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FAO's Current Engagement in Sustainable Mountain Development

Mountain ecosystems and watersheds are essential for long-term sustainable global development and poverty alleviation and can make an important contribution to climate change adaptation and mitigation. Freshwater, rich biodiversity, and other natural resources provided by mountains are vital for the livelihood of billions of people. However, recent environmental, economic, and social developments such as climate change, increasing natural disasters, population growth, the expansion of commercial agriculture, and urbanization compromise the ability of mountain ecosystems and watersheds to provide essential environmental goods and services. Degradation and decreasing water flows seriously affect agricultural production and food security and threaten the supply of water to large urban centers in the lowlands, while water, energy, and food are likely to be the main scarcities in the coming decades. Watershed management and sustainable mountain development (SMD) are necessary and appropriate approaches to address these challenges and need a prominent place on the international agenda.

Food and Agriculture Organization programs on sustainable mountain development

With its mandate to work on natural resource management, food security, and livelihoods, and its attention to the social, economic, and environmental dimensions of sustainable development, the Food and Agriculture Organization of the United Nations (FAO) has played a leading role in sustainable mountain development, watershed management, and forest ecology since the late 1970s. In 1992, the Organization was appointed task manager for chapter 13 of Agenda 21, "Managing Fragile Ecosystems: Sustainable Mountain Development," adopted on the occasion of the United Nations Conference on Environment and Development in Rio de Janeiro. Moreover, FAO was designated as the lead agency by the United Nations General Assembly for the International Year of Mountains (IYM) 2002 and mandated to lead observance of International Mountain Day (IMD), every year on 11 December. FAO hosts the Secretariat of the Mountain Partnership, which was launched at the World Summit on Sustainable Development in Johannesburg in 2002. Finally, FAO participated in drafting chapter 24 "Mountain Ecosystems" of the *Millennium Ecosystem Assessment*, as well as the work program on mountain biological diversity of the Convention on Biological Diversity.

Over time, FAO has progressively built up a conceptual and operational framework for watershed management, sustainable mountain development, and forest hydrology and for the interactions among these themes. Currently, FAO's Watershed Management and Mountains

BOX 1: Ongoing field project 1: Fouta Djallon Highlands Integrated Natural Resources Management

The Fouta Djallon Highlands Integrated Natural Resources Management Project has been developed and implemented in the framework of the Regional Program for the Integrated Development of the Fouta Djallon Highlands (FDH) of the African Union. It is conceived as a 10 year project to be implemented in a first phase of 4 years and a second phase of 6 years. The development objective of the project is to ensure the conservation and sustainable management of the FDH natural resources in a medium- to long-term time frame (until 2025) in order to improve the livelihoods of the rural population directly or indirectly connected to the FDH. The environmental objective of the project is to mitigate the causes and negative impacts of land degradation on the structural and functional integrity of the FDH ecosystems.

The project started in July 2009 and is active in 8 countries: Gambia, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal, and Sierra Leone. To enhance collaboration at the regional level, the project has supported the preparation of a regional legal and institutional framework convention on the transboundary management of the natural resources, which was adopted by the countries in November 2011. National laws and regulations are being reviewed and adapted to reflect the regional convention and to work toward harmonized legislation across the borders. The establishment of a regional observatory to systematically assess and monitor the status of the FDH natural resources and the trends in degradation is foreseen. To develop sustainable and community-based natural resources management approaches and to identify alternative income-generating activities, the project has established 29 pilot sites in small watershed areas and conducted interdisciplinary participatory diagnostics in these sites. Comprehensive watershed management plans are being prepared with the communities (Figure 1), and capacity building of various stakeholders in integrated management of natural resources is ongoing. Field activities have started in some pilot sites, focusing initially on the protection of steep slopes against erosion and the sustainable intensification of agricultural production in the lowlands through improved water management for irrigation, introduction of animal traction, and introduction of multipurpose living hedges to protect agricultural plots against free grazing of animals. A rapid expansion of field activities within the area of intervention and preliminary results from pilot interventions are expected from 2012 onwards.

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FIGURE 1 Fouta Djallon: the local community participating in community planning, Guinea. (Photo by Thomas Hofer)



Programme is engaged in three main areas of work.

1. FAO produces and disseminates capacity-building and technical materials on sustainable mountain development, watershed management, and forest hydrology. Triggered by the International Years of Mountains (2002) and Freshwater (2003) and in close collaboration with a large number of experts and partners worldwide, FAO undertook a thorough review of past and current approaches to watershed management with the objective to formulate recommendations for a new generation of watershed management programs and projects. One of the main characteristics of this new paradigm is the emphasis on watershed natural resources management as part of local socioeconomic development processes. The innovative aspects of the new approach are the focus on multistakeholder participation, the recognized importance of upstream–downstream linkages, and long-term planning and financing. On the occasion of IMD 2011, the program launched the publication "Why invest in sustainable mountain development?". This booklet is addressed to those policymakers and decision makers who are responsible for finding a balance between socioeconomic development and environmental conservation thrusts (download under http://www.fao.org/docrep/015/i2370e/i2370e.pdf).
2. The program is involved in identifying, formulating, and backstopping field projects for sustainable mountain development, watershed management, and related subjects in developing countries and countries in transition. It puts its mission into practice through small-scale catalytic projects as well as through the implementation of large projects funded by multiple donors, unilateral trust funds, or international funds, such as the Global Environment Facility (GEF). In general, field projects combine activities for the sustainable management of natural resources, activities to improve the livelihoods of local people, and policy advice. In the almost 20 years since Rio de Janeiro 1992, FAO has implemented 53 watershed management and mountain development projects in 41 countries in Asia, Latin America, Africa, the Near East, and Europe. Examples of two large ongoing field

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BOX 2: Ongoing field project 2: Chimborazo Natural Resources Management Project, Ecuador

The Chimborazo Natural Resources Management Project was jointly conceived by the Chimborazo Provincial Council (CHPC), other national partners, FAO, and the GEF. The project's global environment objective is to conserve and sustainably manage the Chimborazo's *páramos* and the biodiversity of the mountain ecosystems (Figure 2), and to improve local livelihoods through strengthening of necessary policy, legal, and institutional frameworks and local awareness, capacities, and incentives for participation in planning and sustainable management of natural resources. The project aims also to re-establish and sustainably use the agro-biodiversity in the *páramos* ecosystems and to improve food security of the local indigenous population dependent on Chimborazo's mountain ecosystems by applying modern watershed management approaches. The project area includes five subwatersheds (including the Chimborazo Fauna Reserve) within the Chambo and Chanchán River basins, covering about 114,400 ha.

BOX 3: The Mountain Partnership contribution to the development of CSA

The Mountain Partnership Secretariat developed an FAO-funded project in the framework of the Mountain Partnership involving the Union of Rural Organizations in the North of Cotopaxi (UNOCANC) in Ecuador, upon request of the national government. Among the main outcomes of the High Mountain Management for Sustainable Development in Cotopaxi project, running from 2009 to 2011, is the *Manual of Organic Production of Indigenous Crops*. The book collects information on traditional and innovative techniques for the organic production of Andean crops, based on the ecological management of soil, pest, and biodiversity, and on the use of the lunar phases for tillage practices (Figure 3). Andean crops cover an area of approximately 150,000 ha in the Andes, and about 500,000 farm families rely on their plots for consumption and occasionally for the sale of the surplus. They are an excellent source of protein but are being replaced by monocultures with negative ecological and dietary impacts. Through this project, traditional Andean crops have been reintroduced into this area.

projects are presented in Boxes 1 and 2.

3. Lastly, the program coordinates several international processes such as technical consultations and awareness-raising events. Most recently, FAO hosted the Second World Landslide Forum of the International Consortium on Landslides (ICL) in October 2011. Under the overall slogan "putting science into practice," the event brought together more than 800 experts from different stakeholder groups in order to exchange views and experiences about a large variety of aspects related to landslide processes and, on the whole, disaster risk reduction.

The Mountain Partnership Secretariat hosted by the Forestry Department of FAO promotes exchange and collaboration among its 194 members. Its constituency includes governments, intergovernmental organizations, and civil society groups. Despite the key role played by mountains in supporting livelihoods, there is still a serious lack of recognition for these ecosystems. The Mountain Partnership Secretariat is actively engaged in including "mountains" in all international agenda and forums, such as in the 3 Rio de Janeiro conventions (United Nations Framework Convention on Climate Chance [UNFCCC], United Nations Convention to Combat Desertification [UNCCD], United Nations Convention on Biological Diversity [UNCBD]) and in the Rio+20 process. Further, in collaboration with relevant partners, the Mountain Partnership Secretariat has produced a number of publications on mountains and climate change, mountains and biodiversity, mountains and drylands, and mountain forests.

Sustainable mountain development: opportunities and challenges

Mountain environmental services

One way to reduce the number of hungry people living in mountain areas is to empower them to protect mountain ecosystems and to promote stability in mountain regions. In fact, it has been estimated that agricultural growth has greater poverty-reducing effects than any nonagriculture sector. To address this challenge, FAO is devoted to recognizing the value of positive externalities provided by mountainous ecosystems through market mechanisms. Schemes such as payment for environmental services (PES) are increasingly being adopted in several FAO projects to reward local populations and communities for the sustainable management of natural resources that originate in mountain areas and that benefit billions of people.

The Watershed Management and Mountains program addresses sustainable mountain development (SMD) through a holistic and multisectoral approach that takes into account upstream–downstream linkages and is a potential fertile ground for the development of PES schemes. Using watersheds as planning units, the program implements its interventions focusing both on the mountain

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FIGURE 2 Chimborazo: the Chimborazo Volcano, Ecuador. (Photo by Thomas Hofer)



FIGURE 3 Sustainable practices: conservation agriculture in Cotopaxi, Ecuador. (Photo by Thomas Hofer)



communities that provide ecosystem services and on the lowlands that benefit from those services. In this view, the management of natural resources requires the participation of all stakeholders, such as politicians, technicians, local farmers, foresters, etc, and the practices and points of view of local people have to be included in the search for sustainable solutions. Therefore, policies regulating the use of natural resources become particularly important, especially in developing countries where the absence of official land-tenure rights for local farmers increases land misuse and degradation of natural resources. This approach highlights the need to give mountain communities access to local resources in order to enhance their interest in managing natural resources in a sustainable way, which, consequently, contributes to the supply of the mountain ecosystem services that are essential building blocks for long-term sustainable global development, poverty alleviation, and a key in the transition toward a green economy.

Climate-smart agriculture in mountain areas

In the context of a green economy, FAO is also supporting new investment opportunities that are emerging especially for renewable energy and sustainable agriculture in mountain regions. This offers scope for economic development but also places increased pressure on mountain areas. Therefore, the implementation of innovative institutional arrangements, ensuring a balanced development of social, ecological, and economic capital,

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is essential to protect fragile mountain ecosystems while enhancing mountain economies.

As one of the main conference themes of Rio+20, FAO will explore the global resource footprints of agriculture and food systems, including different scenarios, prospective challenges, and policy options, as part of its Greening the Economy with Agriculture (GEA) initiative. The purpose of GEA is to ensure the right to adequate food, as well as food and nutrition security—in terms of food availability, access, stability, and utilization—and contribute to the quality of rural livelihoods, while efficiently managing natural resources and improving resilience and equity throughout the food supply chain, taking into account countries' individual circumstances. GEA can be achieved by applying an ecosystem approach to agriculture, forestry, and fisheries management in a manner that addresses the multiplicity of societal needs and desires, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by terrestrial, aquatic, and marine ecosystems.

In this context, FAO is contributing to the development of climate-smart agriculture (CSA), a holistic concept that unites various issues related to agricultural development and other global development objectives. CSA covers environmental issues, for example, energy and water, as well as social issues, such as gender and economic issues. It aims to achieve the four dimensions of food security (availability and access to of food, utilization of food for adequate nutrition, and stability of food supply) and make them the overall goal of food production and distribution systems in developing countries. CSA involves agricultural growth for food security that incorporates necessary adaptation and captures potential mitigation measures to climate change.

Mountain agriculture is often equated with a high environmental compatibility and a high product quality. Whilst mountain farms certainly benefit from a healthy, natural environment, the quality of products and environmentally friendly and/or landscape-friendly management rely basically on the farmer's expertise and/or the intensity of operation adapted to the location. Mountain agriculture and forestry play a key role in supporting people's livelihoods with traditional (high-value) products, crops, timber, fodder, and minerals. For these reasons, CSA in mountain areas tends to promote income-generating activities and micro-enterprises respectful of natural resources in order to improve mountain people's livelihoods and reduce poverty, as well as preserve mountain environments.

Further reading

- For a detailed overview of the approach endorsed by the Watershed Management and Mountains Programme, as well as to download its normative products (eg publications), collect any relevant information on ongoing projects and international processes, and find out about partnerships in which the program is involved, please visit http://www.fao.org/forestry/watershedmanagementandmountains/en/.
- For further information on FAO engagement in the preparation of Rio+20, please visit http://www.fao.org/rio20/fao-rio-20/en/.
- To learn more about the activities of the Mountain Partnership and download its publications, please visit http://www.mountainpartnership.org.

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