

DRY RICE AGRICULTURE IN NORTHERN THAILAND

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DRY RICE AGRICULTURE IN NORTHERN THAILAND

by

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FOREWORD

It has been estimated that over 200,000,000 people, almost 10 percent of the world's population obtain the bulk of their food by shifting cultivation or "swidden farming". These people are spread over about 30 percent of the soils suited for agriculture and are located in the tropics where crop growth is possible for 12 months each year. Some of the most intensive agriculture to be found anywhere is also located in the tropics. With modern technology, high yields of the basic food crops can be obtained in such areas and from two to four crops a year can often be grown. A few such areas support a population of 1400 people per square mile. Much of the land under swidden farming supports only 15-20 people per square mile. The great virtue of swidden farming is that it enables peoples, isolated for various reasons from commercial sources of fertilizers, modern machinery and agricultural chemicals, to produce better crops than can be produced with any other system under the limitations cited above.

It accomplishes these results by the use of a long "bush" or jungle fallow in which the original jungle cover is cut off, dried and burned. All the plant nutrients absorbed by the jungle cover (except nitrogen which is volatilized during the burning) are left on the surface of the soil in the form of plant ash. Annual weeds are smothered out by the dense jungle cover and falling leaves are incorporated in the soil by the action of worms thus increasing its content of nitrogen and organic matter. This surface soil when first cleared, is loose and can be planted to rice or corn by making a hole with a pointed stick. It is cropped usually for one to three years and then allowed to revert to jungle for periods ranging from eight to 20 years depending on the amount of land available. It is a system in which the fertility of the surface soil is restored from reserves in the subsoil by the deeper rooted jungle plants.

This system has been in use for hundreds of years in tropical areas in Asia, Africa and South America. It is deeply rooted in the culture of the people. It is of great interest to sociologists, anthropologists and agriculturists. Dr. Judd is a sociologist with advanced training in agriculture. He is therefore uniquely qualified for studying it. He speaks the Thai language and was able to work closely with the swidden farmers of Northern Thailand. He gives a detailed picture of their farming art throughout the year for swidden farming is a year-around business. We need to know more about both the art, the science and the economics of this unique type of agriculture. Dr. Judd has made a useful contribution to our knowledge of all three.

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September 1963

PREFACE

The material presented in this Data Paper is derived from a doctoral dissertation entitled "Chao Rai: Dry Rice Farmers in Northern Thailand", which was presented to the faculty of Cornell University in June 1961. Publication of this excerpt in Data Paper form will make more readily available to those most interested in Thailand and tropical agriculture the results of the research that pertain most directly to agriculture.

References to chapters of the thesis are given where pertinent. Those who wish to refer to the original thesis may do so through copies obtainable from University Microfilms, Ann Arbor, Michigan.

The romanization system used in transcribing Thai into Roman letters is the "General System" devised by the Royal Institute of Thailand and published in the Journal of the Thailand Research Society, Volume XXXIII, Part 1, March 1941, with the following exceptions:

	as an initial sound is written as	j	instead of as	ch
 - 	is written as	aw	instead of as	o
 - 	is written as	o'i	instead of as	oi
 - 	is written as	u'	instead of as	u
 - 	is written as	u'a	instead of as	ua
 - 	is written as	u'ai	instead of as	uai

During the period of field research for this study, 1958-1959, the unit of Thai currency, the bat (given here in its more common romanization, baht) had an exchange value equivalent to U.S. \$.05.

It should be noted that map scales are not accurately indicated because of reduction for reproduction in this Data Paper.

The author wishes to acknowledge his gratitude for the guidance and encouragement of Professor Lauriston Sharp during the research and its reporting, and his appreciation and respect for the teaching and advice given by Professor Richard Bradfield, not only in regard to soil sciences but to their interrelationship with other agricultural sciences and with the social sciences.

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Ithaca, New York
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CHAPTER I
INTRODUCTION

Swidden Agriculture in Southeast Asia

Many articles and books have been written on shifting cultivation as practiced in South America, Africa, and Asia, and several organizations including the Food and Agriculture Organization of the United Nations and the Institute of Pacific Relations have sponsored studies of people in Southeast Asia who practice swidden agriculture. By shifting cultivation or "swidden agriculture" is meant discontinuous cropping of particular fields which are slash cleared and burned for one or more year's crops, and then allowed to lie fallow and return to natural vegetation for at least several years before being used again.¹ In Thailand this practice is called tham rai.² The swiddener is called chao rai, and is distinguished from the wet rice farmer, chao na.

Dobby, in the various chapters of his book on Southeast Asia, attempts to estimate the actual area under shifting cultivation, and the number of people involved. For instance, of Burma he writes that about 2½ million people are engaged in taungya (1950: 182). In summarizing, he states that

Even today as much as 5 million acres of temporary clearing each year is being cultivated over Southeast Asia, and between 40 and 50 million acres of clearing in the forests is being cultivated or is recovering from recent temporary cultivation. (1950: 349)

Bartlett, in reviewing Dobby's writing, finds many flaws -- especially relating to botanical details -- and thinks that "Dobby underestimated the

¹The term "swidden", derived from "swithe", to burn, an old English dialect word found in various forms in Scotch and in several Scandinavian languages, was used in 1951 by Izikowitz on the recommendation of Ekwall, and has since been used by Conklin (1954), Ekwall (1955), Bartlett (1957), Halpern (1958), and others. It meets the need for a single word in English to refer to the general practice of slash-and-burn shifting agriculture, and avoids regionally-linked specific meanings such as are brought to mind by kaingin, milpa, and other vernacular terms used in regions practicing some variation of swidden farming.

²In northern Thai, which is quite similar to Lao, the practice of swidden is called tham hai, since most initial "r" sounds of official Thai (standard Bangkok Thai) are pronounced with a beginning "h" sound. For an exhaustive listing of other vernacular names given to swiddening in Latin America, Africa, and Asia, consult Conklin (1957: 1). In some sections of Thailand, this same term is used to refer to upland crops grown on land that has been permanently cleared.

extent of swiddening in Malaya, but, in general, supports the picture of swiddening drawn by Dobby for the region. (1957: 384-390)

Gourou estimates that there are some 2 million persons who inhabit the 400,000 square kilometers of upland Indochina and who practice swiddening. (1951: 31)

Halpern writes,

In Laos about half the population is composed of mountain tribes, most of whom practice swidden farming as their major economic activity. And if the Lao who use this technique either principally or as a supplement to wet rice cultivation are added to this number, it can be seen that swidden farming is of great significance in Laos. (1958: 24)

Conklin has made an exhaustive investigation of the agricultural techniques involved in swiddening in his study of the Hanunoo in Mindoro Island in the Philippines. His method of distinguishing the basic systems of swidden farming is as follows:

A. Partial systems of at least two major subtypes:

1. Supplementary swidden farming (where a permanent-field cultivator, through necessity /poverty, insufficient lowland or terraced grain fields/ or as a tenant, devotes part of his agricultural efforts to the cultivation of a swidden which may be at some distance from his residence).
2. Incipient swidden farming (where the cultivator, often with little prior knowledge of swidden techniques and usually from a crowded permanent-field region, moves into an upland area as a homesteader, squatter, or resettler, and devotes "all his agricultural efforts" to the swidden in or near which he makes his home).

B. Integral systems of at least two subtypes ("integral" in the sense of "basic or essential to the whole culture; central not peripheral):

1. Pioneer swidden farming (where significant portions of "climax vegetation are customarily cleared each year).
2. Established swidden farming (where tree crops are plentiful and relatively little or no climax vegetation is cleared annually; including an unknown number of subtypes such as the Hanunoo system. . ".) (1957:3)

Credner (1935a), Gourou (1951, 1956), Grist (1959), Huke (1954), Izikowitz (1951), Kaufman (1956), Pelzer (1948) and Pendleton (1953) have all described aspects of swidden culture and written of its importance in mainland Southeast Asia."

Swidden Agriculture in Thailand

Historically, swidden farming has been of importance in all parts of Thailand. Even in the central plain, areas back from the streams were swiddened until irrigation canals were dug, either by corvee labor under royal command, or by interested individuals. In the Northeast, swidden farming has been related to the movements of Lao peoples into Thailand, as reported by Madge who writes that in the region of Ubol

The predominant pattern is of small farmers owning their own land. Originally they were settlers from the north /Laos/ who cleared the jungle and established villages. The practice of shifting cultivation gradually gave place to regular cultivation with definite field boundaries. (1957: 51)

Janlekha records the changes in central Thailand after 1850, noting that the importance of paddy culture has increased tremendously, not only in relation to swidden culture there, but absolutely.

This vast extension of rice cultivation was carried on almost entirely by the Thai themselves and by individuals acting on their own initiative, not to any significant extent by government or private resettlement programs. (1955: 12-13)

The expansion of Thai rice production during the past century is documented by the following statistics given by Ingram:

In 1850, the total area planted to rice was estimated at 5.8 million rai. /One rai equals .4 of an acre./ The area had risen to 8 million by 1905, and it steadily rose to a peak of 34.6 million in 1950. On the export side, the average annual export of rice during 1857-59 was 990,000 piculs. /One picul equals 60 kilograms./ After a slow erratic rise up to 1870-74, the volume rose rapidly to a peak of 25.7 million piculs in 1930-34. This 25-fold increase over the probable maximum volume at the time of the Bowring Treaty /1854/, which took place while the population doubled itself, represented the major economic change in Thailand since 1850. (1955: 37-40)

This expansion of paddy rice growing and changes in the cultural system related to it were restricted principally to the central plain of Thailand. As the topography of northern Thailand does not lend itself easily to wet rice culture on a large scale in most provinces, swidden agriculture still remains a significant element in the life of the northern Thai. In 1945, Pelzer wrote

In Thailand shifting cultivation is extensively practiced by the tribes of the mountains of the north and west, on the eastern part of the Khorat Plateau, and on the peninsula. Probably about 1,000,000 people depend upon it. According to the same kind of calculation that Van Beukering made for the Indies, a total of 1,400,000 hectares would be required, or 200,000 hectares / $\frac{1}{2}$ million acres or $1\frac{1}{2}$ million rai/ annually, if we allow five persons per household and consider that one hectare covers the needs of a family for two years. (1945: 28).

To check Pelzer's estimate, let us consider swiddening in the eight northern provinces that compose Thai Administrative Region Five.

In Region Five, only 4.5 per cent of the land is used for wet rice, and less than 6 per cent for all permanent-field uses.³ To the 56.9 per cent of land classified as forest land can be added most of the 38.8 per cent of land still unclassified to make the land potentially available for swiddening over 90 per cent of the total land area. In one province the area used for paddy rice is only 0.5 per cent, and in only one does the area so used amount to more than 7 per cent. Because swidden land is not owned by individuals, agricultural census figures do not accurately record the extent of swiddening, but one province does report approximately a fourth of the total acreage planted to be in swiddens.⁴

About a fifth of the rural households in northern Thailand must practice integral swiddening, and probably as many more practice supplementary swiddening. In 1950, for Region Five as a whole, only 60.4 per cent of the households engaged in agriculture owned two rai (which is only .8 of an acre) or more of paddy land.⁵ In Lampang Province, which had the largest percentage of rural households in the region owning paddy land, only 73.1 per cent of the households engaged in agriculture owned two rai or more of paddy land; in two provinces, Mae-hawngsawn and Nan, less than 40 per cent owned paddy land of two rai or more. Some villagers work as tenants, but the Economic Farm Survey by Kassebaum and associates estimated that 84.4 per cent of the land used for farms in the north is cultivated by the owner. (1953: 62; note also Judd 1961: 22, 54)

A further indication of the extensiveness of swiddening is the fact that a large percentage of Region Five farmers who have paddy land holdings must practice supplementary swidden farming because northern land holdings average only 10 rai (4 acres), less than 40 per cent of the national average. Again, in Nan Province, not only do paddy farmers with small holdings supplement by swiddening, but large areas surrounding the town of Nan itself are swiddened by town dwellers to supplement their low incomes.

³Statistics given in this section are taken from the B.E. 2490 (A.D. 1947) General Census of the Thai Government, from the 1950 Agricultural Census conducted by the Ministry of Agriculture, and from the summaries of these censuses prepared by the Division of Agricultural Economics of the Under-Secretary, Ministry of Agriculture. The first two are published only in Thai. A summary of pertinent statistics relating to northern Thailand will be found in Appendix A.

⁴Nan Province in 1957 reported 33,861 rai in swiddens compared to 104,294 rai in paddy. However, the report for Nanoi District failed to include swidden acreage; thus the amount reported is based on only four of five districts. These statistics are taken from the report for 1957 to the Rice Department prepared by the Nan Province Rice Department Officer, and secured from him personally in January 1958.

⁵Arrived at by comparing the number of households engaged in agriculture according to the 1947 General Census with the number of farm holdings of two rai or more as reported in the 1950 Agricultural Census.

Considering that swidden fields are rotated on a multiple-year basis, it is obvious that more land is involved in swidden agriculture than in paddy rice culture in northern Thailand, probably more than twice as much. Therefore, I believe Pelzer's figures to be conservative. I estimate that at least a million people in northern Thailand alone are regularly involved in partial or integral swiddening. Admittedly, this type of extensive agriculture requires low population density, but under conditions in northern Thailand swiddening should be possible indefinitely as long as the density does not rise to over 40 persons per square kilometer actually engaged in agriculture. Only two of these eight provinces, counting urban dwellers also, are approaching this density, and for the region as a whole, the density is only 22.17 persons per square kilometer, with one province having less than 5. (Note Figure 1, page 83 and Appendix A.)

Considering land use in terms of its alternatives and potentialities, Gourou speaks of the brilliant economic future of tropical agriculture, but even here he admits that teaching swiddeners to try new ways will be difficult. He writes

Many, including the Rhade of Indochina, have returned to the ladang /swidden/. They have rediscovered cherished habits. . . and they obey the lessons of experience: they have observed that permanent rice fields, without manure, give lesser output per day of work than ladang. The passage from extensive to intensive techniques does not appear to the tropical peasant to be necessarily advantageous. Such an evolution is likely to be realized only where the following conditions prevail: exhaustion of the soils because of short fallows, reasonably high intellectual level of the population, introduction of techniques enhancing the productivity of intensive agriculture, opening of markets, and development of commercial agriculture. (1956: 344)

Pendleton has stated (1953: 42 and personal communication) that he considered swiddening as perhaps the best use of much of the hill land of Thailand, provided certain precautions are taken. Halpern has reached a similar conclusion for Laos

Certainly swidden agriculture should not be regarded as a primitive, inferior type of agriculture to be abolished as soon as possible. Rather it is an extensive type of land use well-suited to the mountainous areas. . . . Nor does swidden farming appear to be inferior as far as yields are concerned. Its one big drawback is that it can support only very limited populations. (1958: 37)

It is obvious, then, that swidden agriculture is a common and widespread practice among the northern Thai; it is economically and culturally important and is apt to remain so for a considerable period of time in the future. A study of the agriculture of northern Thai swidden farmers is needed, therefore, to help round out the picture of Thai society that is being sketched in by the various postwar studies sponsored by the Cornell University Thailand Project.

Place and Time of the Research

The site of the research reported in this Data Paper is ~~Commune~~ Baw (Tambon Baw) in Muang District (Amphoe Mu'ang) of Nan Province (Jangwat Nan) in northern Thailand. This ~~commune~~ is composed of nine hamlets and one "incipient" hamlet, which for administrative purposes have been grouped by the government into four legal hamlets (mu ban). In this paper, "hamlet" is defined as a distinct geographical area with a cluster of homesteads in which most primary face-to-face relationships of daily life are maintained, and which is the natural social unit for group activities. A "legal hamlet" is the lowest government administrative unit, and is served by a hamlet headman (phu yai ban).

The full-scale field research was carried on during the period of January 1958 to May 1959, but some contact with the ~~commune~~ has existed since 1955 and has continued by correspondence up to the present." Details of the research methods, the schedule used, the research assistants, and other methodological aspects of the study will be found in Chapter II of the thesis. (Judd 1961: 12-19) Statistics given which refer to ~~Commune~~ Baw are taken from the household census carried out by the author in 1958-59 unless credited to some particular government official. General statistics on Thailand are taken from the B.E. 2490 (A. D. 1947) official Thai Census.

Chapters on the general cultural environment of northern Thailand, and on the history of each hamlet in ~~Commune~~ Baw and its current composition, as well as on kinship, education, religion, health, politics, leadership patterns and values, and social, technological, and ideological change are not reported in this Data Paper, although references to them are made when pertinent. The reader is also referred to the thesis for the nineteen maps and thirty-eight illustrations included therein.

CHAPTER II

SOIL AND PLANT RESOURCES: CURRENT AND POTENTIAL LAND USE IN COMMUNE BAW

Climatic Conditions

The only official weather records systematically kept in Nan Province are recorded at a government weather station just south of the municipality limits of Nan. Since the nearest border of Commune Baw is about 14 miles north, and the topography there is hilly as opposed to the relatively level area near the weather station, the statistics are not fully applicable, but they will give some idea of the rainfall, temperature, and relative humidity conditions in the Commune. The figures given are the averages for the ten-year period of 1948-1957 (B. E. 2491-2500).⁶

During the months of April through July, there is between 4 and 8 inches of rain (100-200 millimeters) per month, in August an average of 13 inches, and in September over 10 inches. October averages about 3 inches, followed by three months with less than 1/3 of an inch; February averages a half inch and March an inch and a half. The average annual total is 52 inches. From year to year there is considerable variation, however, so that in April in five of the ten years studied there was less than the minimum four inches generally considered necessary to maintain a crop, and even in May the rainfall was less than five inches during the six of the years. The effect is to create sufficient uncertainty in the minds of the villagers to cause most to delay plantings of rice until late May or early June. Furthermore, any crop planted or growing from October on must be able to secure its needs from water already in the soil. The maximum rainfall recorded for a single month during these ten years was 18 inches in August 1955; the greatest total rainfall for a year was 63 inches in 1951.

According to the official statistics, the temperature varies between a high of 100° F. (37.8° C.) in April and a low of 51° F. (10.8° C.) in January, (although I personally have recorded a low of 38° F. (3.3° C.)). During the rice-growing season, day and night temperatures vary 20 degrees or less, (ranging between the seventies and nineties), but during the coldest months, January through March, differences of over 30 degrees are common. Around noon any day of the year, the temperature rises at least to 80° F. Obviously, in this area temperature is not a major limiting factor in growing most crops, although there is insufficient cold to break dormancy in many temperate zone crops that might otherwise be introduced.

Sunrise and sunset are never more than a half-hour before or after six o'clock, giving very little difference in day length. These limited differences are, however, sufficient to govern flowering on the date-

⁶All weather statistics for Nan Province were secured through the Provincial Agricultural Officer of Nan. See summary in Appendix C.

fixed varieties of rice grown, and prohibit the introduction of japonica varieties of rice.

In spite of the distinct rainy and dry seasons, the relative humidity remains fairly constant, never averaging less than 60.7 per cent any month during 1948-1957 nor more than 85.7 per cent. During these ten years March averaged the driest with 64.4 per cent humidity and August the dampest with 83.9 per cent. One is most aware of the high humidity in May which averages 9 per cent higher than April, the greatest between any two months. In May the humidity actually is only 76 per cent, which is the same as the average for the whole year.

The Soils of Commune Baw

In order to understand the soil resources of Commune Baw, it is necessary to see first how they are related to the soil resources of all northern Thailand. Only a limited amount of soil mapping has been carried out in northern Thailand, most of this under the direction of the late Dr. Robert Pendleton. On the "Provisional Map of the Soils and Surface Rocks of the Kingdom of Siam," (see Figure 2, page 85) published in 1953, it will be seen that small areas of soil types 5, 8, and 10 have been distinguished, but that most of Nan Province is shown as having type 30 soil! Dr. Pendleton describes these soils as follows:

Type 5 -- Korat Fine Sandy Loams: Often with pisolitic laterite in the sub-soil. Within this map number is included the Kumpawapi sandy loams. These are deeper soils which occupy elevations, and do not have a laterite horizon.

The Korat fine sandy loams soil group is one of the largest in area, and at the same time one of the most infertile in the Kingdom. These soils have been weathered from "red bed" sandstones of the Korat series in which there are not many mineral fragments to weather, and which, in doing so, could liberate plant nutrients. There are shale strata within the "red beds" formation, which when they weather give rise to clayey soils. But there is seldom, if ever, any evidence of these clays at the surface of the soils except the clay in the termite mounds.

These termite mounds are quite numerous except in the tungs (savannas) and the heavier soils are quite well supplied with nutrients and an excess of lime (calcium carbonate) for certain crops. Many farmers truncate termite mounds somewhat for growing of many crops which cannot be grown on the unmodified or unfertilized Korat fine sandy loams. However, it is not advisable to completely level the mounds in order to cultivate the field as a whole, unless the site of the mound, of the same diameter of the mound and to at least a meter below the general field surface, is excavated and well and widely spread over the field, while the excavation made where the mound was is filled with surface soil from some distance from any termite mound.

The natural vegetation on this Korat fine sandy loams group is usually pa pae: open forest, almost a park-like savanna, in which

the trees are smallish dipterocarps of characteristic shape and growth forms. . . .

When the topographic position of these loams is suitable, the land is diked to make padis. "Suitable" locations are mainly the lower portions of the terrain where seepage water from higher forested slopes reinforces the rain which falls directly onto the padi itself. On many higher slopes and flattish portions of the terrain, the padis have a scattering of krabaen, wa, Dipterocarpus tuberculatus, and other characteristic trees.. Evidently there the soil of the padis is not only not under water long nor even saturated long enough to deprive these tree roots of the air they need. Nor do the great majority of the farmers wish to cut these trees in their padis, for many of the peasants in numerous localities, told us that "these trees were manure" and that they certainly did not wish them cut. . . .

Kumpawapi sandy loams: The higher, coarser-textured sandy ridges or irregular soil bodies need to be distinguished. These soils are deep, without any characteristic horizon differences or a distinct profile. No laterite horizon had developed because of the higher topographic position and the free drainage. These bodies of Kumpawapi sandy loams, from one to several meters above the finer-textured padi plains, unless man interferes, carry a tall forest of yang (Dipterocarpus alatus), mai takien and other big trees. But by kaingining [swiddening], these forests, with the generous supply of ashes which results, give a good yield of some upland crops. . . .

Type 8 -- Limestone Buttes: Often precipitous crags and buttes; usually rough topography. This map group includes low heavy soils from weathering of limestone, the red friable clay soils, but which are more often called "tropical loams". At times these red clays, derived from limestone, contain large quantities of small spherical iron concretions. . . .

Geologists distinguish several sorts and ages of the hard, dolomitic limestones, some almost marble, which give much character to the landscape in certain parts of northern, western and peninsula Siam. But thus far differences in the limestones have not been correlated with any observed soil differences. . . .

In many other places of the Kingdom are limestone crags and bluffs which add greatly to the scenic aspects of the landscape, but have contributed extremely little to the soils, because when these limestones do dissolve there is very little insoluble residue remaining behind to form soil. . . .

Undoubtedly the most important agricultural effect of these limestones is the considerable quantities of phosphatic bat guano which the farmers of the peninsula [and the north] collect in the caves of these crags, and carry (hap) to their padis. . . .

The limestone regions known along the Burma border, and so

suggested by schematic banding on the map, have not been studied by a pedologist, nor do we have any adequate information from other sources as to the character of the soils there. However, the difficult terrain, the wet weather and the unusually serious endemic malaria make this region of only little agricultural or other economic importance-- mining, foresting, and water power excepted.

Type 10 -- Chieng Mai Loams Recent alluvial soils and some stream terraces, especially in mountain valleys. These soils are best developed in the Chieng Mai valley, where the Ping and tributary rivers have deposited considerable bodies of very fine sandy loams, silt loams, and light silty clay loams in the lower portions of the valley. These soils for the main summer padi crop as well as for peanuts, soybeans as the winter crop react well under irrigation; also garlic, near Lampon. [sic] In the lower portions of the terrain where the sand is apt to be too wet for soybeans or peanuts a second crop of padi may be grown.

The Prae valley also has a considerable body of these Chieng Mai loams, which with irrigation also produce peanuts following the principal crop, padi, of the rainy season.

In the Lampang valley, there is shown on the Provisional Soil and Rock Map far too much of this Map Group 10. Actually there should be much more of Map Group 5 and relatively very little of Group 10.

In the Chieng Saen, Chieng Rai, and Muang Payao-Me Ing region there is also far too much of Map Group 10 shown. In this region the gradient of most of the streams is low, the soil has weathered much longer, has a more developed profile, so is heavier and "older". Moreover, for the lowlands of these valleys there seems to be no simple nor easily utilized source of irrigation water, which makes Map Group 10 in the Chieng Mai valley so productive by contrast during the dry winter season.

In the Central valley there are some important bodies of these soils: between Hadsieo and Sawankolok, and on down the Yom River past Sukotai, these recent alluvial soils are used extensively after the annual high water, for tobacco, garlic, onions, etc. Along the right bank of the Ping River, near Ampur Ban Pot Pisai, there is a considerable body of Map Group 10, where Chinese turnips are grown in these alluvial silt loams. . . .

Our experiments with fertilizers on this map group 10 indicates that seldom if ever do nitrogen and phosphorus fertilizers give worthwhile increased. But the residual effects on a following crop, particularly a legume, may make the use of commercial fertilizers worthwhile. . . .

Type 30 -- Rough Mountainous Land: From undifferentiated rocks. Soils usually shallow, steep and stony. Crop production by kaining. A glance at the Provisional Map of the Soils and Surface Rocks will reveal that no bodies of rough mountainous land (map

group 30) are shown below 12° North, and on the peninsula and along the western side of the Kingdom there are no bodies of this group south of 16° North. This is because for those portions of the Kingdom we had at least some very rough geological and/or petrographical information which seemed to be worth incorporation with our other data.

Since in 1946, when we compiled our map, we did not have access to other data which seemed significant for most of the mountainous regions farther north, we put them into our "scrap bag" Map Group 30. It must be emphasized that there is as much or more "rough mountainous land" south of 16° North Latitude, as north of it, mentioned above, so we attempted to show in the south and west, "schematically at least, something of the kinds of rocks and a few hints as to the associated soils.

But now with the appearance of the Geologic Reconnaissance Map of Thailand on just about the same scale as our Soil and Rock Map it is evident that we could make many corrections and additions to our map, and eliminate most of Map Group 30. On the other hand, the agricultural value and significance of the kinds of rocks in the mountains (Map Group 30) are so slight in at least most cases, that for our immediate purposes the petrographical characteristics are of relatively very minor significance. (1953: 2-13)

In the last article written before his death in 1957, Dr. Pendleton regrouped the soil types shown on his provincial soil map. That regrouping is given below. The soil types underlined twice are the ones found in northern Thailand and those starred"(*) are found in Nan Province.

A Generalized Key to the Soils of Siam

A. Lowlands: Smooth topography; poorly drained alluvial plains.

1. Mainly for padi. Ridging, or raising the land (rong), is necessary for many crops other than padi.
 - a. Heavy, low clays, e.g. Bangkok clays. Transplanted padi.
 - b. Very acid, heavy crops, very poorly drained, e.g. Ongkarak clays. Broadcast padi.
2. Clays too saline to grow field crops, e.g. Tachin clays. Salt making; fish ponds and shrimp farms, mangrove for firewood, charcoal, and poles. Ridged for coconuts and fruits.
3. Diversified cropping often possible -- main crop of padi followed by soybeans, peanuts, garlic, or second crop of rice.
 - a. Recent alluvia, e.g. Chiengmai loams*
 - b. Undifferentiated"alluvia in Central Valley, e.g. Yom clays and loams.
 - c. Recent coastal ridges, coconuts and fruit trees on beach ridges, padi between, e.g. Pattani sandy loams and clays.

B. Flat to Gently Sloping: Old deltas, terrace lands, shallow soils on hill and mountain"footslopes.

1. Deeply weathered; old, well-drained, formations.
 - a. Ferruginous concretions, e.g. Krabin gravelly loams. Fruit trees, upland crops.
 - b. Friable, deep red clays, from mafec rocks, e.g. Cbantaburi clays. Pepper, rubber, fruits.
2. Deep soils with flat topography, e.g. Gula Ronghai" silt loams. Poor grass pasture; fishing during rains.
3. With irregular delta topography and variable textures, e.g. Kampaengsaen loams. Tobacco, cotton, sugar cane, padi in low portions.
4. Mountain footslopes from granitic rock, e.g. Sritamarat sandy and coarse sandy loams. Upland crops as paw gaew (kenaf) and maize, peanuts, castor beans, bananas, and fruits. Clearings (kaingins) in rains. Rubber in S. E. Siam and in Peninsula.
5. Soils of moderate depth.
 - a. Marl substratum, e.g. Lopburi clays. padi and early cotton.
 - b. Residual soils of good depth to bedrock, e.g. Pakchong loams. Peanuts, maize, fruits, oranges, lamyai, jahk, "sugar cane.
 - c. Silt loams on outwash plains, e.g. Bangkla silt loams. Padi.
 - d. Sandy and fine sandy loams from sedimentary rocks, e.g. Korat fine sandy loams,* Pasture; open forest; when flooded for padi, becomes Roi Et fine sandy loams.
6. Soils shallow.
 - a. Residual from mafec rocks, e.g. Chaibadan clays. Upland crops, kapok, fruit trees, pasture, legumes.
 - b. Residual from sandstone; laterite horizon in subsoil, e.g. Sakon Nakorn loams. Forest, some padi.
 - c. Loams residual from sandstones, underlain by variegated, dense clay loams, e.g. Ponpisai sandy loams. Padi, pasture, and open forest.

C. Uplands: Hilly to steep topography.

1. Residual soils of shallow depth to bedrock.
 - a. Intermediate elevations, from quartzitic sandstones. Forest, pasture, clearings for annual crops"-- cotton, maize, vegetables. Map Group 42.
 - b. Higher forested hills on gneisses, e.g. Kuntan sandy loams. Forest and pasture.
 - c. Limestone outcrops and crags.* Forest.
 - d. Rough mountainous land* not otherwise classified. Forest, timber, clearing culture (kaingining /swidden/ for upland rice; opium poppies. (1958: 6-9)

Soil samples were collected in Commune Baw in April 1959, April 1960, and October 1960, and have been analyzed in the Soil Testing Laboratory of the Department of Agronomy, New York State College of Agriculture, Cornell University. Although these samples were secured from the swidden sites of

most of the hamlets, due to communication, transportation, and other problems, it has been impossible to guarantee that all samples were collected from the same exact locations, thus no attempt is made to compare the sites of the different hamlets. (A significant research problem for the future is to test the soils of swidden sites prior to clearing, after burning, in the middle of the rainy season and again at its end, after harvest, and the following April, August, and December for five years [when the same site might be re-used].) Comparing all samples of each sampling period together, the following generalizations have been hypothesized.

The organic matter percentage is considerably higher than would be expected from temperate zone soil theory. At the close of the rainy season, it still tested 3-4 per cent. Under forest or jungle conditions in the tropics, the vegetative growth is so abundant that there is much litter supplied to the soil. Clearing and burning adds to the soil organic matter, with some sites showing as much as 6 per cent. The Commune Baw soils all seem to be medium-textured silt loams; thus both from organic matter content and soil texture, the cation exchange capacity is high.

The pH range of top soils at the beginning of the rainy season is near neutral at many sites. As the ash is washed into the soil or carried away in the run-off after heavy rains, soluble carbonates are lost, and the pH drops; three sites tested as low as pH 4.8 in October. This lowering of the pH considerably increased the amount of iron and aluminum available, making the latter toxic in three of the soils tested.

In the Commune Baw soils available, phosphorus is generally low and becomes very low during the rainy season, probably both from being taken up into the crop and from becoming fixed as iron or aluminum salts. Magnesium begins and continues to be adequate or in excess. Even though some of the potassium is lost in the rainy season, it remains highly available. Manganese is present in excess amounts at the start of the crop year, and remains in adequate concentration in all soils tested.

On the basis of these very inadequate tests, it would appear that sufficient nutrients should be available for a second year's rice crop, especially if lime and phosphorus were added. The lime would not only supply the needed calcium, but would overcome the aluminum toxicity by raising the pH. All things considered, Commune Baw soils are not bad.

Vegetation

The dominant forest vegetation of Commune Baw is that called "Mixed Deciduous." There is some teak (Tectona grandis Linn.) still standing in the least accessible parts of the Commune, but the more common trees in the live-in area are phayawm (Shorea floribunda, Kurz.), taeng (Xylia kerrii, Craib et Hutch.), tabaek (in Nan called pu'ai) (Lagerstroemia calyculata, Kurz.), kabok (mamu'n) (Irvingia malayna, Oliver), takhian (Hopea odorata, Roxb.) yom hin (Chukrasia velutina, Roemer), yom hawm (Cedrela toona, Roxb.), makhatae (Sindora siamensis,

Teysm.) rang (pao) (Pentacme siamensis, Kurz.), teng (ngae) Shorea obtusa, Wall.), chancha (Kleihovia hospita, Linn.), kaw (Quercus kerrii, Craib), pradu (Pterocarpus indicus, Woldl.), and kapung (ngun) (Tetrameles nudiflora, R. Br.)

The undergrowth is varied, but consists mostly of various bamboos among which are mai ruak (Thyrsostachys siamensis, Gamble), mai rai (Oxytenanthera albo-ciliata), mai sang luang (mai sang nam) (Bambusa arudinacia, Willd.), mai sang pa (Dendrocalamus membranceus, Munro.), mai sang kham (Dendrocalamus latiflorus, Munro.), mai sisuk (Bambusa blumeana, Schult.), mai hia (Cephalostachyum virgatum, Kurz.), mai pong (Bambus tulda, Roxb.), mai pong nam (Bambusa burmanica, Gamble), mai khao lam (Cephalostachyum pergracile, Munro), and others known only by their Thai names. (The uses made of each of these is discussed in Chapter III.)

Dr. Egbert H. Walker, then of the Smithsonian Institution, visited this Commune in November 1957, and reports as follows on other undergrowth:

The major weeds at the time of my visit. . . were the amazingly variable composite Eupatorium odoratum, dominating every thicket and invading the fields, and the grass Miscanthus, especially abundant along the river banks. In these thickets were found also vines and trailing plants of various taxonomic groups, especially cucurbits (melons), legumes, Vitaceae (grape family), Asclepiadaceae (milkweed family), Dioscorea (yams), the climbing fern Lygodium, and the fern ally Selaginella. . . .

The most dominant group of plants. . . were the bamboos. . . Ferns were fairly abundant, especially in the gullies, but my specimens have not been identified. I was especially impressed by the climbing species". . . The few climbing bamboos also were interesting". In these deeply shaded gullies I found various more or less tender herbaceous plants, among them aroids, one apparently an Amorphophallus with a spathe too large and fleshy for my equipment for collecting, another genus being Aglaonema. There were a few orchids, also Chloranthus officinalis, a couple of genera of the ginger family (Zingiberaceae), a few Gesneriaceae, Acanthaceae, and Connelinaceae.

We augmented lunch with fresh wild figs. . . probably Ficus auriculata. . . Other trees and shrubs in these gullies were a palm, apparently an Arenga, a Sterculia, another Ficus which I cannot name, the thorny Toddalia, and Euonymus". Among the bamboo stands in an area of former cultivation, I found small trees of Maesa, a genus of the Myrsinaceae.

Dr. Walker also reported that on the east side of the Nan River, higher up in the hills, he found some acorns from oaks (Quercus) and chestnuts (Castanopsis) that perhaps were "forerunners of the 'hill

⁷From a personal communication dated January 30, 1961.

evergreen forests' beyond. Here also were obviously dipterocarps, but with no identifiable specimens within my reach." According to a 1955 publication of the Royal (Thai) Forest Department it is characteristic of the mixed deciduous forests that they are replaced on the higher hills by hill evergreen or coniferous forests, on the lower foot-hills and plains by the deciduous dipterocarps forests, and in moist situations near rivers and streams and in damp valleys they give place to forests of tropical evergreen and semi-evergreen types.⁸ In Commune Baw, all of these variations occur, as attested by the varying kinds of trees and undergrowth mentioned above.

Wild Life in Commune Baw

There are many kinds of wild life in Commune Baw, ranging from very small to large animals. Birds are common at all seasons of the year and are shot for food, especially wild chickens (kai pa), dove (nok khao) and heron (nok yang). Other birds seen include singing minna" (nok iang), quail (nok khum), teal (nok petnam), woodpecker (nok huakhwan), parrot (nok kao), robin (nok kangkhen), weaver or baya (nok krajap), pigeon (nok pilap), Burmese green pigeon (nok plao), Burmese peafowl (nok yung), red-crested hill partridge (nok kratha), kingfisher (nok"kraten), and warbler (nok krajip)".

Among the many kinds of fish caught are the carp (pla so'i, pla siu), serpent-head (pla chawn), catfish (pla thepho, pla taw), globe fish (pla pakpao), goby (pla bu), minnow (pla paeb, pla aep), and several without English names: pla salit (Trichogaster pectoralis), pla kradi (Trichogaster trichopterus), pla taphian (Puntinus schwanefeldii), and pla krai (Notop-terus chitala).

Of the smaller animals caught and eaten are field rats, porcupines," snakes, frogs, squirrels, and turtles. Red-ant eggs are eaten and white-ant larvae are fed to the chickens and used for fish bait. Wild pigs and monkeys are shot occasionally, as are goat-antelope (liangpha), the banteng (wild cattle) (wua krating), bear, several kinds of deer (kwang, ihen, fan), and several kinds of wild cats (sua). Black gibbons are captured and sold occasionally. A herd of wild elephants," variously estimated by the villagers to number between twenty and one hundred, lives in the western part of the Commune and forages in the area near the hamlets during the dry season. Occasionally these are shot, though they are more often avoided.

Current Land Use

Of the 62,500 rai (25,000 acres) of land that lies within the area used for all purposes by the Commune Baw villagers, probably less than 2.4 per cent (1500 rai) "is actually under cultivation in any one year." In 1959, fewer than 500 rai were claimed legally by individuals, of which only 309 rai were under cultivation -- as gardens or orchards." Until the

⁸Royal (Thai) Forest Department, "Types of Forests of Thailand," The State Railway of Thailand Printing Office, Bangkok, March, 2498 (1955).

government in 1956 requested everyone in the country to file claims for land in use, there were very few legal claims to land in Commune Baw. Most households have claimed only one ngan (1/4 rai, 1/10 acre) as a house lot, so less than 100 rai are claimed in the Commune for this use. None of the area used for swiddening, which is under 1000 rai (400 acres) each year, is claimed legally by the villager, as will be explained in detail in Chapter IV.

The bulk of legal claims are for orchard sites along the rivers and streams. In 1953 a small orchard was planted in HY2. In 1954 a larger orchard was begun at the site now known as incipient hamlet PT1, by a Christian doctor from Phrae Province who had become acquainted with the Commune through visiting the Christian group at HPS1, and who enjoyed the hunting possible in the area. The doctor's brother and two Christian teachers from Phrae began orchards the following year, as did the Laotian family at RPW2. Others from outside the Commune have claimed sites since, including the largest orchard planted to date, 25 rai, by a Christian doctor from Nan. By the Fall of 1958, 309 rai had been claimed legally as orchard sites by 87 persons, but the majority of these had not yet been planted to oranges. Most claims are for two rai; only nine claim more than 5 rai; only three more than 10 rai.

Tangerines are one of the few exports of Nan Province. Expansion of the tangerine industry in the past ten years has come about through the growth of interest by the salaried and merchant groups in Nan Town, for these people have the cash resources necessary to purchase the marcottes for planting, to secure fertilizers and sprays, and to have the young trees cared for during the five years before they begin bearing. As orchard space has become more limited and more expensive near town, sites have been sought along the road, paths, and especially the streams out from town. Passing these new orchards en route to town, hearing the profits made by the first planter in HY2, and seeing new sites being claimed by outsiders near their hamlets, many Commune Baw villagers responded to advice from the headmen in 1957 to stake claims themselves. For those not having the funds to plant oranges immediately, the sites have been used first as swidden sites, then as gardens for planting peanuts or cotton, banana or kapok trees, or for castor bean trees. (In 1957, a Chinese merchant tried to get swiddeners all over the province to plant castor bean trees from seed that he furnished and the crops of which he guaranteed to buy, but few maintained interest after the one season because the yield was low and the price too low, considering the difficulty of removing seeds from the husks by hand.) Table 1 will illustrate the extent of orchard site claims made by the different hamlets.

Table 1. Percentage of households in Commune Baw hamlets claiming orchard sites and percentage of sites actually planted to orange trees in October 1958.

Hamlet	(Percentage value of each household)	Percentage of households making claims	Percentage of households that had planted oranges
PK4	(1.0)	27%	12%
HPH1		0	0
WM1	(3.2)	32	0
HPS1		0	0
RPW2	(11.0)	22	22
PN2	(7.7)	23	15
S3	(6.6)	66	20
PW3	(7.0)	63	0
HY2	(2.5)	65	30

Note that the highest percentage of villagers making claims live in the hamlets under the most direct care of the kamnan, PW3 and S3, but that in spite of their relative prosperity, they have done very little toward getting orange trees planted. The residents of HY2, who have the closest contact with townspeople and who have had the opportunity to observe the potential results most closely, have invested the most time and money. According to the law, any land claimed must be inspected after three years and if permanent improvement is obvious, ownership is allowed. Undoubtedly, many of these orchard site claims will not be allowed, unless "improvement" is quite liberally interpreted.

Figure 3 (page 87) indicates the areas used by the various hamlets for swiddening and the location of orchard sites. One needs to remember that approximately 85 per cent of the Commune land area has never been used for any types of cultivation, although most of the area has been explored at some time by villagers while forest harvesting or hunting. It will be noted that Huai Tiu forms the western boundary of land used to date for swiddening, but a large portion of the commune is west of Huai Tiu.

Potential Land Use

At the present time there is a population density of only 13 persons per square kilometer in Commune Baw. It would be possible for at least three times the present population to practice an extensive type of agriculture such as swiddening in this area, if the hamlets were scattered around so as not to require excessive walking to and from swidden sites. What, however, are the alternative types of agriculture that might be carried out under the prevailing climate and soil conditions?

By careful planning and a few additional weedings, all land used for rice production could be after-cropped to produce a cash crop maturing before all water is gone from the soil. If the weeds were controlled by mechanical plowing or chemical sprays, it should be possible to get a second year's rice crop without too great a drop in yield. By applying fertilizer, lime, and rotations, some fields might be usable permanently. Were terraces built on the hillsides to delay water run-off and minimize soil erosion, some areas could be put into permanent wet-rice culture, especially if the streams were diverted into the fields as high up the hillsides as possible. All areas that are naturally flooded each year, either by the Nan River or any of its tributaries, could be planted to a cash crop such as tobacco, corn, pigeon pea, potatoes, or peanuts in September or October. Grasses could be sown into the cleared swidden toward the end of the year, and pasture provided for a limited number of livestock. All timber of usable size and quality, could be removed from the swidden before burning, and sawed to transportable size.

However, the easiest and most universally possible alternative to the abandonment of used swidden sites would be to re-forest the site with some tree crop. This might be fruit trees, nut trees, species valuable for timber, or a combination. As soon as these trees came into bearing, there should be sufficient income from them to allow purchase of lowland rice, and thus reduce the necessity for extensive swiddening. Many types of trees would grow in this soil; the choice should be made from those most valuable economically, perhaps with a mixture of short-term and long-range income potential. Among the possibilities are certain bamboos, castor bean, coffee, tea, citrus, mango, tung oil, and coconut, for which markets exist if grown in sufficient quantities. Such tree culture would not involve too drastic or difficult a change. It could easily be assisted by the government or some other change agent who would need only to provide planting material (seed or vegetative) and technical advice. Transport into and out of most of the present hamlets, while involving problems, can take advantage of both water and land avenue: the river and the "roadway". These tree crops would be better able to draw nutritive requirements and moisture from the soil than any type of field crop. If the land that is cleared for swiddening were kept in commercial use, the present waste in labor would be avoided.

Involved in any change from present practices are three types of problems: financial, technical, and social. Most of the Commune Baw villagers operate on so narrow a margin, many even on a day to day basis, that even as simple an innovation as plowing with buffalo or fertilizing would require some outside help in financing to get it started., (presuming that the proposed practice was proved practical for the area concerned.) A slow, but perhaps the soundest approach, would be to help the villagers study about and then begin a credit union. Technical advice would be necessary for most innovations, although tree crop culture would be partially in line with the villagers' past experience and understanding. A pilot project by several hamlets would build confidence and train skills necessary for expansion to a full-scale plan. Agricultural changes that would still allow the villagers to live together in hamlets, to work together in groups, and to continue to have easy access to some forest (especially for hunting and securing bamboo) would be more apt to succeed.

Few laws would need to be passed or repealed to allow such changes, but changes in attitudes by both government officials and villagers would be necessary to work out the necessary adjustments and requirements of positive cooperation. Since this Commune is not over-populated now, it would appear more realistic to introduce the proposed changes through the school children and the youngest swiddeners, perhaps through 4-H type clubs, without trying to change the customs of the older villagers directly.

CHAPTER III

THE TECHNOLOGY OF COMMUNE BAW

Introduction

Since the principal occupation of the people of Commune Baw is swidden agriculture, most of the technology is closely related to subsistence farming. While it cannot be stated that the picture presented here is true of all northern Thai communities that practice swidden agriculture, certainly there are many features of Commune Baw technology that are found in other parts of Nan Province and that are common to hamlets practicing integral swidden agriculture in other northern provinces.

Obviously, it is necessary to refer to some of the occupations of the villagers in discussing their technology; however, occupations, as such, are discussed separately in Chapter IV, and economics in Chapter V. Since so much of the technology is concerned with the home, housing is discussed first.

Housing

The most typical house found in Commune Baw is constructed of wooden posts 8 inches in diameter, bamboo walls and floors, and a grass roof. It has about 30 square yards of floorspace, and is raised about 5½ feet off the ground. The open porch at the front, which is reached by ladder-like stairs that can be either of odd or even number, is usually made of round bamboo poles (or waste sidings from sawed lumber) separated about a half inch through which the rain or waste water can easily drain. Behind this, with the floor raised 4-6 inches is a covered porch where meals are eaten, handwork done, and guests received. Enclosed behind this is the family bedroom (a large permanent house will have this area divided into two or three rooms), and off to one side is a separately roofed section used as a kitchen and store room. The unhulled rice is stored next to the kitchen if the amount is limited. Families with large harvests are apt to have a separate storage building raised to the level of the house and connected to the far side of the front porch, or, as in S3, completely separate from the house. The actual bin is usually round, woven of bamboo and covered with clay on the inside. To one side of the open porch on a raised platform, covered clay bowls hold drinking water, and nearby is hung a coconut shell dipper so that the family and guests can get a drink whenever they wish. Also at an edge of the porch one often sees a seedbox where onion, pepper, and other seedlings are started, and half-bips (halves of old 5-gallon gasoline or kerosene tins) planted with lemon grass, mint, garlic and other herb seasonings. Clothes of all members of the family, may be seen drying on the bamboo railings around the porch.

Most families begin with such a house. They gather the four or more kinds of bamboo commonly used in construction, cut posts of either soft or hardwood timber, and harvest yakha (cogon grass). This normally takes

about two weeks. Another week is given to weaving the grass into shingles (faek) about two yards wide and two feet long, and to making several sizes and types of bamboo string (tawk) to use in binding parts of the house together." Finally some refreshments are prepared and perhaps some liquor is made or bought. Then friends and relatives whom they have helped, or expect to help, are asked to come to build the house which may be completed in one day if enough people assist and if the supplies hold out. Quite often some kind of bamboo is in too short supply, so work stops for a day or two until the owner has cut and brought to the site the supplies needed.

The work of construction is a jolly time for all. Often different groups race each other to complete some part, there is a lot of banter back and forth, and frequently everyone stops to have a drink, chat, and rest. It is not always necessary to feed those who help, although this is often done by the owner's wife and some neighboring women, but it is necessary to have miang, betel nut, water, and perhaps some dessert or bananas lying around for the helpers to eat whenever they rest. (Miang is made from the leaves of wild tea plants which are pickled and wrapped around a piece of rock salt. It is a mild stimulant commonly chewed or sucked /om/ after meals.) The men often have liquor to drink, if not at noon then towards the end of the day when work stops.

The size and shape of the house to be built depends upon the wishes of the owner and the supplies he furnishes." Few houses are smaller than 12 square yards and few of the type described above are larger than 36 square yards. Some houses are made of such poor materials that they need replacement the next year, but almost all will stand with very minor repairs for at least three years." Most people replace broken porch flooring or leaking roof shingles, and perhaps add to or revamp their bamboo house a little each year so that parts of it may be used as long as seven or more years before being entirely rebuilt. On the other hand, few people value this type of house so much that they will let it deter them from moving somewhere else if they take the notion, and remains of such houses are a common sight all over Nan Province.

Widows and handicapped villagers are often helped to a greater extent in house or hut building, including even the gathering of the necessary bamboo or posts; however, a capable but lazy family frequently will be criticized and never helped in the gathering of housing materials.

Some permanent housing is found in each of the Commune Baw hamlets." Seldom, however, does anyone decide to build a permanent house and actually do so immediately. Rather, a family that wishes to have a better house will gradually accumulate planks of wood, sawed by themselves or bought from others, and some thick hardwood posts. When enough has been accumulated to lay at least the floor of the house, they will rebuild, completing the house with bamboo and grass. If the wood being saved is teak, the planks will be tied onto the original house, because although it is illegal to cut teak (mai sak), once it is attached to one's house, the government will not take it away. After completing the posts and floor of wood, additional planks can be added to the walls until after a few years the whole house is of wood. The floor of any house is the most important part since the family sleeps, eats, and sits on the floor. Rare is the house with a chair or table, though low stools are occasionally used.

A few families, especially in PK4, have acquired enough wealth to build permanent houses with massive hardwood posts and all wooden walls. The roofs of older permanent houses are made of teak shingles or clay tiles, but newer ones have corrugated zinc sheeting or cement tiles. When a family erects this type of house, they gradually do most of the work themselves while continuing to live in their bamboo house, sometimes hiring others to help with some parts of the construction. They do not normally ask for free help except in raising posts or for other heavy jobs that require several men. Most homes, whether built of bamboo or of wood, are constructed during the dry months of February to May, but it is not rare for someone to decide to rebuild any time of the year.

If the husband or wife dies, the house is usually taken down and rebuilt at a slightly different location so that the spirit of the departed one will not bother those who remain.

Whenever a new house is built, a dedication ceremony of some sort is held. This ceremony (khun ban mai) may be simple or fancy depending upon the hamlet and the wealth of the owner; it is sometimes held on the day of moving in, but it may be held several days later. Care is taken that the moving day is a propitious one. The khun ban mai ceremony is described in Judd 1961: 280-281."

In the Commune as a whole, 95 per cent of the houses have posts of wood, the rest have bamboo posts. Fifty-three per cent of the houses have bamboo floors, the rest being wood of varying thicknesses. Only 37 per cent of the houses have any wooden walls, 14 per cent have woven bamboo walls, and nearly 50 per cent have walls of common split bamboo. Grass roofs are used on 93 per cent of the houses, most of the exceptions being in PK4. Roofs made of corrugated zinc, clay tiles, cement tiles, or teak wood tiles cover five or fewer houses each.

Still referring to the Commune as a whole, over half the houses are three years old or less, and about 60 per cent of all houses are of temporary construction. The quality of the 18 per cent of the houses that have been built of wood in the past three years varies widely. Less than 10 per cent of all Commune Baw houses have cost in cash more than 1,001 or more baht and 60 per cent of all houses have been constructed without any cash outlay at all. About 30 per cent of the houses in the Commune have separate buildings for rice storage. Most of the rest use either a circular bin on the porch or in the kitchen or have a separate room at one side of the porch, the last being the most common. In terms of overall floor space, 20 per cent of the homes have 16 square yards or less, 52 per cent have between 16 and 36 square yards, and about 28 per cent have more than 36 square yards.

Uses of Bamboo

Bamboo is extremely important in the life of the swidden farmer. It is eaten, used in construction, and for numerous handicrafts. In the preceding chapter, the eleven kinds of bamboo (mai phai) that are grown in Commune Baw were mentioned; their particular uses are as follows: (The usual diameter of the mature canes is given in parentheses.)

1. mai sisuk (5"): A large smooth variety that grows very tall. The young shoots are eaten. When mature, it is split for walling or flooring, and is made into tawk for bamboo handicrafts. It is also cut into sections for water containers to use when traveling or to carry to work!
2. mai sang luang (3-4"); mai sang lek (1½-2") and mai sang pa (5"): The larger type looks much like mai sisuk but is more common in Commune Baw and thus easier to find. As a shoot, mai sang is especially tasty to eat; when mature it is the favored bamboo to use as the stick (mai tuk kan) onto which the grass is tied to make shingles. Like sisuk, it is also used split into halves for wind breaks at the edge of the roof.
3. mai ruak (1½-2"): A smooth, middle-sized bamboo. If one is hungry, mai ruak can be eaten, but it is not favored. For construction, it is perhaps the most adaptable of all bamboo because of its size and quality. It is used unsplit for rafters, wall posts, open porch floors, and for fencing domestic animal pens.
4. mai pong (2-2½"): About the same size as mai ruak but rougher and less sturdy. The type of mai pong known as mai pong kai can be eaten as young shoots, but because it is so itchy to touch when mature, it is avoided. Mai pong kliang is not itchy when mature, thus it can be used like mai ruak for temporary construction, and is the most common bamboo used for making tawk, bamboo string.
5. mai rai (1-1½"): The smallest and commonest type of bamboo. Mai rai is used whenever small size round bamboo pieces are wanted. It is very strong when just cut, but disintegrates soon upon drying out! It is often used to make tawk and its shoots are the kind most often eaten because they are the most commonly available.
6. mai hia (2"): Seldom eaten; it can be used in many ways, but as it is relatively scarce in Commune Baw, it is used almost entirely for weaving bamboo walls for houses.
7. mai khao lam (1½-2"): No one eats this kind, but when the wood is young it is cut into sections and stuffed with rice and coconut milk (and perhaps beans or pieces of pork) and then placed around the edges of a fire to steam the rice. The burnt part of the bamboo is peeled off leaving a thin covering over the rice. Such sticks of khao lam are sold along the railroad tracks in many parts of Thailand and along the roads and paths of the town of Nan. In Commune Baw, this is so only at festival times. More commonly the mai khao lam is used in Commune Baw to make tawk, and sometimes it is used for construction.

The making of tawk is a continuous activity of the residents of all Commune Baw hamlets, for it is used in so many ways. Tawk is thin strips cut from the sides of a bamboo pole after the hard outside surface of the bamboo has been removed. It is prepared in several lengths and thicknesses, depending upon the type of bamboo used and the intended use. For tying grass in making shingles, the tawk used is relatively short and thin. For tying rafters or other major parts of the house frame together, longer and thicker pieces of tawk are necessary. Whatever the size wanted, tawk is

stripped from the cane soon after it is cut while still green and split or cut to the desired length and thickness, then it is tied in bundles and stored. Whenever tawk is to be used in the following year, it is first soaked in water so that it can be twisted without breaking. The villagers, as children, learn to tie things together so tightly that they will not come apart for years unless someone unties or cuts the tawk. This same tawk is used in making any number of handicraft items such as trays, baskets, fish, bird, and animal traps, lunch baskets, mats, toys, cages, and religious symbols, some of which are used by the household and some of which are sold. Some handicraft items combine tawk and wood or tawk and sections of split bamboo, depending on the intended use. The shavings left when making tawk are allowed to dry out for use as kindling in starting cooking fires.

Although abilities vary, everyone is able to make something out of tawk and at least one person of a household can usually be seen in the evening, if not during the day as well, sitting on the covered porch weaving an item out of tawk. Many families in HPS1, WM1, and HPH1 trade these handicrafts for rice after their supplies run out.

Bamboo is also sold to the townspeople in one form or another, mostly by the villagers of HY2, PN2, and RPW2. As long poles, it is transported by ox cart to town and sold, the price depending upon the variety. A certain amount of tawk is also sold to the shops in town, and in the early part of the rainy season, a fair amount of bamboo shoots of various kinds are dug and sent to town for sale in the fresh market.

Grass Shingles

As soon as the rice harvest is completed, or after the middle of December when there is free time, yakha (cogon grass) is cut and laid out to dry. After a week or more it is sorted and gathered into standard size bundles. (One kam is the amount a person can hold between his thumb and second finger; 12 kam make one khawn, and two khawn make one hap (one load, half suspended from each end of a carrying stick). Each khawn will make about ten shingles.) These bundles are carried back to the hamlet and can be seen hanging under most homes, in large quantity during the early months of the year and in lesser quantity during the later months of the year. This standard roofing material can easily be sold as bundles (khawn or hap), but is more often retained to make into shingles when time permits, usually by grandparents, widows, or other less active members of the household. There is some competition to prove who can make the best grass shingles, and therefore they differ in thickness and length, but most adults are capable of making usable shingles. Each year some shingles on everyone's house need replacing and additional use is also frequently found. The wat or church⁹ and certainly the school is apt to ask for a contribution of a certain number of shingles from each household. People in Nan and some of those from Nan who have planted orange orchards in Commune Baw come seeking to buy completed shingles or to contract for a certain number of shingles to be made. One shingle will cover only about two square feet of roof so a small house may require 200 shingles.

⁹The only Christian Church in Commune Baw is located at HPS1, although there are individuals or families in PT1, WM1, RPW2 and PK4 that have some degree of relationship with Christianity. (Judd 1961: 267)

When shingles are to be made, the bundle of yakha is first put into the river for an hour or longer to soften up the grass. The bamboo sticks are prepared in advance and tawk likewise. Everything is brought together under a tree or under the house and several grass stalks are folded over the bamboo, and tied with the tawk just below the bamboo stick, taking about 10-15 minutes per shingle. Completed shingles are stacked together or tied in groups of ten for later use or sale. The edges of the grass are sharp, thus fingers, arms, and legs often get scarred from working with the grass if one is not careful. In the hottest periods, work with grass (especially cutting and sorting) is never done in the midday sun, for salty sweat gets into scratches and irritates.

The actual roofing of a house is always done by the men and older boys who climb up into the mai ruak rafters and tie on the shingles with tawk, starting at the bottom and working up. The final technique used to cover the top ridge and the shape of the roof varies partly with the hamlet but more with the style of house being roofed.

Housing Differences Between the Hamlets

The differences in housing between the hamlets are not so much in kind as in degree. For instance, over 65 per cent of the floors in S3 and PW3 are of wood, and over 50 per cent are wood in WM1, PK4, and HY2, while only 25 per cent or less are wood in HPH1, PN2, and HPS1. No house has wooden walls in HPH1 and PT1, and only one or two do in PN2, RPW2, and HPS1, but 40 per cent or more have some wood walls in S3, PW3, WM1, PK4, and HY2. There was no cash spent in building any HPH1 or PT1 house, and 500 baht or less was spent, if any, in building houses in HPS1 and PN2, but 2,000 baht or more was spent on houses in PW3 and WM1, and over 4,000 baht on one or more houses in PK4, HY2, and RPW2. Houses in HPH1, PT1, and RPW2 are all less than 36 square yards in floorspace, but a third or more of the houses in PW3, PK4, and HY2 have more than 36 square yards of floor space.

Within the past year, one or more new houses were built in each hamlet except PT1, and PN2, but of these new houses only in PW3 and WM1 were more of the new houses of permanent construction than of temporary construction. In PK4 almost every conceivable type of house can be found, while in S3 all the houses look alike. About 75 per cent of the HPS1 houses are less than three years old, while less than 25 per cent of the PN2 houses have been built in the past three years.

Inside the House

Within the house the furnishings are meager-- woven mats for summer-time sleeping and for spreading to receive a guest; narrow kapok-filled mattresses and pillows; usually not more than two blankets and one mosquito net; a bassinet hanging by ropes from the rafters; a set of "good" clothes for trips to the wat or to town; clothes for daily use, usually patched or torn; assorted rags; a phakhama (an all-purpose man's sash, approximately 20 by 60 inches, used as turban, towel, bathing suit, dressing gown, belt, sheet, etc. ad infinitum); ankle-height canvas shoes; slipper shoes made of

old truck tire treads; an evaporated milk can made into a kerosene lamp, and a partly-finished handicraft item of bamboo which is worked on in spare time by either the husband or wife.

In the kitchen there are several sizes of baskets for carrying rice or greens and other plant foods found in the jungle; two or three clay pots and maybe an aluminum one, and the double-boiler-like affair made of tin or clay and wood used to steam the day's glutinous rice; a katha (round bottomed skillet); a few soup-size spoons of either western or Chinese style; a few bowls or plates usually of Chinese or Japanese enamelware; and hanging on the walls, small amounts of various herbs, dried chilis, onions, and garlic used to flavor the "with rice." For cooking there is on the floor a frame of wood or bamboo about one yard square which holds about three inches of soil on which a fire is built using twigs and branches of wood brought home from the swidden. The cooking utensil is set on three large rocks over the fire. Some family cooking and the boiling of the pig's food is done out of doors.

Since people eat by taking a lump of sticky rice in the hand and dipping it into the "with rice", it is not necessary to use knife, fork, or spoon at the "table", or for each person to have a plate." For the most part, food is chopped or finely sliced during preparation, using a machete or a smaller all purpose knife. The family eats sitting in a circle on the floor around the rice and "with rice", and all eat together except, of course, the babies. Glutinous rice is steamed fresh early every morning. After breakfast it is put into covered woven bamboo "lunch baskets" and one of these is carried to the swidden for the noon meal when the rice is cold but still fairly soft." At night the remaining rice is often slightly reheated." (The kinds of food eaten are discussed in Judd 1961: 116-132.)

Clothing

The clothes worn by the women consist of a single piece of material, usually worn locally of native cotton and sewed into a tube worn from the waist down to cover the lower body and legs, or sometimes worn higher to cover the breast. Most women have only two. One is worn all day and then bathed in, getting washed in the process. The second is let down over the wet one, then the first one is slipped off, rinsed out and hung up to dry. By morning it is usually dry enough to use again." Young girls and old women seldom wear anything else, but girls of marriageable age and young married women frequently wear a loose chemise or camisole of white cotton (sua hu hoi), or a dark blue cotton work jacket, that covers their breasts. However, in the hottest weather this is often not worn by the married women, or, if worn, is frequently pushed aside to allow the baby to nurse.

The men usually wear khaki or dark blue cotton shorts in the jungle or fields, but sometimes wear the long dark blue Chinese-style pants of local cotton (they are always worn at night) or just a phakhama. Their shirts are made of dark blue cotton with ties instead of buttons, and large pockets (sua maw hawm); quite often shirts are discarded while working. Small children often wear no clothes or the cast-off pants and skirts of their parents, which may or may not be cut down to size. Some children attending school have one school uniform, as required by the government.

A few of the adults have special homespun white cotton jackets to wear to the wat. Some of the men own long khaki pants and store-purchased white shirts to wear to town or to church. During the cool season, many folks keep warm by wrapping a blanket or a bath towel, if they have one, around them in the early morning and the evening. Phakhamas are also used as shawls.

Tools

The small hand tools used for swidden farming are usually kept in the house and include the ever-present machete (phra), an ax (khwan) or hatchet (mui), a sharpening stone, a short-bladed sickle (khieo), a straight hoe (siam), and/or a mattox (jawp), several gourd or bamboo-section water jugs, and a dibble stick point (lung). Other tools found in the house are scissors and a large general purpose knife (mit). Practically every home has two buckets for carrying water, two or more carrying sticks (mai hap) made of bamboo, at least two hap baskets, and two kinds of brooms (one of soft broom corn for use in the house, and one of stiff small twigs tied together for sweeping the ground around the house). A two-man saw is owned by many. The machete can almost be considered an article of clothing, as it is carried almost all the time, stuck into a woven wicker scabbard which is tucked under one's belt at the right side.

Under the house are found various woven bamboo items such as mats, baskets, trays, lunch baskets, and fish traps. Often a fish net of some size is seen. Under most PW3 and S3 houses and less often elsewhere are hand looms for weaving cotton cloth and sometimes a contraption "to remove seeds from the cotton or to twist the cotton fibers into thread."

Outside the House

Besides the grass for roofing, tools and equipment already mentioned as stored beneath the house, there also "will be found stacked firewood" (with S3 and PW3 having the largest supply on hand) and the "pens for the chickens. Wash water, food scraps, and vegetable and fruit peelings are allowed to drop through the bamboo floor to the ground where the chickens can eat them. The chickens run free in the daytime to find their own food, but are put into a bamboo cage at night.

Near the house is often a bamboo pen with a slightly raised floor for the pig. This pen may or may not be roofed. Nearby also is a shed where rice is pounded to remove the husk by someone stepping on one end of a pestle and letting it fall back into a mortar. This mortar usually is used by several families, although it may belong to one. Only rarely are there fences, except in HY2 and PK4, other than around vegetable gardens, and these are not common in most hamlets, so it is hard to tell where one yard ends and the next begins. In 1956, when the government ordered everyone to make a formal claim for their private land holdings, most of the villagers claimed the lowest unit, one ngan (1/4 of a rai, or 1/10 of an acre), around their home, but seldom does anyone try to delimit their holding by any marker or other usage. During the rainy season much of the land in the hamlet grows up to weeds except along the paths that join the various houses

with each other, with the road, and with the river. By the end of the dry season, some clearing and much trampling makes the whole hamlet look fairly open.

Jointly owned or used areas like the church or wat or school yard, are" cleared periodically by the villagers or the children. Nowhere do the villagers consider the "roadway" as their responsibility to maintain, thus they will not build or repair bridges, or cut weeds along it unless they are paid to do so by the truck owners. Because there is more traffic across it, the worst mud-holes along the "road" are usually where it passes through the middle of each hamlet. The villagers of each hamlet do work together to clear the paths up to the sites of their swiddens each year.

Use of Manufactured Articles

Most of the clothes, household furnishings, tools and equipment used by the Commune Baw villagers is locally made. However, more and more items from outside the Commune are being used. Other than things already mentioned, the following have been seen in more than one house: a wrist watch or clock, lipstick, face powder, combs, hair oil, toothbrushes, toothpaste, laundry soap, a calendar, a cotton-wick kerosene lamp of glass, aluminum kettle, charcoal iron for clothes, flashlight, and cigarette lighter. The presence of such items does not imply that they are used often. For instance, the flashlight may lack batteries, and ironing of clothes would happen only before trips to town, but every man has and uses a cigarette lighter to start fires.

An attempt was made to determine how widely and how long certain manufactured items had been in use in Commune Baw. The results of a special survey and count in August 1958 is given in the following table. Since the hamlets vary in size, the approximate percentage value of one single household is shown below the hamlet symbol.

Table 2. Percentage of Commune Baw Households Owning Certain Manufactured Items, August 1958.

Hamlet Symbol:	PK4	HPH1	WM1	HPS1	S3	PW3	LH2*
% value of each household:	1%	8.5%	3%	4%	6.6%	7%	1.6%
Item:							
Two-man saw	31%	25%	80%	16%	13%	28%	10%
Watch or clock	8	0	6	8	6	7	10
Dish or dishes	100	68	100	100	100	100	100
Spoon and fork**	4	0	6	50	0	7	35
Iron and skillet (<u>katha</u>)	31	17	51	20	20	50	50
Flashlight	100	25	57	76	65	84	100
Pressure lantern	1	0	0	0	0	7	0
Simple scissors	100	68	63	80	52	100	100
Charcoal iron	14	0	0	12	0	7	15
Kettle***	17	17	15	25	26	50	50

*All of Legal Hamlet Two (HY2, PN2, and RFW2) were counted together.

**Stirring spoon of wood or coconut shell locally made not included.

***Most made of clay, some of aluminum; all manufactured outside Commune Baw.

Of these above items, clocks, flashlights, and clothes irons are the newest introductions, apart from pressure lanterns which are still considered too expensive to buy or operate. Obviously, inexpensive useful items like scissors, dishes, and flashlights are more generally accepted than are more expensive items and among the more expensive, the more useful (such as saws) are first accepted. Other manufactured items found to be used by practically every household are galvanized water buckets, machetes, other knives, heads for hoes, mattoxes, and axes, and cotton-wick oil lamps made from small cans; these latter being used by all villagers except in HPH1 where only 50 per cent of the households used oil lamps.

Every household that can afford to do so owns a gun. All guns are home-made with some parts bought from metal workers, and the ammunition is also home-made since to buy ammunition requires both money and a permit. In each hamlet there is at least one man who is a gunsmith part-time; the others bring their guns to him for repair.

Transport

The most common way of travel in the Commune is by walking, and most transport is by carrying. Very heavy loads are carried (ham) suspended by ropes from a pole held on the shoulders of two men or several pairs of men. This is not very common except for bringing house posts out of the forest, or for moving or raising logs for sawing. Light to moderately

heavy loads are carried (hap) by an individual by placing a bamboo carrying stick (mai hap) across his shoulders and hanging baskets, bundles or buckets by ropes from each end of the stick. This method is used by both men and women for carrying rice seed out to plant and bringing the harvested paddy back home, for bringing bundles of kindling home, for carrying water from the river to one's house, and for most daily carrying. Very young children play at hap khawng (carrying things), and at a tender age help to carry drinking water.

Boats are the next most common mode of transport. Less than twenty boats are owned by Commune Baw villagers, but there is at least one in each hamlet that is located along the Nan River, and each boat is shared by relatives and friends of the owner or owners. During the dry season, it is possible to wade the river, but during the rainy season it is necessary to use a boat for crossing. None of the Commune Baw ^{boats} makes a business of transport to town, but on occasion these boats are hired for transport during the rainy season, at least as far as HY2 going south and perhaps as far as Wang Pha going north. Rice and lumber are the principal items carried within the Commune. Apart from river crossing and intra-Commune transport, the boats are used for fishing throughout the year by the owner.

All of the boats used in Commune Baw are dugouts. Some of them have been made by the villagers themselves, and others have been purchased from hamlets in Amphoe Pua at a cost of 115 baht and up. To make such a boat, a large tree is felled and hollowed out to the general shape of the dugout at the place it falls, leaving several uncut sections so that the boat will not be cracked in moving it down to the water. Once in the water, final touches are made. Since it is very difficult to move the dugout overland with only human power, the boats are not large. Elsewhere, elephants are used to take the felled tree to the water before it is made into a dugout.

There are a few more bicycles in Commune Baw than boats, but fewer people use them. No one in S3, HPH1, or PN2 owns a bicycle. In PW3, WM1, HPS1, PT1, and RPW2 there are no more than two per hamlet; however, HY2 has six and PK4 has 13. These are English or Japanese bicycles, costing between 700-1,200 baht. It is possible to use a bicycle all year, but during the wettest part of the rainy season it is more work than walking on the muddy "roads" and through the flooded gullies.

The three carts owned in the Commune are at HY2 where they are used to bring rice out of the hills, and to transport bamboo and charcoal to town for sale. Nowhere else are there any oxen. Of the 26 water buffalo in the Commune, all but one is in PK4, and they are rented out to paddy rice farmers in Commune Tanchum.

Oxen (wua tang) are used by some of the families in S3, PW3, and PK4 to carry threshed rice from the swidden to the house, but only families with surpluses can afford to pay the 7 to 20 per cent of the crop charged by the owners, most of whom live in Commune Tanchum.

The frequency and nature of truck transport has been mentioned in Judd 1961: 20-44. No villager goes by truck between points within Commune Baw, but travel to points in Pua District or to the town of Nan by truck is common during the months that the trucks operate. One middle-aged man, who

was born in Bangkok, and who now lives in PK4, works as a regular driver of one of the trucks, and one from PN2 works as a thai rot (helper who loads freight, collects fares, repairs bridges, puts blocks behind the rear wheels on hard climbs, etc.)s The driver from PK4 has also contracted with the group of truck owners for the last few years to fill the mud holes, to build bridges over the 20 or more gullies in Commune Baw needing them, and to cut the weeds and bamboo that encroach on the roadway from both sides during the rainy season. He hires villagers from the various hamlets along the road for this work at 5 baht per day. The villagers usually refuse to build the larger bridges by day labor, but insist on a contracted sum. The general opinion, probably true, is that this PK4 driver clears a tidy sum on this deal, perhaps 1,000 baht or more. Partly for this reason, and partly because the villagers consider the truck owners to be very rich, when a truck breaks down, or a bridge collapses, no villager will offer to give help unless he is paid. Fires started from cigarettes thrown from the trucks, and supposedly excessive fares charged by some trucks, make villager-trucker relations less than cordial for the most part.

Fishing

Fishing is engaged in daily to some extent by all villagers, although it is a major occupation for only a few, who live at HY2. Most fishing takes place in the early morning or in the evenings after a day's work in the swidden, but occasionally there is mid-day and all night fishing as well. Most of the fish caught in Commune Baw are small and only enough for a single meal is caught each time. When a large fish is caught, it is proudly shown before being sold or eaten. Occasionally a big catch is made, part of which is salted and/or dried. The various types of fishing carried on are as follows:

1. jawn bet (tok bet). (Fishing with a hook and line, using termites (malaeng mao) or some other small insect as bait.) This is the most common method, and is used every day by someone. Sometimes the line is tied to a short or long bamboo pole, sometimes it is trailed from a boat, and sometimes it is merely tossed out from the shore. Besides fishing individually, occasionally a group will go together in one or more boats to a spot where they hope the fish can be found in large numbers. Hooks are usually purchased in town, but string and floaters are homemade.
2. thawt hae. (Fishing by casting a small weighted net which sinks to the bottom, trapping the fish under it.) This is also a common method, used both during the day and at night by individuals or groups. Late at night the group goes to a sandy beach and sleeps or talks until they hear the fish "playing" (len), then all toss their nets. Often the site chosen is near a rapids, or in spots where the fish spawn.
3. lai pla. (Chasing fish into a net.) This method also makes use of the hae but instead of being thrown, the net is stretched open at some point, with bamboo rods blocking somewhat the passage between the shore and the mouth of the net. A heavy string, perhaps 150 yards long, is prepared by tying rocks and pieces of white-colored wood at two-yard intervals.

One end of the string is tied at one edge of the net and the rest is carried by boat in a big circle in front of the net. Then the string is slowly pulled in until it comes across the face of the net. Many fish flee from the white sticks but some swim into the net and are caught.

4. long uan. (Catching fish by the use of a long net, with many people helping.) The net is made wide enough to reach from the bottom of the river up to the surface (about two yards)". One end is usually secured at an edge of the river while villagers grab the net at intervals of about two yards holding the bottom down with their feet and the top up with their hands. Beginning with a straight line across the river, the net is stretched to a big circle until the ends meet and then the center area decreased", so finally the fish that have been enclosed are trapped". This type of net is also used from two or more boats on occasion.
5. chawn pla. (Fishing by scooping with a small pyramid-shaped net (saw-ing)" that is attached to a triangular or round bamboo ring. This is most often done along the bank or from a boat near the shore when the water is murky following a rain.
6. thaeng pla. (Spear fishing with a two- or three-pronged harpoon called a chamuak.) This is most often used at night with a light to attract the fish, but is also used from boats and platforms.
7. long saw (sai)". (Catching fish in woven bamboo traps.) In Commune Baw these traps are woven with two-foot wide mouths and five-foot long pointed ends, so designed that the fish can enter but not swim back out. These home-made traps are placed just below water level facing downstream in the reeds along the shore at many locations, held in place by bamboo stakes. Each morning the owner goes to check the traps.
8. tam khang. A platform is built above the water, with bamboo rods placed out from each side in a funnel shape so that the water and fish are channeled through the opening directly under the platform. The fisherman lies quietly on the platform and attempts to catch fish by any of several ways: using a sawing or other type of net, a fish trap, a "line, or a harpoon.
9. raboet pla. (To kill fish by an explosion in the water.) This is illegal because it kills many baby fish, but the method is often still used both in this Commune and in other parts of Nan Province. The many (perhaps 100 or more) fish that are stunned or killed float to the surface, and everyone in earshot comes running to grab a share. Since the practice is illegal, the person setting off the charge cannot claim ownership to all the fish without risking a fine". Poisoning fish, using kluaa-lo-daeng (lotin) (Derris elliptica), also illegal, is only very rarely practiced.
10. jap mu' plao. (Catching fish barehanded.) This is practiced frequently by those without equipment, especially when schools of fish are reported.

These are the principal types of fishing carried on in Commune Baw, each method having variations depending upon the person, the depth and

nature of the water, and the time of the year. The catch is always better when the water is murky and in the dark of the moon, but some kind of fishing is tried every day of the year and fish are the principal source of protein in the diet of the villagers.

Nets, traps, and lines are almost all locally made. The net strings are rubbed or soaked in resins taken from local trees such as the tamarind and the ma-phap to make them resistant to decay in the water. Strings and ropes are made from several varieties of baw trees. Traps are made of bamboo that is fully mature or of wicker as is theskhawng (basket for confining fish that have been caught).

As there are no paddy fields or canals, neither fence nor basket mud fishing is commonly done in Commune Baw, nor is any variety of the spring net used. HPS1 tried raising telapia in 1956 but the pond was too small and the water supply too limited in the dry season; no other hamlet has tried raising fish in ponds. The Nan River is too wide to dam all the way across, but the Nan Ngao and some of the smaller tributary streams (huai), are dammed to capture fish during the dry season.

Miscellaneous

In PK4 a few families make their own paper for the children to use in school, using the bark of a tree (ton sa) that grows wild along the banks of the Nan River. When the tree is six or seven years old, it is cut and the bark removed. After being beaten with stones, the bark is soaked for a week, then beaten again until it becomes pliable. A piece of cloth is stretched across a wooden frame, bits of the bark are patted onto the cloth and the frame is soaked once more. The frame is then removed from the water and placed in the sun. When dry, the wood pulp will come off as a sheet of paper. The same procedure is used in Chiangmai Province in making paper umbrellas.

The villagers in all of the hamlets are resourceful in using the local natural materials to fulfill their needs. When bridges must be built, trees and bamboo are found and fashioned in a manner capable of lasting a year without recourse to purchased supplies -- even the use of nails is not always necessary. When tigers threatened WM1 in 1959, a sturdy trap was designed and built out of young samplings and tawk. For festivals, temporary sheds rise quickly out of bamboo and leaves; strong bamboo ladders and other useful equipment are quickly made when needed.

CHAPTER IV

OCCUPATIONS

Introduction

In Commune Baw the chief occupation of over 90 per cent of the adult villagers is swidden farming. Almost every physically able adult -- other than priests, novices and school teachers -- swiddens. The only other exceptions are found in HY2 and PK4, where a few villagers are engaged solely in such occupations as merchandising, lumbering, or orchard care. In PW3 and S3 the majority depend completely on swiddening; in the other eight hamlets, most villagers supplement their swidden income by labor for others, forest harvesting, hunting or fishing, gardening, lumbering, or making handicrafts for sale or trade.

In this chapter, swiddening as practiced in Commune Baw is described in considerable detail in the context of a work year, with reference also to the other significant events that fill out a typical year. Following this, the nature and extent of other occupational roles is also explained.

Swidden Defined

The terms often used to refer to swidden agriculture in Thailand are "dry rice cultivation" or "upland rice cultivation", the writer or speaker emphasizing the contrast with the more typical "wet", "lowland", or "paddy" rice cultivation carried on by the central Thai villager. Pelzer chooses to emphasize the fact that the fields are rotated rather than the crop. (1948: 5) Others prefer to call it "slash-and-burn agriculture". The most comprehensive and clear definition of swidden agriculture is that given by Conklin who states

In the literature, the rubric "shifting cultivation" may refer to any one of an undetermined number of agricultural systems within which the critical limits and significant relations of time, space, technique, and local ecology are rarely made explicit. Frequently, it implies an aimless, unplanned, nomadic movement or an abrupt change in location, which may refer to the cropping area, the agriculturalists, or both. Aside from being ambiguous, and in many cases inaccurate, these implications do not focus on the most widely shared characteristics of these various systems: firing and fallowing. Minimally, shifting cultivation may be defined as any agricultural system in which fields are cleared by firing and are cropped discontinuously (implying periods of fallowing which always average longer than periods of cropping). . . . (1957: 1)

Following Conklin's lead, "swidden agriculture" is defined as "discontinuous cropping of particular fields which are slash-cleared and burned" for one or more year's crops, and then allowed to lie fallow and return to natural vegetation for at least several years before being used again." (Judd 1961: 134) The Thai term for this practice is tham rai.

Conklin continues

There are many ways in which the various types of swidden farming may be differentiated. One of the most significant considerations in this regard is the extent to which the agricultural system is integrated with other systems in a given sociocultural matrix. Basically, swidden farming may involve relationships which either (1) reflect predominantly only the economic interests of its participants (as in some kinds of cash crop, resettlement, and squatter agriculture); or (2) stem from a more traditional, year-round, community-wide, largely self-contained, and ritually-sanctioned way of life. Reference may be made to instances of the former type as partial systems and of the latter type as integral systems of shifting cultivation. Most patterns of swidden farming can be placed easily into one of these two categories.

In any particular geographical or cultural province numerous other distinctions may be noted. For varying purposes it may be helpful to distinguish subtypes of swidden farming according to such agronomic and cultural variables as:

- (1) principal crops raised,
- (2) crop associations and successions,
- (3) crop-fallow time ratios,
- (4) dispersal of swiddens,
- (5) use of livestock,
- (6) use of specified tools and techniques,
- (7) treatment of soil,
- (8) vegetational cover of land cleared,
- (9) climatic conditions, and
- (10) edaphic conditions. (1957: 2)

These variables are discussed in the sections following.

In Commune Baw, the general pattern of swiddening is to clear and to burn a field and use it for one year; then to ignore that field for five or six years. S3, PW3, WM1, HPH1, and HPS1 tend to wait longer than the other hamlets to re-use a swidden site, except under one circumstance. If in burning a new area, the wood does not burn well and a dirty, difficult, and time-consuming job confronts the villager in late April, he may decide to re-use his previous year's site by clearing it of weeds rather than do the necessary work on the new site. HY2, PN2, PT1, and RFW2 villagers tend to re-use a site sooner, perhaps because many of them are less committed to remaining in the hamlet and thus less conscious of the opportunity of improving soil resources by longer waits. PK4 villagers also have a tendency to quicker re-use of swidden sites, probably because the size of that hamlet requires a large area for swidden sites, and unused forest becomes more and more distant each year, taking a longer time for commutings.

The speed and character of reforestations that takes place on a particular site also affects the time of re-use. Usually, by the end of the first fallow rainy season there is a mixture of small and broad leaf weeds, plus some sprouts from the stumps of trees. By the end of the second fallow rainy season, the broad-leaf weeds have choked out the narrow-

leaf weeds and a few clumps of bamboo are growing, with heaviest growth near the uncut edges of the site. By the end of the third year, nearly the whole field is covered with bamboo, mostly mai rai. At the end of five fallow years, there are few if any weeds, several kinds of bamboo, and perhaps a few trees growing. Any time after this state is reached, the field may be cleared again for another one-year rice crop, although the borders of the new site and the previous site are seldom exactly the same. An exception to the common order of reforestation just described is when a site remains in cogon grass (yakha). In Commune Baw such areas are not large, but serve to supply the villagers with grass for roofing.

Along with the rice, and especially as the rice becomes ripe, in a part of the field cotton, pepper, sesame and some other upland crop may be planted on a small scale primarily for family use. Two-thirds of the Commune Baw villagers work no land apart from their swidden rice area, and of the third that does only two families reported using as much as an acre for other upland crops.

No animals are used to help in any stage of growing of any of the crops in Commune Baw, except for the hauling of threshed rice back to the hamlet, and even this is more the exception than the rule. No plowing or turning over of the soil is practiced in the swiddens, and the only treatment given the soil is to release the plant nutrients in the natural cover through burning. Occasional watering is given to vegetables or fruits when being started in or near the swidden, but the rice itself is never watered except by the rain.

Each field has a particular owner for the year of use, but there are no permanent legal claims made by any individual or family to this piece of land. Each hamlet informally declares the geographical area that it considers reserved for the hamlet's use, but members of other hamlets are allowed to plant within this area if they come to ask permission from the headman first. For the year 1958, 682 rai (272.8 acres) were reported to the government as used for swidden, but a total of 999 rai (400 acres) were reported as used for swidden in the survey made for our reports. At the greater number, this totals less than 2 square kilometers swiddened to date out of 70 that are within the area, so that probably 15 per cent or less of the total land or 30 per cent or less of the potential sites is actually being used at present.¹⁰ These figures confirm the statement of the kamnan to me on February 25, 1959, that there is an abundance of land available for swiddening, with trouble only when large groups, such as the PK4 villagers, want to swidden together on virgin land without going further from home than previously.

The process of deciding where to plant for a particular year includes the following steps: 1) Each villager in hunting plants, animals, or wood

¹⁰ Gourou (1951: 31) regards half of the total area of the Indochinese uplands as uncultivable for reasons of relief, infertility, superstition, etc. I accept for Commune Baw and northern Thailand his ratio: that half the total area might be considered cultivable.

passes through different parts of the jungle surrounding the hamlet and consciously or unconsciously notices possible places to plant the following year. 2) Friends discuss with each other the places they have seen and the advantages. 3) Since normally several families plant side by side, members of two to nine households or more may take a special trip out to look over possible sites that have been suggested, also noting others that they pass enroute. 4) When a particular place is approved, the space is estimated as to how many rai (.4 of an acre) it includes and thus how many households it might provide for. 5) At an informal discussion and perhaps a called but informal meeting of representatives of each household in the hamlet, it is decided how many and which areas will be cleared in the new year.

In the days that follow there is switching of families back and forth between work groups as they consider the space available and the number of rai that each household wishes to plant; there is no assigning of who is to be in which work group." Often the same core of two or three households will make up each group, but others will join or not as space and inclination permit.

Three significant factors that help determine work groups are: 1) that the families are good friends; 2) that sibling groups are apt to work together; 3) that one family included has a boat if the swidden site is across the river. During this discontinuous discussion, information as to the tentative plans of the neighboring hamlets is also passed around. If one of the areas chosen has virgin timber and is within sight of the "road" or river, those planning to plant there may go to ask permission from the kamnan, but usually they do not bother to do so. Lately, a few have swiddened as a single household on land where they plan to plant an orange orchard.

There are differences between the hamlets regarding how many households join in a single work group. The largest "groups are formed" by S3 and PW3 where almost everyone in the hamlet swiddens as a unit. The smallest work groups are formed by HPR1 and in all of Legal Hamlet Two where very few work groups are composed of more than two households. PK4 and WM1 have work groups of all sizes from single families up to twelve or more, and in HPS1 the groups tend to be middle-sized, containing four to nine households. Speaking of the Commune as a whole, only 20 per cent of households swidden in groups larger than five households.

As to the size of the area planted by a single family, only 20 per cent of the households plant more than 5 rai (2 acres), with PW3 having most of the large plantings, followed by PK4. PN2, RPW2, and PT1 have the smallest swiddens. Seventeen rai (6.8 acres) is the largest area claimed to have been planted alone by any one family.

The Work Year

The yearly work cycle will be described month by month. Most of the variations between hamlets are minor, the main difference being that PW3 and S3 spend longer on each stage of swiddening because they clear and plant larger fields per household and thus have more work to complete. The

swidden year begins in February. Reference is made to other activities occurring in any particular month, but many such activities are not explained here. (See Judd 1961: 139) The important stages in swidden work as practiced in Commune Baw, and discussed in detail below, are choosing the site, clearing the swidden of "the natural plant cover, burning and re-burning, planting, weeding, harvesting, threshing, and storing the grain.

February

Most of the villagers of PW3 and S3 and some individuals or groups in other hamlets begin early in the month of February to clear their new swidden area in earnest, but for most of the Commune early February is the time to make final decisions on swidden sites and the work party that they will join, so it is not until the last week of February that such hamlets as WM1 and HPS1 begin to clear their sites. In the meantime, there are many other activities to take up the villagers' time. Although hunting individually continues, now group hunting (lai lao) and night hunting with a light (head flashlight or home-made charcoal gas light attached to the head) also take place. Fishing is carried on as usual. Yakha is harvested and grass-shingle production begins. Cotton is harvested and traded between the hamlets. Nights are cold so that many hover about open fires (phing fai). There is apt to be considerable sickness during this month.

Itinerant salesmen begin to visit Commune Baw in larger numbers as they know that the villagers have some money or at least rice or other crops to trade; these salesmen include "needle doctors" (maw ha kin) who give shots and sell medicines, silver jewelry salesmen, and machete and knife salesmen from Lampang Province, as well as local peddlers of native confections, and women from PK4 and Commune Tanchum hamlets who want to trade miang and tobacco for cotton.

Some joint projects take place in the hamlets this month such as in 1959 the building of a teacher's house (in WM1), the sawing of lumber for the new HPS1 church, the clearing of underbrush from school, wat, or church grounds, and the than jedi khao pluk ceremony, when rice gifts are given to support the wat. With extra leisure, cash, rice, and ceremonies, there is increased drinking, especially at night. Also at night, the young men go courting (thio sao). Some people use their free time to weave bamboo articles or ~~make brooms~~ for sale; others illegally saw wood to sell or trade; still others repair household equipment such as looms; and in some hamlets, such as HY2, loafing and gambling are favored pastimes.

Sweet potatoes and other crops planted in the swidden following the rice harvest start to mature, and in the forest February is usually an excellent month for gathering edible mushrooms. In the river, aquatic plants similar to seaweed are gathered and then laid out in the sun to dry, before being put away for later use in the kitchen. Local tobacco is shredded and dried for home use and for sale.

In 1958, the government had urged all villagers to register their illegal guns, allowing them to do this without penalty; during the winter months this meant at least two trips to the district office in Nan where

each owner had to wait several hours each time. The police patrol made its annual check-up. Some weddings and deaths took place, with suitable ceremonies. Drunkenness at a WMI wedding led to the stabbing of the hamlet headman which set off a whole series of meetings with the kamnan in WMI, and in town to settle the affront. Another special occurrence in February 1959 was the visit of a group of Phi Tawng Lu'ang forest people to some of the hamlets.

March

As soon as the month of March begins the villagers begin to feel concerned about their new swiddens. All who have not already started to clear, or who have done little, know that now the time has come when they must get busy to allow time for the slashed plants and trees to dry out before burning. Thus, all through this month the major emphasis is on cutting to clear the new site (fan rai)d

This clearing is the first of many stages of swiddening done as a unit. Each family in a work group must furnish one member each day to help clear the sites of all in the group. If any family furnishes more than one person to help, when that family's site is being cleared, the family who received extra help must provide extrahelp in return. Work is completed in units called "faces" (na). A "face" is a natural unit of land separated from the rest by a gully, a ridge, a change of slope, or a major change in the type of vegetation.

During the rest period, the owner of the site must sharpen the machetes, knives, and axes of each person who is helping, using a soft stone brought from home for that purpose. Besides resting, the helpers often make tawk, weave bamboo articles, hunt for food or game in the surrounding forest, or gather firewood to carry home in the evening. Children who are brought along may work with their parents if they are at least six years old, but those below their teens are more apt to be used to care for babies and their younger siblings, and to run errands such as bringing water, cigarettes, or miang to those working.d

The number of "faces" that are cleared in any one day depends upon the size of each "face", the ability and perserverance of the workers, the number in the group, the weather that day, and the nature of the plant cover being cut. Women usually use only the machetes or knives; the men use axes as well when necessary. The average work group will clear four or five "faces" a day.

The members of a work group normally walk to the swidden and return together as a group, laughing and joking along the way to shorten the road. They leave after an early breakfast, and return usually at dusk, about 6 o'clock, taking their lunches with them -- rice in woven bamboo lunch baskets and some kind of "with rice" wrapped in banana leaves and carried either in a hap basket or in a small home-made cotton shoulder bag (thung)d The hour of departure in the morning is usually agreed upon the night before when it is decided whose rai will be cleared the following day. Quitting time in the afternoon is determined by the owner of the site being worked on, but the intention is usually to allow time for walking

home while it is still light, yet not so early that a reasonable amount of work is not completed. Few have watches, so the site owner must gauge time by the sun.

Back at home the wife bathes, cares for the children and prepares supper, often using as kap ("with rice") the greens or other forest plants found near the swidden and carried home. The husband frequently combines a little fishing with his bathing, cuts kindling if necessary, and works around the house. Some nights groups decide to go hunting.

On Sundays the HPSI groups do not do field work, but they may fish, hunt, or work around their homes both before and after the morning church service. In the hamlets with a wat, most do not go to their swiddens on Wan Phra, the Buddhist holy day, but they do go into the jungle to hunt or to search for food or wood. In the hamlets without either a wat or a church, all days are treated about the same.

Mid-March is the end of the academic year, thus in March there is some review but little teaching done. Exams for the first three grades are given by the local teacher, but fourth grade exams are supervised by additional teachers sent by the Muang District Education Office. This month the Nai Amphoe (District Magistrate) and some assistants pay an official visit to the four legal hamlets, giving the villagers sermon-like talks and casually inspecting each village. The villagers do not object to the visit but there is grumbling that a whole day, and sometimes two, must be wasted waiting for the officials to arrive. The priests and novices of Commune Baw have occasion to travel a bit this month, either to town to meetings or exams or to visit Commune Tanchum wats.

Work on handicrafts such as steamed rice storage baskets, fish traps, brooms, and grass shingles continues, and the number of peddlers increases. Some peddlers come by water, trying to sell big water jars (ong) or other clay products. Rafts pass by carrying coconuts, rice, and other products to Nan for sale. There the raft, made of bamboo (mai'sisuk), is taken apart and sold, also. Trucks are overloaded with Virginia tobacco being taken from the curing barns in Pua and Lae Districts into Nan.

Hunting is apt to turn up larger game during March and April. As the jungle dries up, there is less food available and the wild animals come closer to the settled areas. Tigers are shot, and occasionally an elephant. Hunting elephants is risky business and not all villagers are interested. If one is merely injured, as in 1959, he may run wild near the paths to the swiddens and so dissuade many from going into the jungle for a period.

During March kapok (nun) matures and is gathered, seeded, and made into mattresses and pillows. Women who have time also make thread and weave cotton cloth. Crabs are dug as another item for mealtime, and towards the end of the month, a large number of households prepare illegal rice wine in large quantity to use during the Buddhist New Year celebrations in April. Since the weather becomes very hot in the middle of the day beginning this month, the children often run about with no clothes on and the women often shed their chemise.

March being a period when most paddy farmers have free time and some cash, especially if they have just sold Virginia tobacco, there is more travel along the "road" from Pua to Nan. In 1958, the traffic was greatly increased by people from the north coming down to Nan to welcome the King and Queen of Thailand on their visit to Nan. In 1959, a smaller number travelled to Nan to pay respects at the funeral of the jao-rat-cha-but, the son of the last Prince of Nan, who had died the previous year. Those travelling not only fill the trucks, but come by bicycle, horse, and on foot.

Towards the end of the month, the cutting of the swidden is completed except for those groups whose members have large plots, such as in PW3. With more free time, besides the various activities mentioned, some houses are built or repaired, and joint projects in the hamlet take place once again. For instance, WM1 decided to enlarge their salatham before the Buddhist New Year in 1959.

April

The principal activity related to the swidden in April is the burning of plants that have been slashed. No one will state a definite date on which the burning is usually started because so much depends upon the weather in the weeks following the slashing"-- if the sun is out or shaded by the clouds, the relative humidity, and the amount of rainfall. The first hamlets to begin burning are usually S3 and PW3 for they began the clearing sooner and thus at least parts of their fields are dry earlier. There are several principles followed in the burning process. The first is that the fire is not set until all contiguous sites are ready. This is because it is difficult, and one seldom tries to control the fire only to the exact boundaries of the site cleared. A partial burning of a site not ready nullifies the second principle: that all cut material be dry enough to burn and so scattered that every part of the ground is scorched by the fire. Although some of the stumps and roots left in the ground are not completely destroyed by the fire, the majority are deadened in a properly burned swidden. Another principle followed is that all members of a work group are present when the firing is done, so that the fire can be started at the agreed upon points and helped to burn over all the intended area. If the swidden is near the hamlet, care must also be taken that the wind is not blowing towards the hamlet. For any burning still air is preferred, and often early evening is chosen as the time of burning so that the progress of the flames can easily be seen in the darkness. Careless firing in the uncut jungle to clear a path is disregarded, but careless firing in a swidden is a cause for lengthy argument.

There is a tendency for those who have been slow in clearing their own swidden, when they see the smoke from PW3 or elsewhere to become over-eager to burn their own before it is dry enough. This happened to several groups from WM1 in 1959, with the result that the still moist wood did not burn well and did not scorch the earth beneath. This led some to abandon their new sites and to clear weeds from their 1958 site to re-use it. Another reason for the hurry was the imminence of the five-day or longer Buddhist New Year celebrations for which certain preparations

must be made: the men go into town to purchase new clothes for themselves and their wives, food and toys for their children (if they can afford them) and some of the WM1 women make special trips to PK4 to get their hair cut by an "expert".

Travel within the Commune (and throughout the Province) stops during the holidays, principally because every person in sight gets doused with water and travelers dislike having all their belongings soaked. (The nature of the celebrations is explained in Judd 1961: 262-265.)

Apart from the burning, early April is free of swidden duties, and more time is given to hunting, fishing, and group activities in the hamlet. Group hunting is especially popular, and the size of the group participating grows larger as more are free of other jobs. Some days villagers from HPS1, WM1, and HPH1 go out together, as do RPW2 and PN2, or S3 and PW3. The procedure followed for this kind of hunting is for those with guns to hide themselves at some point near where animals have to cross a clearing. The other half of the lai lao group spread out in a line and walk toward those hidden, making a great deal of noise. The animals run from the walkers and are shot at by those with guns; any game killed is divided equally among the individuals participating except for the successful shot, who gets a larger and more desirable portion. Sometimes, as when a tiger is only wounded, the group decides it is wiser to return home than to take a chance of someone being injured. Group fishing at night is common this month also; everyone tries to secure extra food for use during the Buddhist New Year celebrations. Courting is a common nighttime activity for the young people.

Besides helping to build new houses and repairing the old ones, many villagers carry completed grass shingles to their rai and there build a lean-to or a small hut in which to rest out of the sun or rain. Among handicrafts practiced in April are shingle-making, and weaving bamboo articles such as baskets, chicken cages, and fish traps. Saws are sharpened. Bamboo and wood are collected for church construction and for wat repair.

During April mushrooms are still to be found in the jungle, crickets are dug out of their holes, and the first mangoes become ripe on trees in the hamlets and out in the jungle.

The weather continues very hot in April, and it was observed that some of the time both men and women at WM bathed naked in the river. The hot weather supposedly causes many to develop fevers, and funerals are common, normally being held on the day of the death. In the latter part of the month, as duties in the swidden call again, the villagers arise very early and not bothering to eat breakfast, labor until 10 a.m. or so, when swidden work stops for the day.

The nature of the next stage of swiddening (kan kawng set mai lae phao mai) is the gathering of the unburned sticks found scattered around the swidden area into small piles, usually over a stump or else at a place where the ground was not scorched in the first burning, and setting them on fire again. With first and second burnings continuing, the sky is hazy most of

the month. This work is sometimes done by separate households, sometimes by the whole work group together, or again just by two or three families together. In this task as well as at all other occasions of shared labor during the process of swiddening, the owner of the particular swidden where work is being done directs the efforts of all who help, although the amount of formal direction is very limited since everyone understands well the nature of the various jobs that are necessary.

School children are on vacation in April, but in WM1 the new teacher taught them part-time since he wanted to be able to divide the children into two separate classes for 1959-60. Two other happenings in 1959, which can be counted on in most years during this month, were that the hamlets were raided by the provincial liquor control men and trucks broke down blocking the "roadway". The liquor control squad of the Ministry of Finance (kawng prap sanphasamit) conveniently waited until after the Buddhist New Year had passed and all illegal liquor had been consumed. Few of the trucks operating from Nan, north through Commune Baw, can last through an entire six-months without at least one breakdown. Thus, the villagers expect to have to sell meals occasionally to stranded passengers, and perhaps to have travelers sleep overnight in their homes.

May

After the second burning of the rai is completed, it may be necessary to do a little hoeing. When the fields are ready for planting, then the annual guessing game starts-- when will it be safe to plant rice this year? If the rice is planted too soon, and the first rains are not followed by others at least once a week, the young shoots will be killed by the hot sun. On the other hand, everyone is eager to get some new rice as soon as possible and wants to plant just as soon as it appears that the rainy season has started for good. In fact, by early May a fair proportion of the villagers in WM1, HPS1, and HPH1, and some households in HY2, PN2, RFW2, and even PK4 are running low or have completely run out of the previous year's rice. Even as early as February, households that had poor harvests start buying or trading for rice. Some years, as in the 1958-59 season, rainfall in the province is generally inadequate, and even if the upland rice harvest is average, the poor lowland crop causes the price of rice to rise higher than normal. People without their own supply of rice have difficulty in being able to pay for the rice they must buy.

Three main kinds of rice are planted: early-maturing, mid-season, and late-maturing. These are called khao daw, khao siu, and khao pi, respectively. Khao daw is usually planted first, in enough quantity to feed the family from the time of the first possible harvest until the khao pi is harvested. It tastes good, but it is lighter, less filling, and stores poorly. Khao siu has long, white grains that are quite desirable. However, the major portion of rice planted is khao pi which has bigger, heavier grains. An equal bulk measure of khao pi lasts longer than the other varieties because being allegedly more filling, less is eaten. All three major types of rice grown are glutinous (khao nieo), but some non-glutinous rice (khao jao) is also grown. Usually all planted rice is white except for small amounts of red rice used for ceremonies and desserts. Each family chooses and saves its own seed rice from the harvest of that

variety, and many families have their own names for the particular strain that they plant, numerous different strains being used in each hamlet". Seed selection, thus, is on a family rather than community basis.

Among the strains of rice grown are the following, known by names locally: khao daw varieties -- khao nam mun, khao sim, khao man tun (all glutinous) khao jao yao, khao jao daw pradu, and khao jao nga chang (all non-glutinous); khao siu varieties -- khao hang, khao siu, khao doi manamkhua, khao khot, khao daw paw, and khao kam (a red or purple colored rice); khao pi varieties -- khao jan hawn, khao khon hen, khao tiu, and khao hok. The strains of the latter two varieties are all glutinous.

In the latter part of May some families always start planting rice, although most of the rice is usually planted in June. Planting is done with the help of the whole work group, with three "persons working together as a team. One, a man, goes back and forth across the field punching holes in the ground with a tool called a lung. The handle is always wood, and the point may be. Some people buy metal points for the lung. It is cone shaped, with a diameter of about 1½ inches. The soil has had no treatment other than being cleared and burned; there is no effort to hoe, plow or turn the soil, nor is any kind of terracing or irrigation practiced. The only exception to this in Commune Baw occurs when the land is spaded as part of orange orchard cultivation and dry rice is planted between the trees for two or three years. The holes are spaced near or far depending upon the slope of the land and the judgment of the man wielding the lung. Experience has taught that rice grown on a slope grows taller and bigger than that grown on the flat, thus it is spaced further apart.¹¹ The measure used locally is the span of the hand (khu'p), with rice on a slope being planted from two hand spans to a forearm's length (sawk) apart, and rice on the flat being planted 1 to 1½ spans apart, in theory. In practice, it was noted that most rice on level land is only about 5-6 inches apart and on a slope only about 9-12 inches apart.

The man who punches the holes in the ground is followed by two persons each of whom hold a section of bamboo filled with rice seed in his left hand and a handful of poured out seeds in his right hand. Approximately five or six seeds are dropped into each hole and then covered with soil by striking the soil around the hole with the end of the section of bamboo or by foot.

Each hamlet except HPS1 has an animistic ceremony called phithi haek before planting any rice, but "the type of ceremony varies with each hamlet. For instance, at WMI the custom is as follows: First, an auspicious day is chosen. Some do this by asking the advice of the priest at PK4, but more often the day of the new moon is chosen, with the belief that the

¹¹From armchair agronomic reasoning, one might expect larger plants on the level where moisture and nutrients are more apt to be adequate, and where erosion should be less severe. Such is not the report of the villagers. Perhaps the answer lies in the fact that the hillsides represent rejuvenated soil from freshly decomposing materials.

plant will follow the example of the moon. The night preceding and the day of the ceremony must be clear weather. After the day is chosen, preparations are begun. A flat cross-hatching in the shape of a square, called a taling, is woven out of bamboo. Then popped rice, flowers, candles, and incense sticks are attached, and sometimes pieces of ginger are added. The ceremony is carried out by the owner of the swidden at any spot near the swidden.

The taling is carried to the place chosen and either laid on the ground or hung on a stick. Then the lung is used to punch seven holes in the ground, representing the seven days of the week. A new swiddener begins with Monday, placing symbolic seeds in that hole. If the harvest is good, he will continue to use Mondays as the day on which to plant; if the harvest is not good, he will change to Tuesdays and so on throughout the week, keeping record of which day of planting gave the best harvest. Then he will always plant on that day. A simple or complex ceremony is carried out by almost everyone, the differences arising from the fact that the ceremony is family and not community-centered, and individual villagers hold animistic beliefs to varying extents.

At HPH1, either a Monday or a Tuesday is usually chosen as the auspicious day for the phithi haek ceremony, and if a person feels inclined to plant later in the week, he may skip the ceremony since the day is not auspicious. Most, however, endeavor to carry out the phithi haek ceremony in the following manner: A small house, approximately one foot square, is built in the swidden area at any convenient point, and into it is placed betel-vine leaves (bai phlu), miang, home-made cigarettes, flowers, candles, and incense. The actual ceremony consists of the swidden site owner facing this spirit house (ban phi) and requesting that the phi guard and protect this swidden, help the rice to grow strong and a beautiful (ngawk ngam) and not allow wild animals or birds to bother the crop. In DHY2 it is firmly believed that the phi haw dan keeps elephants and wild pigs out of the swidden. Following this, food is presented to the phi (liang phi). A chicken or perhaps a dog is killed on the spot, and after it is ceremoniously offered to the phi, it is eaten by the owner and any guests he has invited.

An additional belief held by the WMI villagers is that if anyone steals from another person's swidden, either rice or more likely any vegetables or other plants grown there, that person will become sick with leprosy sometime in the future. Actually, people with leprosy are not particularly feared or avoided. Nevertheless, human theft is not a major problem in the swiddens.

As the month of May comes to a close, families who have not yet done so build small huts to rest in near their swidden. All continue to plant vegetables such as pumpkin, corn, pepper, and green beans, as well as bananas. The jungle surrounding the swidden is explored noting where edible greens grow and if any fruits or usable plants are available. The first rains cause the bamboo to send out shoots which are collected for family fare and to sell. This month, most of the mangoes become ripe and some are gathered each day. Hunting and fishing in groups continues. In 1959, a tiger was killed as well as a small bear;

many wild chickens and other small game were shot!" A wild elephant kept many out of the jungle for a few days.

Men in each hamlet work at marcotting (wrapping a branch with moist soil enclosed in coconut shell fibers, after having cut away a thin ring of bark, so that the branch will send out roots into the soil after which it can be cut from the tree and planted in the ground as a new tree) of the orange trees both for pay in the orchards of non-residents and on their own trees. Branches prepared at this time are kept wet by the rain with no special care, and are ready for cutting and planting in August. The headmen of the hamlets ask for and receive help from the whole hamlet in planting their swiddens. Ants are a problem, especially in home gardens as they are forced to move their nests by the coming of the rains.

The first rains cause some of the weaker bridges to collapse and villagers are hired to repair them so that the trucks can travel a few more days or weeks. The rains also make the residents aware of leaks in their roofs; more shingles are made and necessary repairs carried out. The rain clears the sky of the haze, and the weather becomes hotter and more humid until rains begin in earnest. Joint tasks remaining, like repairing the roof of the school building and making repairs or additions to the wat or church receive some time! A few more new houses are also built. Peddlers still come with cloth and notions, but cash or tradeable items become scarce and sales drop off.

Handicraft items continue to be made. Guns and tools are repaired. Since the rain does not fall regularly enough as yet, gardens near home and in the swidden must be watered with water carried in buckets from a river or stream, a slow and tiring job. Following each rain, fishing is temporarily improved. School begins again for the children.

June

June is the month most of the planting is accomplished, especially if the ground has been thoroughly soaked by several rainy days and if the consensus of opinion is that the rainy season has truly begun. These early rains will bring out weeds whose roots were not killed by the burning and side sprouts from the tree stumps, so some weeding is necessary prior to planting or soon thereafter. PW3, S3, and PK4 villagers are busier than those of the other hamlets. They have larger areas to weed and plant, and the PK4 folk usually have longer to walk to reach their swiddens.

Late May or early June is also the time for the ordination of novices or priests, the former being much more common. This activity, confined to PK4, HY2, and S3-PW3 (together) does not take place every year, but when it does, about a week of preparation and celebration are involved. Guests are invited from other Commune Baw hamlets as well as from outside the Commune. (This activity is explained in Judd 1961: 265-266.)

With the beginning of the heavy rains, all bridges wash out, so that by early June there are no more trucks operating on the "road", and HY2 becomes the terminal point for truck transportation until mid-November.

The water level rises in the larger streams (huai) and some of the smaller gullies dry completely dry between rainstorms. The rain brings out forest vegetation in greater abundance making "with rice" easier to come by for the villagers; this being true for wild animals also, there is less game in the vicinity of the hamlets.

July

By mid-July everyone has finished planting and the spots that needed re-seeding have been taken care of. The most time-consuming task this month is weeding, which is done by work groups, averaging from 4 to 6 "faces" a day. "This first post-planting weeding" is perhaps the most difficult and requires the most thorough job. As the rice shoots are small, from 4 to 8 inches, the weeds grow as fast or even faster and if left alone rob the rice of the potential nutrients later, when the rice shoots are larger they have the advantage over the weeds. Although weeding is considered proper work for any member of the family, husbands often send their wives to represent the family in this phase of the swidden work, unless the group decides that this phase of work will be done by the individual households. Most weeding is done by hand, but a small knife or a straight hoe is occasionally used as well. Other crops that are planted in or alongside the swidden in July are sesame, sugar cane, and corn.

Free time is given over to fishing, "hunting (mostly birds and small game), gardening, and handicrafts. Some men find time to saw a few planks of lumber for use or sale. Rain is not so hard, but it is steady. For a comparison of monthly precipitation averages, see Appendix C. These activities require the villagers to be out in the slow, steady rain, and the frequent soakings cause many colds and some fevers." At PK4, a regular ferry business across the Nan River is established, and occasionally villagers with boats at any of the hamlets on the river, and especially HY2, get opportunities to transport people up or downstream for pay.

During July the telegraph line running north through Commune Baw falls to the ground at a few points as "rain and wind finish the destruction of the poles begun by fire and insects. The post office reacts very slowly to the reports that the line is down, but the villagers often tie the wire to the side of a bush or to a bamboo pole to get it out of the path. (Mail service to the two northern district offices, incidentally, is provided by two men hired to hike back and forth the sixty to ninety kilometers, which takes them from three days to a week each way depending upon the mud. Packages or freight that must be moved north during this rainy season are sent by poled dugout from Nan to Wang Pha, and "overland by ox cart from there.) As the height of the water rises in the Nan River, more and more boats go into the business of transport. It takes about three days to pole a boat from Nan to Wang Pha, but "only one to ride the current south the same distance. Commune Baw men do not usually engage in long distance transport. PW4 and HY2 do get frequent visitors from boats that stop in passing to whom they can sell food. Some boats stop overnight at HY2 on the northbound trip and at PK4 on the southbound trip.

HY2 can expect another raid by the liquor control squad in July, but

rarely does any government unit take the trouble to walk into any other Commune Baw hamlet; on the other hand, at the end of each month the department heads in the district offices to the north have to travel to Nan (on horseback, bicycle, boat, or foot, at least as far as HY2), and thus there are government officials passing through the Commune at least twice a month, who may report on incidental observations and news overheard. With no one responsible for cutting them back, bamboo and weeds begin to encroach on the roadway, and the rain washes big ruts across the part with no cover growing."

Buddhist Lent begins in July, and during this period the priests and novices are supposed to sleep in their own wat each night; for Commune Baw this means little change, as most of them remain at their own wat all through the year. At PK4 the novices studied hard daytime in 1958 so as to be able to advance in status, but life continued about the same in the other wats. Attendance at the wat on holy days (Wan Phra) by the villagers reaches the yearly maximum.

August

August is the month of the heaviest rains, and the river rises to flood stage by the end of the month. In most of the gullies, the water level rises as water coming down the gullies is met by water backing up from the river, making it necessary to swim or use a boat to travel along the "road". There is seldom a boat available at the gullies that bisect the "road", and the water is apt to be full of small shellfish that cause skin irritations, so most people prefer to stay home or travel via the river. Some students in Nan, from the northern districts, do manage to travel home for two weeks' vacation in late August. If there are lulls in the rain and the water temporarily subsides, there is some inter-hamlet traffic." Pepper pods or handicrafts are traded for rice by those without who have run short. HPS1 women may go to PK4 to buy klaep (rice millings) for pig food or milled rice for their families; HPH1 folk try to trade woven baskets for dogs, which they eat; HY2 residents may come to WM1 or even to PK4 to buy rice.

In the swidden, when the rice reaches a height of 20 inches (nu'ng sawk) a major weeding job is carried out. Weeding in the home garden takes place also.

The marcottes on the orange tree branches are cut and planted or sold to those wishing to start a small orchard. The small first crop of peanuts is harvested, and soon replanted for a larger crop. Mushrooms and bamboo shoots are abundant in the jungle, and melons and other things become mature in the swiddens, so that there are abundant plant foods available. Hunting and fishing are engaged in as usual, the latter being quite good in the muddy, swollen river.

Special activities in August 1958 were the raising of posts, building of the roof superstructure and the laying of cement tiles on the HPS1 church, with about five villagers working in shifts each day, helping the one carpenter who was hired to direct the construction. Each week

the Commune chief spent two or three days in one of the hamlets continuing the measuring of home and orchard sites begun that June, to report on land ownership claims in Commune Baw.

September

The early-maturing rice begins to blossom and fill out, so the last weeding is done on this variety. By the beginning of the month, many more villagers have exhausted their rice supply and therefore must make trips to PW3, S3, PK4, or up to the paddy rice area of Commune Tanchum to buy or trade for rice, then hap it back to their home. Thus, there is a great eagerness for the first rice to mature, and a general easing of tension in the hamlets and households when the new rice is available.

Forest plants are abundant. In fact, bamboo shoots are dug in considerable amounts, cooked, and stored. Birds, wild chickens, wild pigs and other wild life take notice of the ripening grain, and some families move out to their rai to live in order to protect their crop, but no noise-makers are used in Commune Baw such as described by Credner (1935a: 154-156). Red pepper and more peanuts are harvested, then replanted in the fields being freed by the harvest of the early rice. Other crops like sweet potatoes and corn are planted.

Fishing is usually good in September, with woven bamboo fish traps being made and used in large numbers. Toward the end of the month, when most people again have their own supplies of rice to eat, there is apt to be a long hunting trip deep into the hills to the west where the larger wild animals have returned after the beginning of the rains. On these trips, the hunters stay out until they have shot all the game that they are able to carry home; week-long trips are not rare. The RPW2 men especially, make these long hunting trips, selling part of their game to those who have stayed at home. The hunting trips also serve to locate potential forest products that can be harvested and sold during the next three or four months.

Rain during September is apt to be irregular, with clear days interspersed with downpours heavy enough to make September the second wettest month of the year. As in June when the rains start, there are again high winds, and the local custom of building houses out from beneath trees is explained-- falling branches and upturned small trees can and do wreck havoc with a grass-roofed, bamboo house. Flood waters in the Commune reach their peak in late August or early September and then river and stream levels consistently fall except following heavy downpours upstream. These floods, on reaching Pitsanulok and other central plains provinces make possible the planting of paddy rice there in September (the first and only crop) about two months later than northern paddy.

With rice again available, rice wine is produced and more drunkenness is noticeable. The liquor control men come by bicycle on inspections if the weather permits, as it did in dry 1958. "Normally soft-spoken and non-argumentative, when drunk the villagers rant and rave and fights occur.

People turn to weaving mats and baskets to be used in harvesting, with the expectation that there will be opportunities to sell any extra items not needed personally. Regular jobs like weeding the home garden and cleaning guns keep some busy, while others enjoy loafing. A few find time to saw lumber for sale or use. If a trip into town is necessary, the brooms, steamed-rice storage baskets, and other baskets made during the rainy season are taken along to sell, first directly to town-dwellers and then the remainder to the town merchants.

If the weather allows, as it did in 1958, peddlers again begin coming to visit Commune Baw. Cloth merchants are apt to be the first and they find sales brisk because the people have rice or handicrafts to trade, and because the rainy season and heavy work have taken their toll of clothing.

October

Harvesting of the early varieties of rice is the center of attention in October. The rice is cut about six inches or more above the ground, by using a small hand sickle, and the stalks laid on top of the stubble to dry. After a four or five days in the sun, it is tied with tawk into small bundles of about one handful (nu'ng kam) and then several of these into large bundles which are carried to a central spot where threshing is to be done and stacked in such a way that if it happens to rain, only the top layer will become wet. Should the rice be stacked while still moist, it would mildew or ferment inside the stack and be ruined. Each stack (kawng) is just a little over head high, a standard size, and contains enough grain to make about 10 to 12 loads (hap) of rough rice (khao plu'ak), each of which is equal to 2 thang or baskets of about 20 liters. Actually, seldom is more than one kawng of khao daw, early-maturing rice, planted, and most of it is threshed almost immediately for use, thus it may never be piled into a kawng as are the later-maturing varieties at the subsequent harvests.

The quality of the rice harvested varies considerably from year to year, primarily because of dependence solely on rainfall for moisture. If there is not sufficient moisture or plant nutrients after the seed is set, a high proportion of the kernels will not be well-filled. At RPW2 in 1958, as high as one half of the kernels harvested were empty of grain. This condition is a common problem with all the varieties used, but a little less so in the early-maturing varieties as they mature before the end of the rainy season. This problem is widely recognized by the villagers (and of especial concern in dry years) although they do no weighing of the harvest, using only bulk measure in selling or buying. Lodging (falling over) is seldom a problem with Commune Baw rice as the straw is strong. When harvesting, the first step is to choose the best heads, the kernels from them being carefully taken home and stored for seed rice. Regardless of when one runs out of rice to eat or how hungry one might be, this seed rice is not to be touched. Most people try to save more seed rice than they expect to plant the following year, so that they will not find that they have saved too little; and who knows but that there may be another mouth to feed before the end of the next

harvest. Any family that eats its rice seed is strongly criticized by the others in the hamlet, but there are no formal sanctions against them."

The quantity of rice harvested in October depends upon the time the rice was planted, the varieties planted, the weather throughout the season, and the total amount planted. By mid-October every hamlet is doing some harvesting, but only those who have large early-maturing or mid-season variety plantings harvest steadily in October. Apart from threshing enough to eat, and perhaps a little to sell in order to buy some necessity such as foodstuffs or blankets, no major threshing is done until November when all the rice has been harvested, dried (four to five sunny days), and piled into stacks. Households in the hamlets along the river may have only four or five stacks in all; in the hamlets along the Nam Ngao each household will have between ten and twenty kawng; the kamman, with extra help, harvested 73 kawng in 1958.

During the harvesting, which is always done by the whole work group, several members of each group sleep out in the swidden to protect the rice from both human and animal thieves. A family may not return to the hamlet for over a week. Under these circumstances less time is given to searching for and preparing food, thus the diet may not be as good as normal. Others thresh enough early rice to trade for dried fish, chickens, or other easily secured types of "with rice". As always, on the day that the work group helps, the site owner is responsible for feeding everyone the noon meal. A sense of hurry develops because when the crop is fully mature it needs to be harvested without delay. If left too long, there will be more shattering and loss of grain. A late rain may also cause complications.

October is a very busy month. Besides the work already described, there is the weeding of the late-maturing rice, and then cotton and pepper to be interplanted. Sweet potatoes, peanuts, and other vegetables are also planted at this time, all of these plantings being in several stages so that everything will not ripen at once." Early planted crops such as tubers and peppers are harvested. From the jungle bamboo shoots and greens are gathered as well as baw to make rope. During periods of rest from harvesting, hands are not idle -- they weave bamboo. On going to the swidden each day, mats and baskets for use in threshing are taken along; before returning, enough rough rice may be threshed for a load to take home; on the way the path is cleaned and widened for greater ease of travel.

Back in the hamlet, the pace of activities is likewise increased. Besides the usual fishing, hunting, and weaving, gardens are prepared on the river banks as the water level decreases, leaving well fertilized areas. At mid-month, work is begun on building new temporary bridges across the streams that cross the "road", and the spots where the rain has washed the soil away, making deep ruts, are filled in. Villagers who want to earn cash and can spare the time have this work opportunity. Another job is to weed the orchards of the non-resident owners. A few good sawyers continue to saw walling for sale.

Towards the end of the month comes "the end of Buddhist Lent (awk phansa) which is celebrated in most of the hamlets by giving food and other gifts to the priests and novices. After the ceremonies at PK4, the

priest and novices go by boat to visit HPH1 and WM1. At the first stop, there is little attention given, but at WM1 the group chats, chants, preaches, and receives gifts. On this day work in the fields is forgotten as pigs are butchered, rice wine drunk, and desserts eaten in large numbers. At least one day is needed to prepare the food, cut the grass that almost hides the salatham, and repair and clean the salatham where the ceremonies are held. The wat committee, having met a few nights earlier to make plans, assign jobs including the sending of some one to town to purchase gifts for the priest and novices. Others go fishing hoping to have fish to serve. Having relaxed and gorged themselves this one day, everyone goes back to common food and the hard work of harvesting again the next day, leaving the hamlet quiet with only a few old folk and some children around during the daytime and not too many people at night. There is very little contact between hamlets at this season, but occasionally someone comes to buy miang or on other business. On the river, raft loads of coconuts pass on the way to Nan for sale.

During 1958, a few special activities were added. Many had to make a trip to the district office in Nan for the first step in registering their illegal guns. A meeting was held in each legal hamlet to select representatives to serve on the newly formed commune council (sapha tambon). An epidemic killed many domestic animals, especially in S3. The villagers called the disease rok ha (Rinderpest), but the Provincial Livestock Officer claimed that the disease was actually khaw pua (Haemorrhagic Septicemia). No aid was requested from the Provincial Livestock Office, and none would have been received if requested -- the staff of two men were busy with other shots, the supply of vaccine was exhausted, and its cost expensive.

November

Nearly every work group completes the harvesting of all the varieties of rice grown by the end of November. When all is harvested and stacked, some groups rush to complete the threshing as well, but most groups relax somewhat, thus the major part of the threshing is done in December. To protect the rice from elephants, wild pigs, birds and other wild life, work group members still must take turns sleeping in the swidden, tending an all-night fire which serves the double purpose of scaring the wild animals and keeping the people warm.

Again, as the land is cleared of rice, other crops are planted unless the plot has already been interplanted. Cotton harvesting is begun soon after the middle of the month. Very little of the rice straw is saved, but some of it is placed over the newly-planted ground to help conserve moisture.

Many activities away from the swidden take place in November. Many people accept work on the "road" and about the middle of the month the trucks begin operating again between Nan and Pua-Lae. This brings more peddlers, travelers, and government officials into or through the Commune. There are long hunts again deep into the jungle, sometimes involving the men of WM1 and HPS1 together, or other pairs of hamlets. Harvesting of such forest plants as wicker takes place. In some of the four hamlets with wats,

a Preaching Day is held, during which sermons are given almost continuously. In HY2, WM1, PN2, and PK4, lo'i krathong ceremonies, the setting adrift of little boats in honor of the river goddess, were held in 1958s (For details see Judd 1961: 285-286.)

In November 1958, the liquor control men and the police received reports of drinking and gambling at HY2 and made two raids. The second time, illegal liquor was found in HY2 and two men were arrested. The police also came to HY2 hoping to intercept opium shipments from the north on one of the first busses to return after the opening of the road, but none was discovered. Liquor continued to flow freely, with frequent parties to celebrate the harvest. The residents of S3 and PW3 were asked in 1958 by the kamnan to help start building his large new wooden house, and did so. (They had also already helped in his swidden for twelve days: 6 to "clear, 3 to weed, and 3 to harvest.)

December

Threshing takes up most of the month of December. The ground where the threshing is to take place is cleared of stubble, leveled, wet and let dry several times, making a hard floor. Then it is covered with bamboo mats called kala. A bamboo handrail is constructed for the threshers to steady themselves against, and often a shade of bamboo covered with leaves is built over the threshing area. The threshing method used varies with the individuals or the work group, but most of the rice in Commune Baw is threshed with the feet (yiap yan) by rolling small bundles (fawn) of rice stalks back and forth on a bamboo mat on the ground, and then hitting the bundle against something -- another bundle, a leg or hand, or the side of a basket -- "to shake off the last few grains. When the grain on the mat" becomes deep enough it is winnowed with a khalabat (fan) or picked up on trays and tossed in the air a couple of times to let leaves and empty hulls blow away, then poured into a pile on another mat from which it is put into baskets to be carried back to the hamlet. If wua tang (oxen with carrying baskets) are to be used, a temporary storage bin is constructed in the swidden. The treaders have help from others who bring the small bundles of rice stalks and carry away the straw, and who gather up the grain periodically.

At the swiddens of all the hamlets except HPS1, a spirit propitiation ceremony similar to the phithi"haek held at planting time is performed before threshing begins". This time the spirit of the land (phi rai) is thanked for allowing the use of the land and for the crop harvested. At PW3, the procedure in 1958 was as follows: The owner of the swidden prepared four talings with only flowers attached. On the night before the threshing was to start, the talings, a part bottle of wine, three or four desserts (khanom), miang, several cigarettes, a banana shoot, an unhusked green coconut, an egg, red rice seeds, and several bundles of each kind of rice grown that year were taken out to the threshing area, laid on the threshing mat or hung from a pole and left overnight. No further ceremony takes place here, except that the taling and banana stalk are not removed, but the edible items are eaten or taken back home to eat later.

At WM1, the liang phi rai takes a form similar to the phithi haek at HPH1. A dog is tied up and carried to the field, where a small spirit house is constructed. The dog is offered (sen"phi) to the spirit alive", and again after being killed, (the meat prepared as "with rice") with words of invitation to eat (liang phi), and with the request that the phi help the rice threshed to be bountiful. After leaving the food in the spirit house (ban phi) for a while, it is assumed that the spirit has" eaten all it wishes, so the remainder is requested from the phi and eaten by the owner and his friends. In all these propitiation ceremonies, it is assumed that the phi enjoys the same foods that taste good to the villager, so the food serves two purposes.

During the period of threshing the owner of each site works longer hours than those who come to help, getting everything ready for work and picking up afterward. His children may come to help at this task, the older ones helping the women hap the threshed rice back to the hamlet unless oxen (wua tang) are to be used. Early in the morning or at the end of the day's threshing, the man of the house also carried loads of rough rice back home. A necessary preliminary step at home is to prepare a place to store the rice. Households which expect large harvests have semi-permanent storage bins (yung khao) separate from or attached to the porch of the house, but these may need rebracing, re-roofing, or other repairs before re-use. Some of these have solid wooden walls; most have woven matting. Households with smaller harvests build or repair round woven bamboo containers that are coated with clay on the inside to prevent leakage of the grains; these are set up in a part of the kitchen area or on the covered porch of the house. All rice is stored as "rough rice (without milling). During the time the threshed rice is being transported, some member of the family or some trusted neighbor is responsible for keeping an eye on both the house and the swidden so that no rice is stolen or eaten by animals.

Although the great majority of the villagers are involved in threshing and carrying home their rice all month long, other activities do take place. A few do not finish their harvesting until mid-month; on the other hand, by that time some have completed all their threshing. It is cold at nights and in the mornings until the sun drives away the fog, causing many to bathe at midday, sit around fires in the evening, and to get a late start in the morning. In spite of the cold weather and the heavy work in the daytime, the young men go courting most nights. There is much drinking at night by the adult men, especially in PK4, WM1, and HY2, and some men even carry wine out to the swidden. The headmen ask for a day or two of work from "everyone to thresh their rice, and widows or handicapped villagers are given some help as well.

Early in the month the annual sports day is held at HY2 in which all four Commune Baw schools and the two Commune Pha Sing schools participate, then the schools are closed for a two-weeks¹ holiday. Large numbers of students from Pua District pass through in going home and returning to Nan. Several kinds of peddlers and merchants visit the hamlets -- women wishing to trade tobacco or miang or desserts for cotton and pepper, town merchants buying rice for resale in town, Commune Tanchum villagers seeking to buy small pigs to raise, cloth peddlers, and others.

Forest harvesting of luk tao (sugar palm, Arenga saccharifera, Labill.) starts, as does the harvest of yakha. Trucks begin to have accidents, blocking the "road" and increasing the number of through travelers who enter the hamlets other than HY2, where the trucks always stop. In the gardens root vegetables mature and are dug to sell to travelers and to eat.

Ox carts hauling rice from Pua District to Nan pass in numbers up to thirty some days. Oxen used for transporting rice from the swiddens into PW3, S3, and PK4 number over 200, belonging to many different owners.

Handicraft continues, including this month the making of cotton thread. A little fishing and more hunting is done. Others saw wood for sale, or deliver by boat planks already sold, bringing back rice, coconuts, and rice millings (klaep) for the pigs, as well as some cash.

In December the government gives subsidies to families with many children. In 1958, Commune Baw men with large families walked to town and waited around the District Office all day to find out finally that the amount authorized was reduced from 120 baht in 1957 to only 10 baht in 1958 for families with five children, and dropped from 200 to 13 baht for families with six children. Another event in 1958 was the arrest of two men in PK4 for having illegal liquor in their home. There was no recognition of or celebration of the legal new year, except that the four primary schools took a holiday on January first.

January

It is almost the middle of January before all the rice has been threshed and carried into the hamlets, although some groups are long since finished. Most of the villagers store the greater part of their rice, selling small amounts when necessary. A few with large harvests, sell directly from the field. At the end of their work, many groups celebrate with a party (kan liang), and in HY2 drinking and gambling becomes an almost nightly occurrence as does courting by the young men in all hamlets. The harvest of yakha takes a considerable amount of everyone's time, but there is a large amount of group hunting. Other group activities in 1959 were the building of the kamnan's house by PW3 and S3 residents, taking ten days; sawing of wood and assisting the carpenter in laying the floor of the HPS1 church; the re-building of some houses and rice storage bins; and annual celebrations in HPH1 and HPS1. The ceremony at HPH1 was the liang phi ban, in which the special spirit of the hamlet is honored. At HPS1, a combined Harvest Festival-Christmas celebration is held. Celebrating Christmas is delayed a month for two reasons: (1) so that all threshing can be completed, and (2) so that the dates will not conflict with the celebrations in town and in other Christian hamlets, allowing them to come to share the day with the HPS1 church. (Details of these celebrations are found in Judd 1961: 269-277.)

Much trading of goods takes place in January. Within the Commune cotton is traded for miang and tobacco, with outsiders rice or cotton is traded for salt, clothing and medicine. Handicrafts are produced as usual, with rice storage baskets and bird traps predominating. Ammunition

for shotguns is made, and all the daily work necessary around the home is carried out, including: drawing of water, feeding the domestic animals, pounding the rough rice, weeding the garden, gathering and cutting fuel, gathering jungle plants to eat, caring for the children, and preparing taw for later use. At night, many people gather around open fires (phing fai) to chat and to keep warm.

Short trips are taken to Nan or to hamlets in Amphoe Pua to visit friends and relatives. Near the end of the month, the most energetic households begin clearing the next year's swidden.

Thus, the year goes by. At most stages of swidden work, a day or two's delay makes little difference, so there is a chance to loaf when desired, or one can stay home if someone in the family is sick and needs care. If all members of the family wish to use their time otherwise, it is proper to hire some other villager to go in one's place in the work group. Most often the pay is in goods rather than cash, if the debt is not settled by furnishing labor in return on some later day.

It can be seen from the above description that the basic techniques and sequence of swidden work practiced in Commune Baw is not too different from that of the Lamet described by Izikowitz (1951: 206-256) and of the Khmu (Khamu) described by Halpern (1958: 21-23) quoting Smalley, although the Lamet have considerably more animistic practices and ceremonies. On the other hand, it is obvious that the swidden system used in Commune Baw (and probably Laos and Thailand as a whole) has very little in common with the complex, multiple-stage cycle of land use practiced by the Hanunoo in the Philippines, described by Conklin (1957: 29-155). Discussion of relative yields will be found in Chapter V.

Supplementary Occupations

In discussing the supplementary occupations practiced in Commune Baw, I begin with those most closely related to swidden farming or the common life of the majority, and end with those special occupations performed by a few.

Gardening

Gardening takes three forms: in the swidden, in the hamlet, and in the jungle. Many plants are grown at the swidden site during the year. Some, like bananas, tubers, and corn may be planted early in the swidden year; many edible plants are planted in small amounts each month; and towards the end of the swidden year, economic crops like pepper, peanuts, and cotton, are planted in sufficient quantity so that there will be some surplus over personal needs for sale or trade. In Commune Baw, however, practically never is there an attempt to plant or continue to care for any crop so that it can be harvested in the old swidden during the following year.

Gardens in the hamlet may be located on the house porches (herb

gardens), near the "house, or on the bank of the river. The first is universal; the second varies from a few square feet to as much as 300 square yards with most home gardens being small; river bank gardens are generally of good size but are planted only by the more energetic villager and in no hamlet take up all the potential space even within the hamlet boundaries. Free-foraging chickens everywhere and free-foraging pigs in some hamlets discourage garden planting, since even bamboo fences give little protection, but the primary reasons for not planting a garden are the availability of some kind of greens at least in the nearby jungle, and the trouble of carrying water for irrigation, especially in the late dry season.

Gardening in the jungle has two meanings. Rather than merely gathering jungle plants haphazardly, some villagers make regular trips to certain spots in the jungle where particular plants grow, and in harvesting care is taken that the plant is not pulled out by the roots or otherwise killed, with the expectation that it can be harvested again. This is especially true of greens, bamboo shoots, and tree fruits, as well as non-edibles such as wicker. The other type of jungle gardening is that done in the process of establishing an orange orchard. The first year the site is used as a regular swidden, but if there is an expectation that eventually orange trees will be planted, bananas, pineapple, or other plants will be planted in the portion of the area not immediately planted to citrus. Since the marcottes are very small when first planted, bananas are commonly planted between the rows both to provide fruit and to help control the weeds by their shade. Systematic orchard planting like this, even on the scale of 100-200 trees a year, is above the financial ability of most of the villagers, and is more common in the holdings of the absentee owners.

In Commune Baw no vegetable, with the exception of peanuts, is planted in commercial quantities, but the trading of one vegetable for a one-meal quantity of another is common." (For a listing of edible plants gathered or grown, see Judd 1961: 117-121.)

Fishing and Hunting

The catching of fish for personal consumption is an almost daily occupation; hunting is almost as frequent for those who own guns. However, there is no one in the Commune whose sole occupation is either fishing or hunting, although there are a few who combine these with sawing wood, labor for others, forest gathering, and weaving of handicrafts to take the place of swiddening, either through choice or because of physical limitations like old age.

Labor for Others

There are very few villagers in Commune Baw who do not earn some money during the year by working for others in one way or another, and there are still fewer who do not seek such opportunities. Some tasks performed are unskilled in the sense that anyone in the Commune is capable of doing them, but most jobs require the skills developed by a life in the out-of-doors. Thus, a town-dweller could not do many of them well. Some types of work are available often throughout the year, such as substituting

in a work group in a swidden, helping to clear or weed an orchard site, carrying hap (a load) for a traveler (most often just the distance from PK4 to HY2), poling or rowing a boat to transport people or goods, or pounding rice (a task frequently hired out to widows or the blind). Other jobs like building bridges and widening or leveling the "roadway" are seasonal. Payment for labor is discussed in Chapter V.

Skilled Labor and Entrepreneurship

With some jobs there is only a fine line between skilled and unskilled work, so the distinction is dependent upon the one who is classifying. Some of the types of work mentioned in this section could just as easily be included elsewhere, as for instance the sawing of lumber and the making of gunshot. Some sawing is done by most of the men of the Commune, but a few pairs of men spend a large proportion of their time doing this, and earn better than average wages from the sale of their work. Several men repair guns and many more make ammunition, but only ex-kamnan Chune in HY2 makes it a primary occupation. Small-scale entrepreneurship is widespread among the women, with many, especially in HY2 and PK4, making desserts and miang which they carry around to sell, those from the latter village also preparing native tobacco for sale. A few sell these "luxuries" as well as young coconuts, tamarind pods, sugarcane, and yam bean (man kaeo) from roadside stands. Still more widespread is the sale or trade of handicraft items made of bamboo, broom straw, or grass.

Barbering is frequently done by parents for their children, with adults servicing each other, but of late a woman in PK4 has developed a clientele of women whose hair she cuts. Home-made cloth is intended for personal use, but is occasionally traded or sold. An ex-teacher has settled in PK4 where he supplements his swidden income by part-time photography. The school teacher at HY2 and an ex-soldier at PK4 give penicillin shots and sell medicine, and in most hamlets there are one or more "doctors" of various kinds: maw damrae (herbalist), maw du (fortune teller), or maw phi (spirit exorciser). These native doctors may charge directly for their services, or receive payment indirectly as when the maw phi helps to eat the food offered to the spirit.

At HY2 two families, in one of which the husband is Chinese, sell food daily to travelers, and two women sell fresh fish there almost daily. At PK4, there is one simple hardware shop, one liquor shop, and several homes selling Thai foods and locally grown foodstuffs. Also, at PK4 is the only significantly capitalized enterprise -- a rice mill. This mill, turned by a small Czechoslovak-made diesel engine, was opened in October 1957. It is capable of milling about 15 thang (300 liters) an hour but seldom works continuously all day. The owner-operator, who is also a rice dealer, charges one baht per thang for milling if the bran is not taken, or one and a half baht if it is taken. Bran left behind is sold as pig food at one baht per thang. Villagers have walked from as far as HY2 to buy rice at the mill, but only PK4 folk have brought rice there to be milled. The owner buys some rough rice to sell to merchants from Nan who ship it either by boat or truck. A wooden house and several heads of buffalo which are rented out to Commune Tanchum paddy-rice farmers attest to the profit from the mill.

Government Service

Only the five teachers in the four primary schools are paid for full-time work by the government. The kamnan and the other three hamlet headmen receive government money for part-time work; no others in Commune Baw are in government service.

Orange Orchards

Orange orchard ownership is discussed in Chapter II. In 1959 there were only two families deriving their major income from the ownership of an orchard, although at least six families were receiving small regular salaries from non-resident owners for part-time labor and care-taking by residence on the orchard site. At that time only three orchards were old enough to produce crops. Part-time labor on orange orchards has already been discussed.

Other Occupations

There are no other important occupations practiced by Commune Baw villagers, but the raising of domestic animals deserves mention. Ducks, buffaloes and especially oxen are a rarity, owned only by the "rich". (Only two men own cattle, one with 12 and the other with 24 animals.) Native chickens are raised by 80 per cent of the households, but almost entirely for personal use with only thirteen households having more than forty birds and only one household having over 100 birds. Two-thirds of the households raise pigs, but only thirteen households raised more than three, and only one had more than five pigs. The buying and selling of pigs is more of a sport than a business with several bought and sold each year, taking very small profits. Only a few of the households spend any money in feeding the pigs (to buy klap); considerable time is spent collecting and boiling banana stems, papaya, squash, and thorny weeds as a daily mash. Thus, most pigs raised are scrawny as their food does little more than maintain body metabolism.

Sharing of Work Roles

In the foregoing descriptions it has been obvious that most work is engaged in by both the men and women. In Table 3, various jobs are classified as to whether one or the other sex has the primary responsibility, both share equally, or if the task is considered proper for one sex only.

Table 3. Adult Work Roles by Sex in Commune Baw

Work Role	Male	Female
In the swidden:		
Clearing trees	xx	x
Clearing bamboo	x	x
<u>Burning, gathering and re-burning</u>	x	x
Weeding	x	x
Punching hole with dibble stick	xx	x
<u>Dropping seeds in hole and covering</u>	x	xx
Harvesting and stacking grain	x	x
Treading out the grain	xx	x
<u>Carrying rough rice to hamlet</u>	x	xx
Carrying firewood home	x	x
Carrying tools to field and home	xx	x
<u>Carrying jungle foods home</u>	x	xx
In the jungle:		
Cutting trees for timber	xx	o
Sawing logs into planks	xx	o
<u>Searching for edibles</u>	x	xx
Cutting bamboo for <u>tawk</u>	xx	x
Hunting	xx	y
Harvesting jungle plants to sell or use	xx	x
<u>Harvesting yakha (grass for roofing)</u>	x	x
In the hamlet or nearby:		
Drawing and carrying water home	x	xx
Washing clothes	x	xx
<u>Making roof shingles</u>	x	x
Putting roof on a house	xx	o
Fishing	xx	x
<u>Pole or row dugout canoe</u>	xx	y
Harvest coconuts	xx	o
Day labor on roads, build bridges	xx	o
Selling desserts	y	xx
<u>Selling handicrafts, rice, vegetables</u>	x	x
Around the house:		
Preparing <u>tawk</u> from bamboo section	xx	y
Weaving bamboo articles	x	x
<u>Preparing food for pigs</u>	x	xx
Pounding rice	y	xx
Steaming rice	x	xx
<u>Cooking "with rice"</u>	x	xx
Caring for children	x	xx
Caring for chickens	x	xx
<u>Wiping or sweeping the floor</u>	x	xx
Making thread from cotton	o	xx
Weaving cloth	o	xx
Making ammunition and cleaning gun	xx	o

Legend: x - shared responsibility
 xxd- primary responsibility

o - probably never do
 y - seldom do

The work roles of male and female children are similar, distinctions in kinds of tasks performed being based more often on age and strength than on sex differences alone. On the whole, the only task regularly given to children is caring for their younger siblings. However, the children trail after their parents as they work around the hamlet, play at doing the same task and gradually take over some of the jobs, such as drawing water or feeding the chickens, from their parents.

Local Attitudes Toward Work

Only a few of the Commune Baw residents could be called loafers. Most keep at least their hands busy throughout the day, and much of the physical work done requires well-developed muscles. Long walks are frequent, and all adults are capable of carrying (hap) quite heavy loads for long distances. Some parts of the swidden cycle require persistent labor throughout the day in spite of hot sun or chilling rain. After a hard day of work in the fields, there remain many tasks around the home before everyone is fed and the children put to sleep, and there is no supermarket for ease of shopping. Few foreigners could keep up the pace.

However, there is seldom any sense of rush noticeable. Work goals are set for the day in the swidden, but it is expected that there will be frequent rest periods, and what is not finished one day can wait until the next. Never mind (mai pen rai)! Traditional skills are well learned, but there is little experimentation or thought given to "labor-saving" innovations, improved seed, crop diversification, or other forms of planned change. While most would enjoy living in a wooden house, no one considers it wise to strain himself every free moment in order to build one in a single season or a single year.

Cooperative assistance in swidden work is expected and freely given on a reciprocal basis, with little discussion of its necessity and few dragging feet. Cooperative work within the hamlet is much harder to carry through if it requires more than two days for completion, especially if general community betterment is intended rather than help to a neighbor who may be expected to reciprocate. Probably the major reason for this difficulty is that almost everyone lives on a minimum subsistence basis, and any activity which can not be seen as adding to the family income must be interrupted when the opportunity or necessity for personal income arises. Another factor which limits uninterrupted concentration on a major hamlet project is the lack of efficient means of food storage. Without canning or refrigeration, most "with rice" cannot be accumulated very far ahead. Thus, fishing, hunting, or at least gathering from the jungle must take place every few days if not daily. Again, most of the technology is based on freely available but impermanent native materials, and it is expected that whatever was done this year will have to be done again next year. This fact encourages two responses: one, not to put too much effort into any single task; and, second, not to view hamlet improvement projects as "of permanent value. Lastly, because there are certain times when one must work hard (as in the swidden) in spite of hot sun or pouring rain, it is pleasanter to keep activities around home at a slow, leisurely pace.

Use of Leisure Time

For most of the villagers, time is not categorized as "work time" and "leisure time". People may rest frequently or actually loaf on certain days, but such periods of "non-work" are not formally recognized as leisure. Considering the caloric value of their diet, the rest may be necessary. During work breaks, and also at night after supper before retiring, the adults are apt to have tawk or cotton in their hands while they talk, just as many ladies in the United States knit as they visit with friends. Even though there are gaps of time between the stages of the swidden work, fishing, hunting, house-building, and other necessary tasks fill the days, and for most the only distinctively "leisure-time activities" are those that take place during the Buddhist New Year and other, shorter, holidays. For many, refreshment or re-creation of spirit and body comes from finding joy in the job at hand and in chatting with others in the work group. However, for some men in PK4, WM1, and especially in HY2, getting drunk frequently and gambling provide diversion.

As to activities that are termed "leisure-time" activities in the West, there are none in organized form. No sports, even including takraw, are played regularly or in teams, except occasionally by school children. Children play together, often copying adult activities, but organized group games are a rarity introduced through the visits of Christian young people from town.

There are no vocal music groups, and the only instrumental music groups are small groups related to the PK4 and HY2 temples. The only common musical instruments owned individually are a kind of guitar, the phin, which is strummed by some of the young men when they go courting, and the saw (fiddle) which is played to accompany the singing of ballads or stories (saw) in the evening when drinking and during the Buddhist New Year celebrations. An innovation in 1959 was the purchase of a cheap phonograph by a RFW2 man, and its rental with records, operated by the owner, at the rate of 12 sides for 4 baht, with payment acceptable in goods or in cash. For special occasions like khun ban mai, this man was hired to provide entertainment. His records included saw, ramwong (Thai folk dance music with words), and some Western jazz (phleng sakon).

Chatting with one's neighbor is perhaps the most common leisure-time activity, being carried on wherever one meets along the path or road, while fishing or bathing, while pounding rice, or while sitting together on the porch floor. On winter nights, talking together late around an open fire is common, but during the rainy and hot seasons it is more common to retire early, unless one goes night fishing or hunting. As there are few radios (one each in PW3, HY2, and PK4) and no newspapers delivered to Commune Baw, most provincial, national, and world news is spread by travelers who pass through. When someone from outside the Commune spends the night in a hamlet, often many villagers gather informally to talk with him, and some guests improve upon the news in the telling, as for instance, when the carpenter working on the church at HPS1 greatly entertained the folk there with the story of the parachute jumping practice at the Nan "airfield".

CHAPTER V

THE ECONOMY OF COMMUNE BAW

Introduction

Although most Commune Baw villagers supplement their income by some of the ways already described, the economy is primarily based on the rice crop. Therefore, it is essential to consider in detail the economics of swiddening.

Rice Yields

Agricultural input costs are usually distinguished as land, labor, capital, and management expenses. In swiddening, with no land cost, the principal investment is in labor with part of up to 11 months used in some phase of the task. The capital investment necessary covers hand tools, mats, baskets, and seed rice, which for one family could be bought at around 400 baht. Since most of these capital needs can be provided or made by the villager himself, a cash output of 40 baht per year is more likely. Grist's figure of 800 baht for the capital cost of equipment for hand-reaping and threshing wet rice in Malaya seems excessive. (1959: 180) As for management expenses, there is none as each family manages its own swidden site.

Since labor is the principal investment, ideally the cost per man hour should be considered. Grist estimates 127 hours per acre (50 hours per rai) is necessary just for harvesting by hand in Malaya. (1959: 180) It is difficult to make even an intelligent guess for the total man hour requirement per rai in Commune Baw, because all through the year work in the swidden stops and starts many times. Work is interspersed with forest gathering almost every day, and each week some time is spent relaxing, at work in the hamlet, at day labor, in sickness, hunting, or in other non-swidden activities. Furthermore, the size of each work group frequently tends to vary as the husband or wife goes or stays home, as sickness of children occurs, and as families decide "to carry out certain parts of their field work independently of the work group." It is probable that at least 1000 hours per year are spent by the man of the family in the swidden and many wives spend just as much time; obviously families in groups that plant larger crops spend more time. At local wage rates, for 1000 hours of work (if jobs were available) the laborer would receive approximately 700 baht.

When considering production, there are many possible ways to measure yield, such as kilograms per acre, kilograms per man hour, kilograms per acre per day the crop is using the land, or kilograms per unit of money invested. Each of these emphasizes the principal limiting factor under the prevailing agricultural system. The common measure of yield used by the Commune Baw villager is baskets harvested per baskets planted. It is spoken of first as the number of stacks of cut rice of a standard size

that are harvested (one kawng is expected to yield 10-12 hap of threshed rice). After threshing, the total production is measured in hap (loads totaling about 40 liters of rough rice).¹² Thus it is not land, time, growing season, or money per"se that is considered limiting, but the amount of seed necessary to plant in order to secure an adequate rice supply for a year; in actuality, though, all of these factors are to some degree limiting in Commune Baw and the villagers are somewhat conscious of them, but it is more convenient to speak of seed planted and harvested.

The ratio of rice harvested to rice planted in Commune Baw varies with the particular sites chosen, the spacing between the plants, and most of all with the amount of rain and how well it is scattered throughout the growing season. Yields varying from 14:1 to 44:1 were reported in 1958, with an average of 31:1 for the commune as a whole.

Further research is necessary on the weight of rice harvested in Commune Baw. Probably about 100 baskets (thang) of rough rice would provide approximately 1800 pounds of milled rice, which is the amount that Grist estimates is consumed per year by a family of six. (1959: 367)¹³ Using Kaufman's (1956: 2) estimate that an average adult consumes roughly 1.3 pounds of glutinous rice per day, and assuming the 4.5 persons per household in Commune Baw as equal to about 3.5 adults, I equate 100 thang as the yearly rice requirement of the average Commune Baw household." The typical villager expects an adult to eat a bit more than two thang of rough rice or approximately 36 pounds of milled rice per month.

In 1958, 28 per cent of the Commune Baw households produced less than 100 baskets (thang) of rice, 37 per cent produced between 100 and 200 baskets, and 35 per cent produced over 200 baskets. (Figures based on 258 of the 282 households only.) Only 2 per cent produced more than 500 baskets, while in Bang Chan 82 per cent produced more than 500. (Sharp:1953: 164) Those in the first category (with less than 100 baskets) would probably have insufficient rice for their household needs for the year. Rice harvested

¹²The practice of the Commune Baw villager of dealing only in bulk measure and not weighing his rice crop is characteristic of Nan Province as a whole, and this has led to a major problem in introducing the improved seed rice into this province. The improved varieties recommended for this area have smaller grains than the native varieties. Even though the individual grains weigh more and although each new variety has a much smaller proportion of unfilled kernels, at harvest by bulk measure the yield is less. The new varieties also appear to yield less because the grains are scattered all along the stalk rather than bunched at the end. In addition, the characteristic of reduced shattering which is desirable with mechanical harvesting, is considered undesirable by those who harvest and thresh by hand"

¹³The Chief Rice Officer of Nan Province states that a thang of upland rice grown in Nan Province will weigh between 8 and 10 kilograms (between 17.6 and 22.0 pounds) depending upon the size of the kernel and the variety. The khao daw varieties are lightest and bulkiest, while the khao pi are the heaviest from having grown longer. The villagers are aware of the weight differences, but measure their crop by its bulk. Personal correspondence with Nan Provincial Agricultural Officer, March 5, 1961.

over 100 baskets would normally be available for sale or barter for food-stuffs, clothing, blankets, tools, and other necessities.

Comparing Commune Baw harvests with those assembled by Halpern (1958: 36) from data by Izikowitz, Kaufman, Madge, and Sharp on a kilogram per household basis, it is obvious that the Commune Baw production is less than any quoted there, ranging from an estimated 900 kilograms or less for one-fourth of the households, to a maximum of 4500 kilograms for the 14 per cent producing most (ignoring the kamnan's atypical situation). However, comparisons of this type, when involving two very different types of agriculture"-- wet and dry rice cultivation -- are useful only in indicating the range of producti'bn. They do not tell the yield per man hour, per acre, per days invested, per seed used, or even per person. Compared in yield per rai, Commune Baw averages about equal to Bang Chan's 31.9 thang per rai. (Sharp 1953: 163)

Rice Sold

In Commune Baw, most of the rice produced in excess of household needs is sold within the first few months following the harvest. Most sales are small; only 7 per cent claim to sell as much as one-fourth of what they grow. Some is pledged to re-pay loans made before harvest at a price as low as 5 baht per hap (two thang of 20 liters each) of rough rice; some is held until spring or summer when the price may rise as high as 16 baht to 25 baht per hap. The major portion of rice sold is sold in January, bringing a price during the past three years of 10-12 baht per hap at the hamlet of the owner.

Weather conditions and the size of the crop in the nation as a whole affects the local price of rice, especially since Nan Province is a deficit area in rice production. If it appears that rice prices are going to be high for rice imported into the province, many people from town try to purchase from the rural areas such as Commune Baw, and the ensuing scarcity causes the Commune price to rise as the year progresses. During such years there is also a hardening of attitude toward townspeople who come out to swidden and then carry their harvest back into town. The HY2 headman reported in early 1959 that he was considering forbidding outsiders to swidden in his hamlet area. However, it is highly unlikely that such a threat would be carried out, especially in HY2, for the whole hamlet has developed from the settling down there of town-based swidders.

At the price of 10 baht per hap of rough rice, the value of an average family's yearly rice needs would be between 500-600 baht. Ninety-eight per cent of the households harvest a crop valued at less than 2,500 baht, and the kamnan's 1958 crop, using "contributed" labor of all PW3 villagers, was worth less than 10,000 baht. One must remember, however, that although cash is used by all families for some purchases, rice is not viewed by most as a cash crop, but rather as the basic crop for feeding the family, "with some surplus to trade for other necessities. The majority of the villagers do not attempt to grow much more than they expect to need, but instead count on supplementing their income by other means and by being as self-sufficient as possible.

Other Commune Baw Crops and Products

Other crops grown include peanuts, chili pepper, cotton, corn, sweet potatoes, sugar cane, yam bean, ~~sesame~~, casava, cucumber, string beans, eggplant, and squash, in order of importance. Most of these crops are harvested for family use or barter within the hamlet or commune, but small amounts are sold for cash, especially of peanuts (1 baht a kilogram if still green, or 6 baht a kilogram if dry), pepper (15 baht a kilogram), sweet potatoes (5 baht a thang), and cotton! (Prices given refer to 1958 and 1959.)

Barter is also very common in the sale of handicrafts, rice, fish, and fruits, but domestic or wild animal meat, live pigs, salt, liquor, chickens, and forest products like rattan are usually sold for cash. Any animal that is shot or butchered is divided up into small chunks of meat that sell for from 1-5 baht per chunk; pig or buffalo meat is normally contracted for in advance prior to being butchered. Prices paid for live animals vary depending upon the size, age, and kind of animal; pigs never get very large before being sold, 200 baht is about the maximum paid. A wild pig shot near PW3 in October 1958 sold for 150 baht in HY2. In PK4 butchering is weekly, sometimes more often, but in the other hamlets, it usually takes place only at the time of ceremonies. Chickens seldom sell for more than 6 baht apiece, and eggs for $\frac{1}{2}$ baht each.

Handicraft items sell for from 1 baht for a broom up to 10 baht for a baby's crib or a fish trap. Other items made out of forest products are valuable only in quantity. Bundles of grass (yakha) sell for 5 baht a load (hap). Grass shingles sell for an average of 70 baht a hundred; rattan sells for from $\frac{1}{2}$ to 1 baht a stem. Bamboos bring from 20 to 100 baht per hundred canes, depending on the type and where delivered.

Most families eat all the fish they catch, but if any are sold, they are usually tied in tens and sold for 1 baht because they are so small." In HY2, various sized fish are sold daily to truck passengers, but very few bring over 3 baht. Occasionally, a really big fish is caught that is worth up to 100 baht; such must be sold in HY2 for no villagers are willing or able to spend so much money for fish.

For some villagers, especially in HPS1, RPW2, and WM1, sawing wood is a frequent occupation. Most sawing is done in the forest surrounding these hamlets, and then the sawed lumber is carried into the hamlet and stored under one's house until sold (unless it must be kept hidden because it is of a prohibited species). The measures used are not exact as they are based on one's forearm length (sawk) and the width of a finger (niu), but these approximate 20 inches and 1 inch, respectively. At varying widths and thicknesses, the price is quoted at so much per sawk of length. Actually, all boards are sawed to 6, 8, or 10 sawk lengths.

The maximum length of 10 sawk represents the maximum size of log that the villagers can manage by hand. A raised frame is constructed near the site where the tree is felled, and the tree is cut into sections that will divide the trunk into 6-10 sawk lengths. Each section must be rolled and levered up onto the frame so that a two-man saw can be used with one man on

the ground (perhaps in a pit) and the other above the log on the frame. Fewer middle-sized trees are still found near these hamlets because either small or very large trees are the preferred size to saw.

Table 4 shows the common price for various size boards. Since this is hand-sawed, few pieces are of uniform dimensions, and all four sides remain unplanned.

Table 4. Common Price of Hand-sawed Boards in Commune Baw Hamlets in Dry Season

Thickness (inches)	Width (inches)	Price per <u>sawk</u> (approximately 20 inches or $\frac{1}{2}$ meter) in Thai <u>baht</u> (100 satangs = 1 baht)
$\frac{1}{2}$	x 6	0.30
1	x 2	0.20
1	x 8	0.50
2	x 3	0.30
2	x 4	0.40
2	x 6	0.50
3	x 4	0.40

If sawed lumber is delivered by the sawyers to another hamlet, the price is usually about double that given in the table; thus walling, $d\frac{1}{2}$ " x 6", sells at 0.60 baht and 2" x 4" scaffolding sells at 0.70 baht, delivered. Rarer and illegal woods bring higher prices. Also, prices go up during the rainy season; thus, walling may sell for 0.55 baht locally in September. Some sawed wood is sold or used locally, but much is transported by boat to PK4 and hamlets in Commune Tanchum of Paa District. The better sawyers often are hired to go to these neighboring hamlets to saw timber already felled. On such occasions besides being paid about 25 baht for each 100 sawk of any dimension sawed, the sawyers are also fed three meals a day and housed overnight by the employer. A good pair of sawyers can earn 10-15 baht each a day.

Wage Rates

Apart from sawyering, there are few skilled jobs that pay good wages, although during part of the year a skilled fisherman, hunter, forest gatherer, bamboo weaver, or grass shingle maker may significantly add to his income through the sale of his products. For most jobs, unskilled in the sense that any other Commune Baw person can perform them, the common wage is 4-5 baht per day. Such wages are received for weeding orange orchards, repairing bridges or improving the "roadway", substituting in a swidden work group, and other tasks performed within the Commune. If the noon meal is supplied, the wage for helping in the swidden is only 3 baht. During the rainy season or when carrying goods for someone beyond the Commune boundaries, the villager can usually bargain for and get higher pay. For instance, men can get 7 baht and "with rice" (but not rice as well) for orchard labor. For road repair, the hamlet headmen who

supervise the work receive 10 baht per day.

If a villager could get day labor of some sort every day of the year, he would earn about 1,800 baht. Since there are few with enough money to hire anyone for the majority of villagers, 200 baht is a more reasonable expectation of cash income from wages during a year. The only villagers with regular monthly wages are the orange orchard watchmen, the headman, the truck driver and his helper, and the school teachers, in ascending order of income. (The watchman gets about 50 baht and the teacher about 500 baht.)

Apart from day labor for cash and jobs with regular wages, there is some contract labor and some labor paid for in goods. The teachers sometimes hire the villagers to swidden for them; the usual rate for clearing or weeding a plot is 30-35 baht per rai. Absentee orange orchard owners also have some of their weeding done on a contract basis at similar rates. Usually, when rough rice must be transported back to the hamlet by human effort, the members of a work group help each other; in some cases, as at HPH1 in 1958, individuals not in the work group are engaged to help carry the rice, and are paid in rice, at the rate of one load (hap) of rough rice for each four days' labor.

Cash Income and Expenses

An exact study of cash income and outgo remains for future research. That one villager who promised to keep a record, failed to do so is natural, for there is no tradition of record keeping of any kind by these villagers, many of whom are illiterate. With no regular bills to pay, and no regular cash income, there is no felt need for recording what money is received or spent. At present, cash plays a minor part in family living. Such funds as are on hand are usually hidden by the wife on her person or somewhere in the house. Small amounts are spent for kerosene, rice millings for the pig, medicines, liquor, and occasionally for foodstuffs or desserts (khanom). Larger amounts, when available, are spent for clothing, blankets, and tools. The amount of cash handled in a year varies very widely from a probable minimum of 500 baht to a maximum of 2,000 baht for all but a very few. The modal cash income per household from all sources is undoubtedly under 1,000 baht.

The chief exceptions to the 2,000 baht maximum are the salaried people and the merchants. Apart from the rice mill, the only large merchandising establishment in the Commune is a store also in PK4. This "hardware" store sells about 50 items including bottled liquor, bottled soft drinks (Pepsi, orange, and 7-Up, at 2.50 baht, un-iced -- sold mostly to travelers), thin blankets, lamps, matches, simple medicines, soap, wax, and some local items like young coconuts, bananas, duck eggs, yam beans, and desserts. The second largest shop is the Chinese "short-order restaurant" in HY2 where many of the trucks stop. A shop in PK4 and houses in WM1 and HY2 that sell liquor undoubtedly handle more than 2,000 baht a year in cash. The teacher in each hamlet with a school is approached for loans, with handicrafts for sale, and with rice or food to trade for other needs. They provide both short-term credit and a source of supplies. This

is especially true of the WM1 teacher who kept supplies of kerosene, dried fish, salt, fish sauce, matches, etc.", for sale or trade, and of a PK4 teacher who was being threatened with firing from the school for spending too much time as a merchant. The HY2 teacher sold medicines and gave injections.

The degree of involvement in a cash economy varies considerably among the ten hamlets. It is my opinion that HY2 is most highly involved, followed by PK4. PW3 and S3 handle the next most cash, receiving it in payment for part of their excess crops, but their use of cash is more clustered around ceremonies and during the dry season when peddlers come to them. For most people in the rest of the hamlets, cash resources are always limited and never held very long before being used.

The Wealth of Commune Baw Households

The limited use of money in the overall economy reflects the fact of its scarcity and not any unwillingness on the part of the villagers to have or use money. Traditionally, the subsistence agriculture practiced and the value-system followed has not required the use of cash, and still today the villagers manage to provide for their basic needs without using much of it. However, as the Commune has been brought into fuller contact with urban society, there has been an increased desire to secure things that money will buy, and a clear appreciation of the instrumental value of money. Nevertheless, it is my hypothesis that monetary wealth is still not itself considered a primary value. (This hypothesis is tested in Judd: 1961 by specific correlations of wealth with leadership, education, status, religion, participation in politics, medical care, and attitudes toward social change.)

For the correlations "wealth" is defined as low, moderate, or high in terms of scores based on housing, rice harvest, domestic animals owned, orchard land claimed, transport equipment owned, and cash income. It should be noted that all of these levels are relative to the local situation, that the majority of the villagers fall in the "low" wealth category on all items except rice harvested, and that only those in the "high" wealth category would be comparable to those of average wealth in rural central Thailand where wet rice is grown. Specific details of what these levels indicate are found in Table 5.

Table 5. The Bases for Assigning Wealth Levels of Commune Baw Households, 1958-59, and Indications of Distribution Range within Each Factor

Housing:

Low-----	No wood used in floor or walls of house. No cash outlay	--54%
Moderate----	Walls or floor partly of wood. Cash outlay under 1000 <u>baht</u>	--39%
High-----	Walls and floor all wood; roof not grass. Cash outlay over 1,000 <u>baht</u>	-- 7%

Rice Harvest: (Based on 258 households; no information available on 24.)

Low-----	Under 100 <u>thang</u> harvest; no surplus above family needs	--28%
Moderate----	Between 100-200 <u>thang</u> harvested; some surplus to sell or barter.	--37%
High-----	Over 200 <u>thang</u> harvested; surplus sufficient for bulk sales.	--35%

Domestic Animals Raised:

Low-----	Less than 20 fowl raised; fewer than 3 pigs raised.	--77%
Moderate----	Between 20-69 fowl raised; or 3-5 pigs raised.	--20%
High-----	Seventy or more fowl raised; or over 5 pigs; or own some buffalo.	-- 3%

Orchard Land Claimed:

Low-----	Less than 1 <u>rai</u> claimed; only homestead claimed.	--61%
Moderate----	Between 1-3 <u>rai</u> claimed legally.	--33%
High-----	More than 3 <u>rai</u> claimed and planted to other than rice.	-- 5%
No information		-- 1%

Transport Equipment Owned:

Low-----	None	--84%
Moderate----	Own boat	-- 5%
High-----	Own bicycle or cart or both	--10%
No information		-- 1%

Cash Income:

Low-----	No regular cash income. (Estimated total under 1,000 <u>baht.</u>)	--64%
Moderate----	Part-time merchant, or estimated income between 1,000- 2,000 <u>baht.</u>	--31.5%
High-----	Full-time merchant or salaried with income over 2,000 <u>baht.</u>	-- 4.5%

Scoring Plan:

Low:	1 point
Moderate:	2 points
High:	3 points
Range of possible scores:	6-18
Interpretation:	Score of

6- 9 Household of "low" wealth.
10-15 Household comfortable by local standards.
16-18 Household has sufficient wealth for some freedom
of choice when money involved.
On schedules with necessary information lacking for any
item, scoring is based on available items; i.e., if 5
items, range is 5-15, and levels counted at 5-7, 8-12,

The six indicators of wealth used were chosen as those most distinctive in Commune Baw. Other indicators such as clothing, equipment, amount of paddy land owned, higher education of children, amount spent on family ceremonies, etc., were rejected either because of irrelevancy in Commune Baw or because distinction on that basis would require a longer period than the 17 months spent in studying this Commune. Specific data are on hand from the schedule for the first five indicators; schedule data is supplemented by other sources for the cash income status determination. Using these indicators, the wealth of each hamlet is as given in Table 6.

Table 6. Wealth of Households in Commune Baw Hamlets, 1958-59, Based on Housing, Rice Harvest, Domestic Animals Owned, Orchard Land Claimed, Transport Equipment Owned, and Cash Income, as Indicators.

Hamlet	<u>"High" Wealth</u>		<u>"Moderate" Wealth</u>		<u>"Low" Wealth</u>		<u>Unknown</u>	
	#	%	#	%	#	%	#	%
S3	0	0	10	66.7	5	33.3	0	0
PW3	1	6.7	9	60.0	5	33.3	0	0
WM1	0	0	9	29.0	22	71.0	0	0
HPH1	0	0	1	8.3	10	83.3	1	8.3
HPSI	0	0	4	16.7	20	83.3	0	0
PT1	0	0	2	25.0	6	75.0	0	0
PK4	4	3.4	36	30.5	78	66.9	0	0
HY2	2	4.9	18	43.9	21	51.2	0	0
PN2	0	0	3	23.1	10	76.9	0	0
RPW2	0	0	3	33.3	6	66.7	0	0
Commune Baw:	7	2.4	95	33.2	183	64.0	1	.3

From Table 6 it is seen that approximately two-thirds of the Commune Baw households are rated of "low" wealth, and one-third of "moderate" wealth, with less than 3 per cent of "high" wealth. The few "wealthy" households are located in PK4, HY2, and PW3. S3 and PW3 are composed of approximately two-thirds "moderately" wealthy households and one-third "low" wealth households; while HY2 is approximately half-and-half. In all the other hamlets, there are many more "low" wealth households proportionally.

Miscellaneous

Merchandise that passes through Commune Baw going north is of interest in terms of what is available for purchase in rural Nan Province, especially in the Chinese shops in Wang Pha and in smaller "hardware" shops in Commune Tanchum. This merchandise forms the body of urban and industrial artifacts to which the villagers are exposed, although it must be recognized that merely seeing them in a truck or in a store is not as significant as seeing them in use. The merchandise moving south, on the other hand, indicates the types of rural products that are readily saleable.

In 1958, trucks began operating after the rainy season on November 10. Two of the nine trucks regularly operating during this dry season belonged

to Nai Somchai and were used primarily to supply his tobacco barns in Lae Province, and to bring out the cured Virginia-variety tobacco for shipment to Bangkok. The other seven trucks carried general merchandise for the merchants, mostly Chinese, in the towns of Wang Pha, Pua, Sop Kawn, and Lae. Typical loads going north included some of the following:

- matches, soap, candles, wax, nails, hinges, hasps, watering cans, flash-lights and batteries, bicycle tires and innertubes, saws and other tools.
- bags of cement and slaked lime, corrugated iron roofing, chicken wire and barbed wire, paint, and 5-gallon tins of kerosene and diesel oil.
- bags of granulated sugar, non-glutinous rice, and salt, canned and salted fish, fish sauce, cases of condensed milk and of soft drinks, liquor, pastry flour, noodles, and cigarettes.
- bolts of cotton cloth and of plastic sheeting, factory-made men's and women's, and boys' clothing of cotton, canvas shoes, leather shoes, and sandals made from old automobile tires.
- clothing and umbrellas for priests, small suitcases, proprietary medicines, pens and ink, writing paper and notebooks, metal dishware and kettles, pots, pans, and spoons, big water jars, small water dippers (khan nam), and an occasional sewing machine, and on some days, ice.

Sitting on top of a full load of merchandise would be from 10 to 40 people.

Trucks and boats going south carried some of the following: bags of glutinous rice, rice bran, and peanuts; coconuts or copra; pigs; Virginia or native tobacco; dried chili peppers, dried areca palm (betel nut) slices, and dried onions; green beans, sesame seed, and sugar palm fruit; occasionally chickens or ducks, and almost always a full load of people.

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APPENDIX A.

CENSUS STATISTICS FOR NORTHERN THAILAND, 1947

Province:	Population	Area**	Density*	Total Households	% Households in Agriculture	Area** in Padi Rice	% Area in Padi	Rai ⁺ Planted & Reported	Rai ⁺ in Padi Rice
Phrae	213,203	5,960	35.7	46,233	82.0	397	6.7	247,847	211,668
Maehawngsawng	66,389	15,297	4.3	16,247	79.1	77	0.5	48,364	35,486
Lampun	180,360	4,512	40.0	40,549	80.0	464	10.3	289,803	267,156
Uttradit	171,549	7,726	22.2	37,604	85.2	528	6.8	329,184	236,997
Chiangrai	485,080	15,223	31.9	112,339	87.1	1,054	6.9	658,695	611,520
Chiangmai	535,664	22,949	23.3	133,149	80.0	992	4.3	620,063	561,179
Nan	210,858	14,840	14.2	48,839	88.3	169	1.1	105,787	91,714
Lampang	331,956	12,517	26.5	87,324	79.4	750	6.0	368,797	324,079
Totals:									
Region Five:	2,195,062	99,024	22.17	522,274	82.2	4,431	4.47	2,668,540	2,339,799
All Thailand:	17,442,689	511,945	34.1	3,845,153	78.0	66,248	12.9	58,682,037	41,405,267

Notes: * Persons per square kilometer

** In square kilometers

+ One rai is .4 of an acre; 6½ rai equals one hectare; 625 rai equals one square kilometer

Source: 1947 Census Report, Thailand Ministry of Interior (in Thai language)

APPENDIX B.

GLOSSARY OF THAI TERMS USED FREQUENTLY

- amphoe--district; a political unit comprising many communes
baht--unit of Thai ceremony; in 1959 equal to about five cents in U.S. money
ban--house or hamlet
hap--to carry on a stick over the shoulder with the load divided into two parts, suspended from each end of the stick
huai--a small stream, perhaps dry part of the year
jangwat--province; a political unit composed of several districts (amphoe)
kaeng--a curry
kamnan--commune chief
kap--"with rice"; any food eaten along with rice
kaeng--a stack or pile, as of harvested but unthreshed rice
khamm'ang--the local dialect; northern Thai or Lanna Thai language
khao--rice; a ballad; to enter
khru--teacher
khun ban mai--new house dedication ceremony
kwian--the soul/self of an individual which may depart during illness, sleep, death, or other times
lai lao--group hunting
lap--minced raw meat or fish, often eaten with liquor
liang--to feed, honor, or take care of
mae--mother
mai--wood; new
mai (phai)--bamboo
maw--a "doctor" who may practice healing, exorcism, ritual supplication of phi (spirits), magic or divination
miang--pickled wild tea leaves that are sucked or chewed after or between meals
Nai Amphoe--District Magistrate
nak tham--students of the three lower ranks in Buddhist scholarship
nam--water; liquid; river or stream (mae nam)
parian--a group of seven advanced ranks in Buddhist scholarship
phaet prajam tambon--commune public health official; "doctor"
phak--vegetables; a district or region
phakama--an all-purpose cloth worn by male villagers
phansa--Buddhist Lent; the monsoon season
phaw--father
phi--ghost or spirit; often used with modifying word, such as phi pa, phi rai; older sibling or friend
phin--a type of guitar
phing fai--to warn oneself around an open fire
phithi--a ceremony
phra--a priest; holy; a machete
phu yai ban--hamlet headman
pla--fish
rai--a measure of land equal to .4 of an acre; a swidden site; evil
sala--a communal rest pavilion
salatham--a place for occasional Buddhist ceremonies
sapha tambon--commune council

saw--a type of fiddle; a ballads
sawk--a measure of length equal to the forearm; about twenty inches
takraw--a game of keeping a woven ball in the air without using one's hands
tambon--commune
taw--lengths of "string" made of thin strips of bamboo of varying widths
tham rai--slash-and-burn agriculture; swiddening
thang--a bulk measure equal to about 20 liters
thio sao--to go courting
tom yan--a way of preparing "with rice"
wat--Buddhist temple
Wan Phra--Buddhist holy day
wihan--building in wat compound used for Buddhist ceremonies
yakha--cogon grass, used for roofing

APPENDIX C.

CLIMATIC DATA

1. TEMPERATURE AND RAINFALL MONTHLY MEANS IN NORTHERN THAILAND

Temperature, in degrees Centigrade:

January	20 - 22 for most; 18 - 20 for Chiangrai; 22 - 24 for Tak Province mountains.
February	22 - 24 for most; 20 - 22 for Chiangrai; 24 - 26 for Phrae, Lamphun, & south of 18°.
March	26 - 28 for most; 22 - 24 for upper Chiangrai; 24 - 26 for Chiangmai, Maehawngsawn, & Lampang.
April	30 - 32 for most; 26 - 28 for Chiangrai; 28 - 30 for Chiangmai, Maehawngsawn, & Lamphun.
May	28 - 30 for most; 26 - 28 for Chiangrai.
June	26 - 28 for most; 24 - 26 for western mountains; 28 - 30 for Nan, Chiangrai, Uttradit, & Sukhothai.
July	26 - 28 for most; 24 - 26 for Tak; 28 - 30 for Nan & Uttradit
August	26 - 28 for all.
September	26 - 28 for most; 28 - 30 for Nan, Phrae, and Uttradit.
October	26 - 28 for most; 24 - 26 for Chiangrai & Fang; 28 - 30 for Tak, Lamphun, upper Nan, & Sukhothai.
November	26 - 28 for most; 24 - 26 for Chiangrai, Chiangmai, Tak, & Maehawngsawn.
December	20 - 22 for most; 22 - 24 for Maehawngsawn; 18 - 20 for Chiangrai, Lampang, and Sukhothai.

Rainfall, in millimeters: (25.4 mm equals one inch)

January	0 - 25 for all."
February	0 - 25 for all.
March	0 - 25 for most; 25 - 50 for Phrae & Nan.
April	50 - 75 for most; 25 - 50 for Maehawngsawn and western Chiangmai; 75 - 125 for Uttradit.
May	125 - 200 for all.
June	125 - 200 for most; 75 - 125 for Lampang, Sukhothai, & Tak.
July	200 - 300 for most; 125 - 200 for Lampang & Chiangmai.
August	200 - 300 for most; 300 - 400 for Chiangrai; 125 - 200 for Tak & Lampang.
September	200 - 300 for most; 300 - 400 for Uttradit; 125 - 200 for Maehawngsawn.
October	75 - 125 for most; 125 - 200 for Chiangmai & Nan.
November	25 - 50 for most; 50 - 75 for Chiangmai & Tak.
December	0 - 25 for all.

Source: Plate #3, Geologic Reconnaissance of the Mineral Deposits of Thailand. Washington: Geological Survey Bulletin 984, United States Department of the Interior, 1951.

2. SUMMARY OF CLIMATIC STATISTICS FOR NAN PROVINCE, 1948-1957 AVERAGE MONTHLY MEANS

<u>Month</u>	<u>Rainfall (mm.)</u>	<u>Temperature (°F.)</u>		<u>Relative Humidity (%)</u>
		<u>Highest</u>	<u>Lowest</u>	
January	8.76	86	55	73.63
February	13.94	91	58	69.50
March	39.31	96	64	64.42
April	117.7	97	71	66.58
May	157.2	94	74	75.54
June	136.98	93	75	77.69
July	179.06	90	74	80.70
August	328.4	89	74	83.86
September	258.11	90	74	83.56
October	77.85	90	71	80.89
November	6.58	87	66	78.28
December	2.38	85	65	76.49
Annual total or mean (average) 1,321.31 (52.02 inches)				75.92

Source: Government Weather Station, Nan Province; secured by the Provincial Agricultural Officer, October 1960.

APPENDIX D.

GENERAL STATISTICS OF MU'ANG DISTRICT, NAN PROVINCE, THAILAND

1. DEMOGRAPHIC STATISTICS:

Area: 3,125,744 square kilometers (national census report, 1957)
3,360,000 square kilometers (Mu'ang District claim, 1958)

Composition: 20 communes (tambon) containing 113 legal hamlets, and one town. The town of Nan reported in 1958 a population of 13,163, living in 2,508 households in an area measuring 5.4 square kilometers.

Population:	<u>1957</u>	<u>1958</u>	In 1947, 85 per cent of the 12,972 households were engaged in agriculture. No statistics on households in agriculture are available yet for 1957.
Females:	33,944	35,526	
Males:	<u>33,404</u>	<u>35,015</u>	
Total:	67,348	70,541	
Households:	13,153	13,206	

Temples: 123, of which 11 are located in the town of Nan!

Schools: 86 primary schools
3 government secondary schools
3 private secondary schools
3 government trade schools (agriculture, carpentry, home economics)

2. AGRICULTURAL STATISTICS:

Rice and Rice Land in Mu'ang District: (one rai equals .4 of an acre)
29,873 rai of paddy rice land owned, Sept. 1957, equals 47.8 sq. kilometers
29,817 rai of paddy rice land planted in 1957
10,526 rai of upland rice land (swidden sites) reported in 1957
11,077.55 kwian (2000 liters each) of glutinous rice harvested in 1957
15.55 kwian of non-glutinous rice harvested in 1957

Tangerines (som khieo wan): 4915 rai (7.9 sq. kilometers) reported planted in May 1958 in the whole province; half estimated to be in Mu'ang District.

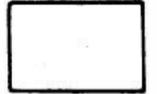
Animal Census, September 1957:	<u>Mu'ang District</u>	<u>Nan Province</u>
Cattle (<u>wua</u>) used to plow	1,229 head	7,372 head
Water buffalo (<u>khwai</u>) used to plow	6,020 head	20,406 head
Other cattle	1,218 head	5,933 head
Other buffalo	821 head	7,713 head
Old, retired, sick cattle	305 head	1,225 head
Old, retired, sick buffalo	678 head	3,801 head
Small, young cattle (<u>lu'k wua</u>)	845 head	5,818 head
Small, young buffalo (<u>lu'k khwai</u>)	3,298 head	11,252 head

Sources: The Mu'ang District Statistical Officer
The Assistant Mayor (palat tetsaban) of the town of Nan
The Nan Province Education Officer
Report for 1957 (B.E. 2500) to the Rice Department, Ministry of Agriculture, of the Nan Province Rice Department Officer.
(Copied in Nan in January 1958.)

THAILAND POPULATION DENSITY 1947

PERSONS PER
SQ. KILOMETER

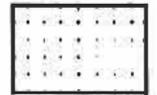
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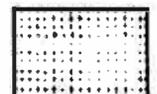
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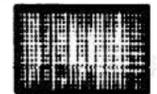
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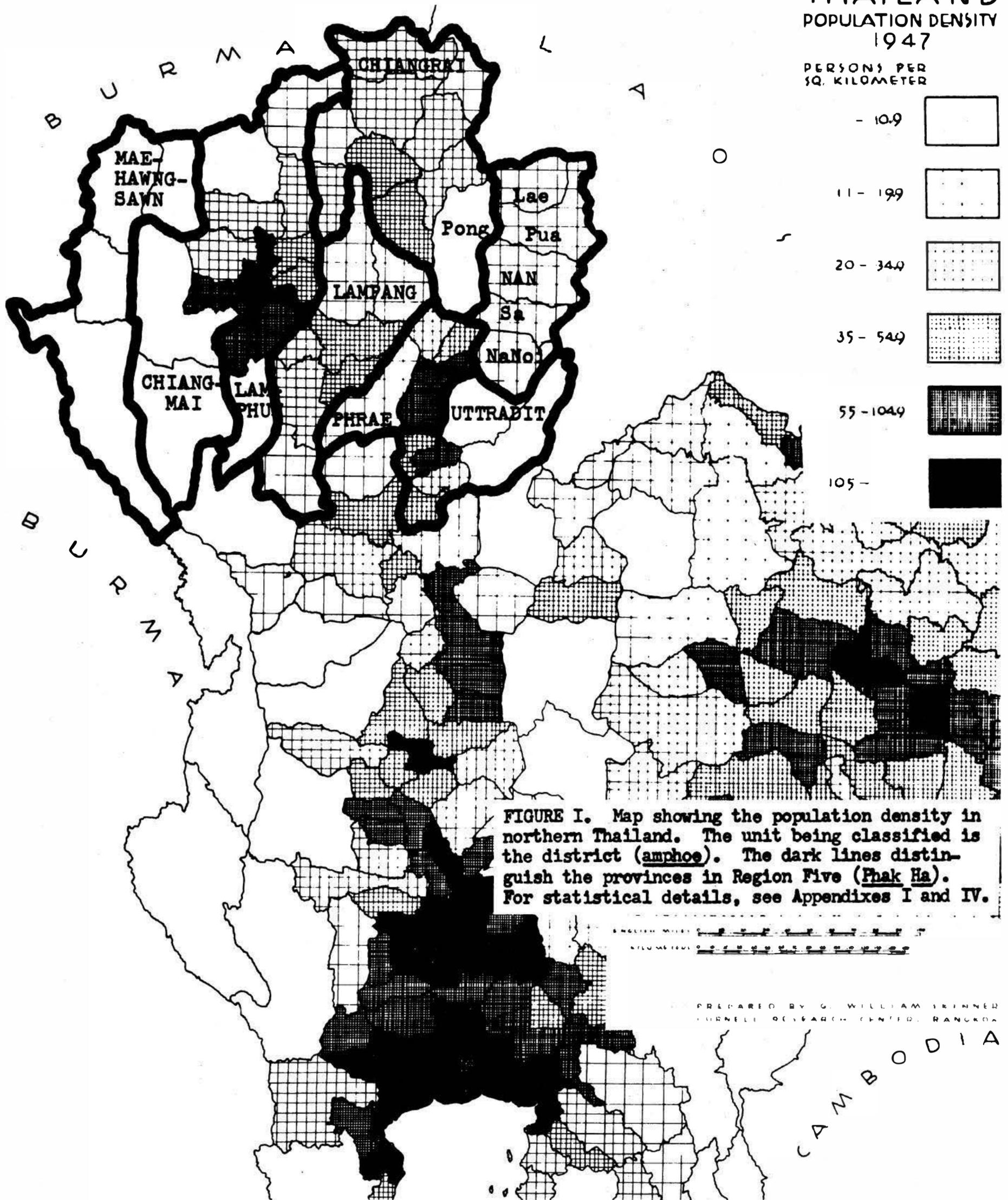
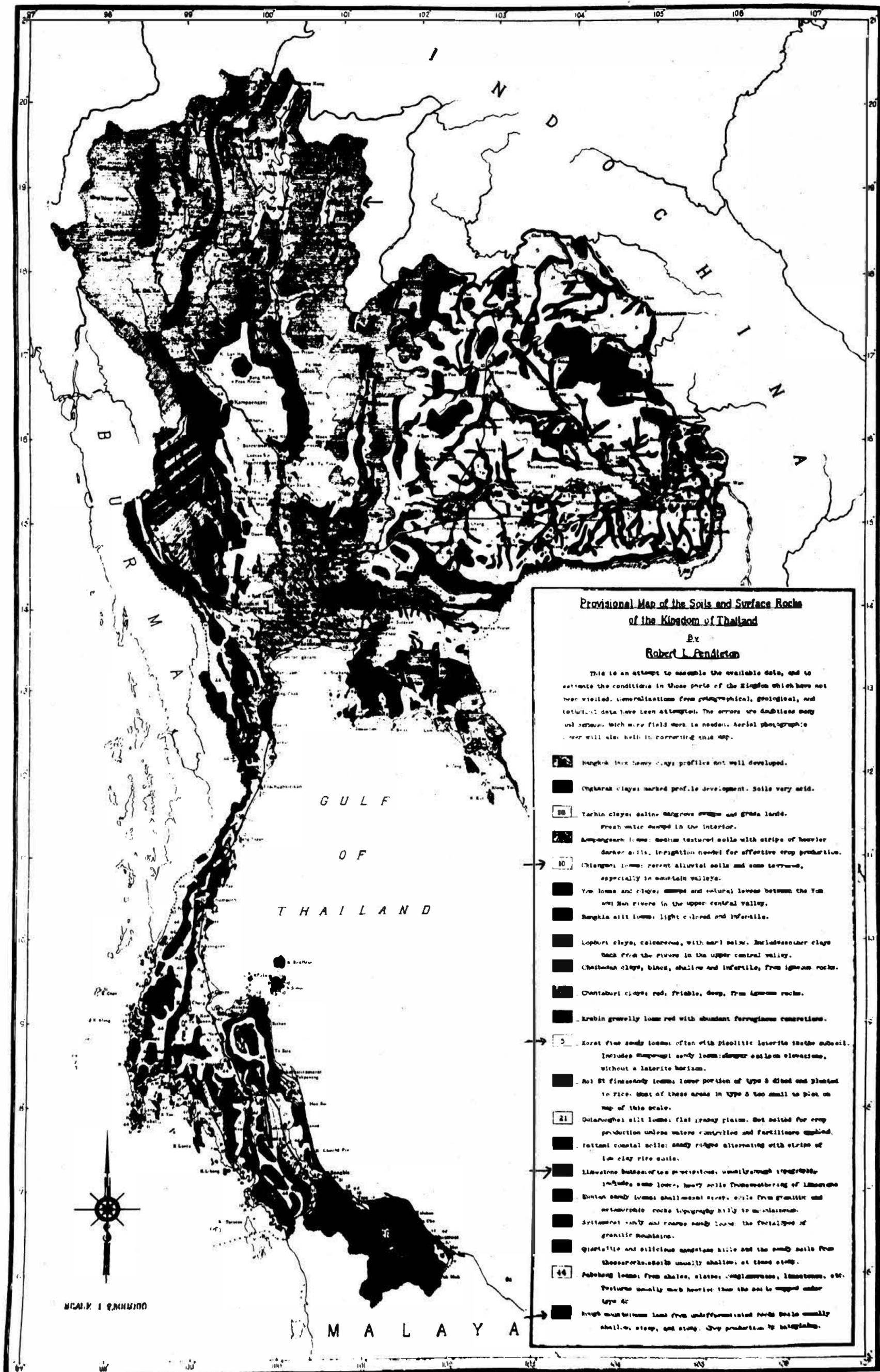


FIGURE I. Map showing the population density in northern Thailand. The unit being classified is the district (amphoe). The dark lines distinguish the provinces in Region Five (Phak Ha). For statistical details, see Appendixes I and IV.

ENGLISH MILES 0 10 20 30 40 50 60 70 80 90 100
KILOMETERS 0 20 40 60 80 100

PREPARED BY G. WILLIAM TRINER
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CAMBODIA



**Provisional Map of the Soils and Surface Rocks
of the Kingdom of Thailand**

By
Robert L. Fendleton

This is an attempt to assemble the available data, and to estimate the conditions in those parts of the Kingdom which have not been visited. Generalizations from geographical, geological, and statistical data have been attempted. The errors and omissions may well be numerous, which more field work is needed. Aerial photographs will also help in correcting this map.

- 1. Bangkok clay: heavy clay; profiles not well developed.
- 2. Chokchok clay: marked profile development. Soils very acid.
- 3. Yachin clay: saline mangrove swamp and grass lands. Fresh water swamp in the interior.
- 4. Ampangsoen loam: medium textured soils with strips of heavier darker soils. Irrigation needed for effective crop production.
- 5. Chiangrai loam: recent alluvial soils and some terraces, especially in mountain valleys.
- 6. Yon loam and clay: swamps and natural levees between the Yon and Nan rivers in the upper central valley.
- 7. Bangkok all loam: light colored and infertile.
- 8. Lopburi clay: calcareous, with marl below. Indurated clay back from the rivers in the upper central valley.
- 9. Chachabun clay: black, shallow and infertile, from igneous rocks.
- 10. Chantaburi clay: red, friable, deep, from igneous rocks.
- 11. Krabi gravelly loam: red with abundant ferruginous concretions.
- 12. Korat fine sandy loam: often with Disolitic laterite in the subsoil. Includes Mueangsoi sandy loam: deeper on low elevations, without a laterite horizon.
- 13. Roi Et fine sandy loam: lower portion of type 3 dried and planted to rice. Most of these areas in type 3 too small to plot on map of this scale.
- 14. Orlanonghai all loam: flat grassy plain. Not suited for crop production unless water controlled and fertilizers applied.
- 15. Pattani coastal soils: sandy ridges alternating with strips of low clay rice soils.
- 16. Limestone bottom of tea precipitates, usually through steep slopes. Includes some lower, heavy soils from weathering of limestone.
- 17. Dinton sandy loam: shallowest strip, soils from granitic and metamorphic rocks topography hilly to undulating.
- 18. Sritamarat sandy and coarse sandy loam: the footslope of granitic mountains.
- 19. Quartzitic and siliceous sandstone hills and the sandy soils from these rocks. Soils usually shallow, at times steep.
- 20. Pabong loam: from shales, slates, conglomerates, limestones, etc. Textures usually much heavier than the soil to which under type 4.
- 21. High mountainous land from undifferentiated rocks. Soils usually shallow, steep, and stony. Crop production by intercropping.

SCALE 1:500,000

M A L A Y A

