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LIVELIHOOD STRATEGIES AND MARINE RESOURCE USE AMONG RESIDENTS OF BUNAKEN NATIONAL PARK, NORTH SULAWESI

Recommendations for Local Involvement
in Park Management

Associates in Rural Development
for
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Preface

This report is one of a number of reports produced under the government of Indonesia's Natural Resources Management Project (NRM) that is assisted by the United States Agency for International development (USAID).

The NRM project, working with the Indonesian National Planning Board (Bappenas) and the Department of Forestry (Departemen Kehutanan), provides through a specially established project Policy Secretariat advice to Bappenas on natural resource issues relating to long and short-term national planning. In addition, working with the Department of Forestry the NRM project carries out field activities in two pilot project areas one in West/Central Kalimantan and one in North Sulawesi including the preparation of management plans for the Bukit Baka - Bukit Raya National Park in Kalimantan and the Bunaken National Park in North Sulawesi. Each report addresses an aspect of the planned NRM project activities that are agreed on and laid out in an annual NRM Implementation Plan and each report aims at providing specific recommendations for future work in the area addressed.

This report looks at the involvement of the local communities in the Bunaken National Park in North Sulawesi. As there is a sizeable local population resident in the Bunaken National Park an important element of the Bunaken NRM project is to see how the activities of the local inhabitants can be best integrated into the development of the National Park. These recommendations will be followed up in the management plan being developed for the park and in the activities of NRM in supporting the Government of Indonesia in development of this area.

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Acknowledgements

I wish to acknowledge the tremendous assistance of Graham Usher in this research effort -- not only for critical logistical support, but for helping me to ascertain those human activities which were of utmost importance from a marine conservation standpoint. Pak Rompas was instrumental in arranging field assistants from local universities, and helping to collect data in the coastal communities. There would not have been so much data upon which to base this report without the help of my four field assistants: Meria Tirsa Gundo and Aarty N. Pinatik from UKIT/Universitas Kristen Indonesia Tomohon; and D.L "Eman" Soleman and Tommy Winerungan from UNSRAT/Universitas Sam Ratulangi. The use and training of field assistants continues, in my opinion, to represent a major but rarely acknowledged contribution of the NRMP-Indonesia.

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Executive Summary

The major objective of the short-term Rural Sociologist was to provide socioeconomic data about local communities as an empirical basis to make recommendations for increasing the involvement of local communities in the management plan for Bunaken National Park. A survey questionnaire was designed and then used to collect data among a random sample of 10% of the households in two villages on each of the islands of Bunaken, Manado Tua, Mantehage and Nain; and in the villages of Arakan and Wawontulap along the mainland coast.

This report summarizes the data on demographic profiles and processes, household food and income sources, coastal and fishing activities, (rainfed) agriculture, and local attitudes towards park management and marine conservation.
Based on these data, the major areas of conflict between current activities of local residents with marine conservation goals involve:

* collecting live coral for road and house construction (all islands);
* cutting mangroves for firewood, furniture and boat construction (especially on P. Mantehage and P. Nain);
* fishing on or near coral reefs with heavy (beach seine) nets (especially on P. Bunaken);
* sloping-land agriculture without soil conservation (especially on P. Manado Tua and by coastal communities);
* human waste and garbage disposal in the sea (especially on P. Manado Tua, P. Mantehage and P. Nain); and
* spontaneous tourist development (especially on P. Bunaken).

The following are areas of high concern from a socioeconomic perspective:

* Low available household labor on all islands;
* P. Nain: high population density, skewed land distribution/limited access to land, poor land quality, dependence on purchasing staple foods, and limited income generating alternatives (most dependent on marine resources: coral reef fishing and mangroves);
* Seasonal availability of fresn water on some islands (especially P. Bunaken);

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* Marginal and declining agriculture, limited access to new seedlings, technical information and low-impact conservation practices (especially on P. Manado Tua where there is access to land and a high degree of local enthusiasm for improving agricultural production);

* Limited access to equipment necessary for commercial off-shore fishing (except D. Bunaken);

* Religious and ethnic diversity (especially on P. Bunaken, P. Mantehage and P. Nain) which could limit inter- and intra- island cooperation;

* Lack of legitimacy of some village leaders to represent local interests;

* Limited and costly educational facilities;

* Limited income generating opportunities for women;

* Rumors concerning future park management plans which are resulting in land speculation (P. Bunaken), insecure land tenure (P. Bunaken and possibly others), and private tourist development (P. Bunaken).

Recommendations for local resident involvement in park management should involve the following:

1. Public Information and Creation of a "Resident Participation Committee;"

2. Development of Sustainable and Multiple Use of Mangroves;

3. Promotion of Agroforestry and "SALT" (i.e., sloping agricultural land technology) for Upland Agriculture;

4. Support for Off-shore Fishing;

5. Locally-Managed, Small-Scale Eco-Tourism; and

6. Education for Diversified (and Non-Island Based) Incomes

H

1. Introduction

1.1 Summary of Terms of Reference (TOR)

The major objective of the short-term Rural Sociologist is to provide essential socioeconomic data about local communities for production of a workable management plan for Bunaken National Park. In support of this goal, the Rural Sociologist will: (1) identify and quantify activities of local (i.e. "resident") communities that are potentially in conflict with the management goals of the national park; (2) recommend options for controlling or providing alternative activities that do not conflict with the management goals of the national park; and (3) recommend follow-up activities that will monitor changes in the socioeconomic profile of communities.[1]

1.2 Guiding Assumptions[2]

* Traditional fishing and agricultural practices of peoples living within or adjacent to protected areas often conflict with coastal and marine resource conservation.

* These conflicts often revolve around the resources and means resident peoples over the centuries have used to make a living.

* Outside efforts to change the attitudes and behaviors of resident populations have direct and dramatic impact on residents' health and welfare.

* Restricting resource use for the purpose of conservation by using police tactics are not effective.

* Relocation schemes are not recommended because they are expensive, have high residivism rates, and create social and ecological disruptions in both leaving and receiving areas.

* A focus on sustainable development and multiple use is desirable for practical, economic and human welfare reasons.

* Raising resident incomes will not necessarily ensure sustainable resource use.

[1]The terms of reference for the Rural Sociologist are included in the appendix.

[2]See Belsky 1992 for a more comprehensive review of the literature on the role of local/resident peoples in sustainable development and protected areas management.

* Moving beyond rhetoric to identify and implement sustainable development and multiple use strategies requires detailed understanding of local ecological, social, economic and political conditions.

* The emerging wisdom to date suggests that where resident peoples are given a fair degree of management control and vested interest, there is a higher likelihood that strategies for balancing local livelihoods with resource conservation can be found; and locals will benefit from and thus support resource conservation.

2. Methodology

A survey questionnaire was designed by myself with substantial help from Graham Usher. It was pre-tested and revised before administering in the study sites from September 21 to October 14. A copy of the questionnaire is included in the appendix.

The survey was conducted in two villages on each of the islands of Bunaken, Manado Tua, Mantehage and Nain; and in the villages of Arakan and Wawontulap along the mainland coast.[3] From Manado, it takes approximately one-half hour to reach Bunaken and nearby Manado Tua by a motorboat, and one and one-half hour to the outer two islands. Travel to Arakan and Wawontulap is along a seasonal coastal highway. From Manado, it takes about one-hour to reach Arakan and in the dry season, another hour to reach Wawontulap. As it was the beginning of the rainy season when the survey was conducted, the road was unpassable and we travelled to Wawontulap by motorboat.

In all villages, 10% of households were interviewed. Households were randomly selected from lists provided by each kepala desa. Random selection is critical to conducting statistical analysis, and to making broader generalizations. Four field assistants were hired and trained to help conduct the household interviews.

We did not conduct the survey on the island of Siladen. This decision was based on the fact that this island supports a relatively small population (52 households), it is administratively part of Desa Bunaken where two other villages were being studied, it is more or less "run" by one family, and there were practical considerations of time. Future studies could easily and quickly be conducted on Siladen.

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[3]See appendix for a map.

The study sample included the following villages or desa:

P. Bunaken	:	Bunaken, Alungbanua
P. Manado Tua	:	Manado Tua I, Manado Tua II
P. Mantehage	:	Tinongko, Tangkasi
P. Nain	:	Nain
Coast	:	Arakan (including Rap-Rap) Wawontulap.

The survey data were analyzed using SPSSPC+. The following report summarizes these data. It combines these data with additional qualitative information gathered from key informant interviews and observation to provide a basis for making recommendations for Bunaken park management. It is important to note that in many instances, village data from one island are presented together. However, they are separated where there are significant differences between villages from the same island.

Some secondary information about the socioeconomics of Bunaken National Park's residents are also included here as well. These data are limited, however, by the fact that none use rigorous random sampling techniques nor involve broad geographic coverage of all the islands; especially lacking are data about the coastal populations. Two reports in particular provide useful descriptive, background information with regard to fishing techniques and equipment (i.e. Colfer and Ngo 1990 and Pontoh 1991 et al.,). A summary of these literature are included in the appendix.

3. Results from the Socioeconomic Survey

3.1 Demographic Profiles and Processes

Table 1 summarizes the published data on the islands -- but it lacks the coastal areas. The best source of population census data disaggregated by village is from each kepala desa. These data still need to be collected for the Wawontulap-Arakan area (and for the villages in Kecamatan Wori) included in park boundaries.

Table 1. Resident Communities in Bunaken National Park, 1991

Village Administrative Unit	Total Individuals	Percentage
Bunaken/Siladen	1,685.	16.2
Alungbanua*	682.	6.5
Mantehage	869.	8.4
Manado Tua	4,607.	44.4
Nain	2,539.	24.5

*Alungbanua is a village located on the island of Bunaken, but is a different administrative village than Desa Bunaken which also contains the villages on Siladen island.

Source: Kusen, Dr. Ir Janny D. et al. 1991. Survai Potensi Laut 1000 Ha Di Taman Nasional Bunaken Kecamatan Molas, Kota Madya Manado, Propinsi Sulawesi Utara. pp.10 (Taken from Kantor pemerintahan desa masing-masing desa).

The survey data suggests a significant difference with regard to the origins of the male "household-head" (or kepala keluarga) between those living on the islands and the two coastal villages: Arakan and Wawontulap. In the latter two villages, only 57 to 62% of household heads were born in the village in which they currently reside compared to 86 to 100% of island respondents. About two-thirds of the people who had moved to the coastal villages had come from the islands within the last ten years, particularly from Nain and Manado Tua. The data suggest that there is currently a natural process of out-migration from the islands to the coastal villages; although it is mediated by some in-migration from outer-islands (e.g. Bajo peoples) to Nain, and some inter-island migration from Nain to Mantehage.

Table 2. Origin of Male Household Head (%)

	B n=45	MT n=50	M n=18	N n=59	A n=30	W n=13	Total* n=215
Native	98	100	89	86	57	62	87
Migrant	2	0	11	14	43	38	43

* B= P.Bunaken, MT= P.Manado Tua, M= P.Mantehage, N= P.Nain, A= D.Arakan, W= D.Wawontulap where P.= pulau or island and D.= desa or village.
Chi square < .0000

The age structure of the current population is not the usual pyramidal shape -- i.e. with the majority of the population located at the base, typically ages 0 to 15 years. Only on Bunaken do we find over half of the population under 18 years of age. On most islands, the largest group of people are 25-55 years of age; especially on Manado Tua where 55% of the population is between 25 to 55 years of age (Otniel et al. 1991, pp 17). These data suggest family planning may be quite widespread. While the survey did not collect formal information on family planning practices, I was told that a constraint to sustained use of contraceptives is their limited access on the islands themselves. Despite this constraint, I detected a very high willingness on the part of the women I spoke with to use contraceptives and limit family size to two or three children.

The most severe population pressure is on P. Nain, and to a lesser extent, on P. Manado Tua. Forty-one percent of P. Nain's population is under 18 years of age, and the mean age of household head is about 10 years younger on P. Nain than elsewhere (except Wawontulap) (Table 3.). These data suggests that many of the young people are remaining on the island and forming their own households. An indication of population pressure on P. Nain is the many houses built on stilts and located over the sea. Rather than representing a cultural practice among traditional Bajo fishing peoples (as I originally thought), I was told this practice has occurred because of a land shortage which has led people to build over the sea which, in the local view, no one owns. It should be noted that human and animal wastes from these residences are routinely discarded through bamboo slatted-floors into the sea below.

Table 3. Mean Age of Household "Head" (yrs)

B	MT	M	N	A	W	Total*
n=45	n=50	n=18	n=59	n=30	n=13	n=215
47	46	41	36	42	38	42

* B= P.Bunaken, MT= P.Manado Tua, M= P.Mantehage, N= P.Nain, A= D.Arakan, W= D.Wawontulap where P.= pulau or island and D.= desa or village.
Std Dev 13.7191
Chi square < .0000

Population pressures on Nain and Manado Tua are especially high given the size and geomorphology of their land area (Table 4). Nain is a very small island, whereas the great majority of Manado Tua is volcanic and very steep. Residents from both these islands expressed concern over the large number of young children, and feeling "crunched".

Table 4. Island Land Area and Land Use (ha)

	Total Area	Residential	Agricultural	Other
Bunaken/Siladen	687.5	15	568.5	104
Alungbanua	359	9	250	100
Manado Tua	937.5	30	507.5	400
Mantehage *	1000	45	40	905
Nain	125	10	30	85

Source: Pontoh, Otniel et al. 1991. Keadaan Sosial Ekonomi Masyarakat Nelayan Dan Konservasi Sumber Daya Perairan Di Taman Nasional Bunaken Dan Sekitarnya Sulawesi Utara. May, 1991. pp. 15.
Note: There is a discrepancy of 10 Ha in the figures for Mantehage

There is a widespread desire to educate children to the highest level possible in order to increase childrens' employment chances. However, school fee costs, transportation and housing limit the educational opportunities of most young children living within Bunaken National Park. This is because there is only a SD in each village. Desa Bunaken and Manado Tua have the only two SMPs and all children wishing to attend SMA must go to Manado. Very few teenagers from Nain, Manado Tua and Mantehage attend the SMA in Manado. This is in stark contrast with Bunaken where some 15% of households currently have one or more child attending school in Manado.

All of the households surveyed on Manado Tua and Nain are "headed" by two parents. Approximately 4% of households on Bunaken, 6% on Mantehage, and 23% in Wawontulap, however, are "headed" by single, females -- most of whom are widows. That almost one-quarter of households in Wawontulap are headed by women suggests some special consideration of gender in local development and park management efforts in that area. This may be particularly the case given generally low labor availability in households in Wawontulap, as well as in the total study area. The mean number of people age 14 years of age or older living at home is 3.3 (Std dev 1.6304).

Two-thirds of all households identified themselves ethnically as from Sangir -- the group of islands to the north of Bunaken. The next largest ethnic group is Bajo, concentrated on Nain (54%) and in the village of Rap Rap (27%). The remainder are from Moluccas, Gorontalo, Minahasa, Bugis and Buton.

Religious faith closely approximates ethnicity. People from the Sangir islands usually follow the Christian faith, whereas those identifying themselves as Bajo are Islamic. Table 5. indicates the breakdown in the sample by religion. Spatially, people from similar religions tend to live close together in one village, hamlet or neighborhood. For example, in Desa Bunaken, the few Islamic households formed their own hamlet or dusun near a mosque (mesjid), situated apart from Christian households.

Table 5. Religion (%)

	Christian	Islamic
P. Bunaken	92	8
D. Bunaken	90	10
D. Alungbanua	93	7
P. Manado Tua	100	0
P. Mantehage	36	64
D. Tinongko	100	0
D. Tangkasi	0	100
P. Nain	3[illegible]	64
Arakan	30	70
D. Rap Rap	20	80
D. Arakan	40	60
Wawontulap	54	46
Total	65	35

* P.= pulau or island and D.= desa or village.
Chi square < .0000

3.2 Household Food and Income Sources

Rice and cassava are the major staple foods, and both are grown and purchased. From Table 6., we see that rice is generally preferred in D. Bunaken, P. Manado Tua, P. Nain and D. Wawontulap; and is generally purchased except on P. Manado Tua and P. Mantehage. No household can grow enough rice to meet consumption demand (or to be "rice self-sufficient,") so even those who grow rice must purchase a proportion of it. Outside of D. Alungbanua and possibly P.Manado Tua, no household can grow enough cassava to meet household consumption and must purchase cassava.

On P. Nain, 100% of households said they rely on the market to purchase their staple food. Most people purchase rice or cassava -- depending upon what is available from farmers on nearby P. Mantehage. In contrast, people from D. Bunaken and P. Manado Tua rely on the market in Manado to purchase their staple rice.

The data from Table 6. is extremely critical as they suggest the inability of most areas to be self-sufficient in food production, and the importance of income to purchasing food. Nonetheless, food production remains important in D. Alungbanua, P. Manado Tua and to a lesser extent, on P. Mantehage.

Table 6. Type and Source of Staple Food (Makanan Pokok) (%)

	Rice	Cassava	Purchase	Farming	Other*
P. Bunaken**	69	31	62	38	1
D. Bunaken	100	0	93	7	0
D. Alungbanua	7	93	0	100	0
P. Manado Tua	96	4	0	96	4
P. Mantehage	61	39	22	78	0
P. Nain	53	48	100	0	0
Arakan	47	53	43	53	4
D. Rap Rap	47	53	33	60	7
D. Arakan	47	53	53	47	0
Wawontulap	77	23	69	31	0
Total	46	54	53	46	1

*Other includes as part of government salary and from children.
** P.= pulau or island and D.= desa or village.
Chi square < .0000
Note: The percentages do not always equal exactly 100%, due to rounding.

The above data also alert us to the importance of cash in the household economies of local residents in Bunaken National Park. Before this survey was conducted, I think it is fair to say that most observers assumed that cash was earned predominantly through fishing or selling agricultural production. Table 7. indicates this is certainly the case on most islands, but with a significant number of households also engaged in construction, salaried work, and trading.

On P. Nain, one-quarter of households earn income by constructing bed frames and other furniture from mangrove wood. This wood is cut from the mangroves surrounding the island of Mantehage; most of it is taken without permission and without compensation to the residents of that island. Some of it is cut and sold. People of all ages and both sexes are engaged in mangrove furniture construction. It is a particularly important occupation for teenagers who lack access to land or fishing gear, and have problems locating alternative work. This lively enterprise may account for the tendency of young people to remain on Nain after they marry. One bedframe sells for around Rp 35,000, and due to its weight and transportation costs, is sold only on Nain. It takes about one week to construct a bedframe, and carpenters estimate they earn about Rp 3000 daily.

Sixty-one percent of households from Wawontulap earn income as agricultural laborers working on a large plantation operated by PT Multi-Raya Ekatama. The plantation produces cocoa planted under coconut. Male laborers receive approximately Rp 3000-4000 per day, whereas females receive less, about Rp 2000 day. These wages appear to be similar to that earned by a small farmer during the harvest season only. Income earned from fishing is more varied and depends on the type of fish caught: Bunaken tuna fishermen estimate they earn about Rp 5000/day during the fishing season compared to Rp 1500 to Rp 3000 per day for those using small nets or handlines and fishing closer to the coral reefs. Some fishermen estimate they earn only Rp 1000 day, although they also provide fish for home consumption. It is important to remember the dirficulty in calculating income due to the seasonality and variability in income generating activities over the course of a year.

Table 7. Major Source of Household Income* (%)

	1	2	3	4	5	6	7
P. Bunaken**	62	24	2	4	2	0	6
D. Bunaken	87	10	0	3	0	0	0
D. Alungbanua	13	53	7	7	7	0	13
P. Manado Tua	44	44	0	12	0	0	0
P. Mantehage	27	50	11	6	6	0	0
P. Nain	54	3	24	2	5	7	4
Arakan	63	17	7	3	3	0	6
D. Rap Rap	73	7	7	0	0	0	13
D. Arakan	53	26	7	7	7	0	0
Wawontulap	8	0	15	62	15	0	0
Total	50	23	10	9	4	2	2

*1=Fishing, 2=Farming, 3=construction, 4=salary, 5=trader, 6=selling shell-crafts and 7=other (chain saw operator, copra laborer, servicing TV/radios, remittances from children, and government pension).
** P.= pulau or island and D.= desa or village.
Chi square < .0000
Note: The percentages don't always equal exactly 100% due to rounding

Cash incomes are critical to many households for purchasing staple foods and other commodities, but much of peoples' subsistence comes from the local environment. For example, ninety-eight percent of households surveyed use wood as their major source of cooking fuel. Around half of households rely on wood obtained from secondary growth on their upland farms, and more likely from remaining forests; whereas 22 percent rely on coconut (wood, fronds and dried husks). On P. Mantehage, the island with the most extensive mangroves, 55.8 % of households claimed to rely on mangrove as their chief source of woodfuel. When we consider that residents are aware that the local government department charged with park management has outlawed mangrove cutting, this statistic is a conservative one. On Nain, 25% of households identified mangrove wood as their major source of cooking fuel. As is the case with furniture construction, most of the mangrove wood used for cooking comes from Mantehage. Respondents claim that they cut only the large, old and dried mangrove.

Coral is used by 78% of households to build house foundations. In Desa Bunaken, where incomes are likely the highest of all the islands, 91% of respondents' house foundations involve coral, either mixed with sand and cement, or burnt first into lime (kapur). Other sources of foundations involve bamboo, soil, black

rocks, thatch and timber. Coral is used in 22% of walls, typically mixed with sand and cement. Eighty percent of houses use corrugated tin (seng) for roofs while the remainder use thatching. Many respondents say that they only take coral that has already died. However, personal observation did not find this to be true.

Access to fresh water is a severe problem on P. Bunaken. At the time the survey was conducted, the end of the dry season, many households were purchasing and carrying drinking water from Manado. They claimed that their wells had gone brackish and were now inappropriate for drinking. Some households on Manado Tua and Mantehage were also purchasing water. On the other islands, however, they were not experiencing difficulties with either the amount or quality of water drawn from wells (sumur).

3.3 Fishing and Marine-Based Activities

Fishing activities in Bunaken National Park involve a variety of techniques and fish species. These are summarized in Table 8. Fishing in the Park can be further broken down into three categories: 1) fishing in the open sea; 2) fishing near the shore or coral reef; and 3) fishing on the surface of the coral reef (nyare) when the tide is out. These distinctions have important and different implications for environmental impact and are discussed in Section 4. Generally, tuna, mackerel and flying fish are caught in the open sea; fusiliers, snappers, emperors, groupers, parrotfish, surgeonfish, and rabbitfish are some of the species caught off-shore and near the coral reef; squid, octopus, sea cucumber, spiny lobster, clams and other shells are the major marine life caught by gleaning on the coral reef.

According to the Marine Conservation advisor of the NRMP, Graham Usher, determining the extent of human pressure on Park fishing and marine resources depends in large part on whether fishing occurs in the open sea, or on or near the coral reef; and whether it entails the use of certain fishing techniques. Use of explosives (bom), poison (typically potassium cyanide-- potas), and large, heavy beach seine nets are the most critical in that they destroy habitat and indiscriminately catch both large commercially valuable fish as well as small immature fish. Virtually 100% of survey respondents claim that they ceased using explosives and poison of any type within the last few years, in large part as a result of aggressive out-reach educational efforts by field workers employed by PHPA. However, residents of Wawontulap, Mantehage and Nain claim that these methods are occasionally still utilized by "outsiders," notably fishermen from Kecamatan Wori. They claim that fishermen using poison wear face masks and thus their activities are easily identified, and that the boats move quickly away if another boat approaches them.

Table 8. Name and Techniques of Fishing

Fish Sought/Local Name	Latin Name	Fishing Technique*
Mandidihang (yellow-fin tuna)	Thunnus albacores	Pancing Tonda (trolling) Pancing Funae (pole from boat)
Cakalang (skip-jack tuna)	Katsuwonus pelamis	Soma Giop (purse seine)
Deho/Tongkol (frigate mackerel)	Auxis thazard	Soma Giop (purse seine) Soma Pajeko (purse seine) Pancing Tonda (trolling) Sero Tanam (fish trap)
Tongkol/komo (mackerel tuna)	Euthynrus affinis	Soma Giop (purse seine) Soma Pajeko (purse seine) Pancing Tonda (troll) Sero Tanam (fish trap)
Biade/abu abu (longtail tuna)	Thunnus tonggol	Pancing Tonda (troll) Sero Tanam (fish trap)
Gorango/cucut, hiu (sharks)	Hemigaleus macrostoma	Pancing Tonda (troll)
Goropa/Kerapu (groupers)	Serranidae	Soma Rarape (gill net) Pancing Noru (hand line) Jubi or Panah (spear gun)

Table 8. Name and Techniques of Fishing (continued)

Gaca/Ikan Merah (snappers)	Lutjanus sp	Soma Tagaho (beach seine) Pancing Noru (hand line) Bubu (fish trap)
Bobara (jacks, trevallies)	Caranx sp	Soma Paka-Paka (gill net) Soma Rarape (gill net) Pancing Noru (hand line)
Tindarung/setuhuk loreng (marlin)	Makaira sp	Pancing Tonda (troll)
Somasi/kakap (barramundi)	Lates calcarifer	Soma Rarape (gill net) Soma Paka Paka (gill net) Jubi/Panah (spear gun)
Behang/lencan (emperor)	Lethrinus sp	Pancing Tonda (troll) Jubi/Panah (spear gun)
Mamanganu/sungkir (rainbow runner)	Elagatis bipinnulata	Soma Pajeko (purse seine) Soma Rarape (gill net) Soma Paka Paka (gill net)

Table 8. Name and Techniques of Fishing (continued)

Malalugis/layang (mackerel scad)	Decapterus russeli	Soma Pajeko (purse seine) Soma Rarape (gill net) Soma Paka Paka (gill net) Soma Giop (purse seine) Sero Tanam (fish trap) Pancing Noru (hand line)
Tude/selar (smooth-tailed trevally)	Selaroides leptolepis	Soma Pajeko (purse seine) Soma Paka Paka (gill net) Pancing Noru (hand line)
Lolsi/ekor kuning (yellowtail fusilier)	Caesio cuning	Soma Rarape (gill net) Soma Paka Paka (gill net) Sero Tanam (fish trap) Pancing Noru (hand line)
Sako/cendro (garfish/needlefish)	Thylosurus sp	Pancing layang layange (kite line fishing)
Gotila/Krot-krot (grunt)	Pomadasys hasta	Soma Rarape (gill net) Soma Paka-Paka (gill net) Pancing Noru (hand line)

Table 8. Name and Techniques of Fishing (continued)

Bebagau/Kerong kerong (grunters)	Terapon sp	Soma Rarape (gill net) Soma Paka Paka (gill net)
Antoni (flying fish)	Cypselurus unicolor	Soma Landra (gill net)
Ikan Merah/Swangi (bigeyes)	Priacanthus sp	Soma Rarape (gill net) Soma Paka Paka (gill net) Pancing Noru (hand line) Soma Tagaho (beach seine) Bubu (fish trap)
Goruo/Belanak (mullet)	Mugilidae	Soma Rarape (gill net) Soma Paka Paka (gill net)
Lahemo/Kembung (short mackerel)	Rastrellige brachysoma	Pancing Noru (hand line) Sero Tanum (fish trap)
Biji Nangka (goatfish)	Mullidae	Soma Paka Paka (gill net) Pancing Noru (hand line) Bubu (fish trap)

Table 8. Name and Techniques of Fishing (continued)

Lahaminang/ Kwee macan (golden trevally)	Gnathanodon speciosus	Soma Rarape (gill net) Soma Paka Paka (gill net) Sero Tanam (fish trap)
Kulit Pasir (trigger fish)	Balistidae	Sero Tanam (fish trap)
Sardin (sardine)	Sardinella sp	Soma Pajeko (purse seine) Soma Giop (purse seine) Soma Paka Paka (gill net) Jubi (spear gun)
Tandipang (herrings)	Clupeids	Soma Pajeko (purse seine) Soma Giop (purse seine)
Alu-alu (barracuda)	Sphyraena sp	Jubi (spear gun)

* English translation -- when there is one -- is included in the parentheses.

Source: Adapted from Pontoh, Otniel et al. 1991. Keadaan Sosial Ekonomi Masyarakat Nelayan Dan Konservasi Sumber Daya Perairan Di Taman Nasional Laut Bunaken Dan Sekitarnya Sulawesi Utara. pp.49a-49b. See this reference for more detail on the fishing equipment and overall fishing techniques.

The survey asked respondents where they usually fished, and what type of fishing equipment they usually utilized. These data are summarized in Figures 1., 2. and 3. and Tables 9. and 10.

Figure 1. indicates that open/deep sea fishermen most likely come from P. Bunaken (really D. Bunaken) and P. Manado Tua. This result is consistent with the data from Table 9. which show that the large fishing boats (funae), which are used to reach the open/deep seas, are most commonly found in P. Bunaken and P. Manado Tua. These boats can carry a crew of up to 20 people. The crew and the boat owner share the catch with the crew keeping one-half of the catch, and the other half goes to the boat owner (who is also responsible for oil and fuel and regular maintenance on the boat). More common is the londe, a narrow small outrigger canoe which can carry 1- 3 people; less common are other sorts of motorboats (including small ones for fishing, and wider and larger ones used for carrying people and goods back and forth from the mainland).

Figure 2. suggests that the waters near coral reefs are most heavily fished near P. Manado Tua and P. Nain, and to a lesser extent near P. Bunaken and Arakan (though 39% of fishermen from P. Mantehage say they "usually" fish in these waters). These fishermen are likely to paddle small dugout canoes to get off-shore and fish with hook and lines (e.g. pancing tangan, noru and snar), small gill nets (e.g. somo landra, paka-paka, rarape, and pukat). Fishermen from Bunaken are most likely to use large, heavy beach seines (soma tagaho and sasang kile). Spear guns (panah or jubi) and traps (sero tanam, bubu) are mostly used by fishermen from Nain, Arakan and Wawontulap. These fishermen typically cannot afford to purchase the other more efficient and "modern" fishing equipment; and as a result, they use these more "traditional" methods which they construct themselves from locally available materials. When asked how the NRMP could assist them, they all replied assisting them to gain access to more "modern" fishing equipment such as nets and motorized fishing boats; and possibly to assist with marketing. Many fishermen from D. Wawontulap are unsure if using sero tanam (a kind of fish trap) is illegal or not, and claim that in the absence of access to other fishing equipment, their livelihoods would be seriously affected if prohibitions on using this type of fish trap were upheld. All fishermen note the seasonal nature of the fishing industry, and the seasonally low price of fish when the supply is quite large.

The major fishing season for tuna begins in March or April and lasts until December; December through February is the worst time of the year for virtually all fishing activity due to strong winds and cold water which sends the fish to lower depths. Some tuna fishermen will leave for one or two months on a fishing trip. It is common for fishermen to leave early in the morning (around 3 am) and return in the early afternoon. We will see below that this schedule meshes well with upland farming.

Figure 1. Percent of fishing households in each study area who said they "Always" fish in the open/deep sea

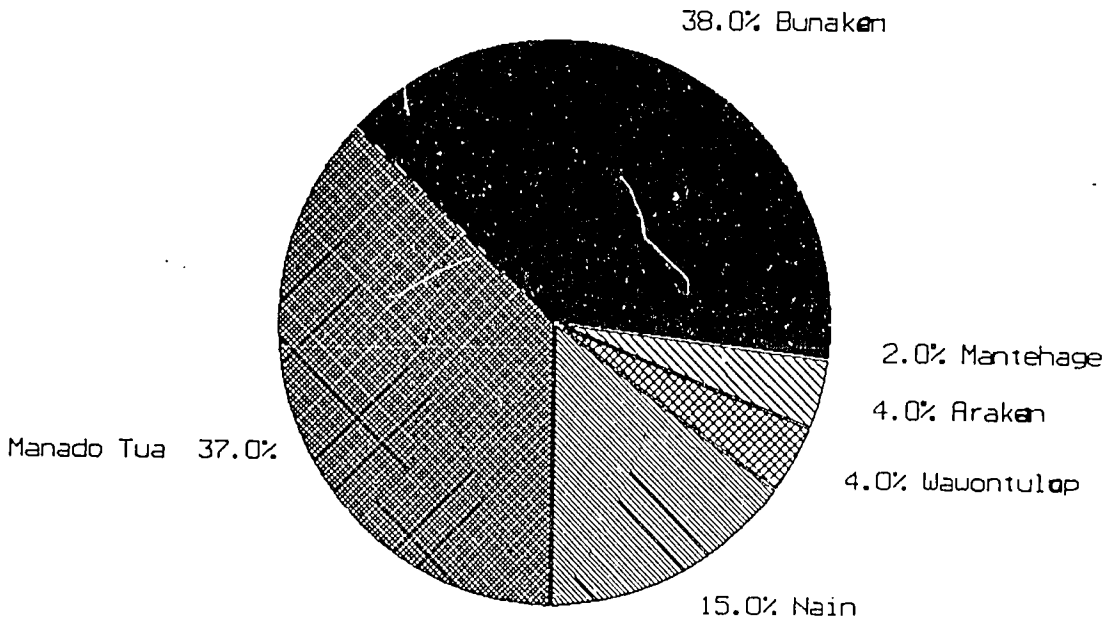


Figure 2. Percent of fishing households in each study area who said they "Always" fish near the coral reef

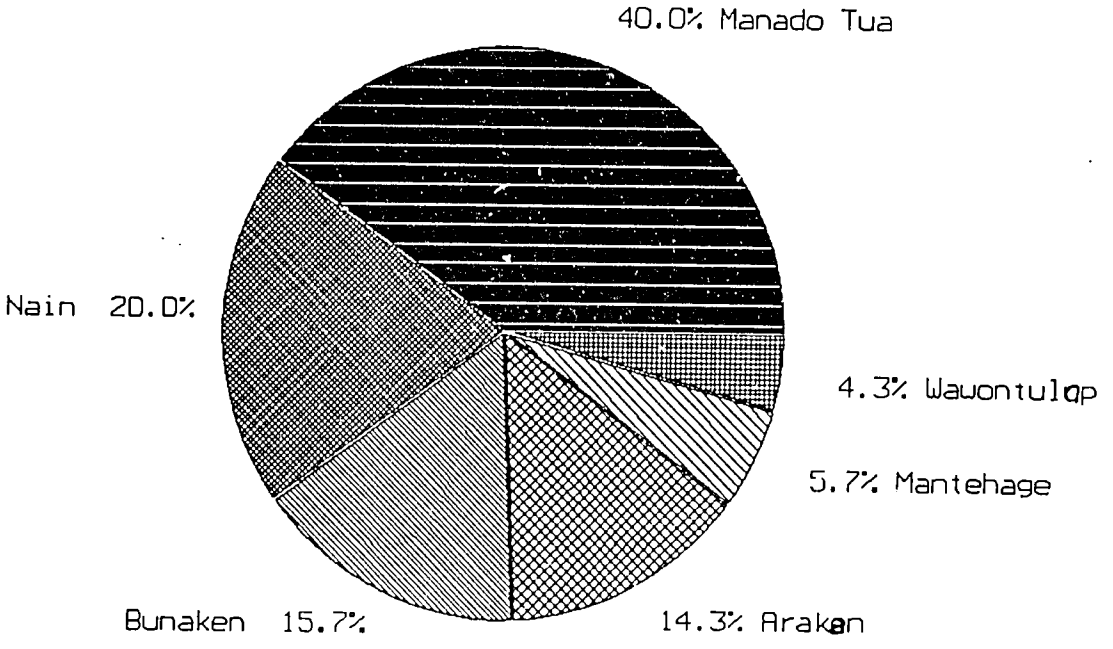


Table 9. Access to Boats (%)

	B n=45	MT n=50	M n=18	N n=59	A n=30	W n=13	Total* n=215
No Boat	53	30	50	42	20	85	42
Dug-Out Canoe (Londe)	38	54	50	54	67	8	50
Motorboat	0	8	0	3	13	8	5
Large Fishing Boat (Funae)	9	8	0	0	0	0	4

* B= P.Bunaken, MT=P.Manado Tua, M=P.Mantehage, N=P.Nain, A=D.Arakan, W=D.Wawontulap where P.=pulau or island and D.= desa or village.
Chi square < .00000

Table 10. Most Frequently Used Fishing Method (%)

	B* n=34	MT n=41	M n=11	N n=44	A n=27	W n=6	Total** n=163
Gill Net	9	24	18	36	44	33	28
Hook and Line	9	56	9	16	26	17	24
Spear Gun	0	5	9	18	11	17	9
Beach Seine	29	0	0	2	7	0	8
Hook and Line off Fishing (Tuna) Boat	35	0	0	0	0	0	7
Purse Seine	6	7	9	7	0	0	5
Fish Traps (igi)							
Sero Tanam	0	0	0	0	0	33	1
Bubu	0	0	0	2	0	0	1
Trawling	3	0	9	0	0	0	1

* B=P.Bunaken, MT=P.Manado Tua, M=P.Mantehage, N=P.Nain, A=D.Arakan, W=D.Wawontulap where P.=pulau or island and D. =desa or village.
** These include only regularly fishing households (N=163).
Chi square < .0000

As noted above, average estimated fishing income varies with the volume and type of fish caught; and of course, with the seasons. Despite higher unit cost of coral fish, tuna fishermen tend to catch a larger volume of fish and market them faster and fresher; and therefore earn high daily incomes. Marketing is less of a problem for Bunaken tuna fishermen who sell fish daily themselves at the Manado market, or sell to a local trader who transports the tuna daily to Manado. Reef fishermen from P. Manado Tua, P. Nain and Arakan generally sell many varieties of coral fish to a local or village trader known as a tibo-tibo. The trader stores the fish in an insulated crate with ice until there is sufficient stock to sell at either the Manado market, or at the coastal market of Amurang -- typically selling these fish one time per week. There is a high demand for the colorful, sweet-flavored coral fish in Manado.

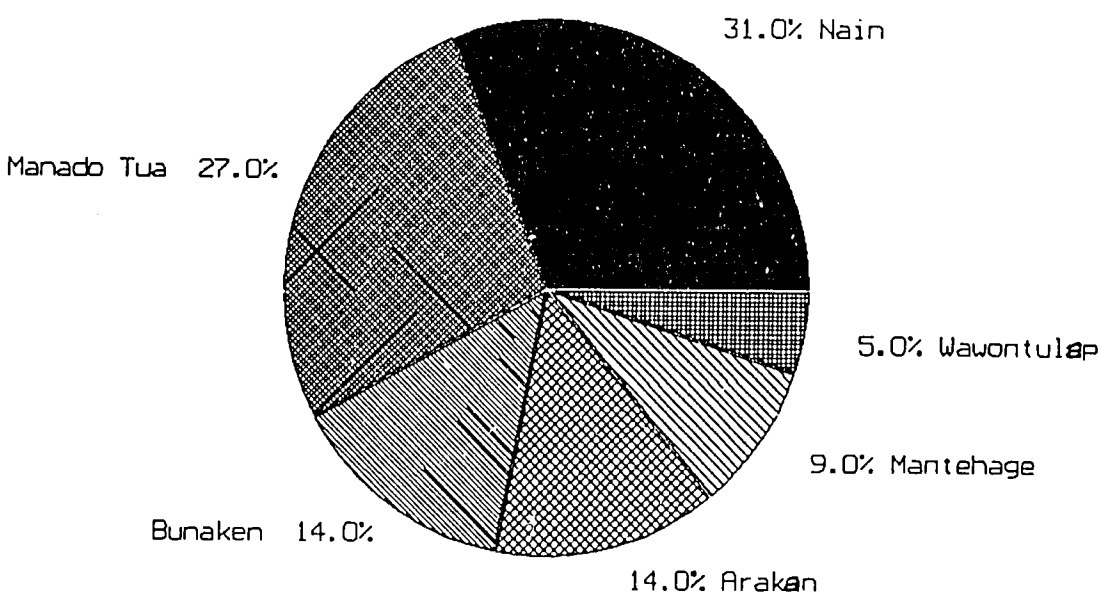
Figure 3. suggests that gleaning for small invertebrates on the surface of the coral reef (i.e. when the tide is out) is most common on Nain and Manado Tua where almost one-third of households said that they "always" glean. The marine species they typically catch include squid, octopus, sea cucumber, spiny lobster, clams and other shells. People from Nain purchase small shells from those collected on Mantehage to construct into handicrafts which they sell locally and in Manado. Gleaning is done by hand in mud, sand rubble, and tide pools and by using spear guns and small nets. Most of the households consume the marine products they collect. Most claim they glean when they do not have any other fish to eat.

Women and children are frequently the ones to glean on the nyare. It is long and hot work, and these are the reasons other people do not search for food on the nyare unless they have no other alternative. People from Nain are worried that the large number of women and children who routinely glean on the nyare is leading to severe competition and decreasing amounts of catch for the amount of time and effort expended. They estimate that they used to be able to earn about Rp 1000 to Rp 1500 for a mornings labor on a "good day."

Households from Nain catch squid and octopus, and in Arakan, sea cucumber, to sell in the market. Sea cucumber (teripang) is a dark, tube-like creature which is collected (the best time is during a full moon), boiled, cleaned, and dried before marketing; and is sought by Chinese who will pay a high price for it (Rp 7000 to 10,000 dried, per kg). We were told by fishermen from Arakan that sea cucumbers are also caught by commercial fishermen travelling on large boats from the island of Madura and Buton. They anchor their large boats near the reef by their village for one to two months at a time. Some say the village head (kepala desa) receives money in exchange for letting them fish near the village.

Another form of marine-based income generation is production of Eucheuma seaweed (rumput laut). Some years ago there was an initiative by some industry to encourage local residents to produce seaweed. Residents were given some seedlings and basic instructions. Many residents in Wawontulap and Arakan began growing seaweed but no longer do today in large part because of marketing problems. Apparently producers were supposed to sell only to this industrial representative. But after some people sold to a different agent, the original representative no longer returned and the market collapsed. Another respondent explained that the original representative did not return for six months. The seaweed was ready to harvest after 1 1/2 months and since it will spoil, people sold the seaweed in order to get some return. Now the price is about Rp 50 per kilo which is not enough to warrant people to continue growing seaweed.

Figure 3. Percent of households in each study area who say they "Always" glean for marine life on the reef surface



3.4 (Rainfed) Agriculture

As noted above, the extent and importance of agriculture in the local household economy vary from island to island, and especially in the case of P. Bunaken notably, from village to village.

Agriculture is extremely germane to the purpose of this report for two reasons: 1) continued soil erosion and sediment loading into the sea adversely affects marine resources (especially coral reefs) and 2) low farm productivity affects livelihood strategies, including whether to intensify fishing and other marine-based livelihoods.

As noted above, farming is the major source of income and food in D. Alungbanua on Bunaken island, on P. Manado Tua, P. Mantehage (especially in D. Tangkasi) and in D. Arakan. On Nain, 71% of households interviewed do not farm at all. Land on Nain is in short supply, rocky, infertile, and controlled by a few families. Today agriculture on Nain is comprised of old coconut trees that are not very productive.

Table 11 provides data on size of land holdings. Landholdings are largest in Desas Tangkasi, Tinongko, Alungbanua and in Arakan -- areas where a significant number of households identify farming as their major source of cash income and staple food.

Table 11. Mean Size of Farm* (in hectares)

P. Bunaken**	1.45		
D. Bunaken	.79		
D. Alungbanua	2.78		
P. Manado Tua	.89		
D. Manado Tua I	.90		
D. Manado Tua II	.88		
P. Mantehage	1.7		
D. Tinongko	1.12		
D. Tangkasi	2.89		
P. Nain			
D. Nain	.29		
Arakan	1.29		
D. Rap Rap	1.27		
D. Arakan	1.31		
Wawontulap			
D. Wawontulap	.86		
Total	.97	Std Dev	1.46

*Includes all parcels a household cultivates.
** P.=pulau or island and D.= desa or village.
Chi square < .0000

Approximately 55% of farmers said their major crop is cassava. Other crops grown include banana, padi rice and assorted vegetables. Cassava is widely grown under coconut trees as part of the land tenure institution known as pinjam (i.e."borrowing" or giving the right to cultivate on a particular parcel only for annual crop production and often in the understory without any formal labor or product sharing arrangement). Twenty-four percent of the total sample reported that coconut is their major crop. Coconut is dried and sold as copra, and is grown by farmers whose land tenure is more secure -- notably they perceive themselves as the land owner having inherited the land from their parents. Land acquired through inheritance is locally recognized as ownership, however it is not always recognized by the government of Indonesia. Only 2 farm parcels in this study sample have been formally registered with the National Land Authority (Badan Pertanahan Nasional). Farmers said that the cost of transportation and government fees have previously limited their desire to register their land; and they did not perceive any need to do so. However, given rumors that the Government is planning to move people out of the park (which will be discussed in more detail below), some have indicated they are now interested in registering their land.

On all of the islands, farmers noted problems with low agricultural production, pest predation, and great difficulty gaining access to new seeds and farming technologies. They also indicated that they have rarely if ever been visited by a government field extension worker (penyuluh pertanian), or benefitted from any government agricultural development effort. Especially on P. Manado Tua, farmers indicate a very strong desire to improve their farming systems by trying new seeds.

Table 12. Livestock (%)

	B* n=45	MT n=50	M n=18	N n=59	A n=30	W n=13	Total n=215
None	56	22	22	78	40	69	50
Have**	44	88	88	22	60	31	50

* B=P.Bunaken, MT=P.Manado Tua, M=P.Mantehage, N=P.Nain, A=D.Arakan, W=D.Wawontulap where P.=pulau or island and D.=desa or village.
** Cow, pig, chicken, goat and/or ducks.
Chi square .0000

3.5 Local Attitudes Towards Park Management and Marine Conservation

3.5.1 Local Attitudes Towards Park Management Thus Far

Bunaken (Marine) National Park was officially established and declared a marine national park in 1989. However, a later Decree of the Minister of Forestry (730/Kpts-II/91 of 15 October 1991) changed the function of the "Cagar Alam Laut Bunaken Manado Tua" and the "Pantai Arakan Wawontulap" to a national park to be known as the "Taman Nasional Bunaken."

Bunaken National Park will eventually be managed by a Unit Pelaksana Teknis (UPT) or Technical Operations Unit with its own office and line budget. Preparation for the establishment of the UPT involves production of a management plan for the park, and development of management facilities including buildings and equipment. The NRMP is assisting with the preparation of a management plan and development of management facilities.

Until the time that the UPT is established, park management functions have fallen to the Sub-Balai Konservasi Sumber Daya Alam (SBKSDA) of the Department of Forestry's PHPA. Over the last few years, the SBKSDA has initiated some activities to restrict marine habitat destruction by local residents and to diversify income generation to take pressure off marine resources. A very small staff of field workers (penyuluh lapangan) with very limited equipment (not even their own boat) periodically visit the islands to inform residents of park rules and to monitor their compliance. In order to visit the islands, the government field workers hitch rides from commercial diving operators. As of last March, a small post was constructed on P. Bunaken for the purpose of maximizing contact between field workers and park residents. Two workers are supposed to live at the post at one time. However, the location of the post is many kilometers away from island residents (it is located about 1/2 km from the major tourist lagoon known as Pantai Liang). This location (as well as a lack of a boat) continues to limit contact between workers and residents; and field workers are reluctant to stay overnight at the still rather primitive facility.

The attitude of local residents to the creation of the park, and incipient attempts at park management, can be summed up in the words of one resident. He said the actions of the SBKSDA amount to three D's: "Dilarang, Dilarang and Dilarang." Translated this means: "not allowed," "not allowed," "not allowed."

While there is no authoritative park management plan, the current focus of the SBKSDA field activities is to enforce local residents' compliance with the following:

1. No cutting mangroves;
2. No collecting coral;
3. No cutting timber or farming in protected forest areas;
4. No throwing garbage in the sea;
5. No use of dynamite or poison.

These rules are noted on signs on all the islands (though not all signs are in conspicuous locations or in good repair). To my knowledge, the sanctions for not following the above rules are verbal reprimands from government field workers, village heads and, in a few instances, chainsaws used to cut mangroves have been confiscated (i.e. one chain saw confiscated from a resident of Mantehage has been held for almost one year). The fact that removal of chainsaws have been random and limited was noted by some residents as unfair.

A very definite negative attitude toward the creation and management of Bunaken National Park by many local residents has been inspired by the spread of rumors. There has never been any formal meeting or announcement by government officials with residents of the park to inform (or discuss) park management plans. Indeed, the survey results suggest that almost half of respondents (mostly from Mantehage and Nain) have not as of yet heard about the park. Many respondents had heard about the park, but its boundaries and functions were unclear. They had learned about the park from signs, radio, PHPA field workers and community leaders, but they thought that its borders extend only to the lagoon on Bunaken island where the Department of Tourism has built a large sign, boat mooring and visitor area.

Furthermore, many people throughout the islands have heard that the governor of North Sulawesi wishes to relocate communities from P. Bunaken and from Arakan and Wawontulap. One resident from Bunaken island informed me that they were to be moved to some forested areas near Gorontalo. There is wide and strong consensus on P. Bunaken and Araken-Wawontulup among residents that they do not want to be relocated. Many insist that they are fishermen and would suffer greatly if they had to become forest farmers. Bunaken residents emphasize that they have an established village with cement houses, paths, schools and churches; and permanent crops in their farms. I was told that government published reports minimize these facts and suggest that D. Bunaken is a poor village. Residents insist they would not be compensated the full market value for their land and trees if the government moves them. They cite as a telling example how the government efforts to install telephone lines from D. Bunaken to D. Alungbanua compensates owners for felled coconut trees at below current market price (Rp 3000 instead of Rp 5000). Some tree owners have not received any compensation.

Local residents do see some "benefits" from the creation of Bunaken National Park. These include the following: 1) influx of tourists who will pay high prices for cooked foods, bananas and fish, coconut drinks, boat transport, and lodging and 2) a more lively and "global" environment which will enable young people to learn English.

However, according respondents, the park has disadvantages which include: 1) restrictions on the use of marine resources which until recently were open-access and open-use resources; 2) future zoning and restrictions on fishing (such as has been imposed in the tourist lagoon on P. Bunaken); 3) enforced restrictions on cutting mangroves and future confiscation of chain saws; 4) land speculation (i.e, rising land prices on Bunaken and entry of Chinese businessmen from Manado buying land and/or renting it to put up small beachfront guesthouses); 5) rising insecurity of land and tree tenure, and fear of forced relocation; and 6) influx of foreigners with different dress codes and morals -- many of which are distasteful to traditional peoples.

There is major concern on P. Nain that the park will restrict fishing; and on Mantehage that more stringent control of mangrove cutting will be forthcoming --- all without any benefits to island residents to whom fishing and mangrove resources are critical to their livelihoods.

Some additional comment is warranted about the growing speculative land market. The Indonesian government's designation of the Manado area in general, and Bunaken National Park in particular, as a favored tourist development area has inspired spontaneous private tourist development on P. Bunaken (e.g. small bamboo and thatch guesthouses known as losmens). Many of these losmens are operated by people from Manado with sufficient capital to build guesthouses on land that they rent from local residents (many from D. Tanjung Parigi). Over the last year, many businessmen from Manado have approached residents on P. Bunaken to buy their land -- interior land as well as beachfront (I was told the former is in case the government decides to build a golf course).

Tourist development on P. Bunaken is a highly contentious issue because the Indonesian government has prohibited all land sales to outsiders and private tourist development within the park. However, permission has apparently been granted by some government official close to the governor to one Chinese losmen owner ("Leng") to continue to expand his losmen, and to even build a small pool (kolam). Residents are rightly angry over these inconsistencies in policies and enforcement. A major problem to date (and one that is beyond the scope of this consultancy) is the lack of coordination among involved parties -- government and non-government -- in managing Bunaken National Park. This is despite the fact that formal management control at present is with the Sub-Balai

Konservasi Sumber Daya Alam (SBKSDA) within the Department of Forestry.[4]

In addition, it is widely known that the village head (kepala desa) of D. Bunaken is promoting land sales to outsiders, despite government prohibition. He supposedly is encouraging land sales so he can receive payment for managing the transaction. He is not well liked in the community (in fact he maintains a residence in Manado), nor is he considered to be a true community leader, despite his political designation as village head. Most residents of D. Bunaken consider the village secretary, as their legitimate village leader. In opposition to the kepala desa, she encourages residents not to sell their land.

Bringing the above situation to light is important for many reasons. Among others, it indicates how local (i.e., intra-island) politics and divisions complicate cooperation between the NRMP and "local communities." Building communication and bridges between NRMP, Park officials and local communities is difficult when the latter is splintered (as well as when government coordination is lacking as well). Furthermore, government-appointed village heads will not be easily bypassed when local input and representation is sought.

3.5.2 Local Attitudes Towards Marine Conservation

From the above section, one can summarize the relationship between local residents and park "managers" in Bunaken National Park as one of a series of restrictions from the "top" levied on the "bottom." This has been a common approach to protected areas management throughout the tropics until recently. In most cases, the reasoning behind taking a restrictive or "policing" approach is that local residents' fishing and extractive activities pose a serious threat to the viability of Park natural resources, that residents are ignorant about marine ecological processes and conservation strategies, and they are too concerned with their own livelihood needs to care about conserving or managing marine resources for future generations.

In order to ascertain the validity of these assumptions, and to provide some empirical basis for making further recommendations, residents were asked their opinions about a variety of ecological and conservation issues. These are discussed below.

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[4]At the presentation I gave in Manado at the end of my consultancy, the head of the Kanwil ended by saying that in his opinion, one of the largest impediments to date concerning park management is a lack of bureaucratic coordination. He specifically suggested the designation of some local institution to manage the park.

Fish Populations/Changes in Fishing Effort

On average, half of respondents note a significant decline in fish populations in general (and certainly during the end of this fishing season when the survey was conducted). In Arakan and Wawontulap, around ninety percent said that fish populations are declining. Those that believed fish populations had declined report they know this because the time and effort now needed to catch fish had increased over the years. Most people in this category also state that the declines are largely for fish caught near the reef, as opposed to fish found in the open sea.

Respondents from P. Nain state that marine life found on the coral reef surface (nyare) are definitely more difficult to collect now than in the past, and as noted above, many link this decline with increased numbers of people involved in gleaning on a regular basis.

(Rainfed) Agriculture and Land Degradation

On average, half of the study sample say there has been a decline in agricultural production which they link to declining soil fertility, especially on P. Mantehage (over three-fourths of respondents note a decline). To date, no farmers use chemical fertilizers.

Most farmers (especially on P. Nain and P. Mantehage) point out the old age of existing coconut trees and their very low productivity. Many say there has not been any agricultural extension efforts on these island for food crops, and only minimal efforts by Dinas Perkebunan (Department of Estate Crops) to address problems with coconut production. Many are concerned about a sickness attacking bananas which leaves black spots on bananas.

On P. Manado Tua and in the coastal villages, areas with access to sloping lands, respondents are well aware that forest cutting and farming in the upper slopes are prohibited for soil and watershed protection reasons. However, observation indicates that these prohibitions mean very little in real life. Large tracts of land have been converted to farms, and bare slopes often lead to serious soil erosion and land slides.

Farmers suggested to me that if they had access to other fertile land, they would gladly stop farming steep lands (which they acknowledge should be reserved for watershed protection). However, they claim to have no other alternative given current resources. Furthermore, they would be eager to try conservation farming practices if they were low in risk, cost and labor. Especially on Manado Tua, farmers virtually begged for agricultural assistance from skilled people in hillside farming crops and techniques.

Coral

On average, half of respondents say that coral should not be extracted because it is an important environment for fish spawning and feeding. On P. Bunaken where educational outreach has been the most aggressive, over two-thirds of respondents indicate awareness of the importance of coral reefs and that they should not be damaged. They say that they only collect dead coral for house and road construction.

The other half of respondents do not see a problem with people collecting and using coral as they have done for decades (if not longer). They are quite aware that the government has prohibited coral extraction, but they are unsure of the function of coral besides its utilitarian value.

Many respondents claim that coral extraction by local people is not the major source of coral damage. They point instead to the increasing number of commercial diving boats which indiscriminately throw and drag anchors. They also describe observing tourists break off large pieces of live coral to take home as souvenirs. As a result, many residents feel that the government wrongly blames them for destroying coral, and claim they too (especially on P. Bunaken) appreciate the importance of the coral marine gardens for attracting and supporting tourism in the Park.

Mangroves (known locally as posi-posi)

Knowledge and concern about mangrove conservation are affected by whether one lives on an island or a coastal community that still has a large extent of mangroves or not; and how one interprets current park rules. While some mangroves are found on all the islands, the most extensive mangroves exist around P. Mantehage where they are a critical source of fuelwood and building material on that island, as well as on the nearby island of Nain. Some respondents think that mangrove cutting for subsistence purposes, such as for fuel wood, is permitted, especially if only old, dried mangroves are felled and if one takes only a "little".

Approximately two-thirds of the survey sample are not concerned with mangrove conservation. Perhaps more significant is the finding from P. Mantehage that 61% of respondents are concerned about mangrove conservation, and acknowledge the important role these marine trees play in mediating impact of waves and protecting beachfronts. However, 73% of respondents from the island of Nain say they are not concerned about mangrove conservation.

Many respondents from the coastal villages of Arakan-Wawontulap lament the loss of mangroves near their villages, and tell stories of how wide beachfronts used to be in the past, and the serious problems they now face with flooding.

Garbage

In the past, garbage has either been burned or thrown into the sea. On average, about two-thirds of the sample are concerned about garbage, mostly because they link its accumulation on the beach to human health problems.

Many respondents on P. Bunaken think provision of garbage containers, at least near the tourist area, has been a positive benefit from the park. They say the beach front is much cleaner now than before. However, it is unclear to me if and how often garbage discarded on Pantai Liang (and that discarded within the communities) is picked up and carted off the island.

There is still a minority of people (largely found in the outer islands) who do not see a problem with discarding garbage in the open sea. It should be noted that on these islands, there is no provision for waste disposal. Litter is routinely burnt or tossed into the sea -- in fact, many think tossing garbage into the sea or burning it represent "solutions" to the garbage problem. Many people are concerned about human waste management and health problems, and look to the government for leadership.[5]

Endangered Species

An attempt was made to judge the extent to which respondents were aware that certain marine species have been identified as "endangered" and should not be collected under any condition. Posters detailing these species designed by World Wildlife Fund may be seen hanging in losmens on P. Bunaken, but no where else.

Some residents were aware that very large clam shells should not be collected, but indicate that these are very rare. Other types of shells are collected and routinely displayed for sale on P. Siladen. All respondents knew that dugong (duyung or sea cows) should not be hunted, though they are killed and the meat eaten (or sold) when these creatures accidently get ensnarled in fishing nets. Off of Arakan-Wawontulap where sea cows are most prevalent, fishermen estimate that around one sea cow is inadvertently caught every two or three months. Turtle meat is rarely hunted or sold.

Outsiders

Throughout Bunaken National Park (and the Sulawesi region as well), marine resources are considered by local populations to be an open resource with few if any social institutions restricting

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[5]The survey did not formally collect data on human waste disposal. But observation suggests perhaps half of respondents use toilet facilities, especially on P. Bunaken and P. Manado Tua. P. Nain seems to have the worst waste management problems.

their use or access to particular social groups. The survey found approximately two-thirds of respondents concerned about "outsiders" fishing in the waters surrounding the islands. There is a widely held belief that the sea belongs to all Indonesians. Residents make exceptions to Filippinos on large fishing boats routinely fishing in the waters behind P. Manado Tua. Local residents report instances where Filippino fishermen have pointed pistols at them when local fishermen have approached their boats.
Many fishermen said they would support actions by park officials to limit fishing to park residents. They desire to decrease competition for fish.

Some residents perceived the question about "outsiders" to refer to non-resident government workers employed to monitor compliance with existing park rules. One respondent notes:

> We don't need petugas (government field workers/rangers). We can together jaga (protect) Bunaken National Park if it is ours.

4. Areas of Conflict and Concern between Resident Activities, Marine Conservation and Resource Management

4.1 Areas of High Concern From a Natural Resource Management Perspective

* collecting live coral for road and house construction (all islands);
* cutting mangroves for firewood, furniture and boat construction (especially on P. Mantehage and P. Nain);
* fishing on or near coral reefs with heavy (beach seine) nets (especially on P. Bunaken) and possibly some fish traps;
* sloping-land agriculture without soil conservation (especially on P. Manado Tua and by coastal communities);
* human waste and garbage disposal in the sea (especially on P. Manado Tua, P. Mantahage and P. Nain); and
* spontaneous tourist development on Pantai Liang (on P. Bunaken).

4.2 Areas of High Concern From a Socioeconomic Perspective:

* Low available household labor on all islands;
* P. Nain: high population density, skewed land distribution/limited access to land, poor land quality,

dependence on purchasing staple foods, and limited income generating alternatives (most dependent on marine resources: coral reef fishing and mangroves);

* Seasonal availability of fresh water on some islands (especially P. Bunaken)

* Marginal and declining agriculture, limited access to new seedlings, technical information and low-impact conservation practices (especially on P. Manado Tua where there is access to land and a high degree of local enthusiasm for improving agricultural production);

* Limited access to equipment necessary for commercial off-shore fishing (except D. Bunaken);

* Religious and ethnic diversity (especially on P. Bunaken, P. Mantehage and P. Nain) which could limit inter- and intra- island cooperation;

* Lack of legitimacy of some village leaders to represent local interests;

* Limited and costly educational facilities;

* Limited income generating opportunities for women;

* Rumors concerning future park management plans which are resulting in land speculation (P. Bunaken), insecure land tenure (P. Bunaken and possibly others), and incipient private tourist development (P. Bunaken and possibly others).

5. Recommendations:

5.1 Public Information and Creation of a "Resident Participation Committee"

Goal:

- The major goal is to create an atmosphere where local/resident peoples are viewed by park and government officials as assets of the park, rather than enemies; and to involve residents in developing and implementing a park management plan so they too can view themselves as having a vested interest in promoting the sustainability of the park's natural resources.

Activities:

- Continue public educational and awareness activities on coastal/marine ecology and conservation, highlighting why people should not collect live corals or throw garbage into the sea.

- In exchange for supporting park management efforts, subsidization/provision of cement (to replace live corals) for community projects such as building village pathways, churches and schools should be considered.

- Employ residents in constructing and hanging signs, making public advertisement adds, and collecting garbage; and to whatever extent feasible, to hiring park residents in the SBKSDA and later in the UPT.

- Train local residents where ever possible to carry-out pilot projects (e.g. to promote upland agriculture (SALT) and sustainable mangrove development (see below)).

- Reorient governmental staff involved in Bunaken National Park management to view their role as "educator/island employment facilitators" rather than merely as "rangers," or worse as "marine police." There are precedents for this attitude at the field extension level where workers have initiated some income diversification schemes, for example, producing honey on P. Mantehage.

- Build on residents' interest in restricting fishing and other livelihood activities within park boundaries to residents only by encouraging patrols and sanctions for violators (i.e. especially outsiders such as Philippine fishing boats and fishermen from Kec. Wori who may still be fishing with poison and bombs).

- Set up an island-wide "Resident Participation Committee" to discuss park management goals, strategies, information dissemination and specific actions to maximize local support. The committee should be comprised of at least two members from each island and major coastal areas, and an attempt should be made to identify potential members as having a broad base of local support. The committee should be included in decisions about park policies, especially the designation of use zones.

Concerns:

- How to identify "Resident Participation Committee" members who represent the main interests on each island will require further consideration. There may be conflict of interests if village leaders are selected, especially on P. Bunaken and possibly on P. Nain. Experience elsewhere has shown that unless local political and social structures are thoroughly understood and built-upon, attempts at involving local communities will fail and could create further divisions and social disruption among small island-populations.

- Note that the term "participation" was purposively chosen instead of "advisory" which could be objectionable to local government personnel, many of whom think local people are represented by their elected officials and, therefore, do not require an additional representative body. Furthermore governmental personnel may object to being "advised" by less educated village peoples. "Resident" was selected to differentiate island/coastal villagers from other "local" interests that should also be included, such as private diving operations and non-governmental organizations.

- SBKSDA/PHPA needs to be involved in setting up and working with the local "Resident Participation Committee." PHPA staff need to see the role of the committee as important, and to take seriously their concerns and suggestions. At this point in time, there are good working relations with PHPA field staff and local communities that can be strengthened.

- Broadening authority to include local/resident voices is complicated by existing bureaucracies and officials jockeying to gain managerial authority in the park. This situation exists despite the fact that the Department of Forestry has been identified by the Governor as the overarching authority.

- Ongoing management activities need to be continually shared with resident populations to bolster their sense of involvement with the park, especially if use zones are developed which restrict or rotate fishing rights. Elsewhere monitoring and public reporting of the status of marine/fish populations in protected areas were instrumental in encouraging local community support.

- It is critical that the community participation committee's involvement be meaningful and not just symbolic. For example, use zones may need to be altered to accommodate fishermen's concerns and preferred fishing areas.

Staffing/Monitoring:

- It is critical that a "Social Marine Advisor" be hired. This position would run parallel to the NRMP "Social Forester" in Kalimantan, though it could be done as a short-term (6 months or longer) position. To be effective, the "Social Marine Advisor" must be a "field" person, willing and able to remain close to resident communities, and should be fluent in Indonesian. He/she will facilitate setting up and organizing the inter-island "resident participation committee," coordinate the rural development and alternative income generating activities discussed below, and monitor ongoing activities -- reporting to and maintaining close ties with the NRMP Marine Conservation Advisors (Usher/Rompas).

- A follow-up survey of attitudes and livelihood activities should be conducted in a few years, ideally by using a revised version of the socioeconomic survey questionnaire developed during this consultancy.

5.2 Development of Sustainable and Multiple Use of Mangroves

Goal:

- Replace the current policy of no cutting of mangroves to one based on multiple use and sustainable development. The logic behind this goal is that mangroves are a substantial, inevitable, and economically important resource for local livelihoods (especially on P. Mantehage and P. Nain); and success at sustainable use of mangroves is being achieved elsewhere. It is unrealistic (and socioeconomically regressive) to assume residents will and can stop cutting mangroves completely. Restricting all cutting gives credence to the view that the creation of the park represents a loss for local residents, rather than any sort of benefit.

Activities:

- Developing a ecologically valid policy of sustainable mangrove development will require additional information including identification of cutting areas, species, growth and regeneration rates, use zones, and reforestation feasibilities and practices.

- Residents should be trained and hired to assist mangrove reforestation and rehabilitation efforts. This would not only provide additional island-based jobs, but would indicate the intent of park management goals to balance resource conservation with local economic development.

- Additional income-generating activities could be explored that are productive and non-habitat destructive in mangrove environments. These could possibly entail charcoal, mariculture, honey and salt production, nipa palm/thatching, and foliage production for fodder.

- An alternative wood source to mangroves for continuing carpentry activities should be explored. For example, there is a surplus of old, low producing coconut trees on all of the islands. If coconut wood could be used economically, this would raise incentives for seeking alternative agroforestry systems (see below), while simultaneously utilizing the wood for income generation. A marine forester needs to be consulted on the feasibility of these possibilities.

- Assistance with marketing of wood products could raise income and reduce the need for accelerated production.

Concerns:

- The success of sustainable mangrove development efforts will rise and fall on the basis of competence. Current efforts by local SBKSDA/PHPA staff to introduce honey production on P. Mantehage, for example, should be applauded but have floundered in the absence of bee keeping expertise and the failure of the bees to produce any sizeable amount of honey.

Staffing/Monitoring:

- It is critical that an experienced marine social forester be involved to identify sustainable mangrove cutting rates, areas, regeneration measures, and alternate mangrove resource use, and to monitor sustainable

mangrove development.

5.3 Promotion of Agroforestry and SALT (sloping agricultural land technology)

Goal:

- To strengthen eco-system integrated coastal zone management in Bunaken National Park.

- To protect coastal watersheds and raise the productivity and sustainability of rainfed agricultural systems -- the latter in order to produce crops for local consumption and/or as income critical for purchasing staple foods. The productivity and sustainability of upland agriculture will directly benefit marine resources by reducing exploitation pressures and by reducing runoff and sediment loading in coastal waters.

Activities:

- Stagger cutting of old, non-productive coconut trees and replace with high value fruit trees (such as mango and avocado which have been requested by local farmers), and development of intercropping systems with staple food crops: cassava, banana, and assorted vegetables.

- Make available a portfolio of SALT techniques for stabilizing hillslopes and reclaiming degraded soils. This could involve the Indonesian government's Penghijauan program, and specifically UPSA (i.e. a component based on improving sedentary farming systems). Particular attention should be placed on following the mandate (also in UPSA guidelines) to develop technologies and farming systems that are socially and ecologically adaptive to local conditions.

- Agroforestry and conservation farming pilot projects should begin on P. Manado Tua where farming is widespread, and there is a very high degree of interest in receiving agricultural assistance. After these efforts are established on P. Manado Tua, NRMP could provide assistance to bring farmers from other islands there to share farming technologies and experience.

Concerns:

- Given poor and often rocky soils, steep slopes, and the very limited experience of local farmers with cropping system other than coconut-based agroforestry (which are low labor-demanding and seasonally timed to complement fishing), it is critical that a knowledgeable adviser be involved to select species that fit with local ecological and social conditions, and who can respond to planting, predation, fertilization, marketing, and soil conservation problems as they arise.

- Suitable conservation farming techniques are likely to include agroforestry strip or relay systems, grass bunds, mulching and use of cover crops. Provision of seedlings are necessary. I do not recommend bench terraces, introduction of petrochemical inputs or monocultures. All of the these have been shown to be costly (in terms of labor and other inputs) and ecologically questionable. Efforts should be aimed at low cost, low labor and vegetative methods instead of engineering methods such as bench terraces. Widespread use of chemical fertilizers could raise costs and risks, and possibly lead to downstream marine resource degradation.

- Cutting coconut trees must be done slowly so as to maintain some yields during the interim before new farming systems become productive. Some subsidization may be necessary. Unless follow-up with technical assistance is forthcoming, suggestions to cut existing coconut trees would be socioeconomically disastrous. Farmers are unlikely to replant with hybrid, short coconut trees due to their incompatibility with multi-storied agroforestry systems and production of food crops, increased risk of theft, increased management regimes and vulnerabilities, and therefore higher overall risk.

- Low labor availability within households across the park, and long maturation period of tree crops, suggest new land use systems be especially sensitive to production of annual crops, amount of labor needed, and seasonal labor allocation needs so as to ensure long-term compatibility between agriculture and fishing livelihoods.

- Successful intensification of upland land use (via agroforestry and agronomic soil conservation measures) may require further clarification and assurance of land tenure security before people make investments in new tree crops and conservation farming practices.

Staffing/Monitoring:

- An Agroforestry/Conservation Farming specialist (ideally with some marine/island background) is critical to implement the above activities. It would be desirable if this person has expertise, or would work in collaboration with an Agricultural Economist, to ensure marketing constraints are given adequate attention given transportation considerations, and likely market competition from other vegetable and fruit producing regions, e.g. Tomohon.

- Perhaps NRMP's Agroforestry/Soil Conservation Advisor working in Bukit Baka could also work in Bunaken (i.e., beginning with a pilot project on P. Manado Tua).

5.4 Support for Off-Shore Fishing

Goal:

- A policy of supporting off-shore fishing should be enacted. However, such a policy should not prohibit all fishing on or near coral reefs as these activities (except use of beach seine) do not necessarily cause habitat destruction; and many of these fishing activities are critical to the livelihood and nutritional needs of island households. An exception is where fishing is restricted as part of designated core zones previously discussed and agreed upon with the "Resident Participation Committee."

- Given the apparent critical role of small invertebrates found on corals in providing important supplementary food for households when other foods are in short supply, no action is suggested to interfere with gleaning activities on the nyare. Gleaning should be allowed until alternative food and income producing activities are developed for individuals living on P. Nain.

Activities:

- Encouraging off-shore fishing could become a pilot project if substantial resources and commitment are allocated to such an effort. To the extent that substantial resources could be allocated to this activity, one might examine the feasibility of subsidization/credit schemes for purchasing off-shore equipment such as boats and nets, or encouraging private investment in one or more off-shore fishing boat(s) which would either transport or employ fishermen. I would

recommend such a pilot project to focus on P. Nain.

- Given the likelihood that coral reef habitat may be damaged by the use of beach seine nets (soma tagaho) which are used primarily by fishermen from D. Bunaken, this technique should be closely examined. This should entail identifying areas where beach seine are used, and evaluating their impacts. Recommendations need to be based on this information. A similar situation may exist for some type of fish traps, specifically sero tanam which are largely used by Wawontulap fishermen.

Concerns:

- If off-shore fishing pilot projects are to be implemented, they need to involve a high degree of NRMP commitment and resources given documented complexities involved in such projects (e.g. Philippines). If pilot projects are developed to employ local residents as employees on open/deep sea fishing boats, careful attention needs to be directed to ensure that wages are tied to fish catch so as to avoid labor exploitation; and that involvement in these activities does not create further divisions or stratification among residents. Marketing/price constraints would also need to be carefully studied and integrated into off-shore pilot project activities. Given these risks, I recommend that the NRMP not get involved in developing commercial off-shore fishing pilot projects unless a highly experienced advisor is hired to monitor the efforts.

Staffing/Monitoring:

- NRMP/local fisheries experts.

- A small-scale fisheries development expert if pilot projects in this area are developed.

5.5 Locally Managed, Small-Scale Eco-Tourism

Goal:

- To strengthen tourism in Bunaken National Park which is ecologically oriented and "bottom-up" rather than "top-down."[6] Above all, tourism in Bunaken National Park needs to be designed to provide residents with livelihood

[6]It is significant to note that the consultants from the Research Triangle Institute hired by USAID also came up with a similar recommendation.

alternatives to marine resource extraction. If local residents' benefit from tourism, they will also be more likely to voluntarily protect and enhance natural resources in the park.

Activities:

- Pilot projects should focus on P. Bunaken where coral reef attractions are extensive and easily accessible; where tourism is now concentrated and where incipient local involvement and interest in tourist development exists.

- A more "cultural-based" tourism could be developed on P. Nain, where fishing techniques are more traditional and diversifying income-generating activities are critical. However, the distance to P. Nain and limited contact thus far between Nain residents and foreign tourists could pose constraints.

- In both cases, pilot project activities need to emphasize locally-managed tourist development that are both ecologically and socially suitable. For obvious reasons, a policy of transmigration meets neither of these goals; constructing large hotels would also be inappropriate (and constrained by limited access to fresh water). More suitable strategies entail government monitoring (and possible subsidization) of enhancing existing losmens owned and operated by residents (rather than outside businessmen), and/or encouraging residents to build additional rooms onto existing homes to lodge guests. The latter "bed and breakfast" strategy is already mounting support among government officials. However, the pros and cons of these strategies need to be seriously considered by park officials in consultation with the "Resident Participation Committee."

Concerns:

- To date, resident input into the design of tourist facilities in Bunaken National Park has never been sought. Letters in the local Manado paper testify to this fact. Continued discussion of relocation as a viable policy only serves to destroy positive local involvement in the Park. Resident views on developing eco/cultural tourism options should be sought and seriously considered.

- Strategies to encourage foreign tourists to stay within local communities could have negative impacts on local

social structures and traditions. On the other hand, they could become an effective means to ensure local residents directly benefit from increased tourism.

- Perhaps most important of all, the possibility of large profits to be made in tourism development in Bunaken National Park works against a decentralized and locally-based approach. Considerable effort should be marshalled to avoid profits being concentrated in the hands of a few whether resident or non-resident.

Staffing/Resources:

- NRMP staff and Social Marine Advisor recommended above.
- Possibly a short-term, "Small-Scale/Eco-Tourist Development" specialist.

5.6 Education for Diversified (and Non-Island Based) Incomes

Goal:

- To balance the goals of natural resource protection/management with improving human welfare by actively supporting higher education for park residents. This is a socially progressive way to encourage diversification and off-farm incomes, and to strengthen a naturally occurring process of out-migration.

Activities:

- Subsidize existing educational opportunity by reducing school fees and costs to local residents and thereby immediately increase incentives to attend school. This could be done by the NRMP providing a block grant to each existing school facility (i.e. SD) in each of the major park areas. Grants to education would also symbolically increase the notion that Bunaken National Park will aid park residents as well as protect natural resources.
- Improve opportunities for students to attend higher educational facilities (e.g. SMA) in Manado. Facilitating schooling at the SMA in Manado could be done through subsidizing student housing in individual homes or in a Bunaken National Park dormitory (asrama). Scholarships to families who support park management could be offered to raise vested interest of local residents in supporting park management.

- Create educational and training opportunities for students from park resident families to assume jobs particularly germane to park management. These could include small business procedures (i.e., to run "bed and breakfasts" and improve marketing of locally-made products), skills to serve as nature/cultural guides and diving instructors, and as agricultural and health care extension workers.

- Enhance formal and informal educational opportunities on the islands through construction of schools (or satellite classrooms), hiring of competent instructors, and provision of educational/training materials and curricula.

Concerns:

- Great care will need to be given to fair and equitable selection of scholarship recipients. Because of risks that these monies could not be distributed widely, subsidizing schools and dormitories directly may be a more desirable approach.

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APPENDICES

1. TIME TABLE

Time Table

I arrived in Jakarta, Friday September 18 and left for Manado, Saturday September 19. On September 20, I met with Graham Usher and we discussed the major goals and content of the socioeconomic survey.

On Monday, September 21 I met with my four field assistants and began their data-collecting training. September 22 I developed a preliminary survey questionnaire which we field tested in Arakan on September 23. I finalized the survey on September 24 and on September 25 I accompanied the first field team to P. Bunaken; I accompanied the second field team to P. Manado Tua. I supervised their use of the survey and other data-collecting procedures until October 2. On October 3, I met with my field assistants and revised the questionnaire. On October 5 I accompanied one field team to P. Nain, and on October 6, I accompanied the second team to P. Mantehage. During this week I analyzed the survey data from the first two islands. I picked up my assistants on October 9 and held additional interviews on the islands. Again, on Saturday, October 10, the team met and we revised the questionnaire and I accompanied them to Arakan-Wawontulap on Monday, October 12 where they remained until the evening of October 14. I continued to analyze the survey data.

In the morning of October 15, I gave a presentation of my preliminary results to the Kanwil and members of Dinas Kehutanan, Perikanan and Pariwisata (Forestry, Fisheries and Tourism). I travelled to Jakarta in the afternoon.

I gave my presentation to NRMP staff and others on October 16, and spent that afternoon and the following morning writing a preliminary draft of the final report to leave with Graham Usher and the Environmental Impact Assessment team led by Francis Seymour. I departed Indonesia on the afternoon of October 17.

I began working on the final report the week after I returned home October 19-23. But due to some unexpected work related to my academic position, I had to delay finishing the final report until I could resume work the week of November 16-20. I mailed the final report to ARD/NRMP on November 20.

2. TOR FOR THE RURAL SOCIOLOGIST

Terms of Reference
Short-term Rural Sociologist

1. Background

The Decree of the Minister of Forestry 730/Kpts-II/91 of 15 October 1991 changed the function of the "Cagar Alam Laut Bunaken Manado Tua: and the "Pantai Arakan Wawontulap" to a national park to be known as the "Taman Nasional Bunaken". The Park will eventually be managed by an "Unit Pelaksana Teknis (UPT)" or Technical Operations Unit having its won office and line budget. Until such time as the UPT is established the park is managed by the local Sub-Balai Konservasi Sumber Daya Alam (SBKSDA). During this time, preparation for the establishment of the UPT involves production of a management plan for the park and development of management facilities including buildings and equipment. Until recently there was minimal management of the park, but the establishment of the NRMP and the allocation of a substantial project budget for development of the park means that the SB KSDA will be playing an increasingly important role in managing the park.

Unlike many remoter protected areas in Indonesia, Taman Nasional Bunaken has a substantial number of communities living on islands within the park (approx. 9000) and on the mainland adjacent to the park. These communities obtain their livelihoods to a lesser or greater degree from natural resources, both marine and terrestrial, within the park. Current activities of local populations within the park include: fishing (various methods); coral mining for building; tree cutting, including mangroves (for firewood and building); farming (including copra production). Some of the above activities, especially coral mining, are highly destructive and unsustainable. Others such as hook-and-line fishing, may deplete some resources of the park if excessive but are not destructive.

Given this it is necessary to provide alterntive activities for local communities to reduce the impacts of potentially harmful activities such as coral mining and destructive reef fishing practices. Besides the establishment of core protection zones to provide breeding sanctuaries to target marine species, these may include: providing help with the development of pelagic and deepwater demersal fisheries; planting of ecologically beneficial trees to firewood production; developing alternative building practices to reduce the demand for coral as a building material.

There have been a number of socio-economic studies of communities living within the park boundaries. Although providing good background material these have been largely anecdotal and non-quantitative, and thus are of little value as data for developing the management plan. Quantitative raw census data is available for the communities adjacent to and within the park, but tends to be simplistic, for instance ignoring the existence of multiple occupations. A the local university, Universitas Sam Ratulangi (UNSRAT) there are potential counterpart staff to work with the rural sociologist. However based on publications emanating from UNSRAT it appears that many of the socio-economic studies carried out to date lack the rigorous statistical validity that is required for surveys such as that planned. By working with the rural sociologist the local counterpart staff will have the opportunity to develop their survey skills. It is hoped that these staff will then provide a cadre for follow-up socio-economic monitoring.

2. Objectives

a. To provide socio-economic data essential for production of a workable management plan.

b. Identify and quantify activities of local communities that are potentially in conflict with the management goals of the national park.

c. Recommend options for controlling these activities or for providing alternative activities that do not conflict with the management goals of the national park.

d. Recommend follow-up monitoring to track changes in the socio-economic profiles of the communities.

3. Tasks

a. Review existing socio-economic data on communities living within and adjacent to Taman Nasional Bunaken.

b. In consultation with the nature and marine conservation advisors of the NRMP in Manado, and up to three local counterparts from Universitas Sam Ratulangi, design and conduct the socio-economic survey.

c. Assess the livelihood strategies of the local communities.

d. Determine the general socio-political organization of the

communities, including identifying key local figures not yet known to the NRMP advisors in Manado.

e. Identify, and where possible quantify, activities of local inhabitants that conflict with conservation and tourism goals of the national park.

f. Identify options for substitute activities that may alleviate current conflicts within the park, with particular emphasis on priority areas for extension activities.

4. Outputs

a. A final report including the following:

- Descriptions of communities living within the park including ethnic and socio-political organizations;

- Descriptions of activities of local inhabitants that impact on the ecosystems of the park and existing and potential conflicts with the conservation and tourism goals of the park;

- Priority options for extension activities to reduce the impact of local inhabitants on the ecosystems of the park, while maintaining or improving their livelihoods;

- Recommendations for future socio-economic research and monitoring needs.

b. At least two local rural sociologists trained in socio-economic survey techniques.

5. Reporting

The consultant will prepare a draft report to be discussed with the local government in Manado and with Bappenas, the Ministry of Forestry and USAID in Jakarta. The final report including inputs from presentations in Manado and Jakarta will be completed not later than 30 days after the end of the field work.

The consultant will report to the NRM/ARD Chief of Party liaising closely with Government of Indonesia counterparts in Jakarta and Manado. In Manado he/she will work closely with the Government of Indonesia counterparts and the NRM/ARD Marine and Conservation Advisors.

6. Location and Duration

Locations: Jakarta and Manado

Duration : up to 36 days

7. Qualifications

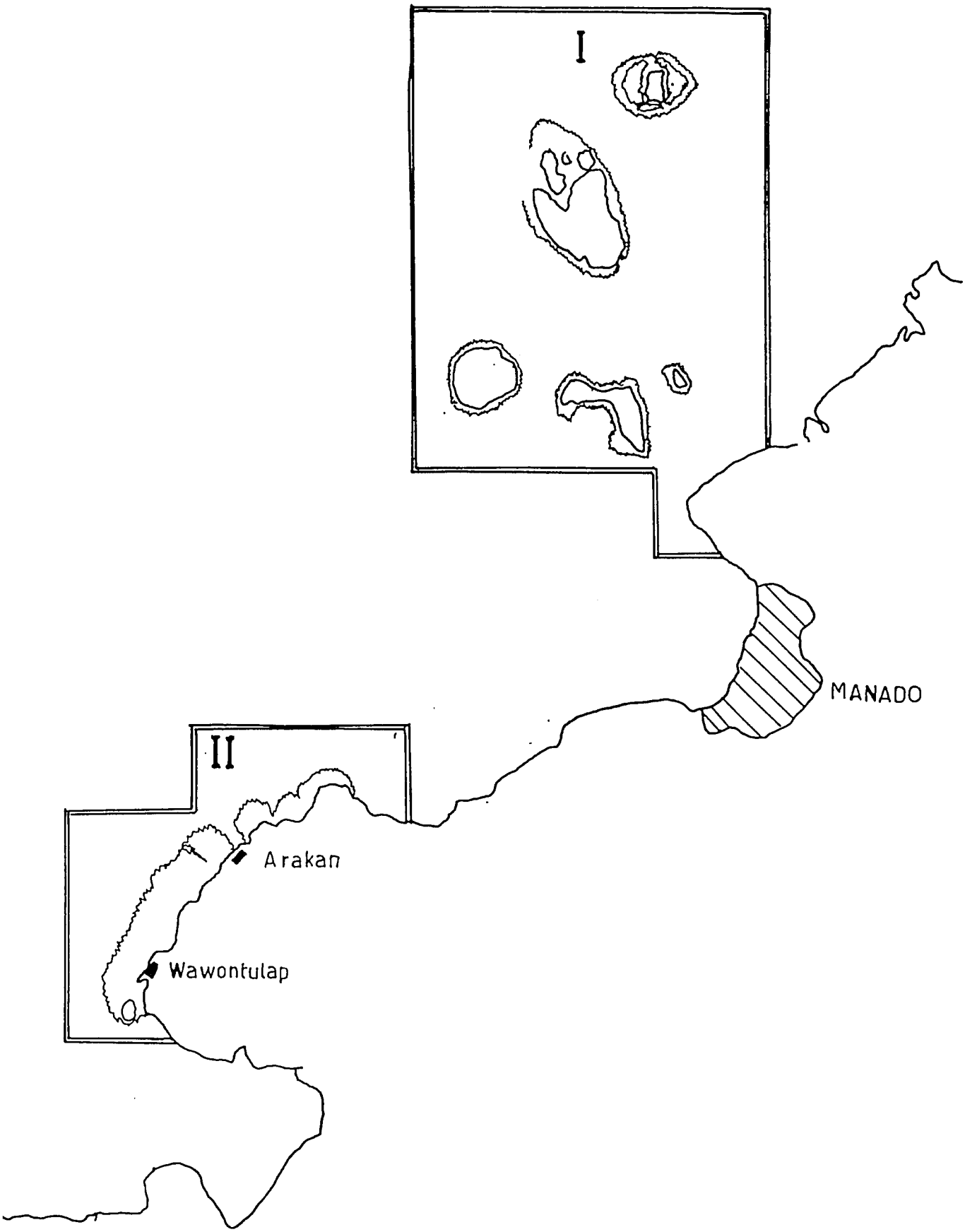
a. Expert in Rural Sociology with a strong background and experience in conducting socio-economic and rural socio-economic development studies.

b. Minumum Masters, preferably PhD, in Rural Sociology or related field.

c. At least five years experience working in rural sociology in tropical developing countries and preferably in Indonesia.

d. Knowledge of Bahasa Indonesia.

3. HAND DRAWN MAP OF BUNAKEN NATIONAL PARK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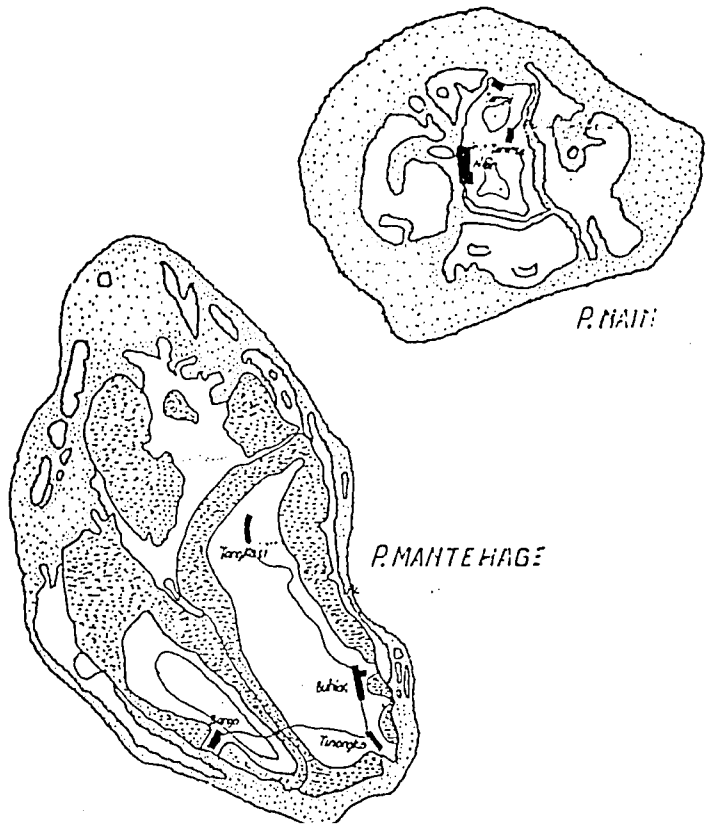
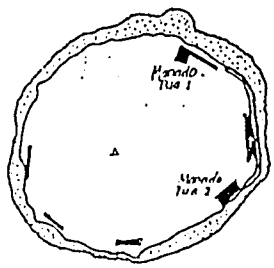
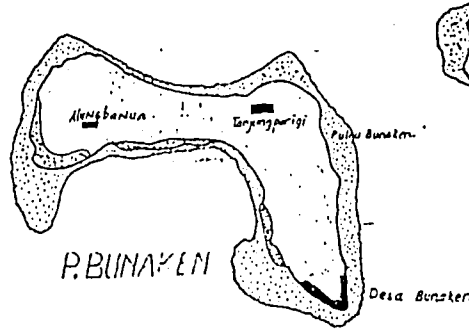
MANADO
II
Arakan
Wawontulap



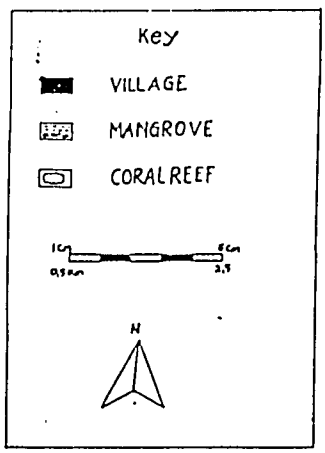


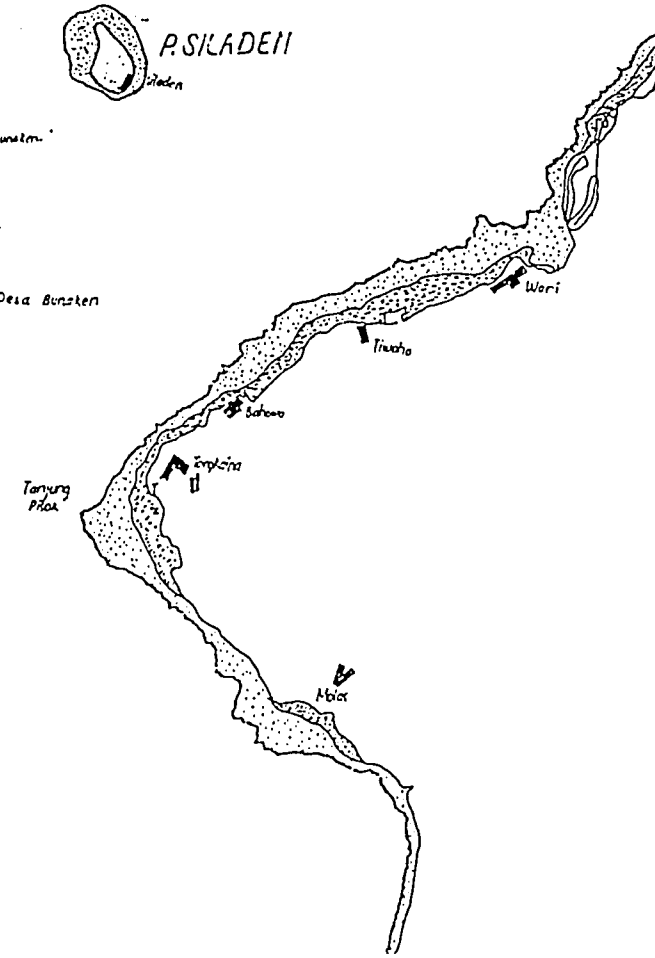
P. MANADO TUA



P. BUNAKEN

P. SILADEN





4. SURVEY QUESTIONNAIRE

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BUNAKEN NATIONAL PARK
RESIDENT HOUSEHOLD LIVELIHOOD STRATEGIES AND
MARINE/COASTAL RESOURCE USE SURVEY

Nomor survey__ _____ Tanggal_____
Nama desa/dusun_____ Nama interviewer_____

Instruksi: Menulis dengan jelas dan rapi. Apabila dimuka halaman tidak cukup, sambunglah dibelakang.

RUMAH TANGGA (orang makan bersama-sama)

1. Nama kepala keluarga (KK) _____

2. Berapa umur KK? _____ 3. Istri/Bapak ada? _____

4. Jumlah orang tinggal di rumah tangga sekarang? _____
4.1 Berapa orang tinggal di rumah tangga sekarang umur lebih dari 14 tahun _____
4.2 Berapa anak sekolah di Manado?_____

5. Apakah bapak pindah ke sini? ya / asli 5.1 Dari mana? _____
5.1 Kenapa pindah ke sini? _____
_____
_____
_____ 5.2 Berapa tahun tingal disini? _____

6. Suku? _____ 7. Agama? _____

8. Kebutuhan makanan pokok apa? _____
8.1 Apakah makanan pokok didapat dari? _____
_____
_____
_____
_____
8.2 yang pertama _____
yang kerdua _____
yang kertiga _____

8.3 Apakah makanan pokok keluarga bapak/ibu perhatikan berbedaan musim (dari satu bulan ke yg lain)? Jelaskan._____
_____
_____
_____

9. Uang keluarga bapak/ibu didapat dari? _____

9.1 yang pertama _____
yang kerdua _____
yang kertiga _____

9.2 Apakah pendapatan uang tergantung pada musim (dari satu bulan ke yg lain ? Jelaskan. _____

10. Rumah bapak dibuat dari?
Fondasi _____
Dinding _____
Atap _____

10.1 Sumber Bahan? _____

11. Untuk masak, pakai apa? _____
11.1 Kalau kayu, jenis apa dan didapat dari mana? _____

12. Bapak/Ibu ambil air tawar dari mana?

		Bersih/tidak	Cukup/tidak
12.1 untuk masak	_____	_____	_____
12.2 untuk mandi/cuci	_____	_____	_____

12.3 Apakah penyediaan air merupakan masalah? _____

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PEMANFAATAN SUMBER DAYA LAUT

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Berapa anggota keluarga (B = bapak, I = Ibu, A = anak) melaksanakan yang berikut?

	Tidak Pernah	Sering	Kadang2	Jarang	Dimakan atau dijual? Dijual dimana?
13. Menangkap jenis...					
13.1 Ikan-ikan laut bebas (mandidihang, cakalang,laheno,dll.)					
13.2 Ikan-ikan karang (goropa, bobara, bronang, uhi, dll.)					
13.3 Ditangkap tidak sengaja (duyung, penyu, lumba2, dll.)					
13.4 Jenis lain-lain (mis. bia, lola, kima, udang, teripang,akar bahar, cumi, gurita, kepiting). Jelaskan:					
13.5 Umpan jenis apa dan didapat dari?					
14. Menangkap dengan alat...					
14.1 soma pajeko, soma giop					
14.2 soma tagaho/sasang kile					
14.3 soma paka2, soma landra, soma rarape					
14.4 pancing tonda					
14.5 pancing noru					
14.6 pancing tangan					

Berapa anggota keluarga (B = bapak, I = Ibu, A = nak) melaksanakan yang berikut?

	Tidak Pernah	Sering	Kadang2	Jarang	Dimakan/Dijual (dijual dimana?)	Kira-kira berapa hasil pendapatkan dari menangkap ikan? (satu hari/minggu: jelaskan)
14.7 pancing funae						
14.8 panah (jubi)						
14.9 sero tanam						
14.10 bubu						
14.11 pancing layang						
14.11 bom						
14.12 rancun (potas)						
14.13mencari sambil jalan di karang (nyari)						
14.14 dan lain-lain (jelaskan)						

14.15 Kalau nelayan, apahkah jenis alat (atau cari ikan jenis apa) yg paling penting untuk bapak/ibu ini? Kenapa itu?_____

4.16 Kalau bukan nelayan sekarang, kenapa?_____

15. Apakah mempunyai perahu? Jenis apa? Apa cara menggerakkannya?

16. Apakah ada masalah atau hambatan dalam kegiatan perikanan /penangkapan diatas? (Termasuk cadangan ikan, alat, pengawetan, pemasaran, pasca panen, dll.)?

yg pertama_____

yg kerdua _____

yg kertiga_____

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BERCOCOK TANAM/PERTERNAKAN

17. Dalam satu tahun belakang ini apakah orang di rumah tangga bercocok tanah? _____
17.1 Kalau tidak, mengapa?_____

18. Apakah bercocok tanam di berapa tempat dalam satu tahun belakang ini? _____ (catat kalau tempat-tempat itu ladang, tegalan, kebun, padi sawah, sawah kering (padi tada hujan), atau dll.)

Kira-kira berapa hasil pendapatkan petanian? Satu hari / bulan: jelaskan.

Jelaskan untuk setiap tempat bercocok tanam:

18.1 Lokasi (km dari rumah)	18.2 Luas kira-kira (hectare)
1.	1.
2.	2.

18.3 Jenis Tanaman2 Berikut jenis tanaman, tulis (D) biasanya dijual/dijual dimana?; (M) makan; (C) campur; kerdua-duanya. Mulai dengan jenis tanaman yg paling banyak. Catat kalau tanaman masih muda.
1.

2.

18.4 Status Tanah (Kalau sudah hak milik sertifikat, hak milik adat/warisan, hak guna (menyewar dari pemerintah),bagi hasil (dari orang yg punya tanah), pinjam, menyewa (dari orang), dll. Jelaskan.
1.

2.

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19. Apakah pelihara ternak? Jenis apa dan untuk apa? Jelaskan._____

20. Apakah ada masalah atau hambatan dalam kegiatan bercocok tanam/perternakan? (mis: tanah subur berkurang, tanah erosi, hama, pemasaran, bibit tidak ada, harga? dll.) Jelaskan.

yg pertama_____
yg kerdua _____
yg kertiga_____

PENDAPAT/SIKAP MASYARAKAT SUMBER DAYA ALAM

21. Selama Bapak/Ibu tinggal disini, apakah ada perubahan dalam lingkungan (mis. jumlah ikan dan hasil laut lain, usaha atau waktu yang diperlukan untuk mendapatkannya, kebersihan/kejernihan laut, perobahan pada daerah pesisir/daratan/ hutan/tanah):_____

Apakah bapak/ibu pikir (punya pendapat/sikap) mengenai yang berikut? Kenapa pikiran itu? Apakah bapak/ibu mempunyai pendapat mengenai jalan keluarnya? (Pilih 1. kesulitan atau 2. tidak kesulitan.)

22.1 Ikan atau hasil laut lain berkurang (jelaskan ikan laut bebas atau ikan karang; dan kalau berkurang musim saja atau umum)

22.2 Hasil pertanian berkurang

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22.3 Karang hancur/rusak

22.4 Hutan bakau berkurang

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22.5 Sampah bertambah

22.6 Hutan berkurang/tanah erosi atau langsur

22.7 Rumput laut

22.8 Orang luar datang mancing

22.9 Dan lain-lain kesulitan dalam lingkungan atau dengen mata pencaharian orang di sini?

_____

_____

23. Apakah bapak/ibu mengetahui penetapan wilayah ini sebagai Taman Nasional Bunaken?
Jelaskan:_____

_____

_____

Informansi itu didapat dari?

_____ TV/radio _____ papan _____ Dinas Perwisata

_____orang dari Manado _____kepala desa/orang di desa _____ koran

dll. apa?_____

23.1 Apakah penetapan taman nasional ini menguntungkan dan merugikan untuk Bapak/Ibu?
Kenapa?_____

_____

_____

_____

_____

TERIMA KASIH

5. BRIEF LITERATURE REVIEW ON EXISTING SOCIOECONOMIC STUDIES OF RESIDENT POPULATIONS

Brief Literature Review on Existing Socioeconomic Studies of Resident Populations

There have been several "rapid rural appraisal" reports conducted within the park. To my knowledge, none have been conducted by trained sociologists, none use rigorous random sampling techniques, and none involve a broad geographic coverage of the many islands and peoples located within Bunaken National Park.

A brief examination of this literature follows. A study on "The Social Economic Conditions of Fishing Communities and Environmental Conservation in Bunaken National Marine Park and Surrounding Areas in North Sulawesi" was conducted by a faculty member from UNSRAT Fisheries Department in collaboration with WWF and PHPA (Pontoh et al., 1991). The report provides a descriptive study of some general socioeconomic characteristics and an ethnography of fishing techniques of communities on Bunaken island. The study makes a real contribution in its description of fishing equipment and activities. A major limitation, however, is that these descriptions apply only to Bunaken island. Similarly, the lack of random sampling techniques throws into question the generalizability of all the data. The designation of family heads' (kepala keluarga) as either "farmer" or "fishermen" further distorts the diversity and seasonally-dependent nature of peoples' livelihood strategies. Lastly, the numbers reported from table to table for each village are not consistent.

A second study focuses on the impact of Bunaken National Park on socioeconomic aspects of communities in the village of Bunaken (Riset 1992). Again, the study focusses on only the village of Desa Bunaken, does not utilize random sampling techniques, and, I think, simplistically conceives of and simplistically measures "impacts" (dampak) of the park on residents of Desa Bunaken. For example, many tables measure "impact" as either good (baik) or bad (tidak baik). As it has been shown in this report, real life is alot more complicated. Many residents identify some aspects of the park as benefits and others as losses. Variability in what different people have heard about the park and its future management plans differentially affect how people respond to general questions.

The "Social Soundness" report prepared by Colfer and Ngo (1990) for the NRM project provides some interesting ethnographic descriptions of fishing techniques and community life in, once again, Desa Bunaken; as well as on the nearby island of Siladen and a small section along the Manado coast. One strength of this short report is its recognition of the importance of agriculture and seasonality on the livelihood activities of resident peoples; and the very strong personalities that dominate the islands of Bunaken and nearby Siladen.

A fifth study is particularly noteworthy because it claims to present the attitudes of Bunaken island residents regarding conservation, and without making the point ad nauseum, provides no source for the data or the methods entailed in collecting them. In "Rencana Penataan Bangunan Kawasan P. Bunaken" the authors state that only 10% of people know about nature conservation (p 18). Seventy-five percent are said to agree to participate in conservation if there is a trusted person to lead them, 15% would likely participate but are waiting for further developments, and 10% do not have a strong opinion either way. According to this report, the fishermen believe that the fruits of the sea are replenished daily and this justifies them catching fish each day to meet their families' livelihood. The report cites the study by Pontoh 1991 which claims 65.88% of the population on Bunaken live below the percapita poverty level. Their poverty, low education and lack of government workers (penyuluh) to lead the way to conservation are cited as the major reasons for their destructive use of marine resources.

Most recent study by Research Triangle, North Carolina - tourism, environmental impacts - conclusion best feature about Bunaken is how tourism is small-scale and blends into the environment. Except for the Manado Beach Hotel, diving club resorts are hidden from shore behind vegetation and that's an asset.

RM/ARD CONSULTANCY REPORTS

NO.	TITLE	AUTHOR
1.	Procurement Plan For Research Equipment at Bukit Baka and Equipment Installation at Samarinda Forestry Research Station	Roy Voss
2.	Agroforestry in Bukit Baka/ Bukit Raya	W.G. Granert
3.	Pengukuran dan Pemetaan Topografi Sebagian Daerah Taman Nasional Bukit Baka/Bukit Raya	Sahri Denny, cs
4.	Applied Research Recommendations for Production Forest Management An Economic and Ecological Review of the Indonesian Selective Cutting and Replanting System (TPTI)	Lisa Curran & Monica Kusneti
5.	Balancing Forest and Marine Conservation with Local Livelihoods in Kalimantan and North Sulawesi	Jill M. Belsky
6.	Proposal to the GOI and USAID for the Development of Comprehensive Environmental and Natural Resources Accounts (CENRA) for Economic Planning and Management	Henry Peskin & Joy Hecht
7.	Bukit Baka Mini–Hydraulic System Implementation Plan	Michael Johnson
8.	Final Report: Bukit Baka – Bukit Raya 1992	Roy Voss
	Station Protocol: Bukit Baka – Bukit Raya 1992	Roy Voss
	Research Protocol: Bukit Baka – Bukit Raya 1992	Roy Voss

NO.	TITLE	AUTHOR
9.	Environmental Education and Awareness in Bukit Baka (vol.1)	Nancy Bergau
	Environmental Education and Awareness in Bukit Baka Guide to Environment and Fire Campaign (vol.2)	Nancy Bergau
10.	Recommendations for Controlled Timber Harvesting in the SBK Forest Concession	John Hendrison
11.	Cruiser Identifications at SBK and Local Uses of Trees by Local People	Jim Jarvie
12.	Community Water Supply Feasibility Study for Bukit Baka–Bukit Raya, Kalimantan	Rick McGowan & Alfonso Rieuwpassa
13.	Report on NRM Library Consultancy September – December 1992	Dachlan Cartwright