Asian Journal of Qualitative Research
2024, Volume 01, Issue 01.
https://ajqr.ibexinstitute.org/

Contemporary Issues in The Governance and Management of Natural Resources in India

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ABSTRACT:

The governance and management of natural resources in India remain critical challenges due to issues of mismanagement and unequal distribution. This study explores disparities in resource allocation across different regions and assesses the effectiveness of government interventions in mitigating these imbalances. By employing a multi-faceted approach that includes policy analysis, resource distribution patterns, and case studies, this research evaluates the extent to which governmental efforts align with principles of equity and sustainability. The study critically examines existing policy frameworks, identifying gaps and inconsistencies that contribute to inefficient resource management. Furthermore, it assesses the role of regulatory bodies, legal provisions, and grassroots initiatives in addressing disparities. Through empirical evidence and qualitative analysis, the research highlights how economic, political, and environmental factors influence the distribution of resources, often exacerbating regional inequalities. Findings suggest that while several government policies aim to promote sustainability and equitable access, implementation challenges, bureaucratic inefficiencies, and political interests hinder their effectiveness. The study underscores the need for enhanced transparency, decentralized governance, and community participation in decision-making processes to ensure better resource management. By providing insights into the effectiveness of current governance mechanisms, this research contributes to the broader discourse on sustainable development and social justice in resource distribution. It emphasizes the importance of policy reforms and institutional accountability to achieve a more balanced and equitable management system. The study's conclusions offer recommendations for policymakers, stakeholders, and scholars interested in fostering a more sustainable and just approach to natural resource governance in India.

ARTICLE HISTORY
Received 11 August 2024
Accepted 10 October 2024
Published 15 December 2024

KEYWORDS
Natural Resource, Governance, Management, Contemporary issues, Policy Framework

PP:
18-39

Copy Right: ©*The Authors*

How to Cite:
Mohammad Afzaal Rashid. (2024). Contemporary Issues in The Governance and Management of Natural Resources in India. *Asian Journal of Qualitative Research*, *1*(01), 18–39. Retrieved from https://ajqr.ibexinstitute.org

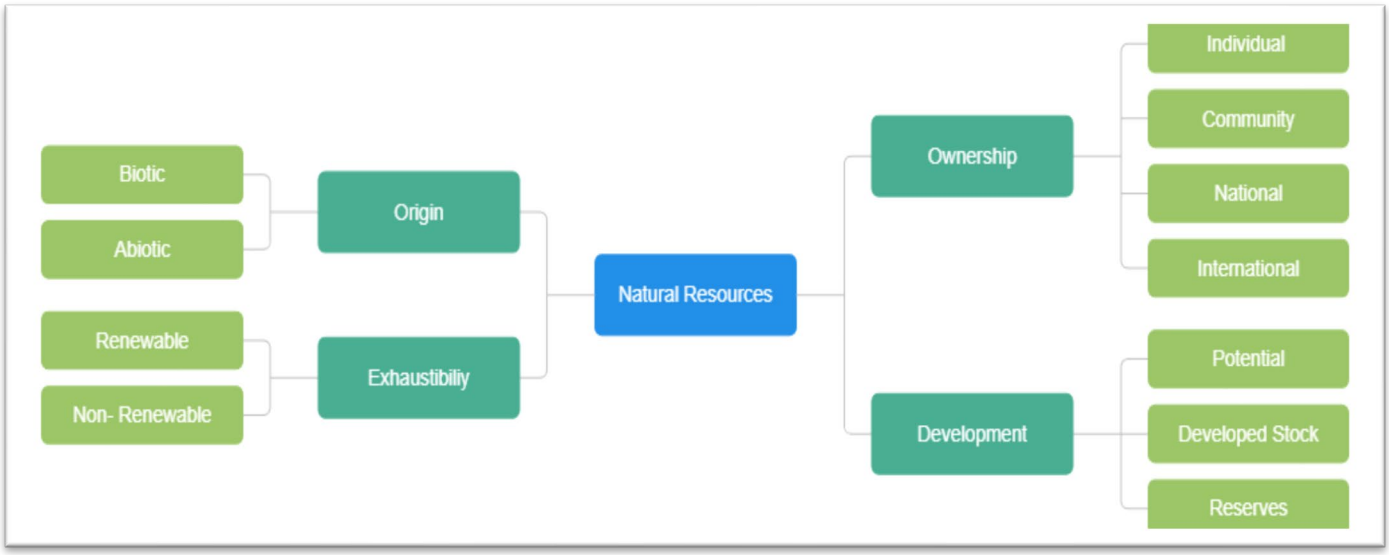
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Introduction

India, a vast and diverse country, is endowed with a rich abundance of natural resources, spanning arable land, minerals, water, and forests. However, these resources are not uniformly distributed across the country. The challenge of ensuring equitable access to these resources while promoting sustainable development has long been a central focus of governance and resource management in India. Effective governance in this area requires that all citizens benefit from these resources while preserving them for future generations. Natural resources can be defined as elements of the environment that exist independently of human influence, such as air, water, soil, plants, animals, and fossil fuels. Based on various criteria, they can also be categorized as biotic or abiotic, renewable or non-renewable, individual or community-owned, and potential, developed, or reserved resources. India faces significant challenges in resource management, as indicated by its low global ranking of 176th among 180 countries

with a combined score of 45.5 out of 100 in 2024. This ranking reflects inefficient land management and rising threats to biodiversity. Countries were assessed based on four key pillars: Land Management, Threats to Biodiversity, Capacity and Governance, and Future Trends (Utkarsh Classes, 2024). For example, India holds 5,500 million tonnes of crude iron ore, accounting for 3.1% of global reserves (Government of Canada, 2024), and possesses 107,726,551,700 tonnes of coal reserves, or 9.5% of the world total as of 2016 (Worldometer, 2016). Additionally, India is the world's second-largest holder of Manganese Ore reserves, totaling 430 million tonnes (PMF IAS, 2018), and ranks as the fifth-largest producer of lithium globally after China, Gabon, South Africa, and Australia (Sharma, 2024). These rankings highlight the nation's resource wealth, yet also emphasize the need for effective governance and management to address its inefficiencies.

Chart 1
Types of Natural Resources



Resources can be classified in various ways, depending on their origin, exhaustibility, ownership, and development status. Biotic resources are derived from living organisms, including plants, animals, and organic materials like forests, wildlife, and fossil fuels formed from decayed organic matter over time. In contrast, abiotic resources come from non-living or inorganic sources, such as minerals, metals, water, air, and sunlight. These resources are typically more stable and less affected by biological processes. In terms of exhaustibility, resources can be renewable or non-renewable. Renewable resources, like solar energy, wind, water, and biomass, regenerate naturally over a short period and can be sustainable if managed properly. On the other hand, non-renewable resources, such as fossil fuels and minerals, are finite and cannot be replenished quickly enough to meet human demand, making them unsustainable in the long run. Ownership of resources can be individual, community, national, or international. Individual resources are privately owned, like personal land or vehicles, while community resources, such as public parks and village ponds, are accessible to all members of a community and managed collectively. National resources are controlled by the government

for public benefit, including forests, rivers, and national parks. International resources, such as oceans beyond territorial waters, outer space, and Antarctica, belong to no single nation and are governed by international treaties. Finally, resources can be categorized based on their development status into potential resources, developed stock, and reserves. Potential resources exist in a region but are not yet utilized, often due to technological or financial limitations, like offshore wind energy. Developed stock refers to resources that are actively used and whose quantity and quality are known, such as agricultural land. Reserves are known resources that can be accessed with current technology but are kept for future use, such as strategic oil reserves or groundwater aquifers reserved for drought situations.

Arable land is one of India's most vital resources, making the country the world's second-largest producer of agricultural goods. Agriculture remains a cornerstone of the Indian economy, employing approximately 50% of the workforce and contributing around 17-18% to the GDP as of 2018. In 2016, agriculture and allied sectors like fisheries and forestry accounted for approximately 15.4% of the GDP and provided jobs for around 13% of the labor force. India also leads globally in net cropped area, closely followed by the United States and China, emphasizing the scale of its agricultural potential. In terms of mineral wealth, India's mining industry plays a substantial role, contributing 11% to the country's industrial GDP and about 25% to the total GDP. As of 2010, the industry's valuation exceeded $104.6 billion, employing approximately 700,000 people, with small-scale mining contributing around 6% of the total mineral production costs (Sawe, 2019). These resources are critical to India's economic ambitions and provide livelihoods to millions across the country. However, with India's economy projected to grow between 7% and 7.2% in fiscal year 2024-2025 and slightly less in 2025-2026, it faces a dilemma (Majumdar, 2024). Although economic growth has been robust, it has sometimes come at the expense of natural capital, as indicated by declining natural resources in states where the growth of the gross state domestic product (GSDP) has averaged around 7-8%. This model of economic expansion, if not carefully managed, risks depleting the nation's natural assets and undermining long-term sustainability (Pandey, 2018).

India faces significant contemporary issues related to resource management, such as urbanization, climate change, pollution, deforestation, biodiversity loss, and the overexploitation of natural resources. Addressing these challenges requires policies that balance development with conservation and ensure the longevity of essential resources. This study aims to evaluate the effectiveness of government resource management strategies and to assess the gaps and challenges that persist despite existing policies and programs. It seeks to understand whether current governance practices adequately address the equitable and sustainable use of resources amid evolving contemporary challenges.

Hypothesis:

This research operates on two main hypotheses that will guide the investigation into natural resource management and governance in India:

Hypothesis 1: Ineffective governance structures are a major contributor to resource mismanagement in India. This hypothesis suggests that gaps within India's institutional frameworks, policies, and enforcement mechanisms may lead to unequal resource distribution, overexploitation, and environmental degradation.

Hypothesis 2: Community-driven conservation practices lead to better sustainability outcomes than top-down government approaches. This hypothesis posits that conservation and sustainable resource management efforts initiated at the community level are often more effective and adaptable to local needs than centralized, government-led interventions.

Literature Review:

Farooqy Persis (2017): *Symbiosis Between Nature & Culture A Case Study of the Apatani Cultural Landscape, India;* The Apatani cultural landscape in Arunachal Pradesh, India, is a profound example of the symbiosis between human culture and the natural environment, particularly through its traditional paddy-cum-fish cultivation system. This unique agricultural practice, which has been sustained for generations without modern intervention, showcases how the Apatani people have rationally utilized their natural resources to maintain soil fertility and secure their livelihoods. The landscape is characterized by terraced fields and bamboo-pine plantations, reflecting a harmonious relationship between the community and their environment. The Apatanis' agricultural practices are labor-intensive and deeply intertwined with their social structures and spiritual beliefs, particularly their animistic faith in Donyi Polo, which emphasizes reverence for nature. Despite its ecological and cultural significance, the Apatani landscape faces challenges from modernization and demographic shifts, as younger generations increasingly seek education and employment outside traditional practices. This trend poses a risk to the continuity of their unique agricultural methods. Moreover, while the landscape has been placed on India's Tentative List for UNESCO World Heritage status, there is a notable lack of local involvement in the nomination process. Effective conservation strategies must prioritize community engagement to ensure that the voices of the Apatani people are heard in decisions affecting their heritage. Recommendations for future conservation include forming inclusive committees that involve local stakeholders in resource management and promoting sustainable tourism that respects traditional practices. Such measures are essential to preserve the Apatani cultural landscape as a living testament to sustainable development and cultural resilience.

Sharad K. Jain (2019): *Water resources management in India – challenges and the way forward;* Water resources management in India has become increasingly challenging due to a confluence of factors, including rising demand, environmental degradation, and climate change. The country faces significant issues related to water availability and variability, which are exacerbated by a growing population and unsustainable water withdrawals. India's rivers can be categorized into four main groups: Himalayan, Deccan, coastal, and inland drainage systems. The Himalayan rivers, such as the Ganga and Brahmaputra, are crucial for the country's water supply but are also subject to transboundary governance challenges with neighboring countries. The chronological variability of water availability leads to severe

consequences such as floods during the monsoon season and droughts in the dry months. More than 70% of annual precipitation occurs within a short time frame, resulting in a mismatch between water supply and demand across different regions. This situation is compounded by the fact that agriculture consumes over 85% of India's water resources, and with no significant increase in rainfall trends, the gap between demand and supply continues to widen. Moreover, excessive groundwater extraction has led to declining water tables and contamination issues, posing risks to both human health and environmental sustainability. To address these multifaceted challenges, comprehensive strategies are necessary. Key recommendations include improving water use efficiency in agriculture through techniques such as drip irrigation, conserving flood flows for use during lean seasons, and implementing integrated water resource management that considers both surface and groundwater as interconnected resources. Additionally, regulatory frameworks must be established to manage groundwater withdrawals sustainably. By adopting these measures, India can work towards a more resilient and sustainable approach to water resource management that balances the needs of its growing population with environmental conservation.

Shashidharan Enarth (2008): *Decentralization and Democratization of Natural Resources Management Programs in India: A Study of Self-Governing Resource User-Groups;* The study of natural resource management (NRM) in India, particularly through the lens of self-governing resource user-groups, reveals a complex interplay between decentralization, democratization, and governance. Historically, NRM programs in India were characterized by a centralized, bureaucratic approach that often led to inefficiencies and inequities. The shift towards decentralization in the 1990s, prompted by civil society advocacy and international pressures, aimed to empower local communities in managing their resources more effectively. However, this transition has not been without challenges. Research indicates that while user-groups can outperform government agencies in resource management, they frequently struggle with issues of participation and equity. For instance, the case studies of Water Users Associations (WUAs) in Gujarat demonstrate that those exhibiting strong governance traits—such as accountability, transparency, and inclusiveness tend to function more effectively than those that do not. Yet, the persistence of historical social structures marked by feudal and patriarchal legacies often undermines these democratic processes within WUAs. This tension highlights the necessity for external support agencies to facilitate democratic practices and ensure sustainable governance structures. Ultimately, the findings suggest that for decentralization efforts to be successful and equitable, there must be a concerted effort to institutionalize democratic processes within these user-groups while addressing the socio-cultural barriers that impede true participation and equity in resource management

Methodology:

To analyze the governance and management of natural resources in India, this study will employ a multi-method approach, utilizing a combination of qualitative and quantitative data sources. Sources of data will include newspaper articles, magazines, academic journals, and government reports that provide relevant information on policy frameworks, implementation challenges, and community-driven initiatives in resource conservation. Case studies will play

a central role, allowing an in-depth examination of specific regions or projects, highlighting both successes and shortcomings in resource management. This approach will enable a thorough analysis of the current state of governance in India's natural resource sector.

Expected Findings:

The expected findings of this study include the identification of key governance challenges that impact the equitable and sustainable management of natural resources in India. It is anticipated that these will include issues such as policy inconsistencies, ineffective enforcement mechanisms, and lack of coordination among various governmental levels. Additionally, this research aims to identify successful community-driven conservation practices that have achieved better sustainability outcomes, demonstrating the value of localized, grassroots approaches over centralized management in certain contexts. These findings are expected to provide insights into potential policy improvements and best practices that could enhance resource management strategies in India.

1. Overview of India's Natural Resource Landscape

India, with its vast geographical and ecological diversity, possesses a rich and varied abundance of natural resources, including arable land, minerals, water, and forests. These resources play a crucial role in the country's economy, social fabric, and environmental stability. However, the unequal distribution of these resources across states presents significant challenges for governance. While Mizoram boasts the highest forest cover (MoFECC, 2022), Haryana has the least (Keelery, 2024), illustrating the disparities in natural resource availability. Such regional imbalances in resource distribution impact accessibility and equitable utilization across the nation, making effective management a key priority for sustainable development.

1.1 The Role of Natural Resources in Economic Development

Natural resources serve as fundamental building blocks for economic development. An abundance of resources can accelerate growth, offering a competitive advantage for industries and attracting foreign investments. In India, natural resources support major sectors such as agriculture, mining, and manufacturing. For instance, India's agriculture sector, supported by arable land and favorable climates, remains a critical contributor to the economy, employing a large portion of the population. Additionally, industries reliant on natural resources, such as coal and oil, are central to India's industrial base, fueling energy and manufacturing needs. Access to these resources allows for capital creation, including infrastructure and machinery, fostering urbanization and the establishment of commercial centers as foreign corporations invest in resource-rich areas (Tiwari, 2021).

1.2 Social and Cultural Importance

Natural resources are also socially and culturally significant. They provide livelihoods for millions of Indians, with fishing, forestry, and agriculture supporting entire communities.

These resources are often intertwined with cultural identities and traditional practices, particularly for indigenous populations who maintain deep connections to the land. For these communities, natural resources are not just economic assets but are integral to cultural heritage and identity, shaping their way of life and sustaining their traditions (manishsiq, 2024).

1.3 Ecological Balance

The ecological value of natural resources cannot be overstated. They maintain essential environmental balances, such as water cycles, soil fertility, and carbon sequestration. Any depletion or mismanagement of these resources can have profound impacts, leading to ecological imbalances that threaten biodiversity, climate stability, and, ultimately, human livelihoods. Forests, for example, regulate water cycles and support wildlife habitats; thus, the depletion of forest cover in one region can lead to adverse climate effects and loss of biodiversity in another.

1.4 Challenges in Governance: Ensuring Sustainable and Equitable Access

India's natural resources governance aims to address both the sustainable use of resources and equitable access for all citizens. However, managing these resources across diverse regions with varying levels of access and usage demands is challenging. Ineffective governance structures, combined with regional disparities in resource distribution, can lead to overexploitation, environmental degradation, and social inequities. Ensuring sustainable development involves not only regulating resource extraction and use but also implementing policies that protect resources for future generations while addressing the current needs of the population.

Analysis

Ineffective Governance Structures as a Contributor to Resource Mismanagement

Policy and Legislative Analysis:

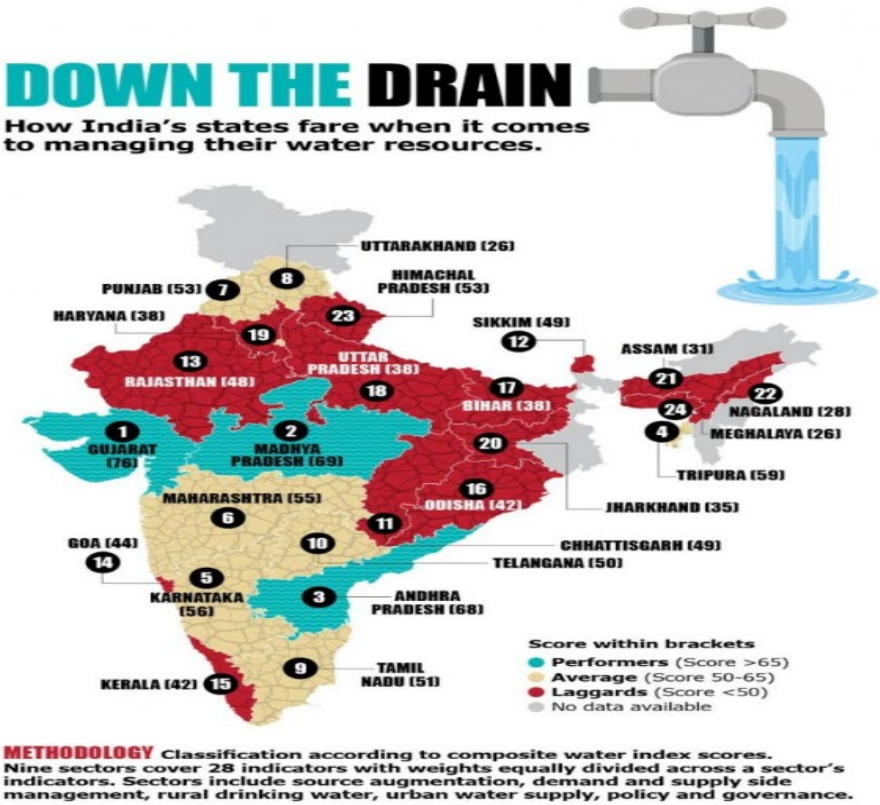
1. National Water Policy (2012)

India, despite being home to 18% of the world’s population, faces significant challenges in managing its water resources, which constitute just 4% of the world's renewable water supply. This discrepancy poses a severe challenge to ensuring equitable water distribution and sustainable development. The **National Water Policy (NWP)** aims to address these challenges through a comprehensive framework for the planning and management of water resources, focusing on the sustainable use and fair distribution of water across the country. One of the key tenets of the NWP is to treat water as a common pool resource, managed under the **Public Trust Doctrine**, which emphasizes the state's responsibility in ensuring equitable access for all citizens. A central component of the NWP is the principle of **Integrated Water Resources Management (IWRM),** which advocates for the management of water resources within the

context of entire river basins (Ministry of Water Resources, 2012). This approach not only seeks to optimize water utilization but also underscores the need for developing appropriate institutional arrangements at the river basin level for monitoring water quality and managing both surface and groundwater resources effectively. However, despite these well-intentioned policies, the implementation has faced numerous challenges.

Status

India faces severe water stress due to its limited share of global water resources relative to its large population. With per capita water availability at a critically low level of around 1,100 cubic meters, the country teeters on the edge of water scarcity. Supporting 16% of the world's inhabitants is daunting enough, especially when recognizing that this population is crammed into an area one-third the size of the United States. Compounding this crisis is the fact that India only possesses 4% of the world's freshwater resources (SIWI, 2018). This stress is compounded by erratic rainfall patterns, as India's heavy reliance on monsoon rains makes certain regions particularly vulnerable to water shortages. Climate change further intensifies this problem by causing unpredictable and often insufficient rainfall, especially in areas already struggling with water management. The gravity of the situation is starkly illustrated by statistics: 163 million Indians lack access to safe drinking water, 210 million lack access to improved sanitation, and 21% of communicable diseases are linked to unsafe water. Tragically, 500 children under the age of five die from diarrhea each day in India. Furthermore, more than half of the rivers in India are highly polluted, with others at levels considered unsafe by modern standards. The Yamuna, Ganga, and Sabarmati rivers are among the dirtiest, carrying a deadly mix of hazardous and organic pollutants. Industrial pollution, human waste, and open usage practices like bathing and washing clothes contribute significantly to this epidemic of water-related health concerns (SIWI, 2018). Additionally, water governance challenges vary significantly across states. For instance, states like Goa, Kerala, and Karnataka score above 65 in water management, while states such as Uttar Pradesh, Bihar, and Rajasthan lag behind, with scores below 50. These disparities underscore the uneven effectiveness of governance structures in managing water resources at the state level. (NEXT IAS, 2024).



Source: https://www.nextias.com/ca/editorial-analysis/04-08-2024/water-crisis-in-india

Key Observations

1. Performance Variation:

(a) Top Performers (Score > 65): States such as **Goa, Kerala,** and **Karnataka** are generally more successful in managing water resources due to better institutional frameworks, effective governance, and water conservation practices.

(b) Average Performers (Score 50-65): States like **Maharashtra, Tamil Nadu**, and **Andhra Pradesh** show moderate performance but still face challenges in addressing issues like groundwater depletion and inefficient irrigation systems.

(c) Laggards (Score < 50): States like **Bihar, Uttar Pradesh**, and **Rajasthan** suffer from significant water management challenges, often due to over-extraction of groundwater, poor infrastructure, and insufficient regulatory enforcement.

2. Regional Disparities:

(a) North India: States in the **Indo-Gangetic Plain**, such as **Uttar Pradesh** and **Bihar**, face challenges stemming from overexploitation of groundwater and industrial pollution, making water quality and availability a major concern.

(b) South India: States like **Kerala** and **Karnataka** generally fare better in water management but are still vulnerable to rising water demand and the growing impacts of climate change. These states also face challenges like increasing agricultural water demand, which puts further strain on available resources.

3. Key Factors Influencing Performance:

(a) Water Availability: States with abundant natural resources, such as those in the **Himalayan region**, tend to have better access to water, while water-scarce regions struggle more.

(b) **Water Governance**: Strong governance structures, which include effective policy frameworks, regulatory mechanisms, and institutional arrangements, have a direct impact on the success of water management.

(c) **Infrastructure**: Access to infrastructure such as **dams, canals**, and **pipelines** is crucial for efficient water distribution. States with better infrastructure are often able to manage their resources more effectively.

Public Awareness and Participation: Public engagement through awareness programs and active participation in water conservation is increasingly being seen as essential for sustainable water management.

Challenges:

Despite the existence of policies like the National Water Policy (NWP), resource mismanagement remains a significant issue in India, primarily due to governance-related challenges. One key problem is the ineffective enforcement of policies. Although India has several water-related frameworks, their implementation often falters at the state level, especially in areas where political will is weak and corruption undermines essential water conservation measures. Additionally, the fragmentation of water management institutions across various sectors and levels of government contributes to overlapping responsibilities and a lack of coordination, hindering effective governance and the sustainable use of water resources. Moreover, many states struggle with inadequate data and monitoring systems, making it difficult to track water availability, usage, and quality, which in turn impedes informed decision-making for resource allocation. Finally, political and regional interests further complicate the issue, as regional disparities in water availability often led to conflicts and competition between states, with politicians frequently prioritizing short-term gains over long-term solutions.

One of the foremost issues is the frequent inter-state conflicts over water sharing, which are often aggravated by seasonal shortages and competing regional needs. For instance, the longstanding dispute between Karnataka and Tamil Nadu over the Cauvery River flared up recently when Karnataka's Chief Minister stated that the state could not release water to Tamil Nadu due to its own severe shortages (The Economic Times, 2024). Similarly, Delhi's water crisis during a heatwave highlighted tensions between Himachal Pradesh and Haryana, with Haryana insisting it could not meet the Supreme Court's directive to ensure Delhi's water supply (Rajagopal, 2024). These disputes underscore the critical need for collaborative

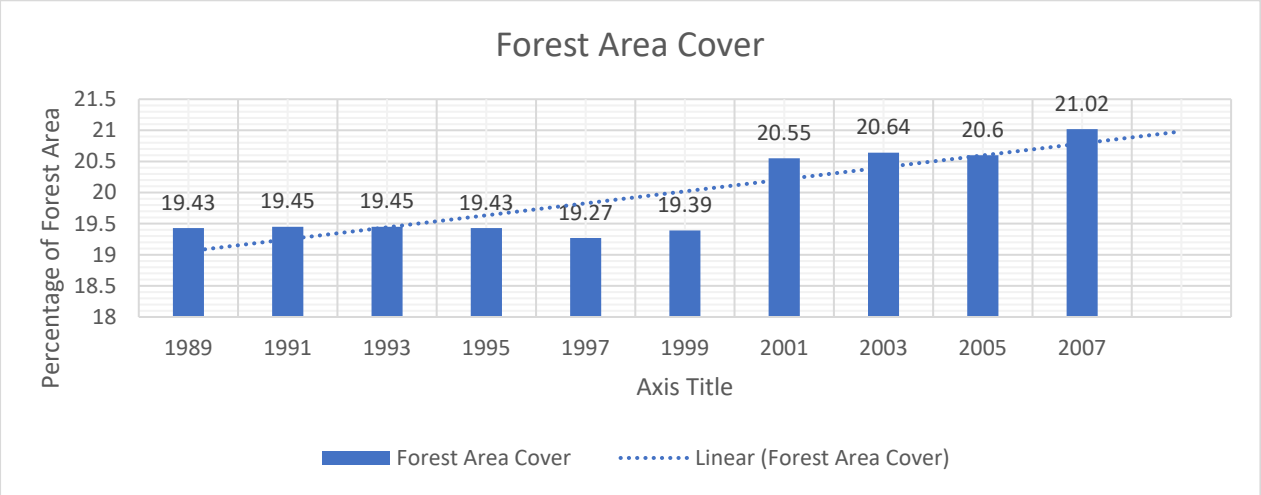
approaches and equitable frameworks to prevent crises and promote fair distribution. Alongside regional disputes, groundwater depletion is a serious concern, especially in northern India, where over-extraction has led to rapid aquifer depletion. This issue is exacerbated in areas with high agricultural activity, where inefficient irrigation practices contribute to overuse. In Karnataka, for instance, many villages have experienced the drying up of borewells, revealing a critical gap in sustainable water management (The Economic Times, 2024). Compounding these problems is India's inadequate water infrastructure. Many regions lack sufficient storage and distribution systems, leading to inequitable access and water loss. Aging infrastructure, especially in urban areas, causes frequent leaks and wastage, underscoring the need for upgraded and well-maintained systems to ensure reliable supply. Climate change further complicates India's water landscape, introducing unpredictability in rainfall patterns and intensifying extreme weather events like droughts and floods. Erratic monsoon rains and prolonged dry spells have become common, particularly in regions highly dependent on monsoon water for agriculture and drinking supplies. Policy inconsistency also plagues India's water management efforts. Although frameworks like the National Water Policy (NWP) advocate sustainable use and efficient governance, inadequate enforcement and poor coordination between central and state authorities limit their impact. Without strong regulatory mechanisms, issues like illegal water extraction and pollution remain inadequately addressed, reducing policy effectiveness on the ground. There are also stark disparities in water access between urban and rural areas, with urban centers like Bengaluru and Delhi facing acute crises due to overpopulation and pollution, while rural areas struggle with infrastructure deficiencies. This urban-rural divide highlights the need for balanced water distribution to ensure equitable access across regions. Adding to these challenges is the low level of public awareness and engagement in water conservation. Despite policies promoting conservation, individual and community practices often do not align with sustainable water use, leading to wastage and depletion. Increasing public awareness and fostering a culture of conservation will be essential to securing a sustainable water future for India.

2. National Forest Policy 1988

Over the years, forests in India have suffered extensive depletion, posing a serious threat to the environment's ability to sustain itself. The pressures of increasing demands for fuelwood, fodder, and timber, compounded by inadequate protective measures and the conversion of forest lands to non-forest uses without sufficient compensatory afforestation or environmental safeguards, have accelerated this degradation. Furthermore, the tendency to perceive forests merely as a source of revenue has led to their overexploitation, undermining their ecological importance. Recognizing the gravity of the situation, the National Forest Policy of 1988 was formulated to establish a new strategy for forest conservation, emphasizing preservation, sustainable utilization, restoration, and enhancement of forest ecosystems. Given the crucial role of forests as a natural resource that supports biodiversity, regulates the climate, and contributes to the overall ecological balance, the policy underscores the need for sustainable development while protecting these vital assets. The National Forest Policy of 1988 outlines comprehensive objectives aimed at ensuring the sustainable management and conservation of India's forests. A key goal is to maintain environmental stability by preserving

forests and restoring the ecological balance disrupted by deforestation and degradation. It emphasizes the need to conserve the country's natural heritage by protecting the remaining forests, which house diverse flora and fauna and represent significant genetic and biological resources. The policy also seeks to prevent soil erosion and land degradation in catchment areas of rivers, lakes, and reservoirs, thus contributing to soil and water conservation, reducing floods and droughts, and minimizing siltation of reservoirs. Furthermore, it aims to combat desertification by checking the spread of sand dunes in desert and coastal areas. An integral aspect of the policy is increasing forest and tree cover through large-scale afforestation and social forestry programs, with a national target of at least 33% of the total land area under forest or tree cover, and 66% in hilly and mountainous regions to ensure ecological stability. Additionally, the policy underscores the importance of sustainable forest management to balance ecological needs with the demands of local communities, industries, and the economy. These objectives collectively highlight the policy's commitment to fostering sustainable development while safeguarding the environment (MoEF, 1988).

Status till 2010



Source: https://frienvis.nic.in/Database/Forest-Cover-in-Indian-States-and-Union-Territories_1825.aspx

Between 1989 and 2007, India's forest covers experienced fluctuations in its percentage of the country's geographical area. It remained relatively stable around 19.43%-19.45% from 1989 to 1995, slightly declined to 19.27% in 1997, and then saw incremental growth to 20.64% in 2003. However, by 2007, it decreased again to 19.27%, reflecting the dynamic changes in forest cover over the years (ENVIS RP on Forestry and Forest Related Livelihoods, 2009).

In the 1990s, India witnessed significant economic growth, largely fueled by the liberalization policies introduced in 1991. This period marked the beginning of a new wave of productivity, with GDP growth rates exceeding 70 percent in the subsequent decades (Mukhopadhyay and Chowdhury, 2024). The introduction of LPG (Liberalization, Privatization, and Globalization) policies spurred rapid urbanization, contributing to a shift in India's economic landscape. Urban population growth between 1990 and 2010, for instance, saw a rise from 25.55% to 30.93%, reflecting a 5.38% increase over five years (Macrotrends, 2024). However, this urban expansion came at a considerable environmental cost, particularly in terms of deforestation.

The need for land to accommodate the growing urban population and industrialization led to continued deforestation, which directly impacted the achievement of the National Forest Policy's goal of maintaining one-third of India's land area under forest cover. Despite the policy's objectives, the governance system, and its implementation, struggled to keep pace with the economic pressures and the rapid urbanization. Consequently, the forest cover did not increase as intended, leading to a failure in meeting the ambitious targets set by the National Forest Policy of 1988.

Implementation of National Green Tribunal (NGT) and the Challenges with the Current scenario of India's forest Area

On October 18, 2010, the Central Government passed the National Green Tribunal Act, 2010, which created the National Green Tribunal (NGT). It was founded with the primary goal of offering a specialized forum for the efficient and prompt resolution of cases pertaining to forest conservation, environmental protection, and the payment of damages resulting from violations of environmental laws or conditions specified during the granting of permissions. The NGT was designed to provide a more targeted approach to environmental protection and to speed up the legal process in environmental concerns. All civil cases pertaining to environmental matters and the application of the legislation specified in Schedule I of the NGT Act may be heard by the NGT. This covers a variety of crucial actions like:

The Water (Prevention and Control of Pollution) Act, 1974

The Water (Prevention and Control of Pollution) Cess Act, 1977

The Forest (Conservation) Act, 1980

The Air (Prevention and Control of Pollution) Act, 1981

The Environment (Protection) Act, 1986

The Public Liability Insurance Act of 1991 and the Biological Diversity Act of 2002. As a result, the NGT has the power to handle any infractions pertaining to these laws or contest judgments and directives made by the government under them. It is crucial to remember that the NGT lacks the authority to deal with issues pertaining to the Indian Forest Act of 1927, the Wildlife (Protection) Act of 1972, and a number of state-enacted legislation pertaining to forests and tree preservation. The NGT's reach in several crucial areas of environmental governance is thus limited because significant concerns pertaining to these particular laws cannot be brought before it (Bhargav, 2011).

Despite the establishment of the National Green Tribunal (NGT) in 2010 and the continuous efforts to improve environmental governance, India has faced a stark increase in forest loss over the past decades. According to Global Forest Watch, India has lost 2.33 million hectares of tree cover since 2000, which is equivalent to a 6% decrease in its forest cover. Between 2002 and 2023, the country lost 414,000 hectares of humid primary forest, representing 18% of its total tree cover loss during that period (The Indian Express, 2024). The rate of deforestation has been alarmingly high, with the country ranked second only to Brazil in terms of deforestation rates between 2015 and 2020, losing approximately 668,400 hectares of forest

per year (Jha, 2023). Mining and urban expansion are key drivers of this ongoing deforestation. A study monitoring land use changes in Madhya Pradesh and Chhattisgarh revealed that from 1994 to 2022, mining activities alone reduced forest cover by 7.32% to 17.61%. This loss also extended to water bodies and agricultural land (Sirur, 2024). The urbanization of India, particularly in biodiversity hotspots such as the Western Himalayas, has exacerbated the problem. Research by the Indian Institute of Remote Sensing (IIRS) highlighted an alarming 184% increase in regional urbanization in the Western Himalayas, contributing to a significant loss of forests and natural habitats (Padma, 2024). The current situation is a stark contrast to the vision set forth in India's National Forest Policy of 1988, which aimed for 33% of the country's area to be covered by forests. Over 30 years later, this goal remains unachieved, with the total forest cover still standing at only 21.71%, according to the India State of Forest Report (ISFR) 2021. Urban expansion, mining activities, and insufficient enforcement of environmental laws have prevented the realization of this crucial target (MoEFCC, 2023). Even with the establishment of the NGT, which has the authority to adjudicate on environmental issues, cases like the Mopa Airport in Goa reveal flaws in the enforcement of forest conservation measures. The Supreme Court recently criticized the NGT for failing to adequately address environmental concerns in the approval process of projects, underlining the urgent need for stricter enforcement of environmental laws and more effective governance to combat the escalating loss of India's forests. This case serves as a reminder of the challenges in balancing development with environmental conservation in India, and the continued erosion of forest cover is a clear indication that the NGT and related institutions must strengthen their role in protecting India's natural resources (Dutta, 2019). At the core of the persistent deforestation and environmental mismanagement lies an ineffective governance system that has failed to manage and allocate resources properly. Despite the establishment of institutions like the NGT, the enforcement of environmental laws and policies remains fragmented and inconsistent. The lack of coordinated action between various stakeholders such as government bodies, state authorities, and environmental agencies has allowed unchecked urbanization and industrial expansion to ravage ecologically sensitive areas. Furthermore, the failure to implement policies like the National Forest Policy 1988 effectively, coupled with a lack of accountability and transparency, has worsened the situation. The ineffective governance system, rather than prioritizing environmental protection, has often failed to address the underlying causes of forest destruction, contributing to the mismanagement of India's natural resources. This systemic failure continues to hinder meaningful progress toward sustainable development and conservation efforts, further undermining the country's environmental future.

Community-driven conservation practices lead to better sustainability outcomes than top-down government approaches

Community-based conservation refers to collaborative efforts where local communities actively participate in protecting biodiversity, working alongside scientists to conserve the species and ecosystems in their vicinity. It recognizes the value of integrating local knowledge, practicality, and community priorities with global scientific expertise. The strength of this model lies in its ability to bring together grassroots understanding and formal scientific approaches, creating more effective and sustainable conservation outcomes. In well-executed

community-based projects, the involvement of local communities begins at the earliest stages, with open dialogues that explore the community's needs, values, and the potential benefits of conservation initiatives. These discussions often reveal that small, practical changes in land management can allow both human populations and wildlife to thrive. Moreover, community-driven approaches can lead to tangible benefits for local people, such as the creation of home-based businesses and the promotion of sustainable tourism (Community Conservation, 2022). In contrast, top-down conservation approaches are often driven by external governmental bodies or agencies, which may not have the same direct investment in the success of the project. These initiatives are typically conceived and implemented by public authorities, which tend to focus on bureaucratic processes, including the allocation of funds and legislative support. As a result, top-down projects often face significant delays, political negotiation, and red tape. Moreover, these approaches typically offer little opportunity for local input during the planning or implementation phases, which can lead to a disconnect between the project's goals and the community's needs. Without local engagement, such projects may alienate stakeholders, leading to insufficient support and potentially undermining the success of the conservation efforts. Consequently, top-down approaches can be less effective and more costly, with fewer benefits for the communities directly impacted by the conservation initiatives (Apfelbaum, S. I., Haney, A., & Ugalde, A. F., 2013).

Discussions

Case Study 1: The Bishnoi Community of India: A Model for Community-Driven Conservation

The Bishnoi community of India presents one of the most profound examples of community-driven conservation, with a deep-rooted legacy of environmental protection that dates back centuries. This community is renowned for its commitment to safeguarding biodiversity and managing resources sustainably, based on the teachings of their fifteenth-century guru, Maharaja Jambheshwar (Jambhoji), and their religious principles. The Bishnoi's environmental practices, which integrate local knowledge and traditional ecological wisdom, make them a pioneering force in conservation efforts. The Bishnoi community is widely known for its heroic sacrifice to protect the Khejri trees, a symbol of their environmental ethos. This event, known as the Khejarli Massacre, occurred in 1730 when Maharaja Abhay Singh, the ruler of Jodhpur, ordered the felling of Khejri trees to meet the demands of timber for a royal palace. In an act of resistance, 363 Bishnoi community members, including the brave Amrita Devi, sacrificed their lives by hugging the trees to prevent them from being felled. The community's sacrifice marked the beginning of India's first organized environmental movement, rooted in the principles of compassion for all living beings and the protection of nature. This act remains a symbol of the Bishnoi's unwavering dedication to conservation and their belief that the protection of trees and wildlife is integral to sustaining life in the harsh environment of the Thar Desert. Guru Jambheshwar founded the Bishnoi sect in 1485, establishing 29 principles, which are now known as the "Bishnoi Code." These principles, which include prohibitions against cutting green trees and promoting compassion for all living creatures, were specifically designed to address the environmental challenges faced by the

people living in the Thar Desert. Jambhoji's teachings encouraged the Bishnoi community to live in harmony with nature, emphasizing sustainability and wildlife protection as crucial elements of their religious practices. The Bishnoi continue to honor these edicts by engaging in sustainable practices that maintain the balance between human needs and ecological preservation. The Bishnoi community's approach to conservation is built on the wise management of natural resources. Their practices have ensured the continued survival of vital species and ecosystems in the region. The Bishnoi have managed the Khejri trees and other desert flora as sacred resources, making it a crime to cut them down. In addition, the community's understanding of desert ecosystems allows them to manage grazing patterns, control over-exploitation, and maintain a balance between animal populations and vegetation. Their stewardship of natural resources, including managing sacred groves and water sources, has helped preserve critical biodiversity in the harsh conditions of the desert. In addition to forest conservation, the Bishnoi also focus on wildlife protection. Their communities are home to several endangered species, including blackbucks, Indian gazelles, and peacocks. The Bishnoi's relationship with wildlife is one of mutual respect, with many wild animals roaming freely through the villages, often treated as part of the community. This connection is visible in the community's animal care practices, where injured or sick animals are nursed back to health, sometimes through extraordinary measures like breastfeeding fawns by Bishnoi women. The modern-day Bishnoi continue to uphold their ecological values, even amidst environmental challenges such as deforestation, groundwater depletion, and urbanization. Despite the pressures of mining, poaching, and development, the Bishnoi use their traditional knowledge and community-driven initiatives to counter these threats. Their activities include the planting of Khejri trees to combat desertification, and community-managed animal care centers where injured wildlife is treated and rehabilitated. The Bishnoi's approach to conservation is not limited to forest and wildlife management but extends to the use of local ecological knowledge in water conservation and desert agriculture. By practicing sustainable farming, careful water management, and nurturing sacred groves, they help ensure a continuous supply of resources, even in the face of climate challenges. The high natural vegetation cover in Bishnoi villages, as reported in recent field surveys, indicates the success of their community-based conservation practices. Notably, Bishnoi villages have a significantly higher density of Khejri trees and blackbucks compared to other areas in the Thar Desert. The impact of the Bishnoi community's conservation practices can be seen not only in the protection of species but also in the improvement of local livelihoods. By focusing on sustainable use of natural resources, the Bishnoi create economic opportunities through ecotourism, medicinal plant collection, and traditional handicrafts. The conservation of sacred groves, which act as biodiversity hotspots, also provides vital resources, such as water, during times of drought. In recognition of their efforts, the government of India established the Amrita Devi Wildlife Protection Award in 2000, and National Forest Martyrs Day was declared on 11th September, in honor of the 363 lives lost in the Khejarli Massacre. Today, the Bishnoi's commitment to conservation remains a model for community-driven efforts across India and around the world. The Bishnoi community's approach to environmental conservation provides a compelling example of the effectiveness of community-driven models in sustaining biodiversity. Their practices highlight the importance of local knowledge and participation in managing natural resources. The Bishnoi community's ability to live in harmony with the desert's harsh

conditions while preserving critical ecosystems shows the power of integrating cultural beliefs with ecological practices. This case underscores the value of grassroots efforts in achieving long-term sustainability and reinforces the argument that community-driven conservation can lead to better outcomes than top-down approaches. Through their unwavering commitment to conservation, the Bishnoi continue to inspire future generations to protect the planet's invaluable biodiversity. The Bishnoi community exemplifies successful community-driven resource management through their deep-rooted cultural values and active participation in conservation. Guided by the teachings of their 15th-century guru, Maharaja Jambheshwar, the Bishnoi community follows 29 principles focused on sustainability, such as protecting trees, wildlife, and water resources. These principles are not externally imposed but are collectively embraced, making conservation a community effort. A key example of their commitment is the Khejri tree protection event, where 363 Bishnoi members sacrificed their lives to prevent deforestation, symbolizing their collective responsibility toward the environment. Their practices, which include planting Khejri trees and managing grazing patterns, have led to sustainable resource management, ensuring biodiversity and ecological balance in the harsh Thar Desert. Despite modern challenges like urbanization and climate change, the community has adapted its traditional knowledge to continue protecting the environment. The Bishnoi's success lies in the integration of cultural beliefs with resource management, demonstrating that community-driven approaches can effectively achieve long-term sustainability and environmental conservation (Sohel, A. & Naz, F., 2024).

Case Study 2: Apatani Cultural Landscape: A Model of Community-Driven Resource Management

The Apatani Cultural Landscape, located in the Ziro Valley of Arunachal Pradesh, exemplifies a community-driven approach to resource management. This biodiverse region, nestled at elevations between 1,564 and 2,900 meters, is inhabited by the Apatani tribe, renowned for their advanced agricultural practices. Unlike other tribal groups in Arunachal Pradesh that rely on slash-and-burn methods, the Apatanis have developed a sophisticated system of paddy-cum-fish cultivation, complemented by bamboo and pine plantations. These practices ensure sustainable livelihoods while maintaining ecological balance. The Apatani system of wet-rice cultivation is a labor-intensive yet efficient process. It incorporates intricate irrigation networks, locally constructed dams (kiile), and bamboo screens to optimize water usage while preventing the loss of fish, a dietary staple. These artificial irrigation channels depend on the conservation of surrounding forests, which serve as crucial watersheds. Such integration of agriculture with natural resource conservation has preserved soil fertility and biodiversity in the valley for generations. Every inch of land in the Ziro Valley is utilized with purpose. Gentle slopes are reserved for bamboo and pine groves, which serve as fuel and building materials. Families ensure sustainability by planting new saplings after harvests, a tradition passed down through generations. This meticulous management leaves no wasteland and exemplifies a

rational use of limited land resources. Governance in the Ziro Valley is another key factor in its success. Traditional village councils, or *bulyañ*, oversee community activities, fostering compliance through moral persuasion rather than punitive measures. This participatory governance model ensures harmony between individual actions and community welfare. Moreover, the Apatanis' belief in Donyi Polo, an animistic religion that venerates the sun and moon, reinforces their respect for nature.

Agriculture sustains 70% of the valley's population, while the remainder engages in ecotourism, commercial crop cultivation, and timber production. The integration of human settlements, wet-rice fields, and bamboo plantations reflects a deep understanding of environmental interconnectivity. Rainwater drainage systems, such as *supyu*, naturally enrich paddy fields with organic manure, ensuring hygiene in villages and minimizing waterborne diseases. The Apatani Cultural Landscape demonstrates the potential of community-driven resource management, where traditional knowledge, ecological consciousness, and participatory governance come together to achieve sustainable development. It stands as a testament to the continuing wisdom of indigenous practices in addressing contemporary environmental challenges (Persis, 2017).

Challenges and Limitations of Top-Down Government Approaches in Conservation

Top-down government approaches to conservation, which often involve creating protected areas and implementing nature preservation policies, have faced significant challenges and limitations, particularly in terms of conflict with local communities and high costs related to enforcement. One of the primary criticisms of top-down conservation approaches is the conflict with local communities. In many cases, conservation efforts have displaced or marginalized indigenous populations and local residents, leading to tensions and resentment. Establishing protected areas, such as national parks or wildlife sanctuaries, often requires restricting local access to natural resources that communities have traditionally relied upon for their livelihoods. This can result in a direct clash between conservation goals and the rights or needs of local populations. The potential for conflict has become increasingly recognized within the conservation community. While the intention is to protect biodiversity, the harm caused to local communities is a growing concern. In India, for example, between 1999 and 2020, 13,450 families were displaced due to the establishment of protected areas. These displacements not only affect people's homes and livelihoods but also their cultural and spiritual connections to the land. Similarly, in the Democratic Republic of Congo, indigenous pygmy communities were forcibly removed from lands within Kahuzi-Biega National Park. In 2018, when some families tried to return to their ancestral lands, they faced violent clashes with park guards, leading to the destruction of homes, imprisonment of a community leader, and even deaths. These types of violent incidents demonstrate the social and ethical costs of conservation strategies that fail to engage local communities in decision-making. While establishing protected areas may be a step toward conservation, the high costs and enforcement challenges are significant obstacles. Simply designating land or marine areas as protected does not guarantee their preservation. Ongoing surveillance, patrolling, and law enforcement are necessary to prevent illegal activities such as poaching, logging, or mining within these areas.

However, maintaining a constant presence is resource-intensive and remains one of the largest costs associated with protected areas. In regions like Kahuzi-Biega, the absence of adequate resources for patrolling and community engagement can exacerbate tensions and lead to conflicts. Without sufficient funding and support, protected areas may be poorly managed, undermining their intended goals of biodiversity conservation. The cost of enforcing regulations in remote or vast areas, often far from urban centers, can be a substantial burden for governments and conservation organizations, leading to gaps in effective protection (Bennett, 2020).

Conclusion

The governance and management of natural resources in India represent a multifaceted interplay of challenges and opportunities. This highlights that while India is richly endowed with natural resources, their unequal distribution and overexploitation underscore the pressing need for effective management strategies. The policy frameworks, governance structures, and community-driven practices are tool that shape resource management in the country. It has also important to emphasized on the ecological, social, and economic significance of these resources and the critical role they play in India's sustainable development. The analysis reveals key governance challenges, including policy inconsistencies, weak enforcement mechanisms, and a lack of coordination among various levels of government. While national policies like the National Water Policy (2012) and National Forest Policy (1988) provide a foundation for sustainable resource management, their implementation has often been marred by inefficiencies and competing political interests. Moreover, the increasing pressures of urbanization, climate change, and industrial expansion have further strained India's natural resources, leading to environmental degradation and social inequities. Conversely, community-driven conservation models, as exemplified by the Bishnoi community and the Apatani cultural landscape, offer valuable lessons in integrating traditional ecological knowledge with modern conservation practices. These grassroots initiatives underscore the importance of local engagement, participatory governance, and cultural values in achieving sustainable outcomes. However, the study also acknowledges the limitations of these models, particularly in addressing large-scale resource management issues that require substantial state intervention and coordination. This research promotes for a balanced approach that combines top-down policy frameworks with bottom-up community participation. Strengthening institutional capacities, fostering collaboration across governmental and non-governmental sectors, and promoting public awareness are essential steps toward achieving equitable and sustainable resource management. Additionally, addressing regional disparities in resource access and usage through targeted policies can help mitigate social and economic inequities. Ultimately, the path forward for India lies in adopting a holistic approach that prioritizes environmental conservation, equitable resource distribution, and economic growth. By harmonizing these objectives, India can not only safeguard its natural capital for future generations but also ensure that its development trajectory remains inclusive and sustainable.

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