

# Landscape scale Disaster Risk Reduction

And the role of wetland ecosystems

90% of all hazards are water-related. To effectively address disaster risk, it is fundamental to understand how water behaves in the landscape, how factors such as infrastructure, vegetation, land use and climate change influence water flows, and to connect all water users and stakeholders. We work on initiatives to transform landscapes into safer and more prosperous environments.

## Wetland restoration to reduce risks, India

The Mahanadi delta and Kosi-Gandak floodplains in India are home to millions of farmers and fishers who used to benefit from the dynamic and nutrient rich floods within the landscape.

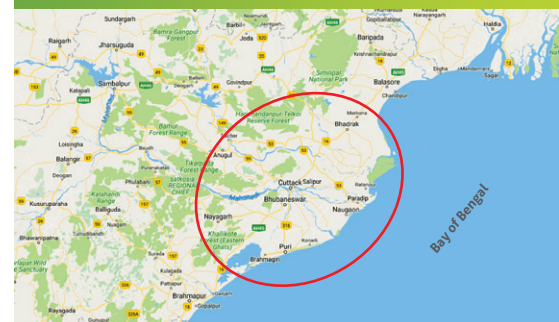
Dams and dykes have led to the fragmentation of water regimes, and in the coastal region the mangrove ecosystems are highly degraded or even lost. This leaves communities vulnerable to droughts, floods and cyclones.

Wetlands International and partners bring stakeholders in the landscape together to increase community resilience through integrating ecosystem restoration with engineering solutions and early-warning and preparedness measures.

We leveraged large scale financial and technical support for our approach through ongoing developmental schemes of the state governments.

### Case Focus:

- Region: Mahanadi delta, Kosi-Gandak floodplains
- Hazards: floods, drought, water logging, cyclones
- People affected: 21 mln
- Ecosystems: rivers, lakes, flood plains, mangroves



### Interventions:

- Restore hydrological connectivity
- Reforestation of hill slopes
- Build community preparedness capacities
- Restore the buffer function of wetlands and mangroves
- Balance engineered infrastructure with ecosystem restoration
- Flood resistant cropping



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### Risks across the Mahanadi delta

- Coastal delta: floods, cyclones, saline water intrusion, tidal inundation
- Central delta: floods, waterlogging
- Delta head: droughts, floods

### Rethinking water management

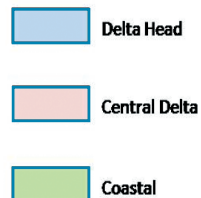
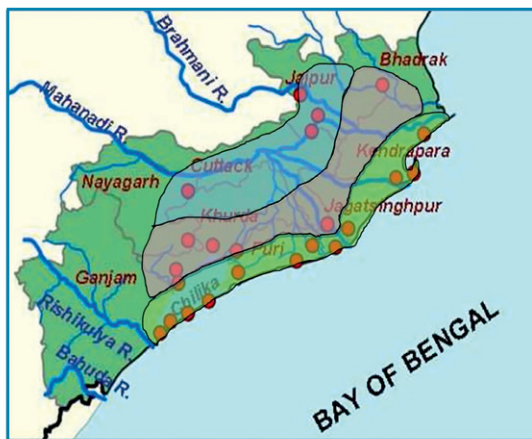
In Mahanadi delta, risks to the local population have been intensified by the silting up of rivers and channels and the loss of 32% of the delta's wetlands. This is mainly due to drainage, urban development, industrial plants, dams and dykes.

Structures built to control irrigation water impede flows to and from the rivers leaving land water logged and aggravating flood damage. Due to stagnant water, agricultural productivity reduces and the incidence of diseases increases.

Communities that once lived with floods, benefitting from the fertile silt distributed across the delta, now live behind embankments. They are increasingly vulnerable to major floods that can breach the defenses at their weakest points.

### Cluster approach

What to do? Some measures make obvious sense, such as rejuvenating traditional water bodies, desiltation of rivers and planting mangroves on the banks of tidal-influenced rivers and on mudflats along the delta coast.



Landscape approach by Partners for Resilience India:

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But while individual villages can reduce risks by restoring wetlands ecosystems, none of this will ultimately work unless the delta landscape as a whole is addressed.

We introduced an approach to connect villages located in similar 'risk contexts' in the coastal, central and upstream parts of the delta. Working together, villages can avoid conflicts over embankments and can team up to organise dredging of silted rivers or reforest hill slopes.

### Collaboration with governments and companies

Other issues that must be addressed to reduce hazard risks in these landscapes require close collaboration with the state government, dam managers and companies operating in wetlands.

A critical element for example is the management of large dams built on the upstream of large rivers. To generate electricity and ensure constant supply of water dam managers tend to keep the reservoir as full as possible. However, flood risk reduction requires keeping these as empty as possible, reserving space to capture flood waters.

Wetlands International together with its CSO partners are working with the authorities to develop scenarios for changing the management regimes of dams to reduce flood risks and address the water needs of downstream communities.

More information at [www.wetlands.org](http://www.wetlands.org) and [www.partnersforresilience.nl](http://www.partnersforresilience.nl).