

Chapter 6: Innovations in Participatory Watershed Resource Management to Conserve Tropical Biodiversity

Dennis P. Garrity
Victor B. Amoroso
Samuel Koffa
Delia Catacutan

Introduction

Two decades ago it was commonly thought that protecting the environment in the tropics would entail a significant drag on economic development in developing countries. But in recent years the global consensus has shifted toward the view that environmental conservation is not in conflict with development, but rather is a crucial element of sustainable development. The conservation of biodiversity has now become a widely shared goal among nations, leading to the implementation of many projects to attempt to save natural areas from degradation or destruction (Keating 1993).

The classical method of preserving a natural area has always been to declare it off-limits and enforce exclusion. Boundaries are set and guards patrol. This often results in conflict and hostility between the enforcement agency and the local communities. Enforcement seldom worked because population pressure on the land was too great, or the costs of enforcement were too high. The modern approach of integrating conservation and development suggests that enforcement ought to be linked with some form of compensation to the communities that are directly affected by the presence of the natural area. This would enable them to recover some benefits from foregoing their use of the protected area (Wells and Brandon 1992). Conservation would only be assured if the management of protected areas is reconciled with the social and economic needs of local people. During the past decade there has been a rapid expansion in participatory watershed resource management projects and integrated conservation-development projects (ICDPs). However, the participatory mode is novel

and complex, and the implementers of such projects have little theory or experience to draw upon (Rhoades 1998).

In the Philippines, the passage of the National Integrated Protected Areas System (NIPAS) Act in 1992 was heralded as one of the most progressive attempts in the tropics to embody into law scientifically-advanced principles of establishing protected areas. But implementation has presented complex challenges. The Philippines' biodiversity heritage is globally valued because of the very high species endemism. The country's species inventory includes about 13,000 species of vascular plants (8,500 species of flowering plants, 3,800 trees), which is about 10% of the world total; 556 birds (6% of the world total), and 210 mammals (4% of the world total). However, 60% of the endemic Philippine flora are already extinct, and a great many other species are endangered. Despite a logging ban in virgin forests, and the presence of 64 national parks and 19 wildlife sanctuaries, the on-the-ground protection for these areas is nominal at best. The NIPAS Act aimed to remedy past deficiencies by focusing on scientific development of resource management plans for 100 priority sites, and mobilizing action at the local level to implement them. Resource profiles and resource management plans are to be developed for each protected area. The first stage is focused at 10 sites distributed across the country: The Mt. Kitanglad Range Nature Park in Bukidnon is one of the 10.

The Sustainable Agriculture and Natural Resource Management (SANREM) Program is a global research effort that aims to develop a new paradigm for research on sustainable agriculture and natural resources management (Hargrove *et al.* 1999). It is a paradigm that includes people, communities, and local government bodies as reviewers, partners, and implementers of research. It is a paradigm that takes the whole landscape and lifescape of a watershed as the basis for formulating and resolving major management issues. The approach seems well suited to tackling some key methodological issues in protecting the natural habitats of unique tropical biodiversity that are encountering human pressure.

One of the three global sites where SANREM has been working is the Manupali watershed on the southern border of the Mt. Kitanglad Range Nature Park in Central Mindanao, Philippines.

The Biodiversity Consortium at the Philippine site was a component of SANREM during its first phase (1993-98). It was composed of collaborating organizations including a university (Central Mindanao University), NGOs (including the Network for Environmental Concerns and Green Mindanao), and government agencies (including the Department of Environment and Natural Resources). The consortium was lead by the International Centre for Research in Agroforestry (ICRAF). Its objective

was to conduct research to develop tools and approaches to improve biodiversity conservation with the active involvement of the communities that live near the Mt. Kitanglad Range Nature Park. This paper reviews that experience. The following section discusses the global setting of Integrated Conservation Development Projects (ICDP) , highlights some of the key lessons learned so far, and proposes a theoretical framework. The subsequent sections review the SANREM experience in developing methods for achieving conservation with development in the Manupali watershed. The conclusion summarizes the progress observed and remaining limitations. It discusses future directions for integrated conservation-development in this location, and more.

The Global Experience

The SANREM Biodiversity Consortium began its work by drawing on the lessons learned from the global experience with ICDPs, particularly from the comprehensive review by Wells and Brandon (1992). That review examined the experiences of 23 ICDPs from around the world. All of the projects were attempts to reconcile the management of protected areas with the social and economic needs of local people. Some of the key lessons that emerged from these experiences are summarized in the succeeding paragraphs.

Cooperation and support of local people is the key. It has been frequently observed that communities near protected areas bear substantial costs in foregone use or extraction from the protected area, yet gain little in return. Local residents are usually poor and remote to normal government services. They perceive that the protected area restricts their ability to earn a living. They often see encroachment as a means to rectify this. International recognition of these realities gradually intensified through the Man and Biosphere Program of UNESCO in the 1970s, the World Conservation Strategy (1980), the World Commission on Environment and Development (1987), and was vigorously affirmed by the Rio Conference on Environment and Development in 1992. It is no longer considered politically feasible or ethically justifiable to exclude the poor from reserves without providing them alternative means of livelihood.

There must be explicit linkages between project components. Practitioners of ICDPs often assume that people made better off by a development project will refrain from illegal exploitation of a reserve

area, even if no enforcement is practiced. But there is no evidence to support this (Brandon and Wells, 1992; Kramer *et al.* 1997). An integrated approach with balanced attention to both enforcement and development is necessary. However, there are few examples so far of effective linkages between enforcement and compensation. This omission is seen as a serious weakness in most projects. In order to achieve the goals of protecting biological diversity and helping to improve the welfare of the people living near the protected area, it is necessary to pay very explicit attention to how the rural development activities directly support the objective of protection.

This linkage is often missing or obscure because, at project initiation there is a clear imperative to build trust and confidence between the implementation staff and the local people. Sometimes this must be done in light of an environment of significant prior mistrust. In such situations, there are obvious advantages in implementing confidence-building activities in which the village community senses a clear positive gain. Negotiated linkages with park protection regulations are deferred until later. In other projects it appears that the institutions involved (being oriented toward development) are uncomfortable with, or unaware of, how to link enforcement with development. This process involves negotiation, and some form of agreement between outside institutions and local institutions about rights and responsibilities. This issue of linkages in the circumstances of Kitanglad poses a major challenge.

Another difficulty is that some types of development initiatives can themselves increase the pressure on the reserve, rather than decrease it. Construction of a road, or growth in agricultural productivity, may have this outcome under some circumstances. Introduction of technologies that raise agricultural productivity will elevate land values, and may make it more attractive to encroach on to reserve land. Implementation of such 'double-edged' changes must be assessed carefully, and must be linked with clear and effective enforcement mechanisms. The lesson is that the development orientation of the ICDP approach does not mean that direct enforcement is no longer needed. Rather, it justifies making traditional enforcement mechanisms more effective. Enforcement from within the community may take a number of avenues. Our initial concept was that conservation agreements on a village-by-village basis appeared most likely to succeed. This was later supplemented by a much more comprehensive framework involving the natural resource management at the municipal, natural park, and ancestral domain levels.

Alternatives in promoting local development. Compensation to communities may take many forms. The ICDPs that were reviewed by

Wells and Brandon employed a diverse range of such mechanisms including agroforestry practices, crop intensification and irrigation, conservation farming practices, community forestry and others. Most projects attempted to encourage improved natural resource management practices in the areas outside the reserve. The objectives were to increase people's incomes, and to intensify their production systems away from the more extensive systems currently practiced. Agroforestry alternatives were emphasized in many projects. There is growing interest in the development of more intensive land-use systems on the margins of protected forests and the identification of policy and technology directions to underpin these efforts.

Migration and off-farm employment. In addition to boundary enforcement mechanisms through local participation, and technical innovations to increase land-use intensity, there are two other important factors impinging upon protection of natural biodiversity areas. These are: controlling in-migration and off-farm employment influences. If in-migration is occurring, the accelerated population pressure will destabilize the balance between intensification and enforcement. Migration must be controlled in the communities on the boundary. In some areas this has been successfully achieved in mature communities through local land tenure systems (see Cairns (1994), for an example in Minangkabau communities on the boundary of the Kerinci-Seblat National Park in Sumatra, Indonesia). But in most pioneer communities, local control of migration is problematic. Conditions in the wider economy play a major role in affecting migration. Off-farm employment for residents living in the buffer zone may be increased or decreased. The park protection problem may thus be seen as a function of four factors:

$$\text{Protection (P)} = f(\text{E, I, M, OFE})$$

where E is boundary enforcement, I is intensity of land use, M is migration, and OFE is off-farm employment. ICDP or watershed management programs must consider the implications of all of these factors and their interactions.

Integrating Conservation and Development in the Manupali Watershed

Biodiversity Value

The Manupali Watershed in Bukidnon, Philippines, is a microcosm of farm families and communities whose diverse vocations exert pressures on both the natural and managed ecosystems, particularly on the remaining protected forest of the Mt. Kitanglad Range Nature Park. The Park is acknowledged as one of the most important biodiversity reserves in the Philippines. It supports the richest known vertebrate fauna (mammals and birds) in the country (Amoroso *et al.* 1996; Heaney, 1992, 1993). It is the habitat of many endangered, endemic, rare and economically important species of animals and plants. Heaney (1992) found 13 of the 14 species of birds endemic to Mindanao, including the critically endangered Philippine Eagle (*Pithecophaga jefferyi*). One genus of mammal is endemic to the Park alone, the poorly known *Alionycteris paucedentata*.

The Park is a relatively small ecosystem of approximately 50,000 ha, but is also of exceptionally high conservation value in terms of high endemism of the vascular flora (Amoroso *et al.* 1996; Pipoly and Masdulid, 1995). This includes the endangered rootless vascular plant (*Tmesipteris lanceolata* Dang.) (Amoroso *et al.* 1996). The Park has been found to have the highest tree density ever reported in a tropical forest (Pipoly and Masdulid 1995). This combination of a small, manageable size, and a rich, singular biodiversity, conforms to the type of protected ecosystem that Sayer (1995) proposes ought to receive the most determined attention in tropical biodiversity protection. Amoroso (1997) has, however, noted the alarming rate of habitat destruction due to human activities including illegal cutting of trees, over-harvesting of minor products, shifting cultivation, and conversion of forest lands to agricultural production.

The Watershed

The present landscape of the upper reaches of the Manupali watershed consists of essentially three belts of land:

- 1) *The national park*, consisting mostly of pristine forested land existing at high altitudes (>1200 masl) with few current household land claims and National Park status,
- 2) A zone of land surrounding the Park that is managed by the Department of Environment and Natural Resources (DENR) as

production forest: *this is the external buffer zone* of the Park. This is land on the fringe of the forest and has now been mainly converted to agricultural fields interspersed with *imperata*-dominated grassland. Encroachment here has been partly sanctioned through the expectation of social forestry stewardship contracts, with eviction no longer a tenable management option, and

- 3) *Privately-owned agricultural land* that is further downslope from the public DENR lands. These landholdings comprise a mosaic of agroforest, crop, and fallowed fields, with remnant forest existing in the steep ravines which border the streams that drain the national Park.

The Farm Communities

The Participatory Learning/Lifescape Appraisal (PLLA), and our research during the initial years (1993-96), documented the land use practices in the forest margins of Mt. Kitanglad Range Nature Park, and the high rate of slash-and-burn farming in the remaining forest (COPARD 1996; Banaynal 1996). This work highlighted the urgent need to develop an integrated sustainable buffer zone management program. It is commonly assumed that the interests of local communities living in the environs of protected ecosystems are diametrically opposed to those of outside stakeholders concerned with global biodiversity (Wells and Brandon 1992). Our research, however, provided evidence that this is an overly pessimistic assumption, at least in the context of Manupali (Cairns 1996). There is, in fact, significant self-perception among communities on the boundary of Mt. Kitanglad Range Nature Park that the protection of the natural biodiversity is in their own self-interest, particularly among the *Talaandig* indigenous people, who regard the public lands as their ancestral domain. These values are articulated by local people as protection of the hydrological resources of the upper watershed for their water supplies, and of the spiritual and cultural values of the forest, among others. The current failure to protect these resources appears to be due in large part to the lack of institutional mechanisms that provide a framework for management of these systems. Such mechanisms must explicitly include local interests, and address practical local needs for alternative livelihood directions. Lack of secure land tenure by the households residing in the buffer zone outside the park boundaries is a critical limitation to generating among them a perceived stake in park protection.

The Project Framework

The project goal was to elucidate a more fundamental understanding of the people-ecosystem interactions that would lead directly toward development of practicable natural resource management plans and processes. The research aimed to develop the necessary elements of a workable *social contract* between buffer zone communities and the non-local stakeholders at the national and international levels concerned with resource protection. We asked: “What is a practicable social contract? And, what are the processes leading to its successful implementation?” We sought a model of buffer zone management that works, and that could be extrapolated to other protected forest situations.

We hypothesized that there are two essential conditions for sustainable buffer zone management and biodiversity conservation in the Mt. Kitanglad Range Nature Park, and other protected areas in the tropics:

- 1) Agricultural/agroforestry intensification in the buffer zone that enhances income growth on static land resources, complemented by other forms of off-farm employment generation in the local and national economy, and
- 2) Community-supported enforcement of the boundaries of the natural forest ecosystem.

Our work focused on both aspects. The first investigated appropriate technical innovations suited to the biophysical and socio-economic conditions of the buffer zone. The second studied how to induce institutional development based on local and national realities. The social contract underlying the model links the provision of assistance in intensifying agriculture to local responsibility for park boundary protection. The following section reviews some key aspects of the characterization of the watershed, after which we review the work on technical innovations. Subsequently, we examine the institutional innovations for participatory resource management.

Enhancing Agrodiversity

Agriculture is the dominant livelihood of people living in the villages near the park, as is the case with most other protected areas in the tropics. Intensification of the agricultural systems in the vicinity of the park is crucial to providing alternative livelihood means to alleviate encroach-

ment pressure. There is growing interest in the development of more intensive land use systems for forest margins all over the world. ICRAF is coordinating a global research program on Alternatives to Slash and Burn that seeks to identify policy and technology directions to guide national efforts (van Noordwijk *et al.* 1995).

Agroforestry systems have frequently been cited as a path toward appropriate intensification in the buffer zones of protected areas (Wells and Brandon 1992; Garrity 1995). The planting of useful tree species is often a highly desired intervention by recipient communities near protected areas. Provision of tree germplasm through nursery programs has therefore been one of the most popular ICDP development interventions. Farm families can increase their nutrition and economic welfare through a greater quantity and diversity of fruit and timber trees on their farms (Garrity and Mercado 1994).

Where there has been a history of tree crop cultivation in the vicinity of a protected area, the environment of the farming zone outside the boundary develops ecologically favorable characteristics for protection, and even extension, of the biological diversity of the park itself. The *damar* agroforest systems on the boundaries of the Barisan National Park in Lampung, Indonesia, harbor a major proportion of the natural rainforest flora and fauna species (Michon *et al.* 1995) and effectively act as a continuation of the biodiversity of the park into the agricultural landscape. Rubber agroforests on the boundary of Kerinci-Seblat National Park in Jambi Province of Sumatra play a similar role (van Noordwijk *et al.* 1995). Even in areas where smallholder agroforestry systems do not yield such striking levels of protection or extension for natural biodiversity, the benefits of increased tree cover on the watershed functions of the landscape may be important.

The boundary area of Mt. Kitanglad Range Nature Park is located at an elevation (600-1700 m), where temperate vegetable crops (including potatoes, cabbages, and tomatoes) are quite productive. Vegetable production is expected to further expand dramatically in the future. Our analysis indicated that the most likely future trajectory for farming systems in the buffer zone is toward continuous vegetable production on a portion of the farm (0.1-1.0 ha), with perennials (timber or fruit trees) grown on the remaining farm area, particularly on the steeper parts. A farm planning exercise with 67 families in three buffer zone villages (COPARD 1996) found that their greatest interest was in establishing contour hedgerows on the annual crop areas of the farm, and increasing the area of fruit and timber tree crops on the

remainder. The farmer-participatory research effort backstopped this self-perceived vision. The consortium focused on three technology-related initiatives:

- the enabling environment for smallholder tree production;
- participatory contour hedgerows initiative; and
- intensifying indigenous fallow management.

These research activities were implemented to develop sustainable agricultural systems in the upper watershed. They were seen as key components of the evolving social contract. The following sections briefly review the progress in these initiatives.

Enhancing Smallholder Tree Production Systems

Prior attempts to reforest the buffer zones of protected forests in the Philippines tended to focus on the public sector (DENR) and the planting of large blocks of trees with local wage labor. These tree plantations were then guarded against fire and encroachment. Such a project was implemented in the Manupali watershed during the late 1980s before SANREM began. Like many other such top-down attempts, it was a failure. The plantations were burned out, often by local smallholders, across whose land the trees were planted. Only a few small remnant stands now remain in the 'reforested' area. Meanwhile, there is overwhelming evidence that smallholders will enthusiastically plant trees on their own farms if they have some semblance of tenurial security. There is increasing acceptance of the idea that smallholders are the key to future reforestation efforts in the tropics (Pasicolan 1996; Garrity 1994). Research in Northern Mindanao (including Lantapan) has documented a major transformation toward smallholder timber tree production in this region in response to market development (Garrity and Mercado 1994).

The approach we are testing is to ensure that the demand for trees and tree products is strong, that market infrastructure is adequate to keep marketing costs low, that price information is widely available, that improved germplasm is available of a variety of species to enhance yield and reduce risk, and that best management practices suited to local farm circumstances are in place. Our initial work focused on determining an appropriate mix of species of interest to farmers, and testing diffusion strategies to incorporate them into farming systems rapidly and cost-effectively. A farming systems survey (COPARD 1996) and our previous training exercises (Koffa and Garrity 1996) indicated that farmers in the buffer zone and on private lands were very interested to expand the area

of timber trees on their farms. The constraints to accelerating the process were the lack of low cost and convenient seedling supply, knowledge of which species were most profitable, appropriate tree management, and availability of a wider range of tree germplasm to diversify risk.

Farmers currently have a very limited repertoire of potential timber species. We conducted a farm survey that resulted in a comprehensive database on multipurpose tree species performance by elevational belt in the upper watershed, based on participatory rural appraisal methods (Glynn 1996). The most common timber species planted in the upper watershed were *Pereserianthes falcateria*, *Gmelina arborea*, and *Eucalyptus camaldensis*. Farmers observed that *Eucalyptus* species performed particularly well at the buffer zone elevation levels (Glynn 1996). We introduced germplasm of a range of other fast-growing timber species, with emphasis on new accessions of *Eucalyptus deglupta* and others. This was followed by the development of a series of trials to evaluate available commercial species for performance by elevation. This work is being complemented by investigations to domesticate a number of local species identified and used by farmers for timber (Palis 1997).

What is the best approach to getting tree seedlings to farmers? We are experimenting with three types of smallholder nursery systems and how they may be mutually reinforcing: private small-scale nurseries, neighborhood or *hugpong* nurseries, and village-level nurseries. By implementing nurseries with enthusiastic partners at all three scales we are developing case study experience and general guidelines to inform the private and public sector about more effective nursery development (Koffa and Garrity Chapter 10, this volume).

Indigenous Strategies to Intensify Shifting Cultivation

Since the end of World War II, high birth rates and heavy in-migration have dramatically increased land use pressures in the Lantapan watershed. In response, both *Talaandig* and migrant farmers have been forced to modify traditional swidden practices into more exploitative versions. As fallows have shortened and cropping periods expanded, the ecological balance underpinning the sustainability of these systems has been lost, pushing them into a downward spiral of dwindling crop yields and degradation of the biotic resource base. During this intensification process, fallow successions have gradually evolved from secondary forest, to bush, and eventually to more pernicious floristic communities dominated by *Imperata cylindrica* and ferns. A wide band of this fire climax vegetation cuts across the mid-slopes of Lantapan's toposequence and is regarded as marginal for agricultural purposes. With decreasing

returns to labor, farmers often abandon this degraded land and clear more forests further upslope with more fertile soils. It is this expansion of degraded land, and its subsequent abandonment, that has fueled much of the encroachment pressure on the forest margins of the Mt. Kitanglad Range Nature Park. Urgent solutions are needed to rehabilitate degraded lands on the park periphery and bring them back into productive cultivation.

Recently, scientists have begun to focus on the soil-enhancing properties of *Compositae* species and their potential application to intervene in declining swidden systems and intensify farming towards permanent cultivation. When introduced by seed or stem cuttings into recently abandoned dryland or burned *Imperata*/fern areas, these *Compositae* species formed dense thickets within one year. They are aggressive, pioneer colonizers that will dominate fallowed fields with minimal farmer intervention if conditions are favorable for their growth. Farmer management of wild sunflower, *Tithonia diversifolia*, as a green manure crop was widespread among the Igorots in Northern Luzon (Maslan 1989; Bawang 1995; Ferrer 1996). Igorot migrants brought this technology with them to Lantapan. Awareness of its agronomic potential has helped gradually spread information among the wider area of the farming community. Farmers are manipulating wild sunflower as a biological tool to eradicate *Imperata* and rehabilitate degraded grasslands. They claim that at the end of the first year, the *Imperata* was almost completely controlled and displaced by sunflower; by year two, the sunflower fallow could already be re-opened and grown without fertilizer inputs. We are validating this practice as a prelude to dissemination of this practice in the watershed and elsewhere (Cairns and Garrity 1999).

Getting Conservation Farming on the Land

Continuous crop production on steep slopes in Mindanao induces annual rates of soil loss often exceeding 100-200 t/ha (Garrity *et al.* 1993). The installation of contour buff strips reduces these losses by 50-99% and creates natural terraces that stabilize the landscape and facilitate further management intensification. These advantages have led to wide promotion of contour hedgerow systems by the DENR and the Department of Agriculture (DA). But adoption has been poor, and installed hedgerows are usually abandoned. This is because the increased labor demands in managing tree hedgerows were not sufficiently compensated by the yield increases observed (ICRAF 1997). An adoptable technology must have minimal cost to the farmer as well as to the public agencies supporting the program.

We have been working with an indigenous practice: natural vegetative strips (NVS). These very simplified 'hedgerows' are made by laying out the contours and allowing natural revegetation of the site (Garrity *et al.* 1993). We found that NVS were exceptionally effective in soil conservation. They required minimal maintenance and required no outside source of planting materials. The NVS concept was included in our farmer-to-farmer training program conducted in collaboration with the DA. We have observed that almost 300 farmers have adopted the technique in the upper watershed. NVS technology seems particularly well-suited to vegetable farming systems because there is a little possibility of competition between the NVS and the crops.

In summary, we observed that there have been advances in all three technical areas we've been investigating (tree farming, improved fallows, and contour buffer strips). They have immediate potential to help farmers in the buffer zone intensify land use and increase profitability, while reducing resource degradation. These practices are now backstopping the institutional innovations by providing pragmatic alternatives to encroachment in the national park. We now turn to the process of evolving participatory institutional innovations.

Assembling the Elements of a Social Contract

The foremost policy issue impinging on local natural resource management systems in the area is the reality of overlapping land rights and management priorities. There are three sets of overlapping management claims and systems in the case of the Kitanglad Range Natural Park. These are the jurisdictions of the six municipalities that surround the Park, the Park and production forest land administration of the state (DENR), and the ancestral domain claim of the *Talaandig* people (see Fig. 6.1.) The conflicting claims must be reconciled, and effective management plans developed and implemented by each of the three types of entities.

Each municipality surrounding the Park includes a portion of the Park area, and a portion of the buffer zone, that is legally a part of its land area. As the seat of local government, the municipalities play very important roles in influencing the ultimate fate of land use within their borders. The Park itself was gazetted only a few years ago (1996), and a Protected Area Management Board (PAMB) was instituted to guide its administration. The PAMB is composed of the Park administrators from the DENR, the mayors of the six municipalities, and representatives from a range of other agencies and stakeholder interests, including an NGO

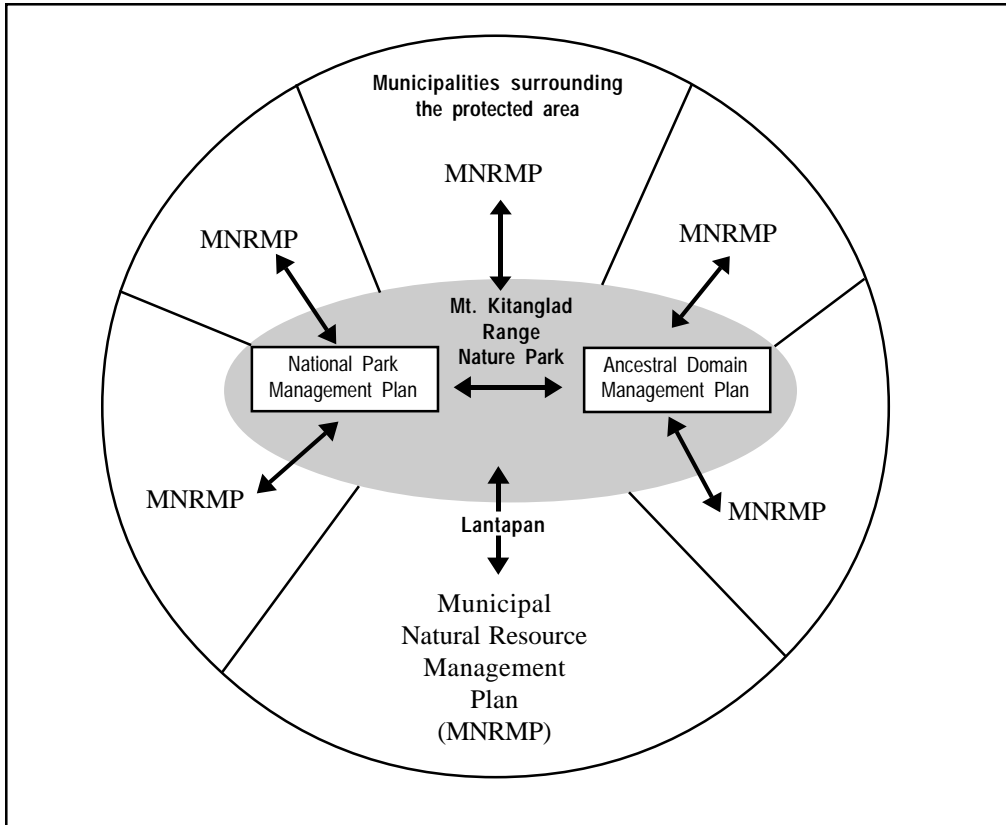


Fig. 6.1. Diagrammatic representation of the linkages between three types of natural resources management plans.

specially created to facilitate park management, the Kitanglad Integrated NGO (KIN). Much of the area of the Park and buffer zone also falls within the constitutionally protected indigenous rights of *Talaandig* communities. Tension between *Talaandig* control over the management of ancestral areas, and the conservation priorities expressed by local government and park management, is a critical consideration to promote sustainable resource management.

SANREM research has focused on understanding ways in which the three overlapping jurisdictions can be reconciled, and in developing a scientific basis for management plans by the three sets of entities. The first five-year phase of work concentrated on two components. The first focused on assembling the information needed to guide the development and implementation of a natural resource management plan for the Municipality of Lantapan. The second aimed to analyze the ancestral domain claim of the *Talaandig* people in relation to the natural resource

management issues of the natural park and the surrounding municipalities. It became clear that the interactions between the three domains (the Park, the ancestral domain claim, and the municipalities) must be resolved. The work aimed to provide options leading to a consensus that would meet the various stakeholders' concerns.

We envision the development of a natural resource management system for the buffer zone of KNP that is based on a holistic park management plan. It will be coordinated with an ancestral domain management plan, that in turn is consistent with individual municipal-level conservation plans. This will be backed up by conservation plans developed at the village level. The following sections review the current status of that work.

The Ancestral Domain Claim

The Philippine community forestry program is designed to address the needs of the nation as a whole as well as those of local communities that depend upon and have clear rights to forest resources. Central to this approach is the development of a package of options government now offers local communities, a package that in many ways is not unlike what is offered forest industry. Foremost is the right to exploit forest resources in selected secondary forests. But unlike the forest industry, many local communities have long-term traditional rights over their land classified by the state as forest — rights that must be considered during the development of tenurial instruments for local people.

Villagers, universities and NGOs in Indonesia and the Philippines have developed a two-stage approach to promoting secure tenure for communities that hold ancestral rights. The first entails work within the state regulatory framework and promotes the granting of limited use and management rights to local individuals or communities. This responds to the immediate need for halting the conversion of ancestral lands to large-scale forest concessions while at the same time supports sound management of these areas. The second stage is a long-term legal and political struggle by local people to gain legal recognition that their lands have been misclassified as state forest zone and that in fact private rights are attached to these areas.

The community forestry program also includes opportunities for local people to be central players in the management of protected areas, particularly national parks. The National Integrated Protected Areas System (NIPAS) enabling legislation explicitly supports the rights of Indigenous Cultural Communities (ICCs) who are living within NIPAS

sites. While this law has opened the door for ICCs to participate in the development and implementation of conservation areas within their ancestral areas, many questions, such as the processes that will lead to complementary management approaches remain unanswered (Dagondon *et al.* 1997).

In 1994, a group of *Talaandig Datus* (community leaders) prepared and submitted a *Talaandig* ancestral domain claim covering more than 40,000 ha. The claim includes the entire Kitanglad Park and surrounding buffer zone. In May of 1996, the Provincial Special Task Force on Ancestral Domain, chaired by the DENR and responsible for the recognition of ancestral domain claims and the awarding of Certificates of Ancestral Domain Claims (CADC), delayed action on the *Talaandig* claim. It requested an endorsement of the claim by the Kitanglad Park Area Management Board (PAMB), a group made up of local government officials, community leaders, government line agencies, and non-governmental organizations. After considerable deliberation, the PAMB opted not to take action, sending the claim back to the PSTFAD without an endorsement. As this process unfolded, several mayors of municipalities bordering the Park began to promote a process that would lead to ancestral domain claims that are based upon municipal boundaries, as opposed to the one unified claim. The PAMB, organized a consultative process aimed at determining the best way for the *Talaandig* to proceed with their ancestral claim. Some *Talaandig* leaders assert that PAMB and local DENR used consultation formats that have favored efforts to promote municipal-based claims. As organizing on both sides of this issue continues, no aspect of SANREM community-based research and the IPAS community organizing work is unaffected. There is a need for clear guidelines for how consultations with local communities are conducted. It is possible that such guidelines could draw from similar work that is being done on how best to determine when “informed consent” of local communities has been genuinely gained.

Native belief that nature is controlled by a hierarchy of spirits whose wrath must be avoided, guides the tribes in a respectful attitude to the environment (Cairns 1996). Indigenous practices such as safe havens for wildlife, preservation of keystone tree species, and restricting swidden size indicate a conservation approach to resource management. The tribes reacted to the degradation of their ancestral lands in 1993 by organizing and creating a network of ‘tribal guardians’ to maintain vigilance on the forest margins. Some seizures of poached lumber have been made and the initiative appears to be gaining momentum. The community-based park protection (CBPP) that is evolving spontaneously in these forest margin villages is internally-driven and has been enabled by reviving and

strengthening existing tribal institutions. This determined and highly organized surveillance of the forest warrants recognition by DENR, and argues for further empowerment of these communities by formally decentralizing forest protection to their control.

The tribes' demonstrated commitment to conservation suggests that granting them ancestral domain would not be antagonistic to National Park objectives. Rather, it could form the basis of a contractual agreement in which the tribes would guarantee protection of the forest margins in exchange for commensurate development programs. The cultural diversity of the tribes has contributed to maintenance of the Park's biodiversity, suggesting that cultural conservation should be an integral goal in National Park protection. Our findings indicate that while both *Talaandig* and migrant settlers are guilty of park and watershed encroachment, the *Talaandig* communities represent the best bet for implementing sustainable land use systems that protect the integrity of the park. Research among a number of *Talaandig* communities has revealed indigenous traditions and experience in implementing land use systems that aim at maintaining a balance between natural resource extraction and forest conservation. Consensus has emerged that the policy question that now needs the greatest attention is: "How does the *Talaandig* ancestral domain claim and the management of lands under the claim relate to the conservation objectives of the Mt. Kitanglad Range Nature Park?"

As the SANREM Biodiversity Consortium pursues its work to develop methods for buffer zone management, it was judged opportune to hold a national meeting through which the Consortium could help synthesize the current status of such work elsewhere in the country, and share its experiences with others facing common concerns. The workshop, held in 1995, reviewed the principles and national experiences in buffer zone management and agroforestry. It identified lessons that could be applied in current and future buffer zone management programs, fostered closer linkages, and planned follow-up action that will accelerate the successful implementation of buffer zone programs in the Philippines (Garrity 1996).

A Model for Municipal Natural Resource Management Planning

SANREM research in the early years evolved a knowledge base to contribute to the development of a scientifically-based natural resource management process. In late 1995, discussions on this led the Mayor of Lantapan to commit human and financial resources to the development and implementation of such a plan, for which there was no precedent in the Philippines (Catacutan *et al.* 1999). Authority was derived from the Local

Government Code of 1991, which had devolved numerous functions and responsibilities to the local governments from the state. In 1996 a Memorandum confirmed SANREM's commitment to provide technical assistance using the research outputs in the development of the municipality's Natural Resource Management and Development Plan (NRMDP).

The Lantapan municipal government created a multi-sectoral Natural Resources Management Council, and a local planning team. The planning program involved an iterative learning process. That experience identified a number of innovative features and important lessons for participatory and local NRM planning. The draft plan was circulated and subjected to public hearings, and enacted by the Municipal Council in early 1998. The municipal government has currently allocated 5% of the municipal budget for plan implementation. Ten villages within the municipality have also allocated an average of 10% of their budgets for activities related to the plan. The initial impact of the plan may be seen in terms of a number of new policies and regulations related to resource conservation, and a number of activities that were implemented to conserve land, water, and biodiversity.

In 1998, as the plan was being finalized, the DENR recognized the Lantapan experience as a national model for natural resource management planning that is based on local demand and voluntary action, in the *Philippines Strategy for Improved Watershed Resources Management* (DENR 1998). The plan is now being implemented based on public-private partnerships. All stakeholders involved in the planning process were called upon to participate in the implementation of the plan. A formal partnership was forged by the local government and various stakeholders in implementing the plan through a Memorandum of Understanding signed by all concerned parties.

ICRAF's technical contributions to the plan stemmed from its research on agroforestry, conservation farming, and biodiversity conservation. For example, numerous steep ravines emanate from the Kitanglad range out into the agricultural landscape. These valleys are the least disturbed part of the agricultural landscape, and in part, harbor diverse natural communities. They may be valuable in radiating and maintaining strands of biodiversity outward from the protected area through the farmed parts of the landscape. We worked to develop an appropriate strategy to enhance the biological integrity of the ravines. Glynn (1996) developed a methodology to survey and map the vegetative communities of major ravines of the Alanib River. She surveyed the spatial relationship between natural vegetation, agroforestry, and field crop systems on a transect basis. These maps provided a basis for

identifying the hot spots where change was needed in land management practices to protect the streams and the biodiversity along them. Based on this information, ravine habitat management has been incorporated into the municipal natural resource management plan.

ICRAF is currently doing an assessment of the planning process, and publishing a 'how-to-do-it' booklet on the process for other municipalities around the country. The Lantapan experience is a significant advancement in municipality-led and participatory local NRM planning. We are now seeing the model implemented in other municipalities in Bukidnon and in other provinces. It is a significant step in the decentralization of planning and management to the local level and a shift from traditional top-down planning approaches towards participatory multi-sectoral planning and research-based decision making.

Landcare Movement Mobilizes Grassroots Conservation

The villages immediately surrounding the protected area are on the conservation interface. They are embedded physically in the competing jurisdictions of the local municipality, the state (their farms often occupy land claimed by DENR), and the ancestral domain claim. In terms of on-the-ground enforcement of the park boundaries, we observed that the villages tended to occupy one or more interfluves (land between two streams). They occupied the areas between the ravines of respective streams emanating from the mountains. Further up the interfluve is the boundary with DENR forest land (buffer zone) and yet further upslope is the boundary of the National Park. These interfluves thus embody a natural zone for resource management. The people of the village are in a favorable position to monitor activities that may occur in the buffer zone or within the park on the interfluve above.

Ultimately, the success of natural resource conservation depends on the support of the villagers. This is dependent upon a strengthening of a conservation ethic at the community level, the successful adaptation and adoption of conservation-oriented and more productive farming practices, and ultimately, the development of conservation agreements at the village level (Garrity 1995). Our hypothesis was that village-level landcare organizations may be a key to knowledge-sharing, and to building community approaches to natural resource management problems.

ICRAF had facilitated a farmer-led approach to technology development and dissemination in Claveria, Northern Mindanao that began in 1996. It resulted in an unexpected boost in farmer adoption of soil conservation technologies and agroforestry (Mercado *et al.* 2000). The institutional innovation that drove the process was the Landcare movement: a federation

of community organizations developed and led by farmers. The movement attracted strong support from local government and technical support from NGOs. Landcare started as a method to rapidly and inexpensively diffuse agroforestry practices among upland farmers, based on the farmer's innate interest in learning and sharing knowledge about new technologies that earn money and conserve natural resources (Garrity and Mercado 1998). The movement is composed of self-governing groups of people concerned about land degradation problems, and interested in working together to do something positive for the long-term health of the land. Today, there are more than 5,000 farmers in Claveria, Misamis Oriental, and in 14 other municipalities in five provinces who are members of the Landcare Associations. These farmers are maintaining hundreds of voluntary fruit and timber tree nurseries and are actively doing extension work to disseminate conservation farming technologies to fellow farmers.

The core of the Landcare model is effective local community groups and partnership with government (Mercado *et al*, 2000). Groups respond to the issues that they see as locally important, solving problems in their own way. In other words, Landcare depends on self-motivated communities responding to community issues, not issues imposed by any external agency.

The Landcare approach was introduced in Lantapan in 1998, through networking with the local government and the extension agents based there. Farmer training and assistance in the organization of Landcare chapters was provided by ICRAF. There are currently 60 Landcare groups with a total of over 1,000 members, most living in the villages near the Park boundary. The groups have formed a federation in order to share information and plan larger-scale activities. The municipal and village governments actively and financially support the Landcare groups through annual budgetary allocations. The chapters have stimulated the development of over scores of nurseries for timber and fruit trees, and fostered the adoption of contour buffer strips on nearly 300 farms (see previous section). They have begun community-wide environmental protection by assisting in the planting of thousands of trees to develop the riparian buffer zone along the Kulasihan River, which is suffering the most severe pollution problems in the municipality. The movement is continuing to expand rapidly, and a major review is underway to assess its experience. During the current phase of the project the potential for Landcare to be a means to evolve community support for national park protection will be tested.

In Australia, the Landcare movement, which began in the late 1980s, is now composed of over 4500 groups, with strong support from the local,

state and federal governments. About one in three Australian farmers are members. Consciousness and support for Landcare is also ubiquitous in the urban population. Increasingly, the focus is shifting to catchment management through the participation of Landcare groups. This is a direction that is becoming evident in Landcare in Mindanao as well.

Conclusion: Putting the Pieces Together

Significant progress has been made in assembling the elements for an effective social contract to protect the natural biodiversity of Mt. Kitanglad Range Nature Park. As a result of the dramatic increase in environmental awareness in the communities surrounding the Park, due to the Landcare movement and the implementation of the municipal plan for natural resource management, there has been a dramatic decline in the incidence of encroachment into the Park. But constraints remain to be overcome. These constraints mainly involved institutional limitations, rather than the technical ones. Key among these are continuing confusion over government lines of responsibility and authority, and overlapping and potentially contradictory land use processes. Processes for resolving these conflicts have not yet been developed. This is one of the major areas on which we are now concentrating further research efforts. The Lantapan Natural Resource Management Plan, for example, in spite of its very impressive technical detail, does not address the issue of the ancestral domain claim within the municipality. Rhoades' (1998) has pointed out the unwieldiness of decision-making bodies that are composed of a wide array of stakeholders are evident in the limited effectiveness of the Protected Area Management Board. These issues need to be addressed.

It was mentioned earlier that there were few examples so far of effective linkages between enforcement and compensation, and that this omission is seen as a serious weakness in most projects. Our work has not yet succeeded in overcoming this weakness. Experience indicates that a gradual progression toward this linkage may often be necessary. There is clear evidence however, through the strong support for natural resource management planning and implementation, the grassroots Landcare movement, and other evidence, that a conservation ethic is evolving rapidly within the community. Biodiversity protection is gradually being viewed as a responsibility but with pride.

These developments point to the evolution of a demand-driven and community-based approach to the management and sustainable utilization of local resources for multiple purposes; and the extension of responsibility

for national park management beyond the limited area of jurisdiction of the Park out into the agricultural landscape of the surrounding communities. It is increasingly accepted that in the future local government units will assume more responsibility for planning, implementation and evaluation of these activities within their areas with the guidance and support of national institutions. Many methodological challenges are still evident in fostering these processes.

The IPAS program must come to terms with reconciling the need to protect the park with the legitimate claims of the indigenous peoples to their ancestral domains. It must also work out ways of implementing effective community involvement in park enforcement. Our methodology - building research- will continue to try to provide useful guidance to the IPAS program. The Bukidnon Watershed Management and Protection Council, and the Bukidnon Provincial Planning Board and the Pulangi Watershed Council have approached us to use Lantapan as a model for municipal natural resource management training and implementation throughout the area.

We are currently working with these bodies to scale-up our outputs to the Pulangi River Basin and to the entire Central Mindanao area.

All municipalities in the Philippines are charged with taking a more serious approach to natural resource management planning. We are collaborating with the USAID-funded GOLD project to extrapolate methods of municipal natural resource management planning derived from our work and that of GOLD to a range of other Philippine municipalities.

Part of our efforts are directed to scaling-up to the global level. Our work is linked with the global program on Alternatives to Slash and Burn coordinated by ICRAF. This will further ensure the global extrapolability of the participatory research methods and the management model developed in Manupali. Wells and Brandon (1992) noted that the problems that all the ICDPs are grappling with appeared enormous, complex, and variable compared to the modest scale of the efforts invested so far. The pitfalls are sobering. Their conclusion is that such approaches must be reinforced and expanded simply because there are so few viable alternatives. This makes the issue of improving their performance such an important one.

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