

Yayasan Sabah

Danced

**Management of Maliau Basin Conservation Area
Sabah, Malaysia**

TECHNICAL ASSISTANCE REPORT No. 9

**Socio-Economic Study
On
Local Communities of Tongod District
Surrounding The
Maliau Basin Conservation Area**

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Socio-Economic Study

Introduction

The socioeconomic survey was conducted through a series of active participatory interviews with informants from various villages around Maliau Basin Conservation Area. Generally, active participatory observation had been conducted on the various uses of natural resources, socio-economic and village activities. In general, ethnobotanical and hunting survey had been made at several sites within the study area, other than the social survey specifically in areas that are easily and actively accessible to the villages. Basically, ethnobotanical surveys cover most of the habitats types found around the Conservation Area including riverine in nature, secondary forests and house compounds at the edge of the primary or secondary forest.

Generally, we believed there was minimal extraction of the natural terrestrial resources by the local communities. However, the intrusion of outsiders or loggers have created tremendous imbalance and resulted in a fierce competition with local inhabitants. Thus, the limited resources will result in over exploitation of the surrounding habitats and serious degradation of natural resources. Further illegal activities and dangerous approach to extract forest product will directly contribute to the permanent destruction of the Maliau Basin Conservation Area. Thus, a socioeconomic study is very important and should be included in the management plan for which the purpose of conservation generally is: how, who, where and what? From this point, the awareness by the local communities of the need to protect and preserve the Maliau Basin Conservation Area is very important and in crucial need.

Objectives:

- To carry out investigation and study of the surroundings of Maliau Basin Conservation Area inhabitants.
- To identify the felt needs of the local communities.
- To identify the settlers and users of the Maliau Basin forest products.
- To carry out ethnobotanical and hunting survey in relation with the local communities.
- Discuss options and requirements of affected groups, consultation to discuss all aspects of the conservation status and community involvement.
- To meet compatible balance for conservation and optimal resource development
- To harmonise the conservation agenda of Maliau Basin with the local people.

Basic survey is a starting point to realise the aims of conservation and the need for some kind of protection and enforcement too. Building up trust, a continuing effort to make local communities aware of the aims of the Conservation Area, the need to protect and preserve the Maliau Basin.

Terms of Reference:

To provide base-line information on the socio-economy, ethnobotany, hunting activity and daily lives of the local communities surrounding Maliau Basin Conservation Area.

To recommend ways to improve the standard of living of the local communities and to preserve their culture.

To recommend ways of harmonising the conservation agenda of the Maliau Basin Conservation Area with the local communities.

To recommend ways for the local communities involvement in co-managing the Maliau Basin Conservation Area.

To ensure a compatible balance between conserving the Maliau Basin Conservation Area with minimal forest extraction by the local communities for their subsistence.

Methodology:

This study was carried out by two main groups: Group A: carried out the study in August at Tongod and Pinangah; September at Langga, Inarad and Kuamut. Group B: August at Sook, Nabawan dan Sapulut and October at Kalabakan dan Luasong. Each group could only spend about five days per visit.

Core Personnel

Group A :	<u>Sabah Museum</u>	<u>ICSB/ Danced</u>
	Ms. Anna Wong	Ms. Darline Hasegawa
	En. Janis Galaip	En. Sidkan Ali
	En. Matius Angkaus	En. Norhaidah Maral
	En. Albert Lo	En. Jupailin Naiman
	En. Kohming Kohni	En. Henry Baindang
		En. Abel Gintod
Group B :	<u>Sabah Museum</u>	<u>ICSB/Danced</u>
	Ms. Judith John Baptist	En. Jadah Suhaimi
	En. Robin Fedilis	En. Sidkan Ali
	En. Lasong Murang	En. Jupailin Naiman
	En. Ignatius Selvasius	Cik. Zurina Dayat

Villages were visited around Maliau Basin Conservation Area to gather information about their way of life in the area, their problems, their subsistence economy, health and hopes. The study was conducted using mainly two major techniques: participatory observation survey and active participatory survey i.e. interview survey and in-depth interview with selected respondents, heads of households and local leaders within the study area. For the purpose of study, a head of household was operationally defined as a member of a household who makes major decisions for the household. In the Tongod District, like in other rural communities, a majority of the families have men as their household heads. Census was carried out with village residents, village headmen, Chairmen of the Village Committee on Security and Development (Pengerusi JKPK); discussion with District Officer, Assistant District Officer, District Land and Survey, Yang Berhormat Datuk Malik Chua, State Assemblyman Adun N.40 Kuamut, Anglican Pastor of Pinangah and Tongod, Pastor Musa, school teachers, government officers, and some selected elderly men and women. The economic potentials of the Maliau Basin forest products were investigated in term of ethnobotanical values such as medicinal plants and hunting activity for wild meat and game. Gather information on human settlements or people movements and current happenings and their socio-economic profile. Documentation was made of activities, traditions and crafts of the local communities, and general observations of their daily activities which include:

- a) their cultivation or gardens,
- b) livestock
- c) exploitation of ecological spheres:
 - Material gathered from forest - firewood, timber for building house, medicinal plants, wild meats and fishing activities.
- d) manufacture
- e) pots, mats and miscellaneous craft
- f) income and trade
- g) water & electricity
- h) level of education
- i) facilities: clinic, shop, 'Balairaya'/hall
- j) types of transportation
- k) movements
- l) religion and practice

Study Location:

The study area covered four main districts of about 210 villages. In the Tongod district of 4 divisions, 28 villages from 45 villages were surveyed. In Nabawan district, 14 from 79 villages, 7 from 86 villages in Sook, and 12 villages from Kalabakan including Luasong were surveyed. Those villages have been identified to be more important and nearer to or surrounding the Maliau Basin Conservation Area; and the villages surveys where were carried out are listed as follows:

Tongod District

1. Mukim Tongod : Kg. Kuala Tongod, Kg. Maligatan, Kg. Purutawoi, Kg. Bulot (Sinarupa), Kg. Kiliwatong, Kg. Kiandongo Darat, Kg. Talibu, Kg. Imbak
2. Mukim Pinangah: Kg. Penangah, Kg. Tampasak, Kg. Dewara, Kg. Malikup, Kg. Mengkavago, Kg. Masoum, Kg. Masoum II, Kg. Saguon, Kg. Alitang, Kg. Langga dan Kg. Inarad.
3. Mukim Entilibon: Kg. Langkabong, Kg. Mananam, Kg. Maliau, Kg. Namukon, Kg. Minusoh
4. Mukim Kuamut: Kg. Desa Permai, Kg. Kuamut, Kg. Tungkuyan dan Kg. Tulang-Tulang.

Kalabakan District:

Kalabakan: Batu Lima Tibou, Ulu Murut, Seludung Laut, Pinang Kalabakan, Kg. Ulu Kalabakan, Lubang Buaya, Rancangan Kalabakan, Kg. Mangga, Batu 2 Kalabakan, Kalabakan Pekan, Luasong and Makandot 1 Luasong.

Nabawan/Pensiangan District:

Kg. Laiyon, Kg. Malinja Tiga, Kg. Pulutan, Kg. Sikalabot, Kg. Empat (Murni), Kg. Kagulangu, Kg. Sandukan, Kg. Kainggalan, Kg. Salong, Kg. Panabaan, Kg. Salangan, Kg. Tataluan, Kg. Padang Talangkai and Kg. Sapulut.

Sook District:

Kg. Sinua, Kg. Papar Baru, Kg. Johan Jaya, Kg. Kuit Lanas, Kg. Lanas Station, Kg. Malima and Kg. Nukakaton Baru.

**Table 1 : Population of each village in Tongod District
(Based on National Population Census - 2000)**

DIVISON	VILLAGE	POPULATION
ENTILIBON	Entilibon I Entilibon Simpang Kironggo Samundoh Sanan Bobotong Linayukan Langkabong Napagang Mananam Minusoh Maliau Namukon Lanung Liupampang	463 471 190 253 492 299 469 100 415 639 2,391 373 201 410 49
		7,215
TONGOD	Kuala Tongod Kiliwatong Malagatan Kecil Kiandongo Darat Sogo-Sogo Tongodon Bulot Imbak Talibu Purutawoi	386 359 538 419 360 170 340 349 198 99
		3,218
PINANGAH	Penangah Saguon Dewara Tampasak Alitang Malikop Langga Inarad I Inarad II Mengkawago Masaum	647 510 576 670 977 240 118 180 237 392 386
		4,933

DIVISON	VILLAGE	POPULATION
KUAMUT	Kuamut	451
	Tungkuyan	421
	Desa Permai	173
	Tulang-Tulang	124
	Kenang-Kenangan	128
	Kuala Keramuak	452
	Keramuak Dalam	460
	Tenaga Baru	216
		2,425
	Total	17,791

Source : Tongod District Office

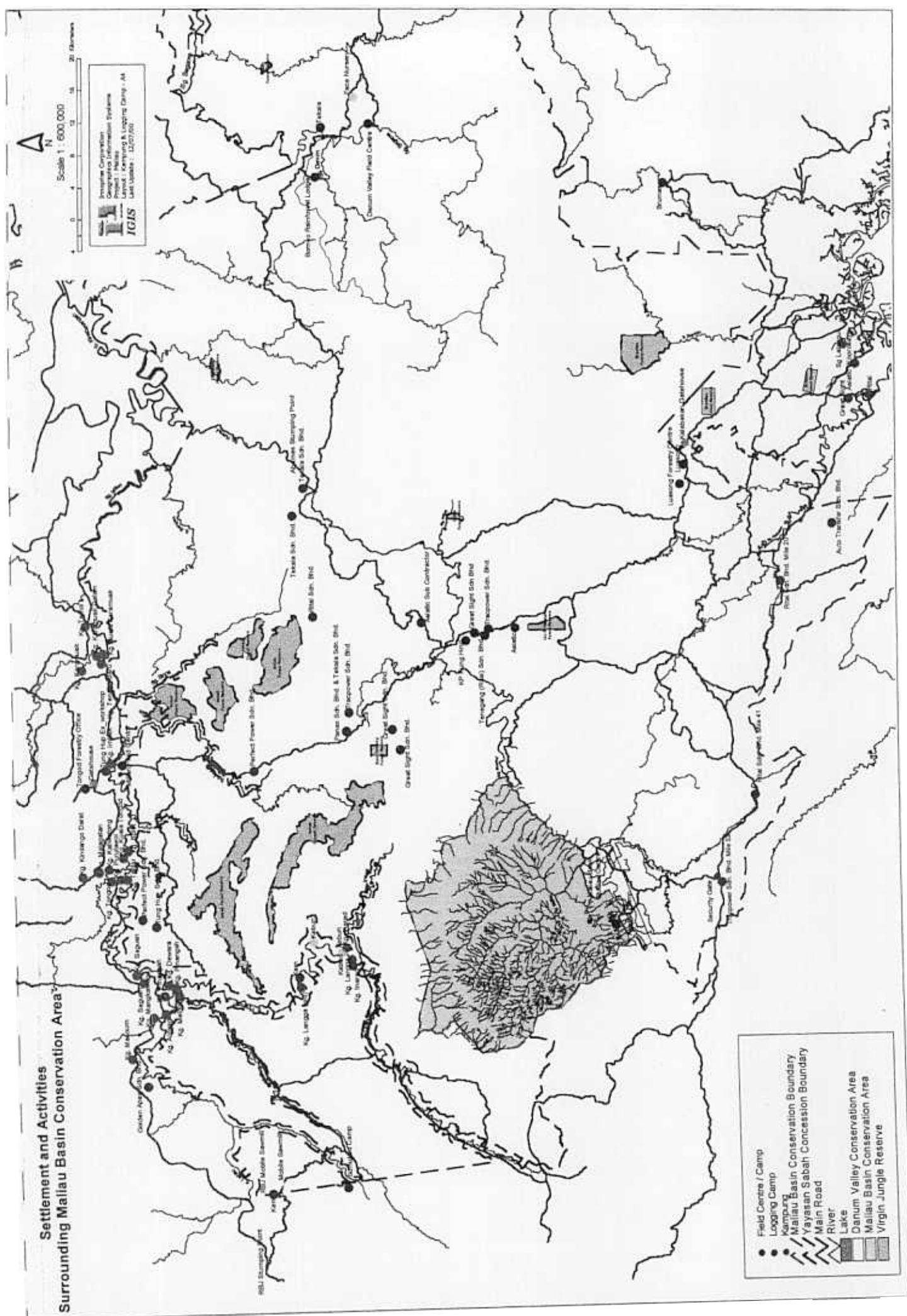
Tongod District

1.0 Introduction:

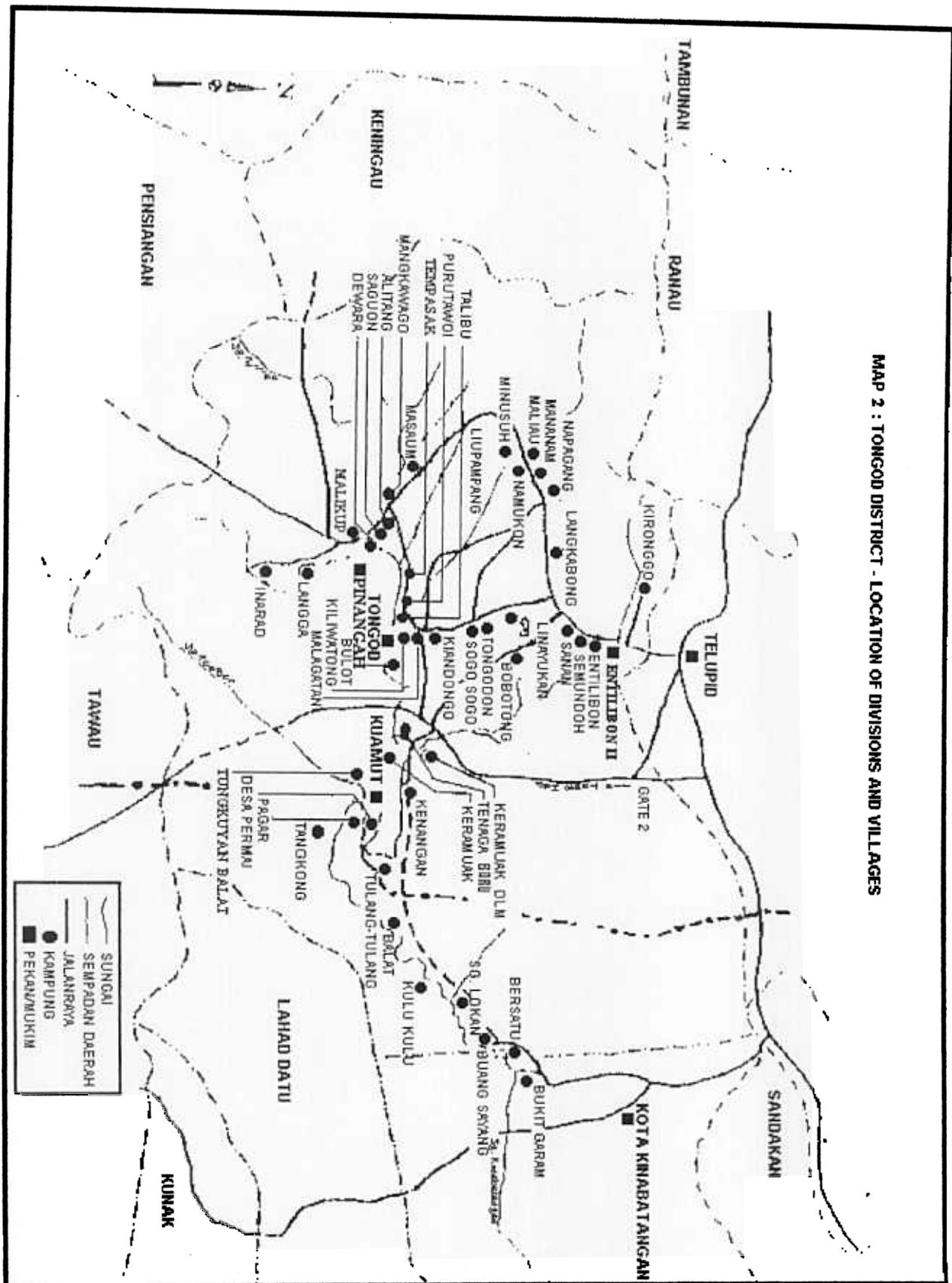
Tongod district comprised of four main divisions or 'mukim' i.e Mukim Tongod, Mukim Pinangah, Mukim Kuamut and Mukim Entilibon. Formerly it was administrated under the Kinabatangan District and there was an sub-district office at Tongod till last year when it was upgraded to a full district office. Tongod district at $5^{\circ} 16.399$ N and $116^{\circ} 58.322$ E is very remote compared to other districts, it is right in the center of Sabah where one of its division "Pinangah" came from the word 'Tangah' which means right in the center; and with population scattered around. In 1988, the total population was 6,569 people (Clive and Barnabas, 1988) and increased two and half times to 17,791 people in July 2000. According to the latest population census in July 2000, the population of each village in Tongod Distict are shown on Table 1. The biggest village is Kg Minusoh of Entilibon comprised of 2,391 people due to the resettlement scheme introduced in 1982, followed by Kg. Alitang (977 people), Tampasak (670 people) is divided into Tampasak Darat and Tampasak Laut; and Penangah (647 people), also divided into three parts, i.e. Pinangah Darat, Pinangah Tengah and Pinangah Laut. The other villages mostly comprised of about few hundred people, in an average of about 400 people. There are new villages formed recently which may have split off from the old village, renamed and so on, partly due to the intention to have more village headman positions. A small village with too low population can not justify to be entitled to have certain government facilities such as dispensary or even primary school; and this will not benefit the village from the administrative and facilities aspects.

The main transportation is by boat even though there are logging road or gravel road from Telupid to Pinangah, Tongod and Langga (Fig. 1 & 2). It takes about two and half hours to travel by boat of 170hp engine from Bukit Garam to Kuamut, and it takes about more than half a day to travel from Pinangah to Langga, a one hour boat ride from Kg. Langga to Kg. Inarad by using a 15hp engine (Fig. 3 & 4). Most of the villages are not accessible by road, they are accessible by river because they are located near by the river bank. Along the Ulu Kinabatangan river, two main rivers are Sungai Millian and Sungai Pinangah. From Bukit Garam to Kuamut, Karamuak, Tongod and Pinangah is Sg Millian, another two smaller rivers i.e Sg. Imbak and Sg. Sinoa meet Sg. Millian right before Karamuak. Pinangah town is where Sg. Melikop, Sg. Millian and Sg. Pinangah meet. Further up from Pinangah to Langga till Inarad is Sg. Pinangah but it fork into Sg. Inarad at Kuala Inarad (Map 1). A general view of the major towns of Tongod district are shown on Fig. 5 - 7.

Generally, the people are known as 'Dusun Sungai' because they live along the river, and very harmonious. They are divided into 11 subgroup: Tanggal, Kalabuan, Rumanau, Mangkaak, Makiang, Minokok, Sinabu, Sukang, Kuamut, Sinua and Idahan. People in Masoum to Minusuh are mostly Rumanau; at Langga is Kalabuan; Murut Tanggara in Inarad; Mangkaak at Kg. Kiandongo Darat, Kg. Mananam, Langkabong and Sogo-Sogo; Dusun Makiang at Kg. Talibu, Kg. Dewara and Tampasak Darat (Dewara till Kuala Tongod); Dusun Minokok from upper Kg. Mananam, Minusuh and Nomukon of Entilibon; Sinabu at Kg. Kiliwatong and along Sg. Tongod; Suluk, Kuamut, Bugis and Dusun Sungai at Kuamut; and Sinua at Karamuak whereas Idahan are widely distributed from Sukau to Abai. Thus, this ethnic groups are very rich culturally. The most upper part of Ulu Kinabatangan such as Inarad are the Murut Sungai (Tanggara) who are Murut speaking, Angalai and Sumazau dance with Sonsolon, Galigatong, Andui-andui and Saminali songs. Their typical house is long and with few units attached called 'Binatang' (Fig. 16-19). Moving down to Langga, there is a mix between Murut and Dusun Sungai Kalabuan, with Sumazau dance and Runsa song; further down to Pinangah, there are mostly mixed Kalabuan and other Dusun Sungai, then to Kuala Tongod, also Dusun Sungai with Sumazau dance and Titipak; then to Keramuak and Kuamut before down to Bukit Garam. The typical houses of some ethnic groups are shown on Fig. 20-23. The religion at the upper Kinabatangan such as Inarad and Langga is Christian, and they are mostly Christians in Tongod and Pinangah with an exception of a small Muslim population, there are equal proportions of Muslims and Christians in Kuamut. These indicate that the Muslim live mostly at the lower part of Ulu Kinabatangan and the Christians live at the upper part of the river. The locations of all the villages along the Ulu Kinabatangan is shown on Map 1 & Map 2.



MAP 2 : TONGOD DISTRICT - LOCATION OF DIVISIONS AND VILLAGES



Most of them live there since birth especially those from Langga and Inarad. There are people who have migrated from other villages due to marriages, agriculture purposes or job opportunities. For example, the village headman of Kg. Pinangah is originally from Langga but through marriage moved down to Pinangah. People from outside Tongod district seldom move into this area except the government servants or through marriage. The people are mostly confined to their villages except for job opportunities elsewhere or further studies because there is only one secondary school at Pinangah, Tongod, Entilibon or else they will have to go to Bukit Garam, Sandakan. For those educated beyond the lower secondary school, they work and reside in the major towns of Sabah. The villagers have a very basic life style especially villages at Kg. Kiandongo Darat, Maligatan, Bulot, Kiliwatong, Purutawoi, Dewara, Masaum, Nomukon, Langga and Inarad. Most of their houses are in bad condition except those near the town, the walls are made from tree bark, with tree poles and rattan or bamboo floor, some with one or two rooms and some even without. Most of the villages are without piped water supply except Tongod town, supply of gravity water system is available only in Pinangah town and certain parts of Inarad. The other villages either use murky river water or collect rain water and store. There is no electricity supply too, except in Tongod town and Pinangah town which have generators to supply electricity from 7.00pm till 11.00pm. Half of the villages of Tongod district have primary schools except for Langga, Malikop, Dewara and Alitang of Pinangah and Kg. Talib, Bulot, Kiliwatong, Maligatan Kecil, Tongodon and Purutawoi of Tongod where they have to travel a distance by boat and by foot. Some even move to another village for schooling.

The people live in a very poor condition (Fig. 24). Most of them earned about RM15 to RM30 per month with the exception of government servants, some do not even have any income, they are self sufficient from their agriculture and forest produce. There is no cash flow or trade in most of the villages at Pinangah and Tongod, except some vegetables and sundries for sale (eg. a Chinese old man- Chee Yik Pak who owns an old wooden shop estimated 70 years old at Kuala Tongod selling some cold drinks and sundries (Fig. 25); and another shop opposite the old Native Court at Pinangah town).

Two major forces of change which have impacted upon the life of the people in Tongod district are education and religion (Fig. 8). These forces have modified not only their values and beliefs, but also had brought changes to the demographic structure of the community. The more educated population tended to move out of the district thereby leaving behind the younger children and elderly population.

2.0 Economic Activities:

2.1 Agriculture

The staple food of Tongod District is rice (*Oryza sativa*) and tapioca (*Manihot esculenta*) as shown on Table 2, Fig. 26 & 27. The other important food include corns (*Zea mays*), sweet potatoes (*Ipomea sp.*), yam (*Alocasia sp.*) and vegetables. The villages spend about eight months planting hill padi (*Oryza sativa*) as shown on Fig. 28 & 29 and another four months for planting some fruit trees: rambutan (*Nephelium lappaceum*), durian (*Durio zibethinus*), banana (*Musa sp.*), and other locally domesticated fruit trees: mango (*Mangifera indica*), coconut (*Cocos nucifera*), langsat (*Lansium domesticum*), limau (*Citrus sinensis*), jack fruit (*Artocarpus heterophyllus*), pineapple (*Ananas comosus*), mata kucing (*Euphorbia malaiense*) and star fruits (*Averrhoa carambola*). According to the headman of Kg. Dewara, he and his family spend about eight months at his second home, so called "Sulap" planting hill padi twice a year with other crops, the other four months at his first house further down the Millian river. The distance of his two houses is about 40 minutes boat drive of 15 hp.

About 91.2% out of a total 57 interviewees are farmers in the Tongod district with the percentage of farmers in each division as shown on Table 2. Hill padi occupied most of their nearest agriculture land (Fig. 30 & 31). An adult individual can apply for about 15 acres of land for agriculture but normally they can only operate about 2-3 acres of their nearest land. They computate the land area for hill padi by counting the number of seed cans, which means they normally take about 2-3 cans of seeds. Some even take a can seed only if they intend to operate

Table 2: The Percentage of Population Involved in Agriculture Activity and the Major Crops in Tongod District

DIVISION (MUKIM)	VILLAGE	AGRICULTURE ACTIVITY	HILL PADI	TAPIOCA
TONGOD		100%	94%	87.5%
PINANGAH	Langga Inarad	92%	100%	91.7%
		75% 100%	100% 100%	100% 100%
ENTILIBON		89%	100%	100%
KUAMUT		100%	71%	100%

Tongod District = 91.2 %

for an acre of land. They normally start planting hill padi in April and harvesting in July, then again in August and harvesting in November. They have sufficient rice by planting twice per year, with additional crops of some tapioca, sweet potatoes and corns. The second most important food for them is tapioca because tapioca is used to make wine or "tapai" for drinking.

Shifting cultivation is very common here. It lasts about once a year or two years after which the land is no longer fertile. Open burning is also very common and is the only method for them to clear their lands before planting (Fig. 32 & 33). So far, the annual rice production for each family is quite substantial-rice shortage is seldom a problem among families in the Tongod district, they do not sell their rice harvest, except some vegetables.

Consequently, farmers in Tongod district find it difficult to manage their farms. Thus, their farms become smaller, to be managed only by a few family members (Fig. 34 & 35). Most families comprised older people and younger children due to the current trend in outward mobility. The younger middle-aged, and well educated tend to go out of Tongod district to work and probably settle down in places where jobs and better facilities are available.

Already there are some logged over areas surrounding the villages and extensive logging is going on within the Tongod District areas, even adjacent to forest reserves which is affecting major changes in the environment and natural resources. These changes certainly affect not only the crops and livestock but also the people themselves.

Two exceptional cases are the representative of village head man from Kg. Lingkabong, En. Samiun Pinkor who earns about RM600/month because he owns 45 acres of land (a man with two wives, with 15 acres per head) planting oil palms, together with orchards on commercial scale. A village head man of Napagang, Entilibon, En. Putan Salab earns RM800/month from his fruit harvest, and also owns a motorcycle.

There were some problems faced by the villagers on agriculture, such as labour shortage, encroaching logging activities, marketing and transportation difficulties, and lack of choices in the selection of alternative crops, which may in fact be better alternatives in generating cash income for the them.

Once they are able to produce enough food and generate sufficient cash income it will reduce pressure on the Totally Protected Area (Sidu, 2000 a). This can be done by diversifying and improving the rural economy through community development project.

At the moment, the local communities are keen to plant oil palm rather than expecting revenue from the timber produce. People in Inarad and Langga are aware of the difficulty in obtaining any subsidies from the timber concessions of Yayasan Sabah, they thus divert their attention to Oil Palm plantation (according to the Inarad village headman and pengurus JKPK speeches during the River Feast Cultural Night at Langga), but how far is their success in uplifting their lives is still a question (Fig. 37).

2.2 Livestock

Besides farming as their main activity, the villages also rear some animals and most of them rear chickens and a few of them keep goats, buffaloes, ducks and pigs in their house compound. They do not keep many livestock because they can obtain wild meat easily from the nearby forest, either secondary or primary forest. That means the source of protein is adequate for them. The livestock is not for sale but for their own consumption. Unfortunately, we did not find out whether there was any grazing areas for these animals in Tongod district.

2.3 Fishing

Most of the villages do fishing as part of their living along the river banks. There are not many streams around and they fish along the main river. Along Sungai Pinangah and Sungai Haruan, Talapia, Ikan Ubi, Ikan Batu, Baung, *Sopong* (Baung besar), *Lagai*, *Turungou* (*Puntius selai*), *Lolou*, *Tawi*, *Luot*, *Limpata*, *Muu*, *Bungkok*, *Salan*, *Garap*, Pelian, *Tapah*, *Makalo*, *Lawang*, Ikan Merah, *Butol*, *Bagudan*, *Lagau*, *Gomutan* (Keli), *Sayap*, *Sinsilog*, *Lumpis*, *Pemberingat*, *Baing*; and also *Tokuyo* (ketam) and prawns. Further down to Kuamut, the villages easily catch *Tawi*, *Sopong*, *Luwot* (Patin), *Bungkok*, *Muu*, *Palian*, *Makalau*, *Mantimus*, *Tapa*, Baung, *Lais*, Putih, Pelian, *Kokok*, *Lipata*, *Lawang*, *Lontong* and *Mantipu*. Most of the villagers use 'Pukat' or drift net, 'Rambat' or cast net, *Mangalanduk* or hook and line, *Rawai* or numerous hook and line, and 'Bubu' or rattan or bamboo fish trap. They are very seldom use 'Tuba' or poison. Each family have their own fishing equipment which is kept under or outside their house as shown in the Fig. 38 & 39.

In Inarad, the villagers like to go to Lake Linumunsut for fishing rather than to the river along Sungai Pinangah. According to the villagers, the fishes at Lake Linumunsut are abundance and very big in size. The distance to the lake is at least two days walk. Most of catches from the lake are Pelian, *Lontong*, Ikan merah, *Barob* (Hampala), Ikan putih, *Lombo*, *Salap* (common carps), *Luot*, *Rompok*, *Sopong*, *Lambungau* (Peranak Sungai), *Pelahu*, *Halahas* (Pelian), *Baung* and *Tulumbaik*.

All the catches are for their own consumption and not for commercial purposes because there is no demand as most of them fish themselves. This is also a vital source of protein for the villagers.

A headman from Kg. Mananam, En. Isong Egih said that the streams in his village are polluted, too silty and difficult to find fish (Fig. 40). He is unhappy with the deforestation activity near his village. However, there is no freshwater fish farming implemented in the villages.

2.4 Forest Produce:

In Sabah, the forest plays a central role in people's lives, with many rural people still practicing shifting cultivation, hunting and gathering (Fig. 41). Primary forest areas were traditionally cut, burnt and cultivated for only a year or two and left abandon for five to ten years before the secondary forest developed on the abandoned lands were cut and burnt and the land recultivated (Fig. 42). The areas affected by shifting cultivation were small because it was done manually. Shifting cultivation has long been practiced by the local community of Tongod district because they lack fertile land for settled agriculture. Thus, the forest is a source of subsistence, a source of income, a home and a source of many other activities that enhance life (Langub, 1990). According to a review of Ford Foundation (1998) on Supported Community Forestry Programs in Asia, it mentioned that efforts to increase forest-dependent villagers' rights and access to forest products are fundamental to the community forestry approach.

2.4.1 Hunting & Wild Meat

Most of the villages poach for wild meat as their main source of protein. They normally go as far as 10 to 20 miles from their villages to hunt. In the Mukim Tongod area, the people go into Imbak Valley Virgin Jungle for hunting, not into Maliau Basin Conservation Area. In the Mukim Pinangah except Kg. Langga and Kg. Inarad, most of them go to Imbak Valley for hunting too and they also go to the other side of the forest (so called Maliau). This was confusing to half of

them regarding the actual Maliau Basin except for the head men and JKKK. In fact, both divisions did not go to Maliau Basin Conservation Area for hunting (Table 3).

They usually go for hunting in a group of at least two to three people, the most is seven persons and occasionally they go alone. Some of them venture around 2 to 3 miles only from their villages but some go as far as 20 miles and stay overnight. They mostly spend about one to three nights in the jungle and they go hunting on foot and by boat. They mostly get wild boar (*Sus barbatus*), sambar deer, barking deer, mouse deer and others like monkey, monitor lizard, porcupine, squirrel and birds (Table 4).

The most common hunting equipment is 'Bujak' and dog. 'Bujak' is a spear, together with the dog are the cheapest and effective equipment for hunting (Fig. 43). The other equipment used for hunting include 'Sumpitan' or blowpipe, 'jerat' or traps and guns. The harvest is unpredictable, once they get an animal, they return home, sometimes they get more, about 4-5 animals but sometimes none at all. Most of the harvest are for their own consumption, or they divide among their relatives or friends (Fig. 44). They seldom sell their meat or if they did, the price for a kilogram of wild boar meat is RM\$5.00/= in Pinangah and Tongod. They preserve the meat in the form of 'Salai' where the meat is salted and smoked. They also preserve in the form of 'Jaruk' where they preserve the meat with salt, together with rice in a bottle, other than cooked as food and extract it's oil. The animals' horns or trophies were used as decorative (Fig. 45).

In Kg. Langga and Kg. Inarad, they people can not differentiate Maliau Basin Conservation Area boundary and they thought that Maliau Basin is just confined to the Maliau water fall area only. They entered Lake Linunmunsut, without realising that they have entered Maliau Basin Conservation Area, they presumed that the Lake is theirs-as cultural heritage. Their ancestors used to go there for prayer, it is a worship place for them and also for any important decision making. In addition, the people go there not only for fishing but also for hunting along the way (Table 3).

People in Inarad and Langga usually go as far as 10 miles for hunting, once or twice a week to three times a month. They can differentiate between Imbak Valley and Maliau Basin. They normally hunt the wild boar, sambar deer and mouse deer from the primary forest by using dogs and spears, and also traps (Table 4).

In Kuamut, the local community use dog and spear for hunting and normally stay over a night. For the Muslim community, they look for sambar deer, barking deer and mouse deer only whereas the Christian community look for wild boar and deers (Table 4). Also, there is a respondent from Kg. Kuamut collecting birds' nest from Bukit Timbang, Kuamut.

In general, the local community of Tongod district did not encroach into Maliau Basin Conservation Area except Langga and Inarad for wild meat. For local consumption, their poaching did not have significant impact on the wildlife population in this Conservation Area. Due to the low population of Inarad and Langga, about 300 people each village and only about half of them are adults and only men go hunting, the number of wild animals being hunted is low and the animals can reproduce in an undisturbed jungle seasonally.

The poachers from outside need to beware. Three years ago, in Inarad, there was a case where 3 vehicles were found to have 14 guns (licensed guns) from Tambunan coming in to hunt but they were sent back.

2.4.2 Plants:

The villagers totally rely on forest produce for building their whole houses from roof to pole, wall and floor. In Inarad and Langga, most of the houses are made from 'Kayu Bulat' or tree trunk. Another good example of the usefulness of tree trunk is the shop house owned by Chee Yik

Table 3 : Percentage of the Local Community in Tongod District able to differentiate Imbak Valley and Maliau Basin Conservation Areas and their location of hunting.

DIVISION (MUKIM)	VILLAGE	Able To Differentiate Imbak Valley & MBCA	LOCATION OF HUNTING ACTIVITY	
			IMBAK VALLEY	MBCA
TONGOD		50%	YES	NO
PINANGAH	Langga	25%	YES	NO
		100%		YES
ENTILIBON	Inarad	75%		YES
		62.5%	YES	NO
KUAMUT		NA	NO	NO
TONGOD DISTRICT		48.6%	YES	YES

Table 4 : Hunting Activities and type of animals being hunted by local communities in each division of Tongod District

DIVISION (MUKIM)	VILLAGE	% OF HUNTER	TYPE OF ANIMAL				
			WILD BOAR	SAMBAR DEER	BARKING DEER	MOUSE DEER	OTHERS
TONGOD		52.9%	+++++	++	/	/	
PINANGAH		66.7%	+++++	+	++	+	+
	Langga	100%	+++	++	++	++	
	Inarad	100%	+++++	++	+	+++	
ENTILIBON		77.7%	+++	+	++	+	++
KUAMUT		100%	++	+++++	+++	++	+++

OTHERS : Porcupine
 Monkey
 Squirrel
 Monitor Lizard
 Bird

INDICATION +++++ = highest percentage
 +++++ = quite many
 +++ = moderate
 ++ = a few
 + = very few
 / = not at all

Pak of Kuala Tongod. It is about 70 years old, built before independence but still in good condition. There are also many houses in Mukim Pinangah and Mukim Tongod built by tree trunk. On the other hand, most of their house walls is also made from the tree bark of *Seraya sp.* especially for Makiang and Tanggara people except those who can afford to buy wood or get supply from timber company (Fig. 46-48). For those who do not have house walls, they use tree branch as railing which is very common in Kg. Maligatan (Fig. 49). Rumanau people like to make their house wall from Bamboo. Even most of their roofing are made from zinc but some still use 'Nipah' leaves (Fig. 50)

Basically, the floor of their house is also made from bamboo, rattan or 'nibong' as shown on Figure 51. A house at Saguon that we visited, a big house (house without room or living units like a hall called *Sinampayat*) the floor was made from nibong, belonging to a couple, whom the husband is Sungai Makiang and the wife is Sinabu. A raised platform was also made from tree trunk (called *Tindud*) to store their treasures and daughters at night during the old days (Fig. 52). This indicate that the villagers do not have to purchase material from outside to build houses, they can extract all their need from the near by forest.

Medicinal Plants

Even though there is a clinic or dispensary in every 'mukim' or division, but the local community still rely heavily on medicinal plants. Most of them travel far to go to their second home or 'Sulap' to plant crops which are far away from their first home or main village. They hardly come down to the main village for medication, so they prefer after harvesting to come to the dispensary and this take long time. Thus, most of them know some basic herbal medication for their own uses. The list of plants used in each village or ethnic group, with their methodology and purposes is attached (Appendix A).

Most of the medicinal plants are obtained from the primary and secondary forests. If they found useful and effective, they plant it in their compound or garden for their conveniently use (Fig. 53). For example, the village headman of Kg. Dewara planted some *San Sam taragang* or *Bubuwoi* (*Amaranthus giganteus*) in front of their 'Sulap' together with the hill padi, a red plant like 'Sayur Bayam' with medicinal value, to treat women who have just given birth and to increase blood production. Its leaves and young shoots can also be steamed to relieve fevers (Fig. 54).

The knowledge of medicinal plants have unfortunately not really passed down to their younger generations except those who stay together or nearby. Some of the young people go for further studies and work far away, they normally do not know the uses of herbal plants used by their ancestors.

Fuelwood

Fuelwood is normally collected by the villagers from the nearby secondary forest or logged area, and stored them under their house (Fig. 57). They still depend heavily on fuelwood for their daily cooking (Fig. 58). Most of them do not use gas stove or 'kerosene' because they can not afford it, and there is also the difficulty in transporting the gas and kerosene to such remote areas.

Damar and 'Gaharu'

The local communities of Inarad and Langga depend heavily on the damar extracted from the forest for making/seal their boat. It is also used as fuel. The other divisions like Pinangah and Entilibon extract more damar and 'gaharu' than Tongod and Kuamut, and claimed that they have to go very far to get damar and gaharu from the forest.

Rattan

Another forest produce is rattan which is highly used in these area for making house floor, mat atau *wallot*, fish trap so called 'Bubu' or *Selaid*, bird catch, *Lelibu* and *Nyiru*, basket like *Kalong*, *Wakid*, *Barait*; and *Padaka* and *Rajak* (Fig. 59-62). Normally they used Rotan Saga (*Calamus caesius*) for making mat, 'sikutan', *Barait* and they sometimes use Rattan Peradas for making basket or 'bakul'. All the rattan are obtained from the primary forest and they need to go very far to obtain this material because most of the nearby forests are disturbed or secondary forest.

The villages do not make handicraft as part of their income because there is no market or demand. They just make the those necessary utilitarian goods from rattan for their own use. Fig. 63 shows the uses of rattan in making goods in their daily activity especially during free time.

Bamboo

Bamboo is widely used by the local community of Tongod district. It is also used to make floors of houses especially for Rumanau people other than using rattan. It is also used for making basket, bird cage, the Murut dancing equipment like 'Magunatip' and other handicraft like *Raya*, *Tigawi*, *Adang*, *Wakid* and *Barait*, 'Bubu', *Nyiru* and *Lelibu* (Fig. 64). Most of the bamboo is extracted from the primary forest.

3.0 Trade and Income

Most of the village people live within the hard core poor level except those government servants or sawmill staff. They hardly earn more than RM100/month, therefore, they are living far below the national poverty level. In Tongod and Pinangah, most of people earn around RM15 to RM30 per month. Further up to Langga and Inarad, they almost do not have any income but the situation is better in Entilibon because it is nearer to Telupid town where there are more government facilities and better transportation. The village headman of Langkabong and Napagang of Entilibon earn RM600 and RM800 per month because they have fruit orchards on a commercial scale. Basically, those villagers near to towns like Pinangah, Tongod and Kuamut have a better life whereas villagers in Masaum, Purutawoi, Dewara, Namukon, Langga and Inarad have mostly negligible incomes. The hard core poor situation in these interior areas began much earlier and this had hindered them from giving proper education to their children or no education at all.

Their incomes are mostly derived from agriculture, by selling some vegetables (but not rice or padi) and wild meat if they have extra. The people do not use cash very much, they just exchange their goods or harvest on a barter trade basis. Overall, cash incomes generated from the sales of livestock are relatively insignificant. The money obtained is used for buying salt, sugar and cigarette only. Basically, there does not seem to be any business trade in the villages except some illegal logging, a small volume of vegetables and sundries sold at the wooden shop of Pinangah and Tongod. Kuamut people mostly have a better living, with better houses through the illegal logging activity except for Kg. Tunguyan and Kg. Tulang-tulang (Fig. 65-67).

4.0 Health and Education

Health is a major concern in this area because there is no proper piped water supply except in Tongod town, Pinangah town and a small part of Inarad uses the gravity water system but uses the murky river water and dusty rain water. The environment of the villages like Pinangah and Tongod are very dusty and dry after timber logging over about 10 years ago, when

rain comes, the dust is washed away to the river and accumulated in their wells. The people totally rely on this type of water for drinking and washing which is easily pose a health hazard to them (Fig. 68).

The gravity water system supplies treated water to Pinangah town, settlement area of Kg. Minusuh and some parts of Inarad, and ordinary piped water to Tongod town. Until today, most of the villages in Pinangah, Tongod, Inarad and Langga have no piped water supply. Due to the lack of education and health awareness, the villagers cut off the steel pipe to make home-made guns, so called 'Bakakuk' and finally these pipes had to be replaced by PVC pipes.

Recently, there was a malaria case being detected in Tongod with three virus strains on a person at a time. This is the first case recorded in Sabah and Malaysia in which urgent prevention is required for the whole community. All the villagers were urged to use mosquitoes nets at night. Malaria cases are very common at Tongod and Pinangah and due to their occupations as farmers and fishermen, the exposure to mosquito bites is high even during the day.

Another chronic illness is tuberculosis which is quite common amongst the villagers. They are not aware of the epidemic and the disease can spread through saliva, coughing and spitting, for instance they like to share straw while drinking 'Tapai' and more occurrences of sharing especially during festivals. This has caused the TB illness very hard to be eradicated.

Other common diseases in Inarad and Langga which is associated with mosquito-transmitted disease, filariasis, for which the causal agent is a nematode worm. Severe cases result in elephantiasis and this had happened to En. Gusmia (Mantiri's brother), an old man of about 65 years old from Inarad where there was no medication available there (Fig. 69).

Most of the villages have no clinic or dispensary; dispensaries are only available in main villages like Tongod, Pinangah and Kuamut (Fig. 70 & 71). The villagers have to travel to the main village for medication and normally it takes quite a long time especially when they are in their farm or during harvesting. Only after harvesting, they prefer to come for medication or when they are free especially during night time. Transportation and medication cost money which they only come to the dispensary when it is very serious. Even though the dispensary only charges them RM1/= per visit, it is relatively expensive for them who do not have any income at all.

In several villages like Mangkavago, Pinangah, Minusuh, Entilibon, Karamuak, Tongod and Kuamut, there is a Rural Health Clinic mainly for women and children. The Flying Doctor from Yayasan Sabah comes only once a month to villages without dispensary, and that also depends on weather conditions. The Pinangah dispensary visits Inarad once a month also.

Health and education are correlated in developing the villages. When most of the local communities are not educated, they tend to ignore and not aware of the importance of their health. Only through education can the local community be developed progressively.

Most of the villages have primary schools and the secondary school is only available in major towns like Pinangah, Tongod, Entilibon and Bukit Garam. Basically the villages can obtain primary education at their respective or nearby village but they have to move to major town or Sandakan for secondary education (Fig. 72-73). A few villagers have to go to primary school at the nearby village either by boat or foot; or some stay at hostel for instance, Kg. Talib, Purutawoi, Kiliwatong, Malagatan kecil, Tongodon and Bulot of Tongod division, Alitang, Dewara, Malikop and Langga of Pinangah. A list of kindergarten, primary and secondary schools available in villages of each division of the Tongod district is shown on Table 5.

At Mukim Pinangah, villagers from Kg. Dewara have to go to Kg. Pinangah for primary education because there is no primary school. Due to the cost, distance and sometimes health problem, the village headman's son of Kg. Dewara has not been to school even though he is 8

	Keramuak (Kuala)	SK Keramuak TABIKA Kampung Keramuak
	Keramuak (Dalam)	Nil
	Tenaga Bersatu	Nil
PINANGAH	Pinangah	SMK Pinangah SK Pinangah TABIKA Kampung Pinangah
	Tampasak	SK Tampasak TABIKA Kampung Tampasak
	Saguon	SK Saguon
	Dewara	Nil
	Malikop	Nil
	Inarad I	SK Inarad
	Inarad II	Nil
	Langga	Nil
	Masaum	SK Masaum
	Mangkawago	SK Mangkawago
	Alitang	Nil
ENTILIBON	Entilibon	SMK Entilibon SK Entilibon
	Entilibon II	Nil
	Kironggo	Nil

Table 5 : Kindergarten, Primary and Secondary schools avaible in the villages of Tongod District

DIVISION (MUKIM)	VILLAGE	SCHOOL
TONGOD	Kuala Tongod	SMK Tongod SK Tongod TABIKA Kampung Tongod
	Bulot	Nil
	Talibu	Nil
	Purutawoi	Nil
	Imbak	SK Imbak
	Kiliwatong	Nil
	Malagatan Kecil	Nil
	Kiandongo Darat	SK Kiandongo Darat
	Sogo-Sogo	SK Sogo-Sogo
KUAMUT	Tongodon	Nil
	Kuamut	SK Kuamut
	Tangkuyan	Nil
	Desa Permai	SK Desa Permai
	Tulang-Tulang	Nil
	Kenang-Kenangan	SK Kenang-Kenangan

	Semundoh	Nil
	Sanan	Nil
	Bobotong	Nil
	Linayukan	SK Linayukan
	Estate Koko KPD	Nil
	Langkabong	SK Langkabong
	Napagang	Nil
	Mananam	SK Mananam
	Maliau	SK Maliau
	Namukon	Nil
	Minusoh	SK Minusoh
	Liupampang	Nil
	Singgah Mata	Nil

Note : Tabika = Kindergarten

SK = Primary School

SMK = Secondary School

years old. This boy is helping his parent to do farming at the *sulap* as shown on Fig. 74, What a waste!

Travelling by boat, long walks on foot and financial constraints are reasons that have obstructed them from going to school. The children either help their parents to do some farming, fishing or hunting or worse, create social problems in their village. According to the village headman of Kg. Pinangah about half of the village children do not go to school, creating social problems now.

Another problems that needs to be addressed is the village may split into smaller villages which will not justify for more schools and government facilities. Thus, the existing school which has too few students will not be able to operate continuously, for instance one school, S.K. Tangkong, below Kuamut has less than 16 students, it will not get enough teachers specialised to teach most of the subject, only 2 teachers are available to teach all subjects which might not produce quality student. Another village, Kg. Masoum has less than 30 students, S. K. Inarad has less than 50 students, including student from Langga which does not justify for a government primary school in Langga.

Although many educated villagers have moved to the towns for employment, for a majority of the urban-employed Orang Sungai, their attachment to Ulu Kinabatangan is strong. Most still consider Ulu Kinabatangan as home and hope one day to return and live their retirement days there. In other words, the move to the town is not intended to be a permanent migration.

5.0 Main Problems and Felt Needs of the Community

From the point of view of the surveyed households, the most critical problem affecting the communities is the problem of transportation and being too far from town centre, All of the respondents perceived the two related problems as their major problems. This is a fact as being in the remote area they have no other means of transport but are totally dependent on rivers for their mobility. With numerous rapids along the way for instance, from Langga to Pinangah, river transport is not only costly and time-consuming but can be dangerous too, especially during high tides.

Being in the interior region, basic social and public amenities and services such as clinic and schools are inadequate in the remote villages. As a result, they have limited access to various public and social amenities and services that are available in town centers.

Another major problem of the community is the increasing scarcity of the neighbouring primary forest. It getting harder to go for hunting and extract any forest produce because they have to go far from their villages, otherwise, they only have large tract of secondary forest to be utilised.

Generally, both of the family and community problems reflected not only their rural conditions but also highlighted a relatively difficult socio-economic situation of the community concerned. Any development programme that help to improve their socio-economic well-being would be beneficial to the community, which would also help to minimise their dependency on the neighbouring forest for living.

As discussed earlier, resulting from their remoteness and lack of transport and communication network into the areas, the villagers in the remote areas have limited access to basic facilities for health care and education. In view of this, their top priority need was in respect of the development of the basic infrastructures and social amenities.

With its huge investment cost, road construction to the respective areas is expected to be just a dream to the community even in the distant future unless other major development takes

place in the neighbouring areas. As an alternative measure, the government should, thus, make an effort to improve the existing public facilities and social amenities in the areas.

With a relatively high incidence of poverty among them, there is a need to continue the assistance in terms of advisory services and material inputs for their income generation and food production.

6.0 Government Facilities, Aid and Development

The government has taken initiative to exercise the right for the local communities to be a Malaysian citizens where some of local communities in remote areas do not have their birth certificates and Identity Cards. There was an 8-day operation to issue their birth certificates immediately and register their Identity Cards for all the villagers from Inarad, Langga, Karamuak, Pinangah and Tongod from 25 August till 10 September 2000 (Fig. 75). All together about 2000 birth certificates were issued and 800 Identity Cards were registered. Hence, the people have equal rights as other Malaysian citizens for scholarship, voting and job opportunities.

In order to improve the health facilities, the government is building a permanent dispensary in Tongod town with a cost of 12 million ringgit to replace the old dispensary in an old mission building which was built in 1938. Another new dispensary is being planned in Pinangah town. This will provide more medical facilities to the villagers where there are black spots for malaria, tuberculosis, denggi and cholera. Recently, the government also provided plastic toilets to villages along Entilibon and other divisions so that they have some sanitary hygiene.

A development project is being undertaken by Borneo Samudera Sdn. Bhd. jointly with the local community of 1200 families to develop 137,000 acres, so called Tongod Plantation Sdn. Bhd. This will provide job opportunities to the local communities and resettle them too. The location of this project is shown in Fig. 76.

Another piece of land given by the government to Sabah Rubber Fund Board to develop is next to Masaum and Mangkawago. The villagers are asked to work in a given plot and the harvest go to Sabah Rubber Fund Board and they will be paid salaries accordingly. In Masaum, a resettlement scheme was introduced to the local communities as shown on Fig. 77.

During the Usno era, a minor settlement scheme was introduced to the villagers to plant coconut in Kuamut but the project failed in 1971. In 1976, the government tried to revise this scheme by building a road from Desa Permai to Karamuak but the road was not accessible till 1995. Now they plan to take 3,500 acres of government land for resettlement for the people from Kg. Tulang-tulang, Tangkuyan and Kuamut (Malik Chua, Pers. Comm.).

The “Projek Perumahan Masyarakat” or resettlement scheme is in Kg. Minusuh for about 120 families where the government appointed a saw miller to build basic semi-permanent houses for the local community in 1982 (Fig. 78 & 79). Another resettlement scheme will be in Inarad for about 70 families, has yet to take off.

Most of the villagers' land especially in Tongod and Pinangah Divisions are under land application where they have been staying there for a long time, some even since birth. There are some villagers in Entilibon, Kg. Kuamut, Desa Permai, Langga and Inarad with land titles. Recently, about 87 land titles were handed over to villagers from Langga and Inarad during the River Feast on 11th Sept. 2000 (Fig. 80).

7.0 Impacts Of The Maliau Basin Conservation Area Upon The Local Community

It is well documented that the range of uses and functions of forests in rural setting are enormous. Being part and parcel of their livelihood system, forest and its resources contribute considerably to the welfare and economic well being of the rural community. Based on our survey, about 48.6 % of the local communities can differentiate between the Maliau Basin Conservation Area and Imbak Valley Virgin Jungle, and the percentage for each division as shown on Table 3. The highest percentage is Langga and Inarad because they are nearer to Maliau Basin Conservation Area whereas Entilibon, Tongod, Pinangah and Kuamut are further and they are not the users of MBCA. The local communities living nearby have been and will continue to be dependent on the forest for their living. Under the circumstances, any effort to develop and manage the Maliau Basin would definitely affect the livelihood of the local community either directly or indirectly, especially in terms of their land use pattern and traditional practices.

Buffer zone concept should be included here and it covers areas outside the Totally Protected Areas (TPA) which would include CLA(Customary Land Areas), gazetted grazing areas (if there is any) and other alienated lands for the purpose of agricultural activities of the villages for their self sufficient needs. The most suitable buffer zone areas are between the Kg. Inarad to the northern part of MBCA, i.e. a Class II Forest Reserve. The buffer zone concept would create a cushion effect in the management and enhancement of Natural Resources and Environment of Maliau Basin.

However, the actual impacts of the Maliau Basin Conservation Area on the local community will depend on the various restrictions imposed by the rules under Forest Enactment, 1968. Nevertheless, based on the observations and preliminary study, following are some of the benefits and negative points.

Benefits

I) Management and Enhancement of Natural Resources and Environment

With the conservation and management of Maliau Basin, the existing environment will be maintained in its natural and pristine state. Beside its ecological and hydrological benefits, the whole biomass in general is the total wealth to the state, and to the local community in particular. Frequently, the common property as mentioned above has been overlooked, and the loss of which are often not accounted for in view of its intangible values (Sidu, 2000b). With its undisturbed environment, the forest provide excellent cover for wild life, while indiscreet felling and environmental destruction of the areas will definitely affect the natural habitat of the available wild animals and wild plants, including endangered species. Also, with its catchment remain intact there will be minimal pollution of rivers within Maliau Basin, which serve as breeding ground for indigenous fishes. All these are direct benefits, which the community living nearby the Conservation Area will continue to enjoy so long as the environment is under control and properly managed.

Therefore, the effort to conserve the Maliau Basin would be much beneficial to the local community both in the immediate and long term. Biodiversity in natural forests is crucial as it confers resilience and stability and provides multiple benefits for local community. As such, the conservation of the areas is definitely to their benefit as the forest and its resources can help sustain their livelihood in terms of supplementing their food supply and cash income.

II) Provision of Opportunity for Employment and Income Generation

Another direct benefit to the local community surrounding Maliau Basin Conservation Area will be creation of opportunity for their employment. It is expected that various activities,

conservation programme and management will definitely require some manpower, which could be recruited from neighbouring villages.

In addition, the greater participation of local community in the management of the Maliau Basin, would also help cushion the pressure on the existing resource of the Conservation Area. Therefore, with these opportunities, their cash income and socio-economic status will be slowly improved, and thereby, giving less pressure on the Conservation Area.

Negative Points

In any development of a conservation area, there are certainly some negative views that are unavoidable especially in relation with the enforcement of the enactment, rules and regulation for the conservation area, including protection of the wildlife, plants and ban on the sale of wild meat.

III) Restriction on the traditional Activities

Most of the communities in the neighbouring area are dependent on farming, hunting, fishing, and collection of jungle produce for their living. Therefore, one of the most distinct issues is in respect of the restrictions of these traditional activities and their present lifestyle. Even though the villagers in the neighbouring areas have the rights to collect jungle produce, strict enforcement of the regulations relating to these activities, especially the ban of the sale of wild meat of protected species.

But the restriction to the community is intended to properly control the exploitation of wild life, which in the long run will ensure continuous supply of wild meat for their own consumption.

8.0 Discussion and Recommendations

Depending almost totally on the resources available from the surrounding forests and the ecosystem, the local communities have a far greater awareness of the importance of conservation than anyone else. Therefore, those interested in conserving biological diversity must be equally concerned about conserving cultural diversity as many indigenous communities are already practising sustainable management of the resources.

One always assumes that the rural communities exploit forests and natural resources to get as much as possible, and fail to manage them in a sustainable manner. This is an underestimation on our part. Instead they posses not only the knowledge about forest as a whole, but more importantly, they know about its management, they know the traditional rules and regulations to avoid over-exploitation.

With their great reliance on the immediate environment for subsistence, the local community will manage it in the most sustainable and productive way possible. It is again their interests not to damage it because to destroy the environment would be to threaten their own survival.

Based on the existing situation, priority should be given to their socio-economic development, establish good rapport and cooperation with the local communities, and greater participation of the communities in the management of MBCA. As only through these recommendations could the pressure on the Conservation Area in the near future be minimised.

8.1 Socio-Economic Development

i) Uplifting the Standard of Living

Since the local communities are scattered around, there is a need to bring them together to become a bigger community. It is necessary to introduce them some form of town life and on the other hand preserving their culture. Due to the difficulty in maintaining them in isolation and the government facilities are not available in every small village. With the aid of the government, there is a need to facilitate and open up some lands to be owned by the local communities, in order to improve their income and education, change their way of life from leisure to a legitimate manner. Ultimately, working for a bigger corporation or company could train them to live in a legitimate way of life.

In order to eradicate poverty, there is a need to instill them to a bigger horizon. There is a need to expose them to the world of knowledge, to educate them properly and bring some changes with job opportunities and business opportunities in their villages. They need to have more contact with other towns, not only nearby villages or even with other districts. Certain ethnic groups who do not want to mix with others, they are just secluded from others. For instance, Murut Tanggala of Inarad do not mix with other people except Sungai Kalabuan people in Langga, as the nearest village and this needs to be broken off. Their children need to be brought down to live in boarding school, to expose them with more contact with other ethnic groups since childhood, and also with proper education.

ii) Education and Hygiene

Education is the primary tool for development. Only with education can we eradicate poverty and they will become more aware of health and development. For their sanitary hygiene, there is a need to educate the people to use toilet and also provide them with plastic toilet, so that they will not continuously treat the river as a natural toilet in which they use it for washing and drinking.

Gravity water system in Pinangah and Inarad should be replaced by a Tube Well System where the water can be obtained from underground and treated in the main tank as drinking water and use solar power to supply villages with water.

iii) Job Opportunity

Other than the oil palm plantations which involved a small percentage of local people in land clearing and harvesting, the local people need to be involved with bigger corporations to work on a given plot as introduced by Sabah Rubber Fund Board in Masaum to Mangkawago.

a) Agroforestry and Reforestation Programme

To avoid the spread of shifting cultivation into primary forest, an agro-forestry and reforestation programme need to be introduced. Fast-growing trees need to be planted in areas affected by shifting cultivation. Shifting cultivators should be recruited to do the planting as this gives them a means of livelihood and helps them to understand the role of forestry in rural community development. They should also be encouraged to plant agricultural crops for their own needs between rows of trees. The development of more agricultural plantations enables the local communities to gradually move away from subsistence shifting cultivation.

b) Development of Freshwater Fisheries

Through observation and discussion with the villagers, river fish in certain villages are increasingly on a decline. Therefore, to ensure a constant supply of freshwater fish for the community, there is a need to provide necessary assistance to develop freshwater fisheries in the respective areas. Such development with high value indigenous fish would definitely provide good income and constant supply of protein for the community.

c) Livestock Rearing and Domestication of Wild Animals

Apart from freshwater fish, the main source of protein food at the moment is from wild meat, particularly wild boar and various type of deer. The Sabah Wildlife Department and Sabah Veterinary Department should work together to initiate rearing and domestication of wild animals, particularly wild boar and the deer in the remote villages, this would not only meet their needs for protein, but also serve as an additional source of cash income to them. Indirectly, through implementation of such project, their possible encroachment into the Maliau Basin Conservation Area could also be minimised.

d) Development and Promotion of Eco-tourism

There is a bigger tourism potential along the Ulu Kinabatangan River where the fauna are very diverse and abundant. The local people may organize river expeditions and highlight fauna as the major attraction with the riverine habitat, plus the ethnic groups folk tales, typical traditional houses and promoting 'Dusun Sungai' culture along the river. The recent river feast or 'Pesta Sungai' is just an introduction to the world about Kinabatangan as a potential tourism industry.

Another potential tourism site is Lake Linumunsut, near to Inarad but within Maliau Basin Conservation Area. The legends of Lake Linumunsut would add value to the area as an eco-tourism area. The untouched lake by outsiders but a heritage for the Murut Tanggala, people of Inarad, need to be managed properly. After the Maliau Basin Management Plan is ready and adopted, this lake should be opened for tourism industry and co-managed by the local community. Another tourist attraction along the river from Langga to Inarad is the waterfall called Mias-Bias, it never stop flowing even during the drought season.

e) Development of Cottage Industry

Based on the existing skills and available raw materials, there is a potential to develop a cottage industry in respect of the handicrafts, particularly weaving, mat-making and basketry. The target group will be the elders and the women, who are often left behind in their houses or 'sulap', while the capable males are away for heavy work elsewhere. The activities could also help to generate some cash income to the local community given proper support by the relevant government agency, particularly in terms of the marketing of the finished products and to promote cultural tourism.

8.2 Establish Good Rapport and Cooperation with the Local Community

There is a need to improve the relationship between the local communities and Yayasan Sabah, the traditional conflicts had been there due to timber right and cess claimed by the local communities, then aggravated by some misunderstandings and unsuccessful yet long awaiting projects. Yayasan Sabah should identify themselves more to the people so that their presence and co-operation are felt. For instance, the flying doctor from Yayasan Sabah, there is a need to mention "Yayasan Sabah", because so far the people assumed that it is from the government only and their subsidy mentality are very high in the remote areas. By identify Yayasan Sabah, they might appreciate more on any contribution by Yayasan Sabah and not just think that Yayasan Sabah and Innoprise Corporation Sdn. Bhd. are the agencies responsible to clear their forests

where their live totally rely on forest produce. Their hard feelings and bad image about Yayasan Sabah need to be erased very soon, so that any development project put forward by Yayasan Sabah will be accepted and without obstruction.

In order to avoid any possible conflicts with the local community in the future, attention must be given to the human aspect of development. This is particularly relevant to development of the Maliau Basin Conservation Area, as we need greater participation from the local community.

In 1984, the Tongod Regional Planning Study was undertaken with the idea to form a one stop governing body whereby all the development has to refer to this board. The board has members from village representatives to coordinate any project in Tongod. This was written by Harrison Flammings with strong recommendation for Economic Planning Unit but this was not implemented till today (Malik Chua, Pers. Comm.). Sarawak state is the first state in Malaysia involved local community in managing their protected areas, so called "Co management".

8.3 Encourage Greater Participation of the Local Community in the Management of MBCA

Many Asian countries have experimented with ways to provide forest dwellers with legal access to forest lands, and to share responsibility for forest management with local people (A review of Ford Foundation, 1998). If there is any traditional forest management system still intact that is used by local communities, this can be incorporated in the overall management system, and empower the community to uphold this system.

It is impossible for the Maliau Basin Management Committee and the Yayasan Sabah to protect the Maliau Basin Conservation Areas without the support and collaboration of the local community. People are unlikely to support the Maliau Basin if they feel that they have lost some of their rights over the forest produce and are getting little return. The best way to generate their support is to enlist their help in planning, managing and operation of the area; this should help them regard the area as "theirs" to feel proud of it, to benefit from it, and therefore will feel the need and want to protect it. The aim of the Special Committees, is to involve local communities in the management of Maliau Basin, by allowing them to work with the Government in a system of co-management.

The aim of this is not to hand over total management to the local communities. It has often been shown that if that happens, the conservation aim is lost, and the area is over-exploited (eg., Redford, 1989; Oates, 1999; Robinson and Bennett, 2000). The primary aim of Maliau Basin is conservation. Co-management should achieve this because the Government is still in charge, ensuring the laws are respected and the primary conservation goal is met. But the local communities are partners too, working together with the Government to help meet those goals.

There might be a need to make provisions in the law to allow co-management to be taken one step further, by directly increasing benefits to local communities from the Maliau Basin Conservation Areas. To be legally feasible, a certain percentage of the entrance, accommodation and other fees for Maliau Basin to be shared with the local communities through Special Committees. In other parts of the world, it has been proven that this is the best way to recruit local support for a Totally Protected Area, by their obtaining direct benefits from it (Wells and Brandon, 1992; Pleumarom, 1993; Weber, 1995). Those benefits must come with a direct link to conserving the Maliau Basin, so people can easily see the link. For example, managing the Maliau Basin properly links directly to increased tourism revenue, and increased benefits to the community. The people should not receive the funds as a hand-out, otherwise they will develop a welfare mentality, and still do not respect the conservation area. The money must be tied firmly in to their being involved in decision making and co-management (Wells and Brandon, 1992).

In term of division of revenues, a balance must be struck between winning community's support, and meeting the revenue need of the government, thereby also maintaining Government

support for Maliau Basin Conservation Area. However, it needs to be assessed thoroughly. Another way of providing benefits to local community is through job opportunities, as ranger, boat driver, canteen operator and staff.

Due to the difficulties of enforcement in remote, rugged rural areas, some of this undoubtedly coming out of the conservation area. It threatened the traded species themselves, and also other species which were increasingly hunted like Banteng by the local people, may be from other districts for subsistence or even commercial purposes. This was not only a problem from the viewpoint of conserving biodiversity, but also had major implications for the culture, nutrition and well being of local community. In terms of hunting, the Sabah Wildlife Department should undertake a comprehensive master plan to review the problems facing wildlife in the state particularly in Maliau Basin Conservation Area, then reinforce their enactment. Hunting is limited mainly to those people in rural areas who need wild meat for their own subsistence. The aim is to stop the unsustainable trade in wildlife, but not stop hunting totally.

Three elements are needed to make the laws work well, to maximize the benefits both to conservation and to local communities.

1. **Education** – This is vital so that people understand the concept of sustainable use of resources, problem of unsustainably high levels of hunting, value of the wildlife trade ban, and the multiple benefits of Maliau Basin Conservation Areas. Hence, plans are for the Environmental Education Awareness Unit to be extended to encompass all rural communities around Maliau Basin Conservation Area.
2. **Monitoring** – It is crucial to ensure that management is truly protecting wildlife populations. If it is, management can continue along similar lines. If it is not, there must be a change in what is being done. Thus, wildlife population must be monitored, and the results fed directly to the Special Committees, as well as to the staff in the Maliau Basin and to the Management Committees, to allow adaptive management. Such monitoring of Wildlife populations is already being done successfully by local hunting communities working in a co-management system with other agencies in Peru (Bordmer and Puertas, 2000), and in Sarawak, a major training programme of TPA staff is underway to allow it to be done soon (Tisen & Bennett, unpublished). Therefore, the villagers in surrounding Maliau Basin can assist in the enforcement task more effectively.
3. **Create Buffer Zone and Increasing the total area of TPA's**, so that the area where animals can breed away from disturbance be increased. Without that, as forest outside the Maliau Basin continue to decrease in size, collection of resources will be concentrated increasingly in Maliau Basin Conservation Area which are too small to withstand such pressure in the long run. Expansion of the conservation areas or upgrade the status of the nearest forest reserves from class II to Class I protected area for instance, Imbak Valley Virgin Jungle which is near to Maliau Basin Conservation Area. Therefore, is critical to ensure that the balance between the needs of local community and conservation can be met.

Overall, despite some restrictions on their traditional activities, this suggestions would certainly be beneficial and socially acceptable to the local communities both in its immediate term and long term development.

9.0 Conclusion

There is a need to make provision in the law to involve local communities in decision making and co-managing for the Maliau Basin Conservation Area, and to receive the direct benefits from tourism and other activities in the Maliau Basin Conservation Area. To work fully with local communities to co-manage Maliau Basin Conservation Area by establishing a Special Committee, and put the system of revenue sharing into effect, linking it where necessary with

agreements to reduce hunting. With all these steps, we are following Sarawak state in leading the way in tropical forest areas to maintain the intricate links between conservation and local cultures, to the long term benefit of both.

10.0 References

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Appendix 1

NO	INFORMER	VERNACULAR NAME	BOT-NAME	FAMILY	USES	PREPARATION
01	En. Musa Antirak	<i>Rondog (Murut)</i>			Wound	The juice is dropped onto wound to stop bleeding
02	En. Musa Antirak	<i>Bambalas (Murut)</i>			Beverage	Juice drinkable
03	En. Daribah B. Sungkia	<i>Pegawagan (Murut)</i>	<i>Scindapsus perakensis</i>	ARACEAE	Stomach-ache	Leaves are dried on fire and applied to stomach
04	En. Daribah B. Sungkia	<i>Umbit (Murut)</i>			Stomach-ache	Leaves are dried on fire and applied to stomach
05	En. Pauyong Dalong	<i>Pegawagan (Murut)</i>	<i>Scindapsus perakensis</i>	ARACEAE	Stomach-ache	Pounded leaves are dried on fire and applied to stomach
06	En. Pauyong Dalong	<i>Gonsing (Murut)</i>	<i>Melastoma malabathricum</i>	MELASTOMATACEAE	Tonic	The roots are boiled and drank
07	En. Pauyong Dalong	<i>Pacak Bumi ('BM')</i>			Tonic	The roots are boiled and drank
08	En. Mantiri Minggin	<i>Tanom Tambiag (Murut)</i>	<i>Kalanchoe pinnata</i>	CRASSULACEAE	Head-ache	Leaves are pounded and applied to forehead
09	En. Mantiri Minggin	<i>Parut (Murut)</i>			Stomach-ache	Leaves are boiled and drank
10	En. Mantiri Minggin	<i>Munatol (Murut)</i>			Eye-inflammation	The juice from roots are dropped into the both eyes
11	En. Mantiri Minggin	<i>Pisang (Murut)</i>			Ear-ache	Young seeds are burn and insert into ear hole
12	En. Mantiri Minggin	<i>Pangkubag (Murut)</i>	<i>Hoya</i>	ASCLEPIDIACEAE	Asthma	?
13	En. Awang Bantan	<i>Tatapis (Sungai)</i>			Fever & Stomach-ache	Whole plants are pounded and applied to body and stomach
14	En. Awang Bantan	<i>Pegaring (Sungai)</i>			Bruise	?
15	En. Raziman Gantar	<i>Kalawit (Sungai)</i>	<i>Uncaria</i>	RUBIACEAE	Tonic	By drinking the juice of root.
16	En. Mondin Nandu	<i>Wadan (Sungai)</i>	<i>Dinochloa scandens</i>	GRAMINAE	Small wound	The juice is dropped onto wound to stop bleeding
17	En. Mondin Nandu	<i>Kayu Tambakak (Sungai)</i>			Eye-ache	The juice of young leaves are dropped into eye
18	En. Mondin Nandu	<i>Gasing (Sungai)</i>	<i>Melastoma malabathricum</i>	MELASTOMATACEAE	Stomitis	Pounded leaves are mixed with water and drank
19	En. Manap Umboi	<i>Rumput Bunga Putih (Sungai)</i>			Fever & Stomach-ache	Whole plants pounded and applied to body and stomach.
20	En. Manap Umboi	<i>Kapal-Kapal (Sungai)</i>	<i>Kalanchoe pinnata</i>	CRASSULACEAE	Fever	Leaves are pounded and applied to body

Appendix 1

NO	INFORMER	VERNACULAR NAME	BOT-NAME	FAMILY	USES	PREPARATION
21	En.Saradin Bangali	<i>Langkunai (Sungai)</i>	<i>Eupatorium odoratum</i>	COMPOSITAE	Wound	Leaves are pounded and applied to stop bleeding
22	En.Saradin Bangali	<i>Takang (Sungai)</i>			Diuretic	Leaves are pounded and applied to affected part
23	En.Saradin Bangali	<i>Toring Balak (Sungai)</i>			Stomach-ache	Leaves are pounded and applied to stomach
24	En.Saradin Bangali	<i>Lambaad (Sungai)</i>	<i>Curculigo latifolia</i>	AMARYLLIDACEAE	Stomach-ache	Roots scraping mixed with lukewarm water and drank
25	En.Saradin Bangali	<i>Lambaad (Sungai)</i>	<i>Curculigo latifolia</i>	AMARYLLIDACEAE	Malaria	Roots mixed with hot water and drank
26	En.Mataim Minggin	<i>Pemamampang (Murut)</i>	<i>Begonia</i>	BEGONIACEAE	Fever	Soaking in lukewarm water and bathe
27	En.Mataim Minggin	<i>Pepalut (Murut)</i>			Fever	Soaking in lukewarm water and bathe
28	En.Ajum Sanihgkai	<i>Pamagun (Sungai)</i>			Swollen	Whole plants are pounded and mixed with water and applied to the swollen part
29	Pn. Masuara Atioh	<i>Tanda kebusan (Sungai)</i>			Wound	Young leaves are pounded and applied to wound
30	En.Amos Tasa	<i>Pangaga (Sungai)</i>	<i>Centella asiatica</i>	UMBELLIFERAE	Fever	Whole plants are boiled and applied to body (Reducing fever)
31	En.Amos Tasa	<i>Tarupok (Sungai)</i>			Fracture	Plants are pounded and applied to broken part
32	En.Amos Tasa	<i>Tongkat ali ('BM')</i>	<i>Eurycoma longifolia</i>	SIMAROUBIACEAE	Multipurpose	The roots are boiled and drank daily with correct dosage
33	En.Isong Egih	<i>Langsat (Dus Mangkak)</i>	<i>Lansium domesticum</i>	MELIACEAE	Fever	Young leaves are pounded and applied to body (Forehead and chest)
34	En.Isong Egih	<i>Sogumau (Dus Mangkak)</i>	<i>Cymbopogon citratus</i>	GRAMINAE	Fever	Leaves are burnt and bathe in smoke
35	En.Isong Egih	<i>Togutui (Dus Mangkak)</i>	<i>Musa sp</i>	MUSACEAE	Wound – stop bleeding	The juice of stems are dropped to wound
36	En.Isong Egih	<i>Lado (Dus Mangkak)</i>	<i>Capsicum frutescens</i>	SOLANACEAE	Head-ache	Young leaves are pounded and mixed with water and applied to forehead, wrapped with cloth
37	En.Isong Egih	<i>Tawawoh (Dus Mangkak)</i>	<i>Blumea balsamifera</i>	COMPOSITAE	Post – parturition treatment	The leaves are soaked with hot water and bathe

Appendix 1

NO	INFORMER	VERNACULAR NAME	BOT-NAME	FAMILY	USES	PREPARATION
38	En.Isong Egih	<i>Bulangou (Dus Mangkak)</i>			Post – parturition treatment	The barks are boiled and rub onto stomach
39	En.Isong Egih	<i>Gasing (Dus Mangkak)</i>	<i>Melastoma malabathricum</i>	MELASTOMATACEAE	Diarrhea	The roots are boiled and drank when water is lukewarm
40	En.Isong Egih	<i>Liabas (Dus Mangkak)</i>	<i>Psidium guajava</i>	MYRTACEAE	Diarrhea	The barks and buds are boiled and drank
41	En.Isong Egih	<i>Wadan (Dus Mangkak)</i>	<i>Dinochloa scandens</i>	GRAMINAE	Eye-ache	Juice dropped to the eyes
42	En.Isong Egih	<i>Bawing Oitom (Dus Mangkak)</i>			Hypertension	Leaves are boiled and drank daily
43	En.Uloh B. Mapi	<i>Kalait (Sungai)</i>	<i>Uncaria spp</i>	RUBIACEAE	Gastritis Beri beri Fever	By drinking the juice of stem Directly
44	En.Uloh B. Mapi	<i>Lapad (Sungai)</i>			Fever Head-ache	By drinking the juice of stem directly
45	En.Uloh B. Mapi	<i>Ombiau (Sungai)</i>	<i>Gendarussa vulgaris</i>	ACANTHACEAE	Fever To expel alimentary gases	The leaves are pounded and applied
46	En.Uloh B. Mapi	<i>Powo (Sungai)</i>	<i>Musa sp</i>	MUSACEAE	Chest-ache	The stems are pounded and rubbed into chest
47	En.Kalawang Siong	<i>Binak (Sungai)</i>				Boiled and drank
48	En.Kalawang Siong	<i>Sapai (Sungai)</i>	<i>Tinospora crispa</i>	MENISPERMACEAE	Hypertension	The stems are boiled and drank
49	En.Kalawang Siong	<i>Bangkaka (Sungai)</i>			Reducing fever	No information
50	En.Musa	<i>Mangkapal (Sungai)</i>	<i>Kalanchoe pinnata</i>	CRASSULACEAE	Boil	The leaves are pounded and rubbed to boil
51	Pn.Mariam Abam	<i>Bunga Raya ('BM')</i>	<i>Hibiscus rosa sinensis</i>	MALVACEAE	Fever	Leaves pounded and applied to forehead
52	En.Emok Andaran	<i>Soringmundak (Dus Minokok)</i>	<i>Leucosyke capitella</i>	URTICACEAE	Wound	The barks and leaves are pounded and applied to wound
53	En.Emok Andaran	<i>Papak diorou (Dus Minokok)</i>			Head-ache	The leaves pounded and applied to forehead
54	En.Emok Andaran	<i>Liabas (Dus Minokok)</i>	<i>Psidium guajava</i>	MYRTACEAE	Stomach-ache	The young leaves are boiled and drank

Appendix 1

NO	INFORMER	VERNACULAR NAME	BOT-NAME	FAMILY	USES	PREPARATION
55	En.Emok Andaran	<i>Sasapai(Dus Minokok)</i>	<i>Tinospora crispa</i>	MENISPERMACEAE	Stomach-ache	The roots are boiled and drank
56	En.Emok Andaran	<i>Lobo (Dus Minokok)</i>			Stomach-ache	The roots are boiled and drank
57	En.Emok Andaran	<i>Bingkudu (Dus Minokok)</i>	<i>Morinda citrifolia</i>	RUBIACEAE	Gastritis Hypertension	The roots are boiled and drank
58	En.Sinan Banggali	<i>Sagit (Sungai Makiang)</i>			Reducing fever	The leaves are pounded and rubbed on chest
59	En.Sinan Banggali	<i>Wadan(Sungai Makiang)</i>	<i>Dinochloa scandens</i>	GRAMINAE	Eye-ache	Juice dropped into the eyes
60	En.Patrick Guruk	<i>Tongkat ali (Dus Sungai)</i>	<i>Eurycoma longifolia</i>	SIMAROUBIACEAE	Stomach-ache Hypertension	The roots are boiled and drank
61	En.Patrick Guruk	<i>Butang-butang(Dus Sungai)</i>			Sore	Whole plants are burnt and applied to sore
62	En.Patrick Guruk	<i>Gasing(Dus Sungai)</i>	<i>Melastoma malabathricum</i>	MELASTOMATACEAE	Head-ache	The leaves pounded and applied to forehead
63	En.Patrick Guruk	<i>Kelapa (BM')</i>	<i>Cocos nucifera</i>	PALMAE	Migraine	By drinking the coconut water
64	En.Patrick Guruk	<i>Limau kapas (BM')</i>	<i>Citrus spp</i>	RUTACEAE	Giddiness	The juice mixed with lukewarma water and drank
65	En.Patrick Guruk	<i>Bambu (BM')</i>	<i>Gigantochloa laevis</i>	GRAMINAE	Eye-ache	The juice dropped onto the eyes
66	En.Patrick Guruk	<i>Sangkakalib(Dus Sungai)</i>			Ear-ache	Leaves are pounded and rubbed around the ear lobe
67	En.Patrick Guruk	<i>Pakis (Dus Sungai)</i>	<i>Blechnum spp</i>	BLECHNACEAE	Boil	Buds pounded and applied to boils
68	En.Majimir Jindon	<i>Tetapis (Dus Minokok)</i>			Fever Swollen	Leaves are pounded and rubbed to body and swollen part
69	En.Majimir Jindon	<i>Liabas (Dus Sungai)</i>	<i>Psidium guajava</i>	MYRTACEAE	Stomach-ache	Leaves are boiled and drank
70	En. Putan Salab	<i>Magabang (Dusun)</i>			White spot	By rubbing the sap to lips, tongue and mouth
71	En. Putan Salab	<i>Belimbang (BM')</i>	<i>Averrhoa carambola</i>	GERANIACEAE	Reducing fever	The leaves are boiled and drank
72	En. Putan Salab	<i>Romus (Dusun)</i>			Wound & Stomitis	By rubbing the sap to wound and white spot ailment
73	En.Kamil Lasam	<i>Singkakapal (Dus Mangkak)</i>	<i>Kalanchoe pinnata</i>	CRASSULACEAE	Head-ache	Leaves are pounded and applied to forehead
74	En.Kamil Lasam	<i>Ginseng Sabah(Dus Mangkak)</i>			Body- ache	By boiling the root and drank when lukewarm
75	En.Kamil Lasam	<i>Luong (Dus Mangkak)</i>	<i>Zea mays</i>	GRAMINAE	Stomach-ache	Leaves are boiled and drank

Appendix 1

NO	INFORMER	VERNACULAR NAME	BOT-NAME	FAMILY	USES	PREPARATION
76	En.Kamil Lasam	<i>Bayam (Dus Mangkak)</i>	<i>Amaranthus</i>	AMARANTHACEAE	Post – parturition treatment	Consumed as vegetables
77	En.Kamil Lasam	<i>Wadan (Dus Mangkak)</i>	<i>Dinochloa scandens</i>	GRAMINAE	Eye-ache	By dropping the juice onto eyes
78	En.Kamil Lasam	<i>Biabas (Dus Mangkak)</i>	<i>Psidium guajava</i>	MYRTACEAE	Diarrhea	Young leaves are boiled and drank in lukewarm water
79	En.Kamil Lasam	<i>Tatangan (Dus Mangkak)</i>	<i>Jatropha curcas</i>	EUPHORBIACEAE	Swollen liver	Leaves are pounded and mixed with ash and rubbed on the part of liver
80	Pn.Bibiana Rosani	<i>Ombiau(Dus Sungai)</i>	<i>Gendarussa vulgaris</i>	ACANTHACEAE	Head-ache Vomiting	The leaves are pounded and drank or applied to forehead
81	Pn.Bibiana Rosani	<i>Dodoung(Dus Sungai)</i>	<i>Musa spp</i>	MUSACEAE	Stomach-ache	Young trees are boiled and drank
82	Pn.Bibiana Rosani	<i>Kalait (Dus Sungai)</i>	<i>Uncaria spp</i>	RUBIACEAE	Hepatitis	The juice is mixed with juice of 'BULIAN (<i>Eusideroxylon zwagerii</i>) and drank directly
83	Pn.Bibiana Rosani	<i>Patiatah (Dus Sungai)</i>	<i>Leucosyke capitella</i>	URTICACEAE	Fever	The leaves are boiled and steam bathe
84	En.Madasah Ugam	<i>Ambiau (Dus Sungai)</i>	<i>Gendarussa vulgaris</i>	ACANTHACEAE	Fever	Leaves are boiled and drank
85	En.Madasah Ugam	<i>Dalamato (Dus Sungai)</i>	<i>Homalanthus populneus</i>	EUPHORBIACEAE	Head-ache	Leaves are pounded and applied to forehead
86	En.Madasah Ugam	<i>Wonod diondou(Dus Sungai)</i>	<i>Eurycoma longifolia</i>	SIMAROUBIACEAE	Stomach-ache	The root boiled and drank
87	En.Madasah Ugam	<i>Wadan (Dus Sungai)</i>	<i>Dinochloa scandens</i>	GRAMINAE	Eye-ache	By dropping the juice onto eyes
88	En.Bani Bingkason	<i>Bubuanoi(Dus Sungai)</i>			Baby bathe	Whole plants mixed with lukewarm water and bathe
89	En.Bani Bingkason	<i>Mangkapal (Dus Sungai)</i>	<i>Kalanchoe pinnata</i>	CRASSULACEAE	Heart-ache	Leaves are pounded and rubbed to chest part
90	Pn.Julianah Amil	<i>Salinatad (Dus Rumanau)</i>	<i>Elusine indica</i>	GRAMINAE	Flu	The roots are mixed with hot water and drank while lukewarm
91	Pn.Julianah Amil	<i>Indorokot (Dus Rumanau)</i>	<i>Urena lobata</i>	MALVACEAE	Beri beri	Mixed with hot water and drank while lukewarm
92	Pn.Julianah Amil	<i>Dinding (Dus Rumanau)</i>			Barren	Leaves are pounded and applied to stomach (Female only)
93	Pn.Julianah Amil	<i>Langsat (Dus Rumanau)</i>	<i>Lansium domesticum</i>	MELIACEAE	Stomach-ache	By boiling the leaves and drank

Appendix 1

NO	INFORMER	VERNACULAR NAME	BOT-NAME	FAMILY	USES	PREPARATION
94	Pn.Noriah Pirai	<i>Pamagun (Dus Sungai)</i>			Liver	Leaves are pounded and applied to affected part
95	Pn.Noriah Pirai	<i>Sagit(Dus Sungai)</i>			Fever	Boiled and drank
96	En.Bungkok Naung	<i>Langkunai (Dus Sungai)</i>	<i>Euptarium odoratum</i>	COMPOSITAE	Wound-Stop bleeding	Young leaves are pounded and applied to wound
97	En.Bungkok Naung	<i>Pisang hutan (Dus Sungai)</i>	<i>Musa sp</i>	MUSACEAE	Wound-Stop bleeding	The juice applied to wound to stop bleeding
98	En.Abd Rahim	<i>Bunga Raya('BM')</i>	<i>Hibiscus rosa sinensis</i>	MALVACEAE	Diuretic	The flowers are pounded and applied to bladder
99	En.Siniong Shai	<i>Tolidus (Dus Makiang)</i>	<i>Achasma macrocheilos</i>	ZINGIBERACEAE	Wound	Soft parts of plant are pounded and applied to wound to stop bleeding
100	En.Siniong Shai	<i>Pampan (Dus Makiang)</i>	<i>Tetracera scandens</i>		Anti-cogulant	Dropping the juice onto wound
101	En.Siniong Shai	<i>Angitas (Dus Makiang)</i>			Head-ache	Leaves are pounded and applied to forehead
102	En.Siniong Shai	<i>Dalai (Dus Makiang)</i>	<i>Zea mays</i>	GRAMINAE	Post – parturition treatment	Leaves are mixed with hot water and bathe
103	En.Siniong Shai	<i>Sasad (Dus Makiang)</i>	<i>Amaranthus spinosus</i>	AMARANTHACEAE	Post – parturition treatment	Roots are soaked with hot water and bathe while lukewarm
104	En.Siniong Shai	<i>Tundun (Dus Makiang)</i>			Eye-ache	By dropping the juice onto eyes
105	En.Siniong Shai	<i>Tapayas (Dus Makiang)</i>	<i>Carica papaya</i>	CARICACEAE	Stomach-ache	Young leaves are boiled and drank
106	En.Siniong Shai	<i>Pamagun(Dus Makiang)</i>	<i>Gendarussa vulgaris</i>	ACANTHACEAE	Swollen foot	Leaves are soaked with hot water and rubbed to the swollen part or legs

Appendix 2: Photos



Fig. 1 Main transportation in Ulu Kinabatangan is by boat



Fig. 2 : The villages are accessible by river because they are located near the river bank



Fig. 3 : Boat ride from Langga to Inarad take about 1 hour by 15 hp engine



Fig. 4 : Group A of the survey team comprised of Sabah Museum personnel and ICSB / Danced staff, participated in the river feast with YB Datuk Malik Chua. The location is just after a rapid of Sg.Pinangah at the upper part of Inarad.



Fig. View of Pinangah



Fig. View of Tongod Town from the Tongod Dispensary and Missionary area



Fig. 7: Houses at Kuala Tongod



Fig. 8 : An old church at Tongod Town

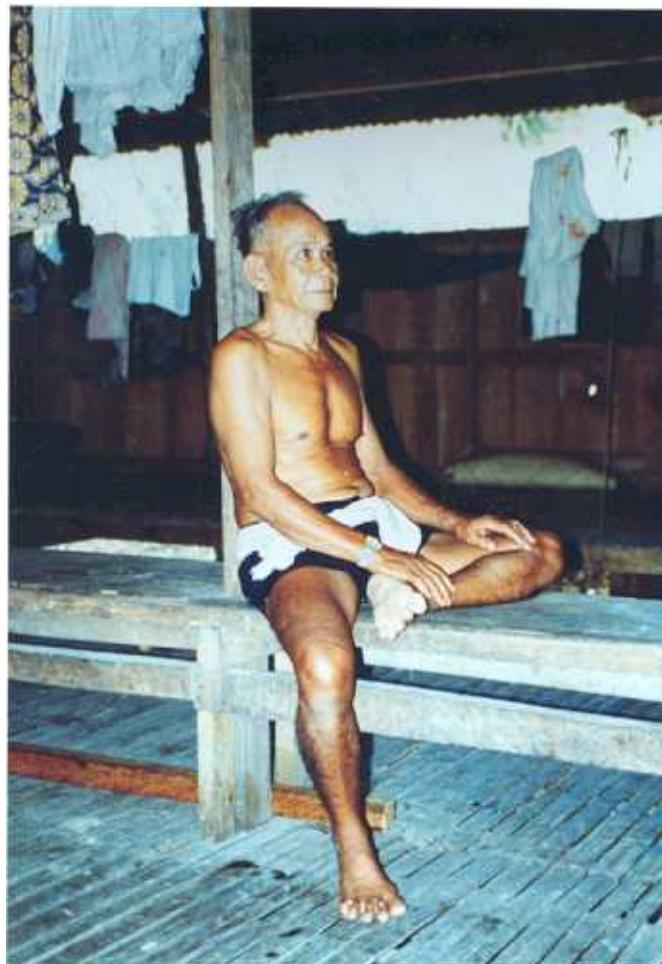


Fig. 9 : Murut Tanggala at Inarad



Fig. 10 : A couple of Sungai Makiang, He is the village headman of Kg. Dewara, Pinangah.



Fig. 11 The man is a Dusun Makiang, married a wife (as below) at Kg. Saguon

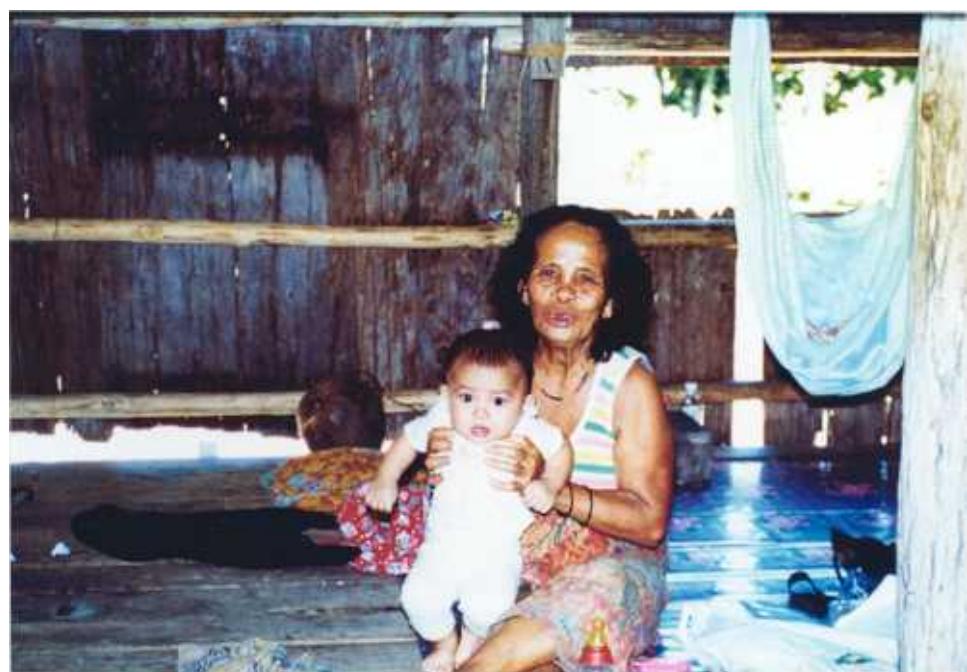


Fig. 12 : The wife is a Sinabu



Fig. 15 : Dusun Sungai Kalabuan from Langga together with Murut Tanggala from Inarad



Fig. 16 : Angalai dance performed by the Murut Tanggala of Inarad.



Fig. 17 : 'Kulingtangan' performed by the Dusun Kalabuan, Langga



Fig. 18 : Gongs are their heritage of the local community. These gongs belong to the village headman of Inarad, En. Mandur.



Fig. 19 : A typical house of Murut Tanggala which is long and with few units attached so called 'Binatang'



Fig. 20 : A typical house of Dusun Rumanau, with a very long window.



Fig. 21 This long house belongs to the headman of Kg. Pinangah



Fig. 22 A typical house of Dusun Makiang Kg. Tampasak



Fig. 13 : A pensioner works as a farmer at Kg. Tampasak. He is a Dusun Sungai



Fig. 14 A group photo of the village headmen of Pinangah (front row) together with representative of Ketua Anak Negeri (KAN), also with some villagers



Fig. 23 : The second house owned by a farmer at Kg. Tampasak



Fig. 24 : A small house was newly built at Kg. Minusoh. These people live in a poor condition.



Fig. 25 : A wooden shop at Kuala Tongod (estimated 70 years old) owned by a chinese who is selling some cold drinks and sundries



Fig. 26 : Variety of 'Hill Padi' planted by the local community



Fig. 27 : Another staple food in Tongod District is tapioca



Fig. 28 : Planting 'Hill Padi' as their main activity. The village headman of Kg. Dewara spend about 8 month for farming

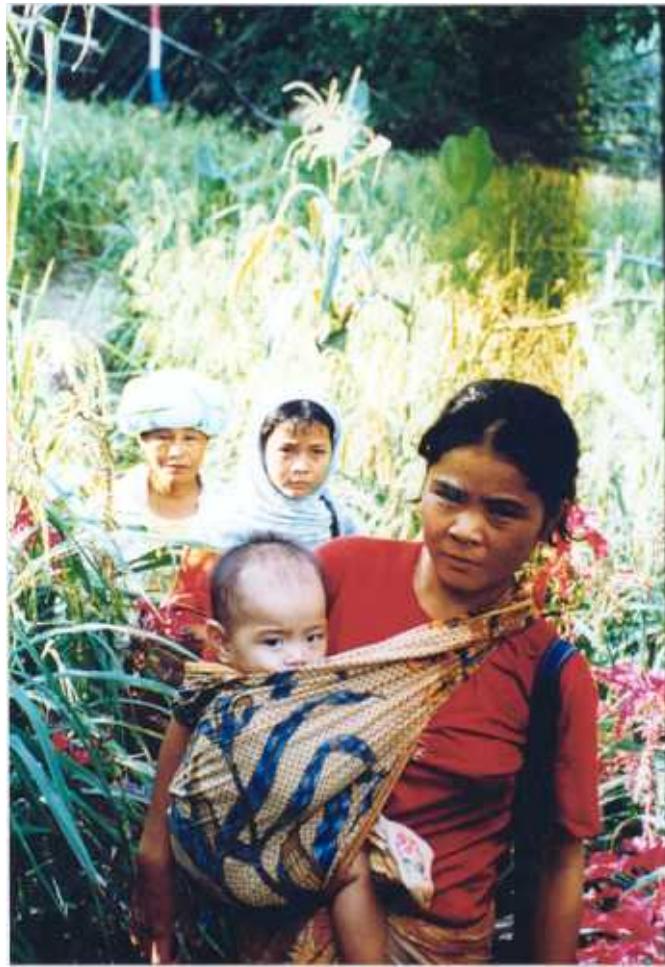


Fig. 29 : His daughter and wife just came back from their farm



Fig. 30: This is about 2 - 3 acres of hill padi planted at their nearest land of Kg. Masoum



Fig. 31 The agriculture practices were passed on to their younger generation



Fig. 32 : Open burning is the only method for them to clear their lands before planting



Fig. 33 Shifting cultivation is very common in Tongod District



Fig. 34 A small farm at Kg. Tampasak, managed by a couple



Fig. 35 : Their farms mostly managed by older people, or a few family members



Fig. 36 : One of the fruit trees at Kg. Nomukon - 'Mengkudu'



Fig. 37 : The local community are exposed to oil palm recently



Fig. 38 : A cast net to be dried at their house compound



Fig. 39 : Most of villagers have cast net as their fishing equipment



Fig. 40 : One of the stream at Kg. Mananam is very silty and difficult to find fishes



Fig. 41 Forest plays a central role in people's live at Tongod District



Fig. 42 : Abandon lands were left for 5 to 10 years before secondary forest developed and the land recultivate

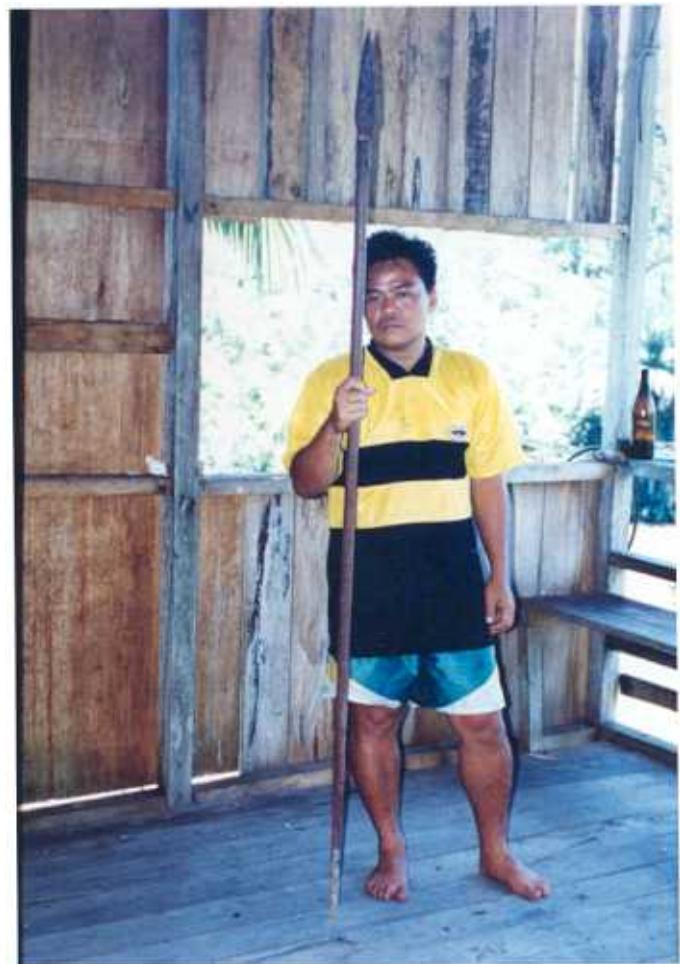


Fig. 43 : 'Bujak' is a spear, together with dog are the cheapest and effective equipment for hunting



Fig. 44 : Most of the hunting harvest for their own consumption. Quite a number of wild boar being hunted as their source of protein



Fig. 45 : Deer trophy used for decoration



Fig. 46 : The house wall of Makiang people is made from tree bark



Fig. 47 : A chapel at Kg. Tampasak with the wall also made from tree bark



Fig. 48 : The Murut Tanggala's house wall is made from tree bark



Fig. 49 : A house without wall but with some tree branches as railing at Kg. Maligatan



Fig. 50 : Roof tatching made from 'Nipah' leaves

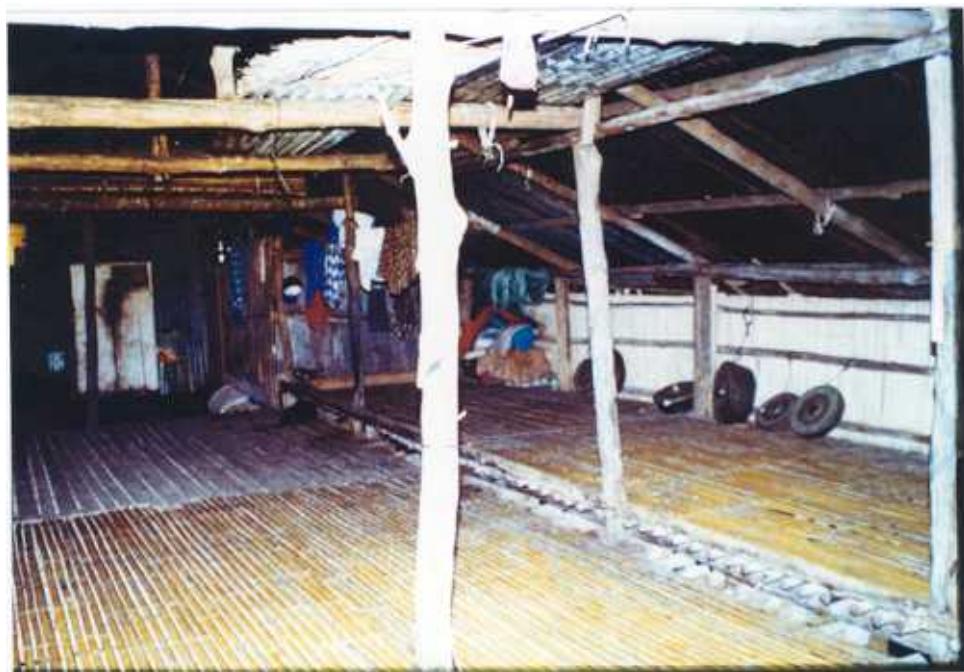


Fig. 51 Floor of the house is also made from Nibong, the living units called 'Sinampayat'

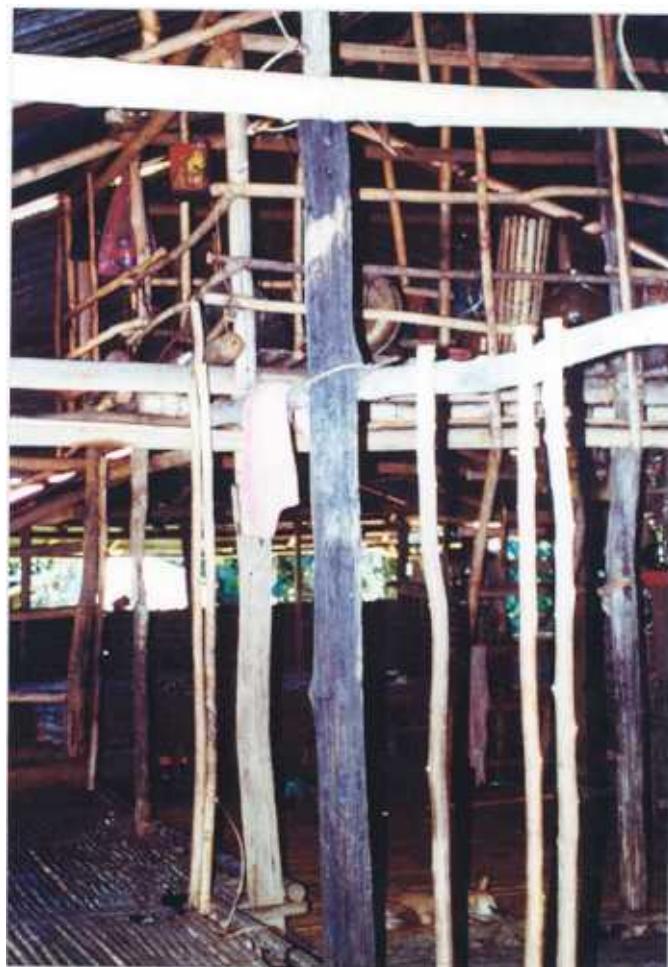


Fig. 52 'Tindud' raised platform to store their treasures and daughters



Fig. 53 : They planted some medicinal plants at their garden



Fig. 54 'Bubuwoi' or *Amaranthus giganteus*- a red plant like 'Sayur Bayam' with medicinal value - used for women who just give birth



Fig. 55 : Sorinipon / Nipon - Nipon (*Phyllanthus niruri*) - taken by children to reduce fever



Fig. 56 : Kambing - Kambing (*Ageratum conyzoides*) - to prevent wound from bleeding



Fig. 57 : The local community collect the fuel wood from the near by secondary forest or logged area



Fig. 58 : They still depend heavily on fuel wood for their daily cooking



Fig. 59 Variety of baskets - 'Wakid', 'Barait' and 'Raga' are made from rattan



Fig. 60 : 'Lelibu' and 'Wallot' are made from rattan



Fig. 61 Their hat and basket are made from rattan but their floor made from Bamboo



Fig. 62 : 'Sikutan' or Kalong (in Bhs. Murut) is made from rattan



Fig. 63 A Dusun Minokok from Kg. Nomukon is making a basket during his free time



Fig. 64 : A fishing trap or 'Bubu' - made from Bamboo



Fig. 65 : People at Kg. Kuamut having better living standard



Fig. 66 : 'Balai Raya', houses and field at Kg. Kuamut



Fig. 67 : Kg. Tulang-Tulang occasionally having flood problem



Fig. 68 : Most of the local community rely on the murky river water for washing and drinking



Fig. 69 : A case of elephantiasis happened on En. Gusmia (third from right) of Inarad where there is no dispensary



Fig. 70 : The Dispensary of Tongod division is temporary using the mission building, it was built on 1938.



Fig. 71 : Dispensary at Pinangah Town, it open at night to provide services for farmers



Fig. 72 : SK Pinangah was built on 1956



Fig. 73 : The oldest hostel remain as a historical site at Tongod



Fig. 74 : The son of the headman of Kg. Dewara who is about 8 years old
didn't go to school



Fig. 75 : The villagers of Langga and Inarad gather at a village headman house, waiting to do their Birth Certificate and Identity Card



Fig. 76 : View from Kg. Bulot, with 17,000 acres of land to be developed by Borneo Samudera jointly with 1200 families, it will provide job opportunities and resettlement Scheme



Fig. 77 : A resettlement scheme was introduced in Kg. Masoum



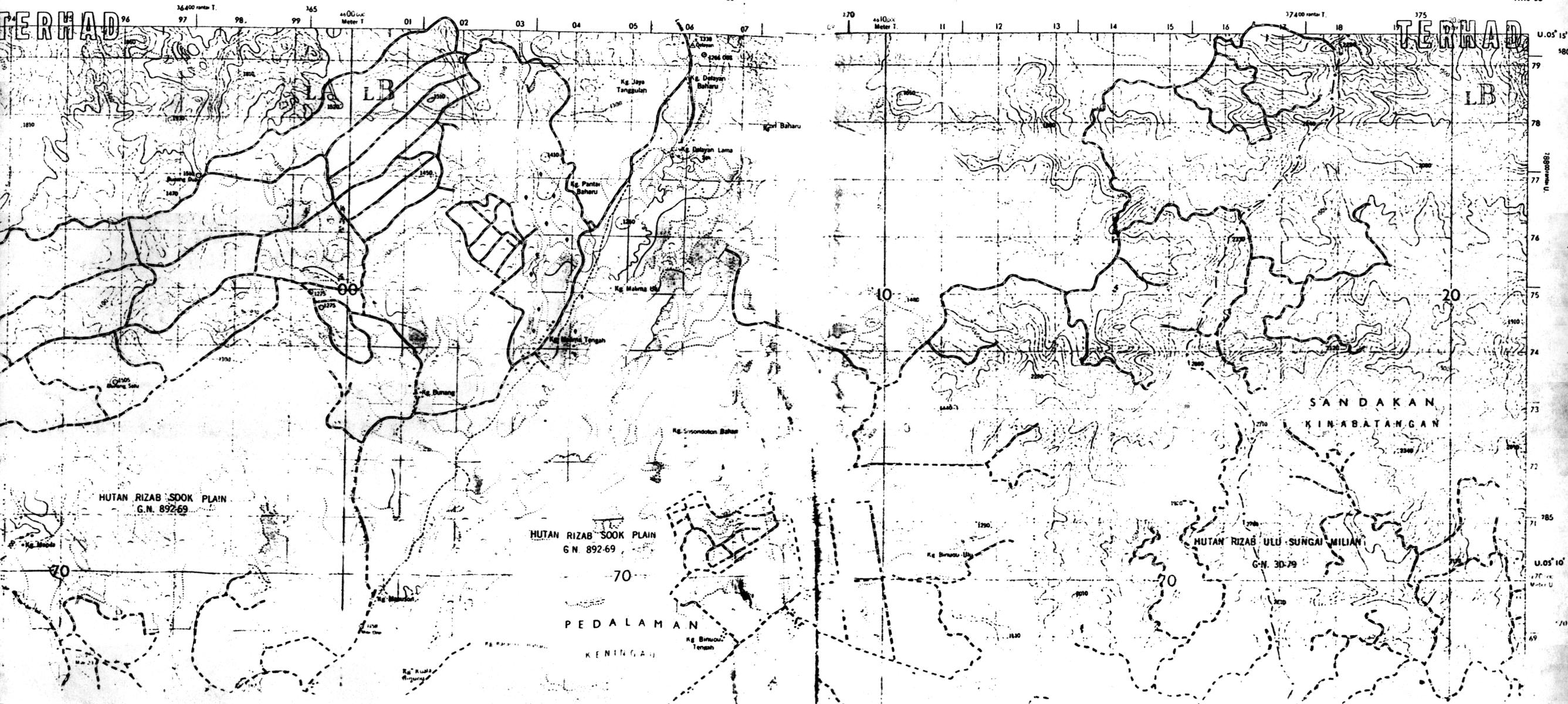
Fig. 78 : Semi permanent houses were built at Kg. Minusoh for the local community in 1982

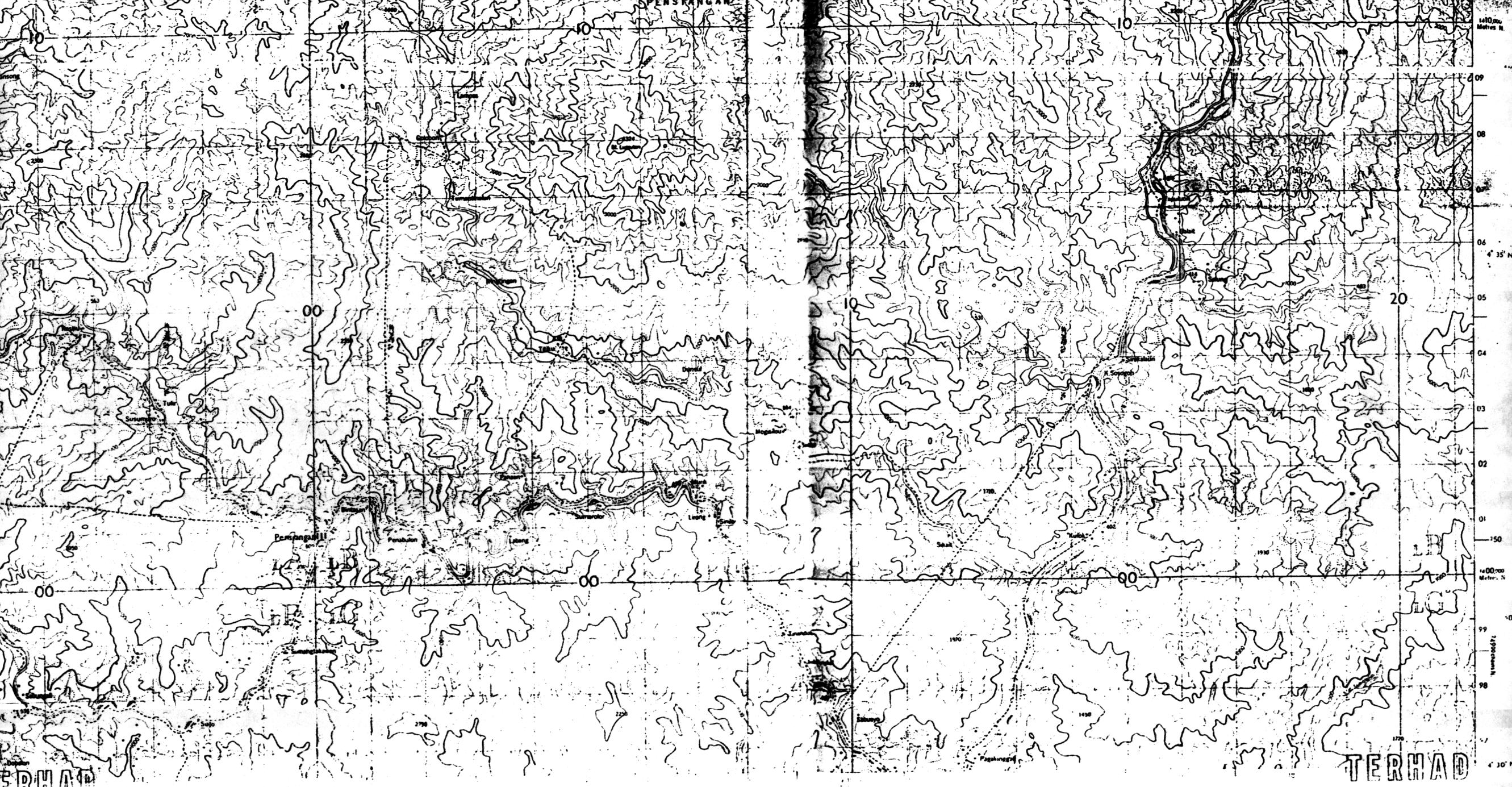


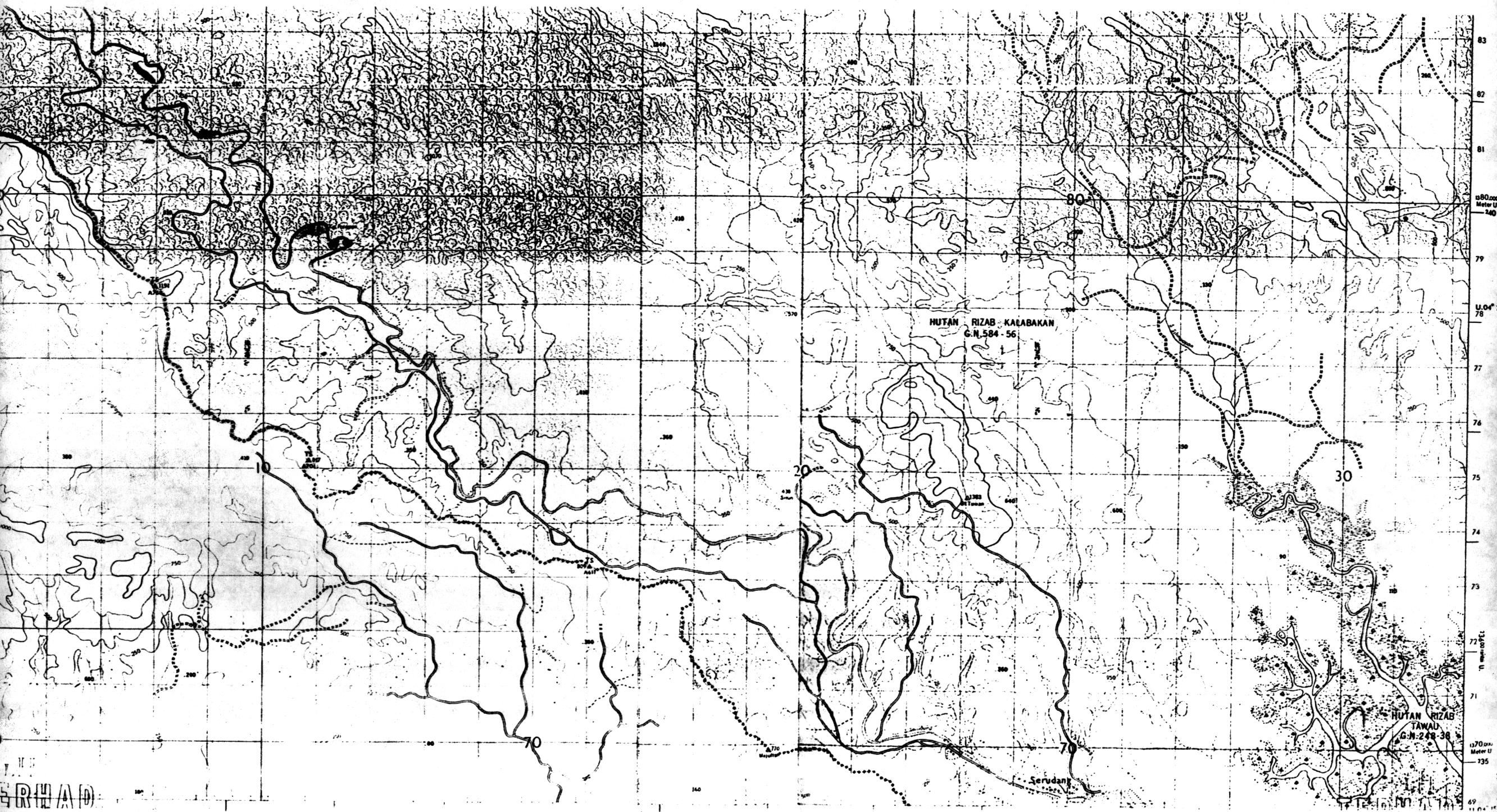
Fig. 79 : Villagers especially children of Kg. Minusoh like to gather under their houses in the afternoon

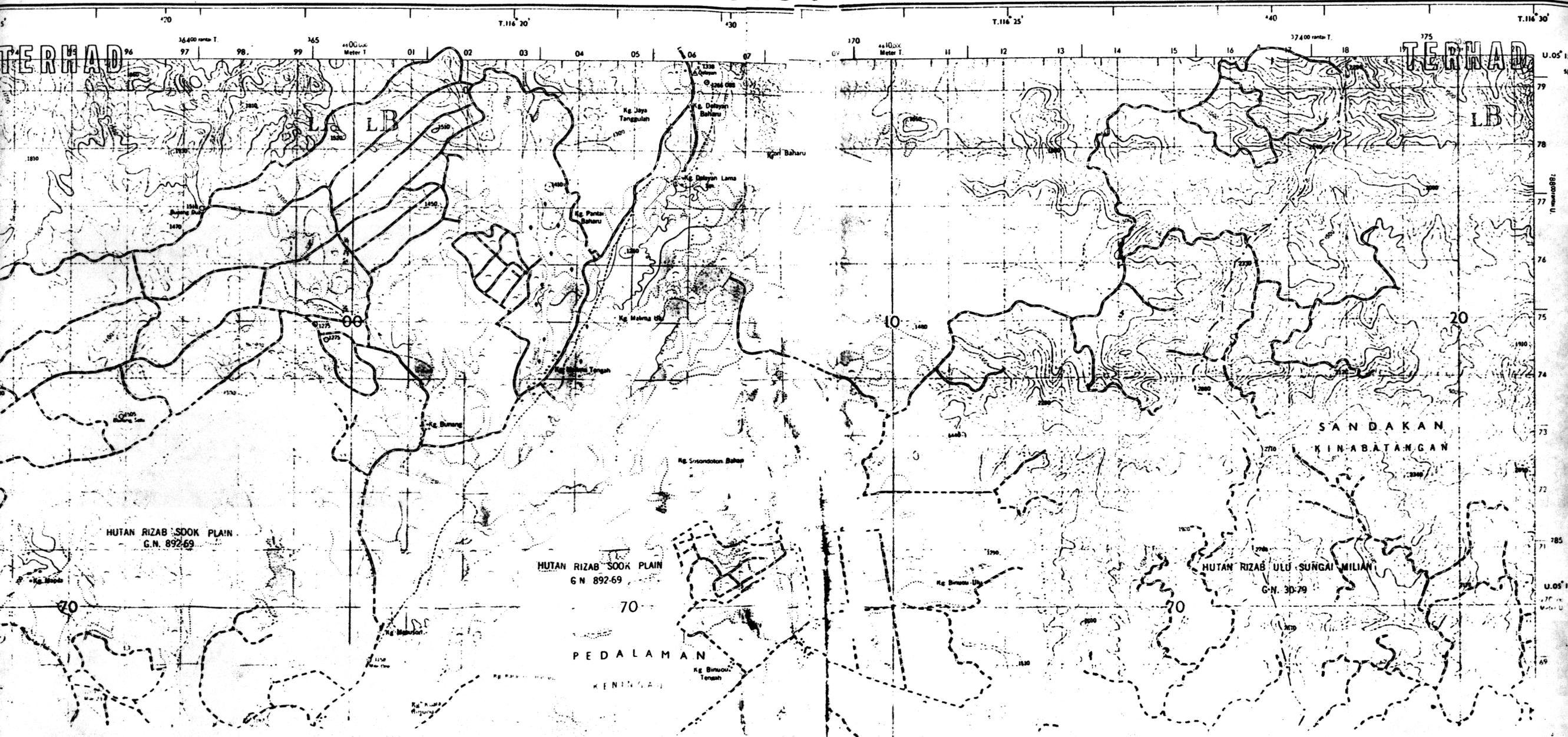


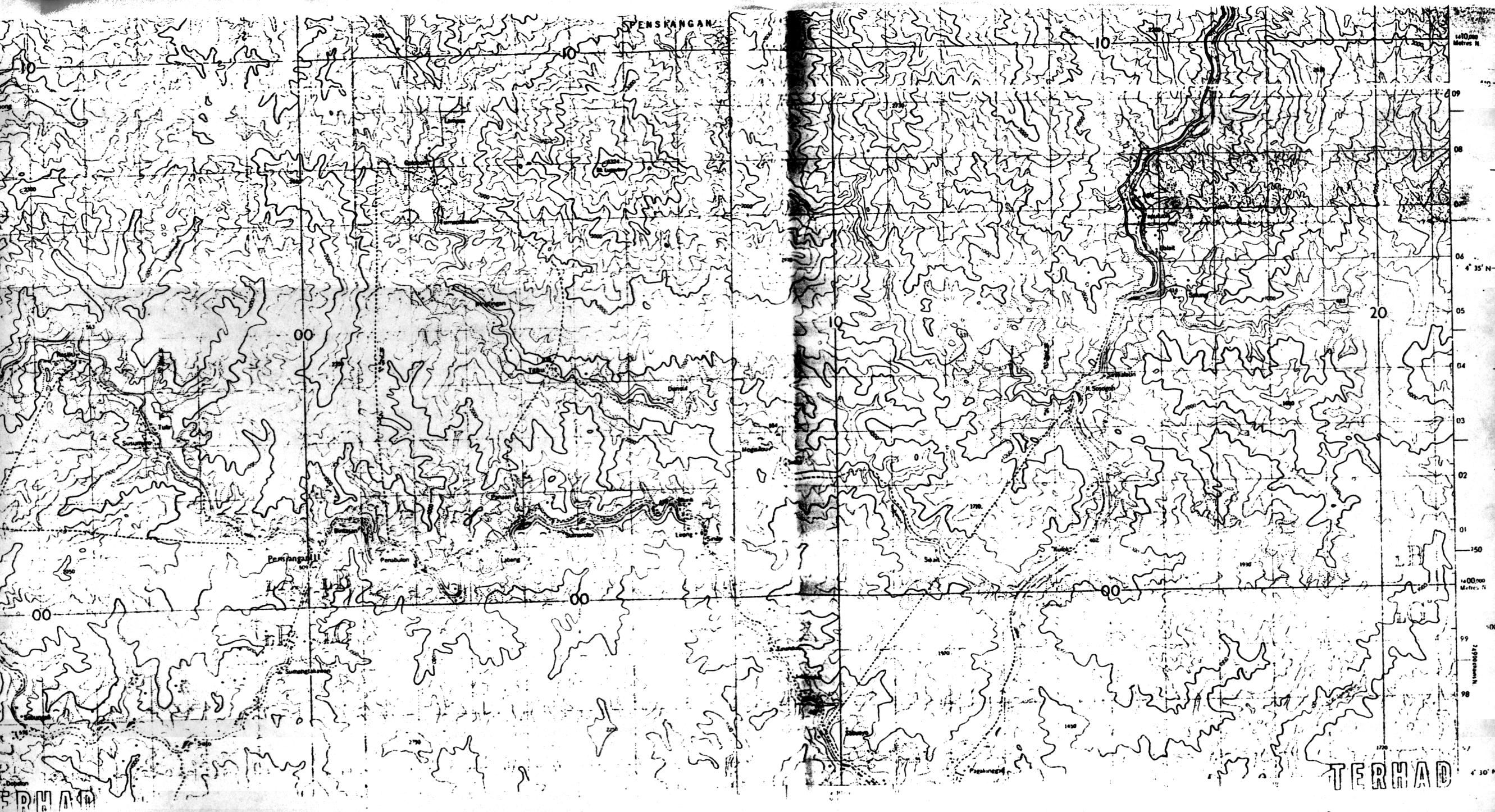
Fig. 80 : The local communities waiting for the government aid in Langga

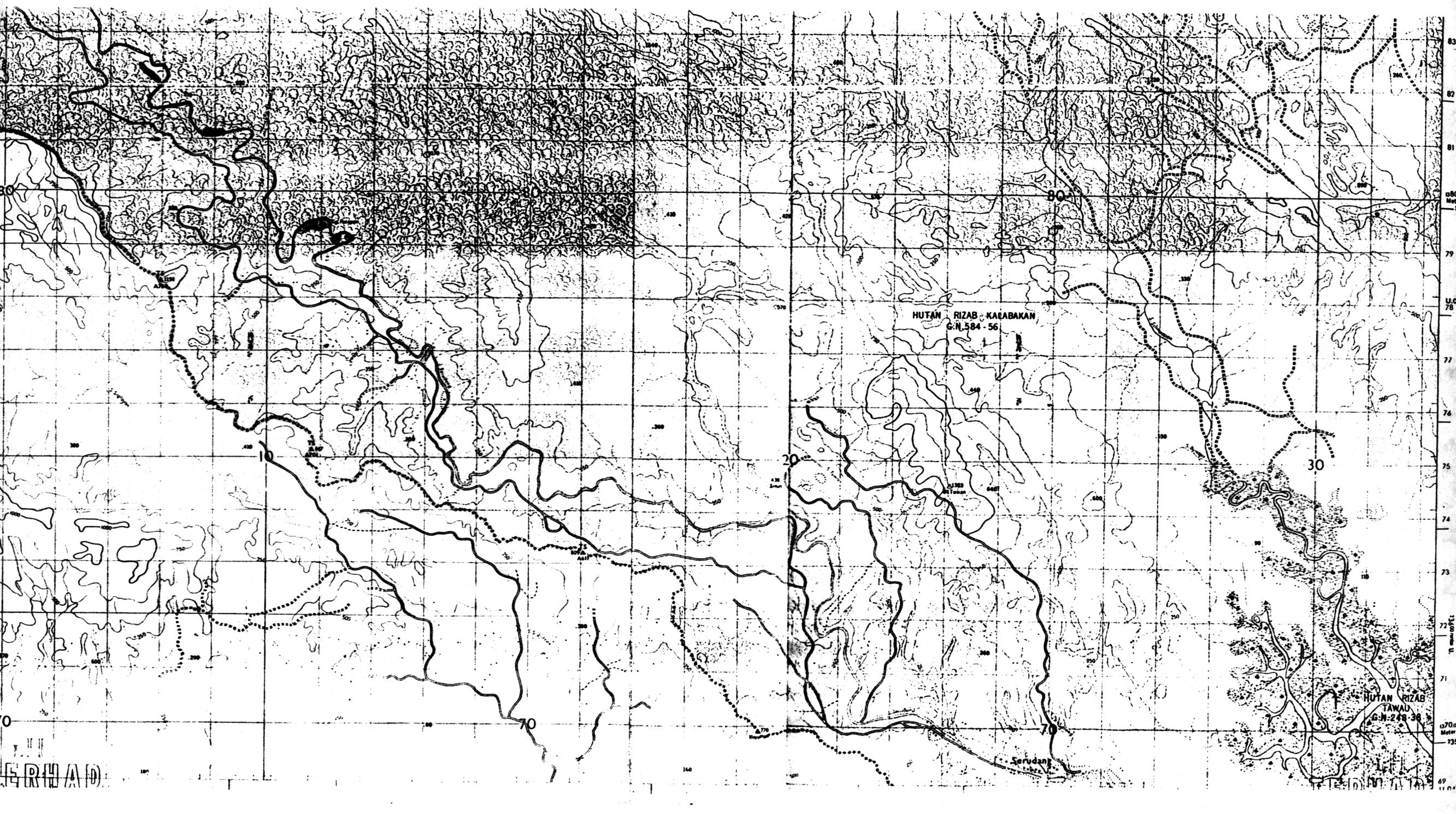












Appendix 3: Daily Activity Report (Group A)

Date	Location	Note
4/7/2000	Danum Valley Field Centre -Luasong	Traveling
5/7/2000	Luasong-Kuala Tongod To 8 villages of Tongod Division	Preliminary survey
6/7/2000	Luasong-Pinangah Division	Preliminary survey
7/7/2000	Luasong-KK	Traveling
7/8/2000	KK to Tongod, Tongod District Office	Traveling & meeting
8/8/2000	Tongod Division	Survey (Interview)
9/8/2000	Tongod Villages, afternoon proceed to Pinangah	Survey (Interview)
10/8/2000	Pinangah Division	Survey (Interview)
11/8/2000	Pinangah Division & Entilibon Division	Survey (Interview)
12/8/2000	Pinangah-KK	Traveling
10/9/2000	KK – Langga, meeting at JKKK house	Traveling
11/9/2000	Langga – Inarad	Survey (Interview)
12/9/2000	Langga (Inarad people & Langga people gather at Langga)	Survey (Interview)
13/9/2000	Langga-Bukit Garam, meeting with ADO of Bukit Garam (arrange logistic)	Traveling & meeting
14/9/2000	Bukit Garam – Kuamut	Survey (Interview)
15/9/2000	Kuamut-KK	Traveling