

Acknowledgement

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List of contents

1. INTRODUCTION.....	1
The Village.....	1
Background and theoretical considerations	1
Objectives.....	3
2. SOCIAL SCIENCE METHODS	4
Sub-groups.....	4
Expert interviews	4
Participatory mapping and calendars.....	5
Direct observations	5
Systematic random sampling	6
Questionnaires.....	6
Selection of households for in-depth interviews	7
Semi-structured interviews	8
Validity.....	9
Language and cultural biases	10
Reliability.....	10
Interpreter	11
Achieving new knowledge	12
Cultural constraints and possibilities.....	12

3. NATURAL SCIENCE METHODS	14
Soilsampling.....	14
The purpose of the soil sampling	15
Forest methods	16
Questionnaires and broad in-depth interviews	16
Key informants.....	16
Reliability and validity of data.....	17
4. DATA ANALYSIS.....	18
Political aspects	18
Migration	19
Tenure	20
Economic aspects.....	21
Analysis and discussion of soil data.....	22
Analysis and discussion of the forest.....	23
5. CONCLUSION.....	26
6. REFERENCES	27

1. INTRODUCTION

THE VILLAGE

Ban La Bao Ya village is a Mien hill-tribe village. The villagers originate from China and their religious beliefs are Buddhism and animism. They originally settled in Yunnan Province in China but because of communist threats they moved from China to Thailand. Later they were forced to move as due to different circumstances. Ban La Bao Ya was established only 37 years ago, thus, making the village young compared to the Thai villages down stream. For many years hill-tribe people in northern Thailand have been victims of marginalization and lack of recognition of customary rights to the land they have cultivated. Only a decade ago resettlement of hill-tribe villages was not uncommon (Colchester, 1994) and Ban La Bao Ya is a result of such resettlement.

There are 153 households with a population of 1.415, making Ban La Bao Ya twice as large as the second largest village in the watershed. Their main occupation is agriculture with focus on cultivation of upland rice for household consumption, maize used as fodder for pigs and they grow litchi, cotton and rambutan as cash crops. Most of the villagers depend on non-timber forest products (NTFP) both for household consumption and to some extent as a non-agricultural income source. Moreover a number of villagers migrate to the cities for work in order to support their families economically. In the village there is a school both for elementary and junior-high, which teaches more than 400 students and there is a healthcare centre, which provides health care for three villages in the watershed.

The village is located at the end of the only tarmac road in the valley close to the Khun Sumun River. The area around the village is hilly and the land is cultivated on slopes that are very steep. Forests grow on top of the ridges, but are not dominating the landscape. Despite the fact that most of the land is under cultivation, all land is classified as forest conservation zone by the government. This classification does not allow any type of land use, which thereby causes a dilemma for the people of Ban La Bao Ya. Officially they are not allowed to cultivate the land at all, but in reality they have been dependant on the land ever since they arrived in the area. For the same reason no farmers in Ban La Bao Ya have title deeds or any other kind of land certificate.

BACKGROUND AND THEORETICAL CONSIDERATIONS

The indigenous hill-tribes in northern Thailand have traditionally been dependant on the forests for agricultural land and NTFP's and have had great difficulties in obtaining

recognition of their traditional land use by the Thai government. The hill-tribes suffer an increasing pressure from the Thai population both culturally and physically as they are moving up into the hills in search of land. Land shortage, poor management of cultivated fields, insufficient crop yields, increasing forest conservation and deforestation together with the increasing population growth make the survival of the hill-tribes highly precarious (Anderson, 1993).

The main idea of the theory of the economist Ester Boserup (1987) is the connection between agricultural intensification and population growth. She states that when population growth increases, labour supply rises and demand for food increases. The effect is a more intensive agriculture where fallow is eliminated, multi-cropping is introduced and increasingly intensive labour methods are introduced in order to preserve soil fertility, reduce weed growth, water plants and grow fodder crops. Investments in the land may be necessary such as terracing, building irrigation, drainage or fencing to control animals. More agricultural activity means a demand for specialisation like blacksmiths, millers and traders. More activity creates the basis for an improved infrastructure, creating market access through lower transport costs and finally, when population is large enough, markets will move into the area instead of goods being transported away from the area. This further reduces transport costs and creates more economic opportunities. As Ban La Bao Ya is the most populated village in the valley and situated at the tarmac road, Boserup's theory is relevant when investigating agriculture and intensification in the village.

In the 1990's Thailand has experienced a very fast growing economy mainly in the urban centre around Bangkok. This has created a growing gap between the well-off urban population and the poorer rural farmers (Phongphaichit & Baker, 1998; McCaskill, 1997). However, achievements have been made by the Thai government in cooperation with foreign aid agencies in order to support the development of schools, health care facilities and infrastructure in the rural areas. However, McCaskill (1997) argues that a negative side effect is the neglect of the hill-tribes' cultural integrity. By promoting this uniform development it is assumed that the target group wants material progress and integration into the society. The children in the hill-tribes, learning the Thai language and the Thai way of living, may quickly wish to have a share of the wealth in the urban areas, with the risk of losing culture and local knowledge and their parents being further marginalized. The government may have an underlying interest in unifying the 'primitive' indigenous people in order to absorb them in the society, eventually turning them into a 'civilised' ethnic minority (McCaskill, 1997).

The question is whether intensification of the land use among the Mien hill-tribe in Ban La Bao Ya is a natural part of the general development in the society? If not, why is that. When looking at Boserup's theory the conditions seem to be present.

OBJECTIVES

This report investigates land-use patterns and intensification of agriculture in Ban La Bao Ya taking the above into account. The investigation is based on a two-week interdisciplinary survey in the village applying natural and social science methods in order to understand the problems. Our team has one main objective:

What are the main constraints for intensification of the land use and how does these constraints effect the livelihood of the hill-tribe village Ban La Bao Ya?

With the following sub-objectives:

1. How does the settlement location effect land use and livelihood security of hill-tribe villagers?
2. How does household economy effect land use?
3. How do present agricultural cultivation patterns and the location of fields influence the farmers' possibility of intensification?
4. How does present local forest management effect land use and livelihood?

Our intention with the above sub-objectives is to identify constraints to land use intensification by looking at:

- **The household level** only with a focus on family structures including income sources, labour availability and household economy.
- **The political level** only with a general focus on land restrictions, regulations and the role of the local government and relevant local governmental institutions e.g. the Royal Forest Department (RFD).
- **Agriculture** with a focus on soil and soil fertility.
- **Forest use and management** with a focus on the use of NTFP and the management of the resource, in order to identify a link between agriculture and forest use and a link between use of NTFP's and level of household income.

The following chapter specifies what methods were used in order to extract the data outlined above, as well as the limitations of these methods.

2. SOCIAL SCIENCE METHODS

Different methods both related to natural- and social science have been applied in order to answer the research questions. The methods concern structured survey by using random sampling, case studies, questionnaires, semi-structured- and expert interviews, transect and forest walks, participatory mapping and calendars (Cultural-, crop-, NTFP-), direct observation of the physical surroundings, soil sampling and analysis (pH, NPK, texture and colour). Sub-question 1-2 is mainly answered through questionnaires, semi-structured and partly through key informant and expert interviews. Sub-question 3 and 4 were tried answered through case studies of two households, participatory mappings and calendars, interviews with key informants and partly through the semi-structured interviews.

SUB-GROUPS

In order to investigate the different sub-questions the group was divided into different sub-groups depending on the students' scientific background. One group contained two foresters, the second were two students with an agronomic background and the third was an economist, an environmental planner and a geographer. This way it was possible to support each other individually in the sub-groups and furthermore we exchanged knowledge and qualifications between the groups during research. The strategy worked out quite well. Unfortunately the exchange of data did not always happen regularly, which sometimes limited the information shared between the sub-groups. But all in all the sub-groups division was a good solution and has taught us much about each other's scientific background.

EXPERT INTERVIEWS

The expert interview is supposed to provide information about general issues and not about the experts themselves. The respondents have extensive knowledge about existing situations in the area and can therefore provide insight and information on particular subjects.

Understanding the conservation policies and how these are thought implemented in Khun Sumun Watershed different experts from RFD were interviewed. The aim was to gain knowledge and understanding of RFD and the conservation policies and not analyse the policies themselves.

As the different sub-groups had their own interests, this sometimes created confusion about the exact officers we were going to interview at RFD and what kinds of information they were supposed to provide. Lack of planning and miscommunication between group members as well as limited interview preparation was the main problems.

Only a few experts from RFD were interviewed, which limited the opportunity to cross check the information given. The conservation policies are implemented from a *lassie-faire* point of view meaning that implementation depends on the constellation and needs of each area. Therefore different experts with relation to the conservation policies would have been interesting to investigate in order to understand the subjective nature of the implementation and the effectiveness of the policies.

PARTICIPATORY MAPPING AND CALENDARS

The mappings and calendars created a not very time consuming and simple survey of the different crops that are cultivated, location of fields, what kind of NTFP's the villagers depend on and if there are any cultural events that influence the land use in any way. Through participatory methods it becomes possible to view the villagers' perception of their physical surroundings and agriculture. The villagers get to tell the story from their point of view and one could wish that the participatory approach also gives room for reflections concerning their situation, their knowledge about crops, NTFP' and cultural traditions.

Using a participatory approach we experienced the villagers to be very involved and serious. During the interviews participatory mapping was often a part of the interview. This always turned out very positively, as the respondents were very interested in showing the location of their plots and other features concerning the area. During the last community meeting where our data was presented to the villagers they were encouraged to participate in various mappings (cultural, agricultural pattern and NTFP). This turned out very positively and made us realise that this should have been done at the first community meeting, but at that time we were not enough prepared in order to do this.

DIRECT OBSERVATIONS

The first day in the village we all walked through the village in order to achieve an impression and absorb any information concerning houses, natural surroundings and the setting of the village. Through observations and noticing different details the opportunity to reveal significant and potential features important for the research is increased (Neuman, 1997).

During the interviews one group member spented time observing the respondents house and its setting and the interior. Through that a lot of information about wealth, lives and subsistence level were gathered, something that has been very useful in order to understand the research field more comprehensively. Unfortunately these data were not gathered from a structured point of view, which makes it complex to use directly in our analysis.

SYSTEMATIC RANDOM SAMPLING

In order to gain knowledge about the research area it was decided to make a representative sample of Ban La Bao Ya. The structured survey is designed to give quantitative data and questionnaires are typically used. The interviews are conducted with a sample of respondents selected according to randomisation procedures.

Ban La Bao Ya exists of 153 households and represents the population from which we selected a sample. First the objective was to gather general information about the household's economy and agricultural conditions by interviewing key informants; the headman of the village and two TAO representatives and from these informations chose 30-40 households. Key informants can provide information and insight about general features and is an easy way to achieve knowledge.

The interviews were designed to cover different indicators such as demographic and economic aspects. After the interviews with the 3 key informants and assembling the information gained we realised a degree of divergent and insufficient knowledge about important aspects concerning the households. Instead of relying on general information from key informants in order to select a sample, it was decided to choose 36 households randomly first by taking every household with a number ending on 0 or 5 and later those ending on 3. If the family somehow was not able or relevant for us to talk to the neighbour to the north was chosen instead. Even though random sampling can overlook important aspects this seemed to be the best possible solution considering the need to have a representative sample.

QUESTIONNAIRES

Different indicators related to agricultural conditions, economy, and family structures and their knowledge about the conservation zone were chosen and a questionnaire containing closed questions were constructed. The questionnaires gave a good opportunity to convert the information about the village and households into a limited set of codes and tables, which later was used to select the final sample. Questionnaires provide an easy and time limited way to gather information and can be done by mail or phone and through interviews (Neuman, 1997). The latter is often used in rural areas, as literacy as well as limited access to phone and mail is common.

From the basis information about the households gathered through small questionnaire interviews a modified case oriented approach was taken and households representing aspects within agriculture, economy and family structures were selected. As we believe that political, social and economic contexts and experiences, perceptions and surroundings are decisive for the intensification of agriculture and livelihood in Ban La Bao Ya, we needed to collect further information from the households. Of different reasons such as time constraints and resources it was not possible to make in-depth investigation of 36 households why it was

decided to make a sample representing the extreme, less extreme and average characteristic of the households in the village. This approach was not supposed to indicate general trends but make us understand different characteristics of the agricultural and livelihood patterns in Ban La Bao Ya.

SELECTION OF HOUSEHOLDS FOR IN-DEPTH INTERVIEWS

The main objective of the selection was to include all aspects from the questionnaires including; all major crops, small and big farmers, farmers having only upland fields and farmers having only lowland fields, farmer with only orchards and farmers with only fields, farmers with and without off-farm income, farmers with and without debt, farmers using and not using the forest and farmers using many or few NTFP's. Roughly this is a stratified selection because we decided that all indicators mentioned should be represented. As seen in the final selection in table 2.1 there is a lot of overlap between the different indicators used. This is important in order to strengthen the foundation of the data and to be able to compare data from the semi-structured interviews. However, this selection will make the weight of the minor indicators have a relative higher weight.

The number to be selected was not determined beforehand, but turned out to be 16. It was found realistic to complete the interviews within our timeframe.

Table 2.1 Data from questionnaires of the 16 households selected form In dept interview

Household nr.	6	12	21	25	155	150	135	16	43	125	50	121	152	61	130	95
Adults in household	4	7	4	2	6	3	5	1	4	3	4	4	4	7	4	3
Rice U/L	U		U	L		U	U	U	U	U	U	U	U	U	U	U
Maize			M			M	M				M	M	M	M	M	
Cotton							C				C		C			
Oranges	O	O	O	O	O	O	O					O	O	O	O	O
Litchi	L	L				L					L	L	L	L	L	L
Longan			L								L					
Rambutan						R										
Number of rai	23	13	23	69	70	18	14		3	10	22	5	15	33	45	31
Plots	4	3	3	3		3	5	1	2		4	2	2	5	5	5
Upland/Lowland fields	U/L	U/L	U/L	U/L	U	U/L	U	U	U	U	U/L	U/L	U	U	L	U
Orchards/Fields	O/F	O	O/F	O/F	O	O/F	O/F	F	F	F	O/F	O/F	O/F	O/F	O/F	O/F
Number of labour	2	1	4	2	6	3	5	1	4	4	2	2	4	4	4	1
Non agricultural income	YES	YES	YES	YES	YES	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES
Debt/Saving	D/S		D/S			D					S	D	D	D		
Forest Use	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
Member of forest Committee	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	NO	YES	YES	YES	NO	YES
No of different NTFPs used	4	7	5	7	12	12	1	8	8	10	5	0	12		5	3

SEMI-STRUCTURED INTERVIEWS

The 16 households were the key source to information and a semi-structured interview guide was prepared. The semi-structured interview is open-ended interviews where the informants are encouraged to express themselves fully. The sequence of the questions are not predetermined and the interviewer can control the course of the interview and finally questions can be asked in order to investigate interesting leads (Casley & Kumar 1988).

The semi-structured interview has several strengths. The information from various respondents is comparable in order to determine the frequency of types of information, although the emphasis is on the in-depth understanding provided by the respondent. In comparison with other types of qualitative research methods the semi-structured interview can be conducted more quickly than others (Casley & Kumun 1988). One of the limitations with this sort of interview is that if the interview is conducted by others that confine themselves strictly to the written questions and not follow interesting leads, the value of the information then depends fully on the quality of the interview guide. Sometimes the students used the interview guide very strictly and the notes taken gave limited and very specific information, which has been a problem due to analysis of our data.

The semi-structured interview guide was supposed to cover all aspects related to forestry, agriculture, economic, health and the conservation zone, as we wanted to avoid interviewing the households again and again. The semi-structured interviews made it possible to achieve a deeper understanding and primary information concerning agriculture and livelihood and through that uncover correlation between the different sub-objectives.

As every interview was designed to cover all the mentioned issues the guide became very long and time consuming. In average interviewing a household took 2 hours and even so there was not always enough time to pursue interesting perspectives, which then again lead to several compromises during the interviews.

The head of household was chosen in order to obtain as valid information as possible. Unfortunately this was not always possible because not everybody was aware of how important interviewing the head of household was, why the person available was interviewed instead. Secondly the head of household was difficult to get hold of, which in some cases lead to interviews of the available person. Having more time a strategy contributing with a back up sample of relevant households should have been made.

In order to avoid any undesirable feelings or thoughts concerning our investigation and presence when coming into the respondent house the sub-group 1 was split up into 2 groups. Fewer people do not seem as overwhelming as many and because the Mien people are shy and not used to strangers this seemed to be a less infringing approach. As interviewers we

encroach on the respondents' time and privacy for information without actually benefiting the respondent (Neuman 1997).

In some interview situations especially when interviewing the women we had a feeling of being intruders within their private sphere. In such a situation it can seem very difficult to achieve good and valid information. Interviewing the women as a foreigner was more difficult than interviewing the men but in both cases the presence of a foreigner seemed to create some sort of discomfort.

No test interviews were made so the first couple of interviews did not turn out well. First of all the interview were structured completely wrong as the first questions dealt with touchy issues such as politics and the conservation zone. Furthermore the interview guide was not used as a guide in the beginning, which resulted in confusion about the exact questions asked. These mistakes were corrected. The structure of the interview guide changed, opening and informal questions were added and the guide was used to a greater extent. These changes made the interviews more relaxed and less intrusive.

VALIDITY

Validity is the relationship between the actual research and the research that was intended to carry out. So is the actual research made sufficient enough to conclude in the main objectives?

Concerning the overall validity of the data collected it is very hard to say whether every information gathered from the semi-structured interviews have a scientific validity. Basically we do not consider the gathered information to be able fully to answer the research question, but to emphasise important trends related to our research area. This is mainly due to our sample, divergent information and time limitation. During the in-depth interviews divergent and different information came to the surface. The final sample was made on the background of a random sample approach. There is a possibility that such an approach ignores important aspects. The final sample has to some extent been chosen from a case orientated point of view and are therefore supposed to cover the extremes. There is a chance that this might put some constraints on the overall research, as minor but important characteristics can be ignored. Furthermore we realised divergent information due to misunderstandings, which left doubt about the basis information gathered through the questionnaires. The group members might have had different perceptions and understandings of the questions asked, which might be the reason for the contradictory information. Because the questionnaire was not discussed thoroughly enough it was not possible to prevent such mistakes.

In spite of conflicting information and the chance of not always receiving the right information the short and in-depth interviews did give a good indication of the circumstances

in Ban La bao Ya. Through a good initial research, the questionnaires and then the semi-structured interviews gave an opportunity to cross check our data and if more time had been available the contradictory information could have been demolished. The consistency in the research is definitely a strength concerning validity.

LANGUAGE AND CULTURAL BIASES

Each culture has its own assumptions, modes of thought and fundamental values about life. All this influences how people interact, talk and perceive their lives. In our situation such biases have induced the work among the students and the student-villager relation. Ban La Bao Ya is a hill tribe and has its origins in China which therefore also created some biases specifically in relation to the Thai students. There seem to be a general perception of the hill tribes among non-hill tribe people in Thailand about the hill tribe people as being primitive and second rank people. It is difficult to decide exactly how this has affected the Thai students' research and the way they encountered the villagers. The Danish students can be criticised for being biased towards the Western culture and scientific approaches. Even though the main objective of our research was discussed comprehensively among both Thai and Danish students, the Danish students did have a decisive influence on the chosen concepts and methods. These biases can easily be the reason to miscommunication and lack of common understanding of the research area. Language biases are major constraints concerning validity of our data. As mentioned earlier every culture has its own assumptions and modes of thoughts and several times contradictory perceptions of meanings and concepts due to language biases appeared. Concepts and words such as community forest, agriculture, farmers etc have different meanings depending on the person asked. Even though we did get a good indication of how the villagers perceive the community forest and conservation zone around ban La Bao Ya we never accomplished a common understanding of the concept among the villagers. This is important to have in mind when trying to understand the role of the community forest and how the conservation zone affect the land use.

RELIABILITY

Reliability deals with the issue about whether you can trust the collected data. These are hence influenced by formulations, subjective assessments and the interview situations.

Because of the subjective nature of the question asked and the notes taken it is difficult completely to decide the reliability of the information given. Judgement on the reliability should therefore be based on considerations about the respondent's relation to the matters investigated. Is it direct and firsthand information, what kind of sources is the respondent relying on and is he or she in a position to provide the correct information (Casley & Kumun

1988)? Due to the questionnaires and the semi-structured interviews accurate information was given. In order to guarantee the most reliable information the key respondent within each household was supposed to be the head of household. It was not always possible to get hold of that person and instead of choosing another household or come back another time the available person were interviewed. Some of the respondent's could not give sufficient and correct answers because they simply did not know better. This was dissatisfactory, as it to a lesser extent is possible to secure valid information because they do not have the overall responsibility of the household. In such situation there is a chance that the respondent when not having sufficient knowledge about a certain issue will try to find answers in order to please the interviewer. These facts have of course given some limitations to the reliability of the information, which is something we have to keep in mind when analysing the data.

INTERPRETER

The interpreter played an enormous role regarding the understanding of the language, the Thai culture and mitigating all sorts of information. When the semi-structured interview guide was composed a Danish student and a interpreter sat together and read through every question. Different concepts and questions were explained in order to mitigate the same perception of the questions to everybody. This appeared to be a good solution as definitions of some concepts were unclear and not all the questions were understood properly. By doing so a lot of misunderstandings were avoided and furthermore it gave the students and the interpreters' confidence in regard to the interview guide.

Unfortunately this preparation was only made in regard to the semi-structured interview guide. It was realised later that information gathered during the questionnaire interviews sometimes were not in accordance with the information gathered during the in-depth interviews. To a certain extent this might have been avoided if the questionnaire had been prepared and discussed extensively.

Concerning translation of conversations among the students there did not seem to be any major problems we could not overcome in the long run. There was some miscommunication and –understanding due to poor translation. During the interviews wrong or insufficient translation happened. To elaborate non-translated information different questions were asked during and after the interviews. But unfortunately this was not sufficient and at this stage we have to accept that a lot of the information is lost forever. We should have spent more time preparing the interviews, cross checked the information and very importantly spend more energy on translation during and after the interviews. As the in-depth interviews were time consuming the idea of spending even more time because of translation did not seem decisive. The balance between translation and time was considered from interview to interview.

ACHIEVING NEW KNOWLEDGE

Among the students there was different ways of achieving knowledge. Thai students did not discuss or plan the interviews as much as the Danish students would have liked, but instead they relied more on the interview situation itself. That can sometimes be okay if you are experienced in interviewing people, but as none of us can be said to be experienced with interviews, it sometimes made the interview unstructured.

One of the good things about the Thai students was their work ethics. They are hard working and have a disciplined approach in everything they are doing. In this as Danish students we could learn something. On the other hand we would have liked a more independent and critical way of achieving knowledge. In our opinion we found that it was difficult for the Thai students to ignore the presence of the teacher. In the beginning they were very often looking for guidelines of what to do from the teachers present, but they became better at working without specific guidelines during the process. The deep respect and belief in authorities (e.g. teachers and officials) limit the Thai students independence and critical approach (e.g. you do not question a teachers knowledge). On the other hand there is a genuine politeness both from the Thai students and the teachers that the Danish students learned a lot from. Often our Thai counter-parts prevented us from doing gross social and cultural mistakes in our interviews and practical work.

The Danish students are both taught and used to work with a more independently and structured approach as well as a critical attitude towards gained knowledge. The Danish students are taught to gain knowledge through an independent and selective approach, whereas it seemed the Thai students have been taught to gain knowledge through what they are told to read and learn from lectures. This does not imply that the Thai students were not independent working and the Danish students were exclusively independent working. It more says something about the way of working.

Because of these differences it is possible to learn a lot from each other as long as we keep an open mind. Also, the Danish students can learn a lot from the Thai students concerning Thai culture, issues related to the country and the Thai students general thorough knowledge about their own country. The Danish students could contribute to the process by sharing the knowledge especially about methodology, critical approach and general knowledge about project work.

CULTURAL CONSTRAINTS AND POSSIBILITIES

Understanding and acceptance of one another's cultures and tolerance due to differences in ways of working are the main objectives in order to make co-operation between two so very distinct groups of students' function.

As the Danish students tend to be very dominating it was necessary to slow down, give the Thai students space to participate in the discussions and listen carefully to their opinions. At first hand the Thai students seemed shy and modest but giving the right space where everybody was accepted equally the Thai students became very eager and participating. Meeting the Thai culture has been an 'eye-opener' due to our own and the Thai way of interacting socially. Common interest in family relations, daily lives and politeness is decisive in order to bond with the Thai students. The Thai students have a very polite attitude and it takes time to understand whether they mean it or not. If the politeness is an attitude co-operation with the Thai students can be a troublesome affair, but if their respect and tolerance in the relationship is sincere, working with them can be very interesting and progress in research can be achieved.

Difficulties in communication due to language barriers demanded great patience among the students. Sometimes we had trouble planning our time and interviews properly as there were different perceptions in the way things should be planned. It was mainly the Thai students who made appointments and introduced us all. This way we tried to avoid intrusion and misunderstandings among the students and the respondents. But of course there is a chance of mistakes even though the Thai students had the responsibility, something we had to accept.

At times the group work was very demanding and positive solutions to our problems were hard to find. During the course we learned to appreciate our differences. To a certain extent we learned to compensate each other's weaknesses by, at one side, having very serious and hard working Thai students with good knowledge in their study field and, on the other side, an extensive methodological and critical approach to the work on the other side.

The main reasons for our difficulties are to be found in cultural differences. Culture and customs are two very complex concepts and it will take a long time if not forever to understand how to interact and co-operate between two so very different cultures. Lack of understanding about customs and cultural aspects on both sides gave space to a lot of frustrations and it is an issue that only continuously experiences can fulfil.

3. NATURAL SCIENCE METHODS

SOILSAMPLING

Case description for soil sampling

Two farmers' fields were chosen as case studies because of the location of their fields and the specific crops they had on those fields. Both farmers had all their fields in or just around the village and it was our intention to see if there was a common indicator for the soils close to and around the village. The reason for choosing only two case studies for soil sampling was in order to identify differences in the soil in the various fields due time limitations.

As we later found out one of the farmers had "forgotten" to tell us about a field he had another place in the village and the fields he had told us about earlier, were not quite where he had explained the first day. This meant that the sampling we had decided to do did not get the content we expected. On the other hand it taught us that it is practically very difficult to take case studies in the field as the information can change from day to day. Instead we should have selected certain key areas and then have asked the headman if we could take samples from these areas. That would have given us a more general view of the soils in the area and it would not have been necessary to pick two case studies. This would on the other hand not have given us the more specialised information that each farmer has about his fields (e.g. cropping pattern and use of pesticides, fertilizers).

The problems we had interviewing the farmers about the physical location of their fields, was in our opinion different perspectives on what was said. So as when we said village, they were quite aware of what we meant but if it was the field's location in relation to the village it was quite another thing. Here expressions like "close to the village" and "just around the village" had quite different meanings for the farmers and us. This we should have expressed more exact as it gave us difficulties later on with the soil sampling. But, this would only have been possible for us if we had had some more time, as the small misunderstandings only became apparent in the situation.

Farmer number 1: An old man who had fields in the lowlands close to the river and two small streams. His information to us was very detailed and thoroughly and therefore useful for us.

Farmer number 2: A young man who had (supposedly) fields along the river and the village. What he actually had was fields at one end of the village and outside of the village.

The choice of these particulars farmer were that their fields were located close to village and therefore fairly accessible and furthermore the fields seemed to cover the most important type crops and geographic area (detailed information can be found in appendix II).

THE PURPOSE OF THE SOIL SAMPLING

The idea behind the soil sampling was to investigate the fertility of the soils and to see how different cultivation methods may affect the quality of the soils. We started out with three different ideas of comparing soils:

1. To see if there was a difference in soils on the same field/area, when they were cultivated differently. For this we decided to compare soils from a field that partly held 5-6 year old lynchee (perennial crop) and another part of the field that had been cultivated continuously with rice for at least 10 years. By doing this it would be possible to see if degradation of the soil happened when continuously cropped with annuals, by comparing it with the perennial part of the field. It was important to take the samples from the same area, as the data would not be comparable if the samples were not from the same parent-material.
2. To get an overview of the soils just around the village to see if there was any anomalies when compared with each other. Two farmers with fields around the whole village were chosen for interviews. As it later turned out this was not correct and the method was not used as expected.
3. To see if it was possible to notice a difference across the valley, it was proposed to take samples from both sides of the river and here take two samples, one upland and one lowland on both sides. The reason for doing so, was because the vegetation on the two sides of the river seemed different.

To have an indication of how the soils had developed from the time when the area had been covered with primary forest, reference soil samples in the surrounding forest area was taken. These samples should ideally have been taken from primary forest, but there was no more primary forest in the area, therefore these samples are not good indicators of how the soils has developed.

Soil sample methods

The 16 soil samples were taken from different locations. One sample consists of 9 small samples from the same field and these samples was taken from different places on the field and mixed. This ensures that the sample has an average of all the conditions that exist in one small area.

Sample 11 – 13 and sample 14 – 16 was taken at the same field in order to compare the samples and get a better view of the soil. Sample 11 – 13 was taken from a part of the field that held rice and had been cropped with rice for more than 10 years continuously. Sample 14 – 16 was taken from a part of the field that held lynchee and had held lynchee for more than 6 years.

The reason for choosing this specific field and taking many samples from the same field, was in order to see if their was any difference in the soil between the part of the field with annual

crops (rice) and the part of the field with perennial crops (lynchee) as they were situated on the same parent material.

Samples from the other fields are taken as reference for this test, but also to see how the soil was in different locations around the village. There have been taken soil samples from further 4 lynchee-fields and 2 more rice fields.

Further information on soils and each soil sample can be found in appendix XI and appendix II and an overview of the soil test results can be seen in appendix X.

FOREST METHODS

The people of Ban Lan Bao Ya use many NTFP's. According to Falconer (1995) research in many parts of the world has shown that the most important role of NTFP's is as a critical resource for poor rural people, as a buffer in economic hardship. Assuming this is true, it is relevant to use NTFP's as an indicator when investigating the livelihood in the village.

QUESTIONNAIRES AND BROAD IN-DEPTH INTERVIEWS

From the random sampling of 36 households people were asked how they use the forest. This created a representative overview of the use of forest products in the village. The results created the basis for further questions. 15 selected households were asked questions covering all aspects relevant to our research. In these interviews further questions about the use of bamboo and firewood were incorporated.

KEY INFORMANTS

Two in-depth semi-structured interviews were carried out with key informants using and depending on many NTFPs (household nr. 52 and nr. 146) these interview created the basis for making a NTFP-calendar. GIS (maps) was used in order to point out where NTFP was collected. Both households pointed out, a dense evergreen forest located 15-20 kilometers to the north independently, as an important source for some specific NTFP. Unfortunately we didn't visit the dense evergreen forest due to lack of time. It may have been useful to get an impression of the differences between the degraded bamboo forest type found near the village and the dense evergreen forest located to the north.

Three middlemen trading rattan, bark for paper and bamboo shoot in the village were interviewed. See interview guide in appendix V. Through these interviews we gain knowledge about availability, trade and prices of NTFP. Furthermore it was possible to crosscheck information.

Finally people at a community meeting were asked to participate in correcting and adding to our NTFP calendar.

A key informant from RFD was interviewed regarding RFD's perception and definition of community forest and the legal framework for getting a community forest approved by RFD.

Forest walk

A forest walk of 9 km was carried out in the hills close to the village in order to get an impression of forest characteristics including structure and main species. Another objective was to identify boundaries between the cultivated land, the community forest and the forest conservation zone according to the local village management.

GPS measurements were recorded during the walk, each time the land use changed. The forest walk was supplemented with information from interviews with key-informants. See above.

RELIABILITY AND VALIDITY OF DATA

A substantial part of the forest survey was based on interviews. For problems related to interviews see the section about social science methods. However compared to the brought in-depth semi-structured interviews it was much easier to carry through the specific forest related interview due to a much more common understanding of objectives. Even though there was a generally language barrier this barrier was not as clear when working with forest related issues. This led to a much more free dialog and more dynamic interviews – more semi structured. This was most likely due to the common forestry background of the Danish and Thai forest student.

The data regarding the use of NTFP is assessed as reliability in relation to the use of the data. Different methods and different informants have been used, which enables cross-checking information. Further more some of the products used are also used in neighboring countries enabling us to compare our findings with written sources – e.g. regarding the use of bamboo, sugar palm and paper mulberry.

The use of NTFP is much more straightforward compared to the issue of community forest and conservation zone, which is more complicated to understand, and therefore may be perceived much more individually by the different informants. Thus, making the information gathered difficult to interpret.

4. DATA ANALYSIS

Before analysing our data gathered it is important to emphasise limitations related to the methods used. The final sampling aims at representing trends in household demography, economy and agricultural patterns and because every characteristic is sought covered this do to some degree make a representative sample. However, several reasons have forced us to compromise and make the final sample smaller than desired. In order to reduce the number of households in the sample specific households was chosen from a case orientated point of view. To a certain degree the final sample can be said to contain some sort of representativity as every characteristics are covered but it is very important to keep in mind that the sample is very small, which limits any form of generalisation. Neither is it our objective to make large generalisations and the tendencies emphasised during the following analysis shall only be considered as trends found when interviewing the 15 selected households.

POLITICAL ASPECTS

There seems to be general knowledge about the conservation zone surrounding Ban La Bao Ya. This means that trees cannot be logged and expansion of agriculture is prohibited. The villagers perception of the location of the conservation forest is on the other hand quite interesting as most of them consider the north of the valley as conservation zone and south side of the valley as forest that can be used fairly unlimited. This means that here all kinds of NTFP, firewood and trees for building houses can be collected any time of the year and as often as needed. But fact is that the entire area surrounding the village is by law considered conservation zone so basically activities of any kind are strictly prohibited, which leaves both the village and RFD in a dilemma. These different and divergent understandings of the conservation zone emphasise the different perceptions of the conservation zone among households and students. Every household seems to know that any form for encroachment on the forest is prohibited in the entire area surrounding Ban La Bao Ya. This becomes interesting when asking specifically about the location of the conservation zone, which is the reason for any restrictions related to encroachment of land, as it is pointed out to be on the north side of the valley, only.

The conservation zone influence agriculture to such an extent that it is no longer possible to prepare more plots and extend farming. But so far it has been observed that the problem is more a matter of little financial input opportunities, soil quality and lack of labour than lack of access to more land. Many households has abandoned some of their plots because they are located very far away and they do not have enough money to replant the plots. Intensification of the agriculture would improve the villager's livelihood as more crops either could be used

for household consumption or sold on the market. Concerning the plots that are used for agricultural purposes the villagers are afraid to leave them fallow because, if plots lay fallow and become covered by forest RFD will consider this as conservation zone and clearing the land would be a crime. For some farmers this means that they do not leave the land fallow for more than a year at a time.

From a formal point of view the conservation zone limits the villager's possibilities of freely using the forest. Thus there seems to be a great flexibility in the forest policy as the villagers still use the forest and cultivate according to their needs and economy (except from logging). Most households are in a situation where NTFP's are decisive for their subsistence and if they lost completely access to the forest they would simply not be able to survive or new ways to provide a living had to occur. This has partly happened as many households depend on migrated family members but this also leaves the households with limited working force and intensification of the land use through more labour becomes impossible.

Knowledge about RFD

There seems to be different opinions about whether RFD often is present in the village or not. In average the villagers notice RFD 4 times a month either because they pass through the village, participate in a community meeting or because of other activities such as controlling the forest. Not all seems to know details about RFD but no matter what there seems to be a common perception of the forest on the opposite side of the river.

Investigating if the farmer's amount of plots has increased over the years also indicates that no encroachment of the forest for agriculture has taken place for a long time and the villagers seems to accept the forest conservation. Thus, some households acknowledged that they would consider clearing attractive land located nearby the village if they had the opportunity. Taken the households economic situation into consideration this seems quite understandable as many of them struggle to survive.

Most of the villagers respect the forest conservation concerning logging and encroachment and will at any time report to the headman or a TAO representative if someone was logging. But when it comes to using the forest as a non-agricultural income and food source they have a different opinion on protecting the forest. The forest is used to collect NTFP and firewood. Most households depend on access to the forest. Many travel a long distance to collect firewood, astap and other valuable NTFP.

MIGRATION

As previously pointed out basically every household interviewed depends economically on migrated family members. Except from two households every household has family members working outside the village. Typically it is the children that migrate and almost every

household has a couple of children who have migrated. It seems that the main reason is the lack of jobs and income opportunities in the village. The income coming from this source is very important in the total household economy. Some households completely depend on this kind of income, as they cannot survive on agriculture and NTFP alone. One household (155) totally depend on the income from their migrated son and daughter in law even though they do own plots to cultivate.

Having migrated family members also influence some households ability to intensify their land use as absence of family members mean they cannot provide enough labour to work in the fields. We have noticed that many households have abandoned old orange plots as it demands to much labour and time, which many households because of migration does not have. For some households migration is not a problem as the existing cultivation cover their needs together with the economy from their migrated family members. But migration has a negative affect on the opportunity to intensify the land use and limited land use do not provide enough work and villagers decide to leave the village and find work somewhere else.

Lack of working and income opportunities seems to be a problem for many households in Ban La Bao Ya and now that the area has been declared a conservation zone this do not indicate any promising changes. This might also affect the perception of opportunities in the future. This seems to be an evil spiral, which need new ways of thinking concerning income and food generating activities. If the area is turned into a national park (RFD talks about this becoming a reality in the near future, Interview RFD 22 Oct) this might release new opportunities depending of cause on how the national park is managed.

TENURE

No one in Ban La Bao Ya have or are able to achieve title deed, as the area is located in the conservation zone. The headman talks about getting title deeds in 3 years time but RFD dismissed this. There seems to be mixed opinions about the need for title deeds among the households. About half of the households do not find it necessary to have a title deed and sees it as a unnecessary protection of their land. The argument is that every body respect one another and would never steal or take land not belonging to them. A dozen households find that title deeds will give economic advantages and they would consider investing more in agricultural matters but the desire to achieve such advantages is limited to the extend that they would never leave the village for title deeds. In order to understand this phenomena a throughout investigation of the households priorities and values is demanded.

ECONOMIC ASPECTS

The following information concerns household economics according to the findings in the village Ban La Bao Ya (see figure 3.1).

Households with incomes lower than 5,000 baht are 41.6% of all the households.

Households with incomes between 5,001-10,000 baht are 33.3%.

Households with incomes between 10,000-20,000 baht are 16.6%.

Households with incomes higher than 20,000 baht are 8.5%.

52.8% of the household income comes from agriculture, where crops like lynchee and other fruits are the main cash crops. In the area there are many abandoned orange orchards, these have been left due to lack of input such as fertilizers, labour and pesticides. Many of the farmers with old orange orchards, cannot afford to clear them for other crops. Thus, they have to rely on other sources of income. Upland rice are cultivated only for household consumption and maize is cultivated for chicken and pigs. Other sources of income are (see figure 3.2):

8.7% of all income comes from working as laborers.

7.9% comes from selling embroidery.

4.3% comes from selling NTFP.

26.3% comes from family members who migrated to work in town.

The expenses can be divided into two parts, namely household expenses and farming expenses. The household expenses are between 500-1500 bath/month. The farming expenses are mainly for fertilizer and herbicide.

The average number of people working within agriculture is 2.7 people/household. Every household has members moving to the city to earn more money to support their family. Money to spend on investment of agriculture often depends on the money received from migrated family members.

According to the interviewed households we found that 30.7 % of all the households have debts. The main objective for taking a loan is for agricultural investment. The present loans of the farmers are old loans, no farmers have taken new loans the last year.

The average income in most of the households is low. More than half of the household's income comes from agriculture and more than 25% of the income comes from outside the village. As the village depend so much on income from outside of the village, and still have a low level of income, intensification of the agriculture is very dependent on outside generated income opportunities.

Due to lack of title deeds it is furthermore very difficult to obtain loans for further investments in the area.

ANALYSIS AND DISCUSSION OF SOIL DATA

Soil fertility

Both of the farmers from the two case studies said that their fields/soils was very poor in nutrients. As can be seen from table in appendix X all the samples show a low level of ammonium in the soil samples and the level of nitrate is subsequently even lower. Concerning Phosphorus and Potassium the soil samples varies a lot, from samples having a low to very low content of P and K to other samples with a high content. The pH and the land-use type cannot in this instance generally be said to have an influence on the availability of these two nutrients. Whether this is important or not is an entirely different matter, because the N-level in the soils are at so low levels, making it the limiting factor. This means that there is low to very low amounts of nitrogen in the soils, which will inhibit the plant growth and there is not need for the amounts of potassium and phosphorus compared to the need of nitrogen. One has to be considering though that the soil samples was taken in the end of the growing season, thus there would naturally be low amounts of nitrogen in the soil anyway.

The pH is as expected in the humid tropics, actually it is a bit higher than expected as most of the samples has a pH above 5,5 (see appendix X). A pH above 5,0 is normally adequate for growing crops and getting a moderately good yield. However the phosphorus availability in the lower end of the pH range is low as would be expected at low pH-levels. The low levels of pH are mostly found in samples from fields with perennials or from the secondary forest area outside of the village. This is also as expected, as a slight natural acidification of the soil under perennial plants.

For method number one, which was to compare soil samples from the same field, but cultivated with rice at one part and with lynchee on another part. It was found that the SOM content was approximately 0,5 % higher on the part of the field with lynchee than on the part with continuously cultivated rice (see appendix XII). The SOM on the rice-field part was expected to be somewhat lower than the figures shows, as the decomposition rate was higher here and that the replenishment of organic matter would be insufficient for the percentage measured (see appendix XII). The CEC was measured and it was found that the CEC on the lynchee-part was on average 18,7 cmol(+)/kg, while on the rice-part it was 16,63 cmol(+)/kg (see appendix XII). This is also consistent as there is more SOM in the lynchee-part and therefore it should have a higher cation exchange capacity.

For method number two, it is only to say that there are no major differences between the soils other than what should be expected. For more reliable data it would be necessary to take more samples.

For method number three to take samples from the upland (sample 1) – lowland (3) – upland (4) from non-cultivated land across the valley, to see if there was a measurable difference in the soils. There were no major differences in the soils that can be taken as conclusive.

ANALYSIS AND DISCUSSION OF THE FOREST

The focus is on three major issues. Firstly the forest near the village is briefly described, secondly how the villagers use the forest, and finally, how the community manages forest is also explained.

The forest

A forest walk was done on the north side of the Khun Sumun river. The forest is secondary degraded mixed-deciduous forest dominated by different types of bamboo: *Bambusa tulda*, *Dendrocalamus strictus*, *Dendrocalamus asper* Back and *Cephalostachyum pergracile*. Four tree species such as *Pterocarpus spp.*, *Terminalia spp.*, *Azelia xylocarpa* and *Xylia kerii* was found in the top strata but relatively scattered but non of them were of commercial timber size.

From a visual point of view the biodiversity may be considered relatively low. There were very few big trees, one stump above 2m in diameter was found. Few herbs were found. The sound level from birds and other animals was almost absent. No significant debris was found on the forest floor, which may indicate collection of firewood.

The main objective of this forest, seen from the headman's point of view, was the importance for water conservation. He said that people was not allowed to collect any products in the forest because it is considered conservation zone.

Several informant in the village was asked where forest products were collected. One informant was asked about the forests in the hills seen from the village. The informant pointed up hill and said 'this is not forest you have to go fare to find the forest'.

Many NTFPs and timber is collected from a forest used by several villages. The forest is situated approximate 15 km to the north towards Ban Huai Hua in an area bordered by 3 streams; the Huai Koen, the Huai Mae Kham Phaen and the Huai Pong Kham. The villagers of Ban La Bao Ya origin from this area. It is called a dense evergreen forest with very big trees. Some trees are too big to fell and trees more then 2 m in diameter have been recorded.

Forest Use

More then 40 plant species has been identified as used by the Mien people of the village. In addition animals and insects for food is used. Most are used for home consumption and only 5-7 different types are utilized commercially. A NTFP calendar is found in appendix IV.

A representative part of the households in the village consider the following 4 types of NTFPs most important: Bamboo, firewood, mushrooms, and forest vegetables.

Table 1 gives an overview of the main commercial uses of NTFPs.(see appendix VI for further details)

Table 1 Commercial use of NTFPs

Plant	Utilized	End product	Season	Trade	Prices to collector
Sugar palm	White grape	Canned dessert	Oct-Nov	Direct to factory	10 baht/kg
Rattan	2-3m strings	Furniture	All year	Middleman	60 baht/100strings
Don Por Sah	Bark	Paper for handy-craft	May-Oct	Middleman	13 baht/kg
Bamboo	Bamboo shoot	Canned food	May-Sep	Middleman	3 baht/kg

It is clear that NTFPs mean a lot in order to maintain livelihood in the village. The poorer people the more important, especially if people do not have land to cultivate or is not able to cultivate due to health problems in the family. The great variety used, also indicate NTFP contributing to variety in food sources.

Mostly the elder people collect medicinal herbs, younger people do not have the interest. Maybe local knowledge about forest uses may disappear, especially knowledge about medicinal herbs. This may be part of the general development in the area. The younger generation is getting used to use the healthcare center and easy access to medical care.

Forest management in the village

In Ban La Bao Ya a forest committee is part of forest management. It has 98 members from the village and it works together with neighboring villages. The task is once a year to maintain firebreaks and to weed along roads. The committee does not consider issues such as regulations regarding utilization of the forest. However the community has community regulations dealing partly with this issue. The regulations forbid any cutting of trees in community forest or in conservation zone. If people cut a tree they will be fined 5000 baht and turned over to the police. If a household needs timber for house construction they have to ask the headman or TAO for permission to cut a tree.

There is no formal community forest in the village according to RFD definitions. Under present legislation it is very difficult to get official recognition of a community forest in the conservation zone. However the villagers perceive the forest on the south side of the village as community forest, but there is no informal institution controlling access and utilization, except for the regulations regarding cutting trees.

Present forest management is weak but the use of the forest is very important for maintaining livelihood. It is not evident that forest is used for expansion of agricultural land. Even though the Headman recognize the importance of the conservation zone it is not clear whether he enforces the regulations. It is not clear whether present or past, informal or traditional management is sustainable.

5. CONCLUSION

When concluding we have to return to the main objective of this paper, that was: What are the main constraints for intensification of the land use and how does these constraints effect the livelihood of the hill-tribe village Ban La Bao Ya?

The main constraints identified during research are summarized as follows:

- Labour shortage because of migration
- Low nutrient level in the soils (NO_3 , NH_4 , P and K)
- Limited use of fertilizers and pesticides
- Lack or need of knowledge about better farming methods, no extension service available
- Lack of security of the land
- Subsistence agriculture, no extra money for external inputs.
- Limitation of land use because of c-zone restrictions
- More dependency on NTFP as an important food source

There is a limited use of inputs into the land-use systems leading to lower amount of nutrients in the soil. This gives the farmers lower harvests and subsequently lower income and greater dependence on NTFP's, which again means that there is no money for new inputs and for maintaining a living. This spiral leads further into poverty for the villagers which threatens their level of existence as many of them are already living at a subsistence-level. At this level NTFP are the most important products available to them, both for income and consumption.

Lack of necessary income opportunities have forced many household members to migrate, as this is the only way to provide money for living. This means that the remaining household members are left with a shortage of labour to cultivate the fields. All of this continues the downward spiral and limits the possibility of intensification.

There are at the present no intensive land-use going on in the village and most plots are cultivated extensively.

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Abstract

The following paper deals with intensification of land use in Khun Sumun watershed in The Nan Province in Thailand.

The main objectives for the research aims at identifying the main constraints for intensification of the land use and look at how these constraints affect the livelihood of the villagers in Ban La Bao Ya. In order to answer the overall objectives various sub-objectives both dealing with natural- and social perspectives have been investigated. This deal with the actual location of the village as it is located in a conservation zone and how this affects the livelihood of the villagers. Moreover household economy, forest management as well as present agricultural cultivation patterns are taken into account and investigated by using various methods. During research we found that some of the main constraints can be found in the lack of financial inputs followed by little input of fertilizers, which affect the amount of crops harvested. Moreover the villagers depend to a great extent on NTFPs mainly for consumption, which to some degree is a dilemma as the C-zone formally prohibits any activities in the forest surrounding the village. Due to limited agricultural activity and outputs, there seems to be few opportunities to make a living in Ban La Bao Ya and often members of the households are forced to migrate and earn a living in the cities. This way they can financial support their families living in village and it seems that this income source is decisive for their survival. Unfortunately this affects the agriculture, as lack of labour is a result of migration. The shortage of labour impinge on the intensification of the land use as many plots have been abandoned or are simple not cultivated as the households do not have enough available labour to work in the fields.