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Importance, Conservation, Policies And Status Of Wetlands In India

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Abstract

Wetlands are the repository of the aquatic system and have their own ecosystem. Wetlands are very important to balance the ecological environment and are very valuable for mankind in a number of ways such as flood control, purification of water and recharging of groundwater. It also provides a peaceful environment which is very favourable for recreation, trip and also tourism. But now a day, wetlands are being destroyed in large numbers. There are so many reasons for their destruction such as urbanization, deforestation, pollution, excessive use of the toxic chemical in agriculture, industrial waste and unawareness of the conservation of wetlands. In this paper, a study of the wetlands has been done. The function, threats, and conservation of wetlands have been studied. The schemes, policies and programmes running in India for the conservation of the wetlands have been studied and discussed in detail.

Keywords—NWCMP, National wetland conservation and management programme, NLCP – National lake conservation plan, NEP- National environment programme

INTRODUCTION

Wetlands are the areas which are covered with shallow surface water and it consist of swamps, aquatic animal life and some aquatic plant. Some plants and animal can survive only in the wetlands. Ponds, lower lakes and peatlands are the example of the wetlands. Wetlands play very important role to storage of rain water, improvement in quality of water, processing of carbon and other nutrients and very helpful to stabilisation of shoreline. The 6% area of earth is covered with wetlands[1]. wetlands provide habitat of wildlife and it forms an ecosystem. But now fifty percent wetlands are in the stage of drying. Urbanization and agricultural activities, pollution, and lack of industrial waste management and climate change are some basic reason to destruction of wetlands. So, to protect the destruction of wetlands different plans can be adopted such wetland restoration, wetland creation, wetland enhancement and awareness programme. 2nd February is commemorated as wetlands day that was decided in Ramsar convention 1971. This convention is recognised as a treaty on an international level. The main purpose of this treaty is to conserve and utilize sustainably the wetlands by recognizing their benefits in terms of fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. Non-governmental organizations and government agencies and groups of citizens celebrate wetlands day by undertaking to raise awareness about the values and benefits of wetlands.

FUNCTION OF WETLANDS

Wetlands are very helpful to environment as well as human being. The functions of wetlands are following:

A. Wildlife habitat

Wetlands consist of surface water, soil, aquatic animals, aquatic plants and organisms. So, we can say the wetlands provide habitat. Some unique plants are found in the wetland which are very useful in pharmacy. By providing habitats to wildlife wetlands form an ecological system and make a healthy environment [2].

B. Flood control

Wetlands play a very important role to control flood. As we know the wetlands have a large surface area. During the rain, wetland absorbs the water and also provides the surface area for storage of water[3].

C. Purification of water

Wetlands store water for a long time. Due to the long time storage of water, the sediments and other massive components are settled down and pure water is present in the middle level of the wetland. this freshwater can be used to drink [4].

D. Ground water recharging

Wetlands collect the runoff water during the storm and rain, and for some days all undesirable components either shuttle down or flow over the surface and the fresh water remains in wetlands. This freshwater release to ground level and process of recharging of ground level are completely done. Sometimes groundwater is also discharged to wetlands. So, wetlands are having a very important role in the water cycle [5].

E. Improve economy

Wetlands can be used for fisheries. In some wetlands such as ponds, a large amount of production of fishes can be produced. Wetlands provide a healthy environment for fisheries and some peatland wetlands provide fodder to animals. So, the wetlands are also important to the growing economy of any country [6].

F. Tourism

Wetlands have a beautiful and peaceful environment and their biodiversity is so attractive, that different types of hydric animals and aquatic life can be seen. So, wetlands are very important place for tourism and trip. In a wetlands environment the beauty of nature can be seen and many people come to wetlands for meditation and amusement[7].

Table 1: A non-exhaustive list of the general function of wetlands

1.Regulation functions	<ul style="list-style-type: none"> a) Storage and recycling of nutrients b) Ground water recharge c) Erosion control
2.Carrier functions	<ul style="list-style-type: none"> a) Agriculture irrigation b) Habitat for plant and animal species
3. Production Functions	<ul style="list-style-type: none"> a) Water b) Food c) Genetic resource
4.Information function	<ul style="list-style-type: none"> a) Culture heritage b) Research

THREATS TO WETLANDS

There are so many activities which are responsible for the destruction of wetlands. Most of the reasons of destruction of wetlands are due to undesirable human activity towards the environment. These activities are also responsible for pollution in environment. Some basic reasons of destruction of wetlands are as follows:

A. Urbanization

As we know that this is era of science and technology, for implementation of new technology some components requirement is to be fulfilled by industry. So, for installation of industry, large area is required. But on the earth the area is limited. It has been observed that most of industrial area are established at the inundated wetlands. Due to this, there is decreasing in number of wetlands.

B. Agricultural activities

To get more production of crops and more money, the number of wetlands is converted in to field for agriculture. Now days there is a use of number of toxic chemicals to get large production and more profit. These chemicals like nitrates, nitrites, phosphorus, phosphates alongside other pesticides and fertilizers are very harmful. Due to the excessive use of these chemicals, during the rain these chemicals discharged to wetlands. And these are very harmful for aquatic life. So, due to presence of such chemicals most of aquatic animal die and due to this the ecosystem of wetlands gets unbalanced and slowly the wetlands get dried out.

C. Deforestation

Deforestation is also major reason for destruction of wetlands. Deforestation is done for business purpose and to full fill the requirement of population need. Forests are being cut down. Due to the deforestation the ecosystem of nearby wetlands gets unbalanced and gradually the wetland gets dried out.

D. Climate change

Due to the climate change such as increase in temperature due to global warming, number of species living in wetlands are dying. And the ecosystem of wetland becomes unbalanced. Gradually the wetland gets dried out.

E. Overgrazing

Overgrazing is also responsible for the destruction of wetlands. Due to the overgrazing, paddylands and plants in wetlands are eaten and due to this, aquatic animals, which are dependent on these plants have no food so they can't survive and gradually the ecosystem of wetlands gets unbalanced and wetland gets dried out.

WETLANDS IN INDIA

In India there are different type of geographical topologies and climate changes after two or three months. So, there are different types of wetland in India. 7,57,040 wetlands covering 1,52,60,572 ha are in India as per the National Wetlands Atlas.

India became a party to the ' Convention on Wetlands' , also known as the RAMSAR Convention on 1st February 1982 and has since then designated 49 wetlands covering an area of 10,93,636 hectares under the List of Wetlands of International Importance which includes 5 sites designated during FY 2020-2021. Presently, India stands first in South Asia and third in Asia in terms of a number of designated sites. Detail of RAMSAR wetlands in India [as on February, 2022] are given in Table 3. The change in number of RAMSAR sites in India and area year wise is given in fig. 2.

Most of wetlands are natural. The largest site is Venbanad which is in Kerala. Vembanad spread around 1,51,250 hectares. In India there are so many acts and laws are implemented to conserve the wetlands. But there is lack of regularity framework to conserve wetlands in India. There are so many programmes are organized to aware the importance of wetlands and current status of wetlands.

Table 3: Detail of RAMSAR wetlands in India [As on February, 2022]

Sl. No.	Name of Site	State Location	Date of Declaration	Area (in Sq. km.)
1	Kolleru Lake	Andhra Pradesh	19.8.2002	901
2	Deepor Beel	Assam	19.8.2002	40
3	Kabartal Wetland	Bihar	21.07.2020	26.20
4	Khijadia Wildlife Sanctuary	Gujarat	13.04.2021	5.12
5	Nalsarovar Bird Sanctuary	Gujarat	24.09.2012	120
6	Thol Lake Wildlife Sanctuary	Gujarat	05.04.2021	6.99
7	Wadhvana Wetland	Gujarat	05.04.2021	6.30
8	Bhindawas Wildlife Sanctuary	Haryana	25.05.2021	4.12
9	Sultanpur National Park	Haryana	25.05.2021	1.425
10	Chandertal Wetland	Himachal Pradesh	8.11.2005	0.49
11	Pong Dam Lake	Himachal Pradesh	19.8.2002	156.62
12	Renuka Wetland	Himachal Pradesh	8.11.2005	0.2
13	Wular Lake	Jammu & Kashmir	23.3.1990	189
14	Hokera Wetland	Jammu and Kashmir	8.11.2005	13.75
15	Surinsar-Mansar Lakes	Jammu and Kashmir	8.11.2005	3.5
16	Tsomoriri Lake	Jammu and Kashmir	19.8.2002	120
17	Asthamudi Wetland	Kerala	19.8.2002	614
18	Sasthamkotta Lake	Kerala	19.8.2002	3.73
19	Vembanad Kol Wetland	Kerala	19.8.2002	1512.5
20	Tso Kar Wetland Complex	Ladakh	17.11.2020	95.77
21	Bhoj Wetlands	Madhya Pradesh	19.8.2002	32.01
22	Lonar Lake	Maharashtra	22.7.2020	4.27
23	Nandur Madhameshwar	Maharashtra	21.6.2019	14.37
24	Loktak Lake	Manipur	23.3.1990	266
25	Bhitarkanika Mangroves	Orissa	19.8.2002	650
26	Chilka Lake	Orissa	1.10.1981	1165
27	Beas Conservation Reserve	Punjab	26.9.2019	64.289
28	Hariker Lake	Punjab	23.3.1990	41
29	Kanjli Lake	Punjab	22.1.2002	1.83
30	Keshopur-Miani Community Reserve	Punjab	26.9.2019	3.439
31	Nangal Wildlife Sanctuary	Punjab	26.9.2019	1.16
32	Ropar Lake	Punjab	22.1.2002	13.65
33	Keoladeo Ghana NP	Rajasthan	1.10.1981	28.73
34	Sambhar Lake	Rajasthan	23.3.1990	240
35	Point Calimere Wildlife and Bird Sanctuary	Tamil Nadu	19.8.2002	385
36	Rudrasagar Lake	Tripura	8.11.2005	2.4
37	Bakhira Wildlife Sanctuary	Uttar Pradesh	29.06.2021	28.94
38	Haiderpur Wetland	Uttar Pradesh	8.12.2021	69.08
39	Nawabganj Bird Sanctuary	Uttar Pradesh	19.9.2019	2.246
40	Parvati Agra Bird Sanctuary	Uttar Pradesh	2.12.2019	7.22
41	Saman Bird Sanctuary	Uttar Pradesh	2.12.2019	52.63
42	Samaspur Bird Sanctuary	Uttar Pradesh	3.10.2019	79.94
43	Sandi Bird Sanctuary	Uttar Pradesh	26.9.2019	30.85
44	Sarsai Nawar Jheel	Uttar Pradesh	19.9.2019	16.13
45	Sur Sarovar	Uttar Pradesh	21.8.2020	4.31
46	Upper Ganga River (Brijghat to Narora Stretch)	Uttar Pradesh	8.11.2005	265.9
47	Asan Conservation Reserve	Uttarakhand	21.7.2020	4.444
48	East Kolkata Wetlands	West Bengal	19.8.2002	125
49	Sunderbans Wetland	West Bengal	30.1.2019	4230

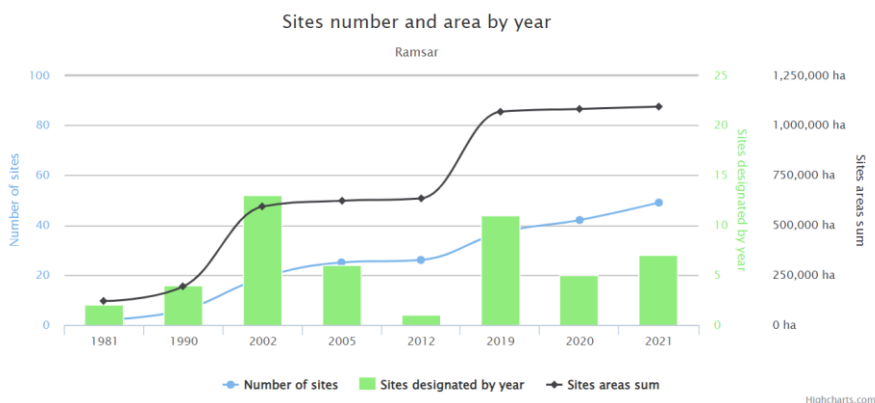


Fig. 2 Number of RAMSAR sites in India and area, year-wise is given in fig. 2 [8].

CONSERVATION

The conservation of wetland can be done by the following ways:

A. *Wetland restoration*

Wetland restoration is the process of recovering the physical and biological condition of wetlands. If we recover the favourable biological and physical condition of any wetland, then we can save the wetland from getting destroyed. So, the wetland restoration is very important method to conserve the wetlands. These biological and physical condition can be achieved by planting specific plants, and maintaining the pH level of water.

B. *Wetland enhancement*

The wetland enhancement is the process of maintenance and modification of the wetlands. Generally, wetland is enhanced by following ways:

- *Enhancement in hydric soil*

The wetland can be enhanced by desirable modification of biological and hydrodynamic properties like porosity, soil organic carbon level, pH level.

- *Enhancement in vegetation*

In this process, some suitable plants are planted in the wetland to balance the ecosystem. This is the method generally used nowadays. There are so many projects for the enhancements and maintenance of the wetland.



Fig.1 Vegetative Enhancement

C. *Wetland creation*

It is the process of the creation of a new wetland. For the creation of wetland, the suitable environment should be available. And plants and some animal species should be there. The created wetlands are called constructed wetlands. This process is difficult but the research is going on to make a favourable environment for wetlands. Now day some projects and research going on to reduce the complexity in the creation of wetlands.

D. Industrial waste management

The industrial waste has major role to polluted and destroyed the wetland so, industrial management is another way to control the degradation of wetlands. So new technology is required to manage the industrial waste. The industrial polluted water can be filtrate and for treatment of polluted water and waste is required to overcome the problem of industrial waste. The radioactive industrial waste is the major problem for wildlife in wetlands. Due to radioactive waste the all living organisms and species are died and wetlands are destroyed.

APPROACHES TO CONSERVE WETLAND

Protection laws and government initiatives

A. RAMSAR convention

It was the first convention for the conservation of wetlands which was organized at Ramsar city in Iran in 1971. The mission of RAMSAR convention is “ the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world” . In this convention, there was a proposal for intergovernmental cooperation to the conservation and wise use of wetlands. And the list of wetlands and their current status were discussed. This Major obligations of the country which participated are:

- to designate wetlands for inclusion in the list of wetlands of international importance.
- to promote, as possible, the wise use of wetlands in their territory.
- to promote international and intergovernmental cooperation for wetland protection.

Total Contracting Parties in RAMSAR Convention are 172. The total number of Wetlands of International Importance is 2,439 and the total surface of designated sites is 254,688,925 ha. This data is as on June 30th, 2022 as per <https://www.ramsar.org/>[8].

B. National lake conservation plan (NLCP)

This NLCP is carved out of wetlands protection and conservation programme in 1993. In this programme lakes which are spread around urban areas are focussed. It was found that these lakes are subjected to anthropological pressure. This programme was to reduce the degradation of these lake. And scheme of NLCP is to restore and conserve polluted and degraded lakes generally which are spread around the urban areas. Following were the steps

proposed and done. First of all the pollution level are checked and then cleaning process is done. Some public awareness programme also organized.

Inclusion of all wetlands types (marshes coastal freshwater mangroves swamps and waterlogged areas) in land use classification should be done in the country.

A national wetland biodiversity register should be started. Wetlands economic evolution should be computed and it might be integrated with National Resource Accounting.

National wetland inventory and monitoring programme should be established to develop sustained wetland programme to improve their conditions. Studies on wetland productivity for long time, identified organization from different areas of country should be undertaken, it will bring out indisputable information and data of wetland productivity and it would be very helpful to check the wetland ecosystem health.

C. National environment policy (NEP), 2006 The cabinet approved NEP on 19 May,2006. And recognized a number of environmental and ecological services rendered by wetlands. Six-fold plans were identified by NEP to save the wetlands, do a survey to the number of wetlands and know the condition of the wetlands. If any factors to found that may degrade the wetlands then they plan how wetlands may be unaffected by it. They also survey for any illegal activities and complain to stop. To integrate wetland conservation, involving conservation of village ponds and tanks into sectoral development for livelihood improvement.

D. National Plan for Conservation of Aquatic Eco-Systems' (NPCA)

This is a centrally funded program of the government of India that was formulated in 2013 by the amalgamation of the National Lake Conservation Plan and the National Wetlands Conservation Programme. The aim of this programme is to conserve and protect the wetlands and lakes. Additionally, there will be inventorization on lakes and wetlands along with the scope the for related information system.

There will be National level directive on criteria for lakes and wetlands, Regulatory Framework (Revisiting the Wetlands Rules, 2010), Capacity building at State Government and local body levels, Evaluation etc. [9]

E. Wetlands (Conservation and Management) Rules 2017

These rules were notified by the Ministry of Environment, Forest and Climate Change (MoEF&CC) in 2017. These rules will be the regulatory framework for the preservation and administration of wetlands in India. It was a noteworthy step to preserve, manage and uphold the environmental eccentric nature of the wetlands without limiting their astute use. These rules strengthen the legal structure for conservational concerns and reinforce the formal agenda through State / UT Wetland Authorities and a National Wetland Committee.

Some of the other key Indian legislations related to wetlands are given below:

- The Indian Fisheries Act – 1857
- The Indian Forest Act – 1927
- Wildlife (Protection) Act - 1972
- Water (Prevention and Control of Pollution) Act - 1974
- Territorial Water, Continental Shelf, Exclusive Economic Zone and other Marine Zones Act - 1976
- Water (Prevention and Control of Pollution) Act - 1977
- Maritime Zone of India (Regulation and fishing by foreign vessels) Act - 1980
- Forest (Conservation act) – 1980
- Environmental (Protection) Act - 1986
- Coastal Zone Regulation Notification - 1991
- Wildlife (Protection) Amendment Act -1991
- National Conservation Strategy and Policy Statement on Environment and Development – 1992
- National Policy and Macro level Action Strategy on Biodiversity-1999

Some of the other key Indian organizations related to wetlands conservation are given in table 2.

Table 2: Key Indian organizations related to wetlands conservation

S.no.	Organization
1.	Gujrat Ecological Education and Research (GEER)
2.	Environmental Planning and Coordination Organization (EPCO), Bhopal
3.	Wildlife Institution of India, Dehra dun
4.	Centre for water resource development and management (CWRDM), Kozhikode
5.	Institute of Management and Ecological Designs (IMED), Kolkata
6.	Chilika Development Authority, Bhubaneswar
7.	National Centre for Sustainable Coastal Management, Chennai
8.	Sálím Ali Centre for Ornithology and Natural History, Coimbatore
9.	World Wide Fund for Nature India, New Delhi

CONCLUSION

In India, wetland biological systems support different and special territories and are disseminated across different geographical and climatic systems. They are viewed as a crucial piece of hydrological cycle and are profoundly useful frameworks in their normal structures. Wetlands support huge organic variety as well as give a wide cluster of environment labor and products (Wetlands Rules, 2017).

In India, wetlands offer different types of assistance, including water systems, water supply to homes, freshwater fisheries and water for the use of recreation. They are likewise assuming a significant part to recharge groundwater, controlling floods, sequestration of carbon and decreasing contamination. Notwithstanding, the board of wetlands has gotten lacking consideration in the public water area plan. Thus, large numbers of the wetlands in metropolitan and country regions are dependent upon anthropogenic tensions, incorporating land-use changes in the catchment; contamination from industry and families; infringements; the travel industry; and over abuse of their regular assets.

India being a member of Ramsar Convention on wetlands, drafted the Wetland (Conversation and Management) Rules in 2017. However, till date no noteworthy advancement has been made for wise use of wetland and its conservation. This is because only limited number of wetlands have got received attention and financial support from the authorities under the Indian wetland preservation programmes while the left over ones remain to be ignored.

Larger part of exploration work on wetland the board in India connects with the limnological perspectives and natural/ecological financial aspects of wetland. Yet, the physical, (for example, hydrological and land-use changes in the catchment) and financial (like populace development and changes in monetary exercises) processes prompting limnological changes have not been investigated significantly. Additional, the formal perspectives (strategies, rules, guideline and associations) of wetland the executives stand out enough to be noticed and drawn in the creative mind of exploration researchers as of late. In this way more examination accentuation on the physical, financial and institutional variables impacting state of wetlands and their utilization is expected to show up at better and more extensive administration systems for wetlands that are confronting developing pressure from various anthropogenic and climatic elements. The policies for wetland conservation and management need the overall revival and improvement.

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