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CO- DRIVE-PD - AN EFFECTIVE TOOL FOR VULNERABILITY ASSESSMENT

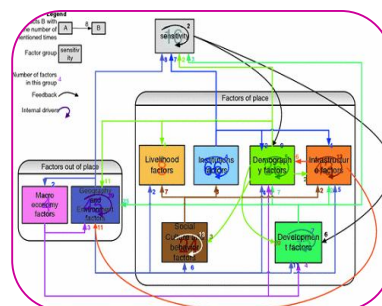
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ABSTRACT

Climate Change has its own effects on the nature in general and human being in particular. The level of vulnerability created due to climate change decides resilience capacity of individual or community's'. Vulnerability assessment is essential for facilitating better adaptation practices. The Tool developed by Watershed Organization Trust (WOTR) is very robust tools to conduct participatory vulnerability assessment.

KEY WORDS: Watershed Organization Trust (WOTR) , Weather variations and extreme weather.



METHODOLOGY

A case study of application of tool "CoDrive- Program Designer conducted in 2014-15.

INTRODUCTION

Weather variations and extreme weather events will continue to exert stress on human societies and the environment alike thereby making these even more vulnerable. This is a serious problem for developing and emerging countries, particularly for the climate change hotspots. It is critical for India being a hotspot and especially for people living in dryland regions.

THE CONCEPT OF VULNERABILITY

According to the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report, Appendix B in Watson et al., 1996), vulnerability defines 'the extent to which climate change may damage or harm a system; it depends not only on a system's sensitivity but also on its ability to adapt to new climatic conditions'. The Collins English Dictionary (Second Edition, 1986) defines vulnerability as, inter alia, the 'capacity to be physically or emotionally wounded or hurt'. It means that vulnerability is defined primarily by the prior damage (the existing wound) and not by the future stress (any further attack). **W. Neil Adger(2006) has** the opinion that, 'The concept of vulnerability is powerful analytical tool for describing states of susceptibility to harm, powerlessness, and marginality of both physical and social systems towards the effects to Climate Change. At the same time, it helps to motivate and guide to find out the solution or adaptation. **Antoinette L, Brenkert and Elizabeth MaloneL (2005) are defining** "Vulnerability is the likelihood that an individual or group will be exposed to and adversely affected by a hazard. It is the interaction of the hazards of place (risk and mitigation) with the social profile of communities."

Climate variability and extreme and sudden weather events are inherently less predictable or unpredictable and hence cannot be controlled. Today these pose a threat to the expected impacts of developmental interventions. Given this, a lack of proper understanding (and hence preparedness) regarding climate change variables can infuse the intervention with un-addressed and uncontrolled vulnerabilities, resulting in harmful impacts. Expected outcomes will vary significantly from the anticipated results and may even result in failure. Thus, scarce funds are wasted and precious time is lost.

While attempting to acknowledge and understand this looming threat, WOTR found a need to factor in an evaluation of key vulnerabilities early on in the project design and integrate these variables within the project framework, so as to minimize adverse impacts and thus have better control of the project achievements and the desired outcomes.

ABOUT THE TOOL

Conceptually, CoDrIVE-PD is a community driven tool necessitating assessment and grading of the livelihood capitals to be done by the community, while making them aware of their vulnerability and potential resilience to climate factors. It documents their knowledge of the local climate trends, coping responses, and history. This utilisation of community and stakeholder perceptions and knowledge helps the practitioner identify links and interdependencies of the human and environmental components of the system. **Operationally**, CoDrIVE-PD helps anticipate and reduce the risks arising from climate change; it helps incorporate a sustainability angle, especially in “no or low regret” interventions. It helps develop the ‘big picture’ and formulate near to-accurate interventions for mid-course corrections, monitor and evaluate projects, draw lessons for future work, and essentially ensure that funds are used appropriately and efficiently. **Practically**, Project implementation and management, especially in the context of managing climate impacts and risks, needs a holistic ecosystem-based approach.

Case study

I. Description of the area:

Area of study: Math jalgoan Village, Block- Ambad District, Jalna.

Location: 19 km from block place and 25 Km from District place.

Geographical Area: 1169 hectares, predominantly flat land with slide undulation. There is 254 ha adjoining forest land. 49 ha area grazing land (encroachment by community)

Demography: Households (HHs): 216. Total Population – 1076 (Male- 543, Female-533)

Land holdings: 24 percent large farmers, 24 percent middle farmers, 24 percent small and marginal farmers, and 28 percent are landless.

II. What is happening to the environment and why?” Building a vulnerability context

i. Agriculture sector

A) Past History (25–30 years ago): For the villagers of Math Jalgaon the main source of living was rain-fed agriculture, with a system of mixed farming. The main agricultural crops were sorghum (jowar), Bajara, Country Cotton, Kardi, Rice, Groundnuts, other minor millets, and pulses. Local varieties of seeds were sown and yields were small when compared to yields from hybrid seeds used now. The farmers stated that they never used pesticides or excessive fertilisers as they did not need them; the soil was fertile and healthy. Sowing method- Traditional methods with bullocks, wooden equipment’s etc. The common diseases observed are- Mava and Tambera . The farmers were shared that they are using groundnuts and Kardai for household purpose. The production of Country cotton is 1-2 qtl/ Acer with market rate of Rs 3—50 /qtl. The production of Bajara is 1-2 qtl/acer, with market rate of Rs 25-30 /qtl. There were only 5 wells in village for

irrigation purpose. The farmers were using traditional method for irrigation. Only 0.20 ha area could irrigate with this method.

B) Present Status Kharif season Crops- Over the last 25 years the crops have been change. The major change is that the BT Cotton is introduced in this area. The other crops like Maize, Groundnuts, Onion and Wheat are also introduced. The Horticulture is also well developed in this area. Pomegranate and Sweet Lemon are the main horticulture varieties. The cultivation method has been changed. It is more mechanised. The hybrid seeds are introduced. Farmers are using the chemical fertilizers.

LIVESTOCK

A) Past History (25–30 years ago): As the farming system was predominantly mixed farming, a prime component was the rearing of cattle for farm-animal production, coupled with small ruminants, and native poultry. This was found in every household. Livestock production was entirely a grazing-based system. The village had large tracts of land left uncultivated and there were more agriculture fallows, both of which were used as common grazing grounds. Bullocks played a critical role and were used for farming, transport, pumping water, manure, and fuel. Besides cattle, indigenous buffaloes and goats were kept by all households. Milk yields, as reported by communities, were around 3–5 litres/day for indigenous buffaloes and 1-3 litres/day for indigenous cows. As there was no market for milk it was consumed at home; however milk products were sold at local market. The joint family supports the livestock rearing.

B) Present Status: Around 40 % families' livestock. 20% families are having milk animals. The reasons for reducing the livestock are uncertainty in rainfall, change in cropping pattern, separation in family etc.,. The private grazing land is also the less fodder available on common land due to encroachment. Milk consumption at house hold level is reducing. Selling is increased.

ii. Forest Resources/Biodiversity

A) Past History (25–30 years ago): Different varieties of forest species and medicinal plants on forest as well as on common land - as Azadirachta indica (neem), Tamarindus indica (tamarind), Mahaduk, Bor, Jambhul, Bel, Kawath, Pimpal etc.,. With regard to food supplements, women shared that availability of fruit trees and tamarind contributed significantly to the food of the communities. Wood is available for house construction, and agricultural equipment's locally.

B) Present Status: With the expansion of agricultural activity, most of the trees species that once existed in the fallows and village common lands have been cut down

iii. Fishery

A) Past History (25–30 years ago): The villagers were doing fishery for house hold consumption in river and percolation tank. The varieties like Murali , Dhok and Wambat are available. After 90s the commercial fishery is introduced.

B) Present Status: The fishery is done by Cooperative society in percolation tank. Apart with local Murali, Dhok, and Wambat the Supernus an Hybrid variety is introduced. It is emerged as new livelihood source for some families

III. Key Drivers and Pressures (Sectoral only): Why is this happening?

Drivers:

Govt subsidy, availability of Hybrid seeds for higher production, and availability of mechanisation equipment of agriculture have been identified as key drivers of change. Apart from the common drivers such as market demand, improved education and agriculture subsidies, etc.

Pressures:

Arising from this, some of the key pressures identified were:

- Increasing demands and requirement of Cash,
- Increase in crop losses climatic hazards
- Reduction in grazing land (common & private) and fodder,
- Increasing nuclear families- Labour shortage,
- Limited livelihoods sources,
- No spare time for self-fisheryetc.

These drivers and pressures are causing changes that induce maladaptive pathways or are acting as barriers for beneficial adaptation, increasing the vulnerability to climate change.

IV. The climate earlier?

Communities said that 20–30 years earlier the impact of climate was fairly manageable in the sense the three different seasons were clearly distinguishable and so was the arrival of the monsoon. The temperature too was somewhat normal according to the season.

V. Climate risks/hazards identified from 2000 till date

The major climate risks identified by the communities are given below. They observe that since 2000 there is an increasing trend of (i) irregular rainfall, with prolonged dry spells followed by drought conditions. (2003, 2005, 2009, and 2012) More recently they noted temperature fluctuations with very hot summers in some years (2012) and cool summers in others (2006). In last year they have observed Hailstorm (2013)

VI. Responses - what is being done and how effective is it?

Adaptation responses to climate risks identified and impact felt	Efficiency and sustainability /effectiveness	Vulnerability of ecosystem	Vulnerability of communities	List of livelihood resources /strategies essential to coping
Distress migration for wage labour work	Effective (temporarily); not sustainable	Decreases temporarily	Decreases temporarily	Local non-farm livelihood options as 2 nd livelihood, local biodiversity (trees), CPR development, small stock rearing, improving agriculture skills that attract better wages
Taking loans for agriculture inputs	Effective (temporarily); not sustainable	Increases	Increases	Farm-yard compost, local seed and grain (traditional) banks, crop storage houses, crop diversification, tree based farming, etc.
Selling of cattle	Effective (temporarily); not sustainable	Both increases and decreases	Increases	Fodder plots, livestock management systems, community chaff cutters, fodder storage units
Multiple sowing with new seed varieties	Not sustainable; not effective (sometimes seeds sown are not suitable to the existing biophysical conditions of the region)	Increases	Increases	Indigenous seed varieties, seed banks, better knowledge and application of crop contingency planning; locale specific Agri-met advisories; local Agri-knowledge service centers
NREGA job cards, watershed projects	Effective temporarily; not sustainable	Decreases	Decreases (temporarily); unless	Alternative livelihoods and skill development; asset creation

	as people are engaged for a few days in a year		interventions improve land productivity, e.g. WSD activities)	
Govt. help/claimed loss from govt.- Crop insurance	Effective (temporarily); not sustainable	No Impact	Reduces temporarily	Local farmer knowledge and service centres
Selling dairy cattle in summer and buying them back in the monsoon season	Seems effective from ecosystem point of view but sustainability needs to be explored	Decreases	Immediately decreases at time of sale, increases at time of purchase	Pasture land protection and management on an annual basis; a temporary method of giving them to other farmers/villages to tend, on a payment for services basis
Increased use of chemical fertilisers and pesticides to increase crop production	Effective initially; unsustainable	Temporarily decreases	Temporarily decreases	Knowledge of good agriculture practices, compost pits, indigenous livestock, mixed farming system

VII. Sensitivity Analysis of the main livelihood resources

A. Level of Analysis: Watershed Level

Based on the data elicited for both communities and secondary literature for the village of Math Jalgaon, the main livelihood resources are classified under the capitals and graded based on functionality/availability in the following categories.

Capital-based Resilience Scale:

1 = nil (10% and below), 2 = minimum (10-30%), 3 = low (30-50%), 4 = medium (50-70%), 5 = high (70% & above)

List Resources under each capital	1	2	3	4	Notes on how sensitive/essential for coping are the resources
Natural Capital :					
Forest area		2			Local biodiversity (trees), water bodies, common property resources, and grazing lands are directly affected by climate risks. They are sensitive and are essential for coping.
CPR		2			
Water bodies	1				
Pasture/grazing lands		2			
Physical Capital					
Watershed (soil & water conservation) structures		2			All are very essential for coping but are not directly affected by the climate risks that occur in the region
health service center	1				
Farmer knowledge & service centres	1				
Social Capital :					
SHGs	1				All get affected by climate risks indirectly
Farmers groups- informal	1				
Human Capital :					

Knowledge on crop diversification, tree-based farming, water efficient technology management, pasture land management skills, application of crop contingency planning; locale specific Agri-met advisories		2				All get affected by climate risks indirectly
Financial Capital :						
Funds with GP and other CBOs		2				All get affected by climate risks indirectly. However are affected by availability of government/donor projects

VIII. Arriving at the Vulnerability Code

The vulnerability codes based on the livelihood resources at village level and vulnerable group level are:

Financial Capital	Human Capital	Natural Capital	Physical Capital	Social Capital
Less own funds are available with local CBOs for developmental activities	Human capital with respect to climate-sensitive livelihoods is low: most of the knowledge is increasing maladaptation, with climate change increasing the risk CBOs like the VOs have no knowledge of climate adaptive strategies to use the fund effectively;	No forest lands Minimal availability of common property resources Low in local biodiversity Ground water scarcity very high Natural water bodies decreasing/drying up Degrading cultivable lands (problems of soil fertility, salinity, etc.)	Physical capital with respect to education, transportation and institutions is adequate However physical capital with respect to climate sensitive livelihoods is very low Seed banks and agricultural warehouses are located very far away There are large numbers of bore wells but no recharge structures	No farmers clubs/cooperatives Un organised women and youths
2	2	2	2	1
Risk	Risk	Risk	Risk	Danger

Note: Vulnerability color coding Index for indicating Vulnerability based on Capitals: Red – Danger (1), Orange – Risk (2), Yellow – Alert (3) , Blue – Stable (4) , Green – Safe (5)

IX. How the results will be helpful

a. Natural Capital Enhancement:

These are some possible areas of interventions, to protect the resource base and adapt to climate change;

- Implement watershed development (soil and water conservation) measures wherever possible, particularly in high-potential recharge zones, with first priority to bore well and well recharge measures.
- Identify and revive small irrigation sources such as farm ponds and tanks (both private and government-owned).

- Promote local biodiversity tree species as avenue plantations on farm bunds or in CPRs in the village to enhance the tree cover, biomass, and soil moisture. This will also provide alternative livelihoods, inputs for agriculture, and food security for communities.
- Provide agro-advisories based on locale-specific weather data and improved agricultural practices.

b. Physical Capital Enhancement

With soil and water conservation structures the other essential physical capitals that need to be developed are the Farmer Service Centre that attends to agricultural and allied needs, storage houses for Agri-produce, community grain banks, establishment of fodder banks by enterprise management of crop residue, and improved drinking water facilities in the villages.

c. Social Capital Enhancement

Most of the institutions are managed and dominated by the forward and better-off communities which are quite knowledgeable about new agricultural and other farming practices. There is a need to strengthen SHG groups located in the hamlets and to increase their capacity to access schemes from existing VOs as they do not seem to derive adequate benefits from these.

d. Human Capital Enhancement

There is a lack of knowledge and awareness of sustainable farming practices including traditional cropping patterns and storage practices. The farmers seem to grow only a few varieties of crops resulting in soil degradation and water scarcity. They purchase seeds based entirely on market information or exposure to government schemes; and the large farmers set the example for the medium, small and marginal farmers. As input costs are increasing for agriculture and animal husbandry, which are needed to meet food and nutrition security, capacity building is required for to improve productivity of indigenous cattle and buffaloes, LEISA techniques in agriculture, collective enterprise development, and crop-water budget based agricultural production.

e. Financial Capital Enhancement

The village requires viable alternative livelihoods. These should be so selected that they meet the various needs of a cluster of villages, which villagers otherwise seek outside. Finances (loans and/or grants) are required to create the human, natural and physical resources that will create sustainable livelihoods from skills and services provided, that meet village needs and also ensure that the primary livelihoods – sustainable agriculture and livestock systems – are viable. Women, small and marginal farmers, and the landless are the important groups to focus on.

f. Research areas

The current vulnerability assessment report acts as a baseline report and will help monitor project progress. When applied during project implementation, it suggests mid-course corrections and provides leads for action research based on interventions identified.

g. Policy advocacy pointers

The chief policy advocacy indicated is for identification of CPRs and their revival, and lobbying for

- Appropriate indigenous varieties of food crops and local livestock breeds with potential, together with a variety/breed improvement programme, as they have greater resilience to climate factors.
- For feed supply, animal and human health care infrastructure, and services.

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