Investigating the effect of the Nanthaburi National Park on villagers' livelihood in Ban Huai Mon, Nan Province, Thailand

A Joint Interdisciplinary Research Project

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Abstract

In Nan Province in the northern Thailand, the Nanthaburi National Park is to be implemented in the near future. This report investigates the effects of the national park on villagers' livelihood in Ban Huai Mon by analysing the livelihood provided by agriculture, forestry and other income generating activities as well as the government's implementation plans for the national park.

The proposed boundary of the national park includes all forest areas and most upland agriculture fields utilised by the villagers. Since it is illegal to collect forest products or to do logging in a national park, the implementation will have serious consequences for the villagers' livelihood in terms of consumption and economy, and they might have to depend more on other income generating activities. In order to minimise the effects on the villagers' livelihood, the national park authorities therefore needs to include the villagers' viewpoints in the implementation plans.

Key words: Thailand, agriculture, forestry, household economics, national park, interdisciplinary.

Acknowledgements

Interdisciplinary Land Use and Natural Resource Management (ILUNRM) is part of the Sustainable Land Use and Natural Resource Management (SLUSE) course. The aim is interdisciplinary approaches that may contribute to a more holistic understanding of the complex relationships that characterise this field of study.

Interdisciplinarity was conducted by combining quantitative and qualitative disciplines concerning agriculture, forestry and household economics. This was done while writing the synopsis for the fieldwork, while conducting fieldwork in Thailand with our Thai counterpart, and while analysing the fieldwork in this report.

Many people have helped us during this interdisciplinary research. We would like to thank them all: Firstly, our supervisors Thorsten Treue, Peter Oksen, Mogens Pedersen and Suphathida Aumthong have kept us in the right direction and have supplied us with the necessary equipment and literature. The Thai instructor team have provided us with knowledge and facilitated us while we worked at Ban Huai Mon in Thailand. Respondents and key informants have supplied us with important information. Finally, special thanks to our Thai counterparts of the interdisciplinary team: Piriya Tanvarapong and Vesava Chotiko in the agriculture team, Taewan Peeradarsartsak and Jenphol Chotigo in the forestry team and Nattavute Pimladda in the household economics team. Also special thanks to the interpreter team, Mui and Honey.

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Contents

1 Introduction

Three weeks of fieldwork was conducted in the village Ban Huai Mon, which is located in northern Thailand. The purpose of the fieldwork was to analyse three sub villages - the northern part, the southern part and Huai Jum Poo - in order to determine what consequences the proposed Nanthaburi National Park will have for the villagers. The fieldwork was interdisciplinary in three senses. First, it was cooperation between five Thai students and three students from Denmark. Second, the students had different educational backgrounds hence each contributed with specific knowledge from their former studies. Thirdly, both quantitative and qualitative methods were used to collect data; these include PRA techniques, own observations, questionnaires, interviews and literature research.

1.1 Village information

The history of Ban Huai Mon village goes back to 1972. Mien people from Laos, Lumpang, Chiangrai, and Tung Chang District in Nan migrated to the area to establish their homes in what should be known as the northern part. 10 years later, Tin people, who were hill-tribe people escaping the Communist Party, arrived in Ban Huai Mon and established the southern part of the village (Kanjana *et al 2002)*

The village was formally established on April 30th 1981 and named *Ban Huai Mon* after the stream, Huai Mon Stream, which runs through the village. The village is the eighth village of the Ruang Sub District, Amphur Muang, Nan Province. Since 1982, there have not been any migrations to the area, since all of the land has been occupied. Though around 1985 to 1986, because of shortage of land the Mien people from the northern part of Ban Huai Mon established Huai Jum Poo, which is now recognised as a sub village to Ban Huai Mon, and where new cultivation areas were made.

Today Ban Huai Mon consists of 128 households, 158 families of 729 villagers. The northern part has 55 households, the southern has 60, and Huai Jum Poo contains 13. Generally, all of the inhabitants are doing agriculture, and collect non-timber forest products (NTFPs) from the surrounding forest areas. The community forests in the area are completely separated between the three sub villages. The northern part has three large community forests with a total area of 2,200 rai. Of these, 1,000 are conservation zone (C-zone) and the rest (1,000 and 200 rai) can be utilised. The total area of the southern part's two community forests is 800 rai. One is C-zone and the other is for utilisation (Khunarak *et al* 2003).

1.2 National parks in Thailand

As a part of the forest policies in Thailand, it has been decided that around 40 % of the total area of Thailand should be covered by forest. 25 % of this should be conservation forest and 15 % should be production forest. This policy has lead to an increase in the forest and national park area. More than 100 national parks are to be established in Thailand in order to fulfil the policy. One of the national parks that are going to be established is the Nanthaburi National Park, which is proposed to be in the area of Ban Muai Mon. The proposed boundary of the national park is including a big part of the agriculture and forest areas utilised by the villagers of Ban Huai Mon (Pathama 2004), and it is therefore assumed to have a big effect on the villagers' livelihood. This has lead to the following research question:

1.3 Research question

How will the livelihood of the villagers within the three sub villages of Ban Huai Mon - the northern part, the southern part and Huai Jum Poo - be influenced by the proposed Nonthaburi National Park?

1. How will the livelihood provided by agriculture be affected?
2. How will the livelihood provided by forestry be affected?
3. How will the livelihood provided by other income generating activities (household economics) be affected?
4. How will the government implement the national park in the area?

In the table below we have listed the issues, which we want to investigate in order to be able to answer our research questions.

	What information/data do we want to obtain?	What is the purpose of obtaining this information (how does it relate to the research question)?	Which data is needed for this?
Agriculture	1. Yield, size of fields and crops crown 2. Soil fertility/inputs used 3. Irrigation possibilities 4. Farming methods	1. How much do villagers rely on the fields? 2. How is the soil quality? Can it be increased in order to give better yields? 3. Does the land lack water to do agriculture? 4. Are the systems currently used sustainable?	1. Information from villagers, own observations 2.Nutrient content, crop condition, soil structure 3. Information from villagers, own observations 4. Information from villagers, own observations
Forestry	1.Location of the forest areas	1. Is it a part of the national park or is it going to be? Who is affected by the expansion – specific groups?	1.Borders of the proposed national park, land documentation

	2. Size/yield of collected forest products 3.Quality/health of forest	2. How much do villagers rely on forest products (to determine the importance of the forest area)? 3.Is the good or bad forest included in the national park? Effect on villagers?	2.Information from villagers 3. Forest inventories: Height, trees per area, age, size
Household economics	1. Which other income generating activities exist? 2. Alternatives to present activities	1. How much do they rely on income from these activities in the village? 2. If the national park expands, can the villagers then rely on other income?	1. Household economy in the village in general 2. Local market conditions
Implementation of Nanthaburi National Park	1. Borders of the proposed national park 2. Compensation for possible losses 3. Villagers' rights	1. Which areas are affected? 2. Can the implementation be eased for the villagers? 3. Can the villagers influence the decisions about the national park expansion? Do they have any legal rights?	1. Maps from RFD 2. Laws from national park office 3. Laws/rules about national parks and villagers' rights

1.6 Relevant literature

Falvey, L. (2000): *Thai Agriculture, Golden Cradle of Millennia*. Kasetart University Press. ILUNRM compendium (2003): *Interdisciplinary Land Use and Natural Resource Management 2003-2004*. Kasetart University (2002): *An interdisciplinary Study On Existing Land Use In Klong Sathorn Village*. First edition, A Plus Three Media Ltd. Part. Khunarak R., O. Mingtipol, S. Prabudhanitisarn, P. Oksen & T. Treue (2003): *Basic information for the SLUSE Field Course 2003-4. Piang Pao Watershed, Nan Province*. Scoones, I. (1998): *Sustainable Rural Livelihoods: A Framework for Analysis – IDS Working Paper 72*. SLP Working Paper Series. Thai Forestry Sector (U.Y.): *Master Plan Discussion*. Office of the Thai Forestry Sector Master Plan, Royal Forestry Department. Traynor, C.H., S. Prabudhanitisarn, P. Oksen, s. Dontree & C. Saarnak (2002): *Problem of sustainable land use and natural resource management in a community at Song Watershed, Phrae Province, Thailand*. TUCED-SLUSE, Thailand. Wichawutipont, J. (1964): *Forestry Law*. Royal Forest Department, Thailand.

2 Methodology

The following methods were applied in our field research:

- Meeting with the headman
- Participatory Rural Appraisal (PRA)
    - Mapping
    - Activity calendar
    - Trend analysis
    - Transect walks
- Own observations
- Questionnaires
- Interviews
- Literature research

2.1 Meeting with the headman

The objective of the meeting was to introduce us, and to get useful information regarding the village. The meeting with the headman also provided us with knowledge about which key informants to choose for the PRA sessions and who to be guides for the transect walks concerning agriculture and forestry.

2.2 PRA

PRA is a methodology that helps identify and illustrate the community and problems, which can take place in it. The idea of PRA is to present practical means to enable local people to express and analyse their realities (Selener *et. al* 1999). The methods to a very high degree give the word to the respondent, and mostly result in qualitative data. The PRA was conducted in the beginning of our research in Ban Huai Mon in order to get basic information. The people involved in the PRA session were the headman, the southern TAO members, two headman assistants, an old villager from the southern part and two northern villagers. These were chosen because of their positions in the village and additionally to get viewpoints from people of both the northern and southern part of Ban Huai Mon.

Four PRA methods were conducted. Participatory mapping is a session in which local people make their own map of either the natural resources or a map of the village showing different wealth ranking or important people (Chambers 1997).
The activity calendar can identify livelihood tasks and the intensity of the activities (Slocum *et al* 1995). Trend analysis is useful for analysing important changes in community life. It helps to understand past events and how these influence the present and future (Selener *et. al,* 1999). In

transect walks a local from the research area will inform the researcher about what they pass while walking, and more detailed information can therefore be obtained.

2.3 Own observation

2.3.1 Agriculture

The aim of doing own observations in the fields of Ban Huai Mon was to analyse the quality of the soil. To do this we took soil samples in all the sub villages, and investigated two plots (upland and lowland) according to soil structure. 37 soil samples were collected in different agricultural areas using an auger to dig 20 cm in the ground. The soil was placed in a plastic bag and dried in the shade for two days before tested with the Thai soil testing kit.

Table 1: Location and numbers of fields for soil samplings.

Field type	Number of soil samples
Northern part	
Young*) lychee (U)	3
Old lychee (U)	3
Soya/paddy fields (L)	4
Southern part	
Young lychee (U)	3
Old lychee (U)	3
Young lychee, maize + rice in between (U)	2
Paddy field (L)	3
Soya/paddy field (L)	4
Maize (U)	3
Huai Jum Poo	
Young lychee (U)	3
Old lychee (U)	3
Young lychee, maize in between (U)	3

*) Young lychee is below 5 years, whereas old lychee is above 5 years. U: Upland field. L: Lowland field.

In order to get the best picture of the soil, we did three soil samples in each field at different elevations: In the top, the middle and at the bottom of the field.

To keep track of where we did the soil samples, we used a GPS. Each time we took a soil sample, we made a waypoint on the GPS. This was done in order to see if some of the fields cultivated by the villagers were overlapping with the proposed boundaries of the Nanthaburi National Park.

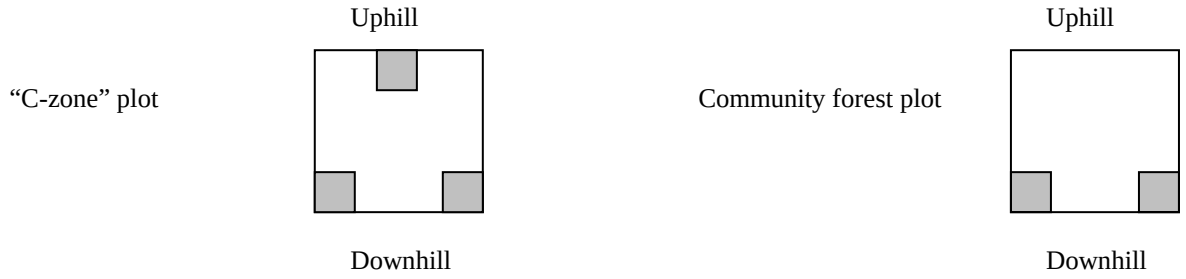
The reason for choosing these different fields was to see if there was any difference in the nutrient content of the soil in fields that were growing different crops. To analyse the soil samples, we used

the Thai soil testing kit, which tests the soils' content of ammonium, nitrate, potassium and phosphorus. Furthermore we tested the soils' pH.

2.3.2 Forestry

In the spots detected in the transect walks as representatives[1] of the forest areas, 40 × 40 meter (1 rai) plots were made using measuring tape. Two sampling plots were made in all; one in the "C-zone"[2] of the northern part and one in the community forest of Huai Jum Poo. The objective was to obtain information about forest types and the quality of these. No plot was made in the utilisation zone, since it mostly consists of bamboo. Within the two plots, 10 × 10 meter plots were made because of shortage of time (see grey colour in the figure below). In each of these plots, the diameter of all trees (bigger than 4.5 cm in DBH - **d**iameter in **b**reast **h**eight) was measured using a caliber, and the species of as many as possible of these trees and the smaller ones were identified.

Figure 1: Forest sampling plots.



There was a lot of bamboo in the "C-zone" and the community forest, which made it difficult to use the method of determining the diameter class distribution. Instead of measuring the diameter of each bamboo culms in all the bamboo bushes, we counted the amount of small and big bushes and found an average diameter for the bushes in each of the categories mentioned. This is far from a precise way to do it, but it seemed as the best solution when considered the limited time.

A GPS walk was conducted making waypoints and tracks while walking in and along the different forest areas (the map can be seen in figure 8). The objective was to compare the results with GIS maps showing the proposed boundary of the Nanthaburi National Park to see what forest areas will be included in the national park. The GPS walk started out in Huai Jum Poo from where a villager went with us through a part of the sub village's community forest and the utilisation zone of the northern part, ending up in the cultivation zone of the southern part. Several waypoints and tracks were made in the forest areas and on the border between them and a few times we stopped to draw the borders between the different forest areas by using the UTM coordinates of the GPS, a topographical map and a compass. From the southern part, we went to the border between the

[1] *Representative* forest spot: An area including a good average of the species, soil type etc. of the certain forest area. Furthermore the spot should be in the middle part of the forest zone, since a spot in the upper or lower part could be affected by different forest areas bordering on it (Kringsak 2004).

[2] The C-zone determined by the RFD both include the utilisation zone and what the villagers call the "C-zone".

cultivation and utilisation zone of the northern part, and walked along this border for about 1 to 1½ kilometre.

2.3.3 Household economics

The objective of investigating the households by doing own observations within Ban Huai Mon was to get information about household economics and villagers' livelihood. To do this we walked in the village observing the different activities conducted by the villagers.

2.4 Questionnaire

The questionnaire is the most important element of a structured survey; it must be standardised, well tested and listed in a systematic manner (Casley *et al* 1988). The data collected from the questionnaires was used to analyse the distribution of the different sources of income: Agriculture, forestry and other income generating activities (household economics). 27 questionnaires were conducted in the northern part of the village, 33 in the southern part and 7 in Huai Jum Poo. Each group member was given an area within the village according to our sampling strategy, which was simple random sampling. Random sampling is an appropriate strategy when one wants to generalise from the sample studied, to a larger population. The reason for using random sampling is to increase the likelihood that the data collected is representative of the entire population of interest (Sanders 1995).

5 pilot tests of the questionnaires were conducted in the northern and southern part before the actual questionnaires in order to detect weakness and ambiguities (Casley *et al* 1988). The pilot tests were not conducted in Huai Jum Poo, since it was time consuming, and since this sub village is more or less similar to the northern part. Two persons did the pilot test, unclear questions were corrected and some words were clarified before performing the actual questionnaires.

2.5 Interviews

We did 9 interviews (for details see appendix *section 7.6*). These where divided into clarifying interviews and specific interviews. All of the interviews were carried out as semi structured interviews.

2.6 Literature research

The research made from literature consisted of studying notes that we got from the TAO office and our Thai counterparts, but also by looking into laws concerning national parks and forestry. We got information about the establishment process of the Nanthaburi National Park and some basic information from earlier research done in Ban Huai Mon.

2.7 Methodology concerns

During our fieldwork, we experienced some difficulties with the cooperation of the villagers due to parties and religious events. The headman informed us, that Chinese New Year was coming up, which might make our fieldwork difficult, since some of the villagers would not be available because of preparations for the big day. The New Year party lasted as mentioned earlier for five days, and we were prepared for this, but what we were not prepared for was the ceremony of spirits feeding. This ceremony kept us from working in the northern part of the village, the agriculture and forest areas, which they utilise. Instead we used these days in the base camp doing data analysis.

During the fieldwork we worked with colleagues from a Thai university. Generally the teamwork went well, although it was not always easy to communicate with the counterparts. Though, we were fortunate to have two good interpreters, who eased this issue so that we did not have any serious problems with the teamwork.

3 Results

Four PRA techniques were performed to obtain some of the results. The results of the mapping and the trend analysis can be seen in the appendix under *section 7.1 and 7.2*, the calendars can be found in the three sections below as well as the data from the transect walks, that are described in the beginning of the agriculture and forestry sections below. No transect walk was conducted according to household economics. Parts of the trend analysis can be found in the introduction, too.

The data presented in the next sections *Agriculture*, *Forestry* and *Household economics* are results from the meeting with the headman, transect walks, calendars, own observation, 67 questionnaires and several interviews; all conducted in the northern part, the southern part and Huai Jum Poo.

3.1 Agriculture

3.1.1 Ownership situation

According to most of the specific interviews, the farmers of Ban Huai Mon do not have any title deeds. Therefore the farmers do not, according to the laws of Department of Lands, have any proper land ownership documents. Furthermore, in the RFD interview we were informed that the upland area belongs to the government and cannot be claimed by the villagers.

Many farmers who cannot obtain any land document have been willing to pay land taxes and thus receive a tax receipt called PBT5. This receipt does not provide the farmer with any official right to the land, but many farmers will pay the relative cheap land tax and thereby get an official recognition that they are users of the land. This matter becomes important in the future if land titling programs are initiated, this typically will allocate land according to proof of prior active land use. In many cases, the PBT5 has unofficially been regarded as a sort of land document in buying and selling of land (in the 1970's) included the transfer of the PBT5 (Dontree *et al* 2002). The last 15 years, the villagers in Ban Huai Mon have purchased these tax certificates to the land, for which they have to pay 5 BHT per rai. This enables them to claim some right to their lands, even though no official ownership documents are obtained. These tax certificates can also be used if there should be any local difficulties with regards to land rights. But as far as we experienced, there seem to be no problems within the village concerning rights to use of the land.

3.1.2 Crops

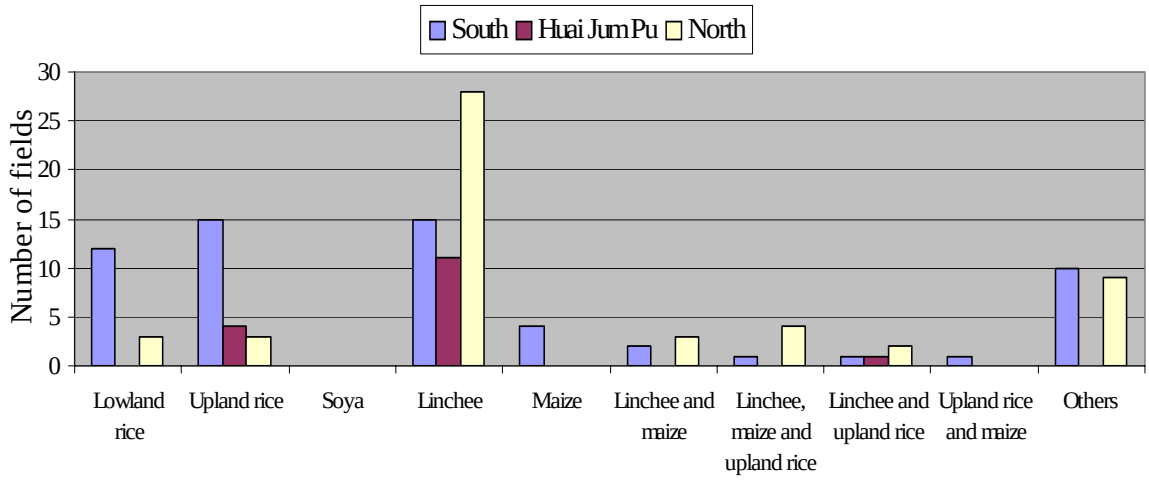
Almost the entire population of the village is doing agriculture[3]. Especially people in the southern part and Huai Jum Poo are very dependent on agricultural activities. People in the southern part

[3] S*ee appendix table 5.*

primarily grow rice (upland and lowland) for own consumption, maize and soybeans[4] as cash crops and more recently lychee as a cash crop, too. The oldest lychee orchard is 8 years old, and the average age of the orchards is about 4 years. In Huai Jum Poo, the villagers mostly grow lychee (varies in age from 2 to 17 years) and a little maize. The northern part of the village also has a high level of agricultural activity mainly consisting of lychee orchards, which have the same age as the ones in Huai Jum Poo[5]. In *figure 2* below, the distribution of the different agricultural fields is shown.

The main crops that we investigated were lychee, rice, soybean and maize. Lychee and maize were generally grown on the upland fields, rice in both upland (dry rice) and lowland (paddy) fields, and soybean was grown in lowland fields.

Figure 2: The amount of the different agricultural fields in the three sub villages.



[4] The soya does not appear in figure 2. This is because it is a part of the technique called sub sequential farming in the meaning, the main crops of the fields are grown sequentially more than once a year in the same plots (Dontree *et al* 2002*)*. The soya is planted in the lowland paddy fields after harvesting. There are two reasons for the farmers to grow soya, one is for the cash income, the other is that soya fixates nitrogen from the atmosphere for the benefit of the soil. But in order to be able to plant soya seedlings, the field must be drained for water - otherwise the soya cannot grow. Generally the farmers are able to drain their fields, but some cannot get rid of the excess water, and therefore cannot benefit from growing soya.

[5] See appendix. *Lychee trees age table 8.*

Table 2: Crop calendar of the three sub villages

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Crop	Ly-chee	Ferti-liser	Insecticide			Harvest							
	Rice			Seedlings									Har-vest
	Maize			Soil prep.	Seed lings	Fertil-iser							Har-vest
	Soya	Seed-ling	Har-vest										

3.1.3 Farming methods

The farmers use different farming techniques in the cultivating process. From the data we collected, we were told that when the villagers prepare an upland area for agriculture, they clear it by hand and then burn the branches and trees. This method is referred to as slash and burn technique and is used in shifting cultivation practices where cropping and fallow periods are integrated in the farming. In this system, a piece of forest is cut down, cleared and burned before cropped intensively. After a few years (in Ban Huai Mon between 2-4 years) the field may be abandoned or left to lie fallow for a period ranging from 5 to 10 years. This form of shifting cultivation is in the main regarded as an unsustainable form of land use. This can be because the newly cleared fields give high yields in the first few years, but then the yield starts to decline due to degrading nutrient content in the soil. While short crop season allows the area to regenerate quickly, the long fallow helps the system to be able to restore soil fertility and remain productive for a long time without any inputs from outside. Hence, fallow management is the key to the success of a rotational shifting cultivation system (Hansen 1995).

Some farmers use intercropping when establishing lychee orchards. Farmers purchase one-year-old lychee seedlings and normally plant 25 trees per rai. Crops are then grown in between the rows of lychee trees for the first five years. From the transect walk and various interviews, we were told that lychee trees starts yielding well from around 5 years of age, and until that the farmers grow crops, e.g. maize or rice, in between the trees in order to obtain a yield from the field. But when the trees reach around 5 years of age, they begin to shade too much, which makes it difficult for crops to grow between the lychee trees. These areas then become permanent agricultural fields.

The final cropping system is monoculture cropping. This is a system, where only one crop is grown repeatedly every year (Waramit *et. al* 2002). The crops cultivated in this manner are maize, upland rice and also some paddy fields where the farmers cannot grow soybean.

3.1.4 Land preparation

To clear these areas, the southern villagers most commonly rely on help from friends, and normally 15-20 people help to clear an area for agriculture. In the northern part and Huai Jum Poo it is more widespread to hire labour to prepare the land. In the village there is one machine to do ploughing which can be rented in cases where farmers do not want to do the tillage by hand.

Many of the lowland rice fields have been made with the help from machinery such as bulldozers and bobcats. The reason for this is that the rice fields belonged to the Watershed Management Unit[6], but were then sold to the farmers of Ban Huai Mon. The ownership situation of these fields is unclear, despite the fact that the watershed management unit sold the fields to the farmers. What we learned from the interviews was that the owners of the fields had a tax certificate, similar to most other fields in Ban Huai Mon.

3.1.5 Inputs

In the interviews we were told, that compared to earlier the villagers are now generally better at using inputs and doing intensified agriculture, and this prevents the villagers from clearing new forest areas. Illustrated in the tables below, is the percentage of villagers applying inputs to their fields. Furthermore, it is shown that farmers in the northern part and Huai Jum Poo apply generally more insecticides to their fields than villagers in the southern part, but this can be due do the fact that most of the insecticides are used in lychee orchards. A large percentage use herbicides, but fewer farmers apply chemical fertilisers to their fields. Furthermore it is shown that the use of organic fertilisers is more widespread in the southern part than in both the northern part and Huai Jum Poo.

Table 3: Amount of households in the three sub villages using input for agriculture.

Village / Amount	Northern part		Southern part		Huai Jum Poo		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
Use input	21	77	27	82	7	100	55	82
Do not use input	6	23	6	18	-	-	12	18
Total	27	100	33	100	7	100	67	100

[6] This unit forms under the RFD section local section of Nan.

Table 4: Type of input used.

Village / Input	Northern part		Southern part		Huai Jum Poo		Total	
	Amount	% of using each input n=21	Amount	% of using each input n=27	Amount	% of using each input n=7	Amount	% of using each input n=55
Insecticide	13	61	3	11	7	100	23	41
Herbicide	19	90	24	89	7	100	50	91
Chemical fertiliser	12	57	16	59	5	71	33	60
Organic fertiliser	-		8	29	1	14	9	16
Growth hormone	2	9	1	3	2	29	5	9

3.1.6 Irrigation

Most of the lowland fields have irrigation possibilities, and from the interviews we were informed that the water for irrigation mainly comes from the local streams or water reservoirs. Though, some lowland farmers do not use irrigation, but rely on rain only. For upland farming there were normally no irrigation, most of the fields in these areas were rain fed. These numbers suggest that more people in Huai Jum Poo could benefit their agricultural yield if they had irrigation possibilities, thus decreasing the risk of harvest failure in years were droughts are problems.

Table 5: Amount of households doing irrigation.

Village / Amount	Northern part		Southern part		Huai Jum Poo*)		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
Irrigation	15	58	17	56	5	71	37	59
Rain fed	11	42	13	44	2	29	26	41
Total	26	100	30	100	7	100	63	100

*) In Huai Jum Poo the villagers have developed a system of pipes running from the streams to their fields.

3.1.7 Yield

As seen from the table below, the fields that use inputs, in general produce a higher yield compared to fields with no inputs. Rice seems to give a higher yield in the lowland, where it is easy to keep the water and hence nutrients from being washed away from the fields. The results with lychee give a very unclear picture of whether it should be rainfed or irrigated. In both Huai Jum Poo and the southern part, irrigated fields give the highest yield, whereas in the northern part the yield is 257

kg/rai with irrigation and 286 kg/rai without. This can be seen as a result of different age of lychee orchards in the irrigated and the rain fed fields. In the southern part and Huai Jum Poo, the lychee yields less than in the northern part, but this is due to the fact that the lychee orchards are older in the northern part, and hence yield more. The numbers obtained from the questionnaires were based only on the yield, not on the age. Furthermore it seems as if the southern part has better prerequisites for doing maize production than the northern part, which could be the explanation of the high yield of maize in the southern part.

Table 6: Estimated average yield/rai (kg) of main crops in the three sub villages.

Crop/ Input / Type/ Location	Maize Input	Maize No input	Rice Input	Rice No input	Soya Input	Soya No input	Lychee Input	Lychee No input
Northern part								
Irrigation Upland			200				257	
Irrigation Lowland			501					
Rainfed Upland	83		41	200			286	
Rainfed Lowland								
Southern part								
Irrigation Upland							125	
Irrigation Lowland			325		120			
Rainfed Upland	381		78	180			40	
Rainfed Lowland				90				
Huai Jum Poo								
Irrigation Upland			311	190			195	
Irrigation Lowland								
Rainfed Upland							142	
Rainfed Lowland								

3.1.8 Soil texture, nutrients and slope

Soil texture and fertility play large roles for agricultural productivity levels, and being able to maintain the texture and the fertility of the soil will give the farmers a higher yield. The soil texture was investigated by soil profiles conducted in an upland lychee field orchard and a lowland soybean/paddy field (see figure 3 below).

Figure 3a: Soil texture upland (80 cm)

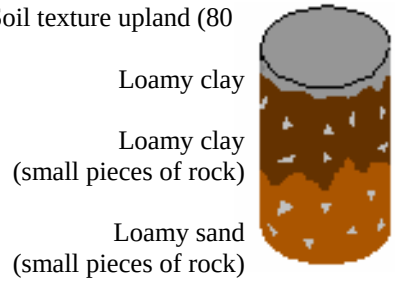


Figure 3b: Soil texture lowland (60 cm)

Clay (sloping)

Loamy clay (wet)

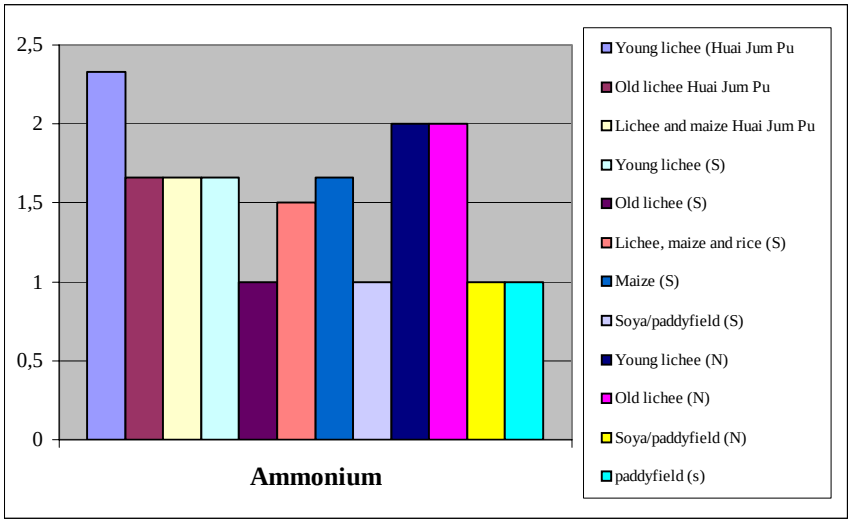
Big bed rocks
(60 cm below surface)

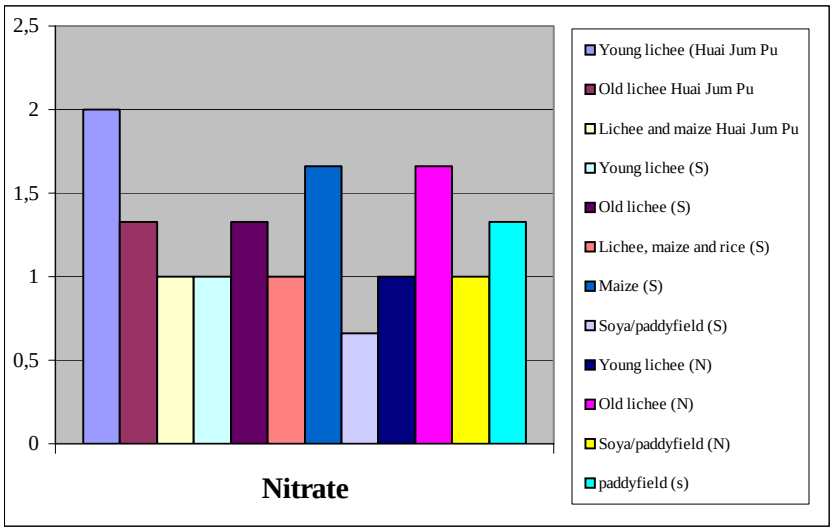
The soil fertility is indicated by many parameters, and we have tested for the following contents: Ammonium, phosphorus, nitrate and potassium. We also tested for pH, and the pH ranged from 6.5-8 with the majority of the values between 6.5 and 7.0. (The pH results can be seen in the appendix *section 7.5*). As it is seen in the four figures on the next page, the nutrient content of the soil in the fields of the three sub villages is very low or near low concerning ammonium, phosphorus and nitrate, and it does not differ much between fields with different crops. Though, three of the fields have medium to high content of phosphorus, but this might be due to recent fertilisation. The potassium content is medium to high, which in the main fits well with the fact that the farmers use the ashes as a help to fertilise the soil.

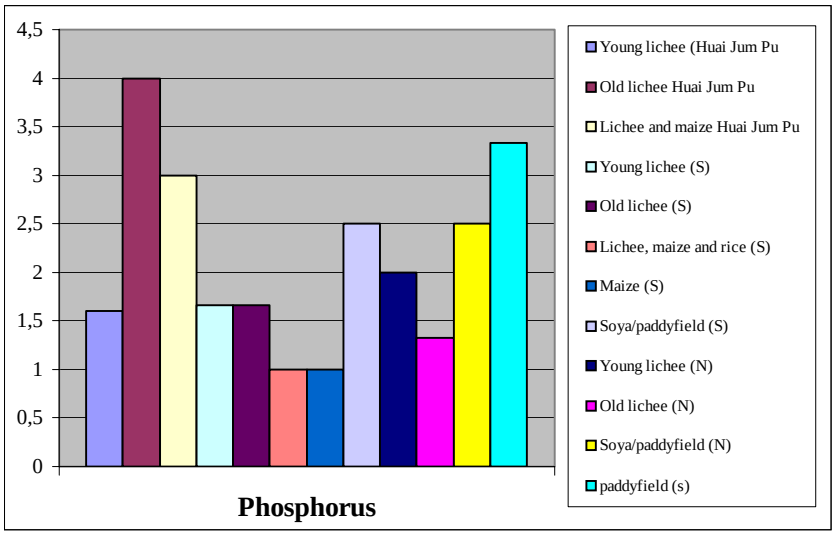
During the shifting cultivation practices, nutrients are lost mainly from burning and some from leaching, but harvesting crops removes only limited amounts, since crop residues are left in the field, and fallow re-growth ensures nutrient capture. Losses of nitrate during burning are less important as it is found in soil organic matter, which is mineralised after burning. Burning increases availability of phosphorous because of pH increase, but pH tends to drop relatively fast with subsequent phosphorous immobilisation. Soil organic matter is reduced if cropping periods are more than 2 to 3 years and this may affect soil productivity without fertilisation (Mertz & Magid N.A.).

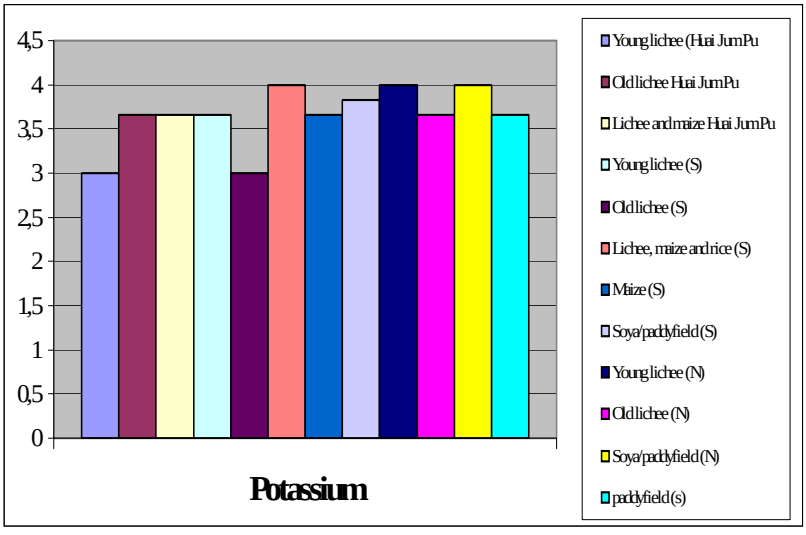
In general, the slopes of upland fields in Ban Huai Mon were measured to be between 30 to 50 degrees.

Figure 4: The result of the soil fertility tests in the three sub villages. Nutrient content: 1 is very low, 2 is low, 3 is medium, 4 is high and 5 is very high.






4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
Phosphorus
Young lichee (Huai Jum Pu
Old lichee Huai Jum Pu
Lichee and maize Huai Jum Pu
Young lichee (S)
Old lichee (S)
Lichee, maize and rice (S)
Maize (S)
Soya/paddyfield (S)
Young lichee (N)
Old lichee (N)
Soya/paddyfield (N)
paddyfield (s)


4,5
4
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0,5
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Potassium
Young lichee (Huai Jum Pu
Old lichee Huai Jum Pu
Lichee and maize Huai Jum Pu
Young lichee (S)
Old lichee (S)
Lichee, maize and rice (S)
Maize (S)
Soya/paddyfield (S)
Young lichee (N)
Old lichee (N)
Soya/paddyfield (N)
paddyfield (s)

3.2 Forestry

3.2.1 Description of the three forest areas and the use of these

The utilisation zone mainly consists of an upper layer of fairly young bamboo with a few fruit trees in between and some burned stumps. There is not really a middle layer, and the lower layer only consists of a few herbs. Villagers informed us, that about 20 years ago, they cut down a big part of the forest to clear the land for agricultural purposes. Some of the cut down trees up to the size of 70 cm in DBH can still be found lying on the forest floor. The villagers left some of the big trees standing to be used for shade for the farmers working in the fields, and then used the slash and burn technique to improve the soil quality. Later the villagers left the fields, and the pioneer bamboo started to grow, as did coppices of the cut down trees. In this forest area, the NTFPs collected for own consumption are mainly wild banana, fruits, bamboo shoots, termites, ants and bamboo worms; sometimes the bamboo worms are sold in nearby villages. Furthermore, the villagers collect wild banana for pigs fodder, plants to make roofs and colouring clothes, horse fodder, medicine plants, bamboo culms for building material.

Above the utilisation zone of Ban Huai Mon, a forest area is located, which the villagers call the "C-zone". This area consists of an upper layer of big trees (especially Ma Yang - *Sarcosperma arboretum*), a middle layer of younger trees, few bamboos and bushes, and a lower layer of plants, grasses and flowers. The NTFPs collected by the villagers for own consumption are roots, bamboo shoots, crabs, wild boar, ants and birds. Villagers collect the trunks of wild banana for animal fodder, herbs for medicine, big leaves of Tong Sad (*Phrynium capitatum*) to wrap food and the trunk to make mats, and bark of the Utzang Liang (latin name unknown) to make aromatic oils. This forest area seems much more diverse compared to the utilisation zone, since it contains more than one species of bamboo, more mammals e.g. wild rat and wild dog, butterflies and other insects, orchids, more herbs, and much more trees (Tong Sad - *Phrynium capitatum* , Mai Tong - *Dipterocarous tuberculatus*, Ma Yang - *Sarcosperma arboretum*, Mai Ko - Latin name unknown), some of them are even indicators of natural forest according to Kriangsak (2004).

In the community forest of Huai Jum Poo there is a bigger amount of bamboo compared to the "C-zone" and fewer herbs opposed to the utilisation zone. The upper layer consists of big trees, the middle layer contains bamboo, few bushes and herbs, and the lower layer mainly has a few grasses and herbs. Villagers collect bamboo shoots, fruits, ants, and termites, and hunt birds, deer, wild boars, small monkeys, and wild chicken for own consumption. Bamboo worms and ant eggs are collected for either own consumption or sale. Furthermore, medicine plants are collected and bamboo culms for building material. The area does not seem as diverse as the "C-zone", since there are fewer herbs, birds and indicators of natural forest, but still it contains a lot of different tree species (No Gai Piang, Ki Yo Kai, San Tong, Mai Sau[7]).

[7] The villager spoke a dialect, and so it was not possible to translate the Thai names into Latin when back in the base camp.

The villagers seem to collect NTFPs from all of the forest areas. Timber and building materials are mostly collected in the utilisation zone and the community forest. For more details of the collection of NTFPs and the villagers' opinion about the benefits from the forest, see appendix *table 20 and 21*.

In the forest areas located near to the cultivation zone, the villagers make firebreaks to prevent fire from the fields from spreading into the forest.

Table 7: Forest calendar of the three sub villages.

Month		Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Forest products	Mushroom					Summer – rain mushroom		Rainy mushroom					
	Bamboo shoots				Picking								
	Herbs	All season picking											
	Others	Bamboo culms, hunting											

3.2.2 Data from the forest inventories

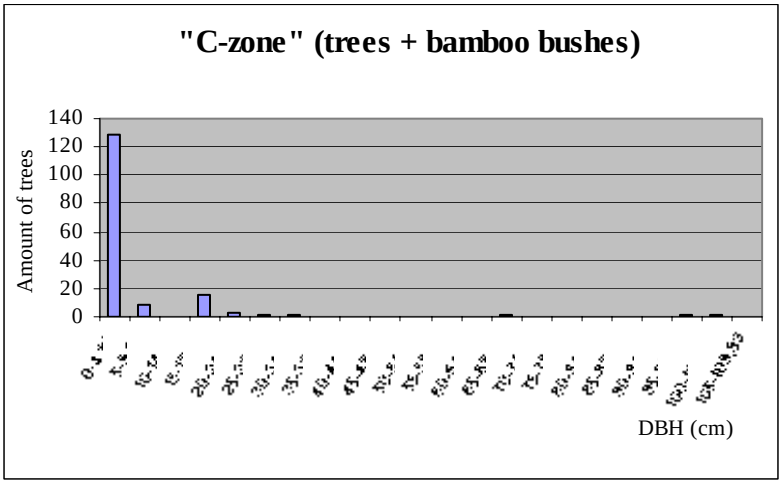
Since no sampling plot was made in the utilisation zone, the forest type of this area was not specifically classified; as well as no soil profile was made. Though, it was very easy to see, that the majority of the utilisation zone consists of bamboo, which is a sign of disturbance (Pathama *pers com.* 2004). The soil is reddish with bedrocks and covered with bamboo leaves. The slope of this forest area is similar to slopes of upland agricultural areas, i.e. 30 to 50 degrees.

The climate, altitude (900 to 1000 meters above sea level) and trees like *Dipterocarpus sp*., *Castanopsis sp*., *Baccaurea sp*. and *Wrightia sp*. found in the "C-zone" and community forest sampling plots indicate, that the forest type is a mix between mixed deciduous forest and dipterocarp forest. Though, some pioneers like *Ficus sp*. and especially bamboo were found in the areas, and since these species are not typical for the forest type, it indicates that the forest areas are disturbed (Pathama *pers. com.* 2004, Gardner 2000). The soil in the "C-zone" is black, soft, porous and covered with leaves from herbs, bamboos and trees. In comparison with the "C-zone", the soil in the community forest is more reddish with big bedrocks, more porous (still, the surface is quite hard) and the soil cover does not include as many leaves from herbs but more bamboo leaves.

Figure 5 and 6 shows the diameter class distribution in the "C-zone" and community forest sampling plots. Concerning the "C-zone", there are a lot of young seedlings, especially with DBH 0-5 cm and 15-20 cm, and a few big individuals, but in between a lot of the diameter classes are missing. This is not a healthy forest picture, since a healthy forest should show a L-shaped graph

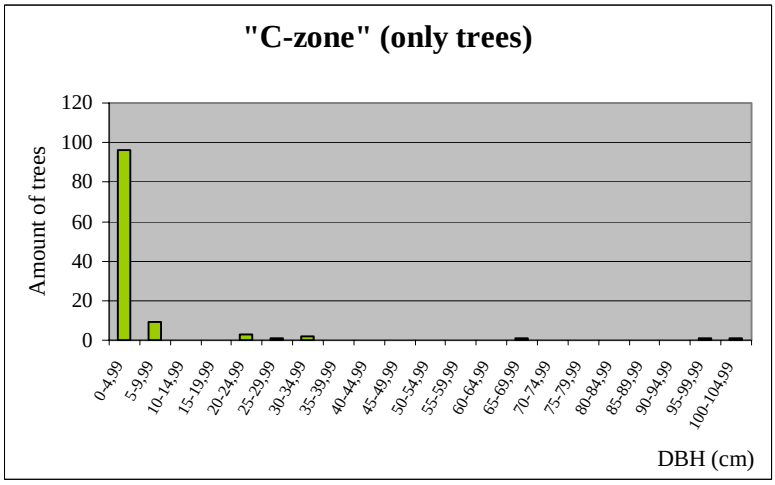
with a lot of young seedlings, and a continuously decreasing amount of bigger diameter classes (Carter 1996).

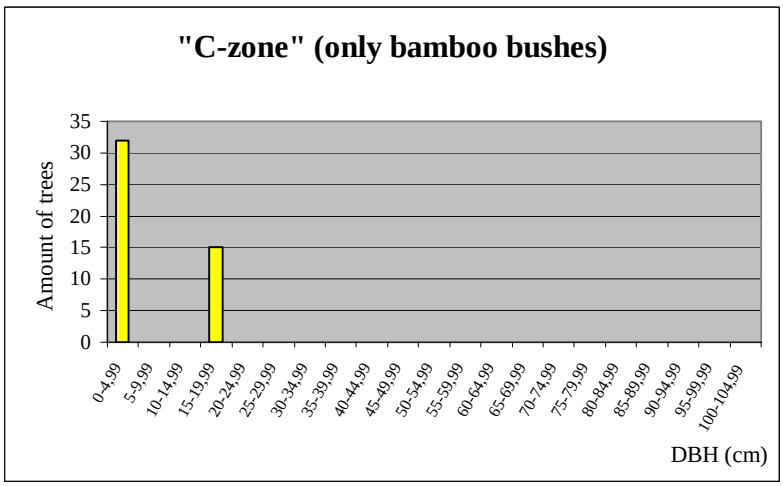
Figure 5a: Diameter class distribution in the “C-zone” at the northern part.



Furthermore, about 25 % of the youngest seedlings consist of young bamboo bushes, and all of the individuals with a DBH ranging from 15 to 20 cm are bamboo.

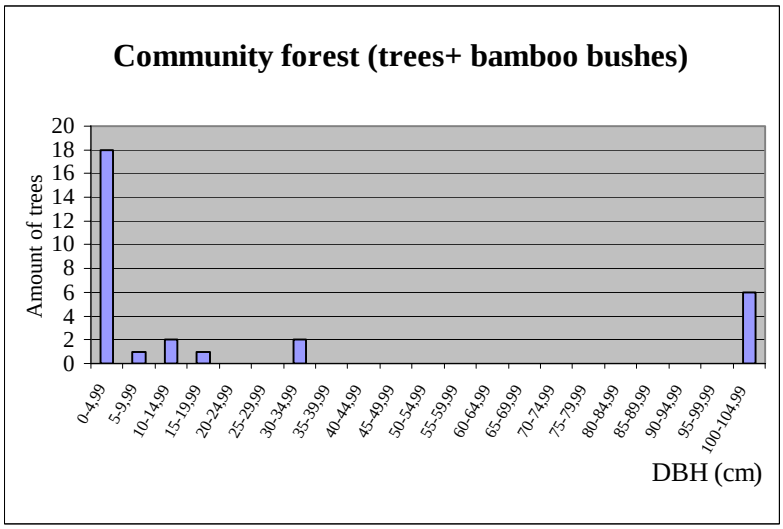
Figure 5b: Diameter class distribution in the “C-zone” at the northern part.





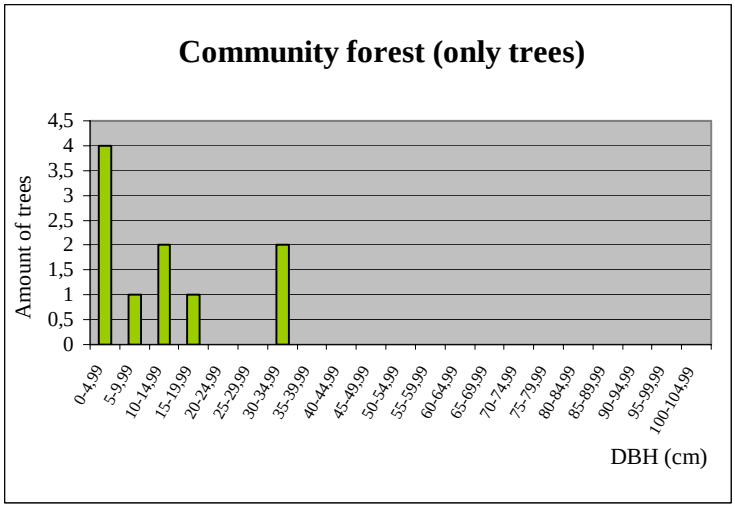
In terms of basal area, 99.94 % of the total basal area of individuals (4,643 m^2/rai) consists of bamboo bushes (4,640 m^2/rai) and the remaining 0.06 % (0.003 m^2/rai) is trees with a DBH above 4.5 cm. The missing diameter classes could be a result of a lot of cutting about 22 years ago, when the villagers of Ban Huai Mon arrived in the area and needed timber for building material. Another affecting factor could be the big cuttings of the timber companies in the area in 1973. Concerning the biggest trees, it seems like they are too big to cut and transport, or a reason for leaving them in the forest could be that the villagers are not allowed to cut big trees in the "C-zone".

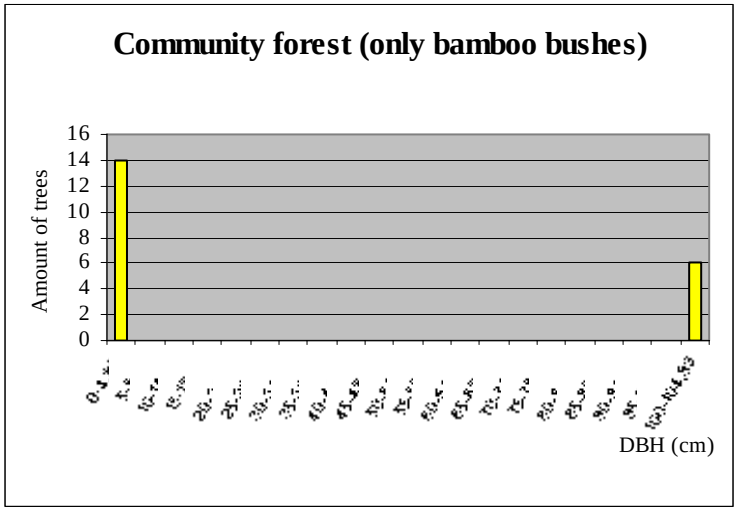
Figure 6a: Diameter class distribution in the community forest in Huai Jum Poo.



The community forest plot more or less shows the same degraded forest picture with a lot of young seedlings of which the majority is bamboo bushes, there are only a few big individuals, some of the middle size diameter classes are missing, and in terms of basal area, bamboo bushes (0.0177 m^2/rai, 99.4 %) cover most of the total basal area (0.0178 m^2/rai) compared to trees with a DBH above 4.5 cm. Though, when looked at more closely, the community forest seems more disturbed than the "C-zone".

Figure 6b: Diameter class distribution in the community forest in Huai Jum Poo.





First, bamboo bushes do not affect the discontinuous decrease of DBH in the first diameter classes, since no bamboo bushes were found with a DBH between 5 and 100 cm. Again, this uneven diameter distribution could be due to the effect of the logging companies or the establishment of Ban Huai Mon, but other reasons could be, that the villagers are allowed to cut trees for building material, fuel wood and other causes in the community forest. Second, none of the biggest individuals found were trees, which could be a result of the short distance to Huai Jum Poo, which makes the transportation easy for the villagers. The lack of big trees gives light to the forest floor, which explains the big amount of pioneer species.

3.2.3 Management rules and the enforcement of these in Ban Huai Mon

According to the interviews, the headman and a villagers' committee have determined the management rules of the forest areas. This is probably not the whole truth since the forest management rules are often determined in corporation between the RFD and the certain community RFD (2004). Though, from the interviews it seemed that the villagers did not all agree upon these rules, or at least were not aware of the exact rules. Most of the interviewed agreed that they are allowed to collect NTFPs in the utilisation zone for own use and not for sale, but when asked later in the interviews if they sell any of their NTFPs, some answered that they sell the bamboo shoots. Concerning the "C-zone", the majority said, that it is not allowed to cut trees, collect NTFPs or go hunting, but from the transect walk it seemed that they collect a lot of NTFPs in this area. Concerning the community forest some claimed that this forest area cannot be utilised at all, some said that only villagers from Ban Huai Mon could use the area for own consumption, but according to the headman, they could not cut bamboo in this area. The villager who went with us in the transect walk in the community forest of Huai Jum Poo said that the villagers are allowed to cut

down timber or building material in this forest area, but not without a permission from the headman.

However, the interviewed agreed upon the enforcement of the management rules, and told that in practice it is the headman, the headman assistant and the villagers' committee who enforce the rules (de facto). Though, the RFD is the only official management authority (de jure) to enforce the forestry law (Janesak *pers. com. 2004).*

3.3 Household economics

The livelihood of villagers in Ban Huai Mon strongly depends on income, both cash and non-cash. Income can be divided into three sources, i.e. on-farm income from agricultural activity, NTFP income from forestry activity and off-farm income.

3.3.1 Source of income

As shown in *table 8*, 82 % of the total income in Ban Huai Mon village is from off-farm activity. As seen in *figure 7*, the vast amount of income in Ban Huai Mon, 59 %, is generated in the northern part and most of it came from off-farm income.

The three sub villages in Ban Huai Mon depend on different cash incomes. In the northern part, 90 % of total income is from off-farm source, 8 and 2 % are from agricultural and forestry sources respectively. In the southern part, 90 % is also from off-farm; on-farm and NTFP incomes are each 5 %. Whilst in Huai Jum Poo, 66 % is from agricultural activity. 27 and 7 % are from off-farm and forestry activity *(table 8)*.

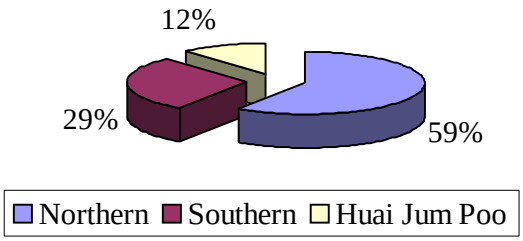
The average incomes are 63,421, 25,091 and 48,113 BTH/year/household in the northern part, southern part and Huai Jum Poo in that order.

Table 8: Income in Ban Huai Mon by source.

Sub village	Northern part		Southern part		Huai Jum Poo		Ban Huai Mon	
	Income (BTH/ year)	% of total income	Income (BTH/ year)	% of total income	Income (BTH/ year)	% of total income	Income (BTH/ year)	% of total income
On-farm*)	147,295	8	43,583	5	220,730	66	411,608	15
NTFP	29,262	2	43,000	5	24,000	7	96,262	3
Off-farm	1,535,800	90	741,410	90	92,060	27	2,369,270	82
Total	1,712,357	100	827,993	100	336,790	100	2,877,140	100
Average (BTH/ year/household)	63,421		25,091		48,113		42,942	

*) Net on-farm income from crops sold.

Figure 7: Income distribution in the three sub villages (calculated via data from questionnaires with 7 people from Huai Jum Poo, 33 from the southern and 27 from the north).



3.3.2 On-farm income

Agriculture is the typical occupation in Thailand's rural areas. The main income of the farmer in Ban Huai Mon comes from lychee (86%) and second is maize (11%). 2 and 1 % are from soybean and maize in that order. The non-cash income only comes from rice, 74 % is from up-land rice and 26 % is from lowland rice. Approximately, half million BTH is rice consumption as non-cash income. *(Table 9)*

In the northern part, the entire on-farm income is from lychee. The non-cash income is mostly from up-land rice (76%) and the rest is lowland rice.

In the southern part, 74 % is from maize, the second is soybean (14 %), then 9 % comes from lychee, which is the smallest amount compared with the other two sub villages. Apparently, a little on-farm income comes from rice (3%), but it is significantly low. Regarding non-cash income in this part, a large proportion of rice consumption comes from the upland (69%) and lowland (31%).

Huai Jum Poo is depending on agricultural activity, which they conduct intensively. Thus the sub village has the highest proportions of on-farm income among the three sub villages. The major income comes from lychee. Concerning non-cash income, this merely comes from upland rice.

Table 9: Gross on-farm income (by type of cash crop)

Village / Cash Crop	Northern part		Southern part		Huai Jum Poo		Ban Huai Mon	
	Total (BHT/year)	% of total income	Total (BHT/year)	% of total inc.	Total (BHT/year)	% of total income	Total (BHT/year)	% of total income
Lychee	283,500	100	8,400	9	256,400	100	548,300	86
Soybean	-	-	12,500	14	-	-	12,500	2
Rice	-	-	3,000	3	-	-	3,000	1
Maize	-	-	71,433	74	-	-	71,433	11
Total (cash)	283,500	100	95,333	100	256,400	100	635,233	100
Up-land rice*) (non cash)	37,500	76	259,950	69	58,800	100	356,250	74
Low-land rice	11,550	24	116,700	31	-	-	128,250	26

(non-cash)								
Total (non-cash)	49,050	100	376,650	100	58,800	100	484,500	100

*) Rice price: 15 BTH per kg

3.3.3 NTFP income

This income comes from the forestry sources. From questionnaire survey[8] we found that 91 % of the respondents use the forest for NTFP collection. The NTFPs collected are used for own consumption and sale (44%), 56 % are used only for consumption. The NTFP collected are bamboo shoots, mushrooms, wild vegetable, fruits and bamboo worms. The bamboo shoots and bamboo worms can be sold and it is a small income that can be required only in the rainy season. However, this is an important source of food for consumption in households. The villagers preserve the bamboo shoots for consumption the whole year, which can reduce their food expense.

3.3.4 Off-farm income

Off-farm income is larger than on-farm and NTFP income. The most important off-farm income is silverware activity, which only occurs in the northern part. As shown from *table 10*, in Ban Huai Mon, 45 % is from silverware activity. The second is from salary (25%), this money can give a fixed amount every month in the year, i.e. employees in the government office, the public health doctor, the TAO member, headman and headman assistant. 10 % is from children and relative income, this money is sent from relatives in the household who works outside the village. 9 % is from non-agricultural sector employment, i.e. building house employment, iron melting employment and jobs not related to agriculture. The other activities of off-farm source are slightly below this; 3 % comes from agricultural sector employment, the activity of this income is farming employment. This amount of income is especially from the southern part and Huai Jum Poo, where the villagers are mainly doing agricultural activity. The people hiring this labour are usually other villagers of Ban Huai Mon. Income from vodka, grocery and handicraft are each 2 %. Vodka activity generating income was made legally a few years ago in Thailand; this activity is particularly done in the northern part.

In the northern part[9], 93 % of respondents are doing the silverware, while 96 % are doing agriculture. The vast amount of income is from silverware, but the villagers also expect income from lychee. The silverware market is however unstable and prices are fluctuating. Additionally silverware material cost is increasing. Villagers cannot control this, and therefore they invest in lychee fields as a security in the future.

In the southern part, the most important off-farm income is salary (48%) and the average is 51,206 BTH/year/household, but there are only 7 samples in our questionnaire getting a salary. However, salary activity requires high education.

[8] Sources of data can be seen in appendix questionnaire tables 18 and 19
[9] Sources of data can be seen in appendix questionnaire tables 5 and 24

In Huai Jum Poo, 37 % is from relatives and 24 % from agricultural sector employment. Young members of the household work outside the village and send money back home. There is also employment in neighbour farms within the village. 6 % is from handicraft. This is not a large share of income, but women spend their time doing this to earn some extra money besides from the agricultural activities.

Table 10: Off-farm income by different type in Ban Huai Mon

Activity	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Total	%	Total	%	Total	%	Total	%
Silverware	1,059,500	69	-	-	-	-	1,059,500	45
Grocery	-	-	37,000	5	-	-	37,000	2
Non-agricultural sector employment	36,000	2	136,010	18	30,000	33	202,010	9
Agricultural sector employment	13,100	1	40,800	5.5	22,500	24	76,400	3
Vodka	51,000	3	-	-	-	-	51,000	2
Leasing	24,000	2	5,000	1	-	-	29,000	1
Handicrafts	43,000	3	800	0.5	5,560	6	49,360	2
Salary	241,200	16	358,440	48	-	-	599,640	25
Children or relative	38,000	2	157,760	21	34,000	37	229,760	10
Others	30,000	2	5,600	1	-	-	35,600	1
Total	1,535,800	100	741,410	100	92,060	100	2,369,270	100
Average (BTH/year/household)	56,881		22,467		13,151		35,362	

3.3.5 Labour migration

Since 1984, villagers have gone to work in Sukhothai Province between December and March for harvesting sugar cane as agricultural sector employment income. Since 2003, two to four villagers of the southern part have gone to work in southern Thailand for harvest coconuts. Work outside the village throughout the whole year includes villagers, who send money home to their families. They typically get the money from silverware production, iron melting, jobs in factories, or jobs as guards.

Table 11: Activity calendar of the three sub villages

Month		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Off-farm activities	Labour	Sugar cane/ coconut harvesting →											←
	Others	← Work outside village →											

3.3.6 Expenditure

There are agricultural costs and household expenses in Ban Huai Mon. As seen in *table 12* the average agricultural cost of Ban Huai Mon is 3,338 BHT/year/household. In the southern part it is 1,917 BHT/year/household, which is very low compared to the other two sub villages. Considering the other two sub villages, 6,486 and 5,096 BTH/year/household are from the northern part and Huai Jum Poo in that order. This is because they conduct intensive farming when growing lychee as cash crop. Hence they spend money for buying input, concerning lychee grown require a lot of insecticides, herbicides and chemical fertilisers as well as labour and machine cost for performing these activities in farming system.

Table 12: Agricultural costs in the three sub villages

Village	Total agricultural cost(BHT/year) *)	Total agricultural cost (%) *)	Average of agricultural cost (BHT/year) *)
Northern part (n=26)	136,250	61	6,486
Southern part (n=30)	51,750	23	1,917
Huai Jum Poo (n=7)	35,670	16	5,096
Total (n=63)	223,625	100	3,338

*) Agricultural costs are herbicides, pesticides, machine rent and labour. These are cash cost.

The average of household expenditures is 21,778 BTH/year/household or about 1,815 BTH/month in Ban Huai Mon. This amount is generally spent for children tuition fee, transport, infrastructure fee and health care fee. Regarding to non-cash income, it is rice consumption. The average approximately is 7,231 BTH/year/household *(table 13).*

In the northern part, the average is 30,922 BTH/year/household, which is much larger compared to the other two sub villages. Although there is rice production as non-cash, the low average is 1,817 BTH/year/household. They spend some money for buying food as well as rice. The villagers spend time making silverware in their home, this activity consumes electricity cost e.g. for the silverware machine. The northern part earns a large amount of income from silverware activity, whilst the southern part and Huai Jum Poo have widely different off-farm income. Thus they cannot allow themselves large expenditures *(table 13).*

The average household expenditure is 16,335 and 12,171 BTH/year/household in the southern part and Huai Jum Poo respectively. Considering non-cash rice expense, it is 11,414 and 8,400

BTH/year/household in the southern part and Huai Jum Poo in that order. For this reason the villagers can save a lot of money from buying rice *(table 13)*.

Table 13: Household expenditure in the three sub villages

Village	Total household expenditures (BHT/year)	Total household expenditures (%)	Average of household expenditures (BHT/year)
Northern part (n=27)	834,900	57	30,922
Southern part (n=33)	539,040	37	16,335
Huai Jum Poo (n=7)	85,200	6	12,171
Total (n=67)	1,459,140	100	21,778

3.3.7 Loan

The past years a Canadian aid organisation has given money to the northern part, and the aim is to support silverware investment. However, this fund has drawn back from Ban Huai Mon. There are currently 6 funds in Ban Huai Mon. These funds are the One million - one village, Village, Miyasawa, Housewives, Hill-tribe and the Firebreak Fund. One million - one village Fund was started in 2001. It is supported by the Thai government, and aims to encourage villagers to get capital for investing in household businesses in the community. For instance, villagers borrow money to buy input for agricultural practices or silverware material. This village's current balance amount is 1,185,000 BTH and there are 199 members. These members are villagers from the northern and the southern part. The interest rate is 5 % per year.

The Village Fund has existed since 1998. The start budget was 60,000 BTH, there are 31 members, and the interest rate is 5 % per month. A firebreak activity supported by the RFD has been done every year; villagers will be participating in making firebreaks, which pay 2,500 BTH per km. Then all the money earned will be divided equally into 2 parts; one part will be given to villagers who helped in firebreak making, the other part is put in a fund. This agreement does not exist in the southern part. Additionally, Housewives Fund only exists in the northern part, which was stared from 2000 with a budget of 8,000 BTH.

In 2000 a project called Miyasawa was supported from Japan. The purpose is to promote silverware production and careers, which is generating revenue for the households. 100,000 BTH was given to Ban Huai Mon village. It was divided equally into 2 parts for the northern and the southern part. 4 villagers in the northern part borrowed money from the fund, whereas in the southern part it was divided equally between every villager. 1,041 and 241 BTH are provided each man and woman for borrowing in that order. The Miyasawa does not exist in Huai Jum Poo.

There are two funds in Huai Jum Poo. These are Firebreak and Hill-tribe Fund. Firebreak Fund has a budget of 50,000 BTH at commencement, and the interest rate is 1 % per month. The Hill-tribe

Fund has existed since 1998 and has a budget of 12,000 BTH for 14 households in Huai Jum Poo. The southern part also has the Hill-tribe Fund, which is not related to the one in Huai Jum Poo.

As seen from *table 14*, in the northern part 79 % of total loans come from One million - one village Fund, in the southern part it is 98 %. While in Huai Jum Poo, the big source is Hill-tribe Fund contributing with 80 % of loans. In the northern part, the villagers use loan for agricultural cost and silverware material cost. The southern part mostly uses loan for agricultural investment and Huai Jum Poo only uses for agricultural practices.

Table 14: Loans in the three sub villages

Village / Loan	Northern part		Southern part		Huai Jum Poo	
	Total (BHT/year)	Total (%)	Total (BHT/year)	Total (%)	Total (BHT/year)	Total (%)
1 million - 1 village	241,000	79	272,000	98	-	-
Village	55,000	18	-	-	-	-
Miyasawa	5,000	2	2,761	1	-	-
Housewives	2,000	1	-	-	-	-
Hill tribe	-	-	2,000	1	80,000	80
Firebreak	-	-	-	-	20,000	20
Total	303,000	100	276,761	100	100,000	100
Average (BHT/year)	15,947		11,070		25,000	

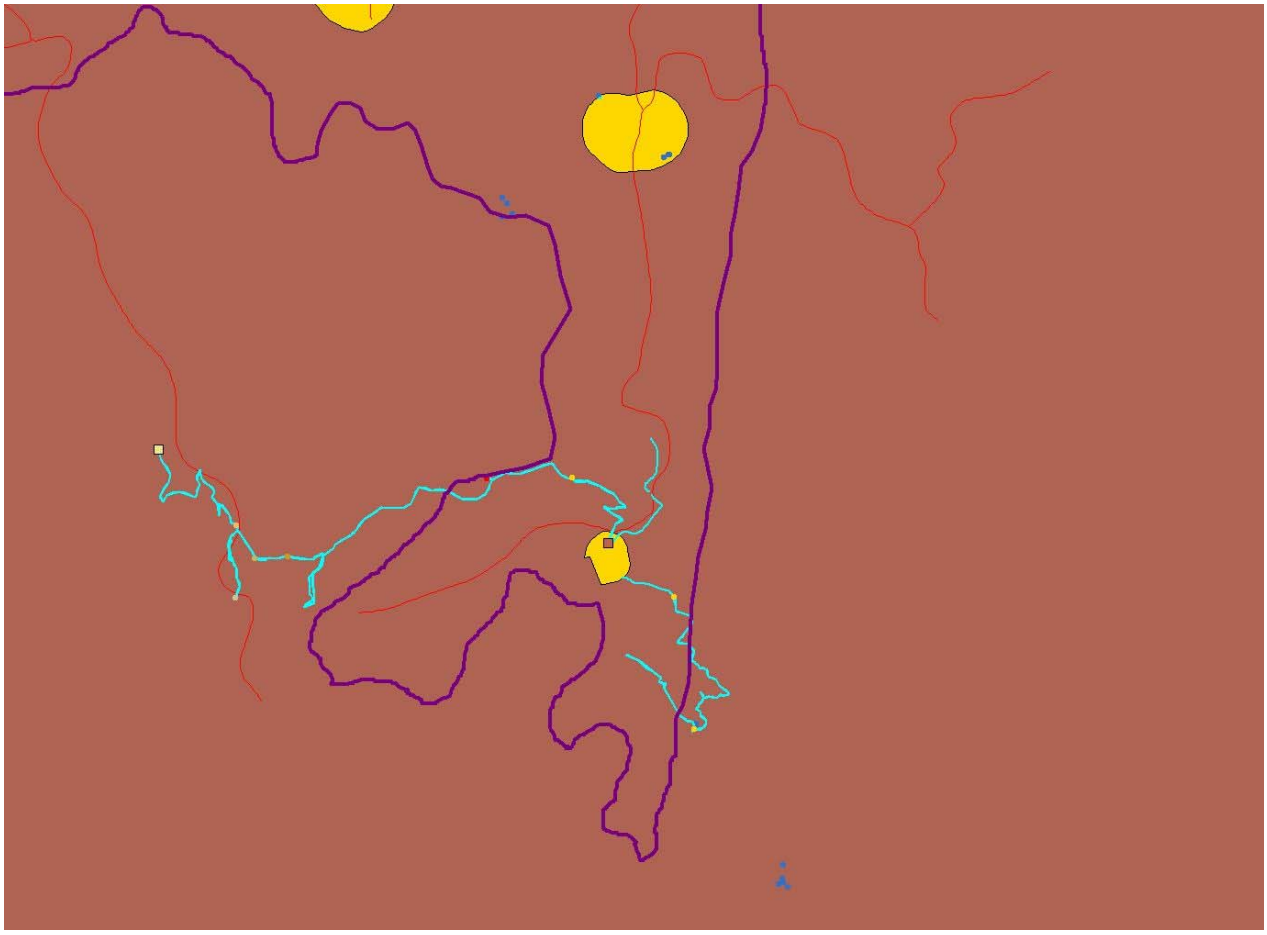
3.4 Nanthaburi National Park[10]

3.4.1 Boundaries of the national park

In the Geographical Information System (GIS) map below, the proposed boundary of the Nanthaburi National Park is shown. The purple line marks the proposed boundary of the national park, and the area below this line is proposed to be the national park. The yellow areas are economic zones (E-zone) that can be utilized by the farmers, and the brown area is conservation zone (C-zone). The brown square in the middle marks the part of Ban Huai Mon including the northern and southern sub village, and as is seen these sub villages do not lie within the proposed national park. The bright yellow square in the left side of the map shows Huai Jum Poo, which is to be placed within the national park boundary. Many of the paddy fields of Ban Huai Mon are placed along the road going north from the village up to the utilisation zone, a distance of approximately 4 km. The bright blue line marks a route tracked from the community forest of Huai Jum Poo in west though above the hilltop to the utilisation zone of the northern part, across the southern and northern village and finally ending with a track along the border between the cultivation zone and the utilisation zone of the northern part. The first side road near Huai Jum Poo shows the border between the Huai Jum Poo's community forest (west of the border) and the utilisation zone of the northern part (east of the border). The next side road determines the transition from the utilisation zone to the cultivation zone. The track to the east of Ban Huai Mon shows the border between the utilisation zone and the cultivation zone of the northern part. From all this, it is seen that the majority of the forest areas and some of the agricultural areas utilised by the villagers are included in the proposed Nanthaburi National Park.

[10] Based on the proposed Nanthaburi National Park survey (Sereenonchai (N.A)), the area covers 15 districts in Nan province. These districts are Pa Ka Loung, Ban Pee, Ban Fa and Ban Soug in Ampher Ban Loung, Thuem thong, Chai Sathan, Sanean, Bor, Ruang, Soug and Phasing in Amphur Muangnan, Phathong, Santhong, Paka, Sriphum and Talchum in Amphur Tha Wang Pha. The estimated area of Nanthaburi National Park is 740,692.5 rai.

Figure 8:GIS map. Scale: 2 cm equals 1km.



3.4.2 Implementation of the national park

Due to the latest constitution in Thailand, villagers who will be affected by a national park have to participate in the establishment of it (Phattama *pers. com.* 2004).

The national park establishment process is as follows: Firstly, selection of forest area for potential national park, often the same as the conservation boundary. Secondly, demarcation by surveying of forest selection, at this stage villagers and TAOs will participate. For example, one national park covers 3 TAOs, and if one TAO disagrees, the process cannot go to the next stage. Thirdly, agreement between the RFD and the TAOs. Fourthly, a cabinet committee consideration, which proceeds in a house of parliament by cabinet of a government. Fifthly, a decree proceeding and finally the demarcation of the national park. The formal document receives the king's signature and the national park is publicly announced (Phattama *pers. com.* 2004).

Obviously, the establishment process seems like functional participation, meaning that people participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organisation. Such involvement

does not tend to be at early stages of project cycles or planning, but rather major decisions have been made involving the villagers. (Pretty 1994).

As regards the RFD and TAO interviews, Ban Huai Mon is being in the second stage of the national park establishment process, hence negotiating with government official and local TAO representatives. However, the TAO representative of Ruang district has not participated in this process.
Therefore may of the villagers in Ban Huai Mon are not yet aware of the isues concerning the national park, as seen in table 15.

Table 15: Amount of households in Ban Huai Mon knowing about the proposed Nanthaburi National Park

Village / Amount	Northern part		Southern part		Huai Jum Poo		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
Know	7	26	10	30	2	28	19	28
Do not know	20	74	23	70	5	72	48	72
Total	27	100	33	100	7	100	67	100

4 Discussion

4.1 Methods

Concerning the fieldwork as a whole, when looking at the results and drawing conclusions from these, it has to be taken into consideration that we only did 3 weeks of fieldwork, which is not enough time to do precise and fulfilling research. Furthermore, the methods used to obtain the results both have advantages and shortcomings.

As for the PRA methods used at the community meeting, they were all visual presentations, which quickly provided us with a good overview of the situation in the village and the villagers' livelihood in general. Though, the session was time consuming and quite confusing because a lot of people were present at the same time. Furthermore, some of the informants may not have expressed their honest opinion, if they felt uncomfortable in a big group or because the headman was present at the meeting. The transect walk, which was the only PRA method conducted in the field was also time consuming but to walk with a villager provided us with a lot of information about the areas and how he villagers utilise them. This information we would not have obtained by walking on our own. Though, to keep a good relation with the villagers, we did not discuss sensitive topics as slash-and-burn method, cutting endangered species etc. Such topics are more suited for questionnaires and interviews.

Concerning the own observations, it was fairly easy to find out about household economics, the different activities within the village, and to do a lot of agricultural soil samples within a reasonable time. Though, the analysis of the soil samples was time consuming and the Thai soil testing kit was not the most precise, but it gave us a good picture of the nutrient content, and it was easy to use. The sampling plots in the forest were more difficult to conduct. The distance to the forest areas limited the time available, hence too few plots were made to make a good average, and the species definition of all trees was not possible[11]. Using a GPS for the agriculture and forestry observations was also time consuming, especially when walking on steep hills, across hilltops or through dense bamboo areas but the method gave us precise data about the areas, that are within the proposed boundary of the national park.

Using questionnaires was a quick way to talk to a lot of villagers and to get information about their livelihood. Though, there was a limitation in the way the villagers responded (or rather did not respond) to some of the questions asked. Therefore, interviews as a qualitative method was used to go deeper into interesting or missing results of the questionnaires, which is a quantitative method as well as the own observations. Of course we used a lot of time conducting the interviews, but they were useful to enlighten specific topics.

[11] Therefore, the results of the forest inventories were compared with another group, who used more time for this method. Surprisingly, our results fit well with the results of the other group, even though we only made few sampling plots.

The Danish students were very dependent on the interpreters, and had it not been for their good skills and corporation, the Danes would not have been able to talk to and get a good relationship with the villagers. Though, when conducting questionnaires and interviews a lot of the indirect information was lost, when every question and answer had to be translated. E.g. the body language and the facial expression of both the interviewer and the respondent is not linked to what is being said, when you have to get every sentence translated.

4.2 Agriculture

The village is located at the boundary of the Nanthaburi National Park. Demarcation of the park can result in a loss of land for agriculture of crops and then villagers could expect their livelihoods to be worse off if they have to depend on the marginal land or other activities besides agriculture which they may have difficulties adjusting. Furthermore, it will have a big effect on the villagers' economy if the mentioned areas are to be included in the national park. As seen from the estimated average yield of the fields, some of the upland areas produce a high yield, and contain important cash crops like lychee. If some of the agriculture areas were going to be included in the proposed national park, the villagers would need to intensify the production in those fields that will not be included in the national park. To obtain higher yields in the remaining fields, the villagers would have to implement better farming methods or use more inputs compared to what they do now. In the rice production there seems to be possibilities of increasing the yield. By using paddy fields instead of upland rice fields the yield sometimes becomes twice the size. Paddy terraces are commonly accepted as a permanent form of agriculture and with support from the watershed management office to construct these; the village has achieved some rather secure land use systems within the village boundary. However, there are problems in establishing these fields. The villagers need machinery assistance to set up the paddy fields. Another problem is then the cost of purchasing them. The farmers should be giving title deeds once such a paddy field is purchased, otherwise the farmer would most likely not be able to obtain the necessary capital needed to buy these fields, due to lack of collateral. But it is also important to notice that the potential areas for this form of cropping system may be limited, because long-term capacity of paddy terraces to support the local population is likely to be limited in the mountainous areas.

Shifting cultivation is by some seen as a uniform system with negative impact on forest resources. Policies in national parks and other protected areas are to stop shifting cultivation and promote permanent agriculture as the alternative. However, permanent fields as an alternative land use to shifting cultivation cannot be certain to prevent further expansion of the agricultural area and forest encroachment. But still in this issue, the lychee orchards can be beneficial. The lychee trees can have great potential in this area as they can provide a steady and reliable income to the farmers. If successfully established, these trees can eventually minimise the practice of shifting cultivation. Additionally the planting of fruit trees can be a good practice in a sort of reforestation and conservation programs, thus rendering an overall improvement to the environment. This argument

must be seen in the light of the alternative, which is continuing shifting cultivation, and thereby creating ecological problems due to soil degradation and an increasing amount of areas being cleared. There are still the issues of chemical inputs used in the agricultural practice of lychee to be taken into consideration. But one must weigh the costs and benefits in this.

From the questionnaires and interviews, we found that because of the situation regarding ownership, some of the farmers seem less willing to invest in better farming methods like irrigation or better machinery. If the farmers cannot be sure of their future rights to the land, they have no incitements for investing. Anyhow, many farmers grow lychee and it seems as if the numbers of lychee fields are increasing. This could be due to the land right issues, since villagers with lychee orchards on their land are in better position to claim the land due to their investment, compared to farmers with perennial crops or fallow land. Nevertheless, depending on one cash crop in a lot of the fields of Ban Huai Mon can be a high risk, because problems might arise for this certain crop, e.g. changing prices, failing harvest and pests. This problem was formerly seen with orange orchards in northern Thailand.

It must be taken into consideration that our soil analyses might not be a good representative of how the quality is throughout the whole year. Hence the fields with poor soil quality detected in January, when the crops were recently harvested, might show a different soil quality later in the year.

4.3 Forestry

We found that the villagers depend a lot on the three forest areas for NTFP collection, fuel wood, timber and building material. As is seen from the map made from the GPS walk along the forest zones, the whole forest area utilised by the villagers is included in the proposed Nanthaburi National Park. If the boundary of the national park is not going to be changed, and if the villagers are to obey the National Park Act from 1961, the implementation of the national park will have serious consequences for the villagers' livelihood, since it is illegal to do collect anything from a national park area whether it is NTFPs, timber or other forest products (Wichawutipong 1964 & Pathama *pers. com.* 2004).

Furthermore, if the crop calendar is compared to the forest calendar, it can be seen that the villagers depend a lot on NTFP collection for household consumption in April, August and September, where there is no yield from agriculture. If the villagers are not allowed to collect anything within the national park boundary, it will therefore have even more serious consequences for their livelihood in the months mentioned.

Though, according to Janesak (2004) the reality is somewhat different. In other cases, where forest areas utilised by villagers were included in national parks, agreements was reached with the villagers, so that they could still collect some timber and NTFPs within the national park. In most of

these cases, villagers are only allowed to collect forest products for own use and cannot sell any of the products collected in the national park. Usually, park officers will control the area to check the amount of wood or NTFPs that the villagers bring out from the forest. If this will be the situation in Ban Huai Mon, the implementation of the national park will not affect the villagers' livelihood provided by forestry too much.

4.4 Household economics

If the proposed Nanthaburi National Park is going to include agriculture or forest areas, the villagers' household economy will be affected, so that they might need to depend more on other income generating activities compared to now.

The part of the household economy coming from agriculture can be affected in different ways, depending on what areas are going to be included in the national park. The areas of the northern part and Huai Jum Poo contain much lychee, which is an important cash crop, hence a major income from agriculture. The southern part relies on maize and soybean for cash crop. If these cash crop fields are included in the proposed national park, it will have a big effect on the economy of the villagers who utilise the fields, since they might need to buy food from outside the village.

The part of the household economy coming from forestry is not a big amount compared to agriculture and off-farm income sources, since the forest products are mainly used for own consumption. However, the income from selling forest products can be an extra income for the household in occasional seasons of the year as written above. If forest areas utilised by the villagers are going to be included in the proposed national park, it will therefore mostly have an effect on the money spend on household consumption, since the villagers do not spend much money on buying forest products from outside the village. Furthermore, the national park could have an effect on the income generated from forest products in periods without an output from agriculture. This of course is dependent on whether the villagers will make an agreement with the national park authorities to utilise the forest areas included in the national park.

If the villagers cannot live from utilising the agriculture- and forest areas, when the national park is implemented, they might have to depend more on other income generating activities, and the effect would be different in three sub villages. Virtually, the villagers will look for activities that will enable them to make certain amount of money needed for food consumption. Most likely, the northern part will increasingly produce more silverware whilst villagers of the southern part will probably look for a job outside village, where they can earn money in a fixed amount; and finally Huai Jum Poo will do more handicrafts. Concerning the probable expansion of silverware and handicraft production, it could be a problem if the demand for the products does not correspond to the supply, and hence the prices decrease. Then, the villagers would not be able to compensate for the lost income from the agriculture and forest areas included in the national park.

4.5 The Nanthaburi National Park

From the specific interviews, most of the villagers had heard about the national park, and all except one agreed that establishing national parks is a good way to preserve the forests of Thailand. Nevertheless, they were concerned about the fact that their fields could be included as well as areas, where they collect NTFPs and therefore, they claimed that a national park would have a big impact on their livelihood. When asked about their opinion on money compensation for areas included in the national park, some of the informants replied that they would rather keep their agriculture areas instead of receiving money as compensation, since this is their traditional way of living and also, the money received would run out within short time. However, some found that the money compensation was a good idea.

According to the national park officials, all the involved villages must participate in the decision-making. In theory this means that the headman or members of the TAO offices must walk with the national park representatives around the areas of the village. Before coming to the village the national park representative can have a map showing the proposed boundaries of a national park. Then it is the job of the village representative to come up with the village's proposal. The involved partners assignment is then to reach an agreement concerning the boundaries that makes both villagers and national park officials pleased.

However, when reaching the goal of establishment, the government should be more interactive with the villagers. In the initiating stage of Nanthaburi National Park the selection of forest area by government had been done by officers. It might have been a good idea to have a voted meeting among the villagers in Ban Huai Mon to get the majority to agree on the Nanthaburi National Park proposal. According to the questionnaire survey and interviews, most of villagers needed to be informed before the demarcation.

Then the next step is the negotiating stage, which is proceeding between RFD and TAO. TAO works as a coordinator between the government and the villagers so that the villagers get information through the TAO members. In general, villagers have not been informed about national park proposals so the TAO members in the villagers might also need to be more interactive with the villagers.

5 Conclusion

The purpose of three weeks of fieldwork in northern Thailand was to analyse the three sub villages of Ban Huai Mon - the northern part, the southern part and Huai Jum Poo - in order to determine what consequences the proposed Nanthaburi National Park will have on the villagers. Throughout the construction of this report it has been important to look at linkage aspects in agriculture forestry and household economics, because the majority of the villagers to a certain extent are all occupied within these sectors. It has to be taken into consideration that three weeks of fieldwork is not enough to do precise and fulfilling research, and therefore the following conclusions should not be seen as final.

Most of the villagers in Ban Huai Mon depend on agriculture and forestry. Huai Jum Poo is the sub village that depends most on agriculture, and concerning forestry the sub villages are more or less the same. In relation to source of income, other income generating activities besides from agriculture and forestry contribute with 82 % of the average annual income in Ban Huai Mon.

When comparing the locations of agriculture and forest areas utilised by the villagers with the boundary of the proposed national park, it is seen that all of the forest areas used by the villagers and most of the upland agriculture fields are to be included in the Nanthaburi National Park. If the boundary of the national park is not going to be changed, and if the villagers are to obey the National Park Act from 1961, the implementation of the national park will have serious consequences for the villagers' livelihood, since it is illegal to cut the forest for e.g. agriculture area or to collect any forest products.

Concerning the agricultural areas that are to be included in the national park, it will have an effect on the villager's livelihood, since they will not get income from the cash crop fields and they would need to buy the products that their non-cash crop fields would otherwise have supplied. To compensate for these extra expenses, the villagers would need to intensify the production in those fields that will not be included in the national park by using more inputs and better farming techniques. Furthermore, they would need to depend on crops with a high rate of income and maybe crops making it possible to claim the right to the land and hence obtaining title deeds, which would then provide the villagers fixed values (e.g. lychee). Land rights issues are also very important because of the necessity of investment in order to make more high yielding fields. Additionally it is likely that the village would have a problem with a lot of surplus labour, because the villagers could not work in their fields. This would evidently have a large effect on both the village's economical situation but would also lead to other problems of unemployment. This is a factor that the Thai government must take into consideration, when implementing the national parks all around the country.

Regarding the livelihood provided by forestry, the villagers would not be able to be self-sufficient with NTFPs, fuel wood, timber and building material, if all of the forest areas they utilise are to be

included in the national park. They would have to buy the forest products from outside the village and hence, it will have a big effect on their livelihood and economy. Nor would the villagers be able to sell forest products as bamboo worms or bamboo shoots, and this will affect their economy, especially in the seasons where there is no yield from agriculture. This is all depending on whether the villagers of Ban Huai Mon reach an agreement with the RFD like the one reached in other villages, where a national park was implemented. The agreement in the other villages was to be able to utilise some of the forest areas within the national park boundary if it was only for own consumption and not for sale.

If it should happen that the villagers could not make a living from utilising the agriculture and forest areas, they would need to depend more on their other income generating activities. Most likely, the northern part will increasingly produce silverware; villagers of the southern part will probably look for a job outside village, where they can earn money in a fixed amount; and finally Huai Jum Poo will do more handicrafts. Again, it can become a problem if the demand for silverware or handicrafts does not correspond to the supply, and the prices decrease. Then, the villagers would not be able to compensate for the lost income from the agriculture and forest areas included in the national park. There could also be problems with the labour markets outside the village, if it cannot absorb the new increase in labour. Therefore it is very important when the national park authorities draw the boundaries of the Nanthaburi National Park that they listen to the villagers' viewpoints on where they believe it is most acceptable to locate the boundary. In this way the villagers livelihood would be affected to a minimum, hence avoiding the problems that is likely to occur if the boundaries where to include large parts of the areas utilised by the villagers of Ban Huai Mon.

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7 Appendices

7.1 Daily activities of the authors during the field trip

Date and activities in the group	Kasper S. Pedersen (agriculture)	Sara Di Maria (forestry)	Jomsri Lummayos (household economics)
January 16th: Meeting with headman Mapping preparation Transect walk Own observation	Meeting with headman Mapping preparation Transect walk in fields Detecting spots for sampling plots	Meeting with headman Mapping preparation Transect walk in forest Detecting spots for sampling plots	Meeting with headman Mapping preparation Detect activities, talk to villagers (N & S)
January 17th: Transect walk Own observation Community meeting, PRA	Transect walk in fields Finding sampling plots Community meeting, PRA	Transect walk in forest Forest inventory (HJP) Community meeting, PRA	Talk to villagers (HJP) Community meeting, PRA
January 18th: Own observation Pilot testing questionnaire	Soil sampling (GPS)	Forest inventory (N)	Pilot testing questionnaires
January 19th: Own observation Data analysis Rewriting questionnaire Literature research	Soil sampling (GPS) Soil sampling analysis	Forest inventory data analysis: Identification of species, diameter class distribution Soil sampling analysis	Pilot testing and rewriting questionnaires Literature research
January 20th: Clarifying interview Data analysis Preparing midterm evaluation	Soil sampling analysis Preparing midterm evaluation	Diameter class distrib. Preparing midterm evaluation	Talking to villagers Preparing midterm evaluation
January 21st: Preparing midterm evaluation Midterm evaluation	Preparing midterm evaluation Midterm evaluation	Preparing midterm evaluation Midterm evaluation	Preparing midterm evaluation Midterm evaluation
January 22nd: Chinese New Year Day off			
January 23rd: Clarifying interview Questionnaires	Questionnaires (N & S)	RFD interview Questionnaires (N)	Questionnaires (N & S)
January 24th: Spirits ceremony Data analysis	Questionnaire analysis GIS	Notes from RDF interv. Questionnaire analysis GIS	Questionnaire analysis

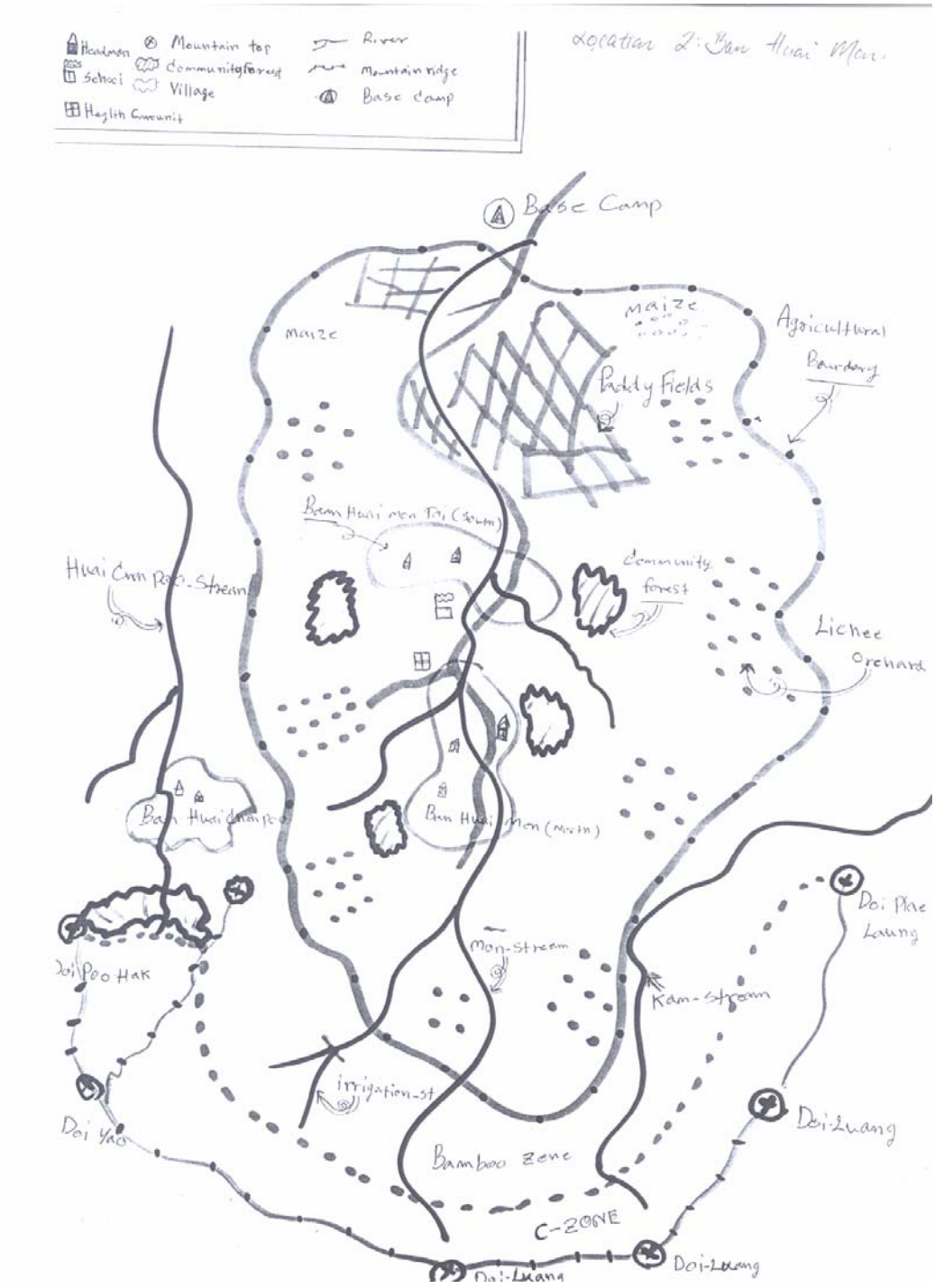
January 25th: Spirits ceremony Specific interviews Data analysis	 Specific interviews (S) Notes from interviews Questionnaire analysis	 Summing up data in one document	 Specific interview (S) Questionnaire analysis Helping summing up
January 26th: Clarifying interview Questionnaires Specific interviews Own observation Community meeting	 Questionnaires & spe-cific interviews (HJP) Community meeting	 GPS walk (HJP & N) Community meeting	 Questionnaires & spe-cific interviews (HJP) Community meeting
January 27th: Specific interviews Data analysis Preparing final presentation	 Specific interviews (N) Questionnaire analysis Preparing final presentation	 Summing up data Questionnaire analysis Preparing final presentation	 Specific interviews (N) Questionnaire analysis Preparing final presentation
January 28th: Specific interviews Data analysis Preparing final presentation	 Specific interviews (N) Questionnaire analysis Preparing final presentation	 Specific interviews (N) Summing up data Preparing final presentation	 Specific interviews (N) Questionnaire analysis Preparing final presentation
January 29th: Final presentation	 Final presentation	 Final presentation	 Final presentation

7.2 Trend analysis

Topic / Year	General	Agriculture	Forestry	Beside
2515 (1972)	- Move from ban pang ma O to establish in Ban Huai Mon - The southern moved from Bo Kaey vill. (5 year later) - enough all year water		2513 (1970) Forestry concession	
2522 (1977)	- flood (2523) - running water for both wills. - First headman election (2524) - Support for car &tracktor in community activity		- Close forestry concession (2525)	
2526 (1983)	- School Establish (2526) - flood (2530)	- District agri Dep. Gived seed to villagers (2526)		
2531 (1987)	- electricity (N+S) (2534,1991)			- silver ware making (1988)
2536 (1992)	- Health care unit established (2540,1996)			
2541 (1997)	- Huai Jum Poo Electricity (1998,2542) - Huk Muang Nan gave blanket(clothes) (1999,2543) - running water for (HJP) (2545,2002) - 1 million Bath for 1 village.(fund) (2545,2002)			- (2545,2002) Canada fund for silver ware - (2546,2003) Government fund for silver ware

7.3 PRA mapping

Map showing the area of Ban Huai Mon, constructed by villagers during the mapping.



7,4 Questionnaire

7.4.1 Questionnaire guide

แบบสอบถาม

1. เพศ/Gender ( ) ชาย/male ( ) หญิง/female
2. ชื่อ-สกุล/name-surname อายุ/age ปี
3. บ้านเลขที่/Home No.
4. จำนวนคนในบ้าน คน (มีกี่ครอบครัวในบ้าน), จำนวนแรงงานในบ้าน คน
   (how many people live in the house? (how many family live in the house?), how many people wok in the house?

ภาคการเกษตร part agriculture

1. ทำการเกษตรหรือไม่ ( ) ทำ ( ) ไม่ทำ
   Do you do the agriculture? ( ) yes ( ) no
2. มีพื้นที่เป็นของตัวเองกี่แปลง กี่ไร่ ใช้มากี่ปี ลักษณะพื้นที่เป็นอย่างไร_____
   how many rai of each field do you owe? How have the fields been used? How is the location of area?

แปลงที่ (field)	จำนวนไร่ (amount of rai)	ใช้มากี่ปี (years of used)	ลักษณะพื้นที่ (area aspect)
แปลงที่ 1)			
แปลงที่ 2)			
แปลงที่ 3)			

3. ปลูกพืชชนิดใดบ้าง? ผลผลิตต่อปี? รายได้ต่อปี?
   Which crop do you grow? ,How many yield/year(last year)?, how much did you get last year?

ชนิดพืช (crop sorts)	ผลผลิต (ต่อปี) Yield (last year)	รายได้ต่อปี (area aspect)

5. มีระบบชลประทานในพื้นที่เพาะปลูกหรือไม่ อย่างไร ? ถ้าไม่ทำไมไม่มี
   Do you use irrigation and how? If you do not use irrigation,why not?
6. มีการเตรียมดินอย่างไร (ถามต่อเนื่องได้) How did you prepare the land?
7. มีการทำการเกษตรอย่างไร? Which agricultural practices do you conduct?
   ( ) แรงงานคน ระบุ Labour _____
   ( ) แรงงานสัตว์ ระบุ Animal_____
   ( ) เครื่องกล ระบุ Machine _____
8. ใช้ปัจจัยการผลิตอะไรบ้าง? ใช้เท่าไหร่ต่อปี? เป็นเงินเท่าไหร่?
   What inPoot do you used? , How much per year?, How many Bath per year?

ประเภท (Type)	จำนวน(ต่อปี) (amount)	เป็นเงิน (ต่อปี) (Bath)	หมายเหตุ (remark)
1. ยาฆ่าแมลง (Insecticide) 2. ยาฆ่าวัชพืช (Hebicide) 3. ปุ๋ยเคมี (Chemical fertilizer) 4. ปุ๋ยคอก (Organic fertilizer) 5. อื่น ๆ (ระบุ) Other (Specify) _____			

9. คุณได้รับความรู้หรือเทคโนโลยี ทางด้านการเกษตรจากแหล่งใด? อย่างไร? ทราบจากที่ใด?
   Where and how do you get the knowledge of agriculture?
10. มีการกู้เงินเพื่อทำการเกษตรหรือไม่? จากแหล่งใด? เท่าไหร่? เงื่อนไขการกู้อย่างไร?
    Do you get loan for agriculture? If yes, from which source, How much and the condition of loan?

11. แหล่งรับซื้อสินค้า (ตลาด) ทางการเกษตร?
Where and how do you sell the product ?
12. มีการบำรุงดินอย่างไร How do you improve the soil?
13. มีปัญหาในการทำการเกษตรอย่างไร? What are the problems in Agriculture?

ภาคป่าไม้ part Forestry

1. มีการใช้ประโยชน์ อะไรบ้างจากป่า? What are the benefits from the forest?
   ( ) มีศักยภาพในการทำการเกษตรในพื้นที่ป่า/Potential land to be converted into agriculture?
   ( ) เป็นแหล่งไม้ซุง /Source of timber
   ( ) เป็นแหล่งเก็บของป่า/Source of NTFP
   ( ) สำหรับพักผ่อนหย่อนใจ/Recreation
   ( ) แหล่งน้ำ/Water sources
   ( ) มีความสำคัญทางด้านวัฒนธรรม เช่น ประกอบพิธีกรรม/Culturally important
   ( ) ใช้ล่าสัตว์/Hunting
   ( ) อื่น ๆ ระบุ Others (specify) _____
2. NTFP ของป่าชนิดที่เก็บจากป่า? ช่วงเดือนที่เก็บ?What NTFP does the household collect? /which month?
   _____
   NTFP เก็บมาเพื่ออะไร? Which Poorpose for using NTFP?
   ( ) ขาย/sale ( ) ใช้ในครัวเรือน/consumption
   ( ) อาหาร/food _____
   ( ) สร้างบ้าน/Building materials_____
   ( ) ยา/medicine _____
   ( ) อาหารสัตว์/animal fodder _____
   ( ) เชื้อเพลิง/Fuel wood _____
   ( ) อื่น ๆ ระบุ/Others (specify) _____
   จำนวนครั้งที่เก็บ (ต่อสัปดาห์)How often do you collect NTFP/week?
   ( ) ทุกวันeveryday ( ) 2-3 วันต่อสัปดาห์2-3 day
   ( ) 1 ครั้ง/สัปดาห์1 time ( ) น้อยกว่า 1 ครั้งต่อสัปดาห์ less than 1time (please specify how often/month)
   2.3 Which NTFP do you collect? Which month?
   ( ) เห็ด mushroom _____
   ( ) ผลไม้ fruit _____
   ( ) ดอกไม้ flower _____
   ( ) หน่อไม้ Bamboo shoots _____
   ( ) ต้นไผ่ Bamboo culms _____
   ( )ผักป่า wild vegetables _____
   ( ) แมลงและผลิตภัณฑ์จากแมลง Insects and their products _____
   ( ) อื่น ๆ ระบุ Others _____
3. ความรู้เกี่ยวกับการประกาศเขตอุทยานแห่งชาติ และความรู้สึก?

ภาค กิจกรรมอื่น ๆ นอกภาคการเกษตร Part Besides activities

1. รายได้จากแหล่งอื่น ๆ (ต่อปี) ? /How many bath did you get last year? (Bath per year)
   ( ) เครื่องเงิน/ silver wear
   บาทต่อปี
   ( ) ของชำ / grocery
   บาทต่อปี
   ( ) รับจ้างนอกภาคการเกษตร /non agriculture sector employment บาทต่อปี
   ( ) รับจ้างภาคการเกษตร/ agriculture sector employment บาทต่อปี
   ( ) ลูกหลานส่งให้ /Children to relative
   บาทต่อปี
   ( ) ปศุสัตว์/ livestock
   บาทต่อปี
   ( ) งานฝีมือต่าง ๆ/ Handy craft
   บาทต่อปี
   ( ) อื่น ๆ ระบุ/ Others _____
   บาทต่อปี
2. รายจ่ายอื่น ๆ ไม่รวมภาคการเกษตร (ต่อปี)?
   How many bath of Expenditure excluding agricultural expends year?

3. ปัญหาและข้อจำกัดในการทำงานนอกภาคการเกษตร?
   Problem and constraint of doing off-farm activitives?
   3.1)
   3.2)
   3.3)
4. มีองค์กรใดบ้างในหมู่บ้าน และท่านได้มีส่วนร่วมอย่างไร
   Which organization do you participate in the village? How?

7.4.2 Questionnaire results

Table 1: Gender of respondents

Amount / Gender	Northern	Southern	Huai Jum Poo	Ban Huai Mon	
	Amount	Amount	Amount	Amount	%
Male	23	20	6	49	73
Female	4	13	1	18	27
Total	27	33	7	67	100

Table 2: Age of respondents

Amount / Age	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Male	Female	Male	Female	Male	Female	Male	Female
1. 21-30	-	-	2	-	-	-	2	-
2. 31-40	18	4	5	4	3	-	26	8
3. 41-50	4	-	7	2	1	-	12	2
4. 51-60	-	-	5	4	2	-	7	4
5. 60 up	1	-	2	3	-	1	3	4
Total	23	4	20	13	6	1	49	18

Profile of household

Table 3: Amount of member in the household

Village / Amount	Northern	Southern	Huai Jum Poo	Ban Huai Mon	
	Amount	Amount	Amount	Amount	%
1. 1-5	10	22	3	35	52
2. 6-9	14	11	3	28	42
3. 10 up	3	-	1	4	6
Total	27	33	7	67	100

Table 4: Amount of people working in the household

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
1. 1-2	13	48	25	76	5	72	43	64
2. 3-4	9	34	8	24	1	14	18	27

3. 5-6	3	11	-	-	1	14	4	6
4. 7 up	2	8	-	-	-	-	2	3
Total	27	100	33	100	7	100	67	100

Agriculture

Table 5: Amount of household doing agriculture

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
Do agriculture	26	96	30	91	7	100	63	94
Do not agriculture	1	4	3	9	-	-	4	6
Total	27	100	33	100	7	100	67	100

Table 6: Total land use of type of area

Village / Type	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Total (rai)	%	Total (rai)	%	Total (rai)	%	Total (rai)	%
Up land	222.5	99	262	94	101	100	585.5	97
Low land	2	1	18	6	-	-	20	3
Total	224.5	100	280	100	101	100	605.5	100

Table 7: Amount of land use by type of field

Sub village / Type of Land used	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	(amount of field)	% n=26	(amount of field)	% n=30	(amount of field)	% n=7	(amount of field)	% n=63
Young Linchee (1-5 years)	17	65	10	33	3	42	30	48
Old Linchee (5 years up)	18	69	7	23	7	100	32	51
Maize	-	-	6	20	-	-	6	10
Rice	3	12	16	53	5	-	24	38
Maize and Rice	1	4	-	-	-	-	1	2
Maize and young Linchee	-	-	1	3	-	-	1	2
Maize, Rice and young Linchee	1	4	2	7	-	-	3	5
Paddy rice	2	8	6	20	-	-	8	13
Paddy rice and Soya	-	-	3	10	-	-	3	5
Longan	2	8	4	13	-	-	6	10

Table 8: Size of field by type of land use

Type \ Village	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Total (rai)	%	Total (rai)	%	Total (rai)	%	Total (rai)	%
Young Linchee (1-5 years)	88	39	58	21	16	16	162	27
Old Linchee (5 years up)	109.5	48	37	13	70	70	216.5	36
Maize	-	-	36	13	-	-	36	6
Rice	6	3	110	40	15	14	131	21
Maize and Rice	5	2	-	-	-	-	5	1
Maize and young Linchee	-	-	4	1	-	-	4	1
Maize, Rice and young Linchee	6	3	8	3	-	-	14	2
Paddy rice	2	1	9	3	-	-	11	2
Paddy rice and Soya	-	-	9	3	-	-	9	1
Longan	8	4	9	3	-	-	17	3
Total	224.5	100	280	100	101	100	605.5	100

Table 9: Average of field size by type of land use in Ban Huai Mon

Type of land use	Ban Huai Mon	
	Total(rai)	Average (rai/field)
Young Linchee(1-5 years) (n=30)	162	5.4
Old Linchee(5 years up) (n=32)	216.5	6.77
Maize (n=6)	36	6
Rice (n=24)	131	5.56
Maize and Rice (n=1)	5	5
Maize and young Linchee (n=2)	14	7
Maize, Rice and young Linchee(n=3)	14	2.33
Paddy rice (n=8)	11	1.38
Paddy rice and Soya(n=3)	9	3
Longan (n=6)	17	2.83
Total (n=63)	605.5	9.61

Table 10: Average of field size by type of land use in the Northern part

Type of land use	Northern	
	Total(rai)	Average (rai/field)
Young Linchee(1-5 years) (n=17)	88	5.18
Old Linchee(5 years up) (n=18)	109.5	6.03
Maize	-	-
Rice (n=3)	6	2
Maize and Rice (n=1)	5	5
Maize and young Linchee	-	-
Maize, Rice and young Linchee(n=2)	6	3
Paddy rice (n=2)	2	1
Paddy rice and Soya	-	-
Longan (n=2)	8	4
Total (n=26)	224.5	8.63

Table 11: Average of field size by type of land use in the Southern part

Type of land use	Southern	
	Total(rai)	Average (rai/field)
Young Linchee(1-5 years) (n=10)	58	5.8
Old Linchee(5 years up) (n=7)	37	5.29
Maize (n=6)	36	6
Rice (n=16)	110	6.88
Maize and Rice	-	-
Maize and young Linchee(n=1)	4	4
Maize, Rice and young Linchee(n=2)	8	4
Paddy rice (n=6)	9	1.5
Paddy rice and Soya(n=3)	9	3
Longan (n=4)	9	2.25
Total (n=30)	280	9.33

Table 12: Average of field size by type of land use in the Huai Jum Poo

Type of land use	Huai Jum Poo	
	Total(rai)	Average (rai/field)
Young Linchee(1-5 years) (n=3)	16	5.33
Old Linchee(5 years up) (n=7)	70	10
Maize	-	-
Rice (n=5)	15	3
Maize and Rice	-	-
Maize and young Linchee	-	-
Maize, Rice and young Linchee	-	-
Paddy rice	-	-
Paddy rice and Soya	-	-
Longan	-	-
Total (n=7)	101	14.43

Table 13: Agricultural practiced by type of technology

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
Machine and man labor	21	81	14	47	7	100	42	67
Machine	-	-	-	-	-	-	-	-
Man labor	5	19	16	53	-	-	21	33
Total	26	100	30	100	7	100	63	100

Table 14: Yield of crop by type of land use in Ban Huai Mon

Type of land use	Ban Huai Mon		
	Total yield(kg)	Total land use(rai)	Average(kg/rai)
1.Young Linchee (1-5 years)	-	162	-
2.Old Linchee (5 years up)	39,384	216.5	181.91
3.Maize	14,952	36	415.33
4.Rice	17,450	131	133.21
5.Maize and Rice		5	
5.1 Maize	2,600		520
5.2 Rice	700		140
6.Maize and young Linchee		14	
6.1 Maize	3,333		238.07
7.Maize, Rice and young Linchee		14	
7.1 Maize	1,100		78.57
7.2 Rice	5,600		400
8.Paddy rice	4,230	11	384.55
9.Paddy rice and Soya		9	
9.1 Paddy rice	4,320		480
9.2 Soya	1,225		136.11
10.Longan	-	17	-

Table 15: Yield of crop by type of land use in the Northern part

Type of land use	Northern		
	Total yield(kg)	Total land use(rai)	Average(kg/rai)
1.Young Linchee (1-5 years)	-	88	-
2.Old Linchee (5 years up)	22,165	109.5	202.42
3.Maize	-	-	-
4.Rice	1,200	6	200
5.Maize and Rice		5	
5.1 Maize	2,600		520
5.2 Rice	700		140
6.Maize and young Linchee		-	
6.1 Maize	-		-
7.Maize, Rice and young Linchee		6	
7.1 Maize	300		50
7.2 Rice	600		100
8.Paddy rice	770	2	385
9.Paddy rice and Soya		-	
9.1 Paddy rice	-		-
9.2 Soya	-		-
10.Longan	-	8	-

Table 16: Yield of crop by type of land use in the Southern part

Type of land use	Southern		
	Total yield(kg)	Total land use(rai)	Average(kg/rai)
1.Young Linchee (1-5 years)	-	58	-
2.Old Linchee (5 years up)	420	37	11.35
3.Maize	14,952	36	415.33
4.Rice	12,330	110	112.09
5.Maize and Rice		-	
5.1 Maize	-		-
5.2 Rice	-		-
6.Maize and young Linchee		4	
6.1 Maize	3,333		833.25
7.Maize, Rice and young Linchee		8	
7.1 Maize	800		100
7.2 Rice	5,000		625
8.Paddy rice	3,460	9	384.44
9.Paddy rice and Soya		9	
9.1 Paddy rice			
9.2 Soya	4,320		480
	1,225		136.11
10.Longan	-	9	-

Table 17: Yield of crop by type of land use in Huai Jum Poo

Type of land use	Huai Jum Poo		
	Total yield(kg)	Total land use(rai)	Average(kg/rai)
1.Young Linchee (1-5 years)	-	16	-
2.Old Linchee (5 years up)	16,799	70	239.99
3.Maize	-	-	-
4.Rice	3,920	15	261.33
5.Maize and Rice		-	
5.1 Maize	-		-
5.2 Rice	-		-
6.Maize and young Linchee		-	
6.1 Maize	-		-
7.Maize, Rice and young Linchee		-	
7.1 Maize	-		-
7.2 Rice	-		-
8.Paddy rice	-	-	-
9.Paddy rice and Soya		-	
9.1 Paddy rice			
9.2 Soya	-		-
	-		-
10.Longan	-	-	-

Forestry

Table 18: Amount of household using forest

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
Use forest	25	93	30	91	6	86	61	91
Do not use forest	2	7	3	9	1	14	6	9
Total	27	100	33	100	7	100	67	100

Table 19: Forest use in Ban Huai Mon

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
Sale and consumption	10	40	14	47	3	50	27	44
Sale	-	-	-	-	-	-	-	-
Consumption	15	60	16	53	3	50	34	56
Total	25	100	30	100	6	100	61	100

Table20: The benefits from forest use

Village / Use	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	% of forest use n=25	Amount	% of forest use n=30	Amount	% of forest use n=6	Amount	% of forest use n=61
Source of timber	14	56	-	-	3	43	17	28
Source of NTFP	25	100	30	100	6	86	61	100
Fuel wood	14	56	30	100	-	-	44	72
Recreation	9	36	-	-	2	29	11	18
Water source	16	64	33	100	6	86	52	85
Culturally important	9	36	33	100	4	57	43	70
Hunting	8	32	-	-	-	-	8	13

Table 21: NTFPs collected by type

Village / Type	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	% of using NTFPs n=25	Amount	% of using NTFPs n=30	Amount	% of using NTFPs n=6	Amount	% of using NTFPs n=61
Mushroom	11	44	21	70	3	50	35	57
Fruit	2	8	6	20	1	17	9	15
Flower	1	4	-	-	-	-	1	2
Bamboo shoot	22	88	26	87	6	100	54	89
Bamboo culms	13	52	15	50	4	67	32	52
Wild vegetable	3	12	14	47	4	67	21	34
Insect	12	48	15	50	5	83	32	52

Household economics

Table 22: Amount of household earning income by source

Village / Source	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	% of earning n=27	Amount	% of earning n=33	Amount	% of earning n=7	Amount	% of earning n=67
Agriculture	26	96	30	91	7	100	63	94
Forestry	10	37	14	42	3	43	27	40
Off-farm	27	100	29	88	7	100	63	94

Table 23: Amount of household earning off-farm income

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
Earning	27	100	29	88	7	100	63	94
Not earning	-	-	4	12	-	-	4	6
Total	27	100	33	100	7	100	67	100

Table 24: Amount of household earning off-farm income by type

Village / Amount	Northern		Southern		Huai Jum Poo		Ban Huai Mon	
	Amount	%	Amount	%	Amount	%	Amount	%
1. Silver wear	25	93	-	-	-	-	25	37
2. Grocery	-	-	2	7	-	-	2	3
3. Non-agricultural sector employment	1	4	11	38	1	14	13	21
4. Agricultural sector employment	4	15	10	34	3	43	17	27
5. Vodka	2	7	-	-	-	-	2	3
6. Leasing	1	4	3	10	-	-	4	6
7. Handicrafts	9	33	1	3	4	57	14	22
8. Salary	4	15	7	24	-	-	11	17
9. Children or relative	5	19	14	48	3	43	22	35
10.Others	1	4	2	7	-	-	3	5

Table 25: Off-farm income by different type in Ban Huai Mon

Sub village	Total off- farm income	Percent of total off-farm income	Average of off-farm income
1. Silver wear(n=25)	1,059,500	45	42,380
2. Grocery(n=2)	37,000	2	18,500
3. Non-agricultural sector employment(n=13)	202,010	9	15,539
4. Agricultural sector employment(n=17)	76,400	3	4,494
5. Vodka(n=2)	51,000	2	25,500
6. Leasing(n=4)	29,000	1	7,250
7. Handicrafts(n=14)	49,360	2	3,526
8. Salary(n=11)	599,640	25	54,512
9. Children or relative(n=22)	229,760	10	10,444
10.Others(n=3)	35,600	1	11,867
Total(n=67)	2,369,270	100	35,362

Table 26: Off-farm income by different type in the Northern part

Activity	Total off- farm income	Percent of total off-farm income	Average of off-farm income
1. Silver wear(n=25)	1,059,500	69	42,380
2. Grocery	-	-	-
3. Non-agricultural sector employment(n=1)	36,000	2	36,000
4. Agricultural sector employment(n=4)	13,100	1	3,275
5. Vodka(n=2)	51,000	3	25,500
6. Leasing(n=1)	24,000	2	24,000
7. Handicrafts(n=9)	43,000	3	4,778
8. Salary(n=4)	241,200	16	60,300
9. Children or relative(n=5)	38,000	2	7,600
10.Others(n=1)	30,000	2	30,000
Total(n=27)	1,535,800	100	29,535

Table 27: Off-farm income by different type in the Southern part

Activity	Total off- farm income	Percent of total off-farm income	Average of off-farm income
1. Silver wear	-	-	-
2. Grocery(n=2)	37,000	5	18,500
3. Non-agricultural sector employment(n=11)	136,010	18	12,365
4. Agricultural sector employment(n=10)	40,800	5.5	4,080
5. Vodka	-	-	-
6. Leasing(n=3)	5,000	1	1,667
7. Handicrafts(n=1)	800	0.5	800
8. Salary(n=7)	358,440	48	51,206
9. Children or relative(n=14)	157,760	21	11,269
10.Others(n=2)	5,600	1	2,800
Total(n=33)	741,410	100	14,828

Table 28: Off-farm income by different type in Huai Jam Poo

Activity	Total off- farm income	Percent of total off-farm income	Average of off-farm income
1. Silver wear	-	-	-
2. Grocery	-	-	-
3. Non-agricultural sector employment(n=1)	30,000	33	30,000
4. Agricultural sector employment(n=3)	22,500	24	7,500
5. Vodka	-	-	-
6. Leasing	-	-	-
7. Handicrafts(n=4)	5,560	6	1,390
8. Salary	-	-	-
9. Children or relative(n=3)	34,000	37	11,333
10.Others	-	-	-
Total(n=7)	92,060	100	8,369

Table 29: InPoot cost in Ban Huai Mon

Type	Total inPoot cost	Percent total inPoot cost
Northern	123,005	59
Southern	46,540	23
Huai Jam Poo	37,370	18
Total	206,915	100
Average(n=55)	3,762 BTH/year	

Table 30: InPoot cost by different type in the Northern part

Type	Total inPoot cost	Percent total inPoot cost
Insecticide	25,195	20
Herbicide	51,620	42
Chemical fertilizer	45,250	37
Organic fertilizer	-	-
Growth hormone	940	1
Total	123,005	100
Average (n=21)	5,857 BTH/year	

Table 31: InPoot cost by different type in the Southern part

Type	Total inPoot cost	Percent total inPoot cost
Insecticide	2,580	6
Herbicide	32,230	69
Chemical fertilizer	8,500	18
Organic fertilizer	3,230	7
Growth hormone	-	-
Total	46,540	100
Average (n=27)	1,723 BTH/year	

Table 32: InPoot cost by different type in Huai Jum Poo

Type	Total inPoot cost	Percent total inPoot cost
Insecticide	13,100	35
Herbicide	16,520	44
Chemical fertilizer	6,200	17
Organic fertilizer	150	-
Growth hormone	1,400	4
Total	37,370	100
Average (n=7)	5,339 BTH/year	

Table 33: Amount of household having loan in Ban Huai Mon

Village / Amount	Northern		Southern		Huai Jum Poo		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
Having loan	19	70	25	76	4	57	48	72
Not having loan	8	30	8	24	3	43	19	28
Total	27	100	33	100	7	100	67	100

Table 34: Loan in Ban Huai Mon

Sub village	Total of loan	Percent of loan	Average of loan
Northern(n=19)	303,000	44	15,947
Southern(n=25)	276,761	41	11,070
Huai Jam Poo(n=4)	100,000	15	25,000
Total(n=48)	679,761	100	14,162

7.5 Own observations

Table 35: Soil testing results

	Ammonium	Nitrate	Phosphor	Potassium	pH
Young lichee Huai Jum Poo *Low*	M	M	L	L	6.5
Young lichee Huai Jum Poo *Middle*	L	L	L	H	7.0
Young lichee Huai Jum Poo *High*	L	VL	VL	M	6.5
Maize & lichee Huai Jum Poo Low	L	VL	VH	H	6.5
Maize & lichee Huai Jum Poo *Middle*	L	VL	L	M	6.5
Maize & lichee Huai Jum Poo *High*	VL	VL	L	H	7.0
Lichee Huai Jum Poo Low	L	L	L	H	8.0
Lichee Huai Jum Poo *Middle*	L	VL	VH	M	7.0
Lichee Huai Jum Poo *High*	VL	VL	VH	H	7.0
Community forest Huai Jum Poo	L	VL	L	H	6.0
C-zone forest Huai Jum Poo	VL	VL	VL	L	
Maize, rice and lichee (S) Low	VL	VL	VL	H	7.5
Maize, rice and lichee (S) High	L	VL	VL	H	7,.5
Maize (S) Low	L	L	VL	M	7.0
Maize (S) Middle	VL	VL	VL	H	7.0
Maize (S) High	L	L	VL	H	7.0
Young lichee (S) Low	L	VL	L	H	7.0
Young lichee (S) Middle	VL	VL	L	M	6.5

Young lichee (S) High	L	VL	VL	H	6.5
	Ammonium	Nitrate	Phosphor	Potassium	pH
Oldest lichee 8 years(S) Low	VL	VL	L	M	7.0
Oldest lichee 8 years (S) Middle	VL	VL	L	H	7.0
Oldest lichee 8 years (S) High	VL	L	VL	L	6.5
Soya/PF (S) 1	VL	L	L	H	7.0
Soya/PF (S) 2	VL	VL	L	H	6.5
Soya/PF (S) 3	VL	VL	M	H	7.0
Soya/PF (S) 4	VL	0	M	H	7.0
Soya/PF (S) 5	VL	0	L	H	7.5
Soya/PF (S) 6	VL	0	M	M	6.5
Young lichee (N)	L	VL	L	H	8.0
Young lichee (N)	L	VL	L	H	7,5
Young lichee (N)	L	VL	L	H	7.5
Oldest lichee (N)	L	L	L	M	7.5
Oldest lichee (N)	L	M	VL	H	7.0
Oldest lichee (N)	L	0	VL	H	7.0
Soya/PF (N) 1	VL	0	M	H	7.0
Soya/PF (N) 2	VL	VL	M	H	7.5
Soya/PF (N) 3	VL	L	L	H	8.0
Soya/PF (N) 4	VL	VL	L	H	7.0

7.6 Interviews

7.6.1 How and with whom were the interviews conducted

The clarifying interviews were done before the specific ones, and consisted of an interview with a TAO member in the Ruang District office and an interview with an RFD officer in Nan. One group member was sent to carry out the interview in Ruang District, and one was sent, along with members from other groups, to perform the RFD interview in Nan. The reason for doing these interviews was to provide us with basic information about the national park policies.

The specific interviews were conducted in the village at the end of the research. The informants were chosen during our work in the village, and the criteria for the selection of the key informants was that they were capable of giving detailed answers to most of the questions which was in the interview guide. We made two interviews in the northern part of the village; one with the headman and one with the TAO member. Four were made in the southern part; one with the grocery shop owner, one with a farmer's wife, one with the southern TAO member and one with the rice mill owner. In Huai Jum Poo we did one interview with a farmer. By doing these specific interviews we were able to go in depth with some of the issues raised during the performance of the PRA methods, the own observations and the questionnaires.

7.6.2 A summary of the interviews with an RFD and a TAO representative is given below. The RFD interview was the most informative, and therefore most of the notes come from this interview

Reforestation in Thailand
According to the RDF representative, there are several reasons for the government to do reforestation:

1. International rules recommending a forest cover of 40 percent
2. Environmental protection: Prevent floods, erosion and impacts of dry season.
3. Economical potential: Plantations, e.g. rubber creates a high income

The RFD tries to prevent local farmers from doing shifting cultivation and wants to reduce the number of plots cultivated from 10 to 5 per household in order to avoid an increasing deforestation and therefore to promote the reforestation. The RDF representative claimed that the Watershed Unit has been the authority in charge of fulfilling the reforestation demands of the Thai government.

Community forest rules
According to the RFD representative, the community forest in Thailand generally are not recognized by the government. The local communities make the regulations themselves, and the only restriction is, that they are only allowed to cut the trees for own use and can not cut timber for commercial purposes. In the villages, this free way of determining the regulations causes unequal rights to the forest areas, and powerful villagers like the headman are often allowed to cut more wood. The RFD representative said, that the problem exists that the villagers can be offered money for their community forest areas, and the new owners might turn the forest into agricultural areas.

Nanthaburi National Park

Concerning the proposed Nanthaburi National Park, the RFD representative said, that its boundary has not yet been declared, but he thinks the negotiations of the declaration will be finished within the next five years. Though, there has been a proposal of the boundary, which was supposed to be done in cooperation between the government and local villagers, but in reality the government did it. At the moment, this boundary is being negotiated with government officials and local TAO representatives.

Villagers' rights
One of the main issues mentioned in the RFD interview was the change of the government's priorities within the last decades. Formerly, the government was focusing more on technical matters like establishing fire brakes, and there was

not much communication between the different governmental departments. This was a problem, especially according to deforestation, since it is related to a lot of issues like income, population density and level of education. Therefore, the departments now try to coordinate their activities and work more interdisciplinary. Furthermore, when establishing national parks, or when wanting to conserve certain forest areas, the government has realised that you cannot focus on criteria like environment only. The needs of local villagers must be met, too, in order for them to consider forest conservation as a possibility. According to this, the government is focusing on four different factors:

1. Culture/livelihood of the community
2. Individual characteristics (education level, poverty)
3. Economics (occupation, income)
4. Ecosystem (land use and community forest)

In reality, this means that the local villagers should be allowed to keep their agricultural land to support their families.

Alternatives to villagers whose land are to be included in the national park

The RDF representative claimed, that the government is willing to give the villagers subsidies if their land is to be included in a national park. The problem is, that villagers are not always accepting money to give up their land, since agriculture is a part of their traditions. To give local villagers alternatives to agricultural production, the RDF is educating some villagers to depend on other things. E.g. in Ban Huai Mon, the villagers have learned about silverware[12].

Activities in Ban Huai Mon

Activities of the TAO in Ban Haui Mon includes hiring villagers to make fire brakes from January to April, and providing sprouts for the villagers to plant in their forest areas. Last year the TAO had projects like concrete roads and running water in the village. Next year, the TAO will build a nursery newt to the health care unit

7.6.3 Specific interview guide

Presentation

Introduce yourself. Explain why you are doing this interview.

General information

[ ] Male
[ ] Female

What is you name? _____
What is your age? _____
Position in Family (Head,member)_____
Position in Village (Headman, Headman assistant, Member)_____

How many is living in this house (consumers)? _____
- Who? _____

How many persons in the household are working (working force)? _____
- Who? _____

Agriculture

1. How is your tenureship situation?
2. Do your fields produce enough food for the household?
    a. How has the annual yield been fluctuating?

b. Do you have any problems with soil degradation?

3. Are there any funds or loans to help the villagers if their fields do not produce enough food for the household?
4. Do you know if there is any GO or NGO who is supporting/promoting the agricultural practices in the village?
5. Are the villagers being insured a good price for their agricultural products, and is the government helping this?
6. During the time you have been cultivating your fields, how has the amount of inPoots that you apply to your fields developed?
7. In your community, what is the watering technique applied to the field in the dry season?
8. How does your community preserve water for cultivating?
9. Have you ever lack water for cultivating? And have you ever adjust your cultivation, e.g.,change the crop and other solution?
10. How many villagers have fields in Reserved Forest? How many rai?
11. If answer yes in question, are there conflict in land utilization. (with whom?)
12. Do you think the forest will be destroyed more for agriculture Poorpose
13. Have you ever cleared an area for agricultural Poorpose?

Forestry

Have any authority ever give you some knowledge about forestry?

14. Yes_____ No_____
15. Do you know anything about the classification of watersheds? If you know, how did you know it.
16. In your village, do villagers have activities in the Reserved Forest and National areas?
17. What is the difference between the way you use the conservation area, the bamboo area, and the community forest?
18. How have the different forest areas been determined?
    a. Conservation zone
    b. The bamboo area
    c. Community forest
19. What are the management rules for the different forest areas? (restrictions etc.)
    a. Conservation zone
    b. The bamboo area
    c. Community forest
20. Who determined the management rules for the different areas?
    a. Conservation zone
    b. The bamboo area
    c. Community forest
21. Who is enforcing these rules?
    a. Conservation zone
    b. The bamboo area
    c. Community forest
22. Is the NTFP's collected enough to cover your household consumption at the moment?
    a. How has the annual yield been fluctuating?
    b. Have you been able to sell any of the NTFP's you collect? If so, which NTFP's are most profitable to collect?
23. Are there any period during the year where you depend more on NTFP's than other sources of income?
24. Does your village set up the program to preserve forest?
    a. Do villagers help in this process?
25. Are there encouragement in forest preserving in the villager (community), e.g. teaching their descendants, communities, community and government
26. Are there any working between community and community,or community and state agencies/watershed office?

Other income generating activities besides from agriculture and forestry

27. Would you be able to do other activities besides from agriculture and forestry?
28. Are there any constraints to get a job outside the village?

Future

29. Have you heard about the proposed Nanthaburi National Park?

    If yes:

    a. Do you agree with the declaration?

b. How will your livelihood be affected? (land use, forest area)
c. Do you have the possibility to find other ways to support your livehood?

30. What is your opinion about subsidies? (e.g. rubber plantations)
31. What is your opinion about money compensation for areas that will be included in the national park?

Table 36: Results of specific interviews conducted in Ban Huai Mon

	Headman (N)	TAO member (N)	Grocery woman (S)	Farmers wife (S)	Rice mill owner (S)	Farmer (HJP)	Headman assistant	Mr. Odd
Name, age, position in family + village	Mr. Thawatchai Saephan, -, head, headman.	Mr. Surachet Saetuen, 32, member, TAO member (N).	Mrs. Yanee Luangchai, -, member, member.	Mrs. Bundy, 47, member, member.	Mr. Hom Chaimongkon, -, -, mill owner.	Mr. ??, 54, head, member.	Mr. Jumrus, -, head, headman assistant.	Mr. Odd, 47, - , -.
Consumers + workers in household	-	-	-	8 (grandmother, wife, husband, 4 children, cousin), 2 (??).	-	5, -.	9, -.	-
1 Tenure	No tenuresh. in village (has been invalidated last year). Last 15 years villagers paid tax (5 BHT/rai).	Tax certificate, agreements with RFD and common sense shown by both me and the villagers.	Tax certificate for grocery shop and two fields.	Land certificate (cannot remember the name).	Booking paper for linchee and paddy fields.	Tax certificate.	Tax certificate.	-
2 a. Fields produce enough food for the household b. Problems with soil degradation	a. Sometimes need to buy. Last 3 years yield OK b. Field cultivated for 3 years yield less.	a. Yield not enough. Fluctuation depends on the rain. b. Yes, cultivated for 21 years.	a. Almost enough. Yield slowly declining the last 18 years. b. No, but fields need fallow period (1-2 years) to re-obtain soil nutrients.	a. No, the yield is low in periods, where they don't apply fertilisers. b. Yes, topsoil erosion.	a. Yield enough, sometimes de-/increases (depends on fertiliser). b. -	a. Yield enough, yield fluctuates but maintains yields by adding various inPoots. b. Yes.	a. Decreasing yield. b. Yes.	a. - b. -
3 Funds if fields do not produce enough	No.	No, they support themselves.	No, villagers help themselves.	1 mill. – 1 vill. Fund (lend money to buy herbicides and fertilisers).	1 million – 1 village Fund.	1 million – 1 village Fund, but you have to *borrow* money.	1 million – 1 village Fund.	-
4 GO/NGO supporting or	TAO, Hill-tribe Dev.	Hill-tibe Dev. Dep., Sub-	District Agri. Dep. (extracts	No helping in 10 years,	No.	Only knows about Hill-	-	TAO, Hill-tribe Dev.

promoting agricultural practices	Dep., Hug Muang Nan (prevent drugs, forest, AIDS, tree seedlings in 1997+1998).	district Dep., private organic fertiliser company (primarily in village to sell products).	information, doesn't support much, only with few seedlings).	cannot remember kind of help before this. Villagers support themselves.		tribe Dev. Dep., they are not very practical.		Dep.
5 Price, government help	No.	No.	No.	No, middleman decides price.	No.	No.	-. Sub-district agricultural Dep, only.	-
6 InPoot development	Decreasing use of inPoots.	Stabile use of inPoots.	Stabile use of inPoots.	First 2 years: Good yield, no fertilisers. Last 3 years: Topsoil degradation, fertilisers (apply stabile amount).	Increasing use of inPoots every year to lowland rice.	Increasing use of fertilisers (first year 2 kg, second year 3 kg, third year 4 kg). Stabile use of pesticides.	Villagers apply fertiliser to obtain good yields.	-
7 Water technique applied to fields in dry season	Irrigation.	Few irrigation possibilities. Hill-tribe Dev. Dep. made water res. few years ago, it is ruined now.	Her fields get water from Huai Mon Stream.	Doesn't do agriculture in dry season.	Irrigation, water pipes from the stream.	Irrigation.	Stream water and rain fed in upland areas.	Rich villagers use irrigation. Poor villagers rely on fate.
8 Preserving water for cultivation	Only preserved water for lowland field	Ponds, water pipes from the mountains to the village.	No such activity.	They don't preserve water; it comes from the streams.	Natural reservoir at the watershed area.	Small ponds, use water from mountains.	2 reservoirs of the head watershed office, 1 of the village.	-
9 a. Lack of water b. Change of cultivation, crops etc.	a. Lack of water for cultivation. b. -	a. No lack, but decreasing water source. b. -	a. No lack, can get water from water reservoirs. If floods, she cannot do anything (dam not efficient). b. -	a. No lack. If too much water, they build a small dam to protect lowland fields b. Always grow same crops).	a. - b. Adjusts cultivation by having fallow periods, crop rotation and multi cropping.	a. Has experienced water shortage from headwater resources. b. Therefore switched to mountain	a. Yes. b. Didn't change anything.	a. - b. Doesn't cultivate In the dry season.

						irrigation.		
10 Fields in reserved forest	Everyone (village has been reserved forest area). Area size: 2,500 rai.	Everyone has fields in reserved forest.	-	Think some have, don't know how many rai.	Everyone.	Everyone, about 700-800 rai.	Everyone.	South (has been reserved forest for 2 years, already in Forest Concession): Everyone.
11 Conflicts of land utilisation	Conflicts between villagers.	Enough land to cultivate, no conflicts.	No conflicts.	No conflict, maybe in future.	Conflicts with head watershed office.	No conflicts. People use common sense to avoid it.	Conflicts with the watershed office.	No conflicts.
12 Will more forest be destroyed for agriculture Poorposes.	Clear only bare land, not CF or watershed forest.	No.	No. Rate of deforestation has decreased. Tendency of intensifying lowland agri. and do fields in valleys.	No.	No.	No, most of the land is already preserved.	No.	No (everybody should cultivate in the same land).
13 Cleared area for agriculture	Yes.	Yes, cleared area with grass and very small trees.	No. Bought land 18 years ago from Mien people.	Yes, cleared an area of 15 rai.	Yes, 34 years ago.	Yes, cleared area with small trees 4-5 years ago.	Yes.	-
14 Authority give knowledge about forestry	Knowledge about fire, soil, water.	Yes, cannot remember name. 10 years ago RFD taught about forest benefits.	Yes, watershed office.	Yes.	No.	Yes, in 2003 RFD forbid villagers to cut down any trees.	Yes.	Yes, long time ago. Topic: "Reserved nature".
15 Know about watershed classification (how)	Know from lectures; send other to lectures, too (Mr. Sukson + Mr. Chiangkoy). Lectures: Fire + bad deforestation.	No.	No.	No.	Knows a bit (self teaching).	No.	-	-

16 Activities in reserved + national forest	Fire brakes, reforestation.	Linchees, NTFP collection.	Yes.	No.	Firebreaks.	Yes, NTFP collection.	-	-
17 Use of forest areas	C-zone: 500-1500 fine for collecting NTFPs. Util. zone: Bamboo CF: -	C-zone + CF: Cannot be used. Util. zone: Bamboo shoots/culms.	C-zone: Don't cut. Util. zone: Bamboo. CF: Utilise the area.	C-zone: Don't collect NTFP's. Util. zone + CF: Collect NTFP's.	-	C-zone: Cannot use anything. Util. zone: Bamboo CF: Own consumption, not sale.	-	Community cooperation: Looking after the forest. Community rules for the forest.
18 Determination of forest areas	C-zone: Fertile forest. Util. zone: - CF: Near communities. The villagers determine the zones.	C-zone + CF: Big trees. Util. zone: Bamboo forest.	Meeting every month (6th), where the location of the boundary is discussed.	Doesn't know.	C-zone: Head water area: Util. zone + CF: -	C-zone: Big trees. Util. zone:Bamboo. CF: A mix of the two above.	-	-
19 Management rules of forest areas	C- and util. zone: Collect NTFPs and fuelwood. CF: Not collect bamboo, collect wood (for use in village), 500-1500 fine for collecting NTFPs.	C-zone + CF: Cannot use. Util. zone: Only for own consumption, not for sale.	C-zone: No tree felling, hunting or NTFP collection.	Doesn't know.	-	C-zone: No use. Util. zone: Use bamboo products. CF: Utilisation is allowed only for villagers.	-	C-zone: Cannot cut trees. Util. zone: Own consumption, not for sale. CF: Can be utilised only by villagers.
20 Who determined the management rules	Villagers.	Headman, village committee, villagers at meeting (about use of area).	Village committee and headman.	Headman, headman assistant, district office and sub-district.	-	29 years ago, soldiers stopped them from growing opium, set up rules for forest zones.	-	Villagers.
21 Who enforces rules	Doesn't know. None has violated	The people who made the rules, uphold	Village committee and headman.	Headman, headman assistant,	-	Community committee.	-	-

	the rules.	them, too.		district office and sub-district.				
22 NTFP's collected cover consumption. a. Annual yield, b. Selling NTFP's	Yes. a. Bamboo shoots decreased 30 % (before 2,200 kg, now 1300 kg). b. Bamboo shoots.	No. a. Depends on the amount of rain. b. Bamboo shoots.	-	No, have to Poorchase some. a. Doesn't know. b. -	-	Enough. a. Fluctuates, because of the rain. b. Sell some of the bamboo shoots.	- a. - b. -	- a. - b. -
23 Period where depending more on NTFP's	-	Some people depend more than others. Often dependence in rainy season.	-	Picks many NTFP's in rainy season (doesn't sell them).	-	More important in rainy season.	-	-
24 Forest preserving programme	No.	Villagers make firebreaks.	Yes, villagers agree about the C-zone.	Yes, not allowed to cut trees in forest, allowed to cut bamboo culms	-	Make firebreaks in the dry season.	-	-
25Encouragement to preserve forest	No.	Parents teach children. Information from watershed office.	Holy trees (yellow or orange cloths around some trees).	Yes, headman, headman assistant and people from sub district tell villagers not to cut down trees in forest, it is a source of water. Rule goes from mouth to mouth.	-	The last 10 years RFD encouraged villagers not to cut down forest, villagers received 20,000 Baht last year (didn't receive money for this before).	-	Fund from RFD.
26 Cooperation (between communities, between	Watershed office: Knowledge and activities	Between community and watershed office	All villages in Ruang District cooperate to enter trees to	Sometimes, mostly between watershed and	-	Between community and RFD.	-	Between community and community

community and state agencies /watershed office)	for villagers (e.g. grow grass to prevent soil erosion).	(firebreaks, sand bag dams).	the monastery (holy trees).	villagers. Meetings are informal.				(look after the forest, headmen consult each other). State gencies help if villagers cannot reach an agreement.
27 Do other activities besides from agriculture and forestry	Mock gold bandages business in department store.	Silverware and crafting.	Sell groceries. Husband helps at the health care unit.	Husband does labour force sometimes. Not many alternatives (work in city) to agriculture and forestry.	-	No, but young generation works in Bangkok and Chiang Mai.	-	Labour employment in other provinces, silverware.
28 Constraints for job outside village	Expensive raw material, good money in the capital.	No.	No.	No.	-	No.	-	No.
29 Heard of NP, a. Agree b. Effect on livelihood c. Alternatives	a. Yes, if it doesn't include the land-use area b. No land-use area or NTFP resource. c. -	Yes (sign demarcation) a. Yes, to preserve forest b. Affected if linchees are included. c. Silverware.	No. a. Good idea to preserve forest for next generation. b. No effect. c. -	Doesn't know.	-	Yes, from TV. a. Yes, to save Thailand's forests. b. Affected if linchees are included. c. No, relies on agriculture.	- a. - b. - c. -	Yes (knows a bit about everything) a. NO! Lived there for a long time. Love forest, it provides food. b. - c. Ox, buffalo, cultivate new land.
30 Opinion about subsidies (e.g. rubber plantations)	If there is practical help = good (e.g. agricultural products guaranteed)	Good idea, but government does not provide villagers with any.	Like idea of product price insurance to help farmers maintain good income.	Good idea, help villagers make more money from crops they already grow.	-	Good idea to support cash crops, villagers can make more money,	-	OK, but not good if villagers' land is used for cash-crop plantation.
31 Opinion about money	Doesn't agree with the	Not a valid solution in the	Good for the upland, since	Doesn't want compensation.	-	Doesn't want money. Wants	-	Good if authorities

compensation for areas included in the national park	authority in these cases. Cannot make any decisions now.	long run. Money would not last forever, and then villagers would not have any land to cultivate.	fields not yield much. For the lowland, she would rather prefer the land, since fields yield more.	Wants to keep doing agriculture to support family. If she gets money from the government, she will just use it and then have nothing.		to keep doing agriculture.		give villagers new land-use areas and money compensation for lost land.