Wetlands INTERNATIONAL

NEWSLETTER OF WETLANDS INTERNATIONAL SOUTH ASIA

SAROVAR

FEBRUARY 2021
VOLUME 7

WORLD WETLANDS DAY SPECIAL ISSUE

WETLAND GOVERNANCE

Wetlands International South Asia

Wetlands International South Asia is a non-government organisation working for sustaining and restoring wetlands, their resources and biodiversity in the South Asia region. Its office in New Delhi (India) was established in 1996 as a part of the Wetlands International network. Wetlands International is a global, independent, non-profit organisation dedicated to conservation and restoration of wetlands, and presently works in over 100 countries through a network of 18 regional and national offices and expert networks with Global Office in Ede, the Netherlands. Wetlands International is also one of the five International Organisation Partners of the Ramsar Convention. In 2005, Wetlands International South Asia was registered under the Societies Registration Act of Government of India, consequently gaining an Indian legal entity while subscribing to the goals and targets of the Wetlands International network.

A multidisciplinary team within the organisation and expert network enable providing evidence-based scientific and technical advice to central and state governments, wetland authorities and civil society on various aspects of wetland management.

The Editorial Panel welcomes contributions of articles and information. These may be sent to: editor@wi-sa.org

Cover Photograph: Aerial view of Pallikarnai Marsh, Chennai, Tamil Nadu (Jayshree Vencatesan)

Inside Cover Photograph: Gosabara, Mokarsagar Wetlands, Jamnagar, Gujarat (Wetlands International South Asia Photo Library)

Back Cover Photograph: Loktak, Manipur (Wetlands International South Asia Photo Library/Dushyant Mohil)

Editing: Namita Sharma, Technical Officer and Dr Ritesh Kumar, Director, Wetlands International South Asia

Message from the President

It gives me immense pleasure to hand you over the seventh volume of our newsletter Sarovar based on the theme of 'Wetland Governance'. Environmentally sound management of wetlands can be done through considering all uses and functions of water and all interactions between environmental conditions and human activities. A long-term preventive than curative approach should be the main theme of good governance. It must include knowledge base, sustainability, citizens participation and a team of trained field managers to execute action in the field. We must be in a position to implement technical water conservation measures to reduce water use and coordinate it with poverty alleviation programme. Merely improving management plans and regulation is not enough unless there is a deeper change in governance mechanisms. There is an urgent need to improve governance from demand driven to specific goal driven actions which will certainly help in combating the degradation of wetlands.

In order to stem wetlands conservation and loss, India has been prioritizing wetlands conservation within its central government schemes. Support is provided to states for prioritizing wetlands and developing and implementing integrated management plans. Yet, continued degradation of wetlands indicates that the malaise is much deeper, and beyond technical fixes. Wetlands governance is currently fragmented across several sectors, the policy statements are not harmonized, and gaps remain at several places. In the current incarnation, Wetlands (Conservation and Management) Rules, 2017 provide regulatory cover to only a narrow subset of natural wetlands – and several regions, such as urban wetlands in Deccan region, remain exposed to developmental threats. Through a series of articles, we explore this theme in this issue.

2021 is going to be a significant year for wetlands on several counts – the Ramsar Convention will be celebrating its 50th year of signing, the post 2020 and post-2020 global biodiversity framework will be firmed up. Closer home, the Central Asian Flyway initiative is coming to life with discussions on establishing a secretariat for the initiative. The Indian network of Ramsar Sites, with 41 wetlands, is now next only to China in Asia. This is an opportune moment to upscale our efforts on wetlands conservation, and address sectoral mainstreaming challenges.

The COVID pandemic has brought to fore our broken relationship with nature – and as economic activities have slowed down, nature has recovered. It is important that governance for wetlands addresses these discrepancies and creates a reflexive, multi-level framework which is adaptive in the face of increasing anthropogenic pressures. Wetlands governance needs to be a collaborative effort involving all sectors of government/management/policy/research organisations/stakeholders. While governments will continue to have a central role in wetlands governance, success will lie in their ability to instil a sense of responsibility amongst citizens and private sector on the need to conserve, maintain and enhance the full range of biodiversity and ecosystem service values that these ecosystems provide.

I hope you will enjoy reading the current issue. As always, we welcome your feedback and comments to improve the content of our newsletter. I also look forward to receiving your contributions for the next issue. May the coming year usher in a positive hope for wetlands. I wish you all a very Happy New Year.

Dr Sidharth Kaul
President
Wetlands International South Asia

Wetlands INTERNATIONAL

From the Director's Desk

In 2021, we will be marking 50 years of the establishment of the international treaty on wetlands – the Ramsar Convention. The progenitors of the Convention were farsighted in establishing an international framework dedicated to a single ecosystem, and coining wetlands wise use as an approach balancing nature conservation with human use of this ecosystem, on pathways that do not alter the natural character of the ecosystem. This coinage predated 'sustainable development' and reflected a deep appreciation of human-nature interlinkages in developing conservation and management strategies. Yet, unfortunately over the years the value of wetland wise use as a concept and instrument for mainstreaming wetlands in development has considerably eroded.

In December 2020, two news items struck my attention – the Gram Panchayat in Palghar's Jamsar passed a resolution to declare a heritage lake as a wetland and undertake conservation measures. The residents of Jhajjar in Haryana have demanded a wetland status for their village which receives nearly 150 migratory bird species. The significant role that Panchayati Raj Institutions and Urban Local Bodies can play in conserving the diverse wetland regime of the country is hitherto understated and underutilized. The Gram Panchayats have been ascribed significant responsibilities in framing local developmental plans and have also been devoured substantive funds to implement these plans thus opening up windows for convergence. The Jal Jeevan mission of the Ministry of Jal Shakti, Government of India includes water source protection as one of the core intervention pillars.

The United Nations has ascribed the 2021 World Water Day theme as 'Valuing Water'. The corona pandemic has brought to fore the limitations of economic paradigms which focus on development and growth of economic capital and remain oblivious on the sustaining role of natural capital. The divergence was apparent when a slowdown in economic activities was reflected in the rejuvenation of nature – stories from several wetlands indicated declining pollution and abundance of life such as congregation of waterbirds. This will be an important moment to build a case for valuation that captures the life sustaining role of wetlands which is fundamental to water and climate security. Values should also reflect the diversity – from those reflecting livelihood dependences to relational and cultural dimensions such as sense of place and identity. It is often the latter underpin conservation ethos. Also pertinent is to ensure we do not stop at valuation alone, but capture those values in affirmative actions that conserve nature as the basis of sustainable development.

Let 2021 usher in an era of development which ensures that nature is conserved and sustainable development reflects in our ability to conserve ecosystems such as wetlands as its basic building blocks.

Dr Ritesh Kumar
Director
Wetlands International South Asia

Wetlands INTERNATIONAL

Contents

Wetlands Regulation In India

A well thought-out holistic scientific approach has been long overdue for the conservation and management of wetlands. In the absence of a strong framework, wetlands and their values are being lost at a rapid pace. It is now important to have guidelines for wetland management by specifying certain activities that can be allowed, and banning others which are inherently detrimental to this ecosystem. **Dr Sidharth Kaul,** *President, Wetlands International South Asia* writes on the current state of wetlands regulation in India and how strengthening of governance measures is the need of the hour.

Several wide-ranging policies, strategies and action plans have been formulated by the Government of India which directly or indirectly support wetland conservation in the country. The national conservation strategy and policy statements on environment and development highlight conservation and sustainable development of wetlands including coastal areas, riverine and island ecosystems. The National Forest Policy 1988 and the National Wildlife Action Plan 2017-31 emphasises on conservation of wildlife based on scientific principles of evolution and genetics as well as social and cultural ethos of the country.

Wetlands offer a wide variety of goods and ecosystem services. They provide livelihood and serve as a support system for people living around these areas and are extremely important components of the global water cycle. They recharge underground aquifers, help in flood mitigation, sediment retention, waste treatment and water quality improvement, and draught alleviation. Apart from being a dependable source of water for local communities, domesticated animals and wildlife., they are prime habitats for aquatic and amphibious flora and fauna. Wetlands provide shelter and feeding ground for resident aquatic birds and serve as winter resorts for migratory water fowl.

Wetlands support fisheries, cultivation of aquatic food and medicinal plants and tourism thus, contributing to the

economy. They are also very important for educational, scientific, recreational and aesthetic reasons. A well thought-out holistic scientific approach was long overdue for their conservation and management and in the absence of a strong framework, wetlands and their values are being lost at a rapid pace which is a matter of great concern. The present law on regulatory framework is the first attempt to stop degradation of wetlands without restricting their legitimate wise use within their carrying capacity. To conserve and encourage sustainable wise use of wetland resources, it is important to have guidelines for their management by specifying certain activities that can be allowed, and banning others which are inherently detrimental and responsible for their degradation and loss.

Sustainable use of wetlands is critical for ensuring the delivery of goods and services to people and biodiversity. A well-defined management planning process for wetlands with full stakeholders' participation is essential for achieving their sustainable use.

RATIONALE FOR REGULATION

- Strengthening multi-disciplinary and symbiotic intersectoral ties and effective implementation mechanisms
- Greater focus on alternative livelihoods, capacity building and monitoring systems
- Establishing closer interface between research findings and management action plans
- Emphasising on quantifiable deliverables and tangible outcomes.

A multidisciplinary expert group was constituted by the Ministry of Environment, Forests and Climate Change (MoEFCC) to draft a regulatory framework which recommended categories of wetlands for regulation, process and procedures for identification, composition of regulatory authorities, functions of authorities and activities to be regulated and finally bring a notification under Environment Protection Act of 1986.

Categorisation of wetlands into three groups namely A, B and C was proposed for the purpose of regulation by the centre, state and local bodies at district level, respectively. It was also necessary to develop threshold for the three categories of wetlands and let each body decide the level of regulation. Series of meetings were held under the chairmanship of

A well-defined management planning process for wetlands with stakeholder participation is essential for achieving their sustainable use. (Point Calimere/ Harsh Ganapathi)

the Secretary so that judicious regulatory regime will check further deterioration of wetlands and contribute towards realisation of multiple values embodied in wetlands. While the wetlands in forest areas are protected through a host of legislative instruments, the ones located in non-forest areas are vulnerable.

Basic issues of threat and functions remain common for centre, state and local bodies while implementation agencies were kept separate. Activities impacting wetlands which included effluent discharges of industrial, domestic and agrochemicals, solid waste, sewage, filling and dredging, conversion of wetland to non-wetland use, withdrawal of water, impoundment/diversion/ interruption of sources, harvesting of living/non-living sources, navigation of high-speed crafts etc.

Agencies for regulation were to be decided on the basis of a criteria of spatial spread, technical expertise and avoidance of conflict of interest. Distinction between role of regulator and the enforcement agency needs to be maintained. These should preferably be two different agencies. The agency having a vested interest in the wetland site should not be the enforcement agency considering reasons of conflict of interests.

Taking in to consideration all these aspects, a list of prohibited activities within wetlands and activities with approval of concerned agencies were finalised. The functions of the authority at top was to appraise proposals for identification of new wetlands, to enforce the provisions contained under these rules along with other laws in force, grant of clearances or identification of areas for grant of clearances for regulated activities in the wetland under jurisdictions, issuance of directions necessary for conservation from time to time, preservation and wise use of wetlands to the state governments, and lastly, undertaking review of the list of wetlands and details of prohibited and regulated activities under the rules and the mode and methodology for execution.

Category A contained all wetlands under the Ramsar Convention, high altitude wetlands, transboundary wetlands, wetlands recognised as world heritage sites or lying within world heritage sites, inter-state wetlands and wetlands which are a major source of drinking water. These were to be regulated by the centre. Earlier, clearance for Central Wetland Authority only was given by Ministry of Law and Justice but these rules have been further changed in 2017.

SOME DIRECTIONS FOR FUTURE

There is a need to explore a proper institutional mechanism with an integrated multidisciplinary approach for solving management issues.

Proper coordination among various subject matter departments and experts, consolidation of baseline data for better management, use of innovative technologies in collaboration with all experts at

Conflicts between water and tenurial rights needs to be looked into. We also need to give emphasis to capacity building and generating awareness.

national and international level, appointment of knowledge-based staff at technological and administrative levels which must take in to consideration their future is also imperative for future planning

Water being used by both government and stakeholders such as concerned sectors to work for proper water flows so that there is balance between needs and availability of resources for both government and all stakeholders.

We must develop appropriate technologies for utilisation of biodiversity available in the region and find indicator species to assess such changes.

Point and non-point sources of pollution with reference to toxic substance, pesticides, weedicides and other organic chemical fertilizers which are less explored also need to be taken into consideration.

Conflicts between water and tenurial rights needs to be looked into. We must also look into rapid impact assessment exercise wherever needed. Identification of lead institutes is a must to coordinate for a multidisciplinary and integrated approach. We also need to give emphasis to capacity building and generating awareness.

Apart from the above ramifications, we need to look into basic urban structures such as water supply, sanitation, road and public transport, solid waste management, environmental improvements and incidental services such as public toilets, street signage, and lighting through government agencies as all these aspects are responsible for degradation of wetlands in one way or the other. We also need enhanced qualities of natural and cultural tourist attractions to ensure convenience and safety of visitors. We must strengthen capacities of concerned sector agencies and local communities for planning, development, management, and marketing in various sectors. We also must promote private sector participation which is fruitful for our R&D sector in general and our country in particular. Project supervision and monitoring is a must to attract better results.

The revised guidelines have been framed to assist state governments in the preparation of a brief document on wetlands through a wetland authority which was not earlier approved by the Ministry at state and district levels. Any natural or human-made wetland can be proposed for notification under the Wetland Rules except river channels, paddy fields, coastal wetlands within the purview of the Coastal Regulation Zone, wetlands with permanent agriculture in Rabi and Kharif seasons, water logged areas created due to fragmentation of hydrological regimes within the last three decades and which do not possess any significant biodiversity or ecosystem service values, ash ponds of thermal power plants, equalisation tanks, polishing ponds as a part of effluent treatment plant, sewage treatment plant or water treatment plant.

Urban wetlands face serious developmental threats (Yamuna Floodplains in Delhi seen in picture) (Shutterstock)

States are requested to make detailed inventory by consolidating the available information from existing inventories and list of wetlands to be notified under Wetland Rules to be submitted by states/ UTs. The brief document to be prepared by the designated authority after collating required information from recognised agencies like the Botanical Survey of India (BSI), Zoological Survey of India (ZSI), Wildlife Institute of India (WII), Salim Ali Centre for Ornithology and Natural History (SACON), Bombay Natural History Society (BNHS), Wetlands International South Asia (WISA), International Union for Conservation of Nature (IUCN), World Wild Fund for Nature (WWF) and others which possess the required information. List of endangered, rare, vulnerable, threatened biodiversity to be prepared along with land use from revenue records.

While delineating wetland boundaries, hydrological regimes need to be used as the primary factor using maximum area under inundation or saturation of soil near the surface during a normal monsoon year. When a wetland dependent species shares several wetlands as habitats, such areas can be taken as complex wetlands. While delineating zones of influence, we must include which developmental activities are likely to induce adverse changes in structure and functioning of wetland ecosystems.

Wetlands having defined drainage need to be delineated as the zone of influence including inflows and outflows and wetlands having diffused drainage where slope is too gentle rendering large basin areas; the features need to be taken up for consideration which can affect wetland functioning. The notified wetlands need to be mapped along with all the areas influenced with local landmarks preferably in the scale of 1:25000 for bigger wetlands and 1:10000 for smaller wetlands. Authorities also need to look into pre-existing rights and privileges and activities impacting ecological health of wetlands which are not allowed and other activities which can be permitted after examination by the constituted authorities after thoughtful scrutiny. All relevant guidelines are made for ease of operation. The Wetland Authorities at the state/ local level shall be responsible for enforcing the regulations through proper enforcement machinery. Some states have already nominated some wetlands for notification. They have given a list of prohibited activities and activities which are regulated, and those permitted with required maps and geo-coordinates including activities within the catchment areas.

OVER LAPPING LEGAL PROVISIONS

Wetlands lying within protective areas of national park and sanctuaries to be regulated under the provisions of Wildlife Protection Act 1972 and wetlands lying within the notified forest areas to be regulated by the provisions of Indian Forest act 1927, Forest Conservation Act 1980 and Environment Protection Act 1986, while the gaps if any can be plugged by invoking provisions of EP Act 1986.

Authorities also need to look into creation of artificial/ constructed wetlands to minimise nutrient content by use of macrophytes for nutrient removal by single species or combination of many species which have the ability to remove nutrients using them as biological filters to check eutrophication. State/ UT authorities need to take help from leading institutes and expert groups to prepare, implement and monitor various projects in action. The most important aspect is to quantify the carrying capacity of wetlands, inflows and outflows which are essential components for wetland management and restoration.

In spite of all these efforts, we still see some barricades to address issues which need to be

We need enhanced qualities of natural and cultural tourist attractions to ensure convenience and safety of visitors. We must strengthen capacities of concerned sector agencies and local communities for planning, development, management, and marketing in various sectors. We also must promote private sector participation which is fruitful for our R&D sector in general and our country in particular. Project supervision and monitoring is a must to attract better results.

redressed to get positive results.

The following remedial measures are suggested to bring positive results if looked at during the initiation stage of implementation of wetland regulations:

- There should be distinction between a role of a regulator and enforcement agency. Preferably two separate agencies are required. The agency having a vested interest in the wetland site should not be the enforcement agency for reasons of conflict of interest. As such even at the centre, the regulatory authority may strictly deal with regulatory mechanism while management action plans involving finance should be left with national wetland committee to be constituted for such purpose.
- Functions of monitoring may also be performed by NGO'S but the regulation has to vest with central or state government.
- In the event of regulatory authority failing in its duties, there needs to be a provision of audit mechanism before relief is sought from the concerned agency/tribunal.
- Any person aggrieved by the decision of the authority may prefer to appeal to the National Green Tribunal constituted under the National Green Tribunal Act within a period of 60 days from the date of decision.
- A separate expert group needs to be constituted to examine efficacy of management action plans so that money distributed to various state governments /UTs is not misused. This applies to both central as well as state governments.
- No separate research projects are specifically for wetlands. We need to constitute a research advisory committee for wetlands so that application-oriented projects are given in this area which not only help to stop their further deterioration but also help in policy planning for wetland restoration as these are being lost at a rapid speed.
- Identification of nodal agencies by respective state governments along with nodal officers who will execute the work at the ground level.
- Some effective monitoring mechanisms need to be evolved to monitor activities from time to time or to take mid-term corrections if needed so that assistance released is utilised in a fruitful manner

We are sure if all the relevant measures are taken well before initiation, regulatory mechanism for conserving wetlands can strengthen our task of wetland conservation in a very effective manner.

A fisher harvesting chestnuts at Wular, a Ramsar site in Jammu and Kashmir (Wetlands International South Asia Photo Library)

Wetlands

Charting an agenda for Collaborative Governance

Dr Ritesh Kumar, *Director, Wetlands International South Asia* and **Dr Sidharth Kaul,** *President, Wetlands International South Asia* present an overview of wetlands governance in India and suggest measures for setting up collaborative governance for these ecosystems.

Why governance matters for wetlands?

Conventional 'command and control' approaches are increasingly found limiting when decision-making needs to accommodate diverse views and collaborate with a range of stakeholders, often beyond the government. Governance thinking is widely understood to encapsulate transition from 'government' as the center of all decision-making processes to interactions between state and other actors. Governance is a steering function – and is generally defined as the institutions, structures, and processes that determine who makes decisions, how and for whom decisions are made, whether, how and what actions are taken and by whom and to what effect. Governance is delineated from management in the sense that the latter refers to the resources, plans, and actions that result from functioning of governance.

So, what makes governance of wetlands special? Firstly, wetlands encapsulate a range of ecosystems providing myriad benefits – from large lagoons and backwaters to small village ponds, and from wetlands in the lap of glaciers to floodplains adorning the rivers. These wetlands have been historically governed on different approaches (such as mangroves as timber forests, and tanks and lakes

Wetlands International South Asia : Sarovar

as fisheries and water sources for irrigation and drinking), thus making the task of a unified governance regime arduous. Secondly, human beings and their actions form an integral part of wetland ecosystem functioning – and thereby, governance needs to integrate nature-human interlinkages, rather than treating nature and people as separate entities. Thirdly, wetlands are open to influences from developmental actions taking place within their wider catchments. Thus, wetlands functioning needs to be factored in planning and decision-making processes of a broader range of institutions and organizations that working at multiple scales. Fourth, as complex and coupled social-ecological systems, surprises rather than predictability are norms in wetlands, and thereby governance needs to be adaptive and responsive to dynamic decision-making environments by learning from such changes.

Till recently, it was widely believed that as 'public goods', ecosystems such as wetlands would ultimately end up degraded because of the curse of the 'tragedy of commons.' It was presumed that disconnected individual actions, acting on self-interest, will act contrary to the common societal interest in a shared resource system. However, recent work around 'commons' has also shown that governance models and approaches can break this jinx – through the decision-making at multiple levels, involving multiple stakeholders (polycentric approaches) and creating hybrid governance models that bring together elements of public and private governance systems.

While much of energies are put in place to design management plans for wetlands, governance remains an afterthought – mainly on the presumption that the existing arrangements are sufficient to deliver wetlands conservation and wise use. Nothing can be far from reality. Wetlands degradation is as much an outcome of 'poor governance', as is the adoption of development of pathways which fail to recognize and integrate the full range of wetland ecosystem services and biodiversity values of these ecosystems in their planning and decision-making. Unless governance improvements take place, wetlands will continue to be relegated to the periphery of decision-making.

Recent governance scholarship has put spotlight on four objectives and attributes of good environmental governance. Firstly, environmental governance should maintain or improve the ability of ecosystems to function and to produce ecosystem services through the persistence of species, habitats and biodiversity. Key governance attributes which can enable this include direction setting, coordination, capacity, being informed, accountable, and efficient. Secondly, to achieve the objective of being socially equitable and inclusive, environmental governance should engage decision-making processes and produce socioeconomic outcomes characterized as being inclusive, participatory, fair, and just. Third, environmental governance should be responsive by adapting to changing environmental and social conditions and diverse contexts. Critical attributes of

Hokera on the outskirts of Srinagar in Jammu and Kashmir (Wetlands International South Asia Photo Library)

Decades of work on Indian birds and passion of stalwarts such as Padma Vibhushan Shri Salim Ali have laid the foundation of a network of wetland protected areas supporting large congregation of waterbirds. Vedanthangal, Keoladeo, Khijadiya and Ranganathituu were designated as protected areas under the colonial laws and regulation. Protected areas in the form of government notified sites for wildlife conservation, and managed through centralized bureaucracies formed the core of governance of such sites.

such systems include learning, anticipation, adaptability, innovation, and flexibility. Finally, good environmental governance should be robust and persist over time, maintain performance, and cope with perturbations and crises. Robust environmental governance systems are legitimate, connected, nested, and polycentric.

The shaping up of wetlands governance in India

Worldwide, modern nature conservation has emerged on an 'idealistic view of pristine nature', existing in landscapes untouched by humans and often devoid of their presence, and perpetuated in models such as Yellowstone National Park of the western United States.

However, evidence of wetlands governance in India points out to diverse arrangements, depending on the values ascribed by the entities that controlled access. In Chilika, the King leased the lagoon to the fishers who in turn evolved a complex resource governance system, setting spatial and temporal limits on use of gears– a governance regime which was based on a nuanced understanding of the habitat and fish migration. The Ahar-pyne, a network of traditional floodwater harvesting wetlands which formed the backbone of farming in South Bihar was governed on the basis of collective action of farmers, and mutually agreed water sharing agreements which often cut across caste and occupation hierarchies. Khazan, multiple-use coastal wetlands of Goa, were managed for long by organized groups of self-regulating tribal peasant communities called the gaunkari, who were renamed as the Comunidades, during the Portuguese regime.

In Bhitarkanika mangroves, the erstwhile ruler of Kanika zamindari permitted rotational felling of the mangroves. Vedanthangal, an irrigation tank in Tamil Nadu known for its large heronries, has been protected by the local villages for over two centuries when they recognized the nitrogen and phosphorus-rich bird guano's value as highly nourishing to the surrounding paddy fields.

Worldwide, conservation of wetlands was triggered by a decline in waterbird populations. Hunting began to be regulated by different approaches such as rationing using 'duck stamps' in the United States in the thirties. It is but natural that wetlands conservation policy and programming as

Conserving migratory waterbirds has been a major motivation for wetland programmes. In picture – Demoiselle cranes in wetlands of Wadwana, Gujarat (Wetlands International South Asia Photo Library)

we see today in India drew its roots from recognition of their roles as waterbird habitats, drawing in parts from waterbird centric wetlands conservation movements in Europe and North America. Erstwhile rulers, several of who were also avid game hunters, laid the foundation of a network of wetland protected areas in India.

The British left behind a mixed conservation legacy – that of promoting widespread hunting of game animals while also setting aside nearly 0.6 million km2 of government forests that became an abode of several species. Later on, it laid the foundation of post-independence protected area network. In 1972, a legislation to protect wildlife was enacted, at the behest of then Prime Minister Indira Gandhi, banning hunting and commercial exploitation of timber and forest produce from natural reserves. Further, in 1980-81, the Forest Conservation Act was brought in preventing diversion of reserved forest land for agriculture and development projects. Together with The Wild Life Protection Act, 1972, it facilitated the establishment of strict protection of several nature reserves. Decades of work on Indian birds and passion of stalwarts such as Salim Ali laid the foundation of a network of wetland protected areas supporting large congregation of waterbirds. Vedanthangal, Keoladeo, Khijadiya and Ranganathituu were designated as protected areas under the wildlife protection laws and regulation. Centralized bureaucracies of the forest and wildlife departments formed the core of governance of such wetlands.

Around the 1960s, the idea of reconciling conservation and development started gaining ground, supporting a view of nature not only as a pristine area for species other than humans, but also as a valuable resource. The preservation ideal was already challenged at the turn of 20th century, such as through call for wise use of forest resources in the United States championed by Gifford Pinchot who defined forestry as 'the practical knowledge of how to use the forest and range without destroying them' as against a preservationist approach of 'locking up' these resources. Thus, when the text of Ramsar Convention was being framed in the sixties, wise use became the central tenet – linking together nature conservation as well as human use, while not altering the natural properties of the wetland ecosystem. India ratified the Convention in 1982. In 1985, when the Ministry of Environment, Forest and Climate Change, wetlands started receiving national attention, beginning from a specific mention in the National Conservation Strategy and Policy Statement on Environment and Development issued by the Government of India in 1992.

The British left behind a mixed conservation legacy – that of promoting widespread hunting of game animals while also setting aside nearly 0.6 million km^2 of government forests that became an abode of several species. Later on, it laid the foundation of post-independence protected area network.

A national programme for wetlands was put in place in 1985, immediately after India ratified the Ramsar Convention. The programme recognized the need for coordination across multiple sectors and stakeholders. In the implementation arrangements, the Ministry recommended constitution of State and District Wetlands Committees as key entities for ensuring wetlands conservation within states. The focus, however, was on a handful of wetlands, which were prioritized by the State Governments on the basis of ecological and socioeconomic values.

In 2006, the National Environment Policy articulated the need for putting in place a regulatory framework for wetlands – a decision which culminated into Wetlands (Conservation and Management) Rules, 2017. From a governance point of view, the regulation does three fundamental things. Firstly, Wetland Authorities have been constituted within states and UTs as the nodal institutions for all policy, management and regulation aspects of wetlands within their jurisdiction. Secondly, all-natural wetlands have protection, either in the form of coverage under other rules, or notification under Wetlands Rules, clearly specifying rules of access and use of notified wetlands (in the form of activities prohibited, regulated and permitted). Thirdly, wetlands authorities have been entrusted with the task to frame management plans based on wise use principle.

In summary, the diversity of governance arrangements in

With top-down governance, management solutions are also simplistic and regimented. It is not incidental that management of wetland protected areas follow Keoladeo National Park as the role model. Standardized management planning guidelines have meant that management prescriptions are also similar.

wetlands has narrowed down over time to be anchored in government departments and agencies. Attempts to replicate Joint Forest Management models have also been made in wetland settings, such as Joint Mangrove Management Committees in Pitchavaram, Tamil Nadu. However, such instances are few and far between. Community participation in management has been reduced mainly to user groups, who have little say in governance matters.

Governance of wetlands within Protected Area Network

As per the Forest Survey of India of 2019, nearly 62,000 wetlands are located within reserved forests (or green wash).

The establishment of protected areas in several cases has reduced instances of illegal hunting and poaching of wetland-dependent species, such as Sangai Deer in Keibul Lamjao National Park (Manipur), one-horned rhino in Manas and Kaziranga (Assam), Swamp deer in Gangetic Plains, muggers and crocodiles, and waterbirds, especially migratory species across the Indian peninsula.

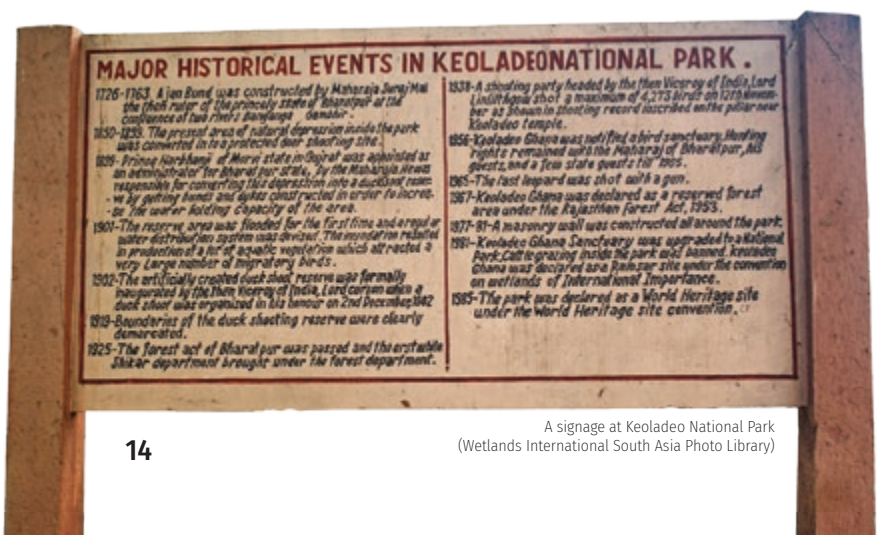
However, the 'fortress conservation' approach remains plagued with several problems, and efficacy remains somewhat mixed. The ideas of pristine nature are themselves socially constructed and may have been the visions of elitist conservationists.

Firstly, the exclusion of local communities, especially those with access to these wetlands for livelihood needs, has resulted into conflicts, often violent ones. The killings of villagers in building of a wall around Keoladeo (Rajasthan) is an example. Secondly, in several parks and sanctuaries, human-wildlife conflicts have become common. In Bhitarkanika (Odisha), the farmers are often at terse relationship with saltwater crocodiles which invade on their lands and often prey on small cattle. Finally, closing areas does not ensure that issues of hydrological connectivity, or management of catchments are effectively addressed. Thus, in Keibul Lamjao National Park in Manipur, the control of poaching has led to the resurrection of the population of endangered Sangai deer. In contrast, the habitat has continued to degrade due to changes in hydrological regimes brought about by the construction of Ithai Barrage. In Hokera, adjoining Srinagar City of Kashmir, while the Department of Wildlife Protection has put boundary pillars to prevent encroachment, the dredging of a canal through the wetland as a part of flood protection measure has left the wetland dry.

Closing large swathes of land for protection is very difficult these days, and politically contentious. In 2002, the Wild Life (Protection) Act, 1972 was thus amended to add 'conservation reserves' and 'community reserves' as the third type of Protected Area other than National Parks and Sanctuaries.

Conservation Reserves are community co-managed biodiversity-rich areas, close to existing Protected Areas and serve as a buffer or a corridor to establish a continuous network. Conservation Reserves can be declared only on government-owned lands, whereas Community Reserves can be set up on lands that are privately or community-owned, and are managed by the individual(s) or communities in possession of such areas. In both these reserves, extraction of natural resources is permitted at levels decided by a multi-stakeholder Reserve Management Committee, thus allowing for management flexibility.

Since 2002, several wetlands



A signage at Keoladeo National Park
(Wetlands International South Asia Photo Library)

have been designated into the category of conservation and community reserves, the key being Charidhandh (Gujarat), Gharana, Hokera, Hygam, Mirgund (Jammu and Kashmir), Tso Moriri (Ladakh), Kokkare Bellur, Aghanashini and Puttenhalli (Karnataka), Kadalundi (Kerala), Ropar and Keshopur Chhamb (Punjab), and Asan and Jhilmil (Uttarakhand).

Repeated attempts to designate Keshopur marshes as a protected area during 1998-2005 met with stiff resistance from the farmers inhabiting the area. In 2007, after a series of consultations with local communities, Keshopur was designated as the country's first community reserve. The 340-ha marsh (also designated as a Ramsar Site in September 2019), is jointly managed by a committee with the Range Officer (as the representative of State Forest Department) and Sarpanch from the five villages as members.

With top-down governance in most protected areas, management solutions are also simplistic and regimented. It is not incidental that management of wetland protected areas follow Keoladeo National Park as the role model. Standardized management planning guidelines have meant that management prescriptions are also similar, and do not adequately account for local conditions and different ecological, hydrological and social settings.

Governance of wetlands outside Protected Area Networks

For significant wetlands located outside the formal protected area network, the model of creating wetlands authorities was adopted. The Loktak Development Authority was the first such organization constituted by the Government of Manipur in 1987 and followed by Chilika Development Authority by Government of Odisha in 1991. These organizations have been registered under the Societies Act of the respective states, and practically as Special Purpose Vehicles (SPVs) to guide formulation and implementation of ecological restoration plans, cutting across diverse sectors and disciplines. Chilika Development Authority has emerged as a successful example, as the organization was not only able to implement restoration measures effectively, but was able to do so with required political support, enabled by a network of research institutions with which the Authority informally collaborated with, and has over time established newer benchmarks in capacity development, research and monitoring.

Though promising, the success of Authority model is dependent on several factors – key being leadership, alignment of political views with ecological one, and stable financing. In the case of Loktak, the Authority has remained project dependent even after three decades. In East Kolkata Wetlands, the political leadership has toed stances against conservation of the Ramsar site, leading to severely curtailed management. The name Authority itself is a misnomer – as most of these organizations do not enjoy any regulatory backing – or have acquired so much later.

Sanagi Deer in Manipur (Shutterstock)

For majority of wetlands, there is no single department or agency which has responsibility for conservation and wise use. Often, there are different departments managing wetland waters (such as irrigation and flood control), resources (fisheries and agriculture) and land (revenue), but no one is

Unfortunately, wetlands rules have created, although inadvertently, debates on what is a wetland and what is not? Wetlands Rules regulate only a limited category of natural wetlands, leaving out a large number of human-made wetlands, and wetlands which receive protection from overlapping jurisdiction.

responsible for the wetland. This leads to sectoral pursuits and ultimate neglect of these ecosystems. In some instances, departments identified as nodal for wetlands do not have the requisite management capacities. Lack of clear jurisdiction is a glaring cause of decline, particularly in the case of urban wetlands where land is at premium and short-term commercial gains weigh over long-term ecological values of wetlands.

Stakeholder engagement is a critical ingredient of any conservation effort. In 2016, the Karnataka Lake Conservation and Development Authority put forward the idea of appointing citizens as lake wardens, and become a partner in conservation and management efforts by playing a watchdog and outreach role. However, the idea hit a roadblock when the Authority discovered political coloration in membership. The approach has however been revised by the MoEFCC and is incorporated as one of the four pillars of the wetland rejuvenation programme.

States such as Tamil Nadu and Uttar Pradesh have constituted District Wetland Committees, to assist State Wetlands Authorities in conservation and management of wetlands, as well as oversee wetlands inventorization, implementation of management plans, and serve as a forum for inter-departmental coordination. Wherever such organizations have been established, there has been a scope of aligning different administration units with wetlands conservation at district levels and opens up possibilities of convergence with developmental programmes. In Sitapur District of Uttar Pradesh, the erstwhile District Collector was able to use funds allocated under the Mahatma Gandhi National Rural Employment Guarantee Act to rejuvenate wetlands. Such integration opportunities are also being pursued in Bihar and Goa, and some other states.

Wetlands regulation: a maze of laws

India has a rich legacy of environmental preservation enshrined in her various legislation and regulatory regimes. The Indian Constitution encapsulates this spirit, notably in its Article 51–A (g) stating that "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures."

Peatbogs are effective carbon sinks, yet their true extent in India remains unassessed. In picture – peatbogs in Chandertal, Himachal Pradesh (Wetlands International South Asia Photo Library)

For majority of wetlands, there is no department or agency which has responsibility for conservation and wise use. Often, there are different departments managing wetland waters, resources and land, but no one is responsible for the wetland. This leads to sectoral pursuits and ultimate neglect of these ecosystems.

Provisions of the Indian Forest Act, 1927, the Forest (Conservation) Act, 1980 and the Indian Wild Life (Protection) Act, 1972 define the regulatory framework for wetlands located within forests and designated protected areas. The Indian Fisheries Act, 1897, The Water (Prevention and Control of Pollution) Act, 1974, and The Biological Diversity Act, 2002 provide instruments for regulating various development threats on wetlands.

The Coastal Aquaculture Authority Act, 2005 prohibits the conversion of natural coastal wetlands such as mangroves, salt pans, estuaries and lagoons for aquaculture. Further, under the Biological Diversity Act, 2002, the Central Government can issue directives to State Governments to take immediate ameliorative measures to conserve any area rich in biological diversity, biological resources and their habitats especially when the area is being threatened by overuse, abuse or neglect.

In 2017, the Ministry notified the Wetlands (Conservation and Management) Rules under The Environment (Protection) Act, 1986. Ramsar Sites and wetlands notified under these rules are protected from development threats by prohibiting a range of activities such as discharge of untreated sewage, and construction within 50 meters of high flood lines. Further, under The Environment (Protection) Act, 1986, coastal wetlands are protected under the Coastal Regulation Zone (CRZ) Notification (2018) and its amendments and the Island Protection Zone (IPZ) Notification, 2011. The Environment (Protection) Rules, 1986, empowers the Central Government to prohibit or restrict the location of industries and carrying on of processes and operations in different areas including wetlands. Several state governments (notably West Bengal, Odisha, Kerala, Manipur, Assam and Rajasthan) have also enacted their own legislation pertaining to wetlands.

The regulatory regime, though seeming comprehensive leave several wetlands out of their ambit. The Wetlands (Conservation and Management) Rules, 2017 are applicable only to natural wetlands, thus leaving out human-made wetlands which are under tremendous threats particularly in urbanized areas of the Deccan.

The wetland definition mentioned in the rules is often cited and interpreted out of context as restricting what is considered as a wetland and is protected. In Sindhudurg District, the efforts of a citizen science process for inventorying the wetlands were watered down when the district administration struck down a large part of the inventory on the grounds that human-made wetlands were technically 'not wetlands' as per the definition under the Rules. The case of Sindhudurg is not an isolated one.

Environmental clearances remain one of the weakest links in the current regulatory regime. In several cases, environmental clearances for developmental projects on wetlands have been issued without taking into account the impacts on these ecosystems, or by even distorting land use records. Several of such clearances have been reverted by the National Green Tribunal and Supreme Court. In recent times, the Courts have cited the responsibility of the government for conserving and rejuvenating wetlands under the Public Trust Doctrine. In a sweeping order of February 8, 2017, the Supreme Court desired that all wetlands above 2.25 ha be notified under Wetlands Rules. In July 2017, the apex court also directed the High Courts to monitor the status of Ramsar Sites, particularly the usage of funds for implementing management plans. While the regulatory regime may look exhaustive, in reality their implementation on ground leaves much to be desired. The penal provisions under Environment (Protection) Act, 1986 are weak.

The State Wetlands Authorities, on which much of the implementation of Wetlands Rules rests, are very understaffed, and in most cases, not well prepared to undertake notification of wetlands as per the process specified in the Wetlands Rules.

Mainstreaming challenges

The distinct recognition of wetlands as audaka in Kautilya's Arthashastra and anupa in Caraka-Samhita were gradually lost when a revenue centric land administration system was put in place by the Mughals and firmed up in colonial times. A limited understanding of benefits of wetlands led to their classification within wastelands – and their drainage and reclamation was incentivized within policies for wasteland reduction. Several states had specialized drainage divisions for the purpose. Post-independence, when India went into a spate of famines and expansion of area under agriculture was the primary policy for achieving food-security, wetlands were reclaimed under government patronage. Unfortunately, wetlands are still clubbed under wastelands to date in land records, and the most recent National Wasteland Atlas of 2019, published by the Department of Land Resources (Ministry of Rural Development) includes marshy and waterlogged lands, riverine and coastal sands and glaciated areas within wastelands. While there has been limited headway in getting wetlands recognized as a separate land use category at national level, states have found out their own solutions. Uttar Pradesh has made a remarkable effort of entering nearly 0.1 million wetlands into land records, thus protecting them from illegal conversion.

There are several elements of policy convergence supporting wetlands conservation and wise use. The National Environment Policy of 2006 has articulated the core wetland policy elements: including their inclusion in poverty alleviation and rural development strategies, and taking into account explicit impact of developmental projects on wetlands. The National Water Policy of 2012 (currently under revision) recommends adoption of a basin approach for water resources management and identifies conservation of river corridors, water bodies and associated ecosystems as an essential action area. The National Action Plan for Climate Change includes wetland conservation and sustainable management in the National Water Mission and the Green India Mission. The National Disaster Management Plan takes into account several non-structural measures for flood and cyclone risk reduction measures

Wetlands International South Asia : Sarovar

The National Water Policy of 2012 (currently under revision) recommends adoption of a basin approach for water resources management and identifies conservation of river corridors, water bodies and associated ecosystems as an essential action area.

and makes direct reference to wetlands.

multiplicity of definition and interpretation of wetlands used by different Ministries and agencies of the Government of India. The MoEFCC subscribes to the wider definition of wetlands as agreed to in the text of Ramsar Convention – yet operates multiple schemes to fund conservation of different wetland types. The Ministry of Jal Shakti on the other hand has tended to distinguish between wetlands and water bodies. The National Water Policy of 2012 mentions wetlands only once, together with water bodies, with restoration efforts recommended to be directed to the latter. The manual prepared for census of water bodies uses a diffuse definition, indicates these entities to be any area of water, salty or fresh, large and small, distinct from one another in various ways. The Water Resources Information System of the MoWR includes information on water bodies and does not use the term wetlands at all. The National Agriculture Policy skirts any reference to wetlands, despite agriculture being the most significant driver of wetlands degradation worldwide. The Smart Cities Mission of the Ministry of Urban Development often ends up investing into beautification and concretization of wetlands in the name of their preservation.

Governing transboundary wetlands

An area where governance gaps are glaring is in the case of transboundary wetlands - wetlands which straddle boundaries of two or more states, or even share international boundaries. Due to jurisdictional issues, states limit their intervention to their boundaries, and in absence of complementary or synergistic efforts from other states, the wetland ecosystem ultimately degrades, bearing the brunt of patchy governance.

Flamingoes in Chhaya Rann (Dhavalkumar Vargiya)

The Najafgarh Jheel, a transboundary wetland along Delhi-Haryana border is a flood buffer. During winters, the wetland teems with migratory birds and supports several heronries.

The case of Pulicat, a transboundary lagoon shared between Andhra Pradesh and Tamil Nadu exemplifies this governance deficit. Due to littoral drift and silt from degrading catchments, the mouth of the lagoon to the Bay of Bengal has choked, leading to rapid decline in migratory fisheries, water quality deterioration and growth of invasive species. Despite availability of good scientific knowledge, and restoration models (such as the one used in Chilika, Odisha) the two state governments are yet to come together to frame a joined-up management plan. While the responsibility of conserving transboundary wetlands ultimately rests with the MoEFCC without support and collaboration of states, the efforts have come to a naught. The lagoon continues to shrink, polluted, and its dependent fishers under tremendous stress.

Najafgarh Jheel, a transboundary wetland shared between Haryana and NCT of Delhi, is a critical natural infrastructure for the region, buffering floods, treating wastewater, recharging groundwater and providing habitat to numerous plant and animal species. The Jheel has been highly fragmented and transformed, used as a waste receptacle, and infested with invasive species. The Sahibi River, to which Najafgarh Jheel was the natural floodplain, has been converted virtually into a drain. The decimation of wetlands has exposed the neighbouring settlements in Haryana and NCT of Delhi to high risks of pluvial flooding and reduced groundwater levels. Recent constructions within the wetlands, while impeding hydrological connectivity are precarious owing to high seismicity and liquefaction within the region. While the wetland area which spanned over 200 square kilometer in the beginning of 20th century is not even one tenth of its regime at present, the two governments continue to debate on the exact boundary to be notified.

International governance on wetlands

Conventions and multilateral environment treaties provide the core of international legal instruments for collaborative and collective action on global environmental challenges, including the continued loss and degradation of wetlands. At core of international governance related to wetlands are commitments related to the

three biodiversity conventions – namely the Ramsar Convention on Wetlands, the Convention on Biological Diversity, and the Convention on the Conservation of Migratory Species of Wild Animals.

Under the Ramsar Convention, India is committed to conservation of her entire wetland wealth, and ensure that management of Ramsar Sites are in such standards that their global biodiversity value is retained and enhanced. In reality, however, much of the effort to date, has been on increasing the List of Ramsar Sites, without commensurate effort on improving management and its effectiveness. Wetlands such as Sambhar, despite being designated as a Ramsar Site for over three decades now, still does not have a clearly defined management plan.

CMS provides an inter-governmental framework for cooperation on migratory species within their migratory range. Migratory waterbirds, which are ecologically dependent on wetlands, connect continents, hemispheres, cultures and societies through their seasonal movements. India is at the heart of the Central Asian Flyway, and over 70% of the waterbird species known to use the flyway use Indian wetlands as a stopover site. The flyway comprises 30 countries, of which only 19 are parties to the CMS. Notable exceptions are Russia and China which have the bulk of species breeding ranges, to which the Indian wetlands are the wintering sites. While a Central Asian Flyway Action Plan was formulated under the framework of CMS way back in 2005, it was not until the CMS Conference of Contracting Parties meeting in February 2020, that a decision to establish a Secretariat in India and further progress on implementation of action plan was made. In absence of any concerted action, the population trends of migratory birds in the flyway are declining. Considerable shortfalls of protected area coverage for migratory species considering their requirements for protection across each of their seasonal ranges have been noted for India, exposing these species to a multitude of threats.

India is a signatory to the 2030 Agenda for Sustainable Development Goals, and in her statement to the High Level Political Forum on Sustainable Development, expressed complete alignment of the national development agenda with the SDGs. In its fourth Ramsar Strategic Plan (2016-2024), the Convention identified four goals and 19 targets, which in its subsequent analysis, are aligned with 10 of the 17 SDG goals. Such a comprehensive alignment of role of wetlands with the SDGs is however not reflected in the thinking at the national level. In the mapping of central sector schemes and ministries with SDGs conducted by the Niti Aayog in 2018, wetlands were included only under two goals and targets – namely, Target 6.6 (Protect and restore water related ecosystems) and Target 15.1 (ensure conservation and sustainable use of terrestrial and inland freshwater ecosystems). In the final set of 100 SDG indicators used for constructing state and UT wise rankings for 2019-2020, only two (change in extent of waterbodies within forests under SDG Goal 15, and percentage increase in area under mangroves under SDG 14) relate to wetlands.

India ratified the Paris Agreement in 2017, and in her Intended Nationally Determined Contribution (NDC) committed to reduce the emission intensity of GDP, increase share of non-fossil-based energy sources, and creating additional carbon sinks. Locking carbon in wetlands can be a cost-effective option for delivering NDC commitments, especially through rewetting of peatlands, preventing thawing of permafrost, and avoiding degradation of wetlands. The 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands provide tiered methods to estimate carbon stock and stock difference with varying levels of sophistication to suit country capacities and contexts. However, in the portfolio of actions identified for NDCs by India, wetlands are only indirectly connected through the interventions under Green India Mission (which includes mangroves), and through pollution abatement programmes in rivers. A major barrier herein is knowledgebase on the distribution of peatlands

Under the Ramsar Convention, India is committed to conservation of her entire wetland wealth, and ensure that management of Ramsar Sites are in such standards that their global biodiversity value is retained and enhanced.

and permafrost in the country.

India is also a signatory to the Sendai Framework for Disaster Risk Reduction, which was adopted during the Third UN World Conference on Disaster Risk Reduction in March 2015 to work towards making all stakeholders disaster resilient and significantly reduce the loss of lives and assets. The Framework recognizes the significance of ecosystems such as wetlands in buffering extreme events, and endorses use of ecosystem-based approaches for disaster risk reduction. India's National Disaster Management Plan does include wetlands conservation as a flood and drought risk reduction measure, and national guidelines do encourage inclusion of wetlands within the district disaster management plans.

While the global Conventions set up an enabling environment for wetlands conservation, regional cooperation on wetlands in South Asia has been very difficult. The Himalayan Wetlands Initiative, which involved all Hindu Kush Himalayan countries could not take off despite over a decade of dialogue on the need for conserving these wetlands. So much so, the October 2020 'Hindu Kush Himalaya Call for Action to sustain mountain environments and improve livelihoods' issued by ministers of eight countries made no direct reference to HAW in the call. Similarly, environment agenda for South Asian Association for Regional Cooperation (SAARC) precludes wetlands.

The way ahead

The continued and unabated decline of natural wetlands in India calls for urgent focus on getting the governance right for conserving these ecosystems. Apparently, much needs to be done – but the future should build on the elements developed so far, and learning from effectiveness of various governance models.

Firstly, the focus should be on creating accountability for wetlands conservation and wise use, specially for those located outside the protected area network. The multiplicity of ownership should be resolved and a single agency must be entrusted with the responsibility of their management and upkeep. As per the National Wetlands Atlas, over 80% of the wetlands are below 2.5 ha in size, and lying within the domains of India's 0.8 million villages and towns. Such wetlands can be well placed within the administration of Panchayat and Urban Local Bodies. The Gram Sabha of Jamsar Village in Palghar, Maharashtra recently passed a unanimous resolution to declare a 6.16 ha of a heritage lake in their village as a wetland.

Decentralization and polycentricity hold the key to wetlands governance. Governance arrangements should bring on board stakeholders particularly local communities on board, and include their views, rights and capacities while framing regulation and management actions. Wise use, which provides ample bandwidth to incorporate wetlands use which are aligned with ecosystem functioning, can be used as basis of defining stakeholder engagement strategies and dovetailing wetlands conservation with developmental plans.

However, merely allocating management responsibility is not going to be enough – capacities of these organisations to sustainably conserve and manage wetlands will also need to be built. State Wetland Authorities need to be backed up with the required human and technical capacity to inventorize, monitor, regulate and holistically manage wetlands. Wetland Authorities may be encouraged to build collaboration with

Wetlands International South Asia : Sarovar

research and knowledge institutions to address technical capacity gaps and identify solutions to emerging issues such as addressing climate change induced risks. A systematic capacity development tailored to meet the needs to State Wetland Authorities, district wetland committees and stakeholders is core to building a cadre of trained professionals who can support conservation and wise use of wetlands.

The implementation of extant regulatory regime, particularly Wetlands (Conservation and Management) Rules, 2017 will need to be scaled up. The notification process will also ensure that regulation of access and developmental planning in the zone of influence is effectively put in place, at least for the natural wetlands. The environmental impact assessment procedures may need to be strengthened for projects involving wetlands, and ensure that all impacts of the project on wetlands are carefully assessed and described to enable decision-making.

A system of periodic management effectiveness assessment may be put in place for significant wetlands. This will help assess the capability of governance regimes in ensuring that wetlands maintain their health, and are able to provide ecosystem services and maintain biodiversity values on long term basis. A process for assessing management effectiveness for protected areas has already been put in place by MoEFCC, experiences of which can be useful in rolling out a similar programme for wetlands.

Effective governance regimes can also be enabled by ensuring policy coherence. While the articulation of values of wetlands in conservation sector policies is clear, similar messages are not conveyed by other sector policies such as water and agriculture. A beginning can be made by according wetlands a distinct category within land use recording system. There is ample scope for enhancing consideration of wetlands in SDG indicators which can also be used to incentivize states to perform on wetland conservation. Focused research on carbon locking potential of wetlands, specially within High Altitude Wetlands can open up new areas of integrating wetlands within NDCs. It is high time that India adopts a 'No Net Loss of Natural Wetlands' as the guiding policy framework.

The financial models for funding wetlands conservation also needs to be reworked. Continuous dependence on central government schemes for funding wetlands rejuvenation has created an inverted incentive structure for the states, and a 'project linked' financing mindset. The states should be urged to make allocations for wetlands conservation within their development plans as a part of their commitment to maintain their natural assets. Convergence financing approaches may also be given high priority – to enable accessing existing development sector funds for ecological outcomes. The Central Government's flagship "Water for All Initiative" depends for its delivery on the network of Gram Sabhas – each of which have received up to Rs 1.2 million per year for undertaking development works, which include water source protection, primarily wetlands. Such convergence opportunities will need to be capitalized upon.

The adaptiveness of governance regimes may be addressed by creating learning and feedback opportunities, driven by multidisciplinary science. The science-base on wetlands will need to be furthered focused on providing quantitative assessments of hydrological and ecological functions, in usable forms and terms suited to sectoral policy-makers. Investments into research on use of wetlands as nature-based solutions for sectoral challenges related to urbanization, water security and climate change can greatly improve sectoral integration.

Chilika fishers devised a nuanced governance regime based on their traditional knowledge of ecosystem functioning. (Wetlands International South Asia Photo Library)

Governance Lessons from an Urban Wetland

The Case of Pallikarnai Marsh of Chennai

Dr Jayshree Vencatesan, *Managing Trustee, CARE Earth Trust*, outlines conservation strategies for Pallikarnai, one of the last remaining natural wetlands of South India

Chennai, the coastal capital city of the most urbanized State of Tamil Nadu, is characterized by a unique presence of wetlands, lakes, ponds, human-made tanks, marshes and swamps (shallow water system), backwater estuaries organized in the form of complexes running from west to east.

The city has had a complex relationship with hydrological management in the recent past, oscillating between waterlogging and flooding to severe droughts. The key feature of this is the fact that the rainfall received has been consistent, placing the cause of these events on the poor management of the city's wetlands.

Of these, one of the critical wetlands is the Pallikaranai Marsh, amongst the few and last remaining natural wetlands of south India. Locally known by its generic Tamil name 'kazhuveli', which means a marsh or a waterlogged area It is located on the geo-coordinates of 12.949371°N latitude and 80.218184°E longitude.

The area around Pallikarnai Marsh was historically the natural water holding zone for the city of Chennai. The Marsh is biodiversity rich with studies by Care Earth Trust pegging numbers at 167 species of birds, 100 species of fish and 141 species of plants which includes 29 species of native grasses.

The Many Facets of Pallikarnai

The area around Pallikaranai Marsh was historically the natural water holding zone for the city of Chennai. For defining the boundaries of Pallikaranai Marsh and considering watersheds as units of demarcation, the landscape under question is 231 sq. km, in which the remnant Pallikaranai Marsh is centrally located.

The more or less flat low-lying land has sustained an ecosystem by draining the storm water from large areas of southeast Chennai into the Bay of Bengal. The aorta of this ecosystem is the narrow canal at Okkiyanmadavu (a canal) that takes the Marsh's water into the sea. Despite the flow being interrupted by the Buckingham Canal during the past 100-150 years, the Okkiyanmadavu has been vital to the sustenance of the Pallikarnai Marsh by allowing the storm water to drain into the sea during the monsoons and letting the seawater enrich the ecosystem

Pallikarnai marsh situated at the heart of Chennai city is its primary flood buffer. It has shrunk rapidly due to reclamation, dumping of waste and choking of inflowing channels. (Jayshree Vencatesan)

during the non-rainy months. The entire ecology of the Marsh is sustained by the seasonal hydrology in general and the mixing of sea and freshwater in particular.

The wetlands around the Marsh as well as the remnant forests such as Nanmangalam are thus ecological extensions of the marsh. This entails that the watershed, christened as the South Chennai Flood Plain, is redefined as the management unit and it is important to focus on protecting the hydrology of the South Chennai Wetland Complex.

The Marsh is biodiversity rich with studies by Care Earth Trust pegging numbers at 167 species of birds, 100 species of fish and 141 species of plants which includes 29 species of native grasses.

The rapid decline of the marsh area

A 2002 study by Care Earth Trust established that the marsh area had a spread of 6000 Ha in the 1900s and subsequently suffered a 90% loss of habitat resulting in an area of only 593 ha.

This drastic reduction in area has been largely caused due to a lack of understanding about the importance of a marsh as a flood regulator for the city and as an environmentally highly productive habitat. In light of this, the marsh was utilized for a number of urban centric anthropogenic activities such as roads, development of residential and industrial settlements, establishment of institutions and disposal of municipal solid waste and sewage. The actual decrease in wetland area has been accompanied by the degradation of adjoining wetlands within the landscape and the loss of hydrological processes as a consequence.

Within this loss, three broad patterns can be discerned

- Large tracts of the marsh, especially those along the residential areas and erstwhile villages of Thoraipakkam, Pallikaranai and Perungudi have been reclaimed into terrestrial habitats and converted into residential colonies.
- The second loss is characterized by habitat fragmentation wherein roads, infrastructure, municipal landfills and sewage treatment facilities have fragmented the marsh into smaller portions and grossly impacted the natural drainage pattern.
- The third is a direct consequence of the first two, as also the unscientific manner of addressing flood control, wherein large tracts of the marsh have been invaded by invasive species of plants notably Prosopis juliflora and Water Hyacinth.
- Despite the onslaught, the marsh has survived due to its unique ecology – in being partly saline and largely freshwater.

From a 'wasteland' to a protected area

The failure to recognize the hydrological importance of the marsh stems from the persistence of archaic land classification. According to the State Revenue records the marshland was classified as a 'wasteland'. This

led to fragmentation and large parts were reclaimed to be developed as residential and rehabilitation areas.

In 2007, the Government of Tamil Nadu, responding to the science-based advocacy programme of Care Earth Trust and the Save Pallikaranai Marsh Forum, a civil society network that was forged as part of the advocacy programme, notified the southern portion of the marsh, spanning 317 ha, initially as a Reserved Land which was later upgraded to a Reserve Forest. As the merit of protecting the marsh assumed centre stage, additional patches of the marsh were added to the 317 ha, resulting in 690 ha of the marsh being protected by 2014. This was further consolidated by constituting a Conservation Authority for the Pallikaranai Marsh. In a first for Tamil Nadu the authority facilitated the existence of a Project Executive Committee comprising of stakeholders. Interestingly, the Pallikaranai marsh is the smallest range in Tamil Nadu with a dedicated presence of staff. In recognition of the need to draft a locale and situation appropriate management plan for the marsh, the authority initiated the process of drafting a comprehensive management plan in 2013-14.

In 2014, Care Earth Trust drafted this Comprehensive Management Plan based on the notion of Adaptive Management, which is a flexible, inclusive and knowledge-based approach. This plan accords equal consideration to people and nature and in a manner is a reconciliation of conservation and development goals.

The Adaptive Management targets formulated include

The wetlands around the Marsh as well as the remnant forests such as Nanmangalam are ecological extensions of the marsh.

- Maintain current wetland area
- Restore adequate water retention in wetland and surrounding watershed(s)
- Eliminate groundwater depletion
- Reduce ecological risk in wetland to acceptable levels
- Attain sufficient social valuation of wetland
- Restore species diversity
- Maintain individual species

Future-proofing Chennai

The major sources of pollution in Pallikaranai Marsh are large quantities of untreated and partially treated sewage water and Perungudi Municipal Solid Waste dump, spread over an expanse of 78 Ha. Pallikaranai marsh is largely affected by organic waste disposal and contamination as is indicated by the high levels of Chloride and Sulphate and alarmingly high concentrations of the heavy metals known to be carcinogenic in nature.

Research has indicated that about 700-800 tankers extract water within 3 km of the Pallikaranai marsh either by directly pumping water from the wetlands or through bore-wells, which needs to be managed as it is unsustainable as well as unregulated.

It is therefore critical that areas identified as wetland/ marsh areas must be protected by annexing the same to the existing Pallikaranai Marshland RF and areas outside the ambit of being part of RF, notably the 54 wetlands identified as being components of the South Chennai Wetland Complex need to be brought under the purview of the Conservation Authority for Pallikaranai Marsh. The two-tier structure of the Authority offers a platform for civil society participation in conserving the marsh, and this opportunity needs to be effectively utilised.

In view of the significance and long-term anthropogenic degradation of the Pallikaranai Marsh, it is recommended that while the first five years of the systematic management beginning 2014 are considered as the building blocks for the process, definition of certain goals, notably those pertaining to habitat improvement need to be addressed in blocks of five years.

An expanding city and the consequent increase in densification necessitate that natural areas, especially wetlands be managed with utmost care. The euphoria of having a biodiversity rich wetland within the city may lose its sheen when there are more charismatic demands for land. For instance, the sudden and steep increase in real estate value of the marsh being declared a RF has had a corollary of demand for public infrastructure. Much like the growing call for gardens and paved walkways and lighting. This list is only bound to increase in the foreseeable future. It is hence important to manage the wetland for strengthening its ecosystem services by ensuring that the ecological integrity of the marsh is not compromised.

Integrating Wetlands in Land Records

Experiences of Uttar Pradesh

The Government of Uttar Pradesh has made a landmark effort to include wetlands within land records of the state to deter any illegal conversion and encroachment. In this article, **Sanjay Srivastava,** *Additional Principal Chief Conservator of Forests and Authorized Officer, Uttar Pradesh State Wetlands Authority* presents an account of how this massive exercise was implemented on ground.

Wetlands of Uttar Pradesh

The three physiographic divisions of Uttar Pradesh are dotted with diverse wetlands ranging from wet grasslands of the Terai, riverine wetlands of the Gangetic plains and ponds and tanks of the Vindhyan hills and plateau. These wetlands play a central role in ensuring food and water security to the region, and are icons of cultural diversity. As per the National Wetlands Atlas, the state has 12.4 million ha of natural and human-made wetlands. Conserving these fragile ecosystems is a high policy priority for the state – also acknowledging the high biodiversity values including the iconic Sarus Cranes Grus antigone, the state bird, which inhabits the shallow agricultural wetlands of the state, and the Swamp Deer Rucerves duvaucelli which is the state animal.

Wetlands of Uttar Pradesh are located within high intensity development settings. The highly fertile Gangetic floodplains are intensively cultivated, with waters distributed over a 74,200-kilometer-long network of irrigation canals, supported by over 130 dams and reservoirs and 20 major barrages. With over 630 municipalities, the state has one of the densest populations and largest urban systems in the country with a tremendous water footprint. Increasing intensity of agriculture, and intensive chemical agro-inputs have further increased water intensity and pollution loading. Wetlands are thus under intense development pressure, and often encroached or converted for alternate usages, polluted and fragmented thus altering their natural character.

Wetlands Governance in Uttar Pradesh

Within the state government set-up, conservation and management of wetlands is placed under the charge of the Department of Environment, Forest and Climate Change. The department's vision places emphasis on wetlands conservation, pollution abatement and improved water use efficiency. Conservation and rejuvenation of human-made wetlands constructed for irrigating farmlands, storing rainwater and recharging groundwater is also promoted by Department of Agriculture.

Recognizing multiplicity of government departments which implement programs related to wetlands, the GoUP,

as per direction of GOI, issued vide letter dated 19.01.2005, constituted the Uttar Pradesh State Wetlands Steering Committee in 2006 under the chairmanship of the Chief Secretary. The Committee provided an inter-departmental coordination mechanism for various wetland related issues, including identification of priority wetlands, reviewing and approving wetlands management plans, capacity development of line agencies and research and development.

In 2009, the GoUP constituted district-level wetland committees. These committees are headed by the District Collector, and have the District Agriculture Officer, Superintending Engineer of the Irrigation Department, District Fisheries Officer, and the Divisional Forest Officer as the Member Secretary. The committee was entrusted with the task of surveying and demarcating wetlands of the district, creating a database on their current situation, and priority ranking for conservation and management needs based on traditional, social and economic contexts. The committee was directed to forward the list of surveyed wetlands to the Principal Chief Conservator of Forests (Wildlife).

The Wetlands (Conservation and Management) Rules, 2017 were notified by the MoEFCC in September 2017. In line with the notification, the GoUP constituted the Uttar Pradesh State Wetlands Authority with the Hon'ble Minister (Environment) as the Chairperson and Principal Chief Conservator of Forest (Wildlife) as the Member Secretary. The District Wetlands Committee constituted in 2009 was brought under the ambit of the Authority.

14 wetlands of high ornithological value have been designated as bird sanctuaries under the provision of the Wildlife Protection Act (1972), and are managed on the basis of plans prepared in conformity with the regulatory regimes. The State has also designated seven wetlands as Wetlands of International Importance under the Ramsar Convention, thus expressing the commitment to wise use and maintenance of ecological character.

The Decision to Enter Wetlands in Land Records

In 2011, the National Wetlands Atlas was published by the Space Application Center under the National Inventory and Assessment Project of the Ministry of Environment, Forest and Climate Change. The State Wetlands Atlas, providing details of district-wise wetlands extent were also published in the same year.

Taking into cognizance the data presented in the state atlas, the State Steering Committee decided to include all wetlands enlisted in the Atlas in revenue records. The committee opined that such a measure would prevent encroachment and conversion of wetlands into alternate usages.

Land records since the British times have been designed to meet revenue needs of the government. Although forests and rivers find a place within the land classification system, wetlands do not have a distinctly identified place in the system.

The land records in Uttar Pradesh are prepared on the basis of eight types, which have further been classified into 25

Sarus Crane, state bird of Uttar Pradesh (istock photo)

Enlisting wetlands in the land records is an important foundation for wetlands conservation in Uttar Pradesh. Through this process wetlands parcels are clearly identified and recorded, their conversion into alternate usages is rendered extremely complicated, and thus is expected to act as a strong deterrent against their encroachment.

sub-types. Each land record is assigned to one of the land types, based on the surveys conducted by the department, and approved at the district level by the District Collector.

In 2013, the Forest Department sought the directions of the Revenue Department on the specific land category under which wetlands could be recorded. The department advised that all wetlands could be placed under category 6 (non-agricultural land), sub category (1) – land covered with water. The department also advised linking areas of such land parcel with the particular land record. In 2014, the State Wetland Steering Committee in its 8th meeting decided that all wetlands enlisted in the Uttar Pradesh State Wetlands Atlas also be recorded in the land record under the sub-category 6 (1).

The Process

For incorporation of wetlands in the land records, the government decided to bank on the district administration, which under the District Collector, is inter alia, responsible for administration of land and related matters. The state has an extensive network of 75 districts, which have been grouped into 18 divisions, guiding developmental planning in 822 blocks, nearly fifty-two thousand Panchayats and 0.1 million villages.

In line with the decisions of the Eighth Wetland Steering Committee, the GoUP communicated the district wise list of wetlands to the concerned District Collector, requesting them to validate the list and include incorporation in the corresponding land records. Worried over slow progress, directions for speeding up the wetland identification process

Pelicans at Sur Sarovar (Diwaker Saxena)

were issued at the level of Chief Secretary, and progress was assessed in detail during the ninth meeting.

The district administration subsequently designated their network of field officers to visit the identified site, corelate the wetland data with land records, and identify land parcels which fell under the wetland category. Post-verification, the land records of the wetland parcels were updated on the online portal.

By the 10th meeting held in July 2016, the herculean task of incorporating 133,484 wetlands in land records was completed in the entire state. Notably, the number of wetlands finally recorded were higher than those listed in the State Wetlands Atlas. In only 19 districts did the list of wetlands as indicated in the Atlas corresponded with the field records.

Way Ahead

Enlisting wetlands in the land records is an important foundation for wetlands conservation in Uttar Pradesh. Through this process, not only wetlands parcels are clearly identified and recorded, their conversion into alternate usages is rendered extremely tedious and complicated, and thus is expected to act as a strong deterrent against their encroachment. The institution of State Wetlands Authority and District Wetlands Committees provide a rich institutional architecture, wherein all policy, regulatory and programming matters related to wetlands can be discussed with line departments and stakeholders. The Authority is currently the process of notifying important wetlands situated in 9 Agro Climatic Zone, under the provisions of Wetlands Rules.

Regulation, however, is but one line of action towards securing a safe future for our wetlands. This needs to be complemented by affirmative actions for conserving wetlands by ensuring that their natural hydrological regimes are maintained, pollution is abated, resources are harvested on a sustainable basis, and all forms of plant and animal life are protected. This requires substantive efforts in improving managerial capability within the frontline staff, both in terms of human resources and skill sets, as well as in terms of monitoring infrastructure. Interventions in wetlands need to be guided by well-meaning action plans, which are systematically monitored and adapted as per needs. The Authority is developing a collaboration framework with several knowledge institutions so that best possible skillsets could be used for supporting on-ground management actions.

Documenting Wetlands Through Community Participation

Experiences from Konkan Division

Sachin Desai, *Trustee, Syamantak* shares the exprience of documenting wetlands of Konkan Division in Maharashtra – a process that involved local civil society members, administration and the judicial system of India.

Beginning of the Journey

Sindhudurg Wetland Brief Documentation Committee became the entity that acted on ground visiting and studying wetlands across the Konkan Region of Maharashtra.

Curiosity, information, knowledge and wisdom could be seen as four aspects of why and how we have been documenting activities and processes. The experience (of undertaking Wetland Brief Documentation) covers all the four aspects. It started with a curiosity about surroundings and is on-going still, with a sense of wisdom. Wetland Brief Documentation is a journey of on ground activities, sharing of knowledge, volunteering, participative ways of working and mainly the

ideation and imagination of the future. At the end, it's shaped by human minds, and therefore, has its own positives and negatives.

In the year 2018 a committee was formed to take upon itself the documentation of wetlands in the Konkan Region of Maharashtra. It wasn't a sudden, out of the blue decision, of course. The path to this day was paved by many previous attempts such as "Vanashakti Vs State of Maharashtra ' ' case and the NGT intervention on violations at Dhamapur Lake. Syamantak, an organisation in Dhamapur had already begun understanding and documenting issues around the Dhamapur Lake. The local district administration took a note of Symantak's experience and invited the representatives for a meeting to discuss and decide on the next steps on documenting the wetlands in Konkan Region. It takes only sincerity for a resourceful entity to cause something better for the environment and society, not

Dhampur Lake (Sachin Desai)

intelligence or ideas. Perhaps, the district administration would have been well within its rights not to invite Syamantak, but it did and that was a key event that set the course ahead to where this journey has reached.

"Nature does not compartmentalise". Even if senior executives at District Collectorate are in the Revenue Department, they can constructively pursue or act on environmental issues with other departments and civil society members, in liaison. Former Collector Mr. Uday Chaudhari, Additional Collector Mr. Mangesh Joshi and the Former RDC, Sindhudurg Mr, Vijay Joshi are some of the government officials who understood the importance of wetlands and facilitated the brief documentation process in their own capacities. "What is needed is "Ichcha Shakti" (willingness) of the officer and not the training", stated Mr. Vijay Joshi, the Former RDC, Sindhudurg when asked to comment on the documentation activity.

The Approach towards Documentation

Wetlands - a vast area of study and in reality, is still just a part of an infinity known as nature.

Hence, documentation of wetlands related to many aspects of life and in a minimalistic way, formal studies. Botany, zoology, archaeology, geography, soil chemistry, revenue records, tourism, history, education, sociology, mythology, anthropology are only a few to name. And one can liberate one's mind to keep adding relevant subjects. And this is something

Wetlands - a vast area of study and in reality, is still just a part of an infinity known as nature.

that any one of us can do!

That points to a real-life fact that information, knowledge and wisdom lies with not one entity but in the society, as a whole. Government and local administration bodies are merely limited, human-made representations of the society of that time. They are useful tools in addressing short- and long-term situations. But the underlying layer - the society has much more to offer and deal with. To cover such a vast canvas, it is important (rather needed) to involve various stakeholders. It will be just impossible to imagine that a representative person or office, even with better resources would be able to even touch all the aspects of wetland documentation. As such "documentation" in itself is just a representation of a deep understanding of a thorough study. In the meeting, Syamantak put forth this approach of bringing together experts and locals under a committee to replace a single person representation. The resultant structure of stakeholders had representation from the High Court, State Environment Ministry, District Collectors, Tehsildars and lastly, the Wetland Committee.

Civil Society District Wetland Committee

The Wetland Brief Documentation Committee

Table 1 - Current statistics of wetlands enlisted and documented

Index	Specifications/District	Sindhudurg	Raigad	Thane	Palghar	Total
1	**Wetland mapped on Wetland Atlas**	377	1760	1895	4032	
2	**Wetland sites mentioned in the list provided by environment department to DCs**	64	130	132	87	413
3	**Wetland sites verified in the Brief Documentation Process**	57	87	111	59	314
4	**Wetland Verification Reports submitted by District Collector to High Court**	57	6	8	4	75

formed on the order of the District Collector consisted of citizenry (members) from the local community as the backbone of this endeavour. Among various tools that the government had already devised, there was a mobile application developed by the Environment Department for ground truthing of wetlands in Maharashtra. Syamantak was invited by all District Collectors to help them in replicating the model of brief documentation through community participation in their respective districts. But unlike Sindhudurg, the District Collectors of Ratnagiri, Raigad, Thane and Palghar, on pretext of Wetland Rule 2017, excluded sites from this documentation, which were minor irrigation dams. The status is mentioned in Table 1.

It is important to note here that the number of identified wetlands is considerably higher than the documented ones. And the number of submitted documents upward [row 4] is a lot lesser than the ones prepared [row 3]. While we can take a glimpse of content for the desired work is that is on-going, it is even more important to take a note of the vast amount of remaining work that lies ahead (as human beings).

Years of collective experience and wisdom across the globe, underlines the important aspect of planned governance. Even in the most genuine cases of such interventions, various arms of the government need to work together, from different directions. The official list of wetlands maintained and provided by Department of Environment, mentions sites from four districts in the Konkan division (Sindhudurg, Raigad, Thane and Palghar). 51% of these sites are minor irrigation dams that are under the jurisdiction of the Department of Water and Irrigation. 39% Lake-dams in Palghar and 17% in Sindhudurg are under the control of Village Panchayat or Revenue Department. Such is the role of various arms of government at local level. As Syamantak started participating, to our dismay, it became evident that the Water Irrigation department and Forest department were inactive in the collective effort. The meetings were held under the direct orders of District Collectors. The reasons for non-active participation could be that these departments are not under the influence of District Administration. The other possibility is that these departments did not see their role, may be due to ignorance. However, the natural progression is indifferent to whether we and our governance understand our role or not.

Ground Truthing of Wetland Brief Documentation Shallow Water and Deep-Water Ecosystems

The dams coming under Minor-irrigation Department are basically human-made lakes formed due to the bund constructed to stop the flow of streamlets coming from underground and the adjoining mountains and forest. For instance, Dr Aprna Phadke, Assistant Professor, Geography Department, Mumbai University mapped 64 streamlets feeding the Dhamapur Lake-Wetland. The Water Irrigation Department had never bothered to document, protect and conserve these streamlets, while the Forest Department is another ill-informed department on this issue. One must understand that there is direct relation of plantation to the water reservoir and its water quality. In many wetland sites, the adjoining land comes under jurisdiction of the Forest Department, where they had planted invasive species in the vicinity of the water reservoir.

A vivid example of this is the 50-year-old Jaisagar Dam in Jawahar Taluka – the only source of drinking water for the city. During our field visit, we found that there wasn't a single drop

of water in the reservoir. Huge invasive plantation was already made by the Forest Department. Species like *Akeshia*, *Gulmohar*, *Suru* can be seen in the wetland area of the reservoir. It should be noted that similar to Wetland Rule 2010 and 2017, other rules and acts do not restrict plantation of mono-cropping alien species. Neither do they encourage plantation of native species in wetland areas of water reservoirs. Both Water Irrigation and the Forest department are either not aware or are ignorant of this fact. In the case of Jaisagar dam, it was observed that the destroyed shallow water area (a.k.a. wetland) has impacted the deep-water ecosystem of the water reservoir. It is the need of the hour for policy makers and administration to understand that digging deep into the ground is the correct way to increase water storage capacity and improve the quality of water. Habitat destruction renders entire habitats functionally unable to support the species present; biodiversity is reduced in this process when existing organisms in the habitat are displaced or destroyed.

Tansa Dam Wetland in Thane district is another example. This dam is a vital source of water to Thane and Mumbai. The area around the reservoir is a wildlife sanctuary conserved by the local Adivasis for ages. The richness of shallow water body (a.k.a wetland) in the back-waters attributes to the native Adivasis who have invested generations to conserve it. The forest around the reservoir is home to *Pipal, Banyan, Sissoo* and other native species. According to Mr. Avinash Bhagar and Ms. Clara Correia (member of Thane Wetland Brief Documentation Committee), "Forest owlet", endemic (categorised as CR, some 100-400 acc. to BI 2014) to the forests of central India is found at Tansa Dam Wetland due to its rich biodiversity. Any plans to plant invasive species would destroy this rich habitat and the Forest Owlets in return". Another example is the Jayakwadi Dam wetland, an earthen dam in Jayakwadi village in Paithan *taluka* of Aurangabad district which hosts many rare species. Due to variation of plant species and fishes in the water; some migratory species of birds arrive during winter. Because of its shallowness, aquatic flora found inside the water body, grows from the bottom of the reservoir to the surface that attracts different kinds of migratory birds. The sanctuary is a man-made reservoir that was created after construction of Jayakwadi dam in 1975.

Environment and life are interrelated. Therefore, by merely pointing the Wetland rule 2017, the position taken by Environment Department of Maharashtra in the High Court, 'to exclude dams which provide

Documenting process at Jaysagar Dam (Sachin Desai)

water for drinking and irrigation from Wetland notification" is in contrast with the Article 21 of the Indian Constitution.

Wetland Rules and Maharashtra Irrigation Act, 1976

The Definition and the Guidelines of the Wetland Rules, 2017, procedure for notification of wetlands are contradictory and violates the Ramsar Convention as well as Article 21 and Article 48 A- Directive Principle of State policy and the Article 51-A – Fundamental duties of the Indian Constitution. Our Legislature admits in the first paragraph of Wetland Rule 2017, that the Wetlands are vital parts of the hydrological cycle, and the highly productive ecosystems which support rich biodiversity and provide a wide range of ecosystem services such as water storage, water purification, flood mitigation etc. In our experience, the very list of such services becomes the reason behind why individuals and organisations must participate in initiatives such as Wetland Brief Documentation. The livelihood and then perhaps, the understanding of being one with environment are the main drivers behind this reasoning. If wetland fulfils the criteria of Ecosystem services (Section 4) and the listing of all available scientific resources, reports pertaining to the wetland (Section 10) of the Wetland Brief Documentation Format then as mentioned in Chart 1, the district administration cannot mark wetland as 'not verified' only because the site is human-made water body which provides water for drinking as well as irrigation purpose. In doing so, the Government of Maharashtra has violated Articles 14, 21, 48-A, and 51-A of the Indian Constitution. The state has not yet verified the wetlands in Maharashtra. Thus, disregarded its statutory duties. There should be scientific investigation and analysis of the brief documentation. For example the district administration of Konkan division completed this part too, again, with the help of civil society community members.

After excluding wetland sites from the Wetland Atlas, 50% sites are minor dams in the list provided by the Environment Department of Maharashtra to District Collectors for wetland brief documentation. The state Department of Irrigation should therefore incorporate rules for wetlands under section 4 of the Maharashtra Irrigation Act,1976. In fact, the Irrigation Department has the opportunity to make rules as per the guidelines of wetland rules 2017, for protection and conservation of wetland which will facilitate conservation of water reservoirs by Nature's Rule.

In some dam-wetlands invasive fish are introduced by contractors. For example, *Tilapia* is an invasive species. Other species do not flourish in the presence of such invasive species. The Water Irrigation Department is not aware of this issue. There is no coordination between the Fisheries Department and the Water Irrigation Department.

> The natural world is disappearing in cities and there is a need of an urgent call from lawmakers and the administration to look into the policy and implementation of activities on the name of beautification.

Exploitation of Wetlands

Urbanisation puts huge strain on water reservoirs, effectively impacting the wetlands. Maharashtra Irrigation Act 1976 exists, but no rules have been laid out. In 1976 word "wetlands" was mentioned and it was guided to make the rules. However, 2010 Wetland Rule gives three exceptions – Forest dept. CRZ and wildlife are exempted. Wetlands in these areas are out of wetland rules. The Konkan Wetlands mostly come under CRZ. The legislation should have made rules based on geographical variation in Maharashtra. Wetlands are a part of the Ramsar Agreement. These sites contribute to irrigation and electricity generation. However, there is a contrast that within Maharashtra, similar wetlands are designated as human-made and hence Wetland Rules do not apply to them! Both the common man and administration are confused about the rules.

Why Wetland Notification Is Need of the Hour in Konkan Region

- Unique physiography with an undulating terrain and narrow coastal plains.
- Receives heavy rainfall averaging to about 3000 mm.
- Region has dense forests and

Creation of a recreational park near the Chakreshwar Lake (Sachin Desai)

Bound by the Arabian Sea to its west and the Western Ghats to its east, identified as 'Eco-Sensitive' according to the High-Level Working Group on Western Ghats.

- Earthen dams are important and are seen a lot in Konkan, because there is almost no other way to store water. Hence, the lakes are present due to these earthen dams.

All these geological, ecological features exhibit the need for protection and conservation of wetlands in Konkan.

Konkan's geography makes it important to have micro-dam-based storage. As a whole, the policy in India, at least in Maharashtra needs to consider geographical variance across the land. One policy cannot be applied to every place. Dams, Forest and CRZ are protected and so, the government argues that these sites do not need wetland notification. However, notification is not just about protection it has also to do with conservation of wetlands thus understanding the ecology of wetland ecosystem.

Urban Handling of Lacustrine Wetlands – A Disappearing Vulnerable Ecosystem

Many architectural proposals of wetlands and lakes in Maharashtra are built with pure aesthetic and functional point of view without any regards to conservation of the ecological services of the wetland, hence transforming a full of life active wetland body to just a lifeless tank. Wetlands in urban areas are reclaimed. These urban lakes have lost their riparian zones due to so called beautification and development projects of local administration. Conserving the riparian zones will enable restoration of these lakes and wetlands around them, and nature will take care of itself.

There is a strong reason why lakes in cities should be notified under the Wetland Rule. The lakes in Thane, Palghar and Raigad under the jurisdiction of municipal corporations are transformed into concrete water tanks. The natural world is disappearing in cities and there is a need of an urgent call from lawmakers and the administration to look into the policy and implementation of activities on the name of beautification. During the survey, the team was welcomed at Chakreshwar Talao in Vasai with a foul smell of dead fish floating which is apparently a common scene at the lake. On inquiring further, the private security guard informed that the foul smell was a common at Chakreshwar Talao and the neighbours have been complaining about it for a long time.

Two major factors were evident in this case - lack of oxygen in the water body and presence of invasive species in the lake. Chakreshwar Talao is in front of an ancient Chakreshwar temple. The temples and lake are connected with ancient wisdom stories which tell the story of the purity of water and rich ecology in ancient times. The beautification of lake which is lauded by local politicians has some common elements: Fibre toys installed near lakes are another example of dead investment with the nexus of lawmakers and local contractors. Unhygienic spaces like public

The two realities need to be handled appropriately, to find an optimal balance for maximising societal wellbeing. It has become evident that the fate of wetlands depends on human attitudes and activities, and that incorporating cultural values can be beneficial for conservation.

toilets with poor conditions and unsustainable discharge were reported to be present on wetlands in cities like Vasai, Thane and Palghar. **Reclamation and Concretization of edges** in Urban wetlands leaving with no riparian zone. Concretization of boundary of wetlands disturbs the very important riparian zone which gives services like filtration of water, groundwater recharge, nesting and food for birds and fishes

Lawns & ornamental plants require high maintenance and water consumption. Instead, lawn can be used for pathways replacing the concrete pathways. Reducing the intensity of lawn mowing in urban spaces leads to increased biodiversity, economic savings and reduced presence of allergy-triggering weeds. (Source: British Ecological Society, Dec 19, 2019) It increases pollinators, increases plant diversity and even a modest reduction in lawn mowing frequency can bring a host of environmental benefits: At the same time, a longer, healthier lawn makes it more resistant to pests, weeds, and drought events. Native biodiversity lawn, butterfly park, birding parks etc. are synchronised ideas, even if the whole thought is reduced to "beautification" in the Lake areas. **Idol immersion** activities are adding to the pollution load of the water bodies. Non-biodegradable materials and synthetic paints used for making these idols are posing serious threats to aquatic life and environment. **Ornamental Fish** are introduced in water bodies while there is no awareness generated and therefore there are no checks on people/authorities introducing ornamental fish etc. in the fresh water body.

Disconnection of Rural Communities

Skywalk construction in Dhamapur Lake, fishing contracts in dams of Palghar and beautification of lakes in

Artefact discovered around Jamsar Lake (Sachin Desai)

Construction on the edges of Kolote Moashi (Sachin Desai)

Thane, Raigad & Palghar districts are examples of nexus of local politicians and contractors. Our natural heritage is threatened by these politicians-contractors nexuses. On the pretext of facility and beautification some whimsical structures have been erected, damaging the ecology and creating threat. By these activities, there is erosion of the very foundation of sustainable economies, livelihoods, food security, health and quality of life in the Konkan region of Maharashtra.

Survey to the Kolote Mokashi Lake site in Khalapur *taluka* in Raigad district was a nightmare experience during the survey in Raigad district. Kalote Mokashi lake is surrounded by lush green hills on three sides, and a gorgeous lake. A day before the survey, the *tehsildar* had called the staff of the concerned department and held a meeting with us at his office. During the surveys, we had held such meetings in every *taluka*. But in this meeting, some elders from Koloshi -Mokashi village had especially come to meet us. They requested us to come and see the kind of activities going on at Kolote Mokashi Lake.

The misuse of this lake is an eye opener for other villages in Maharashtra. All the lands on the edge of the lake have been purchased by the rich urbans and Bollywood giants. Due to the presence of high-profile landowners we were able to survey only three to four sites but it was an unforgettable experience. Resorts and farmhouses have sprung up around the lake and in addition, swimming pools, guest houses, resorts have been built literally inside the lake. The visible culture of the village or the traditional businesses do not exist anymore. Till date there had been violations on the banks of wetlands but here there have been violations in the lake itself. These violations were reported to authorities but they fell on deaf ears.

In the Khajan land, popularly known as Gogte salt pan in Vasai, farmers used to grow a specific variety of rice known as Khara Bhat (Salty Red Rice). Traditionally along with rice farming, they used to fish as well. Some of the local varieties of fish that were found in the area were *Boi, Chivni, Khajri and Jhila*. The fish used to settle well in the waters and both the fish as well as the rice were collected together. Both of them together fulfilled the purpose of earning their livelihoods for them. During those times, the tracks or paths for the flow of water were completely natural, as also there used to be a creek. There was little urbanization of the land in those days. So, though the land used to be waterlogged after the rains, over a period of time, the water used to dissipate naturally from one stream to the other and eventually flow into the nearby creek on its own. But nowadays due to the urbanization of the land, there is only one outlet for all the water to drain out from the fields. Due to the natural maintenance of the water level in the fields, the crops used to grow well and hold the soil firmly. But now, because of extensive water logging and mixing of nearby drainage water with the water body, rice farming is becoming more and more difficult. Many of the natural inlets and outlets

Improper waste disposal in Nirmal Lake (Sachin Desai)

of water are closed now. Also, earlier mangroves were far away and the creeks used to be wider. But now, because of soil erosion and deposition in the creek, the level of the creek water has gone down and mangrove growth has increased. According to the rules of the Government on mangroves, it is difficult to displace them. Further, the problem is aggravated during high tides as this water cannot be emptied at all.

The number of fish compared to earlier times has reduced drastically. During the survey, the team met traditional farmer from local community Mr. Hemant Patil on Khajan Land. Expressing his concern, he said**, "**In fact, in some days we dread that we will not find any freshwater fishes in the fields and hence, we will have no option but to resort to the marine salt water fishes. The types of fish that we used to find in our fields used to be *(*Indian White Mullet), *Kala* (Indian Salmon), *Jhinga* (Prawns), *Khajuri*, *Warashi* and many other types of fish used to be found. These fish used to be perennially available to us through the natural inlets and outlets of the waters in and out of the fields. The rice is softer than the normal freshwater varieties of rice.

In the village of Jamsar, near the wetland site of Pazar Talav there is a temple situated which is known as the Lord Shiva Temple. A large number of carved stones were found in the vicinity of the temple. When asked about them it was known that these were old artefacts. Hence, an extensive four-day exploration was carried out at the site. The artefacts found near the Jamsar Lake wetland site were considerably high in number and such high-density clusters of artefacts are rare.

Traditional management practices, spiritual and sacred values, varied forms of knowledge and expressions of these, represent examples of the benefits that humans derive from wetlands while at the same time they often provide the key to successful conservatio

During the survey, the team identified ancient temples on the banks of the lakes. The rituals and religious beliefs of locals which are associated with the sites, artefacts and the wetland landscape are very clear. The bonding of locals with the landscape, with the sites and their lifestyle has significant relation. The importance of the site, and its location is unbelievably strong. The artefacts give a unique Identity and significance to the location, also the artefacts are the milestones of development and evolution of humans and the landscape together.

Although the site with artefacts cannot be protected alone as a singular entity, it has to be protected on a landscape level, as the sites are across a significant distance and shows the spread of Archeologically important landscape. The same landscape is also under human habitation and cultivation, if the right protection is not given to the site then there is

a high chance of losing such a significant piece of information.

Traditional management practices, spiritual and sacred values, varied forms of knowledge and expressions of these, represent examples of the benefits that humans derive from wetlands while at the same time they often provide the key to successful conservation. The local people are victims of false propaganda of beautification which in reality is a revenue generating model for opportunists. Riparian zone destruction to make artificial structures, fountains (which bring algae).

The Ramsar Convention has been addressing the issue of the cultural aspects of wetlands for over ten years, which is highlighted in its original text. They have reaffirmed the myriad ways in which culture is fundamental to wetland conservation. Culture is described by some as a fourth "pillar of sustainability" (alongside the environmental, social and economic) and by others as running in an integrative way through all the other three. Cultural considerations are avoided in specialised multilateral agreements, such as UNESCO and its World Heritage Convention. Perhaps they underestimate the significance of integration of nature and culture in the management of wetlands.

The two realities need to be handled appropriately, to find an optimal balance for maximising societal wellbeing. It has become evident that the fate of wetlands depends on human attitudes and activities, and that incorporating cultural values can be beneficial for conservation. This aspect is an appropriate tool for promotion of wise experiential and community-based tourism in Konkan.

The two realities need to be handled appropriately, to find an optimal balance for maximising societal wellbeing. It has become evident that the fate of wetlands depends on human attitudes and activities, and that incorporating cultural values can be beneficial for conservation. This aspect is an appropriate tool for promotion of wise experiential and community-based tourism in Konkan.

Need of An Eco-Sensitive Architectural Design and Planning of Wetlands

There is a need of applying a multidisciplinary approach towards restoration, design and management of Wetlands. An eco- sensitive landscape architect would provide design input and expertise that would improve human or social benefits and engagement with a restored wetland ecosystem, such as through the creation of view capes, places for respite and education, or other recreational opportunities. These are the sorts of benefits that appeal to locals, municipal officials, even tourists which can translate to increased public support for wetland restoration efforts.
(Source: www.aswm.org)

Design Jatra, a group of young eco-sensitive architects voluntarily submitted their report on Eco-Sensitive Architectural Design and Planning of Wetlands in urban and rural areas of Konkan Division.

Envisioning Experience Outcomes

Wise development which would entail – educational and historical tourism can be promoted, based on training of the departments themselves. To fill the gaps and integrate them together. So, there should be an ecological relationship among departments. Eco-sensitive architectural design firm Design Jatra's participation gave the recommendations to the Government on faulty designs. But there are no indications that the Environment Department has taken any action as yet. It was suggested by Syamantak that every district should have a common facility, a wetland research and conservation centre initiated by local educational institutions. Learning about wetlands through such a centre will bring forth to students, the subjects - botany, zoology, history, archaeology from different institutions.

The funds should be diverted to such research centres where students will come up with ideas and use the Wetland App developed by the Environment Department, GoM. This should be made open to public for community participation in wetland brief documentation in different seasons and intervals. Every district should have their own Wetland Website for e.g. sindhudurgwetlands. in and lastly, wetland village/wards should have a village/ward museum with a mini herbarium.

Citizen Science for Wetlands

30 years of the Asian Waterbird Census

Dhruv Verma, *Technical Officer, Wetlands International South Asia* and **Dr Asghar Nawab,** *Programme Head (Ecology), Wetlands International South Asia* discuss the accomplishments of the longest running citizen science programme for wetlands in India.

The potential of reducing the human footprint on earth through citizen awareness and mobilisation is getting widely acknowledged. A number of people who have innate interest in nature protection and those who are keen to work with fellow citizens and scientific organisations to upscale scientific efforts on ground qualify as Citizen Scientists. Citizen science is a collaborative form of science where science practitioners collaborate with people to create science and influence positive human footprint.

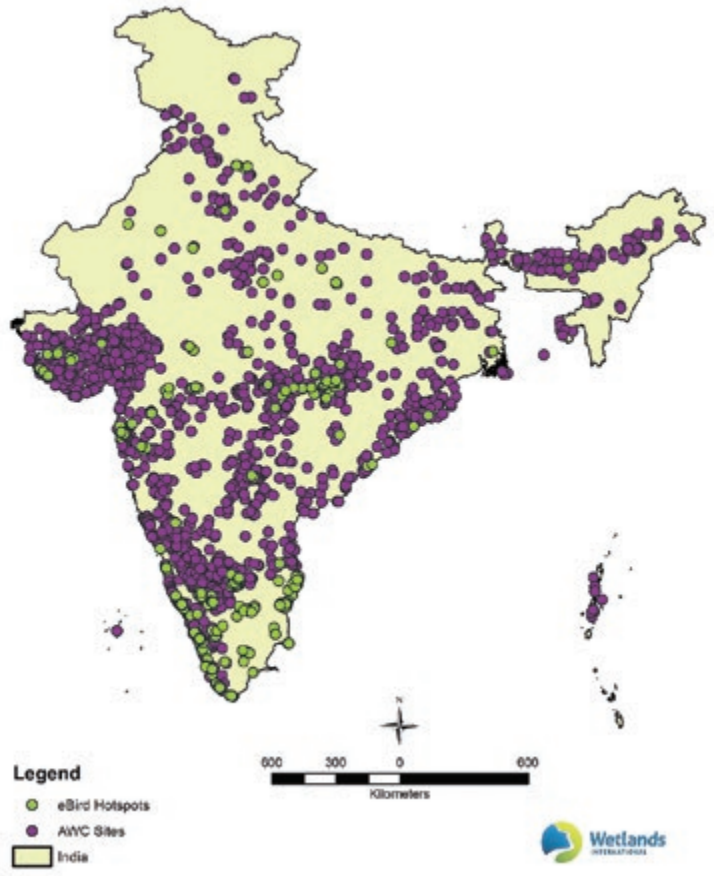
But citizen science is not a naïve concept. In the early days of the scientific revolution, many curious personalities followed nature and its phenomena to understand their systemics and linkages with day-to-day life. Through assumptions, experiments, trials, and validation, the then citizen scientists paved foundation of fundamentals in science. For instance, Audubon, an avid hunter was naturally curious and put together the first 'Birds of America' collection, and then the 'Ornithological Biographies'. Alexander von Humboldt was a naturalist who viewed the world as an interconnected system governed by biodiversity, geography and climate, and laid foundation for contemporary concept of biogeography. These people and many more from earlier times were either farmers, priests, or artists with interest in knowing nature. However, from mid-19th century, science started to become a practice for specialists and no longer remained a field for generalists to engage in. Due to lack of inclusiveness, accessibility and societal relevance, the current regime of science is believed to be in crisis. But, as evolution is inevitable, the natural science evolved as field of both specialists, generalists and even enthusiasts. Recognition of the crisis brings forth the modern era concept of citizen science, which pitches to democratize the science and promote public participation in scientific research and communication. It includes collaboration between scientists and amateur citizens to create, communicate and use science.

In India, the oldest and longest running contemporary citizen science imitative which

Citizen scientists participating in Asian Waterbird Census in Andaman (2019) (Wetlands International South Asia Photo Library)

focuses on monitoring waterbird counts and wetland health is the Asian Waterbird Census (AWC). The AWC was initiated in 1987 in the Indian sub-continent with an objective to obtain information of waterbird populations on wetlands; monitor the status and condition of wetlands; and inform governments, conventions and the public on waterbirds distribution and trends.

Recently, decadal analysis of AWC counts from India during 2006-2015 provided many interesting insights on waterbirds and wetland conservation. The coordinated effort put in by over 1400 volunteers reported presence of 170 waterbird species (85% of total waterbird species in India), including 142 migratory species (84% of total migratory waterbird species in the country) from 1409 wetlands (0.18% of the total number of wetlands in the country). It also reported on many threatened waterbird species and their population inhabiting the Indian wetlands during winter season. The citizen science effort also led to identification of several sites of ornithological importance across India. Over 270 wetlands were reported to regularly support 1% or more of the bio-geographic population of at least one species of waterbirds and 65 wetlands reported to support 20,000 or more waterbirds for at least one year during the assessment period.



Map depicting wetlands covered under the Asian Waterbird Census in India

The AWC data has been used in various conservation activities and programs from local to global levels, including species and site conservation; development of national wetland and waterbird conservation action plans; for raising awareness; and implementation of various multi-lateral environmental conventions. The significance of the AWC programme in India is underlined by representation of such sites that act as ecological networks within a larger socio-ecological landscape or bird flyway systems. Also, the AWC reports those wetlands that represent diverse value systems and risk profiles which usually do not come on the radar of conservation policy makers, but hold immense value for both conservation and development goals.

In order to enhance the significance of AWC as a conservation tool, improving geographic coverage and partnering with other citizen science initiatives is essential. In addition, the overall governance regime which includes mainstreaming AWC within implementation of protected area plans or wetland management plans through cross-sectoral collaboration, capacity building of volunteers and improving technological interface of data collection and sharing is equally important. These measures will enable growth of scientific acumen in the larger community and public interest in science. It will not only contribute to an efficient model of wetlands governance but also encourage citizens to participate in conserving their natural heritage.

The significance of the AWC programme in India is underlined by representation of such sites that act as ecological networks within a larger socio-ecological landscape or bird flyway systems.

High time to operationalize a Central Asian Flyway network of internationally important wetlands to conserve migratory waterbirds!

In February 2020, the Contracting Parties of Convention on Migratory Species adopted a resolution to implement conservation actions for migratory birds in the Central Asian Flyway. **Dr Taej Mundkur,** *Sr. Technical Officer, Wetlands International,* highlights the need for establishing a network of internationally important wetlands to conserve migratory waterbirds.

There is a growing recognition that freshwater and coastal wetlands provide multiple ecosystem services to sustain human wellbeings across the globe. Besides humans, a large number of waterbirds such as cranes, pelicans, ducks, geese, shorebirds, gulls and terns depend on these wetlands, and in many ways, help to sustain and maintain them. Many of these waterbirds are migratory, nesting in the Russian arctic permafrost and steppes of Kazakhstan, Mongolia and northern China. After their nesting is complete; they fly south to escape the cold winters. They travel south to the floodplains, rivers, rice fields and marshes of the Indus, Ganges and Brahmaputra in South Asia and coastal intertidal mudflats, sand flats, coral reefs and associated mangroves of Pakistan, India, Bangladesh and Sri Lanka and the Maldives and Chagos atoll.

Endangered Indian Skimmer on the Jamnagar intertidal mudflats, Gujarat, an internationally important site for this species. (Yashodhan Bhatia)

During these annual migrations, these birds have to stop and rest multiple times. This is when they depend not only safe wetlands, but also farmland, grasslands and other terrestrial habitats. For practical management purposes, about thirty countries in North, Southwest, Central and South Asia, are collectively considered to be the "Central Asian Flyway" for these waterbirds.

These birds include the strikingly beautiful Indian Skimmer *Rynchops albicollis* which may only migrate hundreds rather than thousands of kilometres along the rivers and coasts of South Asia. Northern Pintail *Anas acuta* that nests in the arctic, migrates all the way to the south of Sri Lanka and occasionally even to the Maldives.

While it may appear that waterbirds are abundant in many places and a few are even known to be spreading and increasing (such as the Glossy Ibis *Plegadis falcinellus* and Greyheaded Lapwing *Vanellus cinereus*), there is still little accurate information on the current population sizes of most waterbirds or their population trends. Studies have shown that many are declining rapidly and some could be threatened by extinction, including the Indian Skimmer (which in December 2020 has been raised to the Globally Endangered category in the IUCN Global Red List of Threatened Animals). In doing so, it now joins the Endangered list along with the Black-bellied Tern *Sterna acuticauda* and with which it often nests in colonies together on sand islands in rivers of South Asia, where they face similar threats.

A Demoiselle Crane family in a crop field in India, that have migrated from Mongolia breeding grounds (Dr Taej Mundkur)

These waterbirds share their environment with a very large and rapidly developing human population in several countries that brings with it additional conservation challenges. The direct threats to waterbirds include loss, degradation and pollution of wetlands, lack of allocation of water to ensure functional wetlands, infrastructure development including roads, railways and pipelines that dissect and block wetlands, as well as power lines, solar farms and wind farms that are critical for renewable energy generation, but when placed on the major routes of birds, pose a risk by killing or maiming them. In addition, legal and illegal poisoning, trapping and hunting of birds is also a widespread challenge.

There is also a growing recognition and understanding that management of migratory species in the long-term hinges on maintenance and restoration of a large international ecological network of sites and landscapes

Such Mongolian steppe wetlands serve as important breeding grounds for Demoiselle Cranes and other waterbirds that migrate to South Asia (Dr Taej Mundkur)

Glossy Ibis use rice fields and other freshwater wetlands and have been expanding their range southward to Sri Lanka (Dr Taej Mundkur)

to provide the connectivity of these crucial habitats required to sustain their annual migrations and populations. We know that different birds traditionally use fixed routes and stopover sites on their annual migrations as they have been doing over generations. While some birds may be able to slightly alter their migratory habits and survive in the face of changes to the environment, such as impacts of climate change through increase in frequency of droughts or higher rainfall are being experienced across the region, other species with very specific habits or food preferences may simply not be able to adapt.

Designing and managing an international ecological network of sites thus requires an understanding of the many different migration routes of the various species, as well as knowledge of precisely when and how they utilise and depend on these particular sites at different times during their annual migrations. Fortunately, there is a growing body of information from research and monitoring activities to initiate conservation action now around the important sites. The existing knowledge gaps should be addressed as well to ensure that some species are not allowed to die out simply due to lack of attention and information.

Way back in 2007, Afghanistan, Azerbaijan, Russia, Kazakhstan, India, Iran, Pakistan and Turkmenistan have already taken the positive step of establishing the *West/ Central Asian Flyway Site Network for Siberian Crane and other Waterbirds* which now includes 26 internationally important wetlands. In addition, there are over 150 wetlands along the length and breadth of the flyway in nearly all 30 CAF countries that have been designated as Ramsar Sites in recognition of their international importance for waterbirds. A few others have been designated as natural World Heritage Sites. There is thus a large number of sites that have been formally recognised as internationally important by governments of the region. All these internationally important wetlands provide an ideal basis for the rapid establishment of a more comprehensive CAF site network. Providing governments with a decision support tool that brings together information on the most important sites for each waterbird population would greatly assist the process.

Additionally, at the national level there have been new developments to recognise the importance of networks for waterbirds. For example, in 2018, the Ministry of Environment, Forest and Climate Change in India adopted the National Action Plan for Conservation of Migratory Waterbirds and their Habitats along the CAF, in which it identified a preliminary list of wetlands as part of a national network of sites. This offers an excellent opportunity for the government to promote and support all interested national and state agencies, NGOs, universities, research organisations and local groups in working together to develop a range of activities, including capacity building and strengthening for monitoring and conservation of this comprehensive network of nationally and internationally important coastal and inland wetlands across the country.

As habitat loss and modification remains the biggest threat to wetlands and migratory waterbirds in the CAF, the highest focus should be on improving management and restoration of wetlands and other landscapes on which these species depend. Finding innovative ways of extending the Site Network outlined above to cover community managed reserves, religious sites and privately owned sites will provide new ways to involve local people in conservation.

A significant recent development is the official recognition by the Prime Minister of India of the Central Asian Flyway and the priority of enhancing cooperation in his opening statement to the

13th Meeting of the Conference of Convention on Migratory Species (CMS) that took place in Gandhinagar, India in February 2020. This is also reflected in formal resolution and decisions adopted by all governments that call for action during the coming years. Through this commitment it is foreseen that the Indian Government clearly views developing conservation action and international cooperation in this flyway as a high priority, especially during its current presidency of the CMS.

In September 2020, the UN Environment and Wetlands International had organised an international webinar titled 'Wetlands as Ecological Connections in the Central Asia Flyway' provided an excellent opportunity to highlight some of the urgent conservation priorities. It recognised that as the CAF region is home to nearly a fifth of the world's human population, there needs to be a paradigm shift in current conservation approaches to find more effective ways to address the issue of wetlands conservation. . This implies that conservation directly depends on our ability to communicate with and educate the people who depend on these wetlands such that they can act as ambassadors for their protection and support local action. This will require building skills and strengthening capacities of frontline staff in carrying forward such a message as well.

It would be important to have our *finger on the pulse* to be able to monitor impacts of our collective actions. As an example, the next annual Asian Waterbird Census will be undertaken in January 2021 by a large network of volunteer birdwatchers, forest department staff, researchers and conservationists in most countries in the flyway. This should contribute to the latest information on the abundance and diversity of waterbirds in these wetlands as well as a rapid assessment of their threats and potential threats in each country in the flyway. Additional monitoring efforts will be required to cover other times of the year. All this can serve to inform and further prioritise wetlands for urgent conservation action.

Running parallel to site-based action, the CMS recognising the high risk of extinction that some species face has prioritised those species for special attention through implementation of existing single species conservation action plans, including for Baer's Pochard *Aythya baeri*, Dalmatian Pelican *Pelecanus crispus*, White-headed Duck *Oxyura leucocephala*, Sociable Lapwing *Vanellus gregarious* and Eurasian Spoonbill *Platalea leucorodia*. In addition, it calls for development and implementation of a regional plan for the Indian Skimmer. Implementation of the latter, besides achieving urgently needed conservation of this species, offers an excellent opportunity to promote better South-South cooperation.

UN Environment and Wetlands International had organised an international webinar titled 'Wetlands as Ecological Connections in the Central Asia Flyway' in 2020 that provided an excellent opportunity to highlight some of the urgent conservation priorities.

Thus, in moving forward to achieve conservation of migratory waterbirds and their habitats in the CAF, a multipronged approach is urgently needed:

- At the flyway/international level led by governments working together with conventions and international organisations and others to provide the appropriate flyway framework and mandate as well as the core resources for implementation of agreed flyway wide priority actions, especially initiation of the establishment of a CAF Site Network with conservation actions implemented at key sites,
- At country and local levels, througha wide-range of actions, including management and restoration of critically important wetlands, raising awareness, support, involvement and pride of local communities and other stakeholders, dealing with on site direct and indirect threats to species and habitats.
- Implementation of conservation plans for threatened species, that benefit the species and act as a flagship for wider conservation action for species and habitats.

While the Covid-19 pandemic may have put a temporary break on enhancing flyway cooperation in 2020 in the CAF, it is hoped that there will be more rapid international dialogue and concrete actions in 2021 and beyond. The leadership of India and other governments will be critical in this moving forward.

Denotification of Vedanthangal Sanctuary
A ready reckoner

Vedanthangal, India's oldest wetland bird sanctuary is under threat from its caretakers. The Tamil Nadu Forest Department wants to denotify a major portion of the sanctuary allegedly to benefit commercial and industrial interests. **Nityanand Jayaraman,** a Chennai based *writer and activist,* writes on current developments within Vedanthangal Wildlife Sanctuary.

Facts First

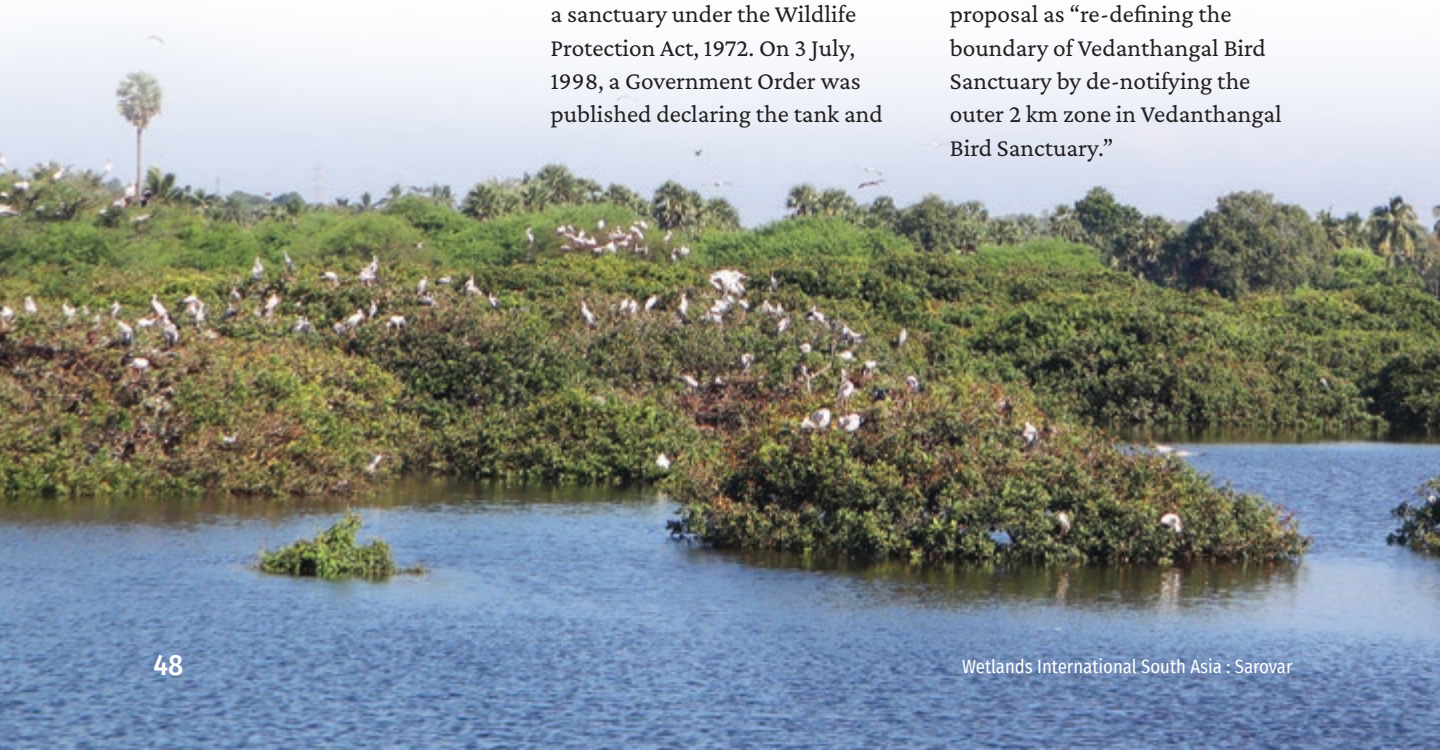
Vedanthangal – a 29.51 ha irrigation tank – and its surroundings have been protected by local villagers as a heronry and bird sanctuary at least since 1790. A note by John Shortt dated 1864 records how the local villagers saw value in maintaining the sanctuary as the nitrogen and phosphorus rich bird droppings nourished the surrounding paddy fields.

In 1962, Vedanthangal was declared a Reserved Forest under Madras Forest Act. In 1996, the Government of Tamil Nadu published an order stating its intent to declare the 29.51 ha tank and the area within 5 km around the tank boundary as a sanctuary under the Wildlife Protection Act, 1972. On 3 July, 1998, a Government Order was published declaring the tank and the areas contained within 5 km around the tank as a Wildlife Sanctuary. The G.O. recorded that no objections or claims were received in response to the 1996 order.

From July 1998 till current date, the Vedanthangal tank and the areas within 5 km around the tank remain part and parcel of the Wildlife Sanctuary with the full protection of the Wildlife Protection Act, 1972.

On 23 January, 2020, the Government of Tamil Nadu tabled a proposal with the State Board for Wildlife to denotify area contained in the circular band within 3 to 5 km from the tank.

An inspection note by the Chief Wildlife Warden on the same date, referred to the proposal as "re-defining the boundary of Vedanthangal Bird Sanctuary by de-notifying the outer 2 km zone in Vedanthangal Bird Sanctuary."



On 19 March, 2020, Principal Secretary to Government of Tamil Nadu, Mr. Shambhu Kallolikar, IAS, wrote to the National Board for Wildlife seeking concurrence of the Government of India for Tamil Nadu's proposal to "denotify the outer 2 km zone of the existing 5 km." The letter said "a proposal to reduce the buffer zone of Vedanthangal Bird Sanctuary from 5 kms surrounding the main tank area of 29.51 ha to 3 km in which first 1 km to be notified as Core Zone including main lake/tank and next 2 km boundary to be notified as Buffer Zone and to denotify the outer 2 km zone of the existing 5 km."

A pharmaceutical company, Sun Pharma, located inside the sanctuary is seen to be a major beneficiary, as its expansion plans would sail through if the outer 2 kms of the sanctuary were denotified as proposed.

News about the proposed denotification provoked a swift and strong response from the people and opposition parties in Tamil Nadu and from environmentalists throughout India forcing the government to respond.

On 9 June, 2020, an undated, unsigned Press Release in Tamil was put out via whatsapp by the Tamil Nadu Forest Department's Chief Wildlife Warden. The key elements of the press release are translated and paraphrased as follows:

- The Vedanthangal tank's total area is 73.06 acres. This is a Public Works Department irrigation tank.
- On 8.7.1998, by Government Order No. 199, the tank was declared a "wildlife sanctuary" under the Wildlife Protection Act.
- Under the Government Order, the private and revenue lands in the areas within 5 km surrounding the tank were also declared as "sanctuary."
- The Central Government has directed that all sanctuaries should be demarcated as Core Zone, Buffer Zone and Eco Sensitive Zone.
- As per that direction, efforts to demarcate the areas within 5 km of the Vedanthangal lake sanctuary as follows are underway: 0-1 km Core Zone; 1-3 km Buffer Zone; 3-5 km Eco Sensitive Zone. [Emphasis added]
- Therefore, the claim that the 5 km circumference area is being reduced is very wrong.

Hiding the fact that its factory is located squarely within the sanctuary, Sun Pharma clarified that its expansion will not involve any fresh land acquisition.

The communiques of the Principal Secretary, Sun Pharma and the Chief Wildlife Warden contain several mis-statements and false claims.

- The Principal Secretary's letter of 19 March makes it appear as though the Bird Sanctuary had already been demarcated into core and buffer, and that the 5 km zone around the main tank area was actually a buffer zone which was sought to be redefined by the proposal.
- The Chief Wildlife Warden's press release claims that the Central Government has directed the zonation of sanctuary areas into Core, Buffer and Eco Sensitive Zones, and that Government of Tamil Nadu's proposal does not denotify portions of the sanctuary.
- Sun Pharma's letter states that their proposed expansion is not within the sanctuary.

Core and Buffer

The Wildlife Protection Act, 1972, contains no reference to core and buffer areas within protected areas. Only in 2006, by amendment to the Act and in specific reference to Tiger Reserves were the words Core and Buffer introduced. The core zone refers solely to critical tiger

A panoramic view of Vedanthangal Sanctuary (M. Yuvan)

habitat within sanctuaries and reserves. The area peripheral to the critical tiger habitat is defined as a buffer where lesser degree of habitat protection is required. This area too falls within and is in reference solely to Tiger Reserves in India. Other sanctuaries and national parks are to be administered as per the provisions of the WLP Act, and are not required to be demarcated as core and buffer.

In fact, the 23 January 2020 letter of the Principal Chief Conservator of Forests cites the Government Order of 1998 to clarify that "As per G.O.Ms. No. 199, Vedanthangal Reserve Land/ Lake with an area of 29.51 ha and surrounding 5 km area all around (comprising revenue area of 28 villages) was declared as Vedanthangal Bird Sanctuary. And, whole Sanctuary is treated as Core Zone for management and there is no buffer zone."

While the use of core and buffer by the PCCF in this case is uninformed, the point is clear that the entire area contained within 5 km of the tank is an integral part of the sanctuary.

Eco Sensitive Zone

The concept of ESZs was first introduced in the Wildlife Conservation Strategy – 2002 which was adopted in the Indian Board of Wildlife meeting held on 21 January, 2002. Point No. 9 of the strategy suggested that "lands falling within 10 km of the boundaries of National Parks and Sanctuaries should be notified as eco-fragile zones. . ."

ESZs refer to the lands outside the protected area that need some degree of protection to ensure the integrity of the sanctuary or national park. The National Wildlife Action Plan 2002-2016 makes this clear: "Areas outside the protected area network are often vital ecological corridor links and must be protected to prevent isolation of fragments of biodiversity which will not survive in the long term. Land and water use policies will need to accept the imperative of strictly protecting ecologically fragile habitats and regulating use elsewhere."

Proposed Denotification is Bad in Law

There is no provision in law to declare an area within a sanctuary that is not a tiger reserve as core or buffer. ESZs are to be defined outside the boundaries of protected areas. Denotification of a sanctuary or altering its limits from 5 km to 3

Pelicans at Vedanthangal Sanctuary (M. Yuvan)

km -- in this case – can only be done if it is established that it will aid conservation objectives. It cannot be justified by citing the aspirations of industries who are operating illegally within the sanctuary limits.

Industries within Sanctuary Limits

A number of industries, including Sun Pharma, Ordain Healthcare and Amco Batteries operate within Vedanthangal Wildlife Sanctuary's 5 km boundary.

Even if an industry existed prior to the notification of the sanctuary, the declaration of the lands as a sanctuary in 1998 would extinguish all prior rights and claims unless such rights and claims had specifically been brought to the notice of the District Collector and settled.

On 30 May, 2020, Sun Pharma submitted an application to the Tamil Nadu State Environmental Impact Assessment Authority seeking permission to expand. The application was made using a diluting amendment to the EIA Notification, 2006, made by the Ministry of Environment citing COVID-19 as an urgency to argue for reduced environmental due diligence for pharmaceutical companies wanting to set up or expand before September 2020. The amended law allows pharma companies to set up or expand without environmental impact assessment or public hearing.

Sun Pharma's application states that it is located 0.72 km outside the sanctuary boundary, and 3.72 km from the boundary of the lake. This suggests that the company may have been privy to the efforts by the Forest Department to redraw the boundaries of the sanctuary from 5 km to 3 km, thereby placing Sun's facility just outside the redefined limits.

In order for a sanctuary to be denotified, the proposal must be recommended by the State Board of Wildlife. The National Board of Wildlife would have to concur, after which the Government of Tamil Nadu would have to issue a Government Order denotifying the sanctuary under the WLP Act.

In order for a sanctuary to be denotified, the proposal must be recommended by the State Board of Wildlife. The National Board of Wildlife would have to concur, after which the Government of Tamil Nadu would have to issue a Government Order denotifying the sanctuary under the WLP Act. As things stand, Vedanthangal sanctuary limits extend to 5 km from the tank boundary. Sun Pharma's existing operations and the proposed expansion fall squarely within the sanctuary.

Will reduction of park boundary affect the birds?

Citing commercial pressures to reduce the park boundary is untenable considering that only 4.71 percent of India's landmass is under some sort of protection. The remainder is available for development and commercial purposes.

The large-canopied trees inside Vedanthangal tank provide a preferred roosting and nesting site for birds that visit the region during the wet and post-monsoon season from October to February. The surrounding areas, including wetlands such as lakes, tanks and paddy fields, serve as foraging grounds for the birds. A healthy agricultural landscape is well suited to the conservation objectives of the sanctuary.

Already, industrial presence inside the sanctuary has degraded the quality of wetland habitats. A study carried out by Chennai Climate Action Group, a city-based youth collective, found four common industrial solvents, which are used in pharmaceuticals manufacturing, in ground and surface water samples.

Dibromochloromethane and dichloromethane were found in all three water samples taken from the region, including one from an irritation well, tetrachloroethene and toluene were in two water samples taken from surface water sources fed by rainwater run-off from the pharma company.

In its application for Environmental Clearance, Sun Pharma has declared that will require a top-up of 176,000 litres of water each day.

Promoting industrialisation, urbanisation and commercialisation within and around the sanctuary will bring down the areas under agriculture, degrade water bodies by increasing impenetrable land cover in their catchments and desiccate the landscape.

A well-managed sanctuary will be a boon not merely for the wildlife but also to local communities who will enjoy the benefits of improved water availability, healthy living environment and the economic benefits of tourism.

Governing Urban Wetlands For People Or Nature?

The East Kolkata Wetlands, the largest sewage fed fisheries in the world, present a unique opportunity and challenge for wetland managers in a continuously changing urban environment. **Dushyant Mohil,** *Programme Manager* and **Harsh Ganapathi,** *Technical Officer* from Wetlands International South Asia have penned down their experience and learnings from working on the management of this site.

Located on the eastern fringes of Kolkata, spanning 12,500 ha, are the East Kolkata Wetlands (EKW) a mosaic of landforms from predominantly water dominated areas (used as fish farms) to land centric usages for agriculture, horticulture and settlements. The existing wetland regime is a remnant of a series of brackish wetlands connected to freshwater and marine environments of the Gangetic Delta and the Bay of Bengal, in an ecological continuum with the Sundarbans.

Sewage is carried by long channels towards the bheris (fish farms) where the sewage is broken down under the sun diverted into the small bamboo and hyacinth barriers ultimately flowing into bheris where algae and fish thrive. Over 260 such bheris exist which receive over 900 MLD pre-settled sewage from the Kolkata Metropolitan region through a network of locally excavated secondary and tertiary canals. EKW is one of the most productive urban ecosystems in India, where nature's power is

A view of East Kolkata Wetlands (Wetlands International South Asia Photo Library)

utilised to produce 20,000 MT of fish, 50,000 MT of vegetables annually and irrigate 4700 ha of paddy lands.

As the nutrient-rich effluent moves through the system, it is progressively cleaned, and nutrients are redirected to algal growth or agricultural products grown along the edges of the fish farms and the agricultural lands. Algae and other aquatic plants are used to feed up to 17 species of fish cultured in these ponds, which in turn create nitrogen and phosphorus-rich water to irrigate the adjacent paddy fields. The traditional waste recovery practice provides subsistence opportunities for a large, economically underprivileged population of 0.15 million living in over 37 mouzas (revenue villages) within its boundaries. EKW is also one of the few natural habitats providing recreational avenues for the urban and peri-urban population.

The traditionally evolved natural water purification and waste recovery practice saves Kolkata city nearly Rs. 4,680 million annually in terms of the treatment cost to treat nearly 65% of the city's sewage. These wetlands also lock down over 60% of carbon from wastewater, thus reducing harmful Green House Gas (GHG) emissions from the region. Apart from humans thriving in the ecosystem, the wetland is also a home to diverse species of flora and fauna. At least 120 plants, ten amphibians, 29 reptiles, 260 birds, 58 fish, 11 prawns, three mollusk, and 11 mammal species have been recorded in these wetlands. Marsh mongoose (Herpestes auropunctatus) is endemic to the region and also included in the

The traditionally evolved natural water purification and waste recovery practice saves Kolkata city nearly Rs. 4,680 million annually in terms of the treatment cost to treat nearly 65% of the city's sewage. These wetlands also lock down over 60% of carbon from wastewater.

schedule II of the Indian Wildlife Protection Act, 1972.

Institutional Setup

EKW is human ingenuity at its best, the wetlands provide Kolkata with a unique natural filtration system, livelihood for its residents, vegetables and fish for the city, an important flood buffer and a vital defense against climate change.

EKW provides multiple benefits, hence it needs to be managed for conservation of its natural remediation and resource recovery ability, biological diversity as well as securing sustained provision of its full range of ecosystem services which support livelihoods of dependent communities. The effectiveness of management is reflected in the ability to sustain multiple use of the wetland, based on the traditional knowledge of resource recovery developed over time, without undermining the key ecological and social processes that underpin the functioning of EKW social-ecological system.

The management of EKW is entrusted with the East Kolkata Wetlands Management (EKWMA), a nodal agency for systematic implementation of wise use principles for the management of this Ramsar site. EKWMA was borne out of the East Kolkata Wetlands (Conservation and Management) Act, 2006, a unique regulation passed by the state government charting a course for management of EKW as a Wetland of International Importance and its various ecosystem services, including the ability of regulation of water regimes, wastewater treatment, source of groundwater recharge and other socio-cultural values. The Act defined the land use within the wetland, identifying each land parcel as substantially water dominated, under agriculture, horticulture or settlements, and banned any further diminution of wetland area, change in ecological character, and overall land use. EKWMA was accorded functions to enable implementation of the Act, which included regulating land-use change, preventing unauthorized development and promoting integrated management of the wetland system.

EKWMA is administered under the Chairmanship of the Minister in-charge of the Department of Environment and a list of members which include the Chief Secretary of West Bengal, Additional Chief Secretary or Principal Secretary from different departments (i.e. Department of Environment, Department of Land and Land Reforms and Refugee Relief and Rehabilitation, Department of Fisheries, Department of Forests, Department of Tourism, Department of Panchayats and Rural Development, Department

of Irrigation and Waterways, Department of Irrigation and Waterways), as well as four experts each in the areas of wetland ecology, hydrology, fisheries and socio-economics.

Recent Trends

With its unique capabilities, managing EKW is a herculean task and hence a separate act and management unit was deemed necessary, all along a rapidly urbanizing environment. Development threats loom large construction of an elevated corridor over the wetlands to ease traffic congestion in Kolkata city was deemed necessary.

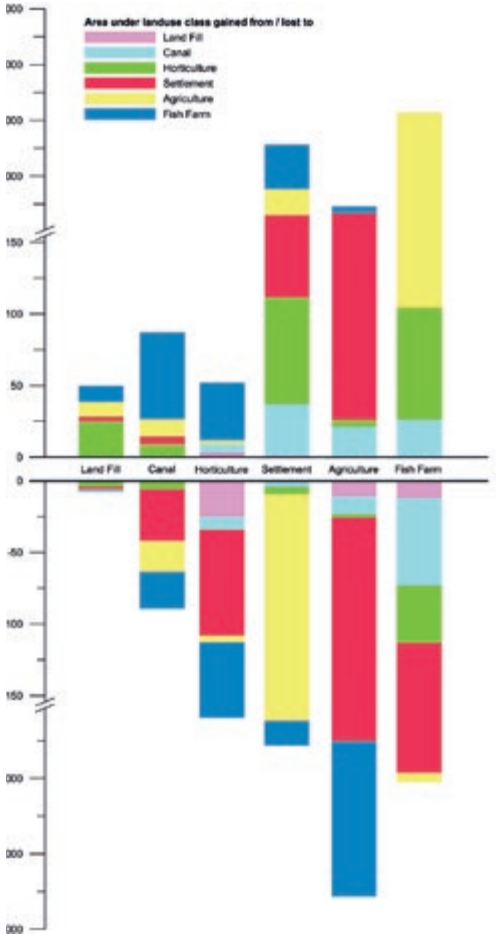
EKW itself is seeing immense transformation ever since being declared a Ramsar site, the boundary and periphery have been protected by law, thanks to the oversight of Dr Dhrubajoyti Ghosh, but within the boundary area, under fish farms has increased significantly by 1,668.79 over a 20-year period. The increase in fish farm area has been observed after 2015, even though it had decreased during 2000-2015.

The area under agriculture has reduced which bodes well for the wetland and its capacity to treat wastewater. The wetlands, however unique its setting and services, is still considered a large dump-yard, wherein the area under solid waste has doubled and this poses a great risk to adverse change for the wetland. Excessive dumping of solid waste means that threats due to pollution and discharge of leachate remain high, posing health risk for the communities.

The settlements within the wetlands have also surged which could increase resource use leading toan increase in vulnerability of wetland communities to flooding and climate risks. There is a significant reduction in the number of waterbird species being sighted; over 30 species have not been sighted in recent times. Increased urbanization in the periphery of the wetland, habitat encroachment and shifting climate patterns has led to the reduction of key wetland species sighted in the area. The changes to the external and internal environment of EKW means that monitoring and strict regulations need to be ensured at all times, guided by a management plan that is endorsed by all departments and communities.

The unique ecosystem is also guided by the Wetlands (Conservation and Management) Rules, 2017 notified by the Ministry of Environment, Forest and Climate Change, Government of India. Management under the Wetland Rules present a unique challenge as the rule prohibits activities which include discharge of sewage, dumping of solid waste and construction of permanent nature (except boat jetties) were listed as prohibited activities in notified wetlands which included all Ramsar Sites.

The natural regime of the EKW has been altered to function with the inflowing sewage as the major component of the wetland cycle. However, the Wetlands Rules present a challenge to managing EKW as the wetland primarily relies on waste water flows for water recycling activities and the rules. Which



Land use transformation in EKW

would mean that EKW would not be able to maintain its resource recovery practice.

Governance challenges

Decision-making processes and performance outcomes by EKWMA are generally transparent, with meeting minutes available publicly. EKWMA have put in place decision-making processes and protocols, where reasons for decisions are clearly articulated. Having a detailed look at the minutes of EKWMA meetings over the years the following challenges still remain:

External consultation and role of other actors have reduced over time: Even though Panchayat samities are formed to support implementation of conservation activities, their role in governance has not been discussed at length. Partnerships and collaboration between state and non-government actors remain blurred. Traditional roles of communities, CSOs and their legitimacy is not discussed.

Meetings of EKWMA have been infrequent as 29 meetings have been held over a 15-year period since the formation of EKWMA. The meetings have greatly reduced over the years, as after the reconstitution of EKWMA in 2017 only two meetings have been held.

Potential of EKWMA beyond resource recovery is not significantly explored by the authority: EKWMA meetings discuss potential of eco-tourism at great length. Wetland interpretation centers are also greatly discussed but concrete actions have been limited. Exploring potential of

The unique ecosystem is also guided by the Wetlands (Conservation and Management) Rules, 2017 notified by the Ministry of Environment, Forest and Climate Change, Government of India.

EKW services has not be taken up proactively.

Enforcement over solid waste dumping remains a primary concern: Concrete actions are yet to be taken to limit waste dumping within the wetland even after detailed discussions. Support from other government departments to enforce strict measures to stop waste dumping remains limited.

Management decisions on conservation of EKW have decreased over time: Enforcement of EKW Act remains high on agenda, authority takes serious note on the violation of EKW Act and rules pertaining to the wetlands. Discussions over land mutation and cases regarding encroachment, over areas of conflict, land allotment, land ownership and creation of structures, houses within EKW take up a majority of the meeting time when compared with conservation and management actions. Monitoring protocols can ease the burden on EKWMA to focus on conservation and management of EKW.

Way Forward

East Kolkata Wetlands is a natural wonder that conservationists have fought for; it serves as a model for potential sustainable food production, all the while it offers a glimpse into the future for other urban wetlands that are vanishing fast. However, with increased encroachment, their ability to provide food, filtration and flood control is being compromised. Maintaining the land use and land cover in line with regulatory requirements becomes the top most priority, along with enabling synergy between the wetland ecosystem and people. Sewage quantity and quality received remain the lifelines of the system which is sufficient and efficiently treated applying traditional waste recovery practices, management of EKW needs to ensure that resource recovery practices are sustained with suitable protection for its biodiversity, with efforts to reduce species invasion.

Management also needs to provide opportunities for wetland communities to participate in wetland management. Work towards enhancing individual and collective capacity to continuously monitor changes to the wetland under the pressures of development and changing climate, while inculcating behavioral change. A better appreciation of the huge economic benefits the wetland ecosystem services could fetch may tip the balance in favour of the wetlanders. A successful conservation model implemented in these wetlands can compensate opportunity costs of the commons with ecosystem services. Urban wetlands remain out of the purview of traditional natural systems hence their management as in the case for EKW should remain in balance for humans as well as nature.

Wetland Rejuvenation

Early Experiences from the National Capital Territory of Delhi

Dr Prathna TC, *Department of Irrigation and Flood Control, Govt. of NCT of Delhi* and **Ankit Srivastava,** *Delhi Jal Board* discuss their experience of working on wetland rejuvenation in the National Capital Territory of Delhi.

As per government records, there are 1009 lakes and water bodies in Delhi, of which only 600 can be revived.

Encroachments, presence of invasive species, increasing water contamination and eutrophication, greater likelihood of floods, and loss of biodiversity are some of the major threats on wetlands. Pressure to convert wetlands for developmental activities is immense especially in case of urban riparian wetlands and Delhi is no exception. A gradual decline in wetland area has been observed in Delhi over the years similar to most parts of India. At the same time, increased awareness towards conservation and restoration of wetlands has also been witnessed in the recent years. Many projects have been undertaken by the Government both at the Central and State levels together with active participation from NGOs, citizens and local communities.

Floodplain Restoration along River Yamuna

Floodplains are the most widespread among wetland ecosystems present along the stretch of Yamuna. Floodplains have always acted as a natural buffer against climate change. The floodplains of Yamuna are inundated with floodwater from the river during monsoons and a gradual seasonal variation in vegetation is observed along the stretch. The wetlands along the floodplains play a critical role in hosting resident and migratory birds as well as regulating floodwater and recharging groundwater levels. Over the years, untreated and partially treated sewage has been flowing through drains before entering the wetlands and ultimately discharging into the River. Highly polluted water can contaminate the aquifer, and also destroy the fine balance in the wetland ecosystem. Recently, directions have been issued under the National Green Tribunal (NGT) to initiate work on treating wastewater in the drains prior to their discharge into wetlands in addition to the removal of invasive weeds which have suffocated the wetlands. Nearly ten major drains presently discharge untreated sewage into wetlands along the western part of the floodplains. Projects have been designed to treat this sewage using a constructed wetland system before it reaches the natural wetlands. Preventing further flow of sewage or untreated water into the wetlands is one among the preliminary steps to restore wetlands.

Revival of Lakes and Water bodies in Delhi

There are 1009 lakes and water bodies as per government records in Delhi, of which only 600 can be revived. Most of these lakes have been impacted negatively and are presently fighting for survival. Bhalaswa Lake, Najafgarh Jheel, Sanjay Lake, Neela Hauz, Hauz Khas and Okhla Bird Sanctuary are among some of the major wetland ecosystems in the Delhi NCT region in the form of lakes and marshlands. Of these, Bhalaswa Lake is the second largest lake in Delhi with a unique horse shoe shape and is a part of the Yamuna riverine wetland system. With directions from the National Green Tribunal (NGT) earlier this year, the Delhi Government has projects in place to prevent animal excreta from the dairy discharging into the lake by overhauling the drainage system. Simultaneously, work has been initiated to utilize a constructed wetland system to treat domestic sewage, storm water and grey water to recharge and replenish the lake.

Delhi also has a number of constructed wetlands which assist in water purification and storage. Neela Hauz located in South Delhi in a human-made wetland, which was historically used as a water source. However, continuous discharge of sewage and solid waste into the wetland sounded its death knell. The wetland was revived by the use of a constructed wetland system to treat the domestic sewage and further utilize it to recharge the lake. Concerted action has brought back both resident and migratory birds.

Rejuvenation of Rajokri Lake: A Pilot Project

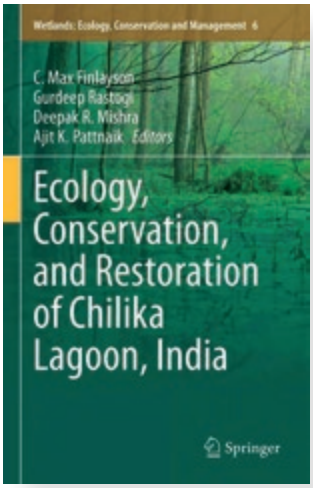
The lake project at Rajokri (28°30` 44.92 ″ N 77°07` 10.28 ″ E) is another stellar example of using natural treatment methods to restore and revive water bodies. The lake in Rajokri village, located on the outskirts of Delhi used to be heavily encroached until 2017 with untreated sewage and cattle dung which was being emptied into the dying water body. The Delhi Government initiated the revival project using scientifically designed wetlands to treat sewage and recharge the lake. The constructed wetlands comprised native wetland plants such as Canna and Spider Lily. The treated water which was used to fill the lake was further polished with floating wetland systems. The environmental impact of the project upon completion was noticeable with diverse species of migratory birds being spotted in the surrounding locality. In addition to ecological, aesthetic and economic values, wetlands in India have always been associated with socio-cultural and religious values.

Chhath Puja is a festival rituals by the local community at Rajokri with performed in the water body. Prior to the restoration of the lake, rituals were performed by public in the wastewater sink. During the course of restoration, feedback from the residents indicated the need for a *Chhath* Ghat to perform rituals during the festival following which a separate Ghat was included away from the water body. This intervention has ensured the active participation of public towards maintenance and upkeep of the restored water body.

Wetlands are crucial for their rich biodiversity, replenishing the water table, controlling the loss of nutrients together with reducing the impacts of climate change. In addition to government legislations, conservation programs and capacity development, public support is critical in ensuring restoration of wetland resources. Any restoration project should convince the community to participate in the program before its implementation to achieve the objectives of protection and sustainable management of wetland resources.

The constructed wetland in Rajokri Village (Dr Prathna TC)

RECENT PUBLICATIONS



Ecology, Conservation, and Restoration of Chilika Lagoon

Finlayson C.M., Rastogi, G., Mishra, D., Pattnaik, A. (Eds.)

This book recounts years of studying, analysing, and reversing the environmental pressures that threatened India's Chilika Lagoon by experts. It transcends scientific analysis to explore governance and institutional issues involved in wetlands management. The critical themes covered in this book are restoration and management of the Chilika Lake, strategies and management needs for wise use, sedimentologic, chemical, and isotopic impacts, hydrodynamics and salinity, analysis of water quality, status of species diversity and migratory patterns.

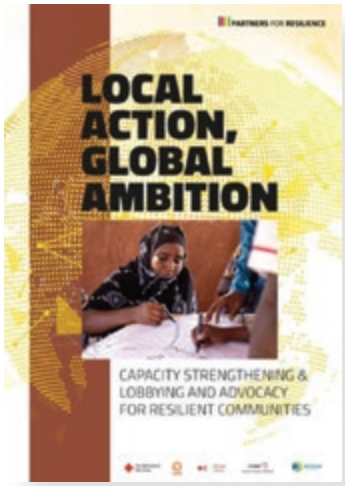
Ramsar New Toolkit for National Wetlands Inventories

The tool kit aims to provide assistance to countries to implement or update their inventories and report on wetlands. It also explains the process of conducting an inventory, examples of good practice, data collection methods and use of inventories in making policy decisions. Emphasis has also been laid on training of practitioners. This toolkit targets various stakeholders involved in the assessment, monitoring and conservation of wetlands.

Indian Sunderbans mangrove forest considered endangered under Red List of Ecosystems, but there is cause for optimism

(Siviers et al., Biological Conservation, Volume 251, November 2021)

The Red List of Ecosystem has been recently introduced by IUCN as a global standard for assessing risk of ecosystem collapse. The framework was applied to Sunderbans and the outcomes reported in this article. The assessment indicates that historical clearing and diminishing fish populations and ongoing threats including climate change and reduced fresh water supply may further impact this ecosystem.



PfR Flagship Report: Local Action, Global Ambition

Partners for Resilience (PfR) is a worldwide network of civil society organizations working in hazard-prone areas to strengthen people's resilience to rising disaster risks. PfR flagship report titled Local Action, Global Ambition: Capacity Strengthening & Lobbying and Advocacy for Resilient Communities has documented the major results that the PfR programme has achieved in its ten years of working on Integrated Risk Management. It offers experiences of organisations who are part of this partnership from around the world, keeping poverty, vulnerability and risks of communities that are prone to natural disasters as the crux of the report. The report is an invaluable source of knowledge which puts forth diverse experiences of working on the issue of disaster risk resilience and management globally.

A Deep dive into Fresh Water: Living Planet Report 2020 by WWF

"A Deep Dive into Fresh Water: Living Planet Report 2020" presents a six-point emergency recovery plan for freshwater biodiversity. The report comes at a time when freshwater bodies and the biodiversity that thrives around these natural resources is under threat. Data suggests that freshwater biodiversity has been declining at a rapid pace. The publication covers experiences and recommendations by a team of global scientists and policy experts working on freshwater bodies and wetlands who have argued that these changes in the status of freshwater ecosystems need an urgent response aimed at recovery and replenishment. Some of the pressing issues discussed in the report include loss of wetlands and biodiversity, decline of river systems, and the steep decrease in the population trends for monitored fresh water species.

Upcoming Events

Asian Waterbird Census 2021

The Asian Waterbird Census (AWC) is part of the global International Waterbird Census (IWC). This citizen-science programme is supporting conservation and management of wetlands and waterbirds worldwide. The recommended dates for the AWC are 2 – 17 January 2021, covering two weeks and three weekends.

World Wetlands Day

Celebrated annually on 2nd February, World Wetlands Day aims to raise global awareness about the role of wetlands for people and the planet. The theme for 2021 is Wetlands and Water.

Asian Wetlands Symposium

The Ramsar Regional Centre – East Asia (RRC-EA) will co-organize the 9th Asian Wetland Symposium (AWS9) with theme "Voice of Asia: Changes, challenges, and successful practices" in collaboration with the Ramsar Centre Japan, Wetlands International Japan, Japan Wetlands Society and other partners. The event is scheduled for 21-25 June 2021.

Stockholm World Water Week

The World Water Week 2021 will be held as a full-scale digital event on 23-27 August. The theme for 2021 is Building Resilience Faster. The event will focus on finding concrete solutions to the world's greatest water-related challenges, starting with the climate crisis and including water scarcity, food security, health, biodiversity, and impacts of the Covid-19 pandemic.

11th INTECOL 2021

The International Wetlands Conference will be held between 10-15 October 2021 in Christchurch, New Zealand. The conference will focus on challenges of climate change, developing green infrastructure, promotion of sustainable resource use and community wellbeing as the important themes.

Ramsar COP 14, China

14th Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands (COP14) to take place in November 2021.

Convention on Wetlands 50 YEARS

UN WATER

DANONE evian

World Wetlands Day is made possible by the Danone Fund for Water.

IUCN

Wetlands INTERNATIONAL

Wetlands Internation South Asia

World Wetlands Day
2 February 2021
Wetlands and water

Join us - visit WorldWetlandsDay.org #RestoreWetlands

We safeguard and restore wetlands for people and nature.

A-25, Floors 1 & 2, Defence Colony, New Delhi 110024, India
T: +91 11 24338906, 46038906
E: wi.southasia@wi-sa.org

Wetlands
INTERNATIONAL
www.south-asia.wetlands.org

Wetlands International
@WetlandsInt
Wetlands International