



# **MOUNTAINS AS THE WATER TOWERS OF THE WORLD**

## **A CALL FOR ACTION ON THE SUSTAINABLE DEVELOPMENT GOALS (SDGs)**



# MOUNTAINS AS THE WATER TOWERS OF THE WORLD:

## A CALL FOR ACTION ON THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

Mountains cover 25 percent of the world's land surface, and directly support 12 percent of the world's population living within mountain regions. Sustainable mountain development (SMD) should be a global priority, given the multitude of ecosystem goods and services that mountain provide, not just to mountain peoples but to the millions living downstream.

Through their watershed function, mountains supply more than half of humanity with water for drinking, irrigation, industry, food and energy production. However, water and other mountain ecosystem services are particularly vulnerable to the impacts of climate change. Human activities such as urbanization and infrastructure development further aggravate environmental degradation which affects the quantity and quality of water resources. The degradation of mountain ecosystem services has severe consequences for livelihoods and environments of downstream regions.

Following the call for SMD in Chapter 13 of Agenda 21, the action plan endorsed by the 'Earth Summit' in 1992, and the recent Rio+20 outcome document, "The Future We Want", **mountains need to be covered by the SDGs, especially the goals where mountains play a crucial role for global sustainable development. These include the focus areas related to water and sanitation, poverty eradication, food security, energy, ecosystems and biodiversity as well as climate change.**

The following actions<sup>1</sup> are required to protect mountain ecosystems and communities:

- ➔ Recognize the contribution that mountains play in the food, water and energy nexus, and the need for improved understanding of hydrological, ecological and socio-economic processes and dynamics in mountain regions;
- ➔ Increase the awareness of global change and climate change variability and its impacts on mountains, which can lead to risks such as natural disasters and near and long-term water shortages, affecting agriculture and major urban centres in downstream areas;
- ➔ Protect and restore mountain ecosystems and watersheds and promote their sustainable use, in order to ensure their global water supply function for food and energy security, sustainable economic growth and to enhance mountains' ability to moderate the impacts of climate change and natural hazards for the benefit of humankind including mountain populations;
- ➔ Apply integrated, multi-sectoral ecosystem management within and between countries that share mountain landscapes, watersheds and river basins, including cooperation mechanisms that prevent or moderate conflicts over transboundary water resources;
- ➔ Support the development of regional networks of benchmark basins to investigate the impacts of climate change on water resources and the effects of proposed adaptation measures on watershed hydrology and socio-economic dynamics in the basins;
- ➔ Create and improve adequate policies, frameworks and incentives to promote investments in SMD including for climate change adaptation, disaster risk reduction and ecosystem service provision – and spur opportunities for public-private partnerships;
- ➔ Support the development of proven practices in the fields of water security, food security and energy security and efficiency in mountain areas, while emphasizing the role of mountain communities, especially women, to make these practices sustainable;

➔ Support and operationalize the concept of payment for ecosystem services (PES) for the benefit of mountain communities who provide these valuable ecosystem services to downstream users;

➔ Following UNGA Resolution on SMD<sup>2</sup>, give appropriate consideration to mountains in the Post-2015 process by supporting the establishment of mountain-related targets and indicators for goal areas, in particular, related to water:

GOAL AREA	PROPOSED SDG TARGETS	PROPOSED INDICATORS
Water and sanitation	Safeguard mountain ecosystem services for a sustainable water provision for mountain and lowland communities/ Increase to 75%, by 2030, the number of mountainous countries that have put in place adaptive, integrated water resources management and water efficiency plans based on IWRM principles.	The number of mountain countries adopting policies for adaptive, integrated water resource management and water efficiency plans based on IWRM principles.
	Increase incentives for and investments in water resource management in mountain regions.	The number of investments in water management implemented by 2030.
	Improve wastewater treatment in mountain communities.	Quantity of wastewater treated in mountain areas.
	Enhance the conservation and sustainable management of mountain ecosystems to ensure the provision of ecosystem services of global importance such as water through integrated approaches.	The number of countries incorporating mountain-specific policies into their relevant sectoral and national sustainable development strategies.
	By 2030, enhance mountain ecosystem resilience through conservation of at least 7 percent of each mountain range and restoration of at least 15 percent of degraded ecosystems.	The proportion of degraded mountain ecosystems restored, ecosystem resilience built/ percentage of mountain areas covered by protected areas and dedicated to ecological networks.
	Provide access to safe drinking water to all mountain peoples by 2030.	The proportion of population living in mountain regions with access to safe drinking water.
	Sanitation services and hygiene education in mountain regions available to at least 50% of mountain population.	The number of cases of water borne diseases in mountain regions. The hours spent by women collecting water daily. The number of households and other infrastructures such as schools with sanitation infrastructure.

<sup>1</sup> While the recommendations specifically refer to mountain regions, they might also apply to other regions.

<sup>2</sup> Doc. A/68/438/Add.9

## MOUNTAINS AS THE WATER TOWERS OF THE WORLD: KEY FACTS AND FIGURES

Mountains are the “water towers” of the world, supplying half of the world’s population with freshwater for drinking, domestic use, irrigation, industry and hydropower. The ten largest rivers originating in the Hindu Kush Himalayas alone supply water to over 1.35 billion people (20 percent of the global population). About 40 percent of the world’s irrigation is supported by flows originating from large mountain systems.

**Mountains are key for resilience in arid and semi-arid regions, where they contribute 80 to 100 percent of the total runoff of river basins.** For example, the arid Pacific coast of Peru has become a regional agricultural and industrial hot spot thanks to runoff from the nearby Andes, and Lima, the second largest desert city in the world, relies completely on water resources from the slopes of the Andes. In East Africa, Mount Kenya is the only source of freshwater for over 7 million people.

**Water is one of the main sources of energy production in mountain regions.** In Latin America, 85 percent of the hydropower energy is generated from water coming from mountains. Hydropower is also increasingly important in Asia and Africa. However, adequate social and environmental safeguards are needed when developing sustainable energy solutions.

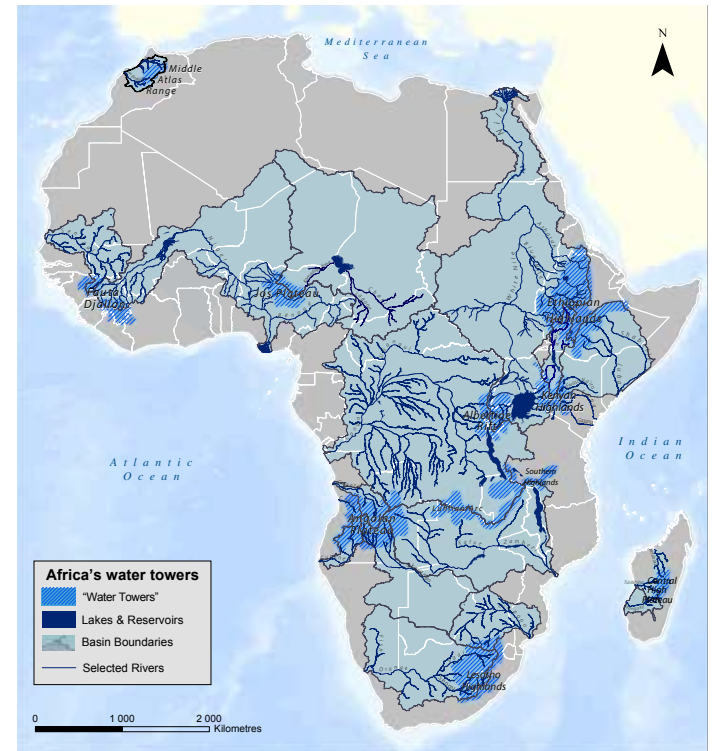
**Climate change poses a serious threat to natural freshwater regime of the mountains, which will have implications on water and other ecosystem goods and services to millions of people downstream** – subsequently impairing water, energy and food security, and agriculture in general. Rainfall patterns, especially seasonal distribution, more than annual rainfall, in mountains are expected to change drastically, disrupting the balance between water supply and demand. Processes of water regulation – storage and release – and seasonal streamflow patterns are threatened in general by temperature increases, for example through changes in soils, wetlands, and snow and ice storage. Almost globally, glaciers continue to shrink due to climate change. There are 54,000 glaciers in the Hindu Kush Himalaya (HKH) region, with a total area of 60,000 km<sup>2</sup>, and the maximum annual snow covered area is 1.79 million km<sup>2</sup>. A majority of the glaciers in the region are losing mass, though the recent glacier response in the Karakoram region is mixed. Associated with the shrinkage of glaciers, the region has experienced formation and growth of a large number of glacial lakes, numbering 8,790 in 2010. There are 1466 such lakes in Nepal, among them 21 are potentially critical lakes.



There have been 34 recorded glacial lake outburst flood events in the HKH region in the past.

**Changes in water availability due to climate change are taking place at a time when demand for water resources is increasing.** Irrigated areas and hydropower demand keep increasing while cities keep growing. In India and China, large inter-basin schemes are planned to irrigate arid regions, which would raise the number of people depending on water from the Hindu Kush Himalaya region to more than two billion. As demand increases, the potential for conflict over the use of mountain water grows both within and between countries. For example, in 1995 alone, the distribution of water from mountain areas was a contributing factor to 14 international conflicts, plus countless disputes within national borders.

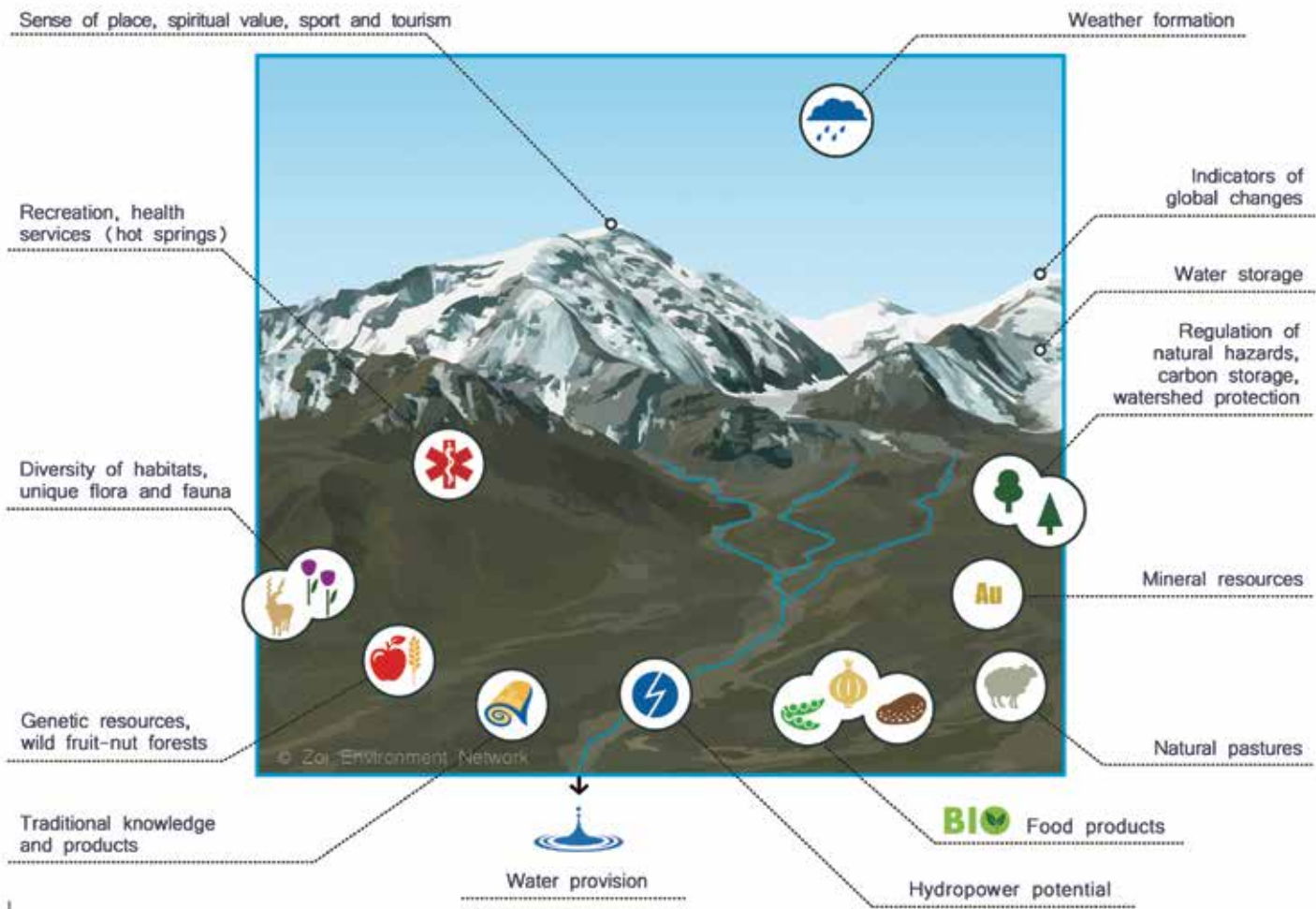
Given the scarcity of water resources worldwide, integrated and proper management of mountain water resources should become a global priority. Water management practices need to be adapted to different climatic zones, using locally adapted soil and water management techniques. Management should also consider the linkages and interests between mountains and lower-lying areas. With water scarcity on the rise in many areas, actions that improve water efficiency and equitable distribution systems are essential.



While Africa's mountains occupy a small surface area of the continent, they supply lowland areas far away from their locations – through their connectivity by their shared water bodies or water resources © UNEP 2010.



# MOUNTAIN ECOSYSTEM GOODS AND SERVICES



## Contributing Organizations:

