

ACTION RESEARCH FOR COMMUNITY-BASED RESOURCE MANAGEMENT AND DEVELOPMENT: THE CASE OF THE NORTHERN SIERRA MADRE NATURAL PARK CONSERVATION PROJECT, NORTHEASTERN PHILIPPINES

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1. INTRODUCTION

In March 1997, through Presidential Proclamation, the Government of the Philippines established the Northern Sierra Madre Natural Park - one of the last remaining areas of rain forest in the country, with a size of 359,486 hectares - as an official National Park. A few months earlier, as part of its rain forest protection policy, the Dutch Government had approved a proposal (US\$5.5 million) to implement a conservation project in the same area, which was to give due attention to the rights and needs of the local people. The regional branch of PLAN International was selected as the implementing NGO of the project - named the Northern Sierra Madre Natural Park Conservation Project (NSMNP-CP).

In this presentation, we shall briefly review the history of this project, giving attention to the factors that determine its constraints and opportunities, and referring in particular to its research components.

2. CAGAYAN VALLEY PROGRAMME ON ENVIRONMENT AND DEVELOPMENT

The history of the Conservation Project and the involvement of the Dutch Government is directly related to the research activities of the Cagayan Valley Programme on Environment and Development, a joint programme of the Centre of Environmental Science of Leiden University (the Netherlands) and the College of Forestry and Environmental Management of Isabela State University (Philippines). In 1989, an official agreement was signed by the two universities to cooperate in the field of environmental science and education, thereby contributing to safeguarding the natural heritage of the Sierra Madre Mountain Range in Northeastern Luzon. This cooperation was designed as a joint undertaking, managed on the basis of equal partnership of the two institutions involved. It was also designed as a research programme with a long-term perspective instead of a short-term project. Up to the present moment, the programme is still running and, as yet, the cooperation is considered to be yielding positive results in terms of research, education, and impact on the environment. Though the programme is primarily a RUL/ISU programme, other universities and institutions in the Netherlands and the Philippines have participated in its activities over the years. In particular, we would like to mention the Institute of Cultural Anthropology in Leiden and the Forestry Department of the Wageningen Agricultural University in the Netherlands, and SEARCA in Los Baños and the regional Department of Environment and Natural Resources in Tuguegarao, Cagayan, in the Philippines.

Over the years, more than 100 Filipino and Dutch graduate students and a number of PhD students and senior researchers of both countries have built up a considerable body of interdisciplinary knowledge on forest exploitation, forest policies, and environmental consequences of various land-use systems. Attention has been given to subjects such as the analysis of the deforestation process, the relationship

between land rights and forest use, the implementation of forest policies such as reforestation and social forestry, and the exploitation and trade in non-timber forest products (de Groot and Kamminga, 1995; Pasicolan, 1996; van den Top, 1997).

Two international conferences were organised in 1991 and 1994 to present and discuss the results of the research with an audience consisting of scientists, local people, non-governmental organisations, and policy-makers (CVPED, 1992; Guzman and de Groot, 1997).

When this programme started in 1989, large-scale logging was still big business, with hundreds of heavily loaded trucks leaving the area daily. The forests of the Sierra Madre were a major supplier of wood for the domestic market as well as for export. The deeply-felt concern for effective measures for protection led both participating institutions to formulate project proposals and to submit them to relevant agencies. After a number of revisions, two of these projects are at present being implemented:

- A project funded by U.S. Aid, for grassland rehabilitation; and The Northern Sierra Madre
- Conservation Project funded by the Dutch Government.

Both projects were initiated and formulated by researchers connected with the cooperating institutions. The project proposals were based on their joint research activities. The cooperation programme has also been instrumental in setting up an environmental information and training centre on the campus of Isabela State University, where both projects are housed.

3. BACKGROUND OF THE CONSERVATION PROJECT

3.1 National situation

Protected areas are generic banks; they contain a country's biological capital, and serve as the ultimate resource that provides genetic materials for the improvement of agriculture, medicine, and industry. Protected areas provide more immediate benefits by:

- Reducing the intensity of floods and droughts;
- Protecting the soil from erosion;
- Regulating the climate; and
- Maintaining the integrity of life-support systems.

Protected areas are thus essential for national survival.

In the Philippines, wilderness and protected areas are under severe threat from the degrading activities of human occupants. In 1975, the Development Academy of the Philippines estimated that as many as 76,000 people were living inside national parks, and that about 4,000 hectares were being logged yearly (DAP, 1975). Today, these figures have to be adjusted to take into account increasing rural poverty, population growth, and upland migration. The continuous decline of protected areas is borne out by the results of a study conducted by IUCN. This study established that the number of national parks in the Philippines that meet international standards markedly decreased from 23 in 1975 to 12 in 1980, and went further down to 7 in 1982. At present, no national park in the Philippines meets international standards. All of the national parks of biological importance and adequate size (more than 10,000 hectares) have human settlements within their boundaries.

The main problem for the management of protected areas in the Philippines lies in the lack of grassroots participation in biological conservation, particularly among the inhabitants of poor and remote villages adjacent to or within the wilderness and protected areas. The country has recently experienced a rapid growth of environmental non-governmental organisations, and the growth of environmental constituency has been no less than remarkable. In spite of this emerging constituency, however, the local population's willingness to participate in conservation is overridden by the imperatives of economic survival. To the burgeoning rural population, the desperate search for

livelihood, often at the expense of the environment, is still the order of the day. The Government Department of the Environment and Natural Resources (DENR) is thus having great difficulty in halting the rapid decline of wilderness areas.

3.2 The Northern Sierra Madre Natural Park

The Northern Sierra Madre Natural Park is one of the country's ten priority areas, selected for biodiversity conservation within the framework of the Global-Environment-Facility-funded National Integrated Protected Area System (DENR, 1992). The area was already turned into the Palanan Wilderness Area during the Marcos regime in 1979, but not much had been done about conservation during those years. Large-scale and small-scale logging, as well as shifting cultivation by pioneer settlers originating from various parts of the country, had already reduced the wilderness-character of the forest land of the proclaimed area. Owing to the rapid loss of forest cover in the Philippines since the 1950s, the area now contains about 25% of the remaining old growth forests of the country. The pristine forest area of more than 220,000 hectares abounds with a multitude of species of flora and fauna, many of which are endemic or still have to be identified. Among the more spectacular elements of the Park are the endangered Philippine eagle and some rare habitat types, such as the still intact coastal forest.

The original inhabitants of the area are the Agta, a Negrito population, traditionally living as hunters and gatherers, but increasingly forced to adapt to changing habitat conditions brought about by logging operations and waves of encroaching farmers. The population density of the Agta has always been relatively low, but waves of migrants have entered the area in the wake of logging operations. The migrants have settled in the logged-over areas, converting forest land to agricultural land through slash-and-burn agriculture. By now, the migrants outnumber the local people. Among these migrants are many people (such as the Ifugao and the Tinggian) who originate from the tribal, upland communities in the Cordellera Mountains.

3.3 Long-term and short-term objectives of the Project

In general, the Project seeks to sustain the natural resource base of the NSMNP through improved community-based protection and conservation activities, while at the same time, enhancing the quality of life of the local population.

Specifically, the long-term objectives of the Project are:

- To preserve the remaining biodiversity of the NSMNP;
- To rehabilitate degraded areas;
- To protect the forested watershed of the NSMNP, which serves as the source of groundwater and surface water for domestic, agricultural, and industrial purposes;
- To address the socio-economic needs and cultural aspirations of the local population on the periphery and within the NSMNP.

On the other hand, the short-term objectives are:

- To establish management zones and the physical boundaries of the NSMNP;
- To generate benchmark socio-economic, ethnographic, and bio-physical information;
- To develop a set of implementing guidelines for the management plan.

Within the framework of preparing the management plan, the following research components have been identified (PLAN International, 1995):

- Flora and fauna surveys;
- Soil surveys and hydrological studies;
- Coastal and marine surveys;
- Mapping activities;
- Ethnographic studies among the people dwelling in the forest, including the mode and intensity of resource use;
- Community-based resource management and alternative livelihood opportunities;
- Preparation of an integrated management plan.

The programme can build on the research work done within the Project and can involve many people with previous experience in the Project.

4. SUCCESS AND FAIL FACTORS OF THE NSMNP-CP

4.1 Success indicators of the NSMNP-CP

By and large, the successful implementation of the various elements of the Project can be attributed to the following factors:

- Cancellation of logging concessions. Though an act imposing a total ban on logging in the country was never passed through Congress, most of the Timber License Agreements (logging concessions) have been cancelled, suspended, or were simply not renewed. Large-scale logging, previously in 35 areas, has almost completely disappeared from the region. Only three concessions remain, with one under suspension. Though small-scale logging still occurs, the rate of deforestation has been greatly reduced. No more logging roads are being constructed, and old ones are deteriorating because of lack of maintenance. This has removed a major threat to the National Park;
- Recognition of the rights of indigenous peoples. For a long time, all forest land and forest resources were claimed to be state property. Even the Agta, the original inhabitants of the area, were regarded as squatters on state land, just as the newly-arrived migrants were. Lack of security prevented many of them from investing in more sustainable forms of land use. Recently, a new Act was passed in Congress recognising the ancestral rights of the indigenous peoples in the country (DENR, 1997). Through this Act, indigenous communities can obtain communal titles to the land they have occupied *since time immemorial*. This law will provide a better basis for the joint management of forest resources by the people and the park authorities, unlike the previous situation in which they were considered illegal occupants of state property, but which in fact was being exploited by those with close connections to the ones in power (Ramos, 1997);
- The spirit of the time. Compared with the boom times of large-scale logging in the 70s and 80s, with almost everybody having a stake in the business, things have changed dramatically in the region. Protection of what is left of the country's biodiversity has become the concern of many. Governmental agencies, local people, non-governmental organisations, the church, the media, and the universities have adopted a greater interest in the protection of the environment. As a consequence of this change, research has shifted its prime focus from studying and describing patterns of resource depletion and their environmental consequences, to the more creative dimension

that is the design of systems of sustainable natural resource management and development.

4.2 Recruitment of qualified staff and training

An essential condition for the successful planning and implementation of field activities is the recruitment of qualified and deeply committed staff. The importance of a deeply committed staff is underscored because of the hardships of working in the field due to the ruggedness and inaccessibility of the terrain and adverse weather conditions, among other things.

The recruitment of the initial key staff - with deep commitment, a solid academic background, and field experience for the Project is considered crucial in terms of:

- Translating the Project proposal into action and budget plans;
- Laying the contacts with the key players of the Park.

Given the bureaucratic red tape of the local government units such as the DENR (with its legendary *surf mentality*=), the appointment of a Project Manager who is very familiar with the study region proved crucial in establishing the necessary linkages and network with key staff in the DENR department - at the national, regional, and local levels. Through him, the necessary cooperation and collaboration in the execution of Project activities became easier.

The selection of the two Project Area Managers (one for the coastal zone and one for the western-side/valley-zone) was equally crucial - especially during the first year of the Project (the inception period). Given the remoteness and isolation of the coastal zone, the Area Manager needed to be familiar with the area and to have solid experience in community-based projects. On the other hand, the Area Manager for the western side needed not only to have good field exposure, but also had to be familiar with the administrative systems of PLAN-International since the Project was to collaborate with the regular programmes of PLAN in this area.

The training of field staff also contributes towards the effective planning and implementation of field activities. While the senior staff have an adequate academic background and field experience, the field staff - the agroforestry technicians, community organisers, botany and wildlife technicians - require continuous training in their relevant disciplines. Thus, periodic training workshops are conducted, not only for the target groups but also for the staff.

4.2.1 Appointment of local and external technical advisers

At this stage of the Project, the appointment of a full-time local technical adviser - who had the required academic credentials and field experience and was also familiar with the region and Project area - helped significantly in the review of various activities, both at the planning and implementation stage. The full-time appointment of the local adviser ensures sustainability of focus in terms of technical backstopping to both field staff and staff at the Project Management Office. It should also be mentioned that, as a former staff member of ISU with residence still on the campus, the local technical adviser also provided the additional advantage of networking with various levels and units of DENR in the region. In contrast, the appointment of part-time technical advisers, with terms of reference based on output, did not provide the necessary continuous support - especially for the field staff.

4.2.2 Authority to implement the Project through a Memorandum of Agreement/MOA with DENR/PAMB

Contributing greatly to the smooth start of the Project was a Memorandum of Agreement with the DENR, through the Regional Executive Director and Protected Area Management Board, which is a necessary condition (as specified in the implementation rules and regulations of the National Integrated Protected Area System Act of June 1992). The Agreement not only gives legal permission to

implement the Project, but also specifies the support that DENR can extend to the Project. This is important because, as mentioned earlier, DENR, just like other government units, has a tendency to be bureaucratic. And equally important, the Agreement comes in handy when other stakeholders ask whether the Project has the authority from DENR to undertake research and conservation and development activities inside the Park and its buffer zones.

4.2.3 Support from academic institutions

As an integrated conservation and development project that is addressing very complex and dynamic socio-bio-physical systems, the need for an interdisciplinary approach cannot be over-emphasised. Setting aside the consulting firms, which are generally based in Metro Manila, the academic institutions in the region - specifically the Isabela State University - is the major provider of the expertise needed for the various work elements of the Project. With its Project Management Office located on the campus of ISU, access to ISU and the Centre of Environmental Science of Leiden University through CVPED, not only becomes easier, but further strengthens their complementary and collaborative work. These relationships may come in the form of:

- The appointment of staff, either on a part-time or a full-time basis;
- Field research by undergraduate and graduate students;
- Sharing of resources (space, equipment, networks, and so on).

Because the area is a hot spot for biological as well as cultural diversity, generating research interest from other institutions within the Philippines or abroad is not very difficult.

4.2.4 Effective networking and the establishment of the Inter-Agency Coordinating Group

As the largest protected area in the country and one of the biodiversity hot spots in the world, the Park has drawn a lot of attention from various groups, both local and foreign. It thus became essential for these interest groups to form an Inter-Agency Coordinating Group, with the immediate objective of integrating, complementing, and collaborating their efforts, instead of developing feelings of competition and jealousy. It is noteworthy to mention here that the Coordinating Group was established as early as March 1996 - about two months before the Project was formally approved and signed through a Memorandum of Agreement between the Netherlands Government and PLAN-International. The early formation of the Coordinating Group significantly optimised the utilisation of the resources of its members.

4.2.5 Strong organisational backstopping

PLAN's experience in community development, and its very sound and time-tested administrative and financial systems, provided the Project with a solid foundation. The regular staff of PLAN have been very useful in providing support, not only during the early stage of the Project, but even more so in its present stage. The implementation of a US-AID-funded project by PLAN, in the buffer zones not covered by this Project, required the strong dovetailing of activities located adjacent to each other. This was immediately attained by reorganising PLAN's regional setting to reflect and account for the individual project's distinct character and the administrative support it requires. These two large special projects (i.e. those funded by DGIS and US-AID), with their administrative staff, are housed in one office.

4.3 Limiting factors and fail indicators of the NSMNP-CP

Needless to say, apart from the generally favourable conditions of the Project, there are also certain limiting factors that need permanent attention.

4.3.1 Conflicting rights and resource competition

At present, there are still large settlements - and even towns - inside the Park. These towns are still growing owing to immigration from resource-poor or overpopulated areas. This situation is enhancing

the claims for the same natural resources as are targeted for conservation. The migrants also compete with the traditional population for arable land and forest resources (see e.g. Masipiqueña *et al.*, 1997).

Over the years, a variety of policy instruments have been used to stabilise the ever-moving forest frontier (e.g. stewardship certificates, reforestation, irrigation, upgrading spontaneous settlements to *barangay*¹ level). As a result of these projects, there are various kinds of overlapping claims on the use of forest resources. These claims need to be handled with care in order not to undermine the conservation aims of the National Park. Of primary importance during all phases of the Project is adequate consultation with the local government units and working with the local people. Along this line, the formulation and development of the community-based (*barangay*) resources management and development plans is an example of real participatory planning in the Project.

The overlapping claims originate not only from the local people; within the Government itself, there are still overlapping claims on the area that have not ceased to exist once the National Park was officially proclaimed (e.g. exploration permits issued by the Bureau of Mining).

4.3.2 Establishment of a coastal Isabela industrial and tourism estate and construction of a road

The biggest threat to safeguarding the Sierra Madre Natural Park is the combination of two proposals that have been circulating for a number of years among some groups of provincial and national politicians. These proposals imply the establishment of an industrial complex and a tourism estate on the east coast of Isabela Province and the construction of a road. The Provincial Government of Isabela has proposed the establishment of the industrial state on an 18,000 hectare block of primary forest, located in the Bicobian and Dimasalansan areas of Divilican, Isabela. The proposed area is not only pristine, but is host to the endangered Dugong and Giant sea turtles, among others. As envisioned, the industrial state will consist of an industrial zone, a built-up area (hotels and cottages), a golf course, and an international airport. The magnitude of these proposed undertakings are expected to have adverse impacts on the fragile environment of the area - on both its nature and its people.

Due to the remoteness of the coastal towns vis-à-vis the need for access to health services, education, and markets, the local government units, at both the provincial and the municipal levels (coastal and valley side), are strongly proposing the construction of roads that will cut across the NSMNP (Figure 1)! When this is approved and implemented, the high biodiversity value of the Park will be lost forever. As shown elsewhere - in the Philippines, as in the rest of south-east Asia and the world - when roads are constructed across forest lands, people immediately follow the opening of such roads and convert forest land into agricultural land with slash-and-burn agriculture. This will also encourage the poaching of wildlife and timber.

¹ *barangay* = community-based resources management, smallest political unit.

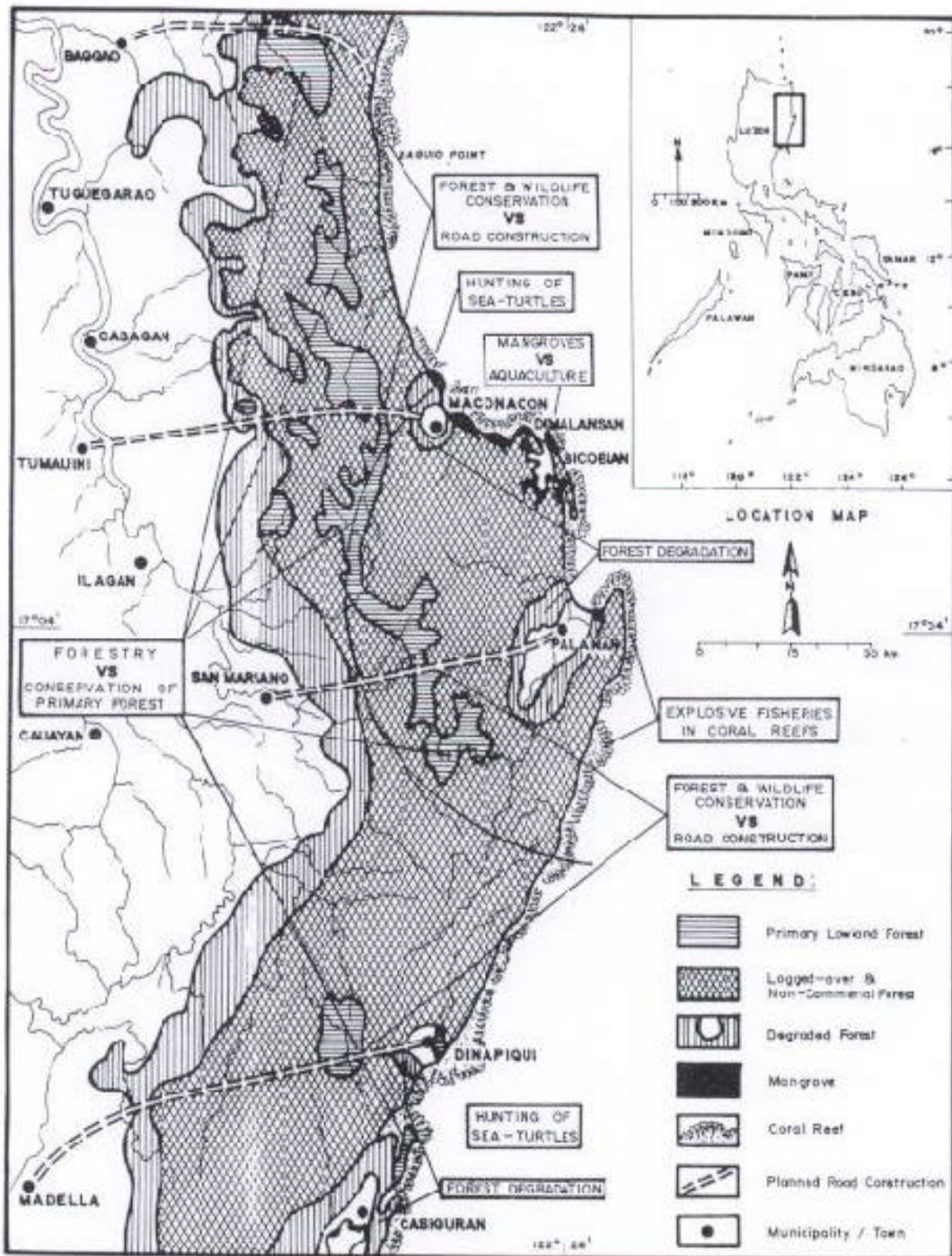


Figure 1 Present and potential environmental conflict areas

As yet, these plans have not reached maturity, but they are a constant threat to all efforts to safeguard the region's biodiversity. They require permanent attention and lobbying to keep biodiversity conservation in the region high on the agenda of politicians. They also require that the research output should not only be directed towards the research community. To have a lasting impact, research output should also be presented in an idiom that will guide the politicians in their decisions. Otherwise, research activities may not have the desired effects. In the end, the fate of the hot spots of the world's

biodiversity is in the hands of politicians.

4.3.3 Rigid Government policies in the conduct of biodiversity research in protected areas

The conduct of biodiversity research in protected areas in the country is now governed by Executive Order No. 247 series of 1995. Under this policy, only recognised Philippine academic and research institutions, government agencies, and inter-government institutions are eligible for an Academic Research Agreement - an instrument that normally takes at least a 6-month processing period. And, since PLAN International-Philippines is neither a government organisation nor an academic institution, it is working with Isabela State University (ISU) to apply for a research agreement. It is to be hoped that ISU will get this Agreement early in 1998. Meanwhile, the Project is conducting biodiversity research under the Resource Base Inventory system of DENR to generate the much needed database in support of the preparation of the Community-Based Resource and Management Plan - also called *Barangay* Land Use and Development Plan and the Integrated Environmental Management Plan for the Park. The limitation for the inventory system, however, is that no collection is allowed for both flora and fauna, which makes identification of new, unknown species next to impossible. It may be mentioned here that some Dipterocarp species (e.g. *Dipterocarpus grandiflorus*) are now in the flowering stage. And considering that the Dipterocarps flowers only every 5-7 years, the opportunity to collect fertile specimens is lost because of this rigid policy.

4.3.4 Administrative procedures and equipment acquisition and support

While PLAN-International is a non-government organisation, its administrative and financial systems are as rigid as government procedures. The response to a call for more flexible policies and procedures, inherent to the kind of project and the prevailing circumstances in the region, is rather slow. While ensuring the necessary control, these have significantly affected the processing time of contracting personnel services and the acquisition of equipment and supplies. Many kinds of equipment require long periods of order time (3-4 months) because they are not locally available. Their acquisition is further aggravated by the fluctuation of the Philippine peso.

A contributory factor to delays in the implementation and response to field problems is the lack of reliable communication systems that can connect the Project management office with the field staff and the whereabouts of technical advisers (both appointed and potential). A single side band as well as a very high frequency radio system have just been installed - providing a vital link between the Project office and the field stations. On the other hand, the Project office has yet no direct telephone link (i.e. land line) with its collaborators. To transmit or receive an E-mail or fax message, one has to go to PLAN's headquarters in Tuguegarao, Cagayan - which is about 40 kilometres from the Project office, or a travel time of some 35-50 minutes by car.

4.3.5 Rugged terrain and adverse weather conditions

The ruggedness of the terrain and the difficulty of access to the coastal area, which can only be reached by small air planes, combined with inclement weather (typhoons) for more than half of the year, significantly affect the generation of the needed database. Given these conditions, what is needed is a combination of advance planning, institutional arrangements with key participants, and the building up of more than adequate logistical support.

4.3.6 Limited institutional counterparting

Manpower and funding resources of the NSMNP managing authority - the Protected Area Superintendent Unit (PASU) - are so limited that even its basic operational activities are hampered; much less is it able to respond to the requirement of NSMNP-CP for counterparting. As provided for by the NIPAS Law (Republic Act No. 7586), the PASU has its own regular funding, but its setting up is being delayed by the non-passage of the congressional bill that would enable it.

5. RECOMMENDATIONS FOR ORGANISING RESEARCH PROGRAMMES

Based on our past and present experiences in the Philippines, we would like to propose the following recommendations for the organisation of research programmes:

1. Research programmes related to the conservation of tropical rain forests should be problem-oriented, which implies an interdisciplinary or multidisciplinary approach, not dominated by a particular discipline or some closely related disciplines. Emphasis within the programme may change with time as the programme develops to reflect the multifaceted character of rain forest conservation. This implies that it should incorporate relevant social, economic, ecological, and political (governance) questions. The nature of this type of research requires a broad-minded and experienced management style, capable of bridging the differences in approach, methodologies, and types of research outputs of the disciplines involved. Finding a balance between the research needs of the project and the quest for more fundamental, basic knowledge of the academics involved, is crucial to the programme. Finding this balance should steer the research agenda from the beginning.
2. If, as in our case, the research programme is implemented by institutions from different countries, the collaboration should be based on an equal partnership, with benefits to all partners in terms of output. This partnership idea should be expressed in the style of (joint) management, in the kind and amount of contributions made by the partners to the programme, in transparency of its mode of operations, and in the distribution of the fruits and opportunities that result from it. Imbalances in these aspects are bound to create tensions in the long run.
3. In the field of rain forest conservation, research programmes that aim at long-lasting effects need, by definition, to have a long-term time commitment. In order to become embedded in the local context, in order to fully understand the complexity of rain forest conservation, including the relevant social-political context, and in order to allow the project to really have an impact on forest policies, a programme should go through a process of ~~natural~~-growth and incorporation. Grounded knowledge, encompassing all aspects of effective rain forest conservation and creating a context that is sensitive and susceptible to recommendations originating from the research, are unlikely to be achieved within a short time span.
4. ~~Plan as you proceed~~ over the years, the focus within the research programme will change. In most developing countries, forest policies and implementation mechanisms change rapidly, sometimes through the influence of international agencies. Just as protection of the rain forest itself requires continuous attention, research that is aimed at improving the effectiveness of measures taken or at proposing better or more efficient solutions, should not be abandoned quickly. In our research area, forest lands have moved within a limited number of years from state property, through quasi-property by issuing certificates of stewardship for a 25-year period, to areas officially claimed by indigenous communities, while with the new Act they are now open to legal titles held by indigenous peoples. The successive changes in policy instruments need to be studied in their implementation, side effects, and their consequences in order to determine their impact on conservation. Short-term research, or rigidly designed research projects, can never yield similar results. In general, the need for long-term social and policy-related studies is bigger than natural science studies because of

changing circumstances, which may induce various kinds of innovations.

Moreover, in-depth knowledge of one particular research site, obtained over a longer period of time will allow for more relevant comparison with other areas, thereby producing increasingly valid ideas, research methods, and theory regarding natural resource management, and people and parks-related issues.

5. Research programmes in the context of rain forest conservation and utilisation should outlive donor sponsorship and relatively short-term implementation projects. Usually, projects start with research before moving into implementation. But once the implementation has started, research interests fade out. Evaluations by an external observer on the impact of the project rarely take place. Internal project evaluations do not serve this purpose well. The research programme which incorporates community-based management must recognise that the programme duration cannot be determined in advance, and the donor should be made aware of this. We therefore strongly recommend a close relationship between rain forest conservation projects and academic institutions (local, national, and international) that can support the project with solid information in numerous fields and sustain the interest in relevant issues once implementation projects have come to an end.
6. There is a great need for the exchange of information between projects of this kind because we feel that there is a lot to be learned from experiences elsewhere. We therefore appreciate the initiative taken by Tropenbos to bring together representatives of various countries to openly discuss the work-in-progress. A moment of reflection amidst day-to-day activities is fruitful and provides new ideas and inspiration for the work ahead of us.

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Achievements

- The project is contributing to conservation of the Northern Sierra Madre Natural Park through improved community-based protection and conservation activities, and at the improvement of the quality of life of the local population.

Challenges and Problems; Information Needs

- Conflicting rights between people and conservation needs; overlapping claims even within the government.
- Threat of infrastructural projects that conflict with conservation needs.
- Rigid government policies in the conduct of biodiversity research in protected areas.
- Difficulties with administrative procedures, equipment acquisition and support within the NGO.
- Rugged terrain conditions.
- Limited institutional counterparting.

Conclusions

- Research programmes related to tropical rain forest conservation should be problem oriented, which implies an interdisciplinary or multidisciplinary approach.
- Collaboration between institutions should be based on a equal partnership with benefits to all partners.
- The recruitment and training of qualified and deeply committed staff is essential for success of the project.
- A long term time commitment is required for research programmes that aim to have lasting effects.
- The focus of research programmes will change over the years, but longer-term research is also needed to determine the impact of changing circumstances.
- Research programmes in the context of rain forest conservation and utilisation should outlive donor sponsorship.
- There is a need for information-exchange between similar projects.

