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CONSERVATION AND MANAGEMENT OF WETLANDS BIODIVERSITY UNDER RAMSAR CONVENTION FOR MITIGATING THREATS OF CLIMATE CHANGE

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Abstract

Wetlands are vital for human survival. They are among the world's most productive environments; cradles of biological diversity that provide water and productivity upon which countless species of plants and animals depend for survival. Wetlands are indispensable for the countless benefits or "ecosystem services" that they provide humanity, ranging from freshwater supply, food and building materials, and biodiversity, to flood control, groundwater recharge, and climate change mitigation. Over the years, a bunch of activities such as accelerated urbanization, industrialization, technological advancement in agricultural sectors along with changed land use pattern have unfortunately threatened the uniqueness of wetlands and affected their ecological, economical, and biological identity. Due to various natural and anthropogenic activities, wetland occupied areas throughout the world are decreasing and declining its water quality. This called for the attention towards conservation and protection of the wetlands before their extinction.

The Convention on Wetlands, called Ramsar Convention, is the intergovernmental treaty that provides the framework for the conservation and "wise use'' of wetlands and their resources. The convention was adopted in the Iranian city of Ramsar in 1971 and it came into force in 1975. India signed the treaty and became a contracting party to the convention on 1st February 1982. At present there are 85 Ramsar sites in India, third maximum among the entire member states. The United Kingdom leads the list with 175 while Mexico holds the second position with 144 sites. The first Indian wetlands of international importance under Ramsar convention were Chilka Lake in Odisha and Keoladeo National Park in Rajasthan.

This paper mainly reviews the present status, conservation and management plans for Indian wetlands with special reference to wetlands in the state of Bihar concentrating on various threats and their possible sources to wetland regions and focuses to investigate major factors responsible

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for overutilization of wetland wealth and various management practices for their present and future usage in sustainable way.

Keywords: *Wetlands, Biodiversity, Conservation, Sustainable use, Ramsar Convention.*

The Ramsar Convention: An International Treaty

An intergovernmental agreement known as the Convention on Wetlands was ratified on February 2, 1971, in the Iranian city of Ramsar, which is located on the Caspian Sea's southern shore. The earliest contemporary international intergovernmental agreement on the preservation and sustainable use of natural resources is Ramsar. All lakes and rivers, subterranean aquifers, swamps and marshes, wet grasslands, peatlands, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and any man-made locations like fish ponds, rice paddies, reservoirs, and salt pans are all considered wetlands under the Convention's broad definition.[2]

The Convention currently has 172 countries as Contracting Parties (COP), recognizing the importance of having a single international convention devoted to a single ecosystem. Managing wetlands is a worldwide concern.

The "wise use" of wetlands is central to the Convention on Wetlands' ideology. Through national plans, policies, and legislation, management initiatives, and public education, COP pledges to work toward the prudent use of all wetlands and water resources within its borders upon ratification of the Convention.

"Maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development" is how the Convention defines wise use of wetlands. For the benefit of both humans and the environment, wise usage can be defined as the preservation and sustainable use of wetlands and all the services they offer.

Article 5 of the Convention establishes that "*the Contracting Parties shall consult with each other about implementing obligations arising from the Convention especially in the case of a wetland extending over the territories of more than one Contracting Party or where a water system is shared by Contracting Parties. They shall at the same time endeavour to coordinate and support present and future policies and regulations concerning the conservation of wetlands and their flora and fauna.*"

The Ramsar Strategic Plan and the "three pillars" of the Convention are mentioned in the third

[2] Article 1.1

Strategic Plan, COP seeks to deliver their commitments to wetland conservation and wise use through "three pillars" of action. These are:

a) Working towards the "wise use" of their wetlands through a wide range of actions and processes contributing to human well-being through sustainable wetlands, water allocation, and river basin management, etc.[3]

b) Devoting particular attention to the further identification, designation and management of a comprehensive suite of sites for the List of Wetlands of International Importance.

c) Cooperating internationally in the delivery of wetland conservation and wise use, through the management of transboundary water resources and wetlands and shared wetland species, collaboration with other conventions and international organizations, sharing of information and expertise, and increasing the flow of financial resources and relevant technologies to less-developed countries.

By setting international standards for wetland conservation and providing a forum for discussing global wetland issues, the Convention enables Contracting Parties to share information on wetlands and address issues together. Contracting Parties commit to work towards the wise use of all the wetlands and water resources in their territory, through national plans, policies and legislation, management actions and public education.

In 1990 the Contracting Parties adopted Guidelines for the implementation of the wise use concept. The Guidelines emphasized the importance of:

- adopting national wetland policies, either separately or as a component of wider initiatives such as national environmental action plans;
- developing programmes covering wetland inventory, monitoring, research, training, education and public awareness;
- developing integrated management plans at wetland sites.

These "Ramsar Sites" acquire a new national and international status. They are recognized as being of significant value not only for the country or the countries in which they are located, but for humanity. There are currently over 2,400 Ramsar Sites around the world. The inclusion of a wetland in the List embodies the government's commitment to take the steps necessary to ensure that its ecological character is maintained. The Convention includes various measures to respond to threats to the ecological character of Sites.

[3] for example, establishing national wetland policies; harmonizing the framework of laws and financial instruments affecting wetlands; undertaking inventory and assessment; ensuring public participation in wetland management and the maintenance of cultural values by local communities and indigenous people; promoting communication, education, participation, and awareness; and increasing private sector involvement.

The Necessity of an International Convention on Wetlands

The Ramsar Convention on Wetlands was established to highlight the alarming rate at which wetland ecosystems are vanishing, largely due to a widespread lack of awareness regarding their vital roles, values, and the essential goods and services they provide. Nations that commit to this Convention express their dedication to combating the historical trends of wetland loss and degradation.

Additionally, numerous wetlands extend across the borders of multiple countries or are components of international river basins. The viability of these wetlands is intrinsically linked to the quality and quantity of transboundary water supplies from rivers, streams, lakes, or aquifers. The aspirations of nations neighbouring these wetlands can be hampered without an organized framework for international dialogue and collaboration aimed at achieving mutual benefits. Consequently, the Ramsar Convention emphasizes particular attention on sites designated as Transboundary Ramsar Sites by the participating parties.

Human activities can adversely affect water sources, like agricultural, industrial, or domestic pollution, often occurring far from the wetland areas themselves, sometimes beyond the borders of affected states. Such actions can lead to the degradation or outright destruction of wetland habitats, jeopardizing the health and livelihoods of local communities. The conservation and management of many migratory species, such as certain fish, various water birds, butterflies, dragonflies, and mammals including otters, also necessitate international collaboration.

In conclusion, wetlands represent a significant resource, holding considerable economic, cultural, scientific, and recreational value for humanity. The interdependence between wetlands and people is undeniable. Moreover, wetlands play an integral role in the global water cycle and are crucial for climate regulation. Thus, the ongoing encroachment upon and depletion of wetland areas must be halted, and steps must be taken to conserve and utilize wetland resources sustainably. Achieving this goal on a global scale requires coordinated intergovernmental efforts. The Ramsar Convention on Wetlands provides the necessary framework for such international, national, and local initiatives.

Ramsar Wetlands in India

India became a signatory to the Ramsar Convention in 1981, primarily for the purpose of protecting waterfowl habitats. The initial Ramsar sites in India, Chilika lagoon and Keoladeo National Park located in the states of Orissa and Rajasthan, respectively, were designated based on their significance for waterfowl. Conservation entails managing resources effectively, minimizing waste, and safeguarding them for future generations.

Efforts to protect wetlands in India commenced in 1987, and various initiatives continue to be undertaken, supported by the government through biological, rather than engineering, methods. It has been noted that the launch of a national wetland mapping project fostered an integrated approach to conservation. Several national committees have been formed to advise on the implementation of suitable policies and management strategies for preserving wetlands, mangroves, and coral reefs. To ensure successful execution of these initiatives, steering committees comprising representatives from government agencies, non-governmental organizations, research institutions, and universities should be established in each state.

Threats to Wetlands in India

Wetlands are among the world's most threatened habitats, facing numerous challenges from both human and natural forces. Various natural processes, including the hydrologic cycle, rising sea levels, sedimentation, droughts, hurricanes, invasive species, and soil erosion, all influence the proper functioning of wetlands. The extent of wetlands is affected by local factors, particularly sea-level rise. In India, wetlands are under considerable threat due to a growing population and escalating anthropogenic activities such as industrialization and agriculture, leading to heightened risks of extinction and degradation.[4] The mismanagement of watersheds and significant land-use changes due to construction projects have dramatically reduced wetland resources in the country. The loss and degradation of vital wetlands result in numerous environmental and ecological problems that directly impact the socio-economic well-being of the communities that depend on them. It is estimated that, globally, one hectare of wetland is degraded every minute.

1. **Urbanization:** Wetlands in urban areas are increasingly under pressure from development activities. These urban wetlands serve as significant freshwater sources for communities. Often, open lands or wetlands in urban and suburban areas are viewed as wastelands and are repurposed for various developments. Local authorities are responsible for zoning these wetlands for light industrial or residential use. The effectiveness of urban wetlands in maintaining water quality and providing flood control has declined due to adjacent developmental activities. Urban and industrial development has reduced wetland areas, and the poor water retention capacity of concrete infrastructures leads to heightened runoff, increasing flooding risks during heavy rains.[5] Additionally, pollutants carried by this runoff severely degrade water quality. Effluents from

[4] Prasad SN, Ramachandra TV, Ahalya N, Sengupta T, Kumar A, Tiwari AK, Vijayan VS, Vijayan L (2002) Conservation of wetlands of India-a review. Tropical Ecol 43(1):173–186.

[5] Romshoo SA, Altaf S, Rashid I, Dar RA (2017) Climatic, geomorphic and anthropogenic drivers of the 2014 extreme flooding in the Jhelum basin of Kashmir. India. Geomatics Natl Hazards Risk. 9:224–248.

industries and untreated sewage from wastewater plants[6] are frequently discharged into wetlands, introducing harmful microorganisms.[7]

2. **Anthropogenic Activities:** Numerous human activities contribute to the deterioration of water quality[8] in lakes and catchment areas. The direct disposal of untreated sewage and solid waste significantly lowers water quality in wetlands. The immersion of idols and the unchecked disposal of both biodegradable and non-biodegradable waste also disrupt the physical, chemical, and biological properties of wetland waters. Human activities such as bathing, laundering, recreation, and motorized boating further affect the ecological balance of these ecosystems. Exploitation of wetland resources through dredging, harvesting aquatic plants, and fishing contributes to substantial ecological and economic losses.[9] Urban, agricultural, and industrial mismanagement has led to the depletion and alteration of wetlands, threatening their survival. While urban areas experience substantial pollution from storm-water runoff, rural areas face different pressures due to the presence of natural vegetation in their catchment areas. Overgrazing and cultivation have stripped catchments of their vegetation, rendering them more vulnerable to soil erosion, leading to the erosion of fertile soil with runoff.

3. **Agricultural Activities:** Rapid population growth and industrialized agriculture have led to the conversion of extensive wetlands, lakes, and floodplains into agricultural lands across India.[10] Increased agricultural activities to accommodate this growing population have resulted in the excessive use of synthetic fertilizers, which wash into wetlands and adjacent water bodies, leading to eutrophication.[11] The demand for water to irrigate crops in drought-prone regions has surged dramatically in recent decades, prompting the construction of numerous canals, dams, and reservoirs. This development has disrupted natural wetland hydrology. While these infrastructures might contribute to the economic success of the nation by converting wetlands and mangrove forests into fisheries or aquaculture ponds, they have also significantly altered the wetlands' ecological and physiological characteristics.

4. **Hydrologic Activities:** The construction of dams and reservoirs to divert river flows for

[6] Brraich OS, Jangu S (2016) Comparative account of accumulation of heavy metals and structural alterations in scales of five fish species from Harike Wetland. India. Iranian J Ichthyol 3(4):275–282.
[7] Kumar G, Kaur A (2018) Status of Wetlands in Punjab: a review on policy frameworks. Asian J Multidimens Res 7(10):169–177.
[8] Farooq R, Chauhan R, Mir MF (2018) Deterioration of water quality of Anchar Lake as indicated by analysis of various water quality parameters. Int J Adv Res Sci Eng 7:2551–2558.
[9] MoEF [Ministry of Environment and Forests], Government of India (2010) National Wetland Atlas. Kerala, Space Application Centre, ISRO, Ahmedabad, p 146.
[10] Foote AL, Pandey S, Krogman NT (1996) Processes of wetland loss in India. Environ Conserv 23:45–54.
[11] Nune S (2016) Wetlands in India: Significance, Threats & Conservation.

irrigation in arid regions has drastically changed the direction of water flow and drainage patterns, severely impacting local wetlands. For instance, in Gujarat, waters from the western Himalayan ranges are rerouted via canals to dry regions of the state and neighbouring Rajasthan, which has changed the soil's physicochemical properties and led to numerous ecological challenges, including the invasion of non-native plant species, salinization, regional water scarcity, and disrupted sustainable local lifestyles. Human-induced alterations in hydrological regimes have affected natural drainage patterns.[12] As rivers and lakes become isolated from their flood plains, groundwater recharge diminishes, leading to lower water tables and increased flood risks in lower areas during heavy rainfall.

5. **Change in Land Use Cover:** Altering land use patterns has contributed to wetland degradation, diminishing the availability and yield of vital resources such as fuel, fodder, fish, medicinal plants, honey, shellfish, and various chemicals. This economic harm accompanies a host of problems linked to land use changes, including sediment accumulation in water bodies, soil erosion, and pollution from waste. Changes in hydrological conditions have intensified soil erosion, leading to the direct loss of wetlands, especially in urban regions where land is filled in. Over-extraction of groundwater has exacerbated soil salinity issues and reduced crop yields, significantly impacting the nation's economic health.

6. **Deforestation:** Recent decades have seen notable shifts in both water quality and availability, primarily driven by deforestation. The rate of wetland degradation has outpaced that of forest loss. The removal of extensive vegetation in catchment areas contributes to soil degradation and sedimentation in water bodies. Mangroves, which are specialized wetlands, are often replaced with agricultural lands and aquaculture ponds, adversely affecting their ecological integrity. Mangrove forests are invaluable for their myriad direct and indirect uses.[13] Changes in land use and the expansion of aquaculture have led to the conversion of substantial mangrove areas into agricultural spaces, disrupting wetland hydrology.

7. **Pollution:** In India, only one-third of the wastewater produced in urban areas is processed, with the remaining untreated waste being discharged into various natural and artificial water bodies, compromising their water quality. The Yamuna River, which flows through six major cities, receives significant quantities of untreated sewage and industrial effluents daily. An overload of

[12] Gopal B (1982) Ecology and Management of freshwater wetlands in India. In: Proceedings of the International Scientific Workshop (SCOPE-UNEP) on ecosystem dynamics in Freshwater Wetlands and Shallow water bodies, pp 127–162. Centre for International projects, GKNT, Moscow, USSR.

[13] Ahmad N (1980) Some aspects of economic resources of Sundarban mangrove forest of Bangladesh. In Asian Symposium on Mangrove Environment, Research and Management, Kuala Lumpur (Malaysia), pp 25–29

nutrients in lakes has polluted freshwater resources, depleting oxygen levels and creating dead zones.[14] Pollution in wetlands primarily arises from two categories: point source pollution (from identifiable sources like sewage and industrial discharge) and non-point source pollution (from diffuse sources such as agriculture and urban runoff). Improper and excessive resource utilization without adequate conservation measures has resulted in the degradation of numerous lakes and wetlands.[15]

8. **Invasive Species:** The introduction of invasive species poses a significant threat to many wetlands in India, as these species often outcompete native flora and fauna for nutrients and space. Water hyacinth and salvinia are among the most prevalent exotic plant species invading local ecosystems. The altered habitats have allowed these non-native plants to flourish at the expense of native species. Since the late 1960s, the issue of invasive species has become pronounced, particularly with the proliferation of salvinia in the Kakki reservoir of Kerala.

9. **Climate Change:** UNESCO reports[16] indicate that climate change is anticipated to be a primary factor driving transformative changes and losses in wetland ecosystems. Alterations in climate patterns, such as the rise in water levels in Tsomoriri Lake in Ladakh, threaten vital breeding habitats for endangered migratory bird species, which may lead to their extinction. Projections suggest that a 1-meter rise in sea levels due to climate change could result in the loss of 84% of coastal wetlands and 13% of saline wetlands. Climate change impacts a multitude of factors—including rainfall patterns, storm frequency, air temperature fluctuations, droughts, floods, and increasing levels of greenhouse gases—which subsequently disrupt the ecological balance of wetlands. While climate change presents challenges, it can also create opportunities; for instance, paddy fields, a type of wetland, are significant sources of methane, a greenhouse gas that contributes to global warming. The rapid population growth in India has reshaped landscapes and topographies, continuously impacting water and wetland resources and reducing their suitability for habitation by both humans and wildlife.

Conservation of Wetlands under the Biodiversity Act of 2002

The Biological Diversity Act of 2002 was enacted in India with the principal goal of safeguarding biological diversity, promoting sustainable utilization of biodiversity components, and ensuring the fair and equitable sharing of benefits derived from biological resource use. Wetlands, recognized for

[14] Shan V, Singh SK, Haritash AK (2020) Water crisis in the Asian Countries: Status and Future Trends, Resilience, Response, and Risk in Water Systems, 173–194

[15] Singh SK, Shan V (2017) Biodiversity and its conservation. In: Environmental studies New Delhi: Bharti Publications.

[16] United Nations Educational, Scientific and Cultural Organization (UNESCO) (2007) Case studies on climate change and world heritage. UNESCO World Heritage Centre, France.

their ecological significance, fall under this Act's jurisdiction but are also safeguarded by various other national and state regulations.

The Act facilitates the establishment of Protected Areas (PAs) within the National Biodiversity Action Plan (NBAP), which may encompass ecologically important wetlands. The State Biodiversity Boards (SBBs) and the National Biodiversity Authority (NBA) are tasked with identifying critical areas for biodiversity, including wetlands, and ensuring their legal protection.

Biodiversity Management Committees (BMCs) are formed at the local administrative levels (i.e., panchayat, municipal, or district levels) as set forth in Section 41 of the Biodiversity Act. These committees are responsible for creating People's Biodiversity Registers (PBRs), which document local biological resources and their uses. Wetlands, being essential biological resources, must be included in these registers, thereby empowering local communities in their conservation efforts.

Furthermore, the Biodiversity Act includes provisions addressing Access and Benefit Sharing (ABS), which pertains to wetlands where biological resources are exploited for commercial purposes, such as fishing, tourism, and medicinal plants. This framework ensures that the benefits derived from utilizing wetland resources are equitably shared with local communities and stakeholders, encouraging sustainable utilization and conservation practices.

Although the Biodiversity Act does not exclusively focus on wetlands, the National Wetlands Conservation Programme (NWCP) initiated by the Ministry of Environment, Forest and Climate Change (MoEFCC) aims specifically at the protection of wetland ecosystems. The objectives of this program are:

- To avert further wetland degradation.
- To promote the sustainable use of wetland resources.
- To encourage the conservation of wetlands with active involvement from local communities.

Ramsar Sites in Bihar, India

North Bihar boasts a well-developed network of rivers originating from the Himalayas, along with numerous natural and manmade water bodies. The region is characterized by thousands of ponds, tanks, chaurs (land depressions), and moins (ox-bow lakes), which serve as essential sources for irrigation and pisciculture. Several wetlands, including Kabartal (Begusarai), Kusheshwarsthan (Darbhanga), Baraila (Vaishali), Saraiyaman (West Champaran), and Gogabeel (Katihar), are recognized as key birding locations. Some of these wetlands have been proposed as potential Ramsar sites, having the capacity to be developed as ecotourism destinations.

Kabartal, located in the Begusarai district of Bihar, has been designated as a wetland of international significance, marking the state's first Ramsar site. Recently, the Union Ministry of Environment,

Forest and Climate Change has recognized Nakti and Nagi bird sanctuaries in Bihar as additional Ramsar wetlands of international importance. Both sites are artificial and situated within the Jhajha forest range of Jamui district. As it stands, Bihar is home to three sites recognized under the Ramsar Convention.

Nagi Bird Sanctuary has been acknowledged as India's 81st Ramsar Site. This manmade wetland, covering 791 hectares in the Jamui district, was created by damming the Nagi River. The reservoir attracts wintering migratory birds from Eurasia, Central Asia, Russia, and Northern China. Nagi was declared a bird sanctuary in 1984 and subsequently recognized by Bird Life International as an Important Bird and Biodiversity Area (IBA). It is notable for hosting one of the largest concentrations of bar-headed geese (Anser indicus) within the Indo-Gangetic plain.

Nakti Bird Sanctuary, designated as the 82nd Ramsar site in India, is also an artificial wetland created by the Nakti Dam, spanning across 332 hectares. This sanctuary lies adjacent to the Nagi Bird Sanctuary and is situated in the same Jamui district. The lake formed by the dam functions as a habitat for over 150 species of birds, mammals, fish, aquatic plants, and more. Established as a bird sanctuary in 1984, it provides a habitat for one of the largest gatherings of red-crested pochards (Netta rufina) on the Indo-Gangetic plain.

In 1986, the state government designated Nakti as a protected area, which was later officially recognized by the central government to prevent bird poaching. According to notification No. G.S.R 1203 (E) dated 26.09.2017 from the Ministry of Environment, Forest & Climate Change (MoEFCC), Wetlands (Conservation and Management) Rules 2017 were implemented for the integrated management of wetlands. Additionally, the Government of Bihar, as per its notification No: Wildlife – 16/2012 34 (E) dated 31.01.2020, established the Bihar Wetland Development Authority (BWDA) with the Minister for Environment, Forest, and Climate Change serving as Chairman, the Development Commissioner as Vice Chairperson, and the Chief Conservator of Forest (Wetland & Climate Change) as Member Secretary.

One of the world's most endangered environments is wetlands. Like everywhere else, wetlands in India are rapidly being impacted by a number of human-caused factors. Therefore, the country's wetland resources have significantly declined as a result of the fast growing human population, extensive changes in land use and land cover, growing development projects, and inappropriate usage of watersheds. Its conversion risks from industrial, agricultural, and diverse urban activities have caused significant losses. These have resulted in pollution, hydrological disturbances, and their consequences. Wetlands have also degraded as a result of fishing and grazing at unsustainable

levels.

Environment and bird experts have sounded an alarm over the state of the lake. Kanwar Lake, a Ramsar site, is slowly drying and dying. This is a big threat for birds, both migratory and local. Water is missing in the large part of this big wetland — a bad sign.[17] The birds have been facing habitat destruction, habitat encroachment and massive hunting,

Kanwar Lake, which covered 6,000–7,000 hectares, was the largest migratory bird hotspot until three or four decades ago. However, as time went on, the lake's size shrank, its water content decreased, and certain regions dried up.

Thousands of local fishermen have been negatively impacted by the drying of Kanwar Lake, and many have been forced to relocate outside in pursuit of other employment opportunities. The fishing community used to rely on this lake as a source of revenue. However, tensions between fishermen and farmers became evident when the lake began to dry up and some strong farmers violently encroached on it. Farmers assert their right to farm, and fishermen assert their right to fish in the lake.

Since Kanwar Lake has been struggling for years, the government should take action to preserve this special wetland. In addition, the lake's growing silt buildup, deforestation, and farmland disputes need to be addressed.

The lake is now overly dependent on monsoon rainfall because the natural water sources surrounding it have disappeared over time and the water passage from the Burhi Gandak River to the lake has been completely disturbed, according to Mishra. To guarantee water flow, the government is being urged to connect the lake to the river via a canal.

Conclusion

Because these habitats offer a wide range of services to humans and aid in maintaining natural balance with human demands, wetlands are the foundation of the economy and human society. However, the state of wetlands today is a topic of worry that has to be acknowledged, debated, and addressed in order to guarantee their conservation, restoration, and protection. In order to do this, an integrated approach to the planning, implementation, and monitoring of different wetland regions should be used, along with productive cooperation with specialists in watershed management, hydrology, ecology, economics, planning, and decision-making for their appropriate resource

[17]https://www.downtoearth.org.in/wildlife-biodiversity/kanwar-lake-bihar-s-only-ramsar-site-faces-challenge-of-survival-but-not-a-poll-issue-96172

management and sustainable and efficient use. Prerequisite conditions include local awareness of wetland restoration and conservation.

While the Biodiversity Act, 2002 does not single out wetlands as a specific focus area, the broad framework it establishes for biodiversity conservation indirectly supports wetland conservation. It encourages the inclusion of wetlands in People's Biodiversity Registers, their sustainable use through Access and Benefit Sharing, and their protection as part of India's overall biodiversity conservation strategy. Wetland conservation is also directly addressed through various other programs like the National Wetland Conservation Programme (NWCP) and linked international agreements like the Ramsar Convention.

To raise awareness of the value of wetlands and the necessity for their conservation, educational initiatives should be implemented in rural regions, at colleges, schools, and among the local population. According to the current analysis, the government's numerous conservation and management plans for major National and Ramsar sites have so far been likely to be ineffectual and impractical in terms of achieving the intended outcomes. These government conservation plans completely ignored little wetlands. Therefore, by giving states and districts more authority, a common whole of government strategy should be implemented to conserve both large and small wetlands. Wetlands may only be sustained with adequate care and effective management; otherwise, ongoing neglect and depletion of the same will dead to crisis for life on this planet.

However, the practical enforcement of these legal frameworks remains a challenge and calls for greater coordination between various stakeholders, including government agencies, local communities, and conservation organizations.

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