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Global Strategies for Wetlands Conservation: Special Emphasis on India

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Abstract: Wetlands are among the most vital ecosystems on Earth, providing ecological services such as biodiversity conservation, water purification, and climate regulation. However, these fragile ecosystems face significant threats, including habitat loss, pollution, climate change, and overexploitation. This review explores worldwide efforts to protect and restore wetlands through policy frameworks, conservation strategies, and international cooperation. Effective management plans are essential to mitigate threats and sustain wetland functions. Integrated approaches involving habitat restoration, pollution control, and community participation are critical. Mitigation strategies also focus on minimizing the adverse impacts of development activities and balancing ecological and economic interests. The Ramsar Convention, a global treaty, underscores the importance of international collaboration in wetland conservation, emphasizing the wise use of resources. Nationally, countries like India have implemented protective measures such as the Wildlife Protection Act and the Environment (Protection) Act, 1986. These legislative efforts are complemented by a National Wetland Policy aimed at preserving critical habitats. Internationally, countries like China, the United States, and Canada have pioneered unique strategies. China emphasizes wetland restoration projects, while the U.S. employs measures such as the Clean Water Act, Swampbuster, and the involvement of the Army Corps of Engineers. Canada integrates wetland conservation into broader environmental policies. To ensure the long-term survival of wetlands, it is imperative to adopt suggestions such as enhancing public awareness, promoting sustainable land use practices, and strengthening international commitments. A collaborative and adaptive approach is essential for preserving these invaluable ecosystems for future generations.

1. Introduction

According to Hu et, al. (2001), wetlands are essential for preserving the global hydrological cycle, controlling the climate, preserving ecological variety, and ensuring human well-being. Humans can benefit directly from wetland ecosystems in addition to receiving indirect services from them (Costanza *et al*. 1997; Smardon *et al.*2009). It has been acknowledged that wetlands provide numerous environmental services or functions in addition to being valuable habitats for a variety of plant, animal, and fish species, and for biodiversity (Smardon *et al.* a 2009; Mitsch *et al.* 2015; Costanza *et al.* 2014; Bobbink *et al.* 2006; Verhoeven *et al.* 2006; Strayer *et al.* 2010). An international, intergovernmental convention that defined wetlands quite broadly was developed by the Ramsar Convention on wetlands

(1971). Article 1 states that wetlands are "…areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide is not greater than six meters" (Ramsar, 2011).

Wetland type classification may be an extremely intricate and challenging procedure as more classifications can be made the more wetland features that are taken into account. Such detailed procedures, however, are outside the purview of this work. To highlight how complicated these classifications may actually be, the most basic categorization scheme will be contrasted to a more sophisticated system in place of this digression. A fundamental categorization scheme divides wetlands into four primary categories: fen, marsh, bog, and swamp (Keddy, 2010) **(**Figure 1**)**. The descriptions that follow are predicated on a review of the literature by Moore (2008) and Keddy (2010).

1.1 Swamp (Carr)

Swamps are relatively high in nutrients, supplied by surface runoff and groundwater from surrounding land. Substrates are typically a combination of mineral soils and well -decomposed peat. The water table is usually above some of the ground surface, though due to large seasonal fluctuations, it can periodically be much higher or lower (Clarkson and Peters,2010).

1.2 Marsh

Marshes are characterized by large periodic fluctuations of the water table or water level. They can experience water-level drawdowns that result in portions drying out and exposing the mineral substrate, but the soil usually remains moist. They have a lower overall water table than swamps, higher nutrient levels and, a higher pH. Ephemeral wetlands are a subset of the marsh type in which ponding and drying out occur on a seasonal basis. In more extreme cases, the vegetation alternates between aquatic and terrestrial (Clarkson and Peters,2010).

1.3 Bog (Schwingmoor)

Bogs are peat-accumulating systems fed only by rainwater and thus have very low nutrient levels. They are usually strongly acid, and water flow is restricted. The water table is either at or just below the surface and remains relatively constant. (Clarkson and Peters,2010).

1.4 Fen

Fens have a predominantly peat substrate, although the peat is shallower and more decomposed than in bogs. They are fed by both rain and groundwater, resulting in low to moderate nutrient and acidity levels. The water table is typically just below the peat surface, with small but noticeable fluctuations (Clarkson and Peters,2010)

2. Hypothesis of the Study

Global initiatives for wetland conservation play a crucial role in preserving biodiversity, maintaining ecological balance, and mitigating climate change. India, as a signatory to various international agreements, has made significant efforts to conserve its wetlands, yet challenges persist in implementation and sustainable management.

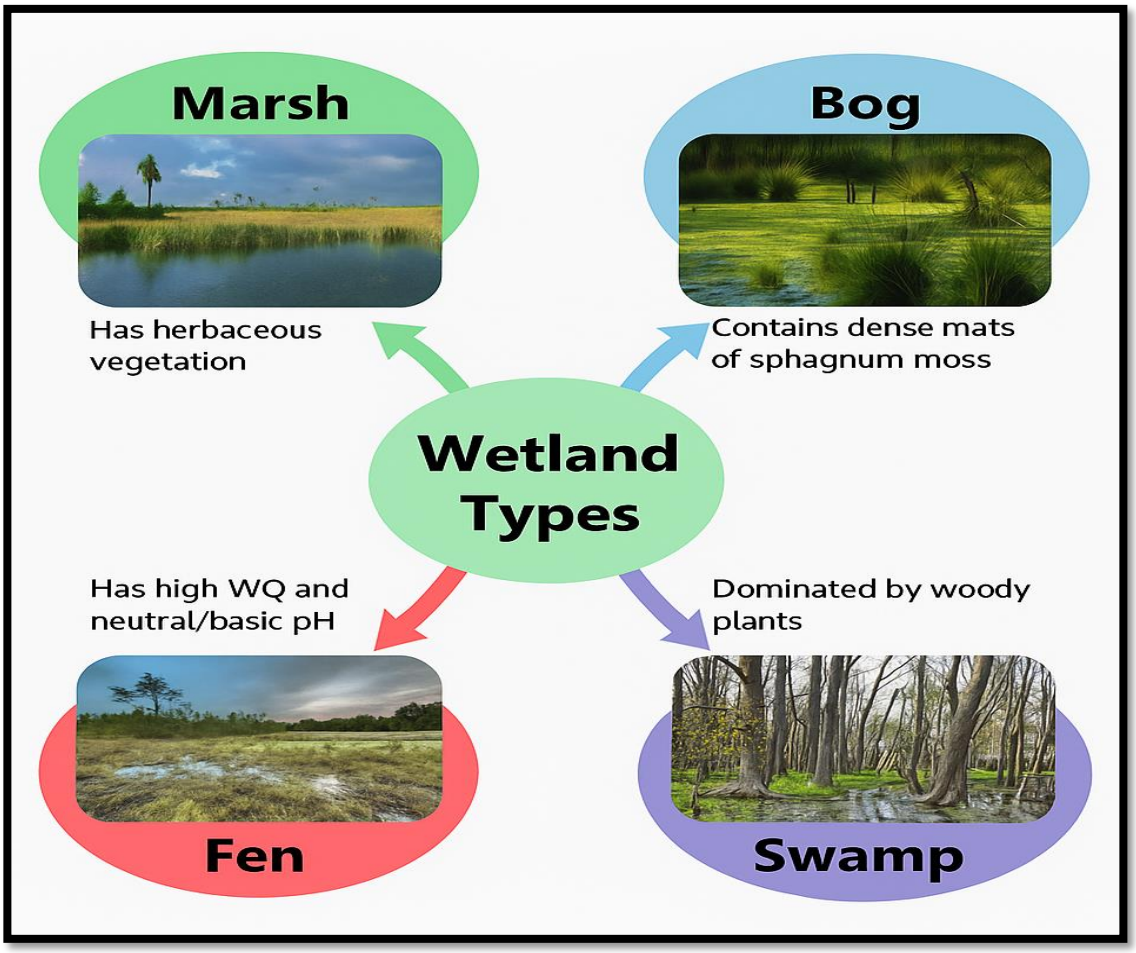

Figure 1. Types of Wetlands

3. Objectives of the Study

1. To analyse the effectiveness of global wetland conservation initiatives, such as the Ramsar Convention, in protecting wetlands and biodiversity, with a special emphasis on India's commitments and progress.

2. To evaluate the challenges and opportunities in wetland conservation in India, including policy implementation, community participation, and sustainable management strategies.

4.Methodology the study

4.1 Literature Review Approach

A systematic review of peer-reviewed journal articles, policy documents, government reports, and international organization publications (e.g., Ramsar Convention, UNEP, IUCN). Use of databases such as Google Scholar, Web of Science, and Scopus with keywords like wetlands conservation, global initiatives, Ramsar sites, India wetlands policy.

4.2 Selection Criteria

Inclusion of papers and reports from the last 10–20 years to ensure relevance.
Priority given to documents related to international agreements and national policies.

Exclusion of non-peer-reviewed and non-official sources unless widely cited.

4.3 Comparative Analysis

Comparison of global frameworks with India's specific conservation policies.
Evaluation of the effectiveness of these initiatives using case studies of key wetlands in India.

4.4 Data Sources & Synthesis

Review of statistical data from institutions like MoEFCC, Ramsar Secretariat, and WWF-India.

5. Impact Mitigation

The goal of mitigation is to lessen some or all of the negative consequences that result from a particular action. By establishing a fresh marsh, replenishing a past wetland, or improving or maintaining an existing wetland, wetland mitigation substitutes for an existing wetland or its services. This is to make up for the approved destruction of the wetland that was formerly there. It is customary to require mitigation before granting authorization for wetland development (National Research Council, 2001). Mitigation of wetlands can be done immediately through a banking system or on an individual basis on the site (Environmental Protection Agency [EPA], 2020). In order to implement onsite mitigation, a developer must establish a wetland as near as feasible to the location of the intended wetland destruction (Mitsch & Gosselink, 2015).

Usually, a one-to-one replacement is required for this. In wetland ecosystems that have been harmed, wetland mitigation and remediation aim to restore ecological functioning. In other cases, remediation efforts establish artificial wetlands for use or aesthetic value, replacing or restoring wetlands that have been substantially destroyed or eliminated from the landscape. A home artificial pond is a straightforward illustration of an aesthetically pleasing wetland. Constructed wetlands utilized for wastewater treatment might serve as an example of a use- value wetland (Vymazal 2011).

5.1 The Ramsar Convention

The Ramsar Convention, formally known as the Convention on Wetlands of International Importance, particularly as Habitat for Waterfowl, is a landmark global agreement dedicated to wetland conservation. It was one of the first international treaties to focus on ecosystem-specific issues, emphasizing not just the protection but also the sustainable use of wetlands. Initially aimed at preserving waterfowl habitats, the convention quickly expanded its scope to include all aspects of wetland conservation. It now recognizes the critical role wetlands play in biodiversity conservation and human well-being. As of 2011, the treaty covers 1,916 wetlands of international importance (Ramsar, 2011). Signatory countries commit to preserving designated wetlands, promoting their sustainable use, and assessing their ecological characteristics. The convention also fosters global, regional, and local collaboration to support wetland conservation, contributing to broader sustainable development goals.

6. National Efforts for Protection of Wetlands

India became a party to the Ramsar Convention in 1981, and since then, six wetlands have been recognized as Ramsar sites: Keoladeo National Park, Chilika Lake, Loktak Lake, Wular Lake, Harike

Lake, and Sambhar Lake. Notably, Keoladeo National Park, Chilika Lake, and Loktak Lake are included in the Montreux Record, highlighting their ecological vulnerability and the urgent need for conservation efforts. Over the years, activists, wetland scientists, and non-governmental organizations (NGOs) have emphasized the necessity of a national wetland policy to ensure the sustainable management of these critical ecosystems (Panini, 1998). Responding to this need, the Indira Gandhi Institute of Development Research, as part of the Capacity 21 Project, published an initial wetland policy draft and an action plan, formulated in collaboration with researchers, NGOs, and certain government officials. However, rather than originating from government initiatives, these efforts stemmed from civil society's recognition of the environmental threats posed by rapid urbanization, population growth, and wetland encroachment, particularly in cities like Bombay. A notable example of grassroots environmental activism occurred in Mahim Creek, where conservationists successfully prevented city officials from reclaiming this vital wetland, home to a diverse waterfowl population (Panini, 1998).

The primary responsibility for wetland conservation in India lies with the Ministry of Environment, Forests, and Climate Change (MoEFCC). However, multiple government bodies, including the Ministries of Agriculture, Water Resources, Power, Tourism, and Surface Transport, as well as the Department of Fisheries and the Department of Ocean Development, indirectly influence wetland-related decisions. Given that wetlands fall under state jurisdiction as per the Indian Constitution, decision-making involves various state-level authorities, adding complexity to conservation efforts. To address these challenges, the MoEFCC established the National Committee on Wetlands, Mangroves, and Coral Reefs, comprising representatives from government ministries, research institutions, and NGOs. This committee convenes at least twice a year to review conservation strategies, policy implementation, and emerging threats to India's wetlands. Despite these institutional frameworks, effective wetland conservation remains hindered by bureaucratic overlap, competing land-use demands, and insufficient enforcement of existing regulations. Strengthening inter-ministerial coordination and implementing a comprehensive national wetland policy are essential steps toward ensuring the long-term protection and sustainable management of India's wetlands (MoEFCC, 2021; Ramsar Convention Secretariat, 2018).

6.1The Wildlife Protection

Wetlands are typically included within protected areas rather than classified as a distinct category under federal legislation such as the Indian Forest Act and the Wetlands Protection Act (WPA). They are considered part of protected areas primarily when they provide habitat for endangered species found in sanctuaries or national parks. Expanding the definition of wetlands in existing regulations, particularly the WPA, would require wetland managers to develop conservation strategies. Additionally, it would ensure institutional and financial support from federal and state governments for local wetland management and sustainable use practices. Currently, some wetlands that serve as animal habitats are included in the traditional protected areas network. However, maintaining a wetland's natural characteristics often requires some degree of human intervention. The Wildlife (Protection) Act of 1972, which applies to all Indian states except Jammu and Kashmir, provides legal protection for species within designated protected areas. Under Section 18, sanctuaries can be established, while Section 35 allows for the creation of national parks. Once a wetland is designated as a National Park, human activities, including grazing, are strictly prohibited under national wildlife laws. While this ensures a high level of protection, it can also make effective wetland management

challenging. Unlike sanctuaries, where controlled human activities may be allowed, national parks impose strict restrictions that may hinder conservation efforts. To improve wetland conservation, regulations should account for the ecological needs of these habitats while allowing limited human intervention where necessary. A more flexible approach would help balance preservation efforts with sustainable management practices (Panini, 1998).

6.2 The Environment (Protection) Act, 1986

The Environment (Protection) Act, 1986, is a comprehensive law aimed at safeguarding and enhancing the environment. Section 2 of the Act defines "environment" as "water, air, and land, as well as the relationships these elements have with humans, other living beings, plants, microorganisms, and property." This Act has played a crucial role in protecting wetlands and wetland ecosystems. Under its broad mandate, several important regulations and notifications have been introduced to monitor pollution and ensure environmental protection. Notably, the Notification of Coastal Regulation Zone places restrictions on industrial activities in coastal areas, and the Environment Impact Assessment Notification of 1994 mandates environmental impact assessments for major projects. Section 3 of the Act grants the Central Government authority to take necessary actions to safeguard and improve the environment.

Utilizing the Environment (Protection) Act, 1986, can help protect endangered wetlands and phase out harmful practices. A more effective approach would involve the Central Ministry of Environment and Forests designating vulnerable wetland areas as "environmentally sensitive" under this Act. This would provide stricter protections compared to merely increasing the number of wetlands listed under the Wetlands of International Importance while neglecting their preservation. The Indian Supreme Court's ruling in the Dahanu wetlands case in Maharashtra set a precedent for such protections. Following this decision, local NGOs successfully halted a destructive mega-port project at Vadhavan in Dahanu due to the area's designation as an "ecologically sensitive" zone.

6.3 National Wetland Policy

A National Wetland Policy for India should establish clear guidelines for wetland conservation and sustainable use. Such a policy must emphasize the importance of community participation in wetland management and provide a framework for cooperative conservation efforts. Local institutions and stakeholders should have the flexibility to adapt and implement management plans that suit their specific needs and ecological conditions.

7 . International Efforts for Protection of Wetlands

The Ramsar Convention on Wetlands (1971) resulted in an international, intergovernmental agreement that provided a rather broad definition of wetlands. A major worldwide role for wetlands and their conservation is played by the Ramsar Convention, formally known as The Convention on Wetlands of International Importance, particularly as Habitat for Waterfowl. The agreement's primary goal was to preserve the habitat of waterfowl by conserving and wisely using wetlands. This was quickly found to be very limited, and it has since been expanded to cover all facets of wetland protection and acknowledge the system’s importance for the preservation of biodiversity and the welfare of human populations. Currently, 1,916 "wetlands of international importance" are included in the treaty.

7.1 In China

Wetland restoration efforts have been carried out throughout China, particularly in the Three Rivers Source Regions. Following the implementation of several ecological water replenishment projects, there has been a noticeable impact on ecological restoration. Most lakes now have larger areas, and most rivers now have much better quality. The Qianhu wetland's biological characteristics and functional integration, located at the Yellow River's source, have clearly improved as the wetland has started to recover.

Even though wetlands like those on the Sanjiang Plain have significantly decreased in number, China has started to take steps to protect and restore its native wetland ecosystems. China's State Forestry Administration published new wetlands policies in 2005. Aims and objectives of these policies included funding for the restoration of natural wetlands, regulating the return of reclaimed croplands to wetlands (lakes, swamps), and putting 90% of China's natural wetlands under protection by 2030 (State Forestry Administration of China 2005, An *et al*.2007).

In order to organize programs for the restoration, protection, and sensible usage (such as ecotourism and wetland national parks) of its wetlands, China has recently announced a $14.6 million proposal to start a new wetland mapping project utilizing remote sensing data Cyranoski (2009). Wetlands-related initiatives by the Chinese government have drawn both appreciation and criticism. as stated by Cyranoski (2009). The "speed and lavishness" with which China's wetland conservation and restoration initiatives are moving forward often makes many environmentalists in the West envious.

7.2 The United States

Wetland regulation is mostly the responsibility of the federal government. Wetland regulations are primarily the responsibility of the federal Government, even if many states have their own laws governing wetlands. The Department of Defense, U.S. Army Corps of Engineers (Corps); the U.S. Environmental Protection Agency (EPA); the Department of the Interior, U.S. Fish and Wildlife Service (FWS); the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA); and the Department of Agriculture, Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) are the five federal organizations that are primarily in charge of wetlands protection.

The Corps's responsibilities include water supply and navigation. Because wetlands support the nation's rivers' ecological, physical, and chemical integrity, the EPA is largely responsible for safeguarding them. The management of aquatic life and fauna, including game as well as those that threatened and endangered, is within the purview of the FWS. NOAA's responsibility for managing the nation's marine resources gives it wetlands authority. Wetlands impacted by agricultural practices are the focus of the NRCS. In addition to federally approved programs, several of these States have implemented their own initiatives to conserve wetlands. State wetland initiatives are becoming more and more important as the Federal Government gives the States more authority. States have focused more on controlling coastal wetlands than interior wetlands thus far. According to Mitsch and Gosselink (1993), the state programs of Connecticut, Rhode Island, New York, Massachusetts, Florida, New Jersey, and Minnesota are the most extensive.

The Department of Defence, U.S. Army Corps of Engineers (Corps); the U.S. Environmental Protection Agency (EPA); the Department of the Interior, U.S. Fish and Wildlife Service (FWS); the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA); and the Department of Agriculture, Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) are the five federal organizations that are primarily in charge of wetlands protection. The methods by which different organizations carry out their mandates to protect wetlands are indicative of their distinct missions. The Corps's responsibilities include water supply and navigation. Because wetlands contribute to the integrity of the country's biological, physical, and chemical waterways, the EPA is largely responsible for safeguarding them. The management of fish and wildlife, including game species and vulnerable and endangered species, is within the purview of the FWS. NOAA's responsibility for managing the nation's marine resources gives it wetlands authority. Wetlands impacted by agricultural practices are the focus of the NRCS.

7.3 The Clean Water Act

Through Section 404 of the Clean Water Act, the federal government controls some activities that take place in wetlands. In order to regulate the release of fill or dredging material into US waterways and wetlands.

Congress significantly revised the Federal Water Pollution Control Act in 1972, which gave rise to the Section 404 program Water control projects include dams and levees, port expansion, fills to create dry land for building areas near water, and channel construction and maintenance are frequently linked to discharges. Certain types of operations, such clearing land and straightening river channels to expedite water flow downstream, are subject to Section 404 discharge regulations if they entail discharging larger amounts of dirt or other substances into marshes or other bodies of water than are incidental.

7.4 Swamp buster

"Swamp buster" is the name of the program included in the Food Security Acts of 1985 and 1990 that aims to eliminate federal incentives for the conversion of wetlands for agricultural use. Farmers who, after December 23, 1985, drained or otherwise altered wetlands in order to plant crops are no longer eligible for the majority of federal agricultural subsidies according to the Swamp Buster law. Congress ordered the U.S. Department of Agriculture (USDA) to restrict agricultural conversion of wetlands through the Swamp Buster Act U.S. Fish and Wildlife Service, Office of Legislative Services, Washington, D.C., 1992, Digest of Federal Resource Legislation of Importance to the U.S. Fish and Wildlife Service.

7.5 The Corps

In 1987, the U.S. Army Corps of Engineers produced the Corps of Engineers Wetland Delineation Manual, a technical handbook that instructs federal agencies on how to utilize wetland field indicators to locate and define wetland borders. In January 1989, the Federal handbook for Identifying and Delineating Jurisdictional Wetlands (also known as the "1989 Manual") was accepted by the EPA, Corps, SCS, and FWS as a unified handbook for wetlands delineation under the Section 404 and Swampbuster programs. The "1989 Manual" outlines the scientific standards needed to ascertain the existence of the three features of a wetland, according to the U.S. Environmental

Protection Agency (1991): wetland hydrology, vegetation that is reliant on water, and soils that have formed under anaerobic circumstances. In doing so, a national protocol for recognizing and defining wetlands is established.

7.6 In Canada

A wetland strategy was established by the Alberta government of Canada in 2013. It recognized and safeguarded the environmental, social, and financial advantages of wetlands and mandated impact studies by the year 2015. The highest-value wetlands were also protected by the policy in order to prevent loss or degradation; value was determined by factors such as relative abundance, contribution to improving hydrologic performance, biodiversity support, and water quality (Government of Alberta, 2013). Additionally, stewardship-based volunteer wetlands restoration, conservation, and protection were encouraged by means of incentives and instruments. As with all policies, only time will tell if they succeed in achieving their goals or if harmful legal or criminal behaviors are sufficiently restrained.

7.7 In Australia

The Murray-Darling Basin's rivers now have more natural flows because to the Australian and state governments' "buying back" of irrigation companies' water rights. Active management is required for reliant aquatic biota since these environmental fluxes are primarily managed for large flood zones, where they are stored and actively released. (Kingsford and Auld, 2005; Bino *et al.* 2014). Wetland distribution and status have been systematically inventoried in the National Wetlands Inventory of the US Fish & Wildlife Service and the Canadian Wetland Inventory. Comparable but more limited data is available for a few European countries (Manual of European Union Habitats) and Australia (Australian Wetlands Database and the Directory of Important Wetlands in Australia). –EU-27 [July 2007] and Annex I of the Habitats Directive [92/43/EC]). Wetland destruction and protection are major global issues for many nations. Because of their differing phases of development, the case studies of Ethiopia, China, and the United States provide a comprehensive view on this topic. Furthermore, the roles that wetlands provide as a source of food, clean water, building materials, or intrinsic value stores are all highly valued in each of these civilizations.

8. Suggestion For Preserving and Restoring the World's Wetlands

Each of the five categories of risks to wetlands is addressed independently by wetland management. Wetland area restrictions can be established to rigorously govern the whole wetland area in order to mitigate the influence on it. Wetlands are best preserved by creating protected zones. Nature reserves can be established in areas with a high concentration of rare and endangered species as well as naturally occurring wetlands. Wetland parks can be constructed in regions where it is necessary to preserve and responsibly use wetland resources. Zones for protecting wetlands can be created in places with protection or less wetland element coverage. Furthermore, the establishment of parks in the forest, picturesque areas, water conservancy areas, parks along the shore, areas protecting water sources, etc.., may help save wetlands. Pollution restrictions can be tightly defined to reduce the total quantity of pollutants released into the wetland, therefore mitigating the impact on the wetland ecology. Wetland management and river basin environmental management can be combined to accomplish this. There should be tight restrictions on the discharge of pollutants near wetlands, rivers, lakes, and oceans from industries, agriculture, animal husbandry, and residential

waste, among other sources. The limitations of species diversity can be established in relation to the effect on wetland biodiversity. It's critical to support rare animal reproduction and make sure their population does not decline. The restrictions of wetland ecological water might be imposed in order to mitigate the impact on wetland water resources parks by the coast, places where water supplies are protected, etc. can be combined to achieve this. Wetlands' ecological water amount may be ensured by rigorously regulating water intake from rivers and lakes.

Climate prediction studies should be conducted in advance to assess how wetlands will be affected by climate change. Given the long-term drought conditions, it is crucial to make sure the ecological water number of wetlands ahead of time and to undertake timely ecological water supply in places that lack water. Wetland drainage should be used as soon as possible to prevent extended precipitation's secondary biological consequences on wetland overflooding. More scientific wetland protection legislation, rules, and policies should be adopted promptly to clamp down on and penalize wetland degradation in order to guarantee the seamless execution of wetland management. Since every nation and area has unique national circumstances, every nation and region should enact laws, rules, and policies that support local growth.

9.Threats

Wetland destruction and transformation are the two categories of wetland impact factors (Mitsch *et al.* 2015). Destructed elements, such agriculture, infrastructural development, water consumption, pollution, etc., contribute to the deterioration of most wetlands (Vörösmarty *et al.* 2010; Van Asselen *et al.* 2013).

- Degradation of inland wetland ecosystems is also largely caused by the usage of water resources. Throughout the world, dams tightly regulate numerous rivers in order to fulfill the increasing demand for electricity and agriculture.

- The lack of water resources and pollution will eventually lead to risks such species invasion and the destruction of wetland ecosystems (Muñoz-Reinoso, J.C. *et al.* 2001).

- In this context, "wetland loss" refers to the actual decrease of wetland area caused by climate change and human activity.

- Overuse of biodiversity resources affects a wide range of wetland habitats; this is particularly true in Africa, South America, and North America, where the amount ratios are correspondingly, 71%, 68%, and 56%.

- With 62% of Oceania's wetlands impacted, invasive species and other harmful genes also have a significant influence.

- Extreme weather and climate change are the primary natural forces affecting some wetlands, along with geological disasters and other considerations. Coastal and marine wetlands account for 41% of the total impacted kind; lake wetlands account for 24% and marsh wetlands for 23%.

Wetland destruction and protection are major global issues for many nations. Furthermore, the roles that wetlands provide as a source of food, clean water, building materials, or intrinsic value stores are all highly valued in each of these civilizations.

10. Management Plan:

Varied parts of the world have varied definitions of wetland management at different times. The majority of decision-makers in management viewed wetland draining as part of wetland management in the 1950s (Mitsch *et al.* 2015). Wetland management has since developed into a full discipline of preserving unique Thanks to the efforts of a few proponents who regarded wetlands as animal homes, hydrological conditions and waterfowl and fish populations have been maximized. (Smardon *et al.* 2006). The definition of wetland management is the process of establishing management goals based on the interests of numerous stakeholders, existing environmental rules, and the priorities of wetland managers. According to the Ramsar Convention, managing wetlands requires an understanding of how wetlands have been used by humans in the past, present, and future, as well as strategies for achieving optimal (sustainable) wetland use (Chatterjee, A *et al.* 2019). Over the past forty years, wetlands in a number of developed locations have been protected or even restored thanks to wetland management. Wetland conservation and restoration, however, are not well regulated in many emerging regions. Centralized management measures are desperately needed to safeguard wetland ecosystems in order to preserve their productivity and biodiversity and to enable the prudent use of their resources. For the purpose of wetland conservation, a wetland management plan is essential in **Figure 2.**

Figure 2. Wetland Management Plan

It should include the following: defining the monitoring requirements; settling disputes; determining and outlining the steps necessary to accomplish management goals; maintaining continuity of effective management; assisting in the acquisition of funding; promoting communicate on between locations, companies, and interested parties; showcasing the effectiveness of management; and ensuring adherence to regional, governmental, and global regulations (Chatterjee, *et al.* 2019).

Conclusion

The primary goal of wetland restoration is to rebuild or restore destroyed or degraded wetlands using ecological engineering and technology (Cui *et al.* 2006). In order for primitive wetlands to benefit from their capacity for self-recovery, care should be taken during the wetland restoration process to preserve the natural characteristics of wetland ecosystems and refrain from undue human intrusion (Cui *et al.* 2006; Mitsch *et al.* 2015). Given the many primary impact variables associated with distinct wetland types, it is imperative to develop restoration solutions tailored to the unique circumstances of individual wetland kinds. River wetlands are subject to significant influence from four categories of human activity-related causes. Dredging the rivers, lowering the sources of pollution, expanding the zones where pollutants are purified, managing biodiversity, increasing the amount of ecological water, etc. are some of the actions that may be taken. Wetlands won't be protected in spite of all the laws, policies, and initiatives put in place by the government if the rules are not followed. Raising public awareness of the advantages of wetlands may be the greatest approach to preserve them. Wetlands will not be maintained if people do not understand the advantages of doing so. Only with the cooperation of the populace can protection be achieved.

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