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Community based climate change vulnerability assessment – tools and methodologies;

Enhancing community adaptation to climate change

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Background to the development of CBVA tools and methodologies

Ministry of Environment, Nepal implemented a technical assistance project since 2009 called **"Strengthening Capacity for Managing Climate Change and the Environment," with ADB assistance**

The TA focuses on

- establishing the right institutions to support the Government's management of climate change and environmental management
- provides supports for building knowledge base for climate change through downscaled modeling and
- raising awareness across the country of the impact of climate change on lives and livelihoods

As part of the institutional framework of the government, one of the visions was to have local governments equipped with capacity to plan for adaptation. Practical Action, WWF, IUCN, CECI, and the Association of Village Development Committees in Nepal had the opportunity to work with MoE and ADB to develop CBVA tools and methodologies

Scope of work

- Agreement of Framework CBVA tools and methodologies among the national stakeholders
- Piloting of the methodologies in 4 ecological zones
- Methodologies refinement and
- Dissemination and training

Climate Change Vulnerability
The theoretical basis

According to IPCC, Climate change vulnerability (V) is a function of

- the character, magnitude and rate of climate variation to which a system is *exposed (E)*,
- its *sensitivity (S)* and
- its *adaptive capacity (A)*

OR

V $\propto$ Climate Change

V $\propto$ Sensitivity of the system and

V $\propto \frac{1}{Adaptive\ Capacity\ of\ the\ system}$

OR

$V = f\left(\frac{E * S}{A}\right)$; where "V" is vulnerability to climate change

Community based vulnerability assessment (CBVA)

In order to enhance adaptation, the variables of Vulnerability are to be assessed

- *Climate change* at local level
- *Effects of climate change* at local level for sensitivity assessment and
- *Adaptive capacity* of the community based on their livelihood assets

CBVA assesses community vulnerability and its variables based on the community perception and evidences. The *Variables (E, S and A)* of Vulnerability and the *Vulnerability (V)* are categorised at 4 levels based on community perception and the numerical values are used in the equation

- Low or 1
- Medium or 2
- High or 3 and
- Very High or 4

The numerical values also provide basis for comparison of the *vulnerability (V)* and its *variables (E, S and A)* between the communities

Elements of Exposure, Sensitivity and Adaptive Capacity

Exposure (local climate change and variability)

Temperature	Precipitation	Plants/ animal behaviour as proxy indicator	Hazards	Livelihood activities	Physical information

Sensitivity (effects of changes at local level)

Agriculture and food security	Forest and biodiversity	Settlement and infrastructure	Water and energy	Human health

Adaptive Capacity (livelihood assets)

Human Resource	Natural Asset	Social assets	Financial assets	Physical assets

Participatory tools for CBVA

CBVA uses Participatory Appraisal Tools to assess the Variables of Vulnerability to get information on changes. Some of the relevant and appropriate tools are

- Seasonal calendar
- Hazard prioritisation
- Cause and effect analysis
- Historic time line assessment
- Hazard mapping
- Resources mapping
- Livelihood assessment
- Institutional assessment

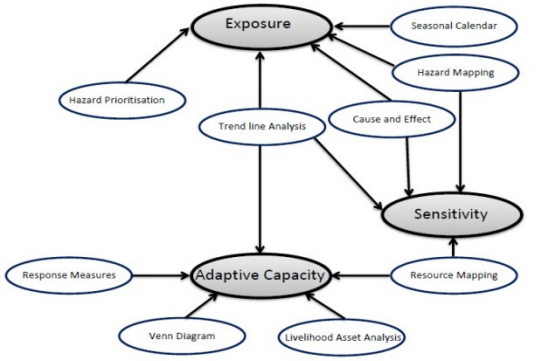
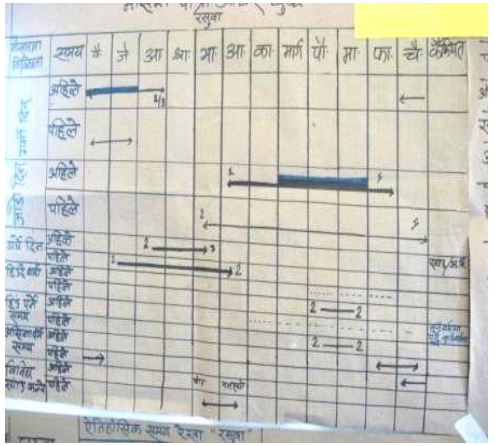
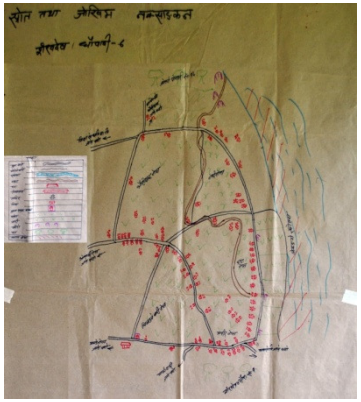
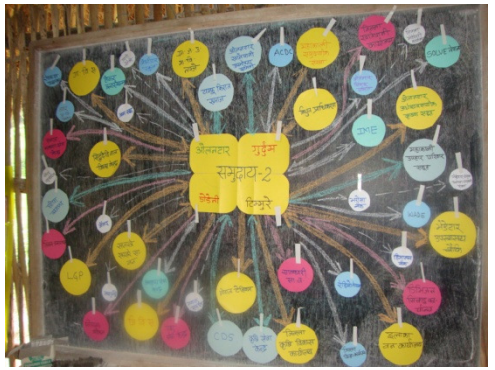


Fig 1: An illustration of linkages of PRA Tools and Components of vulnerability in respect to information generation.



Some of the tools are multipurpose which can be used to derive information for all 3 variables of vulnerability





An example of CBVA

Assessment of climate variables (or elements of E)

Parameter	Indicators used	Perceived changes/ Remarks	Score Index / Remarks
Temperature	• Hot days/ Summer season (increased in number of days/weeks)	Very high (4)	**2.75 (High)**
	• Cold days/ winter season (winter becoming shorter)	Medium (2)	
	• Cold wave (intensity of cold waves decreasing)	Medium (2)	
	• Fog (highly reduced, not as dense as before)	High (3)	
Precipitation	• Monsoon Rainfall (increased – short duration with high intensity)	High (3)	**3.5 (Very High)**
	• Winter Rainfall (decreased and have become uncertain)	Very high (4)	
Climate induced disasters	• Flood and landslides	Very high (4)	**2.66 (High)**
	• Wind	Medium (2)	
	• Hailstones	High (3)	
	• Lightening	Medium (2)	
	• Drought	High (3)	
	• Fire	Medium (2)	
Livelihood activities	• Changes in planting dates of crops	Very high (4)	**4 (Very high)**
Indicators Plants and animals	• Flowering and fruiting behavior of indigenous plant (early flowering in Kabro and Rhododendron)	Very high (4)	**3.3 (Very High)**
	• Appearance and disappearance of species (wide spreading of Ageratum and Eupatorium species , two unknown (unidentified weeds) in agriculture and forest lands	Very high (4)	
Physical information	• Volume of water in water bodies (increased during rainy reason and decreased during winter season)	Medium (2)	**2 (Medium**
	Average Exposure Index	**High**	**2.94**

Sensitivity Assessment (elements of Sensitivity)

Parameters	Hazard	Indicators Used	Perceived Change/ Remarks	Score Index/ Remarks
Agriculture and Food security	Flood/landslides	Loss of agriculture Lands/ productive land/ paddy field	3 (High)	**2.25 (High)**
	Drought	Loss of Crop Production	2 (medium)	
	Wind and hailstones	Crops flower lost, decrease in production, impact on livestock	2 (medium)	
	Out break of diseases	Production decline	2 (medium)	
Forest and biodiversity	Flood/landslides	Loss of forest area coverage	2 (medium)	**2 (medium)**
	Drought	Alien species invasion and enhance forest fire	2 (medium)	
	Fire	Forest biodiversity lost	2 (medium)	
Human settlement and infrastructure	Flood/landslides	Settlement at risk, wiped out houses, irrigation canal structure damaged	2 (medium)	**2 (medium)**
	Wind/ hailstones	Roofs of houses taken away	2 (medium)	
	Lightening	Electrical goods damaged	2 (medium)	
Water resources and energy	Flood/landslides	Loss of fresh water spring	3 (high)	**2.66 (high)**
	Drought	Loss or reduction of fresh water spring	3 (high)	
	Wind/hailstones	Wind mill, solar panel damaged	2 (medium)	
Health	Flood/Landslides	Emergence of water borne disease and skin related diseases	3 (high)	**3 (high)**
	Drought	Emergence of skin related diseases	3 (high)	
Cross cutting issues	Flood/landsides	Mobility to children, elderly and women, affected disease victim	3 (high)	**3 (High)**
	Drought	Access to water and burden to women	3 (high)	
Average Sensitivity Score			**High**	**2.4**

Adaptive Capacity (elements of Adaptive Capacity)

Parameters	Indicators used	Criteria	Perceived changes / Remarks	Score Index / Remarks
Human Assets	Demography	Old age and children population	3 (high)	**2.33**
	Education and literary	Secondary education and awareness on climate change	2 (medium)	
	Skill labor		2 (medium)	
Natural Assets	Water	Availability of drinking and irrigation water	3 (high)	**2.66**
	Forest	Availability of Fodder/ Forage/ Litter, fuel wood	2 (medium)	
	Land	Bari and khet land ownership and productivity	3 (high)	
Social Assets	Social Institutions	Community Affiliation to formal and informal institutions	3 (high)	**2.5 (High)**
	Service Provider	Engagement of GOs/NGOs/INGos with community	2 (Medium)	
Financial Assets	Financial Institutions	Bank, cooperatives, saving/credits groups	2 (Medium)	**2 (medium)**
Physical Assets	Infrastructure for services	Access to school, house, bridge, road, irrigation, electricity, biogas, community taps, vehicle availability	2 (Medium)	**2 (medium)**
	Information and communication source	Access to mobile, radio, TV and papers	2 (medium)	
Average Adaptive Capacity Index			**High**	**2.3**

Vulnerability

$$V = E \times S \times \frac{1}{A}$$

= 2.94 X 2.4 / 2.3

= 3.07

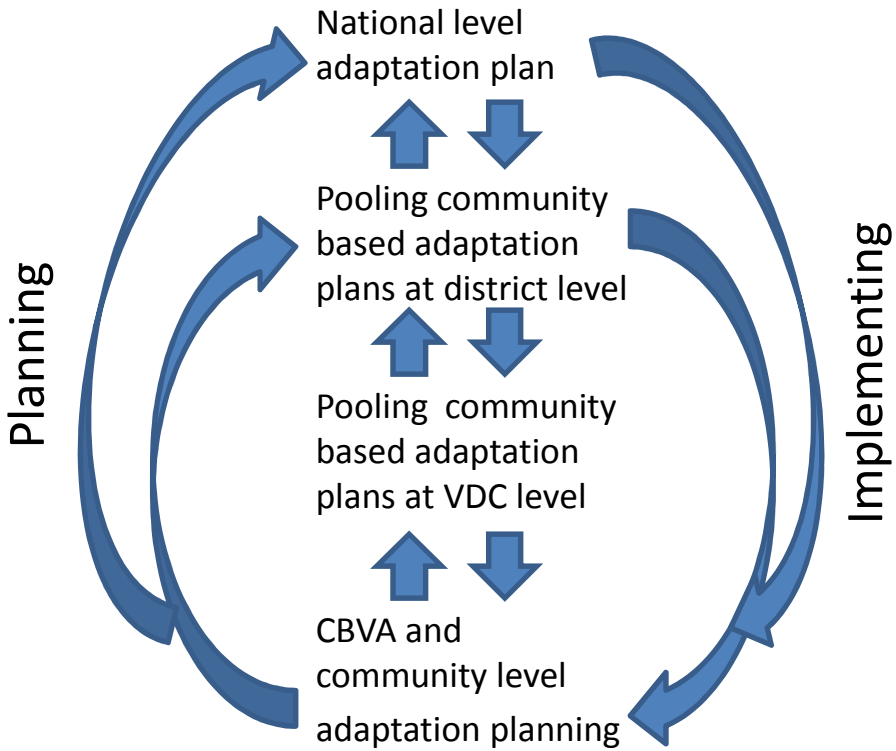
Vulnerability is HIGH

Vulnerability (V)	Grouping
Low	<1
Medium	1- 2
High	2-4
Very high	>4

Adaptation planning

Priority Climate element/ and induced Hazard	Impact Area and threat	Adaptation plan				Financial resource	Partner organisations		
		Activity	Where	When	Level		Community	GOs	NGOs

Mainstreaming or integrating adaptation plans into development plans and process



Conclusion

- Capacity building is required for adaptation planners and implementers on
  - CBVA – tools and methodologies
  - Adaptation Planning
  - Mainstreaming or integrating adaptation plans into development
  - Resources mobilisation
- A groups of resource persons are also needed at district level to support the local (district and village) level planners and implementers
- The support agencies such as the government line agencies, non-government organisations and community based organisations also need build their capacity in mobilising their resources to best help / support the communities

Thank you

- **Exposure** is the nature and degree to which a system is exposed to significant climatic variations

- **Sensitivity** is the degree to which a system is affected, either adversely or beneficially, by climate-related *stimuli.* The effect may be direct (e.g. a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g. damages caused by an increase in the frequency of coastal flooding due to *sea-level rise*)

- **Adaptive capacity** is the ability of a system to adjust to *climate change* (including *climate variability* and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences

Since 2009 the Ministry of Environment has been implementing a technical assistance project called "Strengthening Capacity for Managing Climate Change and the Environment," with ADB assistance. The TA focuses on establishing the right institutions to support the Government's management of climate change and environmental protection. It also provides for building the knowledge base for climate change through downscaled modeling, and raising awareness across the country of the impact of climate change on lives and livelihoods.

As part of the institutional framework of the government, the vision is to have district governments equipped to plan for adaptation. It is in this context that Practical Action, WWF, IUCN, CECI, and the Association of Village Development Committees was commissioned to develop the tools for community-based planning. [Add a few sentences about the scope of the project and the process to develop the tools.]

The Government plans to support the training of district planning officers and community leaders in each of its 75 districts as part of the new Strategic Program for Climate Resilience.