



Why do mountain communities and environments matter?

Mountain landscape and a village in the Jumla District, Nepal. (Photo: PEEDA, 2023)

The sustainability of mountain regions has far-reaching implications for the global environment and human well-being. Mountains are essential for the world's water supply, providing over half of all freshwater resources for our planet. They are home to biological diversity and at least half of the world's population depends on mountain ecosystem services to survive – not only for water but also for food, feed, raw materials, clean energy, recreation space and spiritual meaning, among other things¹. Mountain communities and environments are particularly vulnerable to the currently accelerating socio-economic and environmental crises. People living in mountains often have less access to social and economic infrastructures. They are particularly vulnerable to food insecurity and lack alternatives for economic development. Moreover, climate change is exacerbating the already challenging environmental conditions of mountain regions. For instance, extreme climatic events tend to occur more frequently and

be more extreme on mountains than in lowland areas. Climate change is making these patterns even more erratic and hazardous. Glaciers in mountain ranges around the world are retreating and disappearing due to climate change².

In this factsheet, we report on advances in the development of an integrated approach to strengthening the livelihoods of mountain communities in Nepal, a country located almost entirely within the Himalayan mountain range, with more than 40% of the population living in mountainous landscapes. Thus, mountain communities in Nepal face many of the general challenges of mountain regions mentioned previously. On the other hand, however, these spaces also offer promising experience, practices and knowledge that can be used, further developed and upscaled in order to deal with the complexity of these challenges.

Mountains and their vital role for humanity and nature



27% of the Earth's land surface



20% of global tourism



23% of the world's forest ³



Home to almost billion people



Over half of Humanity's fresh water



25% of all terrestrial biodiversity

The need for integrative approaches to mountain development

It is quite evident that the challenges faced by mountain communities are diverse (they concern various sectors and aspects of life) and complex (the dynamics of each sector and aspect entail interdependencies), for example the lack of access to clean and reliable energy, the deterioration of forests and soils, the increased risk of slides and floods, the lack of economic opportunities, accelerated outward migration of young people, farmland being abandoned, increasing food insecurity, etc. The responses to these challenges (e.g., policies, projects, programmes) generally target only one sector without properly taking into account how they relate to others. Such sectoral approaches are to some extent understandable as professional expertise is built along sectoral or disciplinary specialization lines, for example. However, it is also becoming evident that efforts are needed to understand the interactions between sectors in order to exploit synergies and avoid or reduce trade-offs.

That is part of the tasks that we think an integrative approach should fulfil, i.e., combining expertise from different sectors in order to build more coherent responses to complex challenges. Moreover, other important integration tasks require efforts to acknowledge and articulate different purposes (e.g., environmental conservation AND improvement of socio-economic alternatives, mitigation of climate change AND adaptation to it) as well as different types or sources of knowledge (e.g., scientific/academic, practitioners/experts and indigenous/traditional).

Focusing on people's livelihoods through a transdisciplinary process

Two conceptual tools are proposed to deal with the aforementioned integration tasks for addressing sustainability challenges in mountain regions: The sustainable livelihood approach and the concept of transdisciplinary research practices.

The sustainable livelihoods approach focuses on the capacities of individuals, families and/or communities to access and manage key resources to develop thriving, dignified lives⁴. It recognises that these resources are diverse and vary from case to case. Therefore, defining 'what' is key 'for whom' must be a constitutive part of the process of working with the populations concerned. In order to guide this search, five types of resources or assets are proposed, including human capital (e.g., the skills, knowledge and health of individuals), social capital (e.g., relationships, networks and institutions that support livelihoods), natural capital (e.g., land, water, forests and biodiversity), physical capital (e.g., infrastructure, tools and technologies), and financial capital (e.g., monetary income, savings and access to credit). In this way, a broader perspective is proposed which can help to explore the relevance of and interrelations between different aspects or sectors that determine people's livelihoods.

Transdisciplinary research has been discussed and practiced in particular within the field of sustainability science. While different understandings of transdisciplinarity are discussed, one of the main goals of the conceptual and methodological advances in transdisciplinary research is to promote the integration of knowledge and experience from different disciplines, professions, and fields of expertise (epistemic integration) to address complex real-world problems⁵. An important point of departure is the recognition that – beyond the knowledge production and validation procedures of academic research – there are different ways of knowing and acting that can help to better understand the complexity of a particular situation of concern. Therefore, transdisciplinary research processes encompass spaces in which mutual acknowledgement and learning among different types of knowing are facilitated⁶. The aim, therefore, is to generate socially and culturally robust knowledge, i.e., knowledge that can be understood, processed and applied by all the parties involved in the situation of concern.

Challenges and opportunities for the sustainable livelihoods of mountain communities in Nepal

Based on the basic insights from the sustainable livelihood approach and transdisciplinary research practices, the WISIONS Innovation Lab (IL) Nepal establishes spaces to promote exchange and mutual learning among different stakeholders of relevance to the current and future development of mountain communities and landscapes in Nepal. A central aim of these exchanges has been to advance knowledge about the specific sustainability challenges and opportunities in Nepal's mountain regions and identify available experience, practices and knowledge with promising potential to strengthen the livelihoods of people living in these regions (promising solutions).

One important space for exchange was the "Peak Perspectives: Navigating challenges and shaping sustainable futures in Nepal's mountain landscapes" transdisciplinary conference, which took place in Kathmandu in October 2023. The conference facilitated the exchange of knowledge among professionals and researchers from different fields including agriculture and forestry, hydrology and water resources, energy in general and micro-hydro in particular, politico-economic and social dynamics, and green roads. Some of the insights gained at the event point to at least three overarching tensions that shape current realities in Nepal's mountain regions:

- Increased investment in national infrastructure, including roads and power systems, is paving the way for improved connectivity and economic growth. On the other hand, in some cases this is increasing the vulnerability of landscapes to extreme climatic events, which in turn increases the vulnerability of the infrastructures themselves.
- Diverse sustainable practices such as agroforestry and bioengineering – which can contribute to environmental conservation and climate resilience – have been tested in several contexts within Nepal. However, in many cases the diffusion of such promising practices remains very low and they are in effect only applied by a minute number of potential users.
- Long-standing experience has been gained of community-based organisations that have played a crucial role in the management of local resources over the last few decades (e.g., community forest groups, community-based micro-hydro plants and irrigation systems). However, it is not clear whether such structures are renewing themselves quickly enough to respond to the new and rapid demographic, socio-political and environmental changes in rural Nepal today.



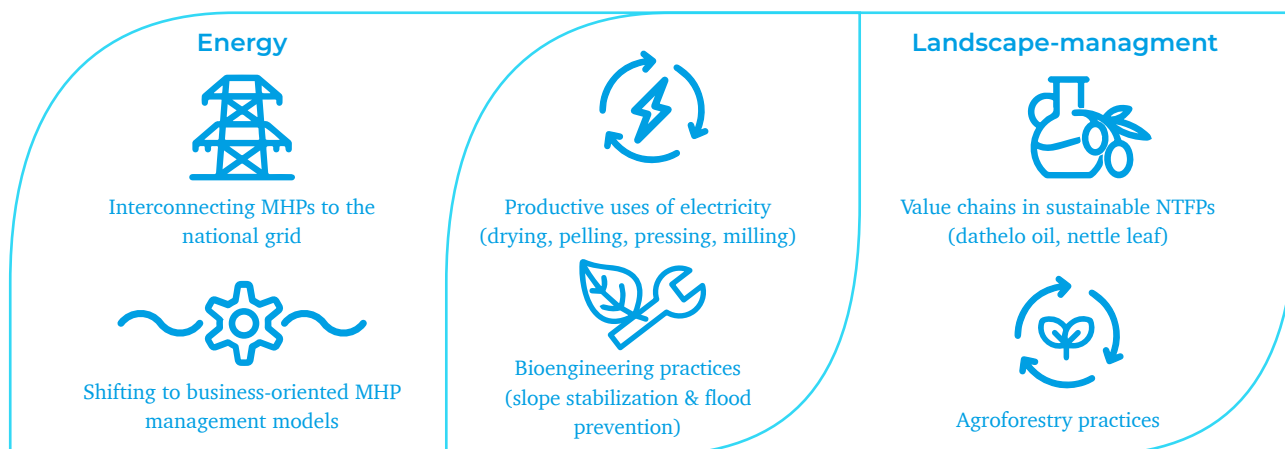
Participants at the “Peak Perspectives” transdisciplinary conference in Kathmandu. (Photo: Winrock, 2023)

The work of the IL needed to focus more specifically on the situations of communities and landscapes in order to advance practical insights into ways of strengthening the livelihoods of mountain people. To achieve this, the diverse and extensive experience of community-based organisations managing resources in the energy sector (i.e., micro-hydro systems) and landscapes (i.e., community forests) presented an excellent entry point to the complexity of their livelihoods. Therefore, based on the previous experience of organisations implementing the IL, two regions in Gandaki and Karnali, namely the Baglung and Jumla districts, with a relatively high density of well-functioning community-based MHPs and CFGs were selected as the geographical focus. Various types of interactions with and exchanges among relevant actors were facilitated involving representatives of community organisations, local government staff (e.g., ward chairpersons, officers of the relevant bodies such as soil conservation and forestry, etc.), community members, and representatives of national institutions and programmes covering energy, soil and forestry issues.



Stakeholder engagement: meeting with staff and members of micro-hydropower management committee in Nisi Khola, Baglung. (Photo: Winrock, 2023)

An integrated approach to strengthening the livelihoods of mountain communities in Nepal



Selection of Innovation Lab solutions

During the process of consultations and exchange with all the actors mentioned, a panorama of possible and relevant solutions (i.e., experience, practices, technologies and knowledge) emerged. The focus then shifted to identifying solutions that could be combined to exploit synergies between the broad fields of energy and landscape management while at the same time addressing (at least some of) the most pressing tensions shaping the realities of mountain regions today. Figure 1 shows a selection of solutions that emerged from this process and will be promoted and implemented in combination during the next phases of the Innovation Lab Nepal.

Connecting business-oriented MHPs to the grid:

The Government of Nepal is investing in the expansion of power generation and extending the national grid. This development could be an opportunity for robust micro-hydro plants (MHPs) to connect to the grid. By selling surplus electricity to the national grid, these MHPs can grow their business and enhance their capacity to invest in local communities (Also see: Grid interconnection factsheet).

Shifting from the user committee model to business-oriented models:

For the past three decades, the user committee model has been most common at MHPs in Nepal. While it has helped to bring basic electricity services to off-grid communities, management and financial sustainability have been inconsistent. Shifting towards a business-oriented local organisation-led model provides clear incentives to generate profits and enhance professionalism, and promotes the productive use of energy in the communities.

Bioengineering practices

integrate physical infrastructure with biological and ecological principles to address challenges such as landslides and floods by providing soil stabilisation, erosion control, and ecological restoration. Local actors involved in the IL will build capacities by applying low-cost bioengineering practices such as MHPs and irrigation channels to enhance the climate resilience of their landscapes and infrastructures.

Scaling up the value chains of sustainable non-timber forest products (NTFP):

At the project sites, two specific products with high commercialisation potential were identified: Dhatelo oil and Nettle leaf powder. Using a whole value chain approach (from forest management practices to the collection and pre-treatment of seeds/leaves to linking up with national and international traders), fair participation of the local communities in value creation can be ensured. In addition to the economic benefits, both species offer excellent alternatives for soil conservation (see bioengineering practices above).

Promoting locally-relevant productive uses of electricity:

The main focus is on mechanising the pre-treatment and processing steps for the prioritised NTFPs such as washing, drying, peeling, pressing, and milling. Moreover, the scalability of other functions such as cold storage and water pumping for irrigation will also be promoted. The promotion of electric cooking at local teashops, hotels, restaurants and schools should also be highlighted here.

Strengthening agroforestry practices:

While community forest groups have a long tradition in Nepal, it is common to find cases of weakened forest governance and maintenance capacities. Updating and improving agroforestry practices such as rotational harvesting, reforestation, pruning, and live fencing have the potential not only to improve the overall condition of forests, but also to contribute to improving the participation of local communities in NTFP value chains.

It is important to note that the six solutions presented here are only an initial selection based on the specific context of the project sites and the priorities defined in consultation with the local actors. However, combining other solutions would also be conceivable and will be further explored when applying the integrated approach for the sustainable development of mountain communities.

Scale-up potential

While the potential replicability of the approach in Nepal was a criterion for its development, we see great potential for it to be applied in several countries with similar conditions, for example the high socio-economic relevance of mountain landscapes and significant experience with micro-hydro plants (MHP). The entire Himalayan region, the Hindu Kush, the Andean region and many more represent potential regions for replication of the approach.

Even in cases with limited to no experience with MHPs, the approach could provide guidance for developing impactful programmes as the need to approach problems holistically becomes more pressing. Overall, the combination of business-oriented management, connectivity to larger energy networks, sustainable agricultural practices, value chain development, bioengineering solutions, and productive uses of electricity creates a robust framework that can be scaled up to benefit further communities and regions facing similar challenges.

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This factsheet is part of the series “Sustainability Solutions for Mountain People and Landscapes,” developed within the WISIONS Innovation Lab Nepal. The aim is to promote an integrated approach to strengthening the livelihoods of people living in mountain communities. Each factsheet provides information on specific sustainability solutions in the fields of energy and landscape management that have shown promising potential for improving the livelihoods of mountain people but have a low level of adoption in Nepal and other mountain regions. The information is tailored to the specific context of Nepal’s mountain landscapes and offers practical insights and guidance for scaling up the application of these solutions. Additionally, it presents an integrated approach that begins with an understanding of the opportunities and challenges faced by mountain communities, enabling the systematic deployment of synergies between solutions from the energy and landscape sectors.

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