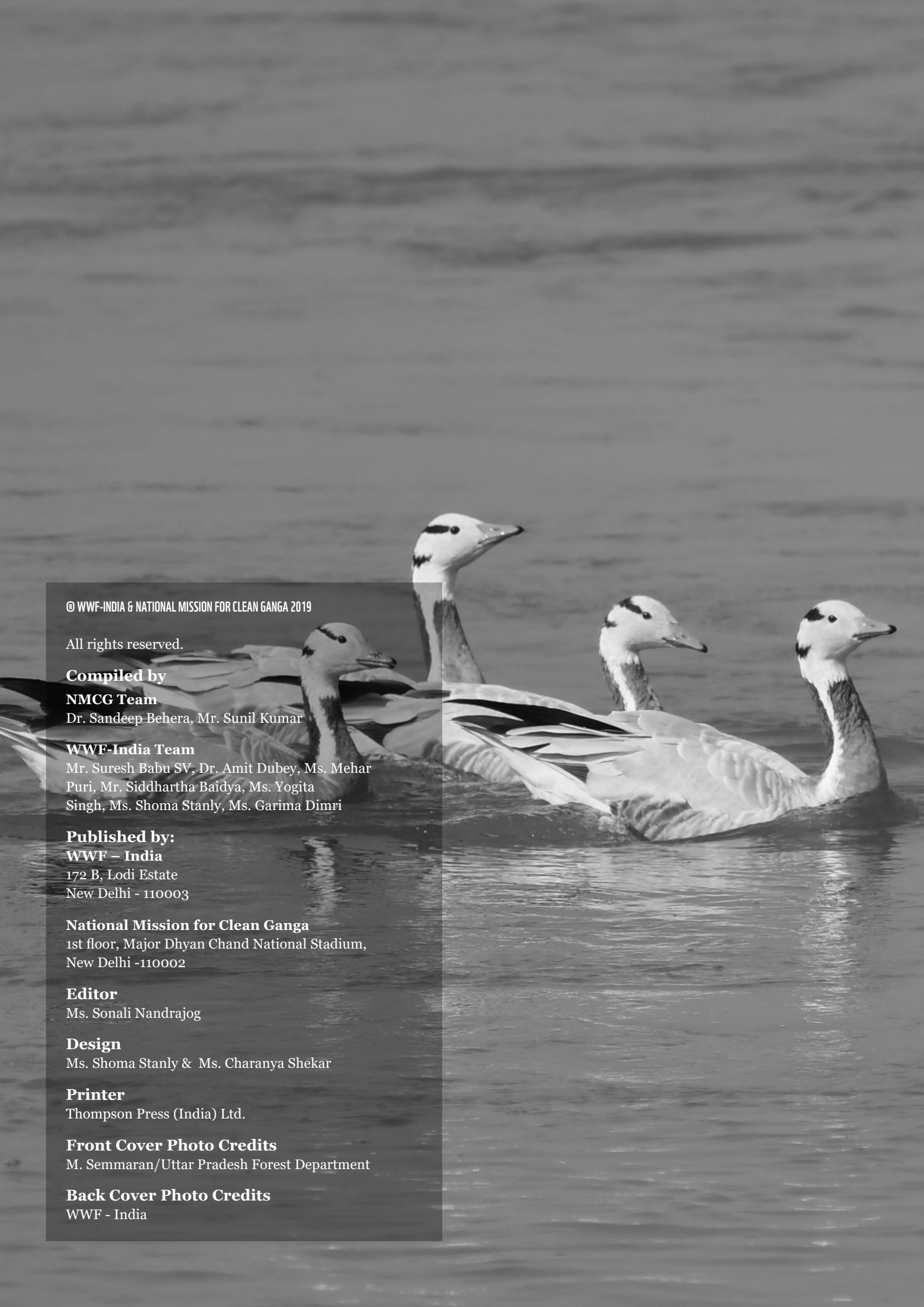




# CONSERVING WETLANDS IN THE GANGA BASIN

RECOMMENDATIONS FROM THE NATIONAL WORKSHOP





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India's water challenges are complex and include quantity, allocation, quality and management issues which needs to be dealt with utmost attention and seriousness. Increasing competition for water among industry, agriculture, energy, domestic use and the environment has highlighted the importance of managing water in an integrated and multi- sectoral basis in a sustainable manner.

Our country is blessed with numerous wetlands—waterbodies, ponds, lakes, marshes and they used to play a key role in the lives and livelihoods of people. These wetlands act as recharge sources and flood cushions. At present, wetlands are in a state of neglect and we need to reverse the trend.

In this context, the workshop organized by National Mission for Clean Ganga (NMCG) and World Wide Fund for Nature-India is a major milestone. It has brought together a range of stakeholders working on wetlands and rivers together. Ministry of Water Resources, River Development and Ganga Rejuvenation recognise the relevance of integrated approach towards managing a basin's water needs, and also has been relentlessly working for the restoration of the wholesomeness of the Ganga river defined in terms of ensuring *aviraldhara* (continuous flow) and *nirmaldhara* (unpolluted flow), through the National Mission of Clean Ganga. The National Water Mission, under the Ministry, on the other hand was launched to ensure integrated water resource management helping to conserve water, minimize wastage and ensure more equitable distribution both across and within states. The recommendations from the workshop, will help strengthen the integration of wetlands into basin management programmes across the countries.

I hope that the learnings drawn from this workshop in integrating wetland conservation for Ganga protection and rejuvenation will provide very useful inputs for our policy making, and would present a viable model for adoption for other major river basins across the country. It is important that the Stakeholders at Government, Non-Government and communities appreciate, adopt and implement these recommendations collectively, so that our aquifers and rivers are protected in a healthy state.

  
(U.P. Singh)

Date : 3<sup>rd</sup> June, 2019.  
Place : New Delhi.

जल संरक्षण - जीवन संरक्षण  
Conserve water - Save life





राजीव रंजन मिश्रा, भा.प्र.से.  
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#### MESSAGE

The Government of India accords highest priority to the conservation of National River Ganga. Marking a major shift in implementation of the Ganga rejuvenation programme, the Government is adopting an integrated approach towards addressing key challenges faced by the river. In this context, establishing linkages between land, water and forest ecosystems becomes very critical and has been a priority for the National Mission for Clean Ganga (NMCG).

As per the Ganga River Management Plan prepared by the consortium of Indian Institute of Technologies in 2015, Ganga basin is spotted with many lakes, tanks and marshes in the Ganga Basin, which play crucial hydrological, ecological and socio-economic functions. However, many of these wetlands are under threat from anthropogenic drivers and are in various state of degradation. In order, to achieve the vision of aviral dhara (uninterrupted flows), nirmal dhara, ecological and geological integrity Ganga, it is important that these wetlands are conserved. The key question is around making this integration possible.

NMCG and World Wide Fund for Nature-India (WWF-India) brought together wetland practitioners, experts, and Government Officials to draw upon existing experiences and knowledge to prepare a road map for integrating and mainstreaming wetland conservation in Ganga river basin management. Following the rich deliberations, a set of recommendations with an action plan has been drawn up, which we hope will guide the National Government, States and other stakeholders to integrate wetland conservation in Ganga rejuvenation programme. A series of collaborative actions around inventorisation, prioritization of wetlands, ecosystem services assessment, preparation and implementation of management action plans have been listed down. It is also important to note that the demonstration of restoration of environmental flows in atleast one priority wetland in each of the basin states is identified as a priority, which if implemented can go a long way in contributing to base-flows and aviral dhara. Synergising technical, institutional, financial strategies of various Government, non-government and technical institutions was identified as a key area of work. Many opportunities for collaboration with Wetlands Division of Ministry of Environment, Forests and Climate Change as well as the State Wetlands Authorities in the basin have been identified. NMCG along with WWF-India has already initiated a discussion with MoEF&CC to take some of these recommendations forward.

NMCG is looking forward to engaging with Government, Non-Government organisations and communities in conserving wetlands in the Ganga basin and this I hope will become a model for successful integration of wetland conservation in basin management programmes.

(Rajiv Ranjan Mishra)

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#### MESSAGE

Wetlands are integral part of our river basins as well as our lives. The Ganga basin is home to one of the richest riverine wetland systems in India, which provide a wide array of ecosystem services. An integral part of the Central Asian Flyway, the Ganga basin has 7 Ramsar sites, about 50 wetlands of national importance and numerous rural and urban wetlands. Degradation and loss of these wetlands, as it is happening today, has resulted in adverse hydrological and ecological impacts as well as economic and social losses and costs to society. This situation calls for an urgent call for collective action to conserve our wetlands.

In this context, I would like to complement National Mission for Clean Ganga (NMCG) and World Wide Fund for Nature-India (WWF-India) in organising a very timely workshop to discuss integration of wetland conservation in Ganga basin management. As we are aware, the Wetland (Conservation and Management Rules) of 2017 stipulated inventorisation, prioritisation and conservation of wetlands across the country and its desired preparation of detailed documents on each wetlands and their zone of influence. While, many States have initiated the process for documentation, there is big opportunity for the Ganga basin states, NMCG and MoEF&CC to collaborate and fast track the process to move towards conservation action in the Ganga basin.

Under the National Programme for Conservation of Aquatic Ecosystems—a Government of India Scheme for conservation of wetlands, there is an emphasis on Integrated Management Plans for wetlands, which aligns with the recommendations of this workshop.

This workshop has been successful in discussing the efforts at identifying the institutional collaborations (between Government, NGOS, technical institutions and communities) and suggesting priority areas where immediate attention is required in order to formulate better conservation strategies for these important aquatic resources.

Having discussed the recommendations in detail with NMCG and WWF-India, I am hopeful that the two Ministries—Ministry of Water Resources, River Development and Ganga Rejuvenation and MoEF&CC and several other stakeholders will be able to collaborate and showcase integration of wetlands in a basin programme—making Ganga the first basin in the country to have mainstreamed wetland conservation. The Wetlands Division of MoEF&CC will extend all its support in this endeavour for the protection and rejuvenation of the wetlands in the Ganga basin, partnering with multiple States in the basin.

(Manju Pandey)



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## SHRI. RAVI SINGH

### SECRETARY GENERAL & CEO, WWF-INDIA

Wetlands, the vital ecosystems supporting an array of critical functions and services (including livelihoods, flood storage, habitats, pollutant removal, socio-cultural, recreation and commercial activities) are unfortunately reeling under different stages of degradation.

The Global Wetland Outlook 2018 reports that the loss of wetlands is almost three times faster than that of natural forests. This decline, since the 1970s, has impacted 81% of inland wetland species populations and 36% of coastal and marine species. WWF's Living Planet Report 2018 also reported that between 1970–2014, the Freshwater Living Planet Index recorded an 83% decline in freshwater species, equivalent to 4% per year since 1970. Studies by the Salim Ali Centre for Ornithology and Natural History, indicate that between 1970-2011, there has been a 37% loss in wetlands in India.

In a scenario with increasing competition for water, the absence of any allocation for freshwater ecosystems is impacting many wetlands in India. The loss of hydrological connectivity between wetlands and their contributing catchments, encroachment in wetland habitats along with pollution is compounding the problem. Over time, the importance of the river-wetland continuum has been lost and hence, both systems are managed separately. We need to recognize the crucial role of wetlands in a basin for maintaining the hydrological, geomorphological and ecological health of river systems

In this context, this workshop on integration of wetland conservation in the Ganga basin rejuvenation programme initiated by the National Mission for Clean Ganga (NMCG) was very timely. The workshop brought together practitioners and experts working on wetlands and rivers to chart out a roadmap for mainstreaming wetland conservation in the Ganga basin to achieve the vision of *aviral dhara* and *nirmal dhara*. From inventorisation to prioritisation and preparation of integrated management plans, it is essential that stakeholders at the National, State, District and local level collaborate effectively.

This report details out opportunities for synergising the efforts of the NMCG and the Wetlands Programme of the Ministry of Environment, Forests and Climate Change. Additionally, to ensure long term sustainability of wetlands conservation programmes, we will need a robust strategy for constructively engaging communities. Work done by many organisations, including WWF-India, has shown that where Government, NGOs and communities work together, positive conservation impacts and changes are possible.

We hope that this report will serve as an important guiding document on integration of wetland conservation in the Namami Gange programme, leading to actions to conserve wetlands in the Ganga basin as well as in other basins.

(RAVI SINGH)





# ACKNOWLEDGEMENTS

We express our sincere thanks to Shri. U.P. Singh, IAS, Secretary, Ministry of Water Resources, River Development and Ganga Rejuvenation for his guidance in conceptualising and organising this workshop. We gratefully acknowledge the guidance received from Shri. Rajiv Ranjan Mishra IAS, Director General, National Mission for Clean Ganga and deeply appreciate his involvement, not only through the planning and organisation of this workshop, but also in the finalisation of this report. Special thanks to Ms. Manju Pandey, Joint Secretary, Ministry of Environment Forests & Climate Change for reviewing the recommendations and providing valuable inputs to make it practical.

We are thankful to Shri. D. P. Mathuria, Executive Director (Technical), Shri. Rajiv Kishore, Executive Director (Administration), Mr. G. Ashok Kumar, Executive Director (Projects) and Mr. Rozy Agarwal, Executive Director (Finance) at the National Mission for Clean Ganga, for their support in planning and organising this workshop. We thank Mr. Ravi Singh, Secretary General & CEO, WWF-India and Dr. Sejal Worah, Programme Director, WWF-India for their constant guidance and encouragement for organising this workshop. Special thanks to Dr. Brij Gopal, Centre for Inland Waters of South Asia for reviewing the recommendations and providing inputs.

We would also like to express deep gratitude to all the participants of the workshop for sharing their knowledge, expertise and perspectives, which formed the basis of this report.

We acknowledge the financial support of the HSBC-Water Programme.



# EXECUTIVE SUMMARY

National Mission for Clean Ganga has launched the Namami Gange Programme with the objective of conserving and rejuvenating the river Ganga. In order to achieve the vision of *Aviral dhara* (uninterrupted flows), *Nirmal dhara*, and the ecological and geological integrity of the Ganga, it is important to understand the role played by wetlands in maintaining basin health, and identify tangible actions for their conservation. Towards this objective, the National Mission for Clean Ganga and WWF-India jointly organised a workshop on February 4, 2019. The workshop was intended to prepare a roadmap for wetland conservation in the Ganga basin and not just to mainstream it.

As per the Ganga River Management Plan 2015, there are many lakes, tanks and marshes in the National River Ganga Basin. An integral part of the Central Asian Flyway, the Ganga basin has seven Ramsar sites - Renuka, Upper Ganga river, Keoladeo National Park, Sambhar Lake, Bhoj Wetland, East Kolkata Wetlands and the Sunderbans (declared as a Ramsar site on February 1, 2019). Close to 50 out of the 170 nationally important wetlands are located in the Ganga basin, along with around 116 High Altitude Wetlands of Uttarakhand, and numerous rural and urban wetlands. Several of the basins' wetlands are home to key flora and fauna, including migratory species. They also fulfill crucial ecological and social functions such as nutrient recycling, water purification, flood attenuation, ground water recharge, buffering of shorelines against erosion, along with being important sources of water, fish, fodder and recreation to society [GRBMP 2015]. However, these wetlands are in various stages of degradation due to threats from anthropogenic drivers. Their role in the overall health of a river basin and waterflows in the region are not well understood by stakeholders, and therefore river basin management and wetland

conservation are not well integrated. This workshop aimed at initiating a dialogue on wetland-river interconnectedness, and draw upon the experiences and knowledge of participants to prepare a roadmap for integrating and mainstreaming wetland conservation in the Ganga River Basin Management Plan. This one-day workshop brought together more than 60 wetland managers, experts, academia and decision makers, who collectively designed a set of recommendations, which will be acted upon by respective agencies. The outcomes of this workshop are presented in this report.

Drawing on the Ganga Basin Environment Management Plan (2015), Ganga Authorities Order (2016) and the Wetland (Conservation and Management) Rules 2017, this report presents a four year action plan to achieve four objectives for the wise and sustainable use of wetlands in the Ganga basin:

- Wetlands critical to maintain the hydrological, geomorphological and ecological balance of the Ganga basin are identified, their health status established and measures identified for conservation.
- Ecosystem based, community-led models of rejuvenating wetlands are demonstrated to enhance *aviralta* and *nirmalta* and strategy for scale up in the basin level is developed
- Enabling policies for integrating wetland conservation in relevant and supporting programmes at the State and National level to facilitate restoration of *aviral* Ganga are developed.
- Stakeholders are empowered to contribute constructively to conservation of river-wetland continuum.

Several of these recommendations will need to be jointly led by the National Mission for Clean Ganga and the Wetlands Division of the Ministry of Environment, Forests & Climate Change, Government of India, along with the State Wetland Authorities. As the first step, this report strongly recommends inventorising and prioritising key wetlands based on the primary inventory of wetlands in the states, prepared by the Space Application Center, ISRO under the National Wetland Atlas (2011). As per the rules, the State Wetland Authorities are required to inventorise wetlands within their state and notify them through 'Brief' documents prepared as per the template prescribed in the Wetland Rules. After notification, the State Wetland Authority is expected to prioritise these wetlands based on their conservation value; and prepare and implement conservation plans within their jurisdiction.

Participants stressed upon the critical role played by wetlands in maintaining the *aviralta* (uninterrupted flows) in the river and importance of urban wetlands in the Ganga basin. They highlighted the need to build strategic institutional partnerships and community engagements to develop an integrated roadmap for wetland conservation in the Ganga basin.

Additionally, this report suggests institutional mechanisms for convergence between many government and non-governmental organisations at the National, State and District levels as well as engaging communities in conservation of wetlands integral to the health of the Ganga. It is envisaged that this report will serve as a reference point for integrating wetland conservation in basin management plan.



# BACKGROUND

On the occasion of the World Wetlands Day, the National Mission for Clean Ganga (NMCG) and WWF-India jointly organised a workshop on February 4, 2019 to deliberate upon the need to integrate wetland conservation into the Ganga River Basin Conservation Management Plan. The workshop analysed the present condition of wetlands in the Ganga basin, the threats they face and possible mitigation strategies to protect them. The aim was to understand the role of wetlands in the Ganga basin to rejuvenate the river.

Wetlands, one of the most crucial sources of freshwater, are transitional areas of land that are either temporarily or permanently covered by water. They are one of the most productive ecosystems on the planet and render many ecosystem services such as improvement in quality and quantity of surface and groundwater, protection against floods and droughts, nutrient recycling, as well as economic services such as livelihoods from fishery, livestock and forestry. They are also important biodiversity habitat.

India is rich in wetland diversity, from the alpine wetlands in the Himalayas to mangroves in the coastal regions and corals in the sea and near shore. Nearly 3.66% of the country's geography, i.e. 11.69 Mha, is covered under wetlands. Of these, the Gangetic wetlands are the largest riverine wetland system in India as depicted in Table 1. Unfortunately, despite their multiple benefits, wetlands today are under tremendous stress due to rapid urbanisation, industrialisation and agricultural intensification. As a result, wetlands are shrinking, as are their hydrological, economic and ecological functions. The negative economic, social, and environmental consequences of declining water quality in wetlands is also an issue of grave concern for India.

## WETLANDS OF THE GANGETIC PLAINS

As per the Ganga River Management Plan 2015, there are many lakes, tanks and marshes in the National River Ganga Basin. An integral part of the Central Asian Flyway, the Ganga basin has seven Ramsar sites - Renuka, Upper Ganga river, Keoladeo National Park, Sambhar lake, Bhoj wetland, East Kolkata wetlands and the Sunderbans (recently declared a Ramsar site on February 1, 2019). It also supports close to 50 out of the 170 nationally important wetlands, close to 116 High Altitude Wetlands of Uttarakhand, and numerous rural and urban wetlands.

Unfortunately, many of these are in various stages of degradation due to threats from anthropogenic pressures. Wetlands play an important role in the overall hydrology of a region, and contribute to water flows underground and in rivers. Therefore, their conservation is crucial to achieve the vision of *Aviral dhara* (uninterrupted flows), *Nirmal dhara*, ecological and geological integrity of the Ganga. Since this inter-linkage between wetland and river health is not well understood by stakeholders, wetland conservation is not integrated in river basin management.

This workshop was intended to initiate a dialogue on the inter-linkages between wetland and river health, and draw upon the experiences and knowledge of participants to prepare a roadmap for integrating and mainstreaming wetland conservation in the Ganga River Basin Management. While a start has been made, this initiative will require synergising the technical, institutional, and financial strategies of various government, non-government and technical institutions. The workshop was attended by more than 60 participants from reputed NGOs, education institutions and government bodies.



THIS WORKSHOP WAS INTENDED TO INITIATE A DIALOGUE ON THE INTER-LINKAGES BETWEEN WETLAND AND RIVER HEALTH, AND DRAW UPON THE EXPERIENCES AND KNOWLEDGE OF PARTICIPANTS TO PREPARE A ROADMAP FOR INTEGRATING AND MAINSTREAMING WETLAND CONSERVATION IN THE GANGA RIVER BASIN MANAGEMENT.

Table 1: Wetlands in India

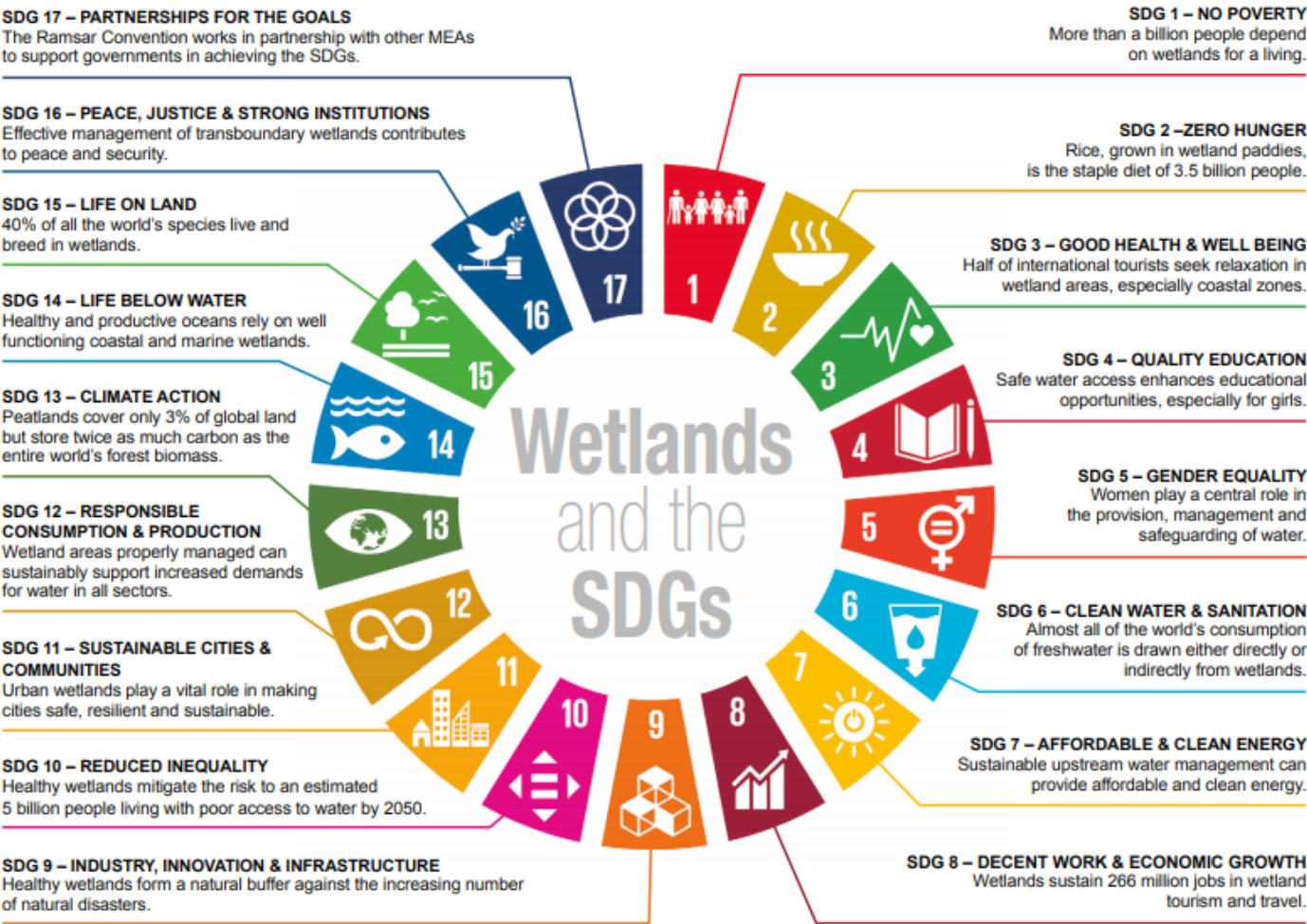
S. NO.	BIOGEOGRAPHIC ZONES	GEOGRAPHIC AREA (HA)	TOTAL WETLAND AREA (HA)	PERCENT WETLAND AREA
1	Trans Himalayas - Ladakh Mountains	18393982	245166	1.33
2	Himalayas - West Himalayas	20396030	177927	0.87
3	Desert – Kachchh	19032015	232337	1.22
4	Semi-Arid - Gujarat Rajputana	50961676	1309550	2.57
5	Western Ghats - Western Ghats Mountains	13040390	251234	1.93
6	Deccan Peninsula - Central Highlands	134347297	3255652	2.42
7	Gangetic Plain - Lower Gangetic Plain	34240009	1345512	3.93
8	Coasts - East Coast	11696546	4192217	35.84
9	North-East - Brahmaputra Valley	16496362	626992	3.8
10	Islands - Andaman	691826	53322	7.71
Total		319296134	11689909	3.66

Source: Analysis of the distribution pattern of wetlands in India in relation to climate change (J.G. Patel, T.V.R. Murthy, T.S. Singh and Sushma Panigrahy), Space Applications Centre, Ahmedabad

WETLANDS AND SUSTAINABLE DEVELOPMENT GOALS (SDGS)

India, like many other countries, has committed to ambitious targets under the Sustainable Development Goals. If conserved, wetlands can play a critical role in achieving many SDG targets, by contributing directly or indirectly to them as shown in the Figure 1.

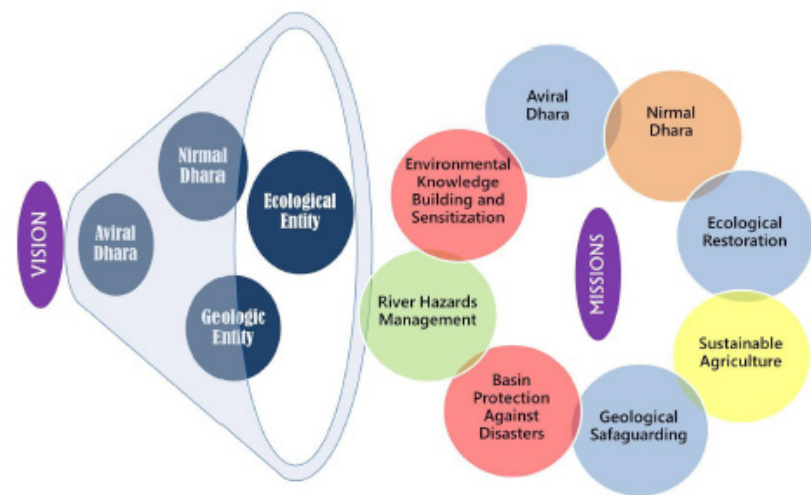
Figure 1: Sustainable Development Goals and Wetlands



Source: Ramsar Convention On Wetlands

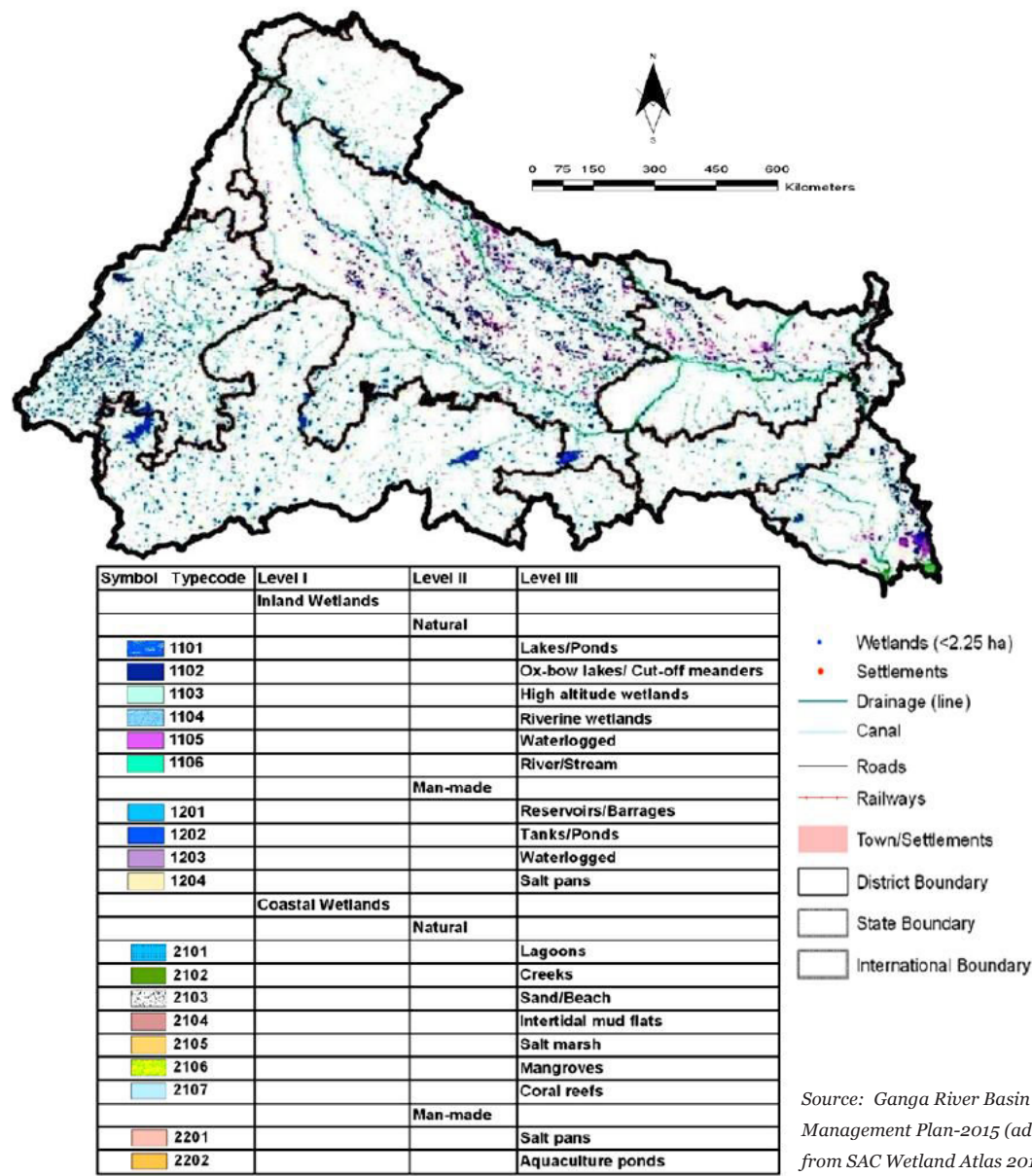


Figure 2: Target missions to achieve vision of a wholesome River Ganga



Source: Ganga River Basin Management Plan-2015

Figure 3: Significant Water Bodies in National River Ganga Basin



Source: Ganga River Basin Management Plan-2015 (adapted from SAC Wetland Atlas 2011)



KEOLADEO NATIONAL PARK, RAJASTHAN  
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# KEY ISSUES FOR DISCUSSION

## WETLANDS AND AVIRALTA

The Government of India and the National Mission for Clean Ganga has recognised ‘aviral’ or uninterrupted flows as one of the key components of the flagship Namami Gange programme, which aims to rejuvenate the Ganga. Towards this, the Government of India issued a notification [S.O. 5195 (E) dated October 9, 2018] to maintain minimum environmental flows at downstream locations of structures or projects set up to divert river flows for purposes of irrigation, hydropower, domestic and industrial use, and others. This is a significant step towards rejuvenating the Ganga, and operationalising this notification will require a concerted and coordinated effort between the Ministry of Agriculture and the Ministry of Water Resources, River Development and Ganga Rejuvenation (including the Central Ground Water Board, Central Water Commission among others).

In parallel, it is also important to understand the role of wetlands in the basin towards maintaining environmental flows in the Ganga. Water diversions, alterations in land use, encroachment and discharge of waste (liquid and solid) has deteriorated the health of many wetlands in the Ganga basin.

- Participants discussed the following issues:
- Status and trends in hydrological, morphological and biodiversity contributions of wetlands to the Ganga and its key tributaries;
  - Strategies needed to protect, conserve and restore wetlands, while maintaining hydrological, morphological and ecological integrity;
  - Integrating wetland conservation into water management and Ganga Basin Management Plans;
  - Institutional arrangements to facilitate the above.



## MANAGEMENT AND CONSERVATION OF FLOODPLAINS AND FLOODPLAIN WETLANDS

Wetlands located in the floodplains of a river are integral to its health as they provide key habitat for aquatic biodiversity, lateral connectivity and groundwater recharge for base flows. However, due to anthropogenic pressures, floodplains and floodplain wetlands are subjected to land use conversion and encroachment, pollution from agriculture runoff, sewage and industrial effluents. At present, there is no inventory of wetlands in the floodplains along the river Ganga and its tributaries. In fact, floodplains have not yet been delineated. These “green infrastructures” need urgent attention and focused strategies for conservation.

As early as 2001, the Ministry of Environment & Forests, had, at the initiative of Prof. Brij Gopal (Jawaharlal Nehru University, Delhi), resolved, inter alliance to take necessary steps towards issuing a notification under the Environment Protection Act, to protect river floodplains, and areas surrounding all inland water bodies, from uncontrolled anthropogenic activities (tentatively called as River Regulation Zone notification)”. The Ministry asked the National Institute of Ecology to prepare a background document (2002) and set up a Committee to take the proposal forward. The Committee was reconstituted several times under the chairmanship of successive Additional Secretaries, during the subsequent 12 years. Prof. Brij Gopal, representing the NIE, remained the only constant member. In 2014, the then Additional Secretary, Ministry of Environment & Forests, Shri. Shashi Shekhar, got the Final Draft of the proposed River Conservation Zone notification prepared and vetted by the Law Ministry. This draft was circulated by the renamed MoEF & CC to all States for their comments on January 8, 2016. This draft notification, as reported in newspapers, suggested delineation of floodplains and recommended regulations prohibiting various activities in different parts of the floodplains.

The Wetlands Rules 2017 of the Government of India gives complete autonomy to states to conserve and manage wetlands located within their administrative boundaries. The rules make it mandatory for states to have a State Wetland Authority, which will plan and execute wetland management interventions. This is a good legal basis to promote conservation of wetlands in general and wetlands in floodplains in particular.

Similarly, the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 has defined floodplain as an area of the river Ganga or its tributaries which comes under water on either side of it due to floods corresponding to its greatest flow or with a flood of frequency once in hundred years. This order states that the longitudinal, lateral and vertical dimensions (connectivity) of the river Ganga need to be incorporated into river management processes and practices. It also emphasises the need to restore and maintain the integral relationship between the surface flow and ground water. To achieve this, it is important that a strategy for conserving floodplains are urgently integrated into Ganga Basin Management Plan.

Participants discussed the following issues:

- What should be the approach of demarcating floodplains? Who are the key stakeholders to be involved? What timelines should be defined?
- How should the efforts of various stakeholders, including NMCG, Wetland Division (MoEF & CC), State Ganga Conservation Authorities, State Wetland Authorities, District Ganga Committees and others be synergized to inventorise and prioritise floodplain wetlands? Design a template for wetland surveys and health assessments? What timelines should be defined?
- How should the ecosystem services of floodplains and floodplain wetlands be valued to create a business case for protection and conservation?
- How should floodplain and floodplain wetland restoration models be created along the key tributaries and the main stem?
- What institutional and legal frameworks exist (and are needed) for identification, protection and conservation of floodplain wetlands and how can they be strengthened? What are the key principles and elements to be considered in the policy guidelines for conservation of floodplains (including wetlands)?
- How can synergies be created between the Namami Gange programme, National Plan for Conservation of Aquatic Ecosystems (MoEF & CC) and other initiatives at the state level through Green Climate Fund and National Adaptation Funding.

## CONSERVATION OF URBAN WETLANDS

Urban wetlands are disappearing at an alarmingly fast rate, owing to changes in land-use, encroachment, and pollution from solid waste and sewage discharge. This is leading to loss of inter-connectivity of water flows, weakened resilience towards flooding and drought, decline in the ground water table, escalating costs of water treatment and access to water and other natural resources provided by freshwater ecosystems, loss of income, decrease in biodiversity and much more. Rapid growth of population and infrastructure in cities is expected to exponentially reduce the wetland area. Many cities in the Ganga basin do not even have an inventory of wetlands and a report card on their health.

Participants discussed the following issues:

- How can a participatory wetland atlas be prepared for all the cities in the Ganga basin?
- Given the huge gap between sewage generation and treatment in small and medium cities, how can wetland-based sewage management models be created?
- Is it possible to aim for creating one such model in each of the Ganga basin cities so that the load on centralised sewage treatment infrastructure is reduced?
- How can urban wetland conservation be integrated in urban water management and urban planning policies as well as urban river management plans.
- How can the programmes and projects of Namami Gange, National Plan for Conservation of Aquatic Ecosystems (MoEF & CC) and AMRUT (Ministry of Housing and Urban Affairs) be synergized?
- How can a framework for citizen engagement be created to monitor the health of wetlands?





# RECOMMENDATIONS & WAY FORWARD

**Integrated river and wetland conservation efforts rejuvenate the Ganga and provide ecosystem services for people and nature.**

The workshop reiterated the need for enhancing understanding of river-wetland continuum in the Ganga basin for maintaining ecological, hydrological and morphological health of the National river Ganga. It recommends –

## OBJECTIVE 1

**Wetlands critical to maintain the hydrological, geomorphological and ecological balance of the Ganga basin are identified, their health status is established and conservation measures identified.**

## OBJECTIVE 2

**Ecosystem based, community-led models for rejuvenating wetlands are demonstrated to enhance *aviralta* and *nirmalta*, and strategy for scale up at the basin level is developed.**

## OBJECTIVE 3

**Enabling policies for integrating wetland conservation in relevant and supporting programmes at the State and National level to facilitate restoration of *aviral* Ganga are developed.**

## OBJECTIVE 4

**Stakeholders are empowered to contribute constructively to conservation of river-wetland continuum.**

The workshop recommendations have been organised around the premise of organisational synergies, convergence with Government schemes and actions by NGOs along with closer working relation between NMCG, MoEF & CC and State Wetland Authorities. Against each of these objectives, actions, nodal agency and timelines have been identified:



OBJECTIVE 1

WETLANDS CRITICAL TO MAINTAIN THE HYDROLOGICAL, GEOMORPHOLOGICAL AND ECOLOGICAL BALANCE OF THE GANGA BASIN ARE IDENTIFIED, THEIR HEALTH STATUS IS ESTABLISHED AND CONSERVATION MEASURES IDENTIFIED.

OUTPUTS	ACTION		NODAL AGENCY	TIMELINES			
				YEAR 1	YEAR 2	YEAR 3	YEAR 4
Inventorisation of all key wetlands for maintaining ‘aviralta’ and ‘nirmalta’ in the Ganga basin is complete (based on Space Application Centre Atlas 2011).	NMCG to source shape files of the wetlands from Space Application Centre	atlas (2011) from MoEF & CC.	NMCG Wetlands Division, MoEF & CC				
	Delineation of floodplains as per the following criteria:  Urban: Highest flood level in last 30 years Rural: Highest flood level in last 50 years		NMCG				
	Mapping of key wetlands (including urban, rural and floodplain wetlands) in on a valuation of their roles in hydrological, morphological, ecological significance. Prioritisation of wetlands for management intervention based on hydrologic	the Ganga basin based cance. al, morphological, ecological and socio-cultural significance.	NMCG Wetlands Division, MoEF & CC State Wetland Authorities				
Prioritisation of key wetlands in the Ganga basin and mapping their health status and rejuvenation plan is complete.	Field validation and ground truthing of wetland information and developing	a matrix of priority wetlands in the Ganga basin.	NMCG State Wetland Authorities				
	Preparation of ‘Brief documents’ for all the prioritised wetlands of the states	in the Ganga basin. (Template attached as Annexure C)	State Wetland Authorities				
	Develop protocol for wetland health assessment (Ref: Report cards by Chili	ka Development Authority and WWF-India).	NMCG Wetlands Division, MoEF & CC				
	Training on wetland health assessments.		NMCG Wetlands Division, MoEF & CC				
	Assess health of the prioritised wetlands in the Ganga basin.		NMCG Wetlands Division, MoEF & CC State Wetland Authorities				
	Prepare Integrated Management Plans for conservation and management of	all priority wetlands including Ramsar sites in the Ganga basin.	NMCG Wetlands Division, MoEF & CC State Wetland Authorities				
	Conduct Ecosystem Services Assessment for prioritised wetlands and establish business case for protection of wetlands.	Finalise a framework for ecosystem services assessment protocol.	NMCG Wetlands Division, MoEF & CC				



	Complete rapid assessment of wetland ecosystem services for all prioritised wetlands.	NMCG State Wetland Authorities				
	Establish business case for protection of wetlands.	NMCG Wetlands Division, MoEF & CC				
Validate the methodology for assessing environmental flows for wetlands key to maintenance of connectivity and flows in Ganga and tributaries and a process to re-establish river-wetland connectivity initiated by states	Guidance on environmental flows assessment of wetlands and links to mission on 'aviralta' in accordance with Ramsar Resolution XII.12 ( <a href="https://www.ramsar.org/sites/default/files/documents/library/comp12_res12_water_requirements_e.pdf">https://www.ramsar.org/sites/default/files/documents/library/comp12_res12_water_requirements_e.pdf</a> ).	Wetlands Division, MoEF & CC NMCG				
	Assess environmental flows of at least one priority wetland in each of the basin states.	NMCG Wetlands Division, MoEF & CC State Wetland Authorities				
	Develop and share the validated methodology for assessing environmental flows for wetlands key to maintenance of connectivity and flows in Ganga and tributaries and a process to re-establish river-wetland, with all basin states.	NMCG MoEF & CC				

OBJECTIVE 2

ECOSYSTEM BASED, COMMUNITY LED MODELS FOR REJUVENATING WETLANDS ARE DEMONSTRATED TO ENHANCE AVIRALTA AND NIRMALTA, AND STRATEGY FOR SCALE UP AT THE BASIN LEVEL IS DEVELOPED.

OUTPUTS	ACTION	NODAL AGENCY	TIMELINES			
			YEAR 1	YEAR 2	YEAR 3	YEAR 4
Validate models for community-led conservation of key wetlands leading to better ecological health of the Ganga and its tributaries.	Demonstrate at least one project on flood plain restoration in each basin state (Ref: ecosystem-based wetland restoration like Yamuna Biodiversity Park and Neela Hauz by Delhi Development Authority and Delhi University).	NMCG State Wetland Authorities				
	Demonstrate ecosystem-based management of critical wetland or wetland complex in urban centres in the Ganga basin and its tributaries.	NMCG State Wetland Authorities				
	Demonstrate models for rejuvenation of springs through catchment and wetland management.	NMCG State Wetland Authorities				
	Demonstrate restoration of environmental flows in at least one priority wetland in each of the basin states (combining catchment management, agriculture water use efficiency, citizen's engagement and policy).	NMCG State Wetland Authorities				
	Demonstrate model for rejuvenation of degraded stretches of key tributaries of the Ganga through a combination of surface water-wetland-groundwater conservation and management.	State Wetland Authorities				
	Develop detailed plan for conservation and management of all priority wetlands including Ramsar sites in the Ganga basin.	State Wetland Authorities Wetlands Division, MoEF & CC				
	Adopt roadmap for replication and upscaling of models of ecosystem-based wetland restoration.	State Wetland Authorities NMCG				



OBJECTIVE 3

ENABLING POLICIES FOR INTEGRATING WETLAND CONSERVATION IN RELEVANT AND SUPPORTING PROGRAMMES AT THE STATE AND NATIONAL LEVEL TO FACILITATE RESTORATION OF AVIRAL GANGA ARE DEVELOPED.

OUTPUTS	ACTION	NODAL AGENCY	TIMELINES			
			YEAR 1	YEAR 2	YEAR 3	YEAR 4
Develop and operationalise roadmap for integrating wetland conservation in Namami Gange programme.	Develop policy on protection of flood plains and flood plain wetlands.	NMCG				
	NMCG to constitute a working group to develop a policy roadmap.					
	Guidelines on integrated landscape/basin approach for conservation of wetlands to maintain ‘aviralta’.	NMCG				
	Integrate wetland conservation in Smart City plans/AMRUT, especially on reforms around wetland conservation and arresting loss of wetland areas.	NMCG, Ministry of Urban Development				
	Prepare roadmap combining key recommendations from the above Working Groups.	NMCG				
	Prepare action plan for conservation of all wetlands in the Ganga basin.	NMCG Wetlands Division, MoEF & CC State Wetland Authorities				

OBJECTIVE 4

STAKEHOLDERS ARE EMPOWERED TO CONTRIBUTE CONSTRUCTIVELY TO CONSERVATION OF RIVER-WETLAND CONTINUUM.

OUTPUTS	ACTION	NODAL AGENCY	TIMELINES			
			YEAR 1	YEAR 2	YEAR 3	YEAR 4
Expand the network of Ganga Prahari/mitras to become a multi-stakeholder group and publish annual report cards on wetland health.	Establish a network of CBOs, CSOs and universities / educational institutions on wetland conservation for Ganga rejuvenation.	NMCG				
	Prepare annual report cards on wetlands in the Ganga basin (with Training on wetland health assessments to Ganga prahari, mitras citizens and urban local bodies).	NMCG State Wetland Authorities District Ganga Committees	Annual	Annual	Annual	Annual
Empower stakeholders to contribute to wetland conservation.	Training of District Ganga Committee, State Wetland Authorities and other stakeholders on wetland conservation and links with Ganga rejuvenation: Landscape/Basin approach Environmental flows Wetland Conservation & Management	NMCG State Wetland Authorities Wetland Division, MOEF & CC				
	Mobile based application for wetland health reporting (Ref: customize based on the prototype developed by WWF-India).	WWF-India District Ganga Committees District Wetland Committees				
Develop and implement communication, outreach and engagement strategies.	Communication and outreach strategy to engage stakeholders on the conservation of wetlands in the Ganga basin.	NMCG WWF-India Wetlands Division, MoEF & CC				
	Roll out of the communications and outreach strategy.	NMCG Wetlands Division, MoEF & CC				



KEY STAKEHOLDERS FOR WETLAND CONSERVATION AND REJUVENATION OF RIVER GANGA.

GOVERNMENT	TECHNICAL INSTITUTIONS	NGO/CSOS
National Mission for Clean Ganga	Aligarh Muslim University	Bombay Natural History Society
Wetlands Division, Ministry of Environment, Forests and Climate Change (MoEF & CC)	Banaras Hindu University	Centre for Inland Waters South Asia
Ministry of Water Resources, Ganga Rejuvenation and River Development (MoWR, GR & RD)	C-Ganga	International Crane Foundation
National Water Mission	Delhi University	People’s Science Institute
Ministry of Urban Development	Indian Institute of Technology, Delhi	Indian National Trust for Art and Cultural History
Ministry of Agriculture	Indian Institute of Technology, Kanpur	Wildlife Trust of India
State Programme Management Groups (SPMG)/ State Ganga River Conservation Authority (SGRCA)	National Institute of Hydrology, Roorkee	WWF-India
State Wetland Authorities: Himachal Pradesh, Uttar Pradesh, Madhya Pradesh and West Bengal; To be formed in Bihar, Uttarakhand and Rajasthan	School of Planning & Architecture, Delhi	Wetland International, South Asia
District Ganga Committees	GB Pant National Institute of Himalayan Environment & Sustainable Development	National Institute of Ecology
State Water Resources/Irrigation Departments/State Urban Development Departments /State Forest Departments	GIZ	Salim Ali Centre for Ornithology and Natural History
Urban Local Bodies	HNB Garwal University	International Union for Conservation of Nature (IUCN)
District Administrations		

Disclaimer : The list is indicative only and non-exhaustive



# SUMMARY OF PROCEEDINGS

The workshop, organised on the occasion of World Wetlands Day for developing a roadmap for integrating wetland conservation in the Ganga River Basin Management Plan, was inaugurated by Shri. Upendra Prasad Singh, Secretary, Ministry of Water Resource, Ganga Rejuvenation and River Development (MoWR, GRRD) in the presence of Shri. Rajiv Ranjan Mishra, Director General, National Mission for Clean Ganga (NMCG) and Retd. Prof. C. K. Varshney, former Dean and Professor of Ecology, School of Environmental Sciences, Jawaharlal Nehru (JNU), New Delhi.

The inaugural session set the tone for the workshop and focused on highlighting the key issues facing wetlands in the Ganga basin, their status and importance. During this session, three books published by the Wildlife Institute of India and the National Mission for Clean Ganga were also released.

This was followed by technical sessions on floodplain wetlands and urban wetlands in the Ganga basin, and open-house discussion on developing a roadmap of wetland conservation in the Ganga basin.





# INAUGURAL SESSION

## WETLANDS AND THEIR SIGNIFICANCE



### SHRI. U. P. SINGH, IAS

#### SECRETARY, MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

Inaugurating the session with his opening remarks, Shri. U.P. Singh shared that water has today become a critical issue, and there are ongoing discussions on the depletion of water and ground water rejuvenation. Today, perhaps India has the maximum irrigated area of any country in the world. However, there is a lack of basic knowledge on ground water science and a gap in understanding of the link between ground water rejuvenation and Ganga rejuvenation.

Recognising the engagement with diverse stakeholder groups, Shri. Singh stated that it is good to collaborate with organisations like WII, WWF - India and experts in the field, and the Government of India is open to partnering with NGOs, civil society and individuals who are doing great work in the sector. He added that the Ministry of Water Resources, Ganga Rejuvenation and River Development recognises the relevance of integrated approach towards managing a basin's water needs, and also has been relentlessly working for the restoration of the wholesomeness of the Ganga river defined in terms of ensuring *aviral dhara* (continuous flow), *nirmal dhara* (unpolluted flow), through the National Mission of Clean Ganga.

Additionally, he lauded the fact that the efforts for Ganga Rejuvenation have moved beyond just STP and effluent management, and towards larger issues like conservation of wetlands in the basin, which requires an integrated approach for Ganga rejuvenation. Shri. Singh said that the recommendations from this workshop, will help strengthen the integration of wetlands into basin management programmes across the country.





**SHRI. RAJIV RANJAN MISHRA, IAS**  
**DIRECTOR GENERAL, NATIONAL MISSION FOR CLEAN GANGA**

Shri. Mishra shared about the history of the Integrated Ganga Conservation Mission – Namami Gange. He highlighted that the mission originated with the idea of an integrated approach for rejuvenating the river Ganga and its tributaries, and the first version of the Basin Management Plan launched in 2015 had acknowledged the role of wetlands in river health.

He touched upon the contributions healthy wetlands can make towards achieving Sustainable Development Goals such as Sustainable Cities and Communities towards Safe and Resilient Cities (SDG 11), Clean Water and Sanitation (SDG 6) and Climate Action (SDG 13), among others. Laying emphasis on the workshop’s focus of integrating wetland conservation in the Ganga River Basin Management Plan, he highlighted the different parts of this concept as:

- Wetlands and *Aviralta* – Maintaining geological and morphological integrity of the river;
- Management and conservation of floodplains;
- Floodplain wetlands

He brought attention to the need for integrating conservation of urban wetlands into urban planning processes, considering their rapid decline and degradation. He also emphasised the need for active engagement from local communities and stakeholders, and to go beyond the sectoral boundaries.



**SHRI. SURESH BABU**  
**DIRECTOR - RIVERS, WETLANDS AND WATER POLICY, WWF-INDIA**

Shri. Suresh Babu highlighted that while the Wetland Management and Conservation Rules 2017 mention hydrological alterations and the need to maintain hydrological integrity, these policies need to be operationalised. He recommended that the State Wetland Authorities and District Ganga Committees can work together to bring focus to basin level conservation of water resources.

He cited examples of the Haiderpur wetland near Bijnor barrage in Uttar Pradesh and Keoladeo National Park on the banks of the river Yamuna in Rajasthan to establish the interlinkage between wetland and river health.

Talking about urban wetlands, he shared that they are falling prey to land-use changes due to lack of understanding of their ecosystem services in an urban setting.

Reiterating the need for community engagement raised by Shri. Mishra, he shared WWF-India’s community engagement experiences. He said that communities engage effectively for the cause of wetlands as they can relate to it and the impact of conservation is visible. He cited an example of rejuvenation of river Aril that used to be perennial. Community’s active engagement and actions showed significant changes in land use.

He said that the diverse and rich expertise of participants will help WWF – India and NMCG to come up with a set of practical recommendations.

**KEYNOTE ADDRESS**  
**PROF. C. K. VARSHNEY**



Prof. C. K. Varshney is the former Dean and Professor of Ecology, School of Environmental Sciences, Jawaharlal Nehru (JNU), New Delhi. He was the Founder Secretary of the Indian National Committee for UNESCO Man and the Biosphere programme (MAB), Member-Secretary of Indian delegation to the UN Conference on Human Environment at Stockholm (1972), Leader of Indian Delegation to the Inter-Governmental Meeting of Ramsar Convention at Groningen, Netherlands.

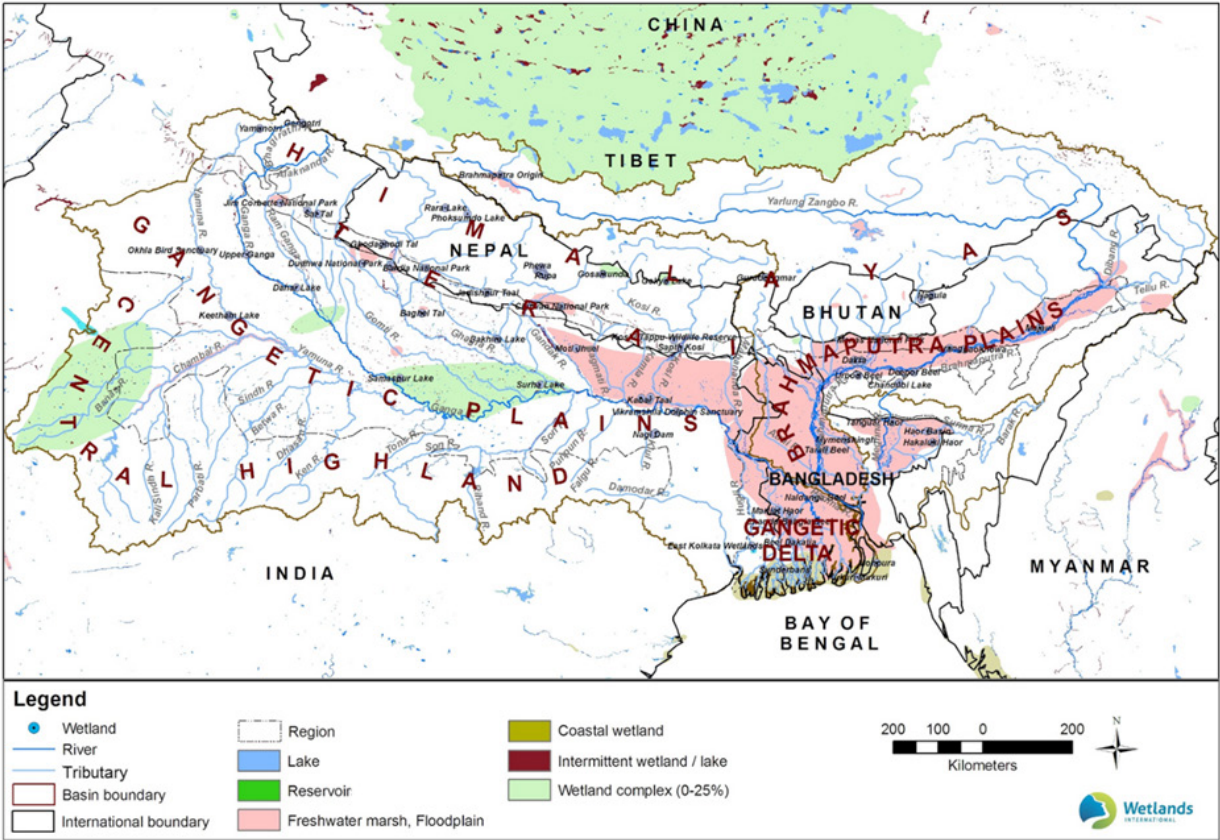
Prof. C. K. Varshney stressed the importance of wetlands to resolve India’s water crisis. While applauding the documentary ‘Water Tales’ developed by WWF-India for capturing the essence of wetlands, Prof. Varshney emphasised that the water problem is worsening with time.

He, too, focused on community engagement, stating that the role of wetlands in human well-being needs to be established with communities. He stressed the need to revise the National Wetland Atlas by mapping wetlands that are less than 2.5 ha in area. Prof. Varshney raised an important subject of ‘sediments’, stating that the exchange of water, sediments, nutrients, biota and energy between wetlands in the floodplain and the river is key to the health of this ecosystem.

Wetlands provide “a sort of corridor” - an easy, subtle, cost effective solution to stability of riverbanks. For many cities, wetlands are the only source of water, and therefore critical for water security. He highlighted that to maintain ‘aviral dhara’, one has to focus on identifying and protecting all three types of wetlands - in-stream, floodplain and riparian.

He pointed out that the present wetland governance and management is highly fragmented - different departments manage wetlands in different areas which limits everyone’s understanding of the big picture. To maintain the health of wetlands, he suggested that all sand mining activities and waste dumping in water bodies should be banned. Dr. Varshney highlighted the importance of oxbow lakes in contributing to the aviralta of the Ganga.

Figure 5: Map of Ganga Basin



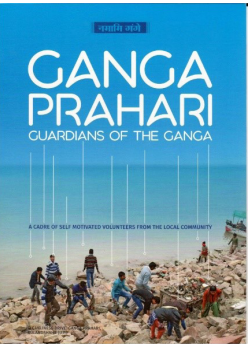
Source: Presentation by Prof. CK Varshney



REPORT LAUNCH

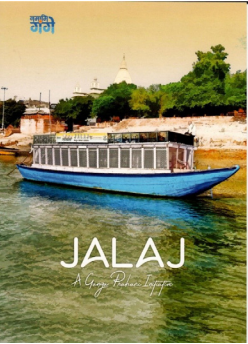


- GUARDIANS OF GANGA
- JALAJ
- HUMARI JHANVI



**GUARDIANS OF GANGA**  
**THE GANGA PRAHARIS**

Ganga Praharis are a cadre of self-motivated community volunteers. The idea was conceived by the Wildlife Institute of India, Dehradun, under the National Mission for Clean Ganga (NMCG) sponsored project “Biodiversity Conservation and Ganga Rejuvenation”. Ganga Praharis are working for biodiversity conservation and cleanliness of the river Ganga with the ultimate objectives of restoring *Nirmal* and *Aviral Dhara*. People with different educational qualifications, age groups and professions have joined this cadre, as they have one thing in common – passion and dedication to work for a healthy Ganga.



**JALAJ**  
**AN INITIATIVE BY GANGA PRAHARIS**

Jalaj is a floating market created by the Ganga Praharis of Uttar Pradesh and Jharkhand. The market sells goods and services such as edible products, organic beauty products, medicinal and floral plants. The Ganga Praharis are trained eco-tourist guides who can take visitors for a water safari on the river Ganga, imparting knowledge about the river’s biodiversity, cultural and ecological significance. This initiative has given them a sense of pride, confidence, and livelihood opportunity, especially the women. Today, they are independently leading conservation efforts to protect the Ganga and its biodiversity.



**HUMARI JHANVI**  
**A BOOK OF POEMS FOR CHILDREN**

Humari Jhanvi is an illustrative book of poems published by the Wildlife Institute of India, Dehradun, under the National Mission for Clean Ganga (NMCG) sponsored project “Biodiversity Conservation and Ganga Rejuvenation”. This book aims to raise awareness among children on issues related to biodiversity conservation, importance of saving water, and iconic species of the river Ganga.



# THEMATIC SESSION 1

## FLOODPLAIN WETLANDS IN THE GANGA BASIN

KEYNOTE ADDRESS  
PROF. BRIJ GOPAL



Prof. Brij Gopal, Coordinator, Centre for Inland Waters in South Asia; President, National Institute of Ecology and Advisor, WWF –India, holds decades of experience in the field of wetland conservation and management.

Introducing the workshop by emphasising the critical and distinctive role played by floodplains and floodplain wetlands in the health of a river. He expressed his content on the appropriate definition for floodplains adopted by the National Mission for Clean Ganga and for focusing on their conservation. Prof. Gopal highlighted that floodplain protection can help avoid natural disaster such as the Kedarnath tragedy in 2013.

He quoted an example to highlight the lack of understanding of the definition of wetlands. An affidavit filed by the MoEF & CC to the Hon’ble Supreme Court of India stated that Rivers are not wetlands. However, the Ramsar Convention has categorised rivers as wetlands and India itself has a riverine wetland designated as a Ramsar site. He stressed that it is imperative to understand wetlands to design appropriate conservation and protection strategies, and subsequently give them legal protection under the Wetlands Act 2017.

Prof. Gopal provided a detailed explanation of the interaction of matter, sediments, nutrients and water between the river and its floodplain. Quoting various studies, he spoke about the value of floodplain in terms of groundwater recharge, flow reduction, energy transfers, settling of particulate matter, nutrient transfer and more, which play a significant role in maintaining river health. He expressed the need to conduct such studies in India and deepen understanding. Though the National Green Tribunal’s order on regulation of developmental activities in the floodplains, specially river Ganga, is an important landmark; however, permitted and prohibited activities in the floodplain are yet to be notified.

He informed the gathering that Uttar Pradesh has the highest number of oxbows and floodplain wetlands, most of which are under the jurisdiction of the Forest Department (Wildlife Sanctuaries) or Irrigation Department. The state has identified 1,800 wetlands to be restored and managed from the climate change perspective, but clarity is required on its implementation and prioritisation of wetlands.

- Prof. Gopal expressed the need for rapid assessment of wetlands to identify, prioritise, prepare and implement conservation plans. He suggested the following measures for rapid assessment of wetlands in the Ganga basin:
- Document hydrological interaction of the wetlands with river Ganga
  - Conduct biophysical characterisation of wetlands in the floodplains
  - Identify problems of wetlands degradation and their root causes
  - Identify measures to mitigate the problems
  - Prioritise wetlands for conservation and restoration
  - Post restoration monitoring and adaptive management
  - Capacity building at all levels as well as community education and participation
  - Declare a “Floodplain Zoning Regulation”



**Figure 6: Floodplain Wetlands along River Ganga in Uttar Pradesh**



Source: Presentation by Prof. Brij Gopal



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**DR. FAIYAZ A. KHUDSAR**  
SENIOR SCIENTIST, YAMUNA BIODIVERSITY PARK

Dr. Faiyaz A. Khudsar highlighted that the vast floodplains of major rivers such as the Ganga and Yamuna used to have large networks of natural wetlands, some of which served as catchment wetlands and others served the purpose of water quality improvement. However, both types of wetlands are nearly wiped out due to anthropogenic activities. He presented a case study of restoring wetlands in the floodplain of the river Yamuna in the upstream of Wazirabad, and highlighted the concept of introducing a biodiversity park to maintain and preserve the biodiversity of the region. He informed that the Yamuna Biodiversity Park harbors more than 1,500 plant and animal species, ecologically assembled into 20-25 self-sustaining communities. The species richness and diversity are comparable to the natural forest ecosystems in the watershed of sub-Himalayan region. He also shared the success story of Neela Hauz, wherein wetland vegetation is being used to treat the domestic sewage which originally flowed untreated into the wetland. He shared plans to establish a Ganga Biodiversity Park in Hastinapur on similar lines.

**Yamuna Biodiversity Park**



Source: Presentation by Dr. Faiyaz Khudsar





**DR. NILADRI DASGUPTA**  
PROJECT SCIENTIST, WILDLIFE INSTITUTE OF INDIA

Dr. Niladri Dasgupta informed the gathering that the Wildlife Institute of India has been developing management plans for different wetlands in Uttarakhand. He stressed the need for regulating land-use changes in floodplain areas of rivers and wetlands, along with assessing E-Flows requirements for wetlands. He quoted examples of wetland degradation in Bangalore, and highlighted the need for unique mitigation plans for different wetlands, as each face unique problems.



**DR. RITESH KUMAR**  
DIRECTOR, WETLANDS INTERNATIONAL, SOUTH ASIA

Dr. Ritesh Kumar stressed upon the need for uniformity in the definition of wetlands. Different streams of academia have different viewpoints on wetland, resulting in many definitions and making it difficult for decision makers and non-technical people to understand what a wetland really is. Dr. Kumar appealed to all the ecologist, scientists to pursue a vision which is more homogeneous and inclusive; and does not fragment people into lake managers, wetland managers, pond managers and village managers etc. He opined that the Ramsar definition, which is accepted globally, should be used as the official definition for wetlands. He also expressed the need for creating an inventory of wetlands based on ground truthing and not purely satellite data; and the data should be linked to Water Resources Information System (WRIS) to have all the water related information is on a single platform. He shared that it is important to understand how river behaves with and without floodplains that will shift the focus on ‘what wetlands do’ rather than ‘what wetlands are’ to create awareness. He reiterated that the management of wetlands is an interdisciplinary science and requires inputs from social scientists, hydrologists, ecologists, economists, historians, engineers and life scientists and take actions towards an integrated wetland management.

**REMARKS**



**DR. RUCHI BADOLA**  
SCIENTIST G, ECO-DEVELOPMENT PLANNING AND PARTICIPATORY MANAGEMENT, WILDLIFE INSTITUTE OF INDIA

Dr. Badola shared that the Wildlife Institute of India has been working for conservation and management of wetlands at the grass root level in the Ganga basin. Wetlands are under the jurisdiction of multiple agencies and therefore, are open access resources. This makes it difficult to implement stringent regulations. Communities depend on these resources and have many traditional and cultural linkages. It is, therefore, essential to engage communities in wetland conservation.



**DR. K. K. VAAS**  
RETD. DIRECTOR  
CENTRAL INLAND FISHERIES RESEARCH INSTITUTE

Dr. Vaas stressed the need to specify the objectives of wetland management. He further added that wetland management plans are based on hypothetical presumptions rather than actual response of wetlands to management interventions. He stated that the first right to a wetland is that of fishermen and expressed his concern over declining populations of native fish in the wetlands of the Ganga basin. He also suggested that the economic benefits provided by wetlands need to form the basis of their conservation and management plan.



**SMT. SAVITA BHANDARI**  
ADVISOR, DELHI DEVELOPMENT AUTHORITY (DDA)

She informed that DDA is working on the restoration and rejuvenation of floodplains of the river Yamuna as per the orders of the National Green Tribunal. However, multiple custodianship of land in the floodplains makes it difficult to implement planned activities. She discussed the plan of creating a buffer of 300 mts along river Yamuna, with a 150 mts pathway for people to visit. She shared that the other areas will be developed as wetlands, biodiversity park, integrating the buffer zone and freeway. She added that the DDA has constructed and manages six biodiversity parks in Delhi.





# THEMATIC SESSION 2

## URBAN WETLANDS



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Smt. Meenakshi Dhote is a faculty member in the School of Planning and Architecture, Delhi and has worked extensively on urban planning in many Indian cities.

### KEY NOTE ADDRESS

#### SMT. MEENAKSHI DHOTE

Smt. Dhote reiterated the importance of understanding the definition of wetlands and subsequently, identifying, notifying and protecting wetlands in the Ganga basin. She highlighted that the wetlands in the Ganga basin differ in elevation, biodiversity values and ecosystem services; thereby making it essential to document and manage all the wetlands individually. She brought to light that the dams and barrages on the river Ganga were originally constructed to regulate flooding, but are now resulting in over-abstraction of water, leading to lean flows in the river and wetlands. Ms. Dhote suggested that the wetlands in urban areas could be effectively used to improve water quality.





**SHRI. RAJIV RANJAN MISHRA, IAS**  
**DIRECTOR GENERAL, NATIONAL MISSION FOR CLEAN GANGA**

Shri. Mishra emphasised that the role of wetlands in urban areas is critical for improvement of water quality and quantity, and flood and drought mitigation, among other services. It is, therefore, important to integrate wetland conservation in urban planning. He highlighted that the Namami Gange programme has an important component of waste management and wetlands can play a crucial role towards this due to their waste assimilating and treatment capacities. Therefore, the programme has a special focus on the conservation and management of wetlands in the urban areas.



**PROF. GAUHAR MAHMOOD**  
**HEAD, DEPARTMENT OF CIVIL ENGINEERING**  
**JAMIA MILL IA ISLAMIA UNIVERSITY**

Prof. Mahmood stressed the need to adopt new technologies for wetland conservation, especially in urban areas. He expressed his concern over the declining water table in urban areas, resulting in increased rate of seepage from urban wetlands. He highlighted the need to segregate industrial effluent from domestic sewage as the treatment of industrial effluent is far more difficult than treating domestic sewage.



**DR. MANU BHATNAGAR**  
**PRINCIPAL DIRECTOR, NATIONAL HERITAGE DIVISION**  
**INDIAN NATIONAL TRUST FOR ART AND CULTURAL HERITAGE**

Dr. Bhatnagar highlighted that the catchments of urban areas are being degraded at a rapid pace due to development and land conversion, which is resulting in loss of wetlands and their services. He highlighted that urban wetlands are the best rainwater harvesting structures to arrest the decline in groundwater tables in urban areas. He discussed the Hauz Khas lake in New Delhi as a success story of rejuvenation.

He opined that there are sufficient regulations and guidelines to manage urban wetlands, but enforcement is weak. He quoted the guidelines of the National Disaster Management Institute, which state that low-lying areas should not be used for construction, but for accumulating rainwater. Dr. Bhatnagar referred to the Niti Aayog Composite Water Management Index which showed that 21 cities are running out of water, including Gurgaon.



**DR. OMKAR SINGH**  
**SCIENTIST F, NATIONAL INSTITUTE OF HYDROLOGY**

Dr. Omkar shared his experiences of working on wetlands in North India including Renuka, a Ramsar site. He shared the success story of pond rejuvenation using the constructed wetland technique to treat wastewater.

**SHRI. SURESH BABU**  
**DIRECTOR - RIVERS, WETLANDS AND WATER POLICY**  
**WWF-INDIA**

Shri. Babu added to the discussion with a suggestion of building the capacity of implementing agencies to facilitate integration of urban wetland management into urban planning exercises. He shared the example of how the persistent efforts of a dynamic officer and communities in Moradabad resulted in the city's first inventory of wetlands developed by its citizens. He expressed the urgency of protecting wetlands in urbanising areas before they are lost completely. He also shared his experiences of engaging communities in wetland conservation efforts such as wetland health assessments. He stressed the need to delineate wetland boundaries and their zone of influence, to avoid conversion for urban development.



# CONCLUDING SESSION

## DEVELOPING A ROADMAP FOR WETLAND CONSERVATION IN THE GANGA BASIN

### OPENING REMARKS

#### SHRI. RAJIV RANJAN MISHRA, IAS

Shri. Mishra said that the workshop was successful in raising issues pertaining to wetlands in the Ganga basin. He reiterated the urgent need to inventorise wetlands in the Ganga basin and prepare management plans, so they contribute to the health of river Ganga.

#### DR. S.K. JAIN

##### NATIONAL INSTITUTE OF HYDROLOGY

Dr. Jain shared that it is key to understand the contributions of wetlands in the hydrology of the Ganga system. He also mentioned that there are models of wetland rejuvenation undertaken by several institutions including National Institute of Hydrology, that could be replicated. A multi-disciplinary approach will be needed for integrating wetland conservation in Ganga basin plan.

#### PROF. BRIJ GOPAL

Prof. Brij Gopal reiterated that wetlands in the Ganga basin hold the key to successful achievement of targets of the Namami Gange programme. This holds true for the tributaries as well. He highlighted that the lateral connectivity is vital to the health of the river and therefore, the prescribed value of E-Flows must ensure lateral interaction of the river with its floodplains. He stressed upon the need to make the floodplains free from construction. He suggested to develop a holistic wetland conservation plan for the entire floodplain of the river Ganga, as isolated efforts would not yield the needed result. Wetlands should be prioritised for conservation on the basis of their ecological, socio-cultural, and economic significance, and degree of degradation. For this, a rapid assessment is urgently required. He stressed the need for developing state specific floodplain wetland conservation plans and suggested that constructed wetlands could be replicated across the Ganga basin for waste water treatment.





### DR. P. S. N. RAO

He highlighted the complexity posed by population density in the Ganga basin. The industrial effluents and domestic sewage generated in urban centers are the root cause of pollution in wetlands. He suggested piloting a model of urban wetland conservation leading to improved river health in one or two cities of Uttar Pradesh such as Agra, Mathura, Kanpur or Meerut. Since wetland conservation require large funds, a revenue model could be considered which integrates tourism and other economic activities associated with wetlands. However, he warned about the ill-effects of tourism on the ecosystem and stressed the need for ecologically sensitive tourism around wetlands.

### SHRI. D.P. MATHURIA

Shri. Mathuria informed that the Ministry of Water Resources carried out an extensive exercise of quantifying the water storage capacity available in water bodies along the river Ganga from Haridwar to West Bengal. To the surprise of everyone, their storage capacity was found to be only a few million cubic litres, which was not sufficient to augment flows in the river. However, they are adequate for groundwater recharge, which ultimately supports the river.

### DR. FAIYAZ A. KHUDSAR

Dr. Faiyaz said that it is important to build the capacity of District Ganga Committees by providing them toolkits, including best practices in managing urban and floodplain wetlands.

### SHRI. SURESH BABU

Shri. Babu suggested the formation of a Working Group for wetland conservation in the Ganga basin, comprising members from NMCG, MoEF & CC, State Wetland Authority and the State Programme Management Groups (SPMGs), as these are the key agencies operating at the decision-making level for the Ganga. He also suggested engaging with District Ganga Committees and local stakeholders in any effort for wetland conservation. He shared WWF-India’s pilot initiative of a mobile based application which empowers citizens to monitor and report on wetland health in their vicinity, thereby engaging them effectively in wetland conservation. He suggested prioritizing 111 important wetlands in the Ganga basin for conservation, which would include 7 Ramsar sites, 15 National priority wetlands and 54 IBAs. Shri. Babu shared a set of guidelines for identification and conservation of urban wetlands, which should be introduced to staff of the municipal bodies, as they are not trained for wetland management.

### PROF. B.C. CHOUDHURY

Prof. B C Choudhury stated that the wetland management in a river basin must be taken up at a landscape level. Site specific management is inadequate to have an impact on the river health. He also stated the need to translate complex and scientific ecosystem service into easy to understand language for a wider audience. He suggested the following points to develop roadmap for protection and conservation of wetlands:

- Mapping of wetlands in the Ganga basin with the engagement of the district administration and map wetlands smaller than 2.5 ha.
- Advocate for no land-use change in the wetlands.
- Shared resources such as wetlands need inclusive management collectively by different stakeholders.
- In the Smart City criteria, include a component for safeguarding wetlands in the geographic scope.
- In the context of surface flow and groundwater, the no-net floodplain wetland loss will help in safeguarding the groundwater and surface flow.
- Rapid assessment and ecological and ecosystem values of wetlands must be taken up for the wetlands in the Ganga basin.
- At least one sub basin each in the northern and southern tributaries of the Ganga should be prioritised for piloting conservation efforts and assess its impact on the river.
- Institutional Framework and capacity building for wetland protection.
- Promote sustainable agriculture and reduce footprint in the Ganga basin. This would contribute to the country’s food security as well.
- Identify innovative ways of involving citizens in monitoring wetland health, such as bird count and surveys.

### PROF. C.K. VARSHNEY

Prof Varshney thanked the National Mission for Clean Ganga and WWF-India for providing a platform for experts to come together on this urgent and relevant issue. He stated that wetland administration and science are two different issues, and science is far too weak compared to administration. He upheld the idea of constructed artificial wetlands for treating wastewater in urban areas along the river Ganga. He suggested to include all water bodies in the definition of wetlands, to avoid any confusion among decision-makers.





# ANNEXURES

## ANNEXURE A

**Programme Schedule**

Venue: Juniper Hall,  
Habitat World, India Habitat Centre, Lodhi Road, New Delhi  
Theme: Developing a Roadmap for Wetland Conservation in the Ganga Basin

Time	Programme Schedule
<b>10:00-10:55</b>	<b>Inaugural Session</b>
10:00-10:10	Welcome & Context Setting: Shri. Rajiv Ranjan Mishra, Director General, NMCG
10:10-10:30	Keynote Address: Wetlands in Ganga Basin, Status & Importance, by Retd.Prof. C K Varshney, Jawaharlal Nehru University, New Delhi
10:30 -10:45	Inaugural Address: Opening Remarks by Shri. Upendra Prasad Singh, Secretary, MoWR, RD & Ganga Rejuvenation
10:45-10:55	Vote of Thanks: Shri. D.P. Mathuria, Executive Director, NMCG
10:55 – 11:10	Tea Break
11:10-12:30	Management & Conservation of Floodplain Wetlands
11:10-11:15	Opening Remarks by Shri. Rajiv Ranjan Mishra, Director General, NMCG
11:15-11:45	Keynote Address by- Prof. Brij Gopal
11:45-12:15	Panel Discussion: Dr. Niladri Dasgupta, Wildlife Institute of India Dr. Faiyaz A. Khudsar, Yamuna Biodiversity Park
12:15-12:30	Open House Discussion
12:30-13:45	Technical Session: Conservation of Urban Wetlands
12:30-12:35	Opening Remarks by Shri. Rajiv Ranjan Mishra and Dr Sharad Jain, National Institute of Hydrology, Roorkee
12:35-12:50	Keynote address by Dr. P. S. N. Rao, Director, School of Planning and Architecture, New Delhi
12:50-13:30	Panel Discussion: Prof. Gauhar Mahmood, Jamia Millia Islamia Dr. Manu Bhatnagar, INTACH Dr. Meeakshi Dhote, SPA Dr. Onkar Singh, NIH Shri. Suresh Babu S.V. - WWF-India
13:30-13:45	Open House Discussion
13:45-14:30	Lunch
14:30-15:30	Open House Discussion- Developing a Roadmap for Wetland Conservation in the Ganga Basin Opening Remarks by Shri. D.P. Mathuria, Executive Director, NMCG Prof. Brij Gopal Prof. B.C. Choudhury Dr. P.S.N. Rao Shri. Suresh Babu S.V.



ANNEXURE B

List of Participants

Name	Organisation
B. C. Choudhury	Wildlife Trust of India
Niladri Dasgupta,	Wildlife Institute of India
Ruchi Badola	Wildlife Institute of India
Sandhya Joshi	Wildlife Institute of India
Ritesh Kumar	Wetlands International, South Asia
C.K. Varshney	School of Environmental Sciences, Jawaharlal Nehru University
Gauhar Mahmood	Department of Civil Engineering, Jamia Millia Islamia
A. K. Kaushik	Uttar Pradesh Pollution Control Board
Naveen Khandelwal	Uttar Pradesh Forest Department
Sharan TG	The Nature Conservancy
Mitu Didee	The Heritage School Vasant Kunj
Sunita Swaraj	The Heritage School Vasant Kunj
Praveen K. K.	The Energy and Resources Institute
Sravan	SWIFT
Meenakshi Dhote	School of Planning and Architecture
P.S.N. Rao	School of Planning and Architecture
Khushboo Mirza	National Remote Sensing Centre,ISRO
Akash Goyal	National Remote Sensing Centre,ISRO
Vishakha Jha	National Institute of Urban Affairs
S.K. Jain	National Institute of Hydrology, Roorkee
Omkar Singh	National Institute of Hydrology, Roorkee
Arpita Gupta	National Informatics Centre
Bharat Pathak	Ganga Vichaar Manch
Ankita Sharma	Ministry of Rural Development
Sairajuddin	Jamia Millia Islamia University
Archana Chatterjee	International Union for Conservation of Nature
Manu Bhatnagar	Indian National Trust for Art and Cultural Heritage
Praveen Kumar	Institute of Management Technology, Ghaziabad
K.K. Vaas	Central Inland Fisheries Research Institute
Satya N Ghosh	GIZ

Name	Organisation
Martina Burkard	GIZ
Savita Bhandari	Delhi Development Authority
Sonal Bhat	Delhi Development Authority
Poonam Dewan	Delhi Development Authority
Kriti Goel	Delhi Development Authority
Mohammad Uzair	Delhi Development Authority
B.B. Saikia	Central Water Commission
Ajay Kumar Sinha	Central Water Commission
Draupati Yadav	Chhatrapati Sahuji Maharaj University, Kanpur
Akanskha Kushwaha	Central Ground Water Board, Faridabad
Neeti Negi	Central Ground Water Board, Faridabad
G.C. Pati	Central Ground Water Board
Brij Gopal	Centre for Inland Waters in South Asia, National Institute of Ecology
Sanjiv Kapoor	Blue Drop, Hyderabad
Avinash F.	Blue Drop, Hyderabad
Faiyaz A. Khudsar	CEMDE, University of Delhi
Rajiv Ranjan Mishra	National Mission for Clean Ganga
D.P. Mathuria	National Mission for Clean Ganga
Rajiv Kishore	National Mission for Clean Ganga
Kritika Gahlawat	National Mission for Clean Ganga
Rishabh Choudhary	National Mission for Clean Ganga
Melwin	National Mission for Clean Ganga
Richa Rashmi	National Mission for Clean Ganga
R.M. Bhartiya	National Mission for Clean Ganga
Sandeep Behera	National Mission for Clean Ganga
Sravan	National Mission for Clean Ganga
Suresh Babu SV	WWF-India
Amit Dubey	WWF-India
Shoma Stanly	WWF-India
Mehar Puri	WWF-India
Asgar Nawab	WWF-India
Arjit Mishra	WWF-India
Sidhartha Baidya	WWF-India
Neha Bhatnagar	WWF-India
Yogita Singh	WWF-India
Mohd. Shahnawaz Khan	WWF-India



ANNEXURE C

Guidelines for Preparation of Brief Document to facilitate implementation of the Wetlands (Conservation and Management) Rules, 2010



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National River Conservation Directorate  
Ministry of Environment, Forest & Climate Change  
Government of India  
January, 2017  
Website: <http://nrcd.nic.in/>



## Introduction

1. Wetlands are areas covered with water permanently or seasonally. They are amongst the most productive ecosystems on the earth. Water is life, and wetlands are life support systems that ensure functioning of water cycle. Wetlands store water, reduce flooding, improve water quality, recharge aquifers, maintain shorelines, and prevent soil erosion. They support a very rich aquatic bio-diversity, and serve as prime habitats for numerous aquatic and amphibious plant and animal species. For migratory water birds, wetlands provide critical feeding, resting and breeding sites. Wetlands are important for fisheries, food and medicinal plants and a major source of livelihoods. They act as important carbon sink, nutrient transformer and repository of rich genetic material. Wetlands are also important attributes of our cultural heritage and deeply connected with societal beliefs and practices.
2. India is a signatory to the Ramsar Convention on Wetlands. The Convention has a broad approach for defining wetlands as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres. Article 2.1 of the Ramsar Convention provides that wetlands ‘may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands’. The definition thus covers a large number of inland wetlands (such as swamps, marshes, lakes and peatlands); coastal and near shore marine wetlands (such as coral reefs, mangroves, seagrass beds and estuaries) and man-made wetlands (such as reservoirs, salt pans, irrigation channels and fish ponds).
3. The Space Application Centre of Indian Space Research Organization, under the National Wetland Inventory and Assessment Project supported by the Central Government has prepared state wise Atlas of wetlands at 1: 50,000 scale using remote sensing imageries of 2006-07. Wetland inventories have also been published by Wetlands International and WWF-India.
4. The measures taken up by the Central Government and State Governments/UT Administrations to promote conservation and their integrated management have been effective to a very limited extent in preventing water pollution, degradation and loss of wetlands. Wetlands have been drained, reclaimed and encroached upon widely. Most of the wetlands that remain today suffer from siltation, mining, altered hydrological regime, infestation by noxious aquatic invasive species, discharge of untreated sewage and industrial effluents, dumping of solid waste, hazardous waste and excessive harvesting of living resources. The loss of wetlands endangers water, food and climate security.
5. The Central Government notified the Wetlands (Conservation and Management) Rules, 2010, hereinafter referred to the Wetlands Rules as a significant step to conserve, manage and to maintain the ecological character of the wetlands, without curtailing and restricting the legitimate and wise use of these ecosystems.

## Purpose and Scope

6. The Wetlands Rules require the State Governments/UT Administrations to prepare a wetland inventory within their jurisdiction and identify/prioritize wetlands for notification by the Central Government (specified in rule 3).
7. Further, the State Governments UT Administrations are required to submit a brief document, for each of the identified/prioritized wetlands, with the following information, namely (specified in rule 6):-
  - (i) broad geographic delineation of the wetland;
  - (ii) its zone of influence along with a map (accurate and to scale);
  - (iii) the size of wetland;
  - (iv) account of pre-existing rights and privileges, consistent or not consistent with the ecological health of the wetland.
8. The present guidelines have been framed to assist the State Governments/UT Administrations in the preparation of brief document for wetlands. Any natural or man-made wetland can be proposed for notification under the Wetlands Rules. Proposals for notification would, however, not be considered for the following:
  - (i) river channels;
  - (ii) paddy fields;
  - (iii) coastal wetlands within the purview of Coastal Regulation Zone 2011;
  - (iv) wetlands with permanent agriculture in *Rabi* and *Kharif* seasons;
  - (v) waterlogged areas created due to fragmentation of hydrological regimes within last three decades, and which do not possess any significant biodiversity or ecosystem service value; and
  - (vi) ash ponds of a thermal power plant, equalization tank, polishing pond as part of effluent treatment plant, sewage treatment plant or, water treatment plant.

## Wetland Inventory

9. States/UTs are required to prepare a detailed inventory by consolidating the available information from existing inventories, official records and other resources together with ground truthing. It may also be helpful to consider the list of wetlands studied and described by various agencies. The States/UTs may seek the assistance of State Remote Sensing Agencies and local experts for preparing such wetland inventory expeditiously. It is recommended to classify each of these wetlands into two broad categories, inland and coastal. Each of these categories can be further sub-divided into ‘natural’ and ‘human made’.
10. The State Governments/UT Administrations may submit a list of wetlands for notification under Wetlands Rules. Identification of such wetlands should be done with due consideration of their area (if specifically listed under category (iv) or (v) under rule 3) and the benefits provided in the form of:
  - a. food as fish and aquatic plants;
  - b. source of water for human use, animal use, agricultural (private/public) purpose or, industrial;



- c. moderation of water regimes for flood control and groundwater recharge;
- d. as a buffer for storms and cyclones;
- e. stabilization of coastlines;
- f. recreation;
- g. cultural or religious or tourism significance, etc.

Consideration of the value of wetlands as habitat for diverse plant and animal species, particularly those of high conservation significance (rare, endangered, endemic and threatened species) must also be included while prioritizing wetlands. Wetlands supporting large congregation of migratory water birds or fish may also be considered for notification under the Wetlands Rules.

11. Wetlands located within the protected area system of the country receive inherent protection under the provisions of the extant regulatory regimes for forests, wildlife and biodiversity. States/UTs may therefore identify wetlands beyond the Protected Area system, as well so as to ensure that the Wetlands Rules provide the regulatory architecture for a wider expanse of wetlands. Similarly, customary and traditional uses of wetlands have mostly been in line with 'wise use' principles of wetland management, and should not be curtailed on account of application of regulatory regimes. For regulating 'Idol Immersion' in wetlands, the Guidelines brought out by Central Pollution Control Board (CPCB) vide *Programme Objective Series: PROBES/136/2010* shall be followed. The same are available on CPCB website at [http://cpcb.nic.in/upload/NewItems/NewItem\\_159\\_Guideline\\_for\\_Idol\\_Imersion.pdf](http://cpcb.nic.in/upload/NewItems/NewItem_159_Guideline_for_Idol_Imersion.pdf)

#### Preparation of brief document

12. A brief document and Check List in respect of each wetland to be notified is required to be prepared as per format prescribed in **Annex I and Annex II**, respectively.
13. The name and contact details of the person(s) compiling the brief documents must be provided since, CWRA may be required to seek additional information or, clarification on sections of the proposal.
14. Guidance on geographic delineation of wetland, zone of influence of wetland and preparing an account of pre-existing rights & privileges (private and public category) are also provided. The State Governments may seek assistance of State Remote Sensing Agencies for preparation and ground truthing of maps.
15. Best available information may be used to fill in the various sections of the brief document. The State Government agency / department entrusted with the task of preparing the said document may refer to published papers, technical reports, as well seek expert support and conduct rapid community consultations for collating the required information. Records of Botanical Survey of India, Zoological Survey of India, and other expert agencies (as Wildlife Institute of India, Salim Ali Center for Ornithology, Bombay Natural History Society, Wetlands International, World Wide Fund of Nature, International Union for Conservation of Nature) may also be accessed. The State Governments may also access information related to land use from revenue records. The known list of plant and animal species may be screened for highlighting species of high conservation significance (eg. species which are endemic, rare,

endangered or threatened). Resources as IUCN Red List of Threatened Species (available at: <http://www.iucnredlist.org/>), National Biodiversity Authority (<http://www.nbaindia.org/>), FishBase (available at: <http://www.fishbase.org/search.php>), and Birdlife's World Bird Database (<http://datazone.birdlife.org/species/search>) can be used for this purpose.

#### (i) Delineating wetland boundary

16. Water creates wetlands. The biological composition of wetlands, from fish to migrating waterbirds, depend on the ways water moves within the wetlands. The amplitude and frequency of water level fluctuations are probably the most important factors affecting composition and functioning of wetlands. Hydrological regimes may therefore be used as the primary delineation characteristics for wetland boundary.
17. Wetland boundary can be derived using maximum area under inundation or saturation of soil near the surface during a normal *monsoon* year.
18. Special attention must be given to hydrological and ecological connectivity while delineating wetlands. Where the wetland proposed to be notified bears significant surface or subsurface hydrological connectivity with other wetlands in the vicinity, these may be delineated as a wetland complex by including all such connected ecosystems. Similarly, when a wetland dependent species shares several wetlands as habitat, these may be delineated as a complex.

#### (ii) Delineating zone of influence

19. The Wetlands Rules recommend delineation of a zone of influence. The zone of influence of a wetland is an area, in which developmental activities are likely to induce adverse changes in wetland structure and functioning. It is, therefore, important to align developmental planning within the zone of influence with wetland biodiversity and ecosystem services.
20. For wetlands with a well-defined surface drainage, its direct drainage basin should be delineated as the zone of influence. Inflows as well as outflows should be included within the zone of influence, as alteration in any of these can lead to adverse changes in wetland status. The zone of influence may be demarcated using a suitable digital elevation model data.
21. For wetlands with diffused drainage and where slope is too gentle, rendering large basin areas, the zone of influence can be delineated on the basis of features that are likely to adversely influence wetland functioning. These could be based on the outer periphery of adjoining settlements, or peripheral agricultural fields which drain directly into the wetland.
22. For each of the wetlands proposed to be notified under Wetlands Rules, a map must be submitted indicating clearly:
  - a) wetland boundary;
  - b) the Zone of influence;
  - c) latitude and longitude for each of the corners;
  - d) boundaries of settlements (villages / towns / cities);



- e) connecting drainages, inflows and outflows;
- f) distance to nearest highway (National/State), railway line (if any); and
- g) nearest bus stand, railway station and airport.

For wetlands above 500 ha, maps may be preferably prepared at 1:25,000 or, lower scale. For smaller wetlands, a scale of 1: 10,000 or, lower is recommended.

23. The map may be drawn on the Bhuvan – the Indian Geo-Platform of Indian Space Research Organization (available at: [http://bhuvan.nrsc.gov.in/bhuvan\\_links.php](http://bhuvan.nrsc.gov.in/bhuvan_links.php)).

*(iii) Listing traditional rights and privileges*

24. Each wetland is likely to be associated with a range of pre-existing rights and privileges, and it must be ensured that such rights and privileges are aligned with natural ecological functioning of these ecosystems. Privilege is defined here as a special entitlement granted to restricted group or persons, on a conditional basis and can be revoked. Rights on the other hand may be irrevocable and inherently held by human being. Thus, fish lease granted in certain wetlands by the Department of Fisheries can be considered as a privilege. Privilege can also be customary and traditional (for example, use of traditional fishing techniques, buffalo wallowing, elephant bathing, source of drinking water for bovines, etc.). Parking a house boat against a lease, right to clean environment are examples of rights. However, resource so generated should be used to conserve the wetland.
25. For assessing the consequence of a pre-existing right or privilege on a wetland, it may be important to consider their implication on ecosystem components, processes and services. Thus privilege of fishing granted along a migratory route can lead to adverse change in fish stocks or disposal of untreated sewage by houseboat in a wetland are thereby not aligned with ecosystem health. On the other hand, in many cases, subsistence level harvest of macrophytes may actually help in keeping species invasion in check, and therefore aligned with ecosystem health.
26. Ecological health of wetlands will be adversely impacted by the following activities, which have been listed as being prohibited under the provisions of the Wetlands Rules (specified in sub rule 4 (1)):
- a. reclamation of wetlands (converting any area inside wetland for a non-wetland use);
  - b. setting up of new industries or expansion of existing industries;
  - c. manufacture, handling, storage or disposal of hazardous substances (except in port areas);
  - d. solid waste or biomedical waste or hazardous waste dumping (any prevailing activities to be phased out);
  - e. discharge of untreated sewage and effluents from industries, cities or towns and human settlements (any prevailing activities to be phased out); and,
  - f. any construction of a permanent nature (except for boat jetties) within 50 metres from the mean high flood level mark in the past 10 years.

27. Certain activities need to be regulated to ensure that they do not lead to an adverse impact on wetlands. The Rules therefore mandate prior approval of the concerned State Government for the following (specified in sub rule 4(2)):

- a. withdrawal of water or the impoundment, diversion or interruption of water sources within the local catchment area of the wetland ecosystem;
- b. harvesting of living and non-living resources;
- c. grazing to the level that the basic nature and character of the biotic community is not adversely affected;
- d. treated effluent discharges from industries, cities or towns, human settlements and agricultural fields falling within the limits laid down by the Central Pollution Control Board or the State Pollution Control Board or the Union Territory Pollution Control Committee, as the case may be;
- e. Plying of motorized boat, if it is not detrimental to the nature and character of the biotic community;
- f. Dredging, only if the wetland is impacted by siltation;
- g. construction of boat jetties;
- h. activities within the zone of influence, as per the definition of wetlands, that may directly affect the ecological character of the wetland;
- i. facilities required for temporary use, such as as pontoon bridges, that do not affect the ecological character of the wetland;
- j. aquaculture, agriculture and horticulture activities within the wetland; and,
- k. repair of existing buildings or infrastructure including reconstruction activities.

28. The list of activities to be prohibited and regulated as listed in Para 27 and 28 should be strictly followed. Any other activities likely to have an adverse impact on the ecosystem of the wetland can be subject to prohibition or regulation, if identified by the CWRA.

29. A list of wetlands to be notified (with summarised information) may be provided as per the format in **Annex. III**.



**Annex. I**

**FORMAT FOR BRIEF DOCUMENT ON WETLAND PROPSOED TO BE NOTIFIED  
UNDER WETLANDS (CONSERVATION AND MANAGEMENT) RULES, 2010**

**SECTION 1: IDENTIFICATION, LOCATION AND JURISDICTION**

- 1.1 **Name of the Wetland** (Alternate names, including in local language should be given in parenthesis after official name)  
\_\_\_\_\_
- 1.2 Name of the Village(s) and Tehsil(s)  
\_\_\_\_\_
- 1.3 Name of the District(s)  
\_\_\_\_\_
- 1.4 State / Union Territory: \_\_\_\_\_
- 1.5 Geographical coordinates (Latitude and Longitude, to degree, minutes and second)  
Latitude: From \_\_\_\_\_ to \_\_\_\_\_  
  
Longitude: From \_\_\_\_\_ to \_\_\_\_\_
- 1.6 Name of the protected area (please write ‘not applicable’ if the wetland is not located in a protected area)  
\_\_\_\_\_
- 1.7 Name of the State Government/UT Administration Department/Agency which has jurisdiction over the wetland  
\_\_\_\_\_

**SECTION 2: SITE CHARACTERISTICS**

- 2.1 Area of wetland (ha) \_\_\_\_\_
- 2.2 Wetland type (Please tick appropriate category and sub-category)

Category	Subcategory
<input type="checkbox"/> Natural (Inland)	<input type="checkbox"/> Permanent lakes <input type="checkbox"/> Seasonal/ intermittent lakes <input type="checkbox"/> Permanent streams/ creeks <input type="checkbox"/> Seasonal/ intermittentstreams/ creeks <input type="checkbox"/> Oxbow <input type="checkbox"/> River floodplain <input type="checkbox"/> Permanent freshwater marshes <input type="checkbox"/> Seasonal/ intermittent freshwater marshes <input type="checkbox"/> Shrub-dominated wetlands

	<input type="checkbox"/> Tree-dominated wetlands <input type="checkbox"/> Geothermal wetlands <input type="checkbox"/> Karst and other subterranean hydrological systems
<input type="checkbox"/> Natural (Coastal)	<input type="checkbox"/> Coastal lagoon <input type="checkbox"/> Estuary <input type="checkbox"/> Intertidal mud, sand or salt flats <input type="checkbox"/> Mangroves <input type="checkbox"/> Coral reefs
<input type="checkbox"/> Human-made	<input type="checkbox"/> Aquaculture pond <input type="checkbox"/> Tank <input type="checkbox"/> Saltpan <input type="checkbox"/> Dam / Reservoir

- 2.3 Depth (m): Average \_\_\_\_\_ Maximum \_\_\_\_\_ Highest ever recorded \_\_\_\_\_
- 2.4 Elevation (above mean sea level) \_\_\_\_\_ m
- 2.5 Water regimes
- a) Main source of water (tick all applicable)
- ☐ Rainfall      ☐ Groundwater   ☐ Catchment runoff      ☐ Direct / indirect inflow from river  
☐ Others, please specify \_\_\_\_\_  
☐ Name of River/Canal system \_\_\_\_\_
- b) Water permanence: ☐ Mostly permanent   ☐ Mostly intermittent
- c) Destination of water from wetland
- ☐ Feeds groundwater      ☐ To downstream catchment      ☐ To river      ☐ To sea
- d) Water pH: (absolute value: \_\_\_\_\_)  
☐ (< 5.5)      ☐ (5.5 – 7.4)      ☐ (> 7.4)      ☐ Not known
- e) Water salinity  
☐ Fresh (< 0.5 g/l)   ☐ Brackish (0.5 – 30 g/l))   ☐ Euhaline (30- 40 g/l)   ☐ Hypersaline (>40g/l) ☐ Not known
- f) Nutrients in water  
☐ Eutrophic      ☐ Mesotrophic      ☐ Oligotrophic      ☐ Not known
- Probable source of Nutrients: surface runoff/ sewage/ industrial effluent
- 2.6 Climatic setting
- a) Annual Rainfall /Snowfall(mm) \_\_\_\_\_



b) Temperature (°C)

Minimum \_\_\_\_\_ Maximum \_\_\_\_\_

c) Humidity (%)

Minimum \_\_\_\_\_ Maximum \_\_\_\_\_

2.7

Area of zone of influence (in ha)

\_\_\_\_\_

2.8

Major land use within zone of influence (provide as approximate % of catchment area)

Forests

\_\_\_\_\_ %; Grassland/Shrubland

\_\_\_\_\_ %

Agriculture

\_\_\_\_\_ %; Settlements (Rural)

\_\_\_\_\_ %

Settlements (Urban)

\_\_\_\_\_ %; Industrial

\_\_\_\_\_ %

2.9

Map of wetland and its zone of influence (cadastral scale/1: 10,000 or lower for wetlands < 500 ha and for wetlands ≥ 500 ha, 1: 25,000 or lower)

(To be enclosed as Annex I to this proposal)

SECTION 3: BIODIVERSITY

3.1

List of plant species present in wetland

\_\_\_\_\_

3.2

List of animal species present in wetland

\_\_\_\_\_

3.3

Species of conservation significance (rare, endangered, threatened, endemic species)

\_\_\_\_\_

3.4

Major plant invasive alien species and extent of invasion

\_\_\_\_\_

3.5

Major animal invasive alien species and extent of invasion

\_\_\_\_\_

SECTION 4: ECOSYSTEM SERVICES

Importance	Relevant for the site (please tick yes or no)	If Yes, Details (upto 50 words for each category)
Source of drinking water for people living and around	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Source of water for agriculture	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Fisheries	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Cultivation of aquatic food plants	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Medicinal plants	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is a recreational site	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Buffering communities from extreme events as floods and storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Groundwater recharge	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Water purification	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Acts as a sink for sediments	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Has significant cultural and religious values	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is a site for recreation and aquatic sport	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Source/cultivation noteworthy food plants species	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Habitat for noteworthy animal species	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Habitat for migratory water birds.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Supports fisheries /aquaculture	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Mining	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Any other, please list		

SECTION 5: PRE-EXISTING RIGHTS AND PRIVILEGES

Nature of right and privilege	Relevant for the site (please tick yes or no)	Does this negatively impact the wetland's ecological health?	Brief description (upto 50 words for each category)
Community Fishing (without any lease or permission from government department)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Fishing under lease from government department	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Harvest of plants (without any	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	



lease or permission from government department)		<input type="checkbox"/> Not assessed	
Harvest of plants under lease from government department	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Agriculture or horticulture within wetland	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Grazing	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Religious practices	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Withdrawal of water for domestic use	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Withdrawal of water for agriculture or fisheries	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Bathing or wallowing of domestic animals (buffalo, elephant etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Drinking water for bovines	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Plying of boats	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	
Any other, please list here	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not assessed	

SECTION 6: PRESENT AND POTENTIAL THREATS

Threat	Degree	Present or Potential	Additional information, if any
Changes in water inflow and outflow	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	
Pollution (sewage/solid waste disposal etc.)	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	
Unsustainable harvest of biological resources	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	
Mining	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	
Siltation/Idol immersion	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	

Estimated rate of siltation			
Encroachment	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	
Spread of invasive species	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	
Any other, please list	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Present <input type="checkbox"/> Potential	

SECTION 7: NOTIFICATION CATEGORY

- ☐Included in Ramsar List
- ☐Included under National Wetland Conservation Programme
- ☐Wetland is located in ecologically sensitive and important areas
- ☐Wetland is located within a UNESCO World Heritage Site
- ☐Wetland is located in religious/cultural site
- ☐High altitude wetland or wetland complex with area ≥ 5 ha
- ☐Below an elevation of 2,500 m above sea level and having area ≥ 500 ha
- ☐Others

SECTION 8: ACTIVITIES PROPOSED TO BE PROHIBITED UNDER WETLANDS (CONSERVATION AND MANAGEMENT) RULES, 2010

Activity	Place a tick mark, if relevant	Additional information, if any
Reclamation / filling up	<input type="checkbox"/>	
Setting up of new industries / expansion of existing industries	<input type="checkbox"/>	
Handling or storage / disposal of hazardous substances (except port areas)	<input type="checkbox"/>	
Solid Waste Dumping	<input type="checkbox"/>	
Sink for untreated sewage/industrial effluent	<input type="checkbox"/>	
Construction activities (except boat jetties)	<input type="checkbox"/>	



Any other, please list		
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**SECTION 9: ACTIVITIES PROPOSED TO BE REGULATED UNDER WETLANDS (CONSERVATION AND MANAGEMENT) RULES, 2010**

Activity	Place a tick mark if relevant	Additional information, if any
Withdrawal of water / impoundment/diversion or any other hydrological intervention	<input type="checkbox"/>	
Harvesting of resources (living / non-living)	<input type="checkbox"/>	
Grazing	<input type="checkbox"/>	
Discharge of treated sewage/ effluent / wastewater	<input type="checkbox"/>	
Construction of boat jetties, and facilities for temporary use , as pantoon bridges	<input type="checkbox"/>	
Aquaculture, agriculture and horticulture activities within the wetland boundaries.	<input type="checkbox"/>	
Any other, please list		

**SECTION 10: LISTING OF AVAILABLE SCIENTIFIC RESOURCES, REPORTS PERTAINING TO THE WETLAND**

**FORMAT FOR CHECK LIST**

**Name of Wetland:** \_\_\_\_\_

- ☐ Responsible agency clearly identified and details of contact person included
- ☐ Wetland boundary delineated using GIS and firmed up by adequate ground truthing
- ☐ Wetland map provided at required scale (1: 10,000 scale for all high altitude wetlands, and 1: 25,000 for wetlands ≥ 500 ha)
- ☐ Wetland zone of influence delineated and included in wetland map or a separate map
- ☐ Wetland zone of influence sufficient to manage all activities
- ☐ Site’s importance listed, and for major categories, justification provided
- ☐ Site’s biodiversity values listed, and for major categories, justification provided
- ☐ List of existing rights and privileges provided
- ☐ Consistency or, inconsistency of existing rights and privileges indicated to be best of available knowledge
- ☐ Threats to site listed, and for major categories details provided
- ☐ List of activities to be prohibited is provided
- ☐ List of activities to be regulated is provided

Date:

Place:

Name:  
Designation:  
Postal Address:  
Tel. No.:  
Mobile:  
Fax:  
Email:



Format for List of Wetlands for Notification under Wetlands (Conservation and Management) Rules, 2010

Sr. No.	Name of the Wetland	District(s)	Wetland area (in ha)	Wetland Category (as per Rule 3) (Please tick the relevant category)						Noteworthy biodiversity value	Noteworthy benefit to the society
				3 (i) Ramsar Site	3 (ii) Located in ecologically sensitive area	3 (iii) Recognized as or lying within UNESCO World Heritage Site	3 (iv) High altitude wetlands or wetland complexes with area ≥ 5 ha	3 (v) Wetlands or wetland complexes below 2,500 a msl with area ≥ 500 ha	3 (vi) Any other		
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100%  
RECYCLED



**National Mission for Clean Ganga**  
1st floor, Major Dhyan Chand National Stadium,  
New Delhi - 110002  
Website: [www.nmcg.nic.in](http://www.nmcg.nic.in)

**WWF – India**  
172 B, Lodi Estate  
New Delhi - 110003  
Website: [www.wwfindia.org](http://www.wwfindia.org)