



Issues in Forest Conservation

Batak Resource Management

Belief, knowledge and practice



James F. Eder

January 1997

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The World Conservation Union

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The programme makes contributions to policy at various levels and uses field projects to derive lessons to feed into the policy debate. The principles of *Caring for the Earth*, published jointly by IUCN, WWF and UNEP in 1991, are applied to these projects, which combine the needs of conservation with those of local communities. One major activity is to develop coherent and informed policies on forest conservation in order to advocate the translation of policies into effective actions. IUCN frequently advises major development institutions on forest issues, to ensure that conservation priorities are adequately addressed in their projects and programmes.

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Executive Summary

Recent years have brought a growing recognition that successful programmes to conserve the world's remaining tropical forests must somehow involve the indigenous peoples who have long utilized the resources of these forests. Relatively little is in fact known, however, about native conservation methods and their past or present efficacy in conserving biodiversity or promoting sustainable utilization of natural resources. Still less is known about how well whatever "ecological wisdom" indigenous peoples possess can survive expanded market participation or the introduction of new technologies for environmental exploitation, or about how such wisdom can best be utilized in the design and implementation of community-based natural resource management programmes.

This report addresses these issues in the context of one particular indigenous people of the Philippines, the Batak of Palawan Island, and one particular natural resource management project, "Sustainable Utilization of Non-timber Forest Products". This involves an ambitious and long-term collaborative effort between IUCN, the Batak, Haribon Palawan (a local NGO) and the European Commission.

The report has three broad aims. The first is simply to record, both for the Batak themselves and for those who would work with them, traditional Batak beliefs, knowledge and

practice in the area of natural resource management, with particular attention to forest resources.

Batak beliefs about human utilization of the environment centre on the jealous protective relationship said to exist between a variety of nature spirits and forest plants and animals, such that any excessive or wasteful human exploitation of these resources is potentially punishable supernaturally. In the context of such beliefs, Batak resource exploitation occurs judiciously and draws upon an extensive on-the-ground protoscientific knowledge of natural phenomena: geographical features, reproductive habits of plants and animals, and so forth. The examples given in this report, pig-hunting and honey-collecting, show how, in practice, Batak belief and knowledge about the environment are inextricably bound up in the resource-use routines of everyday life.

The second aim of this report is to assess where Batak natural resource management practices stand today, in view of increased competition for forest resources from migrant outsiders originating in the Philippine lowlands. With respect to shifting cultivation and the collection of Manila copal, rattan and honey, systematic comparison of past and current Batak practices with those of lowland Filipino migrants shows that some aspects of the traditional Batak resource management system have been

undermined by recent changes or have come to resemble those of outside peoples. Nevertheless, the Batak approach to making a living remains consistently less destructive of the natural resources and the ecological integrity of their forest environment than does that of migrant lowlanders.

The final aim of this report is to evaluate the prospects for community-based sustainable natural resource management from the perspective of what the Batak themselves are able to contribute today. The report identifies some significant weaknesses of the traditional Batak management system as a basis for future sustainable use: the system fails to define legitimate need or to address resource depletion *per se*; it lacks an ideological basis for limiting access by outsiders; and it provides no social (as opposed to supernatural) sanctions for ecological misbehaviour. But the traditional system offers some significant strengths as well, including profound knowledge about the environment, pride in not having significantly degraded the environment despite generations of habitation, and continued commitment to a low-impact, multidimensional subsistence strategy.

Given that lowland migrants and outside facilitating agencies such as Haribon Palawan and IUCN bring additional, complementary strengths of their own to the project, there are considerable grounds for optimism about the future, assuming that significant political progress continues to be made in returning control over local resources to local people. Further joint effort is needed, however, on three related fronts.

First, a specific role needs to be identified for the Batak's considerable environmental knowledge and an appropriate mechanism must be developed to ensure that this knowledge is mobilized and utilized. Second, local stakeholders must work together to make the project area viable economically as well as ecologically. Third, an appropriate management structure, with genuinely empowered local stakeholders at its core, needs to be developed to develop and enforce incentives for ecologically responsible behaviour and to otherwise make the entire programme work.



Introduction

In the current global debate about how best to conserve the world's remaining tropical forests, many participants find compelling the notion that indigenous peoples, because of their long association with and dependence upon the land, have evolved ways to utilize forest resources on a sustainable basis and to otherwise live "in harmony" with their environment. Indeed, conservationists and advocates for indigenous rights alike now find common ground in the position that indigenous peoples must be part of the "solution" to the proper management of natural resources, and programmes that involve indigenous peoples in this fashion abound.

While involving indigenous peoples in the conservation of biodiversity and other aspects of natural resource management has wide popular appeal, we in fact know relatively little about indigenous conservation methods. We also have scarce information about the effectiveness of these methods in promoting either preservation or sustainable utilization of natural resources over the longer term (Hames, 1991; West and Brechin, 1991). Furthermore, still less is known about how well the theory and practice of alleged indigenous conservationists survives the introduction of new technologies for environmental exploitation or expanded market participation (Thomas, 1994). The issue, in short, is whether indigenous people are, or at least once were, somehow "ecologically wise" and, if so, how their wisdom can be

utilized in the design and implementation of effective, community-based natural resource management programmes. In today's world these programmes must increasingly take account of the often dominating presence of non-indigenous peoples and the resulting competition for resources.

This paper addresses the issue in the context of one specific indigenous people, the Batak of the Philippines. They are participants in the ambitious and long-term Sustainable Utilization of Non-Timber Forest Products project, co-sponsored by Haribon Palawan, a local Philippine NGO, The World Conservation Union (IUCN) and the European Commission.

The Batak are a physically and culturally distinct population of several hundred individuals who inhabit the mountains and river valleys of central Palawan Island. Traditionally a hunting and gathering people, they once lived in small, mobile family groups. They were isolated by land from other indigenous tribal groups on Palawan and by the Sulu Sea from all but occasional contact with Filipino and Muslim peoples elsewhere in the Philippine archipelago. In these circumstances, the Batak evolved an elaborate tropical forest foraging adaptation, subsisting on a wide variety of forest, riverine, and coastal foods, and acquiring manufactured goods and other outside needs through the collection and exchange of non-timber forest products — principally

copal, rattan, and honey — with outside trading peoples.

Today the Batak continue to carry out many of their distinctive forest food collecting and resource utilization practices, but they do so in greatly changed circumstances. No longer are the Batak relatively isolated from surrounding peoples; everywhere are the homesteads and communities of lowland Filipino farmers who have migrated to Palawan's uplands in search of land and a better way of life. Incorporation with wider Philippine society, and more intensive contact with lowland Filipinos, has reworked all aspects of Batak adaptation. Nowhere have the resulting changes been more striking than in the Batak economy, where upland agriculture and wage labour for lowland migrants have joined hunting and gathering, and the collection and sale of forest products as mainstays of Batak livelihood. As all of these changes have occurred, the Batak environment has changed apace, and is in need of attention.

While the Batak today are not a "pristine" people living in harmony with their environment, neither have they totally lost their culture; indeed, we have much to learn from them about natural resource management. And if the Batak need outside assistance to construct a more remunerative and more sustainable subsistence adaptation, this is a task in which the Batak themselves — and their knowledge, beliefs, and aspirations regarding the environ-

ment — must be involved as well. This provides the main goal of this report: to record, both for the Batak themselves and for people who work with them, the Batak knowledge, beliefs, and aspirations in these realms.

The research findings reported here are based primarily on a series of field visits, between March and August 1995, to the Batak communities of Calabayog, on the Tanabag River, and Mangapin, on the Langogan River. This report is also based on interviews with Haribon Palawan and IUCN project staff, and on a variety of secondary sources concerning the Batak and the issues in question. Finally, the analysis below inevitably reflects some of my own premises and biases:

- traditional societies are indeed storehouses of information concerning the environment, information that could well contribute to the success of any sustainable development programme;
- indigenous peoples do not passively "blend" with their environment — they, too, shape it through their lifeways; and
- while most or perhaps even all indigenous peoples profess a reverence or respect for the environment, this does not necessarily translate into actions that result in sustainable resource management — that is something to be determined (Thomas, 1994: 16-17).





...Introduction

In the first part of this report, I locate the Batak in the natural world, examining both their own ideological concept of their place in nature and their considerable empirical knowledge about natural phenomena. I then turn to contemporary patterns of Batak resource utilization, comparing and contrasting these patterns with

the more destructive practices of lowland migrants — practices that increasingly influence the Batak's own behaviour. In the final part of the paper, I consider some of the implications of these findings for the design of an effective, community-based natural resource management programme.



Batak Resource Management

Belief, knowledge and practice



The Batak collect and sell canes from a variety of rattan species. All photographs by the author.

The Batak place in nature

Peoples like the Batak have been called "ecosystem people" (Rai, 1990) because they view themselves, and to a degree actually live, as part of an ecosystem, rather than as simply users or exploiters of nature (Bennagen, 1993). On the one hand, the Batak hold to an elaborate and articulated set of beliefs about their place in nature and their inter-relationships with other organisms. On the other hand, they also possess an extensive, on-the-ground, proto-scientific knowledge about natural phenomena. I examine in turn these two aspects of Batak ecological adaptation, cultural beliefs and practical knowledge, and then use the examples of pig-hunting and honey-collecting to show how, in practice, both aspects are inextricably bound together in the traditional resource-use routines of everyday life.

Batak beliefs about nature

The Batak live in a world inhabited by a variety of nature spirits and supernatural anthropometric beings, and they rely on mediums or shamans to mediate their relationships with these beings. Most nature spirits fall into one of two broad classes: malevolent *panya'en* or capricious, but benevolently inclined, *diwata*. Visible only to shamans, these spirits inhabit specific trees, bamboo thickets, rocks, caves, and streams — the very places in the natural environment also utilized or visited by the Batak. *Panya'en* and *diwata* are like humans in their lives, actions, and desires. They affect

Batak welfare in a variety of ways, most notably by causing illness when humans provoke them by unwittingly violating their territory, destroying their dwellings, or injuring their families (Shimizu, 1983: 134).

Panya'en and *diwata* figure prominently in several facets of Batak adaptation; particularly in curing ceremonies. But from the standpoint of the Batak view of nature and ecosystem relationships, what is key is that all the various forest and riverine food resources utilized by the Batak belong to the spirits, principally the



The Batak are a forest-dwelling foraging people of Palawan Island, the Philippines.

...The Batak place in nature

panya'en, and not to humans. (The Batak usually employ the term "*epet*", or "belonging to", to characterize the relationship between *panya'en* and forest animals. The meaning of *epet* is closer to the notion that the spirits are the caretakers of, or are responsible for, these resources, than to the notion of actual ownership in its strict legal sense.)

The relationship between *panya'en* and forest animals is in any case a jealous, protective one: one that must be acknowledged and respected by humans. As a result, there is at least potential danger in any human utilization of forest resources. But since the spirits also recognize that humans have legitimate subsistence needs, everyday patterns of resource utilization that are consistent with meeting only those needs—fishing, looking for honey—do not usually require any specific ritual measures. Rather, there is a generalized, implicit recognition that while forest resources continue to belong to the spirits, the Batak have, since ancestral times,



Overview of Calabayog settlement, Tanabag River, 1992.

had "permission" to utilize them — for the spirits, it is said, also "pity" the Batak, in their struggle to survive.

To the Batak, the real risk of danger lies in wasteful or excessive use of forest resources — intentional or not — and even in displays of disrespect toward such resources. Merely laughing at animals, for example, may antagonize spirits, because it implies *dagwa'y galang*, "no respect". Most dangerous are those cases where forest resources are collected in large quantities or are collected and not fully utilized. Thus specific ritual actions are called for to propitiate the spirits prior to group fish-stunning or group pig-hunting, against the possibility that these endeavours may result in large harvests. Caution is always called for during pig-hunting and honey-collecting, less a wounded pig elude capture and wander away to die uneaten in the forest, or part of the hive fall to the ground and be left behind, wasted.

All Batak can cite examples of the sort of retribution *panya'en* may exact on humans who waste or abuse forest animals or other natural resources. One such case involved the Batak Padaka, the grandfather of a current Mangapin resident, and a Muslim man named Amad. It occurred on the Langogan River during the late 1950s or early 1960s, when the Batak settlement there was located at Bulobulo, downstream from its present location. Padaka and Amad had travelled together to collect copal at

Mayboyengaw, a place then seldom visited about a day's walk upriver. Through use of an explosive device, they obtained about 150 large fish from the river: far more than they needed or expected. Angered by this display of greed, a *panya'en* caused both men to become feverish and soon die.

Another case occurred at Babuyan during the early 1960s and involved the Batak Padang, uncle of a Calabayog resident. He killed a large pig while hunting but left it to spoil in the forest, being too lazy, it was said, to carry such a heavy animal back to camp. About a year later, he was attacked and killed by a pig in the forest — a pig that was actually the *panya'en* "ageng", who had momentarily taken the animal's form.

Some more recent cases of retribution of this sort have involved lowland migrants; all humans, not just Batak, are subject to the *panya'en*. At Langogan, for example, one lowlander unwittingly angered a *panya'en* while collecting rattan at lasgas; he sickened and died two days later. Another lowlander died several years ago in the course of making his *kaingin* (upland rice field). While it looked like an accident — he became caught up in some vines, causing the tree he was cutting to fall on him — it was said that it was, in fact, the work of a *panya'en* whose house had been disturbed by the unfortunate farmer.

In all these cases, retribution by a *panya'en* is very personal: it is directed specifically at the offending individual, and not at humans in general (although a partial exception concerns the *panya'en* "ungaw", who controls the movements of honey bees; see below). Neither is it up to other Batak to sanction or punish those who misbehave ecologically; this is a matter for the spirits to deal with as they see fit (although children, of course, need to be properly instructed). There is also, finally, considerable vagueness about what constitutes a legitimate subsistence "need" in the eyes of the spirits, and hence about the actual threshold of a particular resource's exploitation, beyond which a Batak risks some sort of punishment. In the final section I return to the important topic of what constitutes legitimate human needs.



Batak house and dooryard garden at Calabayog, 1992.

*...The Batak place in nature***Batak ecosystem knowledge**

The detailed and profound knowledge that forest-dwelling peoples such as the Batak have about their natural environment has long impressed researchers and has been abundantly documented (Fox, 1952; Cairns, 1995; Mittelman and Alisuag, 1995; WRI, IUCN, and UNEP, 1992). I will limit myself to providing several specific examples of Batak ecological knowledge to demonstrate the detail of this knowledge.

One striking dimension of the Batak's environmental knowledge is an extensive system of geographical place names. Each river valley inhabited by the Batak possesses its own unique set of such names, numbering in the hundreds and applying to four principal kinds of geographical features:

- *libtong*, or deep-water spots along the main river;



Overview of Mangapin settlement (in distance at left), Langogan River, 1981. This view is little changed today.

- *simang*, or streams and rivulets on the watershed;
- *patag*, or floodplains and flat places; and
- *bulod*, or hills, ridges, and mountains.

This geo-environmental system is learned by all Batak as part of their socialization experiences. It enables them to speak with some precision about virtually any location within their ancestral domain. The names are used daily, singly or in combination, to talk about all sorts of subsistence-related activities: where someone caught an eel, or went to collect rattan, and so on. To illustrate the specificity of this knowledge, Table 1 lists some of the more than four hundred place names known to the Langogan River Batak. These particular names identify 49 successive geographic locations, mostly confluences, deep-water spots and rapids, along the Langogan River from Mangapin, the present settlement site, to Paglaglagan. This is a point about 12 km upriver where the Kabuyaw stream enters and the National Power Corporation (NAPOCOR) proposes to build a mini-hydroelectric plant.

The type of information more commonly reported for forest-dwelling peoples like the Batak is their extensive knowledge of plants and animals. Tables 2 and 3 indicate, respectively, the variety of animal foods and plant foods that the Batak recognize and collect in their environment. Such tables do not do justice to Batak knowledge, however.

First, the Batak recognize numerous other named species of plants and animals that figure in their subsistence adaptation but are not utilized for food and thus not shown in Tables 2 or 3. Further, within particular categories, and based on close empirical observation of sometimes minute differences, the Batak make numerous fine distinctions between species, varieties, and life-cycle stages. They identify, for example, 14 named varieties of edible mushrooms and other fungi, five named kinds of edible univalves, and 16 named kinds of edible riverine fish.

Second, Batak knowledge about plants and animals goes far beyond systems of names, however highly developed these systems may be. The Batak also know a lot about the reproductive habits of plants and animals, and about seasonalities in their occurrence. They know much, too, about the behaviour of animals, both on a daily basis and over the life cycle. This last point will be clearly illustrated by the specific examples developed in the next section.

Another general point about Batak ecosystem knowledge is that the Batak do recognize differences and changes over time in the quantity and quality of natural resources. They know, for example, that *be'gay* (edible univalves) are larger and more abundant upstream than in the vicinity of settlements, and that *tandikan* (Palawan peacock pheasant) are locally extinct near areas of human habitation. While the

Batak may differ about the sustainability of particular resources, they recognize that human habitation and exploitation has consequences for these resources. They are also concerned about, and prepared to act upon, these consequences: another topic to which I return below.

Knowledge and belief in resource use

I now turn to two particular and important subsistence resources, honey and wild pigs, to show how Batak ritual belief and ecological knowledge are bound together in practice. Although resource exploitation is not the focus of this report, I should note that, in general among the Batak, as in all human societies, it occurs in a social context. In the case of the Batak, nuclear families, extended families, same-sex task groups, and entire local communities all figure prominently in everyday subsistence activity. These indigenous cooperative forms and capabilities are based on ties of kinship or geographical propinquity that are an important part of the distinctively Batak sustainable development programme.



Mangapin settlement, 1955. Maturing upland rice field in foreground.

...The Batak place in nature

Honey

The Batak distinguish between two principal bee species, *potiokan* and *nigoan*. The bees differ in appearance and in hive-making habits, and produce two different kinds of honey during successive but partially overlapping seasons. There is considerable geographical and year-to-year variation in the length of the honey season and the amount of honey available for collection, reflecting (among other things) corresponding variations in climate and flora. The *potiokan* season typically runs from



One principal kind of wild bee, known as *nigoan*, builds hives in hollow logs.

January to about the end of May, and the *nigoan* season runs from February or March through August. Most Batak view the two sorts of honey as making approximately equal contributions to subsistence and cash incomes; *nigoan* hives characteristically yield less honey, but they are more frequently encountered and collected.

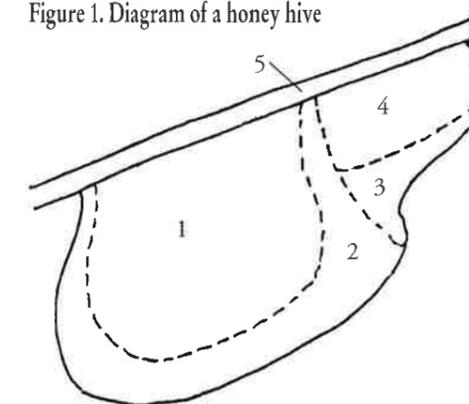
A diverse range of knowledge about bees and their behaviour is essential to successful collection of wild honey. Bees may locate their hives virtually anywhere, and considerable skill is needed to spot them. In the case of *potiokan*, hives are located in the forest upper storey, hanging from lateral branches near the tree tops. *Nigoan*, in contrast, characteristically locate their hives in holes in logs or tree stumps.

Much of what the Batak know about the habits of bees concerns the various flowering trees that bees characteristically feed upon during the course of the honey season. These trees do not all flower on the same schedule; rather, they bloom in succession over the course of the season, each becoming in turn a principal focus of pollen-gathering. Table 4 lists the 19 named kinds of flowering forest trees which serve as pollen and nectar sources identified by the Batak, in the approximate order in which they flower. Also shown in Table 4 is the desirability of the honey, as reported by the Batak, from the bees that have been feeding on each successive kind of tree.

The Batak also know a considerable amount about the structure and function of the hives themselves. Figure 1 illustrates the five parts of a typical *potiokan* hive as conceptualized by the Batak. It also briefly identifies the role that the Batak attribute to each part in the reproduction of bees and the production of honey. Such knowledge is necessary to determine whether a hive is in fact ready for honey collection. Once a Batak has spotted a *potiokan* hive, he may return to it several times to monitor the growth of the *tado* (the honey-bearing section; see Figure 1) and to decide if it has reached *keyanene'an*, the point at which pollen and honey are present in equal quantities.

Actual honey collection requires little in the way of equipment but considerable skill. The only tools needed are a small smoking torch to drive the bees away, a *bolo* (machete), a container for the honey and, in the case of *potiokan*, sufficient rattan or cord to wrap the hive securely and lower it to the ground. For ground-level *nigoan* hives, collectors use a machete (or, on occasion, an axe) to enlarge the hive opening to the point that they can reach inside and break off pieces of the comb, while at the same time blowing smoke into the hive to disorient the bees and drive them off. For treetop *potiokan* hives, collectors must first climb to the hive's location — a task often requiring considerable dexterity and skill — and then cut off the honey-bearing portion of the hive and lower it to the ground.

Figure 1. Diagram of a honey hive



1. *yumo*: area where the larvae live
2. *ingkasan*: area where larvae become adult and leave; an area abandoned by the hatched larvae
3. *biyageng*: area where pollen has not yet been converted into honey
4. *tado*: place where honey is located
5. *pagsapuan*: tree trunk or place where hive is attached

A swarm of *potiokan* makes several new hives over the course of each season, regardless of whether honey is collected or not. *Nigoan*, in contrast, remain at a single location unless



The Batak harvest *nigoan* bee hives from hollow logs.

...The Batak place in nature

disturbed. Once honey has been collected, a swarm of bees is said to take about three days to "survey" for a new hive location, an additional week to make a new hive, and another week after that to start making honey. All of the practical activity entailed by honey collection occurs within, and is influenced by, a culturally-constructed set of beliefs about how both humans and bees relate to the wider and more powerful parallel world of nature spirits. If the Batak know that bees move around during the course of the honey season according to the flowering schedules of specific kinds of trees, they also know that bee movements are ultimately controlled by the *panya'en* Ungaw, the *apo* or "grandfather" of the bees.

Ungaw is a caretaker spirit of the sort discussed earlier; he guards his wards jealously and punishes any Batak abuse of bees by sending them elsewhere or calling them home, thereby bringing an end to the honey supply. Ungaw is thus a major figure in the Batak spirit world, and a variety of stories are told about him.



Wild honey is both a traditional subsistence food and a source of cash income.

He was first encountered, it is said, by Kawali, a Batak who once travelled alone to Malabusog to look for food. Malabusog is located on the coast between the present-day communities of Langogan and Tagnipa; Ungaw lives near there with his wife Baybay at a place known as Kaygunaygunay. At a time when the Batak did not yet "know about" bees, and hence were always hungry and in search of food, Ungaw revealed himself to Kawali and granted the Batak permission to henceforth collect honey to help them survive.

From Ungaw, Kawali also learned the distinctive *lambay kat taro* ritual that, even in the present day, serves to restore ritual equilibrium when Ungaw becomes angry or the balance between humans and bees is disturbed. Should a honey collector accidentally drop a portion of the hive on the ground and waste its contents, Ungaw may anger to the point that the offending individual is unable to locate further hives or even becomes ill. Should an entire hive accidentally be dropped to the ground and ruined, Ungaw may become angrier still. The hapless collector may sicken and die, having been "eaten", it is believed, by Ungaw himself, as a sort of replacement for the wasted hive. Alternatively, Ungaw will send the bees away and the local people will find themselves unable to collect any honey at all. In this latter case, the *lambay kat taro*, or "honey ritual", is called for. This interesting ceremonial cycle requires a 15-day period of collective "good behaviour",

during which the honey search is suspended entirely and all local group members are enjoined to avoid interpersonal conflicts and to only "think cleanly" about their neighbours. Following a culminating ritual, practical knowledge again takes precedence and the search for honey begins anew.

Wild pigs

Wild pig meat is arguably the Batak's favourite food. Hunting for pigs occupies much of the men's time and is a subject of much discussion. It is carried out either with spears and hunting dogs or from blinds with guns or bow and arrow, the last being a distinctively "Negrito" weapon throughout Southeast Asia. Wild pigs can be found throughout the year; Batak efforts to hunt them wax and wane more with need and the competing demands of other subsistence activities than with any seasonalities in the wild pig population.

Batak do not appear as knowledgeable about the breeding habits of pigs as about those of bees, apparently because such knowledge does not loom as large in the hunt. Although the Batak know that a mother pig delivers and raises her litter in a *dogmon* (a nest or den made in any sheltered and secure location), only occasionally are inhabited *dogmon* encountered. Batak also say that wild pigs are prone to gather in large *campo*, or camps, where they sometimes number in the dozens and remain for

months on end. It was not clear if this was speculation or based on observation; I did not interview anyone who had seen such a *campo*.

In any case, knowing exactly where to hunt for wild pigs calls for considerable environmental knowledge. It is especially important to know the feeding habits of pigs and, in particular, where they are most likely to be feeding at a particular time. While wild pigs eat a wide variety of items, their primary food is overripe fruit. This fruit has fallen to the forest floor at the stage in a tree's reproductive cycle that the Batak term its *simbolan*. The Batak concentrate



A bow-and-arrow hunter waits in a blind to ambush a wild pig, a favourite Batak food source.

...The Batak place in nature

their hunting near trees bearing fruit favoured by pigs during that tree's *simbolan*.

Table 5 identifies 21 named kinds of fruit-bearing trees that attract wild pigs in this way. It also reports the month or months of each tree's *simbolan*. As Table 5 shows, at least one forest tree is fruiting every month of the year. Such information is known to every adult Batak. The order in which various trees fruit serves as an annual calendar, akin to the annual cycle of rice cultivation calendars of agricultural peoples in Southeast Asia.

As with honey collection, pig-hunting occurs within the context of a set of cultural beliefs about the relationships between humans, animals, and nature spirits. Wild pigs also have a specific caretaker spirit — the only other animal besides bees to have one. Generally referred to as *diwata kat baboy* or *apo kat baboy*, the specific name varies with locale; at Mangapin it is Biolioganen, and at Calabayog it is Kiodalan. But as with the *panya'en* that controls the bees,



A forest camp task group processes wild yams, traditionally an important carbohydrate food.

the *diwata* that looks after the pigs is quick to punish any ecological misbehaviour by erring hunters. In particular, should a hunter kill a pig and fail to use its meat, he will find it difficult or impossible to find additional pigs in the future, until appropriate ritual action is taken.

The *sagda*, or ritual offering, is the most common such action, and is likely to be attempted whenever an unsuccessful hunter is down on his luck or suspects he has fallen in the bad graces of the *diwata kat baboy*. A typical *sagda* for this purpose consists of a small quantity each of tobacco and alcohol. These are left in the forest and are followed by three days of abstinence from hunting, after which the hunter begins his hunt anew. Should most or all members of a local group encounter difficulty finding and taking pigs, the Batak may resort to a more ambitious group ritual action known as *tuarek kat diwata*. This ceremony is centred around the trance-inducing dance form known as *tarek*, which appeals for relief to the *apo* of the pigs much as the *lambay kat taro* appeals to the *apo* of the bees. Again, the ultimate purpose is to restore the natural equilibrium between humans and other animals.

Batak resource use today

I now turn to the actual patterns of natural resource use that figure in contemporary Batak subsistence adaptation. Because lowland people and lowland influence are omnipresent in the Batak environment today, any discussion of contemporary Batak resource use must be framed in terms of the currently evolving alternative systems of resource use that influence the Batak and their behaviour.

I therefore begin with a sort of ideal model that spells out the various dimensions of contrast between the "Batak way" and the "lowland migrant way" of practising shifting cultivation; of collecting copal, rattan, and honey; and of utilizing still other sorts of resources. Then I turn to what is presently happening "on the ground" with respect to these various activities and resources, both in terms of the present state of the resources themselves and what the Batak are currently doing, and why, with respect to their utilization and management.

Batak vs. lowland resource use: shifting cultivation

One of the most revealing contrasts between Batak and lowland migrant ways concerns how members of each group practice shifting cultivation. The Batak tend to make smaller and more scattered fields; they are more likely to leave some trees standing in their fields and to burn less completely; and they are more likely to weed less thoroughly and fallow their fields for a longer period of time. It is the

lowland migrant practices that have the greater environmental impact: fields are larger and more likely to adjoin other fields or to be cleared stepwise, up or down hillsides in successive years; and fields are more thoroughly cleared, burned, and weeded. Lowland migrant fields are usually not planted with tree crops and are frequently cleared again after only a few years of fallow, rather than being allowed to regenerate more fully.

Batak *kaingin*-making practices, in short, are of the low-impact sort, i.e. they facilitate early



A Batak task group pauses to rest in the forest during a trip upriver.

...Batak resource use today

regeneration of the forest cover. Lowland migrant *kaingin*-making practices, on the other hand, lead to the removal of large expanses of forest cover; indeed, that is their aim. It is ironic that the relatively casual field-clearing and weeding practices of the Batak, and other aspects of their shifting cultivation system, have long stereotyped them in the eyes of lowland migrants as poor or "lazy" farmers. In fact, these very practices have been pursued for at least 100 years in the same general locales, providing the Batak with a subsistence living without resulting in deforestation. As one older resident of Calabayog put it, "Batak have lived on the Tanabag River for as long as anyone can remember, and there were a lot more of us before than now — and yet the forest is still here. If lowlanders had been living here, the forest would have long since been gone".

While farming does not figure in Batak subsistence and culture to the degree that it does among other Philippine tribal peoples, the



The Batak, with the encouragement of the Haribon Palawan/IUCN project, use fire breaks as a field preparation measure.

Batak do share with such peoples the sorts of cultural and religious beliefs that contribute to low-impact *kaingin*-making. In particular, they hold two beliefs that have traditionally encouraged dispersed sites and incomplete clearing, both ecologically-beneficial practices. At the start of the *kaingin* season, a farmer first makes a small "test plot" in his intended location and then sleeps in this clearing. If he has a bad dream, the site is inhabited by *panya'en*, and he tries again elsewhere. Additionally, in the course of field clearance, certain trees are left uncut because they are thought to be inhabited by *panya'en*. Springs, steep slopes, and rock overhangs are left undisturbed for the same reason.

Copal collection

The contrasting histories of Batak and lowland migrant copal exploitation also reveal fundamentally different ecological stances. The indigenous people of Palawan have long been engaged in the international trade of Manila copal, a resin produced by the almaciga tree (*Agathis damarra*) which is used in the manufacture of paint varnish and other industrial products.

The principal ecological issue here is the practice of tapping almaciga trees near the base to facilitate the flow of resin, and the consequences of such tapping for the sustainability of copal exploitation. Today, all copal collec-

tors, whether Batak, Tagbanua (neighbouring indigenous people) or lowlander, engage in tapping (discussed in greater detail in the next section). Traditionally, however, the Batak say that they did not practice tapping. Rather, they either climbed the trees to collect the resin that spontaneously exuded, "flower-like", near the top, or they simply picked up what eventually fell to the forest floor. This account seems plausible, and some of the oldest Batak claim that such collection practices in fact still were carried out during their youth: namely, during the late 1930s. This is unconfirmed, however.

On the other hand, all parties agree that the practice of tapping was introduced by lowland migrants — presumably lowland concessionaries who wanted to earn more money. Some Batak also recall a kind of "middle period", dated by one informant to the post-World War II years, during which the Batak took up tapping but not in the deep and destructive fashion practised today. Tapping in its present form was introduced by specific lowland concessionaries or their agents; it was dated to 1965 by one Batak at Calabayog and to 1961 by another Batak at Kayasan (Melanie McDermott, personal communication). This time period also saw significant numbers of lowland migrants taking up copal collection for the first time.

This may also be the time when the scale of copal-collecting increased to its present level.

Certainly today, lowland migrant and acculturated Tagbanua copal collectors — who have come to outnumber Batak collectors in most locales — collect far larger quantities of copal than the Batak. As the Batak say, their "needs" are greater, a circumstance that is directly related to the appearance of ever-more destructive forms of collection. Typical Batak copal-collecting trips last two to five days, depending on the river valley (and, in particular, on travel times back and forth between settlements and collecting areas). In contrast, better-financed lowland migrant and Tagbanua collectors remain up to a month in the interior, each collecting up to 1000 kilograms of copal before returning to the coast. There is also a subtle but significant difference in orientation. Lowland and Tagbanua collectors, typically young single males, regard copal collecting as a remedio, a sort of strategy of the moment to amass a quantity of money needed for a particular purpose — to make a down payment to buy land, to pay a debt, to get married, and so on. The Batak, in contrast, regard copal collecting



Manila copal is hauled to storage sheds to await transport to market.

...Batak resource use today

as part of their pangabui, or subsistence life-way. Hence for them, the sustainability of the activity is, at least implicitly, more of an issue.

Rattan collection

Similar contrasts surround rattan collection. About 70 species of rattan are found in the Philippines, belonging to four genera of the family *Palmae*: *calamus*, *daemonorops*, *kerthalsia*, and *plectocomia*. Those species that are identified and traditionally utilized by the Batak are shown in Table 6.

The differences between traditional Batak collection practices and lowland migrant collection practices are not as clear-cut as they are with copal. (I return to present-day rattan collection practices below.) This is in part because, unlike the situation with copal, ecological misbehaviour and resource depletion are not so immediately and visibly linked. The Batak do know that over-harvesting — taking

too much of the standing crop, particularly from single plants — brings about depletion. They also know that certain rattan species (palasan and bugtong, see Table 6) only send out one cane in their lifetime, a cane that, in order to prevent local extinction, must be allowed to flower, fruit and reseed before being cut.

Today the Batak claim that, at least in the past, they behaved better in these regards than lowland migrants now do, because they selectively harvested only a few of the largest canes from each plant, leaving behind more of the standing crop. This claim is supported in part by previous interview research by Haribon Palawan, which showed that the Batak in fact possess considerable traditional knowledge about the sustainable management requirements of various rattan species. As with copal, however, the Batak probably have had less of an impact on rattan resources if only because they harvest less, on the average, than lowland migrants do.

Honey collection

Here again, Batak practices are more conservation-oriented. The overall impact of any ecological misbehaviour by lowland migrants here is likely only slight, however, as they only collect those *nigoan* hives which are accidentally encountered in the course of other activities, and do not collect *potiokan* hives at

all. This notwithstanding, there are reports of lowland migrants, at least on occasion, using fire or even chemical insecticides to drive bees out of a hive, thereby effectively killing the swarm (according to these reports) rather than allowing it to survive and relocate elsewhere. While such reports seem plausible, they are not confirmed.

Other forest resources

There are numerous other kinds of resources that the Batak utilize or exploit: wild greens, aquatic fauna, forest animals, and so on. All of these resources are directly or indirectly affected by forest clearance and other activities related to lowland migrant settlement of Batak territory. While none of these resources are the target of large-scale lowland migrant exploitation in the same way as copal, rattan, honey, or land itself, some are quite rare and easily disturbed. Increased human presence and illegal trafficking in wildlife — even occasional — pose significant threats to these resources.

Current Batak resource use

I now discuss the way that the Batak utilize three major resources: agricultural land, copal, and rattan. I will pay particular attention to the departures from traditional practices caused by the influence of lowland migrants and state policies.

In 1995 the Batak began to resume *kaingin*-making at Calabayog and Mangapin. This followed a two-year *kaingin* ban imposed by the Puerto Princesa City government in 1992 as a forest conservation measure. This measure was subsequently revised to alleviate the economic hardships it created for upland farmers. Under the terms of the "Controlled Burning Ordinance of 1995", upland residents of Puerto Princesa City, including the Batak, were allowed to resume *kaingin*-making on certain kinds of lands and under conditions designed to minimize environmental damage.



Batak cultivation practices include intercropping upland rice fields with banana plants.

...Batak resource use today

This measure was promulgated too late in the 1995 agricultural season for most Batak at Calabayog to make *kaingins*, but most of those at Mangapin were able to do so.

Fields in the latter locale are generally close to the settlement and are mostly cut in low-fallow regrowth which was used just before the total ban took effect. With the assistance of Haribon Palawan field staff, Mangapin farmers constructed fire breaks prior to burning, dragged unburned debris into erosion-retarding "dikes"



Batak agroforestry measures also include intercropping cashew trees with rice fields.

across hillside fields, and intercropped their maturing fields with tree seedlings. The political situation regarding *kaingin*-making is very fluid, and current practices look primarily to the future. But there is cause for optimism in view of the traditional and still influential Batak desire to maintain their forest cover, especially with the recent successes of Haribon Palawan-assisted Batak efforts to secure their ancestral lands against further destructive encroachment by lowland migrants. At least for the present, much of these ancestral lands remain extensively forested, and on those lands cleared previously for agriculture, there is little erosion, growth of cogon (*Imperata sp.*), or other evidence of serious degradation.

The current situation regarding almaciga trees and copal collection is more serious and is part of an island-wide phenomenon. Conelly (1985: 43-44), for example, reports that copal resources have become seriously depleted on the west coast of Palawan, in the vicinity of Napsaan, due to a variety of factors that include increased exploitation by local forest collectors (see also Quiniones, 1980).

Callo (1995) studied three sample collection areas near Calabayog, Mangapin, and the Batak settlement in Caramay. He observed large numbers of dead and decaying almaciga trees in each area, and estimated that mortality among tapped trees ran as high as 65 per cent at the Mangapin site. Callo attributes this damage to

inappropriate tapping practices, characterizing the whole system as "unsustainable, very injurious to almaciga trees and even destructive" (Callo, 1995: 7). The Batak themselves are well aware of the damage that has already been done. They estimate that the proportion of the total stand of almaciga trees on the Tanabag and Langogan River watersheds lost to over-tapping ranges to 25 per cent and more.

The importance of copal collection to the Batak economy varies between different local groups, and the Batak generally collect much less than the Tagbanua and lowland migrants. During 1995 at Mangapin, only about three Batak men regularly collected copal. The rest cited the arduous nature of the work, their inability to provide their families with adequate subsistence while off on collection trips, and disputes with the concessionary over matters of payment and credit as their reasons for pursuing alternative income-producing activities. Copal collection is viewed more favourably and makes a bigger contribution to the economy of Calabayog, where most households have one regularly contributing collector (either a young married male or an unmarried teenage son). But even there collection is dominated by Tagbanua and lowland migrants; the concessionary's local agent estimates that Batak only account for about one-third of the total copal currently collected on the Tanabag River watershed.

With respect to those Batak who do collect copal, it appears to be moot whether they somehow do so more "sustainably" than their Tagbanua and lowland migrant counterparts. They all collect from the same trees, and the damage that each successive collector can do may be incremental but is cumulative. The Batak say they behave less aggressively than others in these regards, and they do collect on a smaller scale, as noted earlier. But there is not the clear evidence that there is with *kaingin*-making, for example, that the Batak are behaving more responsibly than others are with respect to almaciga tapping.

The current situation with rattan collection is similarly ambiguous. There is serious depletion of rattan stands on all watersheds inhabited by the Batak, a phenomenon reported elsewhere on Palawan as well (Conelly, 1985). There has apparently also been some local extinctions of commercially-valuable species, particularly palasan (Table 6), due to the harvesting



Some Batak have planted coffee on forest-shaded land near the river.

...Batak resource use today

practices described earlier. Also, a lot of rattan is simply wasted. Most of the canes that climb up into the canopy are cut off as high as a collector can reach, with the rest simply left behind if it can not be pulled down; it is easier to find other canes to cut than to climb to the canopy to free an entangled one. The Batak maintain that even today they collect rattan in a more ecologically responsible fashion than do Tagbanua and lowland migrants. But these claims, too, proved impossible to verify, and



Hook-and-line fishing in the river provides an important source of protein for the Batak.

most local observers believe that the current collection practices of Batak and non-Batak are the same.

The Batak at Calabayog and Mangapin do not currently regard rattan collection as being particularly profitable. By their own calculations, they can earn considerably more per day by collecting copal. As with copal, there is always the potential for disputes with concessionaries — about late payments, alleged undersizing, and the like. The attractions of rattan collecting are that it is less physically demanding and entails less travel than copal collection. At Calabayog, for example, collection areas for at least some varieties and sizes are within a 30- to 60-minute walk of the settlement. At Mangapin, the closest rattan collection areas are several hours away, but are still closer than copal collection areas. More individual Batak collect rattan than copal but rattan contributes somewhat less than copal to their household economy, at least at Calabayog.

Prospects for community-based management

Despite certain ambiguities about past practice, and certain convergences between Batak and immigrant lowlanders in present practice, the foregoing information points clearly to this conclusion: overall, the Batak approach to making a living in their environment is less destructive of natural resources and ecological integrity than that of lowland migrants. And yet this is not a brief for simply letting the Batak “manage their own resources for themselves”. For one thing, Batak material expectations, and the resulting pressure on their resources, continue to grow, and it is unrealistic to expect that this trend can be arrested or reversed. For another, extensive territorial penetration, intermarriage, and other kinds of social interactions with migrant lowlanders are immutable facts of Batak life.

In short, any realistic approach to developing more sustainable natural resource management practices among the Batak must simultaneously involve lowland migrants and take into account the nature of wider Philippine society. I begin by examining, in turn, the weaknesses and strengths of both Batak and lowland migrants, both in what they say and what they do. Then I discuss how some sort of synthesis might be developed that would build on each group’s respective strengths, in the interest of designing and implementing an effective community-based management regime.

The traditional Batak system of resource use, and its associated ideology, seems to be an appropriate place to begin. But efforts to build upon this system must recognize that it has some serious limitations. First, it does not explicitly address possible future resource depletion, either by the Batak or by others. At the level of ideology, the *panya’en* — those apparently ecologically well-intentioned “caretaker spirits” — are not really concerned about the Batak and their future, they are concerned about their own property. It is true that the Batak use resources judiciously, but this is because — or at least they say it is because — they fear the *panya’en*, not because they worry about the future. Certainly, when asked about it, most Batak do not seem to view future resource availability as a problem. Indeed, at least some people (perhaps most) seem to view many resources as inexhaustible. Honey, rattan, and copal were all specifically



The Batak also spearfish for crustaceans in the river.

...Prospects for community-based management

cited by various Batak as resources that "couldn't be used up", whatever the extent of utilization by Batak or by others, because they regenerated naturally (see below, however).

Second, the traditional Batak system of resource utilization does not include a basis for excluding outsiders, either physically or symbolically. Use is based on legitimate needs, acceptable to the *panya'en*. Lowland migrants, after all, have needs too, and while the Batak recognize that there has been unprecedented competition for resources from such migrants in recent decades, they continue to feel that any ecological misbehaviour is a matter for the *panya'en* to address.

Third, there are no obvious social sanctions for ecological misbehaviour, whether by lowland migrants or the Batak themselves. Again, these are matters that the spirits will take care of;



Collecting mollusks also contributes to the Batak diet.

men or women who abuse resources are not subject to ostracism or any other form of punishment by the group itself. In this regard, the Batak system of resource management, based as it was on low-impact exploitation by a limited population, traditionally lacked an important element of more developed common property management regimes.

And yet the Batak also bring some significant strengths to the situation. They have, after all, not significantly degraded their environment despite generations of habitation; moreover, they are quite aware of this fact — and justifiably proud of it. Living in or near the forest is particularly important, not only for subsistence reasons but as a valued part of a Batak's sense of identity and well-being. Upon returning from an NGO-sponsored conference in Baguio City, in the mountainous northern Philippines, the president of the Batak Federation spoke eloquently about how much he missed the forests of Palawan and about how the pine-covered slopes around the city were no substitute for the tropical forest at his doorstep in Calabayog. Other Batak, too, spoke of close emotional associations with the forest, and I am confident they are prepared to work for its preservation.

Second, the Batak bring profound knowledge of their environment to any community-based natural resource management programme. Much of this knowledge is embedded in their

low-impact, multidimensional subsistence strategy: itself a form of ecological wisdom. Unlike those lowland migrants who subsist entirely by farming, the Batak are reluctant to depend entirely on one single subsistence activity. They believe that lightly exploiting a wide variety of different forest resources minimizes the ecological impacts of human exploitation.

Third, and somewhat paradoxically, in view of some earlier-noted Batak "weaknesses", Batak do, in some contexts, clearly recognize that natural resource depletion is a potential problem. They also acknowledge that some depletion — e.g., of almaciga trees, or of stands of rattan — has in fact already occurred. They also recognize that increased exploitative pressures, embodied in growing numbers of lowland migrants to the uplands, are primarily to blame — and need to be addressed.

Turning to lowland migrants, it is important not to assume too much of a general nature about their environmental values because of their ecological behaviour during what is, for them, a new encounter with frontier resource extraction. Such migrants do not set out to be rapacious shifting cultivators or to otherwise destroy the frontier environment. The vast majority are peaceful, law-abiding folk, whose primary concern is securing a better living for their families. And yet it is clearly a significant limitation that many indeed do see frontier

resources as something that they want their "share" of, or perhaps even more than their share of, on the grounds that "if I don't get it, someone else will". Many migrants, based on their experience elsewhere in the Philippines, view the forest as something that will soon disappear anyway, which makes a "get-it-while-you-can" attitude toward forest resources all the more plausible and able to be rationalized.

However, there are also strengths, or potential strengths, in lowland migrant attitudes; they too bring a longer view and a commitment to a



The potiokean bee builds hives on high tree branches.

...Prospects for community-based management

kind of sustainability. The longer view of migrant farmers is characteristically centred around their immediate family and the (future) good of their children. Indeed, folk expressions about the latter are widely heard throughout the lowland Philippines, typically to explain economic striving by the parents. One such widely-heard expression is to the effect that "we're doing this so our children won't have to go through what we went through". The activity in question can include all sorts of efforts at economic betterment — including cutting down the forest. (Given their contrasting on-the-ground ecological behaviours in upland Palawan, it is of course ironic that lowland migrant parents should speak more explicitly than Batak parents about securing a better future for their children.) As in rural areas throughout the world where environments have sustained significant damage, especially over the last one or two decades, project area residents have failed to equate the sustainable management of local ecosystems



Erosion control barriers are a field preparation measure recently adopted by the Batak.

with sustained availability of the products which these ecosystems produce, and upon whose sustained availability their incomes and livelihoods depend.

Associated with this characteristic longer view of lowland migrants is a distinctive lowlander view of "sustainability". Whereas the Batak view the forest as something to be preserved and therefore exploited judiciously, lowland migrants view it as something to be removed to make way for upland farming systems. For at least some migrants, such systems need to be developed and managed in a sustainable fashion; some migrant lowland farmers have made impressive advances in this direction (Eder, 1996; see also Abdoellah, 1989; Cernea, 1992; Mittelman, Muenkul and Kamnerdratana, 1993). While at one level, migrants and Batak have quite different notions of what sort of future they desire, at another level they appear to share an important common interest in making that future a sustainable one.

Despite various strengths on both sides, however, and in spite of the fact that both Batak and lowland migrants do have a stake in conserving the forest and forest resources, the fact remains that individuals on both sides do engage in non-sustainable practices. But we should not forget that Haribon-IUCN's efforts to help develop community-based sustainable resource management in the Batak Ancestral Domain and the buffer zone of St. Paul's

National Park have been significantly transformed by the changes in recent decades.

- First, a heavy influx of lowland migrants has significantly altered prior resource management and utilization practices in an area that was once the nearly-exclusive domain of indigenous peoples.
- Second, an entrenched national concession system for timber and non-timber forest products has allowed outside entrepreneurs to profit from forest extraction. This situation has put increasing pressure on local limited resource bases in ways that have effectively contravened any prior rationale for sustainable management.

Because of this, restoring authority to local people to control local resource use is a vital first step toward more sustainable resource management within the project area. There are several formidable difficulties here that must be overcome, including:

- legitimizing the rights of local communities to own and manage their lands and resources;
- mediating competing stakeholder interests;
- forging public acceptance of any resulting sustainable management agreements; and
- institutionalizing the ability to monitor and enforce compliance with these agreements.



The Batak collect and sell canes from a variety of rattan species.

...Prospects for community-based management

organization and cooperation. Also on the plus side of the equation is the existence of traditional markets for forest products, and the welcome presence of outside facilitating agencies, Haribon Palawan and The World Conservation Union. These organizations have the ability to assist local people to identify instances of locally unsustainable resource use and to undertake mitigative measures when

called for. They are also able to present alternative sustainable management options that coincide with local needs and conditions. Indeed, the continuing assistance of these agencies in developing local capacities, catalyzing local resolve, and synthesizing local sustainable-use assets will be crucial if an effective conservation-based natural resource management scheme is to be established.



Rattan canes are cut and sized before being hauled to the settlement.

Conclusions

If significant political progress continues to be made in returning control over local resources to local people — and there is certainly cause for optimism in this respect — then the principal remaining issue is how to weave diverse cultures, institutions, and technologies into an effective community-based sustainable management capacity. This is a substantial challenge and a full response to it is beyond the scope of this report. But the data and analysis I have presented, and my own wider reading of the local situation, suggest that success in this endeavour can indeed be achieved, if the principal parties involved proceed together on three related fronts.

First, a role needs to be identified for the Batak's considerable traditional environmental knowledge, some of which has been detailed in this report. It would be unwise to overestimate the potential contribution of Batak knowledge to a locally appropriate management system (see DeWalt, 1994; Bellon, 1995), especially if it means overlooking potential contributions from either lowland migrant experience or modern resource management science. A concerted effort is necessary to survey all potentially appropriate kinds of knowledge and to educate local people about them.

In evaluating the role of the Batak's environmental knowledge, a possible starting point to begin is the ecosystem itself. One potential contribution of traditional Batak resource

management knowledge is to help define and better understand the ecosystem that the project aims to manage, especially since so little is known about it. Batak knowledge of seasonal flowering and fruiting patterns, animal behaviour, and so forth, could help establish a viable ecosystem as a basis for the management area and could help determine suitable harvest limits for forest products. In addition, acknowledgment and use of Batak environmental expertise would also contribute to empowering them politically.



The Batak tap almaciga trees at the base for copal.

...Conclusions

Second, local stakeholders must work together to make the project area economically, as well as ecologically, viable. A number of encouraging elements are already in place: the presence of markets for forest products that can, in principle, be harvested sustainably; the Batak's mobile, mixed subsistence strategy and their identification with the forest; and lowland migrant desires to settle, and their willingness to take a longer view of resource use.

The crucial issue of incentives, however, needs to be addressed; in particular, incentives to modify individual behaviour toward more sustainable farming and forest harvesting. There is a continuing role here for education — broadly defined — for all parties.

An aggressive upland agricultural stabilization programme aimed at lowland migrants, for example, could help establish cash crop options that would enable migrants to meet their subsistence and cash needs without excessive



Cut rattan canes are stored before transport to market.

reliance on the forest. Such a programme might also help enlist lowlander support for a sustainable management plan that they might otherwise view with scepticism. But there is also a need for more direct incentives to foster lower-impact behaviour, specifically with regard to market mechanisms that reward forest product exploitation. One possibility, for example (assuming that harvest limits are set), is for local resource managers to vary the level of cash payment that forest product collectors receive according to whether or not they remain within, or exceed, those limits.

The third way in which local stakeholders should proceed is broadly political and concerns the need to organize an appropriate management structure. Such a structure is needed to mobilize and utilize traditional Batak environmental knowledge; to develop and enforce incentives for ecologically-sound behaviour, and to otherwise strengthen the entire management programme.

Elements of such a structure already exist; for instance, in the close working relationship between the Batak and Haribon-IUCN, and in the complex economic and social ties between the Batak and lowland migrants. A project-focused management group that includes all stakeholders still remains to be established, however. As always, the choice is between working with an existing political structure, such as the local barangay organization, or

establishing a new one, such as a local watershed users association. Any such local management organization must be geared toward the management of resources, and must not merely act as a vehicle for outside interests. Organized

and genuinely empowered local people, who share the benefits from — and the responsibilities for — the management area, is the best guarantee of the long-term success of this innovative and promising project.



The almaciga tree, a source of Manila copal, reaches high into the forest upperstorey.



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Appendix

Table 1. Batak place names along a 12-km section of the Langogan River

1: confluence	3: deep water	2: rapid	4: cliffs
Mangapin (present settlement site)		biatatanen: 1, 2	
girek; 1, 2		nanag: 1	
mabitia: 1, 2		bulalakaw: 3, 1	
tabid: 1, 2		sigiang: 3, 1	
bangkal: w3		naglogan: 3, 1	
makanreb: 1, 3		ablay: 3, 4	
piamenglayan: 1, 3		agutay: 3, 1	
siadig: 1, 3		linwasan: 3, 1	
legas: 1, 3		ganed: 1, 2	
bagtik: 1, 2		naglimbengan: 1, 2	
ingegsuran: 1, 3		kanibognan: 1, 3	
ogis: 1, 2		malelbegan: 1, 3	
kiaswagan: 1, 2		malabago: 1, 3	
balingasag: 1, 3		Pitpiten (1970-72 settlement site): 1, 2	
papandayan: 1		pioksan: 1, 2	
tabangarangan: 3, 2		mayboingaw: 3, 1	
mamonmon: 1, 2		tiniktik: 1, 2	
kaybacong: 1, 3		maropropanen: 3, 1	
tumulaong: 1, 2		ginibolangen: 1, 2	
maglepad: 1, 2		pagtayan: 2, 1	
pagtilben: 1, 2		bayo'o: 3, 1	
alupayed: 1, 2		bonoang: 1, 2	
alangay: 1, 2		biakal: 1, 2	
kokodiawan: 1, 2		Paglaglagan (proposed NAPOCOR damsite, near Kabuyaw stream): 2, 1, 4	
maaripit: 1, 3			



Table 2. Traditional Batak animal foods

	Batak name	Scientific name
Mammals		
Wild pig	baboy	<i>Sus barbatus palawensis</i>
Porcupine	dugian	<i>Thecurus pumilus</i> (Gunther)
Palawan stink badger	tuldo	<i>Sullotaxus marchei</i> (Huet)
Scaly anteater	bay'i	<i>Paramansia culionensis</i>
Palawan bear cat	amantoron	<i>Artictis whitei</i> (Allen)
Little leopard cat	mire'	<i>Felis minuta</i> (Temminck)
Dwarf small-clawed otter	dengen	<i>Amblonyx cinerea cinerea</i>
Macaque	bakes	<i>Maceca philippinensis</i>
Flying squirrel	beyatat	<i>Hylopetes nigripes nigripes</i>
Palawan tree shrew	ka'may	<i>Tupaia palawanensis</i>
Squirrel (small)	bising	<i>Callosciurus</i> (Gray)
Squirrel (large)	soysoy	<i>Callosciurus</i> (Gray)
Fruit bat	paniki	suborder Megachiroptera
Insectivorous bat	kalagbeng	suborder Microchiroptera
Birds/jungle fowl		
Palawan peacock pheasant	tandikan	<i>Polyplectron emphanum</i>
Wild chicken	katian	<i>Gallus gallus allus</i> L.
Birds/general	manmanok	class Aves
Reptiles		
Box pond turtle	bayo'o'	<i>Cuora amboinensis</i>
Python	maraniyog	<i>Python reticulatus</i>
Water snake (?)	balinaynay	suborder Ophidia

...Appendix

Table 2. (continued)

Fish		
River eel	katsili	order Anquilliformes
"Fish"	seda'	class Osteichthyes (16 named varieties)
Mollusks/crustaceans		
Shrimp	carundang	class Crustacea
Crab	kaye'ke	class Crustacea
Univalves	be'gay	class Gastropoda (17 named varieties)
Insects		
Honey bee larvae	aniran	order Hymenoptera (5 named varieties)

Table 3. Traditional Batak plant foods

Batak name	Description	Scientific name
Greens		
Anopol		<i>Poikilospermum suaveolens</i>
Bago		<i>Gnetum gnornom</i> L.
Bayakbakaw		
Baradong		
Biasaian		
Dar	escape taro	<i>Colocasia esculentum</i> (Linn.)
Katumbal	escape pepper	<i>Capsicum frutescens</i>
Katebek		
Pako-pako	fern	<i>Athyrium esculentum</i> (Retz.)
Sandaen		
Sugi-sugi		
Fruits		
Akaray		
Alandeg	santol-like	<i>Dracontomelon sylvestre</i>
Amogis		<i>Koordersioclendron pinnatum</i>
Arupiran	carambola	<i>Averrhoa carambola</i> L.
Bago		<i>Gnetum indicum</i> (Lour.)
Balisangkad	wild rambutan	<i>Nephelium lappaceum</i>
Bonog		<i>Garcinia benthami</i>
Bul		
Candis		<i>Garcinia lateriflora</i>
Dagaa		
Keliat		
Kindi-kindi		
Lakyaw		

...Appendix

Table 3. (continued)

Lipso'	apple-like	<i>Aglaia sp.</i>
Lupok-lupok		
Magarugian		<i>Durio graveolens</i> Becc.(?)
Malinapog		
Pali	mango-like	<i>Mangifera sp.</i>
Pangi		<i>Pangium edule</i>
Pa'o	mango-like	<i>Mangifera altissima</i> Blco.
Paraminlolon		
Pega-pega	lime-like	<i>Citrus aurantifolia</i> Swg.
Popoan	breadfruit-like	<i>Artocarpis attilis</i>
Wayway		<i>Gnetum snonom</i> L.
Tubers		
Abagan	wild yam	<i>Dioscorea luzonensis</i>
Ayabe'	wild yam, vine	
Banag	wild yam, vine	
Carendang	wild yam, vine	
Kudot	wild yam	<i>Dioscorea hispida</i> Dennst.
Su'dan		
Suga'ok		
Wanday		
Other		
Wild bananas (2 named varieties)		
<i>Musa errans</i> (Blco.) Teodoro		
Palms (5 named varieties)		
<i>Arenga sp.</i>		
Rattans (7 named varieties)		
Fungi (14 named varieties)		
Bamboos (3 named varieties)		
<i>Bambusa sp.</i>		

Table 4. Plants that attract bees

Plant	Scientific name	Flowering month	Honey quality
hagonoy		February	2nd
banegbegan	<i>Pterocymbium tinotorium</i>	March	2nd
taloto		March	1st
dumaresa	<i>Shorea contarta?</i>	March	1st
samereg		March	1st
balisangkad	<i>Nephelium lappaceum</i>	March	2nd
manaw		April	2nd
malabnang		May	2nd
bayoso'	<i>Pometia pinnata</i>	June	1st
tayubang		June	3rd
ipanga		June	1st
ulayan	<i>Quercus so.</i>	July	4th
lahipga		July	1st
aropag	<i>Euphoria dicyma?</i>	July	3rd
begnay		July	3rd
ala'kat		August	3rd
padiegan		September	2nd
bogo	<i>Gnetum gnormon</i>		3rd
tailis			3rd

...Appendix

Table 5. Trees that attract wild pigs

Tree	Scientific name	Month of simbolan
sagasa	<i>Glochidion littorale</i>	January-February
bagto		February-March-April
ba'wat		February-March-April
alakat		March-April
lagioan		March-April
camaringin	<i>Semercepus philippinensis?</i>	March-April
sala		May
malagtem		June
nato	<i>Palaquium luzoniense</i>	June-July
bangloan		June-July
balisangkad	<i>Nephelium lappaceum</i>	June-July
baloing		June-July
bayoso'	<i>Pometia pinnata</i>	July
ipangah		August
marabayangan	<i>Cyperus rotundus</i>	August
tayobang		August
danglisan	<i>Grewia multiflora?</i>	September
olayan		October-November
sabsaban	<i>Polygonum so.</i>	November
pangi'	<i>Pangium edule</i>	December

Table 6. Locally important rattan varieties

Commercially-important varieties

ariingan	
bugtong	<i>Calamus mindorensis</i> Becc.
colombi	
dagket	
kalabang	<i>Calamus ornatus</i>
lapsik	<i>Daemonorops mollis</i> (Blanco) Merr.
lipi	<i>Microsphaerion ?</i>
palasan	<i>Calamus merrillii</i> Becc.
sambolagan	

Non-commercial varieties: (for subsistence purposes only)

dakawan
morowa
omagas



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