



RAMSAR - Wetland Sites of India Threats and their Management

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Abstract:

Wetlands of India, estimated to be 58.2 million hectares, are important repositories of aquatic biodiversity. The diverse eco-climatic regimes extant in the country resulted in a variety of wetland systems ranging from high altitude cold desert wetlands to hot and humid wetlands in coastal zones with its diverse flora and fauna. The review deals with the status and distribution of wetlands and causes and consequences of wetland losses. The review provides a methodology and an action plan for evolving a nationwide network of management of wetlands.

What are Wetlands?

What is RAMSAR Wetland Site?

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value.ⁱ The convention entered into force in India on 1 February 1982. India currently has 49 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 1,093,636 hectares.ⁱⁱ

Wetlands occur where the water table is at or near the surface and land remains covered by water. Once treated as transitional habitats or seral stages in succession from open water to land, wetlands are now considered to be distinct ecosystems with specific ecological characteristics, functions and values. Wetlands, natural and manmade, freshwater or brackish, provide numerous ecological services. The density of birds, in particular, is an accurate indication of the ecological health of a particular wetland. However, unsustainable use of wetlands without reckoning of their assimilative capacity constitutes a major threat to the conservation and management of these vital biodiversity rich areas. This restricts the prospects of future generations to utilise the benefits of services provided by wetlands.ⁱⁱⁱ



Definition

The term ‘wetlands’ refers to a broad collection of water-based ecosystems, but more than 50 definitions of wetlands are used worldwide. Wetlands vary enormously in size, from tiny village ponds to lakes, bogs, marshes, rivers, and the largest inland delta in the world, the Okavango Delta in Botswana, and character. Ramsar Convention on wetlands uses the definition, ‘areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres’ to classify wetlands.^{iv}

India approach

India has a wealth of wetland ecosystems distributed across various eco-geographical regions that range from the Himalayas to the Deccan. Varied topography and climatic regimes support and sustain diverse and unique wetland habitats in our country. According to the Directory of Asian Wetlands (1989), India has a total of 27,403 wetlands, of which 23,444 are inland and 3,959 are coastal. Wetlands occupy 18.4 per cent of the country’s area of which 70 per cent are under paddy cultivation. Natural wetlands in India consist of high-altitude wetlands in Himalayas; flood plains of the major river systems; saline and temporary wetlands of the arid and semi-arid regions; coastal wetlands such as lagoons, backwaters, estuaries, mangroves, swamps and coral reefs, and so on. In addition to these natural wetlands, a large number of man-made wetlands, which have resulted from the needs of irrigation, water supply, electricity, fisheries and flood control, are substantial in number. These wetlands can be classified into different categories on the basis of their origin, vegetation, nutrient status and thermal characteristics. In India, out of an estimated 4.1 million hectares (excluding irrigated agricultural lands, rivers, and streams) of wetlands, 1.5 are natural, while 2.6 are manmade. The coastal wetlands occupy an estimated 6,750 sq. km, and are largely dominated by mangrove vegetation.^v

The Government of India has been implementing the National Wetlands Conservation Programme (NWCP) in close collaboration with the state/UT governments since 1985-86. The aim of the programme is to conserve wetlands in the country so as to prevent their further degradation, ensuring their wise use for the benefit of local communities and overall



conservation of biodiversity. Under the programme, 115 wetlands have been identified by the Ministry of Environment and Forests which require urgent conservation and management interventions.^{vi}

Wetlands of India

The Ramsar Convention was signed in 1971 with the aim of “conservation and wise use of wetlands with local, national and international cooperation for overall sustainable development of the world”.

The Ramsar sites are maintained in the Montreux Record to track any major ecological changes that might affect any of the wetland sites positively or in a reverse way.

The Ramsar convention entered into force in India on 1 February 1982.

India currently has 49 sites designated as Wetlands of International Importance (Ramsar Sites). This is the highest in South Asia.^{vii}

India has added two wetlands to the List of Wetlands of International Importance, on the occasion of World Wetlands Day.

Khijadia Wildlife Sanctuary (“Ramsar Site” no. 2464), a freshwater wetland near the coast of the Gulf of Kutch in Gujarat State, was formed following the creation of a bund (dike) in 1920 to protect farmland from saltwater ingress.

As one of the important waterbird habitats in North-West India, the Site provides breeding, feeding and roosting grounds for a wide range of resident aquatic and also land-based birds. It provides habitat for over 310 bird species, including 125 waterbirds; over 165,000 individual waterbirds have been counted. These include the endangered Pallas’s fish-eagle (*Haliaeetus leucoryphus*) and Indian skimmer (*Rynchops albicollis*), and the vulnerable common pochard (*Aythya ferina*). The Site also regularly supports more than 1% of the south and south-west Asian population of Dalmatian pelican (*Pelecanus crispus*), more than 2% of greylag goose (*Anser anser*) and more than 20% of common crane (*Grus grus*).

More than 180 plant species are present, including the critically endangered Indian bdellium-tree (*Commiphora wightii*). The Site contributes to the maintenance of hydrological regimes,



erosion protection and nutrient cycling. It is used for recreation and tourism, and scientific and educational activities.^{viii}



Bakhira Wildlife Sanctuary.

Bakhira Wildlife Sanctuary (Site no. 2465), a freshwater marsh in the Sant Kabir Nagar district, is the largest natural floodplain wetland of eastern Uttar Pradesh. The Sanctuary was established in 1980 and is protected under the Wildlife Protection Act (1972); an “eco-sensitive zone” extends up to a kilometre around its boundary.

The wetland is internationally important for its birdlife as it supports over 80 species. It provides a wintering ground for over 25 species which migrate on the Central Asian Flyway, some of which are threatened or near-threatened such as the endangered Egyptian vulture (*Neophron percnopterus*), the vulnerable greater spotted eagle (*Aquila clanga*), common pochard (*Aythya ferina*) and swamp francolin (*Francolinus gularis*), and the near-threatened oriental darter (*Anhinga melanogaster*) and woolly-necked stork (*Ciconia episcopus*).

The wetland also supports 119 plant species and 45 species of fish: it is home to the vulnerable European carp (*Cyprinus carpio*) and the catfish *Wallago attu*, and the near-threatened Gangetic ailia (*Ailiacoila*) and silver carp (*Hypophthalmichthys molitrix*). The Site is also used for recreation and tourism and contributes to food supply and nutrient cycling.^{ix}

Threats

Nearly 30 per cent of the natural wetlands in India have been lost in the last three decades mainly to illegal construction, unsustainable urbanisation, agricultural expansion and pollution, according to estimates by Wetlands International South Asia.

Chennai lost 90 per cent of its wetlands to unplanned urbanisation, leaving the city to grapple with issues of water security and degraded environment. Vadodara lost 30.5 per cent of its



wetlands between 2005 and 2018. Hyderabad lost 55 per cent of its wetlands to inefficient waste management, rising pollution and unchecked urban development.

Mumbai lost 71 per cent, Ahmedabad 57 per cent, Bengaluru 56 per cent, Pune 37 per cent and Delhi-National Capital Region lost 38 per cent wetlands mainly to construction and eutrophication from pollution.

In addition to urbanisation needs, lack of awareness and knowledge on wetlands and their ecosystem services can be blamed for this widespread loss.^x

- ❖ Dense human population in catchments, urbanisation, and various anthropogenic activities have resulted in over exploitation of wetland resources, leading to degradation in their quality and quantity.
- ❖ Today, there is increasing concern to conserve and restore perishing wetlands and endangered habitats to achieve ecological sustainability. According to a World Wildlife Fund's report, half of the world's wetlands may have been destroyed in the past 100 years alone.
- ❖ Wetland habitats are among the most heavily impacted and degraded of all ecological systems.
- ❖ What is perhaps more alarming is that the only factor to which this degradation can be attributed is human interference and mismanagement.
- ❖ Wetlands are shrinking. Conversion of swamps, marshes, lakes and floodplains for agriculture, housing and industrial schemes has led to dramatic alterations of landscapes and ecosystem functioning.
- ❖ The United States has already lost some 87 million hectares (54 per cent) of its original wetlands, mainly to agriculture. In Europe, Italy has lost about 94 per cent of its wetlands, while Ireland has lost an equivalent amount of its peat bogs.
- ❖ Similar examples can be found around the world. With 47 per cent of the world's inhabited land being in river valleys, it is not surprising that such impacts will occur.
- ❖ The abuse of wetlands and their unwise use, reduces their ability to perform useful functions such as water retention and flood control, to supply services and, valuable products. As per studies conducted by The Wildlife Institute of India (WII), wetlands in our country are disappearing at a rate of 2 to 3 per cent each year.



- ❖ Pollution in wetlands is greatest concern, affecting drinking water sources and biological diversity. Drainage and run-off from fertilised crops introduce high concentrations of nitrogen and phosphorous nutrients to water bodies.
- ❖ The accumulation of toxic chemicals in the fatty tissue of animals can lead to reproductive failures, suppression of immune systems, genetic damage and death.
- ❖ Mercury used to separate gold from silt in illegal mining operations has a similar effect on organisms in the food chain, which goes far beyond the aquatic milieu. Non-point source pollutants are among the most difficult to monitor as their sources cannot usually be traced to a single location. But water pollution is not linked to chemicals only.
- ❖ High levels of sediment, often derived from the removal of vegetation in catchment areas, are equally detrimental to aquatic species, particularly fish, insects and filter feeding organisms.
- ❖ Turbidity also prevents sunlight from filtering through the water column, hampering the growth of aquatic plants and algae, important sources of oxygen for other organisms.
- ❖ Urbanisation – increasing developmental pressure for residential, industrial and commercial facilities.
- ❖ Anthropogenic activities-unplanned urban and agricultural development, industries, road construction, impoundment, resource extraction and dredge disposal
- ❖ Agricultural activities – conversion of wetlands for paddy fields; construction of a large number of reservoirs, canals and dams; diversion of streams and rivers to provide for irrigation
- ❖ Deforestation – removal of vegetation in the catchment leading to soil erosion and siltation
- ❖ Pollution-unrestricted dumping of sewage, solid wastes and toxic chemicals from industries and households, leading to eutrophication and hypoxia in marine and non-marine environments.
- ❖ Salinisation due to over withdrawal of groundwater
- ❖ Introduced species – exotic introduced plant species such as water hyacinth and *Salvinia* clog waterways and compete with native vegetation



- ❖ Climate change – increased air temperature; shifts in precipitation; increased frequency of storms, droughts, and floods; increased atmospheric carbon dioxide concentration; and sea level rise.

Managing Ramsar Sites in India

Contracting Parties are expected to manage their Ramsar Sites so as to maintain their ecological character and retain their essential functions and values for future generations.

Article 3.1 of the Convention specifies that “Contracting Parties shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List” as well as promoting the wise use of all the wetlands in their territory.

Resolution 5.7 and Resolution VIII.14 called for management plans for all Ramsar Sites, with appropriate support and funds for implementation and training of staff, and including a monitoring programme with indicators on the Site’s ecological character.

In 2015 the Contracting Parties identified the effective conservation and management of the Ramsar Site Network as one of the three strategic goals of the Fourth Convention Strategic Plan for 2016-2024. The Plan calls for efforts to enable the participation of stakeholders, including indigenous peoples and local communities.

The Ramsar Sites management toolkit provides simple guidance to site managers on the key steps and components involved in managing a Ramsar Site. It also identifies and provides links to more detailed information.

At its 19th meeting in 1996, the Convention on Wetlands Standing Committee adopted a decision that defines recommended wording for signs at all Ramsar Sites, when translated into the local languages of the sites.^{xi}

The National Mission for Clean Ganga in January 2021 formulated a toolkit for management of wetlands and water bodies in urban areas as well as studying the concerns of rapid urbanisation.



Later, on the occasion of World Wetland Day, a massive scientific and community-based programme to develop health card and management of 10 wetlands in each of the 50-plus Ganga districts was launched by the Union Ministry of Jal Shakti (water resources).

In June this year, the Delhi Development Authority invited public comments on Master Plan Delhi 2041 (MPD 2041) to protect and develop an integrated network of ‘green and blue assets’ of Delhi to maintain the biodiversity and microclimate of the capital.

The plan also laid out strategies to enhance public connection with nature. It encourages residents and stakeholders to play a role in the protection and improvement of the green-blue assets to develop community ownership.

The Delhi Development Authority (DDA) has already sent the plan to the Union Ministry of Housing and Urban Affairs for approval and is inching closer to getting it finalised soon.

These are all steps in the right direction for India’s urban planning strategy.

As urbanisation is only likely to intensify, the country’s wetlands need to be safeguarded urgently.

The Ramsar convention with 42 wetlands under its protection has helped some important sites since it came into force in India in 1982.

However, conservation efforts mostly centred on the notified Ramsar sites ignore several other urban wetlands that are equally important.

The Cities4Forests global campaign, which works closely with cities around the world to connect with forests, emphasizes the importance of wetlands and their multiple benefits to help combat climate change and protect biodiversity in cities.^{xii}

Wetlands not only support high concentrations of biodiversity, but also offer a wide range of important resources and ecosystem services like food, water, fiber, groundwater recharge, water purification, flood moderation, storm protection, erosion control, carbon storage and climate regulation.



Path to better management

Mainstreaming wetlands ecosystem services and biodiversity into our developmental policies and urban planning processes, including climate change mitigation, is the pressing need of the hour.

The multiple benefits and services provided by wetlands are essential to achieve the ambitious agenda for building resilient cities to achieve our sustainable development goals, while accommodating further development and eradicating poverty.

Mega urban schemes like Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation need to add the aspects of sustainable management of wetlands.

Cities are unable to cater to the water demand due to a policy vacuum as there is no well-defined ‘National Urban Water Policy’ to guide urban water management.

Wetlands are impacted profoundly by damming and water abstraction: Keoladeo Ghana Sanctuary, Loktak Lake, Chilika Lake, Vembanad Kole are among those severely impacted by dams that affect water and silt flows.

There is also a need for more scientific data, imagery, maps and other relevant tools to provide knowledge on the status of wetlands.

Indian Space Research Organisation carried out the National Wetland Inventory and Assessment using remote sensing satellites from 2006 to 2011 and mapped around two lakh wetlands in India. Besides this, however, little effort has been made by the states in identifying wetlands.

There is also a need for stronger enforcement of rules. For example, the National Plan for Conservation of Aquatic Ecosystems and the Wetlands Conservation and Management Rules, 2017 (updated in 2020), have had limited impact as regulatory bodies like the Central Wetland Regulatory Authority only have advisory powers.

Additionally, existing laws completely ignore the participation of local communities in governing and monitoring wetlands.



Awareness is the first step towards protection, according to the experience of Ramveer Tanwar, who resurrected around 20 ponds and lakes in and around Noida.

Starting with awareness campaigns in targeted areas, Tanwar's team encourage locals to participate with their time and monetary contributions, while fundraising remaining finances from private companies (costs vary between Rs 3-5 lakh per acre of wetland area).

They used a five-point wetland revival process. First, hyacinth and garbage are cleaned off the water. Then, the water body is divided depending on its size and water is drained from each section. The bottom is left to dry completely and if required, they excavate the bottom.

A path is created around the area for plants and finally, water is flown back in it and the waterbody is rejuvenated.

Several other small-scale initiatives can also be studied for scalability / replicability.

In Mithilanchal region (north Bihar), Narayan Choudhary's Talab Bachao Abhiyan has mobilised communities over the years. The campaign created awareness on encroachment and pollution of local ponds and pushed the government to take action.

Shweta Hule's 'Swamini' self-help group of ten women have been organising 'mangrove safari' for tourists in the Mandavi creek in Sindhudurg since 2017. This has been recognised as a model for community-led conservation through ecotourism.

The state forest department has made efforts to replicate their model in other parts of coastal Maharashtra.

Using local experiences and expertise, a robust policy can be drawn to transform the conditions of the wetlands in the country. Plans like MPD 2041 with focus on water bodies and the land around it are the future of urban planning. These are referred to as the 'green-blue policy', where water bodies and land are interdependent, growing with the help of each other, while offering environmental and social benefits.



But DDA wants different agencies like the Delhi Jal Board, flood and irrigation department and municipal corporations to come together as stakeholders for this project. This is going to be a tough task, especially when it has no supervisory power over these bodies.

The Space Applications Centre (SAC), Ahmedabad under ISRO and Indian Council of Agricultural Research-Central Marine Fisheries Research Institute (ICAR-CMFRI), Kochi will jointly identify and demarcate wetlands smaller than 2.25 hectares across India's coastline. They will protect the water bodies through the 'coastal livelihood programmes' to build resilience against the impact of climate change.

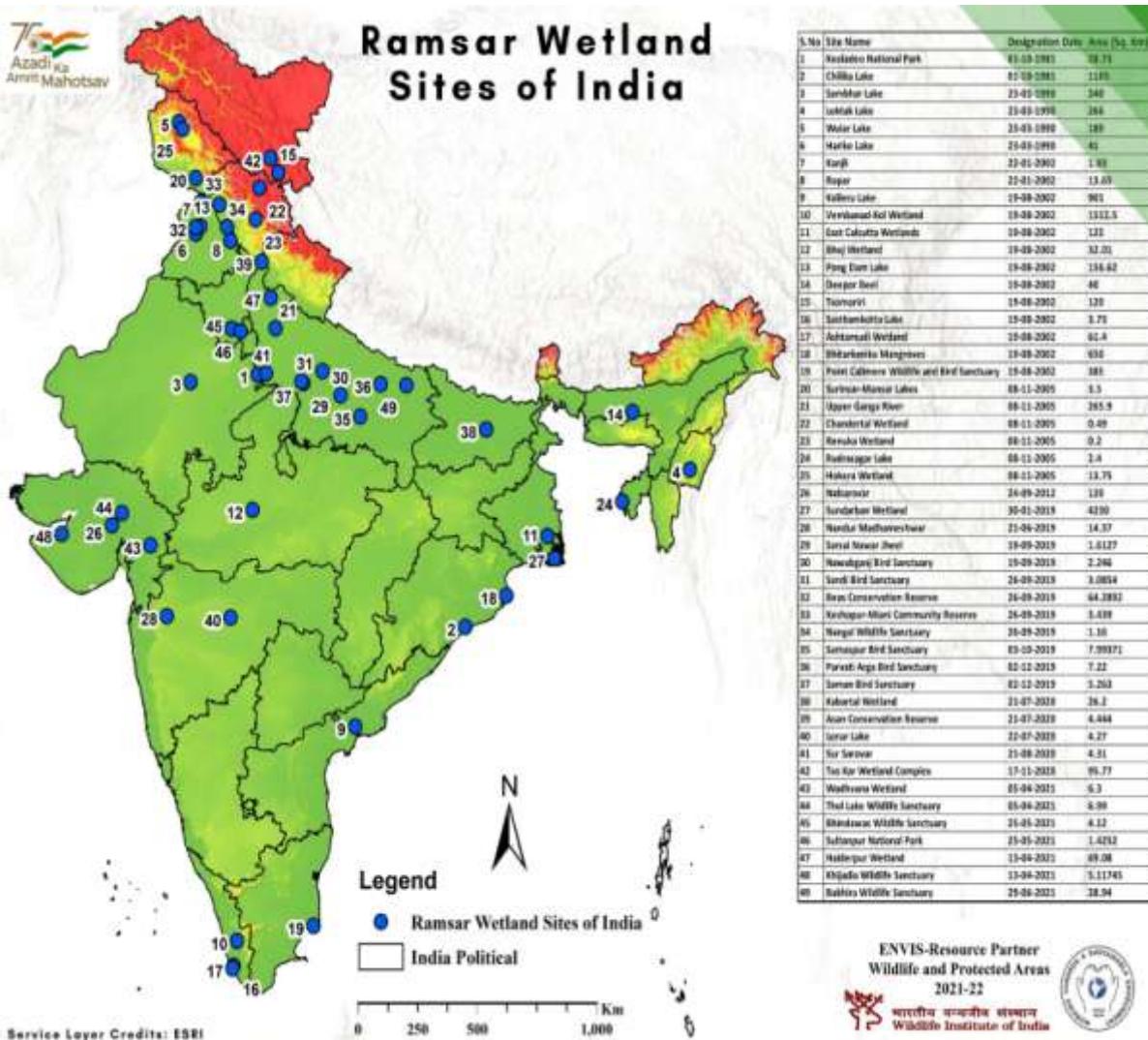
The creation of the toolkit will also enable urban local bodies, urban managers, urban planners and other stakeholders to address the water management issues by achieving action on ground in a comprehensive and integrated manner.

Such smart and innovative ideas along with increasing space for people's participation in management and decision making for their wetlands are a desperate requirement for building a climate resilient future for India.^{xiii}

The ecological character of a Site is fundamental. Its description is an essential part of the designation process, and its maintenance provides the basis of management and monitoring actions. Similarly, the Convention has procedures to respond to possible change in a Site's ecological character.

Many internationally important wetlands extend as one ecologically coherent whole across national borders. In these cases, Contracting Parties can agree to establish Ramsar Sites on their territory as parts of a bigger Transboundary Ramsar Site. The authorities on both or all sides of the border agree to collaborate in the management of the Transboundary Site, and notify the Secretariat of their intent.

Many Ramsar Sites are also protected under national schemes or regional systems such as the European Union's Natura 2000 network. Some are also inscribed on the World Heritage List under the UNESCO World Heritage Convention. Others are also UNESCO Biosphere Reserves or on part of these Reserves.



(Source: *Ministry of Environment & Forests, Government of India*) 2022



RAMSAR WETLANDS SITES (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	DeeporBeel	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	Wadhwana 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	VembanadKol 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	NandurMadhameshwar	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	Harike 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	SarsaiNawarJheel	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

(Source: Ministry of Environment & Forests, Government of India) 2022



International efforts

The ‘Convention on Wetlands’, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 158 Contracting Parties to the Convention, with 1758 wetland sites, totalling 161 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. Ramsar Convention is the only global environment treaty dealing with a particular ecosystem. The Ramsar Convention on Wetlands was developed as a means to call international attention to the rate at which wetland habitats were disappearing, in part due to a lack of understanding of their important functions, values, goods and services. Governments that join the Convention are expressing their willingness to make a commitment to helping to reverse the history of wetland loss and degradation. In addition, many wetlands are international systems lying across the boundaries of two or more countries, or are part of river basins that include more than one country.

The health of these and other wetlands is dependent upon the quality and quantity of the transboundary water supply from rivers, streams, lakes, or underground aquifers. This requires framework for international discussion and cooperation toward mutual benefits.

Major obligations of countries which are party to the Convention are:

- Designate wetlands for inclusion in the ‘List of Wetlands of International Importance’;
- Promote, as far as possible, ‘the wise use of wetlands in their territory’;
- Promote ‘international cooperation’ especially with regard to transboundary wetlands, shared water systems, and shared species; and
- Create ‘wetland reserves.

Earth Summit, 1992 as well as other global conservation organisations have identified aquatic biodiversity to be the most threatened of all biodiversity. Further, the World Summit on Sustainable Development held in Johannesburg in August 2002 highlighted the fact that nearly 1.1 billion people do not have access to safe freshwater and there are nearly 1.7 billion people living in water scarce areas.^{xiv}



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