CII-ITC Centre of Excellence for Sustainable Development

Confederation of Indian Industry

WETLAND MONITORING FRAMEWORK

A TOOLKIT FOR CORPORATES

IBBI INDIA BUSINESS & BIODIVERSITY INITIATIVE

INDIA WETLAND COALITION

Godrej PIROJSHA GODREJ FOUNDATION

WWF

Wetlands INTERNATIONAL

german cooperation DEUTSCHE ZUSAMMENARBEIT

giz

Table of Contents

Introduction

'Wetlands are areas of marsh, fen, peat land 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 6 m', as defined by Ramsar Convention (1971).

Clause 2 (1) (g) of the Wetlands (Conservation and Management) Rules, 2017, defines wetland as:

'A area 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 meters, but does not include river channels, paddy fields, human-made water bodies/tanks specifically constructed for drinking water purposes and structures specifically constructed for aquaculture, salt production, recreation and irrigation purposes.'

Importance of Wetlands

Wetlands are amongst the most productive ecosystems on the Earth, support aquatic habitats and provide ecosystem services to community and businesses. Wetlands provide countless benefits or "ecosystem services" to humanity like freshwater supply, food, biodiversity, flood control and climate change mitigation. Despite all these benefits wetlands are the most threatened ecosystem worldwide. Wetlands are being lost at a faster rate compared with terrestrial ecosystems. More than 35% of the world's wetlands have disappeared in the last 50 years. The trend of loss and degradation must be reversed which can help achieving the Sustainable Development Goals by 2030

India's Wetlands of International Importance

India has 15.98 million ha of wetlands, roughly equaling 4.8% of its geographical area. The diversity of these wetlands ranges from high altitude wetlands of Himalayas, floodplains of Rivers Ganga and Brahmaputra, saline flats of Great Indian Desert, lagoons and mangrove marshes on the coastline and reefs in the marine environment.

India is home to a wide variety and a myriad number of wetlands. India became a party to the Ramsar Convention on 1st February 1982 and has since then designated 75 wetlands covering an area of 13,26,677 hectares under the List of Wetlands of International Importance. Presently, India stands first in South Asia and third in Asia in terms of number of designated sites (https://indianwetlands.in/wetlands-overview/indias-wetlands-of-international-importance/).

Business and Wetlands

Many businesses are directly dependent on reliable freshwater resources for their operations (e.g., energy, agriculture, mining etc.). Wetlands provide numerous benefits and services to businesses such as provisioning services (e.g., fresh water), regulating services (e.g., reducing flood risk), cultural services (e.g., aesthetically attractive workplaces), and supporting services (e.g., soil formation). Hence, wetland restoration can help businesses to address the water risk they may face in a changing climate and provide important places for wildlife thereby meeting their commitments on biodiversity conservation and creating places where employees and local communities can benefit from improved mental and physical health.

Importance of Wetland Monitoring

Wetland monitoring is crucial for conservation and restoration of wetland ecosystems. Monitoring allows better understanding of the health and condition of wetlands and to allocate resources wisely for their conservation and management.

The knowledge gained from monitoring allows wetland managers and users to:

- Prioritize wetlands for conservation and restoration.
- Protect wetlands and aquatic resources more effectively.
- Better management of risks such as flooding, water security, livelihoods of communities etc.
- Evaluate point and non-point sources of pollution.

This monitoring framework contains:

1. Baseline information on industry which undertakes restoration activities and
2. Set of Criteria/Indicators for monitoring activities

Below is the table showing the format for collecting the baseline information by industries during working in wetlands conservation.

Baseline information for Wetland Monitoring

S.No.	Parameters	Description
1	Company and Sector	Write the name of the company and its sector
2	State	Write the name of state where company is situated
3	District and Taluka/village	Write the name of the district and Taluka where company is situated
4	Coordinates of Company	Use GPS to note down coordinates
5	Name of the Wetland	Write the name of the wetland
6	State, district, village	Write the name of State, district and village where the wetland is located
7	Coordinates of the Wetland	Use GPS to note down coordinates
8	Ownership of the land	Write down who owns land: private/government/community etc
9	Area of the Wetland	Write area of the wetland in Hectares <2.5 ha/2.5-50 ha/ >50 ha
10	Type of Wetland	Natural or Manmade (Mangroves/mudflats/Pond/Lake/River/Creek/Dam etc.)
11	Management	Notified wetland/Ramsar site/Protected Forest/National Park/Sanctuary/Community managed/any other. If more than one category, mention all
12	Source of water	Mention the source of water in the wetland: river/stream/rainfed/runoff/canals/any other.
13	Listed in Important Bird Area (IBA)	Mention if the wetland is an IBA If yes, then provide reference number
14	Listed in Asian Wetland Directory (AWD) or any other international database	Mention if the wetland is listed in AWD (https://portals.iucn.org/library/node/5933) or any other wetland database.
15	Proposed or listed under GoI's Amrit Sarovar initiative	Please check with the district/state administration and mention (https://amritsarovar.gov.in/login)

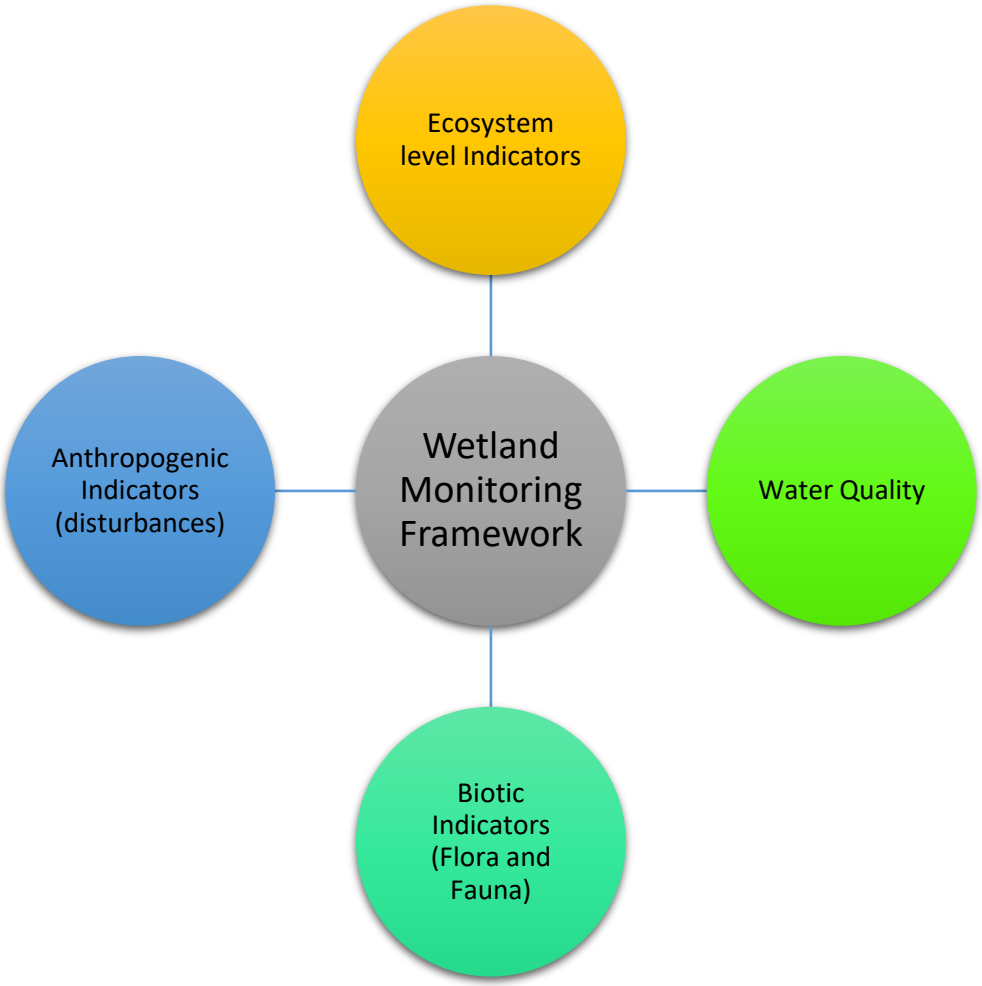
Criteria for Wetland Monitoring Framework

The framework is based on various rules and guidelines, guidance documents and monitoring guidelines for wetlands earlier published by Ministry of Environment, Forest and Climate Change, Ramsar Convention[1], Wildlife Institute of India[2], GIZ India and Wetlands International South-Asia[3], Wetlands (Conservation and Management) Rules, 2010, 2017[4,5] and National Mission on Clean Ganga[6]. This framework has not used indicators that need very rigorous scientific survey or methodology; instead has adopted the indicators which can be easily measured and monitored on field by businesses involved in conservation activities. This framework is based on various important indicators to assess the wetland condition. The framework is based on both quantitative and qualitative assessment of the indicators.

The framework integrates following criteria:

1. Ecosystem level indicators
2. Water Quality
3. Biotic (Flora and Fauna)
4. Anthropogenic

Fig: Wetland Monitoring Framework



S. No.	Indicator	Explanation	How to assess	Note
Criteria 1: Ecosystem level				
1	Surrounding land use	Adjacent land use has influence on overall wetland condition. Intense agriculture practices, settlements, encroachments negatively affect wetlands and its ecosystem services.	Field observation, satellite imagery (google earth, high resolution images)	List dominant and other surrounding landuse: agriculture/settlement/ Encroachment/forest/small waterbodies/any other
2	Shallow water zone (depth<2m)	Most productive zone of wetlands and indicates good health of wetlands	Field observations (can be assessed by observing birds wading through water and feeding)	Write down presence of shallow water zone: Yes No (If possible approx. depth) Ask surrounding community/experts which animals (fish, birds, mammals etc.) are dependent on shallow zone
3	Impervious structures	Presence of impervious structures around wetlands such as roads, buildings, railway tracks, embankments etc can reduce percolation and disturb water availability from catchment.	Field observation, satellite imagery (google earth, high resolution images)	Write down presence and kind of permanent impervious structures: roads, railway tracks, buildings etc.
4	Connectivity	Connectivity between wetlands is an important indicator of wetland health as connectivity in the form of small pools/ditches/streams/ponds indicates good health	Field observations, secondary government data, Satellite imagery	Write down connectivity status of main wetland with nearby small wetlands, streams, rivers, grasslands, forests etc. 1.No connectivity at all 2.Connectivity only during Rainy Season 3.Connectivity throughout year
Criteria 2: Water Quality				
1	Physico-Chemical properties	Physico-chemical properties (pH, BOD, TSS etc) of fresh water is an indicator of	Sampling and analysis should be done as per IS:3025-	Mention water quality status:

		health of wetlands and how the freshwater can be used for different purposes	Part I (1987). *Link below table	pH, BOD, COD, TSS, Colour, smell, Transparency or any other parameter
2	Algal Bloom /Water Hyacinth invasion	Indicates Dissolved oxygen level for ecological functions, also indicates eutrophication by sewage/fertilisers	Site level observation	Note down presence of algal/hyacinth bloom (generally green colour) If possible, list plants in shallow water zone as these indicate waterbody health. Use reference books or ask the local names to the nearest community
3	Solid waste	Presence of floating solid waste such as plastics in wetland, garbage or debris around the wetland that degrade the water quality.	Site level observation	Note down presence and type of solid waste in and around wetland
4	Liquid waste	Presence of sewage or chemical effluents from housings, workshops, factories, community etc.	Site level observation	Note down presence and type of liquid waste (sewage/chemical effluent) falling in wetland with coordinates of outfall)
Criteria 3: Biotic Indicators (Flora)				
1	Free Floating invasive species	Floating invasive species forms thick mats on water surface and affect native species	Site level visual estimation	Note down the presence and name of invasive species on water surface
2	Rooted invasive species along edges of wetland	Affects native species	Site level visual estimation	Note down the presence and name of invasive species along the edges or shallow part of wetland
3	Invasive species around wetlands	Presence of invasive species around the wetlands indicates negative effect on native species	Site level visual estimation	Note down the presence and name of species (local/scientific) around the wetlands
Criteria 4: Biotic Indicators (Fauna)				
1	Native aquatic fauna	Presence of native animals such as fish, crabs, shrimps, amphibians, turtles, snakes, aquatic mammals etc	Site level survey/Literature review/Community interview	Note down the presence and name of species (local/scientific) found in wetland. Refer to the most recent, authentic scientific

		indicates the good condition of wetlands		publications available in public domain or data from relevant government agency like wetland authorities
2	Aquatic birds	Presence of Aquatic birds (residents and migratory) indicates intactness and good condition of wetlands	Site level bird survey with secondary data from locals	Make list of aquatic bird species # eBird India can be used (Link below table) or data from relevant government agency like wetland authorities
3	Nesting and breeding sites	Presence of breeding and nesting sites of birds in and around wetland is a good indicator of health	Site level survey with secondary data from locals	Note presence of nests of birds, species of birds nesting.
4	Invasive plant & animal species	Presence of invasive species affects native species	Site level survey with data from locals	Note down presence of invasive plant and animal species (@ link for species list below)
5	Animal dependence	Do any domestic, wild species depend on the waterbody? If they are listed in IUCN category/Wildlife Protection Act, please mention	Site level survey with data from local community/recent research papers etc	Please list name of animal's dependent such as birds, mammals
Criteria 5: Anthropogenic disturbances (Indicates severity of disturbances/pressure which results in wetland degradation and water pollution)				
1	Water withdrawal from wetland	Water withdrawal from wetland for any purposes reduces the inundation period and area of water spread and depth and hence effects ecology and other functions of wetland	Site level survey for irrigation and other activities showing water withdrawal	Note down the presence of activities leading to water withdrawal such as channels from wetland/number of pumping sets withdrawing water for irrigation.
2	Outflow of sewage channels in wetland	Active sewage discharge points in wetland lead to degraded water quality and causes eutrophication and effecting overall wetland health and function	Survey along edges of wetland for presence of sewage outflow, secondary information from locals or any govt/non govt agency	Note down presence and number of active sewage outflow in wetland

3	Discharge of any industrial effluent	Industrial discharge degrades water quality and health of wetlands	Survey along edges of wetland for presence of effluent outflow, secondary information from locals or any govt/non govt agency	Note down presence and number of active effluent outflow in wetland
4	Other activities	Any activities besides above that affects the waterbody in quality & quantity	Site survey/community interviews	List down sources

* https://law.resource.org/pub/in/bis/S02/is.3025.01.1987.pdf
# https://ebird.org/india/home
@ http://nbaindia.org/uploaded/pdf/laslist.pdf

References

1. Ramsar Convention Secretariat (2010). Inventory, assessment, and monitoring: An Integrated Framework for wetland inventory, assessment, and monitoring. Ramsar handbooks for the wise use of wetlands, 4th edition, vol. 13. Ramsar Convention Secretariat, Gland, Switzerland.
2. Hussain, S.A., Badola, R., Gopi, G.V., Johnson, J.A., Shivakumar, K., Dasgupta, N., Barthwal, S., & Tuboi, C. (2021). Framework for Ecological Monitoring of Ramsar Sites and other Wetlands in India. Ganga Aqualife Conservation Monitoring Centre (GACMC). Wildlife Institute of India. 1-68 pp.
3. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. An inventory, assessment and monitoring framework for Indian wetlands. 1-20 pp.
4. Wetlands (Conservation and Management) Rules, 2010.
5. Wetlands (Conservation and Management) Rules, 2017.
6. National Mission on Clean Ganga (2021). Urban Wetland/Water Bodies Management Guidelines: A Toolkit for Local Stakeholders, Volume 1.