Series 6: Programme 6 (of 10) - 'Shed Loads'

Bees for Water – Bolivia

In the rainforests of Amboró National Park in Bolivia, water has ironically become an increasingly scarce resource. Farmers in Los Negros are losing out to farmers in Santa Rosa, who source their water upstream in the same watershed. To help resolve this conflict, the two communities have adopted an approach of community-based forest resource management. This means that farmers in downstream Los Negros compensate farmers in Santa Rosa when the upland farmers conserve forest cover, which in turn conserves water. The compensation arrives in the form of beehives, allowing Santa Rosa farmers to explore alternative livelihoods.

Conflict Over Resources

Forestry activity in the Amboró National Park

Conflict over natural resources is an inescapable aspect of human life. A variety of recent trends have had significant effects, positive and negative, on the access to and use of natural resources. These trends include the environmental degradation leading to a diminished resource base; the globalisation and liberalisation of economies; growing inequity in the distribution of resources and economic benefits; the decentralisation of authority over resources; changes in political and legal systems; and demographic shifts.

Conflict often emerges because individuals or social groups have different uses for, or ideas about, the management of resources such as trees, water, pastures, and land. Conflict also surfaces when local traditional practices are no longer viewed as legitimate or consistent with national policies, or when external bodies try to pursue their interests, while ignoring the needs of local

people. In the disputes that follow, often between parties of very uneven power, it is not only the environment that suffers.

Local water users throughout Bolivia are rarely able to sustainably manage their water resources because they lack

- Accurate information,
- Transparent and fair institutional mechanisms, and
- Appropriate incentive structures.

In the rainforests of Amboró National Park, conflict grew between two traditional communities who were vying for the use of local natural water sources. Many lowland farmers blamed falling water levels on the deforestation practices of the upland farmers, but there was no mechanism by which the farmers could use to influence land-use decisions.

Amboró National Park
The Amboró National Park is a large natural area of 637,000 hectares (ha) (1.5 million acres), situated in the extreme east of the Andean region of the Santa Cruz Department. It is a zone of exceptional biodiversity as it is a meeting point between four main bio-geographical regions: the south-eastern Amazon (humid tropical forests), the western Brazilian Shield (Cerrado and deciduous forests), the northern Chaco (dry forests) and the very diverse sub-tropical and temperate forests of the Andean mountains. This mosaic of ecosystems houses a richness in fauna and flora diversity.

The Amboró National Park was created in 1973 as the '*Teniente Coronel Germán Busch*' National Reserve and acquired the category and the name 'Amboró' National Park in 1984, with an area of 180,000 ha. In 1991 this was enlarged to 637,000 ha, but in 1995 was reduced again to 442,500 ha (1.1 million acres). The difference between these last two figures is the area of what is called the 'Amboró Natural Area of Integrated management' (*Area Natural de Manejo Integrado Amboró* - ANMIA). A variety of communities exist within the ANMIA, totalling around 4500 families in eight municipalities.

Over the past 20 years the numbers of farms in Santa Rosa, upstream of the neighbouring village of Los Negros, has been increasing. More forest has been cleared to free land for agricultural purposes, which in turn affected the local watershed, as farming consumed much of the water resource upstream of Los Negros. In Los Negros the existing irrigation system, which used

Irrigation system used in Santa Rosa

to supply year-round water was no longer able to do so, especially in the dry season from May to September. Agricultural yields dropped.

> "It's thanks to the water in this (irrigation) system that we cultivate and get produce to the market. But in the last 20-25 years, there has been a substantial drop in the quantity of water. Now we are producing a lot less than before."
>
> Andres Rojas-Peña, Los Negros farmer

Agricultural practices such as the use of fertilisers also increases the pollution of waters, as inputs get washed into the system. Forestry clearance has made land more exposed to erosion, with increased runoff causing further pollution.

To help resolve this conflict, the organisation Fundación Natura Bolivia (Natura) was invited by community organisations from Los Negros and Santa Rosa to look at ways of solving the water resource problem. A model is being developed in Los Negros that will facilitate a more rational system of water resource exploitation.

Negotiations in Amboró National Park

In 2002, Natura began the project that looked to build consensus about the water problem, to increase local understanding of why the river is drying, and to assess what the economic consequences might be. Through discussions with both communities Natura found that, while the downstream farmers were very aware of the relationship between the forest and the downstream water supply and were not averse to the idea of helping their upstream neighbours in protecting this valuable asset, one of the main issues was the lack of trust between the communities.

With the financial assistance of the US Government Fish and Wildlife Service, Natura are trying to pioneer an innovative approach to solve their problems: a locally managed system of compensation for watershed services (CWS). There are four main components in the project:

1. Development of a basin-wide system of compensation for watershed services (CWS)
2. Environmental education
3. Bird life and hydrological research
4. National level scale-up.

Compensation for Watershed Services

Using geographical information systems (GIS), Natura helped to map the area in terms of the vegetation and its importance for water conservation. They helped to set up a broad-based Environment Committee, with a 30 per cent membership of women and including members from the poorest families. The committees were provided with maps showing forested areas vital for water conservation in green and areas that have been cleared for cultivation in red. The remote sensing techniques helped the two communities to agree on and enforce a system of compensation for forest conservation. They have

developed an interesting ‘payment’ system whereby the upstream community is ‘rewarded’ for its good stewardship of the forest by the Los Negros farmers.

Farmers in Santa Rosa had expressed an interest in beekeeping as an alternative livelihood. From the remote sensing maps, the Los Negros community determined that they could offer the farmers a beehive for every 15 ha (37 acres) of preserved forest. When the Santa Rosa community interpreted the maps, they wanted one beehive for every 5 ha (12 acres) of preserved forest.

> “If they do conserve the top of the watershed, we will do all we can to somehow come to an agreement with them and give them compensation.”
>
> Delfím Rivero, Los Negros farmer.

Negotiations resulted in a compromise of one beehive for every 10 ha (25 acres) of forest as a standard rate of compensation. However, the remote sensing techniques also allow for a degree of case-by-case discretion. Using GIS, farmers are able to assess the quality of the forest, and the degree to which it has previously been cleared. Forest areas that are partially cleared may receive a percentage of the standard compensation rate.

In the first year of the project six farmers offered a total of 500 ha (1235 acres), and this was doubled in the second year. Natura persuaded the local government to purchase 50 bee boxes to encourage local take-up and to build up confidence in the project.

Natura offered the farmers of Santa Rosa training in beekeeping and honey harvesting, to make the switch in livelihoods a viable option. Farmers downstream have also exchanged skills and knowledge with their neighbours about honey production. The new beekeepers have to go into the forests to collect their honey and are conscious of the fact that it is now in their interest to retain this resource as a forage base for their bees. Economic benefits vary, but a skilful beekeeper could make a gross annual income of approximately $31-46 (£17-25) per hive.

Also, by binding watershed inhabitants to mutual interdependence, the project enhances communities' abilities to resist incursions from outside, in the form of migrants or unwanted political pressures, that could threaten the system's sustainability.

As confidence in the project increases, so does the number of farmers who want to join. Payments in 2004/5 comprised one beehive and training in apiculture for every 10 ha of cloud forest conserved. Upstream farmers are invited to voluntarily enter the CWS programme. Honoured contracts can be re-enrolled in subsequent years. At present the scheme is using short-term donor funds, but this is demonstrating to downstream users – the potential long-term funders – that upstream watershed protection is feasible and trustworthy as long as appropriate incentives are provided.

In 2004 a flat rate compensation rate, the equivalent of $3/hectare/year (£2/2.5 acres/year), was paid in bee boxes for any land devoted to habitat protection. In 2005 a new concept was introduced: that different forest types were worth more, in terms of water provision and biodiversity protection, than others. A sliding scale of compensation was introduced that tries to better reflect forest value. This is calculated as follows:

- Intact untouched cloud forest and *paramo* (tropical grassland) continues to receive the equivalent of $3/ha/year (£2/2.5 acres/year).
- Non cloud forest that is either undisturbed or receives temporary disturbance from cattle receives 75 per cent of the compensation package, or $2.25/ha/year (£1.25/2.5 acres/year)
- Old second growth forest, or old growth with a permanent level of cattle intervention receives 50 per cent of the compensation or $1.5/ha/year (£0.80/2.5 acres/year)
- Young second growth or disturbed *paramo* receives no compensation.

To cope with this more complex compensation structure, the vegetation mapping and field procedures have been updated to ensure that the appropriate compensation package can be defined correctly. There has also been heavy investment in a precise and effective field monitoring system. This system has three steps:

- Every 12 months the *Project Control Team* revisits every farmer involved in the programme. This committee comprises: one member of the upstream community's environmental committee, one member of the downstream community's environmental committee, a Natura field technician, and the landowner. Equipped with GPS and maps, the group visits the conservation area and the landowner fills in a questionnaire. The committee assesses whether the area has been effectively conserved, and notes any changes, damage or other points of interest, and submits a written report. Monitoring costs are split between all parties.T·
- This report is submitted to the *Enforcement Directorate*, comprised of the President of Natura, and the Presidents of both the upstream and downstream communities' environment committees. This Directorate makes a final recommendation on how to respond to any infractions.

- The project's response to the infraction is communicated to the landowner in a letter from the Enforcement Directorate.

There was only one infraction of the conservation agreements in 2005, when one landowner developed a road through a part of his conservation area. The Enforcement Directorate is currently considering how to appropriately punish the individual concerned. It is important that the decision on how to respond comes from, and is seen to come from, the local representatives, rather than any external body such as Natura.

Environmental Education

To ensure long-term viability of these conservation measures, environmental education was seen as vital. To achieve this the education programme is building the following local capacities:

- **Awareness** of and sensitivity to environmental problems
- Basic **knowledge** and understanding of how the environment functions
- Positive **attitudes** and values towards biodiversity
- **Skills** to identify, investigate and resolve environmental problems.

Natura has targeted teachers of children ages 8-15 at schools in six watershed communities (Santa Rosa, Sivingal, Los Negros, Palmasola, Valle Hermoso and Pampagrande). This age group is the easiest to access in a non-threatening way, and it is hoped that the 'trickle-up' effect of conservation ideas from this age group to parents will be significant.

Research

The third component of the compensation for watershed services (CWS) was bird life and hydrological research.

A bird census of the Los Negros Watershed was carried out during February and March 2005. A total of 235 bird species were observed in the watershed. Thus, despite its small size, less than 35 square km (14 sq miles), the Los Negros watershed has very high bird diversity. The census clearly suggests that bird conservation efforts in the Los Negros valley should prioritise the mesothermic forests in the northern third of the basin, where Natura is focusing the compensation for watershed services project.

As hydrological research is expensive and time consuming, Natura is undertaking a rapid hydrological analysis of the Los Negros Watershed. Not only will this study provide the hydrological data required to further develop the CWS system, but it will also provide guidance to forestry practitioners on whether it is possible (and if so, how) to undertake rapid, inexpensive hydrological analyses that can provide a robust scientific basis for CWS systems.

National Level Scale-up

In 2004 Natura led a multi-institutional diagnostic analysis, which indicated that there is great potential for promoting market mechanisms for watershed management that improve rural livelihoods in Bolivia. It showed a clear need for a new way of thinking for managing Bolivian water resources. Cases such as Los Negros indicate there are clear opportunities for developing market mechanisms for watershed management: small-scale projects can be feasible regardless of political, legal and institutional concerns.

The project team, with funding from the International Institute for Environment and Development, is now looking at further research and actions that are necessary to guide the process. The work is focusing on the following themes:

1. Assessing laws and national policies, and mapping the institutional landscape
2. Detailing the state of hydrological science in Bolivia
3. Reviewing poverty, land use and livelihood issues including the role of property rights in constraining and promoting market development and improved livelihoods
4. Assessing watershed management experiences, both of existing markets and other mechanisms such as integrated watershed management
5. Assessing the feasibility of selected study sites for project development
6. Undertaking stakeholder and actor analyses at the watershed level.

The aim is to develop concrete strategic recommendations about how to scale up from the Los Negros and other projects, and to institutionalise throughout Bolivia the concept of compensation for environmental services at the economic, political, legal social and cultural levels.

Assessing the Project

Whilst the project has received initial funding from overseas and the local government to build confidence in the system, it now needs to be established for a few years so that participants can see the benefits both parties gain, and therefore continue to support these practices. There are concerns about the viability of the project once outside funding is withdrawn. An initial survey of farmers' willingness to pay, conducted prior to the project implementation, indicated that 70 per cent of Los Negros farmers would be willing to pay some costs. But to date no contributions have come from these farmers. Conversely, there are concerns that the Santa Rosa farmers may not have set aside the most threatened land, but instead have used the payments for land they did not intend to convert that year anyway, or just changed a planned location of production to another area on their property. The changes in compensation noted above, and the genuine uptake of the 'beehive payments' are positive moves that are intended to provide greater trust between the communities.

Other issues that need to be addressed are:

- There is little clarity over legal land titles in forest areas, so disputes can arise as to who has claim to this land. This is leading to some confusion over land ownership and rights.
- Using the term 'payment'. This word has associations with privatisation and land expropriation that some groups are ideologically opposed to. Natura now uses the term 'improving management of hydrological resources'.
- The status of landless residents, who think that giving payments to those who are already better off is unfair. This may increase conflict in these areas.

The process of community forest resource management and conflict resolution has helped the two communities to build a working relationship that benefits both the environment and their livelihoods. In the process, the communities have learned that community-based management is a fundamental part of managing a resource that is increasingly in demand. They have developed an understanding which gives them the confidence to tackle conflicting issues of resource management through dialogue.

Further Information

Participating Organisations

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