Participatory Planning for Biodiversity Conservation in the High Tropical Andes: Are Farmers Interested?

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**Farmers’ interest in biodiversity conservation**

Active participation of local inhabitants is increasingly recognized as a key strategy for the success of any well-designed biodiversity conservation project. However, the use of participatory strategies will only be as successful as the interest shown by local communities in biodiversity issues. This interest will probably depend on the direct and indirect benefits people feel that they derive from biodiversity, their knowledge of the ecosystem, and their value systems in terms of their relationship with nature.

In the páramos of the tropical Andes of Venezuela (above 3000 m; Figure 1) the local population consists of farmers established there relatively recently (in the last 300 years). Threats to biodiversity derive mainly from potato agriculture and extensive cattle grazing, which are the basis of the local rural economy. The agricultural systems vary along a gradient from semi-traditional fallow systems in more isolated
areas to market-oriented intensive agriculture highly dependent on agrochemicals and irrigation.

In the fallow agricultural areas, farmers make direct use of páramo biodiversity in a variety of ways: plants for medicinal and religious use, hunting, etc. Moreover, they benefit indirectly from the regeneration of páramo vegetation in fallow fields (which allows partial restoration of soil fertility). Hence, they have more direct contact with the functioning and diversity of the páramo ecosystem than most farmers who use the land for intensive potato cultivation. In addition, both traditional and intensive farmers depend on grazing areas in the páramos (especially high wetlands), as plowing is done with oxen owing to the steep slopes (Figure 2).

The great dependence of intensive agriculture on irrigation water that drains from the páramos has increased farmers’ awareness of the link between ecosystem integrity and human welfare. Interestingly, there has been a recent boom in community-based environmental movements, led in many cases by women. These include initiatives for the conservation of headwaters in the páramo and capacity building for sustainable agriculture.

The Andean Páramo Project experience in Venezuela

The Andean Páramo Project (Conservation of Biodiversity in the Páramos of the Northern and Central Andes) is a regional initiative financed by the Global Environment Facility, implemented by UNEP, and regionally coordinated by the Consortium for Sustainable Development of the Andean Ecoregion (CONDESAN). The project involves the countries with páramo within the Andean community of nations: Venezuela, Colombia, Ecuador, and Peru. Its goals are biodiversity conservation and safeguarding the ecological functions of the páramos, while improving the welfare of its inhabitants. The central component of the design phase (PDF-B) was the development of participatory conservation plans in a network of key pilot sites in the 4 countries. Here, we summarize experience with participation of the local populations of the 2 Venezuelan sites (Figure 3) in the design of conservation plans. These plans will serve as blueprints for action during project implementation (6 years).

Multidisciplinarity during the design process took place at 2 levels. On the one hand, the composition of the facilitation team, coming from diverse backgrounds including ecology, geography, rural development, and social medicine, was essential in addressing the complex links between biodiversity conservation, land use strat-
gies, and human welfare. On the other hand, the planning process incorporated the views of numerous stakeholders, including community-based organizations and regional government agencies (municipalities, National Park authorities, Ministries of Environment and Agriculture, etc).

**The strategy for farmers’ involvement in conservation planning**

**Project presentation: a key starting point**

The initial presentation of the project to the communities was crucial in evaluating the level of interest and establishing agreements for further work. The great diversity and endemism found in the Venezuelan páramos, its limited geographical extension, and the uniqueness of the ecosystem were emphasized. By putting the local páramos in a global context a sense of ownership and stewardship in the participants was created: farmers indicated they had not previously realized that they were guardians of an ecosystem of international significance.

**Building alliances**

A key to the success of the design process was the establishment of alliances with governmental and non-governmental organizations active in each area. This avoided replication of efforts and provided already trusted local counterparts with effective communication between the local communities and project personnel.

**Developing a shared vision**

In workshops, a shared vision for the future of the community was constructed by all its members. Children participated by drawing pictures of their dream community and presenting them to their parents. This was an important experience, as the adults realized that their children have their own views of the future, highlighted in terms of their right to good education, modern technologies, and a clean environment.

**Problem analysis**

In order to focus problem analysis on the overall objectives of the project, a simple diagram was discussed showing the close relationship between management practices, people’s welfare, and páramo conservation. This prevented discussion of problems outside the scope of the project (e.g., access to public services) that could create false expectations. Initial brainstorming was followed by prioritization and establishment of consensus (Figure 4). At both pilot sites, the process resulted in identification of the same core problems: degradation and destruction of the páramo ecosystem, pollution from various sources (agrochemicals, wastewater, etc), and the lack of effective coordination and participation by the community. In Gavidia the environmental impact of tourism was also included, reflecting its increasing importance as a tourist destination. For these main problems, different groups developed problem analysis trees identifying underlying causes and consequences.

**Baseline establishment and participatory mapping**

A detailed baseline study of land use, hydrology, natural vegetation, fauna, socioeconomic conditions, services, and infrastructure was established. Participatory mapping (analysis of air photographs and satellite images) was a valu-
able tool for obtaining farmers’ views of land use management, especially for aspects difficult to characterize, such as cattle grazing patterns. The population at the site where semi-traditional agriculture is practiced showed a more detailed knowledge of their environment than inhabitants at the other pilot site, by clearly identifying all glacial lagoons, water sources, grazing areas, etc. Our socioeconomic analysis showed high levels of poverty, which were reflected in low income and poor housing and sanitary conditions. This emphasized the importance of combining project interventions for conservation with actions for improving living conditions.

Technical evaluation of the action plan
On the basis of all the information gathered, action plans were designed (including implementation strategies and stakeholder responsibilities) and evaluated in technical roundtable discussions. These workshops incorporated representatives of numerous regional governmental and non-governmental organizations (e.g., National Park Agency, Ministries of the Environment and Agriculture, University) and were an exceptional forum to discuss strategies for management and conservation based on the detailed information provided by the two communities. In particular, our work in Gavidia (located within the Sierra Nevada National Park; Figure 5) constitutes a pioneer project for the implementation of a local plan for conservation with community participation within protected areas in the Venezuelan páramos. Moreover, discussions have already contributed to a constructive flow of information and the strengthening of relationships between farmers and regional authorities, which in the case of the National Park have been conflictive in the past.

Proposed lines of action: results of the participatory process
The main lines of work proposed in the action plans are briefly summarized below.

- **Mitigating degradation and destruction of the páramo:** given that the main threat to conservation at both sites is the advance of the agricultural frontier (Figure 6), the main actions will be

![Figure 5](https://bioone.org/journals/Mountain-Research-and-Development)

**FIGURE 5** Pilot site in Gavidia. Fallow agriculture is practiced to cultivate potatoes. The agricultural zone occupies 19% of the total area (6030 ha) between 3200–4200 m. The 400 inhabitants also depend on extensive cattle raising; some derive their income from tourism. The dominant vegetation is a rosette–shrubland páramo. (Photo by J.K. Smith)
directed towards the establishment of local land-ordering and regulation agreements with all relevant stakeholders. In addition, programs to increase agricultural productivity and promote sustainable alternatives will be implemented. Participatory research on the impact of cattle grazing will be associated with an integrated program to increase local capacities for sustainable management (e.g., supplementary forage in the agricultural belt, controlled grazing in high wetland areas).

- **Controlling pollution**: Actions will be mainly directed towards the control and efficient use of agrochemicals, which pose important health hazards to the population and are the main sources of pollution. This will involve capacity building for appropriate use as well as establishment of programs focusing on ecological agricultural techniques (e.g., integrated pest management).
- **Strengthening of local organizations for effective participation**: This will be achieved primarily through identification and training of local leaders, emphasizing the environmental dimensions of leadership. In addition, efforts will be directed towards local capacity building for the establishment and operation of effective local organizations. Implementation of the project should also provide an opportunity to coordinate efforts concerning environmental issues.
- **Controlling the environmental impacts of tourism**: The Gavidia community indicated that the increase in tourism has significantly increased litter and degradation of páramo areas. The action plan proposes controlling the impact of tourism through a joint community–National Park program. This involves strengthening the local environmental brigade, training in National Park regulations and tourist management, environmental education, and the establishment of an ecological information center.

**Lessons learned and future challenges**

The process outlined above was effective in achieving the active participation of local farmers, at both the semi-traditional and intensive agriculture sites. Was this because farmers were already interested, or because of the strategies used? Both explanations are valid. On the one hand, several of the strategies implemented proved successful: a) empowerment through incorporating local knowledge and views as the basis for planning (instead of having environmental regulations imposed from outside); b) active involvement of local GOs and NGOgs from the initial stages; c) participation of all age groups and both sexes (Figure 7); d) use of participatory strategies for detailed problem identification and characterization (including participatory mapping);
e) turning the design process into a capacity-building exercise, in which the community acquires useful tools for strategic planning.

On the other hand, farmers were already interested. It was obvious that they are proud of their status as “parameros” (páramo dwellers) and have a detailed knowledge of the ecosystem. In addition, they clearly recognize the importance of páramo environmental services in sustaining the local economy.

However, active farmers’ participation in planning is one thing, but their adoption of sustainable management alternatives and land use agreements is quite a different matter. This can only be achieved through an effective system of positive incentives, feasible alternatives, and institutional enforcement of regulations and agreements. The main challenge for the project implementation phase will be to establish programs and economic incentives to promote access to viable, ecologically sound, efficient, and cost-effective technologies—something highlighted by farmers throughout the process. In addition, preventing the violation of land use agreements will necessarily require strengthening the institutional capacity of community-based environmental organizations.

**FIGURE 7** Children drawing their dream community in Tuñame during the problem analysis workshop. (Photo by J.K. Smith)

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**FURTHER READING**

Unidad Central de Coordinación, Proyecto Páramo Andino.  