

# Participatory vulnerability assessment and identification of Ecosystem-based Adaptation (EbA) measures: a field Experience from the mountains of Nepal

Keshav Prasad Khanal<sup>1</sup>, Ichchha Thapa<sup>1</sup>

---

## Abstract

Vulnerability assessments have been gaining much attention as a tool to identify solutions to adapt with the impacts of climate change. Although many methods to assess vulnerability exist, we have found that a Participatory Vulnerability Assessment (PVA)<sup>2</sup> helps to identify the real problems of local communities, and particularly their relation to needs and challenges that are not necessarily climate-related. This participatory vulnerability assessment method was developed based on our experience of the Mountain Ecosystem-based Adaptation (EbA) Flagship Programme and focuses on analysing current vulnerabilities and predicting future trends. In this approach, we work closely with local communities to describe and analyse the environmental and social characteristics and processes, ensuring that the measures to be implemented are nature based adaptation solutions. This approach has been found to empower communities in the process of identifying problems and their solutions, and also increases ownership of measure planning as the communities identify measures based on their need and urgency, implementation and maintenance. Thus, we anticipate that the learnings of this assessment approach can be integrated into existing planning guidelines for community development so that climate change issues can be mainstreamed in any development effort.

**Keywords:** *Participatory vulnerability assessment (PVA), Mountain Ecosystems, Ecosystem-based adaptation (EbA), Nepal*

## Introduction

With the increasing risks of climate change, the need to identify adaptation and planning options has never been so pressing. For this, vulnerability assessment as a tool have been

---

<sup>1</sup> Himalayan Program, The Mountain Institute, Kathmandu, Nepal. **Email:** [kkhanal@mountain.org](mailto:kkhanal@mountain.org)

<sup>2</sup> PVA is a climate change vulnerability assessment through the involvement of local people

gaining much attention to identify the specific risks and vulnerability posed by changing climate and identifying solutions to adapt to those changes (GIZ, 2014).

In recent years, EbA, a strategy that uses biodiversity and ecosystem services to help people adapt to the adverse impacts of climate change, is considered particularly promising for mountain regions because it is cost-effective and can be implemented by the communities themselves (Colls et al., 2009). Although many methods to assess vulnerability exist, we have found that Participatory assessments help to identify the real problems of local communities, and particularly their relation to needs and challenges that are not necessarily climate-related. Participatory assessment is a process of building partnerships with local men and women of all ages and backgrounds by promoting meaningful participation through structured dialogue. The assessment includes holding separate discussions with interest groups in order to gather accurate information on the specific problems they face and the underlying causes, to understand their capacities, and to hear their proposed solutions

Understanding both current and future challenges helps us to identify and prioritize nature-based solutions that will be effective both within the current reality (e.g., limited food availability, limited income, limited job opportunities or labour resources) and in relation to additional challenges resulting from a changing climate (e.g., increased erosion, reduced water availability). This assessment helps to evaluate the susceptibility of multiple systems (water, forests, pasture land, agricultural land, wetland etc.) to climate change, and enables a better understanding of the factors (climate and non-climate related) driving the vulnerability.

## Objectives

The main objectives of this participatory vulnerability assessment are to identify the current and potential climate-related and other vulnerabilities of local communities of the mountains of Nepal, and to identify ecosystem/ecosystem service measures that could help them adapt to these changes. This helped to identify the intervention measures that are needed to help local people adapt using nature-based solutions.

## Method

Up-scaling Mountain EbA is a follow-on program to the Mountain EbA Flagship Programme, which established mountain EbA demonstration sites in Nepal, Uganda, and Peru. This program is being implemented jointly by The Mountain Institute (TMI) and IUCN in Peru, Colombia, Uganda, Kenya, Nepal and Bhutan. It aims, in part, to demonstrate, on a multi-country scale, how EbA can help mountain communities and ecosystems adapt to climate

change. This PVA method was developed based on the experience of the Flagship Programme and focuses on analysing current vulnerabilities (climate and non-climate related) and predicting future trends.

In partnership with representatives of local communities, we describe and analyse the environmental and social characteristics and processes that need to be understood to ensure that the measures to be implemented are truly robust and favour adaptation based on ecosystems and ecosystem services. To do this, we adopted a combination of both quantitative and qualitative methods using participatory assessment tools such as participatory resource mapping of their settlements, ecosystems and the services they get from those ecosystems including their exposure and sensitivity. Key informant interviews and community consultations were used to assess local adaptive capacity, and a series of local consultative workshops were organised to help identify vulnerabilities and potential solutions.

We organised such workshops in four villages in the Chilime Watershed in the central Himalayan region of Nepal. In total, more than 150 people of all genders, castes, ethnicities, and age groups participated and worked together with facilitators to identify vulnerabilities and suggest EbA measures that considered both the local context and the climate-related challenges.

TMI led the whole facilitating process, whereas the specialists from the Tribhuvan University and local experts were involved in participatory mapping, identifying the exposure, sensitivity and adaptive capacity of local community and ecosystems.

Our PVAs included the following three steps:

- i) Local communities oriented on climate change and its causes (general and specific to mountain region), impacts of climate change in local communities and ecosystems in their respective villages and climate change adaptation options, including CbA, EbA, Disaster Risk Reduction (DRR).
- ii) PVA conducted, using participatory tools in the community workshops focusing on gathering qualitative data and information on local climate vulnerabilities and contexts. The assessment ensured active participation of youth, elderly, women and marginalised groups to identify underlying causes of vulnerability at the community level based on their local knowledge, skills and capabilities. We adopted the practical guidance on tools for assessing community vulnerability as mentioned in Table 1.

*Table 1 Practical guidance on tools for assessing community vulnerability (Source: Practical Action, WWF, IUCN Nepal, CECI Nepal & NAVIN (2010))*

<b>Vulnerability Component</b>	Practical guidance on tools for assessing community vulnerability
<b>Exposure</b>	Seasonal calendar, historical timeline, rain calendars, climate diaries
<b>Sensitivity</b>	Hazard mapping, hazard trend analysis, hazard ranking, hazard impact ranking, mental models, transect walk for risk identification, climate hazard impacts on livelihood matrix, participatory scenario development for potential risks
<b>Adaptive capacity</b>	Community resource mapping, livelihood resource vulnerability assessment, livelihood asset assessment, vulnerability and capacity matrix, Venn diagram, stakeholder identification, coping and adaptation strategies assessment matrix, effectiveness of coping adaptation strategies assessment, communication maps, preference ranking, wealth ranking, benefit cost ratio, multi-criteria assessment

The participatory tools we used in this assessment were mapping historical timeline, hazard mapping, climate hazard ranking, seasonal calendar, vulnerability assessment, forced field analysis, vulnerability matrix, stakeholder identification and EbA measures identification (Maharjan et al., 2017).

Sharing of the PVA findings and prioritisation of EbA measures was conducted through a watershed level workshop. Participatory approach was used involving diverse stakeholders representing communities, community groups, private sectors, political leaders, district and local government agencies. The participants were involved in group exercise in which each group prioritized the identified EbA measures that addresses their needs and challenges through a priority ranking matrix.

## Findings

On comparing the costs of science based modelling of climate change vulnerability assessment conducted in the mountains of Nepal with this participatory method, we found that the participatory method is both cost and time effective. The vulnerability assessment carried out during the Flagship Mountain EbA Project was scientifically grounded and consisted of exhaustive assessments and took almost all the project period due to which project partners had to move ahead with implementation through identification of no-regret EbA measures using participatory approach. The approach also was found to identify local vulnerabilities of the particular area that is being studied rather than the larger area, which would otherwise weaken the good understanding of the local context. Moreover, the approach was found to empower communities and enhance their capacities to identify their challenges and the nature

based solutions to address them. For example, PVA undertaken by TMI for the Mountain EbA Project identified poor water availability in high pasturelands which had been impacting their traditional transhumance practice. This would not only restore water availability in pasturelands but also preserves their traditions. It also increased ownership of measure during planning, implementation and maintenance. Besides, the mountain landscapes are a result of the interaction of both the social and environmental factors, thus, the approach also contributes to address the issues affecting resilience of the socio-ecological systems in these areas.

## Conclusion

This assessment has shown that local people's participation in the vulnerability assessment and the identification of key and local ecosystem-based adaptation measures is key to the successful implementation of EbA projects. Following the findings of this assessment, the national government could develop a policy framework for community participation in vulnerability assessment and adaptation planning. The learnings of this assessment can be integrated in existing planning guidelines for community development so that climate change issues which might also exacerbate the effects of other non-climate risks can be mainstreamed in any development effort.

## References

- Colls, A., Ash, N., and Ikkala, N. (2009). *Ecosystem-based Adaptation: a natural response to climate change*. Gland, Switzerland: IUCN. 16pp.
- Maharjan, S.K., Maharjan, K.L., Tiwari, U. and Sen, N.P. (2017). *Participatory vulnerability assessment of climate vulnerabilities and impacts in Madi Valley of Chitwan district, Nepal*, Cogent Food & Agriculture.3:1, DOI: [10.1080/23311932.2017.1310078](https://doi.org/10.1080/23311932.2017.1310078)
- GIZ. (2014). *The vulnerability sourcebook concept and guidelines for standardised vulnerability assessments*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. <https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/va/vulnerability-guidesmanuals-reports/Vulnerability Sourcebook - Guidelines for Assessments - GIZ 2014.pdf>
- Practical Action, WWF, IUCN Nepal, CECI Nepal & NAVIN. (2010). *Review of community vulnerability assessment methods and tools*. Retrieved September 27, 2016, from [www.climatenepal.org.np/onlinelibrary](http://www.climatenepal.org.np/onlinelibrary)