



Mountains: Key to a sustainable future

Covering around 27 percent of the earth's land surface, mountains play a critical role in moving the world towards sustainable economic growth. They not only provide sustenance and wellbeing to 720 million mountain people around the world, but indirectly benefit billions more living downstream. In particular, mountains provide freshwater, energy and food – resources that will be increasingly scarce in coming decades. However, mountains also have a high incidence of poverty and are extremely vulnerable to climate change, deforestation, land degradation and natural disasters. The challenge is to identify new and sustainable opportunities that can bring benefits to both highland and lowland communities and help to eradicate poverty without contributing to the degradation of fragile mountain ecosystems.

WATER

- ▲ Mountains provide 60-80 percent of the world's freshwater – without which sustainable development that aims to eliminate poverty and hunger would not be possible
- ▲ Freshwater from mountains is fundamental for achieving global food security, as it is used by farmers to irrigate crops in many lowland agricultural regions, for example:
 - ▷ In Egypt, domestic food production relies almost entirely on the waters of the Nile, which flows from the mountains of Ethiopia and the Victoria Basin;
 - ▷ In Pakistan, waters originating from the Hindu Kush Himalaya mountains provide 80 percent of irrigation for the Indus Basin, where food is grown for 180 million people;
 - ▷ Throughout the Andes, populations in coastal areas depend to a large extent on mountain waters for their food production.
- ▲ Some of the world's largest cities, including New York, Rio de Janeiro, Nairobi, Tokyo and Melbourne, are dependent on freshwater from mountains

Issues

The pressure on water resources will increase as the world population swells to an estimated 9.6 billion by 2050. Meanwhile, climate change is already causing some glaciers to disappear, resulting in springs and rivers drying up. This in turn causes problems for farmers wanting to irrigate crops and affects local livelihoods.

Opportunities

The careful management of mountain watersheds can help adapt to climate change, maintain clean water and regulate the water cycle. Mountain communities need to be compensated for the services they provide that benefit people living downstream, improving local incomes.

CASE STUDY: QUITO, ECUADOR

Ecuador's capital city, Quito, receives its water supply from the Andes. Around 27 000 people live in the mountain areas where the water originates and use the land for agriculture and grazing livestock, which in turn threatens the quality and quantity of water available downstream. However, water users in Quito began to pay a small fee to support environmentally friendly land-use practices and reforestation in the mountain areas upstream. With the money collected, the municipal government pays mountain land owners for the sustainable use of their resources.



ENERGY

- ▲ Mountains have a key role to play in providing renewable energy, especially through hydropower, solar power, wind power and biogas
- ▲ Hydropower currently provides around a fifth of all electricity worldwide, and some countries rely almost exclusively on mountain regions for hydropower generation
 - ▷ In Bolivia, Chile, Colombia and Peru, at least 95 percent of hydropower is generated in mountain regions.
- ▲ Mountains in regions with a dry or tropical climate hold particular potential for the generation of solar energy
 - ▷ In Nepal, almost all remote airports and telecommunication facilities are powered by solar energy;
 - ▷ Solar cookers are widely used in the mountain regions of China and India.

Issues

Large-scale hydropower development can disrupt livelihoods and habitats through loss of land, while populations are sometimes relocated to make way for hydropower facilities without receiving adequate compensation.

Opportunities

When large-scale hydropower development adheres to global standards, facilities can be sustainable. They can also provide a source of income for mountain regions if communities receive a share of the proceeds of downstream benefits. Small- and medium-scale facilities can provide rural households with electricity for domestic use, freeing women from the time-consuming tasks of collecting fuel wood, as well as for small enterprises that in turn can help alleviate poverty. Solar power also has potential for telecommunications, television, radio and computer operation, hooking up previously isolated mountain communities with the rest of the world.

CASE STUDY: NEPAL

In Nepal, around a quarter of a million households are fitted with biogas digester plants, which transform biodegradable materials such as sewage and plant material into gas. Biogas technology reduces reliance on firewood, aiding forest conservation, and reduces greenhouse gas emissions, while residual slurry from the biogas plants can be used as organic fertilizers. The use of biogas also promotes local employment in building, maintaining, marketing and financing biogas plants.



FOOD

- ▲ Mountains contribute to food and nutrition security by providing land for crops, grazing for livestock, water courses for inland fisheries, and non-wood forest products such as berries, mushrooms and honey
- ▲ Mountain farming has been a model for sustainable development for centuries and is inherently 'green' thanks to its small-scale character and low-carbon footprint
- ▲ The use of external inputs such as fossil fuels, mineral fertilizers and pesticides as well as large machinery is often less widespread in mountain regions than in lowland farming
- ▲ Mountain farmers are crucial for conserving global agricultural biodiversity
 - ▷ Of the 20 plant species that supply 80 percent of the world's food, six originated and have been diversified in mountains: maize, potatoes, barley, sorghum, tomatoes and apples;
 - ▷ In the Andes as many as 200 varieties of indigenous potatoes are farmed, while the traditional farmers of Nepal cultivate around 2 000 varieties of rice;
 - ▷ Quinoa, coffee and tea are also mountain crops.
- ▲ Mountain farmers also act as custodians of natural resources, developing over generations ways of conserving soil and protecting watersheds, preventing land degradation and increasing resilience to disasters such as floods and landslides

Issues

Mountain people are among the world's poorest and hungriest. In developing countries a vast majority live below the poverty line and an estimated 300 million are food insecure. Most of what mountain farmers produce is for consumption by the farmers and their families themselves, with only a small portion ending up for sale on large markets. Even when producers have products to sell, they face problems related to high transport costs, weak infrastructure and difficulty in accessing markets.

Opportunities

Mountain communities have much experience in growing crops in diverse and harsh environments. In a world increasingly aware of 'green' and organic goods, there is great potential to improve the livelihoods of mountain people by promoting unique and high quality mountain products – from foods and beverages, to medicines, spices, cosmetics and crafts. Communities need assistance to develop their capacity in production, processing and marketing. Farmers also need help to build resilience to cope with global warming, population pressure and other drivers of change, and to continue using sustainable methods.

CASE STUDY: GUINEA

In the Fouta Djallon Highlands, Guinea, development projects have helped establish women's interest groups to improve agricultural production and increase household incomes, in particular through growing vegetables in fertile valleys. Women's groups are working to fence off fields against livestock encroachment, improve access to water resources for off-season agriculture, build pest-proof storage bins, and adopt improved shea butter processing techniques. As a result, women are able to enrich the daily family diet, become more financially independent and contribute to aspects of household welfare such as schooling.

