

Building Block for

Urban Wetlands

Dr. Shyamli Singh Prof. Vinod K. Sharma



सत्यमेव जयते



Handbook for Urban Local Bodies Officers

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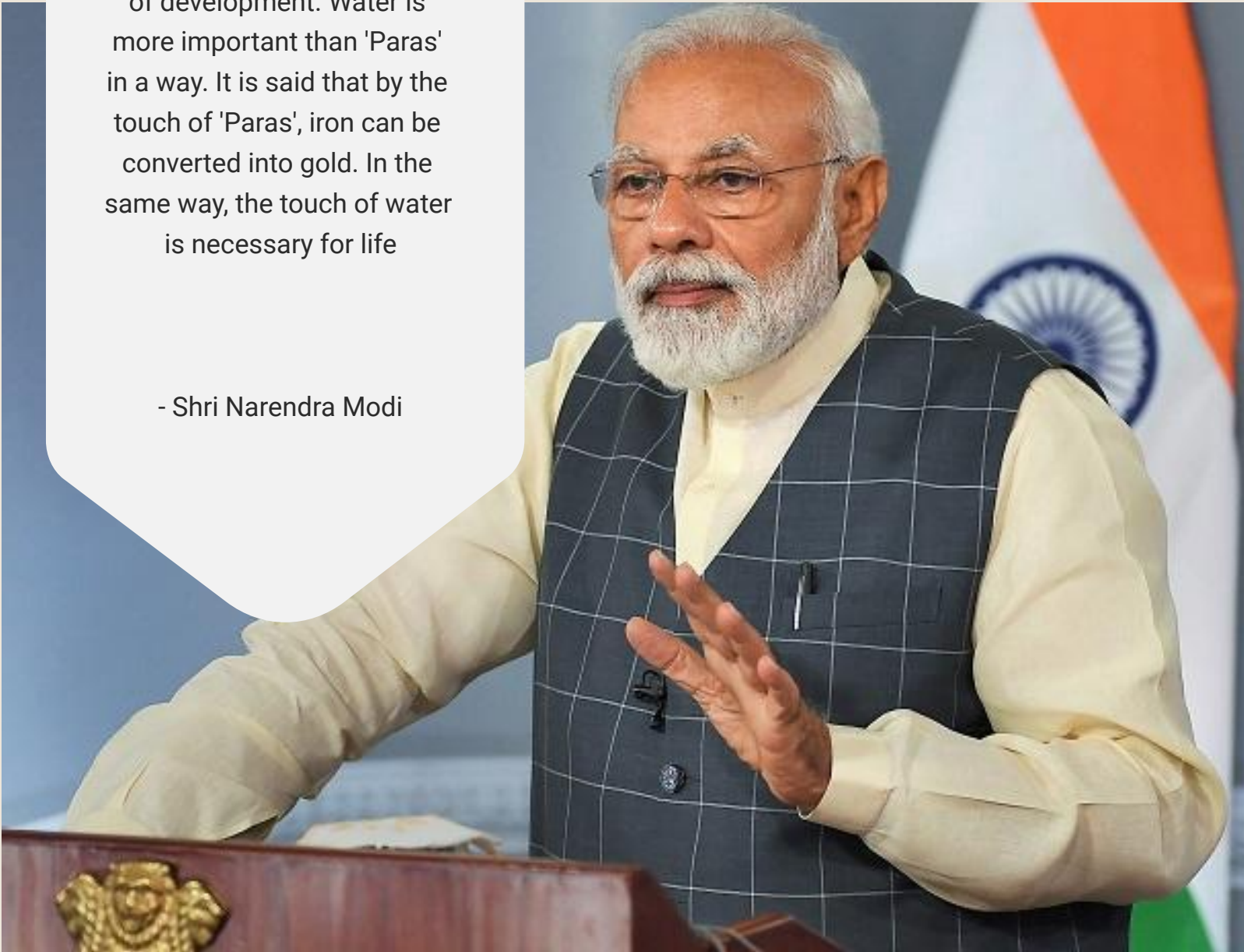
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Water is life for us, it is also faith and it is also a stream of development. Water is more important than 'Paras' in a way. It is said that by the touch of 'Paras', iron can be converted into gold. In the same way, the touch of water is necessary for life

- Shri Narendra Modi



FOREWORD



The 74th Constitutional Amendment marks a landmark moment in India's realm of urban local self governance, creating urban local bodies (ULBs) constitutional entities with the authority to provide better governance and more effective delivery of civic services to communities.

It is therefore important for the states to devolve greater responsibility, power, and resources to the ULBs through the devolution of finances and officials envisioned in the Twelfth Schedule to the Constitution. Indian Institute of Public Administration, New Delhi has developed a complete training program under the project "Blended Capacity Building Programme for Stakeholders of River Ganga under Namami Gange". The modules have been developed in a clear and easy-to-understand manner for the Urban Local Bodies Officers.

Though mostly based on missions of Namami Gange and state governing municipal administration, it lends itself to customization to meet the special needs of other states and river bodies. The modules cover a wide range of topics, including perspectives of ULBs, their constitution, and organisational structure, as well as comprehensive lessons on ULB working.

Amidst unparalleled economic growth and a rapidly increasing population, India is faced with a series of difficult decisions regarding its future. With a 7.4 percent average annual growth rate during the previous decade, the country will become the world's fourth largest economy in approximately two decades. As a result of growing urbanisation and resource scarcity, as well as high poverty levels, this hopeful outlook is not without its obstacles.

This module on Urban Wetlands talks about gaps, needs and framework on introducing perspectives for urban local body officers. Further to bring a change in the city development dynamics for sustainable and economical efficiency. I am hopeful that this training module will significantly help to improve the skills of regulatory authorities across the country.

A handwritten signature in black ink, appearing to be 'S.N. Tripathi'.

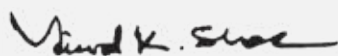
S.N. Tripathi IAS (R)
Director General, IIPA

PREFACE

The world's most important environmental issue is deteriorating wetlands. Wetlands contribute to the livability of urban areas by mitigating flood damage, reducing the urban heat island effect, filtration storm water, recharging groundwater, cleaning the air, and providing needed green space for humans and nature alike in areas frequently influenced by development and impervious surfaces. However, India is faring even worse when it comes to urban wetlands, with practically all major metros experiencing crisis-level conditions.

India must focus inward and seek to restore urban wetlands in order to maintain a balance between environmental services and development in a rapidly growing nation. A long-term approach that involves different stakeholders and considers the multiple advantages of wetland conservation is critical if we are to construct future cities that are liveable and healthy.

The National Mission for Clean Ganga has made tremendous progress by launching a number of programmes and regulatory frameworks to assist state governments with integrated management. The project Blended Capacity Building for the stakeholders of river Ganga under Namami Gange Indian Institute of Public Administration, New Delhi has designed modules as a strategic step toward enhancing the ability of urban managers in cities. We are pleased to observe that the progress made in this direction has been chronicled as a step-by-step guide structure in these volumes. Team IIPA is confident that the module toolkit will motivate communities to reimagine their urban areas as part of the city's integrated vision and urban planning process. We look forward to collaborating with state governments and concerned citizens to protect these natural resources.



Prof. Vinod K Sharma



Dr. Shyamli Singh

Faculty, IIPA

Highlights



Professional Talks

About 70 high-quality technical talks are available to listen to. A Certificate of Attendance was given to all attendees



Keep Learning

The goal was to learn the skills you need to improve visualization, data analytics, data science, and AI skills



Make New Friends

Participants could meet over 500 data & AI experts, business leaders, and fellow researchers in person



Background

Urbanization in India has risen steadily over the past 60 years according to the World Bank's estimates. With an increase in the demand for housing and commercial space in cities, green and blue areas have been progressively disappearing. Urban wetlands, like many other natural sites, are often on the losing end of a never-ending tug-of-war between development and conservation. Current causes of wetlands destruction include encroachment, drainage, and landfilling as well as the release of industrial and domestic effluents into water bodies and over-exploitation. This widespread loss of wetlands is not due to physical draining or pollution, but rather to a lack of awareness and knowledge of wetlands and their ecological functions.



India's wetlands, caught in the crossfire of urbanisation, are frequently overlooked for large-scale infrastructural projects

Lack of awareness and knowledge about wetlands and its ecological functions may also contribute to widespread wetlands loss, particularly in cities

India must look beyond protected regions and protected wetlands and expand conservation measures to lesser-studied waterbodies, including those within city borders



TARGET AUDIENCE

A.

District collectors, Magistrates, Sub-National officials, Development Departments and Public services who address development and planning activities

B.

Officials of Urban local bodies, Panchayati Raj Institutions and Smart Cities Officials who implement the program



C.

Academia, Universities Research Institutions that can help documentation and assess related scenario

D.

Citizen group and civil society as a whole





Why Urban Wetland Management

According to a McKinsey Global Institute study, intense temperatures will dramatically reduce the outdoor working capacity of India's labour force in the next 30 years, with an average loss of daylight working hours putting between 2.5-4.5 percent of GDP. The effect of pollutants contributing to climate change is called Urban Heat Island, which is a consequence of anthropogenic activity increasing heat can create conditions for the growth of bacteria, viruses, and other parasites. Extreme weather events in cities cause heat cramps, sleep deprivation, and increased mortality rates in humans and animals. A high paved and cemented land surface reduces the likelihood of rainwater penetration, lowering the ground water table and causing long-term water crises as recently observed in Chennai and Bengaluru. Urban flooding happens owing to poorly built infrastructure, causing large economic losses, disease outbreaks, and widespread relocation. Wetlands are an important component of natural infrastructure that give several advantages. They can no longer be ignored. Wetlands must be explicitly planned for.

Why we need Urban Wetland Management?



The relationship between water and cities is crucial and balanced by urban wetlands



What is the key principle recommended for decision-makers?



There are a few like Maintain wetland health, Promote the wise use, avoid further degradation and involve citizens.



Is there a legislation to protect wetlands?



All state and territory governments have enacted comprehensive legislative and policy instruments to protect the environment and conserve wetlands.



What should an urban manager focus on when understanding urban wetlands and developing a management plan?



While, this needs an elaborate discussion but I suggest an inclusive growth and development inclination at forefront of urban wetland edges



Role of Urban Local Bodies



They have a lot on their plate and may not be thinking specifically about wetland conservation. However, there are many areas of everyday municipal business where wetland conservation may come into play



They oversee orderly development within their jurisdictional boundaries. Thus, they can have a large impact on the landscape as they carry out their work. This can include visioning out what they want their future to look like; developing and approving plans and setting bylaws and using other tools



Wetlands might also be a consideration when planning green and other open spaces, enhancing outdoor recreational opportunities, or just adding aesthetic value to a housing project. Many municipalities also strive to protect environmentally significant areas as well as the biodiversity they provide. Wetland conservation can help meet biodiversity and other environmental goals

Integrating wetlands into river basin management



Preparatory phase at national level



Preparatory phase at river basin level



Planning phase at regional/ city level



Implementation phase



Review phase

Critical Path Approach

Understanding Wetland
Definitions & Descriptions

1

Understanding Wetland
Policy & Legislation

2

Understanding Wetlands
in the Watershed

3

Finding Resources for
Wetland Conservation

4

Communicating &
Collaborating with Others

5

Identifying Wetland
Values & Setting
Objectives

6

Integrating Wetlands into
Municipal Planning &
Development

7

Promoting Wetland
Stewardship & Education

8

The Role of ULBs in
Wetland Mitigation

9

The Importance of
Measuring Progress

10



Planning phase at river basin level

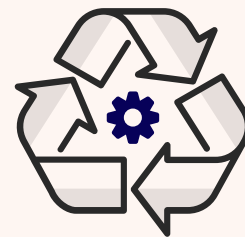


This section elaborates guiding principles in initiating and implementing river basin management approaches into which wetland conservation and wise use are integrated



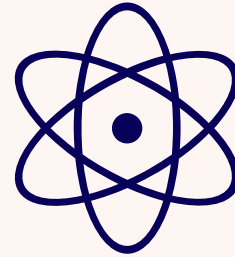
Sustainability as a goal

Effective protection from the pressures of land and water uses within and outside a river basin should be provided in order to ensure the functioning of wetland ecosystems while preserving their natural dynamics for the benefit of future generations. This protection includes providing water allocations for wetland ecosystems.



Clarity of process

The process through which recommendations on river basin management are made, including the distribution and management of water and wetlands, should be transparent to all stakeholders.

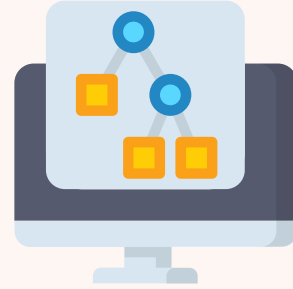
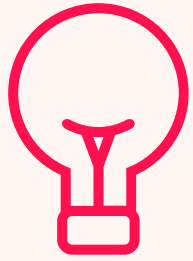


Equity in participation and decision-making factors

Different stakeholders participation in river basin management, including land use, water allocation, and water management decisions connected to wetlands, should be equitable.

Credibility of science

Scientific methods used to support land use and water management decisions related to wetlands, including water allocations to meet environmental water requirements of wetlands, should be credible and supported by review from the scientific community.



Transparency in implementation

Wetlands, like many other ecosystems, are characterized by complexity, fluctuating conditions, and uncertainty. It is critical to have an adaptive management strategy, which necessitates plans that can be adjusted as new information or insight becomes available.

Flexibility of management

Once plans and processes for river basin management, water allotment, and wetlands-related water management decisions have been created and agreed upon, it is critical that they are seen to be correctly followed.



Accountability for decisions

Decision-makers must be held accountable. If agreed-upon procedures are not followed or subjective decisions are demonstrated to be antithetical to the spirit of the aforementioned principles, decision-makers must provide a thorough explanation. If stakeholders believe that protocols have not been followed, they should be able to appeal to an independent body.



Cross-sectoral cooperation in policy development and implementation

All public sector agencies with responsibilities for activities or policies affecting land, water, and wetlands within river basins should commit to collaborative processes of consultation and joint development of policy objectives, both at the national and river basin levels.

Preparatory Phase

In practise, however, most of these phases can be completed in parallel as long as they are all completed to a satisfactory degree.



The Preparatory Phase includes Steps 1, 2, 3 and 4 of the Critical Path Approach

To begin planning for integrated river basin management, it is not required to completely revise all local policies and regulations relating to wetlands, land use, and water resources. The agreed-upon river basin management plan should be executed with sufficient policy and regulation. Any relevant international agreements in a shared river basin should also be reviewed. Current spatial planning should be reviewed.

Before a municipality starts to look at how to manage wetlands within their boundaries, they might first ensure a good understanding of this resource in a local context. This can include looking at current and historical wetland distribution within the municipality, the types of wetlands present, the social, economic and ecological functions they provide (i.e. recreation, flood protection,), etc.



Why Preparatory Phase

A smooth transition from the planning phase to the implementation phase requires early identification of inconsistencies or conflicts in policy and regulatory elements. If necessary, the emerging elements of the integrated river basin management plan should be cross-checked with existing local policy, regulation, and planning procedures. Water resource management plans for the basin as a whole.



BRAINSTORM SESSION

What resources are available to help with this activity?

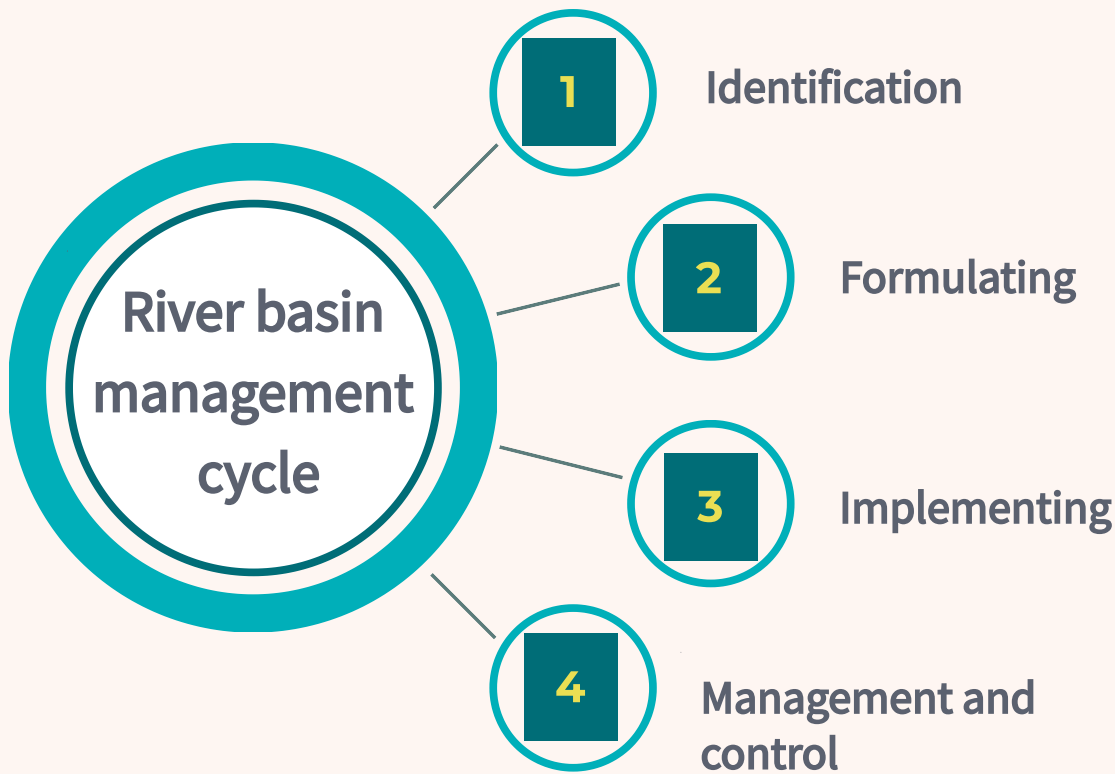


Contracting Parties relating to national policy and legislation for integrated river basin management



- Overcoming impediments to integrated river basin management and promoting integrated land and water use planning/management requires a thorough review of national policy and legislation in all important sectors
- Develop national and river basin consultative mechanisms including sectors and institutions responsible for water management, environmental protection, agriculture, forestry and forest management
- Formulate a comprehensive national water policy that incorporates wetland protection into river basin management goals like water delivery, flood control, pollution reduction and biological diversity conservation
- This policy should include regulating activities within river basins, integrating wetland management into local policies and strategies/action plans, and compensating (for example, through conservation offsets) for potential detrimental effects on wetlands
- Adopting Resolution VII.6 (also accessible in Ramsar Handbook 2, [4th] edition) and Resolution VIII.1 (Ramsar Handbook [10, 4th edition])
- Review existing legislation and establish new legislation as needed to help implement major policy concerns connected to integrated river basin management, such as economic incentives and regulations. (Ramsar Handbook 3, [4th] edition, Resolution VII.7)
- Develop suitable economic instruments and incentive mechanisms (see Resolutions VII.15 and VIII.23) to encourage water demand management, water conservation, and more efficient and socially acceptable water resource distribution
- Create tools to help upstream beneficiaries contribute to the protection and management of upper catchments and other crucial places
- Achieve inclusion of wetland ecosystems in national water policy and legislation, as well as in Environmental Impact Assessments for water resource initiatives. (Ramsar Handbook [10, 4th edition])
- Review national protected area policy to include headwaters, upper catchments, and key wetland areas in protected area systems
- To guarantee that marine and coastal wetland ecosystems' needs are met, review national policies relating to freshwater requirements and prospective inclusion in protected area systems

Methodology



1

- Bringing stakeholders together
- Stakeholder consultations
- Surveys (opinion, attitude)
- Media analysis
- Information meetings and briefings

3

- Information campaigns
- Development of specific materials
- Marketing, education
- Training
- Stakeholder communication, networking
- Cross-sectoral dialogue

2

- KAP (Knowledge, Attitude, Practice) surveys
- Consensus negotiation
- Communication strategy design
- Integration of communication in mix of policy instruments

4

- Networking
- Information monitoring
- Information provision
- KAP surveys

Contracting Parties relating to inventory, assessment and enhancement of the role of wetlands in river basin management



- Consider how to better integrate wetlands into river basin management by reviewing and adapting functional and biodiversity evaluation approaches
- Conduct research to assess the ecosystem services, functions, and benefits of wetlands in each river basin, taking into account groundwater-wetlands interactions as well as wetland ecosystem water requirements
- Using the results of the inventory and assessment of wetlands, protect the remaining wetland areas that contribute to water resource management
- Consider restoring degraded wetlands or creating new built wetlands within river basins to provide water management functions
- Ensure that non-structural flood control options (for example, restoring floodplain wetlands or building flood corridors) are adequately considered in river basin management programmes to supplement or replace current flood control infrastructure

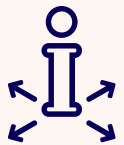
Planning phase at river regional/city level ↙

These steps entails gathering relevant data on the biophysical, biological, and socio-economic elements of the river basin. This stage is necessary to establish priorities (Step 5,6,7) and management objectives for the conservation.



Think It Out : Inventory Tools

Undertaking wetland-related inventories and assessments to support river basin planning. Can you think of tools used for wetland inventory?



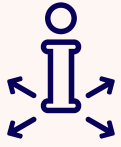
Mapping of City Level Information

INPUT

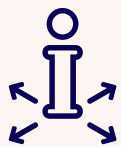
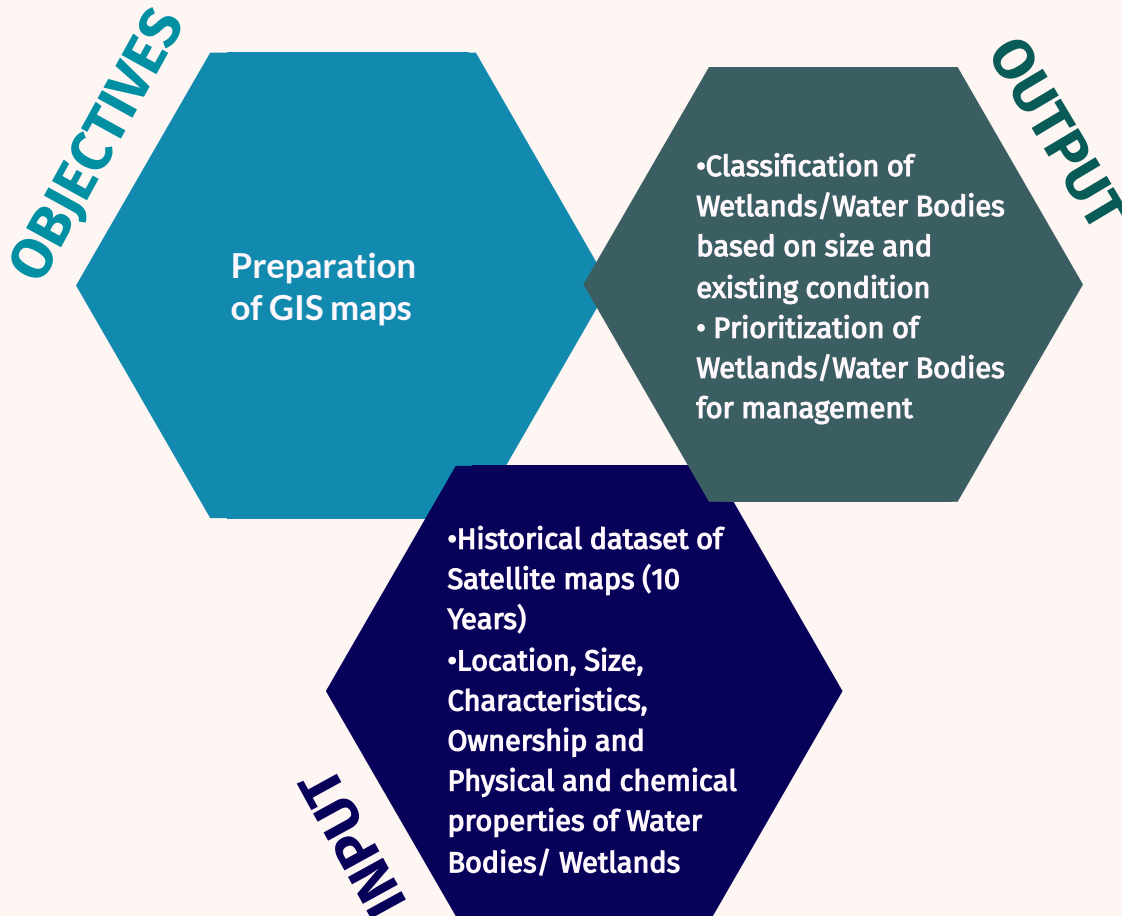
- Administrative Boundaries
- Landuse & Land cover
- Water bodies; Urban & Peri Urban
- Drainage network
- Sewerage
- Soil Map
- Rainfall data
- Ground Water Level
- Agricultural Practices

OUTPUT

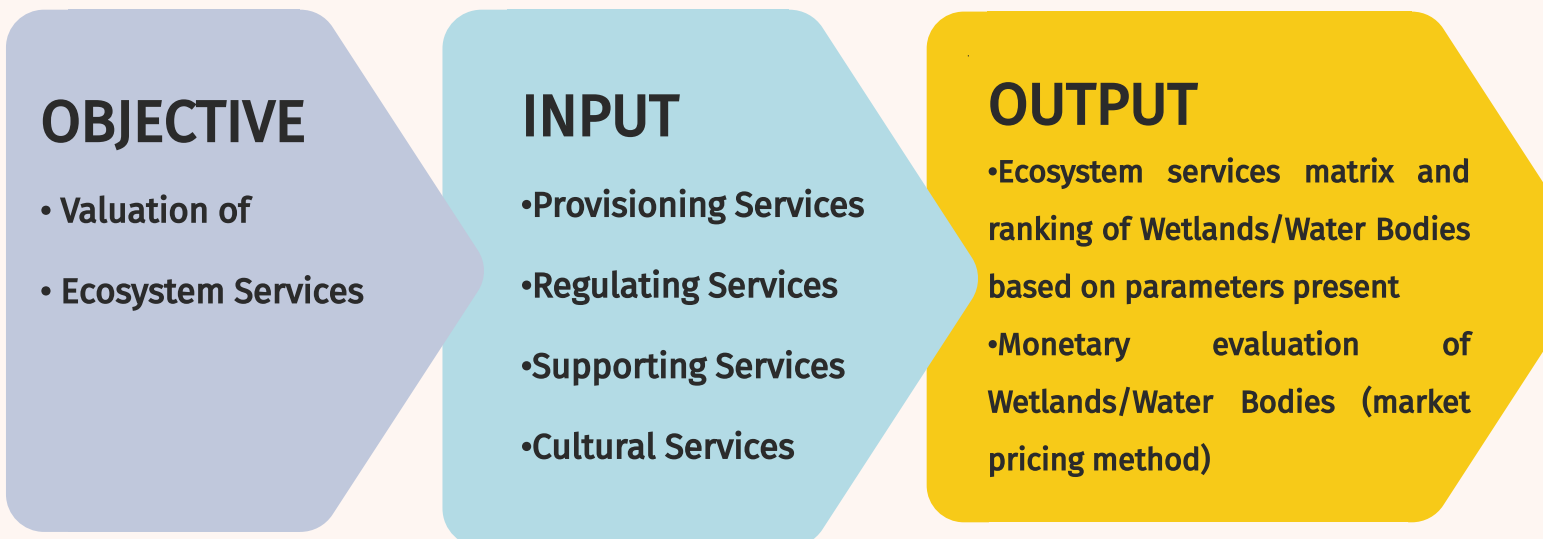
- GIS baseline map preparation
- Prioritization of Watershed
- Delineation of Catchment Areas
- Delineation of Zone of Influence

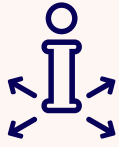


Mapping Urban Wetlands/ Water Bodies



Identification of Ecosystem Services





Ground Water Assessment

OBJECTIVE

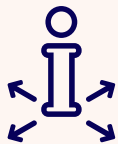
Identification of stage of ground water development

INPUT

- Ground water draft at prioritized watershed level for different purposes
- Seasonal Ground water availability

OUTPUT

- Identification of best use of Wetlands/Water Bodies - ground water recharge, flood control, biodiversity, livelihood, recreational, etc.



Land Suitability for GW Recharge

OBJECTIVE

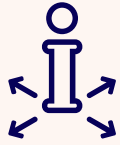
- Identification of potential areas for ground water recharge

INPUT

- Seasonal Ground water Table
- Drainage density (areas well drained)
- Open areas/ agricultural land/ scrub land

OUTPUT

- Suitable sites for groundwater recharge and rainwater harvesting



Impact of Urban Development on Wetlands/Water bodies

OBJECTIVE

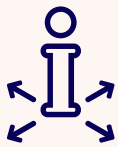
Implication of Land use on Wetlands/Water Bodies

INPUT

- Historical dataset (satellite imagery of city)
- Existing & Proposed land use map
- Population (existing & projected)
- Drainage map
- Sewerage network map
- Encroachment
- Surface water runoff estimation based on existing
- Status of Solid waste management
- Flood prone areas

OUTPUT

- Criticality of Water Bodies/Wetlands with respect to urban development & ecosystem services (ranking based on impact of urban development on Water Bodies/ Wetlands and ecosystem services of water bodies)
- Establishing future scenarios



Action Plan for Wetland/Water Body Conservation

OBJECTIVE
Action Plan for Wetland/Water Body Conservation

INPUT
Critical Wetlands/Water Bodies based on urban development and ecosystem services

OUTPUT
• Indicative actions to be undertaken for conservation of Wetlands/Water Bodies
• Interventions within catchment area, zone of influence and on site

Three major components

1. Indicators of wetlands and their services in the river basin.
2. Evaluation of the hydrological and water resource functions of wetlands, the ecological functions of wetlands within the broader ecoregion, and the socioeconomic functions and values of wetlands (such as those related to human health, food and water security, livelihood, and poverty).
3. The amount to which wetlands are possibly fulfilling their identified roles is assessed.

Implementation phase

CEPA in River Basin Management



○ Role does CEPA play in river basin management

Under the umbrella name of "CEPA," which stands for "Communication, Education and Participation," To enhance knowledge and support for policy concerns and interventions, CEPA is recognised in most international cooperation agreements as a collection of social tools.

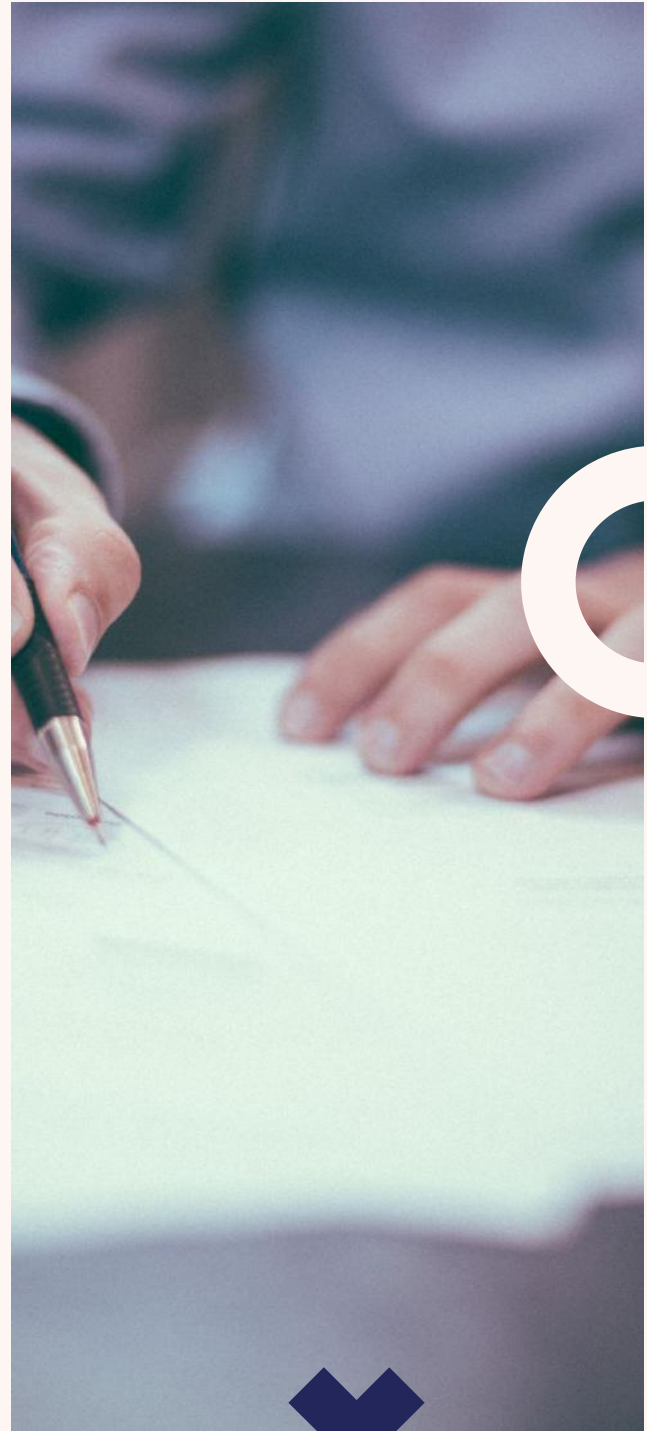
Therefore, CEPA must be planned as an important part of any project, programme or policy from the outset. CEPA is strategic and effective when it supports policy.

In order to be successful, CEPA is a long-term process that requires flexibility and dedication.

CEPA is not only about educating people or providing them with information; it's about building trust and relationships, networks that may serve many purposes when other wetlands or river basin management issues arise.

In the Okavango River Basin, stakeholder involvement and dialogue have been a cornerstone of planning.

In the absence of it, and without the right tools, it would have been difficult to achieve the objectives of planning, and to follow the principles of accountability and ownership.



Roles and Responsibilities



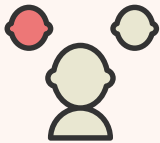
National/ State Government

Set policy direction and legislation for wetlands, water and land use.



Municipal Associations

Provide support and guidance to rural and urban municipalities in local activities such as wetland conservation



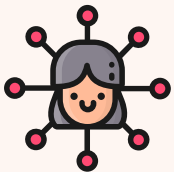
Individual Municipalities

Use local land use planning and tools such as setbacks and environmental reserves to conserve wetlands within their boundaries.



Regulators

Review and approve Water Act and Public Lands Act applications as they relate to wetland mitigation)



Wetland Professionals and Professional Accreditation Groups

Set standards and practices in order to certify qualified professionals may competently identify, classify, delineate, assess function and benefits, assess impacts, and recommend actions consistent with policy and regulation.



Non-government Organizations

Support activities like wetland literacy education and outreach, wetland and riparian mapping and inventories, etc.

Contracting Parties on national policy and programmes for Communication, Education, Participation and Awareness (CEPA) activities related to integrated river basin management



- Encourage the preservation and restoration of wetland areas and their biodiversity
- Create and implement communication, education, participation, and awareness campaigns on the value of wetland protection in water resource management, in line with the CEPA Programme 2009-2015
- Provide training to all levels of water resource and wetland managers on integrated water resource management and river basin management, including the role of wetlands
- Improve sanitation, drain wetlands, and remove trees in the river basin. Develop awareness programmes to reduce activities that degrade river systems
- Identify, create, and implement community-based demonstration programmes that promote wetland conservation and responsible usage
- Document and promote traditional wetland and river basin management approaches
- Encourage effective communication, education, engagement, and awareness programmes for river basin management
- Support the development of skills for community-based groups and NGOs to participate in river basin monitoring and management

Conservation & Management Plan

This section elaborates guiding principles in initiating and implementing river basin management approaches into which wetland conservation and wise use are integrated



Sustainability as a goal

Protecting wetland habitats from the impacts of land and water usage inside and outside a river basin is essential to maintaining their natural dynamics for future generations. Water allocations for wetland habitats are part of this protection.



Clarity of process

The process by which decisions are made on the management of river basins, including the allocation and management of water and wetlands, should be clear to all stakeholders.

PRINCIPLES



Equity in participation and decision-making factors

There should be equity for different stakeholders in their participation in river basin management, including in land use, water allocation, and water management decisions related to wetlands.



Credibility of science

Scientific methods used to support land use and water management decisions related to wetlands, including water allocations to meet environmental water requirements of wetlands, should be credible and supported by review from the scientific community.

Review Phase

EVALUATION, MONITORING AND REPORTING



Assess the implementation of the action plans, which will serve as a starting point for revising each of the subsequent steps. A five-year cycle is not out of the question. The evidence from around the world reveals that the key to success is the strong commitment of all actors (institutional, private, non-governmental organisations, and civil society) at all stages of the process. Water dialogue is a term used to describe the process of coordinating this commitment among the various parties. It's widely agreed that some institutional organisation is required to keep this discourse going and to set standards to ensure that it's open, fair, and fruitful.



What Parameters for Evaluation?

Morphometric parameters of any watershed plays a crucial role in prioritization of sub-watershed. For the morphometric analysis, the goals are to use GIS to extract the morphometric parameters (such as the bifurcation ratio and stream length) from the DEM and to select sub-watersheds based on their groundwater potential and conservation structures, among other things.



BRAINSTORM SESSION

How can monitoring be effective?

Monitoring and Assessment Plan



Level 1, "landscape assessment" relies on coarse, landscape scale inventory information, typically gathered through remote sensing and preferably stored in, or convertible to, a geographic information system (GIS) format. Classification of wetlands is also done at this level.



Level 2 is "rapid assessment" at the specific wetland site scale, using relatively simple, rapid protocols. Level 2 assessment protocols are to be validated by and calibrated to Level 3 assessments. Because of the location-specific nature of rapid assessments, there are many rapid assessment methods currently in use and under development. Some examples of different rapid assessment methods are listed in the Regional Monitoring and Assessment Efforts.



Level 3 is "intensive site assessment" and uses intensive research-derived, multi-metric indices such as the Hydrogeomorphic Approach or Biological Assessments. They are meant to give detailed information regarding how well a wetland is functioning.

Challenges

Even while some countries have had experience integrating wetland and water resource management at the local, site, or sub-basin level, scaling up these techniques to the basin level has been challenging, if not impossible. Implementing wetland management plans is typically difficult when higher level water resource planning, management, and allocation issues are not appropriately addressed prior to design and implementation. Degradation of water quality or changes in flooding patterns might result from a failure to effectively recognise the relevance of wetland ecosystems in early river basin planning.

Implementing wetland management plans is typically difficult when higher level water resource planning, management, and allocation issues are not appropriately addressed prior to design and implementation.

Degradation of water quality or changes in flooding patterns might result from a failure to effectively recognise the relevance of wetland ecosystems in early river basin planning.





CHALLENGES

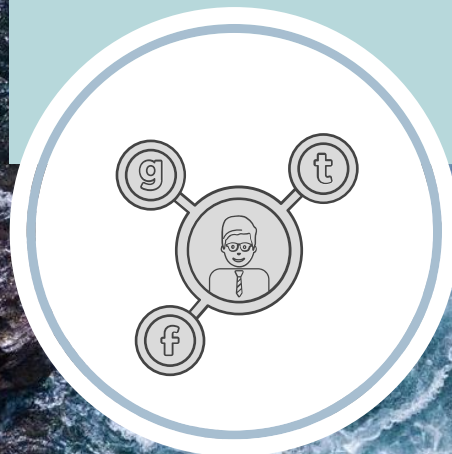
Weak Regulation

Wetlands are commonly classified as wastelands in land records, making their conversion for development purposes a natural policy response. This loophole has been routinely used to restore wetlands for housing and other infrastructure projects.



Sectoral Approaches

Wetlands are frequently managed for specific purposes, such as recreation, fishing, and water storage. This precludes the whole spectrum of ecosystem services, biodiversity values, and connections from being included in landscape-scale management.



Limited capacities for integrated management

Multi-departmental responsibility for conservation of wetlands is common. In several smart city projects, the administration of wetlands within the city limits is delegated to the local authority. Wetlands require unique management approaches not covered by government sectoral pursuits.





CHALLENGES

Obstacles to implementing wetland or river basin management plans

Consultative, consensus-building, and decision-making methods with several stakeholders have weaknesses. When communication, education, participation, and awareness (CEPA) programmes are not properly incorporated into river basin management planning.



Urbanization's impact on wetlands

Urban areas are far larger than expected. conceived and felt. Securing water and food marshes are typically altered to meet urban requirements. upstream and downstream. Many development initiatives fail to consider the influence on wetlands and provide remedies measures.



Focus on hard-infrastructure solutions

The dominant urban planning approaches in India thus far have been infrastructure focused, allowing upstream water sources to be used and trash and runoff to be sent downstream quickly. Less water-secure cities show the limitations of such systems. These techniques frequently overlook the management of wetlands adjacent to urban areas.



INITIATIVES

BY



Atal mission for rejuvenation and urban transformation (AMRUT)

Enhancing amenity value of cities by creating and upgrading green spaces, parks and recreation centres, sewage facilities

Swachh Bharat Mission (SBM)

Development of sanitation infrastructure to improve water quality of Urban and Rural ecosystems



Smart Cities Mission

Area-based development for improvement, renewal and greenfield development

National Scheme on "Welfare of Fishermen" and "Development of Inland Fisheries"

Sustainable fisheries development



Repair, Renovation & Restoration of Water Bodies

Restoration of aquatic ecosystems used as sources of drinking water

Natural Resources Management, Rainfed Farming System, Horticulture, Integrated Nutrient Management

Sustainable agriculture

INITIATIVES BY GOVERNMENT

National Afforestation and Eco- Development Board (NAEB)

Ecological restoration and
Ecodevelopment activities

National Afforestation Programme

Catchment conservation



Green India Mission

Catchment conservation

National Mission on Pilgrimage Rejuvenation and Spiritual Augmentation Drive

Beautify and improve
amenities and
infrastructure at major
pilgrimage
sites in the country



National Action Programme to Combat Desertification

Assessment and mapping of
land degradation, Drought
Preparedness and Mitigation
in the Context of Climate
Change

NPCA

Conservation of wetlands
above 5 Ha



National Coastal Management Programme

National Coastal
Management Programme

National Mission on Himalayan Studies

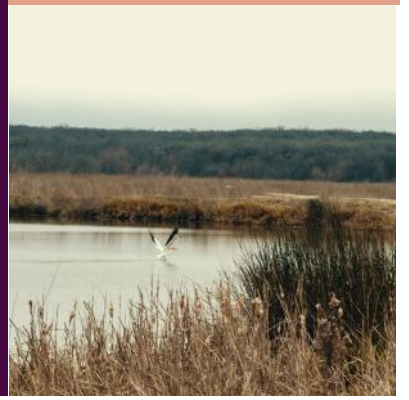
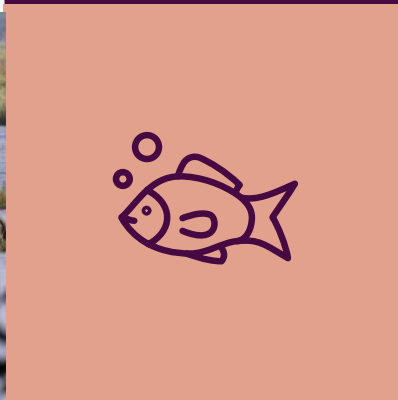
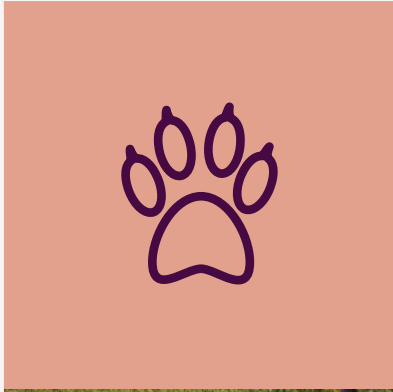
Conservation of Himalayan
Ecosystem and sustainable
development





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