

Comanagement of Natural Resources

LOCAL LEARNING FOR POVERTY REDUCTION

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Learning to share the resource and the responsibility in an Andean watershed

Demand for water threatens a unique ecological reserve in Ecuador

Water shortages that ruined the crops of marginal farmers led to conflicts and a demand for increased water supply that threatened to destroy a unique ecological reserve in the Ecuadorian Andes. But participatory research showed that the real problems lay with management of the resource. Solutions required the people of the region to take responsibility for protecting the environment and to work together to conserve the resource.

Water always runs downhill. However, as farmers in the El Angel watershed in Ecuador's northeastern Carchi province can testify, sometimes very little of that water makes its way to the bottom of the hill. The hills in this case are in the Andean mountains, and the water comes from a unique high-altitude wetland known as the *páramo* that extends across the northern Andes.

The *páramo* is a fragile ecosystem that soaks up rainfall like a sponge and releases it to the rest of the watershed slowly through the year. The cloud forests adjacent to the *páramo* are among the rarest ecosystems in the Andes — 60 percent of the varied species here are found only in these cold tropical wetlands. Recognizing the great potential for ecotourism, the Government of Ecuador created the El Angel Ecological Reserve in 1993.

The reserve sits on a plateau atop the El Angel watershed at an altitude of about 4 000 m. Many of the irrigation canals serving farmers up and down the valley originate here. In the lower reaches of the watershed, marginal farmers find their livelihoods at risk because they never know from one day to the next whether they will have

enough water for their fields and homes. Sometimes disputes over water have led to violence. Sometimes farmers and their families simply give up, leaving the valley as “thirsty migrants.”



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The government attempts to control water use by issuing water licences to regulate withdrawals from the watershed's rivers and streams. But the system is ineffective, so that those farmers at the bottom of the valley, who are usually the poorest, don't always get their fair share. And it is not just livelihoods that are at risk. As water becomes scarcer, there is pressure to develop structures — dams or reservoirs — that might drain or drown the rare ecosystem on the plateau above.

In 1996, a team of natural and social scientists supported by IDRC began work on a project known as Manrecur (from the Spanish for resource management). They found that the problems are in part due to variations in the climate at different altitudes, but are intensified by issues of land and water access rights. Private landholdings in the watershed vary widely, ranging from huge haciendas to very small properties carved out by peasants during various land reforms. There are also the communal territories of the Indigenous peoples who still occupy ancestral lands. Many of these are in the *páramo*, overlapping the El Angel Ecological Reserve, and in the zones in which irrigation canals originate.

At the other extreme, the low-lying valleys are semi-arid and hot, with shallow, stony soils except in the valley bottoms, where farmers grow tropical crops. Unfortunately, they depend entirely on the irrigation water from higher up. But as Saloman Acosta, a farmer from this region, complains, "The water coming into our village is totally contaminated... and there is practically no water during the dry season."

Taking "a bit more"

In talking about water issues with the people of the watershed communities, the researchers soon found that, even though water availability, water quality, and land use were closely linked throughout the watershed, most

residents were able to see only their own local issues. Upstream users believed downstream users were already getting more than their allotted share of water, so they could justify taking "a bit more" themselves. Sometimes they took a lot more, installing pumps or pipes to draw water illegally into their own fields.

Dr Susan Poats, lead researcher on the first phase of the project, summed up her view of the situation this way: "Rather than destroying the *páramo* trying to build dams, let's work on the social and organizational aspects of water. Let's use water more efficiently. And let's deal with the fact that people who live in the upper part of the watershed are stealing water from those who live at the bottom of the watershed."

Using water more efficiently meant doing something about the ineffective system for water allocation covered by national legislation. Researchers examined water flow through the earth-lined, leaky, and very long irrigation canals, many of which are so old that they predate the arrival of Europeans in the country. Losses were found to be "very significant."

Compounding the problem, the researchers also found that the official data on the volume of water flowing through the watershed "no longer reflected reality." Neither stream flow nor water withdrawals were measured in a reliable way, and the available data was out of date. So, while downstream users sometimes had no water at all for several weeks, the state's 15-year-old records showed that the total water concessions in the El Angel watershed were still less than the available flow — that in fact there was a surplus of water.

The irrigation systems are managed by water user associations, and formal applications for water withdrawals are processed by a state-employed water adjudicator. But without reliable data on which to base judgements, it was impossible to satisfy users. Farmer Miguel Angel Cuaspuud voiced the frustration of many when he told the researchers, "The government granted me a right to use water three years ago, but it is water that does not exist."

A better picture

What was needed was more and better data. The researchers devised a simple water flow meter that could be built and used locally. By involving local people in regular participatory monitoring of key points in the irrigation network, they built up a much better picture of actual flows and uses. Soon the water adjudicator, Pedro Loyo, began to use the evidence collected by the research team, refusing applications for more water extraction on the grounds that existing flows were inadequate. "Otherwise it is like giving a cheque with no money. I don't want to cheat people," Loyo explained.

So it was that the people of the El Angel watershed were forced to realize that their livelihoods were inextricably

bound together by the flow of water through those leaky canals. “I have used the information from Manrecur and my own understanding as a civil engineer,” said Loyo. “Together, working with the project, we can see what we can do to rehabilitate the area — to improve the canals and reservoirs.”

A change in attitude was soon evident. In one case, the new data from the research team revealed that the upstream municipality of Espejo was illegally withdrawing more water than it was entitled to. The population of Espejo had grown, as had its water needs. But now that adjudicator Loyo had frozen all new concessions, the stealing had to stop. And without a legal concession the municipality could not obtain state funds to invest in new potable water supplies.

The situation called for a new approach to the water shortage problem — one that was legal. So the local government in Espejo worked with the downstream municipality affected by the illegal water withdrawals, and a joint solution was found: both municipalities invested in the rehabilitation of an old reservoir. The cooperative action, and the increased awareness of downstream impacts by officials in Espejo, ensured that water use would be more carefully monitored in future.

The mayor of Espejo, Renan Flores, admits that the incident has forced his community to think differently about water, and especially about the *páramo*. “Now we are living in a world crisis with respect to water,” he says. “If we don’t invest in protecting and taking care of our water resources, in five years it will be finished.”

Important innovation

To understand the system and its problems better, the researchers needed an integrated assessment of the entire watershed — its hydrology and resources — that could be analyzed using geographic information systems (GIS) technology. This led to an important innovation in information sharing: the Carchi Consortium, which was started by the researchers as a forum to share data on the El Angel watershed. The aim was to bring together not just researchers and local officials, but also ordinary citizens, representatives of NGOs, and national and international agencies.

The innovation worked better than anyone could have expected. The informal meetings of the Consortium attracted the attention of local communities, and the Consortium soon became one of the few spaces where people from all parts of the watershed could come together. Initially, the meetings were attended mainly by researchers, government officials, and development workers, who came together to discuss and coordinate their work. Then the water user associations became involved. Farmers’ groups, county governments, and officials from central ministries all were brought in to help clarify the resource situation for the watershed, using the base data

generated by the research team. Technical advisors undertake research and respond to questions that arise.

As a result of the Consortium meetings, people have begun to think of the watershed as an interconnected system on which they all depend, according to Manrecur researcher Paul Arellano. “Before, most people didn’t know what a watershed was,” he says. “In the past people didn’t talk about the *páramo*. Now wherever you go, when you talk to people who are involved in the water associations, they are much more aware. Now this awareness is moving to ‘okay, what are we going to do?’”

There was still much to be done. Quantity was not the only water-related issue in El Angel. There was also a serious question about quality, and again it was the people living lower down the slopes who were most at risk. Water quality studies conducted by Manrecur revealed high levels of contamination in the lower areas of the watershed. The water coming from the dark, peaty soil sponge of the *páramo* is pure, but as it passes down through the valley communities it becomes contaminated by everything from human and animal waste to agricultural chemicals. In effect, what the researchers found was that the upstream communities quite literally bore a large responsibility for the fate of their downstream neighbours.

Shift in leadership

The need for increased user participation, and the engagement of local government in new multistakeholder governance institutions, accompanied a shift in leadership of the research to a new NGO, Grupo Randi Randi. Founded and led by researchers active in the El Angel communities and the Carchi Consortium, this group promoted participatory approaches to governing the resource in the watershed, with continued support from IDRC. Their goal was to



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capitalize on that increased awareness to convince the inhabitants of El Angel to see themselves as belonging to the watershed just as much as to their own communities, and to accept collective responsibility for its well-being.

By organizing the collection of water flow and quality data by local people, and building on their knowledge, the researchers demonstrated to community organizations the value of using hard evidence in decision-making rather than relying on old assumptions. They used new information-sharing and collaboration techniques to challenge assumptions that were preventing collective action. They demonstrated how this new knowledge could be used to negotiate creative solutions to water conflicts. The researchers helped to negotiate formal rights for upstream water users, rights that also protected the interests of downstream users. The agreements included compensation to upstream users in return for protecting and conserving water resources for the benefit of those living downstream.

As part of the effort to better manage and protect the resource, community activists have been trained to sensitize their neighbours to the importance of the negative

impacts that their behaviour could have on people living downstream. They point out that water contamination affects the health of both the people and their crops. The Carchi Consortium also organizes courses and workshops to raise awareness of issues around water and the environment and is working to improve agricultural productivity through participatory research with the farmers.

The message has taken hold — that the future of the people of El Angel and of the watershed is tied to the health of the *páramo*. Now, the researchers have succeeded in obtaining support from a number of sources to establish a permanent scientific research station in the *páramo*. This is a major step toward strengthening their knowledge of the ecology and hydrology of this rare and fragile environment, to understanding its crucial role in the watershed system, and to ensuring that it will be protected for the foreseeable future.

This case study was written by Bob Stanley, an Ottawa-based writer.

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For more information

Susan Poats
Research Director
Grupo Randi Randi
San Cristobal 1167 y Yasuni
Quito, Ecuador

PHONE: +593-2-224-5274
FAX: +593-2-246-4191
EMAIL: spoats@impsat.net.ec
WEB: www.randirandi.org

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Rural Poverty and Environment Program
International Development Research Centre
PO Box 8500, Ottawa, ON
Canada K1G 3H9

PHONE: +1-613-236-6163
FAX: +1-613-567-7749
EMAIL: rpe@idrc.ca
WEB: www.idrc.ca/rpe

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