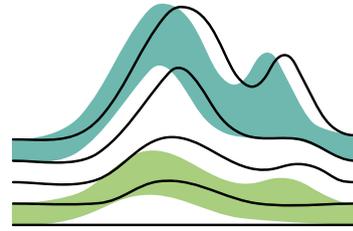


REPORT  
December 2023



ADAPTATION  
AT ALTITUDE

Leave No Mountain Behind

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# Mountains in National Adaptation Plans

A short analysis



### **About Adaptation at Altitude**

Adaptation at Altitude, a collaborative programme launched and co-supported by the Swiss Agency for Development and Cooperation, assists mountain communities and those working with them by improving knowledge of appropriate climate change adaptation and disaster risk reduction strategies in mountain regions, and by transmitting that knowledge through science-policy platforms to inform decision-making in national, regional and global policy processes. This publication is an example of that work.

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# National Adaptation Plans

From extreme heatwaves and devastating droughts, to deadly floods and landslides, the impacts of climate change are increasingly evident. They are already affecting communities and ecosystems worldwide. However mountains bear a disproportionate burden of these climate-related challenges. National Adaptation Plans (NAPs) help countries to anticipate, prepare for, and respond to these impacts and challenges by providing a strategic process for assessing climate risks and vulnerabilities, identifying adaptation priorities, and allocating resources efficiently. The NAP

processes, established by the United Nations Framework Convention on Climate Change (UNFCCC), are participatory, cross-sectoral, iterative, and designed to suit each countries' specific needs and circumstances. They thus provide opportunities to analyze and address challenges in mountain regions as well as related downstream problems. They can also help countries to identify where additional resources including external funding can be most effectively allocated, and enable international and regional cooperation, which is crucial for mountain regions.

## Why mountains are key for adaptation

### Mountains:

**cover** about **25%** of the world's land surface

are disproportionately affected by **climate change**

offer opportunities for **sustainable development**, including renewable energy, disaster risk reduction and sustainable water management

are **hazardous areas** that can present threats to **downstream areas**

**indirectly impact** all life on earth with their **ecosystem services**

are often **left behind**, socially and economically

generate **fresh water** for more than **half the world's population**

## Approach

This report gives an overview of climate change adaptation priorities specific to mountains in NAPs submitted by Non-Annex I countries under the United Nations Framework Convention on Climate Change. It also highlights examples from NAPs of climate adaptation actions in mountains and makes broad recommendations on raising awareness about mountain-specific challenges and solutions in NAP processes.

The analysis presented is based on a systematic review of 46 NAPs of Non-Annex I countries submitted as of the end of July 2023.<sup>1</sup> The selected NAPs were assessed for key words related to mountains<sup>2</sup>, key questions covering different sectors and thematic areas, and particular types of actions (see Figures 2 and 3). Countries were grouped according to the extent of mountainous areas within their borders using the GMBA Mountain Inventory.<sup>3</sup>

## Key findings

Most countries recognize climate change impacts in mountains but many do not plan specific adaptation actions (Figure 1).

- **1 out of 3 countries** that identify climate change impacts in their mountains does not define any climate change adaptation action to address those impacts.
- **2 out of 3 countries** with more than 20% mountain area identify at least one adaptation action for mountains.
- **Almost all countries** with more than 60% mountain area identify climate change impacts in their mountains.

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1 UNFCCC NAP Central: <https://napcentral.org/submitted-naps>

NAPs of the following countries have been reviewed:

Albania, Armenia, Bangladesh, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Chile, Colombia, Costa Rica, Democratic Republic of Congo, Ecuador, Ethiopia, Fiji, Grenada, Guatemala, Haiti, Kenya, Kiribati, Kuwait, Liberia, Madagascar, Mozambique, Nepal, Niger, Papua New Guinea, Paraguay, Peru, Saint Lucia, Saint Vincent and the Grenadines, Sierra Leone, South Africa, South Sudan, Sri Lanka, State of Palestine, Sudan, Suriname, Timor-Leste, Togo, Tonga, Uruguay

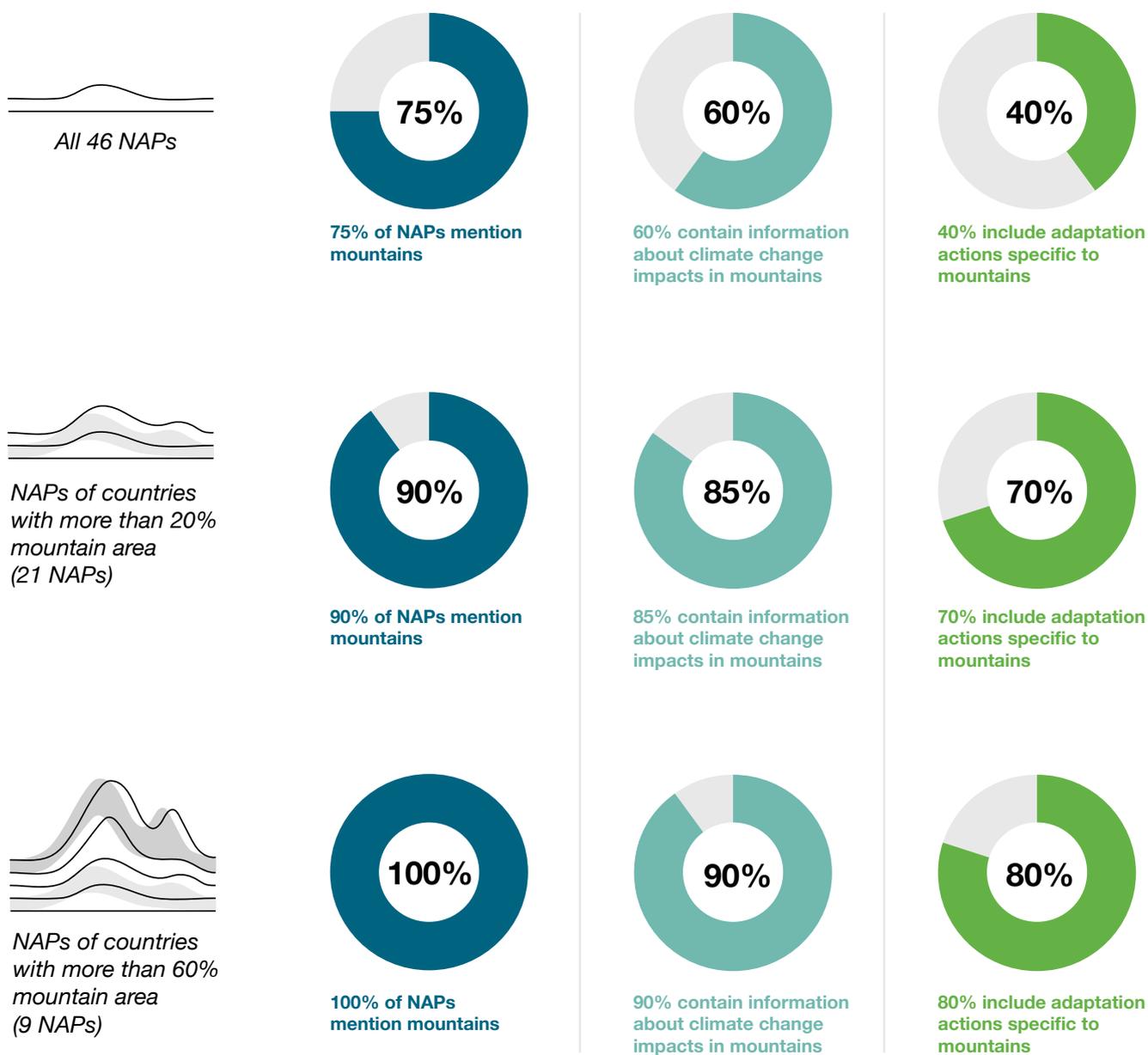
2 Key words used:

Mountain, highlands, hills, volcano, altitude, watershed, permafrost, glacier and its equivalents in Spanish and French, as well as local names including Andes, Himalaya, etc.

3 The inventory has been prepared under the auspices of the Global Mountain Biodiversity Assessment and is available at:

<https://www.earthenv.org/mountains>

Figure 1.  
Reported impacts and adaptation actions



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## Where NAPs include concrete adaptation actions in mountains, their priorities fall across only a few relevant sectors and thematic areas

Climate change adaptation actions related to water, water storage and water supply are addressed in almost 40% of the analyzed NAPs (Figure 2). Natural hazards, agriculture and forestry are each targeted in 20% of the analyzed NAPs. Among countries with more than 20% mountain area, the percentage of relevant sectors and thematic areas addressed is significantly higher, and increases further for countries with more than 60% mountain area.

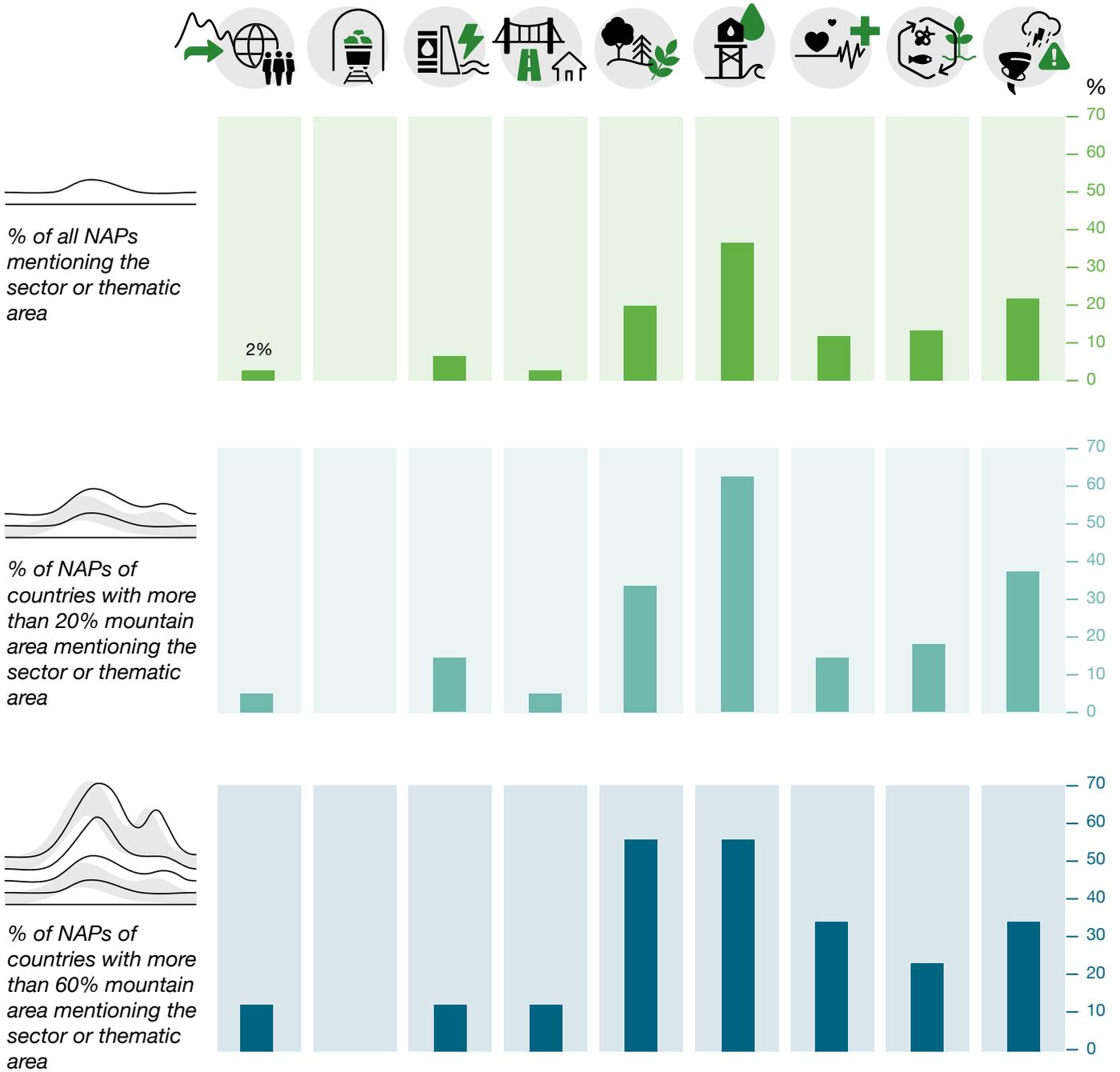
Only a few countries explicitly plan adaptation actions related to tourism, biodiversity or energy. These sectors and thematic areas are each targeted in around 10–20% of the analysed NAPs. Similarly, few countries identify adaptation actions related to infrastructure and transport, or socio-economic opportunities. Mining is not mentioned in any NAP.

## Countries prioritize action related to technology and infrastructure, data and systems knowledge and capacity building

When it comes to the type of climate change adaptation action reported in the NAPs, the analysis shows that countries prioritize action related to technology and infrastructure, data and systems knowledge, and capacity building (Figure 3). Measures to improve infrastructure or technology

in the water sector in mountain regions are included in 25% of NAPs. Governance measures such as stakeholder engagement and participatory processes are not widely prioritized. Similarly, few countries foresee actions involving land-use planning, regulation or international cooperation.

Figure 2.  
Reported adaptation actions per sector or thematic area



	Socioeconomic opportunities / migration from / to mountains		Infrastructure / transport		Human health / cultural value / tourism
	Mining		Agriculture / forestry		Biodiversity / genetic resources / pollination
	Energy / hydropower		Water / water storage / water supply		Natural hazard / risk management

Figure 3.  
Reported type of adaptation action per sector or thematic area



Socioeconomic opportunities / migration from / to mountains
 Infrastructure / transport
 Human health / cultural value / tourism

Mining
 Agriculture / forestry
 Biodiversity / genetic resources / pollination

Energy / hydropower
 Water / water storage / water supply
 Natural hazard / risk management

## Examples from NAPs

The assessed NAPs contain numerous examples of actions to advance climate change adaptation in mountain regions. A selection of these good practice examples is presented below.

### Integrated watershed management in Guatemala

Action to develop territorial planning that considers the integrated management of watersheds, productive landscapes, and biological corridors, while respecting customary rights, with the full and effective participation of Indigenous peoples.

**Sectors or thematic areas:** water, agriculture, biodiversity

**Actions:** land-use planning, stakeholder engagement



### Safeguarding landscapes in Ethiopia

Strengthening sustainable natural resources management through safeguarding landscapes and watersheds. This adaptation option will have multi-sectoral and trans-regional implications including: a focus on energy (safeguarding hydropower dams); a focus on water (improving groundwater recharge); a focus on health (minimizing downstream flood risks); and a focus on agriculture (rehabilitating degraded lands).

**Sectors or thematic areas:** energy, water, agriculture, natural hazards



### Early warning systems in Peru

Implementation of early warning systems for floods, droughts, landslides, and glacier-related hazards in watersheds vulnerable to climate change.

**Sectors or thematic areas:** natural hazards

**Actions:** technology



### Water security in Peru

Implementation of interventions related to water seeding and harvesting for agricultural water security in watersheds vulnerable to climate change.

**Sectors or thematic areas:** water

**Actions:** technology



## Biological corridors in Chile

Mountain biological corridors in the Mediterranean ecosystem of the Metropolitan Region of Santiago. Design and implementation of biological corridors between protected areas and managing buffer zones and conservation lands (green infrastructure).

**Sectors or thematic areas:** biodiversity

**Actions:** technology



## Resilient infrastructure in Nepal

Development of climate-resilient infrastructure, and exploration and enhancement of knowledge and capacities for resilient mountain tourism.

**Sectors or thematic areas:** tourism

**Actions:** technology, Indigenous knowledge, capacity-building



## Research in South Sudan

Research on wildlife species habitat and ecosystem vulnerability to changing climate conditions focusing on the Sudd wetland, Boma-Jonglei landscape and Imotong, Didinga and Dongotono mountains.

**Sectors or thematic areas:** biodiversity

**Actions:** capacity-building, data and systems knowledge



## Payments for ecosystem services in Bangladesh

Introduction of a nominal payment for ecosystem services for tourists and industries in and around the Sundarbans, beach areas, hill areas and wetlands.

**Sectors or thematic areas:** tourism

**Actions:** legal and regulatory framework



## Tourism in Bosnia and Herzegovina

Promoting summer tourism and healthy lifestyles outdoors and in the mountains. The increase in summer temperatures will cause the summer season to be more attractive in the mountains.

**Sectors or thematic areas:** tourism

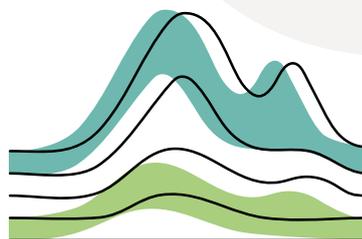


## Recommendations

While many of the assessed NAPs contain climate change adaptation measures in mountains, gaps identified in this review underline how many countries need to plan, implement and finance more such actions for and in mountain regions. The severity of climate change impacts in mountains calls for integrated plans that address all relevant sectors and thematic areas and include an effective mix of different types of actions. In particular:

- NAP processes should promote systemic adaptation rather than prioritize specific sectors, thematic areas or geographic regions. This requires collaborative efforts among all relevant sectors and at all governance levels, including stakeholders from mountain regions.
- NAP processes should promote sustainable development of economic and social systems. This requires the integration of all relevant sectors, including mining, energy, infrastructure and transport, which are highly relevant sectors in many mountain regions.
- NAPs processes should promote agile and evidence-informed adaptation. This requires ongoing research and the acquisition of data and knowledge to understand challenges and opportunities, including in often remote mountain areas.
- NAPs processes should ensure that the knowledge and interests of vulnerable groups and local communities, especially Indigenous mountain communities, is reflected in adaptation planning and implementation by engaging them in participatory planning processes.
- NAPs should be embedded in binding regulatory frameworks, and adaptation mainstreamed into sectoral policies and land-use decisions and regulations, as well as transboundary agreements, which are crucial for mountain regions.

From extreme heatwaves and devastating droughts, to deadly floods and landslides, the impacts of climate change are increasingly evident. They are already affecting communities and ecosystems worldwide. However mountains bear a disproportionate burden of these climate-related challenges. National Adaptation Plans (NAPs) help countries to anticipate, prepare for, and respond to these impacts and challenges by providing a strategic process for assessing climate risks and vulnerabilities, identifying adaptation priorities, and allocating resources efficiently.



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