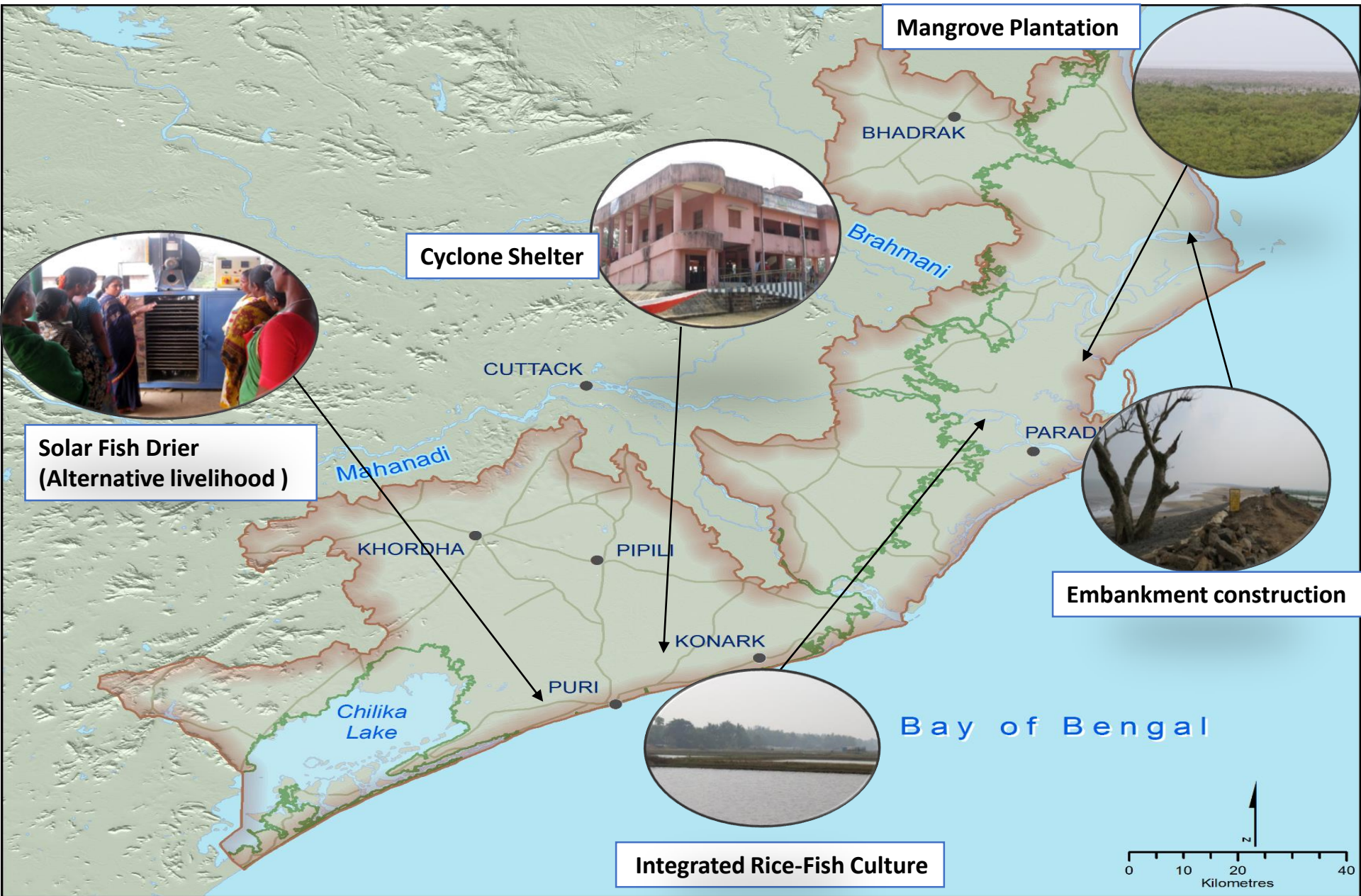


# Examples of Adaptation in the Mahanadi Delta, India



**Mangrove Plantation**



BHADRAK

Brahmani

**Cyclone Shelter**



CUTTACK

PARADIP

**Solar Fish Drier  
(Alternative livelihood)**



Mahanadi

KHORDHA

PIPILI

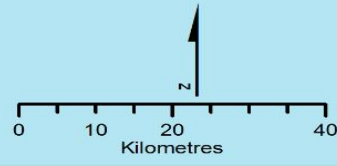
**Embankment construction**



KONARK

Bay of Bengal

**Integrated Rice-Fish Culture**



# Solar Fish Drier (Alternative Livelihood Promotion)

Integrated Coastal Zone Management Project (ICZMP), Odisha has taken an initiative to provide hybrid solar dryers to the SHGs of Coastal Orissa for hygienic fish drying as livelihood support which also includes storage room and fish drying platform for the preservation of fish. As a pilot project area, ICZMP has taken Puri & Kendrapara districts to provide hybrid solar driers as alternative livelihood programme. Out of the selected self-help groups, 94 are women SHGs who would be directly benefitted from the programme.

With the support of National Fishery Development Board (NFDB) in another Network project on **“Capacity building of coastal fisherwomen through post-harvest technology in fisheries”** Directorate of Research on Women in Agriculture (DRWA) has provided a **Model Fish Drying Unit** at Penthakota, Puri, Odisha.

For more information:

<http://orissadiary.com/CurrentNews.asp?id=48578>

<http://orissadiary.com/CurrentNews.asp?id=48578#sthash.i0lEMycD.dpuf>

<http://www.icar.org.in/en/node/5530>

APOWA (2011): case studies, web link <http://apowa.org.in/case-studies-2/>

Report (2010) : Samudram web link <http://www.uaaodisha.org/upload/SAMUDRAM-detail%20profile.pdf>

Report (2014): Integrated Rice Fish Culture: Climate Change Adaptation Option, Paribartan Project in Kendrapara and Jagatsinghpur. pp.2-24. Regional Centre for Development and Cooperation (RCDC). Bhubaneswar, Odisha.

<http://www.rcdcindia.org/PbDocument/995fd0d595e6ccf-173e-455b-a9f9-796e461137e6IRFC%20as%20CC%20Adaptation%20Option.pdf>

# Cyclone Shelter

Coastal regions of Odisha are prone to occurrence cyclones and in the last 20 years, the 1999 Super cyclone was the biggest disaster in Mahanadi Delta. After this disaster, the Government laid emphasis on the planning, preparedness and prevention along with relief, restoration and rehabilitation. About 97 multi-purpose cyclone shelters have been constructed by the year 2005. Proposed 38 more have been taken up under the Prime Minister's National Relief Fund, out of which 30 were completed by 2010 and 8 are on their way to completion. 50 flood shelters in nine flood affected districts (mostly coastal districts) were taken up in 2009, out of which 10 have been completed. In 2013, Centre for Youth and Social Development (CYSD )has helped in construction of cyclone shelters after the 1999 Super Cyclone. CYSD has provided shelter to around 12000 people when Phailin hit the eastern coast of Odisha in 2013. In the same year, Gramvikash also constructed disaster-resistant houses for tribal and rural communities in the disaster prone areas in Odisha.

## For More Information

Odisha Review (2011): Report on Good governance, Government of Odisha.

Report (2013): Response to Phailin 2013 and Subsequent Floods, CYSD, Orissa, web link

<http://www.cysd.org/images/cysds%20response%20to%20phailin%202013%20and%20subsequent%20floods.pdf>

Report (2013): Appeal for “Phailin” Relief & Rehabilitation, PREM, web link

<http://www.prem.org.in/NewsDetails.aspx?id=6>

Report (2013): Social Housing , Gram Vikash, Orissa web link <http://www.gramvikas.org/social-housing>

Report (2013): National Cyclone Risk Mitigation Project- Odisha: Approach Roads,

<http://osdma.org/viewprojectdetails.aspx?vchlinkid=GL018&vchplinkid=PL024&status=2> OSDMA, Government of

Orissa

# Mangrove Plantation

Geographically restricted within the tropics and sub-tropics, mangroves cocoon the coasts and protect the shoreline areas and prevent coastal erosion as they are a natural barrier to hazards such as tropical cyclones and tsunamis apart from providing a wide range of eco-system services. Thus taking into account the vulnerability of the region to natural disasters, sustainable livelihood security for local communities, leadership in conservation and restoration of mangroves have been taken up as an adaptation activity in the forestry sector.. More than 48,000 mangrove saplings were grown in one project (funded by Mangrove for the Future and co-financed by APOWA and local communities) , and all the saplings were planted in the project villages of Kendrapara District.

For More Information :

APOWA (2012): Community stewardship in conservation, restoration and sustainable management of mangroves in Orissa, web link <https://www.mangrovesforthefuture.org/assets/Repository/Documents/Community-Stewardship-in-Conservation-Restoration-and-Management-of-Mangroves-in-Orissa.pdf>

APOWA (2011): Mission Mangroves, web link: <http://apowa.org.in/case-studies-2/mission-mangrove/>

APOWA (2011): case studies, web link <http://apowa.org.in/case-studies-2/>

# Infrastructure and Embankment Construction

When adaptation activities are infrastructural in nature, they ensure an increased resilience of the region in the face of future impacts of climatic stresses or shocks. Construction of roads is an adaptation measure as connectivity not only is important for daily life but also helps in ushering in economic growth. Construction of roads includes filling up of the earthwork, construction of cement concrete pavement, filling of shoulder, metalling, construction of box cell bridge pair casting, filling up of embankment.

Coastal areas are prone to erosion leading to land loss. Construction of embankments can protect the land loss due to erosion. A World Bank-supported geo-synthetic tube sea-wall is under construction in Pentha, a coastal village in Odisha, India. A village with a population of around 50,000 fishermen, has experienced severe erosion over the past two to three decades will be benefited. This construction is being done with dimensions to tackle cyclonic storm surges as well.

For More Information:

[http://www.chilika.com/pdf/WR\\_DPR.pdf](http://www.chilika.com/pdf/WR_DPR.pdf)

National Cyclone Risk Mitigation Project- Odisha: Approach Roads. Odisha State Disaster Management Authority

<https://ejatlas.org/conflict/geotube-construction-in-pentha-india>

# Integrated Rice-Fish Culture

Vagaries of climate change and salt water intrusion adversely affects agriculture, the main occupation of the people. Strict directives from the Government with regard to prohibition of fishing in the National Park at Bhitarkanika (as this is harmful for the estuarine crocodiles and aquatic species of the region) led to serious livelihood crisis. Complying with the directives is important but sustaining livelihood calls for adaptation measures. The system of Integrated Rice-Fish Culture combines pisciculture and paddy cultivation (saline tolerant rice varieties) and growing horticultural trees, fuel wood trees planted along the area to provide protection against cyclones and flooding. Duckery would also serve in the nutrition needs of the family by providing eggs and meat and also contribute in pest reduction. The Paribartan programme (funded by Concern worldwide and European Union) has been initiated on a pilot basis. Implementation of the programme has been done in 74 villages Rajnagar Block, Kendrapara district and 10 villages of Balikuda Block, Jagatsinghpur district.

For More Information:

RCDC, 2014. Integrated Rice Fish Culture: Climate Change Adaptation Option, Paribartan Project in Kendrapara and Jagatsinghpur. pp.2-24. Regional Centre for Development and Cooperation. Bhubaneswar, Odisha.

<http://www.rcdcindia.org/PbDocument/995fd0d595e6ccf-173e-455b-a9f9-796e461137e6IRFC%20as%20CC%20Adaptation%20Option.pdf>