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Managing Mountain Biodiversity for Better Lives

- › Monitoring Biodiversity on the Saharan Slopes of the High Atlas, Morocco
- › Biodiversity Assessment in Lobo-San Juan Mountains
- › A Challenge for Environmental Continuity in Italian Mountains
- › Maintaining Bio-cultural Diversity in the Andes
- › Lessons from Kipahulu Valley, Maui

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Editor: Elizabeth Fox
Publication Coordination Team: Ujol Sherchan, Celine Curi, Prashant Sharma
Design: Payas Chhetri, Trance Creation

Cover photographs (clockwise from right)
Kipahulu District, Haleakala National Park, Maui, Hawaii, USA. Photo: Bob Butterfield
Local children gathering fuel for domestic demand in Ameskar. Photo: Manfred Finckh
Mountain rice harvesters in Lobo, Philippines. Photo: A. M. Caringal
Urban centre in the Alps (Val di Rabbi - Stelvio National Park). Photo: Bernardino Romano

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as a result of various opposing forces. On the one hand, as in many other parts of the world, an overall process of erosion of local environmental knowledge can be observed as a consequence of socio-economic factors (the formal education system, the introduction of a market economy, and the weakening of the role of traditional authorities). On the other hand, indigenous communities are purposely revalorising their knowledge: recognising the link between the principles of sustainable development and local knowledge, many communities take up traditional practices that valorise biodiversity, thus strengthening their indigenous collective identities. This is the result of a continuous process of cultural resistance since colonial times, recently enhanced by the emergence of strong social indigenous movements (in Bolivia and Ecuador), the election of the first indigenous president of the Americas in 2005 (in Bolivia), and the activities of organisations that promote the revalorisation of local cultures. To come up with concrete recommendations for the integration of 'global' and 'local' forms of knowledge and foster the conservation of cultural and biological diversity in the Andes, these processes need to be better understood.

The BioAndes Program reflects the gradual shift in the field of conservation since the 1990s: it is felt that policies are more sustainable if the link between biodiversity and cultural diversity, is enhanced rather than protect biodiversity from people. The BioAndes approach is based simply on the insight that conservation of bio-cultural diversity through alliances with indigenous and other local organisations representing people living within and/or near territories are crucial to really achieve conservation of (agro)biodiversity. Helping people to create new space for practicing and further developing their 'traditional' forms of living is thus a basis for a more comprehensive model of sustainable natural resource use that builds on the enhancement, complementation and innovation of endogenous potential. What is especially promising is the fact that this highly innovative approach to sustainable development is actively supported not only by local communities but also by the national governments of Bolivia, Peru and Ecuador, as well as by the international Community of Andean Nations. Inclusion of representatives of governmental bodies on the Board of BioAndes has helped strengthen the policy dialogue between policy-makers, research institutions and civil society organisations involved in the governance of bio-cultural diversity in the Andes at the meso-level of social organisation.

BioAndes Consortium:

AGRUCO, Agroecología Universidad Cochabamba (lead agency)
 Av. Petrolera Km 4 ½ Cochabamba, Bolivia
 Email: agruco@agruco.org
 Web: www.agruco.org

ETC Andes, Ecología Tecnología y Cultura en los Andes
 Calle Juan Bielovucic 1391, Lince, Lima 14, Peru
 Email: etcandes@etcandes.com.pe
 Web: www.etcandes.com.pe

EcoCiencia, Fundación Ecuatoriana de Estudios Ecológicos
 Calle Francisco Salazar E14-34 y Av. La Coruña, PO Box 17-12-257
 Quito, Ecuador
 Email: info@ecociencia.org
 Web: www.ecociencia.org

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Centre for Development and Environment
 Steigerhubelstrasse 3, 3008 Bern, Switzerland.
 Email: sarah-lan.stiefel@cde.unibe.ch
stephan.rist@cde.unibe.ch
 Web: www.cde.unibe.ch

Land Use Change and Biodiversity Conservation in the Venezuelan Páramo: Integrating Farmers' Perceptions

Luis D. Llambí, Julia K. Smith
 and Maximina Monasterio



Potato cultivation in the páramos, Venezuela. Photo: Julia K. Smith

In the diverse region of the tropical Andean páramos, threats to ecosystem integrity derive mainly from agriculture and cattle grazing. Approaches to biodiversity conservation have often been based on top-down regulations imposed by government agencies. Implementation of an alternative approach, incorporating local communities in the design of action plans for conservation, was the central objective during the design phase of the Andean Páramo Project. These plans will be executed in a network of key pilot sites along the South American páramos.

Here we report on the experience of the two Venezuelan sites, where the design process involved two complementary strategies: a multidisciplinary analysis of land use change and its threats, and the use of a participatory strategy for the analysis of farmers' priorities and perceptions. The success of the process was linked to the importance the local population gives to the páramo ecosystem and its environmental services along with our emphasis to establish a constructive dialogue between local and technical views on the environmental consequences of land use change.

Páramo biodiversity and its environmental services

The high tropical ecosystems of the northern Andes above the tree line are locally known as páramos and are among the most diverse high mountain ecosystems in the world. In Venezuela, they occur in the highest parts of the Cordillera de Mérida (above 3,000 m) forming a group of “continental islands”. Even though they occupy a relatively small area in the country (2,661 km²), the Venezuelan páramos harbour an impressive diversity of ecosystems and species. The vegetation is dominated by giant rosettes, shrubs and grasses. Their unique environmental conditions or typical of the cold tropics (night frost alternating with warm temperatures during the day), have influenced the evolution of spectacular life forms such as the endemic giant rosettes of the Espeletia complex, which had their centre of origin in the Venezuelan páramos. These environments also provide important ecosystem services including carbon and nutrient accumulation in their soils, landscapes that constitute one of the main tourist attractions in the country, and water provision and regulation. In particular, the high Andean wetlands play a key role in the accumulation and regulation of water, which is of critical importance for irrigation of the intensive agriculture practiced in the inter-Andean valleys.

Land use change and its threat to biodiversity

The local population is made up of farmers established in the region relatively recently (in the last 300 years). The threats to biodiversity derive mainly from potato cultivation and extensive cattle grazing, which form the basis of the local rural economy. The agricultural systems vary along a gradient from semi-traditional fallow systems in the more isolated areas to marked-oriented intensive agriculture highly dependent on agrochemicals and irrigation. Both traditional and intensive farmers depend on grazing areas in the páramos as plowing is done with oxen due to the steep slopes. In recent years, the advance of the agricultural frontier has mainly been driven by relatively large farmers with access to capital rather than to the commonly invoked displacement of relatively poor farmers onto marginal lands. On the other hand, the decrease in forest availability in the agricultural belt has generated an increased dependence on high páramo areas for cattle grazing.



Páramo, Venezuela. Photo: Luis D. Llambi

The Andean Páramo Project (Conservation of Biodiversity of the Páramo in the Northern and Central Andes, UNEP-GEF) aims at addressing the most important threats and barriers to páramo conservation, while improving the living conditions of its inhabitants. The project involves the countries with páramo within the Andean Community of Nations: Venezuela, Colombia, Ecuador and Peru. The central component of the design phase was the development of participatory conservation plans in a network of representative sites, which are now starting to be implemented. Their design was based on two complementary strategies: a multidisciplinary evaluation of land use strategies and its threats to conservation; an analysis of farmers' perceptions of the main problems and threats. Here, we summarise our experience in the two pilot sites selected in Venezuela: Gavidia and Tuñame.

Multidisciplinary evaluation of land use strategies and threats

The analysis was done by a multidisciplinary team coming from diverse backgrounds including ecology, geography, rural development and social medicine. In each site, we carried out a detailed survey of family production units, open interviews, field visits, analysis of panoramic and aerial photographs, participatory mapping, and a literature survey.

In Gavidia, the area directly affected by agriculture occupies 1,242 ha, 18.6 percent of the total catchment area. The agricultural frontier extends up to 3,850 m. The farmers use a semi-traditional fallow system for the commercial cultivation of potato, linked to extensive cattle raising. The cultivation phase lasts two to three years and is followed by a fallow phase generally lasting four to ten years in which a partial restoration of páramos vegetation takes place. Pasture lands extend far into high páramo areas, and in the dry season the animals concentrate in the wetlands. In recent years, the agricultural system has experienced a process of transformation towards intensification with a reduction of fallow times, the installation of an irrigation system and the introduction of new crops like carrots and garlic. This last crop is associated with an expensive technological package of intensive use of agrochemicals, financed by external capitals, even though the whole catchment is included in the Sierra Nevada National Park, where this kind of agriculture is not allowed. The main environmental threats derive from the potential expansion of the agricultural frontier, the indiscriminate increase in agrochemical use, and the maintenance of a relatively inefficient system of cattle grazing. In addition, in recent years Gavidia has become more important as a tourist destination, increasing the pressure on páramos areas.

In the case of Tuñame the area used for agriculture occupies 1,201 ha, 47.5 percent of the area included in the pilot site. The agricultural frontier extends to 3,550 m and has been moving up relatively fast in the last ten years (following the construction of a new road). In Tuñame there is a gradient of land use strategies from the valley bottom to the highest areas. In the lowest sector, where producers have access to irrigation, intensive agriculture with two to three cultivation cycles per year is found. In the high area agriculture is practiced with two to three years of fallow and a single cycle per year. The main crop is potato, which is rotated with carrot in places with irrigation. In the high areas, plots incorporated into the cultivation cycle are burnt, a practice which is relatively rare in other Venezuelan páramos. During the dry season these fires can escape affecting extensive páramo areas. Cattle raising has decreased its importance considerably in recent years. However, a few farmers still keep large herds, which pasture in the high páramos. Most of the páramos in the

valley are outside protected areas. The main threats to conservation include grazing and burning, contamination by agrochemicals and the continuing expansion of the agricultural frontier.

Participatory analysis of local perceptions

The action plans for conservation and management were designed through a participatory process, which included a series of workshops for the construction of a shared vision for the future, a detailed problem analysis (establishing priorities by consensus and developing problem analysis trees) and the discussion of viable alternatives. The resulting plans were validated in a technical workshop with representatives of the University, regional NGOs and key government agencies, including the Ministry of the Environment and the National Parks Institute.

At both pilot sites the process resulted in the identification of the same core problems by the farmers: degradation and destruction of the páramos (mainly generated by agriculture and grazing), pollution from various sources (agrochemicals and waste water), and the lack of effective coordination and participation by the community. In Gavidia, the increasing impact of tourism was also included. The resulting lines of work proposed in the action plans are: strengthening of local organisations for effective participation (including the consolidation of environmental groups); mitigation of páramos degradation processes (including participatory land zoning and regulation agreements, increased sustainability of agriculture and cattle grazing and promotion of sustainable income generation alternatives); controlling pollution (mainly through the control and efficient use of agrochemicals).

The main success of the process to design the action plans was the establishment of a constructive dialogue between scientists, farmers and representatives from regional governmental and non-governmental organisations. Interestingly, technical and participatory evaluations of environmental problems and threats were largely in agreement. Farmers in both pilot sites are clearly aware of the link between ecosystem integrity and human welfare and of the threats created by current land use strategies. This seems to be related to the key role of the páramo as a source of irrigation and drinking water and to a recent boom of regional environmental organisations, led in many cases by women. The main challenge for the implementation phase will be to create the conditions for translating local environmental awareness into effective changes in land use strategies. The adoption of these changes will depend on the promotion of economically and technically feasible alternatives and the strengthening of local capacities for the enforcement of environmental regulations and agreements.

Further information

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Learn more about the Andean Páramo Project at <http://www.condesan.org/ppa>

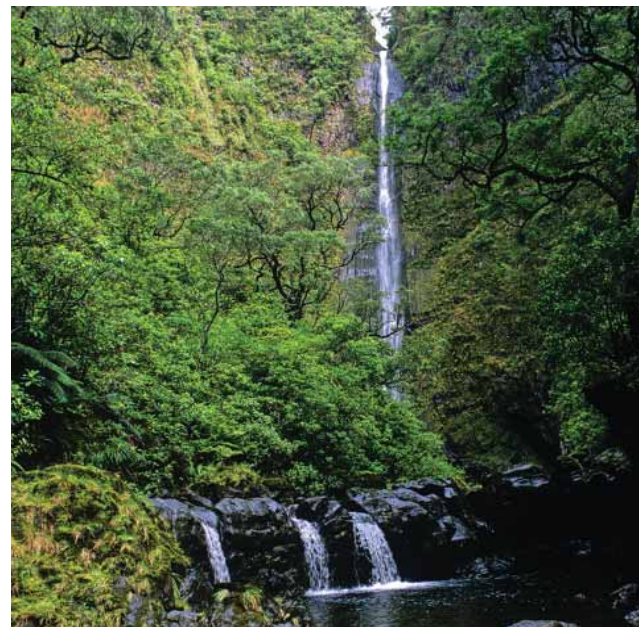
National Executing Agency (Venezuela): Instituto de Ciencias Ambientales y Ecológicas (ICAE). Facultad de Ciencias, Universidad de Los Andes. Mérida, Venezuela.

Regional Executing Agency: Consorcio para el Desarrollo Sostenible de la Ecoregión Andina (CONDESAN). Centro Internacional de la Papa (CIP). Quito, Ecuador.

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Lessons from Kipahulu Valley, Maui

John Cusick



Kipahulu District, Haleakala National Park, Maui, Hawaii, USA. Photo: Bob Butterfield

The Hawaiian Islands may not conjure up images of mountain ranges, they are not even on the Mountain Forum list of mountains or massifs, but these islands are both mountainous and biologically diverse. Kipahulu Valley, on the island of Maui, is an excellent example of island diversity from tropical sea level to alpine summits. The valley supports near pristine to severely altered habitat within four ecological zones found only on the highest mountains in the Hawaiian Islands - Mauna Kea (4,205 m), Mauna Loa (4,170 m) and Haleakala (3,055 m). This diversity has earned the valley numerous protected area designations, including National Park, Scientific Research Reserve, Wilderness Area, and International Biosphere Reserve.

Descriptions of Kipahulu Valley made by research scientists on a 1967 expedition and elsewhere warrant the strict protected area management strategies regarding access and activities; restrictions that have been in place for over three decades:

Supporting Institutions



Food and Agriculture Organization of the United Nations



Swiss Agency for Development and Cooperation



Kipahulu District, Haleakala National Park, Maui, Hawaii, USA. Photo: Bob Butterfield

Host Institutions and Partners



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Mountain Forum Secretariat c/o ICIMOD GPO Box 3226 Kathmandu Nepal
Tel: +977-1-500 3222 Fax: +977-1-500 3277 Email: bulletin@mtnforum.org Web: <http://www.mtnforum.org>