



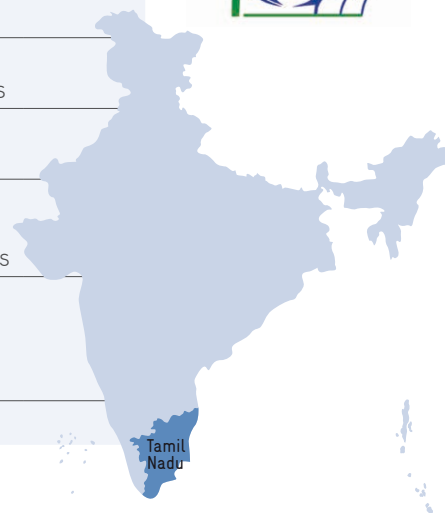
Livestock rearing and rain-fed agriculture are the main sources of income for people in Madurai district.

Results CCA RAI demonstration project no. 4

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

Tank silt application and rainwater harvesting

Project location	7 villages in Madurai district, Tamil Nadu
Project duration	October 2011 – October 2013
Local implementation partner	Development of Humane Action (DHAN) Foundation
Project costs	3,907,000 Indian Rupees equalling 48,235 Euro
Geographic features	Foot hills of the Western Ghats, rain shadow region, dry lands with limited groundwater availability, unfertile soils
Climatic stresses	Erratic rainfall, temperature increase in summer, intense dry spells and frequent occurrence of drought
Non-climatic stresses	Abandonment of agricultural land and invasion of the land by alien plant species, lack of social security (e.g. insurances) for marginal farmers in case of emergencies
Predominant livelihood sources	Rain-fed agriculture (mainly cotton and pulse cultivation) on small land holdings ranging from less than 1 hectare to 2 hectares, livestock rearing, collection of wild-growing medicinal plants, labour migration of family members
Project beneficiaries	795 families (2,385 individuals)



Project context and need for adaptation

In Madurai district of Tamil Nadu the majority of people depend on rain-fed agriculture and rearing goats, sheep and cows to make a living. The project area lies on the foothills of the Western Ghats. It's a dry, rain shadow area of the mountain range where the passage of rain-producing weather systems is blocked by the mountains most of the times. Hence, water for agriculture and livestock has always been a major concern, especially for marginal farmers. Lately rainfall has become even more erratic. The onset and the end of monsoon have altered. Mean maximum summer temperature has gone up from 38 to 42 degree Celsius in the past ten years. Changes in both rainfall and temperature patterns have immense impacts on the livelihood sources of the people, especially on agricultural production. As a consequence, marginal farmers have no choice, but to sell their livestock in dry periods in order to get temporary relief and to survive. Labour migration is another coping strategy for farmers in the region.

The project responded to this critical situation by increasing water availability through rainwater harvesting in farm ponds. These ponds were excavated on agricultural lands with the aim to store rainwater that can be used for irrigation. Another core project focus was the revival of traditional practices like the application of nutrient-rich silt on farmland. Silt is fine granular material that mainly stems from exposed soils. Suspended as particulate matter in surface water run-off, it settles at the bottom of standing water bodies as sediment. South Indian farmers have traditionally been following the practice of applying fine, nutrient-rich tank silt on agricultural fields in order to increase soil fertility. However, due to tedious administrative and legal formalities and increasing use of chemical fertilisers this practice has vanished. Hence, the majority of about 140,000 tanks in Southern India remain filled with silt. Other project interventions were the increase of tree cover through agro-forestry on farmlands and the promotion of life and livestock insurances for farmers in order to reduce their risks and improve their adaptive capacities.

Adaptation hypothesis

Improved methods of water harvesting combined with traditional ways to increase soil fertility – like tank silt application – secure the communities' agricultural produce and the survival of their livestock under changing climatic conditions such as erratic rainfall, rising temperatures and increased occurrence of droughts. Human and livestock insurances bring additional relief.



Ramakrishnammal Ramanathan on her pearl millet field

Ramakrishnammal Ramanathan, 38 years
Chatrapatti village, Tamil Nadu

"In the past years the harvests from our fields brought only economic losses. The reason: My field is in the upland and the fertile top soil got washed away by heavy rains. After applying tank silt in the last two years my soil has become fertile again and could store more water – and I could cultivate pearl millet and harvest full crops although we had only scanty rainfall in these two years. The silt application will be done for three more years, so I can be sure that the soil on my field will stay moist. Unfortunately, the majority of the farmers in our village are not able to get normal yields anymore due to decreasing rainfall. But they are starting to follow our path and get back to the old tradition of tank silt application as well. I myself have profited immensely. Last year, I earned 4,000 Rupees with my pearl millet cultivation."



Tank silt application on an agricultural field

Adaptation interventions

- Realisation of a **vulnerability assessment** with community participation to identify possible project beneficiaries and establish a baseline for monitoring project impacts
- Restoring **community rights** for the traditional practice of **tank silt application** by getting approvals from district authorities
- **Tank silt application** on agricultural land to increase soil fertility and moisture; the silt was taken from existing water harvesting structures called tanks on common and private land
- Construction of innovative small scale **farm ponds** to harvest run-off water from fields with the aim to conserve water for irrigation
- Introduction of **horticulture** and **agro-forestry** to stabilise the microclimate through tree plantations, to provide shade and fodder for livestock and to minimise heat in summer
- Promotion of **insurances** to reduce risks from loss of assets, e.g. in the event of death of an earning family member or loss of livestock

Benefits and added value for adaptation

- Increasing soil fertility through **tank silt application** and improved water harvesting by means of innovative **farm ponds** has led to better agricultural yields. Yields of small millet and cotton have risen 20 per cent for example, and so have the incomes
- The **silt application** itself has created additional income since excavating silt is labour intensive. The project has supported communities in Madurai district to receive government funds for this physical work through the world's largest public employment programme *Mahatma Gandhi National Rural Employment Guarantee Act*
- **Insurances** provide beneficiaries with more confidence, resilience and options for action. On average a nominee gets 52,000 INR equalling 642 EUR as compensation from a life insurance in case of death. In case of livestock death the owner of the animal gets 1,600 INR equalling 19.8 EUR as compensation
- **Agro-forestry** has improved the micro-climate of the area and increased fodder availability for livestock

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

* 81 INR = 1 EUR

Silt application – excavation, transport and labour (per hectare)	8,645 INR / 107 EUR
Design and construction of farm ponds (per hectare)	74,100 INR / 915 EUR + 3,000 INR / 37 EUR maintenance (every 5 years)
Life insurance (per person and year)	100 INR / 1.2 EUR
Livestock insurance (per livestock and year)	60–80 INR / 0.7–1 EUR
Horticulture and agro-forestry establishment (per hectare)	5000 INR / 61.7 EUR + 1500 INR / 18.5 EUR maintenance for first 2 years



A newly dug farm pond

Success factors

- A **vulnerability assessment** helped in designing interventions that are environmentally friendly, based on local needs and require low investment
- **Community participation** throughout the project ensured local ownership and an increased sustainability of interventions
- **Involving local and state government institutions** in the project improved local governance and cooperation; the Department of Environment, Government of Tamil Nadu, for example, provided support to get permission for tank silt application from local authorities
- **Project experiences** were documented with the aim to improve the project's implementation – this participatory review process is called *systematisation* by GIZ

Further information

Department of Environment
Government of Tamil Nadu
www.environment.tn.nic.in

Development of Humane Action (DHAN) Foundation
www.dhan.org

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

Recommendations for project replication in the Indian context

Tank silt application from traditional water bodies has the potential of being scaled up in the Deccan plateau of Southern India comprising the states of Tamil Nadu, Andhra Pradesh, Telangana, Karnataka and some areas of Odisha, Maharashtra and Madhya Pradesh. Desilting of the 140,000 tanks in Southern India can ameliorate 5.6 million hectares of current dryland. Nevertheless, it will be important to study the traditional silt rights, current regulations and get local level authorities' permission before going for large scale application.

Rain-fed agriculture constitutes 55 per cent of the cultivated area in India. Farm ponds allow agriculture in rain-fed regions during dry periods. They can be beneficial in states with few traditional water harvesting bodies and high surface water run-off like in Odisha, Karnataka, Andhra Pradesh, Maharashtra, Jharkhand and Madhya Pradesh. However, it is essential to test the soil's water holding capacity and study climate parameters such as precipitation and surface water run-off in a region before designing and creating farm ponds. Not to forget, neighbouring land owners need to be informed and need to approve possible interventions because water harvesting in one area reduces the water flow to other people's tanks and ponds situated in lower-lying areas.