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TWO YEAR MASTER'S DEGREE COURSE

(CBCS in Accordance with NEP 2020)

SEMESTER - II

ENVIRONMENTAL HISTORY OF INDIA

HISTORY

Surya Kumar Bhuyan School of Social Sciences

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

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COURSE INTRODUCTION

This is the elective Course of the Second Semester of MA Pgrogramme in History. The tttle of this course is Enviromental History of India. The cournse contains a total of 15 units. The course shall introduce the learners to the various environmental policies in the pre-colonial, colonial and post-colonial India and also the various movementd that resulted out of it.

The first Unit is the *Historiography and Concepts.* This unit discusses different concepts in environmental history put forward by historians.

The second Unit *Themes i*n *Environmental History and Modes of Resource Use* discusses the various themes that are crucial in the understanding of environmental history.

The third Unit *Environment and Society in Pre-colonial India* discuses society and ecology *i*n Pre-colonial India.

The fourth unit *Forest and Land Use in Pre-colonial India* throws light on forests and the use of land in pre-colonial times.

The fifth Unit *Forests in Colonial India* discusses the British intervention and their Forests policies and its impact.

The sixth unit *Commercialisatio*n of *Nature* discusess the produces of the forests and its exploitation as commercialisation was enforced.

The seventh unit *Commercial Agriculture and Enironment* on the commericalisation of agriculture and how the environment was affected by it.

The eighth unit titled *Man and the Animal World* discusses the inter-relation between man and animals over a lond period of time.

The ninth unit *Water and its Uses* explores the ways in which water was used and the technologies that developed around it in the pre-colonial and colonial period

The tenth unit *Environment in Post-colonial India* discuses the environment policies and the ongoing development debate in post Independence India.

The eleventh unit *Environmental Movements* discuses the mass movement that erupted as a consequence of the government policies on environment.

The twelfth, thirteenth and fourteenth unit titled *Environmental Setting of North East India, Land Use Pattern in North East India and Post-colonial Environmental Setting* respectively discuses ecology of NE India in colonial India.

The fifteenth unit *Environmentalism and India* reflects on the environmental issues in contemporary India.

While going through this paper, you will notice that some boxes are put in the left hand or right hand side of the text. These boxes are meant to serve the purpose of in-text glossary for you. Again, you may find some boxes marked with: “LET US KNOW”. These boxes will provide you with some additional interesting and relevant information. The boxes marked with “ACTIVITY” will help you in making your learning more active and efficient. And, at the end of each section, you will get “CHECK YOUR PROGRESS” questions. These have been designed to self-check your progress of study. It will be better if you solve the problems put in these boxes immediately after you go through the sections of the units and then match your answers with “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit.

UNIT 1: HISTORIOGRAPHY AND CONCEPTS

UNIT STRUCTURE

1.1 Learning Objectives

1.2 Introduction

1.3 What is Environmental History?

1.4 Concepts in Environmental History

- 1.4.1 Environmentalism
- 1.4.2 Deep Ecology
- 1.4.3 Eco-feminism
- 1.4.4 Wildness

1.5 Historiography of Environmental History

- 1.5.1 Environmental Historians of World
- 1.5.2 Environmental Historians of India

1.6 Let Us Sum Up

1.7 Further Readings

1.8 Answers to Check Your Progress

1.9 Model Questions

1.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- Explain and analyse the importance of environmental history,
- Comprehend the historical relationships between human society and the natural world,
- Investigate key ideas in environmental history such as environmentalism, deep ecology, ecofeminism, and wilderness, and
- Examine the prevalent narratives of environmental change evolution from historical perspectives

1.2 INTRODUCTION

Dear Learner, this is the first Unit of the Paper '*Environmental History of India'*. This paper will engage with the questions of how the environment and humans are inter-related and how they affect each other.

Environmental history is an interdisciplinary topic which examines the dynamic connection between the growth of human and the changes that have occurred within the natural world all throughout history. In the 1960s and 1970s, environmental history came to significance as an independent discipline of history writing. It arose as a direct result of historians' break from conventional elite history and has since evolved into a common platform for the integration of social and environmental history from interdisciplinary perspectives. It also examines how environmental conditions influenced the development of civilization and how human activities shaped the environment as a whole. The environmental history also investigates how civilizations incorporate, change, and adapt to their environments, with a focus on the mutual reliance of environmental and social structures of human society.

1.3 ENVIRONMENTAL HISTORY

The environment has always been a part of human history. Interactions between humans and the environment were intricately intertwined in ancient times, influencing the growth of human societies, cultural practices of people and their ways of living. While advanced technology and tool manufacturing were not as developed as they are today, humans of the ancient civilizations had complex relationships with their natural surroundings which greatly impacted their way of life.

As a result of environmental degradation and climate variability, some human cultures have collapsed. Many recollections state that the fall of the ancient Indus Valley Civilization was caused by a number of different factors, including climate change, forest destruction, and other environmental challenges. It may be noted that the Industrial Revolution and its impact on the natural environment played a pivotal role in the emergence of the

contemporary environmental movement in Europe and Asia in the late nineteenth century. But the 1960's were an important stage in environmental consciousness and activities, and the campaigns of that period had a huge impact on the course of environmental history. This change in global approach boosted the relevance of environmental history, recognizing the necessity of understanding past human-environment interactions in interpreting present-day environmental issues including natural resource use, conservation practices and state policies.

Donald Worster, William Cronon, Alfred Crosby, and Carolyn Merchant are four well-known environmental historians who offer their perspectives on the broad spectrum of environmental history. According to Donald Worster, an ecological system is a local or regional collection of both abiotic and biotic elements that work together. Similarly, according to Worster, the history of nature encompasses human modes of production and organized production systems such as gathering, hunting, and fishing; pastoral economic systems, hydraulic or agricultural economies, and industrial capitalism. William Cronon, however, puts an importance on the ecological prophecies. William Cronon's research focuses on the history of mankind's relationship with the natural world, including how we rely on the ecological systems surrounding us to maintain our material existence, how we change the environments in which we live and work, and how our ideas about nature impact our relationships with the world around us. The term nature has a complicated history. Worster's synthetic framework, he claimed, is too restricted and overly materialist. Alfred Crosby coined the term 'Ecological Imperialism', referring to the substantial significance of European-centered biological species—animals, plants, and pathogens—in enhancing European colonists' prosperity. The idea draws attention to how these animals affect landscapes and cultural groups. Similarly, Carolyn Merchant emphasized a new concept 'Ecological Revolutions' which refers to transformative processes by which societies change their relationships with nature. These revolutions are the result of conflicts between production and sustainability for the environment, as well as between production and reproduction. They lead to the formation of new perceptions of nature, which

emerge both physically and in human awareness. This perspective emphasizes changes in societal ties with the environment, as well as how they impact human understanding and engagement with the natural environment.

Interpretations within environmental history are varied and complicated, reflecting numerous views and analytical frameworks which are used to analyze interactions between humans and the environment. It is worth noting that the history of environment is mainly focused on the complex relationships that exist between human society and the natural world, including both human and other aspects of natural world. Environmental history also indicates how landscapes, ecosystems, and utilization of resources have changed throughout time, offering insight into the outcomes of human actions, abuse, efforts to conserve and restoration of the environment.

1.4 CONCEPTS IN ENVIRONMENTAL HISTORY

Environmental history is the study of the interaction between human beings and their natural surroundings across history. It is noted that environmental history is a range of new concepts that human beings are, to an important degree, formed by their surroundings. The following are the major concepts of environmental history:

- **Environmentalism**

The term 'Environmentalism' refers to a broad social and political movement that advocates for environmental protection and preservation through sustainable ways of life and conservation measures. In fact, environmentalism is a new way of looking at things in which people strive to understand more about the earth and the sustainability of life on earth. It involves recognizing our planet's environmental challenges and devising solutions (both individually and collectively) to tackle them. While environmentalist focuses on the ecological and nature-related facets of green philosophy and politics, ecological theory blends social ecology with environmentalism.

It is a factual matter that the environmental movements in India have a long history of existence. These movements are often led by numerous people and organizations. They have an identical passion for protecting the environment and fight to change environmental regulations and procedures. The effects of fast industrialization on the natural world as well as local populations are also driving forces for environmental movement in India. The Chipko Movement, which began in 1973 to prevent a group of loggers from destroying a patch of trees, is India's most well-known environmental movement. Another popular social and environmental movement was the Silent Valley Movement, which started in 1978 to resist a proposed hydropower plant in Kerala, India's Silent Valley region. These movements are also strongly based in various ideologies such as eco-centric attitudes that integrate social and spiritual matters.

- **Deep Ecology**

  Deep ecology is an eco-friendly social movement which advocates a holistic and ecologically conscious vision with the aim to tackle the planet's environmental issues. Deep ecology, which was developed in 1972 by Norwegian philosopher Arne Naess, along with George Sessions, an American environmentalist, mainly suggests an immense change in environmental awareness among people to build an eco-friendlier relationship with our planet. They put together an eight-point organizational platform for the deep ecological social movement. These are as follows:

- There is intrinsic value in the thriving of human and other species on Earth. The worth of nonhuman organisms is independent of their utility for particular human interests.
- The abundance and diversity of life forms are valuable in and of themselves.
- Humans have no right to destroy this richness and diversity unless it is necessary to meet essential demands.
- Human intervention with the nonhuman world is currently considerable, and the situation is quickly worse.

- The flourishing of human existence and civilizations can coexist with a substantial decline in the human population.
- Important improvement in living conditions necessitates changes to financial and scientific strategies.
- Well-being should take precedence over a high standard of life.
- Those who agree with the earlier principles are obliged to make the changes that are required.

Deep ecology, as philosophy of science, also critiques science while inserting ethical principles into it, giving humankind a sense of respect in the presence of nature. It motivates us to make an ethical position in addition to investigating the interaction between creatures and their natural surroundings and also finding a place for human being within that interplay. It is noteworthy that environmental feminists and social ecologists have lambasted deep ecology for neglecting social analysis, which may make a link between social and environmental issues. Some critics claim that deep ecology's holistic philosophy degrades individuals while others argue that biocentric equality leads to ethical absurdities such as considering a worm or a bush identically to a son or a mother. These charges are sometimes founded on radical deep ecological interpretations that do not reflect its fundamental purpose.

- **Eco-Feminism**

Ecofeminism, in environmental history, connects feminist analysis for ecological ideology and discusses the issue of natural degradation and female enslavement. Ecofeminism is crucial in illustrating the interdependence of the relationship between genders and destruction of the environment. As per the ecofeminist theory, a feminist perspective on ecology does not place women in dominating positions of influence, but rather pushes for an equitable, participatory society in which there is no single dominant group. It serves in understanding the historical relationship between women, the environment, and male-dominated society's hierarchical systems. Eco-feminism, in particular, has transformed environmental history by questioning old patriarchal perspectives that

perpetuate dominance over both women and the environment. Ecofeminism arose a multifaceted movement as a result of the feminist movement in North America and Europe during the 1970s, which explicitly links women's subordination to human's restrictive relationship with nature. It served as a theoretical framework in order to better comprehend how dualist notions of gender may explain human's dominant role in the degradation of the environment.

Some great eco-feminist figures are Vandana Shiva, Carol Adams, Judi Bari, **Mitsuye Yamada,** and *Rosemary Radford Ruether. In fact, Vandana Shiva stated that women have a specific relationship to the natural world through their everyday interactions, which has gone unnoticed. Women in livelihoods who make "wealth in partnership with nature," according to Shiva, "have been experts in their own right of holistic and ecological knowledge of nature's processes."*



LET US KNOW

Some Popular Definitions on Ecofeminism

- According to Vandana Shiva, "We are either going to have a future where women lead the way to make peace with the Earth or we are not going to have a human future at all."
- According to Sonya Renee Taylor, "We will not go back to normal. Normal never was. Our pre-corona existence was not normal other than we normalized greed, inequity, exhaustion, depletion, extraction, disconnection, confusion, rage, hoarding, hate and lack. We are given the opportunity to stitch a new garment. One that fits all of humanity and nature."
- According to Lissa Brown, "Ecofeminism is an integral facet of the women's movement because it addresses the severing of Women and Mother Nature, and the exploitation of both."

It is also noted that ecofeminism is also known as 'socialist ecofeminism', 'social feminism' and 'marxist ecofeminism'. Famous ecofeminist Carolyn Merchant clearly argued that social ecofeminism

promotes the liberation of women by reversing economic and social inequalities that transform all aspects of life into a market economy that today even invades the womb. Eco-feminism tries to rethink and enhance both feminist and environment movements. The theoretical framework explores the intersections of gender and nature, specifically how linear classifications wrongly classify opposing groups, assign disproportionate importance to one group, and promote hierarchical thought. Women gradually started to fight for safeguarding animals, food, air, and water. Beginning in the late 19th and extending into the early 20th centuries, women took part in environmental campaigns, notably preserving and protecting the environment. It is noteworthy that women took responsibility for the Chipko movement in northern India in 1973 to defend woodlands from destruction. Non-violent protesting methods have been used to take control of trees, preventing loggers from cutting them down.

- **Wilderness**

Wilderness is often characterized as things created in our natural environment that are not domesticated, i.e. it avoids interactions with humans. Therefore, wilderness refers to an area that has been mostly unaffected by human activity, as well as its naturally evolved life community. The WILD Foundations, on the other hand, goes into deeper detail, articulating wilderness as "the most intact, undistributed wild natural areas left on our planet - those last truly wild places that humans do not control and have not developed with roads, pipelines, or other industrial infrastructure." Wilderness is an ecological law. The ecological notion of the wilderness does not imply that an ecosystem must remain unchanged. Ecosystems change when available resources and contest dynamics change.

Some important books on the concept of wilderness are Roderick Nash's *'Wilderness and the American Mind'* (1967), William Cronon's *'Uncommon Ground: Towards Reinventing Nature'* and Jack Turner's *'The Abstract Wild'* (1996).

As an environmental concept, wilderness covers unseen, unchanging portions of nature that remain without major human interference. It embodies untamed terrain, uncontrolled ecological systems, and the unrestrained power of the environment. When we look at environmental history, we can see that the wilderness is an important part of biodiversity. Wilderness symbolizes resilient ecosystems as well as the capacity to evolve and exist independently. The wild environment often contributes to genetic variation and is a vital part of the larger web of life. They are critical to preserving environmental equilibrium and the survival of species. Similarly, wilderness has both cultural and aesthetic value. The wilderness is revered by humans for its splendor and mystery. Furthermore, basic ecological knowledge informs that wildness is the most likely habitat for species of all kinds to prosper. As a result, the wild, along with other features of the explored territory's surroundings, frequently evoke awe and humility. It connects the individual with the basic forces which form the natural world.

However, in the face of human activity, the concept of wilderness has grown increasingly difficult in recent years. Urbanization, industrial development, and resource extraction have encroached on wildlife habitats, drastically altering nature's ecosystems and diminishing the natural qualities of the environment. The role of wilderness in preserving environmental health must be recognized, as conservation initiatives tend to concentrate on wildlife conservation or rehabilitation. The modern environmental movement is a coordinated attempt to preserve some wild nature. Finally, wilderness symbolizes the essence of untainted nature, revealing the naturally complex features of life that exist outside of human influence. The intrinsic significance of wilderness in terms of ecological balance, biodiversity, and cultural and artistic context has made its preservation critical.



CHECK YOUR PROGRESS

Q 1: Who was the influential environmental activist known for raising awareness about the harmful effects of pesticides like DDT?

.....

Q 2: When did the Chipko Movement first started in India?

.....

Q 3: Who wrote the book *'Wilderness and the American Mind'?*

.....

1.5 HISTORIOGRAPHY OF ENVIRONMENTAL HISTORY

Environmental historiography has ranged from studying human-environment connections to getting into the sociopolitical dimensions of change in the environment. The genre of environmental history writing is discussed below:

- Historiography of Environmental History: Global Perspective

Scholarly works on environmental history, like any other facet of intellectual life, have countless and complicated origins. Some of the earliest textual writings, such as the Epic of Gilgamesh, highlight the ecological consequences of human activity. In fact, many mediaeval intellectuals, including Ibn Khaldun and Montesquieu, saw variation within the natural environment, particularly climate, as crucial to human conduct. Charles Darwin also made contributions to the study of the environment and its interaction with the human world. Later on, using Darwin's ideas, both American and European historians sought explanations for historical shifts in the natural world, leading to genetic and ecological determinism in the latter part of the nineteenth and beginning of the twentieth centuries. However, George Perkins Marsh (March 15, 1801-July 23, 1882), a well-known scholar and environmentalist, took the initial steps in environmental studies. He

wrote one of the most influential works on early environmental history, Man and Nature (1864). Based on his beliefs and experiences, 'Man and Nature' highlighted the connection between human society and the environment. He rejected the general consensus that human impact on nature is generally benign or not significant, claiming that ancient Mediterranean civilizations caused their own demise by exploiting environmental resources. They had lost the natural productivity that nourished their well-being by deforesting their highlands and degrading their agricultural land.

It is worth noting that George Perkins Marsh argued that deforestation was dangerous. He also spoke about the scarcity of resources, which is a big worry for the environmental conservation movement today. In fact, George Perkins Marsh's ideas and caution concerning the detrimental effects of human interfering in nature foreshadowed much contemporary environmental ideas. Marsh's significant insights into 'Man and Nature' launched environmental history, which has subsequently expanded into an interconnected activity. While founded in early observations and theories, environmental history always adjusts to meet modern issues, providing significant perspective on the ever-changing relationship between society and the natural world.

Frederick Jackson Turner (November 14, 1861 – March 14, 1932), one of the American historians, was an influential figure in the study of environmental history. He was best known for 'The Frontier Thesis', often referred to as Turner's Thesis or 'American Frontierism'. In fact, Turner's important essay 'The Significance of the Frontier in American History' contained ideas that shaped the frontier theory. Turner's Frontier Thesis' highlighted the frontier's prominence in American history, emphasizing its role in shaping the rule of law, individualism, and the American spirit. But a few elements of Turner's work, however, highlighted the ecological and environmental aspects of the American demography. His work 'Frontier Thesis' is concerned with the link between humans and the natural world. Although Turner's ideas connected with environmental components in a round about way, his ideas pertaining to environmental history relatively

limited in comparison to his enormous influence in influencing perceptions of American history and social evolution.

The historiography of environmental history emerged as an increasingly significant field in historical scholarship when it firstly arose in the United States during the environmental movement of the 1960s and 1970s, and much of its influence still results from prevailing global concerns regarding the environment. Rachel Carson (1907-1964) was a well-known biologist who was also known for her writings on pollution in the environment and the evolution of nature. Her classic work 'Silent Spring' (1962), which looked at the harmful effects of pesticides such as DDT on wildlife and humans, had a significant impact on the emergence of environmental history. Carson's work contributed in the formation of the environmental movement and inspired others to find out how people and the environment have interacted throughout history. Her book has a significant impact on how we today care for our environment.

In similar manner, J. Donald Hughes is a well-known environmental historian who studies the history of humanity's relationship with the environment. His significant books include 'Ecology in Ancient Civilization' (1975), 'Pan's Travail: Environmental Problems of the Ancient Greeks and Romans' (1994), 'An Environmental History of the World' (2001), 'The Mediterranean. An Environmental History' (2005), and 'What is Environmental History' (2006). Among his works, 'An Environmental History of the World' is a brief history of the relationships between human societies and the different kinds of life that occupy the world from ancient to modern periods. He claimed that the ecological equilibrium is not static, but rather dynamic. To maintain its life, a living species adjusts to changes induced by inner states and external factors. Indeed, humans have had an impact on the natural world, sometimes with the promise of long-term balance, but occasionally in harmful ways.

It is noteworthy that Donald Worster is a well-known figure in environmental history, known for his extensive knowledge into the interaction between people and their environment throughout history. He has written

some influential books on environment like 'Nature's Economy: A History of Ecological Ideas' (1977), 'Dust Bowl: The Southern Plains in the 1930s' (1979), 'An Unsettled Country: Changing Landscapes of the American West' (1994), 'The Wealth of Nature: Environmental History and the Ecological Imagination' (1994), 'A Passion for Nature: The Life of John Muir' (2008), 'Shrinking the Earth: The Rise and Decline of Natural Abundance' (2016). Doland Worster's achievements go beyond his influential books, as he has shaped the academic framework of the study of the environment. His focus on recognizing the complicated relationship between human activities and the natural world highlights the significance of environmental history in understanding the larger forces that influenced cultures and society over time.

Similarly, although best known as a sociologist and Marxist economist, John Bellamy Foster has made important contributions to both environmental history and environmental economy. His works intersect with environmental history and ecological sociology, examining the connections between the capitalist system, the natural world, and human society. As a student, John Bellamy Foster was active in the anti-war and anti-environmental movements, campaigning for peace and raising environmental consciousness. His participation in these environmental and social movements reflected his desire for social fairness, environmental sustainability, and resistance to the Vietnam War. John Bellamy Foster is the author of a number of notable books on the ecological consequences of capitalism and the interaction between society and the natural world. Among his major works are: 'Marx's Ecology' (2000), 'Ecology Against Capitalism' (2002), 'The Ecological Revolution' (2009) and 'The Return of Nature: Socialism and Ecology' (2020). As a result of the efforts of many scholars and historians devoted to understanding the connections between people and the natural world throughout time, the discipline of environmental history has emerged as a distinct field within the context of the world. Their efforts, which explored the historical connections between civilizations and their natural environments, made significant contributions to the discipline of environmental history.

- **Environmental Historians of India**

In India, environmental history has begun to develop as an integral and established discipline of history. Studying the past connections between human culture and the natural world in the Indian context is becoming increasingly vital for intellectuals and historians. The study of how factors related to the environment such as climate, landscape, and biodiversity have influenced the development of civilization and culture in India. The environmental history of India involves agricultural methods, urbanization, management of water networks, forest destruction, protection of wildlife, and the ecological consequences over time. The ecological consciousness is present in ancient Indian literature through different works that express a profound respect for nature and environmental recognition. The traditional form of nature worship and environmental consciousness is expressed in the Vedas, which were produced in India between 1500 and 1000 BCE and also emphasizing a harmonious relationship between humans and the environment. Great Indian epics such as the Ramayana and Mahabharata include narratives that illustrate the moral handling of animals, the significance of forest conservation, and the negative effects of environmental destruction. During India's historical period, some literary works, such as the Arthashastra by Chanakya (Kautilya) and the Manusmriti, highlighted the significance of conserving forests, restricting hunting, and safeguarding wildlife.

During the decades between the 1970s and the 1980s, the Indian discussion of environmental issues got significant momentum inside the academic community, owing primarily to the popular environmental mass movement such as the Narmada Bachao Movement and the Kerala Fisher Folk Struggle. These grass-roots movements raised serious environmental concerns among historians and prompted significant public discourse on land, water, and biodiversity issues. However, around the middle part of the 1980s, modern environmental history writing in India gained popularity, indicating a major shift towards studying the historical relationships between people and the natural world. During this period, Indian intellectuals and

historians began to devote more time and effort to the interdisciplinary study of history's interaction between people and the natural world. This decade also saw an increase in environmental history research, documents, and academic attempts, examining various aspects such as environmental changes, patterns of land use, the management of natural resources, and the consequences of people's actions on the natural world throughout India's history.

It is worth noting that Ramachandra Guha is widely regarded as one of India's founders of modern environmental historiography His contributions to this issue have had an important influence on articulating the discourse on environmental issues in the larger context of Indian history. In fact, 'The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya' (1989) and Environmentalism: A Global History (2000), written by Guha, is two significant works in Indian environmental history. Guha's works revolves around social change and degradation of the environment in India under British rule. He reveals the various shapes that this century-old tradition of forest-based struggle took when the hills underwent severe environmental and political-economic disruption. Guha's expressive narration, grasp of the scholarship on social movements, and careful extraction of crucial information from a rich collection of raw materials combine to make this book one of the decade's most significant additions to environmental social history.

Another seminal work on environmental history of India is 'Ecology and Equity: The Use and Abuse of Nature in Contemporary India' (1995), a joint venture by Madhav Gadgil and Ramachandra Guha that examines India's ecological challenges and their consequences for equity in society. The book also highlights the complex relationship of ecology, economy, and social systems, covering different challenges caused by environmental destruction, mining of resources and colonization of economy. They also offered a novel perspective of the environmental issue in a vast, diversified, and essential Third World country. The focus of this book is not so much on the magnitude of environmental destruction in India as it is on the

numerous human consequences. Similarly, their another collaborated work 'The Use and Abuse of Nature: incorporating This Fissured Land: An Ecological History of India and Ecology and Equity' (2005) is an umbrella version of two volumes that have profoundly revolutionized our understanding on Indian environmental history.

Similarly, famous environmental historians Mahesh Rangarajan and K. Sivaramakrishnan have contributed significantly to the study of India's environmental history. Their combined work, 'India's Environmental History - A Reader: Vol. 1: From Ancient Times to the Colonial Period & Vol. 2: Colonialism, Modernity, and the Nation', is a two-volume collection that presents a detailed overview of India's environmental history. The two-volume work on India's environmental history explores forests, wildlife, human-animal conflict, indigenous rights and urbanization, displacements, farming and deforestation, epidemics and famine, sedentarism and movement, wildness and professionalism, and the sustainability versus equity debate.

Sumit Guha and David Arnold are two more figures who have contributed to the study of environmental history in India. Sumit Guha's work 'Environment and Ethnicity in India,1200-1991' (1999), highlights how environmental elements have shaped and integrated with ethnic groups, regions, and their evolutionary processes in the Indian context throughout centuries. David Arnold is a well-known historian who has made significant contributions to South Asian history, particularly environmental and colonial issues related capitalist economy. 'The Tropics and the Travelling Gaze: India, Landscape, and Science, 1800-1856' (2015) is his most influential work. He provides a new view of imperial India's history as well as an essential contribution to the knowledge of the ecology and the tropical world.



CHECK YOUR PROGRESS

Q 4: Name two Indian pioneers who have contributed to the field of Environmental History.

.....

Q 5: What is the crux of John Bellamy Foster's work in Environmental Studies.

.....

Q 6: Who is the author of 'Man and Nature?

.....

Q 7: What is the underlying thesis in the work 'Environment and Ethnicity in India,1200-1991'?

.....



ACTIVITY 1.1

1. Make a list of the environmental historians of India and review their latest book in around 500 words.
2. Trace the history of environmental movements in North East India.
3. Watch the film 'The Elephant Whisperers' and write a brief review
4. Prepare a list of environmental activists across the world.



1.6 LET US SUM UP

After going through this Unit, you have learnt that -

- Environmental conditions have influenced the development of civilization and how human activities shaped the environment as a whole.
- Environmental history aims to investigate, through an academic discourse on the various theoretical approaches offered by historians
- Civilizations incorporate, change, and adapt to their environments, with a focus on the mutual reliance of environmental and social structures of human society.



1.7 FURTHER READINGS

1) Carson, R. (1962) *Silent Spring,* Boston: Houghton Mifflin.
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4) Guha, Ramchandra (1993). 'Writing environmental history in India', *Studies in History*, 9(1), 119-129. https://doi.org/10.1177/025764309300900106
5) Hughes, J. Donald. (2015). *What is Environmental History? N.Y.,* Polity.
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7) Worster, Donald. (1979). *Dust Bowl: The Southern Plains in the 1930s.* OUP, New York.

1.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: Rachel Louise Carson

Ans to Q No 2: 1973

Ans to Q No 3: Roderick Nash

Ans to Q No 4: Madhav Gadgil and Ramachandra Guha

Ans to Q No 5: Bellamy's work intersects environmental history and ecological sociology examining the connections between the capitalist system, the natural world and human society.

Ans to Q No 6: George Perkins Marsh

Ans to Q No 7: The work traces how environmental elements have shaped and integrated with ethnic groups, regions, and their evolutionary processes in the Indian context.



1.9 MODEL QUESTIONS

A) Very Short Questions (answer each question in about 50 words)

Q 1. Who wrote the book *'Silent Spring'*?

Q 2. Which environmental historian coined the term 'Ecological Imperialism'?

Q 3. Who is the author of the book '*The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya'*?

B) Short Questions (answer each question in about 150 words)

Q 1. How is Wilderness interpreted in Environmental History?

Q 2. What is Eco-feminism? Give example.

Q 3. State the nature of the Chipko Movement.

Q 4. Mention the contribution of Ramchandra Guha in Environmental History writing.

Q 5. Explain Deep Ecology.

C) Long Questions (answer each question in about 300-450 words)

Q 1. Discuss the concept and key aspects studied within Environmental History.

Q 2. Analyze how the different concepts of environment history shape narratives, methodologies, and the overall understanding of historical relationships between human and environment.

Q 3. Critically analyze the evolution and significance of the historiography of environmental history, considering its global perspective.

Q 4. Discuss the writings of environmental history in India.

*** ***** ***

UNIT 2: THEMES IN ENVIRONMENTAL HISTORY AND MODES OF RESOURCE USE

UNIT STRUCTURE

2.1 Learning Objectives

2.2 Introduction

2.3 Environmental History

- Water
- Forests
- Natural Disasters
- Climate Change

2.4 Modes of Resource Use

- Hunter-Gathering Mode
- Nomadic Pastoralism Mode
- Settled Agricultural Mode
- Industrial Mode

2.5 Let Us Sum Up

2.6 Further Readings

2.7 Answers to Check Your Progress

2.8 Model Questions

2.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- understand the historical relevance of water as a basic component that has shaped ecosystems and society as a whole.
- know the significance of forest as theme of environmental history.
- comprehend the relevance of historical modes of resource including hunter-gathering, nomadic pastoralism, settled agriculture, and industrialization with their impacts on human society.

2.2 INTRODUCTION

Dear learner, in the previous Unit, we discussed some core concepts in Environmental History and the history writing trend in this direction. This Unit will make an attempt to provide an insightful perspective through which we may look at how human cultures have interacted with nature during various historical periods. Through a comprehensive analysis of fundamental issues like water, forests, natural catastrophes, climate change, and use of resources patterns, such as hunter-gatherer, nomadic-pastoral, settled agrarian, and industrial modes, we will be able to comprehend the relationship that exist between human actions and environmental processes.

2.3 ENVIRONMENTAL HISTORY THEMES

The study of environmental history covers a broad range of topics that examine how people have interacted with nature throughout time. It has been observed that many environmental historians possess an interest in historical methods and subjects related to the environment. However, environmental history addresses four primary themes: climate change, natural disasters, forests, and water.

- **Water**

Water plays a crucial part in the global hydrologic cycle by storing water for thousands of years, which makes it very important in environmental history. The ocean, lakes, rivers, glaciers, and snowfall are among the many of the reservoirs that hold water. Water resources have been essential to human civilizations for agricultural cultivation, drinking purposes, and also for maintaining the natural beauty of the environment. In addition to consuming water to replenish the fluids lost from their bodies on a constant basis, humans also depend on food sources which need water to survive. According to the UN Environment Programme (2002), 90 percent of freshwater resources that are easily available worldwide are groundwater. There is only 2.5 percent of this that is renewable. The remainder is a dependable, limited resource.

For over 200,000 years, water has shaped the evolution of human society. Notably, water was a vital resource in the early stages of human existence as a hunter-gatherer. It was used not only to slake the thirst of animals but also as a necessary component for survival. It is noteworthy that ancient humans looked to regions with easily accessible water sources, such waterways, to create civilizations. These areas not only supplied fertile soil for growing food plants, but also drew animals for hunting. In fact, archaeological excavations in human civilizations like Mesopotamia, Egypt, the Indus Valley, and China highlighted the complex systems our ancestors devised for the effective management and utilization of water. In fact, water was also considered as holy in the Minoan culture. It is important to note that the Minoans began the building of the first palace city around 4000 years ago. It became the oldest European city culture with an advanced water system. In similar manner, the Romans constructed the aqueducts, or gravitational water pipes. When it came to searching for clean drinking water, Roman society had several methods.

Water is an essential part of environmental history studies in India as well. Numerous Indian writers have emphasized the value of pre-colonial water management in India, particularly the role played by traditional village communities in the preservation of irrigation systems. David Hardiman, a well-known environmental historian, argues that “small-dams system of irrigation existed in the past which were sustained over long period of times…. by community-based control” (Hardiman, 1995:209). In pre-colonial India, there are several traditional ways to have a water conversation. The wells were the primary means of obtaining water. Historical inscriptions also shed light on the contribution of monarchs to build and maintain water routes and reservoirs, highlighting the vital role that irrigation plays in promoting agricultural growth. For instance, the considerable maintenance efforts undertaken for the artificial reservoir known as Sudarshana Lake, constructed during the Mauryan period, is revealed by the rock inscription found in Junagadh. More proof of the significance given to water management comes from inscriptions such as the one in Mathura that praises a Brahmana

for constructing a tank. These inscriptions praised the people who have made contributions to improving irrigation systems, along with recording the building of reservoirs and tanks.

Environmental history presents some issues with water that should concern all of us. For example, many individuals today may consider groundwater in an aquifer to be 'natural'. What about that same water, though, that has been chemically altered, pumped out, and packaged for sale in plastic bottles with a label that claims it is 'natural' once they've been eaten and then emptied into a river, like the Gange, as liquid waste? Many Hindus in India today consider the Ganga as forever pure, while many 'natural scientists' who approach the river from a chemical and biological standpoint would describe it as abnormally contaminated. Environmental history is a more fascinating field of social science since these opposing viewpoints are constant in the field.

- **Forest**

Forest is a significant theme of environmental history as it sustains a wide variety of plant and animal species, retains carbon to slow down global warming, and offer basic necessities for human subsistence. But since the word 'forest' comes from the Latin word 'foris', which means 'outside', it must have referred to any unoccupied and uncultivated landscape as well as a community boundary or the protective layer. It appears that the forest serves as an ample habitat for a wide variety of flora and animals. Since the beginning of human civilizations, people have taken advantage of forest resources for a multitude of reasons, including the manufacture of timber, food, and medical treatment. But in an effort to enhance their quality of life, humans have cut down trees more rapidly than they can regrowth in a number of cases. This process, dubbed deforestation, affects native ecosystems and creatures, which poses a major threat to the natural world. For contemporary environmentalists, forests are the most significant subject of discourse. The development, preservation, scientific management, and use of forest resources to support the continuous manufacturing of necessary goods and amenities are all included in the theory and practice of forestry.

However, the history of forests goes beyond the mere act of destruction. It is notable that since the beginning of human history, the forest has provided a home for living things. If history is the record of change, then the history of forestry should include all kinds of changes that have occurred, relating to both nature and human agents. In fact, reframing forest history involves shifting focus to those who live within the forest. Furthermore, forest histories always follow a similar pattern, documenting the pressures of the world's growing desire for agricultural land and wood, which leads to an increasing destruction in the natural world. The ecological changes that forest experience is also a part of the history of the environment.

In the context of India, Environmental historians have focused their attention on forests and forest resources, including wildlife and plant life and their impact on the balance of nature, settlement, and forestry. Numerous environmental historians have contended that widespread utilization of iron tools for cultivation at the middle of the first millennium BCE caused deforestation and urbanization in the Gangetic plains of India, resulting in the disappearance of significant forest resources. In fact, eminent historians like D.D. Kosambi and R.S. Sharma have identified iron tools as one of the root causes for the growth of agriculture and destruction of the environment. It is interesting to note that *the Vedas*, *the Mahabharata,* and *Satapatha Brahmana* are among the oldest literary works that portray the destruction of forests to make way for human habitation and agriculture. The great epic *Mahabharata* contains some of the more vivid descriptions of the destruction of forests and life based therein. Similar to this, Kautilya acknowledges the value of forest wealth in his work *Arthashastra* by stating that no one is allowed to cut any portion of the woodland without the state's approval.

Likewise, in the second century CE, Karikala Chola destroyed forests to provide more space for agriculture. It is also noteworthy that British colonial rulers exploited the forest resources for the purpose of profit is another important part of India's forest history. Similarly, the development of hunting as a leisure activity poses important questions regarding the interactions between humans and the natural world as well as the impact of human

activity on ecosystems within the framework of India's environmental history. There have been substantial environmental consequences from hunting for games, including losses in the numbers of some species and disturbances to ecosystems. In summary, the history of India's forests shows how human activity, environmental effects, and economic interests have interacted in complex ways over time. By examining different aspects of forests, environmental historians concentrate on the relationships that have existed historically between people and the natural world. Without a doubt, wood has long had an impact on a wide range of different aspects of human existence, besides providing essential resources that have fueled the economy.

The government of India establishes protected forests, which are the most regulated woods, in order to protect wildlife and forest resources. Hanumasagara Reserve Forest in Karnataka, Begur Reserve Forest in Kerala, Attappadi Reserve Forest in Kerala, and Sholayar Reserve Forest in Tamil Nadu are a few examples of Protected Forests in India. Similarly, in 1952, the National Forest Policy was launched for the first time. This policy was amended in 1988. The National Forest Policy's primary goals were to guarantee sustainable forest management and the empowerment and involvement of local and tribal populations in the preservation and advancement of their forest.



2.1. ACTIVITY

1. Make a list of the Reserved Forest of India

.....

.....

- **Natural Disaster**

Natural disasters have extensively influenced human societies throughout history. Studying natural disasters within historical contexts gives an insightful perspective of human responses to the environment and natural world. For instance, archaeologists found that various deadly diseases affected the demographic structure of the Indus Valley Civilization after

natural disasters, such as earthquakes, which caused significant harm to the social and environment system in the Indus Valley. In fact, India also began to experience economic and social upheaval from rainy failures and droughts as El Nino occurrences occurred significantly starting approximately 500 CE.

There is no doubt that natural disasters, such as floods, droughts, and earthquakes, have a long-term adverse impact on the population pattern of human societies. In fact, the history of natural disasters such Tsunami, earthquake, flood, tropical storm explores the ways in which these catastrophic occurrences have, over time, preserved human society. It is noteworthy that natural disasters disrupt ecosystems and can even cause long-term changes in the environment. Natural disasters have killed a large number of people worldwide every year for the previous few decades.

- **Climate Change**

Another major issue in environmental history is climate change, which has impacted on the existence of humans, ecosystem, and even the rise and fall of human civilizations throughout time. The phrase 'climate change' refers to every change caused by the phenomenon known as global warming. Since the late 1980s, climate change has gained prominence in the international political and environmental agenda and has become an important issue worldwide. Similarly, environmental historians demonstrate how climate change has had a profound impact on human civilizations by examining the archival documents and past societies. In fact, changes in climate have had a lasting effect on history, influencing everything from migrations and resource-related conflicts to changes in farming techniques and habitation patterns. It is significant to note that variations in temperature, precipitation, and other climatic elements have affected the surrounding ecosystem and the ecological balance. The shifting climate has an impact on people's migration from one area to another. Over millennia, the climate has gently shifted throughout the course of geological time. It is noteworthy that paleoclimate refers to the climate of the ancient earth. In fact, climate has varied significantly over Earth's history. For instance, climate was

considerably warmer, and the atmosphere contained a lot more carbon dioxide during the Mesozoic Era, also referred to as the Age of the Dinosaurs. However, the climate has been steadily cooling throughout the entire Cenozoic Era, which began 65 million years ago and continues now.

In 1915, an eminent geographer Ellsworth Huntington stated that climate was "the most fundamental" determinant of culture, and thus a powerful influence on human history (Carey,2014: 25). Huntington suggested that a society's degree of civilization was influenced by its climate, which also created the history of mankind. Although historical climatology is the collecting of historical data on climate by climatologists, environmental historians focus on the history of climate-society interconnections. However, the focus of historians has gradually focused on meteorological phenomena like storms, droughts, and El Nino events. It is found that human action, especially the combustion of fossil fuels, has been the primary cause of changes in Earth's climate since the beginning of the twentieth century. This increase in the amount of heat-trapping greenhouse gases in Earth's atmosphere is a result of this phenomenon. A naturally occurring gas layer in the upper atmosphere called the ozone layer protects people as well as other living beings from the sun's harmful ultraviolet (UV) rays. The ozone layer was gradually depleted as a result of pollution produced by humans. Without a doubt, one of the biggest obstacles to sustainable development facing the global community is climate change. It affects human livelihood and economic enterprises in along with the health and wellbeing of the earth's surface. The greenhouse effect was first observed by Nobel laureate Svante Arrhenius, who joined Joseph Fourier and John Tyndall in identifying the opacity of atmospheric gases like methane, carbon dioxide, and water vapor to heat radiation.

It is found that the fall of ancient human societies such as the Mesopotamian, Egyptian, and Indus Valley civilizations was caused by climate change. Joel Colton and Palmer argued in *"History of the Modern World"* (1983) that 'climate itself can change. We are reminded that the climate there was once again a vital factor for the Roman ruins found in the

interior of Morocco and Tunisia (Isenberg, 2014:2). Recent archaeological data indicates that one of the main contributing factors to the fall of the vast Indus or Harappan Civilization was climatic change. The Saraswati River's drying up around 1900 BCE was the main factor contributing to the Indus Valley Civilization's climate change. During the Harappan era, the monsoons—winds that produce torrential rains—may have blown eastward. Under the direction of geologists at Woods Hole Oceanographic Institution (WHOI), a group of scientists has deciphered nuanced hints to piece together the conditions of the prehistoric past. They argue that the Harappans were doomed because of a decline of monsoon. Similarly, since ancient times, India's climate has been impacted by the Thar Desert and the Himalayas.



CHECK YOUR PROGRESS

Q 1. What is the meaning of 'Forest'?

.....

Q 2. State one factor for the decline of the Indus or Harappan Civilization.

.....

Q 3. When was the National Forest Policy launched for the first time?

.....

2.4 MODES OF RESOURCE USE

The concept of 'mode of resource use became popular with the publication of "This Fissured Land: An Ecological History of India", a book jointly authored by Madhav Gadgil and Ramchandra Guha. Although the early generation of social scientists found the Marxist concept of 'mode of production' useful, the later Marxists themselves criticized this concept by pointing out the relative lack of emphasis in this scheme on political structures and struggles in the society. Ramchandra Guha argued that an ecological approach to such questions suggests that the mode of production is not adequately materialistic. He points out that the Marxist analysis usually begins with the economic infrastructure without investigating the ecological

context. Hence, Guha and Gadgil created a new concept known as 'mode of resource use' which investigates the forms of property, management and control, and of allocation and distribution that govern the utilization of natural resources. It also incorporates two additional dimensions to the mode of production scheme- characteristic ideologies that govern different modes and the ecological impact of various modes.

It is worth noting that the four modes of resource use are Hunting-Gathering Mode, Nomadic Pastoral Mode, Settled Agrarian Mode and Industrial Mode. It is noted that each mode has its own aspects of technology, economy, social organization, ideology and ecological impact.

- **Hunting-Gathering Mode of Resource Use**

It is noteworthy that hunting and gathering was the primary means of subsistence for early human groups during the pre-historic age, which constituted an important part of human history. The way of life in early human societies was represented by this mode of resource.

Technology:

Human muscle power served as the basis for technological advances in these types of societies. It is noteworthy that early humans engaged in activities like hunting and gathering by using their physical power. They also depend on plant life, fuelwood, stones, and other substances that occur naturally to meet their material needs. Indeed, early human species such as Homo Erectus had easy access to a variety of stone tools, such as hand-axes, cleavers, and scrapers. During this period, stone tool sizes significantly decreased when the ice age ended, and warmer weather arrived. In fact, microliths—smaller, sharper tools—rose as a result of this technological change of tool making.

Economy:

The resources used within this method of resource use were obtained within a relatively small area, at most a few hundred squares kilometers. Shells, peacock feathers, and flint tools were among the relatively few resources that could be carried over longer distances. Indeed, communities

that adopted a gathering-based resource utilization strategy were extremely vulnerable to fluctuations in resource availability over time and space.

Social Organization:

During the hunter-gatherer period, social groups were very small and they lived together where everyone could maintain face-to-face relationship. They avoided relationships outside their group as much as possible, and if they did, there was usually conflict. Conflicts arose between various groups as a result of over-occupation of suitable habitat areas. There was no social organization or political force among the groups. Any decision was taken collectively and unanimously. The division of labour among the groups was also very limited. It is important to note that the labour was divided mainly on the basis of gender and qualifications. In fact, men tend to hunt larger creatures, while women usually harvest plant fruits and smaller animals.

Ideology and Ecological Impact:

The first humans believed that nature was God, and they worshipped sacred mountains, rivers, trees, as well as other elements of nature. Social practices that guided societies in the gathering mode for the responsible use of nature served as a foundation for the concepts of worshipping nature. The ecosystem is less affected by gatherer communities because of their low population densities, low per capita resource needs, and other actions that encourage sustainable resource usage.

- **Nomadic Pastoral Mode of Resource Use**

Nomadic pastoralism is characterized by the practice of herding livestock in search of fresh pastures for grazing. Most frequently, this mode of life originated in arid regions approximately 100,000 years ago, where there were few sporadic sources of water and adequate grazing regions.

Technology:

With the domestication of plants and animals, an extended period in human history that involved sole gathering began to come to an end. It is interesting to note that animal husbandry relied on herds being moved across distances of several hundred kilometer. Animal muscular power is available

to pastoralists as a source of energy, especially for transportation. Also, horses are employed in long-distance transportation. In a similar vein, fuelwood was also utilized at this time as an energy source.

Economy:

High-bulk commodities like salt, precious stones, and musk were among the resources that nomadic pastoralists transported. Thus, pastoralists not only carried on with some hunting and gathering while they were on the move and produced meat, milk, and wool from their cattle, but they also obtained resources, particularly from established agricultural groups.

Social Organization:

Due to living in more dry and barren areas, pastoral nomadic societies usually have low population densities. There are only a few thousand kin groups among the nomadic pastoralists' social groups. Over a vast territory, they interact with numerous other communities. There is hardly much division of labour among the pastoralist social groups. It seems doubtful that people living in such a fluctuating environment without permanent territory would have developed cultural practices to purposefully keep their populations at low levels. In fact, the inhabitants of such variable environment, who have no fixed territories would have evolved cultural practices to deliberately keep their populations at low levels.

Ideology and Ecological Impact:

One of the earliest groups to perceive humans and nature as distinct entities was the nomadic pastoral society. Having limited links to a certain area, they were able to thrive in a variety of environments. Notably, nomadic communities had no pantheon of gods as did peasant societies, and their ritual activity was rather sparse. It is possible that the nomadic pastorals contributed to a gradual overgrazing and to expansion of arid regions at their margin, all through their history (Gadgil and Guha, 2012:14). Furthermore, they played a role in the spread of organized trade, the long-distance spread of technology, and—perhaps most importantly— the idea

that humans are superior to the natural world.

- **Settled Agrarian Mode of Resource Use**

A settled agricultural society was one in which the production and maintenance of crops and agriculture served as the foundation for the economy. Around 3200 BCE, the first agrarian civilizations emerged in Mesopotamia, Egypt, Nubia (modern-day northern Sudan), and the Indus Valley.

Technology:

It is clear that about 10,000 years ago, humans learned how to domesticate wild animals and engage in agriculture. Actually, human physical labour was the primary means of agricultural production during the early stages of settled agriculture. Animal labour was also used in certain areas. For example, in the Middle East, farming involved the workforce of both oxen and ploughs for farming. Meanwhile, shifting cultivation also extended over Europe, Asia, and Africa. During the Industrial Revolution, agriculture started to rely more and more on fossil fuels. However, in such agricultural settings, individuals used tools that were found in nature. A further aspect of cultivation in the settled agrarian mode was the increased output of some plant species, particularly wheat and barley.

Economy:

Cereal grain was also stored and transported across great distances in agrarian communities, usually on the backs of cattle or in carts. The village's agricultural area was surrounded by some non-agricultural woodlands, from which the local collected firewood, fruits, fodder, and leaves to fertilize their crops. The bulk of the agricultural population used natural resources in this method of resource use, particularly for food, clothing, and housing. Around the village, a full-fledged civilization was developed, complete with public buildings, schools, houses of worship, etc. By defining the borders of the agricultural areas, family members were able to exercise their rights.

Social Organization:

During the agrarian era, family became increasingly important in society. This is due to the fact that organized human labour is necessary for cultivation. Human effort is still needed for agricultural cultivation, harvesting, etc. As a result, there was an increase in interfamily collaboration. However, sex-based division of labour was prevalent in the peasant mode. Women took on the burden of more arduous tasks including weeding and transplanting and also the collection of fuel.

Ideology and Ecological Impact:

Settlement-based agricultural communities gained significant control over the unfolding events of nature. It is evident that some agricultural crop life cycles had heightened exposure to the environment. Due to this reason, people in settled agricultural communities regarded mankind as part of a larger species. At the same time, there was a growing societal perception of humans as protectors of the environment. Moreover, in agrarian cultures, there existed a practice of restraint in relation to cultivation itself, indicating a preference for avoiding risk instead of maximizing immediate profit. It is noteworthy that the agriculturists began to colonize the forest during the agrarian societies when they used a lot of iron tools for agriculture, which destroyed the forest resources.

- **Industrial Mode of Resource Use**

The transition from an agrarian society to a mechanized manufacturing society is known as industrialization. The 1860s saw the start of the Industrial Revolution, which sped up the growth of industrial resources.

Technology:

Scientific and technological advancements have been incorporated into the production system during the industrial era. The industrial mode has brought several new advancements in technology namely- 1) the application of new crucial materials, primarily iron and steel; 2) the utilization of energy sources, which include fuels and motive power like coal, steam

engines; 3) the invention of novel machines like the power loom and spinning Jenny; and 4) significant advancements in communication and transportation, such as locomotives and automobiles. Though the use of technology has transformed many fields, like agriculture, medicine, education, and so on, the industrial period's technological advancements have strained relationships between humans and the natural world.

Economy:

In the industrialized world, the economy has been a growing dependance on fossil-fuel energy. This transition to an industrial mode of production not only made use of surplus agricultural economy but also transformed cultivated lands to meet the demands of the urban-industrial sector. The growth of industrial factory centers and urbanized cities becomes prominent as people migrate from rural areas to cities in search of employment opportunities in factories and industries. Furthermore, the state's authority to regulate financial transactions has grown significantly in tandem with the rise of individualism. It is interesting to note that, in the industrial mode, forests and their resources are mainly controlled by the state, however private ownership is permitted in certain capitalist societies. This indicates that, especially in capitalist economies, private ownership plays a supporting function to government authority over the management and abuse of forest resources.

Social Organization:

Social organizations have changed significantly in industrial societies. Large-scale industrialization and urbanization led to the growth of social groups, which made it difficult to preserve in-person relationships between various groups in society. This shift led to a complex division of labour within society. Industrial societies have given rise to two classes: the capitalist class, which owns the means of production, and the working class, which sells labour for wages. This class difference can lead to social unrest and conflicts over production system s such as wages, working conditions, and distribution of wealth. In the beginning of the Industrial Revolution, European countries, including England, France etc., established industries

in their own countries by plundering natural resources from other countries through colonization in different parts of the world.

Ideology and Ecological Impact:

The ideology of industrial societies upholds man's supremacy over nature and places a premium on resource extraction for private gain. Environmental conservation efforts in the western nations date back to the 1860s, coinciding with the public's awakening to new issues like acid rain and global warming. Despite post-World War II efforts to combat pollution, environmental degradation persists and continues to pose a challenge to the notion of sustainable development. Meanwhile, Western conservationists have started the campaign for conserving forest land, but because environmental issues have transcended national boundaries, they are now a global concern.

Similarly, habitat destruction, biodiversity loss, and deforestation have resulted from resource extraction in the industrial mode system. It is noteworthy that pollution from industrial activities has adversely affected ecosystems and human health by contaminating air, water and soil. In addition, greenhouse gas emissions have contributed to climate change, causing changes in weather patterns and habitat disruption for numerous species and the extinction of some species. Industrial patterns of resource use have fundamentally altered natural environments and ecosystems, posing significant challenges to environmental sustainability and biodiversity conservation.



CHECK YOUR PROGRESS

Q 3: What characterizes nomadic pastoralism, and where did this mode of life primarily originate approximately 100,000 years ago?

.....

Q 4: According to David Hardiman, what role did traditional village communities play in the construction and maintenance of irrigation technologies in pre-colonial India?

.....

Q 5: What are some key advancements in technology that characterized the industrial era?

.....



2.1. ACTIVITY

1. Make a list of basic features for each of the four modes of resource use.

.....



2.5 LET US SUM UP

After going through this unit, you have learnt that Environmental history has a complex interconnection between human societies and the natural environment throughout the ages. These nuanced relationships that have shaped human civilizations over time. By examining the various modes of resources used from primitive gathering to industrial exploitation, the Unit sheds light on how humankind and its environment have changed over time



2.6 FURTHER READINGS

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2.7 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: The word "forest" means 'outside'

Ans to Q No 2: Climatic change

Ans to Q No 3: 1952.

Ans to Q No 4: Nomadic pastoralism is characterized by herding livestock in search of pastures.

Ans to Q No 5: According to David Hardiman, traditional village communities played a crucial role in the construction and maintenance of irrigation technologies in pre-colonial India through community-based control.

Ans to Q No 6: The key advancements in the industrial era included iron and steel usage, coal and steam engines, and inventions like the power loom.

2.8 MODEL QUESTIONS

A) Very Short Questions (answer each question in about 50 words)

Q 1. What were some traditional methods of water conservation in pre-

colonial India?

Q 2. What is the origin of the word 'forest'?

Q 3. What is the term used to describe the process of cutting down trees at a rate faster?

Q 4. Who is the author of the book, "This Fissured Land: An Ecological History of India"?

Q 5. When did environmental conservation efforts begin in Western nations?

B) Short Questions (answer each question in about 150 words)

Q 1. Write a short note on Forest and Human Society

Q 2. State the impact of climatic change on environment.

Q 3. Explain the nomadic and pastoral mode of resource use

Q 4. Write in brief on the industrial mode of resource use.

C) Long Questions (answer each question in about 300-450 words)

Q 1. Discuss how environmental history shape sour understanding of the relationship between human societies and the natural world?

Q 2. In what ways have the resource utilization modes and adaptation strategies, influenced the human society? Explain.

Q 3. What lessons can we learn from studying the hunter-gatherer mode of resource use in terms of sustainability and adaptation strategies in the face of environmental changes? Analyse.

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UNIT 3: ENVIRONMENT AND SOCIETY IN PRE-COLONIAL INDIA

UNIT STRUCTURE

3.1 Learning Objectives

3.2 Introduction

3.3 Geographical Background of the Indian Subcontinent

- Physical Division of India
- Flora and Fauna

3.4 Ecology of Harrapan Culture

- Environment of Harrapan Culture
- Environmental Factors for the Decline of Harrapan Culture

3.5 Let Us Sum Up

3.6 Further Readings

3.7 Answers to Check Your Progress

3.8 Model Questions

3.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- Analyses the geological structure of the Indian Subcontinent.
- Comprehend the physical formation of India.
- Examine the features of biodiversity of India.
- Explain the ecological causes which were responsible of the decline of Indus Valley Civilization.

3.2 INTRODUCTION

Dear learner, in the previous Unit we discussed some of the crucial themes in Environmental History and the modes of Resource Uses. In this particular Unit, we will be discussing India's physical geography, including geology, physiography, flora, and fauna. India is home to a wide range of geographical environments, including mountains, tropical and temperate forests, mangroves, grasslands, swamplands, and deserts. It is the seventh longest country in the world, taking approximately 2.4 percent of the planet's

geographical area, and is bordered by the Himalayas in the north. It falls out into the Indian Ocean between the Arabian Sea and the Bay of Bengal in the east. India is a massive geological collection of many four rock groups dating from the Pre-Cambrian to the contemporary eras.

3.4 GEOGRAPHICAL BACKGROUND OF THE INDIAN SUBCONTNENT

The country's surface is as complicated as its structure. It features a high degree of physiographic diversity due to variances in geological structure, history, and denudational processes. It has a diverse landscape that includes mountains, hills, plateaus, and plains. It is noted that India's landscape is a geo-environmental diversity, with around 11% mountainous terrain, 18% hilly areas, 28% plateau regions, and a sizable 43% plain surfaces. Particularly, the vast plain surface area exceeds the global average. This diverse terrain has a significant impact on India's climate, biodiversity, and human settlement patterns.

India can be divided into following six physical divisions:

1. The Himalayan Mountains
2. The Northern Plains
3. The Peninsular Plateau
4. The Indian Desert
5. The Coastal Plains
6. The Islands

- **The Himalayan Mountains:**

The Himalayas are among the youngest mountain ranges in the Asian continent. They are found in India, China, Pakistan, Nepal, Bhutan, Afghanistan, and other countries. The Himalayas were formed geologically as a result of the collision of the Indian subcontinent with Asia. The Himalayas are fold, young mountains in terms of structure. The Himalayas are approximately 2500 kilometers long in an east-west direction. It's width spans between 125 and 250 miles (200 and 400 kilometers).

There are significant geographic variations in the Himalayas. There are four parallel ranges that form these mountain ranges which are as follows:

- Inner or Greater Himalayas
- Lesser or Middle Himalayas
- The Outer or Southern Himalayas or Siwalik
- The Trans-Himalayas
- The Eastern Hills or the Purvanchal

Inner or Greater Himalayas:

The northernmost range of the Himalayan Mountain system is known as Himadri and is comprised of the Inner or Greater Himalayas. The three highest mountains on Earth are found there, with an average height of about 6,0000 m: Mount Everest (8,848 m) on the China-Nepal border; Mount Godwin – Austrin (8,611 m), also known as K2, and Kanchenjunga (8,598 m) on the India-Nepal border. Numerous significant mountains, including Nanda Devi (7,817 m), are entirely located in India. Vast glaciers, deep valleys, and untamed terrain are characteristics of the Inner or Greater Himalayas. This area is not simply a geological treasure but also very important ecologically and culturally, influencing weather patterns and providing habitat for rare plants and animals.

Lesser or Middle Himalayas

The Himachal range, also referred to as the lesser or Middle Himalayas, spans 1,500 to 5,000 meters in elevation and is located in the states of Himachal Pradesh, Uttar Pradesh, and Sikkim in North-West India, North-Central India, and North-Eastern India. This range contains several significant mountain ranges, including the Pir Pangal, Dhauladhar, and Mussoorie ranges. It is noteworthy that Shimla, Nainital, Kullu, and Manali are well-known as significant hill stations. Hill stations like these were in use during the colonial era.

The Outer or Southern Himalayas or Siwalik

Situated between the Indo-Gangetic Plain and the Lower Himalayas, the Southern Himalayas, commonly known as the Siwalik range, have an average elevation of 900–1,200 meters. It is noted that sandstones and

conglomerate rocks make up the majority of the Siwalik hills' structure. The Siwalik hills' northern region, known as the Mahabharata Range, rises sharply along the edges of fault lines. River sediments have been carried down to form these ranges.

The Trans-Himalayas

The Tibet Himalayan Region, sometimes referred to as the Trans Himalayas Mountain Region, is situated north of the Great Himalayas. Since Tibet is home to the majority of these ranges, it is sometimes known as the Tibet Himalayan Region. Sven Hyden gave the first description of these in 1906. The Kara-Koram Range was dubbed the 'Backbone of High Asia' by him. The principal ranges of the Trans-Himalayas are the mountain ranges of Kailash, Ladakh, Zaskar, and Karakoram. Deposits from sedimentary processes created these mountain ranges. Rocks from the Cambrian to the Tertiary Period are present there.

The Eastern Hills or the Purvanchal

After passing through the Dihang Gorge, the Himalayas sharply extend southward, forming a crescent-shaped range of relatively low hills with a flat side facing west. It is an aggregational plain. They stretched from Mizoram in the south to Arunachal Pradesh in the north. They form the border between India and Myanmar. These are combined with the Naga Hills in the south, with Saramati (3826 m) standing as the highest mountain.

- **The Northern Plains**

The river valleys of the Ganga and Brahmaputra constitute the northern plains, which are known as the Indo-Ganga-Brahmaputra plain. From west to east, the Northern Plains stretch over 2,400 km, whereas from north to south, it extends 180–320 km. These plains are the most fertile area of India, comprising nearly one-third of the country's land area. The Vindhya Mountains geographically separate the Northern Plain from the south India. Topographically, the plain is homogenous; the only significant natural features are the flood plain bluffs, other features related to erosion caused by rivers, and variations in the paths of the rivers. Although there is a considerable amount of surface change, the relief variance is not as significant as it is in

the Himalayas and the Peninsula. On the basis of the variation, the plains can be classified into four divisions: Bhabar belt, Terai belt, Bangar belt and Khadar belt.

Bhabar belt

The Bhabar belt of the plain is a small area that stretches from the Indus to the Tista and is roughly 8 to 10 km broad. It is an alluvial apron of sediments. The Bhabar belt forms the northern boundary of the Indo-Gangetic Plain. Located at the confluence of the Himalayas and the Indo-Gangetic plain, Bhabar serves as the location of almost all the significant commercial centers of Kumaon, including Haldwani, the largest town in the region. Beyond its commercial significance, Bhabar boasts of fertility, which contributes to higher yields per unit area. This fertility is attributed to the replenishing of the topsoil during the rainy season.

Terai belt:

Situated south of the Shivalik Hills and north of the Indo-Gangetic Plain, the Tarai belt is a region of lowlands in northern India and southern Nepal. It is a marsh tract that runs parallel to Bhabar to the south and is 15–30 km wide. The Terai belt is a region of significant ecological value since it includes a wide variety of geological features. In fact, a variety of wildlife conservation reserves, including Bardia National Park and Chitwan National Park, are also situated in the Tarai region. In addition, the Tarai belt is the location of numerous protected wildlife reserves- numerous deer species, and endangered Bengal tigers are merely a few examples of the diverse plant and animal life found in the ecological site situated in the Terai region.

Bangar belt:

The alluvial terrace of the flood plains is comprised of the Bangar belt, which is distinguished by the older alluvium. The Bangar belt is one of the most fertile regions of the world. This region contains a low upland covered in laterite deposits within the Gangetic plains. This alluvial terrace was created by the gradual deposition of sediments, contributing to the Gangetic plains' geological complexity. The calcareous deposits called locally as 'Kankar' are a defining feature of the Bangar belt, which is composed of

from old alluvial soil. The fertility of this kind of soil is low. The word 'Kankar' describes calcium carbonate nodules or concretions that are found in the soil and have the potential to impact the fertility and quality of the soil.

Khadar belt:

The Khadar belt is found in lowland areas, following the Bangar belt. The Sanskrit word 'Khadar', which means 'low-lying riverbank', was the place where the word originated. A region of fertile alluvial soil that was left behind by recurring river flooding is known as the Khadar Belt. In multiple places, the sediments are compact and have fine grains. During periods of rainfall, the rivers bring these fine-grained sediments with them and deposit them in these flood plains as deltaic silts.

- **Regional Sub-Division:**

The Northern Plains also has sub-divisions encompassing length and breadth of the country which are as follows:

Punjab Plain

The Jhelum, Chenab, Ravi, Beas, and Sutlej rivers, which flow through the area, are responsible for bringing sediments that build the Punjab plain. A homogenous plain is formed by the sediments filling in five doabs, which together constitute the entire plain. East to west, the doabs are as follows: (i) Jalandhar Doab, which is situated between the Sutlej and the Beas; (ii) Rechana Doab, which is situated between the Ravi and the Chenab; (iii) Chaj Doab, which is situated between the Jhelum and the Chenab; (iv) Sindh Sagar Doab, which is situated between the Jhelum and the Indus; and (v) Bari Doab, which is situated between the Ravi and the Beas.

Ganga Plain

The Ganga Plain is a sizable alluvial tract in northern India that has been formed by the Ganges River's and its tributaries' sedimentary deposits. This fertile and thickly populated plain includes the states of West Bengal, Uttar Pradesh, and Bihar. It is noted that the Ganga plain of Uttar Pradesh and Bihar is the combination of the Ganga-Yamuna Doab and Mithila plain.

Deltaic Plain

The deltaic plain is located in Bangladesh and West Bengal, with most of its area currently in Bangladesh. This large plain is composed of mud and alluvium, both old and fresh, and has a swampy character. The delta begins east of the peninsular block and extends to the Padma Meghna complex from Hooghly-Bhagirathi. The Sundarbans Delta, which is a notable example of a deltaic plain, is created by the Ganges, Brahmaputra, and Meghna rivers meeting in the Bay of Bengal.

Brahmaputra Plain

One of India's main geological regions is the Brahmaputra Plain. The Brahmaputra Plain is widely referred to as the Brahmaputra Basin. The Brahmaputra plain's total area is approximately 56 thousand square kilometers. The depositional activity of the Brahmaputra and its tributaries has created an aggregational plain. The Brahmaputra River pours into this plain near Sadiya, then turns south around Dhubri and continues further to Bangladesh.

- **The Peninsular Plateau**

India's geographical features are defined by the Peninsular Plateau. The southernmost portion of the Indian subcontinent is home to the huge and high Peninsular Plateaus. It is one of the oldest land masses and mostly consists of old igneous, crystalline, and metamorphic stone. The Central Highlands, the Deccan Plateau, and the North East Plateau are the three main divisions of the Plateaus. Situated between the Eastern and Western Ghats, the largest of these is the Deccan Plateau, which has deep valleys, vast lava plateaus, and volcanic relics. The Malwa Plateau is characterized by its sloping landscape and abundant alluvial plains to the northwest. On the other hand, the regions of Chambal, Sindh, Betwa, Ken, Bundelkhand, and Chotanagpur are part of the Central Highlands. Coal and iron ore are two of the mineral-rich resources found on the northeastern Chota Nagpur Plateau. The vast regions of Meghalaya, the Karbi-Anglong Plateau, and the north central Chachar Hills constitute the North East Plateau. In addition to affecting climate patterns and acting as vital regions

for agriculture, forestry, and mining of minerals, the Peninsular Plateaus have had a major impact on the geographical variety of India.

The Indian Desert

The Thar Desert, occasionally referred to as the Great Indian Desert, is a dry desert that extends 200,000 km in the northwestern region of the Indian subcontinent. In fact, the Indian states of Rajasthan, Gujarat, Haryana, and Punjab are home to portions of the Thar Desert. The topography of the Thar Desert is primarily sandy, although it also has a variety of different landforms formed by aeolian and fluvial processes. Species like the Indian spiny-tailed lizard and the desert fox are found in the Thar desert, which is well-adapted to the arid environment, while camels, known as the 'ships of the desert' are crucial for transportation and livelihoods.

The Coastal Plains

India has three sides that are surrounded by sea. In fact, India has a coastline of 7516.6 km of the total land frontier 15200 km. It is noteworthy that India's eastern and western regions are home to the coastal plains. The coastal plains stretch from Rann of Kutch in the west to the Ganga-Brahmaputra delta in the east. The coastal plains of India are classified into two categories: the Eastern Coastal Plains and the Western Coastal Plains.

The Eastern Coastal Plains are extended from the mouth of Subarna Rekha to Kanya Kumari and are situated between the Bay of Bengal and the Eastern Ghats. Spanning from Tamil Nadu in the south to West Bengal in the north, via Andhra Pradesh and Odisha, it is flatter and wider than the Western Coastal Plains. The tract of the eastern coastal plain in Orissa is known as the Utkal Plain and is 400 km long.

The narrow western coastal plains stretch from Kanyakumari to Rann of Kachchh. The western coastal plains comprise of three regions: (a) Konkan coast (Mumbai to Goa); (b) Karnataka coast from Goa to Mangalore and (c) Malabar coast (Mangalore to Kanyakumari). There are two famous peninsulas in the western coast: Kathiawar and Kutch, lying in the state of Gujarat.

The Islands

The Andaman and Nicobar Islands and the Lakshadweep Islands are the two main offshore islands in India. It is noted that these islands are situated in the Bay of Bengal. There are 572 islands in the Andaman and Nicobar Islands, but only 38 of them have permanent inhabitants. In 1956, the two groups of islands joined the Republic of India as union territory. Compared to the Andamans, the Nicobar Islands have a more varied topography. Most vessels are unable to anchor on several harbour of the Nicobar Islands' flat coral-covered areas, such as Car Nicobar, due to offshore coral structures. Lakshadweep, on the other hand, is a group of about thirty islands dispersed over 30,000 square miles (78,000 square km) in the Arabian Sea off the southwest coast of India. Its capital city is Kavaratti. Notable islands off the coast of India include Majuli, the biggest freshwater island in Asia and the second largest in the world, on the Brahmaputra River in Assam.

India's physiography is deeply ingrained in the lives of its inhabitants. It is important to note that India is the world's most beautiful country by nature, and the Great Himalayas shield its citizens from foreign invasion. The natural beauty of India and its diverse flora and fauna draw tourists. The nation's abundance of forest resources, river resources, favourable climate, and good soil contribute to its strong economy.

- **Flora and Fauna**

India is one of the world's largest biologically diverse nations due to its magnificent flora and fauna. India ranks fourth in Asia and tenth globally in terms of plant diversity, with over 47,000 species. Similarly, there are about 90,000 different animal and fish species in India. It is noted that India has highly diverse agroecological habitats such as coastal, plateau, desert, plains, hills and mountain system. Four of the thirty-four globally identified biodiversity hotspots namely the Himalaya, Indo-Burma, the Western Ghats-Sri Lanka and Sundaland are represented in India.

India has the following primary types of plants: (i) Tropical Evergreen Forests (ii) Tropical Deciduous Forests (iii) Tropical Thorn Forests and Scrubs (iv) Montane Forests (v) Mangrove Forests.

There are tropical evergreen forests in several places of India, including the Western Ghats, Assam, the Andaman and Nicobar Islands, and the coastline region of Indian peninsula. These forest regions are also rich with a wide variety of flora and fauna. It is noteworthy that they thrive in warm, muggy weather. Similarly, the tropical deciduous forest, also known as monsoon forests, is the most prevalent form of forest in India. These forests are found all the parts of India and are characterized by their 200–70-centimeter annual rainfall. Most of these forests are found on the Chota Nagpur Plateau and the Western Ghats.

It is important to note that Gujarat, Rajasthan, Uttar Pradesh, Chhattisgarh, Haryana, and Madhya Pradesh are among the semi-arid states in northwest India that are home to tropical thorn forests and scrubs. The annual rainfall in these areas of India is less than 70 centimeters. In similar manner, Montane forests can be found in many mountain ranges, such as the Nilgiri Hills, the Himalayan ranges, the Western and Eastern Ghats. These forest areas contain unique plants and animals that have adapted to the unique climate and temperature. It is to be noted that mangrove forests which represent 3 percent of India's total geographical area, can be found in India, including West Bengal, Gujarat, Tamil Nadu, Andaman & Nicobar Islands, and Andhra Pradesh. The largest mangrove forests in the world are found in the Sundarban Mangrove Forests.

Some important floras which are found in India are Aphanamixis Polystachya, Bombax Ceiba, Bauhinia Purpurea, Casca fistula, Dalbergia sisoo, Mallotus, Cinnamomum tamala, Trewia nudiflora, Litsaea polyantha, Premna, Mussaenda etc. The magnificent Royal Bengal tiger, the iconic Asian elephant, the elusive leopard, the playful Hoolock Gibbon, barking deer, Asiatic water buffalo, the fierce Indian wild dogs, the tiny pygmy hog, and the massive gaur (Indian bison) are merely a few of the uncommon and exotic creatures that call India home. Notably, Kaziranga National Park in Assam is home to the greater Indian one-horned rhinoceros.

India has a broad range of reptiles, including cobras, pythons, and different types of turtles including Lissemys punctata and Kachuga tecta.

Similarly, India's birdlife is as diverse, with species like the Asian Green Bee-eaters, Asian Openbill, Black Drongo.



CHECK YOUR PROGRESS

Q 1. In the Inner or Greater Himalayas, which three mountains are the highest?

.....

Q 2. What is the primary geological structure of the Siwalik hills?

.....

Q 3. The Ganga Plain is mainly located in the northern part of _____.

Q 4. The _____ Desert, also known as the Great Indian Desert, is situated in the northwestern region of the Indian Subcontinent.

Q 5. The coastal plains stretch from the Rann of Kutch in the west to the _____ delta in the east.

3.5. ECOLOGY OF HARRAPAN CULTURE

Indus Valley Civilization, or Harappan Culture, existed in modern-day Pakistan and India between 3300 and 1300 BCE. There were many important cities in the Indus Valley Civilization, the two most notable being Harappa and Mohenjo-Daro. Daya Ram Sahini discovered Harappa, a significant hub of trade and culture of Indus Valley Civilization, in 1921. It was located on the bank of the Ravi River in the Montgomery district of Punjab (Pakistan), and it revealed a well-planned urban structure. In a similar manner, Mohenjo-Daro, another well-known city in Punjab (Pakistan), was located on the bank of the Indus River in the Larkana area. The site of Mohenjo-Daro, which meant "Mound of Dead", was discovered in 1922 by renowned Indian archaeologist R.D. Banerjee and was well-known for its extensive public buildings and fan-advanced drainage system. Another Harrapan Civilization site, Dholavira, was also discovered by R.S. Bisht in 1985 and has exceptional urban planning with a distinctive water-management system. The dockyard at Lothal was a focal point for the civilization's maritime endeavours. However, the elaborate artefacts and remarkable seals left behind by the Harrapan inhabitants also indicate their involvement in

agriculture, trade, and crafts. The unreadable script of the Harappan people lends an aura of mystery to their way of life. Many researchers believe that changes in the environment and external factors contributed to the civilization's death around 1900 BCE. The history and archaeology of Indian Sub-continent have been profoundly influenced by the Harappan Civilization, even with its mysterious demise.

- **Environment of Harrapan Culture**

Many scholars claimed that the natural environment and climate of Sindh and Punjab had an impact on the Indus Valley Civilization. According to John Marshall, who conducted the first excavations at Mohenjo-Daro, the widespread use of fire bricks at Mohenjo-Daro as compared to regular mud or sun-dried bricks indicates a wet brick climate. Mortimer Wheeler, a key figure the Archaeological Survey of India believed that the aforesaid burnt bricks were possibly a flood-mitigating structure. The rich plains of the Indus River and its tributaries in modern-day Pakistan and northwest India served as the primary focus of the Harappan civilization, which flourished from approximately 2600 BCE until 1900 BCE. The annual flood caused by the river, which replenished the soil and helped in cultivation, was a major feature of the Harappan Civilization's environment.

It is believed that there was more moisture in the climate at the peak of Harappan civilization. River water resources were readily available for irrigation, which increased agricultural productivity. It is noted that the irrigation systems were made possible by the Indus, Saraswati, and Ghaggar-Hakra rivers, allowing for the production of crops like wheat, barley, and other fruits and vegetables. Archaeological sites preserved in regions apparently vulnerable to floods, erosion, or burial indicate that increasing floods caused by monsoons become less prevalent or less powerful as aridity grows.

The Indus River, along with the Saraswati and Ghaggar-Hakra rivers, facilitated extensive irrigation systems which enabled the cultivation of crops such as wheat, barley, and various fruits and vegetables. Preservation of archaeological sites in locations that appear to be vulnerable to flooding, erosion, or burial suggests that increased monsoon flooding becomes less

frequent and intense as aridity intensifies. The Ghaggar-Hakra system, which became fleeting and was mainly forsaken around 4,000 years ago, is the most striking example of climate-controlled terrain change in the Indus Valley Civilization.



LET US KNOW

Major Sites of the Harrapan Civilization

There are seven important cities in the Indus valley civilization:

1. Mohenjo-Daro	2 .Harappa	3. Kalibangan
4. Lothal	5. Chanhudaru	6. Dholavira
7. Banawali	8. Rangpur	9. Rupar

- **Environmental Factors for the Decline of Harrapan Culture**

There are several narratives for the decline of the Indus Valley Civilization, which occurred approximately 1800 BCE. One historical narrative claims that a nomadic Indo-European tribe known as the Aryans attacked and conquered the Indus Valley Civilization; however, more recent evidence appears to refute this claim. Rather, a number of scholars suggested that a variety of environmental factors led to the decline of the Indus Valley Civilization.

The following environmental factors are responsible for the decline of the Indus Valley Civilization:

(a) Climate Change in the Indus Valley Civilization:

Many scholars believe that the collapse of the Indus Valley Civilization was caused by climate change. The most significant cause of climate change was the Saraswati River's drying out around circa 1900 BCE. The monsoons, or winds that bring heavy rains, may have blown eastward during the Harappan period. Depending on whether they sustain or destroy vegetation and crops, the monsoons can have a positive or negative impact on a region's climate.

(b) Shift in River Courses

The major rivers' changed courses, especially the Saraswati River's drying up, may have interfered with the Civilization's agricultural practices, resulting in decreased production and the decline of cities. Major environmental changes like forest destruction, flooding, or droughts brought on by a river shifting its course could have had catastrophic repercussions on Harappan culture, including famine and crop failure.

(c) Natural Calamities and Plague:

Numerous natural disasters, like earthquakes, caused significant damage to the people living in the Indus Valley Civilization. Furthermore, it compelled common people to move to the northern region of India from major cities of the Indus Valley Civilization. It has also been suggested by researchers those infectious diseases first appeared in the late Harappan culture. It is known that one of the fatal diseases to originate from the Harappan culture was leprosy.

(d) Migration of the Inhabitants:

The Harappan Civilization experienced more severe droughts over the years, which led to its inhabitants migrating to the Himalayan foothills. People were compelled to move from the Harappan urban centers to villages which emerged in other places of India to have the summer monsoon rains which was essential for the survival of their life.



CHECK YOUR PROGRESS

Q 7. Who discovered the city of Harappa?

.....

Q 8. What was the focal point of the Harappan Civilization's maritime endeavors?

.....

Q 9. What crops were cultivated with the help of irrigation systems in the Harappan Civilization?

.....



3.6. LET US SUM UP

Dear learners, after going through this Unit you have learnt about-

- the physical characteristics of the Indian Subcontinent such as the Himalayan range, Indo-Gangetic plain, Peninsular plateau, and coastal plains. The different biological zones and habitats reflect this diversity, sustaining a wide variety of flora and fauna.
- The Harappan civilization which emerged in the fertile plains of the Indus River around 2600 BCE-1900 BCE. It is believed that natural causes, such as changes in river courses and climatic change, had a role in the Harappan culture's eventual decline.
- Understanding these ecological subtleties is crucial for understanding the past as well as for directing current policies regarding the environment and sustainable methods in the Indian subcontinent.



3.7. FURTHER READINGS

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2) Malik, N. (2020) 'Uncovering Transitions in Paleoclimate Time Series and the Climate Driven Demise of an Ancient Civilization', *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 30(8), 2020, DOI: 10.1063/5.0012059.
3) Sanyal, Sanjeev (2013) *Land of the Seven Rivers: A Brief History of India's Geography*, Penguin Global.
4) Singh, Upinder (2009) *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*, Pearson Education India.

3.8. ANSWERS TO CHECK YOUR PROGRESS

Answer to Q No 1: a) Mount Everest Mount Godwin-Austen (K2), Kanchenjunga,

Answer to Q No 2: Sandstones.

Answer to Q No 3: India

Answer to Q No 4: Thar

Answer to Q No 5: Ganga-Brahmaputra

Answer to Q No 6: Daya Ram Sahini.

Answer to Q No 7: Lothal dockyard.

Answer to Q No 8: Wheat, barley, fruits, and vegetables



3.9. MODEL QUESTIONS

A) Very Short Questions (answer each question in about 50 words)

Q 1. Which geological era is known for the presence of prehistoric life?

Q 2. What is the capital city of Lakshadweep?

Q 3. Indian state is home to the greater Indian one-horned rhinoceros in Kaziranga National Park?

Q 4. Name the two most notable cities in the Indus Valley Civilization.

Q 5. Who discovered Mohenjo-Daro in 1922?

B) Short Questions (answer each question in about 150 words)

Q 1. Write short notes on-

- Major Rock Groups in India
- Inner or Greater Himalayas
- The Peninsular Plateau
- The Coastal Plains
- Environment of Harrapan Culture

C) Long Questions (Answer each question in about 300-500 words)

Q 1. Explain India's geological system, focusing on the major rock formations and their significance in the country's geological history.

Q 2. Give a comprehensive overview of the geographical background of the Indian subcontinent.

Q 3. Discuss the flora and fauna with special reference to the various vegetative forests of India.

1) Explore the environmental factors that played a role in the decline of the Harappan Civilization.

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UNIT 4: FOREST AND LAND USE IN PRE-COLONIAL INDIA

UNIT STRUCTURE

4.1 Learning Objectives

4.2 Introduction

4.3 Use of Iron Implements

4.4 Agricultural Expansion and Deforestation in the Gangetic Valley

4.5 Forest as Economic and Cultural Space

4.6 Let Us Sum Up

4.7 Check Your Progress

4.8 Further Readings

4.9 Model Questions

4.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- Understand the various stages and dates of civilization.
- Comprehend the process of implementation of tools in different phases of civilizations.
- Discuss the role of iron in various stages of human civilization with special reference to India
- Examine the expansion of agriculture and forest spaces

4.2 INTRODUCTION

Dear learners in the previous Unit, we discussed the Environmental condition in pre-colonial India. In this Unit, we will look into the use of land and forest in pre-colonial India. This Unit will explore the use of iron tools leading the way to agricultural expansion. At the same time, the Unit will also discuss the concept of Forest as an economic and cultural space.

4.3 USE OF IRON IMPLEMENTS

A remarkable progress in the prehistoric India is noticed in the Neolithic Age (6000 B.C to 4000 B.C.) with the use of Iron. Neolithic remains are

found in various parts of India. These include the Kashmir valley, Chirand in Bihar, Belan valley in Uttar Pradesh and in several places of the Deccan. The important Neolithic sites excavated in South India are Maski, Brahmagiri, Hallur and Kodekal in Karnataka, Paiyampalli in Tamil Nadu and Utnur in Andhra Pradesh. The chief characteristic features of the Neolithic culture are the practice of agriculture, domestication of animals, polishing of stone tools and the manufacture of pottery. In fact, the cultivation of plants and domestication of animals led to the emergence of village communities based on sedentary life.

There was a great improvement in technology of making tools and other equipment used by man. Stone tools were then polished. The polished axes were found to be more effective tools for hunting and cutting trees. The changes introduced in the stone artifacts made possible creations of smooth surfaces, and well-rounded and symmetrical forms which were of such distant-reaching consequences that they were termed as ringing an extra ordinary shift in the stage of human development. Furthermore, mud brick houses were built instead of grass huts. Wheels were used to make pottery. Pottery was used for cooking as well as storage of food grains. Large urns were used as coffins for the burial of the dead. There was also improvement in agriculture. Wheat, barley, rice, millet was cultivated in different areas at different points of time. Rice cultivation was extensive in eastern India. Domestication of sheep, goats and cattle was widely prevalent. Cattle were used for cultivation and for transport. The people of the Neolithic Age used clothes made of cotton and wool.

Regardless of the fact that Indian iron technology may be the result of some diffusion from the west, the early history of iron in India can be examined from different regional contexts, through the study of the various iron using areas of the subcontinent. The chronology of iron differs from one area to another, but between the period 1000 BC and 500 BC its use may be said to have spread to all major areas i.e. the upper Ganges valley and its peripheries, Malwa plateau and the Tapti valley, South and Central Indian megalithic areas, Baluchistan plains Middle and lower Ganges valleys Northwest, mainly Peshawar region.

The earliest presence of iron may be said to be in the first three major regions listed above. In the upper Ganges valley and the Indo-Gangetic Plains iron is first found , around 800 BC, with a culture known as **Painted Grey Ware** (PGW).

In north India the earliest occurrences of objects of iron or objects proving its manufacture and use have been discovered in early stage at Hastinapur, Alamgirpur and Kausambi in Uttar Pradesh and at Ujjain in Madhya Pradesh. In all these sites iron objects occur for the first time in association with Painted Grey Ware, a later phase of the distinctive ceramic known.

The Iron Age is characterized by a diverse range of historical events, such as the migration of Aryans, the growth of cities and urban society, the emergence of states and empires, the spread of Megalithic culture in South India and the developments of distant trading activities including not only South Asia but the surrounding regions.

The Painted Grey Ware and the associated cultural assemblage are lower and earlier than the Northern Black Polished Ware. Its use was sparse in the beginning, but by the middle of the 6th century B.C. it had become fairly common and was associated with the new **Northern Black Polished Ware** (NBPW) Culture.

During this period its horizon expanded to include the central and lower Ganges valley, where it marked a significant break from the earlier cultures. In the Malwa region and Tapti valley too, at sites such as Nagda, Eran and Prakash, iron brought in an element of change in the earlier Chalcolithic cultures, and it is possible that the use of iron was slightly earlier in this region (1000 BC) than in the Ganges valley. Similarly, at Hallur in north Karnataka iron appears to overlap the Neolithic implements of 900 BC. Furthermore, even if this date is not applicable to the other Iron Age sites of southern India, a definite cultural departure from the earlier Neolithic period is seen in the Iron Age megaliths of this region.

Urban centres like Taxila, Kosambi, Hastinapura, Atranjikhera and many others flourished. Typological proliferation of iron objects particularly

agricultural and war weapons increased. Iron became common and the smiths used carburization technique in iron technology.

The urban phase, however, has a gradual growth with regional predominant characteristics and also had a prelude to extensive agro-pastoral ways of life at almost all places. It is the agro-pastoral base of these early cultures coupled with advancement achieved in technology and accumulation of wealth that led to the development of internal forces of complexity. External factors also led to the development of urbanism depending upon ecological and human behavioural aspects.

Two major theories have been established on the origin of iron in India such as, **a) the external origin theory** and **b) the indigenous origin theory.** Regarding the former, R.E.M. Wheeler argues that the iron technology was brought to India and South Asia by the Achaemenids in the 5th century B.C. N.R. Banerjee seeks the origin in Aryans who brought the iron technology from West Asia. He puts the date of the introduction of iron around 1000 BC based on increasing archaeological evidence predating the fifth century B.C. On the contrary, the indigenous origin theory that has become favoured among archaeologists since the 1970s (D. K. Chakrabarti, M.D.N. Sahi, K. T. M. Hegde, R. Tiwari, V. Tripathi is based on the emphasis on the rich iron ore in various parts of India and the ethnographic records of preindustrial iron production among tribal people in addition to the examinations of archaeological evidence.

Archaeology of the Iron Age phases of the Ganges valley settlements is certainly much better known than that of the preceding phase; and there is a hint of their being larger in size. By the middle of the 6th century B.C. some of these settlements had reached the proportions of urban centres. This suggests that for the first time, since the decline of the Harappan Civilisation, a substantial agricultural surplus, which could sustain such urban centres had emerged. The use of silver and copper coins, in large numbers, during this period, implies considerable trade and commerce. Some of the urban centers were also seats of political power, as suggested by elaborate defense arrangements in some of them. Thus, a political system with

definable territorial units as its bases had also developed by this time. Although urbanisation is not evidenced in the south till a few centuries some important elements of south Indian social organization had evolved in the megalithic phase and continued into the early historical times; and at least for the extreme south such elements came to be preserved in the corpus of Sangam literature.

Since 1963, when D.D. Kosambi made the assertion that extensive forest clearance and agrarian settlement would not have been possible in the Ganga plains without the use of iron, archaeologists have been exploring the connection between the introduction of iron technology, settlement patterns, and political development in northern India. It is also clear that with the coming of iron there was such an unprecedented growth in the number of sites in the Ganga-Yamuna Doab that population densities were much higher and the monarchical kingdoms of Magadha and Kosala and the northern republics emerged in the context of the later Iron Age in the Ganga plain.

Debates on Iron:

There have been several debates over the impact of iron technology on the history of ancient India which has to do partly with the larger question of the role of technology in history and partly with assessing the literary and archaeological evidence of iron in different areas at different points of time. The debate has so far focussed on the Ganga valley in the 1st millennium B.C. Some of the older hypothesis thought provoking as they were in their times, are not supported by the evidence and need to be discarded. For instance, D.D Kosambi suggested that the eastern movement of the Indo-Aryans was in order to reach the iron ores of south Bihar, and that a near-monopoly over these ores was responsible for the political dominance attained by the state of Magadha in early historical times. He was of the opinion that the conflict between the Magadha and Kosala was due to the trade and commerce. According to him, the nature of society was changing. The absolute monarch was more essential to regulate the changing occupations and also to keep a strict control and ownerships of the

resources. The monarch was also responsible for forest clearance and bringing new lands under agriculture. The conflicts for resources led to development of states. Some of these hypotheses are untenable, given the very wide distribution of iron ores in the sub continent. As mentioned earlier, chemical analysis of early iron artefacts at Atranjikhera points to the hills between Agra and Gwalior as the probable source of ores.

R. S. Sharma highlighted the role of iron axes in clearing the forests of the Ganga valley and iron ploughs in agricultural expansion in this area. He argued that the use of these implements was responsible for generating an agricultural surplus, which paved the way for the second phase of urbanization. Religions like Buddhism were a response to the new socio-economic milieu generated by iron technology. Many aspects of this hypothesis were questioned.

A.Ghosh and Nihar Ranjan Ray argued that the forests of the Ganga valley could have been cleared through burning. It was pointed out that Sharma's argument was not supported by archaeological data that the impact of iron technology was gradual that it manifested itself in the mid-NBPW phase, when urbanization was well underway and that socio-political factors had an important role to play in the historical transformations of the Ganga valley in the 1st millennium B.C. Makkhan Lal described the idea of large scale forest clearance through the use of the iron axe and the generation of an agricultural surplus through the use of the iron plough as a myth, He argued that there was no significant increase in the use of iron from PGW to NBPW levels and that iron technology was not an essential prerequisite for an agricultural surplus or urbanization. Further, that the Bihar iron ores were not tapped during this period and that the Ganga plains in fact remained heavily forested till as late as the 16th and 17th centuries CE.

4.4 AGRICULTURAL EXPANSION AND DEFORESTATION IN THE GANGETIC VALLEY

Use of iron brought in a change of economy, the characteristic feature of which was a more advanced type of agriculture. In the Ganges valley and in the Malwa region, iron also led to the rise of urban centers. Both

Brahmanical and Buddhist texts are replete with reference to cities during the middle of the first millennium BCE and it is precisely at such cities, Ahichhatra, Varanasi, Kausambi, Sravasti and Ujjayini to name only a few that archaeological evidence of Iron Age urbanization is available. With the introduction of agriculture in the Neolithic period, man began to exercise considerable influence on the plant life in India as elsewhere. With the growing population and increasing demand on the forests for a clearance of land for cultivation, for smelting copper and later on iron, for baking bricks and pottery, a tremendous destructive influence in addition to climatic changes, reduced the indigenous forests to a great extent. The flourishing vegetation in Rajasthan and Sind was replaced by a desert about a couple of thousand years ago.

The beginning of agriculture, considered to be a momentous event in nature-human interface, is generally associated with the Neolithic Revolution. The ground stone artifacts of this period which were well rounded and had smooth long edges made the cultivation of soil an easier process. Once man took to agriculture several significant changes followed that may be legitimately called as heralding the beginning of a new phase in man's relationship with environment. Human dependence on the resources of nature for survival ended. Production of wheat, barley, rice, millet etc allowed them to get their own food. They also began to domesticate some species of animals- both for supplies of milk and meat as well as for harnessing their labour for various purposes. This was a completely new relationship with the environment and its resources.

Archaeological sources indicate that the use of iron and its impact increased gradually over the centuries and is reflected in the increase in the number and range of iron objects in the NBPW phase. While the expansion of agriculture must certainly have involved some amount of land clearance large tracts of land continued to be forested.

Detailed studies of archaeological data from the various regions and sub regions highlight the complexity of the relationship between technological change and history. For instance, in the far south, the early advent of iron

was not followed swiftly by socio economic transformations. Use of iron plough shares tended to be restricted to the wetland areas. He also argues that notwithstanding the knowledge or iron technology the larger socio-political context of war and plunder hindered the process of agrarian growth in Tamilakam.

The idea of surplus has guided almost all thought processes analysing the emergence of urbanisation. Surplus was responsible for all the economic and social variations. But there is also a line of thought that such developments are inevitable and not due to the internal conflicts. Such changes were due to the technological developments, which led to the emergence of cities and urban centres. The surplus in fact led to a synthesis of the factors like social changes, technological advancement and the authority needed.

Various scholars have opined that the Harappans were culturally far more advanced than the Aryans who figured in the Rigveda as destroyers of towns, not their builders. The early Aryans had an advantage over their opponents due to their use of horses and chariots, as well as potentially some better bronze weapons, but they lacked advanced technology, as might be anticipated of people without cities. Their understanding of metals appears to have been restricted. A single metal, named ayas (copper/ bronze), is mentioned in the Rigveda. The word is understood to mean bronze because of the widespread usage of metal in Iran throughout the middle of the second millennium BC. However, to yet, there have been no notable discoveries of bronze artifacts dating back to the Rigveda period at sites unearthed in the Land of the Seven Rivers. The evidence for the use of bronze on any considerable scale being slight, there is no archaeological basis for the view that the early Aryan bronze-smiths were highly skilled or produced tools and weapons superior to those of the Harappans. Nor did the Rigvedic people possess any knowledge of iron.

During the later Vedic period, between 1000 and 600 BC, when the three Vedas *Yajur, Sama,* and *Atharva*, the Brahamanas, and a few early Upanishads were composed, the Aryan way of life underwent significant

modifications. The Rigveda lacks the depth of geographical knowledge exhibited in the later Vedic writings. They refer to the Indian Ocean and the Arabian Sea. There are also several Himalayan peaks mentioned. There is an allusion to the Vindhya mountains indirectly. It seems that the Aryans became familiar with most of the Gangetic valley, where they eventually settled, at the time when the later Vedic writings were being composed.

The Aryans moved their center of action from Punjab to almost all of modern-day western Uttar Pradesh, which is bordered by the Ganga-Yamuna doab, during the later Vedic period. The Kuru people were founded by the union of the two significant tribes, the Purus and the Bharata. They migrated from the doab's periphery to its upper region, known as Kurukshetra or the land of the Kurus. They eventually united with the Panchalas. They established their capital at Hastinapur (Meerut district) and captured Delhi, as well as the upper and middle stretches of the Ganga-Yamuna divide, with the Kurus.

The Vedic people migrated even further east, to Videha in north Bihar and Koshala in eastern Uttar Pradesh, towards the end of the later Vedic period. During their eastward journey, they came across individuals who used copper and groups who made unique pottery known as Ochre Colored Pottery. Archaeologists also connected these people to the use of Black-and-Red Ware. It appears that they have forgotten their previous residence in Punjab. The later Vedic literature makes very few references to it, and the ones that do exist describe it as an impure land where the Vedic sacrifices were not offered. One theory is that the primary Aryan drives eastward north of the Ganga, along the foothills of the Himalayas. But expansion in the area south of this river cannot be precluded. Initially the land was cleared by means of fire. In a famous passage of the Satapatha Brahmana we are told that Agni moved eastward, burning the earth until he reached the river Sadanira, the modern Gandak. There he stopped. In his wake came the chieftain Videha Madhava, who caused the fire god to cross over the river. Thus, the land of Videha was Aryanized; and it took its name from its colonizer.

Towards the conclusion of the later Vedic period, the Vedic people moved

even further east, reaching Videha in north Bihar and Koshala in eastern Uttar Pradesh. They encountered people using copper and groups producing distinctive pottery known as Ochre Colored Pottery while traveling east. The use of Black-and-Red Ware by these people was also linked by archaeologists. They seem to have forgotten that they used to live in Punjab. There are very few allusions to it in the later Vedic literature, and those that do exist characterize it as an impure place where the Vedic sacrifices were not performed. According to one theory, the main Aryan advance eastward occurred along the Himalayan foothills, north of the Ganga.

Compared to firearms, there are less iron agricultural equipment and implements. For this reason, some academics who believe there is no connection between technological advancement and social change have completely rejected the significance of iron technology in aiding in the clearing of land. Shards of Painted Grey Ware have been found in large quantities in western Uttar Pradesh and the surrounding areas, either individually or in conjunction with iron items. Though only a few numbers have been excavated, the number of these sites in the upper Gangetic basin would easily surpass 700. The pottery known as Painted Grey Ware has been generally associated with the later Vedic people and from the sites excavated so far one gets the impression that nomadism of the early Aryan migrants was considerably undermined. They lived a settled life in their wattle-and-daub houses erected on wooden poles, domesticated animals and practiced agriculture more extensively than earlier. In the hymns desire is frequently expressed for increase in cattle, which still constituted the principal form of movable property. Agriculture, however, tended to become the chief means of livelihood in the period; and the idea of private possession of land gradually began to crystallize. The Satapatha Brahmana lists numerous agricultural practices and dedicates an entire section to rituals related to plowing. Deep plowing is indicated by reference to yoking six, eight, twelve, and twenty-four oxen to the plough. The Atharvaveda describes a ceremony for guiding river water into new courses and discusses spells to ward off heavy rain and drought. It appears that the buffalo was domesticated for use in farming. In addition to barley, the chief crop cultivated during the period was wheat

(godhuma), which continues to be the staple food in the Panjab and Uttar Pradesh to this day. Rice (vrihi) is mentioned for the first time, though very likely it was not an important crop in the upper Gangetic basin at this stage. Beans and sesamum were also known; the latter assumed ritual importance in the course of time. All this does not mean a total disappearance of pastoralism, which continues to remain a reasonably prominent feature of life.

But it was evident that the pastoral economy of the past was in danger due to the growing significance of agriculture, which was unable to sustain a growing population with food. The transition from a pastoralism-based to an agricultural economy coincided with the emergence of numerous new arts and crafts. Many of these are enumerated in the later Vedic literature. It is difficult to say how much smiths, smelters, and iron-weilding are related. Since iron was still rare, they probably worked mostly with copper, which was still the most prevalent material.

The later Vedic people increasingly put their pastoralist and semi-nomadic subsistence techniques to the background as agriculture became a more important source of income and as artisanal activity diversified. They were able to produce enough for themselves and, to some extent, for the support of the ruling elite and the priests as their lives became established and sedentary. However, it appears that they have not generated enough excess to meet the needs of those working in specialized non-agricultural crafts and jobs. As a result, they were unable to aid in the development of towns, and despite allusions to the *nagara* in the text, the earliest signs of urbanization appear toward the end of the later Vedic period, at which point Hastinapur (Meerut) and Kaushambi (Allahabad) are established as primitive towns.



CHECK YOUR PROGRESS

Q 1. Painted Grey Ware is associated with which Vedic period?

.....

Q 2. State the significance of the Neolithic period.

.....

Q 3. What was the argument of historian R.S. Sharma on the role of iron?

.....

Q 4. Name two urban centres that emerged due to Iron.

.....

4.5 FOREST AS ECONOMIC AND CULTURAL SPACE

The environmental discussion that came before it shows how deeply concerned ancient Indians were with the sustainability and preservation of the ecosystem. There are several allusions throughout the classic Indian literature of the Vedas, Manusmriti, Ramayana, Mahabharata, and Puranas that highlight the great importance that people placed on their surroundings. Ancient Indian scriptures such as the Arthashastra, Satapatha Brahamana, Vedas, Manusmriti, Brhat-Samhita, Ramayana, Mahabharata, and Rajtarangini all address the ideas of forest ecology and sustainable conservation. Human civilization and development have had a profound impact on the environment. Unsettling reservations about the concept of development itself have been raised by environmental degradation. Environmental deterioration has caused many people to become marginalized and to have their lives and means of subsistence seriously questioned.

As expected, progress has simultaneously promoted consumerism in a tiny portion of society and destroyed natural resources. It is critically necessary to protect the right to preserve the environment overall, as well as food, water, and air, among all other natural resources. We are becoming more aware of the need to handle the new ecological and environmental

problems that contemporary civilized cultures face. Many countries are developing environmental protection measures, but they are all reliant, in one way or another, on traditional knowledge that emphasizes the benefits of leading a simple life.

Economic Space:

The Indian subcontinent was gradually colonized by the pastoralists and farmers in the shape of second urbanisation. India's forests began to be systematically destroyed when the Chalcolithic people arrived. The Indus Valley Civilization covered a huge territory. It goes without saying that the Indus people had to clear large areas of forest in order to acquire land and build the settlements. The kind of fauna that this region sustained in prehistoric times is not compatible with the current climate in Sind and Punjab. The image of prehistoric India's wildlife that has been constructed from archeological remains shows that there were vast tracts of dense forests where a wide range of wild animals, such as buffalo, tigers, elephants, and rhinoceroses, thrived.

People have been interacting with their environment since the dawn of human history. We will discuss how humans relate to the environment and the natural world, and how society's collective wisdom and available knowledge facilitate this interaction. Later in this unit, we will learn more about the scientific and technological advancements accomplished by ancient Indians. The period is covered from the oldest times to 200 BCE. The environment has a significant impact on people's lives and activities early in human history. They were very close to forests and other natural resources, as per the historical documents.

Ancient Indian writings expressed the sustainable ideals of forest ecology and conservation. Numerous facets of the Indus Valley Civilization's social structure and urban planning demonstrated an awareness of the environment. The presence of foliage, wild creatures including peacocks and one-horn deer, tigers, elephants, bulls, and seals in the mud pots can be used to identify the pattern of biodiversity in such locations. The region's forest cover decreased as a result of the widespread usage of timber-wood

for brick combustion.

Rainfall fell as a result, while soil degradation raised the water table and caused silt to accumulate in the Indus River, choking Mohenjodaro from the sea and ultimately leading to his demise. Science and technology were among the many arts that the ancient Indians had mastered. The first urban civilization on the subcontinent was founded by the Harappans, who constructed enormous cities like Mohenjodaro and Harappa. Their engineering expertise is demonstrated by their granaries, dockyard, water tank, and other constructions.

The discovery of iron which in many areas led to the colonisation of the forested land by agricultural people made easy the continued felling of big trees in forests. The Aryans with their knowledge and mastery of iron and improved technical knowledge started a steady process of deforestation towards the east as far as the Gangetic valley.

The Aryans were partly pastoral and partly agricultural people. Naturally they required land for pastoral as well as agricultural purposes. This land could be obtained only by clearing up the jungles. A significant portion of forested land began to be converted into grassland or crop fields. Fire, stone axes and metal axes aided in this process of conversion. The burning of the *Khandava* forest as depicted in the Mahabharata's *Adiparva* beautifully illustrates the destruction of forests by fire. Cultivation imposed increasing demands on natural vegetation and a greater removal of forest produce to be used as fuel, fodder, manure, building-timber and implements. But in this connection, it is noteworthy that the Aryans did not destroy forest for building towns and cities in the early phase of their civilization.

The iron and zinc smelters are highly esteemed for their innovation and major accomplishments. The ancient Indians made significant contributions to many of the fields that flourished in the past, including mathematics, astronomy, geography, and medicine. Actually, the only people that valued science and technology highly were the ancient Greeks and Indians.

The Aryans had to make room for their communities as they expanded from their first settlements, which thrived along riverbanks, into the heart of the woodlands. Large-scale tree destruction was not necessary during this time because they refrained from building structures, but deforestation persisted in order to establish settlements for human habitation. The Aryan people lived in thatched homes and used wood for their chariots. Wood was a necessary building element. But that was not enough to facilitate village-to-village contact. Appropriate routes were to be constructed for their chariots and carts to pass. For this purpose, clearing up extensive forest tracts were carried on. With the extension of human settlement the depletion of forest continued for creating fresh fields and pastures anew.

Eight forest divisions in ancient India are mentioned in Arthasastra in reference to the availability of various elephant quality types. According to Kautilya, the elephants of the best class come from the kingdoms of Kalinga, Anga, Karusa, and Pracya; the elephants of Dasarna and Aparanta are considered middling, and the elephants of Surastra and Pancanada are considered the worst. But there is also good evidence that the dense forest tracts endured for a long time and that the ancient Indians were aware of the forest resources because to the similarities in the names and places of the forests in ancient India as reported in the Arthasastra as well Puranas.

Different Professional Castes Developing Based on Forest Products:

The names of various professional classes that lived in ancient India and were totally dependent on forest goods are revealed in the Pali text Dhammapada. These castes were called Dantakaras (ivory workers), Cammakaras (leather workers), Tacchakas (carpenters), Pasikas and Nisadas (trappers and hunters), and Nalakliras (manufacturers of baskets and mattresses). The gathering of firewood, plants and herbs used for medicine, and the trade of carpentry are all described in the Jatakas. Forests provided the necessary amount of wood for carpentry. The conveyance of a cartload of logs indicates a significant need for wood for fuel and home construction. The furniture featured in the stories suggests that wood is in

high demand. The activities of stick collection, faggot-bearing, and bird-snaring were also conducted in forests. Wicker work was another occupation centered in forests. A sizable population made their living by crafting baskets from the bamboo found in the forest belt and the osiers found in marshy areas. Animal hides and skins were employed. In addition to domestic animal skins, hides from panthers, tigers, and deer were also utilized. Therefore, it is difficult to dispute that man plays the role of a predator in this endeavor based on the numerous references. Certain Vedic and Pali texts provide insight into the occupations of those who live in the forests. Among such tribes may be mentioned Goat clan, Fish clan, Horse radish clan, Serpent clan, Bird clan, Lambakarnas etc.

Prior to the sixth century BCE, the forests were ungoverned by the state, and individuals were free to use their resources as needed. Imperialism had not fully developed, which was the primary cause of this predicament. The year 543 BCE was significant because it saw the ascension of King Bimbisara to the throne of Magadha, signaling the beginning of imperialism in Northern India. Over time, the imperial authorities were aware of the forest's resources and saw them as a potential source of income. However, the forest came more firmly under state control with the advent of Mauryan Imperialism.

It is evident from Kautilaya's Arthasastra that the state authorities fully understood the value of forest resources for the advancement of statecraft and formulated regulations for its appropriate organ. It is difficult to dispute that there were more concerted attempts to colonize large areas of uncultivated territory during the Mauryan era. It is true that a full-fledged department led by a director tried to conserve the forests and their living resources during this period. The Arthasastra makes it very evident that one of the primary sources of income was the forests.

It is very difficult to prove that there was any separate unit of the government to run the administration and management of the forests before the Mauryas. It is for the first time in the Indian History that Kau!ilya mentions the post a Director of Forests produce. When it comes to the so-called

dravyavana forests, Kautilya advises that he should create companies to manufacture commodities derived from the forest's produce as well as settle foresters who are connected to the produce forests. Here, it is crucial to remember that the forest people of ancient India relied heavily on these woods for their food.

In addition, there are precise guidelines for creating elephant forests on the kingdom's periphery, and foresters are required to watch over these woods. Entire responsibility for safeguarding elephant forests on mountains, rivers, lakes, and marshy areas was given to the superintendent of the elephant forest.

The official should be well-versed in the locations of the forest's entrances and exits.

Back then, the nation's ability to defend itself mainly depended on the woods' supply. Megasthenes' evidence clearly shows that the logs of hard woods were preserved and used to build palisades to protect the towns. The homes of buffalo and rhinoceroses, the elephant tusks, wood, and bamboo roots used as the hilts. Leather was a necessary component in the creation of many kinds of clothing and defense gear.

The oficial in charge of production in the forest area need to take continued precautions to ensure that trees, plants, herbs, animals, and other natural resources were properly protected. because there were penalties for any dishonest action with forest produce. Following thorough inspection by a team of experts, the royal store house approved the forest products. Thus, it makes sense to assume that the lower-level staff working under the Department of Forest Produce had to be up to date on all issues pertaining to the development of the forests.

Large areas of forest that spanned the Gupta Empire were naturally seen as significant sources of income with the development of the Imperial Guptas. In a kingdom, forests, grasslands, bushes, trees, and plants were all highly prized. It was forbidden to destroy live things on a large scale during this era, and hunting required prior royal approval. The king also in course of his hunting expedition was not allowed to kill the animals which

were not wild, and cruelty was always discouraged.

Forest as Cultural Space:

Given that ancient Indians had close relationships with both plants and animals, it is quite probable that a curiosity about the impact of nearby trees and plants developed among them. The Vedic literature makes it clear that the Aryans kept close tabs on the flora and wildlife of this almost-obtained region. The Aryans classified trees according to both their general and medicinal qualities in order to make the most use of the forest resources. The trees are categorized in the Rigveda as phalini (fruit-bearing), aphala (not fruit-bearing), 'apuspa' (flower-less), and puspini (flower-having). The plant world is classified in the same Veda as vriksa (tree) and gulma (shrub).

People first learned that plants and trees are living things thanks to science's curiosity with the plant kingdom. The Aryans reached such a high level of plant life knowledge that even the hymns of the Rigveda hint that the Vedic Indians knew a little bit about how food was made, how light affected plant processes, and how energy was stored in plants - a remarkable accomplishment for our ancestors at that far-off time.

Four phases of existence were introduced by the Indian Vedas. Without a doubt, the Brahmacharya's practice of the vanaprastha and sanyasa systems, or the third and fourth asramas, assisted them in learning about the Indian flora and fauna. A Brahmacharya was required to reside in a cottage within or close to the forest in these two asramas. There isn't really a better way for man to understand how nature behaves around him. In addition to imparting knowledge about tangible resources, the forest sparked their creativity, leading to the production of a brand-new collection of Vedic compositions known as the Aranayakas.



CHECK YOUR PROGRESS

Q 5. How are the trees categorized in the Rig Veda?

.....

Q 6. When did the forest comes under state control?

.....

Q 7. The Mahabharata *Adiparva* refers to the destruction of which forests by fire?

.....

Q 8. Who were the Dantakaras?

.....



4.6 LET US SUM UP

After going through this Unit, you have learnt that-

- The use of iron tools date back to pre-historic time and it this has facilitated for the expansion of agriculture leading to changes – socially and economically.
- Forest serned as a source for food and livelihood survival while also promiding the basis for the emergence of different costs and groups.
- Forest has a cultural and spiritual significance besides being of economic value.



4.8 FURTHER READINGS

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4.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1. Later Vedic Period

Answer to Q 2. Use of Iron

Answer to Q 3. R.S. Sharma argued that the use of these implements was responsible for generating an agricultural surplus, which paved the way for the second phase of urbanization.

Answer to Q 4. Ahichhatra, Varanasi, Kausambi, Sravasti and Ujjayini

Answer to Q 5. Tree categorized as- phalini (fruit-bearing), aphala (not fruit-bearing), 'apuspa' (flower-less), and puspini (flower-having).

Answer to Q 6. During the Mauryan period

Answer to Q 7. Khandava forest

Answer to Q 8. Dantakaras were ivory workers.



4.9 MODEL QUESTIONS

A) Very Short Questions (answer each question within 50 words)

Q 1: What are the characteristics of stone artifacts of Lower Paleolithic age?

Q 2: Name the sights where the tools belonging to the Lower Paleolithic have been found.

Q 3: What is the meaning of Neolithic?

B) Short Questions (answer each question within 150 words)

Q 1: What was *ayas?*

Q 2: State the role of stone artifacts in the development of civilization with special reference to India.

C) Long Questions (answer each question within 300-450 words)

Q 1: Discuss the various stages of iron implementation in ancient India.

Q 2: What do you mean by debate on iron? Evaluate your answer as per Indian context.

Q 3: Examine the role of forest as an economic factor in ancient India.

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UNIT 5: FOREST IN COLONIAL INDIA

UNIT STRUCTURE

5.1 Learning Objectives

5.2 Introduction

5.3 Making of British Forest Policy in India

5.4 Forest act in India

- Forest Act of 1878
- Forest Act of 1927

5.5 Impact of British Forest Policy

- Deforestation
- Ecological Change

5.6 Impact of Railway Construction on Forestry during colonial period

5.7 Let Us Sum Up

5.8 Further Readings

5.9 Answers to Check Your Progress

5.10 Model Questions

5.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- Explain about the making of forest policy in India by the British and Forest Acts of 1878 and 1927
- Discuss the impact of British forest policy
- Discuss the impact of railway construction on forestry during colonial period

5.2 INTRODUCTION

Dear learners, in the previous Unit, we discussed the use of Land and Forest in pre-colonial India. In this particular Unit, we will be discussing the ecological changes under the colonial regime specially focusing on the forest policy during the British period in India and impact of infra-structural development like railway contsruction on forestry.

5.3 MAKING OF BRITISH FOREST POLICY IN INDIA

It is proven that India was once densely covered with forests. Over the years, the depletion and exploitation of forests is simultaneous with the progress of man, growth in population, more dependence on natural resources and urbanization. Ancient texts show that forests were very important to people as people used to performed religious ceremonies centering round the trees and forests. The Mughals were also known to have showed keen interest in forests as they were known to have contstructed beautiful gardens with beautiful plants and trees. As soon as the British exercised control over these forests in the colonial period, they were used solely for revenue extraction. They did not consider forests as a means of natural resources but only a way to extract revenue and make profit. Many forests all over India were destroyed in the name of agrarian activities and need for more land for cultivation. The British Empire exploited and used every available resource of the countries they colonized. Therefore, it is no wonder that the Indian forests served as a valuable resource for the British. The Indian Forest Act was passed in 1865 and then it was amended in 1878 and 1927.

Starting with the nineteenth century, attention towards the Indian forests and its conservancy began to be contemplated by the Colonial State. Indian teaks were in great demand especially after the depletion of teak forest elsewhere in Europe and played an important role in the maritime expansion during Anglo-French Wars. Afterwards, therailways were introduced in 1853 which led to the immense exploitation of Indian forests and resources. It was realised that Indian forests could deplete exhaustively which meant British could suffer long term losses in revenue and resources, hence, a Forest Department was sought to be established. Finally, the forest department was started with the help of German Foresters in the year 1864. Following this was the exertion of regulations by the colonial state with the Forest Act of 1865 laying down many rules and jurisdiction for forest land but this lasted for merely 13 years as an even more rigorous and strict act was initiated by the Colonial State known as Indian Forest Act 1878. It

safeguarded their colonial interest and expansion and snatched the rights away from rural communities and prohibitions were implemented in sale and use of forest resources and they were allowed a limited use as laid down by the State, forests were now under the control of British and the forest land was reserved and managed by the Colonial State.

When British rule over India began, t he way colonial affairs were governed underwent significant administrative and structural changes. Colonial control led to stringent revenue collection mechanism in form of the Permanent Settlement, the Ryotwari Settlement and the Mahalwari Settlement. Similarly, new forest administration resulted in the creation of the Imperial Forest Department, Reserved and Protected Forests. Control over the forests in India by the colonial power through creation of various instruments like the Imperial Forest Department, Forest Acts, Reserved and Protected forests, working plans etc. led to deforestation and ecological change in India. With the coming of the railways and the mining industry, there was large scale destruction of forests for commercial use especially for railway sleepers, fuel as well as household construction works. The establishment of the Imperial Forest Research Institute in Dehra Doon in 1878 which was reestablished in 1906 led to judicious as well as scientific management of the forests which also facilitated researches in several silvicultural species. The new administrative structures brought in conflicts, often violent, between the indigenous tribal population and the British administration. These led to the passage of several forest acts.

5.4 FOREST ACTS IN INDIA

The British Empire wanted forests due to the demands of the massive railway expansion. For trade and the movement of British Imperial troops, the growing railway network was essential. Railroad sleepers had to be laid, and wood was needed as fuel for the locomotives. Wood was also required by the Royal British Navy to construct the ships that guarded the vast empire. The British were worried about the local Indian population using the forests because of their needs. Therefore, forest laws were implemented by the British colonial government due with certain motivations.

- **INDIAN FOREST ACT OF 1878:**

The first Forest Act that was passed in India was in 1865, when the Imperial Forest Department tried to establish the control of British over the forests in India. By this Act, any land that was covered in trees was declared as a government forest.

In 1878, another Forest Act was passed, which enabled the government to demarcate and administer the forests. They decided the level of availability of the forest to the locals. They attempted to regulate the collection from forest dwellers and declared certain activities as punishable offenses.

Types of Forests

The Indian Forest Act of 1878 designated Indian forests into 3 different categories: Reserved Forests, Protected Forests, and Village Forests.

i) Reserved Forests – these were the forests with the most restrictions. They were acquired or owned by the Government. These forests are declared so by their respective state governments. Hunting, grazing, entry of locals, etc. were banned in these forests. Entry of anyone was allowed only by a Forest Officer.

ii) Protected forest– These are forests from which the government has the right to use trees and other resources to generate revenue. These forests are less restricted than reserved forests and more people (generally government authorized personnel) have access to these forests.

iii) Village forest– These forests are the least protected ones and the locals have complete access to them. The rights to the forests are assigned by the Government to the concerned village or community.

With the Forest Act of 1878, the British government obtained sovereignty over all wastelands, including forests. The British could mark off forests as Reserved and Protected Forests. The inhabitants' access to the forests was restricted, and any privileges they did have could be taken away at any time. Nothing could be taken from the Reserved Forests for personal use by the nearby villagers. They were restricted to using only forest products for building materials or fuel from the village forests and Protected Forests. The goal of all of this was to control the gathering of

forest wood. The British controlled the forests and made certain activities punishable by fines or imprisonment.

- **FOREST ACT OF 1927:**

In order to make the Forest Act, 1878 more effective and more comprehensive, a new Forest Act was passed in 1927 which repealed all the previous laws and legislations. The new act consisted of 13 chapters and 86 sections. The Act aimed to:

- To consolidate the laws pertaining to forests.
- Regulation of transit of forest produce.
- To levy duty on timber and other forest produce.
- To define the procedure to be followed in relation to reserved, protected and village forests.
- To define acts prohibited inside reserved forests.
- To define offences pertaining to forests and to conserve forests.
- To maintain the quality of lakes, ponds and rivers in forests.
- To improve the effective management of forests by appointing skilled professionals.
- To improve technology in relation to forests.
- To spread awareness regarding the importance and critical need to conserve forests.
- To balance the impact of agrarian activities and other forest activities.

Drawbacks of the Indian Forest Act, 1927

It may seem that the new provisions, rules and regulations that were brought in by the Indian Forest Act 1927 were to protect and conserve the vegetation cover of India, but a deep investigation of the act reveals that the real intention behind the new provisions, rules and regulations of the act was to earn revenue from the forest-produce i.e., cutting down of trees, wood, timber, fodder, rocks and minerals.

This act gave a lot of power to the forest officials and bureaucracy which often led to exploitation of the forest dwellers. Also, it also deprived the nomads, tribal people and forest dwellers of their rights and privileges to use the forest-produce. This act never aimed to regulate the cutting of trees,

but to earn revenue from cutting of trees to such an extent that it does not destroy the forest-land.

The Indian Forest Act of 1927, enacted by the British colonial government, placed more emphasis on the controlled extraction of timber from the forests and not the conservation of forests. The British Empire created laws to strengthen its colonial powers, just like it did with other laws.

The Indian Forest Act,1927 aimed to regulate the movement of forest produce, and duty leviable forest produce. It also explains the procedure to be followed for declaring an area as Reserved Forest, Protected Forest or a Village Forest.

This act has details of what a forest offence is, what are the acts prohibited inside a Reserved Forest, and penalties leviable on violation of the provisions of the Act. After the Forest Act was enacted in 1865, it was amended twice in 1878 and 1927.



CHECK YOUR PROGRESS

Q 1. Mention one Forest Act of Colonial India.

.....

Q 2. When was the first Forest Act passed?

.....

Q 3. What are the different types of forest in Colonial India?

.....

Q 4. Why was the Forest Act of 1927 passed?

.....

Q 5. Mention any two objectives of Forest Act of 1927.

.....

Q 6. Mention one drawback of the Indian Forest Act, 1927.

.....

5.5 IMPACT OF BRITISH FOREST POLICIES

It is not surprising that the Indian Forest Act of 1927 had serious negative effects on the nation, particularly for villagers. Under the new act,

activities like fishing, hunting, gathering fruit and roots, cutting wood, and grazing cattle were made illegal. The villagers were compelled to steal wood by entering the forests and hiding from the British authorities because of the new restrictions imposed by the Indian Forest Act. To ensure that the forest guards and police constables did not arrest the villagers, the villagers would bribe them. The villagers were nevertheless harassed by the guards and constables.

Colonial forestry has resulted in enriching the British and their collaborators, but the impact was overwhelmingly negative or the local population. It endangered the way of life for people who relied on forests for their subsistence, irreversibly damaged the environment and established the standard for post-independence forest management in India, ensuring its continuation.

British forest policies in India were developed and enhanced to achieve the colonial agen daof producing the unethically highest possible outcome from its colonies which one could examine by the study of the 1878 Forest Act, the Indian Forest Act of 1927, and the Forest Act, 1980. Their main goals were to find alternatives for England's timber resources for a range of us es, including fuel, furniture, building materials, warships, and equipment. They also wanted to increase agriculture, the railway, the size of land paying revenue, and easier administration through deforestation. Their goal was accomplished by using military-enforced policies to impose restrictions on how the public uses forests.

- **Deforestation**

The early British mistreatment of Indian forests reinforced the claim that the British race was rapidly converting forests into deserts. By 1860 Britain became the world leader in deforestation, devastating its own forests and forests in Ireland, South America, and north east USA for farming, iron smelting and shipbuilding.

The motives behind the British drive to clear forests in India were-

- To increase revenue by extension of agriculture which was a prime and consistent source of revenue

- To increase political control by increasing land under settled cultivation which was easier to administer than forests and wastelands
- To meet increase in demand for timber for shipbuilding which was accentuated by (a) the Anglo-French naval rivalry (b) shortage of timber in Britain (c) Baltic timber supply stopped because of strategic isolation of Britain during the revolutionary and Napoleonic wars between 1793 and 1815 and the neutrality of the Baltic countries during the blockade.
- To meet increase in demand for timber for building dockyards, barracks, ordnance factories, and later and most importantly railway construction. To meet increase in demand of fuel for steamships, townships and later railways
- To reduce the hideouts of disorderly social groups and revenue fugitives. Forests were the abode fortribals who were considered to be primitive and prone to violence. And peasants from the settled cultivated areas who were unable to bear the revenue demands of the state took refuge in the forests.
- To honour the negative view of woodlands that the British carried into India from Britain. Forests were considered by the British to have lapsed into a state of nature because of inadequate human care. The British believed that forests were meant to be tamed by clearing them for cultivation.

- **Ecological Changes:**

Colonial forestry has had wide ranging consequences. Apart from enriching the British and their collaborators, the impact was overwhelmingly negative. It caused irreparable environmental damage, jeopardized the livelihood of communities who subsisted on forests, and became the role model of India's post-independence forest management, thus ensuring its insidious continuity.

The colonial rulers set the ecological catastrophe in motion. For the peasants, a vicious circle of revenue and debt payment, cash crop plantation and permanent acquisition of new land was created just to meet the new

demands. Forests were cleared to gain new land for cash crops, whilst cultivation of food was increasingly marginalised. Ever greater demands were put upon the soil, hardly leaving time for its regeneration.

The environmental irresponsibility, extent, and infringement of rights of fo rest dwellers and tribal people to access forests and utilize forest products marked a turning point in ecological history with the British forest policies. To forest dwellers and tribals who depended on the forests for their livelihood, British forest policies brought about a watershed in their rights to the forest. Gradually and increasingly the state usurped many of their rights to the forest to safeguard the forest requirements of the state.

In the wake of the Industrial Revolution, the Europeans brought to India some revolutionary ideas about resource use, the transformation of resources from one form to another and transporting them over large distances to the final user. Many resources became commodities with ever-increasing uses. For example, wood that used to be consumed as domestic fuel or for the construction of shelters and tools could now be converted to paper, used to power steamships and railways, and also used as sleepers on railway tracks.

Three elements of the Industrial Revolution influenced the ecological encounter between India and Britain:

There was a change in emphasis from resource gathering and subsistence production to the production of commodities and trade. There was a shift from production for self-consumption to production for market.

Cooperation with neighbours became less important. So, there was a breakdown of cohesive local communities. Human societies became atomized with individuals acting largely on their own.

With the increasing domination of manufacture and commerce, the institution of the market came to receive the veneration that previous food-gatherers reserved for the spirits.



CHECK YOUR PROGRESS

Q 7. Give two reasons for deforestation in India during the colonial period.

.....

Q 8. State the ecological changes as a result of British Forest Acts.

.....

5.6 IMPACT OF RAILWAY CONSTRUCTION ON FORESTRY DURING COLONIAL PERIOD

The history of railways, has been one of the important strands of modern Indian history. Undoubtedly, railways in India generated far-reaching impact on various domains of India. The chapter looks at ecological dimension of the Indian railways and proposes that railways were responsible for massive deforestation by the way of consuming valuable timber for sleepers and fuel.

From the 1860s, the railway network expanded rapidly. By 1890, about 25,500 km of track had been laid. In 1946, the length of the tracks had increased to over 765,000 km. As the railway tracks spread through India, a larger and larger number of trees were felled. As early as the 1850s, in the Madras Presidency alone, 35,000 trees were being cut annually for sleepers. The government gave out contracts to individuals to supply the required quantities. These contractors began cutting trees indiscriminately. A lot of the forest patches were cleared to build the railways. The trees that were cut were used as sleepers to hold railway tracks together and as fuel to run locomotives. Additionally, the government granted contracts to local contractors for supplying timber for sleepers. Forests around the railway tracks fast started disappearing. This also led to indiscriminate tree-felling.

British forest policies, initially inclined heavily towards clearing forests and later towards conserving forests, did attain their objective of enriching the home country and its adventurous officials and their government in India. But it left a swathe of ecological destruction and socio-economic distress in its colony. The actual experience of scientific forestry was quite often at

odds with its professed aims and supposed achievements. The strengthening of state control had as its corollary the denial of customary rights of use of peasant and tribal communities. Peasants and pastoralists, swidden cultivators and wood working artisans, all looked upon the forests as a provider of their basic means of subsistence: the source of fuel for cooking, grass for livestock, leaf for manure, timber for homes and ploughs, bamboos for baskets, land for extending cultivation, herbs for curing ailments, and so on. When access to these resources was restricted by the creation of strictly protected government reserves, escalating conflict between local communities and forest departments was the inevitable outcome.



CHECK YOUR PROGRESS

Q 9. How did the introduction of railways lead to deforestation in Colonial India?

.....

Q 10. How did the spread of railways in India increase the demand for timber?

.....



5.7 LET US SUM UP

After going through this Unit, you have learnt how-

- the British colonial government evolved a forest policy in India. Forest acts were enacted to derive maximum colonial benefit with adverse effect on the Indians.
- The construction of railways too had adverse impact on the Indian forestry.



5.8 FURTHER READINGS

1) Ecological Change in North India: Deforestation and Agrarian Distress in the Ganga-Jamna Doab 1800-1850

2) Saxena, N. C. (1999). *British Policy in India*. WWF-India and International Institute for Environment and Development.

3) Goswami, A. (2018). British Forest Policy in India. *SCRIBD*.

4) Ribbentrop, B. (n.d.). *Forestry In British India (1900)*. Kessinger Publication

5.9 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q. 1: The Indian Forest Act of 1878.

Answer to Q. 2: The first Forest Act that was passed in India was in 1865.

Answer to Q. 3: The different categories of forest are (i) Reserved Forests, (ii) Protected Forests, and (iii) Village Forests.

Answer to Q. 4: In order to make the Forest Act, 1878 more effective and more comprehensive, a new Forest Act was passed in 1927.

Answer to Q. 5: (i) To levy duty on timber and other forest produce (ii) To define the procedure to be followed in relation to reserved, protected and village forests.

Answer to Q. 6: The act gave a lot of power to the forest officials and bureaucracy which often led to exploitation of the forest dwellers.

Answer to Q. 7: (i) Increase in population, main to boom in call for for food, and extension of land below cultivation on the cost of forests. (ii) Colonisation with the aid of using the British recommended manufacturing of business crops.

Answer to Q. 8: For the peasants, a vicious circle of revenue and debt payment, cash crop plantation and permanent acquisition of new land was created. Forests were cleared to gain new land for cash crops, whilst cultivation of food was increasingly marginalised. Ever greater demands were put upon the soil, hardly leaving time for its regeneration.

Answer to Q. 9: Forest patches were cleared to build railway lines. Woods was used to make furniture. Woods were used as fuel to run locomotives.

Answer to Q. 10: The increased railway network created heavy demand for wood. Wood was required as fuel for the railways, to lay the track

and for the sleepers. So, this increased demand for wood resulted in indiscriminate felling of trees



5.10 MODEL QUESTIONS

A) Very Short Questions (answer each question within 50 words)

Q 1. What is De-forestation?

Q 2. What impact did the Railway Construction have on Forestry during colonial period?

B) Short Questions (answer each question within 150-300 words)

Q 1. What is the importance of Forest Act in India?

Q 2. What are the features of the Forest Act of 1878?

C) Long Questions (answer each question within 300-500 words)

Q 1. How the introduction of railways had adverse impact on forest justify?

Q 2. Why were forests cleared off rapidly during the colonial period? Give reasons.

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UNIT 6: COMMERCIALIZATION OF NATURE

UNIT STRUCTURE

6.1 Learning Objectives

6.2 Introduction

6.3 Concept of Commercialization of Nature

6.4 Exploitation of Forest Produce

6.5 Major and Minor Forest Produce

6.6 Debates on the Commercialization of Nature

6.7 Let us Sum Up

6.8 Further Readings

6.9 Answers to Check your Progress

6.10 Model Questions

6.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- Explain the concept of commercialization of nature,
- Examine the exploitation of forest produce, both major and minor,
- Understand the debates on the commercialization of nature.

6.2 INTRODUCTION

Dear Learners, in the previous Unit, we discussed the British Forest policy and the impact of the infra-structural development on the Environment. In this Unit, we will be exploring how the forest produce, both major and minor, were exploited and commercialized. This commercialization of nature had diverse effect on the environment and in this Unit we will try to understand this phenomenon.

6.3 CONCEPT OF COMMERCIALIZATION OF NATURE

The term ‘nature’ has a rich and varied etymological history, which has been evolving over centuries to encapsulate the multifaceted concept that encompasses the world around us. It includes living organisms, landscapes and the broader environment. ‘Nature’ has its linguistic roots

deeply embedded in the historical evolution of languages, with its origin traced back to Latin, which is derived from the word *'natura'*. The Latin term that stems from the verb '*nasci*' meaning 'to be born' or 'to grow', carries the fundamental idea of birth or growth. Nature used to describe the essential qualities and characteristics of living things emphasizing the notion of growth and development as integral components of the natural world. This linguistic root encapsulates the concept that nature involves a continuous process of emerging and evolving, reinforcing the interconnectedness of all living organisms.

The commercialization of nature, a multifaceted phenomenon raises significant ethical, environmental and social concerns. This process involves the transformation of natural resources and ecosystems into commodities, often driven by economic motives. From the extraction of raw materials to the commodification of ecosystem services, the commercialization of nature has far-reaching implications that necessitate careful observations. At the heart of the commercialization of nature lies the exploitation of natural resources for profit. Agriculture, a vital human activity, exemplifies the commercialization of nature through practices such as intensive monoculture and the use of chemical inputs. While these methods increase productivity, they often result in soil degradation, water pollution and loss of biodiversity. The pursuit of profit in the agricultural sector has led to the transformation of vast landscapes, impacting ecosystems and contributing to broader environmental challenges.

The commodification of nature extends beyond tangible resources to encompass the services of the ecosystem. These include pollination, water purification and regulation of the climate for the benefit and well being of the humans. However, the commercialization of these services raises ethical questions as the monetization of fundamental elements of the natural world can result in unequal access and distribution. For example, the privatization of water resources may limit access for marginalized communities, exacerbating social inequalities. The rise of eco-tourism represents another dimension of the commercialization of nature. While tourism can contribute to local economies and raise awareness about

environmental conservation, it also poses challenges. Overcrowding, habitat disturbance and the commodification of indigenous cultures can erode the very landscapes and communities which can draw visitors in the first place. Striking a balance between economic benefits and environmental preservation is a delicate task in the realm of eco-tourism.

One of the notable trends in recent years is the emergence of environmental markets and payment for ecosystem services schemes. These mechanisms aim to assign economic value to the environmental benefits provided by ecosystems, creating financial incentives for conservation. While the payment for ecosystem services scheme can be a valuable tool, it raises concerns about the commodification of nature and the potential for market-driven approaches to overlook social and ecological complexities. Biodiversity offsets, a concept gaining traction in various industries, exemplify the challenges associated with commercializing nature. Critics argue that this approach may lead to the displacement of communities, fail to address cumulative impacts and ultimately prioritize economic interests over genuine conservation. In the pursuit of profit, the commercialization of nature intersects with broader issues of environmental justice. Indigenous communities, whose traditional lands often bear the brunt of resource extraction and development projects, are disproportionately affected. The loss of cultural practices, connection to the land and traditional livelihoods underscores the social impacts of nature commodification. Moreover, the commodification of nature raises questions about the ethical implications of assigning monetary value to elements of the natural world. Critics argue that reducing ecosystems and biodiversity to market commodities may undermine intrinsic values and ethical considerations associated with the respect and stewardship of the environment.

6.4 EXPLOITATION OF FOREST PRODUCE

It cannot be denied that the European colonial powers were attracted by the natural resources of the colonies in Asia and Africa. This keen interest of the British for the forest resources in India had wide consequences. Historians have laid two debates on this issue- first being the

commercialization of the forest and the other forest conservation. The colonial power was criticized for destroying the forest as well as the lives of the forest dwellers who were dependent on the survival of the forest land. At the same time, the second debate gave prominence to the fact that the forest commercialization also led to the conservation efforts by the colonial regime.

Joshy Mathew focusses his attention to the unscrupulous exploitation of forest by the British in the Western Ghats. By the treaty of Srirangapattanam in 1792, the British came to control major portion of South India, mainly the whole hilly terrains of the Western Ghats with valuable timber. Teak (Tectona Grandis) and Anjili (Artocarpus hirsute) were the most valuable trees in the forests of Malabar. The spice items available in the forests were pepper, ginger, cardamom and cinnamon. The reason for the British intervention was the lack of Oak in Britain, which was extensively utilized for ship building in England. Britain, being the naval power, saw an opportunity in this forest. The finest quality of teak from Malabar and Annamalai was sent to Bombay dockyard since the last decades of the eighteenth century as it was a huge source of income. Realising the value of teak, the Bombay Bengal Joint Commission banned the felling of teak. Before long, a structured timber trade emerged in India, centered in Malabar. A timber syndicate within the Malabar district also grew, which annually provided 7000 candies of teak to the Bombay market for a decade. In his report to the Board of Revenue, the Malabar district collector stated that in 1837, 33,000 teak logs were exported from the district. This underscores the intense commercial exploitation of the timber resources in the Western Ghats. The exploitation of Indian forest can be understood from the increase in the shipping capacity of the merchant ships carrying timber and other valuable forest produce. While restrictions were imposed on the felling of trees, and on the extraction of teak and other valuable trees with officer being placed to look into it, but special officers were also appointed for the extraction of timber. Innumerable quantity of timber was extracted by the government and merchants from the jungles of Western Ghats under the *Stump Fee* scheme.



LET US KNOW

Stump Fee Scheme: In this system a certain sum per tree was allowed to cut it down and remove it. In the case of teak this stump fee was one rupee per tree. This scheme gave the government opportunity to extract teak.

Similarly, another forest product that was massively exploited was Sandalwood or *Chandan.* Declared as royal trees by the rulers of Vijaynagara empire and Wodeyar dynasty of Mysore, sandalwood was found in abundance in the hills of Tamil and Kannada regions of Western Ghats was. The British officers identified sandalwood trees in the forests of Satyamangalam, Coimbatore, Salem, Mysore and Coorg regions and supplied massive quantities of it, to Europe. The government leased out the right to private contractors to cut sandalwood in the hills of Salem district which also brought huge revenues in return.

The colonial intervention of the British in South India from the early nineteenth century completely transformed the traditional utilization of forest resources by tribal communities dwelling in the forests. The introduction of market forces into the subsistence economy of the Western Ghats hills undermined the communal ownership of resources. Initially, the British lacked a policy for forest conservation, despite conducting forest surveys and land demarcation. There were no restrictions imposed on the overexploitation of natural resources during this period. Consequently, this lack of regulation led to the severe depletion of valuable timber resources, such as teak in the forests of Malabar, due to indiscriminate felling and overexploitation.

The exploitation of forest produce, driven by economic interests has profound implications for ecosystems, biodiversity and the livelihoods of communities who are directly dependent on forests. This multifaceted issue encompasses activities such as logging, mining and the collection of non-timber forest products (NTFPs). Understanding the complexities surrounding the exploitation of forest produce is crucial for devising sustainable strategies that balance economic development with environmental conservation.

Timber extraction is one of the primary drivers of forest exploitation. Logging when done unsustainably leads to deforestation, habitat destruction and the loss of biodiversity. Old-grown forests which are home to diverse plant and animal species are particularly vulnerable to intensive logging practices. The removal or shedding of all trees from an area not only disrupts the ecosystem but also contributes to soil erosion and alters water cycles. Illegal logging exacerbates the negative impact of timber extraction. Often driven by a lack of effective governance and enforcement, illegal logging depletes forest resources without any regard for sustainable practices. This illicit activity not only effects conservation efforts but also fosters corruption and organized crime, further threatening the integrity of forests.

Mining activities in forested areas pose another significant threat. Whether for minerals, oil or natural gas, mining can result in deforestation, soil degradation and water pollution. The extraction process disrupts the ecosystem, displaces wildlife and leaves behind scars that may take years to regenerate. Moreover, the use of chemicals in mining operations can contaminate soil and water, affecting both the environment and human health. The non-timber forest products are essential for many communities as they act as primary source of food, medicine and income. However, the unsustainable harvesting of non-timber forest products can lead to overexploitation and depletion of valuable resources. Medicinal plants, for example, are often harvested without proper regulation, threatening the survival of certain species and compromising the availability of traditional remedies. The collection of forest produce extends to 'bushmeat' hunting (*bushmeat* hunting refers to the hunting of wild animals for consumption often in tropical forests. While it is a traditional practice for many communities, unsustainable *bushmeat* hunting can lead to loss of biodiversity and negatively impact the ecosystem. Additionally, the hunting of endangered species for their meat contributes to biodiversity loss and disrupts the intricate web of species interactions within forests.

The exploitation of forest produce also intersects with issues of indigenous rights and social justice. Many indigenous communities rely on

forests for their livelihoods, cultural practices and spiritual beliefs. When their rights to land and resources are disregarded and forests are exploited without their consent, it not only undermines their traditional way of life but also contributes to social and economic inequalities. The economic incentives driving the exploitation of forest produce often stem from global demand for commodities. Timber, minerals and agricultural products sourced from deforested areas find their way into international markets. Addressing this issue requires a comprehensive approach that involves not only local and national efforts but also international cooperation and responsible consumer behaviour. Sustainable forest management emerges as a key solution to mitigate the negative impacts of forest exploitation. This approach involves balancing the extraction of forest resources with conservation and regeneration efforts. Sustainable logging practices, such as selective logging and reduced impact logging aim to minimize ecological disruption while allowing for timber extraction. The implementation and enforcement of stringent environmental regulations are essential components of sustainable forest management. The involvement of local communities in decision-making processes is crucial for ensuring that their perspectives and traditional knowledge are considered. Conservation initiatives that focus on protecting critical habitats and biodiversity hotspots are vital. Establishing and maintaining protected areas, national parks and wildlife reserves contribute to preserving ecosystems and preventing the overexploitation of forest resources. Restoring the degraded forests through afforestation and reforestation efforts aids in mitigating the impacts of past exploitation.

Empowering and supporting indigenous communities in their stewardship of forests is fundamental to sustainable forest management. Recognizing and respecting their land rights, traditional knowledge and sustainable practices contribute not only to conservation but also to the preservation of cultural diversity. Collaborative approaches that involve indigenous communities in decision making processes are essential for fostering sustainable relationships between people and the forest. Promoting alternative livelihoods for communities dependent on forest resources is crucial for breaking the cycle of exploitation. Sustainable agro-forestry

practices, ecotourism and the development of non-extractive income-generating activities provide viable alternatives that reduce dependence on destructive practices while ensuring community well-being. Consumer awareness and responsible choices are pivotal in influencing market dynamics. For this reason, supporting business that adheres to sustainable and ethical practices creates a demand for eco friendly products. In conclusion, the exploitation of forest produce is a complex issue with far-reaching environmental, social and economic implications. Balancing the demand for resources with the need for conservation requires a multifaceted approach that involves sustainable forest management, stringent regulations, community empowerment and international cooperation. By recognizing the intrinsic value of forests, respecting the rights of indigenous communities and promoting responsible consumption, forests could be conserved, and this would thrive for the benefit of present and future generations.



CHECK YOUR PROGRESS

Q 1. What was the Stump Fee Scheme?

Q 2. The term nature is derived from which Latin word?

Q 3. By which treaty the British came to control major portion of South India?

Q 4. Who declared sandalwood or chandan as royal tree?

Q 5. What are the ill effects of mining?

6.5 MAJOR AND MINOR FOREST PRODUCE

There is a marked distinction between major and minor forest produce which is pivotal for understanding the diverse array of resources that a forest offers, its utilization and its implication for both environmental sustainability and local livelihoods. Major forest produce typically includes timber and other high-value resources while the minor forest produce encompasses a wide range of non-timber forest products which plays a significant role in the lives of forest-dependent communities. It is therefore imperative to take note

on the characteristics, utilization and challenges associated with all major and minor forest produce which are essential in their own way.

Timber stands out as one of the most prominent major forest produce. It includes various kinds of wood harvested for construction, furniture, paper and other industrial purposes. The extraction of timber has been a key driver of deforestation and forest degradation globally. Unsustainable logging practices such as clear-cutting and illegal logging have led to habitat loss, rapid decline in biodiversity and an adverse impact on the local ecosystem. Sustainable forest management practices including selective logging and reforestation efforts aim to balance the demand for timber with the need for conservation. Beyond timber, major forests produce includes high value resources such as resins, latex and essential oils. The harvesting of such high-yield products can contribute significantly to local economies, but it can also raise concerns about over exploitation and environmental degradation if not managed sustainably.

Certain medicinal plants found in the forests are also considered as major forest produce due to their economic and medicinal value. Traditional healing practices often rely on the knowledge of indigenous communities who have historically used forest resources for medicinal purposes. However, the increasing demand for herbal medicine on a global scale has led to the overharvesting of certain medicinal plants, threatening both biodiversity and the cultural practices of local communities. Sustainable harvesting practices and the cultivation of medicinal plants through agro forestry are emerging as strategies to meet the demand for herbal medicine without depleting natural populations. The integration of traditional knowledge into conservation efforts is crucial to preserving both biodiversity and cultural heritage.

Non- timber forest products constitute a diverse category that include various edible products like nuts, fruits, seeds and mushrooms. The forest provides a rich source of nutrition for local communities and the collection of these products contributes significantly to their diets. Many of these products have also commercial value and are traded in local markets. Certain

medicinal and aromatic plants fall under the category of minor forest produce. These plants are used for traditional medicine, cosmetics and perfumery.

The distinction between major and minor forest produces sheds light on the diverse range of resources that forests provide and the complex challenges associated with their exploitation. Striking a balance between meeting economic needs and ensuring environmental sustainability requires a comprehensive approach that includes sustainable forest management practices, transparent governance, community empowerment and international cooperation. Sustainable forest management guided by the principles of conservation, regeneration and community involvement is crucial for safeguarding the invaluable ecological services that forests offer. Recognizing the rights of indigenous communities, promoting alternative livelihoods and fostering responsible consumer behaviour contribute to a more equitable and sustainable relationship between people and the forests.

As the complexity of forest produce exploitation is navigated, the preservation of biodiversity, cultural heritage and the well-being of the present and future generations are most essential.

6.6 DEBATES ON THE COMMERCIALIZATION OF NATURE

The debates on the commercialization of nature are multifaceted involving discussions across various disciplines including economics, environmental science, ethics and sociology. This refers to the process of treating natural resources and ecological services as commodities to be bought, sold and traded in the marketplace. While proponents argue that this approach can provide economic incentives for conservation, critics raise concerns about ethical implications, environmental degradation and social justice issues.

- Commercialization is seen as a way to assign economic value to ecosystems, encouraging sustainable practices and conservation. By attaching a price tag to nature, the proponents argue that it becomes more visible in economic decision-making, potentially leading to more responsible resource management

- Proponents contend that market-driven approaches can lead to more efficient resource allocation and innovative solutions. They argue that market mechanisms can promote technological advancements and the development of sustainable alternatives by creating economic opportunities.
- Some argue that commercializing nature can contribute to poverty alleviation by providing income-generating opportunities for local communities. Sustainable harvesting of forest products, ecotourism and responsible fisheries are cited as examples that can enhance local economies.

Critics express ethical concerns about reducing nature to mere commodities, arguing that ecosystems and biodiversity hold intrinsic value beyond their economic utility. They caution against instrumentalizing nature solely for human economic gain emphasizing the moral responsibility to protect the environment. There are concerns that the costs and benefits of commercialization are not distributed equitably. Local communities often bear the environmental costs, such as pollution or habitat destruction while global corporations or wealthier nations reap the economic benefits. This further raises issues of environmental justice. Critics further argue that markets may not fully account for environmental externalities, such as pollution or depletion of resources. The failure to internalize these costs can lead to overexploitation and environmental degradation, as market prices may not accurately reflect the true value of ecosystems. The commodification of nature raises concern about the privatization of essential resources, such as water and genetic materials. Critics also argue that essential elements for life should not be subject to market forces, as this may compromise access for vulnerable communities and future generations.

In summary, the debates on the commercialization of nature are complex, reflecting contrasting perspectives on the role of markets in environmental conservation. While economic incentives can drive conservation efforts, addressing ethical considerations, ensuring equitable distribution of benefits and addressing market failures which are essential

for developing sustainable approaches to the relationship between economics and the environment.

The commercialization of nature remains a contentious and complex topic marked by debates across economic, ethical and environmental dimensions. The juxtaposition of economic incentives for conservation and the ethical concerns surrounding the commodification of natural resources underscores the need for a nuanced and balanced approach. Recognizing and integrating traditional knowledge and indigenous perspectives is crucial for holistic conservation efforts. Indigenous communities often possess valuable insights into sustainable resource management and their inclusion is essential for effective culturally sensitive conservation strategies. In navigating the complexities of commercializing nature, society faces the challenge of finding innovative solutions that honor the intrinsic value of ecosystems while recognizing the need for sustainable economic development.



CHECK YOUR PROGRESS

Q 6. Name one major forest produce.

Q 7. To what category of forest produce do aromatic plants fall?



6.7 LET US SUM UP

After going through this Unit, you have learnt -

- how nature has become a commercial entity with ongoing debates covering economic, ethical and environmental considerations. Large scale exploitation was carried out in the forest area by the colonial government for their own benefit leaving nature in a dire state. However, the local population was not allowed through legislation to secure the fruits of nature by using the forest produce in their day to day life. The forest produce was again classified as major and minor.



6.8 FURTHER READINGS

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6.9 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: In this system a certain sum per tree was allowed to cut it down and remove it. In the case of teak this stump fee was one rupee per tree.

Answer to Q 2: Natura

Answer to Q 3: The treaty of Srirangapattanam in 1792.

Answer to Q 4: The rulers of Vijaynagara Empire and Wodeyar dynasty of Mysore.

Answer to Q 5: Mining can result in deforestation, soil degradation and water pollution.

Answer to Q 6: Timber

Answer to Q 7: Minor



6.10 MODEL QUESTIONS

Very Short Questions (answer each question within 50 words)

Q 1: State the major forest produce in Colonial India.

Q 2: State a minor forest produce.

Q 3: Define Nature.

Q 4: Where the finest quality of Teak was available in India?

Short Questions (answer each question within 150 words)

Q 1: How does commercialization impact local ecosystems? Discuss.

Q 2: Explain how do communities benefit from the commercial use of natural resources?

Q 3: What do you mean by commercialization of nature?

Q 4: What is bushmeat hunting?

Long Questions (answer each question within 300 words)

Q 1: Explain the reason behind commercialization of nature.

Q 2: Exsmine the consequences of the exploitation of nature.

Q 3: Do you think that the colonial administration in India turned the forests into a commercial entity?

Q 4: Throw light on the debates on the commercialization of nature.

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UNIT 7: COMMERCIAL AGRICULTURE AND ENVIRONMENT

UNIT STRUCTURE

7.1 Learning Objectives

7.2 Introduction

7.3 Factors that led to the Commercialization of Agriculture in India

7.4 Primary Commercial Crops

7.5 Impact of Commercialzation of Agriculture

7.6 Plantation Economy

7.7 Agro Forestry

7.8 Let Us Sum Up

7.9 Further Reading

7.10 Answers to Check Your Progress

7.11 Model Questions

7.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- describe he development of commercial agriculture in India and its impact.
- discuss the emergence of a plantation economy in India
- know about the main commercial crops grown in colonial India.
- analyse the development of agro-forestry as part of colonial forest policies and the post-independence changes in it.

7.2 INTRODUCTION

Dear Learners, in the previous Unit, we have dealt with the commercialization of nature and how the forest produce, both major and minor one was exploited under the colonial regime. Now in this Unit, we will study about the commercialization of agriculture, plantation economy and agro forestry in colonial India.

Commercialization of agriculture, a gradual transformation from subsistence farming to profit-driven cultivation for broader markets, was not a novel concept in pre-colonial India, where local markets existed

primarily for tax payments and basic necessities. However, under British colonial rule, this process underwent a seismic shift, reshaping land-use patterns, agrarian relations, and economic structures.

At the heart of this transformation lay the exploitative nature of the British colonial state, designed to extract resources for imperial gains. Initially arriving as a trading entity, the British East India Company gradually morphed into a state apparatus focused on maximizing profits for British industries. This shift in focus, coupled with the onset of British industrialization, led to the reorientation of Indian agriculture towards cash crops like indigo, cotton, and opium, catering to British industrial needs. Plantation economies of cash crops like tea, coffee and rubber relied on exploitative labour practices, including indentured servitude and coercive recruitment.

7.3 FACTORS THAT LED TO THE COMMERCIALIZATION OF AGRICULTURE IN COLONIAL INDIA

Commercialization of agriculture refers to the gradual process by which agricultural goods produced for sustenance and local consumption begin to be produced for the broader national and international markets, with the primary intention of making profits. Within India, this process is generally associated with the period of British colonial rule. There was some extent of commercialization of agriculture in the pre-colonial period as well, in the limited sense that agricultural products were sold in markets to acquire money required to pay taxes to the state and purchase other goods and services. However, these markets were mostly local and the money was invested back into the local economy. The commercialization of agriculture in colonial India was characterized by a shift in land-use patterns from food crops to cash crops like indigo, opium, sugarcane, cotton, etc. on a scale that redefined the existing agrarian relations and institutions in the country. To understand why and how the commercialization of agriculture happened in colonial India, it is imperative to understand the nature of the British colonial state in India.

The nature of the colonial state in India was very different from the preceding Mughal state and its regional successor states. The colonial state, by its very design, was an exploitative one created with the primary intention of resource extraction to finance British imperialism and industrialization. Under British colonialism, there was a complex integration of India's economy and society with world capitalism in a subordinate position, that lasted nearly two centuries. Initially, the British came to India as a trading company and their primary objective was to procure goods for profitable sale in Europe. The primary articles of trade included spices, handicrafts, and textiles from India which necessitated a steady outflow of gold and silver bullion from Europe into India since there were no European products that were in demand in the Indian market. This caused an undesirable negative balance of payments for Britain. With the East-India Company acquiring the Diwani of Bengal in 1765, the financial resources required to maintain its trade monopoly vis-à-vis other European and Indian traders and to purchase colonial products were acquired through direct appropriation of revenue from these provinces. The export of Indian goods financed by Indian revenue money accelerated. This trend changed around the 1800s when Britain began to rapidly industrialize. The focus now shifted to making India a market for cheap machine-made goods from Britain. Industrialist lobbies in England protested the import of superior Indian finished textiles into Britain. This meant that the colonial state in India now had to look for alternate export items that could serve as raw materials for the British manufacturing industries. Thus, began the commercialization of agriculture in India, where the crops to be grown were chosen in tune with the demands of British industry. In most cases, farmers were forced d into cultivating these commercial crops using various coercive revenue and administrative policies.

Commercial agriculture is different from plantation agriculture in the sense that commercial agriculture was carried out by small cultivators using loans and advances provided by merchant traders in their own lands with their own agricultural implements, whereas plantation agriculture was carried out in large areas demarcated for one commercially viable crop using agricultural labourers and private capital. Crops like cotton, sugarcane,

indigo, and opium etc were promoted for commercial production. These crops were already produced in India by individual farmers on a small scale for local consumption. Commercialization meant that the farmers were expected to employ a larger portion of their land holdings towards the production of an assigned cash crop and only the remaining was to be used for their sustenance. Since commercialization was taking place under the supervision of the colonial state, there was a systematic extraction of maximum profits for the colonial state at the cost of the Indian peasantry. Commercialization of agriculture was aided by the establishment and growth of a vast railway network that connected India's hinterland areas, trade centres, and agricultural regions to ports and other marketplaces. Technological developments like this aided the movement of labour and goods. Historians like Bipan Chandra argue that when viewed as a well-structured whole, the elements like railways that are at times associated with colonial benevolence emerge as instruments that helped facilitate colonial accumulation and extraction, leading to the overall decline and stagnation of the Indian economy. Thus, the commercialization of agriculture and the expansion of the Indian railways were inter-related developments, both instruments of colonial economic exploitation in India.

7.4 PRIMARY COMMERCIAL CROPS

Initially, those crops that had a strong demand as raw materials in the British industries like indigo, cotton, and silk were chosen for commercial agriculture.

Indigo:

Indigo has been cultivated in India since ancient times but the commercial cultivation of indigo, valued for its vibrant blue dye began in India in the 1770s. European planters were encouraged to settle in India and trade in indigo. There were two main systems of cultivating indigo: the Nij and Ryoti systems. Under the Nij system, planters directly controlled lands for indigo cultivation by buying them or leasing them from zamindars. In this system, the planters faced challenges in expanding due to land scarcity and difficulty in labour mobilization. Large-scale Nij cultivation

required significant resources like bullocks and ploughs. In contrast, the Ryoti system involved coercing peasants to sign contracts and receive cash advances for indigo cultivation, with the condition of selling their produce exclusively to the planters at pre-determined rates. The second system was more widely used as it afforded maximum benefits to the cultivators without any real investment.

Indigo farming was initially concentrated in Bengal, providing large enough supplies to satisfy demand in European markets by the late 18th century. Concentrated in Eastern India, commercial cultivation of indigo was marked by peasant exploitation and harsh contracts. They were compulsorily required to bring a major portion of their land under indigo cultivation. The peasants were given advances by the indigo planters at usurious rates which they were rarely able to pay back and hence became perpetually indebted to the planters. The pre-decided price paid to the cultivators was very low in comparison to the huge profits that the Company made off the indigo trade. Such oppression and exploitation resulted in the Indigo Revolt or Blue Rebellion of 1859-60 in Bengal where ryots rose in revolt against the indigo planters and refused to cultivate indigo. It was brutally suppressed and thereafter the centre of indigo cultivation shifted towards Bihar and other parts of north India, where it continued well into the 20th century. The continued oppression of indigo cultivators can be gauged by the fact that the Champaran Satyagraha of Mahatma Gandhi in 1917 also dealt with the grievances of the indigo cultivators who were forced to grow unprofitable indigo under famine-like conditions when food security and food grain products should have been prioritized. However, the demand for indigo was greatly reduced due to the invention of synthetic indigo by a German chemist around the 1850s.

Cotton:

With the industrialization of textile production in Britain, India was reduced from an exporter of high-quality cotton textiles to an exporter of much cheaper raw cotton to feed British textile manufacturing industries. The British textile industry did not originally favour Indian cotton cultivators

because of their characteristic short fibres, which made them incompatible with the industrial equipment used in Britain. This changed in the 1860s when the American Civil War hampered the export of raw cotton from the American colonies to Britain. Indian cotton was the next good alternative. This prompted a significant expansion in the cotton cultivation area within British India, concentrated in Western India due to its favourable soil type and climate. It led to investments and technological innovations in cotton production in India. However, Indian cotton never reached the quality level of the American colonies mainly because of the unsuccessful attempts at growing foreign varieties of cotton in India, that were not suited to the Indian soil.

Opium:

While the Diwani of Bengal settled the balance of payments with India, Britain was still facing a balance of payment crisis with China which did not want any products from the European market and therefore had to be paid in bullion for the tea and silk that the English were so in love with. The British came up with an immoral solution to this problem by starting the commercial production of opium in India in the 1830s. Opium had long been produced in India as a narcotic as well as medicine in small quantities. But now opium production was imposed on a commercial scale for the purpose of initiating a triangular trade between India, China (Canton), and London that would resolve the balance of payment issue by smuggling low-cost opium into China which would then be exchanged for tea to be sold at high prices in Europe. During this whole process, the Chinese became addicted to opium while Indian opium cultivators became impoverished. The growing of opium poppy was allowed only with the condition of selling it to the government at a fixed price, with harsh consequences for anyone trying to bypass the system. The availability of opium was also attempted to be kept under control in order to keep its price high in the Chinese market.

Other commercial crops like sugarcane, tobacco, and jute were produced in the late 19th and early 20th centuries. These crops also share a similar story of exploitation and extraction. Regional specialization of crop

production based on climatic conditions, soil, etc., was an outcome of the commercial revolution in agriculture. The production of crops like tea and coffee was marked by a different system of large-scale cultivation that came to be known as plantation agriculture, which took commercialization to new heights.

7.5 IMPACT OF COMMERCIALIZATION OF AGRICULTURE

Agriculture has been the backbone of the Indian economy for centuries. The agrarian structure was fundamentally altered by the commercialization of agriculture in colonial India which had both short-term and long-term effects. Commercialization of agriculture is generally associated with corresponding improvements in agricultural technology, organization, and improved incomes. But this did not happen in India. The exploitation of cultivators under this system of cultivation was so acute and calculated that there was no room for profit or incentive for technological innovation for them. Since a small portion of the cultivator's land was allocated for food crop production, he had just enough for sustenance, with no real scope for any improvement in the quality of life. The Indian cultivators also came under debt bondage to the planters through various advances and loans given to them for cultivation that they were unable to repay with their meagre incomes. In some cases, the rural moneylenders benefitted in the process. They gave cash advances to the farmers to cultivate the commercial crops and if the peasants failed to pay back in time, the land of peasants came under the ownership of moneylenders. Thus, the commercialization of agriculture aggravated rural inequality. The most visible impact of the commercialization of agriculture during the colonial years was the impoverishment of the peasantry and the massive drain of wealth from India in the form of agricultural raw materials. Such exploitation at many times, resulted in social unrest like the Indigo Revolt of 1859-60.

Secondly, the Indian farmers became dependent on distant markets for sale. The fortunes of Indian farmers started to be impacted by global market volatility and price changes in a way they had never been previously.

Fluctuations in global demand for commercial goods due to issues like wars were very common, which meant that the farmers now had no guarantee that the crops they were being coerced into producing would find buyers during certain times. Thus, the commercialization of agriculture made the financial conditions of peasants more precarious than before. For instance, the cotton producers received a boost during the 1860s, when American cotton exports declined due to the Civil War. However, once the war was over and cotton exports from the Americas restarted, there was a decline in the demand for cotton from India which negatively impacted Indian cotton producers.

Food security was severely hampered. Under British commercialization of agriculture, India produced more cash crops for export rather than food grains. As a result of the twin effects of the commercialization of agriculture and deindustrialization, the self-sufficient Indian village economy was destroyed. To suit local demands, India had to import more food grains. Although famines had been a recurring feature in Indian history, British India experienced some of the most tragic and large-scale man-made famines in the history of the world with an unprecedented loss of lives. In the long run, the introduction of commercially viable crops, crop specialization, and the integration of the Indian markets into the world markets has proven to be beneficial for India. Still, the exploitative way in which this was done between the 18th, 19th, and 20th centuries is condemnable.



CHECK YOUR PROGRESS

Q 1. What led to shift in cultivation from food crops to cash crops?

.....

Q 2. Name the two main systems of cultivating indigo.

.....

Q 3. Why the American cotton exports declined?

.....

7.6 PLANTATION ECONOMY

The plantation economy emerged as a new economic activity in colonial India and quickly became a crucial aspect of the colonial economy, facilitating the integration of traditional economies into the modern world economy. A plantation economy can be defined as an economic entity engaged in the extensive production of a single cash crop purely for sale in a large contiguous area. The development of the plantation sector in India was closely associated with the growth of the Western market for various products and the improvement in the transportation and communication sectors initiated by the colonial governments to facilitate trade and mobility. Slave labour was not a dominant feature of the plantation economy in India as in most Western colonies. Here, a significant number of unskilled labourers were hired at minimal wages as indentured labourers who signed prior contracts. They were required to work and live under close and strict supervision. Although they were not formally "owned" as slaves, their conditions were not much better. They were often forced to continue working against their will. The primary Plantation Crops in colonial India were tea, coffee, and rubber. Plantations also included trees that provided commercial timber like teak (Tectona Grandis) plantations, that was well adapted to India's hot and humid climate. Open natural forests and grasslands gave way to teak monoculture.

Coffee:

While India is more popular for its tea production, coffee production in India predates tea. Coffee was introduced in the Chikmagluru district of Karnataka in the 1600s by an Indian hermit named Baba Budan who smuggled it out of Yemen. But coffee plantation was seriously undertaken only in the 18th century by British entrepreneurs who turned forests in southern India into commercial coffee plantations, for export to Europe. The India Arabica coffee or Mysore coffee carved a niche for itself in the European market. Today, India is the 6th largest producer of coffee, and the majority of it is produced in South India. The western ghats, where coffee is cultivated under thick tree canopies is highly valued for its unique quality and has

been declared a UNESCO World Heritage site and biodiversity hotspot. Today, the majority of coffee plantations are owned by smallholders. It is popular for its unique shade-grown coffee, - arabica and robusta species.

Tea:

Tea is a native of China and its cultivation and manufacture were a heavily guarded secret for a long time as it earned huge profits for China because of the European dependency on tea. A wild variant of tea was discovered by Robert Bruce in the Brahmaputra Valley of Assam for the first time in 1823. This species of tea was well suited to the Indian climate and grew well. The Cultivation of tea on a commercial scale began in Assam in 1854 as a means to counter the monopoly of China in the tea industry. It was soon followed by tea plantations in Darjeeling and other slopes of the Himalayas around the 1850s. The first Joint Stock Tea Company, called the Assam Company was formed in London.

Tea is made from the young leaves and unopened buds of the tea plants, “Camellia Sinesis.” The provision of cheap land concessions was a major inducer of external investment in the tea industry. It is a labour-intensive industry. As land under tea cultivation expanded, labour shortage emerged as a major source of concern for the European tea planters and manufacturers. Claiming that local peasants were lazy, the British imported indentured labour from central India at cheap rates to solve the labour problem. These migrants were later joined by others who came voluntarily to seek livelihoods. But conditions in the planation were harsh and they were often denied the right to go back home. They were worked hard and were exploited in many ways and not allowed to leave plantations during the contract period. Chinese labourers were also bought as slaves to the tea plantation in Assam, as they were valued for their knowledge and skill about the process of tea production. Both sets of migrant labourers irrevocably changed the landscape of Assam and have emerged as an integral part of the Assamese social fabric. Rights of the contracted indentured labourers were subjected to many abuses like unsanitary living conditions, bare minimum wages, lack of healthcare, physical and emotional abuse, etc.

Many of these issues continue to this day. India remains the largest black tea producer in the world and most of it is grown in northeastern India. After independence, the Indian Government mandated a majority ownership of plantation companies by Indian nationals. Plantation labour acts like the one in 1952 aim at improving the standards of life of plantation workers. Since the 1980s, the Asam Government has eased the entry of smallholders with an average land of around 2 hectares. into the tea industry when large-scale plantation was no longer very profitable. However, the transition is slow due to lack of institutional support.

Rubber:

With industrialization, the demand for rubber in heavy industries like motor vehicles, kitchenware, houseware, and other objects of day-to-day use multiplied. Rubber plantations on a commercial scale began in India in 1902 in the Southern state of Kerala. Rubber which is used to make latex is harvested by controlled wounding (tapping) on the bark of the rubber tree. It grows in a wide range of soil types and climatic conditions. The leakage of rubber milk from the tree bark has given it the name of the crying tree. In North East India, domestication of the rubber (borgos) proved unprofitable and posed complications that forced the government to continue rubber extraction from the naturally occurring forests in this colonial resource frontier. In the last few years, rubber plantation projects have been restarted in Northeast India, with Tripura leading. Only time will tell the efficacy and sustainability of these species. Even today, India is among the top 10 rubber-producing counties in the world, and Kerala is the largest producer in India.



CHECK YOUR PROGRESS

Q 4. Which plantation crop is known as the crying tree?

.....

Q 5. What are the two main variants of coffee in India?

.....

Q 6. Camillia Sinesis refers to which plantation crop?

.....

7.7 AGRO-FORESTRY

The practice of cultivating trees and agricultural crops in intimate combination is called agro-forestry. What has come to be known as agro-forestry in the modern day was practiced by people all over the world until very recently. Trees were an important part of cultivation and supported agriculture in various ways like providing shade. Here, the main aim was food production. But since the end of the 19th century, agro-forestry became popular with colonial foresters as a relatively inexpensive method of establishing forests. The concept of agro-forestry in the 19th century emerged out of the British forest policies in Burma, wherein they developed a form of forestry known as Taungya forestry. Taungya referred to the slash and burn agriculture that was already practised by the Karen tribe in Burma. To this, the colonial officials under Sir Dietrich Brandis added a new dimension by incorporating the planting and growing of teak trees along with cultivation by the Karen tribe itself, thus giving rise to Taungya forestry, which is a form of agro-forestry. The Karens were expected to grow and take care of the teak plants until maturity and in return they were allowed to cultivate land between the rows of the tree seedlings and were permitted to retain their agricultural produce until the forests were fully grown. Such a practise enriched soil nutrients too, but that was not a primary concern of the colonia foresters. Since then, the practice spread across the rest the world, especially in the colonies, with regional variations.

Agro-forestry has a long tradition in India- the socio-religious fabric of the people integrates caring and respecting for trees as a way of life. Also, since ancient times, trees have been integrated extensively in crops and livestock production systems. Within India, agro-forestry was imported from Burma into the Chittagong areas and Bengal in the 1890s. Later, it was adopted in Travancore, the United Provinces and the Central Provinces. Within the official circles, the focus was on the commercial production of trees, and agricultural output was a secondary factor that mainly concerned the local population alone. Little thought was given in the practice of agro-forestry to the farm and its agricultural output. The system was designed

solely for the benefit of the forester, which itself was an office created to ensure the supply of commercially viable crops. In many ways, local farmers and shifting cultivators were exploited to establish their goal of establishing cheap forests. The policy was to eventually remove the cultivators from the forests once they had performed their task of creating the forests, as in the case of Taungya cultivators in Burma. This often led to the alienation of forest dwellers form their land and livelihood and a destruction of their way of life as they were forced to transform into settled cultivators.

Agro-forestry in colonial policy was guided by several misconceptions. Cultivators, particularly shifting cultivators who cleared plots of forests for agriculture through fire were perceived as the main threat to the forests. It was also wrongly believed that it would be beneficial to replace low-yielding natural forests with forest plantation of commercial wood-yielding trees. The importance of different endemic species and floral diversity for a healthy ecosystem and environment was an alien concept for the colonial foresters. Establishment of forests was a lengthy and expensive affair, and therefore investments were scarce. In such a situation, the ruling philosophy was to employ cheap labour in the making of forests by integrating traditional forms of agriculture with tree planting until the forests were created. The peasants and tribals were often coerced or baited into such forms of agro-forestry. This process eventually alienated many tribal communities from their habitats in the forests and its vicinity. The destruction of natural species with commercial species also hampered the utility of the forests for the local communities.

The colonial foresters never envisaged agro-forestry as a system to make any significant contribution to agricultural development or to become a now generally accepted land-management system in its own right, for both farms and forests. In the post-colonial world, the problem of food security in many parts of the developing world, acute rural poverty, the increasing ecological degradation and energy crisis has awakened interest in looking at agro-forestry from a new angle of food and environmental security. It has led to the emergence of social forestry in many parts of the world, including India, wherein many elements of agro-forestry are retained but it

is designed to assist the peasant and the ordinary farmer to increase food production and conserve the environment as much as it helps the traditional forest service to grow tees and produce wood. Social Forestry promotes multi-purpose land use, involving local communities in forest management. In the post-independence period, social forestry has been given importance in India and will be discussed in a later unit.

Initiatives are being taken to promote sustainable agro-forestry by governments, farmers, and NGOs to develop appropriate agroforestry systems but it is yet to reach its full potential. Fruit trees, industry-specific trees, etc are being produced along with traditional farming through this method. In areas that still practice shifting cultivation like parts of northeast India, the burnt fallow lands are planted with trees and legumes so that the soil may enrich fertility faster. Agroforestry holds significant potential in the Indian subcontinent to address present and future needs for fuelwood, food, fodder, and environmental protection. However, its success depends on developing location-specific systems suited to the local climatic conditions and robust support structures. With population growth outpacing resource availability, ecosystems are degrading rapidly. Proactive policy-making developed in cooperation with various stakeholders can help in contributing towards restoring a healthy environment.



CHECK YOUR PROGRESS

Q 7. What is Agro Forestry?

.....

Q 8. State true or false 'Colonial foresters were knowledgeable about the importance of endemic species.'

.....

Q 9. What are endemic species?

.....



7.8 LET US SUM UP

After going through this unit, you have learnt that-

- The commercialization of agriculture in colonial India was a transformative process driven by imperial agendas, leaving indelible marks on the Indian agrarian society and environment.
- The plantation economy in colonial India facilitated the integration of traditional economies into the modern world economy. This integration was to meet the colonial demands with local labour.
- Agro-forestry, originating from colonial policies, combines tree cultivation with farming. Despite initial drawbacks, it holds promise for sustainable agriculture, food security, and environmental conservation, needing tailored approaches for success.
- Despite its complex legacy, in the form of rural inequality, impoverishment of peasantry and hampering food security, the commercialization of agriculture laid the groundwork for India's integration into the global economy, shaping its economic trajectory for centuries to come.
- The enduring impacts of colonial exploitation underscore the need for equitable and sustainable agricultural practices in the present day.



7.9 FURTHER READINGS

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7.10 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: Commercialization of Agriculture.

Answer to Q 2: Nij and Ryoti systems.

Answer to Q 3: Due to the Civil War in America.

Answer to Q 4: Rubber.

Answer to Q 5: Arabica and Robusta.

Answer to Q 6: Tea.

Answer to Q 7: The practice of cultivating trees and agricultural crops in intimate combination is called agro-forestry.

Answer to Q 8: False.

Answer to Q 9: Endemic species are those species found exclusively in a specific geographic area, making them unique to that region.



7.11 MODEL QUESTIONS

A) Very Short Questions (answer each of the question within 50 words)

Q 1: Name any three commercial crops cultivated in colonial India.

Q 2: Where and when was commercial indigo cultivation first started in India?

Q 3: Name a commercial crop that was widely cultivated in Western India.

Q 4: Which Burmese tribe traditionally followed the Taungya system of cultivation?

B) Short Questions (answer each of the question within 150 words)

Q 1: What is meant by the Commercialization of Agriculture?

Q 2: What is the link between the commercialization of agriculture and food security in India?

Q 3: In what ways did colonial misconceptions about agro-forestry impact local communities and ecosystems?

Q 4: Discuss the plight of indentured labourers in the tea gardens of colonial Assam.

C) Long Questions (answer each of the question within 300-450 words)

Q 1. Discuss the inter-relationship between commercial agriculture in colonial India and British Industrialization.

Q 2. What were the motives behind the commercial production of opium in colonial India?

Q 3. Discuss the negative impacts of the commercialization of agriculture in colonial India.

Q 4. Discuss the historical background of agro-forestry and how has its purpose evolved.

*** ***** ***

UNIT 8: MAN AND THE ANIMAL WORLD

UNIT STRUCTURE

8.1 Learning Objectives

8.2 Introduction

8.3 Hunting for subsistence to Hunting for pleasure.

8.4 Domestication and economic uses of animals

8.5 Games Reserve

8.6 Wildlife Protection

8.7 Let us sum up

8.8 Further Readings

8.9 Answers to Check Your Progress

8.10 Model Questions

8.1 LEARNING OBJECTIVES

After going through this unit, you will be able to -

- Explain how hunting developed from a subsistence activity into a 'sport' associated with leisure and power,
- Discuss the domestication of animals and its varied economic uses across different periods in history,
- Describe the emergence of hunting reserves in colonial India.
- Discuss the wildlife conservation policies undertaken in colonial and post-colonial India.

8.2 INTRODUCTION

Dear Learner, In the previous Unit we discussed the commercialisation of agriculture and its consequences. The Unit also discussed the plantation economy the emerged in colonial India as much as agro-forestry.

In this Unit, we shall discuss how the connection between history and wildlife is not apparent at first glance. A careful observation reveals valuable insights into the human-nature relationship, as it has evolved since the beginning of time. These insights are invaluable for policy framing in terms of ecological conservation in the present times. The medium of human-animal interaction has evolved: from spears and arrows in ancient and

medieval times, to guns in pre-modern and modern times, and finally to binoculars and cameras in the present day. This unit seeks to understand the various underlying developments that brought about these changes.

8.3 HUNTING FOR SUBSISTENCE TO HUNTING FOR PLEASURE

Hunting is as old as mankind and was a necessary part of human survival. Originally pursued for subsistence, hunting transformed into a leisure activity associated with the pursuit of pleasure and display of power over time.

During the Stone Age, which comprises the longest period in human history, hunting and gathering formed the primary subsistence strategies. Man depended on hunting to procure essential requirements for their survival including meat for food and hide for clothing and shelter. Hunting made it possible for early humans to sustain themselves in their harsh and unforgiving habitats teeming with predators and all kinds of dangers. Analysis of stone tools by archaeologists has revealed important linkages between subsistence strategies and stone tool technologies used for hunting. Tool making for hunting is also related to the evolution of the human brain. Around 2 million years ago, the Palaeolithic man developed basic core tools like hand axes and choppers, mostly used for cutting purposes. They mostly hunted mid-sized bovids like antelope, sheep, and buffaloes, which required considerable time and effort. By the Mesolithic Age, refinement in tool technology gave way to smaller, more diverse tools like arrows, blades, burins, harpoons, and spears called microliths, which were prepared using the flake technique. Microliths allowed man to hunt swift-moving smaller animals like deer, birds, and other small mammals because of their precision and efficiency. Mesolithic tools have been found in India from sites like Bhimbetka in Madhya Pradesh along with rock paintings depicting the hunting of animals like buffaloes, rhinos, bears, tigers, and elephants. With the coming of the Neolithic revolution around 10,000 BCE (7000 BCE for India), agriculture became the primary subsistence method and man's relationship with animals entered a new phase with the domestication of animals. But man's

tryst with hunting was far from over. In the Indus Valley Civilizations, the mainstay of the economy – agriculture, was supplemented by hunting. The evidence of bone fragments of animals like gazelle, buffalo, nilgai, deer, wild pig, jackal, etc. with cut marks on them from the Harappan site of Shikarpur in Gujarat attests to the prevalence of hunting in the Indus Valley Civilization. Harappan seals also frequently depict many wild animals like the tiger, the rhinoceros, and the elephant.

Gradually as man's mastery over nature progressed, the nature of man's relationship with his natural environment and the other species inhabiting it also began to change. The importance of hunting as a subsistence activity declined slightly during the Vedic period. Now, hunting expeditions emerged as a marker of power, prestige, and martial skills associated with the aristocracy or the Kshatriya caste within the Varnashrama system that emerged around this time. Young princes were trained in hunting or *mrigaya* in the Gurukuls as part of learning the art of warfare. As members of the warrior class, they were expected to demonstrate their physical strength by taking down dangerous creatures like lions and tigers. Some animals were seen as threatening and disturbing the lives of forest-dwelling sages and thus killing them became a matter of honour. The Hindu Epics like Ramayana and Mahabharata are replete with references to the hunting of animals, deer in particular, like the incident of Dasharatha accidentally killing Shravan Kumar while on the hunt for a deer, or the Pandavas getting killed in the poisoned lake when on the search for a deer, being saved only by Yudhishthira answering the Yaksha's questions correctly. Gradually, the subcontinent with its abundance of flora and fauna developed a culture of hunting or *shikar*. While hunting remained a source of subsistence, livelihood, and survival for the lower levels of society, it became of marker of martial power and masculinity for the upper echelons of society. Moreover, hunting does not necessarily mean killing the animal. Large animals like elephants were captured for use in warfare by ruling dynasties like the Mauryans. With the beginning of state formation, hunting as a source of martial power became an important part of the imagination of kingship and a prerogative of the ruling elite.

In the medieval period, with the emergence of the Delhi Sultanate and the Mughal Empire, hunting acquired a new dimension of being regarded as a warlike sport. The attachment of power and political authority to the open display of one's martial prowess through hunts intensified. The hunt of large animals of ferocious nature like lions and tigers was popularized as 'big games' and was hunted using trained dogs, bloodhounds, etc. Many nobles had their private hunting reserves where periodic hunts were organized, with festivity and fanfare. Large-scale organized hunts also served as rehearsals for battle. Hunting as a pursuit of pleasure was prevalent not just among the Muslim ruling elites but also among the Hindu kings and nobility like the Rajputs. Persian literary sources, particularly autobiographies of powerful rulers like Firuz Shah Tughlaq, Balban, etc reveal their intense longing for and fascination with the chase for big games. Mughal paintings are replete with hunting scenes.as for many dynasties, killing was a passage to adulthood, specially manhood.

With the coming of the British, hunting big game once again came to be associated with administrative authority. Hunting also became established as a recreational sport in the late 18th and early 19th centuries. According to Mandala, "Hunting celebrated the martial prowess of colonial men boosting the hyper-masculine image of empire back home." He dismisses the view of colonial hunting in India merely as a leisure activity unconnected with the rule of the empire. He argues that hunting provided routine inspiration and valuable distraction to the workers of the empire. As always, the colonial officials wanted to set themselves apart from the Indian nobility even within the sphere of hunting. They wanted to showcase their hunting methods and practices as more sophisticated and 'proper' than the Indian hunting traditions. Their access to more technologically advanced firearms provided them with an edge over Indians to legitimize their position while relegating Indian hunters to the sidelines. They developed elaborate rules and regulations for the sport of hunting big game, with entourages of Indian servants waiting on a few white men out on the hunt. Entry into colonial hunts became sought after and the British systematically regulated the entry of Indians into these hunt parties.



LET US KNOW

In Northeast India where hunting remained a subsistence activity well into the 20th century, hunting methods practiced by these societies are considered sustainable and environment-conscious by environmentalists today because of their inherent reverence, fear, and respect towards nature.



CHECK YOUR PROGRESS

Q 1. What did hunting signify for the elites?

Q 2. Young princes were trained in _____or the art of hunting in the Gurukuls in the ancient period.

Q 3. The primary subsistence activities in the pre-historic age were _____ and _____.

8.4 DOMESTICATION AND ECONOMIC USES OF ANIMALS

The domestication of animals began towards the end of the Mesolithic age and was perfected by the Neolithic Revolution. Domestication refers to the process by which wild animals are selectively bred, controlled, and adapted over generations by humans for various purposes such as food, labour, companionship, and trade. Domestication has played a key role in human civilization by providing various services and resources. Records of animal domestication in pre-historic times are available to us through rock paintings and archaeological excavations. Domesticated animals served not just economic/military functions but also had various religious and cultural significance. Seals found from the Indus Valley Civilization were decorated with bulls, goats, sheep, elephants, etc. Vedic people reared horses, dogs, sheep, goats, sheep, cow etc. Various ancient texts like the Charak Samhita, and Hastayurveda that deal with the well-being of domesticated animals throw light on their importance in India over the ages.

Animals serve a multitude of economic purposes spanning various sectors like agriculture, textiles, tourism, pharmaceuticals, etc. From ploughing fields to transporting goods on their backs and pulling carts, bullocks and other draught animals play a crucial role in traditional agricultural societies. Livestock farming or animal husbandry like dairy and poultry has contributed significantly to India's economy in modern times. Besides, meeting the demand for milk, meat, and other animal products, these industries in the present day generate employment. Animals like sheep are used in the production of woollen textiles such as shawls, carpets, etc. Silkworms were reared in many households across India for the production of silk. Hides of animals like buffalo, cattle, goats make India one of the world's largest producers of leather and leather goods such as shoes, bags, and garments, and contributes significantly to India's exports. Also, animal-driven ingredients are used for the preparation of both traditional and modern-day medicines. In recent times, the varied economic uses of animals have been marred in controversies over ethical principles of animal usage.

Apart from these traditional uses of animals, animals serve newer economic functions like Wildlife tourism. The National Parks and Wildlife Sanctuaries across India attract large numbers of national and international tourists throughout the year, generating revenue for the government. Wildlife tourism also provides impetus for the growth of other allied economic activities like hospitality in its vicinity. However, making wildlife tourism sustainable and environment friendly to ensure that no further harm is done to the fragile ecosystems in which they live, remains a challenge.



CHECK YOUR PROGRESS

Q 3: How do wild animals contribute to the economy?

.....

Q 4: Wildlife tourism should be ……..…. and ……..……

.....

8.5 GAMES RESERVE

Hunting reserves for the ruling classes were a pre-colonial feature in India but the colonial regulations controlling hunting in the colonial period were much more intensive than in the past. However, these restrictions were selective and applied to certain sections of the population and were not applicable to certain other sections. Post-1857, there was a fear about the dwindling number of flora and fauna. This concern was mostly driven by the concern of animal usage and availability for hunting rather than by environmental consciousness.

Vast tracts of woodlands, jungles, and hills were brought under the direct control of the colonial government with the enactment of the 1878 Forest Act that prohibited locals from hunting or procuring forest produce from these 'reserved areas.' Tribal populations, from whom these lands were unduly acquired, are now being held responsible for the depletion of forest covers due to forest fires resulting from jhum cultivation and overgrazing. The primary motive for creating reserves had less to do with fauna and more to do with the floral resources of the forest. Timber became particularly important around this time with the construction of railways having begun in 1853. Timber was also required in the coal mines. Other minor forest products like rubber, resin, etc also acquired huge commercial significance around this time. Restrictions on entry into reserves game forests affected the lives of gatherers who depended on the forest for fuel, herbs for medicine, grass for fodder bamboo for baskets, fallen branches for firewood, etc.

Graduable lly, the Forest Rules laid down 'bag limits' for sport hunters in these reserves, especially in relation to herbivores and game birds. Breeding seasons were a closed time for sport hunters. But it is to be noted that the game rules exempted license holders, mostly Britishers from these restrictions. All these measures were not taken in the interest of protecting nature. They were intended to ensure a steady supply of commercially valuable forest products and animals to hunt. Those tribals and cultivators who killed herbivores for meat and skin for personal use or

small trade quietly evaded the law because they depended on it for survival. Also, the hunting of big animals like tigers was not regulated initially. Organized large hunts for big animals continued to remain under the rubric of 'sport.' In fact, Sport hunting – a British activity received a great fillip from state control over the forest. The issue of big game came to the forefront only in the 1880s, since wild animals, until then were not a very highly valued commodity. Attention was paid to the preservation of big-game species to permit the continuation of hunting privileges to the elite section of society through the demarcation of 'game reserves.' Open access to hunting grounds was granted only to white members and hill tribals, earlier admired for their skilful hunting were now seen as insensitive killers. Native hunters were branded 'butchers' who killed for profit while the white sport hunter gave his kill a clean and quick death. The number of animals that could be shot by the members within these reserves was regulated. Thus, 'wildlife was being transformed from an open access resource whose use was very loosely regulated by the landed classes, into an exclusive privilege of the ruling race.' The few Indians that were allowed access were from the landed classes or royal families. Around this time, trade in wild animals became widespread as they acquired value as status symbols. As more and more laws began regulating hunting, 'poaching' or illegal hunting for trade rose significantly, through native-foreigner nexuses that continued well into post-independent India, despite much stricter regulations.

Within the colonial narrative of big-game hunting, the image of the wild animals was constructed as 'savage and ferocious,' both to enhance the excitement of the hunt as well as to justify the brutal act of killing. For many British males, joining the imperial services meant enjoying privileges like hunting big game and participating in 'bloody sports' that they were denied back home. The Indian princely rulers also had a dominating presence in the hunting scene in colonial India. Having accepted British paramountcy, they were disallowed from taking up arms in war, except for in service of the Raj. Therefore, they used their time and 'masculine' urge to engage in the use of arms through the hunt. The forests of the princely states became the paradise of colonial officials when the large animals

dwindled in the British-administered territories. It also allowed the princely rulers to mingle and establish close relations with the high officials of the Raj. Mahesh Rangarajan opines that the princely rulers were not very different from their colonial masters as far as the indiscriminate hunting of wild and rare animals was concerned, often mindlessly destroying the habitats and livelihoods of their outlying subjects. Gayatri Devi, the princess of Cooch Behar who later married the ruler of Jaipur was renowned for her hunting prowess.

Thus, hunting in colonial India developed into a sport to secure trophies and secure record-breaking kills in well-demarcated 'game reserves' preserved for the very purpose. Certain areas were now declared out of bounds for commoners, if not for grazing, at least for hunting as they were being set apart for the rulers and the privileged few. At the same time, common people, especially tribals were expected to take part in the great drives or chase for large games at great risk to their lives, while the big game hunters sat on a safe raised platform or elephant back at a comfortable distance.

An analysis of Colonial Forest Regulations vis a vis their mammoth hunting expeditions reveals the double-faced nature of colonialism. While the accessibility of forest resources to indigenous forest-dwelling communities across India was restricted through the legislation of various forest laws like the Indian Forest Act of 1865 which declared certain forests as 'Reserve Forests' to be eventually exploited for commercial production of timber; hunting of big game to the point of extinction by colonial officials continued unabated across the forests of India. Although hunting is as old as mankind, for the first time under British colonialism, unsustainable hunting methods drove hundreds of species to extinction. The memoirs of British officials reveal the complex relationship between wild animals, the local populace, and British officials. British officials saw their ability to kill dangerous animals as a source of earning the respect of the natives by freeing them from the atrocities of the 'dangerous' animals. Thus, hunting was also a means of establishing their cultural imperialism over the people of India.

The image of the white sahib, holding a gun beside the remains of a tiger, emerged as an influential and long-lasting symbol of the empire, evoking admiration from observers. Particularly, the elimination of man-eating beasts that threatened humans solidified the perception of imperial hunters as paternalistic protectors of indigenous communities troubled by 'dangerous' animals.



CHECK YOUR PROGRESS

Q 5: 'The Princely rulers in colonial India did not partake in big game hunts.' True or False?

.....

Q 6: The enactment of the 1878 Forest Act …….…… impacted local populations and their access to forest resources in colonial India.

.....

.....

8.6 WILDLIFE PROTECTION

The colonial government in India adopted a utilitarian approach to wildlife conservation. According to VR Mandala, the rise of conservation ethics among colonial officials in India manifested itself at two levels. First, after 1857, greater attention was paid to the preservation of big-game species to permit the continuation of hunting privileges to the elite section of society through the demarcation of 'game reserves.' There was a change in attitude towards the hunting of many animals and birds killed for meat and skin as well, as these species became scarce. Open access to hunting grounds was granted only to white members as already discussed. Post-1857, the British were concerned about the imminent extinction of the elephants since it was an integral element of the army, and elephant breeding was too time-consuming and expensive. Before this, elephants too were subjected to the same fate that continued for big cats like tigers and leopards until independence. Thus, the elephant became one of the earliest animal species whose conservation was directed by law. Elephants could still be shot if

they were within private premises or were a threat to life and property but it required special permission from the government.

Second, it was only in the early twentieth century that there was a cultural shift in attitude among some colonial officials that placed wildlife conservation at the forefront. Colonial officials like Jim Corbett and RG Burton openly critiqued the earlier policy of 'vermin eradication' that led to the indiscriminate slaughter of Indian fauna both by European and native hunters in the forests of India. Towards the 1930s and 40s, some enlightened princely rulers also guarded rare species against extinction and promoted their scientific study. Ironically, their ancestors were the ones responsible for the endangered status of many of the species that they were protecting. Royal hunts continued but a new sense of awareness developed about the dangers of extinction. Also, an intended positive outcome of the gaming reserves was that it prevented those lands from being cleared for commercial cultivation and timber extraction, resulting in the preservation of the forests in their natural state. However, the faunal life had dwindled in large numbers. One such gaming reserve was the Gir Forest in Gujarat which survived to become a national park in post-independence India because of the protection it received from the Nawab of Junagarh in colonial times.

Conservancy and conservation were first used to describe a set of scientific forestry practices that would enhance forest cover. But as key game birds and animals became scarce, 'game laws' also came to be enacted. Small steps like limiting the size of the Sports hunter's bag as discussed above and declaring certain species like elephants as completely off the list of wild game were taken. Protection was rarely given to any other predatory animals. The wild animals in reserved forests were mainly perceived as game but certain steps began to be taken to protect the dwindling species as awareness was created by the near extinction of certain animals like bison in other parts of the world. Gradually, protecting such species in danger of extinction came to be viewed as a mark of civilized conduct.

The great Indian one-horned rhinoceros was one of the first species to benefit from this attitude change towards wild animals. In 1908, a large tract of grassland was set aside in the Brahmaputra valley as a rhino preserve, where tigers, stags, etc could still be shot but rhinos were off-limits. This eventually became today's Kaziranga National Park. The absence of market-worthy timber in the region because of the annual flooding there, is said to have contributed to the sustenance of a wildlife refuge in the region. European tea planters on its borders resisted the expansion of the reserve as it curtailed their hunts but were unsuccessful. As the rhino, highly valued for its horn received special status in the conservation list, so it did in the target list of poachers. Within Assam, other regions like Manas were transformed from gaming reserves to wildlife sanctuaries. Thus, the Raj now began to refashion themselves as the protector of endangered wildlife, excluding forest inhabitants and natives from the process of conservation.

Unprecedented hunting in colonial India drove many wild faunal species like the Royal Bengal Tiger to the brink of extinction. Around the time of India's independence, the global movement for faunal conservation had intensified, and Indian political leaders like Jawaharlal Nehru displayed a personal interest in protecting the country's natural heritage for future generations. Initiatives like Wildlife Weeks were introduced but had limited impact. Within certain states like Assam, earlier 'game provinces' were renamed as 'wildlife sanctuaries,' highlighting the shift from hunting for trophies or meat to conservation, at least within the official circles. Change in public attitude towards hunting was more gradual and required the effective implementation of law and order. A landmark development in the protection of wild fauna was the Wildlife Protection Act of 1972 which aimed at safeguarding the country's rich biodiversity and protecting endangered species from exploitation and extinction. The Act prevented the hunting, poaching, and trade of certain species of animals based on their conservation status. It illegalized the sale, purchase, and possession of wildlife products such as ivory or rhino horns to conserve the country's wildlife. The Act also empowered the government to declare certain areas as Natural Parks, Wildlife Sanctuaries, and Reserves for the conservation of wildlife and their

habitats. Conflicting rules and regulations, such as those pertaining to land use and development, made it difficult to put its provisions into practice. In addition, several flagship species like the tiger, the greater one-horned rhino, etc, and their habitats, selected for their cultural significance or ecological vulnerability were specially targeted for conservation. Project Tiger, launched in 1973 was one of the first such species targeted for conservation and recovery due to the alarming decline in its population. So far, Project Tiger remains a highly successful endeavor that has inspired similar projects in India and abroad.



8.7 LET US SUM UP

After going through this unit, you have learnt:

- The human-nature relationship has evolved, from a subsistence activity to a leisure pursuit associated with power and prestige.
- With domestication, animals began to serve a multitude of economic services. In recent years, even wild animals have contributed to the economy through wildlife tourism.
- Colonialism transformed hunting into a sport with the formation of 'game reserves.' Hunting was associated with administrative authority and imperialism.
- Conservation efforts in India commenced after 1857, yet the motives behind conservation differed significantly before and after 1947.



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8.9 ANSWERS TO CHECK YOUR PROGRESS

Answer No 1: It signified power and masculinity

Answer No 2: Mrigaya

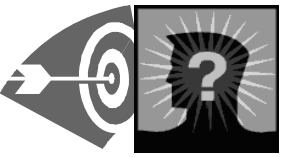
Answer No 3: Hunting and Gathering

Answer No 4: By generating revenue through wildlife tourism.

Answer No 5: Sustainable and Eco-friendly

Answer No 6: False

Answer No 7: Negatively



8.10 MODEL QUESTIONS

A) Very Short Questions (answer each question within 50 words)

Q 1: When was the Wildlife Protection Act passed in India?

Q 2: Name a Harappan site that gives evidence of hunting in the Indus Valley Civilization.

Q 3: Who were some notable colonial officials who played a role in shifting attitudes towards wildlife conservation in India during the early 20th century?

Q 4: Name two flagship species targeted for conservation efforts in post-independence India.

B) Short Questions (answer each question within 150 words)

Q 1: What is meant by the double-faced nature of British Colonial Forest policies?

Q 2: Explain the relationship between hunting and human evolution.

Q 3: How did princely rulers in colonial India contribute to wildlife conservation efforts, despite their historical involvement in activities leading to species endangerment?

Q 4: What were the primary motivations behind the preservation of big-game species post-1857?

C) Long Questions (answer each question within 300-500 words)

Q 1: Explain how hunting evolved from being a subsistence activity to a leisure pursuit over time.

Q 2: Discuss how hunting became a symbol of masculinity, power, and prestige in India.

Q 3: Discuss the colonial forest policies in India.

Q 4: How do animals contribute to India's economy across various sectors like agriculture, textiles, and tourism?

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UNIT 9: WATER AND ITS USES

UNIT STRUCTURE

9.1 Learning Objectives

9.2 Introduction

9.3 Irrigation System

- Bunds and Tanks
- Aquifiers

9.4 Hydrological Technology of Mughal India

9.5 Water and its uses in colonial India

9.6 Let Us Sum Up

9.7 Further Readings

9.8 Answers to Check Your Progress

9.9 Model Questions

9.1 LEARNING OBJECTIVES

After going through this Unit, you will be able to-

- Explain the use of Water as a natural resource in irrigation system,
- Discuss the technologies developed to harvest water,
- Discuss the use of Water in colonial times.

9.2 INTRODUCTION

Dear Learner, in the previous Unit, we discussed the medium of human-animal interaction which has evolved from spears and arrows in ancient and medieval times, to guns in pre-modern and modern times.

In this Unit, we will discuss use of water in the pre-colonial and post-colonial times along with the technologies adopted to harvest water.

9.3 IRRIGATION SYSTEM- BUNDS AND TANKS, AQUIFIERS

Irrigation is the artificial application of water to agricultural lands for the purpose of crop cultivation. It is essential to supplementing natural precipitation, decreasing the negative effects of drought conditions, and promoting higher crop productivity. The practice of irrigation is of paramount

importance in regions characterized by limited or erratic rainfall patterns, where reliance solely on precipitation would render agricultural activities highly precarious. By providing a controlled and reliable supply of water to crops, irrigation serves both a protective and a productive function within the crop growth cycle.

Comprehensive systems of irrigation were developed during the Mughal era by utilising traditional methods and ancestors' knowledge. The Mughal kings ordered the development of intricate canal networks and hydraulic constructions because they understood how important water management was. Significantly, the Grand Trunk Road made it easier for rivers to link by using regulators and sluices, which improved the distribution of water. The 17th-century hydraulic engineering marvel Barapullah is proof of the Mughals' ability to effectively utilise water resources for the prosperous agriculture of the Indian subcontinent. These miracles of irrigation highlighted the critical role that water control plays in promoting social progress.

One of the major contributions of Islamic rule in India was that during Islamic rule, the North-West Frontier Province was transformed from an arid region into a region, where land was brought under the plough. So, numerous crops and vegetables and fruits were grown in this particular area through the use of extensive and elaborate water management techniques by thn ndnwnorkmethods laid the groue Islamic rulers. Irfan Habib argues that durinnng this period there was an agrarian revolution in India during the Mughal times and also during the pre-Mughal period. Pre-Islamic practices seemed to be highly inadequate to meet the new agricultural based new agricultural productivity.

India's irrigation was derived from tapping underground water through wells. The Arthashastra mentions that manual water lifting device (hand pulled water bucket drawn out of well) was expensive as compared to those moved by shoulders (noria an earlier form of *araghata* or wheels with pots tied to its spokes). The discovery of pear-shaped pots at Taxila during the Muran period speaks volumes. Similary, the Arthshastra mentions 'water-based share' (*udakabhaga*) of produce as tax. The Junagad Inscription

through its description suggests the irrigation wobe rks wntioith canals led out of dammed tanks through sluices were constructed by state officials in Mauryan times. The Cholas paid attention to irrigation. The river Kaveri and other rivers were used for the purpose. Tanks for irrigation were built. These traditional irrigation methods laid the groundwork for future advancements.

But it is to be mentioned here that long before the Mughal dynasty, ancient civilizations in India had already devised effective irrigation techniques to harness water for agricultural purposes. These techniques were based on the knowledge and understanding of natural water sources such as rivers, lakes, and rainfall patterns. One such technique was the use of canals to divert water from rivers to fields, enabling regular irrigation and increased crop production. Additionally, farmers in ancient India also constructed small reservoirs and dams to collect rainwater and ensure a steady supply throughout the year.

In the mdieval period, Iltutmish was one of the first rulers who could build very large-scale water reserves. He was the first Delhi Sultan to construct a water reservoir, 'Hauz-i-Samshi', which was about 2 miles long and a mile wide. Such a large lake was built under his rule. These reserves and lakes were needed to provide the drinking water acilities for the people of Delhi and also for irrigation purpose. They also served the purpose of rainwater storage or rainwater harvesting. Alauddin Khalji is also said to have built the famous Hauz-i-Khas - also known as Hauz-i-Alai. During his reign, this particular reservoir is a large square tank 600 meters long and 70 acres wide. Ali Yazdi in his account Zafarnama makes reference to Dariyacha or small sea which was filled with water during the rainy season and caters to the water supply needs of the people of Delhi throughout the year. He refers to Hauz-i-Khas as a small sea.

Ghiyasuddin Tughlaq while planning Tughlaqabad, planned to build tanks for storing rainwater. He planned to build numerous wells to ensure water supply to this new city, Tughlaqabad. From the archaeological excavations we can see that six of these numerous wells were unearthed. It is mentioned in Izami's Futuh-us-Salatin that the king ordered a tank to be

dug under the lofty citadel. Every moment that tank seemed to be surrounded by waves.

It was the outbreak of a major famine that forced Muhammad bin Tughlaq to shift the capital from Delhi to Daulatabad. It became very important for him to think about how to deal with this famine. He gave advance loans to farmers for digging wells and bunds. Although all his experiments were not very successful, but these records or sources show that he was quite sympathetic towards the peasants and tried to help them. Feroze Shah Tughlaq took measures for water conservation and water use strategies. Lakes aqueducts, reservoirs and irrigation canals were constructed during his reign. The Rajabavah Canal and the Ulughkhani Canal were the major ones. It ensured water supply to Firoz Nagar in Hisar. Hisar Firoza was built under Firoz Shah Tughlaq in 1335. The major canal was the Firozabad Canal which is mentioned in Major Colvin's report. In addition to canals, the reign of Firoz Shah is also credited with the construction of large tanks. Some of the famous large tanks constructed during his rule were as follows: Haudi Tughlaq Shah, Haudi-i Qutlug Khan, Haudi-i Shahzada Fath Khan. The reference to sluice gates is important as the main purpose of building sluice gates in these dams was to control saline water. So, sluice gates were constructed for the specific purpose of controlling the brackish water in the dam.

The Mughal era witnessed significant advancements in irrigation systems, thanks to the vision and expertise of Mughal emperors and their engineers. The Mughals recognized the importance of agriculture in sustaining their empire and invested heavily in improving irrigation infrastructure. Some epigraphic sources mention water reservoir bunds and bandharas of this period. Abul Fazal mentions in Ain-e-Akbari that most of the areas of Lahore province were cultivated with the help of well irrigation. Also, an important thing to remember that they implemented well irrigation or water reservoirs according to the specifics needs of that geographical location.

The Mughals not only dug canals, but also highly maintained and repaired the existing canals. Rajabwah which was dug during the time of

Firoz Shah Tughlaq and used to bring water from the Yamuna River was made re-activate during the time of Akbar and was renamed Shaikhu-ni (Akbar use to call his son Jahangir as Shaiku Baba). An official Mir-i-Ab was appointed as canal superintendent. This reveals the importance that was given for irrigation.

In the time of Shahjahan, a particular canal was excavated Nahir-i-Birhist or Nahir-i-Faiz. Susan Gold in her work offers details on the different panels and alignments of this particular canal. Colvin mentions, that it enters the city and passes through an open channel. Abha Khan makes reference to Shaha Jahan's western Yamuna canal as a considerable feat of engineering. Apart from large canals small canals were also excavated in various parts of Mughal empire. Five small canals in Upper Bari Doab region, the famous Shahnahr in Punjab, small canals cut from the Tavi to irrigate Ali Mardan's garden, at Sodhra near Wazirabad Multan it was also criss-cross by canals are splendid examples.

Inundation canals and well irrigation were prominent features during the role of Aurangzeb. The water works were carried out not only by their Mughal rulers, but also by their provincial ministers. Mir Abra was the provincial minister who excavated the canal in North Sind. Darya Khan also tried to store devices in the delta region. Apart from that Hardiman mentions small scale dams, or Bandharas in the Sahyadri regions that is the Western Ghats. He states how effective their role was in terms of waters storage. The irrigation system not only increase in agricultural productivity, but also varieties of crops. The outcome was multiplicity of crops. This multiplicity is very important, this is very important to understand.

The Mughal irrigation systems were characterized by their scale and engineering brilliance. They constructed an extensive network of canals, known as "nahr," to efficiently distribute water to farmlands. The Bibi-ka-maqbara at Aurangabad, built for Dilras Banu Begum, wife of Aurangazeb, featured an impressive water management system. Hati Haud is a massive water tank located in the complex's southeast corner. It is thought that elephants filled it by lifting water from the source. The water channels run

along the enclosure walls of the Hati Haud, and the water is distributed throughout the complex via terracota pipes. Similar water tanks can be located on both the eastern and western sides. Interestingly, an underground water canal called as “Thatte Nahar” was built from Harsul Tank to Begumpura, Aurangabad. The canals built during this period were grand in design, often spanning several kilometers and connecting major rivers to agricultural regions. These canals were lined with stone or brick to prevent erosion and seepage, allowing for efficient water distribution.

One prominent example of the Mughals’ dedication to irrigation is the construction of water tanks, also known as ‘talaabs’ or ‘talais.’ These tanks were built strategically across the empire to store rainwater and provide a reliable water source for irrigation. The construction process involved excavating large basins and lining them with impermeable materials such as clay or stone slabs. The tanks were often accompanied by intricate systems of channels and sluices to regulate the water flow. These water tanks not only served as reservoirs but also became important social and cultural centers. They provided a place for communities to gather, bathe, and engage in recreational activities. The construction of water tanks exemplifies the Mughals’ holistic approach to irrigation, considering not only the practical needs but also the social and cultural aspects of water management.

The Mughals also constructed numerous stepwells, known as ‘baolis,’ which served as reservoirs for storing water during dry seasons. These stepwells were not only functional but also architectural marvels, showcasing the Mughals’ appreciation for beauty and utility.



CHECK YOUR PROGRESS

Q 1. What is ‘Hauz-i-Samshi’?

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.....

Q 2. What was the purpose of Baolis?

.....

.....

Q 3. Name the author of Futuh-us-Salatin.

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.....

9.4 HYDROLOGICAL TECHNOLOGY OF MUGHAL INDIA

The provision of water for irrigation, drinking, domestic, and industrial, and agricultural purposes has always been an important consideration in Muslim lands. The areas conquered by the Muslims were largely dry. The need for technology was apparent.

Many water technologies were used at that time. Among them, 'Noria' is a machine, which is activated by water power, it uses the energy derived from the flow of a river. Another similar water lifting device is called a 'Saqiya.' These two devices are not identical, but they look very similar and sometimes they have similar features. Still, there are some fundamental differences between Noria and Saqiya that we need to be aware of. A fundamental difference is that Saqiya; It is always used in wells, but noria it is used in rivers. So, it draws energy from the flow of a river. Nevertheless, Muslim engineers played a fundamental role in making Noria more effective or improvising it. Saqiya is still used in some parts of Punjab and Pakistan.

Another device is the 'Arraghatta.' Kalhana refers to the use of Araghatta in Kashmir. He says that Lalitaditya in the 800 A.D. set Araghattas on the Jhelam (Vitasta) river to distribute the raised water among villages. In his (Kalhans) own time a minister's wife also set up such water wheels. The Panchatantra does not use the word Saqiya, it uses the word Araghatta. Ara- It means a miniature wheel or spoked wheel; and pot means vessel. This device works in the same way. However, it is also argued that historians of technology, Islamic engineers, also forced improvisation, basically they added the whole thing to Noria. Noria as always driven by water; But Saqiya it is primarily animal driven. Through the use of Saqiyia, we see the use of camels to lift water from wells. So, the animal will turn a horizontal wheel, which is connected to the vertical wheel, and the entire device will work in that particular way.

Another special technology is 'Qanat' This technology is also a rotating device of wood and bamboo connected to each other which was used to pour water from the well into the fields with the help of several buckets with the help of a donkey or ox. This technology is still traditional in North Punjab.

Another, considerably more significant contribution was the 'Persian wheel.' This invention was most likely imported in the thirteenth or fourteenth centuries. By the sixteenth century, when Babur enthusiastically described it, it had become the peasant's primary mode of water transport in the Indus and trans-Jamuna regions. When the metallic Persian wheel arrived, the invention quickly spread throughout the country. While the chain in the Persian wheel allows for the raising of water from a certain depth, the gearing mechanism allows for the use of animal power and the proper regulation of chain movement speed. The bucket chain was of double rope to which were tied wooden strips carrying earthen pots to contain and discharge water. The gearing mechanism was entirely of wood, the animals turning a horizontal pin-drum, or lantern wheel carrying the chain at the top of the well.

Concerning the water-lifting device Charasa in Babur's memoirs, Tuzuk-i-Babari writes, "At the well edge they set up a fork of wood, having a roller adjusted between the forks, tie a rope over the roller and tie its other end to the bullock. One person must drive the bullock, another empty the bucket. Every time the bullock turns after having drawn the bucket out of the well, that rope lies on the bullock tract in pollution of urine and dung before it descends again into the well." This method was followed in the regions of Agra, Chandwar, Bayana (Rajasthan) and the neighbouring districts.

Another notable feature of Mughal irrigation systems was the construction of water wheels, or 'rahats,' which were used to lift water from lower levels to higher fields. These key features are a testament to the Mughals engineering prowess and their dedication to improving agricultural practices.

Another system used was called by different names, such as Dhenkli or Shadoof / Tula / lat/Latha. The Dhenkli is illustrated in the manuscript

Mrigavat, found in Uttar Pradesh around 1525 to 1570. John Fryer (traveller), in his general account of India, describes, the Dhenkli, which was based on the lever principle and was used wherever the water-level was close to the surface.

The Mughal irrigation systems enabled farmers to cultivate multiple crops throughout the year, leading to increased food production and economic prosperity. The surplus harvests not only sustained the growing population but also fuelled trade and commerce. Moreover, the Mughal irrigation systems played a vital role in transforming barren lands into fertile agricultural regions, opening up new avenues for settlement and expansion. The availability of water also led to the development of industries such as textile manufacturing and handicrafts, contributing to the overall growth of society. The Mughals' focus on irrigation reflected their commitment to the welfare of their subjects and the prosperity of their empire.

9.5 WATER AND ITS USE IN COLONIAL INDIA

After the decline of the Mughal empire, the irrigation systems in India underwent a gradual transformation. While many of the Mughal-era canals and water tanks continued to be used, there was a shift towards more localized and decentralized systems. The British colonial rule introduced new methods of irrigation, including the construction of large reservoirs and dams. These structures aimed to harness water resources for irrigation and hydroelectric power generation. However, the colonial approach often prioritized the needs of cash crops over traditional agricultural practices, leading to imbalances in water distribution and ecological degradation. In recent times, there has been a resurgence of interest in traditional irrigation techniques, as they are seen as sustainable and environmentally friendly alternatives to modern methods. The British colonial administration in India implemented a range of policies and interventions that profoundly impacted the traditional water management systems of the subcontinent. These policies were driven by a combination of factors, including the desire to maximize revenue, the belief in the superiority of Western engineering and

technology, and the need to establish centralized control over water resources.

The concept of 'colonial hydrology' has attracted a lot of interest recently, raising discussion over whether it is a suitable term for use in science and whether it can be used to critically examine how water and colonialism are related in South Asia. Rohan D'Souza introduced the term 'colonial hydrology' in his 2006 article "Water in British India: The Making of Colonial Hydrology," published in the journal History Compass. According to D'Souza, colonial hydrology is a theoretical framework that explains South Asia's whole hydraulic history while under British colonial control. He challenges us to consider the intricate relationship between colonialism and water, which leads to a critical analysis of how British actions have affected the water management systems in the area.

Historians have offered a variety of empirical proof from many regional contexts in South Asia to support the idea of hydrolic technology. Elizabeth Whitcombe's major study, "Agrarian Conditions in Northern India" (1972), provides a comprehensive overview of the negative environmental and socioeconomic implications of perennial irrigation schemes installed by the British. Whitcombe contends that these extensive canal systems resulted in the construction of saline deserts, waterlogged wetlands, and diminished soil fertility, reducing agricultural output and peasant well-being. In contrast, David Mosse's research on the Tungabhadra River in Karnataka demonstrates the similarities between pre-colonial and colonial water management systems. Mosse challenges the binary distinction between a 'golden' pre-colonial era and a 'disruptive' colonial period, arguing that the British hydraulic interventions were not entirely novel but built on existing traditional systems.

The Godavari Delta Project, initiated by Arthur Cotton in the 1850s, shows the British colonial approach to water management. Cotton's reports show a strong emphasis on profit maximisation through agricultural commercialization, motivated by the assumption that the delta, like other deltas across the world, could be built to meet their demands. The introduction of commercial crops such as sugarcane and cotton was made

possible by the building of irrigation infrastructure, leading to major revenue creation for the colonial administration. In eastern India, the colonial understanding of floods contrasted starkly with the traditional perception of floods as a blessing and a source of fertile silt deposits. The British implemented a system of permanent embankments along rivers like the Kosi, Gandak, Damodar, and the Ganges to control and regulate floodwaters. This approach replaced the traditional overflow irrigation system, leading to severe ecological consequences, as highlighted by scholars like Rohan D'Souza and Dinesh Mishra. The embankment regime disrupted natural flood cycles and contributed to environmental degradation.

Furthermore, the creation of the irrigation department and the hiring of "trained" engineers allowed for centralised management of water flow, distribution, and allocation, which was a major change from the decentralised methods of resource allocation and decision-making that were common in pre-colonial times.

In the modern era, India has witnessed numerous advancements in irrigation technology and techniques. The advent of electric pumps and sprinkler systems has revolutionized the way water is delivered to fields. These technologies allow for precise control and efficient use of water, mitigating wastage and improving crop yield. Additionally, micro-irrigation systems such as drip irrigation and precision spraying have gained popularity due to their water-saving capabilities. These techniques deliver water directly to the roots of plants, reducing evaporation and ensuring optimal absorption. Furthermore, the integration of remote sensing and data analytics has enabled farmers to monitor soil moisture levels and weather patterns, optimizing irrigation schedules and minimizing water usage.

The evolution of irrigation systems in medieval India showcases the ingenuity and resourcefulness of our ancestors. The Mughal era, in particular, witnessed remarkable advancements in irrigation infrastructure, leaving a lasting impact on agriculture and society. The construction of canals, water tanks, and other structures not only transformed barren lands into fertile fields but also fostered economic and cultural growth.



CHECK YOUR PROGRESS

Q 4. What is 'Qanat'?

.....

Q 5. Who initiated the Godavari Delta Project?

.....

.....



9.6 LET US SUM UP

After going through this Unit, you have learnt that-

- The irrigation system was well organised since ancient times in India.
- The use of water and the technologies used developed in the medieval times under the Mughals.
- The British were instrumental in the use of modern technologies for the usage of water.



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9.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1. Water reservoir built by Iltutmish

Answer to Q 2. Baolis served as reservoirs for storing water during dry seasons.

Answer to Q 3. Izami

Answer to Q 4. This technology is also a rotating device of wood and bamboo connected to each other which was used to pour water from the well into the fields with the help of several buckets with the help of a donkey or ox.

Answer to Q 5. Arthur Cotton

9.9 MODEL QUESTIONS

A) Very Short Questions (answer each question with 50 words)

Q 1. What do you mean by Irrigation system?

Q 2. State the role of religious institutions in the development and maintenance of irrigation systems during the medieval period.

B) Short Questions (answer each question with 150 words)

Q 1. Explain the evolution of hydrological technology, such as tanks, step-wells, and artificial lakes, during the medieval period.

Q 2. Explain the administrative and organizational structures that governed the management of irrigation systems during the medieval period.

C) Long Questions (answer each question with 300-450 words)

Q 1. Analyse the effects of irrigation systems during the mediaeval era on the expansion of urban areas and the establishment of trade routes.

Q 2. Discuss how the irrigation systems influenced the distribution of power and the structure of social structures in Medieval India.

Q 3. Discuss the importance of water as a contested resource in the colonial environment, taking into account both its practical and symbolic value.

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UNIT 10: ENVIRONMENT IN POST-COLONIAL INDIA

UNIT STRUCTURE

10.1 Learning Objectives

10.2 Introduction

10.3 Conservation Policies in the Post-Independence period

10.4 Social Forestry

10.5 Development versus Environment Debate

10.6 Let Us Sum Up

10.7 Further Readings

10.8 Answers to Check Your Progress

10.9 Model Questions

10.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- Explain the evolution of environmental conservation initiatives in post-independence India,
- Explain the role of government policies in protecting wildlife and the environment,
- Discuss social forestry and its significance in the field of environmental conservation, and
- Analyse the development debate centred around environment, which poses a major challenge to policy framers.

10.2 INTRODUCTION

Dear Learners, in the previous Unit, we discussed the uses of Water as a natural resource in irrigation and the development of technologies to harvest water. In this Unit, we will discuss the policies for the conservation of forest and wildlife in post-colonial India. We shall also briefly discuss the debate on development and environment that has been a challenge for the policy makers.

The post-independence period in India witnessed a complex interplay between conservation policies, developmental aspirations, and

environmental challenges. Despite initiatives to address environmental degradation and restore forest cover, the government often prioritized economic gains over ecological sustainability, leading to conflicts between development and conservation goals. The environment-development paradox is very visible in the anti-mega dam movements across India that protest the loss of biodiversity and displacement of local populations caused by such developmental projects. Social forestry emerged as a response, aiming to involve local communities in forest management and address their socio-economic needs while promoting environmental sustainability. Environmental historians highlight the legacy of colonial resource exploitation and advocate for holistic, participatory approaches to development planning that integrate environmental considerations, indigenous knowledge, and social equality.

10.3 CONSERVATION POLICIES IN THE POST-INDEPENDENCE PERIOD

The Colonial period in India witnessed a rapid decline in forest cover, exploited mostly for its valuable timber and minerals resources, leaving behind a trail of environmental degradation and alienation between man and his natural environment. The British colonial government also carried out a plethora of 'conservation' policies starting with the Indian Forest Act of 1865. However, these measures were mostly aimed at maximizing British revenue and meeting their commercial demand for timber and other forest products, rather than being genuine conservation efforts. The popular British forester Dietrich Brandis gave the theory of 'sustainable' and 'scientific' forestry but these terms were very narrowly defined with primacy placed upon economic availability rather than environmental sustenance. Therefore, when the Government of independent India bequeathed colonial legislations like the Forest Act of 1927 and colonial institutions like the Forest Department at independence in 1947, there was much room for revisions and reforms to address the growing environmental problems in India.

Within independent India, it was realized that degraded forests had to be restored and new forests were to be created to ensure a steady supply of raw material needed for the new nation's nascent industrial development.

The 1952 National Forest Policy aimed to substantially increase forest cover to combat land deterioration and sustain resource production, but it was largely an extension of colonial policies. By a constitutional amendment in 1976, environmental conservation was made a part of the Directive Principles of State Policy highlighting the environmental duty of the citizens and the government. The subjects of forests and wildlife that were part of the state list in the Constitution and were regulated according to the outdated Forest Act of 1927 were shifted to the Concurrent list. New acts like the Water Act of 1974 and the Air Act of 1981 were aimed at pollution control. But by and large, the forest policies up to the 1980s were framed along colonial lines with primacy placed upon revenue generation. Like all newly independent states in the 1940s, India faced the challenge of balancing developmental needs with emerging environmental concerns. The success of the democratically elected popular government depended upon its ability to bring development and welfare to its people after years of neglect under the colonial government. Large dam projects were enthusiastically promoted, whose detrimental impact on the environment and local populations would soon become evident, setting the stage for some of the biggest grassroots-level environmental movements in the world. The clearing of lands for commercial agriculture further contributed to a loss in forest cover.

Unprecedented hunting in colonial India drove many wild faunal species like the Royal Bengal Tiger to the brink of extinction. Around the time of India's independence, the global movement for faunal conservation had intensified, and Indian political leaders like Jawaharlal Nehru displayed a personal interest in protecting the country's natural heritage for future generations. Initiatives like Wildlife Weeks were introduced but had limited impact. Within certain states like Assam, earlier 'game provinces' were renamed as 'wildlife sanctuaries,' highlighting the shift from hunting for trophies or meat to conservation. A landmark development in the protection of wild fauna was the Wildlife Protection Act of 1972 which aimed at safeguarding the country's rich biodiversity and protecting endangered species from exploitation and extinction. The Act prevented the hunting, poaching, and trade of certain species of animals based on their conservation

status. It illegalized the sale, purchase, and possession of wildlife products such as ivory or rhino horns to conserve the country's wildlife. The Act also empowered the government to declare certain areas as Natural Parks, Wildlife Sanctuaries, and Reserves for the conservation of wildlife and their habitats. Conflicting rules and regulations, such as those pertaining to land use and development, made it difficult to put its provisions into practice. In addition, several flagship species like the tiger, the greater one-horned rhino, etc, and their habitats, selected for their cultural significance or ecological vulnerability were specially targeted for conservation. Project Tiger, launched in 1973 was one of the first such species targeted for conservation and recovery due to the alarming decline in its population. So far, Project Tiger remains a highly successful endeavour that has inspired similar projects in India and abroad. By the 1970s, the demarcation of protected forest areas and the implementation of developmental projects like mega-dams often led to new problems of deforestation, displacement, industrial pollution, and loss of livelihood. State-centric conservation policies driven by economic interests and implemented by forest departments, officials, and stringent laws gradually began to be criticized by environmentalists for their lack of community involvement. The Government faced criticism for its inability to realize the importance of traditional knowledge about local ecosystems and sustainable resource management that can complement scientific conservation policies. Local populations with a vested interest in the overall health of the forests that are their home are likely to be the most active and empathetic conservationists. But the Indian government through its various conservation policies had sidelined the traditional rights of people living in the forests causing a detrimental impact on their socio-economic conditions. Innovative grassroots environmental movements like the Chipko movement in Uttarakhand in 1973 and the popular Narmada Bachao Andolan in Gujarat in 1985 exhibited the necessity and effectiveness of incorporating local communities and their concerns in conservation efforts. These environmentalist movements that highlighted the detrimental effects of large-scale developmental projects like habitat destruction, loss of biodiversity, pollution, flash floods, injustice, and cultural erosion often pitted the state

and the people against each other. Such movements were at times viewed as opposed to development. But more and more people began realizing the unsustainability of such developmental projects and started looking for alternative models of development that were in sync with environmental conservation.

In 1983, the Brundtland Commission of the United Nations came up with an alternate model of development called 'Sustainable Development.' Sustainable Development was defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Hereafter, sustainable development became a popular topic for policy framers, activists, governments, etc. across the world. A better understanding of processes like global warming, and climate change led to a global shift in attitude towards participatory development and community-based natural resource management. In the wake of the Bhopal Gas Tragedy, 1984 attributed to negligence of industrial safety standards, the Environment (Protection) Act, of 1986 was passed. It provided a comprehensive framework for the protection and improvement of the environment in India from all kinds of hazards. Environmental protection became a part of the Right to Life under Article 21 of the Indian Constitution. The National Forest Policy, 1988 made a very significant and categorical shift from commercial concerns to focus on the ecological role of the forests. It recognized the role of local populations in forest management. The 1990s saw a greater participation of the civil society and judiciary in environmental conservation and management. The Forest Act of 2006 was passed to undo the 'historical injustice' committed against traditional Indian forest dwellers by recognizing their rights to life and livelihood in the forests. The Act aimed at formulating conservation policies that regarded the forest-dwelling communities as an integral part of the forest ecosystem. However, the Indian state is often criticized for failing to make conservation inclusive despite what it says on paper. In the 21st century, civil society participation has declined and there is a shift towards re-centralization of forest and environment management. Unprecedented infrastructural development, population growth, etc has put immense pressure on the fragile ecosystem in the past few decades. While

displaced people are generally compensated, the loss of biodiversity caused by industrial expansion is disproportionately higher than the limited success achieved in biodiversity conservation. Illegal logging, poaching, and extraction of minerals and other raw materials from 'protected forests' act as another roadblock to the success of conservation policies.

India is a signatory to the Agenda 2030 adopted by the United Nations in 2015 which seeks to promote 17 interdependent Sustainable Development Goals (SDGs) to attain peace and prosperity for the people by 2030. Several policy measures are being taken by India taken in this regard. Developing post-colonial nations like India, while being late entrants to industrialization, are facing the brunt of environmental challenges whereas the developed nations who have already industrialized are shifting their production units to developing nations that offer cheap labour and land. Capitalistic modes of economic development driven by material growth and ever-increasing consumption are proving to be environmentally unsustainable in economies across the world and people are looking out for alternate models.

10.4 SOCIAL FORESTRY

The state takeover of India's woodlands and forests in the colonial period, driven primarily by economic objectives, resulted in significant changes in patterns of resource extraction and management in the forests of India. There was a shift in forest use from products like ivory, pepper, etc. to a single-minded prioritization of timber. A forest policy that was obsessively focused on one product- timber had ecological and social consequences. It replaced the diverse floral species in the Indian forests with monoculture aimed at commercial timber production, destroying the natural ecosystems leading to the extinction of several species and the generation of a plethora of environmental problems like loss of soil fertility. The promotion of certain commercially viable species of timber like teak over others led to the replacement of the mixed Indian forests which yielded a variety of products like fuelwood, fruits, fodder, lac, etc. that had been sustainably utilized by local populations across centuries. Such a forest policy also disrupted the traditional social systems, thus generating conflict over access to resources.

The various Forest Acts drastically curtailed the forest access of those populations who were traditionally residing in proximity to the forests and were dependent on it, like hunters, gatherers, and shifting cultivators. The new policy of forest management required that the extraction of forest resources by local communities be strictly regulated and measured to ensure a steady supply of timber for commercial purposes.

Social Forestry promotes multi-purpose land use, involving local communities in forest management. The necessity for creating fuelwood and fodder reserves to sustain the local populace has been felt since colonial times. But it was only in the 1960s, that a scheme of farm forestry was initiated for the first time as a part of the Third Five-Year Plan. But, within this initiative, there was no involvement of villagers. Instead, the Forest Department protected, harvested, and distributed the produce of the designated plantations among villagers. The initial drive for social forestry originated from the preliminary report on social forestry presented by the National Commission on Agriculture, in 1976. This report suggested broadening the domain of farm forestry to encompass social forestry within socioeconomic development initiatives. Since India has a predominantly rural population that still largely depends on forests to meet various needs, social forestry acquires even more significance. While community involvement in forest management is not a new concept and has been practiced since ancient times, the interruption created by colonial Forest policies by excluding of local communities is being reversed in the post-independent period through Social Forestry. The Government of India since the initiation of the Social Forestry program, have promoted afforestation in areas near human settlements as a measure to restore the land that has been degraded by human activities over the years with the goal of creating forests in these regions. Afforestation is also encouraged along the edges of agricultural fields, railway lines, roadsides, and water bodies to boost the availability of fuelwood as well as to prevent soil erosion. This approach addresses local needs amid declining forest covers and increasing population pressure. The government has formally recognized the rights of local communities to forest resources. However, the reserved forests remain

under direct official control with no scope for local intervention. Various initiatives like the “Assam Green Mission’ which aims to plant 200 million trees in Assam by 2025 is one such initiative aimed at extending tree cover through joint state-citizen initiatives.

India, like most of the world, faces acute natural resource crises in the present day, and struggles over scarce natural resources have often precipitated bitter conflicts between individuals, communities, between states, and between the state and its subjects. They also impact the quality of life. Social Forestry aims to involve local communities in the afforestation and management of lands other than croplands and settled lands that are available outside reserved forest areas, in order to meet the requirements of ecological and environmental security and the day-to-day needs of the local population. This is expected to reduce the pressure exerted on the natural forests by the needs of an expanding population. It integrates forestry, agriculture, and animal husbandry for maximum and sustainable utilization of land, labour, and resources. The Social Forestry programs target diversified goals like:

- Replacing cow dung with fuelwood supply for the use of manure
- Supply of small timber for rural housing and agricultural implements
- Fodder supply
- Safeguarding agricultural fields from wind and soil erosion
- Establishing recreational facilities
- Contribute towards reducing the negative impacts of global warming and climate change by purifying air, generating rainfall, reinvigorating soil nutrients, and promoting the growth of complex ecosystems.
- Forest cover would generate more rainfall which would, in turn, benefit agriculture.
- Promote cottage industries through a combination of local forest products and traditional artisanal skills.



CHECK YOUR PROGRESS

Q 1. What did the National Commission on Agriculture report suggest on social forestry?

.....

.....

Q 2. When was the Project Tiger launched?

.....

.....

In addition, social forestry also makes it possible for tribal and indigenous communities to continue to practice their traditional culture and beliefs and indigenous knowledge systems. These knowledge systems are intimately linked to the forest and have declined in recent years because of depletion in forest cover. Social forestry also acts as a medium to strengthen community involvement and unity in a world that is increasingly individualistic and deprived of meaningful human interactions. Social forestry primarily comprises farm forestry, rural forestry, and urban forestry and requires the active involvement of the local populace. In social forestry, local communities would be both the implementers and beneficiaries. The underlying principle is that as long as communities practice sustainable utilization and management of forest resources emerging out of the forests that they grow and manage as a community, these forests can be immensely beneficial ecologically, socially, and economically for the local communities and the country as a whole.

10.5 DEVELOPMENT VERSUS ENVIRONMENT DEBATE

The Environment versus development debate continues to be discussed even today. The dichotomy between developmental goals and environmental risks is a challenge for countries. For example, mining projects in a forested area impact not only its flora and fauna but also the forest-dwellers whose very survival and livelihood depend on that forest and its

resources and who are often not a party to the development we are talking about.

In India, development and environment is shaped by our historical trajectories of societies. Post-colonial states like India faced serious challenges as they had to undertake measures to modernize the state through development and at the same time balance the needs of development with the rising environmental concerns. Development was understood as opposed to 'backwardness,' a term from which the post-colonial nation-states wanted to free themselves. This could only be achieved by the expansion of development measures in every aspect of the land. The colonial policies on forests continued without much change in the post-colonial period of India.

Developmental theories enable us to explain the reason behind under-development, for example, one theory suggests how colonialism and its structures played a crucial role in the destruction of the natural lands, and forests and brought significant changes through their exploitation of resources that colonized nations were blessed with abundance.

The understanding of development as economic growth has been challenged due to the level of inequalities among the nations. The indicators have to be changed as per the level of the nation to understand development.

Indian environmental historians emphasize the colonial legacy of resource exploitation and environmental degradation. Colonial powers prioritized economic development and resource extraction, leading to deforestation, soil erosion, and pollution. The post-colonial period witnessed rapid industrialization, urbanization, and population growth, exacerbating environmental pressures. Environmental historians document how development initiatives have transformed landscapes, altered ecosystems, and affected biodiversity. They analyze the impacts of industrialization, agriculture, infrastructure projects, and urban expansion on air and water quality, soil health, and natural habitats. These studies highlight the uneven distribution of environmental costs and benefits, with marginalized communities bearing the brunt of pollution and ecological degradation. Indian environmental historians critique dominant development paradigms that

prioritize economic growth over environmental sustainability. They examine the shortcomings of top-down, technocratic approaches to development, which often neglect ecological considerations and disregard local knowledge and practices. Alternative models, such as sustainable development and ecological economics, emphasize the integration of environmental concerns into development planning and decision-making. Environmental historians in India advocate for environmental justice, which seeks to address the unequal distribution of environmental risks and benefits among different social groups. They document how marginalized communities, including indigenous peoples, peasants, and urban poor, disproportionately bear the burdens of environmental degradation and climate change. These studies highlight the need for participatory approaches to environmental governance that empower affected communities and promote social equity. Indigenous Knowledge and Practices: Indian environmental historians recognize the importance of indigenous knowledge and practices for sustainable resource management and environmental conservation. They study traditional ecological knowledge systems, such as agroforestry, water harvesting, and community-based natural resource management, which have sustained local livelihoods for generations. Integrating indigenous perspectives into development policies and practices is seen as essential for promoting ecological resilience and cultural diversity. Policy Implications: Environmental historians in India engage with policy debates and advocacy efforts aimed at reconciling development imperatives with environmental protection. They critique policies that prioritize economic growth at the expense of ecological sustainability and social equity. They call for holistic, interdisciplinary approaches to development planning that consider environmental, social, and economic dimensions. They also emphasize the importance of democratic governance, transparent decision-making, and citizen participation in shaping sustainable development pathways.

The social movements have highlighted that environmental issues are interconnected with livelihoods and the pursuit of justice for marginalized communities. One of the major shifts brought about by the pressures of environmental movements is the shift to participatory development and

community-based natural resource management models. Such initiatives shape that development approach should be inclusive of the stakeholders. In India, Joint Forest Management is a perfect example of state-driven policies to bring development.



CHECK YOUR PROGRESS

Q 4. State True or False "The colonial government in India has a long history of resource exploitation and environmental degradation." .....

Q 5. Unplanned Development leads to _____ of indigenous communities.

Q 6. What is the important change brought about by environmental movements?

.....



10.6 LET US SUM UP

After going through this unit, you have learnt that-

- Colonial Exploitation of natural resources for resource extraction led to environmental degradation in India.
- In the post-independence period, the Indian Government was faced with the difficult task of balancing development and environmental restoration plus conservation.
- There is an ongoing debate about development versus environment which discusses the double-edged sword-like nature of development. Finding a middle ground to ensure sustainable development is the ultimate goal of policy framers and environmentalists.
- Various Government and community initiatives like Project Tiger, and Chipko Movement in addition to new approaches towards forest management like Social Forestry have made significant contributions to environmental conservation in post-independent India.



10.7 FURTHER READINGS

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4) Guha, R. and Gadgil, M., 1989. State forestry and social conflict in British India. *Past & Present*, (123), pp.141-177.

5) Sharma, A., 2017. A geographical study of social forestry in India. *International Journal of Science, Engineering and Technology*, *5*(5), pp.148-153.



10.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: The report suggested broadening the domain of farm forestry to encompass social forestry within socioeconomic development initiatives.

Answer to Q 2: Project Tiger was launched in 1973

Answer to Q 3: True

Answer to Q 4: Displacement

Answer to Q 5: One of the major shifts brought about by pressures of environmental movements is the shift to participatory development and community-based natural resource management models.



10.9 MODEL QUESTIONS

A) Very Short Answer (Answer each question within 50 words)

Q 1. When was the first Forest Act passed in India?

Q 2. When and where did the Chipko Movement take place?

B) Short Answer (Answer each question within 150 words)

Q 1. Name any four Environmental Conservation Acts passed in Post-independent India.

Q 2. What do you mean by Sustainable Development? When was the concept first developed?

Q 3. What is meant by Social Forestry?

Q. Long Answer (Answer each question within 300-450 words)

Q 1. Analyse the evolution of Forest laws in India since independence.

Q 2. Discuss why community participation is desirable in the framing of conservation policies.

Q 3. Discuss the Development versus Environment Debate.

*** ***** ***

UNIT 11: ENVIRONMENTAL MOVEMENTS

UNIT STRUCTURE

11.1 Learning Objectives

11.2 Introduction

11.3 Movements

- Chipko Movement
- Narmada Bachao Andolan

11.4 Dams and Mines

- Problems of Displacement
- Loss of Livelihood
- Problems of Rehabilitation

11.5 Let Us Sum Up

11.6 Further Readings

11.7 Answers to Check Your Progress

11.8 Model Questions

11.1 LEARNING OBJECTIVES

After going through this Unit, you will be able to-

- Explain the various social movements that were connected to the environmental concerns,
- Explain the causes and impacts of those movements, and
- Discuss the negative aspect of development that give rise to problems of livelihood, displacement and rehabilitation

11.2 INTRODUCTION

Dear Learner, in the previous Unit, we discussed the post-colonial environment policies and the development vs environment debate. This Unit, will continue on such aspect of the previous Unit, which the development debate as it looks into the issue of mine and dam projects. At the same time, this Unit also throws light on the social movements that have become synonym with environmental movements where women participation was the most.

11.3 MOVEMENTS

The environmental movement is considered as social movement whose main objective is to protect the natural world and natural resources from harmful human activities. Due to developmental works natural environment is adversely affected. Such activities include developmental projects like forest-based industries, dam buildings, mines, use of chemical fertilisers, pesticides etc. These activities also lead to large scale displacement of people. In this chapter we will discuss three prominent environmental movements of India and problems of displacements and rehabilitation.

- **Chipko Movement**

The movement had its origin in the Garhwal Himalayan Mountain region located in present Uttarakhand state in the year 1973. It had huge impact of Gandhian ideology. In 1964 Gandhian social activist namely Chandi Prasad Bhatt founded Dasholi Gram Swarajya Sangha, later renamed as Dasholi Gram Swarajya Mandal. The aim of this cooperative organisation was to promote village industries that used local resources.

There were severe monsoon floods in that area which killed more than 200 people in 1970. People realised that the damage was done due to the felling of trees for industrial logging. DGSM started protesting against large scale industrial logging in the region. In 1973 government allotted a large plot to a sport goods manufacturer whereas the villagers were denied access to a small number of trees which they used to build agricultural tools. People under the leadership of Chandi Prasad Bhatt protested against felling of trees by the company. He took the villagers to the forest and embraced the trees so that they could not be cut. The word Chipko is derived from its method of Chipko or embracing. After several days of protest the government cancelled the company's logging permit. This protest took place near the village of Mandal in the upper Alakananda valley in April 1973.

When the protester got success in this method, it spread to other parts of the region under the leadership of Sunderlal Bahuguna, a local environmentalist. The next major protest was seen in 1974 near the village

of Reni where more than 2000 trees were about to be felled. There was a large student led demonstration against the felling of the trees. The Government then asked to men of the surrounding villages to a nearby city and promised compensation. However, the main intention behind this was to allow the loggers to proceed in felling the trees. But when the loggers went into the forest they had to face the protest of the womenfolk of the village under the leadership of Gaura Devi. They didn't allow the loggers to fell the trees as they embraced the trees. After the protest, the state government formed a committee to investigate deforestation in the Alakananda valley and resulted in a 10-year ban on commercial logging in that area. The peasants and women participated in large number in this movement of forest rights. Apart from the chief method of tree hugging or Chipko, the protesters adopted Gandhian method of Satyagraha or non-violent resistance. Sunderlal Bahuguna did a fasting for two weeks in 1974 as a mark of protest of the forest policy. In another instance, a Chipko activist Dhoom Singh Negi fasted to protest the auctioning of the forest in the Tehri Garhwal district in 1978. In the same year in Pulna village in the Bhuyndar valley the women confiscated the loggers' tools and stopped them from felling the trees.

During 1973-1979, more than 150 villages participated in the Chipko movement. There were at least 12 major protests and many small-scale protests in Uttarakhand. The movement gained its result when its leaders were able to draw the attention of the then Prime Minister of India Indira Gandhi in 1980. Eventually, a 15-year ban on commercial felling of trees in the Uttarakhand Himalayas was announced. As an impact of the movement, similar bans were imposed in Himachal Pradesh too. The movement was successful in creating public awareness for the conservation of forest. It also impacted the policy making process regarding the forest land in India. The government realised the importance of the participation of local communities residing nearby and in the forest.

- **Narmada Bachao Andolan**

Narmada Bachao Andolan is the precursor of anti-dam movements in India. It created an awareness regarding the ill effects of dam building on

the people and the environment. As a part of developmental project Government of India adopted a policy of dam building on the Narmada Valley. The idea of the project goes back to the year 1946 itself. However, the project was started after the clearance from Narmada Water Disputes Tribunal (NWDT). As per the plan the project had 30 major dams out of which 10 was on the main rivers and 20 on the tributaries, 5 hydroelectric schemes, 6 multi-purpose schemes, 19 irrigation schemes, 135 medium schemes, 3000 minor irrigation schemes.

The project promised to provide employment, to control floods, make waters available for domestic and industrial use and also to promote tourism. On the other hand, in reality, the project lacked proper planning. It also did not take proper care in implementation of the projects though it involved large-scale exploitation of natural resources. As a result of the project more than 150000 acres of forest land came under direct threat of submergence. It put pressure on the adjoining areas and its land resources as there was large scale migration of people from the nearby area of the projects who feared the risk of submergence.

The NWDT prepared certain guidelines for compensation and resettlement of the displaced persons due to the projects. In the guidelines, however, there was no provision for land to the displaced person, instead they were to buy lands with the resettlement sum that would be paid to them by the Government. It created the problem of unemployment or underemployment for the displaced person in the new land. Moreover, there was disparities in the resettlement sum paid by different state governments. For example, Gujarat provided better facilities for resettlement and compensation compared to Madhya Pradesh and Maharashtra.

Due to these threats posed by the project the Narmada Bachao Andolan or Save Narmada Movement was launched with the aim to secure better economic future in 1985. Medha Patkar with the support from local tribal communities launched this movement. Initially, the protest was mainly against the Construction of Sardar Sarovar Dam on the river Narmada. It was the largest dam to be built. Gradually the movement continued as a protest against central Indian authorities building large Narmada dams. As

a form of protests, they adopted hunger strikes, marches, and protests demanded cost-benefit analyses of social, environmental, and commercial impacts.

The movement continued with regular protests and by 1989 it got the form of a full-fledged environmental and livelihood movement. In 1988, NBA demanded that construction work of Narmada Vally Developmental Projects should be stopped. It now opposed the construction of dams and demanded proper resettlement of the displaced people. Medha Patkar observed several fasts and hunger strikes along with other protesting people.

In September, 1989 more than 50000 people gathered in the valley to protest against the projects. Next year, thousands of villagers gathered near a small town of Madhya Pradesh and reiterated their pledge that they were ready to be drown rather than moving from their homes. Soon, the World Bank, one of the major sponsors of the project was forced to review the project. In a report published in 1992, it endorsed all the main concern raised by the NBA. Eventually, due to the uproar in international level after the report, World Bank withdrew from the Sardar Sarovar project. The Gujarat gvernment, however, decided to continue the project raising more fund.

The issue finally reached the Supreme Court of India after NBA filed a write petition asking the Court for the stoppage of the dam. Initially the Court ordered to stop the work of the projects and asked the state government to take measures for adequate resettlement and rehabilitation policies. However, later on the court allowed the construction work to continue with some conditions especially with proper rehabilitation and resettlement arrangement.

Thought the movement failed to stop the construction of dams of Narmada Valley projects, it could achieve many successes in their demands. World bank exited from the project as a result of the protest, it could halt the construction of Sardar Sarovar Projects from 1994 to 1999 and it also led to the withdrawal of foreign investor from Maheshwar dam in 1999-2001.



CHECK YOUR PROGRESS

Q 1. The aim of the Narmada Bachao Andolan was _____ .

Q 2. The Chipko Andolan took place in _____.

Q 3. Sunderlal Bahuguna is associated with the _____ Movement.

- **Movement against Lower Subansiri Dam**

Government of India announced its policy on hydro-electric power development in the year 1998. Nort East India was in focus in this policy of hydroelectric power. More than 150 dams were envisaged to build on almost all the perennial rivers. The news of this activities received mixed reaction in this area. The news of 2000 MW Lower Subansiri Hydel Project (LSHEP) at at Gerukamukh of Assam, Arunachal Pradesh foothills in the lower part of the river Subansiri under NHPC came to news in 2001 with its announcement. The downstream communities became apprehensive of the project for several reasons.

Assam and Arunachal Pradesh witnessed a strong anti-dam movement with the construction of Lower Subansiri Dam by National Hydroelectric Power Corporation (NHPC). As per the latest data in the NHPC website, 'Subansiri Lower HE Project is the biggest hydroelectric project undertaken in India so far and is a Run of River scheme with small Pondage on river Subansiri. The Project is located near North Lakhimpur on the border of Arunachal Pradesh and Assam. The nearest railhead is Nagaon and nearest airport is Lilabari / Dibrugarh. The estimated annual energy generation from the Project is 7421.59 kwh in a 90% dependable year'.

Initially, NHPC started the construction work without any public hearing, a mandatory exercise for such developmental work by law. When this issue was raised by some organisations, they commenced a public hearing on September 4, 2001. The Assam Pollution Control Board which organised the hearing got a resolution signed by the local Assamese and Mishing communities after a presentation in English and Hindi. Though some opposed project during the hearing, their voices were ignored. Moreover, the Government of Assam had already gave clearance for the use of forest

land for the project. Afterwards, violations of several laws and Supreme Court Orders were reported in subsequent years. Soon, the negligence from the competent authority to look into these allegations led to popular protest against the project.

The movement against Lower Subansiri dam was carried on by several organisations including All Assam Students Union (AASU) and Krishak Mukti Sangram Samity (KMSS). Asom Gana Pari shad (AGP) also joined the protest which was then the chief opposition party in Assam. Apart from this, the Arunachal Pradesh Government had also their own apprehension in the initial years. The pointed out procedural lapses as NHPC did not take approval from the AP government. It also pointed out that the construction of the dam could aggravate the boundary disputes between Assam and Arunachal Pradesh.

It was argued by the dam builders that there was relatively a very small number of displacements in the LSHEP as the are was sparsely populated. However, this argument had its flaw as the people depended on cultivation in that area and their displacement would result in loosing their agricultural land.

Before 2005, the issue of lower subansiri dam was known to only a few academics and ecological activists. However, when the work began in that year, the issue became politicised. Already in 2004, the Supreme Court of India banned other dams except the lower Subansiri dam as there was downstream impact of the dams were not assessed. Next year AASU led protests in Dhemaji and Lakhimpur districts demanding assessment of the impact of the Lower Subansiri dam. As a result of the protest, a tripartite meeting was held among AASU, NHPC (the company responsible for the construction of the dam) and the Government of Assam in December, 2006. One important outcome of the meeting was that an expert committee was formed to assess the downstream impact. The committee recommended that the height of the dam should be lowered and some other technical changes should be made in the structure so that river flow increases. Around the same time, another committee consisting of the members of Assam Legislative Assembly was formed to look into the issue. In their interim reports,

it was recommended by both the committees that NHPC should stop the construction till the final report was submitted. However, NHPC and Government of Assam ignored the report. When the final report was submitted in 2010 with questions on the selection of the dam site and its downstream impact, the Government of Assam then tried to divert from the final reports' objections and announced to form another committee of internation experts.

Meanwhile, AGP (Asom Gana Parishad), the main opposition party started to become more vocal against the dam as the state Assembly Election was nearing. Though Congress formed the Government in 2011, public sentiment against the dams continued to grow. Activities like blockade of National Highway 52 to stops vehicle carrying materials for dam continued under KMSS and Takam Mising Poring Kebang (All Mishing Students Union) and AJYCP. The protest could not stop NHPC from constructing the dam. It, however, slowed the construction process. As per latest data provided by NHPC the project is likely to completed on June 2024.

Dams and Mines: Problems of displacement, Loss of Livelihood and Problems of Rehabilitation

As per the Guiding Principles on Internal Displacement ' Internally displaced persons are "persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized border." Due to new industrial projects, dams, mines, power plants massive acquisition of land is done which has resulted in displacement of people. This kind of displacement is called development induced displacement. India has very large number of development-induced displacement in the world. It is estimated that more than 50 million people have bee displaced of which displacement due to dams is higher than other projects.

Since the colonial period displacement is common to India. These displacements have taken place in the forest areas, river systems or in mineral base area. People who are mostly affected by these displacements are mostly backward population and among them most are tribals.

Development induced displacement are also divided in two categories i.e. direct and indirect. In case of Direct displacement, people are displaced due to beginning of developmental projects who have been living there for generation. Indirect displacement takes place when as a result of the projects gradually the natural and environmental resources are pushed up to such an extent that the nnearby population are deprived of their traditional resources. In such case, these people are forced to move from their original habitats.

It is observed that construction of dams uproots the people, submerges the forest and the benefits are never received by the displaced people. For example, the first dam built over Narmada, i.e. Bargi Dam in Madhya Pradesh was completed in 1990. The cost of this dam was ten times more than its budget, it submerged three time more land than estimated by the engineers. Michael Cernea, a sociologist argued that people displaced due to dams become more poorer after the displacement. He pointed out that those who are displaced don't receive enough compensations. He pointed out that displacement pose eight risks. They can be discussed as follows-

1. **Landlessness:** Since people lose their land in the dam construction, it alienate them from the very foundation of their productive systems, commercial activities and livelihoods.
2. **Joblessness**: Due to loss of their habitat, there is a risk a joblessness in new habitat. Unemployment or underemployment is common phenomenon among the displaced people.
3. **Homelessness:** After displacement, some people also suffer with the problems of homelessness or worsening condition of their homes as in some cases proper resettlement process is not followed.
4. **Marginalisation:** Due to displacement people's economic power become weak in new area. Many people don't find any suitable arrangement to use their acquired skills in new location. With this

economic marginalisation, they also suffer social and psychological marginalisation as their social status gets dropped in new location.

5. **Food Insecurity:** The displaced people may fall into temporary or chronic undernourishment. In such case calorie-protein levels are below the minimum necessary for normal growth and work.
6. **Increased Morbidity and Mortality**: As dams lead to massive displacement, there occurs serious decline in health levels. Unsafe water supply and improvised sewage systems maximises the chances of epidemics and chronic diarrhea, dysentery and so on. In such scenario, infants, children and the elderly people are affected first.
7. **Loss of Access to Common Property**: Displaced people suffer from the loss of access to the common property assess such as pastures, forest lands, water bodies, burial grounds etc in their new location which they could enjoy in their original habitat. It affects their income as well as livelihood levels.
8. **Social Disintegration**: Displacement leads to massive social disintegrations. Due to forcible displacement, production systems are dismantled, long-established communities and settlements are disorganised and kinship and family systems are scattered. Moreover, informal social network of mutual help become non-functional, trade systems get adversely affected and local labour markets get disrupted. The social fabric is torn apart as a result of these ill effects of displacement due to dams.

Apart from these eight factors, there are two other risks intrinsic to displacement-

9. **Loss of Access to Community Services:** After the displacement, people immediately loss access to healthcare clinics, educational facilities as they need to settle in the new location.
10. **Violation of Human Rights:** Arbitrary displacements due to dams leads to violations of human rights in several ways. People don't receive enough compensations and they lose their civil and political rights. Sometimes, they fell victim of arbitrary arrest, temporary or permanent

disenfranchisement and loss of their political voice. So, displacement carries the risk of human rights violations at the hands of state authorities and security forces as well as communal violence.



CHECK YOUR PROGRESS

Q 4. Subansiri Lower HE Project is located in _____ .

Q 5. _____ led the Narmada Bachao Andolan.

Q 6. Displaced people face the problem of _____.



11.5 LET US SUM UP

After going through this Unit, you have learnt that-

- The social movements that grew out of environmental concerns were able to bring in the stakeholders together to fight for the cause.
- While the movements were partially successful, it did raise awareness on the big projects that were detrimental to land and the resources.
- Displacement have several risk factors for the displaced person. However, since developmental projects will continue in the years to come, the Government must ensure proper resettlement plan so that the adverse effects could be minimised.



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11.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1. To secure better economic future.

Answer to Q 2. 1973

Answer to Q 3. North Lakhimpur on the border of Arunachal Pradesh and Assam

Answer to Q 4. Medha Patkar

Answer to Q 4. Chipko Andolan

Answer to Q 5. Unemployment



11.8 MODEL QUESTIONS

A) Very Short Questions (answer each question within 50 words)

Q 1. State one effect of the Narmada Bachao Andolan.

Q 2. State the factors giving rise to the Chipko Andolan.

B) Short Questions (answer each question within 150 words)

Q 1. Write short note on-

a. Sundar Bahuguna

b. AASU and the Subansiri Dam Project

C) Long Questions (answer each question within 300-450 words)

Q 1. Explain the problems of development with reference to Displacement.

Q 2. Discuss the role of women in the social movements.

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UNIT 12: ENVIRONMENTAL SETTING OF NORTH EAST INDIA

UNIT STRUCTURE

12.1 Learning Objectives

12.2 Introduction

12.3 Ecological setting of North East India

- Biodiversity
- Habitat mosaic

12.4 Shifting Cultivation: Culture and environmental impact

12.5 Let us sum up

12.6 Further Readings

12.7 Answers to Check Your Progress

12.8 Model Questions

12.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- Explain the environment and the biodiversity of North East India,
- Describe the flora and fauna of the North Eastern region, and
- Discuss the impact of shifting cultivation on the environment

12.2 INTRODUCTION

Dear Learner, in the previous Unit, we discussed the various social movements that grew out of environmental concerns among the indigenous communities. In this Unit, we shall discuss the ecological setting of the Northeast at the intersection of culture and environment.

The region encompasses a variety of landscapes, including hills, valleys, rivers, and forests. Its unique geographical position and varied climatic conditions have given rise to a rich tapestry of biodiversity, making it one of the most ecologically vibrant zones in the Indian subcontinent. In this unit, we will explore the environmental setting, ecological framework, biodiversity, flora and fauna, and the impacts of shifting cultivation in North East India, providing a comprehensive overview of natural heritage of this region.

12.3 ECOLOGICAL SETTING OF NORTH EAST INDIA

North East India is known for its diverse ecological setting, which is characterised by rich biodiversity, varied climatic conditions, and unique geographical features. The region is a part of the Eastern Himalayas biodiversity hotspot and is recognised for its abundance in exceptional species and high levels of endemism. In other words, the region boasts of its rich natural heritage, diverse ecosystems, and unique geographical features, making it a critical area for conservation and sustainable development. The National Forest Policy of 1988 set a target of bringing 33% of the geographical area of India under forest or tree cover. This goal reflects the multifaceted role that forests play in maintaining ecological balance, providing livelihoods, and sustaining biodiversity, alongside their importance in soil and water conservation. As per the India State of Forest Report (ISFR), 2021 of the Forest Survey of India, the total forest cover of India stands at 7,13,789 square kilometres. It accounts for 21.72% of the country's total geographical area. This figure is significant as it offers insights into the state of India's forests, including trends in forest cover, types of vegetation, and density. As per the same report, the total forest cover of North Eastern states is 1,69,521 square kilometre. It constitutes 23.75% of the total forest cover of India. Out of this, 28,718 square kilometres is very dense forest, 72,482 square kilometres is moderately dense forest, and 68,321 square kilometres is open forest. The forest cover of the North Eastern states are given bellow:

Forest cover of North East India (Area in square kilometre)

Sl. No.	State	Geographical Area	Total Forest Cover	Percentage of Geographical Area	Change in Forest Cover w.r.t ISFR 2019	Change Percentage w.r.t 2019 assessment
1.	Arunachal Pradesh	83,743	66,431	79.33	-257	-0.39
2.	Assam	78,438	28,312	36.09	-15	-0.05
3.	Manipur	22,327	16,598	74.34	-249	-1.48
4.	Meghalaya	22,429	17,046	76.00	-73	-0.43
5.	Mizoram	21,081	17,820	84.53	-186	-1.03
6.	Nagaland	16,579	12,251	73.90	-235	-1.88
7.	Sikkim	7,096	3,341	47.08	-1	-0.03
8.	Tripura	10,486	7,722	73.64	-4	-0.05
Source: India State of Forest Report (ISFR) 2021						

The environmental setting of North East India is marked by its incredible geographical diversity. The region of North East India is geographically distinguished by its mixed topography of hills and plains. This distinct geographical feature is a defining characteristic of the region, shaping its climate, biodiversity, human settlement patterns, and agricultural practices. The hilly terrain dominates much of the North East, with several major hill ranges including the Eastern Himalayas, the Patkai range, and the Lushai Hills. Around 72% of the region is hilly area. The elevation varies significantly, leading to an assortment of varied climatic conditions within short distances. Out of the total geographical area of the region, about 28.3% has an elevation of more than 1200 meter, while 17.9% between 600 and 1200 meter and 10.8% between 300 and 600 meter above mean sea level. On the other hand, the plains of North East India are predominantly shaped by the Brahmaputra and Barak river valleys of Assam. These river plains are characterized by fertile alluvial soil, making them ideal for human habitation. The smaller Manipur and Tripura plains also play a significant role in the geographical and cultural landscapes of the North Eastern region.

The climate of North East India is influenced by its geographical position, which is characterized by its location at the easternmost part of India, near the Tropic of Cancer, and its proximity to the Himalayas and the Bay of Bengal. The characteristic feature of the climate of North East India is humid subtropical with hot and humid summer, severe monsoon and mild winters. Caused by the region's diverse topography, the Brahmaputra Valley experiences hot and humid summers while in Arunachal Pradesh and Sikkim, the climate is cold with snowy winters and mild summers. The Bay of Bengal influences the climate by providing moisture for the monsoon rains. Most of the places in the region receives annual rainfall of around 2,000 millimetres. Mawsynram in Meghalaya receives annual rainfall of 11,872 milometers and is considered the wettest place on Earth. North East India is one of the first regions in India to receive the southwest monsoon winds, which bring heavy rainfall from June to September. The monsoon is crucial for agriculture and replenishing water resources in the region. Overall, the geographical position of North East India contributes to its unique climate,

characterized by heavy monsoon rains, high humidity, and significant variations in temperature and precipitation across different areas within the region.

- **Biodiversity**

The concept of biodiversity, stemming from the term "biological diversity", encompasses the vast array of life forms present on Earth, spanning all levels from genes to ecosystems. This encompasses the diversity within species, between different species, and among ecosystems. The distribution of biodiversity in any given region is not uniform. The biodiversity of a region is influenced by a combination of natural and human factors that include temperature, altitude, precipitation, soil types, and the impact of human activities. These factors interact in complex ways to shape the diversity and abundance of species.

India's vast and varied landscape hosts a rich array of biodiversity and ecosystems. Over 45,000 species of plants and 91,000 species of animals were reported from India. It is one of the world's 17 megadiverse nations. Four out of the thirty-six recognized global biodiversity hotspots are located within the boundaries of India, namely the Himalaya, the Western Ghats, the Indo-Burma region and the Sundaland. These hotspots are areas distinguished by their rich species diversity. North East India is part of the Himalaya and the Indo-Burma biodiversity hotspot.

North East India is renowned for its rich biodiversity, making it a genetic treasure of various forms of life. This region, often referred to as one of the world's biodiversity hotspots, is characterized by its unique geographical location, diverse topography, and varied climate, all of which contribute to its exceptional ecological richness. It features a wide range of ecosystems including tropical rainforests, grasslands, wetlands, and alpine meadows. Each of these ecosystems supports distinct flora and fauna, contributing to the region's overall biodiversity. This region hosts an extraordinary variety of plants, animals, and microorganisms, many of which are endemic. The region has 19 National parks and 65 Wildlife sanctuaries. Kaziranga National Park, Manas National Park, and Namdapha National Park are designated

UNESCO World Heritage Sites. These parks are crucial for the conservation of endangered species like the one-horned rhinoceros. The region is also home to several threatened and endangered species, highlighting the importance of conservation efforts in the area. Species such as the Asian elephant and hoolock gibbon are some of the notable examples.

Flora

North East India is home to a wide array of forest types, reflecting the complex interplay of climate, altitude, and soil conditions across the region. Out of the approximately 15,000 species of Angiosperms or flowering plants reported in India, about 8,000 are found in the diverse ecosystems of this region. The highest diversity of floral species is found in the states of Arunachal Pradesh and Sikkim. While about 5000 flowering plant species reported from Arunachal Pradesh, Sikkim harbours over 4500 flowering plants.

North East India is suitable habitat for a wide range of gymnosperms including Conifers, Gnetales and Cycads. Conifers are the most dominating taxa of gymnosperms with 24 species found in the region. *Cycas pectinata*, *Podocarpaus neriifolia*, *P. Wallichianus*, *Pinus Kesia*, *Genetum gnemon* and *G. montanum* are some of the noteworthy species.

The bamboos are the most diverse group of plants within the grass family. Nearly 90 species of bamboos are found in North East India. Around 41 species of them are considered endemic. The dominant bamboo genera found in the region are- *Arundinaria*, *Bambusa*, *Cephalostachyum*, *Chimonobambusa*, *Dendrocalamus*, *Dinochola*, etc. Cane species found in North East India include *Calamus acanthospathus, Calamus flagellum*, *Calamus floribunadus*, *Calamus gracilis*, *Calamus latifolius*, *Daemonoorops jenkinsianus*, *Salaca secunda*, etc. Some of the endemic species of cane from the region are- *Plectomia assamica*, *Calamus khasianus* and *Plectomia bractealis*.

Medicinal plants of the region include *Oroxyllum indicum*, *Poulzolzia hirta*, *Lysimachia racemosa*, *Litsea cubeba*, *Rhus javanica*, *Cordyceps sinensis*, *Lemanea australis*, *Panax assamicus*, *Aconitum ferox*, *Aquilqria khasiana*, *Bergenia ciliata*, *Cordyceps sinensis*, *Flickingeria fugax*,

Homalomena aromatic, *Lycopodium pseudoclavatum*, *Rubia manjith*, *Valeriana hardwickii*, etc.

Fauna

North East India is known for its enormous wealth of fauna which includes various species of insects, molluscs, fishes, amphibians, reptiles, birds and mammalian species. The region is home to nearly 3624 species of insects. The Northeast region of India boasts a rich biodiversity, particularly in terms of bird species, with many being endemic or globally threatened. The State of India's Birds report for 2023 highlighted 942 bird species, including 178 categorized as high conservation priorities. Examples include the Sclater's Monal and Bugun Liocichla in Arunachal Pradesh, and the White-winged Wood Duck and Bengal Florican in Assam. Migratory birds like the Bar-headed Goose and Amur Falcon also frequent the region. The mammalian fauna is diverse, featuring primates like the Hoolock Gibbon and various species of macaques and langurs. Endangered species like the Gangetic Dolphin, Red Panda, and Asiatic Black Bear are found here, along with tigers, leopards, and clouded leopards. The region is also home to significant populations of the Asian Elephant and Great One-horned Rhinoceros, especially in Kaziranga National Park. Additionally, rare deer species like the Brown-antlered deer or Sangai are found in Manipur, while wild cattle include the Indian Gaur, wild buffalo, and wild Yak.

- **Habitat Mosaic**

Habitat mosaics refer to landscapes where different types of habitats- such as forests, grasslands, wetlands, and rivers are found in close proximity to each other. The variety of habitats in close proximity provides niches for a wide range of species, contributing to richness of species and ecological complexity.

North East India has around 68% of its land under forest cover. Apart from Assam and Sikkim, the other states of North East India, viz. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, have 70-80% of their area under forest cover. Among the North Eastern states, Arunachal Pradesh with around 80% of its area under forest cover, maintains its position as one of the states with the highest forest cover in India.

Grasses constitute a significant component of the living organisms on earth. UNESCO defines grassland as “land covered with herbaceous plants with less than 10 percent tree and shrub cover”. Grasslands are significant carbon sinks, storing approximately one third of the global terrestrial carbon stocks. In India, grasslands occupy almost one-fourth of its land area. Grasslands are an important part of the natural landscape of North East India. The grasslands of the region are dominated by species like *Agrostis*, *Arundinella*, *Bromus*, *Coix*, *Chrysopogon*, *Cyathopus*, *Cymbopogon*, *Festuca*, *Glyceria*, *Gymnopogon*, *Imperata*, *Microstegium*, *Themeda villosa*, *Tripsacum*, etc.

International Union for the Conservation of Nature and Natural Resources (IUCN, 1965) defines wetlands as “Submerged or water saturated lands, both natural and man-made, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 meters”. According to the Ramsar Convention (1971), “Wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters”. Again wetlands “may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands”.



Ramsar Conventions, adopted in 1971, is Ramsar (Iran) and which come into force in 1975 is an international treaty that promides framework for the conservation of wetlands.

There are 80 Ramsar sites in India deemed to be of international importance under the Ramsar Convention and covers a diverse array of wetland ecosystems. In North East India, the Ramsar sites are: Deepor Bil in Assam, Loktak Lake in Manipur, Pala Wetland in Mizoram and Rudrasagar Lake in Tripura. The total area of wetlands in North East India is estimated 11,64,673 hectors.

The entire North Eastern region channels its waters into the Bay of Bengal, predominantly via the two main rivers, the Brahmaputra and the Barak, which traverse through Bangladesh. The Brahmaputra and the Barak rivers are integral to the geography, culture, and economy of the region. The Borail Range acts as a natural divider between these two river systems.

The Brahmaputra Basin is an extensive geographical area characterized by the catchment of the Brahmaputra River, one of the major river systems in Asia. The Brahmaputra River has its origins in the great glacier mass located north of the Kailash range in the Himalayas, at an elevation of approximately 5,150 meters above sea level. Encompassing an area of about 5,80,000 square kilometres, the basin extends across four countries: China (50.5%), India (33.6%), Bangladesh (8.1%), and Bhutan (7.8%). Though the river does not flow through Bhutan, 96% of area of Bhutan falls under the Brahmaputra basin. The Brahmaputra river is called by different names as it transverses through various countries. In China, it is known as Yarlung Tsangpo. Upon entering India in the state of Arunachal Pradesh, the river is called Siang or Dihang. From the confluence where it is joined by Dibang and Lohit river, the river is called as Brahmaputra. In Bangladesh, the river initially referred to as the Jamuna which merges into the lower Ganges, locally known as Padma and finally, with the river Meghna, it flows into the Bay of Bengal. The Brahmaputra River traverses a distance of approximately 2900 kilometres before emptying in the Bay of Bengal. In India, the catchment area spreads over states of Arunachal Pradesh (42.57%), Assam (36.47%), West Bengal (5.9%), Meghalaya (5.7%), Nagaland (5.63%) and Sikkim (3.69%). It covers an area of 1,94,413 square kilometres which is nearly 5.9% of the total geographical area of India. The Brahmaputra basin is irregular in shape. The maximum east-west length of the basin extends to approximately 1,540 kilometres while the maximum north-south width of the basin is about 682 kilometres. The Brahmaputra Basin is intricately divided into two main sub-basins: the Brahmaputra Upper and the Brahmaputra Lower. The entire basin is further segmented into 180 watersheds, with 97 in the Upper sub-basin and 83 in the Lower sub-basin. The Brahmaputra and its tributaries are vital to the water resources of the region, contributing to more than 30% of India's total water resources potential. The river's average annual discharge, sediment load, and specific flood discharge are key indicators of its behaviour and impact on the regions it traverses. On the north and south bank, the Brahmaputra has a number of tributaries. On the South bank, Bahini, Noa Dihing and Burhi Dihing,

Dhansiri, Dibru, Dikhow, Disang, Janjhi, Kolong, Kopili, Krishnai, etc. and on the north bank, Beki, Borgang, Dikrong, Jiadhol, Manas, Pagaladia, Puthimari, Subansiri, etc. are some of the major tributaries. The Barak River originates in the Manipur hills and has an approximate length of 900 kilometres. Apart from the two major rivers, few other rivers of the region either merge with rivers in Myanmar or Bangladesh or flow directly into the sea.

CHECK YOUR PROGRESS

Q 1. Name one major tributary of Brahmaputra.

Add single line for answer :

Q 2. The _____ acts as a natural divider between Brahmaputra and Barak systems.

12.4 SHIFTING CULTIVATION: CULTURE AND ENVIRONMENTAL IMPACT

In North East India, shifting cultivation (slash-and-burn cultivation), referred to locally as "*Jhum*" is a traditional agricultural practice that has been part of the life and culture of the region for centuries. Widely practiced in hilly areas, shifting cultivation is a dominant mode of food production of North East India. It involves clearing of forest patch for farming, burning of fallen vegetation on site to enrich the soil, and cultivation of crops and vegetables for few years until the soil's fertility starts to decline. Following this, the land is left fallow to allow natural regeneration of vegetation, while the cultivators move to fresh patches of forests to repeat the process. The fallow period is considered essential for restoring soil fertility and maintaining ecological balance. The rotational sequence integral to shifting cultivation is termed as "*Jhum* cycle". Generally, the cycle lasts for a few years to several decades, depending on the soil fertility and environmental circumstances. Besides, it is also influenced by population pressure and land ratio. The crops raised in fields of shifting cultivation include paddy, maize, millet, cucumbers, gourd, brinjal, pumpkin, beans, potato, ginger, chilli, mustard, cabbage, etc.

Shifting cultivation is deeply integrated with the traditions, faiths and belief systems of North East India. In communal land management practices, land is considered a collective ownership, used and managed by a community. Shifting cultivation is part of this management practices and have profound cultural importance. It is not merely an agricultural practice, but a way of life that is closely linked to the indigenous tribes of the region. Indigenous knowledge about shifting cultivation is indeed a remarkable example of resilience and adaptation to changing environmental conditions by the peoples of North East India. It is a crucial cultural and spiritual tradition that connects them to their ancestors and the land. Festivals associated with shifting cultivation in North East India include Aran, Roje, Ettor, Mopin, Solung of Arunachal Pradesh; Nungchungla, Sabuhog, Senamahi of Manipur; Achiroka, Mangela of Meghalaya; Chapchar Kut, Thlai thar Kut, Thal favang Kut of Mizoram, Mileinyi, Mongmong of Nagaland, etc.

Particularly in hilly terrains, shifting cultivation is considered as better suited to the physical environment than settled forms of agriculture. It helps to grow a variety of crops and vegetables that provides food security to the families that cultivates them. Livelihood of a large tribal population of the region is depended on sifting cultivation. However, shifting cultivation has often been viewed as 'bad land use' due to its perceived negative impacts on the environment, such as deforestation, air pollution, soil erosion, and loss of biodiversity. Increase in population density has reduced the *jhum* cycle which leads to ecological imbalance. Short cultivation cycles often leads to decline in soil quality as it prevents the regeneration of natural vegetation and the restoration of soil fertility. Besides, repeated clearing and burning of land reduces the organic content of soil and disrupt its structure. Removal of vegetation, particularly in hilly areas is crucial due to the increases risk of erosion and landslides.

Forests helps the eco-system by absorbing carbon dioxide (CO2) from the atmosphere. When the forests are cleared for shifting cultivation, the carbon dioxide stored in its biomass including trees and soil is released back into the atmosphere. This contributes to greenhouse gas emissions which in turn contributes to global warming.

Due to the negative environmental impacts associated with shifting cultivation, there has been a concerted effort to stop or reduce this traditional agricultural practice by adopting more productive and sustainable practices. During colonial rule, the British administration attempted to control shifting cultivation and forced many tribal communities to replace it with sedentary agriculture. In post-colonial period, though the central and state governments recognized its cultural significance, policies were formulated to promote sustainable practices. Apart from government policies to regulate shifting cultivation, changes in economic and social structure coupled with other factors contributed significantly in the reduction of this cultivation practice in the region.

Shifting cultivation can be sustainable under specific conditions, particularly when practiced with low demographic densities allowing for longer fallow periods. Besides, it relies on simple tools and techniques, without the need for chemical fertilizers or pesticides, which helps to maintain the natural balance of the ecosystem. The communities associated with shifting cultivation can be considered as custodians of traditional cultures. To overcome the problems of shifting cultivation, it is important to improve the existing system of cultivation.



CHECK YOUR PROGRESS

Q 3. _____ festival of Mizoram is associated with Jhun Cultivation

Add single line for answer :

Q 4. What are the drawbacks of the Jhum Cultivation?

Q 5. Mopin festival is associated with which state of Northeast?



12.5 LET US SUM UP

After going through the unit, you have learnt that-

- The North East Indian region is a biodiversity hotspot, known for its rich biodiversity, diverse ecosystems, and unique geographical features.

- Around 68% of the region is under forest cover, with states like Arunachal Pradesh having up to 80% forest cover.
- The region practices traditional *Jhum* shifting cultivation, involving clearing forest patches, burning vegetation, and cultivating crops, which raises environmental concerns.



12.6 FURTHER READINGS

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12.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1. Manas

Answer to Q 2. The Borail Range

Answer to Q 3. Chapchar Kut

Answer to Q 4. Repeated clearing and burning of land reduces the organic content of soil and disrupt its structure.

Answer to Q 5. Arunachal Pradesh



12.8 MODEL QUESTIONS

A) Very short questions (answer each question within 50 words)

Q 1. Which state in North East India has the highest forest cover percentage?

Q 2. What is the traditional practice of shifting cultivation known as in North East India?

Q 3. Which of the following rivers originates in the Manipur hills?

Q 4. In which state is Deepor Bil situated?

B) Short questions (answer each question within 150 words)

Q 1. Write a short note on the flora and fauna of North East India.

Q 2. State the impact of shifting cultivation on the environment of North East India.

Q 3. Illustrate the role of the Brahmaputra River in shaping the geography and economy of North East India.

C) Long questions (answer each question within 300-450 words)

Q 1. Discuss the ecological significance of North East India.

Q 2. Evaluate the importance of North East India's forest cover in the context of national forest policy goals.

Q 3. Explain the significance of wetlands in the ecological setting of North East India.

Q 4. Analyse the challenges and opportunities associated with the conservation of biodiversity in the unique ecological setting of North East India.

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UNIT 13: LAND USE PATTERN IN NORTH EAST INDIA

UNIT STRUCTURE

13.1 Learning Objectives

13.2 Introduction

13.3 Pre-Colonial Land Use Pattern

- Tenure System During the Early British Days
- Land Utilisation and Cropping Pattern in the Early Nineteenth Century

13.4 Colonial Forestry and the Plantation Economy

13.5 C.P.R (Common Property Resources)

- CPRs and Women

13.6 Customary Rights

13.7 Let Us Sum Up

13.8 Further Readings

13.9 Answers to Check Your Progress

13.10 Model Questions

13.1 LEARNING OBJECTIVES

After going through this unit, you will be able to -

- Explain the land use system of a Northeast Indian state in the pre-colonial period,
- Discuss the colonial impact on forest and plantation and economy of Northeast India,
- Analyse the role of CPR (Common Property Resources and customary rights.

13.2 INTRODUCTION

Dear Learner, in the previous Unit, we discussed the Environmental Setting of Northeast India. In this Unit, we will discuss the Land use patter in Northeast India. Land is an invaluable gift from Earth. The thin layer covering the surface of our continents, serving as a growth medium for plants, is the product of countless years of natural processes. While natural elements

are essential, their misuse and overuse can harm the environment. The extent of land use is influenced by the socio-cultural and economic progress of communities in various environments, leading to the development of different techniques and patterns. Land use is a dynamic process that varies over space and time, with a long-standing impact on the economy and ecology of regions.

Assam has adopted the land use classification system developed by the National Remote Sensing Agency (Dept. of Space, Govt. of India). The main categories defined by the Assam Remote Sensing Application Center include built-up land, agricultural land, forest land, desert land, water bodies, and others. With over 65 percent of its total area dedicated to agriculture, Assam is predominantly an agrarian state. However, increasing population pressure and a lack of job opportunities in other sectors are significantly straining the agricultural sector. This pressure has led to the intensification of agriculture and the fragmentation of farms, posing serious challenges to the state's economy and environment.

13.3 PRE-COLONIAL LAND USE PATTERN

The pre-colonial space of the Northeast was seen as bioregions of many clans occupying different geospatial regions of the original space, bound together mostly by clan/kinship boundaries. The economy was based on subsistence and the political structures were mostly independent. Agriculture and cultivation in Assam and the adjacent hills expanded significantly over the centuries. Reliable information about agricultural practices can be found in the records of the Ahom kings who ruled Assam for 600 years. The economy under the Ahoms was managed through a local system known as the Paik System. Under the system the entire adult male population of the kingdom was organized into units called Khels, each comprising 1000 to 5000 individuals. Each Khel was further divided into smaller units known as Gotes, initially consisting of 4 members but later reduced to 3. The Paiks were divided into two categories, namely: Kari Paik and Chamua Paik. Kari Paiks had to perform manual service or worked as ordinary soldiers, while Chamua Paiks did not perform manual services. In

return for their service, the Paiks were granted land known as Ga-Mati which was cultivable lands. This land was tax-free and meant for cultivation to sustain their families.

In the pre-British era, there was so much cultivable but substandard land that the ownership of these lands was never questioned. As Amalendu Guha (1979) states in the pre-British period, any land that was not wet rice land, could be taken for rent-free seasonal cultivation. Uncultivated land was left as general pasture. In addition, there were some feudal estates owned by the king, nobles, and priests, which were worked by private serfs, serfs or workers assigned to these estates by the state. More than 80% of Assam's land was still untouched by the plough in the late 1800s, and only 3% of the population belonged to the working class. An acquired home and garden lands were considered private property, which included some degree of clan control.

- **Tenure System During the Early British Days:**

In the early British era, Assam's land policy was characterized by the granting of large areas for tea cultivation under various sets of Grant Rules, including the Waste Land Grants Rules of 1838, Old Assam Rules of 1854, and Free Simple Rules of 1862. These rules aimed to promote tea cultivation in the region. Additionally, permanently settled estates, established during Lord Cornwallis's time around 1793, were prevalent in Assam and surrounding areas. The holders of these estates, known as Zamindars, had heritable and transferable rights, constituting the Zamindari system. The Land Revenue (Kushiyara) System in Surma and Barak Valley differed from that in the Brahmaputra Valley, with distinct classifications for different types of estates and tenants. The revenue survey in Sylhet, conducted from 1860-66, led to the implementation of the Illam Settlement Rules of 1876 for resettlement and reassessment of revenue.

In the late 1800s, the tenure system in Assam's Land Revenue Administration consisted of two main categories: land reserved for ordinary cultivation and land under special cultivation that required clearance. The introduction of the Ryotwari system in Assam reduced the number of land holdings. the number of privileged nobility and peasant owners increased.

The different classes of landowners during the British period were as self-employed peasant proprietors, tenant farmers, landlords and farm servants.

The following table gives an outline of land utilisation in Assam in 1903–1904

Classification	Area in sq. miles	Percentage of the of area total geographical area
Total area	28,894	100.00
Net cropped area	7,730	26.75
Current fallow	1,980	6.85
Total occupied area	9,710	33.60
Cultivable waste other than fallow	12,258	42.42
Not available for cultivation	3,148	10.89
Forests	3,778	13.07

Source: Imperial Gazetteer of India (1907)

But despite the transfer of land ownership to tenants under British rule, the monetization of the economy and the payment of rent in cash made the peasants almost poor. The reason for this was the low productivity of the land due to the traditional way of farming, and the farmers were forced to sell a large part of the agricultural products for rent. Although there was a lot of unused land, the farming family, depending on traditional methods, had to plow, plant and harvest with their own hands. These farmers found the extra work to cultivate the land too burdensome. An additional factor was the lack of agricultural labor. Agricultural labor in Kamrup and Goalpara was very scarce and practically non-existent in Central and Upper Assam.

- **Land Utilisation and Cropping Pattern in the Early Nineteenth Century**

Agricultural pattern in Northeast India are largely influenced by physiographic variable topography, different soil types and uneven distribution of temperatures and rainfall etc. About 70% of the area is mountains and hills, red soils, laterites and hilly soils which are mostly from Arunachal Pradesh, Mizoram, Nagaland, Meghalaya, Sikkim and half of Tripura, a fifth of Assam and nine tenths of Manipur. The flood plains of the region are - Brahmaputra Valley of Assam, Barak Valley and Tripura Plain in the south,

the Imphal Valley of Manipur which forms only 10% of the state area. Based on these physical characteristics, the agricultural practices of the region are of two types: Shifting Agriculture (Jhum) and Settled or Conventional Agriculture.

Since much of the area is hilly and inhabitated by various tribal groups, shifting cultivation, which is primitive, subsistence, intensive intercropping, is most common. It is mainly practiced by tribals in all regions of Arunachal Pradesh, the hilly region of South Assam, the hilly regions of Tripura, Mizoram, Nagaland and the Kukis the hilly Nagas of Manipur region. On the other hand, plain or settlement culture is generally practiced in the fertile floodplains of Assam, the plains of southern Nagaland, the Brahmaputra plain of southern Arunachal Pradesh, the Barak valley and the plains of the Tripura and Central Imphal valleys from Manipur.



LET US KNOW

After Independence, the main land reforms acts enacted in Assam were:

(i) The Assam Fixation of Ceiling on Land Holding Act, 1956;

(ii) The Assam State Acquisition of Land Belonging to Religious or Charitable Institutions of Public Nature Act, 1959;

(iii) The Assam (Temporarily Settled Areas) Tenancy Act, 1971



CHECK YOUR PROGRESS

Q 1. Paik system was introduced by which dynasty?

.....

Q 2. Ryotwari system was introduced in which of the North Eastern State of India?

.....

13.4 COLONIAL FORESTRY AND THE PLANTATION ECONOMY

The rise of British rule in India coincided with the development of capitalism. Merchant capitalism began with the desire to secure trading rights. With the British Industrial Revolution, the prosperity of British industry forced Britain to import raw materials and export finished goods. The need for new markets led to the conquest of new lands and this process led to the consolidation of British power in Northeast India. The history of Assam, especially the Brahmaputra Valley, has experienced prolonged contact with mainland India. The fertile land and wealth of natural resources attracted the colonial government to start its business first in the Brahmaputra valley. Thus, the colonial power wasted no time in expanding its jurisdiction with the Treaty of Yandaboo in 1826. After the treaty was signed, the British conquered the plains of Assam and declared the plains of Manipur and Tripura as protectorates. It started the tea plantations from 1830s. The government initiated a policy of conservation and protection of forest products because the forest resources are depleting fast in the Western Ghats, West Bengal, Southern Himalayas, etc. The policy also aimed at securing commercial benefits of colonial power at the same time implementing effective measures to maintain forest-based communities' unfettered access to forest production.

The Imperial Forest Department of British India was established in 1864 to manage the forest resources of the state and achieve orderly and systematic financial returns. The department followed a general policy of dividing jurisdiction into three categories. Valuable forest areas were immediately declared as reserve and others were declared as protected and unclassified forest. The colonial government brought railways across the Indian subcontinent to facilitate the extraction of resources from India. This strategic innovation seriously affected the masses of India in general and the forests and natural resources in particular.

The plains of Assam were dominated by colonial rule and the division of forests mentioned above, but the hill regions were under conditions of

imperial control. There can be several reasons why the colonial forest policy in the mountainous regions differed from the forest policy of the plains. One of the most important factors was the political status of those regions. Another important reason could be the geographically desert areas of the mountainous regions of the Northeast, where the construction of roads and railways was very difficult. In 1899, there was no road except from Demagiri (located on the India-Bangladesh international border) to Lungli. Therefore, the only commercial means to mine the Lushai Hills was the river route through Bangladesh via the Chittagong port. The land is a source of agriculture, plantations and natural resources. Inland farming is different in the plains and hills. The proportion of plains in Assam is higher than that in other northeastern states. In the hilly areas, traditional farming was jhum farming. Moreover, jhum cultivation would continue in a circular fashion. The main crops grown in Northeast India are jute, fruits, tea, pulses, coconut, potato, areca nut, rice, wheat, maize, oilseeds, sugarcane, ginger, mesta, spices, pineapple, banana, papaya. In the hilly areas of the Northeast individual ownership of agricultural land is absent as it belongs to the community. However, in the customary areas of the region, inhabited by both tribals and non-tribals, individually transferable and hereditary rights are recognized as like the other parts of India. In tribal areas, village community led by Gaon Budha/Village Head allocates land for individual cultivation. He works for the community and the land is distributed in the traditional way.

The rise of the tea industry in Assam profoundly shaped the colonial landscape, transforming the region's economy and society. Following the East India Company's loss of its Chinese tea monopoly, the discovery of indigenous tea plants in Assam in the early 19th century presented a strategic opportunity for Britain. The colonial government, initially experimenting under Chinese guidance, soon shifted tea cultivation to private companies like the Assam Company, which spearheaded production outside China. Colonial land policies, particularly the waste land settlement rules, facilitated the acquisition of vast tracts of land by European planters at minimal cost. These rules, often revised to favor planters, enabled them to amass far more land

than required for tea cultivation, leading to significant land hoarding and displacement of indigenous communities. While only a small portion of this acquired land was used for tea gardens, the remaining 'wasteland' remained largely unused, exploited for resources like timber, or hoarded to prevent competition. These policies significantly favored European planters, offering them preferential revenue terms and rent-free land grants compared to local farmers who faced higher taxes and harsher land revenue systems. This led to the displacement of indigenous tribes who relied on jhum cultivation (slash-and-burn agriculture) and the forced relocation or displacement of many farmers. The plantation economy's reliance on imported labor further marginalized the local population from participating in the burgeoning industry. While the tea industry brought economic growth, the majority of profits flowed back to Britain, with limited reinvestment in Assam's economy. This colonial-era legacy not only fostered economic inequality but also disrupted traditional land-use practices, leaving a lasting impact on the region's agricultural structure and the livelihoods of its inhabitants.

The colonial plantation economy in Assam was not solely reliant on tea; rubber plantation also played a significant role. In colonial Assam, vast tracts of land in the districts of Kamrup, Darrang, Nowgong, Sibsagar, and Lakhimpur were covered by Indian rubber forests. The growing global demand for rubber necessitated the preservation of existing rubber forests and the establishment of new plantations. Recognizing this opportunity, the British government established state-owned rubber plantations. This expansion of rubber production proved highly lucrative, leading the colonial government to establish a monopoly over its cultivation. These initiatives often involved the acquisition of vast tracts of land, frequently displacing indigenous communities and disrupting traditional land-use practices like jhum cultivation. Colonial land policies consistently favored European planters, granting them access to large land parcels while marginalizing local communities. This approach, prioritizing short-term economic gains over the long-term health of the environment and the rights of indigenous people, had profound social and environmental consequences.



CHECK YOUR PROGRESS

Q 3. What was the impact of the introduction of tea plantations on the tribal land?

.....

Q 4. In which year did the British pass the Forest Act in India?

.....

13.5 C.P.R. (Common Property Resources)

Resources are classified according to their physical nature, ownership and use. Property rights are privileges recognized legally and socially by the communities and state. There are four forms of ownership in society: private, public or state ownership, commons and free access. The most common form is private property, where individuals, households, or groups (such as communities and businesses) own resources with the exclusive right to use them, prevent others from using them, and trade them.

Public goods, or proprietary resources, are not owned by any individual or company, and usually anyone can use or enjoy them. They enable collective use and consumption, often indivisible. Examples of public property include natural and environmental resources, National parks, rivers, waterways, oceans, marine fisheries in Exclusive Economic Zones (EEZ), etc. Other examples include state mineral units, municipal corporations and the National Highway Authority, which owns public roads. Public goods are also considered property of the state because it is the sole owner of the resources or property.

Commonly owned resources known as Common Property Resources(CPRs) are important sources of livelihood for rural households in general and the rural poor in particular. They provide both material and immaterial support to thousands of people. This is especially true for the Northeastern states which are hilly areas and mainly inhabited by the tribal communities. Here agriculture is the main means of livelihood for the majority of its population, where 47.4 percent population work as farmers and 11.41 percent engage as agricultural laborers. Thus, agriculture plays an important

role in the economy of the region, but other sectors are neglected. Around 70-75 percent workforce depends on primary sector compared to 66 percent in India, while more than 20 percent is engaged on the service sector. These figures highlight the role played by CPRs in the livelihood of the people in this region. CPRs are community assets that provide both material and immaterial benefits to those who are dependent on them. These include land used for cultivation and grazing, non-timber (NTFP) harvesting forests, waste and panchayat lands, watersheds, rivers, streams, ponds and other community assets. Some define CPRs by ownership and others by use. Most CPRs include only natural resources such as land, forests and water sources. Others involve the maintenance of all subordinates, such as marine fishing. Thus, the term CPR is used in different ways. In general, they refer to resources that are shared and whose physical characteristics are difficult to delineate. They provide staple foods from jhum (shifting) or other forms of cultivation, as well as NTFPs such as edible fruits, leaves and vegetables, small timber and medicinal plants.

The meaning of the term CPR in Northeast is different from other places of India. Land classification is difficult in the region. Each state, and sometimes a community, has its own classification. J. B. Ganguly (1978) mentions three categories: land held in common by the village, land owned by the chief distributed among individual families, and land owned by individual families.

Among the Northeastern states Arunachal Pradesh, Meghalaya, Mizoram and Nagaland are mostly dominated by the tribes while the rest are primarily non-tribes. Each state defines CPRs differently. There are three types of land in areas outside Assam- *patta* (private property), *Aksonia* (temporary) *patta* and non-patta or *Khasi* land or CPR. *Patta* land belongs in perpetuity on payment of tax. *Axonia patta* is usually one year. *Khasi* land is considered state property and its inhabitants are treated as encroachers. This definition does not apply in Sixth Schedule areas where the village head has a role under the District Autonomous Council and defines common law CPRs. However, the land is under the direct control of the DAC. According to the customary laws of most other tribes, CPRs are land set

aside by the tribe for its members without private ownership. Among the Nagas of Manipur, land is under the authority of the village council or clan, and alienation is not permitted under customary law. For the Kuki tribe, private ownership of land does not exit. Here, each village head owns the land and the jhum grower pays rent to the headman varying from 3 to 5 tins. The right of a head is not proprietary or hereditary in nature, and his office is passed from one relative to another by rotation. Thus, according to the customary laws of all tribes, the land of the community is the collective property of the inhabitants of the local government. Although the administration of CPR varies from tribe to tribe, there are some commonalities. For example, customary law determines the use of village land and forest. The common mineral resources of the village area are at the disposal of the entire community. No person has sole ownership of community property. The territory of each tribe is well defined and each village has a permanent border.



CHECK YOUR PROGRESS

Q 5. Give an example of Common Property Resource.

.....

Q 6. What is meant by CRPs?

.....

13.6 CUSTOMARY RIGHTS

To understand customary rights, we must understand what custom is. It is a custom that has acquired the force of law due to its widespread use and long-standing practice. A custom is a usage that entitles a group of people belonging to a certain area of a certain community to hold rights over certain other people or things in the same community. In fact, it is one of the oldest sources of legal remedies. In terms of land and resources, 'Customary rights' refer to the long standing practices of indegenous people, or communities in their usage of land natural resources. Customary rights are generally not written is texts but it exists on its own merit. It is a result of repeated practice over time within a group or community and accepted widely.

Some of the basic features of custom include:

- **Antiquity**: Custom must have existed since ancient times to be recognized as a legal right. The existence of a custom is characterized by its antiquity.
- **Continuity:** A custom must have been, to be recognized, practiced over a period of time. It must be recognized by the practicing community and acceptable in the circumstances of the case.
- **Peaceful Enjoyment:** The customary should have arisen by consensus, as most traditions arise naturally and not contested for a long time.
- **Reliability:** Customary rights must have wide applicability and acceptability in the community.
- **Following the Law:** Customary rights have the force of law. However, most legal systems have a positive rule that law can override custom.



CHECK YOUR PROGRESS

Q 7. What do you mean by Customary rights?

.....

Q 8. What are customary rights in India?

.....



13.7 LET US SUM UP

After going through this unit, you have learnt that–

- Forests were an integral part of the entire agricultural economy in 19th century India.
- The land use pattern underment changes is the colonial regime in Northeast India. This was true for agriculture as well as other economic sectors.
- Selective integration of local forestry and forest harvesters' skills and local knowledge base into the global industrial capitalist system had a negative impact on local artisan economies from the late 1800s onwards.

- The introduction of these three factors also meant that the implementation of scientific forestry was based not only on imperial requirements but also on local and regional factors, the interaction of which determined the diversity and impact of colonial interventions in India.



13.8 FURTHER READINGS

1) Saikia, Arup Jyoti. (2011). *Forest and Ecological History of Assam, 1826-2000*, Oxford University Press.

2) Handique, Rajib. (2004). *British Forest Policy in Assam*, Concept Publishing Company, New Delhi.

3) Gadgil, M. and Guha, R. (1992). *The Fissured Land: An Ecological History of India*. Oxford University Press.

4) Guha, Amalendu. (1991). *Medieval and Early Colonial Assam: Society, Polity, Economy*, South Asia Books.



13.9 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: Ahom Dynasty

Answer to Q 2: Assam

Answer to Q 3: Forced displacement and labor exploitation

Answer to Q 4: 1882

Answer to Q 5: Community land

Answer to Q 6: Community resource to which each member has a right of access and use with certain responsibilities without being owned by anyone.

Answer to Q 7: Customary rights are based on customs and traditional practices.

Answer to Q 8: Customary rights recognized by a court over a long period of time become customary laws.



13.10 MODEL QUESTIONS

A) Very Short Question (answer each question in around 50 words) :

Q 1. What are the main categories of land in North East India?

Q 2. What fundamental changes did Ryotwari systems bring about in the traditional land system of the region?

B) Short Questions (answer each question in around 150 words) :

Q 1. Write a short note on land use pattern in Assam.

Q 2. Discuss the customary rights of forest dwellers.

C) Long Questions (answer each question in around 300-450 words) :

Q 1. Explain early colonial policies on forest resources.

Q 2. Briefly discuss the impact of colonial forest policy in North East India.

*** ***** ***

UNIT 14: POST-COLONIAL ENVIRONMENTAL SITUATION

UNIT STRUCTURE

14.1 Learning Objectives

14.2 Introduction

14.3 Natural Disaster

- 14.3.1 Causes Responsible for Natural Disasters
- 14.3.2 Natural Disasters in Post-colonial India
- 14.3.3 The 1950 Earthquake

14.4 Colonial Continuum

- 14.4.1 Extension of Plantation Economy

14.5 Flood and Erosion

- 14.5.1 Flood and Erosion in Assam

14.6 Big Dams and Resistance

14.7 Let Us Sum Up

14.8 Further Readings

14.9 Answers to Check Your Progress

14.10 Model Questions

14.1 LEARNING OBJECTIVES

After reading this unit, you will be able to

- explain the environmental conditions in a post-colonial setting,
- discuss the impact of development on the environment,
- analyse the environmental conditions is Assam and its effect.

14.2 INTRODUCTION

Dear learness, is the previous unit, we discussed about the land use pattern in N.E. India. In this unit we will discuss the significant environmental concerns like natural disasters, development policies and their impacts on the environment etc. In the pursuit of progress and a better future, the importance of environmental concerns cannot be overstated. The decision to undertake major development projects, such as constructing mines, dams,

or roads, must consider their potential negative impact on the environment. This debate between development and environmental conservation is ongoing and poses a significant challenge for countries worldwide. For example, the exploitation of mining and coal reserves in forested areas not only affects the flora and fauna but also the livelihoods of forest inhabitants who depend on these resources. Often, these communities are excluded from the decision-making processes surrounding development projects. In light of these issues, it is crucial to consider whether depleting natural resources for immediate development goals is justifiable. Shouldn't there be a greater emphasis on sustainable development and accountability for the environmental consequences of development actions? These are pressing questions that demand careful consideration and a balanced approach towards progress and environmental stewardship.

14.3 NATURAL DISASTER

A natural disaster is an undesirable event caused by natural forces beyond human control, occurring suddenly with little or no warning. These events result in significant disruption of life and property, including loss of life and widespread damage, requiring extraordinary efforts beyond the capacity of normal emergency services. Natural disasters include events such as earthquakes, hurricanes, floods, droughts, tsunamis, and volcanic eruptions etc.

Natural disasters in India, often influenced by its diverse climate, frequently result in significant loss of life and property. The country faces various risk factors, including droughts, floods, cyclones, heavy rains, landslides triggered by excessive rainfall, and snowstorms. These disasters can also be caused by earthquakes, volcanic eruptions, avalanches, and tropical storms. India also contends with dust and thunderstorms, particularly prevalent in the north, causing extensive damage to property and agriculture, displacing soil in arid regions. Hailstorms are another common occurrence, severely impacting crops such as rice and wheat and affecting numerous individuals across the country. In recent years, India has witnessed several serious natural disasters. For example, the Kerala floods in 2018 resulted

in widespread devastation, with hundreds of people losing their lives and thousands being displaced. The 2020 Cyclone Amphan, one of the strongest cyclones ever recorded in the region, caused extensive damage to infrastructure and agriculture in West Bengal and neighboring areas. The 2013 Uttarakhand floods were another major disaster, leading to significant loss of life and property in the region. Assam, in northeastern India, is prone to natural disasters such as floods and landslides. The state experiences annual floods during the monsoon season, affecting millions of people and causing widespread damage to crops and infrastructure. These events highlight the ongoing challenges India faces in managing natural disasters and the importance of preparedness and mitigation efforts.

14.3.1 CAUSES RESPONSIBLE FOR NATURAL DISASTERS

Natural disasters are complex events that result from a combination of natural forces, human activities, and socio-economic factors. They are primarily occurred due to the natural processes or the forces of the earth. These forces can include geological factors such as earthquakes, volcanic eruptions, and tsunamis, which result from movements in the Earth's crust or volcanic activity and Climatic factors such as hurricanes, tornadoes, floods, and droughts are caused by atmospheric conditions and weather patterns. Human activities on the nature or earth are also responsible for different natural disasters. Manmade factors such as deforestation, urbanization, and land-use changes can lead to increased vulnerability to events like floods and landslides. Climate change, driven by human activities such as burning fossil fuels, has also been linked to an increase in the frequency and intensity of some natural disasters, such as hurricanes and heatwaves. Other factors that contribute towards the vulnerability of disasters are such as population explosion, poverty, development policies etc.

14.3.2 NATURAL DISASTERS IN POST-COLONIAL INDIA

With the extended climate change driven by both natural or manmade factors the Earth has become more disaster prone. India lies on the Indian plate which is a sub tectonic plate fragmented from the Gondwanaland, bordered by the major plates namely the Eurasian plate, Arabian plate, African plate and Australian plate. Like the other parts of the world, India is too becoming more disaster prone day by day. Some common natural disasters that occurs in India frequently are such as flood, tsunami, earthquakes, hurricane, cyclone, famine, drought, erosion etc. Let us discuss about few major natural disasters occurred in the post-colonial India.

The Indian Ocean Tsunami (2004): On December 26, 2004 a great tsunami hit the coastal areas of about twelve countries of South and South East Asia. It struck following a massive undersea earthquake with a magnitude of 9.1. The tsunami waves, reaching heights of up to 30 feet, crashed into the Indian coastline, causing widespread destruction. The tsunami devastated coastal areas of India, particularly in the southern states of Tamil Nadu, Andhra Pradesh, and the union territory of Andaman and Nicobar Islands. In India alone, the disaster resulted in tens of thousands of deaths and extensive damage to infrastructure, homes, and livelihoods. The ecosystems of the coastal areas too suffered long-term damage.

The Bhuj Earthquake (2001): On 26 January, 2021 a great earthquake, with a magnitude of 7.6, struck the state of Gujrat. Gujarat's location, 400 km from the India-Eurasia plate boundary, makes it prone to seismic activity, acting as a transitional zone between stable and active regions. The earthquake's epicenter was approximately 70 km northeast of Bhuj, with shaking felt as far as Pakistan and northwestern India. Unofficial reports estimating over 100,000 fatalities due to the earthquake, though official figures were around 20,000. More than 300,000 buildings were destroyed, including critical infrastructure like dams, ports, roads, and bridges. Nearly 800,000 buildings were damaged in Gujarat alone, impacting cities like Kachchh, Ahmedabad, Jamnagar, Rajkot, and Surendranagar. The earthquake also

left over a million families homeless. Liquefaction was severe, observed in areas near the epicenter and the Rann of Kachchh, causing groundwater to surface and geysers to form.

The Orissa Super Cyclone (1999): On October 29, 1999, the Super Cyclone, also known as the Paradip Cyclone, struck Odisha, unleashing wind speeds of up to 250 kmph. The cyclone resulted in the tragic loss of approximately 10,000 lives and caused extensive damage in its path. Referred to as the "Black Friday Tragedy," the cyclone flattened hundreds of thousands of houses, uprooted trees, and devastated infrastructure. Numerous livestock perished, while paddy and other crops were submerged, impacting hundreds of thousands of people. Coastal life in Orissa came to a halt, with large areas inundated along the coastline. The cyclone wreaked havoc in coastal districts like Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Puri, and Ganjam.

India's approach to disaster management underwent a significant shift following major disasters like the Orissa Super Cyclone in 1999, The Gujarat earthquake (2001), and the Indian Ocean Tsunami (2004). Before the 1990s, the focus was primarily on relief and response efforts, with limited investment in early warning systems. However, the establishment of State Disaster Management Authorities (SDMAs) in Odisha in 1999 and Gujarat in 2001 marked a turning point. These authorities spearheaded systematic actions for preparedness and response, setting the stage for the National Disaster Management Act of 2005. This act prompted substantial investments in early warning systems, emergency shelters, and compensation for affected individuals.



CHECK YOUR PROGRESS

Answer the following:

Q 1: Which of the following is a man-made disaster?

a. Terrorism b. Major Fire

c. Pollution d. All of the above

Q 2: Name the instrument which records earthquake wave?

a. Climograph b. Seismograph

c. Hythergraph d. None of the above

14.3.3 THE 1950 EARTHQUAKE

On August 15, 1950, as the nation was celebrating its fourth Independence Day, the northeastern region of India experienced a tragic disaster. While the country rejoiced, this corner faced devastation. At 7:39 pm that evening, a powerful earthquake with a magnitude of 8.6 struck the region, claiming hundreds of lives and ruing thousands of houses. The epicenter was located approximately 20 miles underneath Rami town in Tibet bordering the Anjaw district of Arunachal Pradesh. The intensity of the quake was so high that so many aftershocks were occurred in the next three consecutive days. The quake triggered massive landslides, blocking many streams in the hilly terrain. These streams changed their color, carried sulphurous and other materials, and emitted a foul smell for miles. The fish in these waters perished, and the waters carried the remains of villages, animals, including cattle and elephants, and large amounts of timber. Paddy fields were flattened, grain stocks were washed away, and several tea gardens suffered extensive damage.

The Assam Valley had experienced significant strong earthquakes earlier also. On June 12, 1897, a massive earthquake with a magnitude of 8.3 shook the southern region of the Valley. Even in Calcutta, a major city in West Bengal nearly 700 miles south of the epic center, buildings collapsed and many people lost their lives. But the Great Assam Earthquake with a magnitude of 8.6 remains one of the ten strongest earthquakes recorded since seismic measurements began over a century ago. After the great quake, about 54 quakes shook the region till the month of April, 1951.

The earthquake in 1950 had caused severe loses. Though as per official records 1526 people lost their lives, more than 30,000 people injured and 4000 houses were ruined, the actual number must have been so higher. The great earthquake of 1950 destroyed almost the entire transport system in Assam. The highways and railway lines were cracked; bridges were broken to pieces in many parts of the region. Boat movement was stopped in the Brahmaputra river and its tributaries due to floating of thousands of trees. It caused heavy lose to the nature as well. Thousands of animals died and aqua culture was devastated.

The earthquake severely disturbed the physical setting of the region. As a result of the quake the bed of the river Brahmaputra came up which resulted in severe floods and land erosion in the valley till today. Various geographical changes took place due to the quake including creation of fresh water bodies, changes in the course of the rivers and devastating landslides. At Sadia, due to heavy landslide the Lohit, a tributary of the river Brahmaputra stopped flowing and once it broke up the water of the river Lohit wiped out the Sadia town. The earth caved in developing cracks and gorges at many places such as North Lakhimpur, Sadiya, Pashighat etc. In many places the land became unsuitable for cultivation causing serious displacement of indigenous peasant communities. As already mentioned, the earthquake of 1950 had caused serious geographical and topographical changes that till date the valley has to suffer devastating floods and river bank erosions. The earthquake resulted in significant amounts of silt being carried by the tributaries and deposited on the Brahmaputra riverbed disrupting the river's equilibrium and causing river bank erosion. Subsequently, the tributaries contributed to periodic flooding affecting millions of people in the valley. After the great earthquake the Brahmaputra Valley had witnessed devastating floods in the succeeding years such as the foods in 1954, 1962, 1972, 1984, 1988, 1998, 2004 and more.



LET US KNOW

The biggest recorded earthquake within the world was a magnitude 9.5 (Mw) in Chile on May 22, 1960. When the Chilean earthquake happened, seismographs recorded seismic waves that traveled all around the soil. These seismic waves shook the whole earth for many days, this phenomenon is called the free oscillation of the Earth.



CHECK YOUR PROGRESS

Answer the following :

Q 3. The Magnitude within the Richter Scale of the Earthquake in 1950 in Assam was:

a. 8.6 b. 5.9 c. 6.7 d. 8.5

Q 4. The Orissa Super Cyclone is also known as…....

a. Pradip Cyclone b. Cyclone Fani

c. Amphan Cyclone d. None of the above

14.4 COLONIAL CONTINUUM

The concept of the colonial continuum can be observed in India's environmental situation, particularly in the context of post-colonial development. The period following India's independence from colonial rule saw a strong emphasis on development, mirroring global trends where newly independent nations sought economic prosperity and modernization. This era of development, however, was marked by a continuation of certain colonial practices and ideologies, leading to environmental degradation and challenges in balancing developmental goals with ecological concerns.

The colonial continuum in regard to post-colonial environmental situation in India can be observed from the inherited development models that prioritized economic growth ignoring the environmental costs similar to the goals of colonial rulers; the exploitation of natural resources for development through projects such as mining, dam construction, and urban development leading to deforestation, habitat loss, and pollution; failure to look after for traditional ecological knowledge and sustainable practices of indigenous communities etc.

During the 1970s and 1980s, India witnessed a series of environmental movements such as the Chipko movement in Uttarakhand, Appiko Movement in Karnataka and the Narmada Bachao Andolan in Madhya Pradesh, which aimed to protect forests, rivers, and indigenous communities from environmental degradation and displacement due to large-scale development projects. With the rise of environmental movements, the environmental

concerns gained widespread attention and support leading to the emergence of environmental history as a sub-genre of Indian history.

14.4.1 EXTENTION OF PLANTATION ECONOMY

The extension of the plantation economy in post-colonial India reveals a complex interplay of economic, social, and environmental factors. Plantation crops like tea, coffee, and rubber have played a crucial role in the region's economy, offering high economic value and substantial employment opportunities, particularly for women. The sub-tropical climate of Northeast India is highly conducive to the cultivation of these crops, making them an attractive option for farmers and large-scale plantations alike.

Tea was introduced in Assam, West Bengal, and Tripura during the 19th century as an industrial crop by the colonial government. It has spread to other states in the region in post-colonial period. Currently, tea covers 83% of the plantation crop area in Northeast India, with other crops like coffee, rubber, coconut, arecanut, oil palm, and cashew also gaining importance.

Despite the economic benefits, the plantation sector, especially the tea industry, has faced challenges such as declining productivity and profitability. Factors contributing to this decline include aging tea bushes, lack of timely replanting, and increasing costs of cultivation. These challenges have led to a crisis in the tea sector's competitiveness in both domestic and international markets. The expansion of the plantation economy has had significant environmental implications. The concentration of plantations in environmentally sensitive areas has raised concerns about deforestation, loss of biodiversity, and soil degradation. Practices like felling of shade trees for fuel and unsustainable farming methods have further exacerbated these environmental issues. Moreover, the plantation sector's impact on local communities has been a subject of debate. While plantations provide employment and income opportunities, particularly for small and marginal farmers, they also face challenges such as land alienation, low wages, and poor working conditions. The reliance of these communities on plantation crops as their primary source of income makes them vulnerable to

fluctuations in market prices and environmental changes. The issue of low wage is an ongoing issue among the plantation workers. The past decades witnessed death of numbers of tea garden workers in several parts of the country including Darjeeling and Assam due to starvation. Despite their integral role in producing high-quality tea, these workers struggle to secure even their basic necessities, such as food and shelter. The post independent Indian tea gardens witnessed numerous protest both peaceful and violent in demands for wage hike and fulfillment of basic living conditions.



CHECK YOUR PROGRESS

Q 5. Tea covers ……% of plantation crops in North East India?

a. 75% b. 83% c. 45% d. 85%

Q 6. Mention two challenges faced by local communities due to the plantation economy.

14.5 FLOOD AND EROSION

Floods and erosion are significant natural disasters in India, often attributed to heavy rainfall, river embankments, dam collapses, storms, tsunamis, deforestation, and urbanization. While floods are categorized as natural disasters, they are also influenced by human activities. The Himalayan region, with its high precipitation and sudden altitude changes, contributes significantly to flooding in India. Deforestation in the Eastern Himalayas has increased surface runoff, leading to sediment deposition in riverbeds and reducing their carrying capacity. This, coupled with the construction of large dams in upstream regions like Arunachal Pradesh, exacerbates the flood risk. Heavy rainfall is a primary cause of flooding in India. When there is excessive rainfall, the soil cannot absorb all the water, leading to surface runoff and flooding. River embankments, if not properly maintained, can also contribute to floods by obstructing natural water flow. Dam collapses, often due to old infrastructure and heavy rainfall, release large volumes of water downstream, causing floods. Storms, hurricanes, and tsunamis can also cause coastal flooding, leading to widespread damage. Deforestation

and lack of vegetation increase soil erosion and reduce natural flood mitigation, while urbanization reduces the earth's absorption capacity, leading to increased surface runoff and flooding.

14.5.1 FLOOD AND EROSION IN ASSAM

Floods and erosion in Assam present a unique and severe challenge, unlike any other state in India. The extent and duration of floods, as well as the magnitude of erosion, make these issues particularly acute. Floods and erosion in Assam pose significant challenges to the state's economy, agriculture, and infrastructure. According to the Rastriya Barh Ayogi (RBA), approximately 39.58% of Assam's total area is flood-prone, accounting for about 9.40% of the country's flood-prone areas. The state experiences an average annual flood area of 9.31 lakh hectares, significantly higher than the national average. The total floodplain area of the country is about 10.2% of the total area of the country, but the floodplain area of Assam is 39.58% of the state area.

Major floods have occurred in Assam in various years since independence, causing significant damage and loss of life. During the post-independence period, Assam was hit by major floods in 1954, 1962, 1972, 1977, 1984, 1988, 1998, 2000, 2004, 2012 and more recently in 2022. The average annual loss due to floods in Assam is around Rs. 200.00 crores.

The problem of floods in Assam is further compounded by flash floods from neighboring states like Arunachal Pradesh and Meghalaya. These flash floods, often caused by heavy rains and cloud bursts, have led to widespread destruction and loss of life in Assam. For instance, severe flash floods hit Meghalaya's tributaries along the south bank of the Brahmaputra in lower Assam in 2004 and 2014, caused by intense cloud activity. Similarly, in August 2011, the Gainadi and Jiadhal rivers in the Arunachal Pradesh catchment area experienced extremely severe flooding due to intense cloud bursts.

River bank erosion is another major challenge in Assam. The state faces a significant challenge from the erosion of its riverbanks, including the Brahmaputra River, Barak River, and their tributaries. Over the past six decades, erosion has claimed more than 4.27 lakh hectares of land in Assam,

which accounts for 7.40% of the state's total area. The average annual land loss is estimated to be close to 8,000 hectares. Due to erosion, the width of the Brahmaputra River has expanded by up to 15.00 kilometers in certain areas. According to surveys, the area covered by the river Brahmaputra has increased about 2200 km^2 between 1928 to 2006.

14.6 BIG DAMS AND RESISTANCE

Several major dams had been constructed in India that play a crucial role in irrigation, hydroelectric power generation, and water resource management as one of the main component development in the post-colonial period. Though the large dams in India have been instrumental in meeting the water and energy needs of the country they pose some serious challenges including Large dams in India have been instrumental in meeting the country's water and energy needs, but they pose several challenges.These include the displacement of tribal or marginalized communities living in the dam's reservoir area, environmental impact such as altering river ecosystems, disrupting fish migration patterns, and causing loss of biodiversity. They also led to deforestation, soil erosion, and changes in water quality. It is also noticed that increased siltation resulting from large dams leads to reduced water availability in the downstream and increased risk of flooding in the reservoir area. Moreover, due to large dams' seismic risk poses a significant threat to downstream communities during major earthquakes etc.

Some major dams constructed in post-colonial period in India includes the Sardar Sarovar Dam or the Narmada Dam located on the Narmada River in Gujrat, Tehri Dam situated on the Bhagirathi River in Uttarakhand, Bhakra Nangal Dam located on the Sutlej River in Himachal Pradesh, Polavaram Dam located on the Godavari River in Andhra Pradesh etc. All these major dams led to displacement of thousands of local families mostly from tribal and marginalized communities. The government faced significant opposition from environmentalists and local communities. The Narmada Bachao Andolan (NBA) is significant among them. Led by activist Medha Patkar, the protesters raised voice against the dam, highlighting issues of displacement, environmental degradation, and inadequate rehabilitation of affected communities.

14.6.1 SUBANSIRI LOWER HYDROELECTRIC PROJECT (SLHEP)

The Subansiri Lower Hydroelectric Project (SLHEP) or Lower Subansiri dam located in the upstream of the Subansiri River in Arunachal Pradesh and Assam is a major under construction dam in North East India. The National Hydroelectric Power Corporation (NHPC) ltd. run project is expected to supply 2000 MW power after its completion.

However, the Project has been a subject of significant protest and controversy in Assam and Arunachal Pradesh. The proposed dam faced strong opposition from various groups in Assam, including environmental activists, civil society organizations such as All Assam Student's Union (AASU), Asom Jatiyatabadi Yuba Chatra Parishad (AJYCP), Krishak Mukti Sangram Samiti (KMSS) etc. and political parties. The concerns raised by protesters included the potential impact of the dam on the environment, livelihoods, and the cultural heritage of the region particularly regarding the submergence of large areas of land, loss of biodiversity, and disruption of local ecosystems. They argued that the dam would have severe consequences for the region's ecology and biodiversity. Critics argued that the dam would lead to the displacement of a significant number of people, disrupting their lives and livelihoods. Another key issue raised by protesters was the safety of the dam. There were concerns about the dam's ability to withstand natural disasters such as earthquakes, which are not uncommon in the region.



14.7 LET US SUM UP

After going through this unit, you have learnt that–

- Development projects must consider their environmental impact, especially in forested areas, to avoid negative consequences on flora, fauna, and livelihoods.
- India's post-colonial environmental situation reflects a continuation of certain colonial practices, leading to environmental degradation.

- The extension of the plantation economy, particularly in tea, coffee, and rubber, has economic benefits but also poses challenges such as declining productivity and environmental issues.
- Floods and erosion, especially in Assam, are major challenges, with floods affecting millions annually and erosion claiming significant land over the years.
- Large dams, while meeting water and energy needs, also lead to displacement of communities and environmental concerns.



14.8 FURTHER READINGS

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14.9 ANSWERS TO THE CHECK YOUR PROGRESS

Ans to Q No 1: d. All of the above

Ans to Q No 2: b. Seismograph

Ans to Q No 3: a. 8.6

Ans to Q No 4: a. Pradip Cyclone

Ans to Q No 5: b. 83%

Ans to Q No 6: Land alienation and poor working conditions are two problems faced by local communities due to extension of plantation economy.

14.10 MODEL QUESTIONS

A. Very Short Questions (answer each question in about 50 words)

Q 1. What were the consequences of the great earthquake of 1950 at Sadiya.

Q 2. Name two development projects in post-colonial India which reflect colonial continuum.

Q 3. Mention two challenges posed by the plantation economy.

B. Short Questions (answer each question in about 150 words)

Q 1. What are the main causes and effects of natural disasters in India?

Q 2. Write a short note on flood and erosion in Assam.

Q 3. What are the challenges posed by big dams?

C. Long Questions (answer each question in about 300-500 words)

Q 1. Discuss the post-colonial environmental situation in India.

Q 2. Discuss the 1950 Assam earthquake and its aftermath?



*** ***** ***

UNIT 15: ENVIRONMENTALISM AND INDIA

UNIT STRUCTURE

15.1 Learning Objectives

15.2 Introduction

15.3 Environmentalism in India

- Colonialism as an Ecological Watershed

15.4 NGOs

15.5 Judicial Activism

15.6 Climate Change and India's International role

15.7 Problem of Waste and Waste management

15.8 Swatchh Bharat Abhiyan

15.9 Let Us Sum Up

15.10 Further Reading

15.11 Answer to check your progress

15.12 Model Questions

15.1 LEARNING OBJECTIVES

After going through this Unit, you will be able to-

- explain post-colonial environment related activism in India,
- Explain the role of NGOs in the Indian environmental context,
- Discuss the concept of environment law and its development in the Indian legal system,
- Discuss the effects of climate change and India's position in the global world and,
- Discuss the issue of waste management and the Swacch Bharat Abhiyan scheme

15.2 INTRODUCTION

Dear Learner, in the previous Unit, we discussed the environmental setting in the post-colonial times. While the previous Unit dealt with natural disasters, this particular Unit focusses on activism and policies that were taken up to tackle the issues of climate change, waste management etc.

The term 'Environmentalism' refers to a broad set of ideologies and social movements aimed at protecting and enhancing the natural environment. It includes protection of animals, plants, humans, and non-living factors impacted by environmental changes. Environmentalism advocates to keep a balance between humans and nature, promoting the conservation, restoration, and enhancement of crucial earth system components and processes such as climate, pollution control, and protection of biodiversity. It also focuses on raising awareness about the importance of the environment to humans and other living beings, aiming for sustainable and peaceful coexistence with nature.

Environmental issues in India have become a critical concern, especially as the country experiences rapid economic growth. India's development trajectory has heightened public awareness about the urgent need for sustainable resource management. There is a growing demand for policies that ensure the rational use of natural resources like air, water, forests, and biodiversity. The country has seen a rise in environmental activism and the emergence of environmentalism as a significant social and political movement since 1970s. Environmental activists, organizations, and concerned citizens are advocating for policies and practices that promote sustainable development and preserve the country's natural heritage. They emphasize the importance of balancing economic growth with environmental conservation to ensure a sustainable future for India.
In this unit we shall discuss about different aspects of environmentalism in the context of India.

15.3 COLONIALISM AS AN ECOLOGICAL WATERSHED

Colonialism in India left a profound mark on the ecological landscape, representing a significant watershed in environmental history. This period saw the transformation of natural environments and the exploitation of resources on a massive scale, driven by the needs and interests of Western capitalism and industry. The impact of Western capitalism and the Industrial Revolution fundamentally altered the landscape, leading to extensive

exploitation of natural resources and the imposition of exploitative forest policies. The British prioritized the extraction of minerals, plants, and animals for export to Europe, fueling the growth of European industries while neglecting environmental concerns and undermining the rights of forest dwellers and tribes. This led to significant changes in habitats and ecosystems, disrupting the traditional ways of life of many communities dependent on the forests. The Industrial Revolution further intensified resource exploitation, commodifying natural resources for industrial use and transforming the movement of materials and resources. This period also saw a shift from local production for self-sufficiency to production for the market, leading to the atomization of societies and a breakdown of cooperation within communities. Overall, colonialism in India had a profound and lasting impact on the environment, reshaping landscapes, disrupting ecosystems, and altering the social fabric of the region.



Activity 1

Draw a map of India and locate the places where major environmental movements took place in the past decades.



CHECK YOUR PROGRESS

Q 1. Who is Ramachandra Guha?

Q 2. State the significant impact of colonialism on the ecological landscape of India?

.....

15.4 NGOs

Non-Governmental Organizations (NGOs) play a crucial role in environmental protection and ecology in India, acting as catalysts for change and advocates for sustainable practices. These organizations operate at various levels, from local to international, and focus on a wide range of environmental issues such as climate change, biodiversity conservation, and sustainable development.

One of the key roles of NGOs is to increase public awareness of environmental problems and solutions. They educate communities about the importance of environmental conservation and encourage them to participate in environmental discussions and decision-making processes. NGOs also conduct research and provide expertise in environmental issues, acting as early warning mechanisms for potential environmental threats. NGOs in India also play a significant role in advocating for policy changes and monitoring government actions related to environmental protection. They work to ensure that laws and policies are in place to protect the environment and that they are effectively implemented. NGOs often collaborate with government agencies and other stakeholders to develop and implement sustainable environmental policies and practices. NGOs also play a crucial role in protecting natural resources and promoting fair use of resources. They work to prevent the exploitation of resources for short-term gain and advocate for sustainable resource management practices. Additionally, NGOs often engage in community development projects, helping communities to implement environmental protection initiatives and improve their quality of life. In India several Non-Governmental Organizations are working in the field of environmental protection and ecology. Here is a brief discussion on some NGOs and their activities in India.

Greenpeace India is a leading NGO dedicated to advocating for climate change action, toxic waste management, nuclear safety, overfishing protection, and addressing environmental degradation. Their efforts have led to significant changes, such as lobbying the Indian government to increase the liability of suppliers in the Nuclear Liability Bill and playing a pivotal role in the establishment of a formal law governing e-waste. CERE India is another important Non-Governmental Organization that focuses on environmental education, awareness, and advocacy, working closely with organizations to map carbon footprints and help cap emissions. Another major NGO, EXNORA International's commitment lies in preserving nature, preventing environmental degradation, and managing waste through its extensive network of community-based organizations across India. AWAAZ Foundation tackles issues related to air pollution, toxic heavy metals, tree protection,

and noise pollution, leading to policy changes in Maharashtra and promoting the use of alternative technologies. The Foundation for Ecological Security collaborates with village institutions to conserve ecologically sensitive areas and land and water resources across various states. These NGOs, along with others like Goa Foundation, CSE India, WWF India, CONSERVE India, and Winrock International India, play crucial roles in environmental conservation, education, and policy advocacy, making significant contributions to sustainable development in India.



CHECK YOUR PROGRESS

Q 3. NGOs play an important role in _____ sector.

Q 4. What is Greenpeace fighting against?

.....

15.5 JUDICIAL ACTIVISM

Judicial activism is a concept that refers to the judiciary's proactive role in safeguarding citizens' rights and upholding the constitutional framework by interpreting and shaping laws when the executive or legislature fails in its constitutional duties. The concept of judicial activism originated in United States. Judicial activism in India emerged prominently around the 1970s and 1980s particularly under Chief Justice P.N. Bhagwati in the domain of environmental law. It marked a departure from the judiciary's traditional passive stance towards a more proactive role in advancing social justice objectives. In India, judicial intervention has significantly impacted legislative policy, particularly in enhancing the enforcement of environmental legislation. It is the India n judiciary which interpreted the Constitution expansively to include the right to a clean and healthy environment as a fundamental right under Article 21.

Over the last decades, Indian environmental legislation has evolved significantly. The judiciary, especially the Supreme Court and High Courts, has played a crucial role in this evolution by interpreting laws, issuing

directives, and ensuring their effective implementation. The judiciary's involvement has elevated a clean and healthy environment to a fundamental right. Under the Indian Constitution, while Parliament is empowered to enact laws, the judiciary holds the authority to review their constitutionality. Through this process, the judiciary not only interprets laws but also contributes to the development of legal principles, including those pertaining to the environment. Moreover, the judicial activism has expanded the application of environmental principles through interpretations of State Policy, Fundamental Duties, and Fundamental Rights Directives. Notable cases have led to a relaxation of jurisdictional standards in environmental



LET US KNOW

After the Stockholm Declaration of 1972 of the United Nations, the Indian Parliament made the 42nd amendment of the Constitution of India in 1976 to include provisions on environmental protection under the Directive Principles of State Policy and Fundamental Duties through Articles 48A and 51A. The **Article 48A** states that the state shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country while the **Article 51A(g)** states "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures." matters, enabling the judiciary to address public interest and welfare issues effectively.

Legal activism in India has played a vital role in combating pollution and promoting environmental protection. Here, let us briefly discuss some notable advancement in the context of environmental protection in India under the judiciary.

- **Doctrine of Public Trust:** The judiciary has emphasized the Doctrine of Public Trust, asserting that certain natural resources are in public use and must be protected for future generations. This doctrine has been instrumental in holding the government accountable for environmental conservation.

- **Relaxation of Locus Standi:** The concept of locus standi, or the right to bring a case, has been relaxed by the courts, allowing individuals, NGOs, and other organizations to file cases on behalf of the environment and public interest. This has significantly increased access to justice in environmental matters.
- **Innovations in Environmental Jurisprudence:** Indian environmental jurisprudence reflects a unique legal order that has gradually emerged. The judiciary has innovated techniques, such as Public Interest Litigation (PIL), to further the cause of environmental protection. PIL allows any concerned individual or group to approach the courts directly to seek redressal for environmental grievances.
- **Precautionary Principle and Polluter Pays Principle:** The courts have invoked the precautionary principle, holding that government and health authorities must take adequate measures to limit environmental pollution. They have also applied the Polluter Pays Principle, ensuring that those who cause pollution bear the cost of cleaning it up.
- **Sustainable Development Principle:** The concept of sustainable development has been emphasized by the courts, highlighting the need for development that can be sustained by nature without compromising future generations' needs.



CHECK YOUR PROGRESS

Q 5. Name an activist associated with judicial activism.

.....

Q 6: The right to a clean and healthy environment is included as a fundamental right under which article of the Constitution?

.....

15.6 CLIMATE CHANGE AND INDIA'S INTERNATIONAL ROLE

India recognizes climate change as a major global issue with far-reaching socio-economic and political implications. The global average

temperature has already increased by more than 1 degree Celsius (°C) compared to pre-industrial times, largely due to human activities such as fossil fuel burning and deforestation. This has led to significant changes in the atmosphere, land, and oceans, resulting in more frequent and severe extreme weather events worldwide. The impacts of global warming are evident in the degradation of marine and terrestrial ecosystems, acidification of the Earth's oceans, melting of sea ice, glaciers, and polar ice caps, and rising sea levels. Many of these changes are now considered inevitable and irreversible for thousands of years. Climate change is predicted to cause further disruptions at national, regional, and global levels, including increased competition for resources, market fluctuations, forced human migration, and the spread of infectious diseases.

India, with its diverse geography and large population, is significantly affected by climate change. The country is prone to various climate-sensitive disasters due to changes in extreme temperatures, heavy rainfall, cyclonic storms, and rising sea levels. These hazards are intensifying and becoming more frequent, making India increasingly vulnerable. The 2020 report by the Ministry of Earth Sciences highlights the impact of climate change on India. It predicts a three to fourfold increase in summer heat waves by the end of the century, compared to the base period of 1976-2005. Additionally, India has experienced a 6% decrease in summer monsoon rains between June and September, with significant reductions in rainfall in the Indo-Gangetic plains and the Western Ghats. Conversely, central India has seen more extreme rainfall during the summer monsoon season. India's monsoon rainfall shows wide geographical variation, leading to droughts in some regions and excess rainfall in others. The frequency and extent of droughts have significantly increased between 1951 and 2016, impacting semi-arid and drought-prone regions. Climate change also poses a significant risk to India's coastal cities, home to a large population. Rising sea levels are expected to inundate low-lying coastal areas by the middle of the 21st century, exacerbating the effects of extreme weather events like coastal flooding and storm surges. These impacts underscore the urgent need for India to take decisive action to mitigate and adapt to the effects of climate change.

India's stance on climate change is shaped by its vulnerability to its adverse effects and their impact on the environment, economy, and society. India follows the principles of common but differentiated responsibility, climate justice, and equity in its approach to climate change. Despite facing development challenges, India has emerged as a leader in global climate action, balancing its national development goals with efforts to reduce emissions and meet its climate change commitments.

India has played a significant role in global climate change negotiations and actions. The country's large population and diverse economy make its participation crucial for global climate cooperation. India has consistently advocated for the interests of developing countries, emphasizing the principle of common but differentiated responsibility. Over the years, India has evolved its approach to climate change. Initially, India focused on establishing an international climate action framework, highlighting the need for developed countries to take the lead in emission reductions. Subsequently, India emphasized the importance of climate finance, technology sharing, and adaptation funds to support developing countries in their climate actions. India's commitment to combating climate change is evident in its national efforts. The country has launched various national missions and initiatives to promote renewable energy sources and improve energy efficiency. India's National Climate Change Action Plan and its Nationally Determined Contributions (NDCs) submitted to the UNFCCC demonstrate its commitment to reducing emissions and addressing climate change impacts.

15.7 PROBLEM OF WASTE AND WASTE MANAGEMENT

Waste management is the systematic control of the generation, collection, treatment, recycling, and disposal of solid, liquid, and gaseous wastes to minimize their environmental and health impacts while maximizing resource efficiency. Waste management in India is a pressing issue driven by rapid urbanization, economic growth, and changing consumption patterns. The country generates a staggering 62 million tonnes of waste annually, of

which only 70% is collected, and a mere 20% is processed. This leaves approximately 31 million tonnes to end up in landfills, contributing to environmental degradation and health hazards.

One of the key challenges in waste management is the informal sector's significant involvement. While this sector plays a crucial role in waste collection and recycling, it lacks organization and infrastructure, leading to inefficiencies in waste management. E-waste, a byproduct of the digital age, poses a particular challenge due to its hazardous nature and the lack of proper disposal mechanisms. The future outlook is concerning, with projections indicating that solid household waste could reach 165 million tonnes by 2030. This increase underscores the urgent need for India to address its waste management practices comprehensively.

To tackle these challenges, India must focus on improving waste collection and processing capabilities. This includes investing in innovative recycling technologies, promoting community involvement in waste management, and implementing decentralized waste management systems. Additionally, there is a need for better waste segregation practices to ensure that recyclable materials are not lost to landfills. Converting existing landfills into clean sites and utilizing waste-to-energy technologies can also help reduce the burden on landfills and promote more sustainable waste management practices.

15.8 SWACHH BHARAT ABHIYAN (SBA)

Swachh Bharat Abhiyan (SBA), launched on October 2, 2014, by the Indian government, is a nationwide campaign aimed at addressing the longstanding challenges of cleanliness and sanitation in India. The campaign, with its slogan "One Step Towards Cleanliness," has garnered significant attention and support, becoming a symbol of national rejuvenation. Rooted in the principles of sustainable development, foresight, and the polluter pays concept, Swachh Bharat Abhiyan seeks to transform India into a cleaner and more hygienic nation. One of the primary objectives of SBA is to achieve an Open Defecation Free (ODF) India. The country's track record in this regard was a matter of concern, with open defecation rates higher than

some economically disadvantaged regions. To address this, SBA focuses on improving sanitation infrastructure and promoting behavioral change related to proper sanitation practices. The campaign also aims to align India's sanitation standards with global norms, as outlined in the United Nations Sustainable Development Goals.

The implementation of SBA is divided into two phases. The first phase, implemented until October 2019, focused on achieving ODF status across rural India. During this phase, more than 100 million individual toilets were constructed, leading to the declaration of rural areas in all states as ODF by October 2, 2019. This phase also emphasized raising awareness and changing behavioral norms related to sanitation. The second phase of SBA, which began in 2020 and is set to continue until 2024-25, aims to build on the achievements of the first phase. This phase focuses on promoting the maintenance of open sterile spaces and improving the management of solid and liquid waste. It also prioritizes the improvement of livelihoods for sanitation workers. The second phase aligns with the UN Sustainable Development Goals and aims to demonstrate progress in sanitation.

The significance of SBA extends beyond sanitation improvements. The campaign has created employment opportunities and revitalized the rural economy through the construction of household and community toilets and infrastructure for waste management. It has also empowered Gram Panchayats by providing them with access to financial resources, thereby strengthening local governance. In urban areas, Swachh Bharat Mission-Urban (SBM-U) was launched to promote cleanliness, sanitation, and effective waste management. The initial phase of SBM-U focused on achieving ODF status across urban India, leading to significant improvements in sanitation standards. The second phase, SBM-U 2.0, aims to build on these achievements by striving for waste-free urban areas and promoting sustainable sanitation practices.

Despite its successes, SBA faces several challenges. These include the complexity of behavior change, limited infrastructure development in some areas, and the need for long-term financial sustainability. Overcoming

these challenges requires continued education, commitment, and innovative approaches to waste management and sanitation technologies.



CHECK YOUR PROGRESS

Q 7. What is the primary objective of Swachh Bharat Abhiyan (SBA)?

.....

Q 8. When was Swachh Bharat Abhiyan (SBA) launched?

.....



15.9 LET US SUM UP

After going through this Unit, you have learnt that-

- Rapid economic growth in India has heightened concerns about sustainable resource management, leading to a rise in environmental activism since the 1970s. Ramachandra Guha identifies three main ideological strands within environmental movements in India: Crusading Gandhian, Appropriate Technology, and Ecological Marxists.
- Colonialism in India had a profound impact on the environment, leading to extensive exploitation of natural resources and the imposition of exploitative forest policies.
- NGOs play a crucial role in environmental protection and ecology in India, advocating for sustainable practices and promoting public awareness.
- The Indian judiciary has emphasized principles such as the Doctrine of Public Trust, the Precautionary Principle, and the Polluter Pays Principle in environmental jurisprudence.
- India recognizes climate change as a major global issue and has played a significant role in global climate change negotiations, advocating for the interests of developing countries.



15.10 FURTHER READINGS

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15.11 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: Historian

Answer to Q 2: Exploitation of natural resources for Western capitalism

Answer to Q 3: Environmental Policy Making

Answer to Q 4: Commercial fishing

Answer to Q 5: P.N. Bhagawati

Answer to Q 6: Article 21

Answer to Q 7: To achieve Open Defecation Free (ODF) status in India

Answer to Q 8: October 2, 2014



15.12 MODEL QUESTIONS

A) Very Short Questions (answer each question in about 50 words)

Q 1. What is the goal of environmentalism?

Q 2. How has India's rapid economic growth impacted environmental concerns?

Q 3. Name one environmental movements in India.

Q 4. What are the main focuses of environmental activism in India?

B. Short Questions (answer each question in about 150 words)

Q 1. How has colonialism affected India's ecological landscape?

Q 2. What are the key roles of NGOs in environmental protection in India?

Q 3. How has judicial activism influenced environmental policy in India?

C. Long Questions (answer each question in about 300-500 words)

Q 1. Discuss the different ideological strands within environmental movements in India, as identified by Ramachandra Guha.

Q 2. How has India's approach to climate change evolved over time, and what role does it play in global climate action?

Q 3. What are the key challenges in waste management in India, and what measures can be taken to address them?

*** ***** ***



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