

Ethnicity and the Utilization of Non-Wood Forest Products: Findings from Three Philippine Villages

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The utilization and trade of non-wood forest products in three villages in the Philippines were compared in this study. Two villages were situated close to each other on the Island of Palawan. The Tagbanua, an indigenous people, inhabited one village; migrants from the Visayas Region of the Philippines populated the other. The third village is located on the Island of Leyte, in the Visayas Region, populated by native Visayan settlers. There was no significant difference in the number of NWFPs utilized by the indigenous people and the migrants. However, there was a wide disparity in income between the two groups, with migrants earning more, partly due to the marketing of commercial NWFPs. This gap could be decreased by fairer trading practices that are dependent in part on better educational opportunities, land rights, legal assistance and access to markets for the Tagbanua. Specific socioeconomic characteristics, such as the presence of a hunter within the household and size of the family were found to have a positive correlation with the use of NWFPs in some study villages. Income and the food expenditure of the household were inversely related with the use of NWFPs in the native Visayan village.

Keywords non-wood forest products (NWFPs), indigenous people, migrants, subsistence, market, Philippines

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1 Introduction

1.1 Indigenous People and Migrants

This study examines the relationship between non-wood forest product (NWFP) use and the indigenous or migrant status of the users. In the continuing discourse on political, economic, and social class, ethnicity is often included as an explanatory variable. This is particularly true in some countries in Africa and the Asia-Pacific region, where many indigenous groups are still defining their standing within a political and economic environment and where they are often a less powerful subclass in the hegemony (Howard 1989). Although the discussion on ethnicity frequently revolves around the legal rights of indigenous people and their disempowered status in the larger economy (La Vina 1994), there seems to be a tacit assumption that despite their disadvantages, at some level, the needs of indigenous people are being met. This idea may be based mostly on two observations. The first is their continued existence as a distinct group within the larger population, which is not possible if they are not able to sustain their way of life. The second is the environments in which indigenous groups usually live, which are often the least developed and accessible areas, likely the last pieces of wilderness left. It is normally assumed that there is less competition for land and other natural resources in these areas from the non-indigenous population.

The reality is much more complicated. As Devalle (1989) suggests, even the scientific study (of tribes) has succumbed to stereotype, denoting aspects such as culture or various modes of production as part of a (human) taxonomy. The result of categorization according to ethnic types belies the realities that indigenous people deal with as part of the historical process. Some of these realities include an increased dependence on trade with the non-indigenous population rather than maintaining an essentially subsistence livelihood, and greater competition for forest resources with migrants into their area. Mark (1999) describes some of the historical effects of greater integration into the monetary economy. He proposes that the effects include less friction between common users of natural

resources, since the economic system absorbs most of the functions that the ecological system has had previously for more subsistence-based societies. These functions include providing food, shelter, medicine, and other necessities without the need for direct extraction or production of the desired goods. However, the negative effect of this lack of friction is an economic development that cannot possibly be sustained unless the closer interactions between the economy and the spatial and temporal limits of the ecosystem are restored.

In the Philippines, most of the remaining forests are located in the uplands and mountainous areas. These areas are among the last bastions of indigenous people, of which the Philippines has approximately 127 groups (ESSC 1998). 'Indigenous' and 'ethnic' within the Philippine context require some clarification, because ethnic status is not so much based on racial background, as it is on the position of the group in a broader historical context. Jocano (1998) suggests that it is based on shared cultural similarities, and the level of integration into the larger society. Historically, the indigenous groups in the Philippines were of the same Malay-Polynesian background as people of the dominant lowland culture, but had not been colonized by either the Spanish in the 1500s or by the Americans at the turn of the last century. The conflicts and compromises related to the use of natural resources are particularly critical in the Philippines, because of the rapid population increase, and heavy in-migration to the uplands (World Resources Institute 1992). In many cases, the immigrants have very limited options not only in their original locale because of scarce agricultural land (Findley and De Jong 1985), but also lack education and skills for employment in urban settings (Suzuki 1996, Veloro 1996, Homer-Dixon, as cited in Huby 1998). Migrant encroachment on livelihood activities of the already severely disadvantaged indigenous people, such as NWFP extraction, often occurs. Analyses of the factors affecting the use of limited resources are needed to dispel erroneous beliefs of either sustainable or baneful user groups, especially if national policies are to some extent based on what may be stereotypes.

1.2 Non-Wood Forest Products

Documentation of the importance of non-wood forest products to the subsistence of forest dwellers (e. g. Appasamy 1993, Jensen and Balslev 1995) and for rural income generation (e. g. Gunatilake et al 1993, LaFrankie 1994) in tropical countries is increasing. Studies regarding the different uses of various plant and animal forest species to local populations, and valuation of NWFP potential per hectare of forest, have also contributed greatly to the understanding of NWFPs role in economies and for forest conservation (Chopra 1993, Hall and Bawa 1993). Godoy et al (1995) have done an analysis of the effects of income levels on the kinds and quantities of non-wood forest product extraction by various forest communities. They have concluded that although higher income can be associated with a decline in the importance of NWFPs within the household economy, it does not necessarily encourage specialization in the products foraged, nor does it necessarily lessen the gross economic value of the NWFPs harvested. Wickramasinghe et al (1996) identified some variables related to NWFP collection. Their primary findings were that due partly to the labour availability in a household, family size was directly positively related to whether households collected commercial NWFPs or not, and that the size of the agricultural land of a household, was inversely related to the quantities of NWFPs collected. Yet, there are still many unanswered questions concerning the social and economic factors that affect the kind and level of NWFP extraction. Some of these socioeconomic factors include the indigenous status of the collectors. This may affect aspects of NWFP extraction in various ways, such as familiarity with local plant and animal species, and whether the quantities harvested are mostly for subsistence use, for market, or have reached the level that suggests a need for domestication (Dove 1997; Pinheiro 1997).

The status of non-wood forest products in the Philippines reflects current ideas about the use of natural resources in other parts of the world. One of the most prevalent of these ideas is the sustainability of NWFP use by indigenous people, especially in comparison with the use of the same resources by non-indigenous groups

(FAO 2000; Gatmaytan 1997). However, there is evidence that even subsistence use of NWFPs by indigenous people can lead to depletion unless there are also low population densities and secure property rights for the extractors (Godoy et al 1993). Otherwise, conflict between two or more groups dependent on the same dwindling natural resource is often inevitable. Much of the conflict is based on inequality in the ability and desire to exploit the natural resources, another part of the problem is that of inequity in the distribution of benefits from such utilization (Huby 1998). Often however, there are tenuous, informal but very strict arrangements between the groups making use of the same resource (Agesen 1998). Both cooperation and competition for NWFP extraction exists between indigenous people and migrants on the Island of Palawan, where the main part of this study was conducted.

1.3 Objectives of the Study

The main objectives of this paper are first, to describe as accurately as possible the local use of an important forest resource, in this case the NWFP called *bagtik* or *almaciga* resin. This NWFP is an exudate from the almaciga tree [*Agathis dammara* (Lamb.) L. C., or *Agathis philippinensis* Warb.] which is used for the manufacture of varnish, paints and other industrial chemicals. The second objective is to analyze the role of ethnicity in the management of forest resources, which in the Philippines is one of the main criteria for certain types of forest stewardship arrangements with the government. The last objective is to find specific socioeconomic characteristics of NWFP users that correlate with their knowledge and use of NWFPs.

To accomplish these objectives, this paper is divided into two parts. The first part of this paper describes the almaciga resin collection and marketing practices of two villages in Palawan which were highly dependent on this NWFP for a cash income. The second part of this paper is a description of the non-wood forest products used for subsistence in these two Palawan villages, and a third village called Cienda located on the Island of Leyte, and whether ethnicity had some association with the knowledge of NWFPs.

2 Study Area

The settings for this study are villages within the provinces of Palawan and Leyte, two of the larger islands in the Philippines with still sizeable-forested areas. These villages were selected partly because of their proximity to forest and the ethnic composition of their populations. The study required that two forest-edge villages in Palawan, one populated mostly with indigenous people, the other mostly with migrants from the Visayas Region of the Philippines, be selected. A third village, in a forest within the Visayas Region, is included for comparison as a community with native Visayan inhabitants. The provinces of Palawan and Leyte were also chosen for specific reasons. Palawan is considered the 'Last Frontier' in the Philippines due partly to the possibilities of settlement and agricultural expansion which is no longer the case in more densely populated islands. It has a land area of almost 1.5 million hectares, two-thirds of which is still classified as forest by the Department of Environment and Natural Resources (DENR 1999). Leyte, on the other hand, has a land area of 800, 306 hectares, only a fourth of which is classified as forest (DENR 1999). It is one of the few islands in the Visayas with forest remaining.

Due to its location on the Sunda Shelf, the flora and fauna of Palawan Island are considered to be more similar to those found on the Island of Borneo to its west than in the rest of the Philippines to its east. In addition, the isolation of Palawan from Borneo by any land connections for the past 600 000 years has given rise to a high level of endemic species (1 in 10) of vertebrate animals and flowering plants. However, the heavy immigration of people from other parts of the Philippines, has resulted in a widespread transformation of the forests into agricultural land (Göltenboth et al. 1998). This change in land use combined with more intensive use of both timber and NWFPs has affected not only the unique biodiversity of Palawan, but also possibilities for continued extraction of forest resources.

The Tagbanua are one of seven indigenous groups identified on the main Island of Palawan Province, living mostly in the central and southern parts of the island (ESSC 1998). As recently as the 1950s, the Tagbanua lived both in the low-

land forests and coastal areas of Palawan. However, the encroachment by migrants has pushed them into the interior forested areas, increasingly farther from the provincial economic center and capital, Puerto Princesa, and their traditional ancestral base in what is now known as Aborlan Town. Traditionally, the Tagbanua have multiple sources of livelihood, comprised of slash-and-burn agriculture, collection of non-wood forest products both for subsistence and for trade, hunting, and fishing. Later in the century however, the Tagbanua who had moved further south towards the eastern face of Palawan's central mountain range, had shifted to more permanent agriculture. As well, the collection of NWFPs had concentrated on the commercially valuable *bagtik* or almaciga resin and rattan (*Calamus* sp.) (Fox 1982, Conelly 1996).

The dominant group of migrants on formerly Tagbanua territory in Southern Palawan is from the Philippines' Visayas Group of Islands. These islands comprise the provinces of Leyte, Samar, Aklan, Antique, Iloilo, Negros, and Cebu. Studies of the Visayans and their culture inevitably include the phenomenon of within-country migration, sometimes to urban areas but more often to frontier settlements where acquisition of farmland is the primary incentive (Hoffman 1982, Suzuki 1996, Veloro 1996). In Palawan, the migrant settlers have successfully transformed forest into farmland for their livelihood, in some cases encroaching on the traditional settlements of the indigenous tribes. They have also become competitors with the indigenous people in the extraction of non-wood forest products, especially those with commercial value. In most of the remaining forests of the Visayas, the extraction of specific NWFPs is severely prohibited (DENR 1999) and has been for at least a decade. Siebert and Belsky (1985) have described the depletion of a commercially important NWFP, rattan (*Calamus* sp.) and its effects on the livelihood of villagers in Leyte, in the 1980s.

The villages of Boong and Manaile in the Province of Palawan, and Cienda in the Province of Leyte, share one important feature, for which they had been chosen for this study. All three villages are located at the forest edge. The villages were also chosen for the ethnic composition of their populations. The Tagbanua, who are an

indigenous group of Palawan, populate the village of Boong. The nearby village of Manaile is a settlement of migrant families, mostly from the Visayas provinces. Cienda is a village in Leyte, one of the Visayas islands, one of the few which still have some forest cover.

The study villages' location in forest areas was determined by examining maps of Palawan and Leyte. Based on previous information about the tendency of forest settlers to live among people of the same ethnic group, population statistics of forested municipalities were requested from the provincial offices of the Department of Environment and Natural Resources (DENR). The ethnic compositions of the villages were initially determined from the municipal statistics of the Aborlan and Narra Municipalities in Palawan, and Baybay municipality in Leyte. A shortlist of possible study villages in the above municipalities was drawn up. Initial interviews with community organizers and the respective village headmen were done to determine whether the prospective study villages were sufficiently dependent on NWFP collection to be chosen as the study sites. From these, the following villages were chosen to represent the communities:

- Boong – indigenous community (Tagbanua ethnic group)
- Manaile – migrant community (Visayan ethnic group)
- Cienda – non-migrant Visayan community

In Palawan, the dependence of the indigenous community on the migrant community for help in dealing with the non-indigenous world occasionally resulted in conflict between the two groups, although more often there was a quiet wariness on both sides. Both villages depended on the other to some extent – the Tagbanua had helped the earlier migrants learn which of the numerous forest species could be useful for food and medicine. These were skills that were especially useful during the establishment of Manaile, especially before the new settlers' first harvests. In exchange, the presence of the migrants and their intervention with provincial administrative authorities had accelerated development in the area. Boong gained an unpaved road leading to it, although there was still no bridge across the section of the Manaile River separating it from

the Village of Manaile. There was also a small one-room schoolhouse in Boong, although one teacher for all the levels could not possibly give all the children of the village enough attention. During more friendly encounters between the tribal leader of the indigenous community and villagers from the migrant community, the road and the schoolhouse were considered products of cooperation between the two villages. On visits when there were bad dealings between people from either village for whatever reason, charges of misplaced trust were mostly blamed on the ethnicity of the other party.

3 Methods

3.1 Methods of Data Collection

The data for this study were collected through face-to-face interviews using the local dialect with the help of interpreters or directly in Filipino (Tagalog), the national language, as the respondents preferred. As an aide to the interview process, semi-structured and open-ended questionnaires were used. There were also field visits to the NWFPs collection areas, and participant observation. The interviews and forest visits were conducted during approximately two-month stays in the vicinity of each of the study villages during 1998, and again for the second phase of data collection, in 1999. There was an attempt to interview all the heads of the households in the three study villages. However, it was only in Boong where a complete sample from the whole population of fifty households was accomplished. Due to refusals, in Manaile, only forty-four individuals who were the acknowledged heads of their households were interviewed, which comprised fifty-six percent of all the households. In Cienda, representatives of forty-one of the sixty households (68%) were interviewed. The majority of refusals were due to reportedly unpleasant dealings with outsiders experienced by some of the villagers and the fear of giving information about sources of livelihood. Doubtless, the refusals may have had effects on the results. For example, it is probable that the data on animals hunted could have been greatly

augmented by information from more intensive hunters who refused to be interviewed. However, the researcher decided that a 'forced' interview would have likely lead to more erroneous information than one given willingly.

Interviews with key informants, and participant observation, which involved visits to collection sites and use of some NWFPs by the researcher, were also done to support or clarify information supplied by the villagers. Some of these key informant interviews were conducted with people who do not reside within the study villages, but lived in the surrounding communities. These informants were experts in their own right (e.g., hunters who no longer go to the forest due to old age provided information on the availability of game through the years; dealers in NWFPs). In many cases during interviews, the other members of the households included in the sample were present to give their own observations. These comments were also recorded and verified with other sources.

During two rounds of interviews, respondents were asked about the non-wood forest products they knew about and used. The first round of interviews was done to assess which NWFPs the villagers were familiar with, whether they used these forest products, and the quantities of those products used. The second round of interviews was based on the answers given during the initial interviews. The second round of interviews were conducted both to confirm or correct the answers given during the initial interviews, and also to gather additional information.

The first interview schedule included questions on the respondents' socioeconomic situation, and questions on various categories of NWFPs such as edible plants, game, honey, building materials, medicinal plants, and commercial NWFPs such as rattan, orchids, and other ornamentals. The respondents were asked what their main and secondary sources of income were. The main source of income is defined in this study and was explained to the respondents as the work that provided their household with the most income in money and goods. The secondary source of income is defined as coming from work that augmented the former.

Like the concept of 'household', the categories of NWFPs studied were also useful in providing

some order for the presentation of the data. These categories also proved useful in serving as cues when asking the respondents about the benefits they got from the forest aside from wood. However, these categories are by no means mutually exclusive. The food and medicinal properties of some plants are considered equally important and indeed inseparable, and often a single plant has several uses depending on the plant part discussed. As well, for some NWFPs the line separating a product used at the subsistence level, from a commercial product is becoming obscure.

For the second round of interviews, a checklist of all the plants mentioned in the first interviews was circulated among the original set of respondents. The respondents were asked if they knew the forest products on the checklist, if they used any of those products, and how often they used the products. The checklist was completed first to ensure that the answers given during the first round of interviews were accurate. It was also used to determine if the respondents left out the names of some NWFPs in their answers during the initial interviews, perhaps due to absence of a memory-aid. Assistance with the checklist was provided to residents who could not read.

3. 2 Statistical Analysis

Descriptive statistics were used to determine the socioeconomic characteristics of the respondents in the three villages. Figures given by the respondents, such as prices of commercial non-wood forest products and terms of exchange for bartered goods, were checked with other sources both within and outside of the study villages. This was done to give a clearer picture of the types of communities that frequently settle near the remaining forest areas of the Philippines, and who likely have the greatest impact on NWFP extraction among the rural population. The case of *almaciga* (*Agathis philippinensis* Warb.) resin collection in Palawan was given additional emphasis, because it illustrates the economic, and to some extent political implications of the NWFP trade.

Statistical tests involving correlation coefficients and regression were performed to test any associations between specific socioeconomic characteristics of the respondents and their

knowledge and use of non-wood forest products. Characteristics of the respondents were used as independent variables. Among these factors, which are measurable in an interval scale, were age; the number of years of formal schooling representing 'Education'; Income; the number of household members dependent on a shared income (Size of family); food expenses of the household; and hectares of land owned or had rights to. F-distribution tests were completed on the nominal factors of respondents' gender, and whether members of the household hunt or not, to determine associations with these factors and the number of NWFPs correctly identified. Statistical significance for correlation analysis was set at the 0.05 level of significance.

One of the main purposes of the study was to determine whether there was a significant difference in the number of NWFP species collected by indigenous people, and migrants. For this reason, a z-test was performed between the means of the number of NWFPs collected in each of the three study villages. The two-sample z-test for means with known variances was used to test differences in population means. Boong, with its primarily Tagbanua population, was compared with Manila, with its migrant population from the Visayas. Cienda, with an 'indigenous Visayan' population was compared with Manila, whose population was composed of the ethnic Visayan, who had settled elsewhere than their home province. Finally, Cienda and Boong were compared as two villages with indigenous populations, although it could be argued that the Tagbanua may have possibly lived in Palawan for a few centuries more than the people of Cienda have lived in Leyte. The results of two separate sets of z-tests are presented in Table 3, and Tables 4a and 4b. For the z-tests presented in Table 3, the means of the number of plants collected by the households mentioned during the initial interviews were used. For the z-tests in Table 4a, the means of the number of plants mentioned during the second phase of interviews, with the help of a checklist compiled from answers during the initial interviews, were used. Hypothesis testing on the results of both the initial interviews and the second phase of interviews were done to check or reinforce the results. The Null Hypothesis is that there is no difference between any two of the three popula-

tions in the study. The Alternative Hypothesis for the Boong-Manila z-test is that the number of NWFP species collected by indigenous people is significantly greater than the number of NWFPs collected by the migrants.

In reporting income and other monetary values, the 1998 average exchange rate of forty Philippine Pesos to one U.S. dollar was used.

4 Results

4.1 Descriptive

4.1.1 Socioeconomic Characteristics of the Respondents

The results of the initial interviews showed that the residents all had a feature in common due to their proximities to the forest. The inhabitants of all three villages were to some degree, dependent on the forest as an important source of both subsistence and commercial goods. The villages varied in terms of dependence on forest-based activities as the main income source, and the secondary income source.

In Boong, 64 percent of all the households depended on non-wood forest product (NWFP) extraction, specifically almaciga resin and rattan, for their main source of income. In addition, 41 percent considered NWFP collection as their second most important income source. In Manila, agriculture was the most common income source, but 21 percent considered gathering almaciga resin as their major source of income and another sixteen percent considered it their second most important source of income next to agriculture.

In Cienda, the rattan trade had stopped due to a depletion of natural supplies, and the gathering of honey was an income-generating activity for only a few individual experts. However, one of the most common crops after rice and coconut was a fiber crop, abaca (*Musa textilis* L.), which was grown in slash-and-burn plots called *kaingin* within the forest. Abaca is still classified as a non-wood forest product by the Philippines' Department of Environment and Natural Resources (DENR 1999). However,

Table 1. Socioeconomic characteristics of the respondents in Manaile, Palawan; Boong, Palawan; and Cienda, Leyte.

Socioeconomic indicator	Village					
	Boong		Manaile		Cienda	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age	38.5	13.9	38.0	12.8	43.5	15.5
Years of formal schooling	2.9	2.3	6.9	3.8	5.5	3.3
Number of children	3.1	2.2	3.8	2.5	4.2	2.5
Annual income (in Philippine pesos)	16502	10579	29513	33474	23358	15005
Landholdings (in hectares)	1.1	1.4	0.9	1.2	1.0	1.1

most of the abaca in Cienda had been planted. The maintenance and harvest of abaca plots had made the opportunistic collection of NWFPs for food, medicine, and house building materials almost habitual among the villagers of Cienda. Forty-two percent (42%) of Cienda villagers considered edible forest plants absolutely necessary additions to their food supply. Likewise, although only seven percent of Manaile households were highly dependent on forest food for subsistence, 34 percent considered edible NWFPs welcome additions to their diet. In Boong, 70 percent of the households depended on hunting for their protein, and as many considered forest plants a necessary part of their food supply.

In terms of other socioeconomic characteristics, the Visayan households of Manaile, Palawan and Cienda, Leyte, had more in common than the Tagbanua households of Boong, Palawan. The number of dependent children in the family, the years of formal schooling of the head of household, and the average annual income of the household were more similar between Manaile and Cienda, than between Boong and Manaile, which are situated only seven kilometers from each other (Table 1). Noteworthy was the huge disparity in mean numbers of years in formal schooling and income between Boong and Manaile, as the Tagbanua households had less than half the average years of formal schooling and a little more than half the average income of the Visayan households of Manaile. The average age of the head of household in Boong and in Manaile, were however closer than the average age of the head of household in Cienda.

4.1.2 *Non-Wood Forest Products Identified by the Respondents in the Three Study Villages*

The households of the three villages under study identified some non-wood forest products that were specific only to their area. However, many common NWFPs among all three villages, and especially between the Palawan villages of Boong and Manaile, were found. It is interesting to note that most of the NWFPs common to all three villages are also largely commercial products, although there was also much use of these plants for subsistence purposes. The lists of non-wood forest products are presented in Tables 2a and 2b.

Most of the plants identified as useful forest products in the three villages served multiple purposes. During the interviews, questions categorizing use for these plants were asked, such as which plants were used for food, medicine, handi-crafts, or building materials. All respondents gave several uses for most plants mentioned, mostly depending on the part of the plant concerned. In some cases, such as that between edible and medicinal plants, the categories were not distinct. It should be noted that the Tagbanua of Boong were not forthcoming about their use of medicinal plants, which probably has greatly affected the results of the hypothesis tests done for this study regarding the number of species identified as useful in the three villages.

This lack of openness may be ascribed to two sources. The first was the fear of 'biopiracy' which a local non-government organization had

Table 2a. Non-wood forest products commonly used by households in Boong, Palawan; Manaile, Palawan; and Cienda, Leyte.

Scientific name/family	Tagbanua common name	Common name in Manaile (Visayan)	Common name in Cienda (Visayan)
<i>Agathis philippinensis</i> Warb./ARAUCARIACEAE	bagtik	almaciga	n.m. ^{a)}
<i>Allium tuberosum</i> Rottler ex Sprengel/AMARYLLIDACEAE	ganda	n.m.	n.m.
<i>Antidesma bunius</i> (L.) Sprengel/STILAGINACEAE	n.m.	bignay	n.m.
* <i>Aphanante negronensis</i>	urang	n.m.	n.m.
<i>Ardisia squamulosa</i> auct. non Presl./MYRSINACEAE ^{b)}	tagpo	n.m.	n.m.
<i>Arenga ambong</i> Becc. or <i>Arenga undulatifolia</i> Becc./ARECAEAE	batbat	batbat	batbat
<i>Artocarpus altilis</i> (Parkinson) Fosberg or <i>Artocarpus camansi</i> Blanco/MORACEAE	kamansi	n.m.	n.m.
<i>Artocarpus blancoi</i> (Elm.) Merr./MORACEAE	antipolo	n.m.	n.m.
<i>Artocarpus heterophyllus</i> Lamk./MORACEAE	langka	nangka	nangka
<i>Arytera littoralis</i> Blume/SAPINDACEAE	alasan	n.m.	n.m.
<i>Athyrium esculentum</i> Copeland/DRYOPTERIDACEAE	n.m.	pako	pako
<i>Averrhoa bilimbi</i> L./OXALIDACEAE	n.m.	kamias	n.m.
<i>Azadirachta excelsa</i> Jack/MELIACEAE ^{b)}	maranggo	n.m.	n.m.
* <i>Bambusa</i> sp./POACEAE	kawayan	kawayan	kawayan
<i>Bixa orellana</i> Linn./BIXACEAE	n.m.	n.m.	suete
<i>Caesaria paucinervia</i> Merr./MYRSINACEAE	uyong-uyong	luyong-luyong	n.m.
<i>Cajanus indicus</i> Sprengel/FABACEAE	kadyos	kadyos	tadyos
<i>Calamus merrillii</i> Becc./PALMAE	palasan	n.m.	n.m.
<i>Calamus ornatus</i> Blume/PALMAE	rimoran/limuran	alimuran	n.m.
* <i>Calamus</i> sp./PALMAE	yantok	yantok/ rattan	yantok/ rattan
<i>Callicarpa erioclona</i> Schauer/VERBENACEAE	palis	n.m.	n.m.
<i>Canarium asperum</i> Benth./BURSERACEAE	n.m.	sahing	n.m.
* <i>Cardia dichotoma</i>	n.m.	anonang	n.m.
<i>Caryota cumingii</i> Lodd./PALMACEAE	anibong	anibong	pugahan
* <i>Celosia argentea</i>	tagogtog/tagughug	n.m.	n.m.
<i>Chrysophyllum caimito</i> Linn./SAPOTACEAE	n.m.	n.m.	caimito
<i>Cocculus cordifolius</i> /MENISPERMACEAE	n.m.	makabuhay	n.m.
<i>Cochinchinensis</i> (Pierre) Nakai (Cel.)	alumangug	n.m.	n.m.
<i>Colocasia esculenta</i> (L.) Schott/ARACEAE	gabi	gabi	gabi
<i>Cycas circinalis</i> L./CYCADACEAE	n.m.	petogo	n.m.
<i>Cynometra densiflora</i> Elmer/CAESALPINACEAE	pali (wild mampalang)	n.m.	n.m.
<i>Cynometra ramiflora</i> L./CAESALPINACEAE	tambilikan	n.m.	n.m.
* <i>Dimonorops curranii</i>	n.m.	pitpit	n.m.
<i>Dioscorea alata</i> L./DIOSCOREACEAE	ubi	n.m.	n.m.
<i>Dioscorea hispida</i> Dennst./DIOSCOREACEAE	n.m.	kayos	kuyot/kot
<i>Dracontomelon dao</i> (Blanco) Merr & Rolfe/ ANACARDIACEAE	dao	n.m.	n.m.
<i>Dracontomelum edule</i> (Blanco) Skeels	n.m.	alauihau/	
halowihaw	n.m.		
* <i>Drypetes littoralis</i> ^{b)}	bato-bato	n.m.	n.m.
<i>Durio zibethinus</i> Murray/BOMBACACEAE	n.m.	wild durian	n.m.
<i>Elipanthos tomentosus</i> Kurz. or * <i>Eunymus vibumifolius</i>	alumanggi/ alumangoi/ alumangug	n.m.	n.m.
* <i>Emilia marivelensis</i>	n.m.	libhon/libun	n.m.
* <i>Eugenia cymosa</i> /MYRTACEAE	n.m.	labak	n.m.
<i>Garcinia benthami</i> Pierre or <i>Garcinia dulcis</i> (Roxb.)Kurz./ GUTTIFERAE	bunog	bunog	n.m.
<i>Garcinia binucao</i> (Blanco) Choisy or <i>Garcinia lateriflora</i> Blume/ GUTTIFERAE	kandis	kandis	n.m.
<i>Gnetum gnemon</i> L. Var. gnemon/GNETACEAE	bago	bago	bago
<i>Guioa acuminata</i> Radlk./SAPINDACEAE	pasi	pasi	n.m.

Table 2a continued.

Scientific name/family	Tagbanua common name	Common name in Manaile (Visayan)	Common name in Cienda (Visayan)
* <i>Horsfieldia acuminata</i> ^{b)}	anoniog	n.m.	n.m.
* <i>Intsia bijuga</i> /LEGUMINOSAE ^{b)}	ipil	n.m.	n.m.
<i>Ipomoea batatas</i> (L.) Lamk./CONVOLVULACEAE	lidib	kamoteng bagin	n.m.
<i>Ipomoea reptans</i> Poir./CONVOLVULACEAE	n.m.	n.m.	tangkung/ kangkong
<i>Kopsia fruticosa</i> (Ker.) A. DC./APOCYNACEAE ^{b)}	lipata	n.m.	n.m.
* <i>Lentinus</i> sp.	kulat-kulat	kulat	n.m.
<i>Litsea perrottetii</i> (Blume) F. – Vill (Laur.) or <i>Artocarpus odoratissimus</i> Blanco/MORACEAE	marang	marang	n.m.
<i>Mallotus auriculatus</i> Merr.	n.m.	kamanian	n.m.
* <i>Mallotus pseudopenangensis</i>	n.m.	beri/beli	n.m.
<i>Mallotus tiliifolius</i> (Blume) Müll. Arg./EUPHORBIACEAE ^{b)}	alai	n.m.	n.m.
<i>Mangifera altissima</i> Blanco/ANACARDIACEAE	pao	pao	n.m.
<i>Mangifera fragrans</i> Maingay ex Hook.f. or <i>Mangifera macrocarpa</i> Blume/ANACARDIACEAE	mampalang	mampalang	n.m.
<i>Mangifera indica</i> L./ANACARDIACEAE	n.m.	mangga	n.m.
<i>Mangifera odorata</i> Griffith/ANACARDIACEAE	huani	wani	n.m.
<i>Mangifera philippinensis</i> Mukh./ANACARDIACEAE	paho	n.m.	n.m.
<i>Manihot esculenta</i> Crantz/EUPHORBIACEAE	lideb kayo	n.m.	n.m.
* <i>Melodinus luzonensis</i>	tabo	tabo	n.m.
<i>Mentha cordifolia</i> Opiz./LAMIACEAE	n.m.	herba buena	n.m.
<i>Moringa oleifera</i> Lamarck/MORINGACEAE	n.m.	n.m.	kamunggay
<i>Musa</i> L./MUSACEAE	saging	saging	saging
<i>Muntingia calabura</i> L./TILLIACEAE	n.m.	seresas	n.m.
<i>Nephelium lappaceum</i> L./SAPINDACEAE	rambutan	manti	rambutan
<i>Nypa fruticans</i> Wurmbr./PALMAE	nipa	nipa	nipa
<i>Oncosperma tigillaria</i> Ridl.	anibong	anibong	n.m.
<i>Orania decipiens</i> Becc./ARECACEAE	n.m.	bangga	n.m.
<i>Persea americana</i> Miller/LAURACEAE	n.m.	n.m.	abukado
* <i>Phyllochlamys taxoides</i> ^{b)}	lampataki	n.m.	n.m.
<i>Pometia pinnata</i> Forst./SAPINDACEAE	malugay	n.m.	n.m.
<i>Pouteria campechiana</i> (Kunth) Baehni/SAPOTACEAE	n.m.	tisa	n.m.
<i>Psidium guajava</i> L./MYRTACEAE	n.m.	n.m.	bayabas/ guyabas
* <i>Pygeum euphlebiun</i>	kabong (bamboo)	n.m.	n.m.
* <i>Radermachera palawanensis</i> ^{b)}	Palawan agtap	n.m.	n.m.
<i>Schizostachyum lumampao</i> (Blanco) Merrill/ POACEAE (GRAMINAE)	buhò	n.m.	n.m.
<i>Semecarpus longifolius</i> Blume or <i>Semecarpus gigantifolia</i> Vidal/ANACARDIACEAE	n.m.	anagas	n.m.
<i>Sindora inermis</i> Merr./LEGUMINOSAE	nito	nito	n.m.
<i>Syzygium cumini</i> (L.) Skeels/MYRTACEAE	n.m.	duhat	n.m.
<i>Syzygium ecostulatum</i> (C. B. Robinson) Merr./MYRTACEAE	lamuto	n.m.	n.m.
* <i>Tricalysia reticulata</i>	kalamanti /kalamanis	n.m.	n.m.
* <i>Tuba flava</i>	n.m.	albatra/albutra	n.m.
<i>Xanthosoma sagittifolium</i> (L.) Schott./ARACEAE	n.m.	n.m.	pakodo

* All those with asterisks do not have the authorities' names

^{a)} n.m. – means “not mentioned” in either the first or second interview, by respondents in the specific village. Many times this may mean that the species is not used at all, but at other times it may simply mean that the species was not mentioned because it was not used very often, or was not considered a NWFP by the respondents.

^{b)} Other Tagbanua NWFPs (not mentioned by respondents in initial interviews)

Table 2b. List of Non-wood forest products commonly used by households in Boong, Palawan; Manaile, Palawan; and Cienda, Leyte, scientific name undetermined.

Village/Community	NWFP (Local name)
Indigenous village/ Boong	balisangkad
	orchids/dapo
	Palawan gabi
	alalanday
	ali-alima
	aridit
	barukan
	inlalay
	kalamanti/kalamanis
	kaligsuysuy
	kuriras
	lambunson
	mangoro
	sambiko
	sambong/kalibubon
Migrant village/ Manaile	anheliko
	balisangkad
	kulumbi
	laba
	lampanaya
	lipso
	orchid
	pakpak lawin
	pal
	Palawan durian
	Palawan gabi
	sangi
	santol-santol
	sap-ang
	tagumo
tapikan (bamboo)	
tuge	
wild gabi	
Non-migrant settlement/ Cienda	atay-atay
	gabon
	hayom-hayom
	kadlom
	kaningag
	kinabugahay
	kojaji (mushroom)
	labkos/libgos/libkos
	orchids
	pichay-pichay
	tago-sabaw (mushroom)
	tangog-tangog (mushroom)
tuba-tuba	
wild ginseng	

warned them against, and which had become, in the Tagbanua view, a real danger in dealing with non-indigenous people. The second was the close connection between medicinal plants and traditional rites for healing. Although a large percentage of Boong Tagbanua (58%) still claimed to be heavy users of medicinal plants, they are mostly Christianized and had also stopped practicing traditional rites over at least one generation.

4.1.3 Commercial NWFPs in Boong and Manaile, Palawan

'*Bagtik*', or resin from the almaciga tree (*Agathis philippinensis* Warb.) is one of the largest NWFP exports of the Philippines, earning the country 254000 US dollars in 1998 (Department of the Environment and Natural Resources 1999). Almaciga resin and '*yantok*' or rattan (*Calamus* sp.) have also traditionally been the most significant commercial non-timber forest products to the Tagbanua, and now to the majority of households in Manaile as well. Several other NWFPs such as wild honey, animals, and orchids were considered commercially viable, but the collection of these was much less seasonal than almaciga resin and rattan. Thus the element of opportunism in collecting these products was greater than the carefully planned *bagtik* and rattan gathering trips.

There were many anecdotes told by the migrant villagers during the interviews, on how much more adept the Tagbanua collectors were in extracting *bagtik* from the tree, and how the Tagbanua carry as much as 60 kg of the resin from the forest to the village in one trip. However, individual interviews of both migrant and Tagbanua collectors revealed that most got as much resin as they could carry, and the Tagbanua, like the migrants brought down about 35 to 50 kg of resin per trip. Each almaciga collector had the right to extract from, or had 'tenure to' about 30 trees. Collectors of the resin went to the forest one to five times a month, and often stayed there for three to four days. Daily visits to the forest were now less common than in the early 1990s, when more resin could be gathered in almaciga stands closer to the village, enough to warrant daily visits. During the years of the interviews, most collectors said they got about two to five sacks

of almaciga resin a month, or approximately 70 to 150 kg a month.

Prior to 1988, holders of concessions to the forest area where the Tagbanua were settled controlled the collection of rattan. Tagbanua control of the forest land on which almaciga and other NWFPs were collected, was dependent on their getting a Certificate of Ancestral Domain Title (CADT), a legal document which grants them ownership of traditional lands. The Tagbanua of Boong applied for the CADT in the early 1980s through application for another legal document, the Certificate of Ancestral Domain Claim (CADC), which had been the preceding government policy instrument to provide similar rights. In 1999 and until the CADT is strictly enforced, control over the collection of non-wood forest products were granted by the Department of Environment and Natural Resources (DENR) since the 1940s in the form of concessions, mostly to early migrant settlers within Palawan. Concessions ranged from about a thousand to tens of thousands of hectares, and were frequently passed on from one generation to the next within the same family, subject to license renewal. The renewal of a concession holder's license depended officially on the monitoring of the area by DENR personnel. As there were manpower constraints within the DENR, license renewal sometimes took a few months. The delays for license renewals was also due to the difficulty and cost of going to the provincial capital to follow-up and facilitate the process.

The concession owner usually lived elsewhere than in the collection area, and hired a middleman, called the '*kapatas*' to oversee the collection of almaciga resin for a specific area. The middleman was entrusted with money and goods such as rice and cigarettes, which were given to gatherers as an 'advance payment,' and often consumed during collection trips. The cost of these goods and any monetary loans were then deducted from the pay of the gatherers when the resin was turned in. An unpublished study in 1997 of almaciga collection in the nearby municipalities of Puerto Princesa and Quezon by the Palawan Council for Sustainable Development reported that a concession owner had an average of five middlemen for his/her concession area, and each middleman in turn supervised thirteen to thirty

collectors. Similar numbers of *kapatas* and collectors worked for the concession owner of the Aborlan and Narra municipalities.

In Boong, all the almaciga gatherers had the same middleman, who was a Tagbanua. The collectors from Manaile, worked for another middleman, who like them, was a migrant from the Visayas. Both the Tagbanua and the migrant middleman answered to the same concession owner, who lived in the Provincial Capital of Palawan, Puerto Princesa.

From the migrants' reports, the 'forest-gate' price of almaciga during the most recent concession was six Pesos a kilo. Various respondents gave different quotes on how much the *kapatas* or middleman's profit was, these quotes ranged from one to three Pesos per kilo. As can be expected, most almaciga gatherers complained of the low compensation they got for difficult, discouraging, and often dangerous work. However, they were also quite resigned about it. Gatherers who were also middlemen considered their share of the profits to be justified because of the problems that they endured in organizing the many collectors of a dwindling resource. There were numerous stories of sacks of resin that had more than the acceptable level of impurities, such as soil and tree bark, being turned in. Another frequently mentioned dilemma of middlemen and organizers of collection teams was that of ensuring a functional tree tenure system among the gatherers, the lack of or disregard for which often resulted in conflict. Because all of the *kapatas* interviewed lived within the same village as the collectors, there was frequent and prolonged social contact between them and the collectors. Thus, the small compensation for the resin was often blamed on the absentee concession owner. During the latter months in 1998, the price per kilo of almaciga resin in the Provincial Capital of Puerto Princesa was 11 to 12 Pesos per kilo.

In 1999, there was no concession owner for almaciga resin collection from the forests around Boong. The Chief Elder of the Boong Tribal Council applied for a license to collect almaciga resin from the Department of Environment and Natural Resources until their CADT was approved. However, he had not been successful in acquiring this license. The DENR personnel in the area advised him that the CADT was forthcoming,

and the granting of a license would be redundant. As a result, the Tagbanua collectors then tended to sell their resin one kilo at a time to villagers in Dumanguena who were license-holders. There were two main disadvantages to this arrangement for the Tagbanua. First, they had to make more frequent trips to sell the almaciga they collected, thus expending more time and energy to market less product. Second, the absence of a legal document prevented them from getting a better price for each kilogram of resin. They were then earning five Pesos a kilo to the migrants' six, when under the concession system, they could earn the same as the migrants. The Tagbanua collectors aspired either for an almaciga collecting license, or their village's CADT to push through, because in part, this would have meant that they could get the provincial capital price of twelve Pesos per kilogram. This in turn was because the Tagbanua would then have had the right to market the resin in Puerto Princesa.

In interviews with some buyers of Tagbanua-collected resin, there was some agreement that when the CADT is awarded, the Tagbanua would gain control of the sale of resin. However, various interviewees including personnel of the DENR, villagers from the migrants' area, and the Tagbanua themselves said that the CADT would not help them much in the absence of support services. Among the support services discussed by informants were: a better road into Boong, some help in marketing almaciga resin in the capital; an improved literacy rate among the Tagbanua to better understand written agreements; and the establishment of a working tree tenure system.

4.2 The Relation between Ethnicity and Other Factors Affecting NWFP Use

4.2.1 Differences among Communities' Use of NWFPs

The Effects of Ethnicity on NWFP Collection: Hypothesis Testing Based on the Initial Interviews

The number of NWFPs collected by indigenous people and migrants in Palawan was not significantly different ($p > 0.05$). Therefore, in this case whether or not a person is an indigenous person was not significantly associated with the number of NWFPs collected (Table 3).

As far as the number of NWFPs collected is concerned, the populations of the migrant village of Manaile and the non-migrant Visayan settlement of Cienda belonged to totally different populations. The same was true for the indigenous village of Boong and the non-migrant settlement of Cienda. The results suggest that people from a similar ethnic background, who had remained in their original settlement such as Cienda and those who had settled in a different area, such as Manaile villagers, were affected more by their environment than by common cultural influences. Although the results were limited only to three villages, this may have some bearing on the theory that groups with indigenous status have more knowledge of useful plant species. However, it should also be considered that although the population of Manaile was composed of migrants from the Visayas Region, they were not necessarily from Leyte, nor specifically from Cienda. As mentioned earlier, Cienda was selected as the third study village because it was located in one of the few remaining forested areas in the Visayas.

Table 3. Number of NWFPs collected by households in villages populated by indigenous and migrant people, based on the number of NWFPs mentioned during initial interviews (z-test).

	Indigenous village (Boong)	Migrant village (Manaile)	Non-migrant settlement (Cienda)
Mean number of NWFPs	7.1	6.1	3.3
Standard error	0.57	0.73	0.44
z-test, $p \leq 0.05$ ^{a)}	ab	b	a

^{a)} Means followed by same letter do not differ statistically significantly.

The Effects of Ethnicity on NWFP Collection: Hypothesis Testing based on the Second Phase of Interviews

The results of the answers given during the second phase of interviews differed to some extent from the results of the first phase, in an unexpected way. In the second phase, the indigenous people on average identified fewer NWFP species than the migrants, though not significantly ($p \leq 0.05$). It is not easy to account for this result; statements given by some of the migrant respondents provides one explanation, which is, that they had learned about local species from the indigenous Tagbanua while retaining their knowledge about useful plants from their original settlement. This explanation may be borne by the significantly greater number of NWFPs identified (Table 4a) and collected (Table 4b) by the migrant villagers, over those of the non-migrant Visayan community.

However, although the migrant households identified more NWFPs than the indigenous households during the second phase of interviews, the latter collected and used more of the NWFPs identified than the former, although not significantly more. This reinforces the results of the initial interviews.

As in the z-tests based on the initial interviews, the indigenous status of both the Tagbanua and the non-migrant Visayan community had little bearing on the number of NWFPs identified and collected. However, it could be noted that the indigenous community (Tagbanua) had both identified and claimed to have collected a significantly greater number of NWFPs than the non-migrant Visayan community.

4.2.2 Effects of Household Factors to Use of NWFPs

Indigenous Community: Correlation and F-test Results

As expected, the respondents affirmed the use of the plants they had already mentioned during the initial interviews. In addition, they mentioned other plants on the checklist. Thus, the socio-economic characteristics used as independent variables in the initial analysis were again correlated with the number of plants identified by the respondents during the second phase of interviews, with the checklist (Table 7). The f-test results for the factors of ‘Gender’ and ‘Hunt’

Table 4a. Number of NWFPs identified by households in villages populated by indigenous and migrant people, based on the number of NWFPs compiled in the checklist during the second phase of interviews (z-test).

	Indigenous village (Boong)	Migrant village (Manaile)	Non-migrant settlement (Cienda)
Mean number of NWFPs	54.3	60.2	26.7
Standard error	1.32	1.42	0.30
z-test, $p \leq 0.05$ ^{a)}	ab	a	b

^{a)} Means followed by the same letter do not differ statistically significantly.

Table 4b. Number of NWFPs collected by households in villages populated by indigenous and migrant people, based on the number of NWFPs identified in the checklist during the second phase of interviews (z-test).

	Indigenous village (Boong)	Migrant village (Manaile)	Non-migrant settlement (Cienda)
Mean number of NWFPs	42.3	39.0	22.2
Standard error	3.29	2.73	0.64
z-test, $p \leq 0.05$ ^{a)}	ab	a	b

^{a)} Means followed by the same letter do not differ statistically significantly.

Table 5. Correlation of selected socioeconomic characteristics of the respondents in the three study villages, against number of non-wood forest products identified as useful to the households, during the initial interviews.

Socioeconomic factor	Village					
	Boong		Manaile		Cienda	
	r	P-value ^{a)}	r	P-value	r	P-value
Age	0.143	0.326	0.003	0.985	0.146	0.368
Education	-0.245	0.090	0.150	0.336	-0.153	0.345
Size of family	0.193	0.185	-0.08	0.611	0.129	0.428
Income	-0.120	0.411	-0.175	0.262	-0.081	0.618
Landholding	0.146	0.317	0.269	0.081	0.122	0.455
Food expenditure	-0.194	0.181	0.100	0.523	0.037	0.820

^{a)} P-value – Probability

Table 6. Results of F-distribution tests on selected socioeconomic characteristics of respondents in three study villages, against number of non-wood forest products identified as useful to the households, during the initial phase of interviews.

Socioeconomic factor	Village					
	Boong, df = 48 ^{a)}		Manaile, df = 42		Cienda, df = 39	
	F-distribution	F-test critical value	F-distribution	F-test critical value	F-distribution	F-test critical value
Gender	6.397**	≥ 4.00 to 4.08	2.927	≥ 4.00 to 4.08	2.318	≥ 4.08 to 4.17
Hunt	4.12**	≥ 4.00 to 4.08	4.347**	≥ 4.00 to 4.08	4.058	≥ 4.08 to 4.17

^{a)} df = degrees of freedom

** p = .05

showed a significant correlation between the presence of a hunter in the household and the number of NWFPs identified (Table 6). The correlation results based on both the initial and the second phase of interviews in the indigenous community of Boong (Tables 5 and 7) showed no significant correlation between the number of non-wood forest products identified, and selected socioeconomic factors. Results of the F-test based on the second phase of interviews supported those of the initial interviews. The presence of a hunter in a household was significantly associated with the household's knowledge of NWFPs (Table 8).

Migrant Community: Correlation and F-test Results based on Initial Interviews

There was no significant correlation between the number of non-wood forest products identified, and selected socioeconomic factors based on both

the initial and the second phase of interviews in Manaile (Tables 5 and 7). However, as in the indigenous community of Boong, the result from the initial interviews showed that the presence of hunters within the household was positively associated with knowledge of NWFPs (Table 6). This result was not duplicated in the F-tests based on the second phase of interviews (Table 8), when there were no factors that were significantly associated with the number of NWFPs identified.

Non-Migrant Settlement: Correlation and F-test Results

The initial interviews in Cienda showed no significant correlation between the number of non-wood forest products identified, and selected socioeconomic factors (Table 5). In the F-test, there were no significant associations between the factors of gender and the presence of a hunter in

Table 7. Correlation of selected socioeconomic characteristics of the respondents in the three study villages, against number of non-wood forest products identified as useful to the households, during the second phase of interviews.

Socioeconomic factor	Village					
	Boong		Manaile		Cienda	
	r	P-value ^{a)}	r	P-value	r	P-value
Age	0.264	0.064	0.003	0.982	0.351	0.078
Education	-0.123	0.397	-0.043	0.787	-0.278	0.078
Size of family	0.170	0.239	-0.123	0.434	0.415**	0.008
Income	-0.127	0.379	-0.057	0.715	-0.436**	0.004
Landholding	0.151	0.295	-0.074	0.635	-0.046	0.776
Food expenditure	0.194	0.181	-0.015	0.921	-0.312**	0.050

^{a)} P-value – Probability
 ** Statistically significant

Table 8. Results of F-distribution tests on selected socioeconomic characteristics of respondents in three study villages, against number of non-wood forest products identified as useful to the households, during the second phase of interviews.

Socioeconomic factor	Village					
	Boong, df = 48 ^{a)}		Manaile, df = 42		Cienda, df = 39	
	F-distribution	F-test critical value	F-distribution	F-test critical value	F-distribution	F-test critical value
Gender	1.151	≥ 4.00 to 4.08	1.728	≥ 4.00 to 4.08	2.048	≥ 4.08 to 4.17
Hunt	6.97**	≥ 4.00 to 4.08	2.581	≥ 4.00 to 4.08	4.810**	≥ 4.08 to 4.17

^{a)} df = degrees of freedom
 ** p = .05

the household, and number of NWFPs identified, although the factor of ‘Hunt’ was close to being significant at 0.05 (Table 6).

Using the data from the second phase of interviews, it was found that three of the six independent variables correlated with the number of non-wood forest products identified as used by the household were statistically significant. These three variables were size of family, income, and food expenditure (Table 7). Like the results of the indigenous community and the migrant community for the initial interviews, and the indigenous community during the second phase of interviews, the presence of a hunter in a household was significantly correlated with the number of NWFPs identified (Table 8).

5 Discussion

In the attempt to formulate a hypothesis explaining levels of non-wood forest product use, the possibility that the indigenous status of the collectors was the most important factor affecting both the knowledge of useful forest species and actual use of these NWFPs was always kept in mind. However, the statistical results from this study do not support this hypothesis. Indigenous people do not necessarily have greater knowledge or have higher use levels of NWFPs than migrant populations. Although a notably greater percentage of the households in the indigenous community were dependent on commercial NWFP extraction for their livelihood than the migrant community, the Tagbanua did not identify a significantly greater

number of useful forest species than their migrant neighbors. The non-migrant Visayan settlement did not identify significantly more useful forest plants than the migrant community. They also identified significantly fewer NWFPs than the indigenous community. That the indigenous community had a much higher percentage of households dependent on commercial NWFP collection for their main source of income could be explained though, by other observations made during visits to the three villages that do not lend themselves well to quantitative or statistical analysis. It is difficult to say whether these non-quantitative observations should be given less merit than the statistical results.

Some of these observations came from interaction with the respondents, such as the difficulty of people classified as 'indigenous' in the Philippines to get legal assistance and the inability of many respondents from the indigenous community to read documents presented to them. Also, although the landholdings of the Tagbanua were slightly larger, on average, from those of the migrants, this land was usually on slopes and not on the more productive lowlands where the migrants had their rice fields. Other observations were physical, such as the distance between the indigenous village and the National Highway, and the fact that the Tagbanua had to pass through the migrant village to reach the nearest daily public transit to other communities. There was also the almost complete absence of non-biodegradable garbage in Boong and Cienda, both settlements of people native to the area. A visual inspection of the houses and paths of both Boong and Cienda, where there was hardly any of today's 'consumer garbage,' would support the statistical data. According to some respondents, this was due to the fact that they seldom bought anything from the stores because of the prohibitive cost of merchandise. The remains of goods that came from the forest or their own *kaingin* plots just rot away when done with.

These observations and others were possibly critical indicators of the differences in livelihood between some indigenous and migrant communities and could be explanatory factors for their use of NWFPs.

For example, the lack of legal assistance for, and functional literacy among the indigenous

community make them prone to exploitation by non-indigenous people who are more adept at these matters. Results of such a predicament included receiving smaller compensation for the NWFPs they gathered than the migrants, the inability to get licenses and permits for selling certain commercial NWFPs, and a dependence on the villagers from the neighboring migrant community to act as middlemen. The preference of the Tagbanua for rice as the main staple food sometimes lead them to trade for rice with NWFPs at rates of exchange that were unfavorable to them. The distance between the village and the national highway and their own lack of a daily regular means of transportation discouraged the Tagbanua from marketing NWFPs in places where they could have gotten better prices for them. Large amounts of commercial NWFPs thus were sold for much less in the migrant community, where the villagers who had access to transport and business contacts could sell them at the market price, instead of the 'forest-gate' price.

In summary, results of the descriptive statistics, rather than the z-tests, tell a more accurate story of all three villages of the study. Those households with heads who were older, with less formal education, and more dependent children used more NWFPs, and had fewer options for other sources of livelihood. However, the z-tests give emphasis to the particular socioeconomic variables that are related to NWFP use in each specific community.

In the indigenous community, data from both rounds of interviews support the observation that a significant factor affecting the knowledge and use of forest plants was the presence of a hunter or hunters within the household. Part of this observation were the food collection strategies of the forest guides of the project, of which this study was a part, hunters themselves. In subsequent forest trips by a researcher in this project, it was evident that the consumption of uncultivated vegetables, fruits, and the pith of certain rattans were expected to extend the food brought along for the trip by the guides. In addition, these forest plants were usually brought home by the guide/hunter to his family to be prepared by his wife or older children for meals. The f-test results also show that gender is significantly associated with NWFP knowledge and use. Women and female

children who had fathers, husbands, or brothers who hunted, often knew more about forest plants than female respondents who did not have a hunter in their immediate family.

In the non-migrant settlement of Cienda, the variables significantly correlated to NWFP use were size of family, income and food expenditure. These results support common beliefs about non-wood forest product use. Households with less income, less to spend on food and more dependent members may have had a greater incentive to augment their income and food supply with non-wood forest products. The data gives some support to the widely-held assumption among NWFP researchers that forest food is often used to augment the food budget of households that cannot afford to meet all their nutritional needs from cultivated produce or purchased foods. As a representative variable for labor allocation in the study of Wickramasinghe et al (1996), family size was also considered the determining factor on whether a household collects NWFPs or not.

6 Conclusion

In the final analysis, it is not so much the indigenous status of the gatherers that may affect their knowledge and use of NWFPs, but the opportunities that their position in society provides them with. This position may include their indigenous status, but not necessarily so. It more likely involves the above-mentioned socioeconomic factors, plus the lack of access to roads, markets, land tenure, or land for more productive agriculture. In the three villages studied, the forest serves as a buffer for the failures of the prevailing economic system to provide such necessities for its members. However, neither forest resources nor the way of life of indigenous people dependent on those resources remains static. Commercial NWFPs such as *almaciga* resin are nearing depletion, and people such as the Tagbanua are losing their traditional livelihood without discernable prospects for a good livelihood within the mainstream economy. For this reason alone, further studies of NWFPs could be helpful if they could be directed at investigating optimum extraction practices. Study of extraction may benefit all

user groups and possibly reduce stress on the resources, rather than simply stereotyping certain user groups as either harmful or blameless. Lessening the social and economic gap between 'indigenous' people and the dominant local culture, for example by providing appropriate educational opportunities, could also increase their ability to protect and use their forest resources as they see fit and for their own benefit.

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References

- Aagesen, D.L. 1998. Indigenous resource rights and conservation of the Monkey Puzzle Tree (*Araucaria araucana*, *Araucariaceae*): a case study from southern Chile. *Economic Botany* 52: 146–160.
- Appasamy, P.P. 1993. Role of non-timber forest products in a subsistence economy: the case of a joint forestry project in India. *Economic Botany* 47(3): 258–267.
- Chopra, K. 1993. The value of non-timber forest products: an estimation for tropical deciduous forests in India. *Economic Botany* 47(3): 251–257.
- Conelly, W.T. 1996. Strategies of indigenous resource use among the Tagbanua. In: Eder, J.F. & Fernandez, J.O. (eds.). *Palawan at the crossroads*:

- development and the environment on a Philippine frontier. Ateneo de Manila University Press, Quezon City, Philippines.
- DENR. 1999. 1998 Philippine Forestry Statistics. Forest Management Bureau, Department of Environment and Natural Resources, Quezon City, Philippines.
- Devalle, S.B.C. 1989. Discourses of ethnicity: the faces and the masks. In: Howard, M.C. (ed.). *Ethnicity and nation-building in the Pacific*. The United Nations University, Tokyo.
- Dove, M.R. 1997. The 'Banana Tree at the Gate': perceptions of production of *Piper nigrum* (Piperaceae) in a seventeenth century Malay state. *Economic Botany* 51: 347–361.
- ESSC. 1998. Philippine culture and ecosystems map. Environmental Science for Social Change, Inc. Bookmark, Manila.
- Findley, S.E. & De Jong, G.F. 1985. Community and family factors influencing family migration in Ilocos Norte, in *Philippine Population Journal* 1(2): 18–44.
- Fox, R.B. 1982. Tagbanuwa: religion and society among the Tagbanuwa of Palawan Island, Philippines. Monograph 9, National Museum, Manila, Philippines.
- Food and Agriculture Organization of the United Nations (FAO). 2000. Non-wood News: an information bulletin on non-wood forest products. March 2000. FAO, Rome.
- Gatmaytan, D. 1997. Uprooting the underclass: comprehending development displacement as an environmental justice issue. In: *Focus: Environment and Development*. World Bulletin 13 (1–2): 116–174. Institute of International Legal Studies, Law Center, University of the Philippines, Diliman, Quezon City, Philippines.
- Godoy, R., Brokaw, N. & Wilkie, D. 1995. The effect of income on the extraction of non-timber tropical forest products: model, hypotheses, and preliminary findings from the Sumu Indians of Nicaragua. *Human Ecology* 23(1): 29–52.
- Godoy, R.A. & Bawa, K.S. 1993. The economic value and sustainable harvest of plants and animals from the tropical forest: Assumptions, hypotheses and methods. *Economic Botany* 47(3): 215–219.
- Göltenboth, F. & Milan, P.P. (eds.). 1998. *A guide to the ecosystems of Palawan*. Times Editions, Singapore.
- Gunatilake, H.M., Senaratne, D.M.A. & Abeygunwardena, P. 1993. The role of non-timber forest products in the economy of peripheral communities of Knuckles National Wilderness Area of Sri Lanka: a farming systems approach. *Economic Botany* 47(3): 275–281.
- Hall, P. & Bawa, K. 1993. Methods to assess the impact of extraction of non-timber tropical forest products on plant populations. *Economic Botany* 47(3): 234–247.
- Hoffman, E.S. 1982. The forest frontier in the Tropics: pioneer settlement and agricultural intensification if Negros Oriental, Philippines. In: Hutterer, K.L. & McDonald, W.K. (eds.). *Houses built on scattered poles: prehistory and ecology in Negros Oriental, Philippines*. University of San Carlos, Cebu City, Philippines.
- Howard, M.C. (ed.). 1989. *Ethnicity and nation-building in the Pacific*. United Nations University, Tokyo.
- Huby, M. 1998. *Social policy and the environment*. Open University Press, Buckingham, England.
- Hutterer, K.L. & McDonald, W.K. (eds.). 1982. *Houses built on scattered poles: prehistory and ecology in Negros Oriental, Philippines*. University of San Carlos, Cebu City, Philippines.
- Jensen, O.H. & Balslev, H. 1995. Ethnobotany of the fiber palm *Anstrocaryum chambira* (Arecaceae) in Amazonian Ecuador. *Economic Botany* 29(3): 309–319.
- Jocano, F.L. 1998. Filipino indigenous ethnic communities: patterns, variations and typologies. Punlad Research House, Incorporated, Quezon City, Philippines.
- LaFrankie, J.V. 1994. Population dynamics of some tropical trees that yield non-timber forest products. *Economic Botany* 48(3): 301–309.
- La Vina, A.G.M. 1994. International law and indigenous peoples: The interface of human rights and environmental norms. In: *World Bulletin* 10(3–4): 26–40. Institute of International Legal Studies, Law Center, University of the Philippines, Diliman, Quezon City, Philippines.
- Mark, H.T.R. 1999. The predicament of ecological-economic valuation and the need for linkage through an institutional framework. In: Aerts, D., Broekaert, J. & Weyns, W. (eds.). *A world in transition; humankind and nature*. Kluwer Academic Publishers, Dordrecht, The Netherlands.
- Pinheiro, C.U.B. 1997. Jaborandi (*Pilocarpus* sp., Rutaceae): A wild species and its rapid transformation

- into a crop. *Economic Botany* 51: 49–58.
- Siebert, S.F. & Belsky, J.M. 1985. Forest-product trade in a lowland Filipino village. *Economic Botany* 39(4): 522–533.
- Suzuki, N. 1996. Investing for the future: education, migration and intergenerational conflict in South Cotabato, the Philippines. In: Ushijima, I. & Zayas, C.N. (eds.). *Binisaya nga kinabuhi (Visayan life)*. Visayas Maritime Anthropological Studies, College of Social Sciences and Philosophy, University of the Philippines, Quezon City, Philippines.
- Veloro, C.E. 1996. Frontier colonization and legitimation in a Palawan coastal settlement. In: Ushijima, I. & Zayas, C.N. (eds.). *Binisaya nga kinabuhi (Visayan life)*. Visayas Maritime Anthropological Studies, College of Social Sciences and Philosophy, University of the Philippines, Quezon City, Philippines.
- Wickramasinghe, A., Perez, M.R. & Blockhus, J.M. 1996. Nontimber forest product gathering in Ritigala Forest (Sri Lanka): household strategies and community differentiation. *Human Ecology* 24(4): 493–519.
- World Resources Institute. 1992. Population growth, poverty and environmental stress: frontier migration in the Philippines and Costa Rica.

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