



Catalogue of Ecosystem-based Adaptation measures in mountains

Experiences using Nature-based Solutions to build climate resilience in mountain communities of South America, Asia and Africa



INTERNATIONAL UNION FOR CONSERVATION OF NATURE

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Nepal © Jaymee Silva

Executive summary

Ecosystem-based Adaptation (EbA) is a well-recognized approach for building resilience to climate change in mountain ecosystems around the world. The concept was defined back in 2009 by the Convention of Biological Diversity as the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change.¹ Over a decade after, this approach has been widely implemented across continents and on diverse landscapes, generating evidence on its effectiveness and contributing to national and local policies as a Nature-based Solution (NbS) for climate change adaptation.

Opportunities for climate resilient development are not equitably distributed around the world.

In mountain regions, climate impacts and risks exacerbate vulnerability and social and economic inequities.² Nevertheless, mountains are at the frontline of climate change. Mountain communities have the capacity to adapt to changes and mitigate these impacts, not only for their local benefit, but also for communities downstream. Mountain areas ranked very high in a study which examined the capacity of ecosystems to supply 15 selected ecosystem services, mostly provisioning (freshwater, food and fibre, medicinal plants, fodder, timber, etc.) and regulating (climate, water flow and erosion, natural hazards, pollination, pest control, etc.).³ Therefore, the opportunities for utilizing ecosystem services to build climate-resilience in these areas of the world are countless.

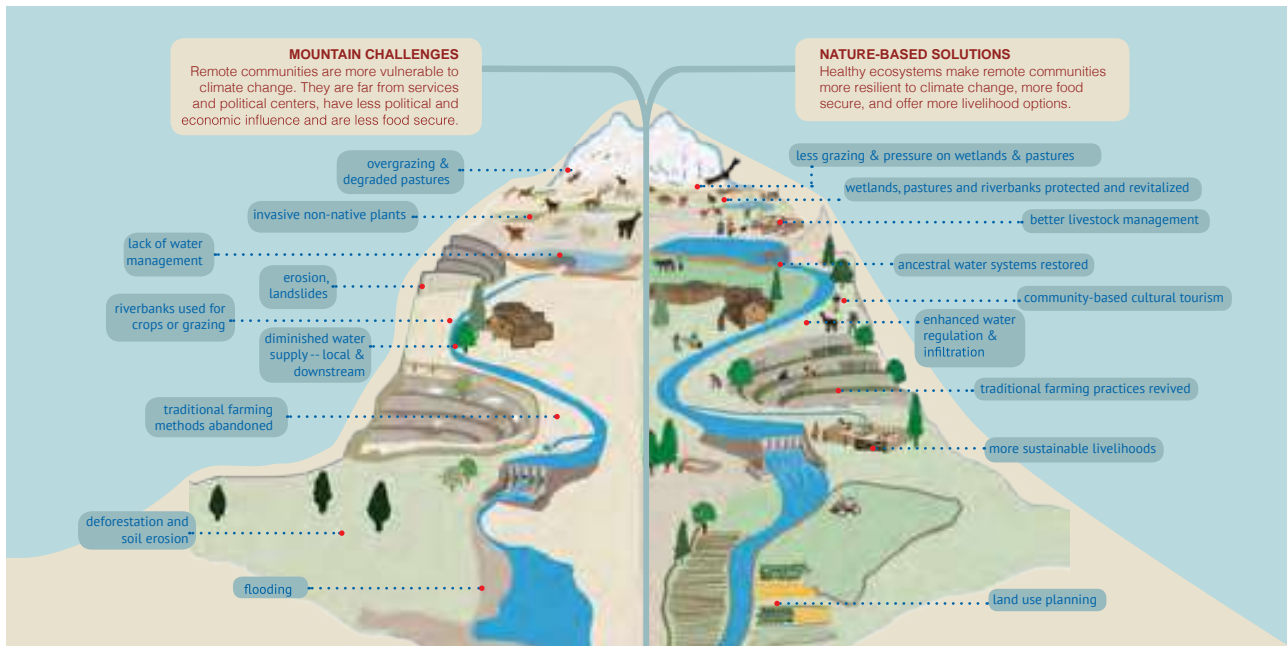


Figure 1: Impacts of climate change on mountains and their NbS solutions to build resilience infographic (© IUCN and The Mountain Institute)

The purpose of this publication is to present and showcase the experiences from the Programme *Scaling Up Mountain Ecosystem-based Adaptation: Building Evidence, Replicating Success, and Informing Policy*. This Programme is part of the International Climate Initiative (IKI), supported by the Federal Ministry for Economic Affairs and Climate Action (BMUK), and jointly implemented by IUCN and The Mountain Institute from 2017 to 2019 and by IUCN from 2021 to 2022.

The *Catalogue of Ecosystem-based Adaptation measures in mountains* focuses on the work done in three mountainous regions of the world: the Andes (Perú), the Himalayas (Nepal) and Mount Elgon in East Africa (Uganda and Kenya). The catalogue aims to display EbA measures implemented in different sites along these regions, to share first-hand experiences and knowledge from project implementors, as well as testimonies from local beneficiaries. Each EbA measure of the catalogue presents practical information in a

concise manner, aiming to reach a broad range of users, including NbS practitioners, decision-makers, project designers and managers, researchers and local communities. According to their main area of intervention, the EbA measures in the catalogue are organized within three themes: resilient livelihoods, adaptive land management and securing water resources. It is important to note that EbA is an integrated approach and all the EbA measures presented follow five selection criteria⁴:

- ▶ Reduces social and environmental vulnerabilities
- ▶ Generates societal benefits in the context of climate change adaptation
- ▶ Restores, maintains or improves ecosystem health
- ▶ Is supported by policies at multiple levels
- ▶ Supports equitable governance and enhances capacities



The implemented EbA measures presented in this catalogue contributed to the achievement of several benefits and positive outcomes. For instance, improving coverage and condition of forests, wetlands and/or pasturelands. In Nepal the planned target of 850 hectares was generously exceeded by achieving 7,000 hectares. Similarly in Perú, where 8,881 hectares were achieved, and in Uganda 2,076 hectares are expected to be improved by the project's closure. Another expected outcome was the number of local, national or sub-national policy documents and processes that included information on Mountain EbA approaches, principles and/or methods generated by the project. The achievements included: four local and four national plans in Nepal; three local and one national plans in Perú; one local plan, two national plans and one law in Uganda; and one national plan in Kenya. In addition, the establishment of long-term partnerships with local, regional and national governments and with other agencies developed synergies. This is seen in Nepal where a series of EbA-based projects are now being implemented by the Ministry of Forests and Environment, UNEP and IUCN. The EbA measures implemented also had a significant impact on restoring and

conserving biodiversity. Nearly 90% of the interviewees stated that the project had conserved biodiversity by restoring and better managing degraded ecosystems. Linkages to biodiversity were observed qualitatively and some of the species supported by the EbA measures were:

- ▶ Nepal: Rhododendron (*Rhododendron arboreum*), Himalayan oak (*Quercus lanata*), Broom grass (*Thysanolaena nees*), Satuwa (*Paris polyphylla*) and the flying spider-monkey tree fern (*Alsophila spinulosa*)
- ▶ Perú: Vicuña (*Vicugna vicugna*), Andean condor (*Vultur gryphus*) and Taruca (*Hippocamelus antisensis*)
- ▶ Uganda: Sesban (*Sesbania sesban*), red calliandra (*Calliandra calothyrsus*), *Flemingia sp*, Napier grass (*Pennisetum purpureum*) and bamboo.

The EbA measures implemented also provide a range of co-benefits. For instance, in Kenya, while implementing the EbA measure, IUCN played an essential role of peacekeeper between the Ogiek and the local government. In 2000, part of the Ogiek people's ancestral lands was annexed into the Chepkitale National Reserve and after years

Nepal © Jaymee Silva





Perú © Jaymee Silva

of dispute and distrust the Ogiek finally won this landmark case in September 2022.

Due to the long-term sustainability approach of EbA, many of the measures' impacts are expected to be continue in the future. In June 2022 an [impact evaluation](#) carried out as an appreciative inquiry for the generation of lessons learned, provided much insight into what has been achieved so far. Part of the assessment involved [interviewing stakeholders](#) from the different countries. The majority of those interviewed stated that the project was successful, and countries are becoming champions of EbA. At the community level, there is both human and economic empowerment through EbA actions. The project has ensured active community participation and now it is possible to appreciate

how this participation translates into community ownership. Moreover, benefits from implemented EbA measures are now measurable and there is evidence that has informed the development of a number of national level plans and programs.

Overall, the Programme has shown considerable strength and flexibility to continue on-the-groundwork and policy advocacy to ensure that EbA has been consolidated and scaled-up, despite the COVID-19 pandemic, government reshuffles in many countries and other challenges.

Thanks to the efforts of each team to continue the implementation of EbA measures, flagship countries have now become champions of EbA and laid the groundwork for commencing EbA implementation in other areas.

Acknowledgements

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Resilient livelihoods

- ▶ Agroforestry
- ▶ Beekeeping
- ▶ Sustainable vicuña management
- ▶ Medicinal and aromatic plants



Resilient livelihoods

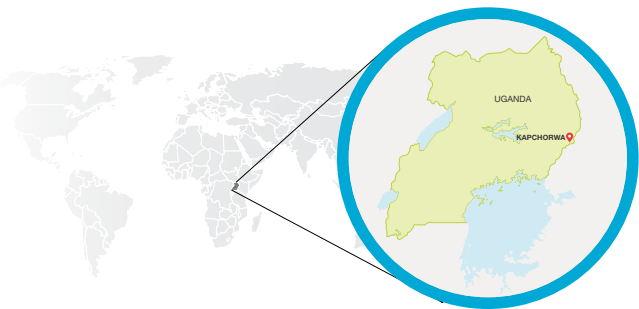


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Agroforestry Uganda

Description

The promotion of agroforestry is an EbA measure that involves the integration of indigenous tree species and shrubs, and other fruit trees and vegetables within cropland and livestock farms. The specific agroforestry practices selected depend on the needs of individual households. Some of these practices include woodlots, intercropping, alley planting and boundary planting. Agroforestry systems are more resilient to climatic stresses than monoculture systems. Incorporating trees in farmlands reduces erosion, controls runoff, provides shade, improves water quality, enhances biodiversity and sequesters carbon.



Measure overview



Location (Sites)

Sipi-Chebonet and Atari-Kaptokwoi micro-catchment in Kapchorwa District, Mount Elgon



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Resilient livelihoods



EbA benefits

Socio-economic:

On-farm access of wood for timber, fuel and building poles is a fundamental aspect of this measure in many ways. It protects women and children from the dangers faced when collecting wood from Mount Elgon National Park and supports the household economy by saving time and resources. Some of the shrubs that are grown (such as *Calliandra calothyrsus*) are a source of nutritious fodder for livestock, improving the quantity and quality of milk and generating more income for livestock keepers. Landowners that introduce fruit trees and vegetables to their farms obtain an extra source of income, while supporting a healthy and diverse diet for their family. Overall, this measure supports the diversification of livelihoods which is essential for building climate resilience.

Environmental:

This measure promotes the integration of trees within cropland to stabilize the heavily cultivated crop fields. Increasing the tree cover within the two micro-catchments increases slope stability and improves the micro-climate. This is particularly important in Mount Elgon as the landscape is characterized by unstable soils prone to erosion and landslides. Nitrogen-fixing trees and shrubs are especially good for degraded lands because they improve soil fertility. The planted trees improve the micro-climate by providing shade and acting as windbreaks, improving local biodiversity and enhancing crop productivity. The measure also reduces the human pressure for natural resources within Mount Elgon National Park.



Key implementation activities

- ▶ Establishing and maintaining tree and shrub nurseries
- ▶ Selecting indigenous tree species that are compatible with crops (recommended agroforestry species)
- ▶ Training of community 'champions' in species propagation and management
- ▶ Meetings with local governments for planning implementation and monitoring of all relevant activities
- ▶ Distribution of tree seedlings of *Grevillea robusta*, *Croton megalocarpus*, *Markhamia lutea* and *Cordia Africana*
- ▶ Training at the demonstration site for EbA measures

Achievements

4

Community tree nurseries established



tree seedlings of different species planted

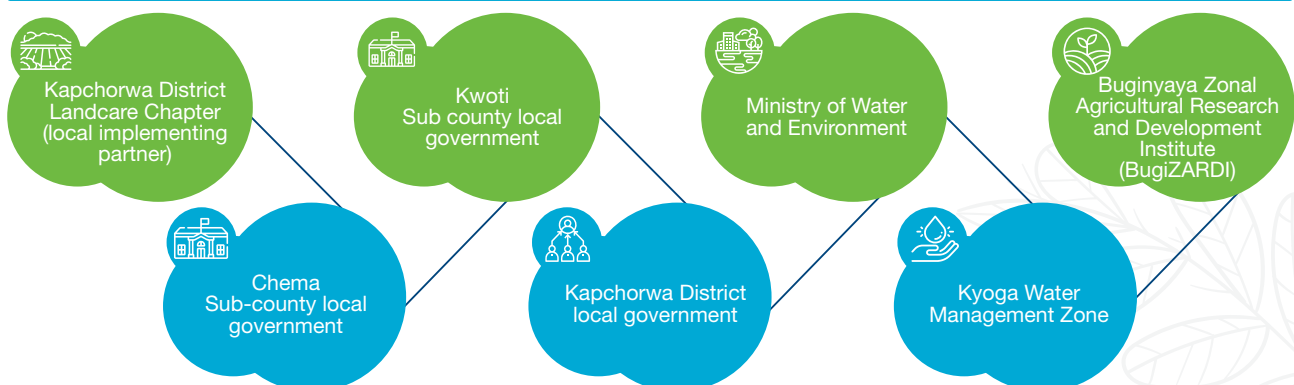
25,600

67

Champion farmers were selected from different parishes and trained



Stakeholders





Resilient livelihoods



Climate change impacts¹

Rising temperatures, shifting rainfall patterns and increased dry periods, pose severe agricultural challenges in the region (e.g. shortened growing seasons and soil erosion). These scenarios are also likely to increase suitable conditions for crop diseases and pests. The direct impacts of climate change on livestock can also be related to rising temperatures and heat. It reduces milk production and reproduction, particularly for dairy cows. The increased frequency of extreme weather events within the Mount Elgon region also causes mudslides, landslides and severe flooding more often.



Climate risks addressed²

- ▶ Risk to food security and risk of malnutrition
- ▶ Loss of livelihood due to reduced food production from crops and livestock
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Participatory community planning and action learning
- ▶ Capacity building provided by a local organization
- ▶ Local government support
- ▶ Community training and demonstration center
- ▶ Availability of indigenous tree species' seedlings
- ▶ Tree planting promoted by community 'champions'
- ▶ Local evidence (from previous flagship project) on the benefits of agroforestry practices
- ▶ Uptake of tree planting by landowners



Water collection Uganda © Jaymee Silva



SDGs



¹ <https://www.preventionweb.net/publication/climate-risk-country-profile-uganda#:~:text=Extreme%20events%20leading%20to%20disasters,due%20to%20more%20intense%20rainfall>

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Resilient livelihoods



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“ Before the project, we were full of problems. There was too much wind that came and destroyed peoples’ houses. Now we are seeing some changes since we planted the trees. Strong winds are no longer there. Also, there was too much drought and now this has reduced. Back then we didn’t even know that we could plant vegetables here. Thanks to the trainings, now some people get money from the crops they plant during the dry season, like tomatoes and sukuma wiki (collard greens). Now we can see the benefits of having trees on our land. They provide shade and protect us from strong winds. These trees are also good for our local economy. I sell my mangoes in nearby towns for extra income.”

Felista Chemusto, Sanzara, Mount Elgon



Lessons learned

- ▶ Building the trust of communities requires long-term engagement and the inclusion of all relevant actors
- ▶ It is important to recognize the different levels of understanding and appreciation of EbA measures by different community members to ensure that everyone remains on board and to avoid cases of maladaptation
- ▶ Participatory planning is crucial for ensuring that all partners, beneficiaries and stakeholders are engaged in the process right from the start
- ▶ Managing expectations is critical to ensuring that community members participate for the right reasons
- ▶ Having a central demonstration site reduces the cost of training and enhances community cohesion
- ▶ Demonstration of EbA measures provides an important opportunity for community members to witness benefits first-hand, thereby facilitating attitude change and accelerating adoption
- ▶ Successful demonstration of EbA measures does not guarantee the uptake and continuation of EbA measures on farms



Resilient livelihoods

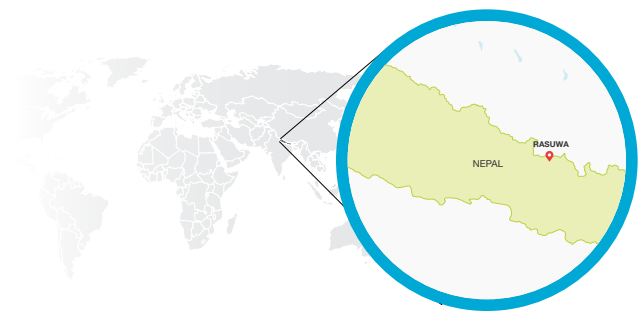


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Beekeeping Nepal

Description

Beekeeping works as an EbA measure, as it provides additional livelihood options to community members while enhancing ecosystem services. Therefore, this measure increases the adaptive capacity of the Indigenous Tamang People when facing the impacts of climate change. The measure involves training in beekeeping and workshops on how to build beehives. Another important aspect of this measure is community outreach and awareness raising on the importance of native bees for the health of the local ecosystems.



Measure overview



Location (Sites)

Gongang, Rasuwa District,
Chilime watershed



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Resilient livelihoods



EbA benefits

Socio-economic:

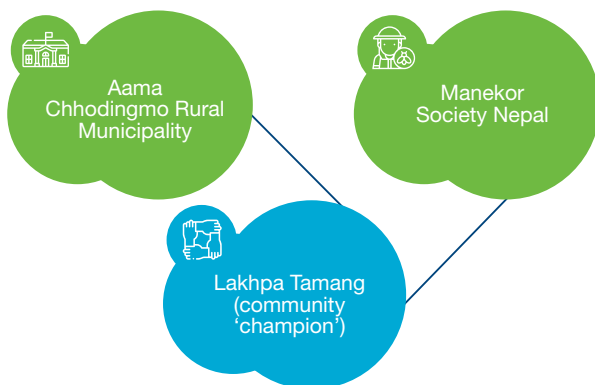
Beekeeping provides an additional source of income and supports the nutrition and good health of families. As local and Indigenous Tamang People are benefited by beekeeping, there is an economic incentive to maintain and expand the practice. Since the demand for honey is very high, beekeepers are able to increase their income significantly. Honey is sold in nearby markets (Tatopani, Tambuchet and Syafrubensi) and to tourists and trekkers visiting the Tamang Heritage Trail. The growing bee population also benefits crop, tree, herb and vegetable production due to the increased cross-pollination. This measure also supports the well-being of the elderly, as many are becoming beekeepers since it is a less physically demanding activity compared to farming. It also generates women's empowerment through alternative livelihood options and income generation.

Environmental:

The relationship between bees and ecosystem health is well-known. They provide ecosystem services such as pollination and promote the diversification of plant species including high soil holding and moisture retaining capacity which may reduce the vulnerability to soil erosion and landslides. Beekeeping promotes organic farming (fewer chemical fertilizers to protect the bees), reducing soil and water pollution. Furthermore, it also encourages to plant and grow different flowering plant species around the home garden, supporting local biodiversity.



Stakeholders



Key implementation activities

- ▶ A baseline study and vulnerability assessment of the site at the initial stage of measure implementation
- ▶ Training and promotion of beekeeping
- ▶ Workshops for building beehives
- ▶ Distribution of basic beekeeping equipment and modern beehives with bees to each participant
- ▶ Monitoring and following-up with individual household to provide feedback
- ▶ Awareness raising on the importance of native bees

Achievement or results

The most important achievement or results of this measure, can be in numbers (for example number of trees planted, tree nurseries established, champions, trainers, hectares, income increase per family, hectares, etc.)

Also, any important contribution to a local or national policy, a course, etc.



12 households received one modern beehive and **29 people (15 men and 14 women)** were trained in hive construction, management, quality control and marketing. Currently, these households are not only engaging in beekeeping, but they are also starting organic farming and planted diverse crops and flower species to feed their bees safely. Assuming the bees in one beehive collect pollen from an **area of 100 ha**, the project's beekeeping actions (12 hives) would have improved pollination in **1,200 ha**.



In only the first **3 months** of receiving beehives, some villagers had doubled and even tripled the bee population within their hives. This exceptionally increase shows that there is an adequate forage area and favourable environmental conditions for bees in this area from April to June. One community 'champion' doubled his annual income due to honey production, and now he also supports his community with further training and technical advice.



Resilient livelihoods



Climate change impacts¹

Changes in precipitation, extreme weather events and rising temperatures are all expected to affect Nepal in the near future. More precipitation and higher temperatures affect the stability of terrain and susceptibility to hazards from mudflows, avalanches, glacier lake outburst floods (GLOFs) and landslides that could be triggered by an earthquake. Increased soil erosion, landslides, flash floods and droughts have a severe impact on the lives and livelihoods of the local community. Gongang, in particular, lies in the Chilime sub-watershed, and it is considered a vulnerable settlement to climate-induced hazards. Other significant impacts in many Himalayan ecoregions as a result of climate change are the increased length of plant growing seasons and the increased rate of species endangerment and extinction.



Climate risks addressed²

- ▶ Risk to food and water security
- ▶ Loss of livelihoods and incomes due to decline in agricultural production
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Great market for honey, high demand and rising prices
- ▶ Technical support and knowledge from Lakhpa Tamang, an EbA champion and local resident of Gongang
- ▶ Highly motivated community members
- ▶ Rural municipality promoting organic farming and beekeeping
- ▶ Attractiveness of beekeeping: low maintenance activity with quick profit earnings



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SDGs



¹ https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15720-WB_Nepal%20Country%20Profile-WEB.pdf

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Resilient livelihoods



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“ My husband left me, later my sons left me too, but now I have bees that keep me company. Before I used to be afraid of bees and considered them pests, but now I realize how important they are not only for my survival but for the survival of the whole ecosystem where life exist. Along with quality honey, now our crops and fruits are well pollinated, and we have increased productivity. In November (2019) I harvested 4 liters of honey from one single hive and made an income of US \$ 70. Because beekeeping is less labor-intensive than cultivation, I am planning to expand the numbers of hives in the coming days.”

Aang Theba Tamang, 60 years old, Gongang village



Lessons learned

- ▶ EbA measures with short term ‘wins’ such as beekeeping, are very easily adopted by community members
- ▶ Beekeeping is an activity that increases environmental awareness and incentivizes people to care more about the ecosystem health
- ▶ Refresher trainings and market linkages are essential for the continuation of the measure
- ▶ Working with ‘champions’ that other community members trust, is fundamental for the successful expansion of the measure
- ▶ Monitoring the beehives is important to ensure they are staying healthy, strong and functioning well (adequate eggs, larvae, pupas, and stored food as pollen and nectar)
- ▶ Beehives kept in open areas need to be sheltered by corrugated galvanized iron sheets and/or plastic to protect them from rain



Resilient livelihoods

Sustainable vicuña management

Perú

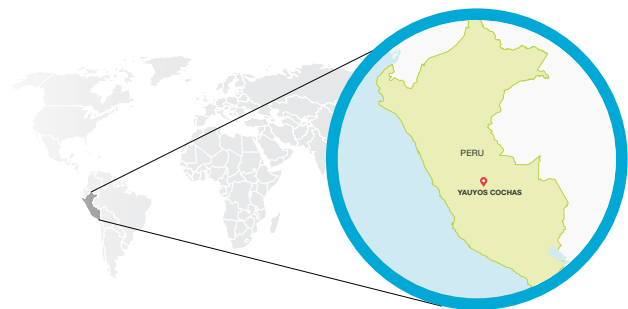
Description

The vicuña (*Vicugna vicugna*) is a wild species of South American camelid, which lives in the high alpine areas of the Andes. Their wool fiber is one of the finest in the world (12 µm) and highly demanded for textile and clothing production. It can cost up to USD\$ 500 per kg, representing a significant source of income for mountain communities. The species is protected by the Peruvian law to avoid its hunting and population decline. Although the species population has recovered in the last years, these animals face many threats like habitat degradation, diseases and the impacts of climate change.¹ Since the Inca empire (and presumably other pre-Colombian cultures), the vicuña is captured from the wild and sheared for its fiber.² Nowadays, some mountain communities practice the traditional “chaccu”, which involves capturing, shearing and releasing vicuñas to collect their fiber. Since the species is protected, these activities are usually under the supervision of national and local authorities.

The EbA measure focuses on the improvement of semi-captive vicuña management in Tomas through social organization and capacity building. The main activity on the ground is the expansion of the fenced area to manage the vicuñas on communal land (in the area of Amaru Pampa). This also allows the recovery of the ecosystem within the fenced area, including the capacity of pastures to store water, which is essential to ensure vicuña health and well-being.



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Measure overview



Location
(Sites)

Community of Tomas, Nor Yauyos Cochas Landscape Reserve (NYCLR)



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach

¹ <https://www.iucnredlist.org/species/22956/145360542>

² Sahley, C.T., Vargas, J.T. and Valdivia, J.S., 2007. Biological sustainability of live shearing of vicuna in Perú. Conservation Biology, 21(1), pp.98-105.



Resilient livelihoods



EbA benefits

Socio-economic:

The measure not only contributes to the conservation of vicuñas and ecosystems, but reduces socio-economic sensitivities, as it involves a significant additional income for the community of Tomas. Strengthening the capacities of the community board and the alpaca and vicuña committees improves social cohesion among community members. This also contributes to the sustainable management of vicuñas and the commercialization of its fiber as a long-term sustained production.

Environmental:

This measure is essential for protecting vicuñas from diseases such as sarcoptic mange, as the fenced area keeps domestic and wild animals away. The fence also keeps other livestock out, preventing overgrazing and pasture degradation. Healthier pastures capture more rainwater, improve soil moisture and infiltration, and therefore increase their resilience to drought and climate variability.



Key implementation activities

- ▶ Participatory and integrated rural assessments
- ▶ Assessment of local water resources, social organization, economic activities, archaeological remains, pasture condition and opportunities for vicuña raising
- ▶ Vicuña census to estimate the optimal population density for a sustainable management considering the pasture carrying capacity within the fenced area and to estimate how many more years they can remain in that space
- ▶ Communal work to expand the fenced area (from 31 to 241 hectares) and provide maintenance
- ▶ Continuous engagement with authorities such as the National Forest and Wildlife Service (SERFOR)-Sierra Central and National Agricultural Sanitary Service (SENASA) to organize permits and other requirements for the “chaccu”

- ▶ Constant coordination between the community board, vicuña and alpaca committees and SERNANP
- ▶ Capacity building in sustainable pastures and water management and vicuña health
- ▶ Support and coordination during “chaccu” activities

Achievements



The fenced area in Amaru Pampa was expanded from **31** to **241** hectares.



During 5 full days of communal work, **35 people (50% women)** achieved the maintenance of **1,805** meters of fence.



120 people participated in the “chaccu” held in September 2022. Of **142** captive vicuñas, **111** were sheared to obtain their fiber. Around **16 kgs** of fiber were collected and the community sold it for **USD\$ 280 per Kg, a total of USD\$ 4,480** of additional income for the community.



To date, **281** hectares of pasturelands have been restored passively through better management in Tomas.



109 households, involving **436 people (49% women)**, benefited from the measure implementation in Tomas.



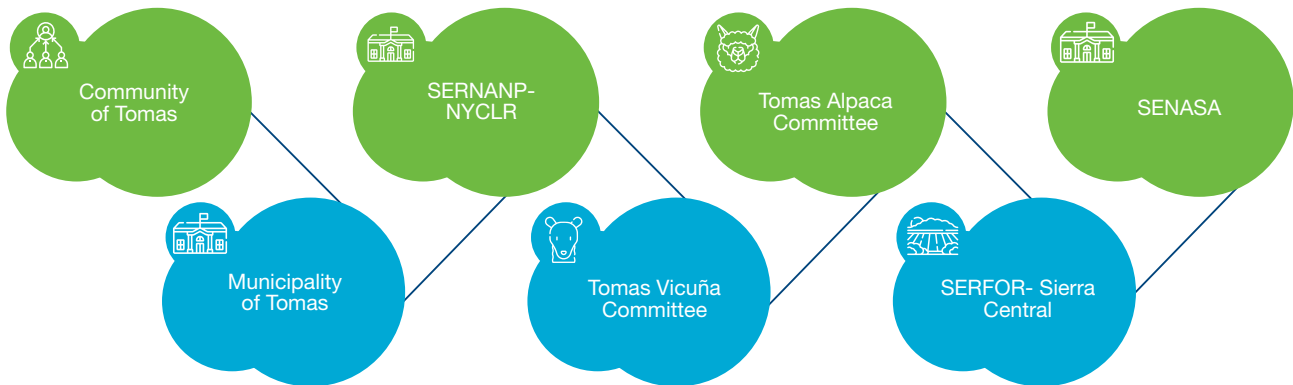
Vicuñas Perú © Christian Vincés



Resilient livelihoods



Stakeholders



Climate change impacts

Extreme weather events such as frost and drought negatively affect pasture availability and quality, endangering livestock and wild animals such as vicuñas (*Vicugna vicugna*). Animals are exposed to higher levels of radiation during the dry season, having consequences for their health. Glacier retreat and changes in hydrological regimes are expected to impact mountain regions threatening their local livelihoods, ecosystems and wildlife. This is a direct threat to freshwater security not only for mountain communities, but also for cities downstream. Shifting rainfall patterns and unpredictable seasons also pose agricultural challenges for farming communities in the Andes, impacting the household economy. In addition, climate change increases the rate of species endangerment and extinction.³



Climate risks addressed⁴

- ▶ Risk to wildlife, species extinction and irreversible loss of ecosystems
- ▶ Risk to livestock health and production due to pasture scarcity and extreme weather events
- ▶ Loss of livelihood due to reduced food production from crops and livestock
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ High value of the vicuña fiber, demand and markets
- ▶ Ancient practice of “chaccu” and traditional knowledge
- ▶ Aligned interests between stakeholders
- ▶ The community’s interest in managing vicuñas and their initiative to form a working group to accompany the process
- ▶ Support and commitment from the NYCLR park rangers and authorities



SDGs



¹ <https://www.iucnredlist.org/species/22956/145360542>

² Sahley, C.T., Vargas, J.T. and Valdivia, J.S., 2007. Biological sustainability of live shearing of vicuna in Perú. Conservation Biology, 21(1), pp.98-105.



Resilient livelihoods



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“ We made a chaccu to shear the vicuñas’ wool. We shear their wool to sell it, to have a benefit for the community. Those benefits provided by the vicuña brings us joy and happiness. In the past years we had fewer vicuñas. Now the population is increasing, and we want that to continue. That is our goal as a community.... On previous years we watched the rain, for example, the summer was until August, and in September the winter began. Now, we don’t have a good summer or winter. Any season is rainy and sunny, and frost is continuously. That is affecting us much, because there is not much grass and we don’t have water. The vicuñas are missing their water wells, they are no longer supplied”

Lilia Melo Dionisio, community treasurer, Tomas



Lessons learned

- ▶ Working in community strengthening and organization is a slow process but fundamental for achieving long-term results
- ▶ Participatory planning, local governance and ownership are fundamental for the measure’s success
- ▶ It is recommended to have a designated site for fiber processing to avoid contamination and maintain the quality and cleanliness of the fiber
- ▶ Previous coordination, delegation and clear understanding of “chaccu” activities is essential to optimize the process and reduce vicuñas’ stress levels on the day
- ▶ It is necessary to continue strengthening capacities in the management of vicuña, its shearing, the treatment of the fiber and its commercialization



Resilient livelihoods



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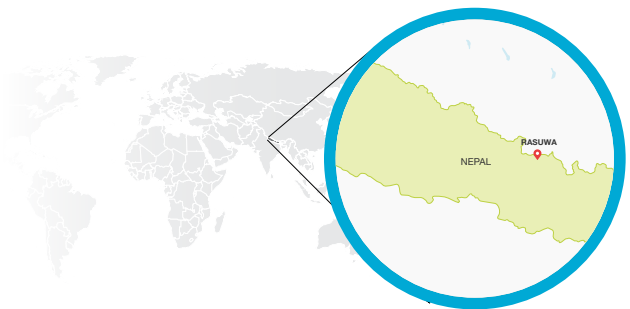
Medicinal and aromatic plants

Nepal

Description

The measure of medicinal and aromatic plants (MAPs) involves the cultivation, conservation and promotion of high-value medicinal plants to provide an additional source of income to the villagers and avoid further forest degradation. Like many mountain villages, people seek additional ways to make a living while also conserving their surrounding ecosystems. The main species cultivated for this purpose is *Paris polyphylla*, locally known as Satuwa, and listed globally as a vulnerable species. This herb is low in volume and high in value (about USD\$ 130 per kg of rhizomes) and has a high market demand mainly for exportation to India and Bangladesh. It is used as a pain reliever, antispasmodic, anti-inflammatory and medicine to treat snake bites among many other uses.

Therefore, this measure was prioritized by the communities and local government. The main activity is to build, maintain and manage nursery beds to propagate Satuwa rhizomes. Capacity building and training are key elements of the measure, as well as training of trainers.



Measure overview



Location
(Sites)

Gongang and Tatopani villages,
Rasuwa District, Chilime
watershed



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Resilient livelihoods



EbA benefits

Socio-economic:

The EbA measure reduces social and environmental vulnerabilities in the context of climate change as it provides medicinal resources and an alternative income generation opportunity. The measure is also in line with national government policies, which encourage the commercial cultivation of high value medicinal plants to address ex-situ conservation and generate job opportunities.

This measure contributes to the creation of women's empowerment and stronger social bond between involved women through capacity building and training.

Environmental:

It restores, maintains or improves ecosystem health as the measure reduces pressure on forests by promoting sustainable harvests from the wild and cultivation. It also contributes to the conservation of the vulnerable *Paris polyphylla* and other MAPs species promoted



Beekeeping lady Nepal © Jaymee Silva



Key implementation activities

- ▶ Establishing MAPs gardens
- ▶ Advance level training on harvesting and expanding cultivation and propagation of rhizomes
- ▶ Distribution of rhizomes as an incentive to begin cultivation
- ▶ Construction of a MAPs demonstration nursery in Tatopani and hiring of a nursery caretaker
- ▶ Installation of water pipes and a tank to water these valuable plants at the peak of the dry season
- ▶ Establishment of a MAPs Farmers Group to monitor and support the newly trained MAPs farmers

Achievement



One community nursery and **18 individual household nurseries** were established between Gongang and Tatopani, planting a total of **11,300 Satuwa seedlings**.



77 people (70% women) had the opportunity to participate in training on nursey establishment, cultivation practices and marketing. Just during the first MAPs training a total of 1,500 Satuwa rhizomes were transplanted in five nursery beds.



Almost **80%** of the villagers are cultivating MAPs and this activity has considerably improved their livelihoods.



Stakeholders





Resilient livelihoods



Climate change impacts

The villages on the Chilime sub-watershed are considered vulnerable settlements to climate-induced hazards. Changes in precipitation, extreme weather events and rising temperatures are all expected to affect Nepal in the near future. More precipitation and higher temperatures affect the stability of terrain and susceptibility to hazards from mudflows, avalanches, glacier lake outburst floods (GLOFs) and landslides that could be triggered by an earthquake. Increased soil erosion, landslides, flash floods and droughts have a severe impact on the lives and livelihoods of the local community. Other significant impacts in many Himalayan ecoregions are the increase length of plant growing seasons and the increase rate of species endangerment and extinction. This is exacerbated by forest degradation due to human pressure on natural resources.¹

- ▶ Damages to life and infrastructure due to mudslides, landslides and floods
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ High demand locally and internationally for MAPs and great prices
- ▶ Technical support and knowledge locally available
- ▶ Highly motivated community members with health-driven interest in having medicinal plants
- ▶ Communal area for demonstration nursery



SDGs



Climate risks addressed²

- ▶ Risk to food and water security
- ▶ Loss of livelihoods and incomes due to decline in agricultural production



Planting Nepal © Alisa Rai

¹ https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15720-WB_Nepal%20Country%20Profile-WEB.pdf

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Resilient livelihoods



© Alisa Rai

“ During the 1990s I used to harvest MAPs in the wild as a young man to earn money to sustain my family. Now I work on my private MAPs field. Together with my wife, we cultivate a number of species on 1.5 hectares of private and leased land and we earn an average of US\$ 400 annually. As older farmers, we find MAPs cultivation a relatively easier occupation that is not so labour intensive and requires less input.”

Pasang Tamang, 71 years old, Rasuwa, Nepal



Lessons learned

- ▶ The continuous technical support, motivation and monitoring from project staff or from the local government contributes to the success of this measure
- ▶ Since Satuwa takes at least 3 years to grow before it can be harvested, the farmers need to understand this well and be highly motivated and patient for this measure to work
- ▶ It is vital to link farmers to markets to sell their products at an appropriate price



Adaptive land management

- ▶ Broom grass cultivation
- ▶ Climate-smart grazing
- ▶ Soil erosion prevention
- ▶ Wetland and pastures restoration



Adaptive land management



© Sudipti Parajuli

Broom grass cultivation

Nepal

Description

Planting broom grass (*Thysanolaena ness*) along roadsides, barren areas and farmland is an EbA measure that prevents soil erosion and stabilizes slopes, reducing risks of landslides. This is due to the strong web-like rooting system broom grass grows. This species can regenerate quickly even in degraded land and does not require much maintenance. It is a multipurpose plant. The leaves can feed livestock, and the stems and roots provide fuel wood. The large flower heads can also be used to make sweeping brooms and mulch to protect the soil. As such, broom grass cultivation provides multiple livelihood opportunities, as well as ecosystem services, building resilience to climate change.

Measure overview



Location
(Sites)

Harpan Khola Watershed
(Makanpur, Kudbi danda,
Damdame, Tare bhir, Simpani),
a region



Type of measure

- on the ground
- capacity-building





Adaptive land management



EbA benefits

Socio-economic:

Broom Grass cultivation is a very cost-effective measure that reduces climate change vulnerabilities. Farmer's uptake is fast, as the resources are available within the community and is a traditional practice.

Therefore, traditional knowledge is enhanced and conserved due to broom grass cultivation, and Indigenous groups are motivated to take action on the ground. The main benefit for households is that broom grass provides them with further sources of income. Women, especially mother groups, are highly engaged in making and selling sweeping brooms; therefore, it is a new climate-resilient livelihood income for them.

Through capacity building and training, it also creates stronger social bonds between those involved and supports women's empowerment.

The protection and stabilization of roadside slopes is also an essential element of this measure, as it addresses the risk of losing lives due to landslides.

Environmental:

This measure contributes to the stabilization of vulnerable slopes, preventing landslides and gully erosion. Cultivating broom grass in barren and slopy land can contribute to the prevention of the siltation in the sub-watershed region and reduces the impacts of intense periods of rainfall and monsoon. Likewise, it helps combat invasive species and weeds, enhancing biodiversity and supporting ecosystem restoration through soil regeneration and moisture retention.



Key implementation activities

- ▶ Establishment of a roadside demonstration plot for eco-safe roads in Panchase
- ▶ Planting broom grass seedlings along roadsides, on farms and on barren land
- ▶ Training, outreach and education on the social and environmental benefits of broom grass cultivation as well as technical aspects
- ▶ Engagement with markets to sell sweeping brooms and other products derived from broom grass

Achievements



All together **26,550 broom grass seedlings** were planted in around 1.5-hectare land area, and **110 households (247 men and 230 women)** from 11 villages directly benefitted from this measure. The measure was able to control soil erosion by **95%** and significantly increased the household's income by selling sweeping brooms. Besides increasing their income, it also reduced their expenditure to raise livestock and to cook, as the broom grass provided both fodder and cooking fuel. Similarly, the community expenditure for roadside maintenance reduced as the roadside slopes were stabilized by the broom grass.



The roadside demonstration plot for eco-safe roads established in Panchase, became a learning center for the community and outside visitors.



Scaling-up broom grass cultivation has increased the annual household income by an average of about **20,000 NPR (USD\$ 157)**.

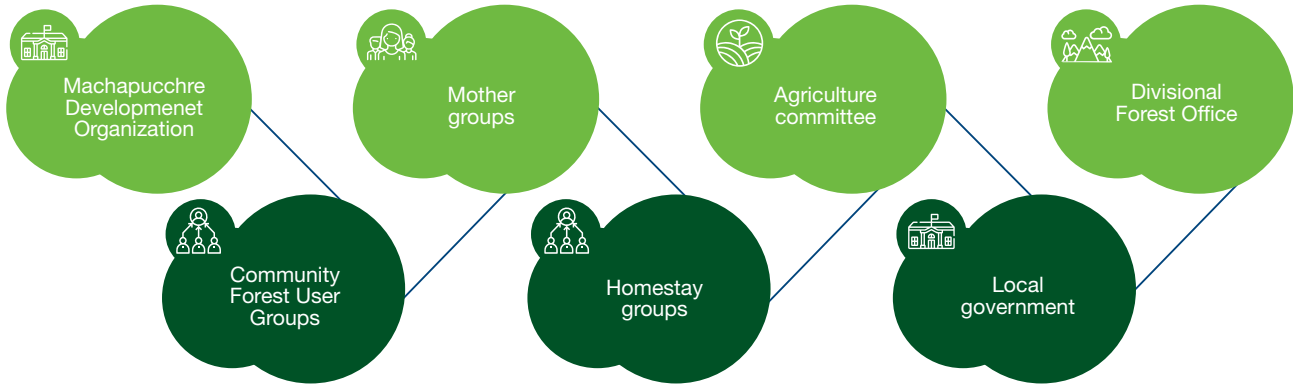


Extra © Alisa Rai



Adaptive land management

Stakeholders



Climate change impacts¹

Changes in precipitation, extreme weather events and rising temperatures are expected to impact Nepal, increasing its susceptibility to hazards from mudflows, avalanches, glacier lake outburst floods (GLOFs) and landslides that could be triggered by an earthquake. Flash floods, soil erosion and mudslides can be detrimental for agricultural areas, as well as to road infrastructure. All of this could negatively affect mountain communities and its people's livelihoods.

Enabling conditions and resources

- ▶ The local government's interest enabled the sustainability of the measure
- ▶ High demand for broom grass products (brooms, fuel and fodder) makes the measure attractive
- ▶ Increase in demand of income-generating activities for women due to the out-migration of young
- ▶ The abandonment of land (due to out-migration) allows further cultivation of broom grass in key areas

Climate risks addressed²

- ▶ Damages to life and road infrastructure due to mudslides, landslides and floods
- ▶ Risk to food and water security
- ▶ Loss of livelihoods and incomes due to decline in agricultural production
- ▶ Reduced economic output and growth, and increased inequality and poverty rates

SDGs



¹ https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15720-WB_Nepal%20Country%20Profile-WEB.pdf

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Adaptive land management



© Alisa Rai

“ EbA helps to reduce this climate change, because EbA teach us to save the diversity by the plantation program, like broom grass and conservation of water resources. It helps people to adapt. It teaches us to adapt to climate change...we must conserve our water sources, we must reduce erosion, we must carry out conservation of the forest. Our local governments are also starting to continue the EbA project. They know we must conserve water, we must conserve the ponds to recharge the soil, recharge the forest, that is why our community, local government also are using the plan for EbA.”

Mr. Ram Kaji Gurung, Chairperson of Ward-23 Pokhara



Lessons learned

- ▶ Broom grass planting works well for this type of landscape as it offers both ecological and social benefits
- ▶ The low labour-intensity and short growing time of broom grass makes implementing this measure very attractive
- ▶ Demonstration is a key tool for the effective adoption and replication of this and other EbA measures
- ▶ Having multiple benefits to multiple stakeholders increases the chances of scalability



Adaptive land management



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Climate-smart grazing

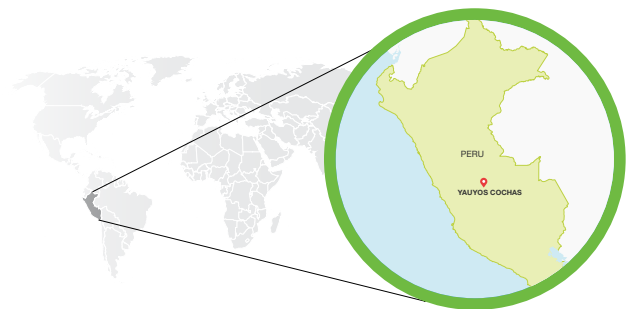
Perú

Description

The community of Tanta highly relies on livestock production and consequently, on pasture availability and quality. Families' livelihoods depend on the animals they own, as agriculture is not the main activity at this altitude (4200 m.a.s.l.). As a community, Tanta owns a farm which keeps around 1000 animals, including alpacas, llamas, cattle and sheep. This measure focuses on improving grazing management to avoid overgrazing and to allow pastures to recover faster and better in response to the impacts of climate change. Grazing can be optimized using traditional practices such as rotational systems.

This measure has three main components to achieve climate-smart grazing: (1) strengthening community organization (2) strengthening local

capacities and (3) combining green and grey infrastructure. An important aspect of the third component is the construction of an animal shed to protect the communal farm's livestock from hail and frost and shelter them from strong winds and intense sunlight.



Measure overview



Location
(Sites)

Community of Tanta, Nor Yauyos Cochabamba Landscape Reserve (NYCLR)



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Adaptive land management



EbA benefits

Socio-economic:

Reducing the grazing carrying capacity helps pastures recover better and faster, allowing them to be more resilient to the impacts of climate change. This enhances livestock production, improves their health and provides better income to families. The animal shed is fundamental to protecting animals from extreme weather events and reducing the loss of lives, especially of newborns. The measure promotes social organization and participatory planning; therefore, another benefit is that the community strengthens their decision-making capacity, which is essential to respond in critical situations, such as an extreme weather event or natural disaster.

Environmental:

This measure allows pastures to become stronger and more resilient to climatic stressors. Consequently, it enhances biodiversity and improves overall ecosystem health. It reduces soil compaction, degradation and erosion from overgrazing, improving local environmental services. Allowing the vegetation to grow healthier improves soil moisture and infiltration as the pastureland captures more rainwater. A stronger and more diverse vegetation cover helps maintain soil humidity for a longer time, which again allows new and existing vegetation to grow, increasing resilience despite scarce rainfall due to climate variability.



Key implementation activities

- ▶ Participatory community planning
- ▶ Animal shed design, model preparation and construction in Gloriapampa

- ▶ Training in sustainable pastures and water management
- ▶ Livestock health and management workshops
- ▶ Strengthening leadership capacities of the community authorities
- ▶ Action Learning Workshop to evaluate project performance
- ▶ Constant coordination and communication with the Peruvian Service of Natural Protected Areas (SERNANP), which manages the NYCLR
- ▶ Awareness campaign “Smart Grazing is the Pride of my People” to promote sustainable grazing practices within the community and local schools

Achievements



With the support of the project and the NYCLR, the community of Tanta developed a project proposal for the recovery of natural pastures and won a grant of **USD\$ 27,950** from the program, “Mechanisms of Retribution for Ecosystem Services,” of the Peruvian Ministry of Environment.



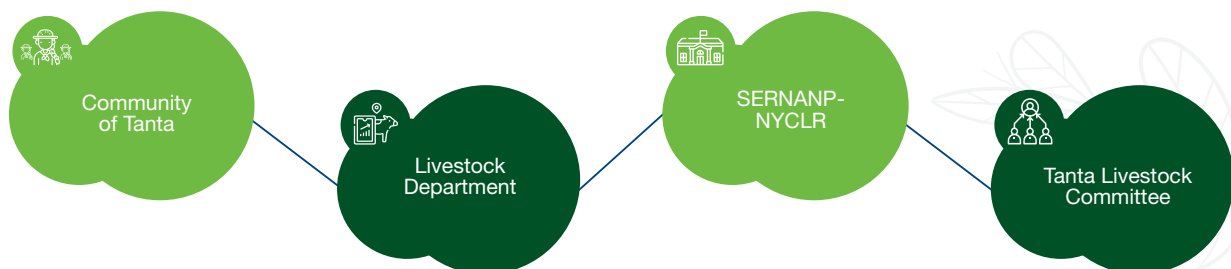
75 households, representing **300 people (47% women)**, benefited from the measure implementation in Tanta.



The construction of an animal shed to protect the communal farm’s livestock from hail and frost and shelter them from strong winds and intense sunlight.



Stakeholders





Adaptive land management



Climate change impacts

In this region, climate change is causing changes in rainfall patterns, including the timing and intensity of rain, frosts, and drought.¹ In some areas of communal pastureland, there is a shortage of water for livestock herds. This compels livestock farmers to abandon a traditional rotation in the higher alpine grassland and graze in the lower grasslands. Extreme weather events such as frost and drought negatively affect pasture availability and quality, directly impacting livestock production. In communities like Tanta, this is detrimental, as they rely on livestock for food and income. Also, animals are exposed to higher levels of radiation during dry season, having consequences for their health and, according to community members, the frequent recurrence of diseases such as 'jacapo' are associated to climate change.



Climate risks addressed²

- ▶ Risk to livestock health and production due to pasture scarcity and extreme weather events
- ▶ Risks to well-being, livelihoods and economic activities from cascading and compounding climate hazards
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Constructing the animal shed was an early win that helped build trust within the community
- ▶ Local understanding of the risk of climate change, hence more interest in the measure
- ▶ Participatory approach for decision-making and planning
- ▶ Traditional knowledge from the local people and technical knowledge from external experts
- ▶ Support and commitment from the NYCLR park rangers



© Jaymee Silva



SDGs



¹ <https://www.minam.gob.pe/wp-content/uploads/2016/05/Tercera-Comunicaci%C3%B3n.pdf>

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Adaptive land management



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“ This project is very important because climate change is affecting us. Everything is changing, frosts are falling and there is no rain. We are now in January, but it is as if we are now in the month of May. And if there is no water, you cannot work, or harvest, or anything. The snow-capped mountains are disappearing, the water has dropped quite a bit... I remember that when I was a child, the snow reached the bottom. Now it looks like the snow is disappearing...

I am sure that the work will continue, because the results are visible. The community is responsible, and we have had a good experience with rotating pastures, it is easier. This is good because climate change is going to continue, and pastures will continue to struggle. The project does not solve everything, and that is why it is necessary for us to continue working.”

Antonia Segura, Community of Tanta



Lessons learned

- ▶ Local communal labour is a great resource that reduces the cost of the measure, however, in this case it was necessary to hire additional workers to help with the animal shed
- ▶ During the planning phase, it is important to allocate sufficient time to activities and plan for delays due to unforeseen situations
- ▶ Working in community strengthening and organization is a slow process but fundamental for achieving long-term results
- ▶ It is easier to implement EbA measures with an adaptive management approach, in other words, plan to adapt as the project proceeds
- ▶ Participatory planning, local governance and ownership are fundamental for the measure's success
- ▶ Communication activities, in this case the local campaign, “Smart Grazing is the Pride of my People,” helped raise the level of trust and participation from the community, increasing their sense of local ownership
- ▶ Working with the schools to inform students is a great way to reach out to their parents



Adaptive land management



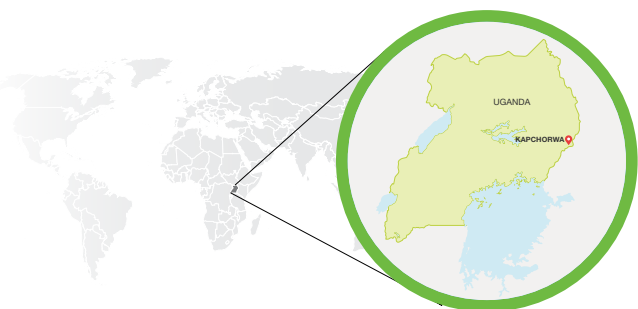
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Soil erosion prevention

Uganda

Description

The measure focuses on the control of soil erosion and the retention of water run-off on farmland. The soil and water conservation structures promoted include contour trenches, trash lines, contour ridges and stone bunds. The structures are stabilized with multipurpose grasses such as Napier and/or shrubs such as *Calliandra calothyrsus*. An essential part of the measure involves training community members on how to map out contour lines and other technical skills.



Measure overview



Location (Sites)

Sipi-Chebonet and Atari-Kaptokwoi micro-catchments in Kapchorwa District, Mount Elgon



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Adaptive land management



EbA benefits

Socio-economic:

Grasses and shrubs that are used to stabilize soil also provide fodder for livestock, helping farmers with the limited grazing area within the micro-catchments.

Controlling soil erosion and water run-off results in improved soil productivity and increased crop yields. This supports the household economy and contributes to food security.

The measure also improves soil water retention during rainy season, ensuring that soil moisture lasts longer to support crops during drought periods. This reduces crop losses, and the subsequent investment for replacing them.

Environmental:

The measure contributes to regulating ecosystem services, especially erosion control. The soil and water conservation structures slow down the loss of top fertile soil and the associated soil macro and micro-organisms, reducing the need to use chemical fertilizers.

This also decreases pollution in rivers and streams, as it slows down water run-off from farms, which usually contain agricultural chemicals. The planted grasses and shrubs improve the biodiversity of the micro-catchments and help stabilize farmland on slopes.



Key implementation activities

- ▶ Growing grasses and shrubs in nurseries
- ▶ Training of trainers and community 'champions' in how to map out contour lines and other technical aspects of the practices
- ▶ Meetings with local governments for planning implementation and monitoring of all relevant activities and programs
- ▶ Establishment of structures for controlling soil erosion as well as storing and slowing down water run-off
- ▶ Maintaining soil and water conservation structures on farms
- ▶ Training at the demonstration site for EbA measures

Achievements



2,887 farmers (1,384 men, 290 women) directly engaged in sustainable land management, **52% women, 48% men.**



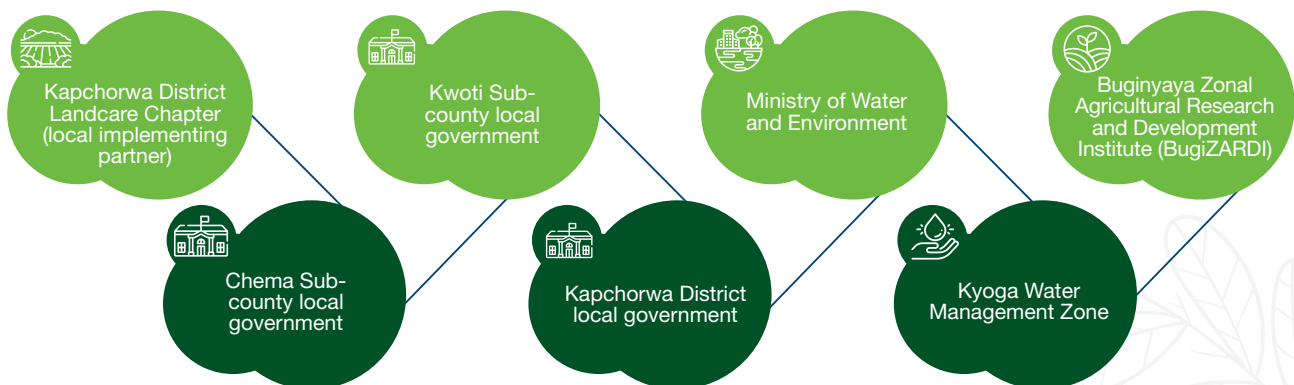
2,076 hectares of land is covered under soil and water conservation.



Contributed to content in the National Climate Change Act, 2021 and Uganda's updated NDC, 2022.



Stakeholders





Adaptive land management



Climate change impacts¹

Shifting rainfall patterns and the increased frequency of extreme weather events within the Mount Elgon region causes more frequent mudslides, landslides and severe flooding. This accelerates soil erosion on farmland which is usually on the slopes. The top fertile soil washes into the streams and rivers, negatively affecting the productivity of cash and food crops. The fast-flowing water downhill not only takes nutrients but also chemicals from fertilizers into the streams, polluting fresh water sources. Rising temperatures and increased dry periods also pose severe agricultural challenges in the region, as there is less water retention on the fields which decreases crop yields.



Climate risks addressed²

- ▶ Risk to food security and risk of malnutrition
- ▶ Loss of livelihood due to reduced food production from crops and livestock
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Participatory planning for measure implementation
- ▶ Support from district and sub-county plans which promote the improvement of soil productivity and prevention of soil erosion
- ▶ Community training and demonstration center
- ▶ Capacity building provided by a local organization
- ▶ Measure promoted by trainers and community 'champions'
- ▶ Local evidence (from previous flagship project) on the benefits of soil conservation practices
- ▶ Grass cuttings supplied by farmers from the previous flagship EbA project sites



Tree nursery Uganda © Jaymee Silva



SDGs



¹ <https://www.preventionweb.net/publication/climate-risk-country-profile-uganda#:~:text=Extreme%20events%20leading%20to%20disasters,due%20to%20more%20intense%20rainfall>

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicyMakers.pdf



Adaptive land management



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“ The project helped to solve several of our livelihood challenges. Mainly I have seen major improvement in soil fertility in my gardens. Before the EbA project, floods had washed away fertile soils in my gardens and the crop harvest were low and of poor quality. Through the project, we were trained on how to construct contour bunds and trenches in our gardens to tap the flood waters and improve and manage soil fertility in our farms. My family is food secure. My crop harvest has more than doubled from the same piece of land I had, and we are able to stock enough food to take us to the next planting season. I have also started to sell excess crops at a better price because the quality is good. My cows now have enough quality pasture throughout the year, even during the prolonged dry season, from the Calliandra and Napier grass I planted. I even now earn money from the sale of fodder to other farmers, and I use that money to meet other family needs. The daily milk production of my cows has greatly improved, because of the quality pasture. I also sell excess milk, which never used to happen before the project. When I look back, the interventions by the project have greatly improved my knowledge and skills on how to manage the risks of floods and prolonged droughts.”

Ms. Pauline Chemonges (EbA Champion farmer), Kapchorwa District



Lessons learned

- ▶ Establishing soil and water conservation structures is labor intensive and expensive to most landowners; therefore, they are better undertaken as a communal activity on a rotational basis
- ▶ More women were interested and have replicated the EbA measures on site
- ▶ Building the trust of communities requires long-term engagement and the inclusion of all relevant actors
- ▶ Participatory planning helps build cohesion, ensures ownership and supports the long-term sustainability of the measure
- ▶ Demonstration of EbA measures provides an important opportunity for community members to witness benefits first-hand, thereby facilitating attitude change and accelerating adoption
- ▶ Successful demonstration of EbA measures does not guarantee the uptake and continuation of EbA measures on farms
- ▶ Having a central demonstration site reduces the cost of training and enhances community cohesion



Adaptive land management



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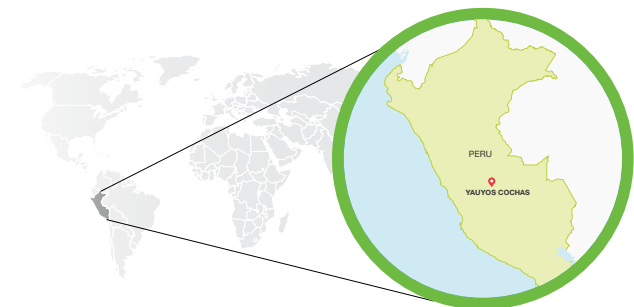
Wetland and pastures restoration

Perú

Description

The measure focuses on the optimization of water usage and availability in order to restore local wetlands and native pastures, which are essential for community well-being and livelihoods. The approach combines traditional, scientific and technological knowledges, and comprises of three components:

- (1) strengthening community organization
- (2) strengthening local capacities and
- (3) combining green and grey infrastructure.



Measure overview



Location (Sites)

Community of Canchayllo, Nor Yauyos Cochas Landscape Reserve (NYCLR)



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Adaptive land management



EbA benefits

Socio-economic:

Restoring and maintaining water infrastructure, such as the dam and canals, helps capture more water and makes it available in communal pasturelands. Therefore, pastures grow healthier with added surface and productivity to feed the livestock. This increases the production and health of the animals, which consequently improves livelihoods, increases food security and reduces social vulnerabilities within the community.

Environmental:

Hybrid green-gray technologies help capture water in reservoirs and distribute it across the grasslands, improving soil moisture, vegetation cover and composition, and increasing infiltration, which replenishes waterholes, aquifers and springs. This serves as a countermeasure to reduced base flow and changing patterns of rainfall due to climate variability. By restoring the humidity of soils, the measure contributes to the reduction of the loss of soil organic carbon contained in these pasturelands and peatlands. This measure helps mitigate the severity of the impacts of droughts and reduces fire occurrences.



Key implementation activities

- ▶ Participatory community planning
- ▶ Participatory rural diagnostics (specific studies in water, pasture, archaeology, social organization, productive activities)
- ▶ Maintenance of the Chacara - Jutupuquio canal located within the communal farm area
- ▶ Hydro-geological study in the water canal's area of influence
- ▶ Maintenance of Chacara dam
- ▶ Training on pasture recovery techniques and evaluation of their effectiveness
- ▶ Workshops on livestock health and management

- ▶ Local agreements on how to distribute water coming from Chacara Lake
- ▶ Knowledge exchange among water users on local water management techniques such as “water sow and harvest”
- ▶ Canal cleaning, pipe covering and hydrant status verification carried out by community members (as communal tasks)
- ▶ A pilot area of 3 hectares was fenced to protect pastures as they recover
- ▶ Theoretical and practical workshops on facilitation tools for participatory work with local universities
- ▶ Action learning workshops to evaluate project performance
- ▶ Joint work, coordination and communication with the Peruvian Service of Natural Protected Areas (SERNANP), which manages the NYCLR

Achievements



The repair of a water dam and rehabilitation of an old and unused water canal, led to the recovery of a network of ancient ditches in the communal farmland and surrounding areas that now supply water to **560 ha of pasture lands**. In addition, the water is recharging temporary ponds and underground aquifers that supply water to pits and springs in the lower part of the Jaramayo micro-catchment and the Cochas - Pachacayo sub-basin.



To date, **560 hectares of grasslands** have been restored passively through better management.



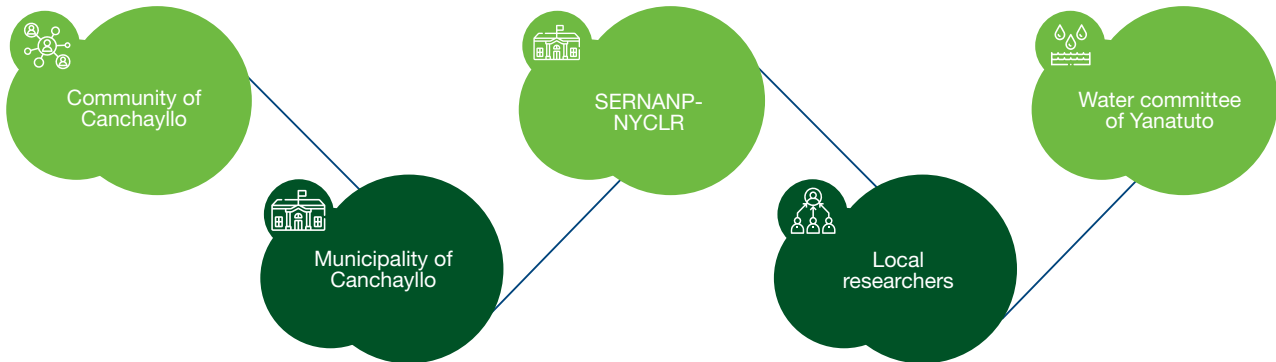
175 households, involving **700 people (51% women)**, benefited from the measure implementation in Canchayllo.



Adaptive land management



Stakeholders



Climate change impacts

The Andes Mountains hold some of the last tropical glaciers of the world. Glacier retreat is a well-known consequence of rising temperatures due to climate change. This is a direct threat to freshwater security not only for mountain communities, but also for cities downstream. Extreme weather events such as frost and drought negatively affect pasture's availability and quality, directly impacting livestock production.¹ Animals are exposed to higher levels of radiation during dry season, having consequences for their health. In Canchayllo, community members identified the desiccation of ponds on higher pasturelands a consequence of climate change. Shifting rainfall patterns and unpredictable seasons also pose agricultural challenges and for livestock, impacting the farmer's economy.

- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Local researchers served as a bridge between the project and the whole community
- ▶ Strong commitment from the community who contributed 45% of the cost through manpower, materials, equipment and machinery
- ▶ Dialogue and knowledge exchange between local and external experts
- ▶ Commitment on the part of communal authorities
- ▶ Sound relationship and coordinated work with the NYCLR and SERNANP
- ▶ Local understanding on the impacts and risks of climate change



Climate risks addressed²

- ▶ Risk to food security due to frequent and extreme droughts
- ▶ Risks to well-being, livelihoods and economic activities from cascading and compounding climate hazards
- ▶ Risks to livestock production due to pasture scarcity
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods



SDGs



¹ <https://www.minam.gob.pe/wp-content/uploads/2016/05/Tercera-Comunicaci%C3%B3n.pdf>

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Adaptive land management



© Jaymee Silva

“ Unlike other projects that come with a pre-established formula, this project was design together. It is a matter of ownership, right? It has not been a parallel construction process. I believe it has been a common planning process and this has been reflected in the activities that have been implemented. We have aligned with each other. The logic is that we have to support each other because in the end these activities are implemented for the benefit of the population, not of the institutions. Ideally, we form one single team and I think that has worked, because we made the calls and invitations in a common language.”

Gonzalo Quiroz, former head of the Nor Yauyos-Cochas Landscape Reserve



Lessons learned

- ▶ A sound assessment of the social component is key when starting a project and for designing EbA measures (e.g., knowing if there are local conflicts that could affect measure implementation)
- ▶ Understanding how many people would benefit from the measure and how is important from the start
- ▶ It is essential to acknowledge any existing activity that is incompatible with the EbA approach or the planned measure
- ▶ Working in community strengthening and organization is a slow process but fundamental for achieving long-term results
- ▶ Participatory planning, local governance and ownership are fundamental for the measure's success
- ▶ Communication strategies can help disseminate the intermediate achievements of a project, motivating stakeholders to continue implementing EbA
- ▶ Including marginal groups, such as young people, women and the elderly in decision making broadens the intervention scope and contributes to the measure's sustainability



Securing water resources

- ▶ Water source protection
- ▶ Reviving ancient technologies
- ▶ Pond rehabilitation
- ▶ Riverbank restoration



Securing water resources



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Water source protection

Kenya

Description

This EbA measure involves the protection of water source springs to ensure sustainable, accessible, clean and safe water supply for the Indigenous Ogiek community as well as their livestock and for the wildlife in the reserve. The EbA measure highly values the traditional management and governance mechanism of the Ogiek people, as it considers their conservation measures. The protection of the spring catchment has three main objectives:

- to improve the recharge of the aquifer
- to prevent groundwater pollution
- to supply clean and safe water to the community, livestock and wildlife



Measure overview



Location
(Sites)

Chepkitale National Reserve,
Bungoma County, Mount Elgon



Type of measure

- on the ground
- capacity-building
- policy
- awareness raising and outreach



Securing water resources



EbA benefits

Socio-economic:

The protection of springs improves ground water discharges as well as the surface flow. This ensures clean water access to local and downstream communities and contributes to water security within the region. Cleaning up and stabilizing important springs, which are close to the villages, improves overall the local health of the people. The increased water availability supports the community's ability to adapt to the changing climatic conditions as it secures livelihoods by improving pastures for livestock, which increases the household income. Water security is also essential for supporting gender equity.

Environmental:

Increasing water availability benefits overall the local ecosystem as it enhances biodiversity. Also, it helps pastures maintain their health and strength, especially when facing the spread of invasive species of unpalatable grass which are rapidly replacing grassland. In addition, a benefit from the measure's mapping and spatial planning process, which builds on the Ogiek Indigenous knowledge, is its contribution to the sustainable management and conservation of the Chepkitale National Reserve.



Key implementation activities

- ▶ Participatory vulnerability assessment that provided community's recommendations on ecosystem-based climate change adaptation measures
- ▶ Site assessments to determine the viability of the proposed springs for protection
- ▶ A detailed feasibility study on water supply and water resources management
- ▶ Design and budgeting for the proposed works
- ▶ Mapping and spatial planning process built on the indigenous knowledge and practices of the Ogiek community
- ▶ The establishment of the Water Resources Users Association (WRUA) to facilitate community involvement, participation and management of the scheme

- ▶ Construction of intake works, two cattle troughs, a storage tank and distribution pipework from the intake to the storage tank and from the tank to the cattle troughs including a community watering point
- ▶ Meetings with local stakeholders for planning implementation and monitoring of all relevant activities

Achievements



There are at around **500** direct beneficiaries from this measure, from which **60% are women**. Many are also school-going children, who will benefit from the water supply from the spring, protected due to its proximity to the local school.



The EbA measure is contributing towards the realization of several strategic objectives for the National Wildlife Climate Change Adaptation Strategy (2022-2032). These include: enhancing land protection and ecosystem management; improving species conservation and management, using local traditions, knowledge and community institutional mechanisms for the management of natural resources and promoting nature conservation for socio-economic wellbeing of the people.



It also enhances the efforts of the national and county governments in terms of resources management and capacity building of different local resources user groups and committees.



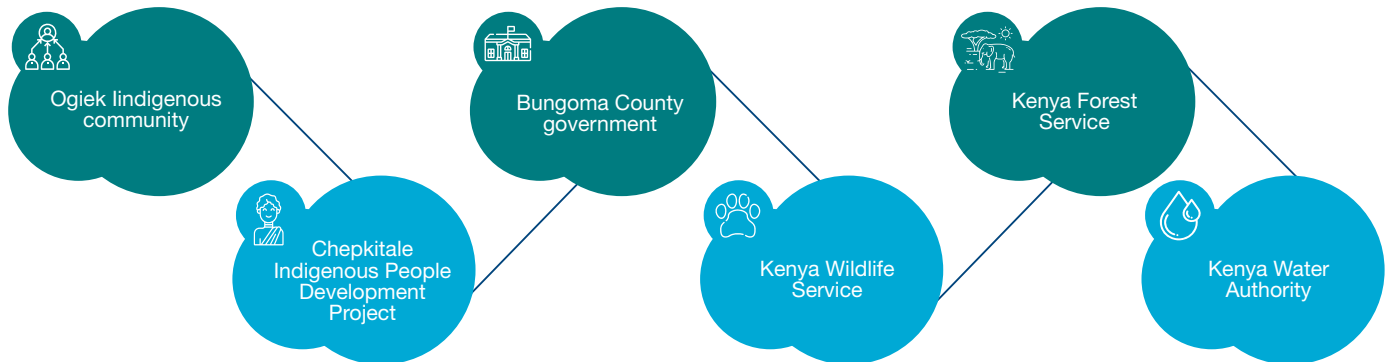
© Dickence Nyathi



Securing water resources



Stakeholders



Climate change impacts

The increased frequency of extreme weather events within the Mount Elgon region increases the chances of mudslides, landslides and severe flooding. This compromises the water quality and quantity of springs, streams and rivers, posing challenges to agricultural productivity and household access to clean water and sanitation. Rising temperatures, shifting rainfall patterns and increased dry periods are predicted to affect Mount Elgon's ecosystems, impacting species distribution.¹ Climate-induced changes in species distribution are also a challenge. For example, the expansion of the unpalatable manyatta grass (*Eleusine jaegeri*) is degrading the quality of upland pastures and rapidly replacing them.



Enabling conditions and resources

- ▶ A national reserve which is community land held in trust by the county government, managed by Kenya Wildlife Service
- ▶ The Ogiek Indigenous community, who have always lived in harmony with the environment as hunters and gatherers, and now as cattle keepers
- ▶ The community's ability to embrace participatory planning approaches in natural resources management and conservation
- ▶ The recently enacted National Wildlife Climate Change Adaptation Strategy (2022-2032)



Climate risks addressed²

- ▶ Risk to freshwater resources with consequences for ecosystems
- ▶ Risk to water security due to increased temperature extremes, rainfall variability and drought
- ▶ Loss of livelihood due to reduced pasture production for livestock
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



SDGs



¹ https://www.adaptation-undp.org/sites/default/files/downloads/undp_ugandaunepunep-wcmc_2013_uganda_via_pop_vs.pdf

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Securing water resources



© Dickence Nyadhi

“ In this community, we relate with trees and nature the same way we relate with humans. Felling a mature tree in our culture is synonymous to killing a parental figure, why should you cut down a tree when you can harvest its branches and use them for whatever purpose?”

Cosmas Chemwotei Murunga, a 74-year-old, Ogiek community elder

“Now that the gazettelement of the Chepkitale National Reserve in 2000 has been set aside by the Kenyan court, meaning that the land now belongs to the Ogiek indigenous community, and given the fact that they have lived in harmony with nature since time immemorial, and have embraced participatory planning processes for natural resources management and nature conservation, it is our hope that Chepkitale, Mount Elgon ecosystem will be well protected and managed to provide environmental services for the Ogiek community and the entire mankind.”

John Owino, Programme Officer, IUCN ESARO



Lessons learned

- ▶ Community land rights and tenure are central and critical in promoting EbA measures
 - ▶ Participatory planning processes are essential from the start of a project
 - ▶ EbA measures can promote sustainable natural resources management and nature conservation
- in the short term, and in the long term, they improve the socio-economic conditions of the local community (“healthy ecosystem, healthy people”)



Securing water resources



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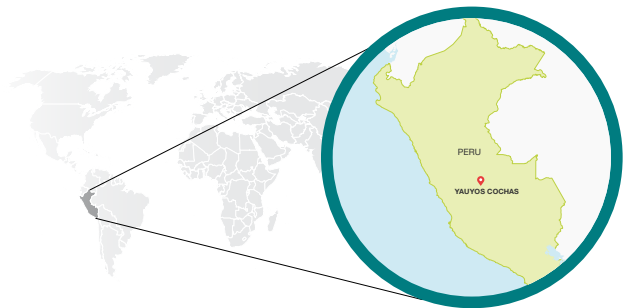
Reviving ancient technologies

Perú

Description

This measure focuses on securing water to ensure quality pasture availability for livestock production, building community resilience to climate change. To do so, the community of Miraflores decided to revive an ancient water system designed and constructed by their ancestors dating back as far as 700 years. The ancient infrastructure is located in Yanacancha (at higher altitude than the town - 4400 m.a.s.l.); it comprises several reservoirs and a canal. To revive this ancient system, the area around the reservoirs was fenced to protect it from the cattle, and a pipe following the canal route was installed to conduct the water towards grazing zones. The Miraflores Community also created the Pasture and Water Management Plan, and revised established rules on animal loads and

cattle grazing rotation schemes. The measure comprises of: (1) strengthening community organizations and institutions, (2) strengthening local capacities and knowledge and (3) combining green and grey infrastructure.



Measure overview



Location (Sites)

Community of Miraflores, Nor Yauyos Cochas Landscape Reserve (NYCLR)



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Securing water resources



EbA benefits

Socio-economic:

The Yanacancha fencing keeps cattle out of the reservoirs and wetland, allowing the natural seed bank to recover and improving the quantity and quality of water that flows into the town and pasturelands. This ameliorates the health of pastures and consequently cattle production and household income. Since the measure promotes social organization and participatory planning, another benefit is that the community strengthens their decision-making capacity, which is essential to respond in critical situations, when there is an extreme weather event, for instance.

Environmental:

Limiting the amount of cattle that each community member can graze, reduces overgrazing and pasture deterioration. This allows pastures to recover better and faster, and makes them more resilient to the impacts of climate change. Other benefits include the recovery of wetlands and biodiversity enhancement. The measure also promotes planting tree species endemic to the Andes, such as *Polylepis incana* and *Buddleja coriacea*. Protecting the ancient reservoirs is not only essential measure to improve ecosystem health but also to preserve the cultural legacy of Yanacancha, an important asset to the people of Miraflores.



Key implementation activities

- ▶ Participatory community planning, design and EbA measure implementation
- ▶ Training community members and park rangers on pasture fencing, water conservation and water distribution
- ▶ Elaboration of the Miraflores Community Pasture and Water Management Plan
- ▶ Sustainable livestock management practices such as livestock limitations, separation by species in different sites and rotational grazing systems
- ▶ Fencing around the Yanacancha reservoirs and planting native trees (*Polylepis incana* and *Buddleja coriacea*) along the fence to provide a natural protective barrier

- ▶ Strengthening leadership capacities of the elected authorities through periodic meetings
- ▶ Action Learning Workshop to evaluate project performance
- ▶ Community regulation and supervision of animal load in pasturelands and cattle grazing rotation schemes
- ▶ Water quality assessments in the ancient reservoirs
- ▶ Training of local researchers in the use of pocket multi-parameter devices to measure water quality
- ▶ Joint work, coordination and communication with the Peruvian Service of Natural Protected Areas (SERNANP), which manages the NYCLR

Achievements



Water samples were collected from the Yanacancha sector in Miraflores to determine the role of ancestral infrastructure in water quality. Results showed that all five ancestral dams have been fulfilling the water quality treatment expected. The first dam has the function of sedimentation and the **water's pH at this point was of 3.70**. The last section of the **ecological flow comprised a pH of 6.69**, a level allowed within the environmental quality standards of the Peruvian Ministry of Environment.



Around the dams, 440 Queñual (*Polylepis incana*) and **220 Colles** (*Buddleja coriacea*) trees were planted in order to fence seven hectares around Yanacancha's ancestral dams to protect them from cattle grazing and damage.



To date, **7,254 hectares** of pasturelands have been restored passively through better management and rotational use in Miraflores.



60 households, involving **300 people (54% women)**, benefited from the measure implementation in Miraflores.



Securing water resources



Stakeholders



Climate change impacts

Climate change poses many threats to farmer communities in the Andes, which includes changes in rainfall patterns, including the timing and intensity of rain, frosts, and drought.¹ The lack of water during drought is exacerbated by the collapse of pre-Inca hydraulic and water management systems. This means that, in some areas of communal pasturelands, there is a lack of water for livestock herds. This compels livestock farmers to abandon a traditional rotation in the higher alpine grassland and graze in the lower pasturelands. Unpredictable seasons and shifting rainfall patterns are altering the agricultural calendar, affecting farming activities such as sowing and harvesting. Glacier retreat is a well-known consequence of rising temperatures and is a direct threat to freshwater security for mountain communities and cities downstream. Extreme weather events such as frost and drought negatively affect pasture's availability and quality, directly impacting livestock production. Animals are exposed to higher levels of radiation during dry season, having consequences for their health.

- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Ancient reservoir and canals built in a key area for capturing mountain water
- ▶ Local population's interest and commitment achieved through a participatory approach for decision-making and planning
- ▶ Aligned interests between stakeholders (the NYCLR, the community and the local municipality)
- ▶ Commitment and support from the communal and municipal authorities
- ▶ Traditional knowledge from the local people and technical knowledge from external experts
- ▶ Local researchers as a communication bridge between the project and the community
- ▶ Trust and good relationships established from the start
- ▶ Support and commitment from the NYCLR park rangers



Climate risks addressed²

- ▶ Risk to food security due to frequent and extreme droughts
- ▶ Risks to well-being, livelihoods and economic activities from cascading and compounding climate hazards
- ▶ Risks to livestock production due to pasture scarcity
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods



SDGs



¹ <https://www.minam.gob.pe/wp-content/uploads/2016/05/Tercera-Comunicaci%C3%B3n.pdf>

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Securing water resources



© Erin Gleeson

“At first, ecosystem-based adaptation was something new for us. Working in the area, we knew about conservation of natural resources, but we still knew little about EbA. But we became acquainted. When this project started, it was a bit shocking to us, that the community members could contribute, and that contribution was their manpower. It was not usual, but that makes them appreciate the communal work they have done. Working with young people has been important. It is as if they had regained their identity, because in all the work they have done, these young people have learned from their ancestors, understanding how they worked long ago. Thus, they are aware of their history and current life plus how they think about tomorrow. That has been important because the youth play an important role in their homes and sometimes help their parents understand.

The grassland and participatory water management plan now developed is important. The people themselves have assumed responsibility and they want it to be implemented, beginning with higher priority actions. We are updating the master plan of the Landscape Reserve and this EbA project is framed within our plan. Park rangers have trained in pasture evaluation. In the future, they will continue to give technical assistance to community members.”

Raúl Crispin Robladillo, NYCLR park ranger



Lessons learned

- ▶ During the planning phase, it is important to allocate sufficient time to activities and plan for delays due to unforeseen situations (mostly weather related)
- ▶ Establishing baselines and monitoring water quantity and quality are essential to understand if the measure is working and to generate evidence for mainstreaming EbA
- ▶ Local communal labour is a great way to ensure measure ownership
- ▶ Building partnerships with local governments ensures the sustainability of the EbA measure
- ▶ It is easier to implement EbA measures with an adaptive management approach or, in other words, plan to adapt as the project proceeds.
- ▶ Involving marginal groups (such as young people, women and the elderly) in the activities, expands the scope of the intervention, and it is essential for fairly distribution of benefits
- ▶ Communication activities help raise the level of trust and participation from the community, increasing their sense of local ownership



Securing water resources



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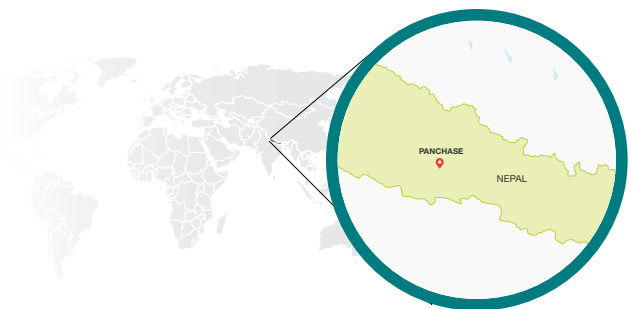
Pond rehabilitation

Nepal

Description

The purpose of pond rehabilitation is to increase water infiltration by lowering the rate and volume of water runoff during the rainy season and to store rainwater for use during the dry season. The measure was designed using EbA principles, with an emphasis on utilising local resources, integrating local knowledge and engaging local people. Community ponds are extremely important in Panchase, as they provide water to local people and their livestock as well as to travellers and wildlife. They are located in forests and in near settlements and their use is part of the local tradition. These natural areas also provide ecosystem services, such as ground water retention and regeneration and habitats for many species, including trees with religious significance. Development in the recent years has caused obstruction of some water sources and in some cases, ponds have

been built over. Therefore, this measure includes the protection, repair, and rehabilitation of springs and old ponds, thereby improving water availability during the dry season for human and livestock consumption and to irrigate crops.



Measure overview



Location (Sites)

Harpan Khola Watershed
(Makanpur, Kudbi danda,
Damdame, Tare bhir, Simpani),
Panchase region



Type of measure

- on the ground
- capacity-building
- policy
- awareness raising and outreach



Securing water resources



EbA benefits

Socio-economic:

Increased water storage serves as a lifeline during dry spells and droughts. Water from rainy season can be used by the locals during dry season, ensuring year-round availability of water. Not only does improving water and sanitation benefit households, but it also contributes to maintaining gender equity. It prevents women from traveling long distances in search for water, allowing them to have more time to spend with their children or engage in income-generating activities. Water availability also increases crop yields and supports livestock production. Since the limited access to water has triggered the out-migration of people in this region, the rehabilitation of ponds can also help address this issue. Access to different forms of water resources can create jobs for marginalized groups such as youths, women and the elderly.

Environmental:

During monsoon or rainy season, these ponds store water instead of letting it run off, helping groundwater recharge and enhancing biodiversity within the region. The revegetation around the ponds also attracts a variety of birds and other wildlife. Healthy ponds reduce and slow down water run-off, preventing soil erosion, flooding and water-induced disasters like landslides. In addition, it reduces the risk of forest fires, enhances soil moisture and fertility and increases the resilience of vegetation during dry periods.



Key implementation activities

- ▶ Protection of water sources
- ▶ Repair and maintenance of older ponds using local materials such as mud, stones and slate
- ▶ Development of water supply arrangements
- ▶ Weed control and debris removal around water sources
- ▶ Streambank reinforcement
- ▶ Planting vegetation with high water-retention and soil-holding capacities around water sources
- ▶ Water resources assessment, including the extent of potential damage, possibility of groundwater

recharge, risk of water-induced disaster, risk of water scarcity and priority for the communities

- ▶ Promotion of infrastructure based on the degree of vulnerability and community prioritization
- ▶ Mapping of prioritized ponds and water sources
- ▶ Construction of basic irrigation infrastructure to channel water from nearby sources to maintain water supply
- ▶ Workshops and training-of-trainers events, held at the village level, have helped to promote pond restoration through different villages and community conservation groups

Achievements



Four community ponds (**3 new and 1 old**) were rehabilitated and able to provide benefits to both the community and the ecosystem. In total, **240 households (263 men and 663 women)** directly benefited from the conservation of ponds, as they are utilizing pond water for their livestock, agriculture and human consumption. In addition, **14 ponds** that were established in a previous project were maintained and conserved, securing water for an even bigger population.



EbA 'champions' were elected as local representatives of the community and decided to make the rehabilitation of community ponds a priority for future interventions.



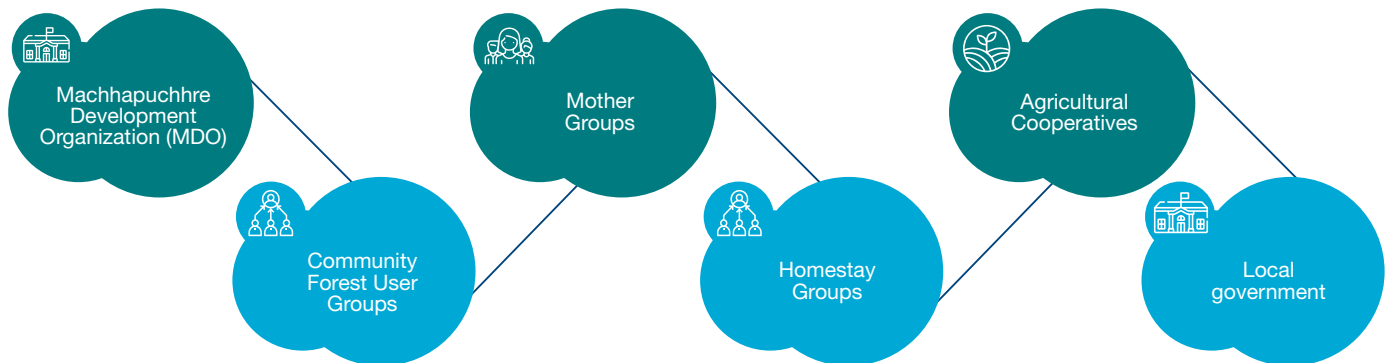
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Securing water resources



Stakeholders



Climate change impacts

It is expected to see the Panchase region highly impacted by climate change. High volume of rainfall during the rainy season and extreme weather events are likely to increase the frequency of avalanches, glacier lake outburst floods (GLOFs) and mudslides, especially when there is an earthquake. In addition, increased soil erosion, landslides and flash floods will severely impact the lives and livelihoods of the local people. Changes in precipitation patterns and rising temperatures can increase periods of drought and pose a threat to water and food security.¹

- ▶ Integration of local knowledge and past experience in the construction of ponds (type of materials, suitable locations, etc.)
- ▶ Practical demonstration of activities and visual tools, such as interactive maps, posters and videos
- ▶ Citizen scientists as bridges between the project and local communities
- ▶ Trust established between the local communities and the project team
- ▶ Communities' active leadership and sense of project ownership
- ▶ Community labour contribution and availability of local affordable materials such as bamboo



Climate risks addressed²

- ▶ Risk to food and water security
- ▶ Loss of livelihoods and incomes due to decline in agricultural production
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Participatory planning with communities
- ▶ Government presence and interest in the measure



SDGs



¹ https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15720-WB_Nepal%20Country%20Profile-WEB.pdf

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Securing water resources



© Anu Adhikari

“ In my 70 years of life, I have witnessed a lot of changes in my community. The village now has a road, electricity, tap water, homestay businesses and small hotels for tourists. But there have also been some negative changes. People are emigrating from the villages and most of the agricultural land is abandoned. With increasing reliance on tap water, the ponds became neglected. Many were overgrown with weeds and the flow of water to others were obstructed by sedimentation from road construction. Rehabilitating community ponds and the sources of spring water that fill them help address these issues. I see many benefits from the increased availability of water, including a diversity of livelihood opportunities such as off-season farming.”

Mr. Guman Singh Gurung, community elder, Panchase



Lessons learned

- ▶ Community participation and ownership is fundamental for the sustainability of measure implementation
- ▶ Working with engaged community leaders first is essential to motivate other community members
- ▶ The engagement with diverse groups increases the potential for success and the equitable distribution of benefits
- ▶ Having a clear contextual understanding of the environmental, socio-economic, and political aspects of the area is important to determine entry points for the intervention
- ▶ Advance planning with clear roles and responsibilities helps ensure the successful implementation of activities
- ▶ Integrating traditional knowledge with scientific knowledge is more effective than applying a purely technical approach
- ▶ Using local resources to promote green infrastructure is more cost-effective, faster and more sustainable
- ▶ It is important to enforce appropriate safeguard measures to protect community ponds from the damage caused due to rural road construction



Securing water resources



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Riverbank restoration Uganda

Description

This measure involves the restoration of the riverbank in order to achieve a number of social and environmental goals. The measure includes the participatory demarcation of the agreed upon river buffer in order to eliminate cultivation activities and restore the vegetation of the river buffer either naturally or through planting of Napier grass, indigenous tree species and shrubs.

Measure overview



Location
(Sites)

Sipi-Chebonet and Atari-Kaptokwoi micro-catchment in Kapchorwa District, Mount Elgon



Type of measure

- on the ground
- capacity-building
- awareness raising and outreach



Securing water resources



EbA benefits

Socio-economic:

Since one of the main benefits of this measure is to reduce river pollution, this ensures clean water access to local and downstream communities and contributes to water security within the region. Grasses and trees used to revegetate the river buffer provide products such as fodder for livestock as well as firewood and poles for households. This reduces the need for women and children to collect firewood from Mount Elgon National Park, contributing to their safety and reducing their workload. The measure also reduces the likelihood of riverbank flooding and the consequent crop loss on nearby farms.

Environmental:

Since this measure restores the Chebonet and Kaptokwoi rivers which feed into the larger Sipi river micro-catchment, it contributes to an overall improvement of water flow quality and quantity in the region. By encouraging the elimination of cultivation activities near the riverbanks, it is possible to achieve a significant reduction of pollution from agrochemicals and silts eroding from the farms. The measure also encourages natural regeneration of vegetation within the river buffer zone, which improves biodiversity and contributes to the conservation of native species of importance such as Elgon teak. Planting trees, grasses and shrubs is also essential for stabilizing degraded riverbanks and supports carbon sequestration.



Key implementation activities

- ▶ Participatory demarcation of river buffer zone
- ▶ Selection of indigenous tree species, shrubs and grasses for riverbank revegetation by landowners
- ▶ Distribution of planting materials, such as grass and bamboo cuttings, among confirmed beneficiaries from the two target micro-catchments
- ▶ Distribution of tree seedlings of *Grevillea robusta*, *Croton megalocarpus*, *Markhamia lutea* and *Cordia Africana*
- ▶ Practical demonstrations on planting grass and tree seedlings
- ▶ Meetings with local governments for planning implementation and monitoring of all relevant activities

Achievements



25,584 tree seedlings and **200 bags** of grass cuttings planted



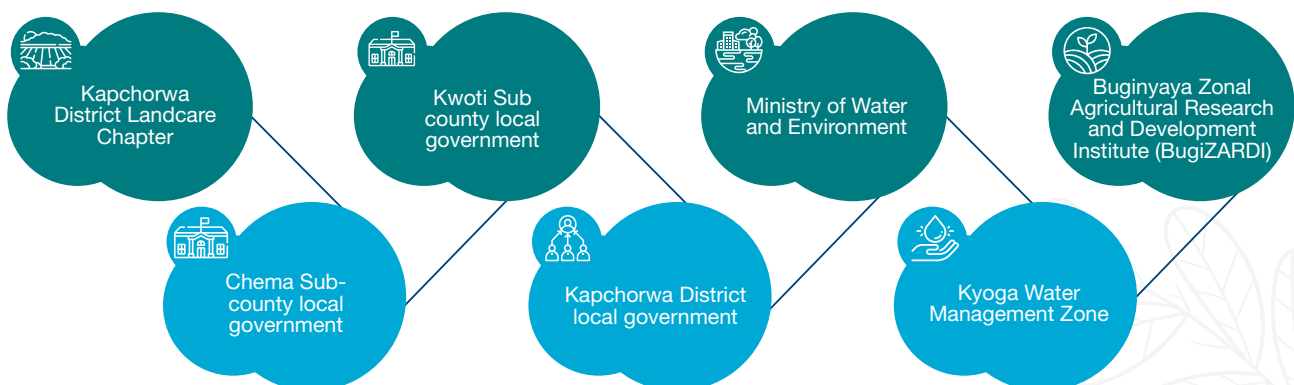
25.5 hectares of land along the riverbank under riverbank restoration



48 km of riverbanks restored



Stakeholders





Securing water resources



Climate change impacts¹

The increased frequency of extreme weather events within the Mount Elgon region increases the chances of mudslides, landslides and severe flooding. This increases river and stream pollution as agrochemicals and sediments are carried with the water run-off. Rising temperatures, shifting rainfall patterns and increasing dry periods not only pose challenges to agricultural productivity but also reduce household access to clean water and sanitation.



Climate risks addressed²

- ▶ Risk to freshwater resources with consequences for ecosystems and water availability and quality for agriculture and human consumption
- ▶ Risk to food and water security due to increased temperature extremes, rainfall variability and drought
- ▶ Loss of livelihood due to reduced food production from crops and livestock
- ▶ Damages to life and infrastructure due to mudslides, landslides and floods
- ▶ Reduced economic output and growth, and increased inequality and poverty rates



Enabling conditions and resources

- ▶ Participatory planning and agreement with all the landowners within the riverbanks
- ▶ Capacity building provided by a local organization and local governments
- ▶ Implementation oversight supported by both technical and political leadership of Chema and Kwoti sub-counties.
- ▶ Grass cuttings supplied by farmers from the previous flagship EbA project sites
- ▶ Tree seedlings supplied by district tree nurseries established under the Sipi Project by the Ministry of Water and Environment
- ▶ Tree seedlings supplied from the established community tree nurseries



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SDGs



¹ <https://www.preventionweb.net/publication/climate-risk-country-profile-uganda#:~:text=Extreme%20events%20leading%20to%20disasters,due%20to%20more%20intense%20rainfall>

² https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf



Securing water resources



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“ My family participated in project activities and have a lot of benefits. One is training on soil and water conservation, construction of trenches along the contour bunds, tree planting on *Calliandra* planting, bamboo stake planting, Napier grass planting on both riverbanks for the fodder. We also had awareness creation meetings on climate change and how to mitigate it. We were also advised to restore the buffer zone along the riverbanks. Before that, the project also gave us Napier grass cuttings, tree seedlings and *Calliandra* seedlings, as well as bamboo stems. We began to plant along our farms and along the riverbanks. So these trees have benefitted us so much because these are indigenous trees. Bamboo stems are also indigenous, these bamboo stems historically are entirely found in the forest. Bringing them outside communities actually use it. Good advantage for us to have bamboo stems which eventually forms construction material and bamboo shoots.

The riverbank has been conserved. So I will say that a champion farmer is one who has adopted so many of these activities being provided by the project, and having adopted these, attended all the meetings and implemented activities successfully. My farm is now a model for others to learn.”

Mr. Jaffer Kamwania (EbA Champion farmer), Kapchorwa District



Lessons learned

- ▶ Participatory planning was fundamental for this measure, as the landowners had to agree on the river buffer demarcation
- ▶ Building a sense of ownership for the measure helps ensure its longevity
- ▶ A clear understanding and awareness regarding the impacts of climate change is essential from the start as it can accelerate the adoption of the measure
- ▶ Support from local authorities and the provision of planting materials plays an important role in incentivizing the uptake of the measure



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