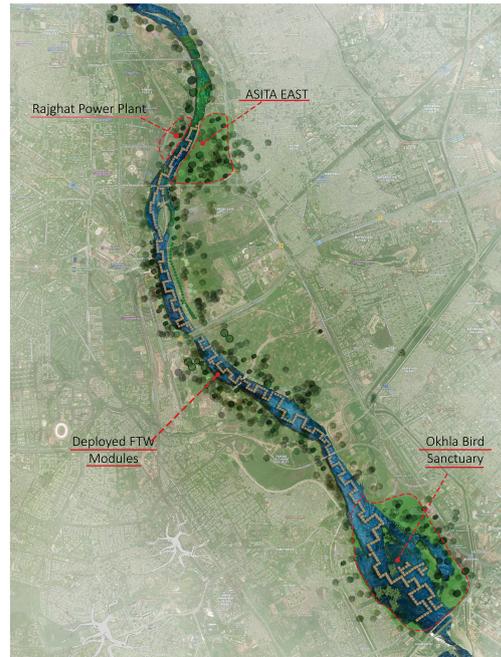


Restoring Ecological Corridors to River Yamuna in Delhi through Floating Wetlands Specialized Planting and Natural Filtration Systems

Jai Rajwanshi



The River Yamuna, one of the most significant rivers in India, has undergone severe ecological degradation due to rapid urbanization, pollution, and encroachments. The floodplain, which historically acted as a natural buffer for floods and habitat for biodiversity, has been significantly altered, resulting in increased flooding, loss of ecological corridors, and deteriorating water quality. This research explores nature-based solutions for restoring our Mother Yamuna to her prime through designing floodplain, specialized habitats that integrate floating wetlands, riparian planting, bio-filtration systems, and ecological corridors to enhance biodiversity and improve water quality.

Mother Yamuna, within Delhi functions as a fragmented ecological corridor, disrupted by barrages, urban encroachments, and loss of floodplain connectivity. Key ecological nodes such as Asita East, Yamuna Biodiversity Park, and Okhla Bird Sanctuary act as biodiversity reservoirs but remain weakly connected.

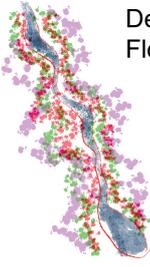


India's most sacred river is now one of the world's most polluted rivers due to lack of a strong approach, implementation of laws and civic sense

These specific FTWS (Floating Wetlands) designed to clean the river water while serving as a stop over home for migratory birds which visit 2 ecological sites near our Rajghat Power Plant Site, our FTWS aim to connect 2 critical avian habitats- Asita East and Okhla Bird Sanctuary along our River Yamuna, the intervention aims to clean the river with help of specialized phytoremediation and restore the ecological corridor enabling safe passage while providing food for migratory birds and native aquatic species.

Each module unit functions as a bioactive floating platform, it is composed of- Bamboo and HDPE base for frame and buoyancy, Coconut husk and soil to anchor plants, Plastic pots with perforations for roots, and native aquatic plants with specialized phytoremediation

Dendrograph Of All Flora And Fauna



● Invasive Vegetation
● Existing Vegetation
● Planted by Us

Phytoremediating Vegetation

PLANT SPECIES

- Typha Latifolia
- Azolla pinnata
- Nuphar Lutea
- Nymphaea Rosea
- Ipomoea Aquatica
- Panicum Antidotale
- Cyperus Ecuatensis
- Morus Alba
- Egeria Densa
- Hydrilla Verticillata
- Pistia Stratiotes
- Azolla Pinnata
- Vetiveria Zizanioides
- Marsilea Quadrifolia
- Sesbania Bipinnata
- Amoranthus Spinosus
- Bombax Ceiba
- Thespesia Populnea
- Cyperus Alternifolius
- Sagittaria Sagittifolia

- Common Teal
- Indian Moorhen
- Phragmites karka
- Indian hare
- Tamarix dioica
- Indian major carps
- Ceratophyllum demersum
- Nilgai
- Cirrhinus mrigala
- Black drongo
- Ficus religiosa
- Monitor Lizard
- Prossopis juliflora
- Vetiveria zizanioides
- Laboe rohita (Rohu)
- Northern Showeler
- Purple Sunbird
- Hydrilla verticillata
- Vallisneria spiralis
- Indian Pond Heron
- White-throated Kingfisher
- Catla catla
- Freshwater molluscs (snails)
- Saccharum spontaneum
- Typha angustifolia
- Eurasian Wigeon
- Common Teal
- Cyperus alternifolius
- Zooplankton & phytoplankton
- Clausa batrachus
- Greater Flamingo
- Bombax ceiba
- Thespesia populnea
- Bar-headed Goose
- Thespesia populnea
- Golden Jackal
- Palm Civet
- Checked Keelback (snake)
- Indian Peafowl
- Purple Heron
- Azadirachta indica
- Garganey
- Little Cormorant
- Lesser Grebe
- Wallago attu
- Freshwater turtles
- Red-wattled Lapwing
- Morus alba
- Greylag Goose
- Eurasian Spoonbill
- Eichhornia crassipes
- Typha latifolia
- Vallisneria spiralis

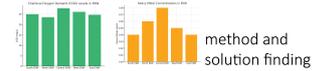
Case Study

Extensive case studies were done of similar habitats for this research to help come up with a proper solution

Asita East

The project focuses on restoring floodplain forests, grasslands, and water bodies while creating catchment zones and ecologically favourable habitats, particularly for aquatic and terrestrial birds. A 2.5-hectare restored wetland at an existing depression functions as a biodiversity-rich marsh and waterbody, augmenting over 60 million litres of water during peak monsoons. Planted with native Yamuna Site floodplain grasses along its periphery, the wetland balances ecological restoration with public engagement through visually open edges, designated viewpoints, and bird-watching benches, while addressing root causes of degradation through stakeholder participation.

EKW- East Kolkata Wetlands

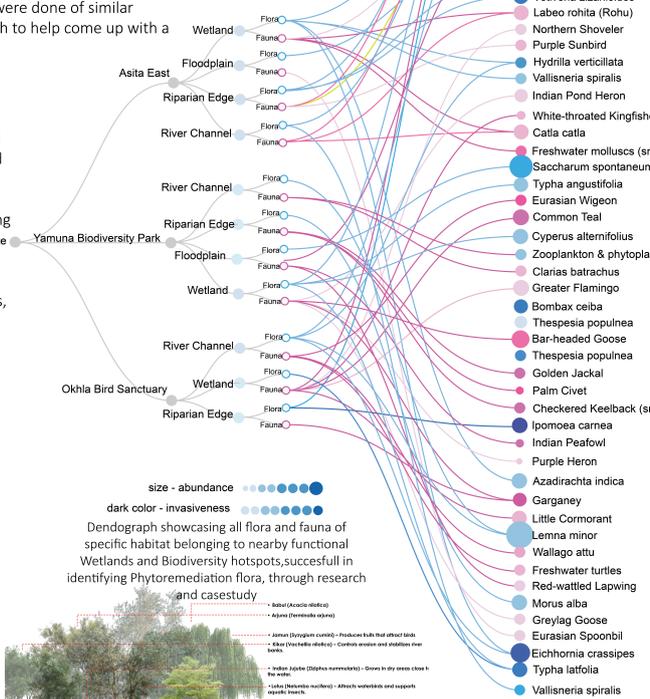


DO- 4.9- 5.6mg/L
BOD- 12.5 mg/L
COD- 27.8mg/L

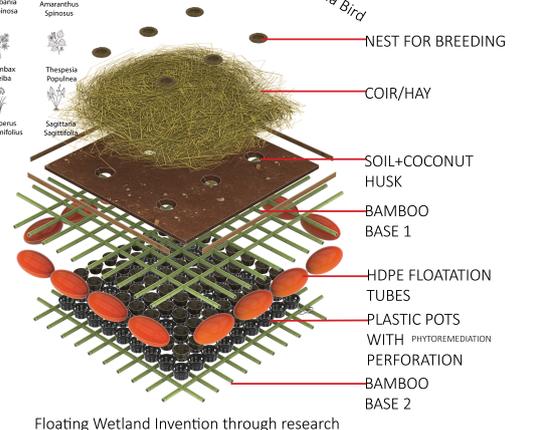
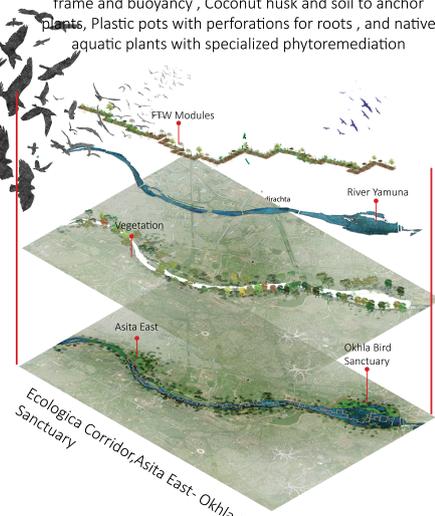
It covers 12,500 hectares and is known as the world's largest integrated natural wastewater treatment system. EKW naturally treats sewage water using fish farming, agriculture, and waste recycling. It supports thousands of livelihoods while acting as a natural filter for Kolkata's sewage.

Our Chosen Site for Intervention

Ecologica Corridor, Asita East- Okhla Bird Sanctuary



Flood plain planting along our ecological corridor, 30m away from active edge Riverbanks are planted with native flood resilient tree species that will stabilize soil, filter runoff and act as microhabitats providing food and shelter for migratory and native birds



Floating Wetland Invention through research

A total of 216 floating treatment modules (each 50x10 m) are proposed for the Rajghat-Okhla stretch (6 km) of the Yamuna. Arranged in cascading series and parallel rows covering 30% of river width, these modules ensure optimal hydraulic retention, biofilm activity, and ecological safety. Collectively, they can reduce BOD and COD by 40%, enhance DO by 120%, and restore aquatic balance, marking the first scalable pilot for nature-based river rejuvenation in Delhi.

