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SMALL SCALE HYDROELECTRIC SITE SURVEY :
A PRELIMINARY STUDY

Report Submitted to USAID/THAILAND

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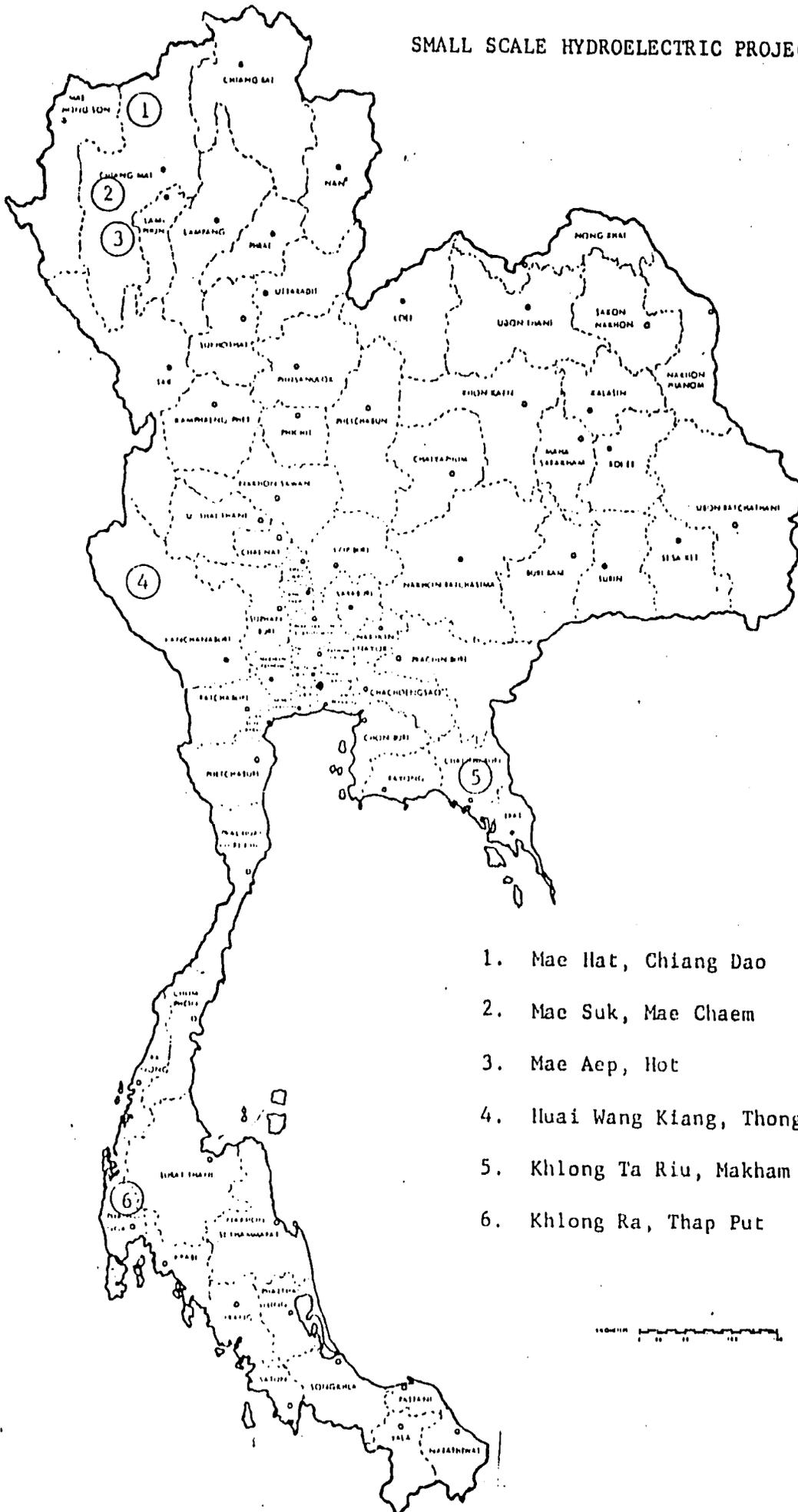
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SMALL SCALE HYDROELECTRIC PROJECT



1. Mae Hat, Chiang Dao
2. Mae Suk, Mae Chaem
3. Mae Aep, Hot
4. Huai Wang Kiang, Thong Pha Phum
5. Khlong Ta Riu, Makham
6. Khlong Ra, Thap Put

SummaryA. Spatial Distribution of Population
and Ethic Composition

Though population density in the area under survey is low, there are still enough beneficiaries within the radius of 15 kilometers to make the program worthwhile. At least 500 households with more than 2,000 population will be benefited from each electric site. There are differences in social and cultural organization among various selected communities of each particular region, but all are well integrated into the wider national economy and society through the systems of education, transportation and communication. Ethnically, they are all different especially the three selected communities in Chiang Mai and one in Kanchanaburi provinces, but most still identify themselves as Buddhist Thai when faced with outsiders.

Furthermore, ecological differences make for differences in occupation and hence differences in income distribution. Most communities in Chiang Mai and Kanchanaburi, where most of the population belong to various ethnic groups, are poor and remote so that contact with outside is rather limited. Their main income is derived from wet and dry rice cultivation, opium growing (among the H'mong, Lisu and Lahu),

trade and working as wage laborers for the Forest Department stationed in the areas. More than half of the population have income below the World Bank's poverty line (฿2,300/year). In the South and the East (Phang Nga and Chantaburi) villagers earn higher income from mining, but there is little opportunity to grow rice, the main staple. More often, most have to buy rice for more than six months a year. The economy is highly commercialized and more subject to the outside markets.

B. Rural Energy Consumption Patterns

Though most communities have no experience with the using of the small hydroelectric generators, they are certainly familiar with electricity for home use. There are, particularly in the North, some villages which have already had household electricity generated from small private diesel engines. The poor, however, have less opportunity to enjoy such comfort. Close to the tin mining, villagers in the South are also tempted with electricity, but little chance to get it.

Villagers rely mainly on kerosene lamps for household lighting and wood (charcoal) for cooking. The cost of wood is nothing but the surrounding trees. Kerosene is purchased from either the towns or village stores at

the price of 10 baht for one bottle. The average household uses 4-6 bottles a month depending on the number of household members and some special occasions such as house blessing and the like. On some occasions at the wat (temple) a small electrical generator is hired either from the town or tambon centers. Thus, many villages though remote and not yet hooked up to the grid, are fairly familiar with electricity and its uses.

C. Assessment of the Impact of Electrification

To be familiar with electricity is not to say that villagers all realize about what and how to make productive use of it. In addition to lighting, most just do not know what they can apply for to make the most use of it in terms of economic development. Nevertheless, potential resources are there but some guidance is needed.

As part of the country, electrification is crucial to integrate these villages into the economy and society. With electricity, knowledge about the outside world increases through the employment of radio and television not mentioning lighting, refrigerator and other household uses. The actual use of television is not for one particular household, but is also enjoyed by other nearby households who cannot afford to have their own and the house soon becomes a center for villagers.

Electrification also helps reducing the cost of kerosene and extending working hours, particularly for housewives to weave and for children to study. Such conveniences are main reasons for the needs of electricity. In addition, electrification also benefits schools, health centers and the wat for public purposes which will be enjoyed by all villagers. Such institutions have already existed in all communities under survey.

As far as the Forest Department is concerned, at Mae Aep site (Hot District, Chiang Mai Province), electricity mainly serves the forestry center. Several projects such as distribution and experimentation of substitute crops for opium and industry of some local products - flowers and fruits have already been introduced. It is hoped that electricity will attract more hill people to settle around the center and also help accelerate economic growth of the area. However, careful study and attention must be given to the existing social and cultural forms of the local dwellers to prevent any destruction of social life.

In the South, electricity will mainly be consumed by many mining stations hopefully to increase their capacity. As the mines are growing more labor employment is expected.

Even individual miners can also increase and enlarge their operation. However, cautions must be given to potential conflicts between villagers and owners for most of the land has been granted by concession to big miners.

Furthermore, all villages have several stores and rice mills functioning as centers whereby any information is likely to pass. Extension of working hours means the increase of sales and the amount of products. Normally, owners are prosperous and are able to afford television and other facilities and often act as innovators introducing some new activities and methods concerning agriculture. Hypothetically, the more the number of village stores are, the more chances of electricity used productively and successfully. The poor thus indirectly enjoy the benefit and participate in the plan of development.

Finally, though electricity is needed, there are many who cannot afford to pay up to the real cost of electricity. Fifty baht a month as compared to the use of kerosene is the price which the average villager is willing and able to pay. This, however, is a matter of further discussion among all concerns. Each particular community may require specific arrangements according to social, economic and cultural conditions of the area.

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Summary of Social and Economic Conditions
of the Surveyed Communities

Northern Region

Project	District	Province	Village	Population	Potential Resources	Economic Status
# 1 Mae Hat *	Chiang Dao	Chiang Mai	6	5,398 Tai Yai, Northern Thai	- rice mills - estimated 10 pick-up buses - 12 village shops - many are traders	Prosperous: - main income from trade - soon becoming sub-district
# 2 Mae Suk *	Mae Chaem	Chiang Mai	8	5,351	- rice mills - pick-up buses - village stores	Intermediate - easily reached - plenty of water for agriculture
# 3 Mae Aep *	Hot	Chiang Mai	7	4,069 Chinese Ho, Tai Yai, H'mong, Karen	- rice mills - 5 village stores - pick-up buses - projects on develop- ment supported by Forest Department	Intermediate - easily reached - forestry center
# 4 Huai Ban Yang (Chang Khoeng) Ban San Pa Tung	Mae Chaem	Chiang Mai	12	8,641 Karen and Thai	- rice mills - weaving - farmer and rice cooperatives	Poor: scarcity of land - easily reached
# 5 Mae Na Chon Mae Wak	Mae Chaem	Chiang Mai	5	9,972 Thai	- rice mills - buses - shops - cooperatives	Poor: lack of water during dry season - not easily reached

Project	District	Province	Village	Population	Potential Resources	Economic Status
# 6 Huai Pong Nam Ron	Mae Chan Tambon Mae Kham	Chiang Rai	26	17,902 Chinese Ho, Lisu, Yao, Akha, Lahu	- rice mills - pick-up cars - trade - electrical generators	Prosperous: Ban Huay Rai is well developed. The Chinese are wealthy, others are poor
# 7 Ban Pu Mun Mae Sao Watershed	Mae Ai	Chiang Mai	9	8,329 Lahu	- wet rice - other cash crops	Poor: wage laborers - not much oppor- tunities for other jobs
# 8 Huai Mae Rak (Thung Cho)	Mae Taeng Tambon Pa Pae	Chiang Mai	11	4,311 Karen, Lisu few Chinese Ho	- rely mainly on the forestry center for jobs	Poor: a number of development projects have been intro- duced at the Forestry Center. - electricity will be consumed mainly by the forestry center
# 9 Mae Pung Ban Pong Na Kham	Muang Tambon Mae Yao	Chiang Rai	11	10,231 Karen, Thai	- little potential for development - very remote	Poor: land shortage - have just been reached by car last year

Western Region

Project	District	Province	Village	Population	Potential Resources	Economic Status
# 10 Hua Wang Kiang	Thong Pha Phum	Kanchana- buri	8	4,809 Khamu, North Eastern migrants	- electricity is already provided by the National Security Council and will be hooked up to the grid next year	Poor: very remote - mainly dry rice cultivators - a latex road is being constructed - rely mainly on the district market about 10 km away for buying & selling
<u>Eastern Region</u>						
# 11 Klong Ta Riu	Makham	Chantha- buri	16	5,703 Thai and in- migrants from the Northeast and nearby provinces	- wet rice - tapioca plantation - irrigation - electricity will be useful for pumping and thus second cropping can be practised	- the poorest area of of the district - road is being constructed - volunteer soldier unit - 5-6 owned electric generators and TV sets - hired pumps
# 12 Klong Pra Phut (Tap Sai)	Pong Nam Ron	Chantha- buri	7	5,139 Thai and NE in-migrants temporarily employed in tapioca planting & harvesting	- tapioca factory - rice buyers - a few are landless	Poor: a retired RFD official owns 1500- 2000 rai of land - marketing monop- olized by money lenders partic- ularly from a sub- district nearby (Pa Tong)

Southern Region

Project	District	Province	Village	Population	Potential Resources	Economic Status
# 13 Khlong Ra Tambon Song Phraeg	Thap Put	Phangnga	8	5,125 Buddhist Thai In-migrant from the Northeast	<ul style="list-style-type: none"> - household and commercial tin minings - few rice farmers - rubber plantation - electricity is available for large mines - a number of buses - very close to the town 	<ul style="list-style-type: none"> - most commercial mines are owned by townspeople - almost all household own motor-cycles - buying rice for consumption - TV sets are available
# 14 Klong Nai	Ka Pong	Phangnga	3	2,300 Buddhist Thai	<ul style="list-style-type: none"> - mining - rubber plantation - dry rice agriculture - cooperatives - 5 village buses 	<ul style="list-style-type: none"> Intermediate and isolated - cash is paid for rice and other necessities - strong village cohesion and close relationship with the others
# 15 Klong Bang Lin	Muang	Ranong	3	1,700 Buddhist Thai	<ul style="list-style-type: none"> - more than 35 large and small minings - few rubber plantations - village No. 3 has had electricity for a couple of years - electricity is provided at the minings 	<ul style="list-style-type: none"> - economically above average with about $\text{฿}2000$ a month per member for about 4 months - wage laborers

CHAPTER I

INTRODUCTION

During the last decade, Thailand, despite its steady growth in GNP, faced energy crises as did many other countries, to the extent that both public and private enterprises have expressed their concern. Many studies have been urged and efforts have been devoted to lessen the effects. Research has been carried out to find substitutes for oil. Scientists have turned to some traditional methods of electrification. Among various methods, small hydroelectric plant has been reintroduced particularly by the NEA. Some have already been in operation, and some are under construction using mainly local equipment and materials. Though these completed electric generation are mainly for the Forestry Centers up on the hills, they have proved feasible and effective and should be expanded to catch more users.

The concern for small hydroelectric plant has also involved a number of foreign aid agencies. The USAID, for example, have proposed to fund 6 micro and 2 mino electric plants. A survey has been launched to find feasible sites both from technical, and social and cultural points of view.

On behalf of the NEA, fifteen possible sites over the country were selected in February, 1981 covering about 50 villages.

It is the purpose of this study to provide basic information on the sites and villages under the USAID hydroelectric program. Three main criteria for selecting are:

- (a) electrification for the poor aiming at household consumption
- (b) electrification for economic development, i.e. to help accelerate economic development in rural areas. This includes all public use such as for the use in clinics, schools and wat ceremonies. It is hoped that this will indirectly benefit the poor by job creation.
- (c) concerning management - both construction and distribution. It is expected that rural participation will be strengthened through a form of cooperatives.

Fifteen sites within the four regions have been surveyed. (See Table I - Summary of Social and Economic Conditions of the Surveyed Communities.) A full description of the conditions is provided in subsequent chapters. However, because of time

constraints, much of the data is still needed and social and economic characteristics have only been given for Chiang Mai. It is hoped that this report provides a basis for further understanding. Further intensive studies should be carried on.

PART I : NORTHERN REGION

CHAPTER II

Social and Economic Characteristics
of the Northern Region

The success of the program depends entirely on the understanding of the people about the uses and processes of electrification and on the understanding of the implementors about the social and economic organization of the people in each community. First, a brief description on social and economic conditions is provided. Most sites, however, are situated in Chiang Mai. Thus full accounts will be given to the Chiang Mai area.

Geographical Setting

Geographically, Thailand is divided into four main regions: the Central Plain, the North, the Northeast, and the South. The North covers 17 provinces (see Map 1.) It is enclosed in the roughly elliptical area bounded to the West and Northeast by the Burmese border, and to the Northeast by the Laotian border. The whole area of the North is 170,000 square kilometers or 32% of the total area of the country.

For administrative purposes, it is divided into two sections: the Upper and Lower North. The Upper North, in which most of the sites are situated, includes 8 provinces: Phrae,

Nan, Chiang Rai, Pha Yao, Lampang, Lamphun, Mae Hong Son and Chiang Mai. The total area is 90,933 square kilometers which constitutes 51.85% of the total area of the North.

About three-fourths of the area is covered with mountains ranging from the north to the south where the downstream rivers are originated. The four main rivers are Ping, Wang, Yom, and Nan which produce more than 22,250 million cubic meters to the Chao Phraya River in the Central Plain.

Communication within and outside the region is excellent except in the under-developed hilly areas in which most of the habitants are hilltribes. From Bangkok, one can travel by car, train and aeroplane. All the journeys are comfortable, easy and inexpensive.

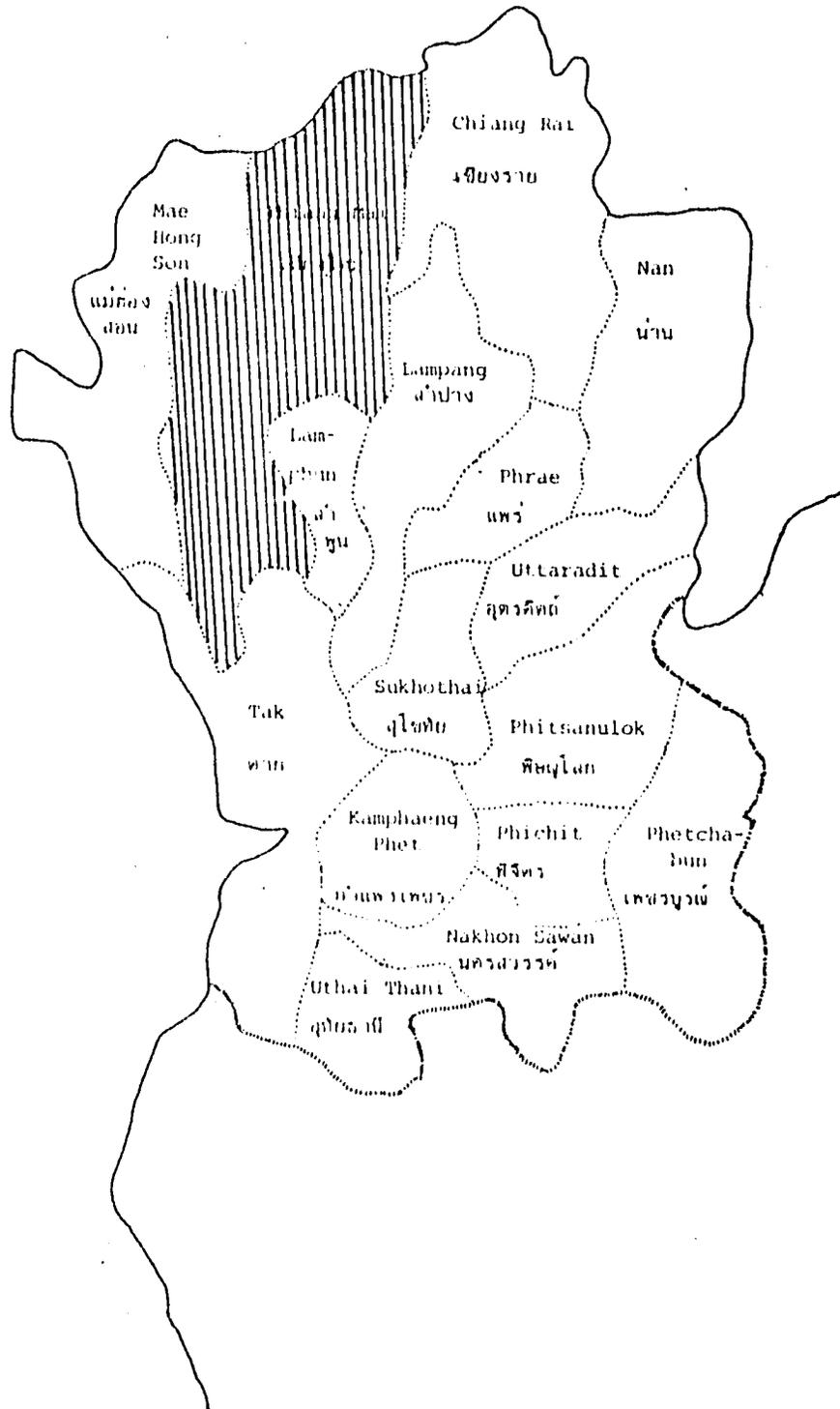
Chiang Mai*, the second largest city, is the most important city of the North (see Map 2). It borders on Mae Hong Son Province to the west, Tak Province to the south, Lamphun Province to the southeast, and Lampang and Chiang Rai to the east. Communication and transportation between Chiang Mai and other provinces is quick and comfortable (half an hour to

* Most parts of this section are quoted and summarized from Abha Sirivongs N Ayuthaya, Fredrick W. Fuh and Suthep Soonthornpasuch, Village Chiang Mai, CUSRI, Bangkok, 1979

Lamphun, three hours to Chiang Rai and an hour to Lampang, to cite a few). They can be easily reached by road and there are regular bus services. Until recently, Mae Hong Son was somewhat isolated because of the poor quality of the connecting road. Nowadays, there are several regular buses using the new constructed roads. Furthermore, regular commercial flights are operated between Bangkok, Chiang Mai and Mae Hong Son, Tak and Chiang Rai.

Within the province of Chiang Mai, it is possible to go by bus from the city to most districts although the quality of the roads is very unequal. Mae Chaem, for example, which has been under USAID watershed development project, is a little isolated and was at one time difficult to reach. Nowadays, however, all districts are connected to the city by the network of asphalted roads and highways. Furthermore, all districts also have local transportation using smaller buses or pick-up cars to travel to individual villages. It is apparent that even in a remote area up on the hills, some hilltribes, particularly the Hmong and the Yao also possess cars and motorcycles used for both personal and public services. Most villages are then affected, more or less, by modern transportation and communication. Radio and television are common and not unusual among the hill people. There is a special broadcast for the hilltribes in different dialects.

Map 1 : The Northern Region



Map 2 a : Northern Region main highways and railroad

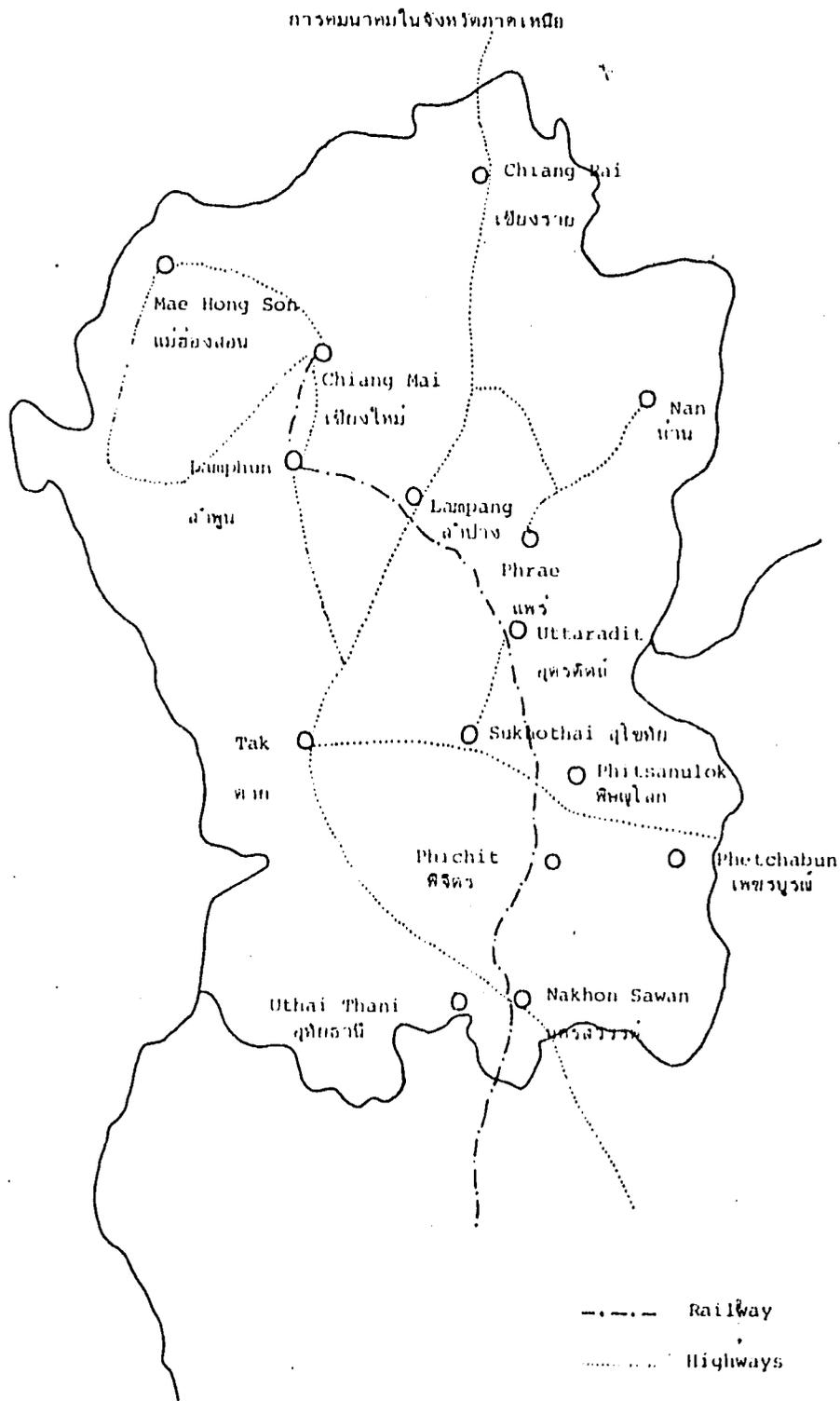
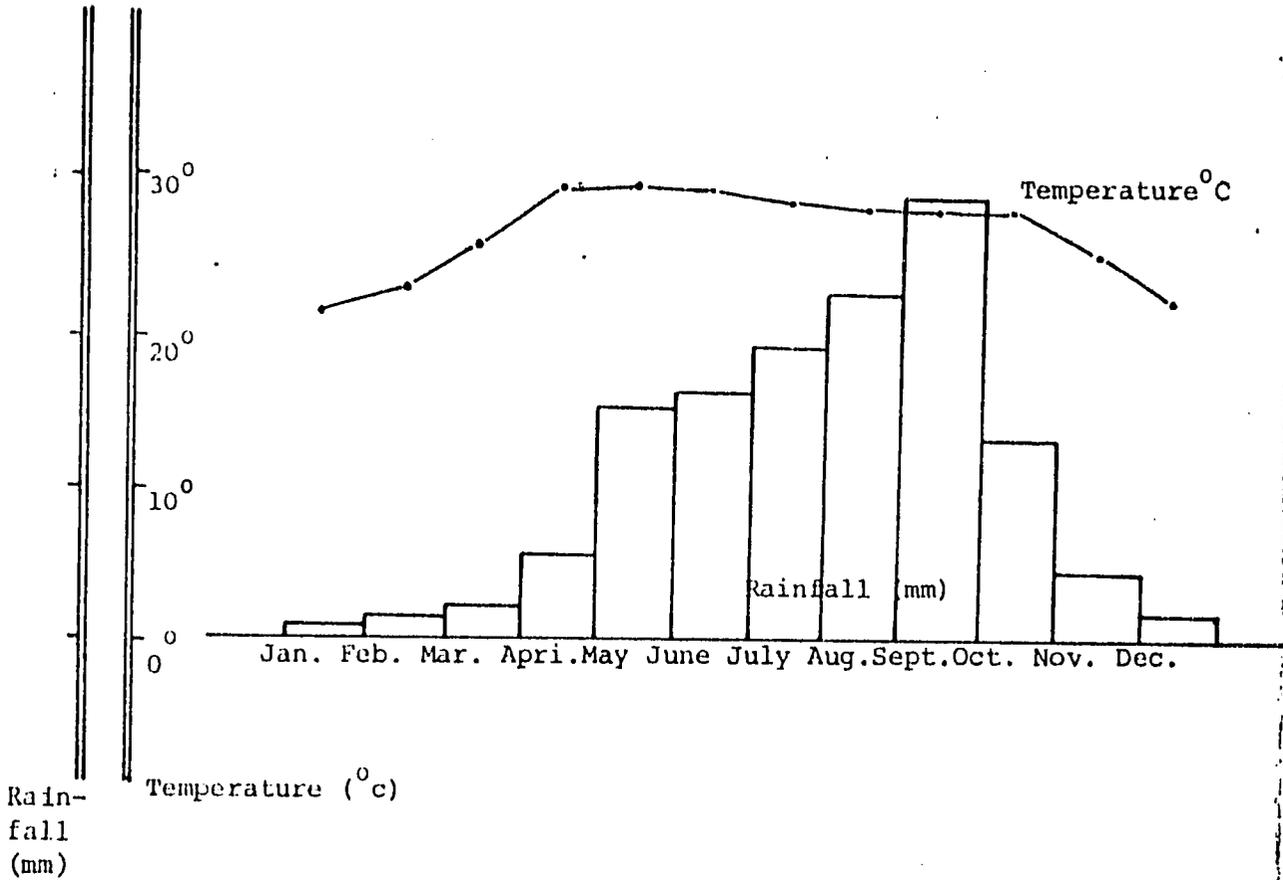


Figure 1. Rainfall and temperature statistics for Chiang Mai Province.



Rainfall : Average rainfall, 1932-1960 : 1253.5 per annum

Temperature : Average temperature, 1937-1967 : 25.7 °C

Source : Chiang Mai City Plan, Planning Office, Ministry of Interior, Bangkok.

Table 2. Rainfall and Humidity : Chiang Mai Lat. 18° 47' N, Long. 98 59 E. (1968-1969)

Month	Rainfall (in millimetres)						Percentage humidity			
	total		Max, in 24 hours		Days of rain		Monthly mean (8 hours)		Mm. daily range	
	(2511) 1968	(2512) 1969	(2511) 1968	(2512) 1969	(2511) 1968	(2512) 1969	(2511) 1968	(2512) 1969	(2511) 1968	(2512) 1969
January	3.8	5.5	3.8	5.5	1	1	72.4	70.2	52.0	55.9
February	0.8	-	0.8	-	1	-	60.8	57.7	59.7	59.9
March	7.7	-	7.6	-	2	-	53.8	49.2	52.9	49.6
April	122.6	22.4	39.8	19.8	13	4	61.3	54.0	44.8	46.6
May	123.2	228.5	35.0	40.1	18	21	75.5	70.7	36.2	40.2
June	245.6	82.8	40.0	14.1	20	17	80.0	79.7	32.3	39.2
July	150.8	145.3	39.5	34.5	19	19	80.2	81.8	33.3	29.3
August	301.5	408.7	166.5	53.2	18	24	81.9	83.8	29.7	27.5
September	184.1	165.7	47.7	47.2	11	11	81.8	82.9	34.2	33.0
October	110.4	91.3	19.1	34.5	13	9	81.2	81.1	36.8	35.8
November	9.1	18.9	3.2	12.1	5	4	78.2	78.7	46.0	39.9
December	-	-	-	-	-	-	75.7	75.9	52.7	48.2

Source : Statistical Year book of Thailand, 1970-1971
Office of the Prime Minister, Bangkok.

Climatically, Chiang Mai province differs from the Central Plain because of the presence of mountain ranges, its relatively higher altitude and its distance from the sea which generally result in cooler temperatures. As for the rest of tropical Thailand, it is in the path of the southwest monsoon which gives rise to three seasons. The cool season begins in December and ends in February. Wind from the Northeast brings with it the coldest weather in Thailand. During the hot season from March to May, winds are either from the southwest or the south. April is the hottest month with a maximum temperature of 41.2 °C. The rainy season extends from May to October. Winds from the south-west bring rain, the heaviest concentration of which is in August and September. The mean temperature for the year is 25.7 °C (Figure 1). According to rainfall statistics compiled by the RTG Meteorological Bureau for 1968 and 1969, the highest rainfall was in August: 301.5 mm in 1968 and 409.7 mm in 1969 (Tables 1 and 2).

In spite of the fact that the highest incidence of rain occurs during the rice growing season from May to September, irrigation schemes are vital for agricultural support in this region. Because of the hilly contour of the area, rain-water is not retained by the land and tends to flow off rapidly. Traditional irrigation systems have been in operation for

centuries and are crucial for agricultural communities outside of the area affected by the modern irrigation schemes developed by the Royal Irrigation Department.^{1/}

Economy

The economy of the North relies mainly on agricultural produce (see Table 3). It is estimated that in 1976 almost 50% of the region's income was from the agricultural sector. Among important cash crops are rice, maize, beans, garlic, onion, tobacco, vegetables and various kinds of fruits.

No doubt there is a considerable diversity of economic activities. The area is forested and many activities concerning forestry are actively taken by local population. Of the total land area of the North 106.2 million rai, 77.2 million rai or 72.7% is forest land, and 27.4 million rai or 25.8% is cultivable land. Nevertheless, land cultivation is still crucial as a basic pursuit of the people. Rice, the main staple, is still the most important crop. In the hilly areas, people first try to produce enough rice for consumption before taking any side-line activities. Scarcity of cultivable land is not uncommon among the hill people. For the lowlanders, substantial income is also derived from orchards such as longans, orange and mango.

^{1/} For more detail see Abha Sirivongs Na Ayuthaya, Irrigation in the North, 1979

Cattle are raised for agricultural purposes, but sometimes for consumption. It is not unusual to find that among hill people, cattle and some other livestock are raised as a form of saving. When cash is needed, they are easily sold. They are also used among many hilltribes for ceremonial purposes, such as the ancestral worship or the New Year.

There are quite a number of industries but these are situated mainly in the urban areas such as saw mills and rice mills. Other industries are weaving and woodwork which can be found both in villages and towns, though the main commercial ones are in Chiang Mai city. Among the hill people, weaving was mainly for home consumption but now is also being sold to tourists.

According to the socio-economic conditions of the Northern Region surveyed by the Department of Business Economics, Ministry of Commerce, per capita income of the Northern region in 1976 ranked third among the four regions. (See Table 4.) However, NSO figures for the same year are somewhat higher (total average per capita income of the whole region is 3,392 baht, see Table 5). Table six provides percentage distribution of households by occupational grouping.

TABLE 3

Value of Produce : Northern Region

Unit: Million Baht

Production	1972	1973	1974	1975	1976
Agriculture	13,223	19,254	23,255	24,743	26,607
Farming	10,778	16,227	18,917	19,950	21,636
Cattle	1,495	1,614	2,805	3,289	3,396
Fisheries	85	183	397	302	320
Forest	865	1,230	1,136	1,202	1,255
Mining	479	506	834	791	733
Industry	1,867	2,272	3,320	3,431	3,423
Construction	1,107	1,264	1,515	2,017	2,371
Electricity & Water	491	574	602	639	611
Transportation and Communication	1,104	1,608	1,722	2,127	2,489
Trading	3,227	4,797	6,922	6,943	7,796
Insurance	397	451	610	700	838
Residences	293	326	390	410	444
Administration	974	1,104	1,541	1,761	1,979
Other Services	1,723	1,819	2,230	2,453	2,777
TOTAL	24,885	34,035	42,941	46,015	50,068

Source: NESDB, 1976

TABLE 4

Average Cash Income of the Four Regions

Region	1974	1975	Baht			
			+	-	+	
Average for the Whole Country	6,341	6,753	+ 6.5	-	7,568	+ 12.0
Central Region	8,566	9,088	+ 6.0	-	11,373	+ 25.4
Northern Region	4,252	4,422	+ 4.0	-	5,471	+ 23.7
Southern Region	5,869	6,456	+ 10.0	-	7,237	+ 12.1
North Eastern Region	2,864	2,942	+ 2.7	-	3,141	+ 6.7

Source: Thailand Gross National Income: NESDB
1974-1975

TABLE 5

ESTIMATED AVERAGE ANNUAL INCOME (BAHT)

Income	Total Region	Municipal Areas	Sanitary Districts	Villages
Percent of household	(100.0)	(7.3)	(11.8)	(80.9)
Total household income	18,432	41,628	22,020	15,816
(Average household size)	(5.05)	(4.79)	(4.89)	(5.11)
Per capita total income	3,665	8,691	4,503	3,095
Total income excluding rental value of owned homes :				
Per household	17,064	38,592	20,244	14,652
Per capita	3,392	8,057	4,140	2,867
Money income only: <u>1</u>				
Per household	12,792	36,276	16,584	10,116
Per capita	2,543	7,573	3,391	1,980
Current income per capita: <u>2/</u>				
Total Region	3,581	8,302	4,426	3,073
Upper sub-region	3,278	8,290	4,110	2,670
Lower sub-region	3,898	8,314	5,160	3,446

1/ Includes other money receipts

2/ Excluding insurance proceeds, lottery winnings, and other windfall receipts

TABLE 6

PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY OCCUPATIONAL GROUPING

Socio-Economic Class	Municipal Areas	Sanitary Districts	Villeges
	5.3	10.0	84.7
All Households	100.0	100.0	100.0
Professional, adm. and technical workers	14.8	5.2	1.6
Entrepreneurs, non-farm	37.3	20.1	8.0
Clerical, sales and service workers	22.7	8.6	3.0
Production and construction workers	7.2	6.7	4.4
Farm operators:	(5.5)	(41.3)	(66.9)
Owning land primarily	3.0	27.0	44.3
Renting land primarily	2.5	14.3	22.6
Farm workers	1.1	1.3	4.9
General laborers	3.3	12.7	8.1
Economically inactive households	8.1	4.1	3.1

The main markets are normally situated at the provincial and district centers. The Chiang Mai market in particular serves as the center not only for its own dependent districts but also for the nearby provinces such as Lampun, Lampang and Mae Hong Son. It is the center for local agricultural produce and imported manufactured goods from Bangkok.

Three methods of rice cultivation have been employed in this region: wet rice, second rice and swidden agriculture. Second crops can be grown mainly in the lowlands. The main problem is not a lack of water but rather a shortage of cultivable land. It is estimated that wet rice land has increased from 9.4 million rai in 1972 to 11.6 million rai in 1976. Similarly, in Mae Hong Son in 1974 the agricultural area for swiddening was 2,232 rai, but in 1976 increased to 72,614 rai. Therefore, the total yields increased during the last four years is a result of increasing in land, i.e. forest land, for the yield per rai is constant (300-350 kg per rai). The basic concern here is that more and more forest land is cleared to grow cash crops. Unless modern intensive cultivation is practised, it is hard to stop people from intruding the national research land.

Society and Ethnic Composition

The Northern Thai people have their own dialects and customs different from the Central Plain Thai. They identify themselves as Khon Muang and their main staple is glutinous rice. Many customs and festivals are unique such as Songkran festivals (New Year ceremony), Dam Hoa (blessings for the older people) and a well-known Northern Thai dancing. Because of its cultural uniqueness and beautiful scenery, it has been promoted, especially Chiang Mai as a center for tourists.

In the past, it was a self-governing city state with its own rulers. It was later incorporated into the Kingdom of Thailand as a monthon (an administrative division larger than the province which has since been abolished). Chiang Mai became more closely associated with Bangkok at the beginning of the twentieth century as the result of the administration reform effected by King Chulalongkorn for the purpose of centralizing the administration of the country. The pre-eminence of Chiang Mai as a cultural and religious center is still recognised throughout the region even though administratively its role is limited to its own provincial territory. More recently, its importance as a cultural center has been enhanced by the creation of Chiang Mai University and a number of vocational schools to serve the educational needs of the whole northern region.

TABLE 7

POPULATION : 1976

Province	Male	Female	Total
Uthai Thani	115,695	116,336	232,031
Nakorn Sawan	469,854	465,321	935,175
Kampangpetch	251,546	247,112	498,658
Phichitr	270,375	264,423	534,798
Petchaboon	372,162	344,124	716,286
Phitsanulok	344,660	330,486	675,146
Sukothaya	250,993	254,175	505,168
Tak	128,875	125,429	254,304
Utraradit	202,364	200,644	403,008
Phrae	211,557	206,791	418,348
Nan	180,714	179,131	359,845
Chiang Rai	658,666	653,398	1,312,064
Lampang	324,348	318,912	643,260
Lampoon	171,491	168,198	339,689
Mae Hong Son	60,597	58,825	119,422
Chiang Mai	558,909	541,416	1,100,325
TOTAL	4,572,806	4,474,721	9,047,527

Source: Ministry of Interior

In 1976, the total population of the Northern region was 9,047,527 comprising 4,572,806 male and 4,474,721 female. (See Table 7). Chiang Rai has the highest population which is 1,312,064. However, this figure includes population of Pha Yao which thereafter became a separate province. Consequently, Chiang Mai is now the largest province with a total population of 1,100,325.

In addition to Khon Muang, the Northern Thai, there are several hill tribes living along the mountain ranges in the North moving forth and back between Thailand Burmese borders. These are the Hmong, Yao, Lisu, Lahu, Akha and others.

All the hilltribes practise swidden agriculture, their economy is self-sufficient, though since the last two decades they increasingly have to depend on lowland traders for some of the household items, such as clothes, kerosene, matches and so on.

Rice, vegetables and beans are grown in the valley and on the hill. These are produced for household consumption. It is not uncommon that the amount of yields, especially rice, is not enough for the whole year. Most have to buy rice or exchange other kinds of crops or items obtained from the forest. Many also hire themselves out to obtain cash, especially

among the Karen. They either work for Khon Muang or other hill people. Hmong and Yao have a special status among the hill people. They are traders and are better-off economically. Karen is probably the poorest among various hill tribes. Hmong, Yao, Akha, Lisu and Lahu also grow opium mainly for sale. Income from opium is attractive and there are traders who would travel to their villages to buy opium. Many have to rely on opium for cash.

During the past two decades, attempts have been devoted to find substitutes for opium and swidden agriculture. To a certain degree, many projects have been successfully implemented especially those under Royal patronage. Markets for their crops and embroidery have been sought both domestically and abroad. Woodwork and other skills have been taught at various hilltribe centers. Schools and health centers have been provided in many hilltribe villages. The RTG policy is to integrate hilltribes into the nation and to make them a sense of citizenship.

Within their villages, they are closely related through kinship. There is no larger organization above the village. Nevertheless, visiting each other among villages within the same tribe is quite common. With the increasing commercialized economy, intra-village relationships across ethnic

boundary is stressed more and more. We find several households of the Chinese Ho selling various items of household goods among the Hmong and the Yao. In addition, lowland traders and the Hmong and Yao traders may appear to live among other tribes. Similarly, the Akha and the Karen are hired to work in the fields by the Hmong. In various circumstances, the Hmong also own pick-up cars carrying people of various ethnic origin, be they Thai, Karen or Akha, to and from the town commercial centers. A number of them also own rice-mills in many villages.

With an increasing commercial contact, it is expected that most hill people will be incorporated into the nation economy and society. Changes have occurred rapidly, though the RTG policy is to preserve cultural heritage while promoting integration. They cannot escape from the wave of modernization and development especially if they are to better their social and economic conditions.

CHAPTER III

Social and Economic Conditions
of the Surveyed Communities

It should be noted that there are several villages which will be benefited from electrical generation sites. These villages are not much different in their social and economic organization and will be termed here as a community. The following description then will be of sites, not villages, though the names of villages will be recorded. In addition, the total number of both households and population cited here is not the total number of beneficiaries. Time does not allow us to make a total survey of all villages.^{1/}

^{1/} Estimation of the total number of population who will be benefited is provided in the section on Technical analysis.

SITE I : MAE HAT*

This site is located in Amphur Chiang Dao, Chiang Mai Province. Two villages were selected as samples. It must be noted that some villages in this area are well developed particularly Ban Wiang Haeng which is administratively chosen as the center of a new sub-district soon to be promoted.

Villages	Population	Household
Ban Wiang Haeng	1110	280
Ban Kong Lom	1506	251

There are traders who have regularly traded with Karen and Burmese in Burma. Ban Piang Luang which will be included into the new sub-district is only 3 kilometers from the Thai-Burmese border.

Geographical Setting

Wiang Haeng is situated in a valley surrounded by mountains about 60 kilometers from the district center (Chiang Dao). It is connected to the center by a laterite road leading to Piang Luang and the border. Communication is easy during the dry

* One of the first six selected sites

season. Villages often frequent the district market and the market in Chiang Mai city, particularly those traders who regularly buy clothes, mats and other necessities for sale to the hilltribes and the Burmese. The cost of transportation is 50 baht in the dry season and 120 baht during the rainy season. Because of trade and other businesses, the road is well maintained by bus owners and traders, though they are ethnically different.

There are three canals passing through these villages which are used both for household consumption and for agriculture. During the dry season, however, there is still a problem of water shortage and second crop cannot be grown. The canals actually are well kept by villagers who communally organize as an irrigation cooperative. There are about twenty small weirs for agriculture in which most villagers participate. Water is thus well distributed and is under the responsibility of an elected leader who in turn is paid about 2½ tang of rice (tang = 20 litres) from each household relying on the canal. In addition, there are about ten public wells for consumption during the dry season.

Ban Wiang Haeng, as a tambon center, has a relatively large market operating in the morning. It provides fresh

food like vegetables, fruit and meat. There are also more than ten shops selling mainly household consumption goods such as kerosene, matches, soaps and so on. Also as a center it has a rather large school offering up to prathom 6 (grade 6). Other government services are also provided such as a health center, police station. There is also a wat (temple) which serves not only people in Wiang Haeng but also the nearby villages.

Social Characteristics

Wiang Hang is a large village with more than 1,000 people. Ethnically, it is a Tai Yai village (Shan) with a unique history. Their ancestors moved from Burma many years ago. Though they speak Northern Thai among themselves, Tai Yai is still a language for conversation. Recently, many northern Thai have moved in and inter-marriage is practised. Because of trade and fairly easy communication and transportation, many of them travel to the town and Chiang Mai city and even Bangkok. This helps accelerate the degree of assimilation. Education also has certain effects upon their social life. Their children learn Central Thai and the teachers are mainly Khon Muang. Few people at the moment can read and write Shan. They regard themselves as Thai and do not want to return to Burma.

All villagers are Buddhists and like the Thai, the wat is still an important center. Though the four monks are Tai Yai, preaching is not different from any Thai wat. The architecture of the wat, however is noticeably similar to that of the Burmese. A number of annual fairs have been centered at the wat. Money has been donated to the abbot and at present the wat has its own electric generator operated whenever there is a fair. Certainly, there are other Tai Yai villages but Wiang Haeng serves as a center for other satellite Thai villages. Around this area, there are other ethnic groups such as the Chinese Ho villages, Lisu, Lahu, H'mong and Karen villages. Relationships among these ethnic villages are fairly close through trade and other activities. The Chinese Ho and the H'mong are the richest among all. Many of them own their own buses operating between their villages and the town. Passengers are of any ethnic origin. However, inter-marriage, except between the Tai and Northern Thai is not common. Each still observes their own custom and traditional practices such as dresses and the style of life and this makes for the distinction of each group. It is expected that when its status as a sub-district is formally authorized,

Wiang Haeng and the surrounding villages will be more exposed to the outside world and thus their life will be more affected and subjected to cash economy and material flow.

Economic Characteristics

Economically, Wiang Haeng is relatively well developed with a market center and ten grocery stores. A number of villagers are engaged in trade across the border with the Karen and other ethnic groups. The business is lucrative and further makes for uneven distribution among villagers. The rich, though they own land, have no incentive to improve the agricultural conditions. Second crops can be practised but with a better income they choose to become itinerant traders. It is no surprise then that three families can afford to have electricity from a small generator bought from the city. It must be noted, however, that trade is not a new occupation. Villagers are familiar with a long-distance trade and have been involved for a long time. About 10% of the population are now involved in trade and marketing.

Agriculture still constitutes the main occupation of the majority of the population. Both wet and dry rice are farmed but the yield is slightly different. Most work on

their own land (70%). Some may have additional land on the hill to grow dry rice. However, because of trade involvement about 20% of the population rent out their land. Few families own more than 40 rai. The average owned land is between 5-6 rai including both upland and lowland rice field.

In addition to rice, villagers also grow tobacco, banana, sugar cane, and other fruit crops. These are both for own consumption and for sale. Onion and garlic are grown and sold to traders from Chiang Dao and Chiang Mai. There are also village middlemen who buy for sale to the town traders. Most of them are also shop owners, and money lenders.

Most of the agricultural equipment and other necessities are obtained either from shops in Chiang Dao or Chiang Mai city. Village shops offer some small items for immediate use.

There is no household industry in Wiang Haeng, though a number of villagers stated that bricks can be made. The cost of transportation discourages them to make it an industry. However, there are four rice mills offering services to the villagers and the nearby villages. Rice is mainly consumed

within the village and small proportion is sold to others in the village.

About 30 villagers are wage laborers working when they are free with the Forest Department. This gives poor villagers some extra income. A number of villagers also raise cattle for sale to traders in the lowlands as a side-line job.

Electrification

Wiang Haeng is thus economically above average. There is no question of the need for electricity. Most stated that they want it and are willing to pay whatever the cost. Three electric generators have already existed in the village which encourage most villagers to acquire it. At present, kerosene lamps are used and it costs about 50 baht a month. Provided that most of them are pretty well off, they don't mind paying more to get electricity.

As mentioned above, Wiang Haeng and Piang Luang will be promoted to become a sub-district, electricity will thus be crucial for such a shift. Several offices will be created and the market expanded. Potential resources for economic development certainly are there. The center will draw more people to do business there. Electricity will accelerate the

growth of services and demand, and certainly will be benefited not only by Wang Hang people but also the surrounding villages. Poor farmers will also benefit from the expansion of the economy since more jobs will be made available through the use of electricity.

SITE II : MAE SUK*

Mae Suk site is in Mae Chaem District, Chiang Mai Province. Villages which will be served by the electric site cover two tambon - Mae Suk and Chang Khoeng with more than 4,000 population. Three villages, one in Tambon Mae Suk and two in Chang Khoeng, have been surveyed.

Village	Tambon	Population	Household
Khong Kan	Mae Suk	420	70
Ton Tan	Chang Khaeng	400	65
Prao Noom	Chang Khaeng	1500	250

Geographical Setting

These villages are in a proximity to the district town spreading up to the North along the laterite road. There is no problem of communication and transportation. Villagers frequent the town market at least once a week by public buses at the cost of 5 baht a single journey.

* One of the first six selected sites

Two main rivers passing through these villages are Nam Mae Sak and Nam Mae Chaem. There are also other small canals, but usable only during the rainy season. The two main rivers are utilized for both household and agricultural purposes. Traditional irrigation system is well provided and second cropping is possible. In the dry season beans and garlicks are grown instead of rice for a higher return with less labor required. There is no problem of water shortage and more than 2,000 rai of land are under irrigation. However, because of population density more land is required, but most available land is in reserve forest.

Social Characteristics

The majority of population are Thai and Karen. Though they live apart in their own villages, relationships among them are close through marketing transaction and visiting each other. It is not uncommon that we find Karen in a Thai village and vice versa on special ceremonies such as New Year celebrations. However, inter-marriage between the two hardly occur, though there is no strict rule against the practice. Karen just marry Karen and the Thai, with a rather negative attitude toward economic well-being of the Karen,

prefer to marry within the group. The Karen, in general, are poor and have to rely on the Thai for many household items. It is quite normal that the Karen visit Thai villages to buy or to exchange some agricultural produce of their own for rice and other necessities. Through such contact words and information are exchanged which leads to an establishment of friendship. Among the Thai villages, however, close relationship is maintained and cooperation has often occurred. Indeed, a number of new villages are an extension of the old Mae Suk village, and thus they are related one way or the other. However, because of the proximity to the town relations are easily dispersed. They have to rely more on the town for many services and facilities.

Economic Organization

Similar to many surrounding villages, Mae Suk community is oriented toward agriculture. Rice growing is the main occupation, but the main purpose is for household consumption. Only when household need is met is the rest sold to traders from the district town. Cash income, however, is derived from other second cropping, such as garlic, beans and other vegetables. Traders visit these villages promptly after harvesting. It is estimated that about 3,000-4,000 baht are

derived from the sale. However, not all villagers can keep up with this income. The villages are net rice importers and about 20% of the population have no land at all. These have to clear the forest land, which is very limited under reserve forest law, to grow up-land rice. To obtain cash, they become wage laborers working for the irrigation station at the rate of 40-50 baht a day. Others are working on the farm such as ploughing, harvesting, digging canals and other agricultural jobs, but wages are lower though close to the town, job prospects are not good. Most just aim at having sufficient amount of rice for the whole year. Cash is spent on clothes, medicines and other necessities. Often they have to spend it for rice to feed the family. According to village standards in Mae Chaem, these villages, however, are not comparatively poor. Even the poorest still have a chance to grow dry rice and to work as wage laborers. The Karen, however, are poor and have little opportunity to obtain cash. With commercialized economy, they too become wage laborers.

Cattle are also raised by the Thai for sale and for agricultural work. It is considered as a good investment and quite a few have more than five. It is quite normal

that a Karen will be hired to look after the animal on the condition that the new offspring must be divided equally between the owner and the worker. Poultry are raised by almost all households for consumption and for sale whenever there is a demand.

Each village has 2-3 small rice mills offering services to villagers at the rate of 2 baht for one tang. However, some villagers still employ the traditional practice of breaking the husks with wood mortar. Similarly weaving is still practised by some household for personal use. These, however, are dying out and are replaced by cheap materials from the market.

A number of villagers are members of farmer cooperatives centered at the town. Some have joined to borrow money of which the interest rate is low. There are money lenders in the villages but the major ones are in the town. In the village, borrowing from kin does occur and often without interest, but only small amounts.

Other social groups exist particularly those involved with development projects under supervision of the district officers. However, such groups dispersed soon after the completion of the work. Village shops which most villages

have are centers or meeting places for both young and old villagers to exchange information and gossip.

Electrification

Near to the town, villagers agree that it is essential to have electricity even for household uses. There was a rumor that electrification would be implemented last year. A meeting then was called for and most agreed that they would be able to afford the cost of electricity. Nevertheless, nothing has yet materialized. The case, however, is a good example showing willingness and expectation of villagers as regards electrification. Most still express the need for electricity.

SITE III : MAE AEP*

This site is situated in Tambon Bo Sali, Hot District, Chiang Mai Province. Three villages, Mae Tho, Lao Li and Pha Toh, have been surveyed. Royal Watershed Development Project, Unit 6 is also situated in this area.

Geographical Setting

Hot district is situated 150 kilometers away to the southwest of Chiang Mai city. From the main highway about 17 kilometers along the laterite road is Ban Mae Tho and the Royal Watershed Development Project Center. Communication is reasonably easy during the dry season. In the wet season (June-August), however, communication is difficult though not impossible. Often villagers have to walk down to get a bus to go to the town and the city.

Ban Mae Tho is village No. 1 of Tambon Bo Sali which also includes ban Lao Li and Pha Toh. They are all in the hilly area where dry rice cultivation is practised. All the land, however, is government reserved land under the responsibility of the Forestry Center. It is estimated that 1000 rai is being used by villagers in this area. Attempts have been

* One of the first six selected sites

made during the last few years to replace the old forest with pine and teak. Villagers are hired at the rate of 25-29 baht a day to plant the trees. The center is also responsible for substituting opium with other crops. A number of various types of seeds have been experimented and distributed to the villagers.

Two streams passing through these villages are Huay Mae Tho and Huay Mae Aep. Nevertheless, during the dry season between February and April, there is not enough water for agriculture. The situation has improved during the last three years when a grant was offered for rural job creation. Not only more people were hired during the dry season, but the money was used to maintain and improve the traditional existing irrigation and cooperatives. Diversification of crops is thus possible though in a small area close to the banks.

Between villages, travelling is by foot. There are also more than ten small buses operating daily to and from the district town. Passengers who want to go to the city will be transferred to bigger and more comfortable buses. Bicycles and motorcycles are common means of transportation and a number of villagers have them for daily short visits within

the area. Though far from the city, villagers are well informed about the outside world through transistor radios which are owned by almost all households.

Social Characteristics

There are seven villages in Tambon Bo Sali with a total population of 4,069. They are about 58 kilometers away from the district center. What is unique for these villages is the ethnic composition. In the surveyed village, it is composed of the following ethnic groups:

Ethnic group	Population	Household	Occupation
Chinese Ho	80	6	trade
Tai Yai	12	3	trade
H'Mong	200	22	farming
Karen	300	60	farming
Northern Thai	3	(married in)	farming

Though living in the same village, each separately resides in a fairly well-defined territorial unit. The Chinese Ho are different for they set up their houses amidst other groups. They are traders and are willing to contact other people.

Their shops are open to anybody. However, it is not common for them to marry people of other groups, except for Khon Muang who married Ho and became part of the group.

Among villagers of each group, cooperation is tight and can easily be observed, such as in building houses, and others concerning agriculture. However, cooperation across the ethnic line is limited, though not impossible. The Chinese Ho are in general more prosperous and do not actually need to seek extra employment. There are instances however, when the H'mong and Karen have worked together with the forestry center for cash income. Furthermore, joint labor forces can be promoted in any work concerning the well-being of the whole village such as road construction and other development projects.

Though their beliefs are different there is a noticeable mixture between Buddhism and animism. Most of them identify themselves as Buddhist though at home ancestral shrines and the workship of natural spirit are maintained and practised.

Economic Organization

All are farmers growing mainly rice, red beans, maize and coffee. Rice is for household consumption, but a small portion may be sold within the villages. There are some who do not have sufficient rice for the whole year. Red beans,

maize and coffee have just been introduced by the forestry center. The products will be sold to traders from the town. Opium is grown by the H'mong and Yao and is sold to the Chinese Ho, who are mainly shop owners. This is the main source of their income. The H'mong are said to be wealthy and own most of the village pick-up buses. Comparatively, the Karen are poor and have to seek additional jobs as wage laborers. Working with the forestry center to replace the old trees, they earn 760 baht a rai. The normal daily wage is 27-29 baht. This offers the Karen cash to spend for household necessities. A number of Northern Thai from the lowlands also seek jobs with the center.

Poultry and cattle are raised for consumption and for spirit worship. Only when cash is needed should a buffalo or a cow be sold. It is a kind of saving and cattle catch good prices.

There are about 8 village stores and 4 rice mills. These are owned by the Chinese Ho and the H'mong, and customers are from all ethnic groups. Stocks are purchased either from the district center or the city of Chiang Mai, and the cost of travelling is 40 baht for a single journey. Rice will be milled at one of these mills with the rate of 2 baht a tang

(20 litres). Mill owners are also middlemen buying crops from farmers and later selling them to town traders. They are also money lenders. In their own estimation, they earn more than 10,000 baht a year compared to 2,000 baht a year of poor villagers.

It must be noted that all land in the area is government reserved land and cannot be sold to anybody lacking land title deeds. This is problematic for many villagers have lived there for some time. Sooner or later title deeds must be granted to villagers. The average land holding is 5 rai per family. About 5% of farmers own no land and become wage laborers. Swiddening is difficult and no more forest land is permitted. The present agricultural land is not enough for the ever increasing population. The actual yield is about 20 tang a rai.

Electrification

All informants agree that electricity is needed and that most villagers are willing to cooperate in both construction and maintenance. However, many mentioned that the cost of electrical units must not be so high in order to allow those poor villagers to participate in the schemes. At present, about 50 baht a month is paid for kerosene.

In fact, an electrical plant had been installed by a trader from Chiang Mai and users paid 50 baht a month. Only six families, however, had used the service. The service broke down after a year, and no more service offered ever since.

Villagers' needs of electricity though not the first priority: they think it must be more convenient in the early morning when they prepare to go out to work and in the evening when they can stay late. However, scarcity of economic resources limit their ability to make productive use of electricity. Most will use it mainly for household lighting. The power will be utilized most by the forestry center. Since the center has introduced some new crops and proposed to have some projects concerning economic development, it is anticipated that electricity will be useful for them and thus help to attract more people and to expand and intensify their projects.

SITE IV : HUAI BAN YANG

The site selected by the engineering team is in Amphoe Mae Chaem, Chiang Mai Province (See Map). Two villages were surveyed. These are:

Villages	Tambon	Population	Households
Ban Tung Yao	Chang Khoeng	408	68
Ban Mae Ming	Chang Khoeng	300	50

Geographical Setting

All three villages are situated only six kilometers from the district town area with a laterite road. Communications are fairly good with several buses travelling to and from villages daily. In Ban Tung Yao, for example, there are at least three pick-up buses owned by villagers; one belongs to the headman. The fare is reasonable, 5 baht for one trip, so that villagers often frequent the district main market to sell agricultural produce and to buy household consumption goods.

Most houses are situated along the main village road. Around the houses are rice fields constituting not more than 350 rai. Further down at the end of the main village road are mountain ranges on which much has been cleared to grow rice and maize. Two main streams flowing from the top down behind the villages are Nam Mae Aum and Nam Mae Ming. These two streams provide villagers enough water for agriculture throughout the year. Traditional irrigation system still exists and very effectively used by villagers. What is a problem of these villagers is the scarcity of agricultural land. Many have cleared forest land to grow dry-rice, but this is very small, about 2-3 rai. Swidden agriculture is still practised in the hilly area.

Though villagers frequent the town market quite often, there are village shops; one at Ban Tung Yao which belongs to the headman who is rather "rich". At each village, there is a school, up to prathom 6 at Ban Tung Yao and prathom 4 at Ban Mae Ming. No health center, but there are health officers travelling into villages from time to time.

Social Characteristics

Similar to the district ethnic composition, Ban Tung Yao composes mainly Buddhist Northern Thai, whereas Ban Mae Ming is mainly recently converted Christian Karen. Each

has its own religious center. Ban Tung Yao has a wat center and Ban Mae Ming has two churches for the village is divided into Catholic and Baptist churches. The two churches are constructed temporarily as bambo huts. Two priests living in a nearby village (Ban Pa Tueng) come as often as once or twice a week to conduct masses.

The effects of the Christian church over the Karen is not minor. Ban Mae Ming is not a unique case, for there are many Karen villages which have been converted. Some bright students supported by the church have been selected to further their study in the town and in Chiang Mai. In addition, the priests help organize rice cooperatives in the villages. Their influence is also strengthened by their being able to speak Karen.

Though the village is divided into Catholic and Protestants, there is no conflict between the two. Marriage across religious groups is still practised, but either side has to be converted into one of the spouse religious belief. Even between Karen and Khon Muang, marriage is considered possible. There are two Khon Muang boys married into the Karen village. At present, they are accepted and behave as Karens. No serious customs and sanction are against marriage with the Thai. Indeed, as we shall see later, relationships

between the Karen and Khon Muang are far more enhanced than in the past. Modern cash economy have forced them to rely on each other. Economically, the Karen have to obtain some household goods including rice from the Thai and even hire themselves out to work in Thai villages. Relationship between Ban Tung Yao and Ban Mae Ming is a good example.

As a Buddhist village, Ban Tung Yao has its own temple (wat). The wat is the center not only for religious ceremonies but also for other social activities. There is a wat committee responsible for anything concerning the wat. A rice cooperative is organized around the wat committee. Furthermore, a kind of wat foundation was set up six years ago by asking villagers to donate according to their economic capability. The total money is kept and arranged by the head of the wat committee. In time of need, villagers can borrow the money with 2½% interest. At present, the foundation does not function any more for the whole money of 9,000 baht was put into the construction of the new residence for monks.

In addition to the wat committee, there are also housewives group with about 40 members and a youth club of 25 members. These two groups are also involved in a number of communal activities such as festivals and road construction.

Through such groups and through kinship and neighborliness, village organization is, to a certain degree, tightly knitted. However, despite similar outlooks of all villagers, stratification still can be drawn according to land holding and possession of other property such as cars and cattle. On the whole, however, most villagers are poor and scarcity of land remains a problem.

Economic Organization

All villagers are farmers growing mainly rice, beans, maize and vegetables. Only few families (about 8 families in Ban Tung Yao) who own land practise any wet rice cultivation. The rest combine growing dry rice up on the hill and also growing wet rice in the lowlands. The average land holding is between 3-5 rai. Because of population pressure, more and more upland forest will be cleared. Out of 68 households, only 38 households have rice land.

The average rice yield is between 30-80 tang per rai for wet rice and 17-18 tang per rai for dry rice. Rice production is mainly for household consumption. Many do not have enough rice for the whole year. The shortage of rice is 3-4 months. To meet the requirement, many have taken up off-farm jobs such as working with the forestry center to plant trees or hiring themselves out for any agricultural

work either within or outside the village. There is one case in Ban Tung Yao where a villager works for a Karen in Ban Mae Ming.

Certainly, the Karen are comparatively poorer than the Thai. They also have to face the problem of rice shortage. Often they have to come down to Thai villages to exchange vegetables or other agricultural items for rice. Many have to work with the Thai to gain extra cash with which to buy rice. The only crop which they can sell is beans.

Normally, both Thai and Karen villagers will load a small part of their agricultural produce on to a bus for sale in the district market when cash is needed. The general pattern is that there will be a number of traders from outside to buy their produce at the farm gate. The ease of communication encourages many traders to travel into these villages. The exact figure of their cash income is hard to obtain, but most of it is spent on rice. The need to have rice for the whole year makes them willing to seek opportunities to get cash. Many become wage laborers whenever there is some construction in the area. Nevertheless, none have gone to work in the town or

Chiang Mai. At present, their main concern is to have enough rice throughout the year.

There are rice cooperatives in the two villages, but many people are discouraged because of the high interest rate (40%). In Ban Tung Yao, there is a farmer cooperative but with only eight families from this village as members. To be a member, it requires a land certificate which poor farmers cannot provide.

There are two rice mills in Ban Tung Yao and one in Ban Mae Ming. Though many villagers especially among the Karen still employ such traditional methods as husk breaking, more and more now turn to rice milling. Milling is free provided that husk and bran are left to the mill owner. Taking bran back, villagers have to pay 2 baht a tang.

Weaving is common for both villages. However, it is considered a time-consuming method, so among the Thai they prefer to buy clothes from the market. There are five modern sewing machines in Ban Tung Yao and none in the Karen village. These, however, are not for commercial purposes, only for household use.

There is a village shop in the Karen village. Whenever need arises, they go to Ban Tung Yao, both in turn rely on the town market to obtain necessary household items. Economically, villages are incorporated into the wider economy. There are also itinerant traders who travel with clothes for sale to villagers. Among the Karen, raising cattle is a kind of saving. In Ban Mae Ming, there are about 40 buffaloes and 30 cows. When cash is needed, they sell one of them. Thus even among the Karen, they are affected by modern cash economy to the extent that nothing is the same as twenty years ago. Most of them have to rely on wages and become poor. They are forced to enter a competitive cash economy.

Electrification

Though the villages are comparatively poor, most express their willingness to cooperate and participate in the project. They complain that the price of kerosene has gone up quickly and should be substituted by electricity which is considered cheaper. When asked about the connection (wires, bulbs etc), Thai villagers said that they could afford them. The Karen frankly stated that it is hard to expect a contribution in cash. Cash is a scarce resource.

Nevertheless, both are willing to look after the machine.

Electricity is not unknown to villagers. However, they are not so sure what they can do with it besides lighting. Ban Tung Yao has some experience with electricity. The headman has already installed a small electric generator for household use and the use for his rice mill. His son-in-law works with the district electric plant. The installation of electricity at the headman's house is from his skill and knowledge. There would be no problem to look for somebody to operate and maintain the machine. Finally, as has already been mentioned, there is no problem of communication and cooperation between the Thai and Karen. They have lived close to each other for so many years and their lifestyle and economic conditions are not much different. The gap between the rich and the poor is not great enough to hinder opportunities of having electricity.

SITE V : MAE NA CHON

Two possible sites are in Ban Mae Na Chon and Ban Mae Wak. Either site is feasible to serve the same population in Ban Mae Na Chon and Ban Mae Wak. The two villages have been surveyed. The first one, a large village, has about 1650 population and the second 500 population.

Geographical Setting

Mae Na Chon is both the name of a village and of the whole Tambon. As a village, it is the biggest center of the whole tambon. Many services are available in this village. For example, there are more than 10 village stores, 3 rice mills and a number of public institutes such as a school, health center, police station, the wat and other development projects.

Travelling into these villages is easy since the last two years when a laterite road was constructed. Buses are also available which make it even easier to travel to the district center. Inter-village communication has also been well maintained and thus for example to travel to Ban Mae Wak a village in tambon Mae Na Chon is easy and cheap (five baht a journey from Ban Mae Na Chon).

Villages in the Tambon also enjoy having more than five streams which offer water for the the whole year and second cropping has been practised. These streams and rivers are Nam Mae Chaem, Nam Mae Chon, Nam Mae Mu, Nam Mae Sa-nga and Nam Cham Toh. Through traditional irrigation associations, waterworks are well kept and provide villagers water for home consumption and for agriculture.

Situated in the hilly area, these villages have rather a limited amount of land for agriculture. Parts of the land are government reserved land. Nevertheless, many villagers have additional land to grow dry rice on the hill to make sufficient rice for the whole year. These lands are mainly forest land. Since Mae Na Chon is almost over populated and has a high rate of population growth, it is hard to prevent villagers from clearing more virgin land to meet the present demand of rice and other foods.

Village	Tambon	Population	Households
Mae Na Chon	Mae Na Chon	1,650	275
Mae Wak	Mae Na Chon	500	83

Social Characteristics

The population of this Tambon is mainly Thai and Karen living apart in their own villages. According to an informant, it is said that this area was formerly occupied by the Karen and later the Thai came so that the Karen were pushed to move further up. At present, there is no real conflict between the two. The Karen, however, are poorer and have to seek jobs to gain cash income from either the Thai or other hilltribes, especially the H'mong. It is not possible to view these villages as isolated entities. They are all related to each other and information exchanged. Many communal activities have been organized. Ban Mae Na Chon serves as a center especially for activities concerning the wat which many people from other villages have to attend. The only school which offers up to grade 6 is also located in this village. Similarly, people from other villages also visit the health center or take part in many activities initiated by the District Office such as road construction, maintaining the irrigation weirs and setting up of children's playground. Above all, except the hilltribes, these villages are part of the former and over populated Ban Na Chon. Therefore, based on intra-village cohesion, inter-village relationships have been expanded and up to the present regular visiting with Karen villages has been practised. There is

no ethnic discrimination and Karen are welcomed to the Thai villages and vice versa.

In addition, villages are also incorporated into the wider society through radio broadcasting. Almost all households own small transistor sets, particularly young boys and girls who carry them most of the time, even into the fields. Newspapers are also available at the village reading center. Thus these villages are, to a certain degree, exposed to the outside world.

Economic Organization

Rice cultivation is practised by almost all households. Both wet and dry rice are two main activities. However, not all households own agricultural land. About 50% have no land in the lowlands and thus have to look for other pieces of land in the hill. Those who own land have about 1-10 rai. Very few have more than 10 rai and many own only 1-2 rai. Through a well-maintained irrigation system, second croppings are introduced and land has been used intensively.

However, rice is mainly for home consumption. Only when this demand is met, should rice be sold to others. There are four rice mills in Ban Mae Na Chon. Such industry

exists in almost all villages nowadays. The owners actually raise pigs as a sideline activity for they have enough bran and broken rice obtained from villagers employing their services.

Other cash income is mainly derived from growing onions, garlicks, beans and other vegetables. It is estimated that for an average household the income derived is about 3,000-5,000 baht a year. For better-off families, water pumps are employed to help pumping water from the streams. However, because of the increase in oil price, they have stopped using the pumps.

In Ban Mae Wak which is less prosperous than Ban Mae Na Chon, villagers are engaged in much wage labor employment such as working with the forestry station to replace the old forest with pines, the income of which is 30 baht a day. Often the Karen come down to be hired to work in the field at the rate of 25 baht a day. There is also other employment available but limited to farming activities such as digging wells and cutting wood. Few people move out to seek jobs either at the district center or in Chiang Mai city.

Cattle cooperatives were set up a few years ago under the supervision of Japanese experts. New breeds have been introduced. In Ban Mae Na Chon more than 300 cattle are

raised. The hilly area around the villages is suitable for grazing cattle. In the future it will become a new activity offering cash to people. Villagers also go to Karen villages to buy buffaloes for sale in the town. An average price is 5,000-6,000 baht for a young buffalo.

There is no local industry, but almost all households still weave clothes for home use. There is tendency that this will be soon replaced by cheaper material from the market. Village stores also offer some items for immediate household use. Not very far from the town, however, villagers frequent the market quite often especially as there are more than 10 buses available to and from the district center. The fare is 20 baht a single journey.

Agricultural produce is mainly sold at the farm gate. Traders in the district market are informed and come with their own trucks. There is no problem of communication. The Karen too are affected by the cash economy. Often they come to the Thai village to exchange some other crops for rice and it is common to see them either at the morning market in Ban Mae Na Chon or in the town. The type of morning market here is unique to the North. It is a place where villagers themselves bring some vegetables and other

produce from the farm for sale. Prepared food and various household items are also sold. Only in a big village where demand is high enough, is there such a market.

Electrification

Ban Na Chon is comparatively prosperous and many potential resources exist for economic development. Electrification helps to increase the chances. Many public institutes will certainly benefit from electricity.

Several villagers including the headman had employed small electrical generators for home use. However, this is no longer the practice because of the increase in oil prices. Most villagers would like to see the village be electrified. Most are willing to cooperate both in terms of necessary expenses and maintenance. Few villagers have mechanical skills, although the headman of one village has designed his own hydro-electric generator by gearing a traditional water wheel onto a small electric generator.

SITE VI : HUAI PONG NAM RON

Huai Pong Nam Ron is situated in Doi Tung, Mae Chaem District, Chiang Rai Province. There are quite a number of villages which will benefit from electric sites. Three villages, however, have been visited. These are:

Village	Tambon	Population	Household	Electricity
Ban Pa Kha	Mae Kham	200	32	Akha
Ban Huai Rai	Mae Kham	1877	223	Chinese Ho, Lisu, Akha
Ban Muser Pa Kluay	Mae Kham	120	19	Lisu

Geographical Setting

These villages are situated up on Doi Tung along an asphalt road not very far from Mae Sai District where the Thai-Burmese border meets. The roads are well maintained and at present there are more than 30 pick-up buses travelling to and from the town. At the top of the hill, there is a center belonging to the Forest Department which initiated a number of development projects in the area. The whole area is composed of various ethnic hilltribes and the center is familiar to them all.

There are three streams passing through these villages. However, only Huai Nam Lee is tapped for household use. No irrigation exists but only rainfed agriculture, mainly swiddening, is practised.

Ban Huai Rai, which is a Chinese Ho village, is well developed with electricity generated from a private engine and has piped water distributed to the whole village. This particular village is far more prosperous than the rest. Financial support must be given from the outside, whereas other villages of the hilltribes remain at best self-sufficient.

Social Characteristics

Doi Tung is well-known for various ethnic tribes living around. The main tribes are Akha, Lisu, Lahu and Chinese Ho. Ban Pa Kha, for example, is an Akha village and Ban Pa Kluay is dominated by both Lisu and Akha. Ban Huay Rai is predominantly Chinese Ho and Akha and Lisu. The "Ho" in this area were originally remnants of the Kuomintang 93rd Army. Some of them have Thai wives, but the village is still full of Chinese atmosphere, Chinese ancestral shrines, architecture and Chinese conversation. One cannot help feeling that this is a Chinese village and it is remarkably more developed than

other surrounding villages. To compare and contrast between the Chinese and other hilltribes is to look at the Akha and Lisu living in the Ho village. They are poorer living in a bamboo hut whereas the Chinese occupy larger concrete houses with radio, refrigerator, fan and other facilities.

Each tribe, however, mostly live among themselves and contact with outside is not beyond general conversation. The Akha of Ban Pa Kha in particular have expressed their unwillingness to live with other tribes. Nevertheless, this is not always true for in Ban Huai Rai there is a sizeable Akha group living with Lahu and the Ho. Thus discrimination against each other is weak, though original differences are felt. One can easily identify each tribe by their dresses and conversation. Furthermore, though living in one village, the territorial boundary still can be easily drawn. One village may comprise three different groups of houses. Communication among these people is through Northern Thai dialect. No-one can speak all the different languages of the tribes. Through Thai schools, most young generations are able to speak at least northern Thai. Not very far from Mae Sai, villagers often travel to this town either to sell their produce or to buy some necessities. They know exactly

their status in the Thai economy and often express willingness to live in Thailand. With enough land to grow rice and other cash crops, they do not really need to be mobile. As citizens, they would no longer like to move unless they have nothing to feed their families.

Most of them say they are Buddhist but anamism still occupies a place in their belief. A religious leader is still as important as it was before. However, the Lahu of Ban Pa Kluay were converted into Christians some years ago. There is a church, and a Lahu Christian Minister comes once a week to preach and hold services. Religion thus offers them a link to the outside and other villages. Visiting each other among different villages is common and this is an important source to find better land elsewhere.

Because of their wealth, the Chinese Ho send their children to good schools in Chiang Rai. Some of them have businesses in Chiang Mai or in Bangkok. The headman, an ex-colonel of the 93rd army, comes to Bangkok at least 5-6 times a year. Through wealth and good education there is no doubt as to why they live in a paradise different from other surrounding villages.

Economic Organization

Swidden agriculture is practised by all villages. Rice, the main staple, has been grown up on the hills during wet season. The environment does not allow them to practise lowland rice cultivation. Such cultivation gives them sufficient rice to live on for six months a year. For the rest, rice must be bought either from other lowland villages or from the market.

To earn extra cash, other cash crops, particularly maize, are grown and sold to traders from the town who come during harvesting. Many, except the Chinese, become wage laborers working for other farmers or with the forestry center. Wages are low ranging from 20-30 baht a day. Vegetables are grown mainly for home consumption. Each village is self-sufficient though more and more is bought from the market such as kerosene, matches, clothes and medicines. The economy will be soon commercialized and villagers depend more on the market.

Poultry are raised by all households. The Chinese are big raisers of pigs for sale in the town. They are also traders and businessmen. Because of the opium network, it is difficult to obtain information on incomes of the Chinese. We know that they are well off, but to press for answers is

not possible.

Not every village has rice mills, but one can always find it in a short distance. Traditional rice mortars are still employed in some villages. Similarly, weaving is still practised among the hilltribes. The Chinese prefer to buy clothes from the market which they can afford and sewing machines are common for them. A number of them also own buses travelling to and from the town. What they need most to expand their capacity is electricity. At present, six families have invested in an electric generator to generate electricity for household use. With electricity, they are economically active and promising. Several of them also own village stores and other villages also have at least one or two.

Electrification

The Chinese are economically very active. With electricity they can certainly do more both for themselves and for other tribes. If anything has to be tested, these villages provide a good example to be experimented in terms of economic development. Other hilltribes are prepared to leave unless their resource base can be improved through electricity or other means.

All express their need of electricity. Consideration must be given to those poor who may not be able to afford the cost of electricity. The Akha are those who need more help and support. Careful study must be given if electricity is to be implemented.

SITE VII : BAN PU MUEN (MAE SAO WATERSHED)

Ban Pu Muen is in Tambon Mae Sao, Mae Ai District, Chiang Mai Province. The population is mainly Red Lahu. Three villages have been surveyed.

Village	Tambon	Population	Household
Ban Pu Muen	Mae Sao	360	60
Ban Pu Muen Nai	Mae Sao	156	26
Ban Doi Pu Muen	Mao Sao	132	22

Geographical Setting

Villages are scattered around the Mae Sao Watershed Center, Unit 21. There are no buses travelling either between villages or to the town. People have to walk or if lucky enough they travel with the Watershed cars. During the rainy season travelling by car is almost impossible.

The only stream passing through these villages is Nam Mae Haeng which is employed for both household consumption and for agriculture. During the dry season, water shortage is a problem. There is no organized irrigation, however, in this area. The village economy is, in general, less developed and a number of villagers have become wage laborers. Because they

are economically poor a number of development projects have been introduced by the Watershed Center and the Border Patrol Police.

Social Organization

Most of the population are Lahu who are divided and known among themselves as Buddhist Lahu and Christian Lahu. The Buddhist Lahu have occupied the surrounding area for more than a generation, whereas the Christian Lahu moved less than 10 years ago from Burma. A number of them, particularly the older generation, cannot speak Thai. It was through interpreters that interviews were possible. Children can attend the BPP school but only one year schooling is offered. There is no wat (temple) in any upland village, but a church is set up among the Christian villages. A priest comes once a week from outside to preach in Lahu dialect. Nevertheless, most Buddhist villages state that they are Buddhist, though there are many ceremonies which are foreign to the Thai. In the ceremonies, ancestral worship is practised and pigs are slaughtered. Among themselves, these are to "feed the ancestral spirit".

Though divided, there is no visible conflict and discrimination against each other. They have expressed

unwillingness to live among some particular tribes such as the H'mong and the Karen, but among the Lahu themselves they have nothing against each other be they Buddhist or Christian. Inter-marriage between the two groups is common. The spouse will be either converted to Buddhist or Christian depending on where they live after marriage. At many festivals, indeed, they communally celebrate and attend the same parties. In normal daily life, they visit each other and some are kin and neighbors. Religious belief does not make them apart.

Relationship with officials though not cordial is close enough to make things run smoothly. The BPP is well-known for their success in working with the hilltribes. They have done their job well. The Watershed has three separate small units each of which has hired the Lahu as laborers. It is estimated that 500 workers are employed to work with them.

Though a little isolated, relationship with both private and public organizations is made possible through an important Chinese Ho trader who has married a Lahu and later set up a shop in Fang market. Because of his wealth and reputation among government officers, particularly at the watershed and the BPP, he is consulted by many villagers. It is said that

he does not merely act as a middleman trader, but also innovator. When asked what they are going to apply electricity for, the answer was that "we have to get advice from Ja Fah, the Ho leader". Ja Fah does more than marry in but acts as a leader and middleman to bridge the gap between villagers and officers.

Within each village, the cohesion is further strengthened by its isolation and several activities. Helping each other to build a house or to dig the field is common, though many have engaged in wage laboring. New Year ceremony is not a family affair, but a fair for the whole village to prepare and celebrate. Pigs are bought and killed and meat is shared among all households. In addition, news from outside is obtained from radio broadcasts from the town. Travelling to Fang, a district market, is also not so much a problem nowadays.

Economic Organization

All are cultivators, growing upland and lowland rice for consumption. The traditional hand mortar is still employed. The only small rice mill is in Ban Po Sang, ten kilometers away. They used to have a rice mill under Royal patronage a few years ago, but it broke down. Villagers thus either use the mortar or load the rice onto a car to be milled at Pa Sang.

Average land owned by villagers is between 5-10 rai. The poor, however, practise swiddening up into the forest a few kilometers away. It will be more and more difficult to clear new land.

Cash is mainly obtained by the sale of maize and opium. We have no data on incomes derived from opium, but a good portion must be grown in this area. Maize is sold both to Ja Fah and other traders from Fang district market. Families earn 2000-3000 baht a year.

About 25% of the population are hired to work with the watershed. The wage rate is 26 baht a day for women and 28 baht for men. At present, a number of crops such as tea, coffee, tobacco and Chinese mushrooms have been introduced and Ja Fah has been thinking about setting up a factory here.

Raising of cattle and poultry is not yet an occupation. Many raise them mainly for consumption and for some important festivals for which animals will be slaughtered. However, several villagers, it is said, own more than 30 head of cattle. Raising pigs is more normal for sale to town traders who frequently come to buy for resale in the market.

There are fewer shops in the Lahu villages here than in other tribal villages. Villagers rely mainly on the Fang market which is not too far away. Regular trading with the same shop creates friendship and trust. Villagers do not feel that travelling to Fang is a problem. They know where to sell and to buy. In addition, some traders travel up to their villages to sell some necessities such as snacks, candy, clothes and the like.

Weaving is still practised by housewives, for their own consumption and for the children. Men prefer to buy from the market which is easy and cheap in terms of labor and time spent in the process.

Electrification

Electricity is available only at the BPP center. Villagers certainly would like to have electricity, but some of them are very poor and probably cannot afford the cost. They are, however, willing to take part in construction and maintenance. Because several projects have been introduced, electricity may help them to accelerate the growth. There is a possibility of economic development in the area. The demand for some crops such as Chinese mushrooms, tea and other fruits may be high and worth the cost of electricity. Ja Fah should be contacted and consulted to see whether introduced projects are feasible in terms of market demand.

SITE VIII : HUAI MAE RAK (THUNG CHO)

Huai Mae Rak is in tambon Pa Pae, Mae Taeng District, Chiang Mai Province, about 80 kilometers from Chiang Mai city. The Royal Watershed, Unit 1, was established in 1975. A new settlement was arranged for various hilltribes to settle down. A number of Karen, Lahu and Lisu have also moved into the area over the past decade or so. Those who work for the Watershed Center receive 20 baht a day. Three villages have been surveyed.

Village	Tambon	Population	Household
Ban Lisu	Pa Pae	200	21
Ban Buak	Pa Pae	210	22
Ban Huai Khun Non	Pa Pae	30	7

Geographical Setting

Around the Watershed Center are a number of villages of various ethnic tribes, namely Lisu, Lahu, H'mong, Karen and the Chinese Ho. Lahu is the main group, however. We visited two Lahu villages and one Karen village. The roads connecting

these villages are laterite and in the rainy season it is difficult to travel from one village to the other. Most have to walk. Few buses are in operation because of less demand. Indeed, many villages are new and are ready to move further if economic conditions are not favorable. All land in this area is government reserved land under the Forest Department. The hilltribes can no longer exploit the forest land further. They are forced to settle down.

Two main streams are usable for the whole year cutting across these villages. However, because cultivable land is scarce in these areas the two streams are not of much use. They are mainly for home use.

Social Characteristics

The setting up of the Royal Watershed in 1975 has drawn a number of hilltribes to settle around. A number of concrete houses were constructed and the hilltribes were able to occupy them on the condition that they paid back the cost of construction which was about 20,000 baht for one house. In addition, the unit has also employed about 500 people to work on several projects such as growing and picking flowers and planting new pines to replace the previous forest.

These ethnic tribes live apart in their own villages. The size of the villages varies from 7 to more than 50 households. Each village is rather self-sufficient and contact is limited. Most rely more on the unit and outside markets. Some may have worked together under the watershed program but this does not lead to an enduring friendship among villagers of different villages. The Lisu, H'mong and the Chinese Ho are better off than other groups and have never worked as wage laborers. Economically, they rely more on opium growing and trading. In terms of economics, they do not have to rely on each other. The Lahu and Karen, however, are hired to work for the Lisu and the H'mong to grow opium and rice as well as with the watershed programs.

Contact with outside is also limited because of the isolation and remoteness. Most buy and sell at the Pa Pae market, the tambon center. They go to Chiang Mai only once or twice a year. But the Chinese Ho who do not usually rely on the watershed for jobs have maintained relationship with people of the same tribe in the city.

The Lahu are divided into Buddhist and Christian in their beliefs. Many have migrated from Chiang Rai to get jobs or a piece of land. Because no more land is allowed to be cleared,

many of them are not sure whether to move further to find new land or just stay on to be employed by the watershed center. At present, they are poor and have to rely mainly on wage incomes.

Traditional customs have been maintained and relationships within the group are strengthened through kinship and friendship. Among the same tribe, visiting each other in different villages is common. Information is exchanged and has sometimes affected their social life for they are readily movable to find new land according to such information. Some still maintain a house in the original village and come into this area only for jobs at the watershed.

Economic Organization

Almost all the land is reserved land, therefore many villagers cannot grow rice but rely mainly on wages derived from the watershed. Some who cultivate have to move out to seek a piece of land outside the area and come back after harvesting. Therefore, many have to buy rice for consumption. The watershed used to provide rice for their employees but because of a limited budget they have ceased to do so. There is a rumour that the watershed can no longer hire the villagers to work in the fields. Thus, a number of them have prepared themselves to move further, unless economic conditions improve.

At present, more than 200 workers mainly Lahu and Karen have been hired to work in flower gardens. Some villagers have their own flower fields. The Watershed is responsible for buying and selling to traders in Chiang Mai city. At present, they still rely on financial support from outside and are not economically fully viable. If their budget is cut down, it is certain that this will affect the employees. The actual wage is 20 baht a day for boys and girls. It is, however, planned that the watershed will develop their own flower factory and thus electricity is needed. It is considered, furthermore, to make it a tourist center.

Those who come from not a far distance away, prefer to go back to their original villages to cultivate rice and maize. Only children are left at the center to work with the watershed. The watershed also provides other facilities such as a school and a playground. They even set up a shop where villagers could obtain some necessary goods, sometimes on credit, but the shop was closed down for unknown reasons.

Other cash income is derived from the growing of opium though on a small scale. We do not have much data on this, but a number have confessed that they have to maintain opium fields just for home use and for elder members of the family.

However, sufficient amount of money must be obtained this way.

Cattle and poultry are raised mainly for home consumption. However, among the Chinese Ho, more than 300 cows and buffaloes are raised for commercial purposes. Normally, traders from the lowlands travel into these villages to sell some household items and buy either maize or cattle and pigs to sell in the lowlands. No village store is evident in all three villages. They have to go to the nearby center at the Pa Pae market.

In sum, most villagers in this area are poor and have to rely on the watershed for wages. Income derived annually does not exceed 10,000 baht. According to one informant, she received about 8,000 baht from the watershed for wages last year, but had to buy rice for consumption for more than 6 months.

Electrification

It is certain that the Center will benefit most from electricity. In addition to the promotion of economic growth of the area, it is also intended to make it a tourist center. From the villagers' point of view, they do not really think that electricity is most needed. They certainly would like to have it but more important to them is to have a piece of land to grow rice. They are happy if rice is sufficient for

yearly consumption. Without land, they tend to be mobile, unless job creation at the watershed is sufficient and attractive.

SITE IX : MAE PUNG (BAN PONG NA KHAM)

This site is situated in Ban Pong Na Kham, Tambon Mae Yao, Muang District, Chiang Rai Province. Three villages of the Karen and Northern Thai have been surveyed.

Village	Tambon	Population	Household	Electricity
Ban Pon Na Kham	Mae Yao	300	51	Thai
Ban Yang Kham Nu	Mae Yao	138	23	Karen
Ban Pha Serd	Mae Yao	180	30	Thai

Geographical Setting

The surveyed villages are up on the hill, especially Ban Pha Serd which is very remote. Villagers said that their children have just seen cars in the last two years. Though situated not far from the provincial city (16 kilometers), difficult transportation does not allow many people to get into these villages. There are two ways to travel to these villages, by water and by road. The road is ~~quite~~ quite, but expensive and usable only in the dry season. Most have to walk or travel with the Forest Centre's cars which are not reliable. However,

motor boats regularly travel to and from Chiang Rai city, the cost of which is 30 baht for a single journey. Such a journey becomes commercialized for a number of tourists, because of beautiful scenery along the Mae Kok river. The other three streams are Hua Pu Sao, Huai Luang and Huai Ban Yang. Thus, there is quite sufficient water to allow people to do double cropping cultivation on a very limited area of land.

Social Characteristics

Most of the land was formerly owned by the Karen. They were encroached on by the lowland Thai, and thus moved further up to the hills. At present, there are still a number of Karen villages which, it is said, are better off than the Thai for they still have enough land to cultivate. Many Thai villages, such as Ban Pha Serd, are now hoping to clear the forest and get a new piece of land. They, however, are prevented by the Forest Center situated further up. Thus, a number of them have become wage laborers working with the Forest Center. The problem of land is lessened if intensive use of land to grow other crops is made possible.

Because of remoteness and difficulties in transportation, many village customs are still observed by most villagers. Cohesion is strengthened by many activities such as house

building or ploughing the fields through labor exchange groups. Many villages are extensions of old villages and visiting each other is frequently practised. Normally, villagers live in a group. One village may be composed of three groups of households. Cooperation normally is far beyond group and village boundaries. Most know each other and under certain circumstances inter-village cooperation is evident. Nevertheless, this is limited within ethnic boundary. Marriage across boundary is difficult, though not impossible.

The Karen, formerly owners of this area, have occupied most of the land and thus are better off than some northern Thai. The Thai under certain circumstances become wage laborers working for the Karen. This is often stated by Thai villagers particularly by villagers in Ban Pha Serd who have just migrated in and do not have enough land. In this case, it is the Thai who visit the Karen and Lahu villages to exchange some other things for rice.

In addition to the Forest Center, other institutes are a school at Ban Pong Na Kham, a wat in the same area and a public health center at Tambon Mae Yang. Much is still needed for development in this area. Outside contact is very limited, and people are too poor. All of them are Buddhists.

Economic Organization

Most of the population are engaged in agriculture, growing both wet and dry rice in order to have enough rice for the whole year. In Ban Pong No Kham and Ban Yang Tham Nu, second cropping is possible. The main irrigation was constructed and provided by the Royal Irrigation Department. However, it is practised on a small scale for the whole area is not covered under the scheme.

The average land holding is 6-7 rai. Many Thais own no land, but are able to grow rice on the hill. It is difficult to get the exact amount of land used for dry rice, but at least an average of 3-4 rai is owned by villagers who do and don't have land in the lowlands.

Vegetables are grown in small plots of land on the river banks or near the streams. The main source of income is from growing maize, garlic, onion and beans. These are sold to traders from Chiang Rai who come right after harvesting. The annual average income ranges from 5,000-8,000 baht. Ban Pha Serd which has just been established has earned less due to the lack of land. It is not in a good strategic site and has to rely on other villages for a number of services such as a school, and health center. Many of them are wage laborers to be hired for any kind of job. The Forest Center is the main

employer. They have to buy rice for consumption at least 4-5 months a year.

Cattle are raised for use on the farms. Many also raise pigs for sale whenever need arises. Poultry is generally for home consumption or during some festivals such as New Year feasts. To increase opportunities, villages want more land and water pumping will be useful to get water for cultivation in the uplands.

Two village stores are available at Ban Pong Na Kham, whereas there is none in Ban Pha Serd. Villagers have to go to Chiang Rai to obtain necessities. With high cost of transportation, they do not often go to the town. Nevertheless, in terms of economic integration, these villages are more and more dependent on the outside. Weaving, for example, is practised by most Karen, but this is declining. Men prefer to buy cheaper trousers from the market. In addition, through commercialization, the Thai and Karen do come into contact and more often this has led to friendship. Whenever there is a celebration in a Thai village, the Karen come to assist and participate, and the Thai also join the ceremonies held in Karen villages.

Most villages have one or two rice mills, the owners of which are both Thai and Karen. In addition, owners of boats

are of all ethnic groups, Karen, Lahu and Thai. There is no sign of specialization along the ethnic lines. Most of them similarly perform the same activities, and there is no discrimination against each other.

Electrification

Most villagers want electricity, but also realize that there are other immediate needs, such as land and better transportation. Most express their willingness to cooperate though they are not sure whether some of them can afford the cost of electricity. In all, these villages are poor and have fewer potential resources for economic development. Nevertheless, electricity may be useful for agricultural improvement such as for pumping and/or leading to the expansion of some other commercial enterprises - e.g. increase in number of shops, weaving and so on. Guidelines are needed to reach the productive uses.

PART II : WESTERN REGION

SITE X : HUAI WANG KIANG*

The site is in tambon Tha Kanun, Thong Pha Phum District Kanchanaburi Province. There are eight villages and Ban Huay Hang (village no. 8) was visited.

Geographical Setting

Kanchanaburi is to the west of Bangkok about 130 kilometers away. Further north about 130 kilometers away from the provincial town is Amphur Thong Pha Phum. It is in the hilly area and very remote. Population density is low. At the district center, there is a tiny market serving a small number of the town dwellers and surrounding villages. Within the town, electricity has been generated by diesel engines implemented a few years ago.

Though situated not far from the district center (about 7 kms), communication is difficult, although a new laterite road has been built. Such conditions are widespread for the whole district and many new roads are under construction now for security purposes. Some villages such as Ban Huay Haeng had opportunities to enjoy electricity provided by the National Security Council. However, because of the energy crisis such services have ceased to function.

* One of the first six selected sites

The main river is Wang Kiang passing through the district town. During the dry season, the river becomes shallow and difficult to be used for agricultural purposes. This is because many watersheds have not been properly protected, as the headman complained. It is water shortage not lack of land which is a problem. However, there is confusion here. Most of the area is said to be under government reservation, but the headman believed that as they have lived in the area for 2-3 generations they have thus been granted certificates. It is likely, as happened to many villages, that what they have occupied will be fully granted and the rest will be under reservation.

In addition to electricity, other services were also provided. Health center which is crucial for a remote area like this is the main center of many surrounding villages. The main school and the wat are also situated at the center. It is expected that with the improvement of communication and transportation such services will be expanded and more villages will rely on the center for various services.

Social Characteristics

Eight villages with almost 5000 population are expected to be under the Huai Wang Kiang electric site. This includes

the town center which will certainly be the main user of the plant. Ban Huay Hang, a village under survey, has roughly about 500 population (75 households). Most of the population are Thai immigrants from the northeast and Khamu (local hilltribe). There are also Karen villages in the area further up north. However, they are not included in the survey because of time constraint. Because of low population density and the immigrants, many villages are new and came into existence not more than twenty years ago. Except the Karen, however, there is a large number of people living and mixing together within any village. Inter-marriage is easily done and there is no problem of communication. People understand each other well. However, to identify each ethnic group is not difficult. Most immigrants are termed Khon Lao (Lao people) by the fact that they are from the northeast. These migrants are poor hoping to find a piece of land to live on. Such movement and settlement is dangerous to the surrounding forest, unless certain places are allotted and further invasion into forest land is prevented.

As a new settlement, Ban Huay Hang has no wat of its own but has to rely on the nearby village or the district town for religious ceremony. However, during the last few years,

villagers have used the school as a religious center to practise their belief by inviting a monk from nearby villages. Through religious belief many villages are integrated and cooperation is possible. Furthermore, several villages are organized as an irrigation society to maintain several small weirs for communal use.

Because they have to rely on the district center, villagers frequent the town quite often. They go there for buying and selling and for obtaining services there. The cost of transportation is 20 baht both ways. It is costly so many villagers prefer to walk. Not many people go to the provincial city because of the cost of transportation (70 baht one way). Only in case of serious illness are patients transferred to the provincial hospital. Thus, villagers most need a doctor and a health center in their village.

Economic Organization

Most villagers are farmers growing mainly wet and dry rice. Only 30% of villagers have land in the lowlands to grow wet rice. The limitation of land forces most villagers to clear land on the hill and practise dry rice agriculture. The average land holding is 5-10 rai. Rice will be mainly consumed within the village and little is left for sale.

Cash income is from the sale of maize. Traders from the district town come directly into the villages. They know each other well. With the improved roads, more traders will visit the villages in the area. At present, however, a number of villagers are indebted to the town traders. Money is borrowed before harvesting at the rate of 10% interest per harvesting season. No form of contract is required.

There are three small rice mills in Ban Huay Haeng offering milling services at 2 baht a tang (twenty litres). Bran and broken rice is returned to the villagers who use it to feed poultry and pigs.

Vegetables are grown in the home ground or on the banks of Klong Pha Phum canal. Villagers take them to the town market for sale early in the morning. Most, however, are consumed within the village.

In addition, poor families are hired to dig wells, plough the field or any jobs which need more labor. There are no seasonal emigrants to seek jobs either in the provincial center or Bangkok. They are to a certain degree self-sufficient farmers though the trend is that they will have to rely more on the market when the economy is fully commercialized.

News about robbers and thieves is rarely heard of. Each family has at least one buffalo for farming and they have not been stolen.

In general, this village is comparatively poor for it is a newly established village. According to the headman this village has no buses or long-tailed boats which are enjoyed in many other villages. However, there are more than five village stores together, and with a short distance to the town market this village is not fully in a disadvantageous position. There are certainly many villages which are absolutely poor in terms of income and other economic conditions such as the Karen villages and villages in Sangkla Buri situated up the stream.

Electrification

There are two places which enjoy electricity. The first one is the district market center which employs three diesel generators to generate electricity for the market community. The other one is at Ban Huay Haeng which is under supervision and operation of the National Security Council for counter-insurgency. One hundred kilowatts have been operated from 6-9 pm. However, because of the energy crisis, the generators have ceased to operate for more than two months. They will be

operated only on special occasions. On the normal daily operation, villages paid a flat rate of 30 baht a month no matter how much was consumed by each particular household. Electricity was most used for lighting. It was claimed that besides conveniences, electricity helped extend working hours. Villagers made baskets at night, for example. Also important is that it helps reduce the cost of kerosene. People spent 50-60 baht a month for kerosene but only thirty baht a month for electricity. Thus villagers are familiar with electricity and certainly need it though mainly for home lighting. They only need time to learn to make productive use of electricity and the headman is confident about the prospects.

PART III : EASTERN REGION

SITE XI : KLONG TA RIU*

The survey covered tambon Ta Kien Tong of Makam District in Chantaburi. It is next to Pong Nam Ron district. Its important river which has potential for hydro power generation is Klong Ta Liu which flows off the Chantaburi River.

The People

Tambon Ta Kien Tong has a relatively large population. It is composed of 16 villages and the total population is approximately 4,800, excluding those who have recently moved in to seek more farmland from the nearby provinces (i.e. Rayong and Chonburi) and the immigrants from the Northeast who are temporarily employed in field cropping. The people are all Buddhist Thais. The four informants interviewed are representatives of Ban Thung Ka Bin, Ban Klong Yai, Ban Klong Plu and Ban Ta Kien Tong.

The Economy

The economy of tambon Ta Kien Tong is predominantly agriculture. Most of the villagers earn their income from tapioca and peanut production. Wet rice cultivation is practised, particularly for household consumption. During the

* One of the first six selected sites

dry season some men go searching rattan that can be sold for 35 baht per bundle. Most villagers own about 10 rai of riceland and the range is between 3 to 20 rai. Paddy yield estimated is 450 kg per rai while that of the tapioca is 2.5 to 3.0 tons per rai. Some villagers, however, plant rubber trees, maize and fruit trees. There are 10 landholders who have recently moved into Ban Tung Ka Bin and the rate of land rent is 50 baht per rai per year. According to the district officer, it is the poorest community in the district. The average total income of the poor is between 5,000 to 6,000 baht a year while a few better off have double income of the poor.

Aside from rainfed agriculture, some of them use pumping machines along the Klong Ta Liu and its tributaries for farming. Loans may be obtained from either the credit institutions (Agricultural Cooperative Group and Bank for Agriculture and Cooperatives) or the money lenders in the villages. In spite of the existing agricultural extension program, applying fertilizer is not yet common among the villagers and their farmland may be infertile soon, particularly that used for tapioca planting. Normally they hire a tractor for land preparation at a rate of 200 baht per rai but some of them keep buffaloes for ploughing. In

tapioca planting and harvesting, a number of employees from the Northeast are paid either 30 or 40 baht per person a day. This depends on the kind of job done at different periods of time. The trucks are finally hired for transportation of farm products to the town market which costs about 140 baht per ton of tapioca. However, they sometimes sell at their farm.

The Community

The village settlement is lined along the road, the community area is broad and the villages far apart. Each village has usually a few stores whose owners buy goods from the district or the provincial town. There are also traders from the province selling food (vegetables, fish, rice etc) daily in the village. A volunteer soldier unit has been recently stationed due to the border situation. Most village school teachers are from the Makam district town. Since it is a large size community, a family planning program was introduced to the villagers. Some of them are members of the Bank for Agriculture and Cooperative - BAAC while some are members of the district Agricultural Cooperative group. There are also members of the Agricultural Youth Club in the community.

The villagers used to participate in community development projects, such as village road construction, school building and small-scale irrigation tanks under the Rural Job Creation Program. Nevertheless, labor exchange is still practised in farming and there are strong social ties among the villagers themselves.

Attitudes Toward Electrification

The villagers do need electricity for household use. About 5-6 cases own diesel motors that can be applied for pumping irrigation during daytime and for electric generation at night. The villagers often gather at such houses where they can watch TV free of charge. In their opinion, cost of electricity would be cheaper than other sources of energy. They plan to use electric pumping machines for irrigation, especially for second cropping. Some of them mentioned that electric power can be used for a tapioca factory, rice mill and other facilities. In the meantime, the informants hope that the villagers would be willing to pay for electric installments or to contribute their labor. However, they also doubt whether the poor can afford to pay for it if the cost is high.

Concluding Remarks

There are a number of potential resources in the community, i.e. tapioca factory, irrigation pumping machine and rice mill. The villagers do need electricity and would be willing to pay for the cost if it is not too high, especially for the poor.

SITE XII : KLONG PRA PHUT

The community survey covers the area in Tambon Tub Sai of Pong Nam Ron district in Chantaburi. The district is about 42 kms northeast of the province. It occupies a total land area of approximately 1,699 km. The topography of the district can be divided into the rivers, the mountain and the forest. Its land is primarily suitable for upland cropping. The main river, the Chantaburi River, originates in the South Soi Dao mountain area and drains into the Gulf of Thailand and the Klong Pra Phut, flowing off Kampuchea. The North Soi Dao mountain, on the other hand, is the origin of a number of rivers, i.e. Klong Pra Sa Tueng, Klong Sai Khaw, Klong Pa Tong, draining into Sra Kaow district in Prachinburi, Nakorn Nayok, Chachoung Sao, the Gulf of Thailand and the Klong Pa Tong which drains Sra Kaow district in Prachinburi. Another important river is the Klong Pong Nam Ron, originating in the Ban Tad mountain, flowing off into Khao Saming district in Trad, Khlung district and Pong Nam Ron district in Chantaburi and the Mae Khong river in Kampuchea.*

* Data is made available by the Pong Nam Ron District Officer

The People

The population of Pong Nam Ron district is about 48,186. Administratively, the district is divided into five tambons, namely Tambon Tub Sai, Tambon Pong Nam Ron, Tambon Nong Takong, Tambon Sai Kaow and Tambon Patong.

Tambon Tub Sai, where the survey was conducted, has the river (Klong Pra Phut), and its water can be used for both irrigation and hydro power generation. Tambon is further subdivided into seven villages. Although the total number of population in this tambon is not yet known, the four informants representing their villages (Ban Wang Ta Prae, Ban Ta Lu, Ban Kai Dug and Ban Pong Ngon) estimated the total number of households and the number of population of the four villages as being 600 and 3,600 respectively. However, there is still a continuous wave of temporary immigrants, mainly from the Northeast, employed in tapioca planting and harvesting. Some of them married village girls and settled in the villages. Most of them are Buddhist Thais.

The Economy

Almost all of the population of Tambon Tub Sai is engaged in field cropping. Crops, such as tapioca, peanut and maize

are the main sources of cash income to the farmers in general, while a few of them plant rice, fruit trees and cotton, primarily for household consumption. Nevertheless, rice production is inadequate and the villagers still have to buy rice all year round.

On the average, the yield of tapioca is 2 tons per rai or 1,500 baht while that of maize is the same as that of peanut, i.e. 135 kgs per rai.

The villagers have no certificate of land ownership since the area was declared forest reservation. On the contrary, they are supposed to pay land tax every year. Their size of farmland ranges between 10 to 100 rai, except that of the retired RFD official in Ban Ta Lu which is approximately 1500-2000 rai. A few in Ban Pong Ngon are leaseholders.

The villagers practise rainfed agriculture, supplemented by water in the Klong Pra Phut. Maize and peanut can be cultivated twice a year while tapioca plantation is limited only once. Usually, they hire tractors for land preparation at a rate of 400 baht per rai. Loan is made available by either the credit institution (Bank of Agriculture and Cooperatives, BAAC) or the money lenders in the Tambon nearby (Tambon Pa Tong). The purpose of getting a

loan is either for farm inputs (i.e. hiring tractor, labor and buying seeds) or for buying rice or both. The cost of inputs for tapioca production is about 1,200 baht per rai. Those who borrow from the money lender are obliged to sell their products to him. Therefore, marketing is more or less monopolized.

The Community

Although the villages in Tambon Tub Sai are isolated, they share some contact with each other, particularly those who are relatives. In the absence of a school, the children of Ban Wang Ta Prae have to attend the Ban Pang Ngon school, and in the absence of a temple, the villagers in Ban Ta Lu go to the temple of Ban Wang Ta Prae. Some of them are either members of the Tambon Agricultural Cooperative group or the Tambon Credit group. The villagers have strong local ties and labor exchange still exists, for example in weeding, planting and house building. They sometimes participate in community development projects such as bridge construction in the village under the provincial subsidy and well construction under the Rural Job Creation Project. The village headman of Ban Ka: Lug, one of the informants, has two assistants. Usually these local leaders get their people organized and work together or else ask for cooperation.

There is one forest checkpoint as well as one tapioca factory in the Tambon area. A few stores in each village are owned by local people. The store owners and some villagers go to buy their goods and necessities in either the district or the provincial town. There is no rice mill in the village, therefore the rice farmers have to take their paddy to be milled in another tambon nearby. A few villagers own trucks which are hired primarily for transportation of farm products to the market. The villagers sometimes sell their products at their farmland. However, the traders from outside occasionally sell their goods to the villagers.

Attitudes Toward Electrification

All of the informants stated that most villagers do need electricity, primarily for lighting. They realize that the gas price will be going up. Two out of the four informants, representing Ban Kai Dug and Ban Pong Ngon, insist that the villagers are willing to pay for the electric installation. Whereas the informants representing Ban Wang Ta Prae and Ban Ta Lu doubt whether the poor in the villages can afford to pay for it. According to the informant representing Ban Ta Lu, a retired RFD official who owns the largest area

of land, was accused of taking land from the three landholders without any payment. He told three of them that if they do not give him their land, the soldiers will take it. Therefore, the villagers dislike him very much. The informant himself is also curious whether the retired FRD official will consume all electric power provided for the villagers since he has the largest area of land in the area. Nevertheless, he is a good innovator and makes his land more productive.

Concluding Remarks

The villagers do need electricity, primarily for lighting and are willing to pay for the installation (except the poor). The potential resources can be tapioca factory, pumping irrigation along the Klong Pra Phut, village stores, and probably a rice mill. However, conflict over land should be also accounted for if the rural welfare is to be provided since it may affect, to some extent, local participation.

PART IV : SOUTHERN REGION

SITE XIII : KLONG RA*

This site is in Ban Klong Ra, Tambon Song Phrag, Kam Phut District, Phang Nga Province. Electricity from the site will also benefit villages in Tambon Nop Pling, Muang District. All together about ten villages will be under the scheme.

Geographical Setting

About ten kilometers from Phangnga are villages in Tambon Nop Pling. Village No. 8 which is the village under survey is about five kilometers from the main highway to Phangnga. The road leading to this village is laterite which makes travelling difficult during the rainy season. Further up the stream is Tambon Song Phrag which comprises three villages. The cost of transportation is 7 baht from village No. 8 and 15 baht from Tambon Song Phrak. Because of proximity to the town, villagers frequent the provincial market at least once or twice a week especially when they have rubber or tin for sale at the market.

One main canal up on the hill passing through these villages is mainly used for mining. As will be clear later on, most villagers are one way or another involved in mining.

* One of the first six selected sites

In some villages, one may also see rubber plantations which are another source of income.

Social Organization

Villagers in these villages are mainly Buddhist Thai and have lived there for many generations. In village No. 8, there are about 40 households with 250 population. For the whole Tambon, there are more than 5,000 people (eight villages). Tambon Song Phrag which is composed of three villages has about 600 population. There is, however, migration from the nearby provinces and even from the Northeast and this constitutes about 500 population. They come to work with the large mines as wage laborers. Several migrants have married and permanently settled down. No conflicts between migrants and local people occur for they have different interests. Most migrants live in temporarily made huts close to the mines. Above all, they are all Buddhists and often go to the same wat to practise religious beliefs. Not every village has their own wat. Villagers from village No. 8 go to the wat in village No. 6 which is more populated and older.

Both tambon have health centers and schools of their own. Village stores can be found in all villages selling small items for household use. However, the proximity to

town reduces the role of these places. Villagers are well exposed to the outside world. In addition to small transistor radios which most villagers have, several television sets are also available at the mines and wealthy households.

Inter-village relationships are strengthened through kin relations and neighborliness. Indeed, village no. 8 is an extension of village no. 1 which is highly populated. Most know each other quite well and visiting each other is normal. Contact is further intensified through a well organized transportation system. Many villages have several pick-up buses travelling daily to and from the city.

Economic Organization

The main occupations are mining and rubber tapping. For mining, villagers can be either wage laborers working with the large mines at the rate of 45-50 baht a day or small private miners on their own. Most, however, prefer to be independent working on their own which in their eyes offers them a higher income than becoming wage laborers. They just employ simple methods which they can all afford. The earnings vary between 1500-2000 baht a month for a single family member. They can do it only when water is available and wherever a place is not yet occupied.

One problem, however, is that most land has been granted concession to large miners. As far as they employ simple methods, large miners will not be affected. Villagers must take great care to sell tin in the market for it is illegal (they have no right to mine). Often, they sell it to the big miners. At present, they are thus at the mercy of large-scale miners.

Many villagers own rubber plantations varying from 10 rai to 50 rai. Those who have none actually work for the big plantations. The actual practice is that the worker will share the rubber equally with the owner (six for each if they obtain 12 pieces of rubber). The duration for tapping is about six months a year. During the rainy season, tapping is not possible and many turn to mining which offers them better income. One piece of rubber costs 30 baht but the yield is flexible roughly about 150 kilograms a month.

Compared with other regions, incomes for these villages are high. However, little rice has been grown in the area. Often, most villagers find that they have to buy rice, their main staple, from the city. This also applies to other necessities which most have to buy, and thus high income is justified. Vegetables are grown on the banks but on a small

scale. Thus, all villages are by no means self-sufficient, and most of the things are obtained from outside. Most own motorcycles which make it more convenient to go to the town.

Electrification

It must be noted that all big mines have used electricity generated from a station situated on the highway leading to Phangnga. This is mainly used for lighting but various equipment and facilities are also connected such as television and cooking pots. There is no question of the need of electricity among villagers. Productive use of electricity is possible by applying it to the processes of mining and rubber drying. Since they are exposed to the outside to a large extent it is expected that electricity will help them make more out of their jobs. As they earn high income, the ability to make productive use increases for they can afford to do more.

Electricity is also helpful to many housewives who often are rubber tappers. Many also have sewing machines which certainly will be benefitted from the light.

Large mines are certainly the main consumers; hopefully this will help them to enlarge their capacity and thus employ more laborers.

SITE XIV : KLONG NAI

The selected site is in Tambon Romanee which comprises three villages. They are in Kampong District, Phangnga Province. Two villages have been visited.

Population

The population of Tambon Romanee is approximately 2,350 and the number of households is over 370. It is composed of three villages, village 1, village 2 and village 3. The number of households in each village is about 43, 30 and 305 respectively. Most of them are Buddhist Thais.

Economy

The villagers' main occupation is tin and wolfram mining. Their agricultural activities include upland rice farming, rubber plantation, fruit tree gardening, coffee and bamboo cultivation and tapioca planting used for pig raising. Chickens are raised, mainly for household consumption.

The minimum income earned from mining is 2,000 baht a month while the maximum is 10,000 baht per month per person. They gain a relatively high income during the wet season but earn less or nothing in the dry season. Some of them, however, go rattan searching for sale while some have nothing to do and have to borrow money with high interest.

The average size of their farmland is 10 rai and the upland rice yield is about 2,000 kgs (2 kwien) per household per crop year. There are ten households who own no farmland since they have just married and moved out from their parents' families.

Since minerals are rare and the villagers will earn less and less, the district agricultural extension officer has introduced some new crops such as rubber, coffee, bamboo, tapioca and fruit tree plantation.

Community

The village settlement is scattered along the road which at present needs some improvement. There are five buses going daily from the villages to Kapong/Takua Pa District town centers but there are at least two buses available everyday. The bus fares for a round-trip to Kapong and to Takua Pa town centers are 50 to 80 baht respectively, per person. The villagers usually bring their mining/agricultural products for sale at Takua Pa town center and at the same time buy some foodstuffs or necessities for their household members. The villagers in village 2 and village 3 have their rice milled in village 1. There is a local school, offering up to Pratom 6 in village 1 and 2 while that of

village 3 offers up to Pratom 4 only. Every village has a wat where the villagers share their religious activities. The agricultural youth club is organized in this tambon by the agricultural extension officer and there are about 300 members of the agricultural cooperative.

Radio is the most popular mass media in the villages. Marriage between people of different villages is practised and the villagers consider each other as relatives, particularly those in village 1 and village 2 which are nearby. Cooperation among the villagers is frequent.

Attitude Toward Electrification

The villagers do need electricity, primarily for lighting and they are willing both to contribute their labor or to pay for the electricity installation. The informants have no idea what other benefits electric power will give them. They need advice.

Conclusion

It seems that the first priority need of the villagers in Tambon Romanee is a good road for all seasons. Electrification would, therefore, be the next priority. There will not be any problem of contribution of either labor or money from the villagers in this tambon. Finally, electricity is

also useful for security reasons. The villages are remote and several times have experienced troubles from undesirable visitors. They need more intensive contact with the outside and electricity would best serve the goal.

SITE XV : KLONG BANG LIN

The electrical site will be in Tambon Had Sompan, Muang District, Ranong Province. Two villages have been surveyed.

People

The population of Tambon Had Som Pan are Buddhist Thais. There are 400 registered households and approximately 100 unregistered households of immigrants from other districts of Ranong. The population is about 1,907 excluding 200 Burmese employees who temporarily migrated from Victoria Point. A few of them are Chinese traders in village 3.

Economy

Most villagers are engaged in tin/wolfram mining and only a few can mine in the dry season because of the lack of water. There are only 10 upland rice farmers, therefore the majority have to buy rice for household consumption all year round. The villagers are able to mine four months during the wet season. The average income is between 2000 to 3000 baht per month per person. There are rubber plantations in village 2 and village 3, the area of which is fifty rai for each village. Those who are employed in mining also work in the rubber fields whose owners are in village no. 5.

Other agricultural activities include fruit tree gardening for consumption, namely rambutan, jackfruit and mango. A few villagers are engaged in pig and chicken raising and vegetable gardening for sale.

The villagers usually have no job in the dry season; some of them, however, are involved in various kinds of betting, e.g. cock fighting. Nevertheless, some of them go to the forest in order to search for rattan or food. Those who have no savings are money borrowers, sometimes with interest at 20 percent a year.

Community

There are three villages in Tambon Had Som Pan, i.e. Ban Thung Ka, Ban Sung Tee and Ban Had Som Pan. The number of households in village 1, village 2 and village 3 is 50, 50 and 300 respectively. There are about 100 members of the Tambon Agricultural Cooperative and most of them borrow money, especially in the dry season. Although the villagers in Tambon Had Som Pan have higher economic status than other Tambons, some spend all and save no money.

The villagers go to the market either in Ban Had Som Pan or in the Muang District town center. There are 14 village buses whose owners live in village 3. The Provincial Electricity Authority installed village electricity in

Bar Had Som Pan in 1978 while a mine in village 1 has its own electric generator for lighting.

Besides the agricultural cooperatives, there are also the village educational committee and religious committee. The villagers demonstrated good cooperation among themselves, namely in building the monks' residence and in social and religious affairs. Labor exchange still exists in house building and land preparation.

Attitudes Towards Electrification

The villagers are in need of electricity and they are willing to pay for its installation. As one of the informants, the Tambon headman, pointed out, electric power is a potential resource of mining, a mineral factory and white clay factory. He is confident that there will not be any problem of electric power management since there is an electrical technician living in the Tambon and some of the students are at present studying in vocational school.

Concluding Remarks

The village electrification is in great demand. The villagers are willing to pay for its installation and help manage the project.

CONCLUSION

The above description of the fifteen surveyed electrical communities is intended to offer readers some basic information on geographical, social and economic conditions of each particular community. It is totally descriptive and purely ethnographic. However, within a limited time, the interviews could not be as intensive as we wished and the number of informants is small. Most communities are remote and situated up in the hills.

It is still hoped that this report will provide sufficient information for the selection of both electrical sites and communities and will be useful for further intensive study. Information on income, size of land holding, employment opportunities, local industries, size of family and other social and economic resources for development must be further obtained through the use of questionnaire for household survey.

Upon this study, it is found that fourteen electrical sites are feasible from both technical and social and economic points of view. There are certainly some villages which are economically better off, but among poor villages

people have expressed their willingness to participate in both construction and maintenance. The only problem is the cost of electricity which should not be so high so that the poor cannot afford to participate. The only electrical site which should be avoided is Site No. 12 (Klong Pra Phut in Chantaburi) because more than 2000 rai of land are owned by a retired official.

As far as cooperative promotion is concerned, there is no serious problem. In the North, where the proposed communities are comprised of different ethnic tribes, however, information and explanation for the need of cooperatives must be carefully given. It is also necessary to find out further whether there is any discrimination against working with each other among these various ethnic groups. It is suggested that the traditional irrigation cooperatives of the North should be employed as a model for the promotion of electrical cooperatives. Under such system, all village water users are organized under a leader and his assistants to participate in all the processes of construction, operation and maintenance, and if necessary, money is contributed by all the users. Such cooperatives have existed for more than two hundred years and are still very effective. A full account

is provided by Abha Sirivongs' report paper on the Northern Traditional Irrigation Cooperatives.

Finally, because of the remoteness of most of the sites, it is recommended that a survey should not be more than one site a day to allow for more intensive information to be gathered.

Social and Economic Conditions
of the Proposed Communities:
Interview Guide

The Setting

- Conditions of roads, canals, rivers and other infra-structure such as health center, schools, wat, market.

(Give number if possible; describe its functions in relation to electrical uses.)
- Density of population and migration.
- Proximity to the district center.

Social Assessment

- Find out any traditional form of cooperatives which could be employed as a model for electrical cooperatives.
- Inter and intra village cooperation in public and social activities.
- General impact on village social organization
(strengthened the bonds to be incorporated into the national society, local conflicts, factions).

- General impact on individual beneficiary (increase and expand household social and economic activities, socialization, increasing opportunities to earn more and to be involved in other new jobs).
- The role of women in participating in rural development specifically through the use of electricity.
- Find out about available technical skills to make productive use of electricity.
- Number of beneficiaries.

Economic Assessment

- Farming and relevant technologies (irrigation, pumping, weirs and so on).
- Animal raising, poultry, cattle (potential for development, dairy, meat etc).
- Village shops and other businesses (give number if possible).
- Local industries, milling, weaving, drying of fruits and flowers, mining and other cottage industries (both existing and to be innovated).
- Income distribution.

- Contemporary expenses on energy for household and other uses.
- The cost of electricity which most villages are willing and able to pay.
- Development projects in the area.

Management

- Discuss with village leaders about village participation concerning patterns and processes involved in construction, operation, maintenance and fee collection. (No contribution - no power.)
- Nomination of two representatives to be trained for management, operation, and maintenance.

Information to be gathered from village leaders, district officers, teachers and monks.