



Fishermen in the river delta of Cuddalore district

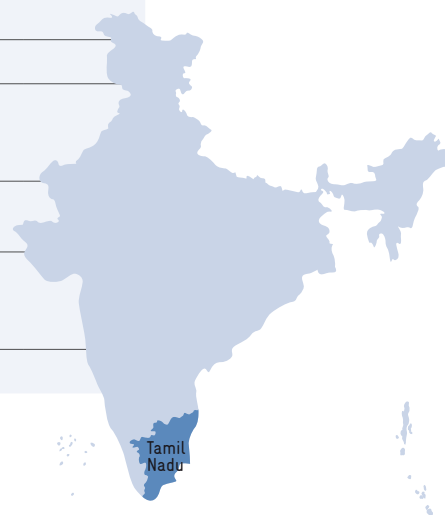
Photo: V. Selvam

Results CCA RAI demonstration project no. 1

This demonstration project was realised under the Indo-German development project Climate Change Adaptation in Rural Areas of India (CCA RAI) which is jointly implemented by the Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. CCA RAI is financed by the German Federal Ministry for Economic Cooperation and Development. For further information see: [www.ccarai.org](http://www.ccarai.org)

## Integrated Mangrove Fishery Farming

Project location	2 villages in Cuddalore district, Tamil Nadu
Project duration	December 2011 – December 2013
Local implementation partner	M S Swaminathan Research Foundation (MSSRF)
Project costs	4,129,000 Indian Rupees equalling 50,975 Euro
Geographic features	River delta with saline soils, degraded coastal land
Climatic stresses	Erratic rainfall, temperature increase in summer, increasing intensity of storm surges, anticipated sea level rise in future
Non-climatic stresses	High population density, urbanisation, industrial development
Predominant livelihood sources	Small-scale coastal fishing and agriculture (predominantly paddy cultivation)
Project beneficiaries	262 families (786 individuals)



Ministry of Environment, Forests and Climate Change, Government of India

## Project context and need for adaptation

In the Indian state of Tamil Nadu almost half of the population lives in coastal areas. Large parts of these people are landless and dependent on fishing in the ocean and in backwaters as well as on paddy cultivation for their livelihoods. In the last years, many of them have started to feel the effects of climate change. Storms, floods and rising sea level have led, among other things, to land erosion and salinisation of land and groundwater, which means: less agricultural yields and less income. However, most people affected don't have the means to just go elsewhere. That's why adaptation measures to address climate change vulnerability and to introduce sustainable alternatives to generate income are of growing importance.

With Integrated Mangrove Fishery Farming Systems (IMFFS), the M S Swaminathan Research Foundation (MSSRF) has tested such an alternative in two villages in Tamil Nadu. "IMFFS is a farming system that is meant to turn saline areas into productive land again. In the last two years we have introduced saline tolerant plants, built ponds to grow brackish-water fish which generates immediate, yet sustainable income, and we have built bunds around the ponds on which we planted mangroves and halophytes in order to protect people against upcoming cyclones and other natural disasters," explains Dr Ramasamy Ramasubramanian from MSSRF. "Our approach was special as it was science-based and community-centred at the same time."

### Adaptation hypothesis

By providing additional and sustainable income Integrated Mangrove Fishery Farming helps to make coastal communities less vulnerable to the impacts of climate change. Bunds and newly planted mangroves protect the coastline from storm surges, cyclones and sea level rise. Awareness creation and provision of information on how to deal with climate variability increase the communities' adaptive capacities.



For Indrani Pakri Samy fishing doesn't cause health problems any longer

### Indrani Pakri Samy, 25 years MGR Nagar village, Tamil Nadu

*"Fishing was never easy for us. Very often we used to spend the whole day submerged in creeks or mangroves to handpick fish and crab. And very often this caused health problems like wounds in legs and hands, skin diseases, colds or fever. Plus, our fish catch decreased with time.*

*With this project, things have become better. Together with other community members, I set up a nursery, raised mangroves and planted them along the bunds and mounds of the ponds. It is an overwhelming feeling and immense satisfaction to see the mangroves grow. This way, I could earn money. I can also earn money by selling fish which grows in our pond again since we use new fish varieties now."*



Villagers participating in a local vulnerability assessment meeting.

## Adaptation interventions

- Realisation of a **vulnerability assessment** with community participation in order to draw a picture of the socio-economic and geographical situation in the project area and to identify the locations affected most by salinity and sea level rise
- Establishment of a **nursery** in order to grow **mangroves and halophytes** that can be planted on the bunds of the ponds
- Design and construction of seven IMFFS **ponds** with raised **bunds** in cooperation with local communities and with the help of machines
- Selection and introduction of suitable **species of fish, prawns and crabs** in the ponds for providing additional income and sources of nutrition
- Creation of a **village level institution**, i.e. a local management committee that develops rules, regulations and micro plans to implement all project activities and that monitors the same
- **Technical trainings**, e.g. on fish farming, for community members in cooperation with a government training centre

## Benefits and added value for adaptation

- Newly established **bunds** in and around the IMFFS ponds provide physical protection against cyclones and tidal waves
- Newly planted **mangroves and halophytes** on the bunds also mitigate the effects of cyclones by acting as a physical protection
- Depending on the **fish** variety cultivated, the IMFFS ponds create additional income (in the case of cultivating sea bass additional income per beneficiary family up to 81,000 INR equalling 1,000 EUR per year)
- The newly formed **village level institution** plans, implements and monitors all project activities and provides additional information on beneficial government programmes and policies
- **Technical trainings** of community members on fish farming and monitoring, climate change impacts and possible adaptation options reduce the sensitivity to climate change impacts

## Cost estimates\* for main interventions (in INR / EUR)

\*81 INR = 1 EUR

Pond and bund construction (per pond, average pond size 0.85 hectares)	426,465 INR / 5,265 EUR
Nursery for mangroves and planting of mangroves and halophytes (per pond)	145,557 INR / 1,797 EUR + 9,639 INR / 119 EUR maintenance (every 6 months)
Procuring fish juveniles and culturing them in the IMFFS ponds (per pond)	14,580 INR / 180 EUR + 4,860 INR / 60 EUR maintenance (every 6 months)
Training and capacity building of community members (per training)	58,320 INR / 720 EUR



Mangrove plants on the bunds of an IMFFS pond

Photo: MSSRF

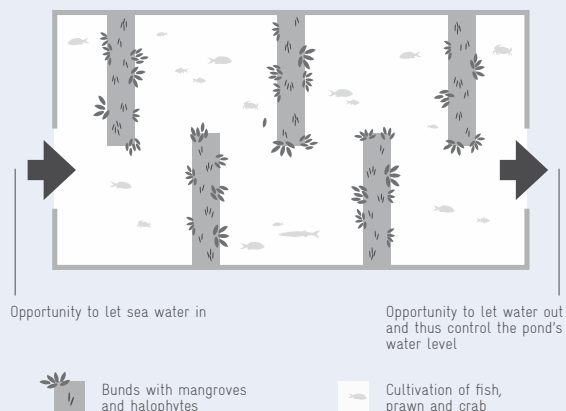
## Success factors

- A **vulnerability assessment** helped to understand the physical and socio-economic situation and to identify relevant project sites and beneficiaries
- Active **community participation** throughout the whole project – from its development to implementation and monitoring – improved people's commitment and the sustainability of the project
- **Exposure visits** of beneficiaries to other sites where IMFFS has already been successfully established were organised in order to boost motivation and enable know-how exchange
- **Project experiences** were documented with the aim to improve the project's implementation – this participatory review process is called *systematisation* by GIZ

## Recommendations for project replication in the Indian context

According to the Intergovernmental Panel on Climate Change (IPCC), low-lying and densely populated coastal areas in India are highly threatened by sea level rise and cyclones. 7,500 kilometres of India's coastline are vulnerable to inundation and salinisation. Thus, IMFFS could be of relevance for nine coastal states of India. However, before large-scale replication a market study that analyses demand and prices for selected fish varieties should be undertaken to ensure that beneficiaries can sell their produce at a reasonable price.

### Design of an IMFFS pond (top view)



### Further information

Department of Environment  
Government of Tamil Nadu  
[www.environment.tn.nic.in](http://www.environment.tn.nic.in)

M S Swaminathan Research Foundation  
[www.mssrf.org](http://www.mssrf.org)

Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH  
Natural Resources Management Programme  
[www.giz.de/india](http://www.giz.de/india) | [www.ccarai.org](http://www.ccarai.org)