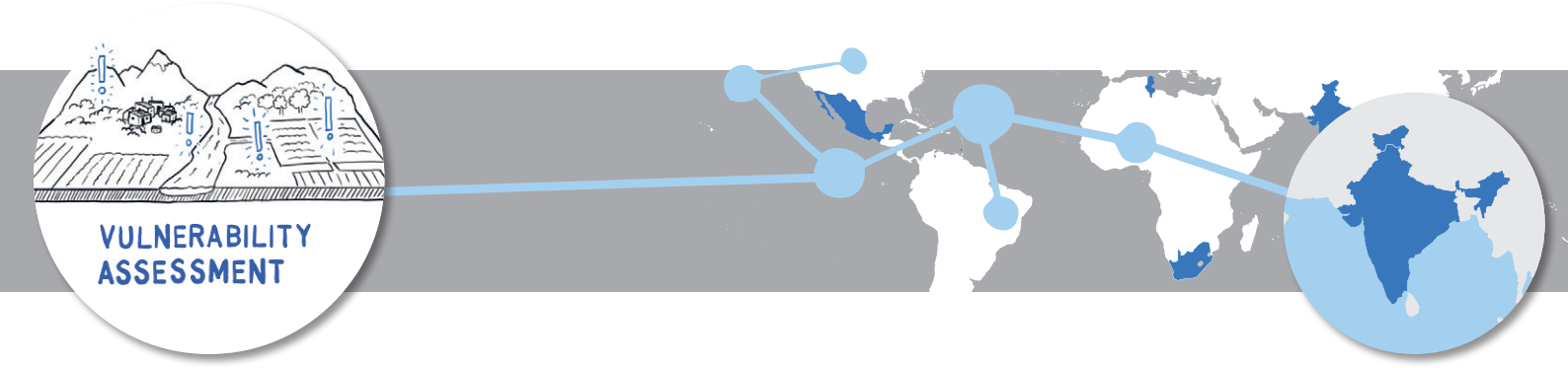

Method Brief

India: Bottom-up vulnerability assessment

Approach

The **bottom-up climate change vulnerability assessment** is part of a demonstration project on climate change adaptation in the districts of Malda and Murshidabad in West Bengal, India. The specific purpose of the pilot was to assess the vulnerability of agriculture-based livelihoods to shifting rainfall patterns, erratic rainfall and waterlogging conditions.

Scope and Entry Points

The vulnerability assessment was conducted at the outset of a demonstration project on climate change adaptation under the Indo-German project 'Climate Change Adaptation in Rural Areas of India (CCA RAI)'. The vulnerability assessment was conducted in January 2012 in three villages. The key functions of the vulnerability assessment were to prioritize and focus climate change adaptation options, to identify criteria for the selection of participating farm households, and subsequently to select a number of farm households that would participate in the project.

How it works

A range of qualitative and quantitative tools and methods were combined for the climate change vulnerability assessment, as shown in the figure. The different methods and tools provided information on the different components of vulnerability (exposure, sensitivity, adaptive capacity) as defined by the IPCC.

First, three-day-long **Participatory Rural Appraisal (PRA)** sessions were carried out in each project village. Subsequently, a **socio-economic baseline survey** was conducted among the villagers selected for the first phase of the project's implementation. **Climate data analyses** were performed to assess present climate conditions and past climatic trends in the project sites.

A **regional and micro-level assessment of waterlogged areas** in the identified villages was carried out. Topography and land uses in the villages and surrounding areas were assessed through the use of GIS and Remote Sensing tools, complemented by field trips, ground surveys and discussions with villagers.

The results of four sub-analyses provided information on the **livelihood profiles** of the three village communities, namely: to what climatic stimuli these livelihoods are exposed, how the climatic stimuli impact the livelihood base, and what adaptive capacities the communities have to deal with the impacts. In turn, this allowed qualitatively determining the vulnerability of the village communities.

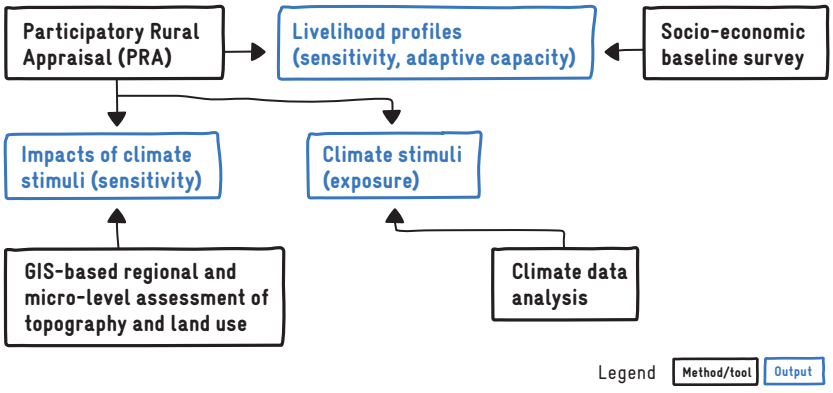

Figure: Elements of the bottom-up vulnerability assessment

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Specifics of Application

Stakeholders and institutional set-up

Coordination of the vulnerability assessment was done by the implementing NGO Development Research Communication and Services Centre (DRCSC) in Kolkata. Work on the different components of the vulnerability assessment was led by experts in the respective fields. Local NGOs were responsible for mobilizing villagers and facilitating the PRA sessions. Local stakeholders were involved through the PRA and for verifying specific data and information (e.g. land use, waterlogged areas). The **GIS-based regional and micro level assessment** was conducted by two university researchers. **Climate data analysis** was done by a DRCSC staff member.

Input

- **Time:** In total, about four to five months were needed from inception to completion of the final vulnerability assessment report.
- **Data:** Topographic and land use analyses of the project villages were based on the publicly available data sources. Climate data on district level for the years from 1961 to 2011 were obtained from the Indian Meteorology Department (IMD) upon request.
- **Personnel intensity:** The personnel requirements of the assessment were moderate. Apart from five NGO representatives, two university researchers were involved in the assessment.

Output

The final output of the vulnerability assessment consisted of a vulnerability assessment report including:

- Geo-referenced **maps** of the project villages indicating areas vulnerable to waterlogging
- **Diagrams of climatic variables**
- **Diagrams of socio-economic baseline data**

Capacity required and ease of use

Expertise for PRA, household surveys and climate data analysis can be provided relatively easily by NGOs working on climate change adaptation. GIS-based assessments, on the other hand, require special knowledge and must therefore be contracted to external consultants.

Conclusions for future Application

Outcome and added value

The integrated results of the vulnerability assessment were used to **identify and adjust the most suitable adaptation options from a wide selection of options** and to select the beneficiaries for the demonstration project's first phase.

Cost-benefit ratio

The complete vulnerability assessment incurred costs of about Euro 4,400. More than 80 % of the total cost of the vulnerability assessment was spent on the GIS-based regional and micro-level waterlogging assessment. Most of the required results were obtained through PRA exercises in the project villages. In this light, it remains doubtful whether the relatively high costs of the waterlogging assessment are justified.

Potential for replication

PRA tools can provide essential information on community's vulnerability to climate change. Since PRA exercises can be carried out by skilled personnel, who are often available in NGOs, they provide a high potential for replication.

It cannot be expected that the required high expertise input for GIS-based assessments is present in organizations that implement climate change adaptation projects. Hence, these assessments incur additional costs for external consultants. Moreover, certain necessary data, e.g. high-resolution Digital Elevation Models, are often not available.

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