The Mountain Institute

SUBMISSION IN THE AREA OF ECOSYSTEMS, INTERRELATED AREAS SUCH AS WATER RESOURCES, AND ADAPTATION

IN RESPONSE TO A CALL BY NWP FOR CONTRIBUTIONS TO THE SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE (SBSTA) AT ITS 44TH SESSION

Introduction

The Mountain Institute, as partners with IUCN, UNEP and UNDP on the BMUB-IKI funded Mountain Ecosystem based Adapatation (EbA) Flagship Programme (2011-2016) led planning and implementation of EbA measures with the Andean communities of Miraflores and Canchallyo, Peru. The Mountain EbA Flagship Programme used ecosystem based approaches to reduce vulnerability of mountain communities to climate change, recognizing the benefits to local communities and the co-benefits to millions downstream through improved resilience of ecosystem services and biodiversity. The programme's EbA approach integrated sustainable management, conservation, and restoration of ecosystems that provide services that allow people to adapt to climate change.

The project consisted of 4 main components:
1. Development of methodologies and tools for EbA *(Described in Part C of this submission.)*
2. *Application of the methodologies and tools at the ecosystem level (Described in Park A of this submission.)*
3. Implementation of the pilot measures at the ecosystem level, including their continuation and evaluation. *(Described in Part B of this submission.)*
4. Promotion of EbA at the national level and their incorporation into planning processes

A. Adaptation planning processes addressing ecosystems and interrelated areas such as water resources:

- ### Description of relevant activities and collaborating partner institution/s (if any)

The Mountain EbA Flagship Programme Component 2 (Application of the methodologies and tools at the ecosystem level) used the methodologies and tools developed to identify EbA measures which were appropriate to the community and ecosystem context of the pilot zones and prioritize those which had the greatest chance for successful adaptation outcomes.

- Key results

Through the application of methodologies and tools at the ecosystem level, the project identified the specific areas within the NorYauyos Cochas Landscape Reserve (NYCLR), Peru for which to implement EbA measures and selected the specific EbA measures that would be most effective for the areas identified. The identified measures and zones were carried out using tools developed during the first project component as well as a vulnerability and impact assessment (VIA).

The VIA was designed to analyze the context of the NYCLR and measure the impact of climate change on social vulnerability and the vulnerability of ecosystems. This component reveals several important results: (1) the identification of ecosystems and services that are most vulnerable to climate change; (2) an analysis of the dependency of communities and important livelihood activities on vulnerable ecosystem services; (3) the identification of the spatial distribution of vulnerable ecosystems, communities, and livelihood activities; and (4) a description of measures to address vulnerability.

In preparation for the implementation of EbA measures, the project partners carried out an integrated analysis of supply and demand for ecosystem services, incorporating the pressure on natural resources. The study aimed to analyze vulnerability to climate change within the NYCLR to identify which of the reserve's ecosystems are most vulnerable. The analysis data included climate records from the last 30 years, primary information collected during field visits, ecosystem services maps, group interviews, and a socio-economic survey of more than 330 participants. This information yielded a profile of the past and current climate situations and a visualization of a future scenario of ecological processes, hydrology, economic processes and livelihoods. The study showed that grassland and wetland ecosystems contributed directly to 8 and indirectly to 4 of the 15 ecosystem services provided by the NYCLR.

The Mountain Institute carried out a consultancy for project partner IUCN to (i) identify potential sites to implement robust adaptation measures, (ii) propose measures for each site, and (iii) develop a work plan for implementation of the selected measures.

With input from all the partners and the head of the NYCLR, TMI developed criteria for the selection of sites. Two communities were identified, Miraflores and Canchayllo, that met certain desired criteria: low levels of conflict, relatively strong social organizations, inhabitants who depend on the main ecosystems (wetlands/grasslands) of the NYCLR, and communities which have established relationships with the head office of the NYCLR. Both Miraflores and Canchayllo communities depend principally on livestock activity in NYCLR pastures as their main source of income.

In order to select and prioritize which of 20 specific EbA measures should be implemented, the project carried out an analytical assessment to understand which EbA measures were the most relevant to the local population and for the reserve. The assessment included: theoretical identification of best options; dialogue with various stakeholders through field visits, meetings, workshops, interviews, and the VIA study; and direct engagement with organizations, local authorities, and the general population using a Participatory Rural Development approach (DRPI).

The results of the above analysis recommended the following measures: 1. Application of a governing structure to manage livestock grazing activity, as this is the most critical threat to ecosystem health and sustainable livelihoods, whether or not climate change threats, 2. Incentivize vicuña management through commercialization of vicuña fiber, 3. Demarcate and protect natural resources that are

particularly important for sustaining livelihoods, 4. Promote agroforestry and traditional Andean production, and 5. Investments in production and sustainable management of medicinal and aromatic plants (MAPs).

- Description of lessons learned and good practices

The Mountain EbA Flagship project's implementation of activities benefitted from the perspectives and expertise of multiple stakeholder groups, including local community members, national park management authority, academics, etc. The project was guided by the following principles:

- Multi-sectoral approach
- Work at multiple geographical scales
- Integration of flexible management structures
- Alignment of benefits with development and conservation goals
- Use of scientific and local knowledge
- Provision of benefits to the local population, especially those most vulnerable
- Participatory and culturally appropriate approach that considers gender equity

- Description of key challenges

Some of the challenges for planning and implementing EbA include the lack of comprehensive information regarding climate impacts, ecological and societal vulnerability, as well as limited experience on how to monitor and evaluate EbA effectiveness. Institutional challenges also arise because EbA requires collaboration across sectors and institutions, and adaptation involves a need for forward-looking planning and implementation over a period of years. While the impact of some EbA measures can be assessed relatively quickly, in other cases success or failure can only be fully assessed after some years. Thus, planning must consider a long time frame for implementation and monitoring. Measurement of results can also be complex because one needs to take into account not only the counterfactual of what would have happened in the absence of these measures, but also the shifting baseline in terms of how the weather patterns to which the measures are designed to respond have actually changed over the decades, as seen with hindsight.

- Planned next steps (as appropriate)

The focus of the Mountain Ecosystem based Adapatation (EbA) Flagship Programme is expected to be expanded during a second phase of implementation through a BMUB-IKI award to TMI and IUCN. This second phase will concentrate on up-scaling mountain EbA through building greater evidence on the effectiveness of mountain EbA, expansion of implementation nationally within Uganda, Nepal, and Peru as well as internationally to Kenya, Colombia, and Bhutan, and advocacy to facilitate uptake of mountain EbA solutions. With regard to national and local planning processes, this second phase will push to incorporate mountain EbA into local adaptation plans for action. Using methodologies, tools, and lessons from the first phase TMI seeks to initiate implementation of EbA measures in new communities across Peru and Nepal.

B. Monitoring and evaluating the implementation of ecosystem-based adaptation

- Description of relevant activities and collaborating partner institution/s (if any)

Baseline information using the socio-economic and environmental indicators selected in the first component of this project (see section C). The impact of the project was then assessed comparing these

initial baselines to the indicators after the project period of implementation. As above, partners included IUCN, UNEP, UNDP, TMI, the communities of Miraflores and Canchayllo, the head of the NYCLR, and research and science institutions.

- Key results

In terms of water and grasslands, project activities have noticeably improved the condition of pastures and wet grasslands through project implementation. Biodiversity in the project areas has also improved. These results are largely attributed to a change in pastureland management of livestock.

Another positive result of the project is the increased capacity of the communities and other stakeholders. There is increased recognition of the value of natural resources amongst community members and that actions taken to manage natural resources can reduce vulnerability to climate change.

Individual community members also sited many benefits from now being part of the communal groups or committees formed through the project. Participants felt a sense of motivation from working in groups. Despite some duplicative roles and a substantial time investment of community leaders, the communal committees successfully ensured the continuation and community participation in the implementation of the proposed EbA measured.

Finally, both SERNANP and the NYCLR authorities benefited from the information generated by the project, especially through the VIA. The park authorities use the project's information to prioritize areas for action. Information from the VIA will contribute to the elaboration of the park's Master Plan to serve as an example for prioritizing action in other protected areas.

- Description of lessons learned and good practices

Communities have shown more interest in the economic and social benefits of EbA, and less in the environmental benefits. An important lesson learned by the programme is, therefore, to ensure that EbA measures generate short-term economic and social benefits as a means to increase interest and buy-in for environmental benefits and to secure commitment to implement ecosystem conservation, restoration and management measures, including in the medium- to long-term.

A landscape or ecosystem scale was adopted at project sites following the VIAs. This scale enabled the design of EbA measures that were framed with future climate change scenarios in mind. Tackling adaptation challenges at this scale would enhance provisioning ecosystem services related to water, crops and vegetation, as well as regulatory services related to water and soil. This landscape approach makes it more likely that multiple benefits will be provided in the medium- to long-term. The VIAs proved particularly useful in making the case for EbA to regional and local level planners, such as the Regional Government of Junín and the NYCLR-National Park Service (SERNANP) in Peru, by showing which climate change impacts are likely to affect their landscapes and how EbA measures can be used to reduce vulnerabilities.

Protected areas were found to provide relevant governance structures and plans for planning and implementing EbA at a landscape scale. The project experiences in Peru's NYCLR provided an entry point for making the case at national level for policy change, which would enable the integration of climate change and EbA measures into national strategies for protected area management.

- Description of key challenges

It took a considerable amount of the total project time to establish the indicators and collect baseline data. This presented a challenge in that the project had to evaluate the implementation of EbA measures over a very short period of performance timeframe. It was important that the pilot project had been designed to facilitate monitoring beyond the project period, because that impact of EbA may take many years of implementation before improved resilience is evident.

The additional of performance indicators and their use during the project presented an additional challenge. In some cases the teams were able to use an adaptive management approach to adjust planning and implementation. However, there were also cases where this was not possible, and some teams concluded that there was very few lessons to be documented. Additionally, some partners acknowledged having felt like outsiders during the implementation of various activities, and that, as a result, they contributed less to the project implementation than they may have otherwise.

Despite these difficulties, the project produced convincing evidence of the effectiveness of EbA measures.

- Planned next steps (as appropriate)

The second phase of the flagship programme for upscaling EbA will include activities to continue monitoring the measures in place to assess the medium-term effectiveness of these measures. By the end of the second phase cycle, TMI hopes to have captured data from 6 years of EbA measure implementation.

C. Tools for assessing the benefits of mitigation and adaptation to enhancing resilience and emissions reductions that ecosystem-based adaptation provides.

- Description of the tool/method or tool kit

The methodologies and tools created by the project were developed as activities of the first programme component to help conceptualize the focus of mountain EbA. Thus, these tools and methodologies were essential for mountain EbA planning processes and for general decision-making within the EbA proposal.

Criteria for the definition, prioritization, and principles for the selection of EbA measures

The project began by defining EbA to help the internal project team and external stakeholders, including researchers, scientists and other specialists, to understand what the project considers EbA, what is the goal of EbA, and importantly, what the project does not considered EbA. The definition of EbA linked closely to vulnerability to climate change of communities and ecosystems. It was concluded that EbA action should reduce exposure, reduce sensitivity, or increase adaptive capacity.

Criteria for defining what is (and isn´t) EbA:

- The measure reduces the population´s vulnerability to climate change
- The measure directly or indirectly increases the resilience of biodiversity and ecosystem services
- The measure uses biodiversity and ecosystem services in a sustainable manner, without damaging them, and in some cases enhances them

Next, the project developed a series of principles for the selection of EbA measures and the subsequent monitoring and evaluation of their implementation. This involved input from multiple stakeholders, including the local communities so that community members could use the same indicators in their own management plans. A set of principles were created to help in the prioritization and selection of EbA measures. These principles were used to analyze some of the EbA measures that had been proposed in the communities.

Criteria for prioritizing between EbA options:

- Quantity of affected population
- Capacity of the measure to reduce the vulnerability of the population (efficiency)
- Importance of biodiversity and ecosystem services to the population (prioritizing ecosystem services that support main productive activities, and biodiversity used by the population)
- Vulnerability of biodiversity and ecosystem services to climate change
- Durability and immediacy of the measure

Principles for selecting EbA options:

- Population participates in the planning and implementation of EbA measures

Participants worked in groups to analyze the structure of ecosystems of the project areas, their functions and the services they provide, as well as, the impact of climate change on these functions and services. The potential effectiveness of each measure could then be validated through a list of indicators.

Social and economic indicators included:

- Level of technical knowledge in pastureland management
- Level of application of pastureland management practices
- Level of compliance with the pastureland and water management plans
- Community initiatives for pastureland and water management
- Income from communal farming due to the implemented measure (both in the medium and long term)
- Number of families per communal farm linked to profitable markets (Camelid and sheep fiber)

Environmental Indicators included:

- Area of pastureland available in conditions of drought (hectares)
- Flow from the lake, Jutupuquio (at the mouth of the canal in the communal farm Canchayllo)
- Number of puquiales (underground water channels) in use per time of year
- Grassland condition
- Vigor of the plant growth
- Pasture productivity
- Number and population composition of vicuñas
- Number of palatable plant species (for grazers) per square meter

Vulnerability Impact Assessment

The project developed a VIA as a tool for determining and quantifying, to the extent practicable, how vulnerable a particular area is to the impacts of climate change. At the outset of any adaptation initiative, an assessment of climate change implications for the composition and functioning of ecosystems, as well as the different aspects of human society (e.g. social well-being, economic activities) are required to determine whether, and the extent to which, climate change will have an impact. Once a determination has been made that climate change poses significant risks and that adaptation is needed to manage those risks, assessments are carried out to provide essential information to inform the subsequent components of the adaptation process: planning, implementation, and monitoring and evaluation.

Assessments of climate change impacts and vulnerability vary widely, depending on the subject matter (e.g. a natural resource/production system such as agriculture, or an economic activity such as investment in infrastructure development); time frame (e.g. near-term consistent with annual crop planning, or longer timeframe comparable to the design lifetime of road transport system); geographic coverage (e.g. a transboundary watershed or a single site); and purposes of the assessments (e.g. to raise awareness of climate change, or to inform the technical design of large/expensive infrastructure). Consequently, a wide range of methods and tools were developed and applied to facilitate the assessments, with the support of appropriate data and information.

- Partner institution/s (if any)

TMI was a local implementing partner of the IUCN/UNDP/UNEP Mountain EbA Flagship Programme in Peru.

- Key results if the tool has been tested and challenges (as appropriate)

Criteria for the definition, prioritization, and principles for the selection of EbA measures

This exercise of exploring the definition of EbA allowed the project to plan the location and scale of implementation, as well as the selection of which measures should be implemented. Through this exercise, it was concluded that activities in the NYCLR could serve as pilots that, once proven, could be up-scaled. However, the analysis showed that despite action at local scales, a broader ecosystem context must be considered, including size, relative fragmentation, anthropogenic uses, and habitat for endemic or endangered species.

Vulnerability Impact Assessment

Once developed, the VIA study took almost a year to complete (August 2012-August 2013). The analysis was exhaustive, drew from the expertise of professionals from multiple disciplines, and took considerable time to develop the results. Despite criticism of the time lost during the long duration of the analysis, the study provided crucial information to guide implementation component of the project and was thus a worthwhile and critical step to precede implementation. The analysis served to support, with clear and detailed scientific evidence, the selection of ideal sites for measures implementation. It also yielded very valuable information for regional governments and for the head of the NYCLR.

- Planned next steps (if any)

The principles for selection of EbA measures and VIAs will be used for planning for the second project phase of Upscaling in new communities.