



# MOUNTAINS AND BIODIVERSITY



*Mountains are storehouses of global biodiversity. Mountains offer vertical environmental gradients for life otherwise only seen over several thousands of kilometers of latitudinal distance. A gravity shaped, extremely diverse topography provides opportunities for additional diversification of life, leading to unbeaten biodiversity. Mountains are cradles and refuges of organism diversity. Half of the world's biodiversity hotspots are concentrated in mountains. Mountains provide vital goods and services for the benefit of all humankind, able to support sustainable development at a global level, and to lead the world towards a greener economy. But provision of these goods and services is at risk by human activities. As arks of life, preserving much of the world's biodiversity, mountains are key to conservation in a changing world.*

## Mountains Biodiversity – a global heritage

Mountain environments cover about 27 percent of the world's land surface, and directly support those 22 percent of world's people who live within mountain regions and their immediate forelands. Mountain biodiversity provides basic ecosystems services such as freshwater, timber, medicinal plants, and recreation for the surrounding lowlands and their increasingly urbanized areas. By preventing erosion, mountain plant diversity secures livelihoods, traffic routes and catchment quality. More than 50 percent of mankind benefits from mountains as the world's water towers. They host some of the world's most complex agro-cultural gene pools and traditional management practices.

Mountains are rich in endemic species. In addition to supporting a great diversity of species and habitat types, the world's mountains encompass some of the most spectacular landscapes and harbor a significant portion of distinct ethnic groups, varied remnants of cultural traditions, environmental knowledge and habitat adaptation. Isolation and relative inaccessibility have helped protect and preserve species in mountains – from deer, eagles and llamas to wild varieties of mustard, cardamom, gooseberry and pumpkin. In the Andes, for example, farmers know of as many as 200 different varieties of indigenous potatoes. In the mountains of Nepal, they farm approximately 2 000 varieties of rice. While mountain services are vital, there are growing threats to their sustainable supply. Climate change, poverty, commercial mining, logging and poaching all exact a heavy toll on mountain biodiversity. Mountain gorillas in Central Africa, spectacled bears in the Andes and the resplendent quetzals of Central America are all clinging to ever-shrinking patches of cloud forest. At the same time, trade in rare mountain plants and animals, including species of orchids, birds and amphibians, continues to deplete populations.

## Threats to Mountain Biodiversity

Human impact dominates large mountain areas, and its effects are often irreversible. Human activities are profoundly affecting the world's climate and, consequently, mountain ecosystems. Because of their altitude, slope and orientation to the sun, they are easily disrupted by variations in climate. As the world heats up, climate warming is also causing migration of plant and animal species. Given that all mountains become narrower with elevation, more species will compete for the upper area and its limited resources. As a consequence, rare species may be outcompeted in the long term. The main problem presented by temperature increase concerns the speed of change: ongoing and expected climatic changes are much faster than what evolution and migration are commonly able to cope with. Human interaction with regional species and climatic drivers has shaped mountain biodiversity for centuries. Many traditional upland grazing systems are classical examples of sustainable management. In recent decades, however, mining, industrialization, intensification of agriculture and tourism, exacerbated by population growth and ambiguous resource governance and tenure rights, have all led to pressures on biodiversity that were unknown before. Moreover, poverty has caused upslope migration and forced farmers to use inappropriate land e.g. on erosion-prone slopes for agriculture, leading to significant biodiversity or soil losses in fragile mountain ecosystems.

## Protecting Mountain Biodiversity

Management of mountain biodiversity has increasingly been recognized as a global responsibility. In the past 40 years, protected areas have increased six- to eight-fold, largely in mountain areas, expanding from 9 percent of total mountain area in 1997 to 16 percent in 2010. While protected areas are essential, they alone cannot ensure conservation of biodiversity or cultural heritage. Traditional indigenous communities often use and manage biodiversity in mountain protected areas, and may be even more threatened than biodiversity itself. Mountain regions where people live and work require innovative and respectful approaches to conservation; local people should be encouraged towards stewardship of both their natural and cultural heritage. Participation of mountain communities at all stages is crucial in the sustainable management and use of biodiversity. Stewardship, with its focus on community-based management and local leadership, holds great promise for conservation of those mountain areas around the world where the biological, cultural and scenic qualities of the landscape are the result of the interactions of people with nature over a long time. In the Hindu Kush region of the Himalayas for instance, conservation efforts now adopt participatory approaches, implement policies of decentralised governance for biodiversity management, and empower local communities toward achieving that goal. A gradual paradigm shift in conservation policies and practices has included the acceptance of communities as an integral part of national conservation initiatives, and the integration of many global conventions.

Conservation landscapes are increasingly recognized for their potential to maintain high levels of biodiversity in combination with intensive, but diversified, small-scale agriculture in densely populated mountain areas where the establishment or extension of formal protected wilderness areas is not feasible. These landscapes incorporate mixed crops, agropastoral and agroforestry approaches, and soil and water conservation. Mountain land users also may be compensated for the lack of on-site benefits through Payment for Environmental Services (PES). Considerable experience from developing and industrialized countries shows that PES supports biodiversity management and is an innovative tool for resource transfer to upland communities, which are often more socially and economically disadvantaged than surrounding lowland areas. (GMBA 2010)

## Mountain biodiversity and the International Agenda

Over the past two decades, since the Rio Earth Summit in 1992, there has been increasing awareness of the importance of the world's mountain areas and of their biodiversity. On the aftermath of Rio, the Convention on Biological Diversity (CBD), entered into force in 1993. The Convention, ratified by 187 countries, is an international legally binding treaty, dedicated to the development of national strategies for the conservation and sustainable use of biological diversity. The convention recognized, for the first time in international law, that the conservation of biological diversity is "a common concern of humankind" and is an integral part of the development process. At its seventh meeting, on February 2004, the Conference of the Parties - the governing body of the CBD - adopted a Programme of Work on Mountain Biological Diversity, a set of actions addressing characteristics and problems that are specific to mountain ecosystems. After years of international negotiations and calls for a biodiversity science, more than 90 governments have just agreed to officially establish the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). It is a leading global body providing scientifically sound and relevant information to support more informed decisions on how biodiversity and ecosystem services are conserved and used around the world. Besides, over the past two decades, a number of Intergovernmental and Non-Governmental Organizations, such as the International Centre For Integrated Mountain Development (ICIMOD), the Mountain Partnership, the Global Mountain Biodiversity Assessment (GMBA), Euromontana, Adelboden Group and many others, were founded to improving the lives of mountain people and protecting mountain environments around the world.



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