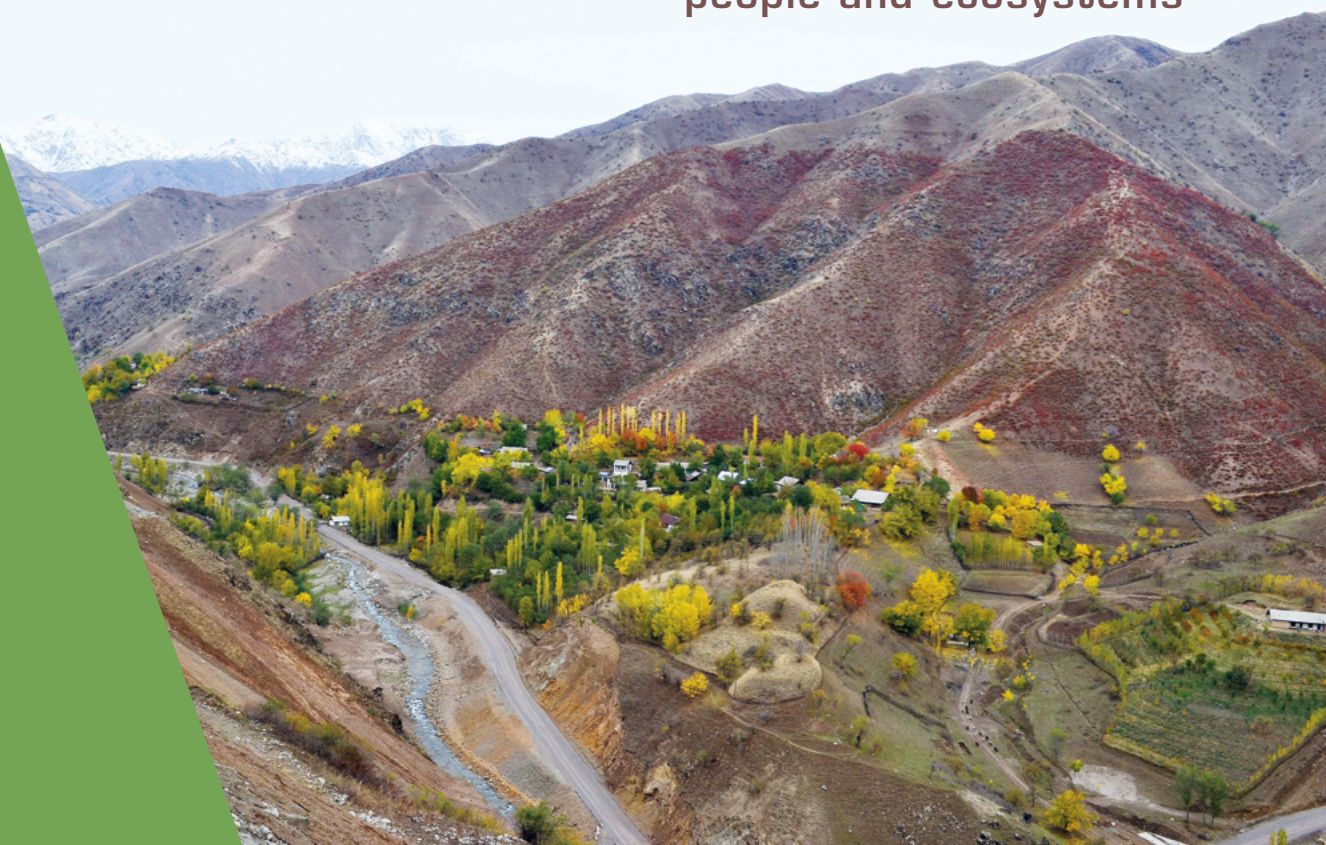


Leaving no one in mountains behind

Localizing the SDGs for resilience of mountain
people and ecosystems



Pledged to “leave no one behind”, the United Nations 2030 Agenda and sustainable development goals (SDGs) have major potential to advance sustainable mountain development and strengthen the resilience of communities and ecosystems in mountain areas. But to realize that potential, the SDGs must be translated – i.e. “localized” – to mountain areas. This will enable policymakers and implementers at the local, national, regional, and global levels to understand mountain priorities, customize actions, and measure progress towards the SDGs. To aid such localization, expert assessments were conducted in Nepal, Uganda, Kyrgyzstan, Ecuador, and Switzerland. The findings

highlight common development priorities in mountains, such as sustainable resource use, climate action, and strengthening people's livelihoods and resilience. But they also reveal significant differences based on mountains' diversity. Going forward, one key challenge is the lack of data specific to mountain regions that correspond to the SDG indicators. Overcoming this will require a pragmatic approach that makes the best use of available data – including proxy data – and iteratively combines it with transparent, participatory stakeholder reviews. Waiting until data availability has improved is simply not an option: Achieving the SDGs in mountain areas is too urgent.



Securing sustainable livelihoods is challenging in this rugged terrain in Nepal. (Photo by J. Bajracharya/ICIMOD)

The 2030 Agenda and mountains

Diverse and vulnerable mountain livelihoods

Mountains are home to approximately 915 million people and harbour rich natural and sociocultural diversity, providing essential ecosystem services to up to half of the world's population [1]. However, numerous people living in mountains worldwide face multiple challenges in securing sustainable livelihoods. Poverty incidence in mountain areas is high, and close to 40 percent of the 835 million mountain people in developing countries are considered vulnerable to food insecurity [2]. Steep slopes and the harsh climate at higher elevations limit agricultural productivity and expansion of production. Rugged topography and remoteness impede access to markets and the provision of social services and basic infrastructure essential for enhancing well-being and advancing economic development. Often mountain communities are exposed to multiple natural hazards that put their lives and livelihoods at risk [3], [4].

Moreover, mountains are among the regions most affected by climate change. Amplified warming at higher elevations [5] and changing precipitation patterns (amount and intensity) compound the risks to livelihoods and ecosystems. Major

effects from climate change include water scarcity due to droughts or retreating glaciers and diminishing snow cover, rockfall/debris flows, and glacial lake outburst floods [6]. Building the resilience of mountain communities and ecosystems is thus pivotal to support pathways to sustainable development in mountains (Box 1) [7], [8].

Localizing the SDGs to mountain contexts

The 2030 Agenda's stated aim of achieving a "better and more sustainable future for all" presents a major opportunity to improve mountain people's livelihoods and safeguard mountain-based natural resources. Indeed, the 2030 Agenda explicitly highlights the importance of mountains for sustainable global development in the following three SDG targets [10]:

- **SDG 6.6** By 2020, protect and restore **water-related ecosystems, including mountains**, forests, wetlands, rivers, aquifers and lakes.
- **SDG 15.1** By 2020, ensure the conservation, restoration and sustainable use of **terrestrial and inland freshwater ecosystems and their services**, in particular forests, wetlands, **mountains** and drylands, in line with obligations under international agreements.
- **SDG 15.4** By 2030, ensure the **conservation of mountain ecosystems**, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

However, the 2030 Agenda does not explicitly stress the needs and priorities of people living in mountains. Are mountain communities at risk of

BOX 1 Resilience

Resilience is the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation [9].

being left behind due to their remoteness, political marginalization, and the costs of providing them with basic services and infrastructure? Will international and national efforts overlook mountain areas in favour of regions and communities where progress can be achieved more easily? Not if we pursue the right approach and processes.

Indeed, to harness the 2030 Agenda effectively on behalf of mountains, we must address the conditions and needs of mountain *communities* and *ecosystems* in tailored, mountain-relevant SDG assessment, implementation, and review processes at the local, national, regional, and global levels. In other words, we must localize the SDGs to mountains by setting relevant priorities, determining effective means of implementation, and adopting adequate indicators to measure progress [11], [12]. Voluntary National Review (VNR) processes as well as regional and global reviews can provide suitable platforms (Box 2) to draw attention to specific challenges in mountains and highlight mountains' potential for sustainable development locally and in support of neighbouring areas. Including a mountain perspective in such reviews is essential to ensure "a longer-term orientation" of development efforts that benefit mountain communities.

Expert assessments as initial step

Not all 169 SDG targets are equally important to sustainable development in mountains. Thus, a crucial first step is to decide on development priorities and corresponding SDG targets. Further, to monitor the effectiveness of implementation efforts, a subset of adequate and relevant indicators must be narrowed down out of the 232 SDG indicators [11], [13]. However, there are data-related challenges to these steps. First, there is a shortage of data specific to mountain areas. Second, available mountain data do not always match the requirements of the SDG indicators. Third, the data from different mountain areas may use different variables and parameters, and may differ in terms of quality, resolution, and periods covered.

In this Issue Brief, we present initial steps towards localization of the 2030 Agenda to mountain areas. The programme *Promoting Sustainable Mountain Development for Global Change* (SMD4GC, see box on back cover) invited experts in Nepal, Uganda, Kyrgyzstan, Ecuador, and Switzerland to contribute to assessments based on the following questions: What SDG targets have a high priority in terms of addressing the most critical development issues of mountain areas in their countries? Which of these priority targets help to strengthen the *resilience* of mountain communities and ecosystems? (See Box 3.)

The results of the expert assessment in Ecuador enabled the first mountain-specific measurement of SDG indicators for SDG targets selected as high-priority in the country. Combined with a desktop study by Bracher et al. [14], the assessment method and results from Ecuador enabled identification of a pragmatic approach to integration of mountain perspectives in national, regional, and global reviews of progress towards the SDGs.

BOX 2 Review process of the 2030 Agenda

UN Member States have agreed to systematic follow-up and review processes as an integral part of implementing the 2030 Agenda ([10], paragraphs 47–48 and 72–91). Reviews will be conducted at the national, regional, and global levels with the aim of tracking progress, learning from experience, and ensuring that "no one is left behind".

Accordingly, Member States are encouraged to "conduct regular and inclusive reviews of progress at the national and sub-national levels, which are country-led and country-driven" (paragraph 79). These so-called Voluntary National Reviews, or VNRs, should strengthen policies and mobilize the support of multiple stakeholders.

Regional reviews will draw on national reviews and aim at sharing of information, knowledge, and good practices at the regional level. They will also address regional and transboundary issues (paragraphs 80–81).

Reviews by the High-Level Political Forum at the global level are informed by the national and regional reviews, as well as by Global Sustainable Development Reports (paragraphs 82ff).

BOX 3 Methodology of expert assessment

SMD4GC's partners conducted rapid expert assessments in Nepal, Uganda, Kyrgyzstan, Ecuador, and Switzerland. These countries represent diverse socio-economic and environmental conditions. Uganda, located in a tropical zone, and Nepal, located in a sub-humid zone, are both considered low-income countries according to the World Bank's classification [15]. Ecuador, part of the tropical Andes, and Kyrgyzstan, located in semi-humid and semi-arid zones, are both middle-income countries. Finally, Switzerland, located in a temperate zone, is a high-income country. In total, 66 experts took part in the rapid assessments. A balanced group of development experts, government staff, and researchers participated in each country. Experts' knowledge covered socio-economic, cultural-institutional, and environmental aspects of sustainable development in mountains.

The assessment pursued two objectives:

First, to identify high-priority SDG targets necessary to address the most critical development issues in the mountain regions of their respective country. To this end, an online survey was separately facilitated in each country, except Nepal. In Nepal, the high-priority SDG targets were derived from the results of the Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP) [16].

Second, to determine whether the selected high-priority SDG targets reinforce or conflict with SDG targets that explicitly aim at promoting resilience of mountain people and ecosystems. Interactions were assessed using a simplified approach proposed by Nilsson et al. [17].

SDG priorities to address mountain needs

Critical development issues

The SMD4GC assessments of the most critical development issues in all five countries point to a variety of environmental, economic, institutional, and political conditions that present challenges and shape people's livelihood opportunities in mountain areas. Several challenges span a number of mountain areas in the different countries. Common issues include degradation of mountain ecosystems, lack of economic/employment opportunities for communities, and lack of well-maintained basic infrastructure. Notably, many of these issues are also exacerbated by common institutional weaknesses, such as inadequate policies, lack of inclusion of mountain communities in policy- and decision-making, poor enforcement or neglect of people's rights, and broader corruption. Finally, climate change and disaster risks are crucial development issues in all mountain areas – ranking near the top in Uganda and Kyrgyzstan, for example. Though poverty is a key critical issue in virtually all low- to middle-income countries, it was not cited among the most important development challenges in the mountain contexts assessed.

At the same time, several critical development issues are more specific to individual countries. These include land conflicts and land fragmentation in Uganda, weak enforcement/lack of regulations in the mining sector in Kyrgyzstan and Ecuador, and shifting demographics and agricultural structures in Switzerland. These country-specific critical issues highlight the diversity of mountain contexts, shaped by distinct sets of conditions.

High-priority SDG targets

Given the diversity and specificities of mountain areas, the relevance of the 17 SDGs and 169 associated targets can vary from one mountain context to another. Indeed, the expert groups identified a broad range of SDG targets as taking priority depending on the specific country and mountain setting (Figure 1). Nevertheless, comparing the assessments from all five countries, several targets within the 2030 Agenda were found to be especially relevant to sustainable mountain development:

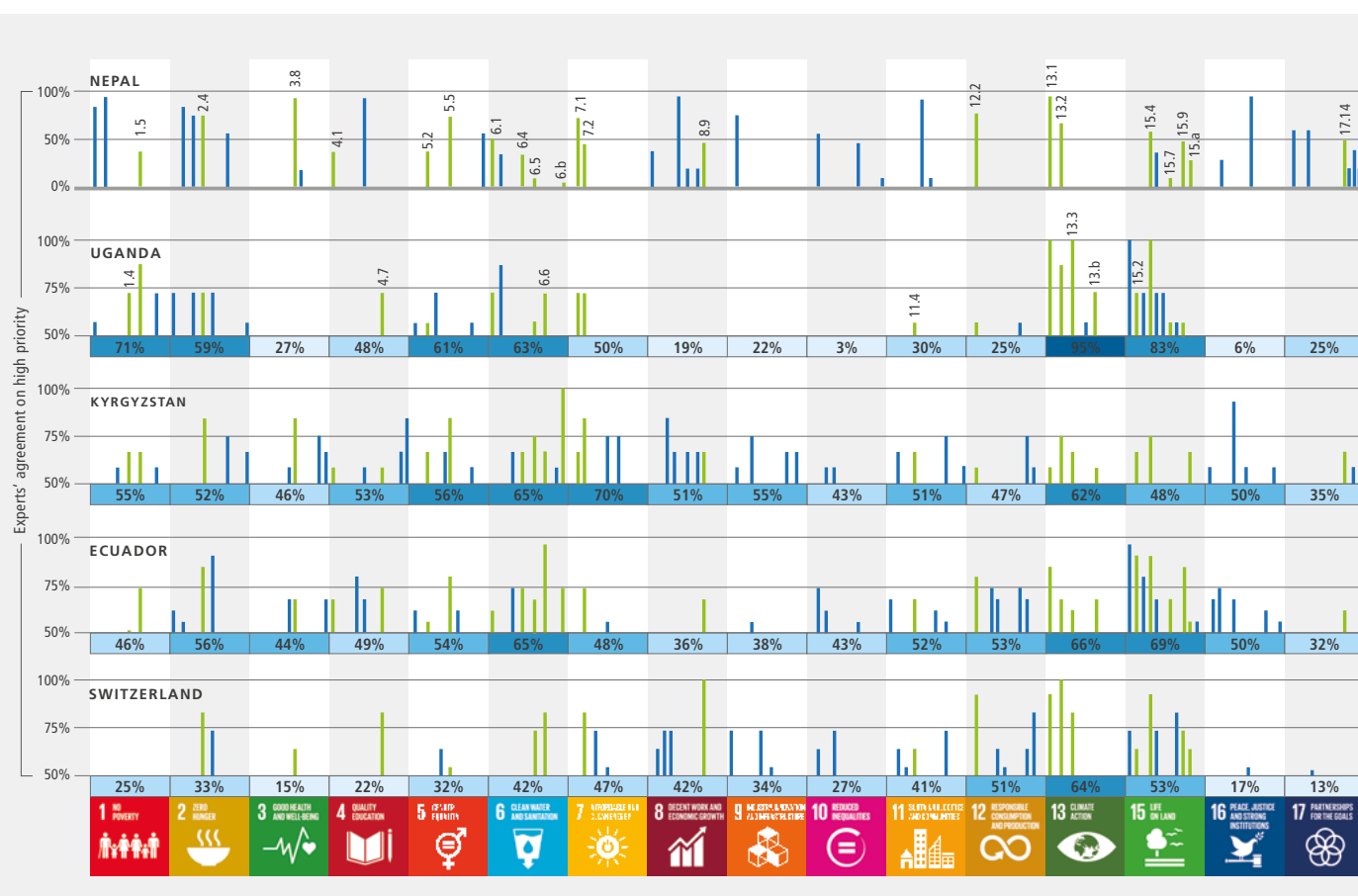


Figure 1: SDG targets selected by experts as high-priority to address critical development issues in the mountain regions of five countries. For Uganda, Kyrgyzstan, Ecuador, and Switzerland, the bar height indicates the degree of agreement among experts; only targets selected by over half the experts are presented. For Nepal, the selection is based on results from the Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP); the bar height represents the ranking of these targets by experts. Bars in green indicate targets that are of high priority for several countries (see also Figure 2). SDG 14, "Life under water", was not included in the assessment due to its limited relevance for sustainable mountain development.

Tackling climate change and mitigating its impacts. This encompasses integration of climate change measures into national policies, strategies, and planning (SDG 13.2), as well as improving education, awareness-raising, and human and institutional capacity on climate change (SDG 13.3). Increasing the share of renewable energy globally (SDG 7.2) is another key target that will help to mitigate climate change and address energy poverty in mountains.

Strengthening the resilience of mountain people and ecosystems. This comprises improving adaptive capacity to climate-related hazards and natural disasters (SDG 13.1) and fostering climate-resilient agriculture (SDG 2.4) to increase food production and improve land quality. It is particularly important to build the resilience of the poor and those in vulnerable situations by reducing their exposure and vulnerability to climate-related extreme events and other shocks and disasters (SDG 1.5).

Conservation and sustainable use of mountain ecosystems. This includes not only conserving terrestrial and freshwater ecosystems in mountains in general (SDG 15.1), but also protecting and sustainably using forests (SDG 15.2) and mountains' biodiversity (SDG 15.4). Equally crucial is maintaining the genetic diversity of seeds, plants, animals, and related wild species (SDG 2.5). Relatedly, conserving traditional knowledge and putting in place schemes for fair and equitable benefit sharing are essential. Moreover, protection and restoration of water-related ecosystems are highly important (SDG 6.6). Delving deeper, these conservation-related goals are supported by several other targets, such as that of implementing "integrated water resources management at all levels, including through transboundary cooperation as appropriate" (SDG 6.5). Also clearly relevant are sustainable management and efficient use of natural resources (SDG 12.2) and the protection of natural and cultural heritage in mountains (SDG 11.4).

Eradication of poverty. This target (SDG 1.1) is especially important in the low-income countries Nepal and Uganda. In Kyrgyzstan and Ecuador, particular emphasis is placed on the related goal of ensuring equal rights to essential assets like economic resources and land, as well as ensuring equal access to basic services for all men and women, particularly for poor and vulnerable people (SDG 1.4).

Achieving gender equality and empowering women and girls. This requires women's full and effective participation and equal leadership at all levels of decision-making (SDG 5.5) as well as elimination of all forms of violence against women and girls in public and private spheres (SDG 5.2). Despite 40 years of concerted gender-mainstreaming efforts, gender equality in mountains remains far from being achieved [18].



Promotion of sustainable tourism. This comprises developing and implementing tourism-related policies to promote mountain-specific economic/employment opportunities, culture, and products (SDG 8.9). Sustainable tourism is a promising sector for mountain areas around the world, providing rural communities with job opportunities beyond agriculture [19].

Mosaic of land uses in Carchi Province, Ecuador. (Photo by A. C. Benítez, CONDESAN)

Health coverage and education (also for sustainable development). Experts agree on the high priority of providing universal health coverage to people living in the mountains (SDG 3.8) and the importance of "free, equitable and quality primary and secondary education" (SDG 4.1). However, according to the experts, acquiring knowledge and skills needed for promoting gender equality, human rights, global citizenship, and the appreciation of cultural diversity is equally crucial for advancing sustainable development in mountains (SDG 4.7).

→ Priority setting is a first important step in localizing the SDGs to mountains. Existing national mountain policies or mountain strategies – such as Uganda's national strategy for sustainable mountain development [20] or Switzerland's policy for rural and mountain areas [21] – can be related to the SDGs and can help to identify priorities within the 2030 Agenda framework.

→ In countries where no such mountain policies or strategies exist, an expert assessment of mountain-relevant targets can be an initial step that helps to guide SDG localization and monitoring efforts. However, follow-up activities have to occur in a deliberative multi-stakeholder process involving mountain actors from different sectors and governance levels in order to validate the priority setting, agree on the mountain-specific agenda, and create ownership among the different stakeholder groups. Ideally, the agreed priorities are backed by evidence.

Benefits for resilience building

Given the high sensitivity of mountains to climate change, the many disaster risks, and the diversity of priorities, entry points must be found for policies and interventions that simultaneously *address critical development issues and strengthen the resilience of mountain people and ecosystems*. Low resilience may jeopardize any progress achieved in situations where mountain communities and ecosystems are subject to compounding hazardous events and other stressors.

The 2030 Agenda comprises four targets that explicitly focus on resilience building (hereafter called “resilience” targets). They aim at

- building resilience of **the poor** and reducing their vulnerability and exposure (SDG 1.5);
- implementing **resilient agricultural practices** for sustainable food production systems (SDG 2.4);
- developing reliable, sustainable, and **resilient infrastructure** for economic growth and human well-being (SDG 9.1);
- strengthening the resilience and the capacity to adapt to **climate-related hazards** and disasters (SDG 13.1).

Village close to Mount Moroto, eastern Uganda. (Photo by Mountain Club Uganda)



When evaluating practical responses to high-priority targets, it is important to grasp the implications of each action for resilience building in mountains. In other words, we must identify whether actions towards high-priority targets will have positive or negative consequences for resilience. This is especially important when

priorities must be set in the context of resource limitations or political and institutional constraints [17], [22].

To this end, experts were asked to assess whether the selected “high-priority” targets are intrinsically linked to, reinforce, or enable progress towards the “resilience” targets, or whether they instead constrain, counteract, or even cancel out progress towards resilience building. Figure 2 shows some of the results obtained regarding the five countries, arranged in matrices. It includes only those targets deemed high-priority for at least three of the four low- to middle-income countries, or for four of the five countries in total. Hence, the results offer an overview of what is relevant across the different mountain areas and not a full assessment for each country.

Multiple synergies strengthen resilience

According to the experts’ comparisons, the “high-priority” SDG targets overwhelmingly contribute in a positive way to “resilience” aims in mountains (Figure 2, green shade). Negative implications for resilience were anticipated in only a few instances. Indeed, the resilience of mountain communities and ecosystems strongly depends on progress towards many other SDGs. This is not surprising considering that resilience is characterized by three main attributes: the buffer capacity of a system, the ability for self-organization, and the capacity for learning [23]. Many of the “high-priority” targets help to enhance these capacities in one way or another.

Climate action is important, but not sufficient: The findings clearly show that resilience building must go far beyond achieving progress towards the targets under “climate action” (SDG 13). Nevertheless, integrating climate change measures into policies, strategies, and planning (SDG 13.2) reinforces achievements towards the “resilience” targets, except in Kyrgyzstan.

The resilience of poor people benefits most from synergies: In all five countries, poor and vulnerable people’s resilience is likely to benefit the most from achievements made towards the “high-priority” targets (see all interactions with SDG 1.5). This applies both to climate-related extreme events and to other economic, social, and environmental stresses and shocks (SDG 1.5).

Policy coherence is indispensable: In Nepal, Kyrgyzstan, and Ecuador, the experts consider policy coherence (SDG 17.14) crucial to building resilience. This is especially the case in Ecuador, where achievements towards three out of the four “resilience” targets seem to be inseparably linked with the implementation of coherent policies.

NEPAL					UGANDA				KYRGYZSTAN				ECUADOR				SWITZERLAND			
"Resilience" targets																				
	1.5	2.4	9.1	13.1	1.5	2.4	9.1	13.1	1.5	2.4	9.1	13.1	1.5	2.4	9.1	13.1	1.5	2.4	9.1	13.1
"High-priority" targets	1.4				2	2	1	1	2	3	3	1	2	2	1	1				
	1.5		2	1	3		2	2	3		3	2	1		2	0	2			
	2.4	2		1	1	2		1	2	2		1	3	2		1	2	1		2
	3.8	1	1	1	1					2	0	2	0	3	0	0	1	3	0	0
	4.1	1	1	0	0					1	1	1	1	2	2	1	2			
	4.7					1	1	2	0	1	1	1	1	2	2	1	2	1	0	1
	5.2	2	1	1	1	1	1	0	1	2	2	2	0	3	2	1	2			
	5.5	2	1	1	1					1	1	1	1	3	2	0	2	1	0	0
	6.1	2	2	3	2	1	2	2	3					2	1	2	2			
	6.4	2	?	1	3					2	2	2	2	3	3	1	2			
	6.5	1	2	2	2	1	3	2	1	3	1	2	2	2	2	2	2	1	2	1
	6.6					2	3	0	2	2	2	2	3	3	3	2	2	2	?	0
	6.b	1	1	2	1					3	3	2	3	2	3	1	2			
	7.1	1	1	2	0	3	0	1	1	2	2	2	2							
	7.2	2	1	2	2	3	1	1	2	2	0	2	3	-1	1	2	1	1	2	1
	8.9	1.5	1	1	1					2	2	1	1	2	1	3	2	0	1	2
	11.4					2	0	1	2	2	0	2	3	2	3	2	3	0	1	0
	12.2	2	2	?	2	3	1	0	1	1	2	1	2	3	3	1	3	1	2	1
	13.1	2	2	2		1	2	1		1	2	2		3	3	2		2	2	2
	13.2	2	2	2	3	3	2	2	3	1	0	1	0	2	2	2	2	2	2	2
13.3					2	1	1	1	1	1	0	1	3	2	1	3	2	1	2	2
13.b					2	1	-1	2	1	2	0	1	2	2	2	2				
15.2					1	1	-1	2	2	1	1	2	2	1	-1	3	2	1	1	2
15.4	2	2	0	1	2	2	0	2	2	0	-1	3	1	2	-1	3	1	1	1	2
15.7	0	1	-1	1	0	1	1	0					0	1	0	0				
15.9	2	2	1	2	1	1	-1	1					2	1	0	1	1	2	-1	1
15.a	1	2	1	2					1	0	0	1	3	2	1	3	1	2	1	1
17.14	2	2	1	2					3	3	3	2	3	3	3	3				

Figure 2: The five matrices show how selected "high-priority" SDG targets in mountains interact with SDG "resilience" targets (targets that explicitly refer to resilience building) in the different countries. Green shades indicate synergies between SDG targets, while red shades indicate conflicts leading to trade-offs between SDG targets (based on a scoring system adapted from [17]).

A few trade-offs and contextual differences

Conservation of ecosystems constrains infrastructure development: Efforts to conserve mountain ecosystems and their services (targets of SDG 15) may limit the development of basic infrastructure (SDG 9.1). In such cases, environmental and social impact assessments are instrumental to transparent, participatory negotiation of possible trade-offs with affected stakeholders.

Context matters: Overall, the matrices reveal substantial differences between the different countries. Experts in Ecuador and Kyrgyzstan perceive strong linkages between the "high-priority" targets and building necessary resilience in local mountain regions. In Switzerland, by contrast, experts see progress towards separate "high-priority" targets as having little bearing on resilience to climate change and other challenges faced in the country's mountain areas. Such contrasts may be due to differences in the countries' resource endowments or governance systems, as well as differences in understanding of resilience itself [17], [24].

Score	Type of interaction	Explanation
3	Indivisible	Inextricably linked to the achievement of another goal
2	Reinforcing	Aids the achievement of another goal
1	Enabling	Creates conditions that further another goal
0	Consistent/neutral	No significant positive or negative interaction
-1	Constraining	Limits options on another goal
-2	Counteracting	Clashes with another goal
-3	Cancelling	Makes it impossible to reach another goal
?	Uncertain	No consent among the experts
	Not assessed	Interaction not assessed

→ When setting priorities for implementing SDGs and corresponding targets, governments should carefully consider interactions between them and attempt to maximize synergies and address possible conflicts and trade-offs at an early stage.

→ Rapid assessments by experts can provide important insights and information on how SDG interactions might play out in different mountain areas. Such assessments should be backed by evidence from science and practice to ensure credibility and reliability.

→ Monitoring progress towards explicit "resilience" targets only provides limited information about factors of success or failure. Resilience is an outcome of bundles of interventions in different domains. A monitoring scheme that accounts for interactions can contribute to understanding and effectively informing pathways to transformative change.

Mountain-specific SDG assessment in Ecuador

But how does use of such assessments function in greater detail at the country level? SMD4GC's partner in Ecuador, CONDESAN, conducted a first-ever *spatially* disaggregated SDG assessment of that country's mountain areas. Ecuador features high accessibility of data suitable for measuring progress towards the 2030 Agenda. Its government increasingly incorporates SDGs into the design and monitoring of public policy and into its planning tools such as the National Development Plan [25]. Two SDG targets are selected here to illustrate the opportunities and challenges of tracking sustainable development in the Andes of Ecuador (see also [14]).

Protected areas and access to safe drinking water

Mountains, especially in the tropics, harbour unique biotic communities and important ecosystem functions that are very sensitive to the combined effects of climate change and land use/land cover change [26]. This is the case in Ecuador. However, the Ecuadorian Andes also feature major diversity of social and ecological systems: Globally important ecosystems are found in close proximity to agricultural mosaics, and rural areas characterized by persistent poverty are interspersed within a dense network of urban areas [27], [28]. Vulnerable local populations rely on the ecosystem services of mountains, such as water for food production and direct consumption [29].

Using databases from ecosystem monitoring programmes and censuses, two maps were created on behalf of SDG indicator 15.4.1 "Coverage by protected areas of important sites for mountain biodiversity" (Figure 3) and SDG indicator 6.1.1 "Proportion of population using safely managed drinking water services" (Figure 4).

The Ecuadorian Andes feature the greatest expanses of remnant vegetation and priority areas for biodiversity, followed by the Amazon and coastal regions (Figure 3). However, Ecuador's national system of protected areas only covers 40 percent of the important biodiversity areas in the Andes, with major gaps occurring in the drier ecosystems of the southern Andes and in the piedmont of the eastern Andean range. Given the importance of water regulation services for rural livelihoods, these mountain landscapes represent priority areas for future conservation interventions. Focusing efforts here bears high potential for achievement of multiple benefits on behalf of ecosystems and rural livelihoods.

Overall, access to safe drinking water in Ecuador is better in urban areas than in rural areas. Regionally, the share of households with access to safely managed water is higher in the Andes than in the coastal and Amazonian regions. Given that 63 percent of Ecuador's rural population lives in the Andes, the gap in access to safe drinking water means that community-based water management systems are especially important to the resilience of rural livelihoods in the mountains. Combining patterns for the two indicators – i.e. protected areas and access to drinking water – a broader picture emerges of Andean ecosystems' central role in providing key hydrological services to vulnerable populations. In addition, the spatially disaggregated analysis also shows the heterogeneity that exists within Ecuador's mountain region.

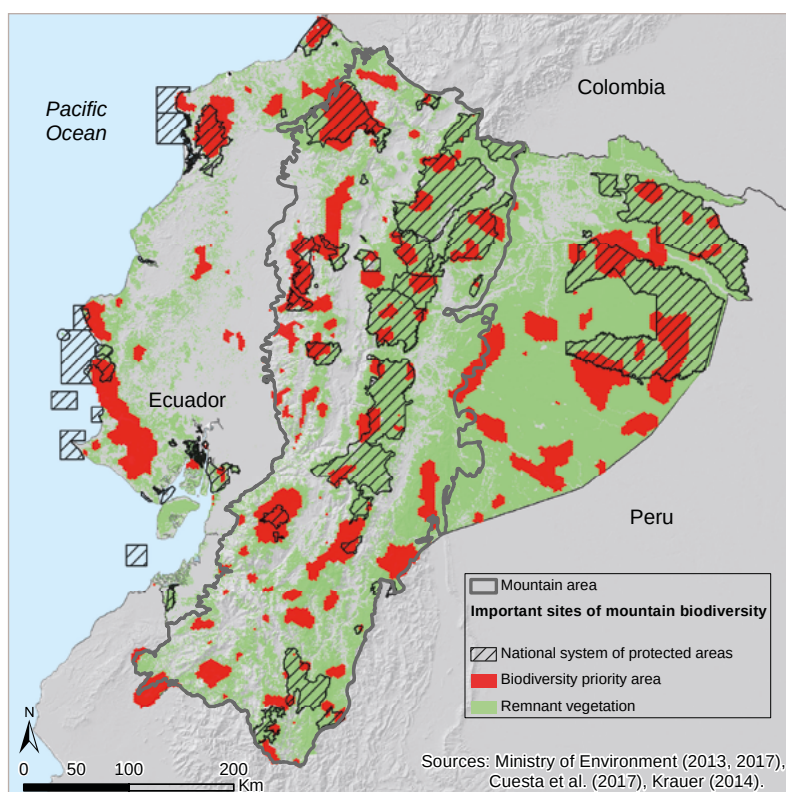
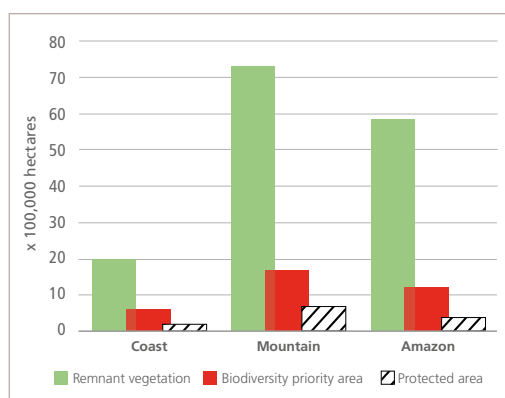


Figure 3: Coverage of protected areas and important sites of mountain biodiversity and related statistics.



Availability of data and use of proxy data

Given the lack of strictly defined indicator data, SDG assessments are often done at the level of targets rather than indicators. The target-level approach offers more flexibility, since proxy data can be used. For certain SDG indicators, detailed data-generation guidelines are provided, including proxies that enable precise monitoring of progress towards SDGs. In Ecuador, data on biodiversity priority areas (Figure 3), for example, can be derived from an established national conservation assessment [30] that compares species and ecosystem data at the national level. This serves as a robust proxy for important sites of mountain biodiversity.

In terms of socio-economic data for Ecuador, results from censuses conducted by the Instituto Nacional de Estadística y Censos (INEC) can be used to track progress towards the SDGs. For example, one key census item records individual households' source of drinking water, enabling direct measurement of progress towards the indicators established under SDG target 6.1 (Figure 4). At the same time, it is important to place such results in broader context to adequately monitor progress towards the SDGs in mountain areas overall. The Ecuadorian datasets used in the above examples allow for comparison of indicators from different regions, revealing diverse social and environmental contexts in the Andes.

Delineation of mountains

Spatial delineation of mountain areas is not as straightforward as might be assumed. There are several delineation approaches, and the areas defined as mountains can differ substantially depending on the approach used [31]. This can give rise to challenges for mountain-specific SDG policies and progress monitoring. For instance, the delineation approach illustrated in Figure 3 and Figure 4 uses altitude and topography information to define mountain areas (Krauer based on classification by [32]). However, this definition does not match ecosystem-based delineations of the Andean region [33] or delineations based on political-administrative units. From a policy perspective, this poses difficulties because many territorial units (e.g. provinces) have mixed lowland and mountain landscapes. Policies that do not take into account these different contexts risk performing poorly as social and environmental conditions change rapidly along the elevation gradient.

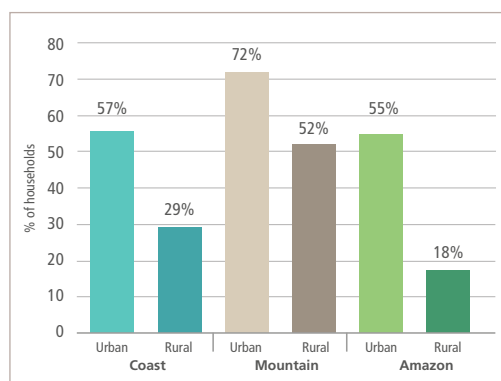
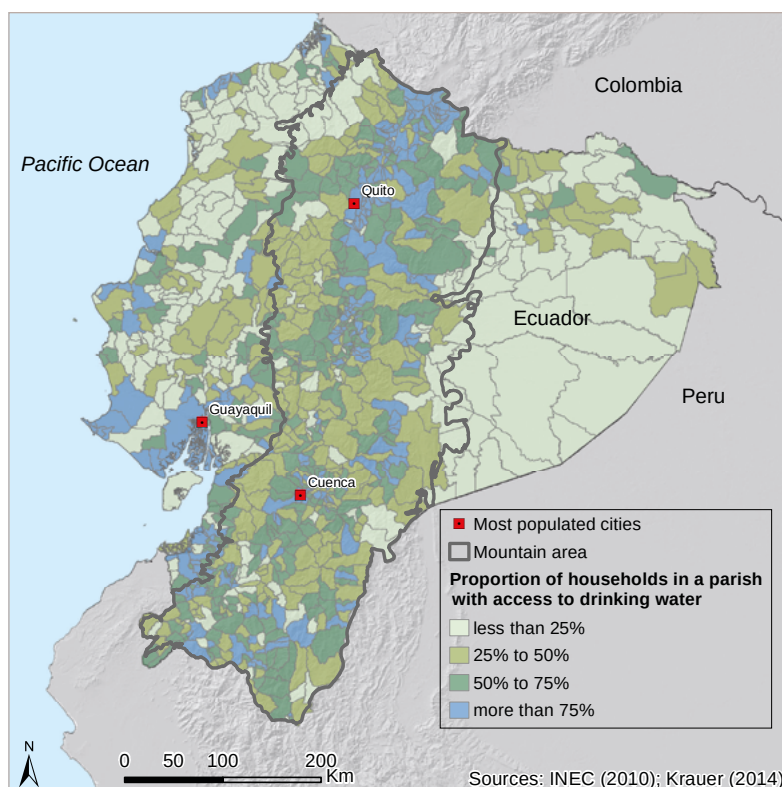


Figure 4: Proportion of households with access to safely managed drinking water services (map and related statistics).

→ Detailed spatial databases of ecosystems, land use dynamics, and social dimensions of sustainable development are highly useful to distinguish the Ecuadorian Andes vis-à-vis neighbouring regions as well as to characterize the heterogeneity existing within the Andes.

→ An appropriate monitoring system for SDGs in the Ecuadorian Andes is needed, integrating existing long-term data-generation efforts and identifying gaps in data regarding important dimensions such as poverty and disaster-risk reduction, climate change adaptation, and food and water security.

→ A dedicated sustainable development policy framework for mountains in Ecuador is needed, given the particular ecosystem, demographic, and socio-economic characteristics of this area.

These findings and proposals for the Ecuadorian Andes are also applicable in other mountain regions and countries. At the same time, the quality of available data may not be the same elsewhere. In many cases, major investments may be needed to generate additional mountain-disaggregated data.

Integrating mountain perspectives in SDG reviews

Governments have committed themselves to fulfil the 2030 Agenda, pledging to “leave no one behind”. This holds promise for fostering sustainable development in mountains and making mountain communities and ecosystems more resilient. But it requires understanding the specific conditions and needs of mountain communities and ecosystems, making them visible, and incorporating them into national, regional, and global efforts to implement and monitor progress towards the 2030 Agenda. Recognizing the challenges the task can entail, decision-makers should pursue a pragmatic approach that facilitates inclusive stakeholder processes and considers the different data and knowledge needed at the local, national, regional, and global levels (Figure 5).

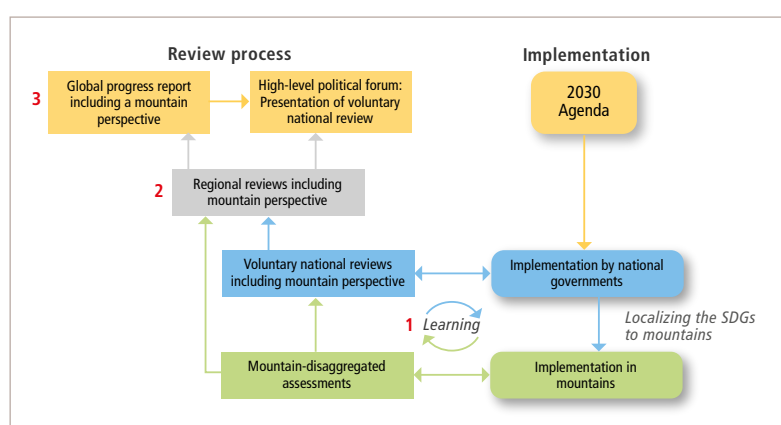


Figure 5: Proposal for amending the 2030 Agenda review process to integrate mountain perspectives

Local to national levels

National governments bear the main responsibility for implementing, monitoring, and reviewing progress towards the 2030 Agenda. However, in the context of increasing decentralization of (environmental) governance, national authorities have to engage more with local governments to jointly formulate and implement development policies. Ideally, corresponding “local development plans” will be prepared and implemented in an inclusive, participatory manner. Overall, mountain-specific guidelines can support responsible actors in their efforts. Some initial guidelines are as follows:

Ensure participatory processes that include key actors from mountain regions. Platforms such as Voluntary National Reviews should strive early on to involve representatives from different sectors and social groups in mountain areas, including local governments. Enabling these actors to contribute to national review processes will ensure understanding of the challenges and opportunities in mountain areas. Platforms are needed that give voice to, account for, and learn from local experiences in mountain regions, facilitating adaptation of policies, strategies, and development efforts (Figure 5, point 1).

Agree on delineation of mountains and mountain-specific policy agendas. The spatial and political boundaries of mountain areas should be defined and delineated in a joint, transparent process enabling stakeholders from mountain regions and relevant sectors to reflect on the mountain-specific settings in which their policies and decision-making are enacted. Delineating mountain areas and developing agendas in this way makes it possible to visualize and enhance the coherence of policies relevant for mountains.

Identify a subset of relevant SDG targets specific to sustainable and resilient development in a given mountain region. Inclusive, transparent stakeholder processes can also be used to identify subsets of SDG targets that address specific development challenges and possible interactions (e.g. SDG synergies or trade-offs) in particular mountain communities and ecosystems. Such processes should build on existing regional or national policy frameworks relevant to mountains, taking advantage of on-going efforts and avoiding unnecessary redundancy. Examples of such existing frameworks include the National Sustainable Mountain Development Strategy of Uganda, the Carpathian Convention, and the Alpine Convention, among others.

Pragmatically approach gaps in mountain-specific data. In cases where a lack of indicator data makes it difficult to meet established or official SDG data collection protocols, proxy data may be used. However, it is important to clearly state definitions, collection methods, and the limitations of such data, so as to aid proper interpretation and subsequent data-generation efforts. In addition, the results and findings of efforts to fill gaps in mountain-specific data should be reviewed and validated in transparent, multi-level processes involving stakeholders from different sectors, remote mountain areas, and marginalized social groups.

Regional and global levels

Compiling mountain-related data and information from different national review processes can help to identify important opportunities for cross-border collaboration based on the transboundary characteristics of many mountain ranges and highland–lowland interactions spanning different countries. Integrating cross-border data and information can strengthen the position of mountain areas in regional debates and negotiations, notwithstanding context-specific challenges (Figure 5, point 2). This also applies to global reviews based on synthesis analyses, findings, and insights from multiple countries and regions (Figure 5, point 3). Global reviews that include a mountain perspective

are key to complement global assessment of the three mountain-related SDG targets (SDG 6.6, 15.1, 15.4), to learn from progress on sustainable development in mountains, and to strengthen communities' and ecosystems' resilience.

Global reviews of progress towards the SDGs could highlight achievements and challenges related to a subset of common concerns in mountains. However, broad reviews cannot capture the entire and diverse range of mountain realities. Ideally, Voluntary National Reviews, regional reviews, and global reviews will complement one another, combining to provide a comprehensive view of progress towards sustainable mountain development for people and ecosystems.

Stakeholders discuss sustainable options in the Swiss Alps. (Photo by B. Schädler)



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Authors:

Susanne Wymann von Dach¹, Christoph Bracher², Manuel Peralvo³, Katya Perez³, Carolina Adler²

Contributing authors:

Salome Alweny⁴, Marie Du-Pontavice⁵, Christian Hergarten⁶, Abid Hussain⁷, Samuel Kanyambwa⁴, Aino Kulonen², Gabriela Maldonado³, Eric Nanchen⁵, Philbert Nsengiyumva⁴, Alma Uzbekova⁶, Nadine Salzmann⁸, Philippus Wester⁷.

1. Centre for Development and Environment (CDE), University of Bern, Switzerland
2. Mountain Research Initiative (MRI), Institute of Geography, University of Bern, Switzerland
3. Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN), Quito, Ecuador
4. Albertine Rift Conservation Society (ARCOS), Kampala, Uganda
5. Foundation for Sustainable Development in Mountain Regions (FDDM), Sion, Switzerland
6. Mountain Societies Research Institute, University of Central Asia (UCA/MSRI), Bishkek, Kyrgyz Republic
7. International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal
8. Department of Geosciences, University of Fribourg (UniFr), Switzerland

Centre for Development and Environment (CDE)
University of Bern, Switzerland
www.cde.unibe.ch

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Anu Lannen (CDE), Stefan Zach (z.a.ch GmbH)

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Sustainable Mountain Development for Global Change (SMD4GC)

The objective of SMD4GC is to contribute to sustainable development in mountain regions and to increase the resilience of vulnerable mountain people who are increasingly exposed to the impacts of global change. The programme works through partner organizations in the Andes, Africa, the Hindu Kush Himalaya, Central Asia, and Switzerland. Funded by the Swiss Agency for Development and Cooperation (SDC), the programme was initiated in 2014 and draws on Switzerland's long tradition of supporting sustainable development in mountains [34].

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