

Strengthening Ecological Monitoring for Management of Mangroves in Odisha

Bhitarkanika National Park

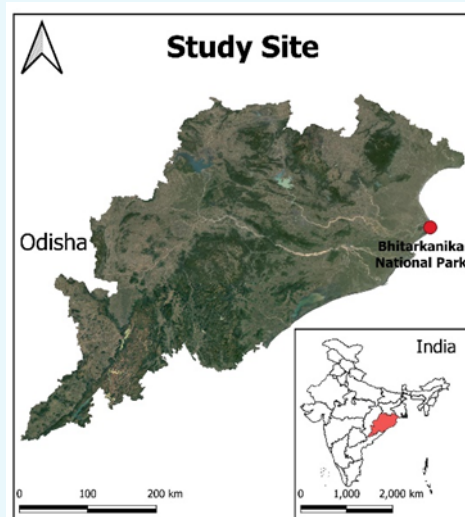
Background

Coastal ecosystems and associated biodiversity are under severe threat due to global climate change and subsequent sea level rise (SLR). Mangroves as a socio-ecological system are of paramount importance for combating climate change and ensuring sustainability of coastlines and sustenance of coastal communities. Despite provisioning several ecosystem services and benefits to the society, these ecosystems face huge pressure from anthropogenic and natural causes. For instance, the rate of sea level rise in the Indo-Pacific region, which holds the highest mangrove area and species diversity, is much higher (3.14 mm/yr) than the global average (2.5 mm/yr). Although mangroves provide coastal resilience against rising sea level, the accelerated rate of SLR inhibits mangroves' natural adaptation processes. These challenges are exacerbated by increased urbanization, aquaculture expansion, and other related land use changes hindering landward movement of mangroves. Overall leading to increased coastal vulnerability and poor ecosystem resilience. Baseline data and scientific information on these vulnerable zones are of paramount importance in tailoring adequate management practices.

Odisha has approx. 259 sq km of mangrove which harbour rich biodiversity, contributes to local economy and coastal protection. The state has an opportunity to conserve and restore these areas to enhance resilience of its coasts and ensure coastal sustainability. The appropriate restoration actions and priorities have greater probability of success when based on location specific ecological information, and following data driven adaptive management decision making.

Bhitarkanika National Park

- Situated in the Kendrapara district of Odisha (20° 4'–20° 8' N; 86° 45'–87° 5' E).
- Bhitarkanika was declared a wildlife sanctuary in 1975 (672 sq. km), as national park (145 sq. km) in 1998 and designated as a RAMSAR site in 2002.
- The Bhitarkanika Landscape contains approximately 309 villages. It is surrounded by the rivers Brahmani, Baitarani, Dhamra and Pathsala.

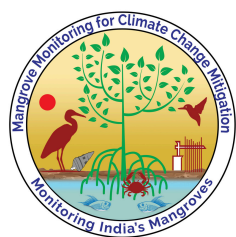


Biodiversity

- Flora: 21 true mangrove species and 10 mangrove associate species (Rasquinha 2024).
- Fauna: 174 bird species and 31 mammals (Pandav, 1996).
- Habitat for Saltwater Crocodile (*Crocodylus porosus*) and a mass nesting site of the Olive Ridley Sea Turtle (*Lepidochelys olivacea*) [Vulnerable as per IUCN].

Socio-Economic Importance

- Forestry and fishery products - 104 \$ / household /yr (2015 estimates).
- Provided protection service worth more than \$ 8700 against the super cyclone *Paradip* in 1999. (Hussain and Badola, 2015).
- It has temples from the medieval era and attracts many tourists.



The Odisha Forest Department is our partner in this study and is greatly acknowledged for supporting the field campaign in Bhitarkanika National Park.



Aim

The project aims to establish ecological monitoring sites to help understand future climate change vulnerability of mangrove ecosystems within Bhitarkanika National Park. Information and scientific data will help to evaluate the efficacy of current management practices and allow for interventions for the conservation and protection of mangroves.

Project activities

Conducting field-based studies, data and information collection, analysis and knowledge exchange, communication and capacity enhancements, such as -

- **Establishing ecological monitoring sites** to understand the vegetation characteristics, carbon stocks, and influence of environmental parameters (salinity, pH, inundation frequency, etc.) on mangrove ecosystems.
- Establishing a network of **rod surface elevation tables (rSETs)** to understand sedimentation and erosion rates, and changes in surface elevation over time.
- **Training opportunity** for the forest department staff and researchers in local institutions to undertake mangrove monitoring and develop **best practices for mangrove restoration.**

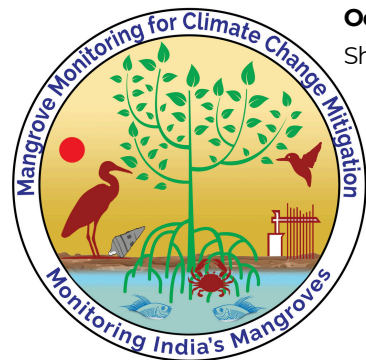


Program outcomes

- Scientific information for informed decision making.
- Long-term ecological monitoring scheme for adaptive management
- Identification of mangrove restoration priority areas.
- Planning interventions for mangrove conservation and management.

Impact on Climate Efforts

- Enhancement of India's climate ambition by developing baseline information.
- Improvement in carbon stock inventory from coastal systems.
- Refined and accurate accounting for carbon sources and sinks in context of nationally determined contributions (NDCs).



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