणावी आणि आपण सर्वांनी आपल्या देशाचे पर्यावरण संरक्षण व आर्थिक विकास कसा होईल यासाठी प्रयत्न करावा, ह्या दृष्टीने एक पाऊल पुढे टाकावे व या यज्ञकुंडात सर्वांचा खारीचा वाटा असावा, या हेतूने प्रेरित होऊन आम्ही हे चर्चासत्र आमचे मार्गदर्शक, संस्थेचे अध्यक्ष मा. श्री बालासाहेब पांडे आणि संस्थेच्या सचिवा अॅड. वनिता जोशी व राष्ट्रीय परिषदेसाठी अध्यक्ष म्हणून लाभलेले संस्थेचे कोषाध्यक्ष मा. श्री कैलासचंद काला, तसेच सहसचिव मा. श्री धनंजय जोशी व महाविद्यालयाचे सन्माननीय प्र. प्राचार्य डॉ. एम. वाय. कुलकर्णी यांच्या मार्गदर्शनाखाली आंतरविद्याशाखीय एक दिवसीय राष्ट्रीय परिषदेचे आयोजन केले होते.

या राष्ट्रीय परिषदेसाठी स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठाचे माननीय कुलगुरू डॉ. मनोहर चासकर उद्घाटक म्हणून लाभले तर महाराष्ट्र प्रदूषण नियंत्रण मंडळाचे सहाय्यक सचिव (तांत्रिक) मा. श्री. नंदकुमार गुरव हेही या ठिकाणी प्रमुख अतिथी म्हणून उपस्थित होते. तसेच बीजभाषणासाठी वर्ल्ड बँकेचे इन्स्पेक्शन पॅनल सदस्य मा. डॉ. अजय देशपांडे हे उपस्थित होते. सदरील राष्ट्रीय परिषद पर्यावरणशास्त्र व अर्थशास्त्र विभागांच्या माध्यमातून देशाच्या शाश्वत विकासाची पायाभरणी व्हावी या उद्देशाने आयोजित करण्यात आली होती.

राष्ट्रीय परिषदेसाठी देशातील विविध राज्यांमधून 314 संशोधकांनी आपले संशोधन लेख सादर केले. देशाच्या शाश्वत विकासात नव संशोधकांनी आपली भूमिका संशोधन लेखातून प्रभावीपणे मांडली.

राष्ट्रीय परिषदेमध्ये पर्यावरण जागृती व आर्थिक विकास करण्यासाठी विविध प्रकारच्या थीम्स दाखवण्यात आल्या. ज्यामध्ये शालेय व महाविद्यालयीन विद्यार्थ्यांकरिता पर्यावरण पोस्टर स्पर्धेचे आयोजन करण्यात आले होते. या स्पर्धेत एकूण 163 विद्यार्थ्यांनी आपला सहभाग नोंदवला व त्यांच्यातील कला कौशल्याचा विकास साधत पर्यावरणाबद्दल आपली कटिबद्धता दर्शवली.

या प्रसंगी वृक्षारोपण करून प्राथमिक शाळेच्या विद्यार्थ्यांनी वड, पिंपळ, तुळस, कडुलिंब इ. वृक्षांचे महत्त्व सांगितले.

16 सप्टेंबर हा दिवस जागतिक ओझोन दिवस म्हणून साजरा करण्यात येतो त्या निमित्त्याने ओझोन वायूचे रक्षण कसे करावे या संदर्भातील मॉडेल परिषदेत दाखविण्यात आले.

देशाचा शाश्वत विकास कसा असावा हे दाखविणारे "इकॉनॉमिक ग्रोथ मॉडेल" तयार करण्यात आले व या मॉडेलने सर्वांचे लक्ष वेधून घेतले.

या परिषदेत पर्यावरण संरक्षणा बरोबर देशाचा शाश्वत विकास कसा साधता येईल यावर सखोल चर्चा झाली आणि अनेक तज्ञ मंडळींनी आपल्या विचारांचे आदान प्रदान केले.

या परिषदेला डॉ. जे. नारायणा, डॉ. जयभारत मंगेशकर, डॉ. पी. पी. लोणारकर, डॉ. आर. के. नारखेडे, डॉ. आर. जी. पवळे, डॉ. जे. एम. पटवारी, डॉ. वाय. पी. लोळगे, डॉ. डी. डी. चौधरी, डॉ. आर. आर. कांबळे, डॉ. एस. एम. मुंडकर, डॉ. व्ही. सी. बेलुरे व माजी प्राचार्य डॉ. सुधीर शिवणीकर यांनी मार्गदर्शन केले.

महाविद्यालयाच्या उपप्राचार्य डॉ. कल्पना कदम व डॉ. अर्चना भवानकर, डॉ. जान्हवी शिऊरकर, अर्थशास्त्र विभाग प्रमुख प्रा. के. जे. कांबळे, थीममेकर्स प्रा. क्षमा करजगावकर व प्रा. किरण वाघमारे यांनी सहकार्य केले.

या राष्ट्रीय परिषदेला वेळोवेळी मार्गदर्शन करणारे महाविद्यालयाचे प्रा. डॉ. मनीष देशपांडे, डॉ. गिरीष पांडे, डॉ. भालचंद्र धर्मापुरीकर, डॉ. संदीप काळे, डॉ. सागर साकळे, श्री. बासरकर, श्री. करडखेडकर, प्रा. पेदेवाड आणि सहकारी प्राध्यापक, शिक्षक व शिक्षकेतर कर्मचारी यांचे ही आम्ही खूप खूप आभारी आहोत.

तसेच सर्व ऑर्गनायझिंग कमिटी मेम्बर्स, सर्व समिती प्रमुख व सदस्य या सर्वांचे आम्ही कायम ऋणी आहोत.

याठिकाणी सर्वांचा उल्लेख करणे शक्य नाही. ज्यांनी ज्यांनी प्रत्यक्ष व अप्रत्यक्ष सहकार्य केले त्यांचे आम्ही आभारी असून सर्व संशोधक व अभ्यासकांनी आम्हाला उत्स्फूर्तपणे प्रतिसाद दिला त्यांचे आम्ही मनापासून आभार व्यक्त करतो आणि पुढेही असेच आपले सहकार्य लाभेल अशी आशा व्यक्त करतो.

सर्वात शेवटी या परिषदेच्या कार्यासाठी अप्रत्यक्षपणे मदत व पाठबळ देणारे आमच्या दोघांच्याही कुटुंबातील सर्व सदस्यांचे आभार व्यक्त करतो.

धन्यवाद!

संपादक

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