



Cultivating *peace*

Conflict and Collaboration in Natural
Resource Management

edited by Daniel Buckles

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Conflict and Collaboration
in Natural Resource Management

Edited by Daniel Buckles

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
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MATAGALPA, NICARAGUA: NEW PATHS FOR PARTICIPATORY MANAGEMENT IN THE CALICO RIVER WATERSHED

Ronnie Vernooy and Jacqueline A. Ashby

This chapter describes current progress on the International Centre for Tropical Agriculture's Hillside project in Nicaragua. This action-oriented research project aims to provide decision-makers at various levels with the strategic information and instruments they need to improve the management of the natural resource base in the fragile and degraded hillside environment of Central America. The main activities are described briefly, with emphasis on the organizational principles and actions that are guiding the project. We conclude with a summary of the impact and lessons learned so far.

The research site and context

The International Centre for Tropical Agriculture (ICTA's) Hillside project is an action-oriented research project aimed at providing farmers, farmers' associations, nongovernmental organizations (NGOs), and policymakers with strategic information and methods for improving the management of the natural resource base in the fragile and degraded hillside environment of Central America. Research is being carried out in four watersheds: three in Honduras and one in Nicaragua. The project is funded by the Swiss Development Corporation, International Development Research Centre (IDRC), and the Inter-American Development Bank. The fieldwork in Nicaragua is being carried out by an interdisciplinary team of researchers that includes the coordinator, research associate, Jorge Alonso Beltrán,

and research assistants, Nohemi Espinoza, Dominga Tijerino, and María Eugenia Baltodano. ICTA staff based in Cali, Colombia, and Tegucigalpa, Honduras, provide additional support in such areas as geographic information systems and soils research.

In Nicaragua, the area of research is the Calico River watershed, located in the southern part of Matagalpa, about 125 km northeast of the capital, Managua (Figure 1). The Calico River is a tributary of the Great Matagalpa River, and its watershed covers an area of about 170 km². In 1997, the total population was about 23 800 people, living in 17 rural communities (about 13 000 people) and the town of San Dionisio, the municipal capital (Baltodano et al. 1997).

The climate of the watershed, which forms part of the central-hillsides range of the country, is semi-arid (800–1 600 mm annual rainfall; temperature range, 22.5° to 25.0°C). The land ranges from 350 to 1 250 m above sea level. Agricultural activities are based mainly on small-scale farmers' production systems: a combination of corn and bean crops (one cycle of corn, two cycles of beans), dual-purpose livestock (milk sold to the factory,



Figure 1. Map of Nicaragua showing general location of San Dionisio.

cheese produced for the local market), and coffee in the higher altitudes (for export). Land tenure varies; there are still a significant number of landless households, a large number of smallholders (less than 2 ha), but also a few large landowners.

The major problems people face are poverty, characterized by lack of health and education facilities and poor housing conditions; a strong dependence on corn and beans, with no, or very few, production alternatives; soil degradation; a scarcity of water; and deforestation. According to a 1996 study, 76% of the population in the San Dionisio municipality is considered poor, and the municipality is among the poorest in the country (Arcia et al. 1996). Data that we gathered in 1997 confirm that this very high percentage of people does live in poverty. Local people explain that one of the main factors contributing to these conditions is the land-tenure situation, which forces many to rent land and others to work as day labourers to earn some additional income (Baltodano et al. 1998).

The problems for people in the watershed were further aggravated by the devastating impact of hurricane Mitch at the end of October 1998. The Calico River watershed was badly hit by the hurricane, which destroyed 150 houses, secondary roads, and the bridge over the Great Matagalpa River (disconnecting the area from the south and east of the Department of Matagalpa) and damaged rural schools, health-care centres, and crops in the fields. A preliminary evaluation estimated that about 80% of the bean crops and 40% of the corn yield were lost. Coffee, sorghum, fruit, and vegetable crops were also affected. Hundreds of trees were uprooted and washed away. People from San Dionisio described the newly formed shores of the Calico River as *playa*, or beach; the force of the water had dramatically enlarged the river bed.

Problems, conflicts, and opportunities for alternative management arrangements

In September 1997, a participatory workshop on watershed management brought together a mixed group of 30 local men and women (farmers, NGO staff, and local-government officials), who identified the key problems affecting land management and the livelihoods of people in the Calico area at various levels — community, microwatershed, and watershed. These problems included land degradation leading to lower yields, deforestation causing soil erosion and loss of wildlife, water scarcity, and water pollution (Vernooy 1997). Survey data collected in 1997 as part of our watershed-wide study on poverty confirmed these findings.

At the beginning of the Hillside project, the situation in terms of organization could best be described as the uncoordinated presence and intervention of a number of NGOs — Programa Campesino a Campesino (Farmer to Farmer Program) — Unión Nacional de Agricultores y Ganaderos (national union of farmers and ranchers), Cooperative for American Relief Everywhere (CARE), PRODESSA-UCOSD, ODESAR, Indigenous Association of Matagalpa. Each of these NGOs operates in one or more of the 17 communities in the watershed, providing technical support in terms of soil conservation techniques, reforestation, diversification, postharvest treatment, credit, marketing support, and training. Several organizations sometimes independently serve the same rural households. There is also a Municipal Development Council, made up of municipal-level representatives of the ministries of health, education, water, and social action, members of the municipal council, and the coordinator of the Campesino a Campesino program. This council focuses mainly on infrastructure — the construction and repair of roads, schools,

and health-care centres. At the community level, there are several Drinking Water Committees in charge of maintaining the water system, as well as Parent Committees that oversee the programs implemented in rural kindergartens and primary schools, and a variety of active church groups that deal with health issues and cultural events. The ministries of agriculture and livestock, natural resources and the environment, and agrarian reform had virtually no presence in this organizational context.

The main problem leading to conflict in this watershed regards access to, and use of, drinking water. Tensions have arisen between the owners of land in the upper reaches of the river and downstream communities that depend on these sources for their supply of drinking water. Downstream users complain about the negligence of the landowners in terms of water-source maintenance and deforestation of the surrounding areas. They are also regularly faced with threats by the landowners to cut off the water supply. A second area of tension is between neighbouring communities where one of the communities depends on another for drinking water; an example of this type of tension is found in the communities of Susuli, which has a water source, and El Jicaró 2, which does not have its own source and depends on Susuli for water. Some farmers use river water illegally for irrigation, a practice prohibited by municipal law. Municipal authorities are powerless to stop this. Downstream users complain because water flow is reduced, limiting the amount available for domestic use and consumption.

Access to, and use of, land is another source of conflict. Uncertainty about the legality of the agrarian land-reform process and its results continues to cause trouble, especially for farmers organized in cooperatives. Several cooperatives in the watershed have received expropriation notices from former landowners who have returned to Nicaragua after the 1996 election of neoliberal President Arnoldo Alemán Lacayo.

We examined this situation in terms of opportunities for action:

- ♦ Looking at natural resource management problems at the watershed and microwatershed levels;
- ♦ Improving rural people's participation in decision-making at the municipality level;
- ♦ Stimulating coordination among NGOs, the Municipal Development Council, and ministries (to increase the impact of efforts and avoid duplication); and
- ♦ Facilitating *concertación* (cooperation, harmonization), where relevant, focusing on the resolution of conflicts over natural resources and, perhaps, the development of an integrated natural resources management plan.

In meetings and conversations with NGO staff and members of the Municipal Development Council, we learned that they were aware of the lack of coordination, the duplication of efforts by NGOs, and the existing opportunities for more concerted action, but that no one was interested in taking the initiative to do anything about the situation. However, a few months after our arrival in the area, we proposed reviving one of the ideas developed by the Campesino a Campesino program and the municipality — reforestation of a tract of the Calico River. Coordination was rapidly achieved; a project proposal and planning process were outlined, with input from most local actors; and work was spearheaded by the mayor of San Dionisio.

Activities under way in the Calico River watershed

Enhancing local organizational capacity

In terms of strengthening organizational processes in the area, the ICTA Hillside team came to an agreement with the Campesino a Campesino program in San Dionisio to form a number of Comités de Investigación Agrícola Local (CIALs, local agricultural-research committees). The idea behind these committees is to provide local communities with a way to carry out participatory research, focusing on and solving a locally felt natural resource management problem (identified through participatory problem analysis), thus enhancing local organizational capacity (Ashby et al. 1997). CIALs are also seen as key building blocks for an organizational structure at the watershed level to deal with cross-boundary natural resource management problems and opportunities.

Eight CIALs have been formed so far, and they are functioning fairly well. A considerable number of people have been involved in the various stages of the research process (represented by an *escalera*, or ladder). Experiments (identification of promising, unknown varieties of corn and beans) have been carried out, the results have been seen as successful by the CIALs and community members, and a commitment has been made to continue experimenting in 1999 on a larger scale. A number of new farmer-leaders are emerging, and CIALs have been involved in watershed-level initiatives. CIALs are linked to each other to exchange ideas and results within the watershed and with research and technology organizations, such as the Nicaraguan Institute for Agricultural Technology.

Reforestation of the watershed

The revival of a local initiative and the formation of an interinstitutional committee on reforestation of the Calico River area constitute a second activity facilitated by the ICTA team. Members for this committee were selected from the Municipal Development Council. In addition, a CIAL member and a farmer with land along the Calico River were included on the suggestion of the ICTA team. Based on a diagnostic study of the natural resources along the banks of the river, which was coordinated by ICTA, the committee prepared a project proposal. Funding for the project was obtained, and a tree nursery was established. Planting of trees along the river, with the involvement of committee members, local farmers, and students from secondary schools in San Dionisio, was completed in September 1998. This experience demonstrated to local people, community organizations, and NGOs that the focus on the watershed level was relevant to the discussion of problems and to testing potential solutions. The Municipal Development Committee in San Dionisio has indicated an interest in using the watershed approach in future activities it spearheads.

Funds for local management

A third initiative concerned the establishment of a small-grants fund for small natural resource management projects in the rural communities, to be managed by an association of rural community organizations representing a variety of interests or user groups, with the support of one ICTA team member (who would serve simply as an adviser, without a formal function). As one of its first tasks, this Association of Community Organizations will support local-level group or community initiatives to improve water, soil, and tree

management. The association is also expected to create the environment for a more demand-driven process of technology development and development assistance as well as for building managerial capacity. During the first half of 1998, the association, with the support of the ICTA team and through a participatory planning process, defined its goals, objectives, activities, rules, and regulations. Its members have also expressed interest in establishing chapters at the community level.

One of the participants in the Association of Community Organizations is the Association of Drinking Water Committees, which is an umbrella organization for the local *Comités de Agua Potable* (CAPs, drinking water committees) that exist in most of the 17 communities. With support from the *Campesino a Campesino* program, the municipality, and the government department dealing with drinking water, the CAPs are responsible for the repair and maintenance of the local drinking water system. They collect small user fees for this service. The organizations that support the CAPs all agree that strengthening the committees would help solve some of the current conflicts about access to, and use of, drinking water and prevent future conflicts.

Participatory research and environmental analysis

During 1998, the Hillside project carried out a series of participatory microwatershed analyses, involving small groups of local key informants in each of the 15 microwatersheds (farmers, local *tecnicos* [technicians], *promotores* [promoters], and assistant mayors). Factors being examined include land use (agroecological zones), the state of forests, water resources, crops, wildlife, domesticated animals, pastures, and local soil indicators. In addition, participants are identifying the limitations, as well as opportunities, for agricultural production and natural resource management in the area (Espinoza and Vernooy 1998). Based on their findings, a set of natural resource indicators has been developed for monitoring and comparisons between diverse microwatersheds.

The aim is to present the results of these analyses to key local decision-makers, such as the Mayor of San Dionisio, state agencies, and NGOs operating in the watershed, as well as to the recently created Association of Community Organizations, which we consider will be a key stakeholder. The results will allow decision-makers to identify priority zones for action where natural resources are already in bad shape or are at high risk or, alternatively, offer opportunities for alternatives. The analyses will also be helpful as a pre-Mitch overview of the state of the natural resource base and will allow for comparison with the post-Mitch situation.

To get a better idea of the extent of destruction and damage caused by the hurricane, the Association of Community Organizations, with funding from IDRC, will coordinate a study to evaluate the impact of hurricane Mitch on the natural resource base across the watershed. The study aims to provide detailed data as input for the development of a broad reconstruction and rehabilitation program, in collaboration with local NGOs, the municipalities, and government ministries at the regional and national levels.

Establishing a planning process

Building on the microwatershed analyses and considering the new, posthurricane situation, the Hillside team aims to facilitate a multistakeholder, participatory planning process to look at organizational or institutional aspects, decentralization, and policy-making at the watershed level, within the context of reconstruction, rehabilitation, and disaster

prevention and mitigation. The intent is to examine the organizational activities and structures that currently exist (community, NGO, and government based), where they operate, and what they do. The next step will be to determine how these processes and structures can be organized at the watershed level to facilitate more participatory, effective, and efficient natural resource planning and management, to rebuild what was lost as a result of hurricane Mitch, and renew agricultural production. Although it is still too early to measure the impact of these new forms of experimenting, planning, and organizing, so far people have accepted the ideas with enthusiasm and invested considerable effort. The participatory research process is providing local people with the opportunity to analyze and reflect on their own situation and to discover gaps and linkages among various levels of local ecology and socioeconomic organizations in the watershed. New paths are being explored for dealing with issues affecting people's livelihoods, and a collective sense of the social structure of the watershed is emerging.

Lessons learned

Action research in the Calico River watershed in Matagalpa, Nicaragua, points to lessons regarding effective methods and organizational principles.

Methods

Watershed resources are needed by a variety of direct and indirect users with different and sometimes opposing or conflicting interests. This is especially the case in agroecologically diverse hillside environments such as the Calico watershed. Identification of these stakeholders is therefore critical to organizing for sustainable management at the watershed level. Because the stakes can change over time, a continuous analysis of the configuration of stakeholders and interests is also needed (Ravnborg and Ashby 1996).

An interdisciplinary perspective is also critical. Soils and microwatershed analyses important to management decisions need to be placed in the context of user groups, multiple interests, and other socioeconomic features. Interdisciplinarity also increases the understanding of the interconnectedness of various levels of analysis, from the plot, farm, and community to the microwatershed and the watershed. A combination of "diagnostic" research (for example, dividing the watershed into agroecological zones, identification of critical areas for intervention) and participatory action research (for example, the CIALs, the formation of multistakeholder committees, the formation of associations of local groups, the development of indicators to be used by local people, the participatory evaluation study of the impact of the hurricane) helps to provide multidisciplinary information on the state of the resource base at various levels. It also enhances the involvement of the users of the resources in problem and opportunity analysis and facilitates the rapid transition from research to action. Farmer-experimenters, local leaders, and extension workers have an important role to play, together with the technical people and researchers from NGOs and government ministries.

Local-level monitoring of resource use is required to ensure compliance and regulation. In order to achieve better resource management practices through cooperative action, rules, and sanctions, it is important that local people and those cooperating with them have a good understanding of ecological processes, such as soil dynamics, nutrient flows, and water cycles. Resource assessment and resource-use monitoring are, therefore,

key activities in any effort to improve management practices and regulatory arrangements. Monitoring will help to raise awareness among local decision-makers about the interdependence of resources and, if carried out collectively, can easily impart skills and credibility and create a sense of ownership and confidence.

There is a need to develop methodological tools that local people can use to analyze the local situation; discuss constraints, problems, and opportunities; take action; and monitor results. The microwatershed seems to be a useful level for intervention and action to develop and test these types of tools.

Organization

The nature and scale of watersheds require some form of collective action for their sustainable management (Malanson 1993). Thus, strengthening and involving local organizations is needed to change the ways they interact with each other and with broader society (Campbell 1994; Anderson White and Ford Runge 1995). The goal is greater and more equitable control over resources, amplifying the range of options of less privileged people (women, ethnic minorities, the landless), enhancing their involvement in policy-making at the regional or national level (providing space for more people to make their voices heard), and improving the quality of their involvement. The strengthening or establishment of interest groups, however, is not an easy process. Collective action does not emerge automatically, even when, from the outsider's point of view, potential gains seem obvious (Cernea 1989). Building trust is key, but this takes time. Recognizing the strengths and weaknesses (comparative advantages) of different players is also a key principle — it helps to build the required trust.

Our experience suggests that to get things going it is useful to deal with different organizational levels simultaneously in an iterative process that seeks to identify interdependencies between the community, microwatershed, and watershed levels. This should build on existing initiatives, such as the projects carried out by NGOs (for example, CARE and the Campesino a Campesino program in San Dionisio) and local community organizations (the CAPs). Organizing should focus on defining rules and norms for equitable resource use. This will require informed communities (user groups, stakeholders) with the capacity to engage in dialogue and undertake particular tasks. This, in turn, requires an appropriate level of community or grass-roots organization, based on managerial capacity (Bromley and Cernea 1989) and leadership at the local level, involving both formal and informal rural organizations (see, for example, Claridge and O'Callaghan 1997) .

The CIALs and the Association of Community Organizations have also proven to be good starting points. They provide a means for local people to organize around a specific issue (for example, challenges of natural resource management and agriculture) and solve locally felt problems. There is a need for more support for these kinds of local initiatives and to involve these local forms of organization in municipal and watershed affairs, such as land-use planning, reforestation, water distribution, and conflict management.

The experience of the project suggests that it is useful to start by planning activities to bring people together to learn by doing (presenting ideas, working together, collectively planning, participatory monitoring) (Uphoff 1992). This creates a forum for discussion of problems and solutions and allows people to assume responsibility for new initiatives, such as the reforestation project. There is room for more and more meaningful interaction between community groups, NGOs, the Municipal Development Committee, government

ministries, ICTA, and other organizations in Matagalpa. However, the starting point is the strengthening of local groups and the building of bridges among them.

The integration and coordination of planning efforts, from the farm to the micro-watershed and watershed levels, is also critical to developing more sustainable management practices. This requires bringing together the direct users of the resources who are living or working in the watershed. However, outside or external users of the resources may also have interests different from those of the people living in the area. Steps are needed to involve them in planning efforts as well and bridge the gaps or negotiate internal versus external interests in the watershed.

Horizontal and vertical links among stakeholders can be strengthened by addressing key institutional and organizational gaps. In Calico, this involves creating and linking horizontally local groups of farmer-experimenter (the CIALs) and facilitating, through ICTA, vertical links with the national research and technology-transfer centres. ICTA has also facilitated, through workshops and meetings, horizontal links between organizations operating at the community level and between these organizations and NGOs, ministries, and the municipality. Creating these links helps local actors identify sources of technical assistance and exert pressure on governments for the services they deserve. It also helps to integrate governments into the local planning process and influence broader policy agendas.

The experience of the Hillside project suggests that researchers should operate as facilitators for local analysis and action, building bridges between local knowledge, initiatives, and forms of organization, on the one hand, and external sources of information and resources, on the other. Local people are interested in new knowledge, but they frequently lack the channels to access it. This new role for researchers requires the art of skilful listening, asking the right questions, fostering group synergy, and assisting in problem diagnosis and mission definition.

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