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

Climate proofing a rural development programme for fish farming

<table>
<thead>
<tr>
<th>Project location</th>
<th>Gandhwani Block, Dhar district, Madhya Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project duration</td>
<td>November 2011 – June 2013</td>
</tr>
<tr>
<td>Local implementation</td>
<td>Towards Action and Learning (TAAL)</td>
</tr>
<tr>
<td>partner</td>
<td></td>
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<tr>
<td>Project costs</td>
<td>2,166,600 INR equalling 26,748 EUR</td>
</tr>
<tr>
<td>Geographic features</td>
<td>Undulating topography, semi-arid climate, high rate of soil erosion</td>
</tr>
<tr>
<td>Climatic stresses</td>
<td>Erratic rainfall, shift in monsoon timing, temperature increase</td>
</tr>
<tr>
<td>Non-climatic stresses</td>
<td>Tribal area with poor state of socio-economic infrastructure, low employment rate, high dependence on daily wage labour, money lending in order to meet basic needs</td>
</tr>
<tr>
<td>Predominant livelihood sources</td>
<td>Agriculture (mainly soybean, maize and cotton cultivation) and inland fishing</td>
</tr>
</tbody>
</table>
Project context and need for adaptation

In Madhya Pradesh’s Dhar district, there are many small-scale farmers who traditionally depend on rain-fed agriculture for their livelihood. Some of the agricultural land is irrigated with groundwater. Since recharge rates are low, groundwater extraction has reached a critical stage. Lately, farmers have also been affected by changes in rainfall patterns, such as decrease in pre- and post-monsoon rainfall and a shift in the onset of the monsoon. Rising temperatures are another challenge.

The district is a tribal area where a large number of the population is landless. Since the region has quite some water bodies and rivers, these people rely mainly on traditional fishery. Hence, fishery is another important livelihood source for the communities in the region in addition to agriculture. However, the increasing temperature and rainfall variability has reduced the fish production. In addition to climatic stresses, low access to savings, credit or insurance products limits rural communities from making investments in fishery that could increase their income and spread it over different seasons. Further, due to lack of money and appropriate market infrastructure, such as cooling facilities, fishermen are often forced to sell their produce to unfavorable prices instead of waiting for ideal selling conditions.

India has several government programmes to foster rural development. One of them is the Mahatma Gandhi National Rural Employment Act (MGNREGA). The goal of the MGNREGA scheme is to enhance livelihood security in rural areas by guaranteeing at least 100 days of wage employment a year. To further increase livelihood options, the Government of Madhya Pradesh has initiated a sub-scheme of MGNREGA called Meenakshi. This sub-scheme aims to provide alternative income sources to farmers by providing funds for constructing small ponds or hatcheries for fish farming on sections of their land. Through a lease agreement some of these farmers and pond owners dispose their ponds at a fixed amount to traditional landless fishermen who, for their part, do the fishing and sell the produce at local markets.

The design of existing ponds and the use of the fish species in these ponds follow the standard guidelines of Meenakshi. However, these guidelines don’t take into account climate variability and change, e.g. changes in precipitation and temperature. Since high intensive rainfall events have become more frequent, causing surface runoff, the siltation rates of ponds are increasing. In addition, rising temperatures are likely to change the breeding period of fish causing growth retardation and a decline in overall production.

That’s where this project came in. It reviewed the guidelines of the Meenakshi scheme, analysed past and present climate data and the hydro-geological circumstances in the region. These activities and the consequent findings provided the basis for recommendations that are to make sure that ponds created under the Meenakshi sub-scheme are technically sound and climate-proof, i.e. sustainable in the light of changing climate.

Adaptation hypothesis

A review of existing guidelines together with an in-depth analysis of climate and hydro-geological data helped to direct the design of new ponds into a more climate resilient direction. A newly developed weather-based insurance will provide farmers with more security and options to cope more effectively with climatic variability in the future.
Main project activities

- Review of the guidelines of the Meenakshi sub-scheme and of past and present climate data in the light of climate variability and change with the aim to make recommendations for pond design and fish species selection
- Realisation of hydro-geological assessments in order to select the most suitable sites for future pond construction and to make recommendations for the specific design of these ponds
- Realisation of a local fish market study to assess the prices and preferences for different fish species
- Cooperation with a private insurance company on the development of a weather-based insurance product for fishermen to address potential risks and losses in fisheries
- Technical Training of traditional fishermen and fish farmers on climate change and fishing practices so that both will be able to better cope with climatic stresses in future

Main project outcomes

The main outcomes of this climate proofing project have materialised in a set of recommendations covering the following aspects:

- Design of ponds: The depth of ponds should increase from 1.2 to 2 metres as per the existing guidelines to at least 4 metres. This counteracts evaporation loss and allows to retain water for a longer period of time. If evaporation can be reduced, the existing size of the ponds – which is 1 hectare minimum per pond according to the existing guidelines – could be reduced to 0.5 hectares. This would allow to increase the overall number of ponds to be created
- Fish species: Based on the outcomes of the market study and the climate data analysis the fish species combination proposed is Rohu (Labeo rohita), Katla (Catla catla) and Common Carp (Cyprinus carpio) whereas the existing guidelines recommend a combination of Rohu, Katla and Mrigal (Cirrhinus mrigala). The reason for introducing Common Carp is that it is a bottom dweller fish that can survive under low oxygen concentration. Hence, it is least affected by an increase in air and subsequent water temperature. Plus, it is a preferred choice on local markets according to the market study carried out

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

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost (INR)</th>
<th>Cost (EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of technical guidelines and of past and present climate data</td>
<td>44,798</td>
<td>553.1</td>
</tr>
<tr>
<td>Hydro-geological assessments</td>
<td>92,836</td>
<td>1,146</td>
</tr>
<tr>
<td>Training of traditional fishermen and fish farmers</td>
<td>14,000</td>
<td>172.8</td>
</tr>
</tbody>
</table>

* 81 INR = 1 EUR
• **Insurance product for fish farmers**: In cooperation with this project, a private insurance company developed and launched a weather-based insurance product for fish farmers and invested in setting up a weather station at Gandhwani Block – since the insurance settlements will be made as per the rainfall data generated from the station. This means: If the rainfall in a certain area is lower than a defined threshold, all farmers from that area who have purchased premiums will receive their claim. To give a concrete example: A pond of 1 hectare size is insured with 15,000 INR equalling 185 EUR and the yearly premium to be paid is 1,350 INR equalling 16.7 EUR. So far, a fishing area of about 20 hectares in Dhar district has been covered under the new insurance scheme. However, its effectiveness and potential to enhance adaptive capacities of fish farmers can only be valued in the upcoming years.

• **Technical training**: Since the trainings on sustainable fishing practices as well as the training material that was developed for this purpose were very successful, it is recommended to offer more trainings like this to traditional fishermen and fish farmers in the future.

• **Traditional fishermen**: The existing Meenakshi guidelines do not recognise traditional fishermen as direct beneficiaries. However, like land-owning farmers, traditional fishermen shall also be recognised as important stakeholders of Meenakshi and shall be involved in the planning and implementation phase both at the district and at the local level. Fish farmers and traditional fishermen both have to be taken into account, since both provide key resources. One owns the land and the pond, the other has the traditional knowledge of fishing and a profound understanding of the fish market.

These recommendations were not implemented at local level during the project duration. Yet, they were presented to the state level MGNREGS council that is responsible for the Meenakshi sub-scheme. This initiated a policy dialogue at state level that will strengthen joint efforts to make the Meenakshi sub-scheme and similar schemes to come more climate-proof.

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Further information

Environmental Planning and Coordination Organisation
Government of Madhya Pradesh
www.epco.in

Towards Action and Learning (TAAL)
www.taalindia.org

Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
Natural Resources Management Programme
www.giz.de/india I www.ccarai.org

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