

CLIMATE CHANGE ADAPTATION
IN RURAL AREAS OF INDIA

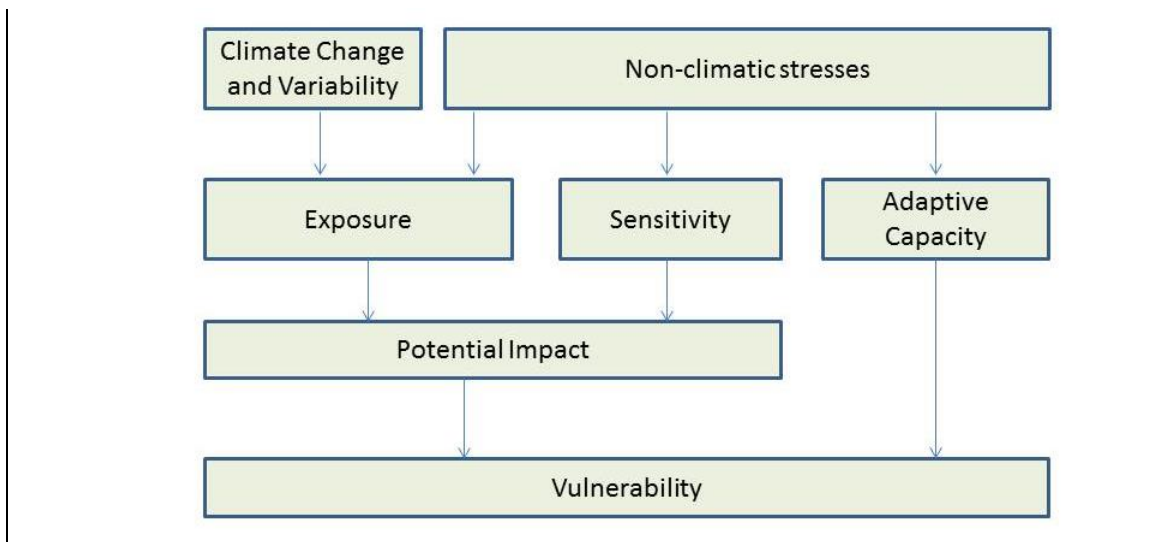
Vulnerability Assessment of “Technical Intervention for resilient village institutions through eco-restoration and sustainable livelihoods” for tribal communities of Mandla District

Title of project:	Technical Intervention for resilient village institutions through eco-restoration and sustainable livelihoods
State:	<i>Madhya Pradesh</i>
Location:	<i>Niwas Block, District Mandla,</i>
Project duration:	<i>Dec 2011 – Nov 2013</i>
Project implementing agency:	<i>Foundation for Ecological Security</i>

Definition of Vulnerability according to IPCC Fourth Assessment Report:

Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of **exposure** to climate stresses, **sensitivity** and **adaptive capacity**. Vulnerability increases as the magnitude of climate change (**exposure**) or sensitivity increases, and decreases as adaptive capacity increases. **Sensitivity** is the degree to which a system (e.g. a community or ecosystem) is affected, either adversely or beneficially, by climate variability or change. **Adaptive capacity** is the ability of a system to adjust to climate change and climate variability to mitigate potential damages, to take advantage of opportunities, or to cope with the consequences.

Figure 1: Conceptual Framework for Vulnerability



1. Methodology (2-5 pages)

1.1. Boundary of the Vulnerability Assessment

The analysis aims at studying the vulnerability of tribal communities located in the upper catchments of Gaur river in Niwas block of Mandla district towards erratic rainfall. However, the analysis also has relevance for the entire Mahakuahsal region which comprises of 5 districts of Eastern Madhya Pradesh, which fall in same meteorological division and share undulating topography, rich in biodiversity and forest.

1.2. Overall approach

The overall approach of this assessment is in line with what IPCC defines vulnerability as. In order to understand exposure, sensitivity and adaptive capacity of the region, the team has taken a people-centric approach and has tried to assess people's vulnerabilities both from the field as well as from the data available under public domain. Our ground work would primarily consist of collecting household data and village institution data to understand and present an analysis on the factors contributing to the region's vulnerability keeping in the mind the three elements of vulnerability studies viz. exposure, sensitivity and adaptive capacity. This bottom-up approach would be complemented by the top-down

approach which would primarily consists of desk research for finding and analyzing existing meteorological data, other data from government agencies and interviews of higher authorities.

Table 1: Tools used for the Vulnerability Assessment

Method (e.g. PRA, GIS, household survey)	Tools (e.g. Community Mapping, Focus Group Discussion, Questionnaire)	Purpose What did you want to find out by applying the tool? (e.g. changes in cropping pattern and income)	Output (e.g. resource maps, reports, trend graphs, experience from the communities)	Specify data and source of Information (e.g. Qualitative information from community members and quantitative information e.g. rainfall data from IMD)
PRA	Timeline preparation	Role of institutional control measures in conservation of natural resources	Time line of resource in terms of loss or gain of biodiversity, NTFP production and village level regulations around forests	Qualitative information from community members
Ecological baseline protocol	Forest plot survey, biodiversity and biomass assessments	Ascertaining the level of degradation of forests.	Ecological baseline	Primary data from forest
Household economic analysis	Questionnaire and Focus Group Discussion	Assessing the adaptive capacities of households.	Vulnerability profiles on the basis of Income and expenditure and occupation	Data based on Household survey
Farmer questionnaire	Household survey, Observation, Focus Group discussion	Risks of the present the agriculture system level due to erratic rainfall across socioeconomic categories	Developing crop level profiles enlisting impact of erratic rainfall (heavy or scarce) on various critical	Farmer interview

			crop stages	
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2. Results of the Vulnerability Assessment (2-5 pages)

2.1 What are the non-climatic factors (sensitivity) the communities are exposed to?

The villages have weak village institutions which are making the government schemes as well as efforts of local NGOs less effective. This is further creating more risks for the tribal communities which are traditionally dependent on forest for their livelihood and other ecosystem services. Since this dependency is not sustainable and the poorest among the poor would be most vulnerable to economic shocks in case any shortage or ban is imposed on the collection and sale of NTFPs or any other ecosystem services.

The agriculture is also shifting towards high input-high output agriculture which is making the villages more sensitive towards erratic climatic events. The region also comes under the catchment area of Narmada basin which itself faces water stress situations as indicated in the State Action Plan of Climate Change. Not having enough storage capacity for water and not having systems which would ensure judicious use of water, topped up by rising trend of high high output agriculture aggravate the existing crisis and increase the vulnerability of the poor.

From last few years, with the advent of high input high output agriculture, farmers have shifted to longer duration varieties of paddy, which would mean that they can sow rabi crops only in November. This makes rabi crops susceptible to frost and wilting, especially in pulses.

2.2 What are the additional climatic stresses (exposure) the communities are exposed to?

The primary occupation of the region is agriculture which is predominantly rainfed and erratic rainfall in recent years has heavily impacted agriculture. Rainfall in Mandla has been shown to be erratic for the initial and final months of monsoon season

which raises serious concerns in terms of field preparation and seed viability. There has been reduction in pre-monsoon showers causing the level of moisture required to prepare the paddy fields going down. The region also has a low potential for surface water storage owing to its high drainage density which also amplifies the impacts of intense rainfall resulting into heavy runoff. This further accentuates soil degradation and silting downstream. The region also faces the problem of frost during winters that ruins winter crops.

2.3 What are the potential impacts of climate change and variability (determined by exposure and sensitivity) in your project area?

Reduced crop yields, damages to crop and infrastructure due to water logging, nutrient loss and soil erosion due to intense rainfall, frost and water stress etc. increase the burden on subsistence farmers. These impacts especially on agriculture forces the communities to further exploit forest resources resulting in forest degradation. The region faces seasonal and regular water stress situations. Intense rainfall with lesser number of rainy days leads to increased soil erosion. The erratic rainfall also affects the soil moisture and any intense spell in the last month can adversely affect winter crops such as maize which needs less soil moisture. The forests and the common lands are fast getting degraded owing to soil erosion, biotic pressure for fodder and fuel wood and gradual integration of governance of common properties.

2.4 What adaptive capacities exist in your project area?

“Panchayat extension to scheduled areas act” which applies to Mandla district allows village institutions to take charge of the natural resources, conserve them and use them judiciously. The diversified livelihood systems that families have been practicing continue to add to the adaptive capacities of the farmers.

However, there is lack of required skills, knowledge about improving the livelihoods in a manner that would negate climate change impacts.

The project area has a lot of scope in planning and implementing adaptive capacity building strategies. There is vast scope in

improving the land use which would improve crop yield and strengthening village institutions to discuss and plan on judicious use of natural resources. They can be engaged in discussion with higher government authorities and carve byelaws as per resources use. Communities can be further mobilized for storage of NTFPs, grains and seeds and an ecological monitoring system can be set up by village institutions. Improvement in agriculture practices and diversification of agriculture on all kinds of lands, introducing agro-horticulture and agro-forestry can be another adaptation strategy that can be implemented. Strengthening the governance of common resources and diversifying the livelihood portfolio are other adaptation strategies that can be implemented.

2.5 What coping strategies does your community already use?

Historically, the village institutions have been preparing the communities for adapting to climate change. The farmers have been practicing mixed cropping in their backyard which is risk mitigation strategy.

Summary of VA results (up to 5 sentences)

The vulnerability of the project area is primarily due to erratic climatic events which are aggravated by the presence of a weak village institutions and lack of a strong knowledge base. The results also show that adaptation strategies need to be designed with a community-oriented approach so that the villages become more self-dependent.

3. Use of Results (0.5-1 pages)

The VA results would be used to design and implement activities that specifically work on counteracting the impact of erratic rainfall, drought conditions, containing soil erosion and strengthening village institutions for building conservation ethic, in order to control the forest degradation and fragmentation. Building models to interlink farm and demonstrations on commons for reducing soil erosion.

Our results of the Vulnerability assessment can also be linked with government schemes such as MNREGA for preparing a climate proof planning for village institution. The results of Vulnerability assessment can be compared with another vulnerability assessment carried out in future which would create more scope in understanding the dynamics of changing vulnerability patterns as well as effectiveness of the adaptation strategies being implemented.

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