

**PROBABLE EFFECTS OF THE PROPOSED NONTHABURI NATIONAL PARK
ON THE LIVELIHOODS OF VILLAGERS IN BAN PANG POEI VILLAGE,
NAN PROVINCE - NORTHERN THAILAND**

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ABSTRACT

This report presents the findings of a study carried out in Ban Pang Poui village, Northern Thailand. The purpose of the study was to determine the probable effects of the proposed Nanthaburi national park on the villagers' livelihoods. The park will include land currently used by the villagers. Both social and natural science methods were used in this study. The major findings were that the final location of the border has not been determined yet. Apparently there is some kind of agreement between the government and the villagers to exclude their agricultural land. Most likely some land will be excluded and some not. Depending on where the border will be located, the villagers might lose access to fields, forest products and non-timber forest products. The major impact will be on the poor people, who derive their livelihood mainly from agriculture. The richer people have income from non-agriculture to a greater extent.

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1.0 INTRODUCTION

1.1 Background to the Study

In the last decades, Thailand has experienced a dramatic increase in population density. As agriculture is the major form of livelihood subsistence in Northern Thailand, the increasing population needs land for agriculture in order to subsist. This has led to deteriorating natural resources and environment (Reilly & McDonald 1983). An example is the encroachment on areas that were previously densely forested (Reilly & McDonald 1983). This put the government in a dilemma. The government desired to preserve the forests, but at the same time realised that a lot of conflicts are connected to removal of the livelihood for the subsistence farmers depending on these forests. The deforestation resulting from the encroachments led to establishment of Forest Reserves to pursue the government's goal of a forest area of 50%. The success of the reserves was very limited and the forested area continued to decline (Feder 1988).

Since mid 1970's, establishment of National parks and other protected areas has been recognised as the most efficient means of avoiding further deforestation; and thus has been the favoured strategy pursued by the government. Establishment of National Parks often led to restrictions on the use of the natural resources in the park area. This had implications for the people that depended on the area and, created a lot of conflicts with local people (Ghimire 1994). One of these national parks is the proposed Nanthaburi National park in Nan province of Northern Thailand.

The hill tribe people of Ban Pang Poui are involved in this conflict because they are living on forest frontiers in the hilly Northern Thailand. They traditionally did not stay in one place, but moved around doing slash and burn. As the population density became higher in the Southern lowland, people moved North deforesting for agricultural purpose and logging companies cut the valuable timbers in the forest. Since most other places have been deforested these Northern hills are the only place where forest is left to be preserved. Due to the fact that the villagers of Ban Poui are of Non-Thai origin they do not have land certificates and are therefore in a bad situation, when it comes to protecting their interests in conflict with the government (Ghimire 1994).

The overall research focus for our field study was to determine how the livelihood of villagers in Ban Pang Poei village will be affected by the proposed Nanthaburi national park.

1.2 Background to the Study Village

The field study was carried out in Ban Pang Poei village Moo 6 Tambon Sanian, Muaeng District, Nan Province in Northern Thailand. Ban Pang Poei village was formerly the land used by the Ban Song Kwae village. It included the white Hmong and black Hmong.

In 1982 the Sae Wang ancestry broke off from Song Kwae village in Petchaboon Province, moved and settled in the present Ban Pang Poei area, which was upgraded into village status following the local government act. The village currently is comprised of six main ancestries of Sae Her, Sae Wang, Sae Sow, Sae Yang, Sai Ae, and Sae Tao. In 1999 five households of Mien hill tribe origin moved to Ban Pang Poei village and bought some land from the Hmong. These Mien households then moved their census registration to Ban Pang Poei village in 2002. The population of the village at present is about 169 households (176 families) (key informant). The village is managed by the village committee headed by the headman.

2.0 PROBLEM EXPLORATION

2.1 Problem statement

The present tentative boundary of the proposed Nonthaburi national park includes part of the land used by villagers in Ban Pang Poei village. If this boundary is enforced, the villagers are going to face various problems. According to Khunarak et al (2003), it is expected that some of the villagers will loose access natural resources like land, water, and forest, which will have implications on the villager's livelihood sectors like household economics, production systems and social-political structures.

2.2 Problem formulation

“How is the villagers' livelihood being affected by the proposed Nonthaburi National Park?”.

To address this overall problem formulation, the hypothesis adopted for the research was that the nature of effects will depend on how much of the village's present livelihood strategies are dependent on the area gazetted for protection as a national park.

2.3 Research Objective

Our main objective was to assess the possible effects that the proposed national park will have on the following livelihood systems in the village: -

- Household economies.
- Social relations.
- Agricultural systems, and
- Access to natural resources.

2.4 Research Question

To achieve the above research objective, the research was guided by the quest to answer the (group) question: “what would be the effects of the proposed National Park on the Villagers’ livelihood strategies?” This research question was divided into the following two sub-questions. The first sub-question guided the research that was carried out using natural science methods, while the second guided the part of the research that applied social science methods: -

- What would be the effect of the proposed national park on accessibility to the soil/land, water, and forest resources in the village?
- What would be the effects of the proposed national park on the following aspects of the villagers livelihood: household economics, production system, and social-political structure?

After gathering preliminary data, specific questions were formulated to better address the major topics of the sub-research questions. The topics and their respective specific questions are as follows:

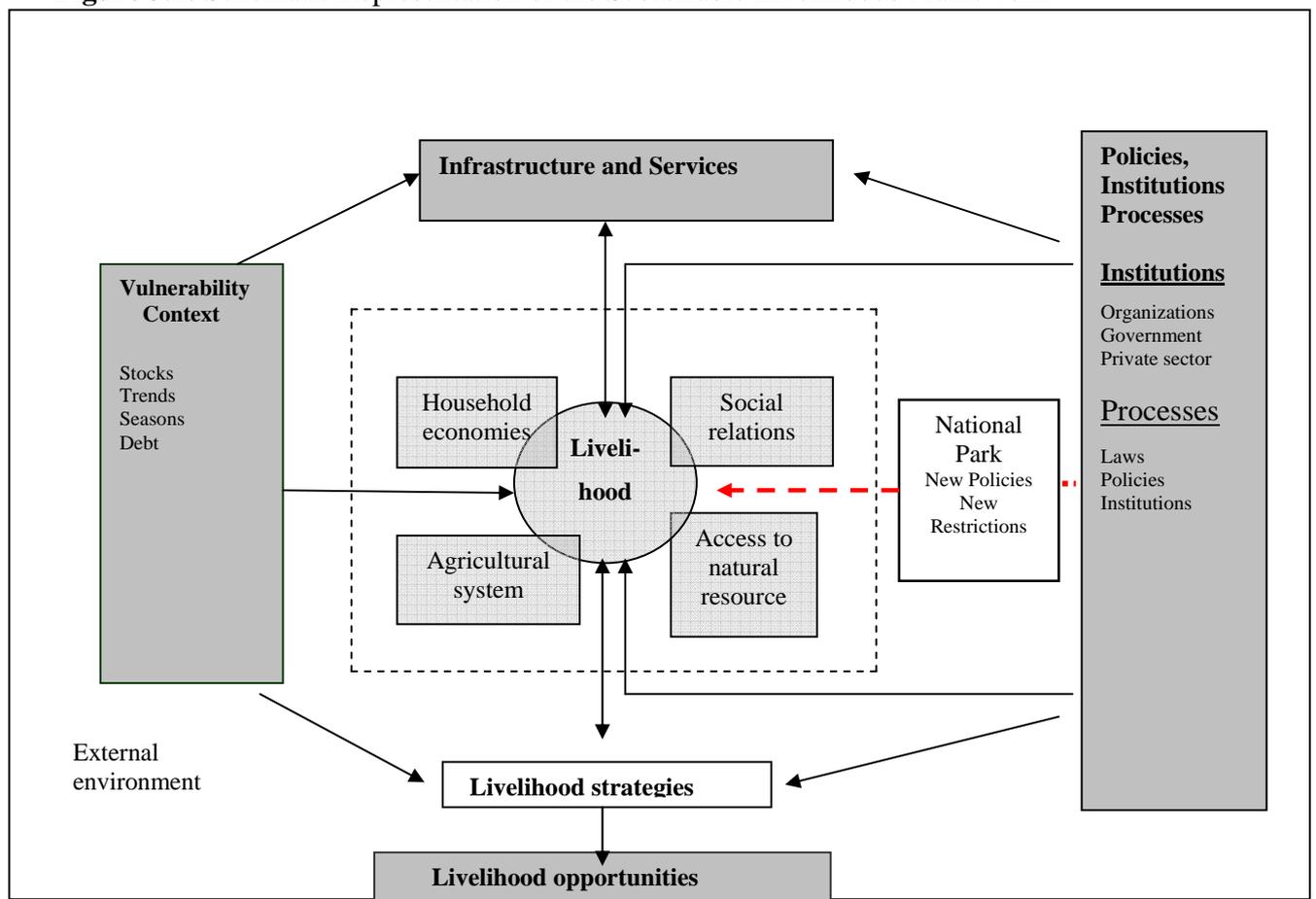
- **National Park:** What would be the actual losses?
What are the implications of these losses?
- **Social Structure:** How will losses affect different income groups within the village?
- **Land use:** How do land ownership policies affect investment in agriculture?
- **Production System:** How sustainable is the current agricultural system and what is the potential for intensification?
- **Water:** How will the national park affect opportunities for villages to improve their water supply?
- **Forest:** How do community forest regulations affect forest use and management done by local people?
- **Political Structure:** Are the local people empowered to affect the national park plans?

3.0 RESEARCH DESIGN

3.1 Sustainable Livelihoods Framework

The sustainable Livelihoods Framework was used to structure data collection and analysis. The Framework was used to identify the key elements, factors and relationships within the village that will be affected by the proposed national park. The data was collected and analyzed in terms of four **livelihood assets**, namely: household economics, social relations, agricultural system, and access to natural resources. The interrelationship between these assets, the external environment, policies, infrastructure and services, and their impact on the villagers' existing livelihood strategies as a result of the national park, were captured as shown below (figure 3.1)

Figure 3.1: Schematic Representation of the Sustainable Livelihoods Framework



(Based on Rakody, 2000, but modified for the purpose of this study)

3.2 Livelihood Assets

The villagers' livelihood assets that were examined are: -

- Social relations. Inter- and intra- family power structures were assessed. The households were categorized into rich, middle and poor, and the citizenship status was studied. Focus was also put on the distribution of fields to determine who will be affected by the proposed national park; the relations within the village and to the outside world; the social resources (networks, memberships of a group, access to wider institutions of society) such as clans and kin groups on which people draw in case of crisis, and work separation.
- Household economics. Economic income available to the household, both from agricultural and non-agricultural activities. It encompassed the financial resources available to the villagers (savings, credits, remittances, pensions and subsidies), and also considered their expenditure (farming costs, clothes, food, medicine, transportation and possibly schooling, pay off of debt and interest).
- Agricultural system. Included an analysis of the agricultural practices, knowledge available, land use, field quality and farming inputs, (Rakodi, 2002).
- Access to natural resources. Access to assets such as land, water and forest with in the village was investigated.

3.3 Policies, Institutions and Processes

Focus was on the influence of national park implementation policy. Other policies related to this like land titling was studied.

3.4 External and Other Factors

External factors looked into included:

- Infrastructure and services: This included access to the markets (e.g. roads) knowledge (e.g. schools), credit, electricity, schools and other services in the within or outside the village.
- Vulnerability: Due to the long term nature of these aspects they were not looked into, except for debt and employment opportunities.
- Livelihood opportunities: Faced with the proposed national park, other opportunities available to the villagers for continued support of their livelihood were assessed, especially possibility for agricultural intensification, livelihood diversification, and migration.

4.0 METHODOLOGY

4.1 Methodology Approach

The research was carried out in an inter-disciplinary way. The group members worked in close cooperation and shared the research framework so as to create a common perception of and formulation of a strategy for addressing the identified problems. The Sustainable Livelihoods Framework was used to structure the research process in a way that gave a holistic and integrated view of the possible effects the proposed national park will have on the study village.

4.2 Methods

Both social science and natural science methods were carried in this study.

4.2.1 Social Science method

This section presents the social scientific methods used in the study.

4.2.1.1 Village meeting

A village meeting was carried out after we met the Assistant Headman. The meeting was for presenting ourselves to the villagers, for them to get an understanding about what we would do in the village; achieve the permission to walk in the fields; prepare the Participatory Rural Appraisal (PRA) meetings, questionnaire and interview.

4.2.1.2 Observation

In order to determine the extent of the agricultural land and get location of this according to the proposed national park border, village walk with local guides was conducted. During the walk, observations about landscape, agriculture and forest were made and questions for using in the following data gathering was generated.

4.2.1.3 PRA Meeting

PRA was carried out to gain first hand information on the livelihood and natural resources of the village; to identify important issues that were the focus of questionnaires and interviews; to create knowledge and awareness about the study in the village; to allow the villagers to participate in the process as much as they could in order for us to be

able to identify villagers that were used as key informants. The reason for using PRA was for simple visualisation: it revealed and clarified complex relationships faster than any other method; it stimulated interesting discussion that could be recorded; it opened up for very active participation; and it made sharing data with respondent easier (Guijit, 2001, p.1)

4.2.1.4 Questionnaires

At the PRA meeting the villagers picked 10% of total households (18 out 180 households) as questionnaire respondents. This included six poor households, six middle households and six rich households. An extra poor household was added in order to give a broader picture of the poor household. This was because the villagers mentioned that differences between middle and rich would not be remarkable.

The questionnaires were used for collecting general knowledge about the villagers' livelihood. The questions formulated were based on the information from data collected in the observation walk and the PRA meeting. The questionnaires were full to semi-structured in design, so as to guide the general and/or in-depth interviews with the appropriate respondents. Semi-structuring the questionnaire was to allow the informants to give answers, which we did not anticipate. The questions asked required a yes, no or multiple chosen answers; which was made in order to make the analysis easier. Responses to questions on sensitive issues like income, expenditure were given on a "low-middle-higher" scale. The exact questions asked can be seen in appendix I.

4.2.1.5 Interviews

The interviews were used to get in-depth information from half of the households used as respondents for the questionnaires. They included three poor, three middle and three rich households. The type of interview performed was semi-structured open ended, with an interview guide containing the specific questions to be asked, that were made from the results of the questionnaires. This type of interview was chosen because it allows for comparison between different villagers, and was less time consuming than less open interview forms.

4.2.1.6 External Key Informant Interviews

There were three joint interviews. The Chief of the Watershed unit was interviewed at the headquarters of the Watershed unit. The TAO and the National Park Authorities were interviewed at the base camp (Appendix G).

4.2.1.7 Feedback Meeting

This was carried out in order to share the research findings with the villagers and to get their feedback suggestions and comments. The findings of the soil, water and forest studies, questionnaire and interviews analyses were presented including the problems identified and how they were ranked by the interviewed villagers.

4.2.2 Natural Science Methods

The natural science methods used in the study are presented in this section.

4.2.2.1 Geographical Information System (GIS) and Geographic Positioning System (GPS)

The border of the agricultural land was registered by using a GPS¹. GIS visualised the geographical data collected by the GPS and thereby illustrated the boundary of the village, the location of the forest, fields and watershed. The information recorded where samples were taken from and was an important factor for later data collecting and analysing.

4.2.2.2 Soil sampling and analysis

Soil analysis was carried out to gain the general knowledge about the soil quality of the village. The analysis studied the agriculture input, especially the fertilizer input of the villagers, the upland cultivation system and soil erosion. The sampling strategy was based on the information collected from the questionnaire. It involved picking one household from each income group and taking soil samples from their different fields (Appendix B).

¹ Accuracy with selective availability varies between 15-100 m horizontal and 100-156 m vertical (altitude) (Letham, Lawrence, 1998).

4.2.2.3 Water sampling

Water sampling was done in order to gain general knowledge about the water quantity and quality in the village. The samples were taken from three main streams in the village, (Appendix B).

4.2.2.4 Forestry

The focus was on forest use, forest conditions and forest access. To obtain the relevant information:

- Visual observations were carried out in the community forest in order to compile a forest inventory.
- In the inventory, the forest types, species composition, and forest conditions were observed. The inventory area was located on the top part of the slope, chosen to be representative for the less disturbed upper part of the forest (Appendix B).
- A forest transect was made to examine changes in species and other forest attributes with slope and altitude. The transect was carried out from the bottom to the top of the community forest (Appendix B).

4.3 Critic of the Methodology Used

Major limitations on our data collection are that time spent in the field was very limited. This has several implications most of them can be put in the following categories representativity, reliability and the role of the fieldworkers. Some aspects are related to lack of time, others to inexperienced field workers and some aspects of insecurity will always be there.

4.3.1 Representativity

The sample strategy used where sample villagers were picked out by other villagers, may have resulted in that we only got in contact with the elite in the village, since the villagers will only pick out people that they consider as a part of the village. What should have been done was a stratified random sample or a systematic random sample.

The sample sizes in forest, soil and water samples were too small to be representative for the general conditions of these natural resources.

The community visited was very male dominated, and we hardly only spoke with men and there fore have a gender bias in our data.

4.3.2 Reliability

During our data collecting the fieldworkers were very dependent on things that we were told we did not have the time to double check information. This can have an effect in two ways we might have been misled both unintentionally and intentionally. First of all it can be hard for people to remember details about there daily life and to quantify subsistence goods. Further more the ranking of income and expenses in categories of high, middle and low can be problematic in that the villagers might have different perceptions of what is high, middle and low. What poor people consider high might be middle for a rich household.

We might have been misled intentionally, it could be due to lack of trust or respondents having a hidden agenda. Especially, the external key informants being representatives of government bodies, there responses could have been subjective: reflecting the official position not reality. Furthermore due to the language barrier details probably got lost in translation.

Further soil and water test could have been carried out, but the equipment for doing this was not available in the field. Some relevant water attributes like fertiliser and pesticide contamination in the river could not be determined due to the dry season.

4.3.3 Role of the fieldworkers

The way that we behaved and the way questions were asked might also have influenced the outcomes. Especially it was noted at the PRA, where the outset was to do a PRA, but

the actual character ended up being RRA, due to time limitation the actual character of the meeting was more like a RRA. The approach ended up being a top down discussion lead by the field workers.

5.0 RESULTS AND ANALYSIS

This chapter begins by presenting the results of the field study by using the Sustainable Livelihoods Framework structure, and concludes with an interdisciplinary analysis of the different part analyses of each discipline. Mentioned firstly are the problems in the village stated by the villagers.

5.1 Problem ranking

The following problems were identified and listed by participants at the PRA. The problems were then ranked from the most important to the least², as shown in table 5.1.

² . The ranking procedure was as follows: each of the participants ticked off three problems (of all mentioned) as those he felt were the most important. Then the ticks were counted for each problem.

5.1.1 Result from Problem ranking

Table 5.1: Problem ranking

Problem Mentioned	Reason Mentioned	Tally	Rank
Education	<ul style="list-style-type: none"> The only school in the village provides schooling up to the ninth grade. Due to limited economic means their parents cannot afford to send them for education outside the village. 	//// //	10
Unemployment.	<ul style="list-style-type: none"> No employment opportunities outside agriculture in the village. Movement restricted due to lack of Thai citizenship. 	//// //	7
Land certification.	<ul style="list-style-type: none"> Most of the villagers are not officially entitled to the land they cultivate. Temporary land certificates have been cancelled because of the proposed National Park. This has the following implications: <ul style="list-style-type: none"> Limits long term planning. Limits transfer of land (occurs mostly through inheritance). Makes it hard for newcomers to get land. 	//// /	6
Insufficient resources	<ul style="list-style-type: none"> Increasing population density. Not enough water for agricultural purposes. Poor soil quality. No opportunity for expansion of agricultural land. 	////	5
Health:	<ul style="list-style-type: none"> Lack of knowledge of how to address health problems. Lack of nearby health facilities. Monthly visits by doctor do not cover all village health problems that need medical attention. 	//	2
Food scarcity:	<ul style="list-style-type: none"> Maize and rice are not enough to meet food needs for some families. The availability of NTFPs is seasonal. 	//	2
Transportation.	<ul style="list-style-type: none"> Some fields are far away from village and/or located on steep hill slopes, Implications: <ul style="list-style-type: none"> -Long transportation time. -Transportation of agricultural inputs and crops 	/	1

	<p>are difficult. -Some farmers build temporary shelters in the fields, to stay over night.</p>		
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5.1.2 Analysis of Problem Ranking

Major surprise in the problem ranking was that the villagers did not mention the national park as one of their problems. This can have many causes: It could have been a sensitive issue that they did not want to mention, it could be that they simply ignored the problem because that they are not able to do anything about it. More likely it could also be that they do not separate the park from the general land tenure issues since they are already in a forest reserve.

Many of the other problems mentioned indicate that there are too many people living on too little amount of land and it is furthermore indicated that these people are in agriculture because they do not have another choice.

5.2 Social Relations

This chapter focuses on the household structure. It looks into factors, such as the amount of members, their age, education and occupation, which provided the basis for the analysis of the differences in each household group.

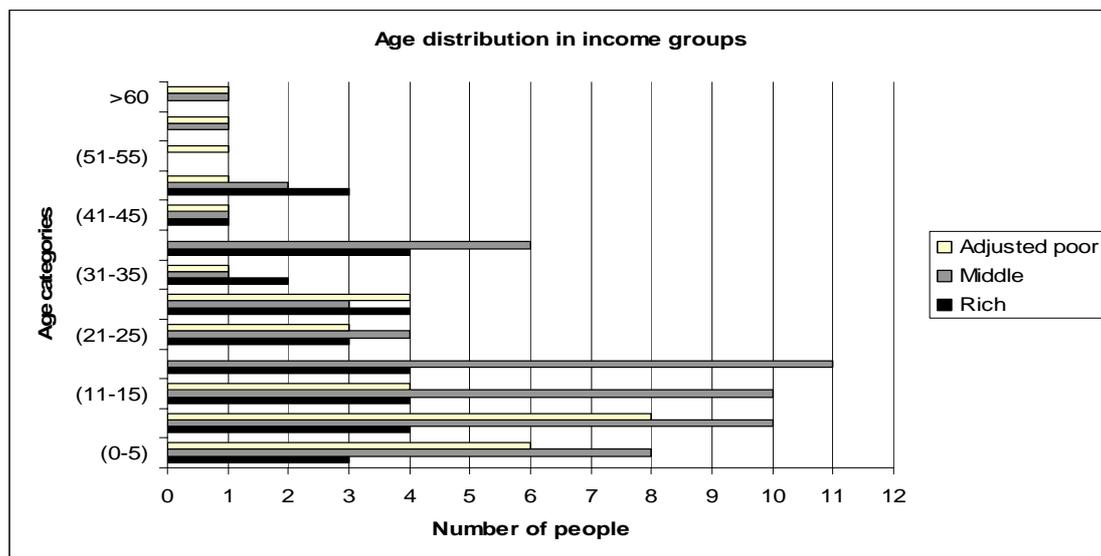
5.2.1 Household Information

This section presents findings on household aspects of the villagers.

5.2.1.1 Age Distribution

Figure 5.1 shows the age distribution across the different income groups. The number of the rich, poor and middle income group members is 31, 32 and 58, respectively. The average age is lower in poor households, with regard to both parents and children, where children from 6-10 are represented by most, followed by 0-5 years. In the middle households the group between 16-20 years is having the highest representation, followed by the groups 6-10 and 11-15. The rich households are having a more even age distribution. The amount of children is higher in the poor and middle households.

Figure 5.1 Age distribution in village sample

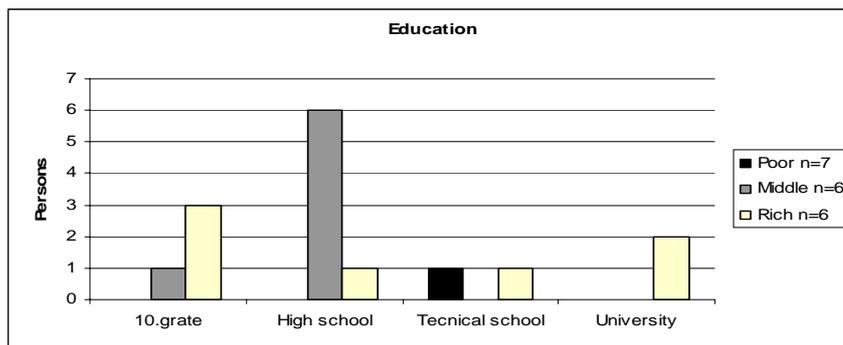


The total score of poor household group was adjusted by a factor of 6/7 to adjust for having 7 households in this group. (Source: data from questionnaires)

5.2.1.2 Education

Figure 5.2 shows level of education attainment by the respondents in the different income group. The village school provides education till ninth grade free of charge. One respondent in the poor income group had reached technical school; while seven in both the middle and rich group had reached tenth grade or above.

Figure 5.2 Education higher than ninth grade

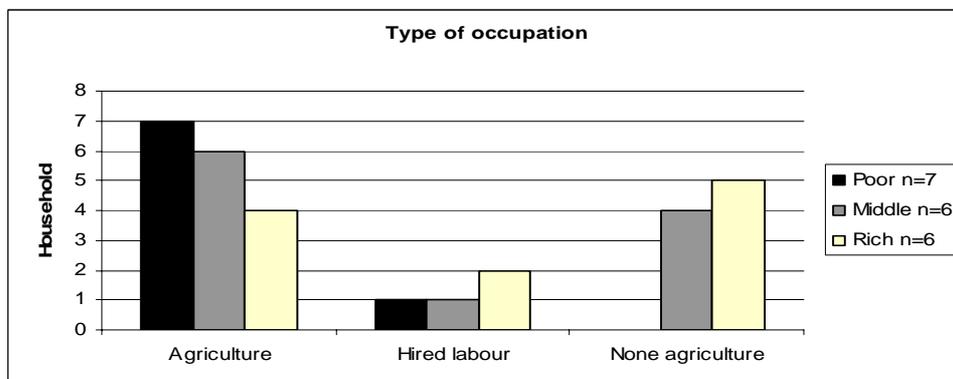


(Source: data from questionnaires)

5.2.1.3 Occupation

All seven poor households practice agriculture and only one of these provides hired farm-labour, (figure 5.3). All six middle practice agriculture. One of these provides hired labour, while four practice non-agricultural activities. Five of the rich households practice non-agricultural activities, three of which also practice agriculture. Only one practices solely agriculture. Only two households of the rich six provide hired labour as well.

Figure 5.3 Different Types of Occupation



5.2.2 Wealth ranking

A key informant assisted in categorizing the households into three levels of income: poor, middle and rich. The criteria for ranking wealth were: -

- **Working abroad (migrant work):** Two people in the village were reported to be working in Taiwan, sending about 10,000 to 15,000 Baht monthly back to their families.
- **Agriculture:** The villagers who cultivate large or many fields, especially those who have linchee fields, were found to fall in the rich category.
- **Ownership of family shop:** There are four shops in the village and owners were found to fall either in the high or middle income categories (PRA).

The low-income households were regarded as those with no or less land, big outstanding debts and are often unemployed (interviews).

5.2.3 Part Analysis on Household Information

The poor and rich have fewer people in the households because in two middle households there are two wives, (figure 5.1), which could be due to the general perception that more children give more labour and wealth. The middle households are having high labour requirements in agricultural production and at the same time they have the means to support the many mouths. It can be that the rich people have gone through the same development, but as they left the agriculture as their main source of income they did not need the high amount of labour. The higher educational level in the rich households can affect this matter in two ways (figure 5.2). They might have a higher awareness about contraceptives and they might also not share the perception that more children leads to higher wealth. There might also be a cultural difference in that 3 of the rich households were Mien and not Hmong.

The traditional behaviour of the Hmong people might be hard to change. The Hmong people being male dominated can affect the amount of births since they continue to get children until they get a boy, and they believe the more boys you get the richer you will become (interview with Hmong girl from USA). A visiting nurse also told us that their

birth control campaigns had limited success caused by their reputation of reducing the women ability to work hard. According to this it could be expected that the poor people were having the most children. It turned out not to be the case, probable causes are that they cannot afford feeding many children and they might also have a higher mortality.

The findings from interviews and questionnaires correspond with wealth ranking finding that rich people depend less on agriculture and more on non-agricultural work (figure 5.3 and section 5.2.2) (migrant work and shop keeping – Three rich and one middle household had shops).

5.3 Household Economics

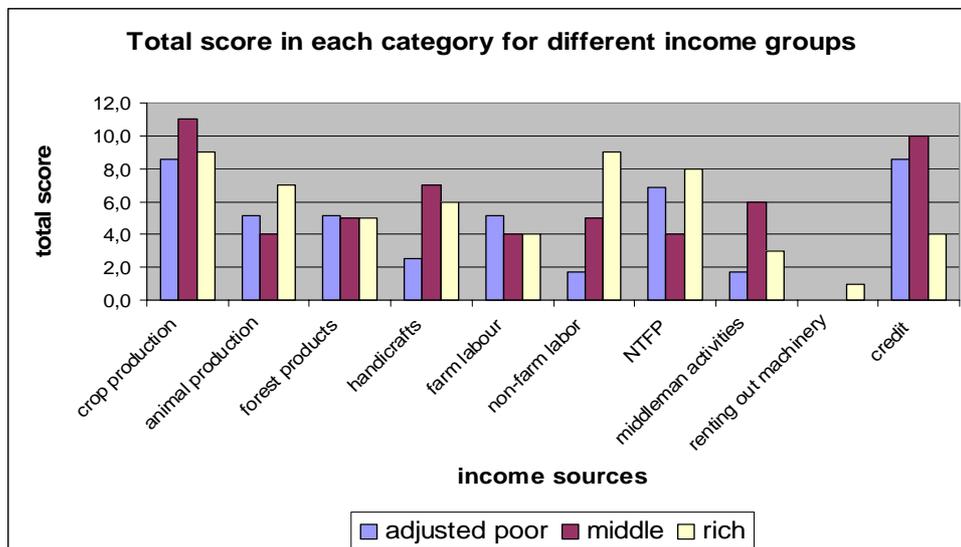
In this chapter the economic income available to the households, both from agricultural and non-agricultural, consumption and cash activities are presented. It shows the financial resources available to the villagers, and also considered their expenditure.

Although the different sources of income and expenditure could be estimated in terms on money, this was not done because of the sensitivity of the questions. Instead, income and expenditure were measured in terms of how important (or big) the people felt these resources are relative to their other household economic contributions. The range of “Low-medium-high” was used to reflect the level of respondents’ perception of the source’s importance to them. The same procedure was used to estimate the importance of loans/credit (Appendix A).

5.3.1 Income

The three highest scoring income sources for the seven poor households were crop production, NTFP’s, and credit (figure 5.4). For the six middle households they were crop production, handicraft and credit. For the six rich households they were crop production, non-farm labour and NTFP’s.

Figure 5.4 Importance of Different income Sources



Comparison among income classes; the total score in each category was calculated as follows: none = 0, low = 1, medium =2 and high =3. The total scores were made from adding the scores times the number of households. This was done for every income source in each income group. The total score of poor household group was adjusted by a factor of 6/7 to adjust for having 7 households in this group. Forest products include fire wood, timber and bamboo; NTFP include all other products.

The middle group has the highest income from crop production (rice, maize, ginger) compared to the other groups. This might be because there are two households in the rich group that do not have any income from crop production. The rich group had the highest animal production, probably because they could afford the high investment involved; all the three groups scored almost the same on income from forest products (fire wood, timber and bamboo). The middle and rich group scored higher in handicrafts, which could be caused by the higher surplus labour in these income groups. Generally, the level of income from farm labour is low, because most of the households are subsistence level of farming, no nearby industrial farm requiring labour. The level of farming labour is a bit higher for the poor group, which can be due lack of enough land to support their families so they have to get income from elsewhere. The level of non-farm labour is very high for rich income groups compared to the other groups; it is very low in the poor group. At the PRA it was reported that 20% of the villagers were reported to provide migrant labour, but in our sample it was about 50%. This contradiction could be due to

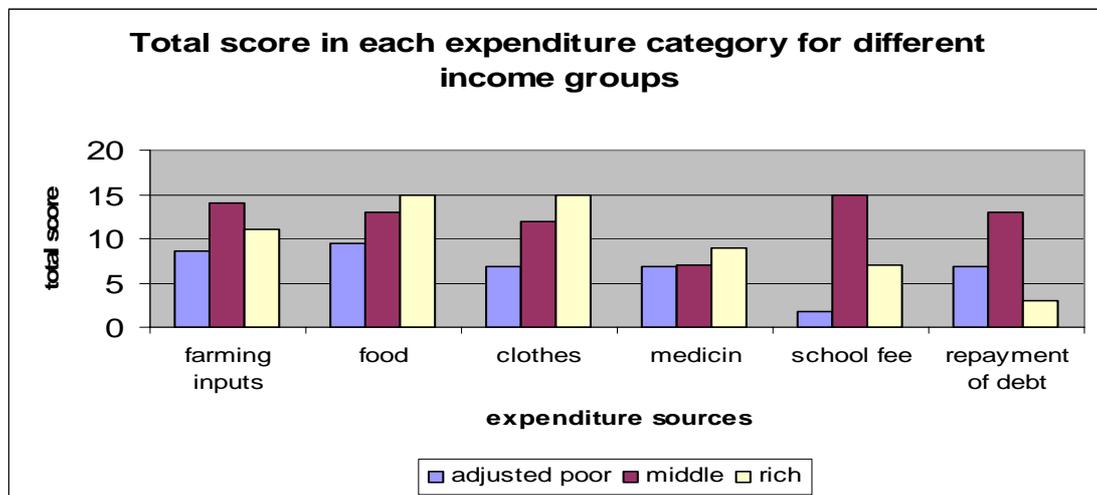
biased sampling; because all the respondents were selected by a key informant. Hence may not have been representative.

The score of NTFP is the lowest in the middle income group, which implied that the poor people depend heavily on NTFP's. The middle income group have a high agricultural production, so they do not depend on NTFP so much. The rich people have sufficient amount of surplus labour, which corresponds with one rich household mentioning as the only one that they were selling NTFP's. The middle income groups carry out most middleman activities. This could be because they have the biggest agricultural production and highest amount of capital as well. Only one person rented out machinery. The levels of credit are high, especially in the low and middle groups,

5.3.2 Expenditures

Figure 5.5 shows the different sources of expenditure of the people. It shows that distribution of expenditure corresponds with the distribution of income sources.

Figure 5.5 Importance of Different expenditure Sources



Comparison among income classes; The total score in each category was calculating from ranking: none = 0, low = 1, medium =2 and high =3. The total scores were made from adding the scores times the number of households having each score. This was done for every expenditure source in each income group. The total score of poor household group was multiplied by a factor of 6/7 to adjust for having 7 households in this group.

The middle households have high farming inputs because they depend more on agriculture and have the capital, (have highest credit). The expenditure of the rich

households on food is the highest, probably because they practice less agricultural practices. The rich also spent the most on clothes and medicine. The level of expenditure on school fees is highest in the middle income group because they have the highest number of kids. There are 32 kids in age 5-20 in the middle group compared to 14 and 9 in the poor and rich, respectively.

The middle income group also has the highest expenditure on debt repayment, which corresponds to the higher credits they took. The poor have low levels of expenditures on food because they mostly rely on self-sufficiency. The ritual ceremonies will also cost the villagers small amount of money, but not so much. (Appendix A)

5.3.3 Loans

There are different sources of loan and funding schemes available to the villagers (Appendix C).

All the villagers have the equal chance to apply for the loans, if the following criteria are met:

- Presence of two guarantees.
- Suitable collateral for instance standing crop in the field. However, rice in the field is not considered because of its low economic value.
- Submission of a formal application for the loans or grants.
- If the debt is not repaid in time you will get a fine.

5.3.4 Household Economics Analysis

The poor people depend more on subsistence agriculture as their major income. They have low levels of both income and expenditure. They do not spend much on agricultural inputs and other commodities. The rich groups depend more on non-farm labour, but to the extent where they depend on agriculture it is with high level of investment. The middle income group is somewhere in between, they have the highest level of agricultural production with high inputs financed to a large extent through credit. The access to credit

depends on the ability to provide some kind of guarantee. This explains why poor people do not have as much access to credit as middle and rich.

It can be very hard to evaluate the value of subsistence products. It can also be due to a psychological effect that expenses especially repayment of debt is stress factor and people tend to give it more weight.

5.4 The Agricultural System

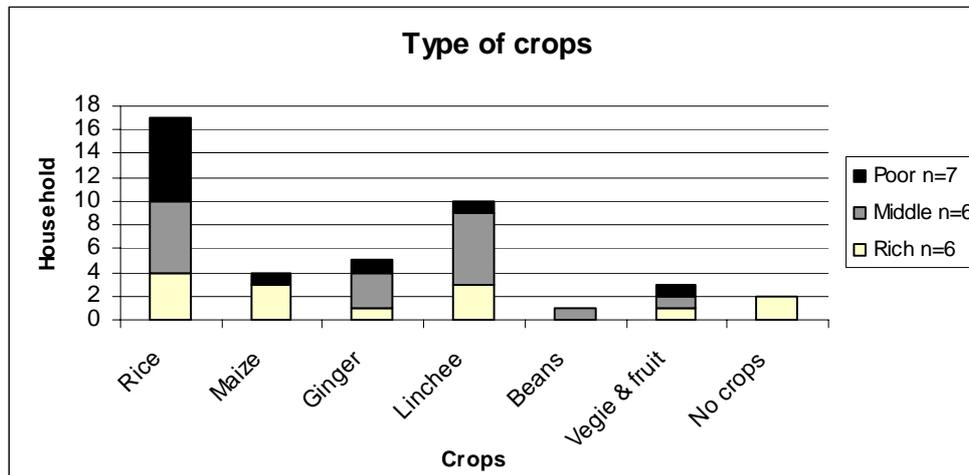
This section presents an analysis of the agricultural practices, crops grown, field quality and farming inputs in the agricultural labour.

The main crops in the village are rice, grown mainly for own consumption, maize for animal feeding, ginger mainly for selling (Appendix F). The rotation system most prevalent in the village is that between rice and bamboo. Fertilisers are normally used in ginger fields; and in rice and maize fields if the quality of soils is poor. The number of the fields per family ranged from one to five plots; with an average of three plots/family. Animals reared in the village included cattle, buffalos, pigs and chicken. Five household have a total of 57 heads of cattle; one household has four heads of buffalo; fifty household have pigs; and almost all the household have chickens. The main problems to livestock production were frequent diseases incidences and the smaller size of animal. Linchee and ginger were the most common cash crops grown in the village; as shown in the crop calendar in Appendix F, which also gives details about other crops grown in the village.

All the agricultural fields in the village were located on upland hill slopes. Rice was the staple (and for some, the only) food for most of the poor house households, although some of them grow a few other crops. Figure 5.6 below shows how different crops are grown in the village by the three income groups. In the middle and rich households linchee and rice were the main crops; grown by all the households. They also grow a high amount of ginger (3 households) as a cash crop. Beans, vegetables and fruit are grown,

but in a smaller amount and mainly for own consumption. Two of the rich households did not practice agriculture at all.

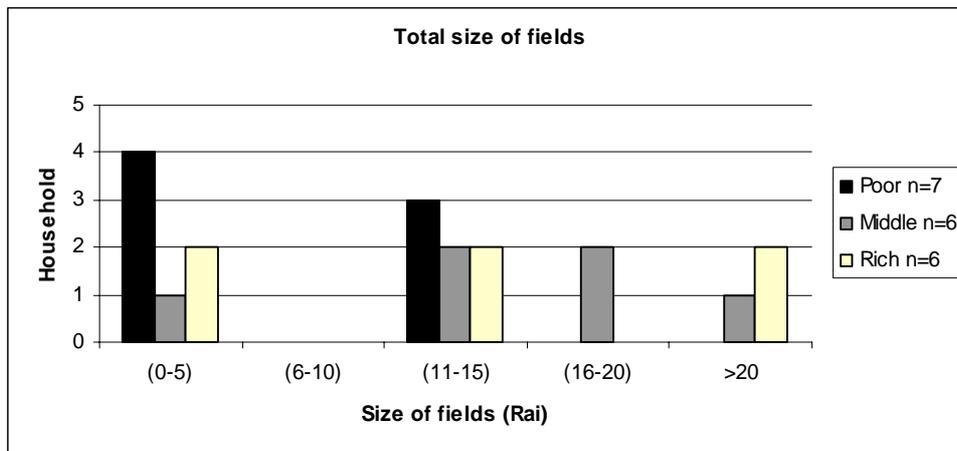
Figure 5.6 Different types of crops grown



(Source: data from questionnaires)

The poor households were generally having fewer agricultural fields than the middle and rich. The size of the fields varied a lot in all the groups, but according to the total amount of all the fields the middle and rich households had a larger amount than the poor (figure 5.7). Four out of 7 poor households have between one to five Rai and the last 3 had 11-15 Rai, (1Ha = 6.25 Rai). The middle households had larger amounts of fields than the poor; only one household of these had 0-5 Rai. Two households had 11-15 Rai; two others had 16-20 Rai and the last household had more than 20 Rai. The rich households also had a larger amount of fields. Two households did not have any fields; two had 11-15 Rai, while the last two had more than 20 Rai.

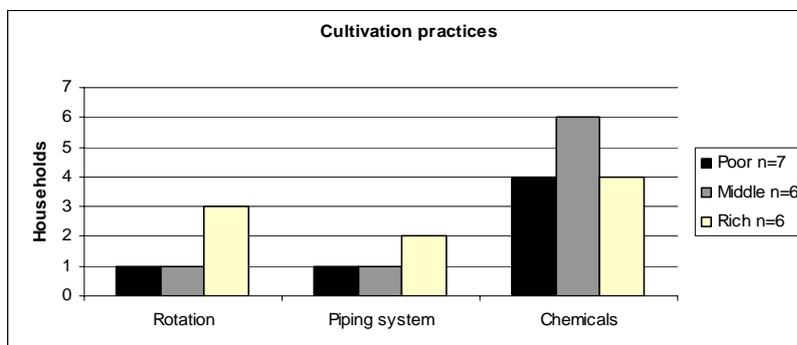
Figure 5.7 Size of Village Fields



(Source: data from questionnaires)

Cropping rotation system indicated in Figure 5.8 below was the rotation mainly between bamboo and rice. The rice fields are left to fallow when they are degraded. The system was mainly carried out mostly by the rich households. In the poor and middle households only one household is practising rotation system. The piping system refers to the pipe water system in the village. About half of the rich households reported to be using piped water in their fields. In the poor and middle only one household have piping systems. Use of agricultural chemicals was mostly by the rich and middle household for all their fields; of the poor households, only four out seven use chemicals.

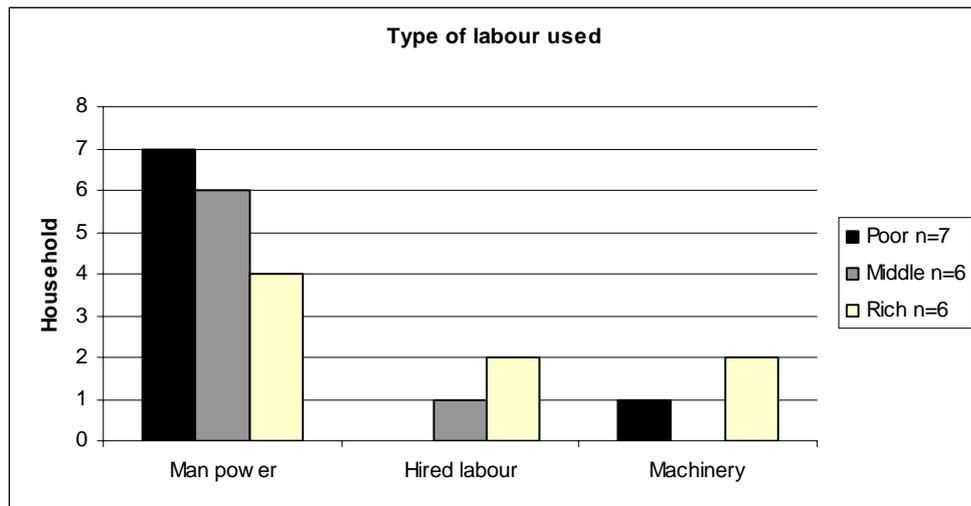
Figure 5.8 Cultivation Practices



(Source: data collected from questionnaires)

Figure 5.9 indicates that manpower was the major source of labour for agriculture, while machinery was used by only two rich 2 households. A grass cutter was the only machinery found to be in use by one member of the poor households.

Figure 5.9 Type of Labour



5.4.1 Problems Relating to Agriculture

Major agricultural problems experienced were: the decrease in yields because of soil degradation and changes in rainfall, fluctuating market prices of crops and inputs. Soil analysis revealed that the texture of the soils sampled was either silty clay or clay; indicating low quality. The Nitrogen Phosphorus Potassium (NPK) level was generally low except in some linchee and rice fields. Comparing the different parts of slope revealed that the cultivated layer of the upper land was thinner than the middle and bottom part, (appendix B).

5.4.2 Part analysis of the Agricultural System

Compared to the poor households, the middle groups have more capital, more labour and better land. This was because most of the middle group came to the village earlier than the poor; thus occupied more and better land, (interview data). Renting out machinery is insignificant because the main source of labour is manpower. Generally, the levels of credit are high, especially in the low and medium groups. Firstly, this could be because

the rich people do not need credit. Secondly, it is mainly sought for buying agricultural inputs, which the poor and middle income households are more heavily depending on.

Pigs and chickens are kept more or less by all the households. They are not only an important source of protein, but also used for by sacrifices in rituals relating to marriage, death and New Year, as well as in healing ceremonies.

Field observations concur with the data collected by questionnaire and PRA that all the three different households grow rice, the staple crop, and for some poor households, the only crop. Linchee and rice are grown by the middle and the rich households. Most of the poor households do not have supply of piped water in their homesteads or fields. However two middle income households reported use of piped water in their low land rice fields. The rich family uses the system in their vegetable yard. The agricultural fields generally lack adequate water, especially upland areas. The maize production is very small. Most maize fields observed has dry standing crop, due to lack of water. A few maize stalks belonging to some rich households were observed scattered along some banks of village streams.

The soil analysis results confirmed the information obtained from the PRA (problem ranking): that the soil quality in the village is generally poor (The judgement of nutrient level was made from a scale in the soil test kit). The possible reason could be the low use of fertilisers by the majority of the farmer. Fertilisers were reported to be used only by rich households. This fact was evidenced by rich households having higher ammonium cation (NH_4) level in their linchee fields; higher Nitrogen (N) and Phosphorus (P) level in their upland rice field; and very high phosphorus levels in their vegetable gardens. Soil analysis also showed that high incidences of soil erosion occurred on hill slopes. Through erosion, debris from fields is washed into streams and other low lying water sources, thus leading to their contamination.

5.5 Access to Natural Resources

This section presents the analysis of information obtained on access to land, water and forests; the major natural resource assets of the village.

5.5.1 Forest

5.5.1.1 Forests used

There are three different kinds of forest in the village: Ritual Forest, Conservation Forest and community forest.

The ritual forest measures between seven to ten Rai. It is mainly used for ritual ceremonies by the Hmong tribe. It was established at the same time as the village, and the biggest tree in forest was chosen as the village's idol. There is a forest ceremony held every year in January by the oldest spiritual leader to worship the tree. This is carried out by feeding the spirits or ancestors of the village who are believed to live in the tree, (interview). People are not allowed to cut trees or collect anything from this forest.

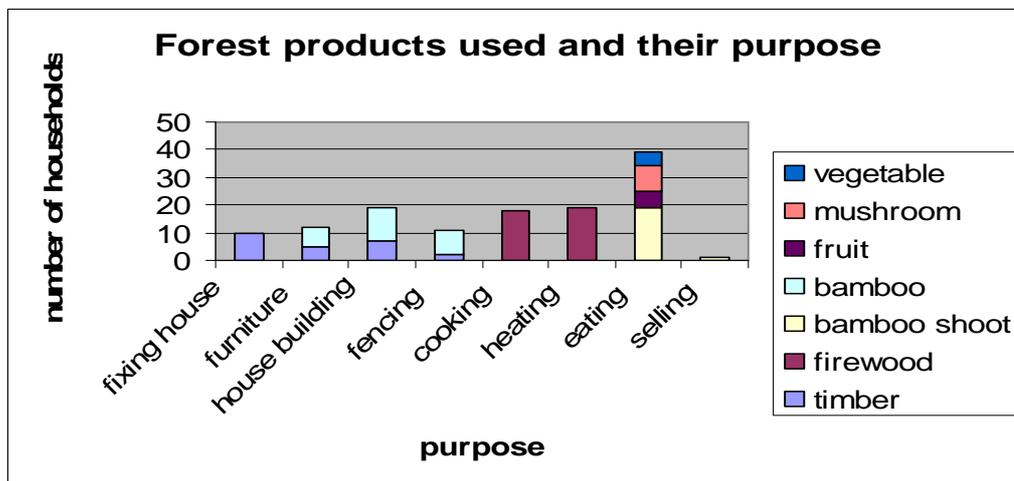
In the conservation forest the forest regulation was settled by the leaders of Sanian sub-district and Ban Luang sub-district eighteen to nineteen years ago, (key informant). In the conservation forest, the villagers are no longer allowed to cut trees. They can cultivate in the area but cannot expand the farm land; otherwise get fined 4,000 Bath.

In the community forest, bamboo and non-timber forest products (NTFP) can be cut freely, but only for own consumption. Permission is required from the village committee in order to cut trees (key informant interview).

5.5.1.2 Use of forest products

The villagers depend a lot on forest products such as timber, firewood, bamboo and NTFP's, all for own consumption, except for one rich household where selling of NTFP's was mentioned. Timber is mainly used for house construction and fixing; bamboo for house building, fencing and furniture (figure 5.10).

Figure 5.10: Forest Products used by Villagers

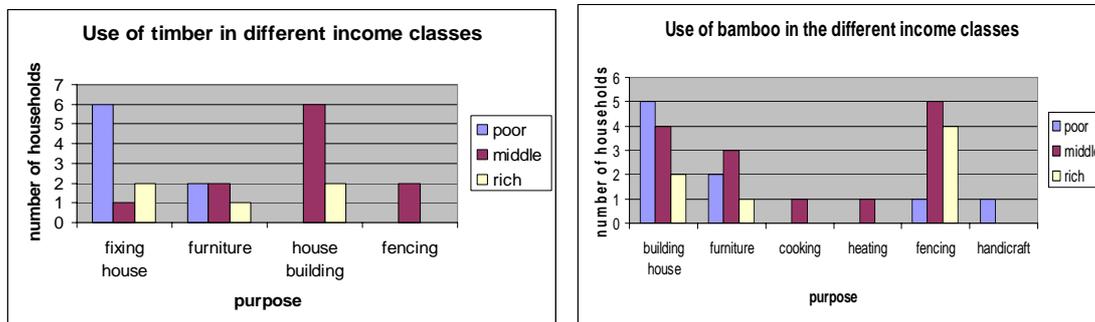


(Source: data collected from questionnaires)

There are differences in how the three income groups use the forest products. All households construct their houses from wood. However, use of timber was noted most in the rich houses as walls. The walls in the poor household are mostly made of bamboo.

The results in figure 5.11 do not correspond to these observations, probable due to a misunderstanding of the question by respondents. People not currently building houses/fences would answer “no” when asked whether they use any product in these categories. For furniture the poor people used timber whereas middle and rich to a large extent used plastic chairs (observation).

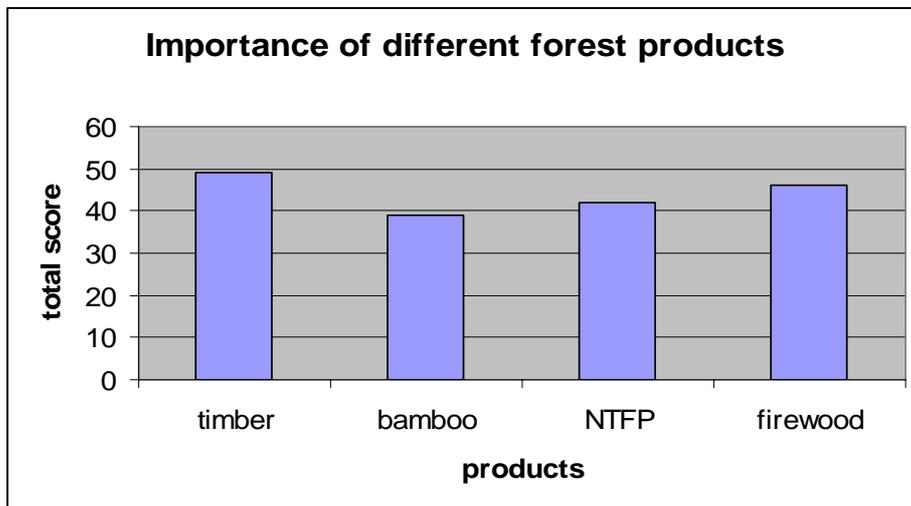
Figure 5.11 Use of timber and bamboo in different income groups



(Source: data collected from questionnaires)

Figure 5.12 shows the importance of different types of forest products to the villagers. A surprising result was that bamboo and NTFP are less important than timber and firewood; yet the house construction of the poor households is mostly by bamboo (figure 5.11). This contradiction could have been due ambiguity in the question design that let the respondents to score the question as they did. It is more likely that they scored in terms of quality (i.e. how scarce and difficult the resource is to get hold of) than quantity (i.e. how much of the product they used). Otherwise bamboo was the most abundant and most used product; but it was still ranked lower than the other products. Firewood is mainly gotten from the community forest (questionnaire data), logging sites and agricultural fields, (in-depth interview).

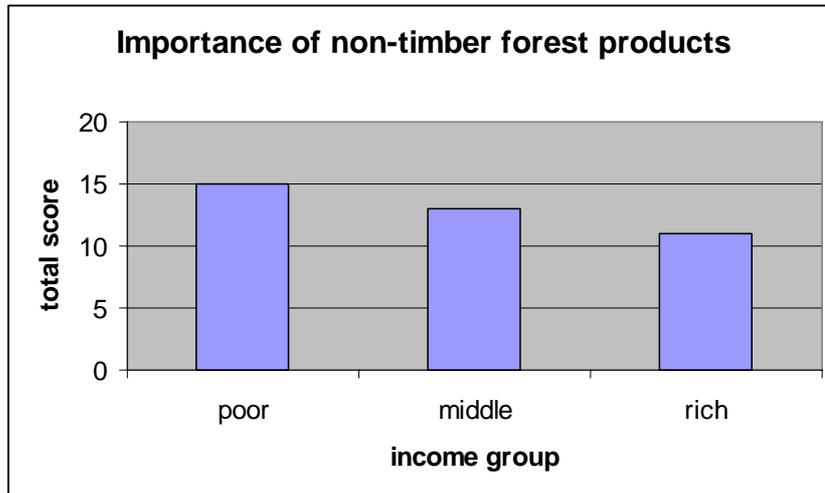
Figure 5.12 Importance of Forest Products as scored by the Villagers



Comparison of importance of different products: The total score in each category was calculating from ranking: low = 1, medium =2 and high =3. The total scores were made from adding the scores times the number of households having each score. This was done for each product. There were no major differences between income classes (appendix xx), (Source: data from questionnaires).

According Arnold (1992) and Warner (1997), poor people depend more on forest gathering activities because it requires the least amount of capital and skills. Therefore the use of NTFP's would be expected to be more important for the poor people. This was in agreement with our result findings, (figure 5.13). However the difference gap among the income groups is not so big, probably because even the middle and rich income households in the village are poor compared to other people in Thailand.

Figure 5.13 Importance of NTFP's as scored by different Income Groups

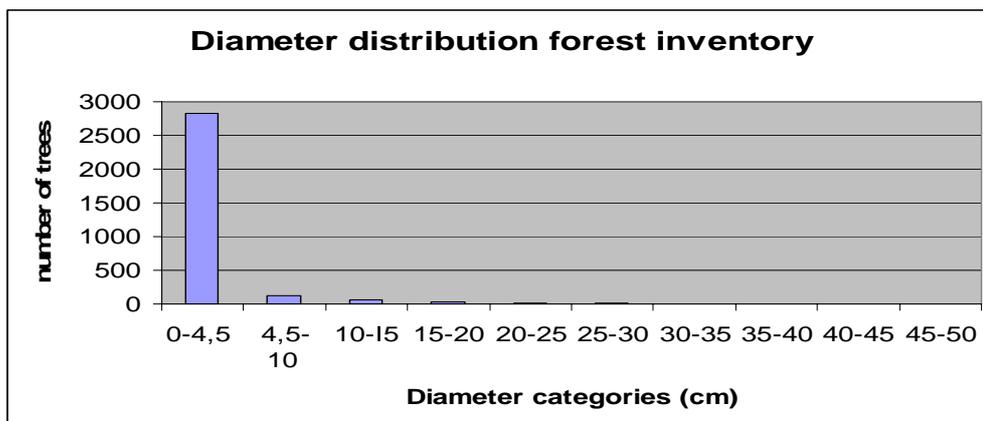


Comparison of importance of NTFP's in different income groups: The total score in each category was calculating from ranking: low = 1, medium =2 and high =3. The total scores were made from adding the scores times the number of households having each score. This was done for each income group. (appendix xx), (Source: data from questionnaires).

5.5.1.3 Forest conditions

The diameter distribution from the forest inventory plot is a reversed L-shaped, meaning that the amount of seedlings highly exceeds the number of larger trees. This shows that it is a healthy forest except that there are no tree in diameter classes above thirty centimetres (figure 5.14).

Figure 5.14 Diameter Distribution in Forest Inventory



(source: forest inventory)

The plot showed signs of recent burning. The species distribution showed dominance of *Litrocarpus sp.*, *Dipterocarps shorea siamensis*, *S. obtusa* and *Pterocarpus macrocarpus*. These species dominate both in terms of number of trees and basal area per hectare (table 5.2 & Appendix B).

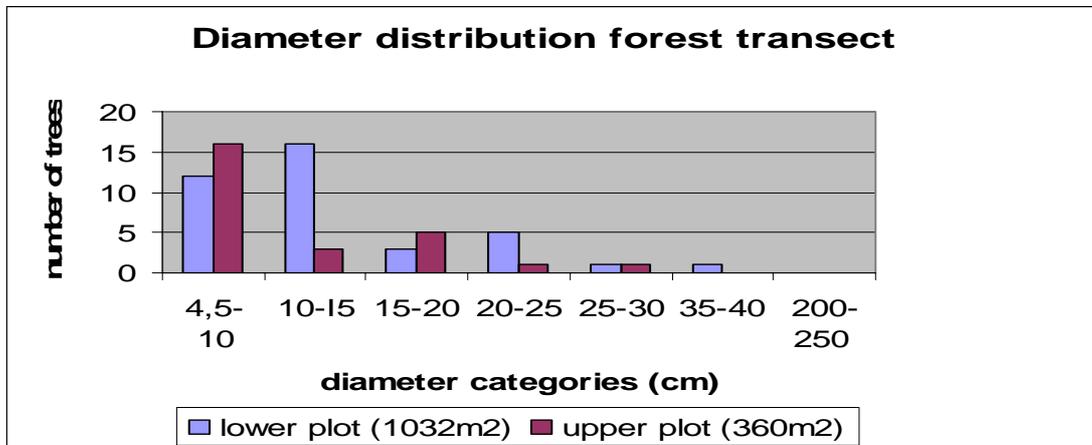
Table 5.2: Findings from forest inventory

Dominant species	Number of trees pr. hectare	Basal Area m2/ha
Litrocarpus sp.	413	5,8
Shorea siamensis	281	4,4
Shorea obtusa	200	4,9
Pterocarpus macrocarpus	113	1,3
Spondias pinnata	56	0,7
Gluta usinata	56	0,7
Others	60	4
Total	1494	21,8

Litrocarpus species were the most abundant in the forest, but since they grow in a variety of forest types this does not signify anything. Dipterocarps are prevalent in the dry dipterocarp zone, whereas *Pterocarpus macrocarpus* usually grow in the mixed deciduous forest at lower altitude (Gardner et al 2000). Information on current land use and show that burning of fields is commonly practiced (Appendix F). The fires often spread to the remnant forest on the top of the slopes. This lead to wider distribution of the Dipterocarp forest into areas that are normally covered by mixed deciduous forest; as more moisture depending species can not tolerate the frequent fires. *S. siamensis* has a high fire resistance and therefore very abundant in degraded the forests. *S. obtusa* is often found together with *S. siamensis* (Gardner et al 2000). It is peculiar that *P. macrocarpus* was that abundant since it was one of the valuable timber species from the mixed deciduous forest that was heavily logged when logging licenses were issued from 1979-1989 (Gardner et al 2000 & Feder 1988).

In the forest transect seedlings were not counted it is hard to see any trends in the diameter distribution except that the larger diameter classes are missing and that compared to the area covered there are very few trees in the lower plot (figure 5.15).

Figure 5.15 Diameter distribution in forest transect



(Source: forest transect)

The dominant species in the upper plot was again *Shorea siamensis* (appendix B), the dominant species in the lower plot was bamboo, which was not counted by signified with a very low number of trees compared to the upper zone (Table 5.4).

Table 5.4 Tree Density and basal area

Plot/ measure	Total number of trees pr. hectare	Basal area m ² pr. hectare
Lower plot (1032 m ²)	378	8,1
Upper plot (360 m ²)	1056	20,3

The most abundant was *P. macrocarpus* (Appendix B). Bamboo is a pioneer species that normally occupies gaps in the higher parts of mixed deciduous forests on moist slopes, whereas the upper part plateaus are too dry. Its dominance indicates that the forest is disturbed by annual fires. The tree species of the mixed deciduous forest are not adapted to frequent fires and their seedlings die during fires, whereas the rootsystem of the bamboo has a high sprouting ability (Dokrak et al 1999).

Comparing these number to numbers revealed by Pedersen & Peiwluang (2003) in dry dipterocarp forest and mixed deciduous forests in Khong Chiam in Northeast Thailand (figure 5.3), these numbers seem extremely high. Except *P. macrocarpus* there is no overlapping species. Further comparison is hard to do since the exact condition in Khong Chiam are unknown.

Table 5.3: Findings from forest inventory in Khong Chiam

Forest type/measure	Number of trees pr. hectare	Basal area m ² /ha
Dry dipterocarp forest	151	7,6
Mixed deciduous forest	410	11,9

(Source: Pedersen & Piewluang 2003)

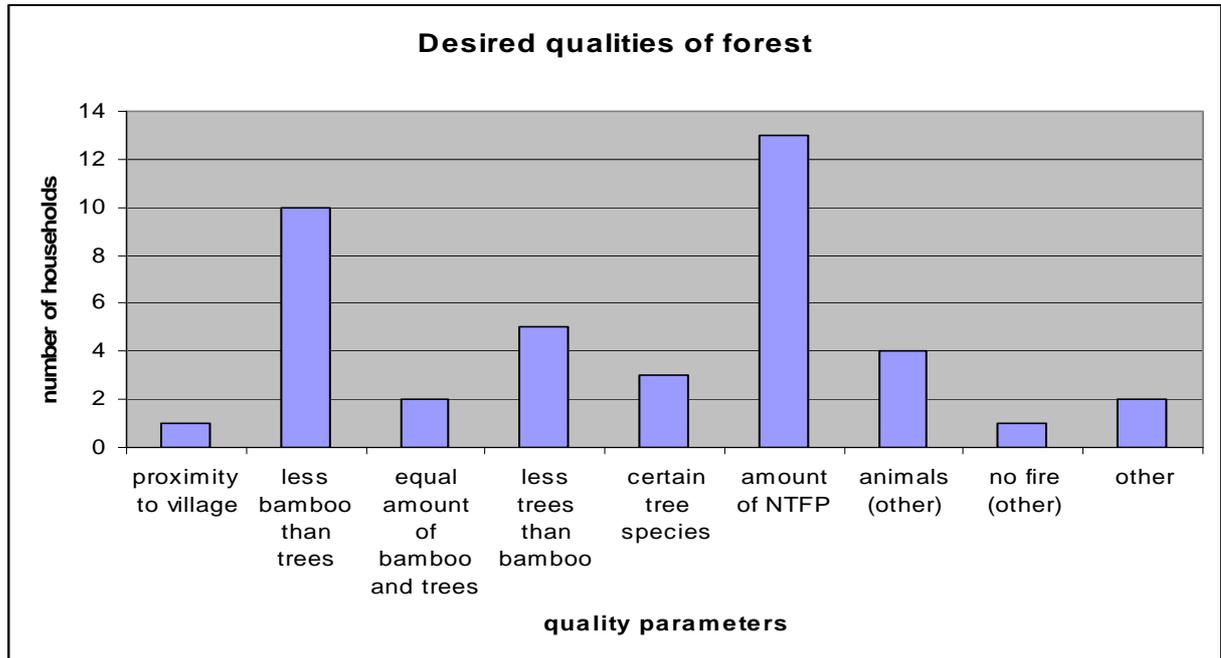
5.5.1.6 Forest management

The type of forest management performed by the villagers was:

- Headman and the TAO Committee trying to convince the villagers not to destroy the forest.
- In the dry season firebreaks around the forest was made for protection
- On mothers and fathers days (birthdays of the queen and the king) the villagers participate in reforestation (Interviews).
- Everybody in the village has the responsibility to look after the forest, if anybody breaks the regulation they will be fined according to the community judgement (key informant interview).

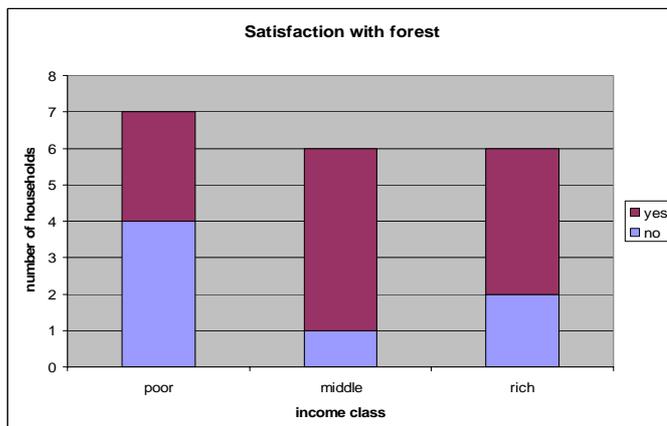
The only signs of forest management seen during the fieldwork were the fire breaks and planted fruit trees around the school. When the villagers were asked what they considered a good forest more trees than bamboo was preferred by 10 out of 19 only exceeded by amount of NTFP's that was indicated by 13 out of 19 household (figure 5.18).

Figure 5.18 Qualities of the Forest desired by the Villagers



When asked if they were satisfied with the forest 7 out of 19 answered no. There was a slight overweight of poor people not being satisfied with the forest (4 out of 7). This can be due to that poor people are more dependent on the forest or have less access (external key informant interview, appendix G).

Figure 5.19: Satisfaction with forest indicated by different income groups



5.5.1.7 Forest Part Analysis

This section concerned 3 issues in relation to forest: the use of forest products, the condition of forest and finally forest management.

Major findings concerning the forest products were that the local villagers depend a lot on forest products as raw materials for constructing purposes (timber and bamboo), firewood for cooking and heating and NTFP's as a supplement to rice. There is a tendency that poor people depend more on NTFP's than middle and rich people, which corresponds with findings in household economics.

Concerning forest conditions there are two forest types in the community forest. They both show signs of disturbances in the form of burning and logging. The burning is related to agricultural practices where the rice and maize fields are burned every year. These fires spread to the forest and kill the seedlings, but make good conditions for bamboo, preventing re-growth of trees that do not tolerate the shade (Dokrak et al 1999). This is the situation in the lower part of the forest slopes adjacent to the village fields, but on the top plateau the situation is different. Apparently, this site is too dry for the bamboo which is not present here. This leaves space for fire tolerant species like *Shorea siamensis* and many other trees.

Apparently the villagers are making fire breaks and occasionally planting trees within the village. The reasons for not doing any other active management of the forest can be multiple; it can be due to lack of knowledge, in some interviews the respondents said that nothing could be done to get rid of the bamboo, more likely it could also be due to lack of incentives. The local people are allowed to use the bamboo, but they can only cut a very restricted amount of trees for own purpose. In order for people to actively manage the forest resources it is required that they have secured rights to the benefits from the forest. Insecurity can be both in terms of lack of tenure or in terms of restricted user rights. Generally lack of security leads to investment in short term crops (Pasicolan 2003).

5.5.2 Water

There are 3 streams in the village, Sa-Lai, Pao and See Pan. Pao stream is only used for agriculture because of the high amount of sediment, indicating erosion. Sa-Lai and See Pan are both used for agriculture and drinking; there is some original watershed conservation in the Sa-Lai stream (Key informant interview & water sampling).

The water analysis (Appendix B) showed that:

- The PH level of the water in the village is ranged from 7.7-8.3, higher than the standard of drinking water, which is 6.5-6.7. This could indicate some degree of water contamination.
- The bio-indicator indicated that the water quality of Pao stream is good and consumable.
- High conductivity indicated the water quality of See Pan stream is not good.
- The bio-indicator of the Salai stream indicates that the water quality is good.
- Conductivity indicated that the water quality of the combined SeePan and Pao is good, the combined Salai+SeePan+Pao is good as well.

The judgement of whether the water quality was good or bad was based on a scale in the water test kit.

Asked if they think the water availability is insufficient, a total of 14 households answered yes for water for household consumption, 5 poor and 5 rich answered yes, while 4 middle incomes answered yes. For water for agricultural use only a total of 8 households answered yes, no rich households found the water supply for agriculture insufficient. 5 poor and 3 middle found it insufficient (figure 4.29).

Figure 4.29 Insufficiency of water

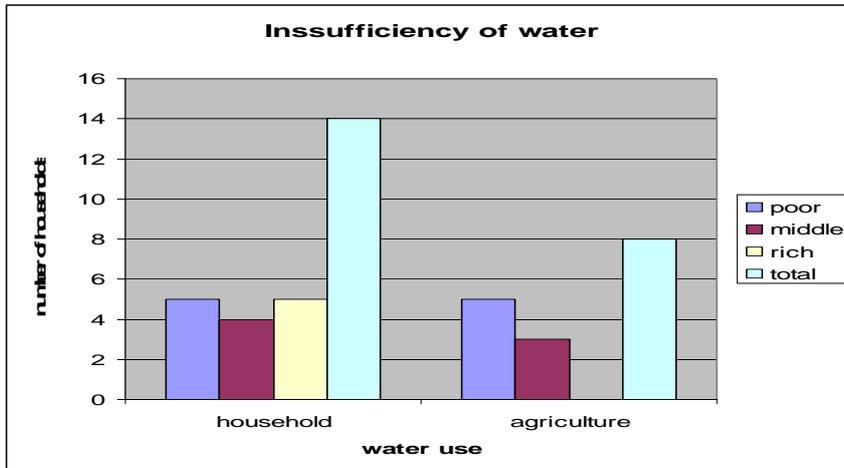
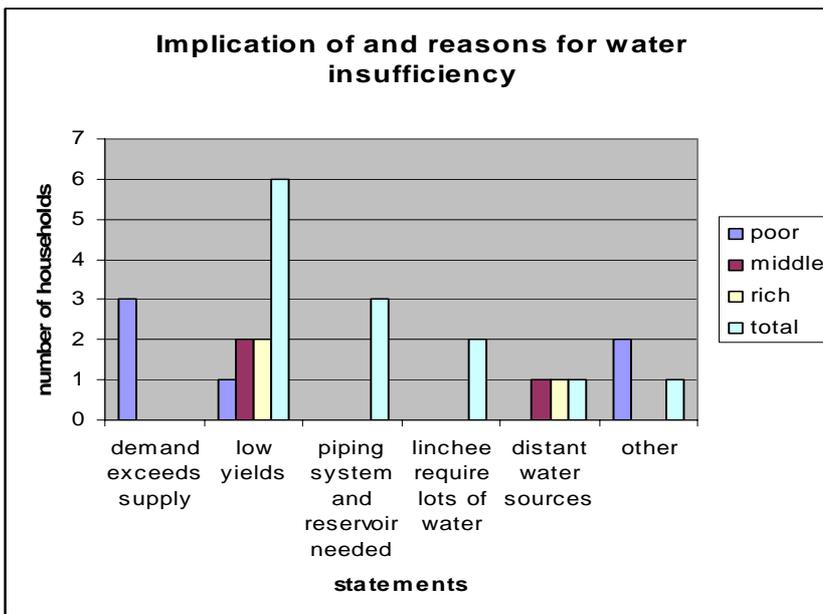


Figure 4.30 Reasons and implications for water insufficiency



5.5.2.1 Water Part Analysis

There are three streams across the village, which indicated that the main village has the access to the water resource. The quantity of the water seems enough for the villagers` daily consumption but might not be enough for the agriculture production, especially for

the upland fields or the fields faraway from the water resource since the lacking of pipe system and water can system.

The water quality is generally good enough for drinking, except the water from See-Pan stream in which the conductivity (EC) is too high. It might be because of the rotten leaves in the stream, which pollute it. The bio-indicator indicated that the water quality of Pao stream is good and consumable. However as the information given by the PRA, the village mainly uses the river for agriculture, because they believe that there are a lot of sediments in the river.

The EC value of the village streams is quite high, which might be because of the utilization of chemicals like herbicides, pesticides, and inorganic fertilizers etc., which are washed away from the soil to the stream in raining season. However, in the dry seasons, it is still high because of the soil infiltration. To confirm the findings, we took the soil samples from the bottom of the streams and found that the N-P-K level is quite low. Near the stream, there is a water-flow track from the upper area to the lower area, we took the water-flow soil sample from these area respectively, found that the N-P-K in upper area is lower than lower area. According to the information from the key informant that there is original watershed conservation at the upper Salai Stream, maybe that is the reason why the water quality of Salai is quite good.

As expressed in the problem ranking and in the questionnaires the villagers find their water supply insufficient. Internal key informant interviews revealed that efforts are done to improve the water supply, but the proposed project needs approval. Whether this is an actual project or a way to silence the crowds is unknown. The water insufficiency is related to the area of production where fields are located above the water sources.

5.5.3 Land

It is difficult to get new fields because of limited amount of land and lack of land titles. Officially it is not allowed to sell land without having a land title, but some respondents mentioned that they do it anyway. In theory the only way to get new land is through

sharing with family members. The right to land depends on the owner giving permission to use it. The owner, is according to the local people the person that got the land first.

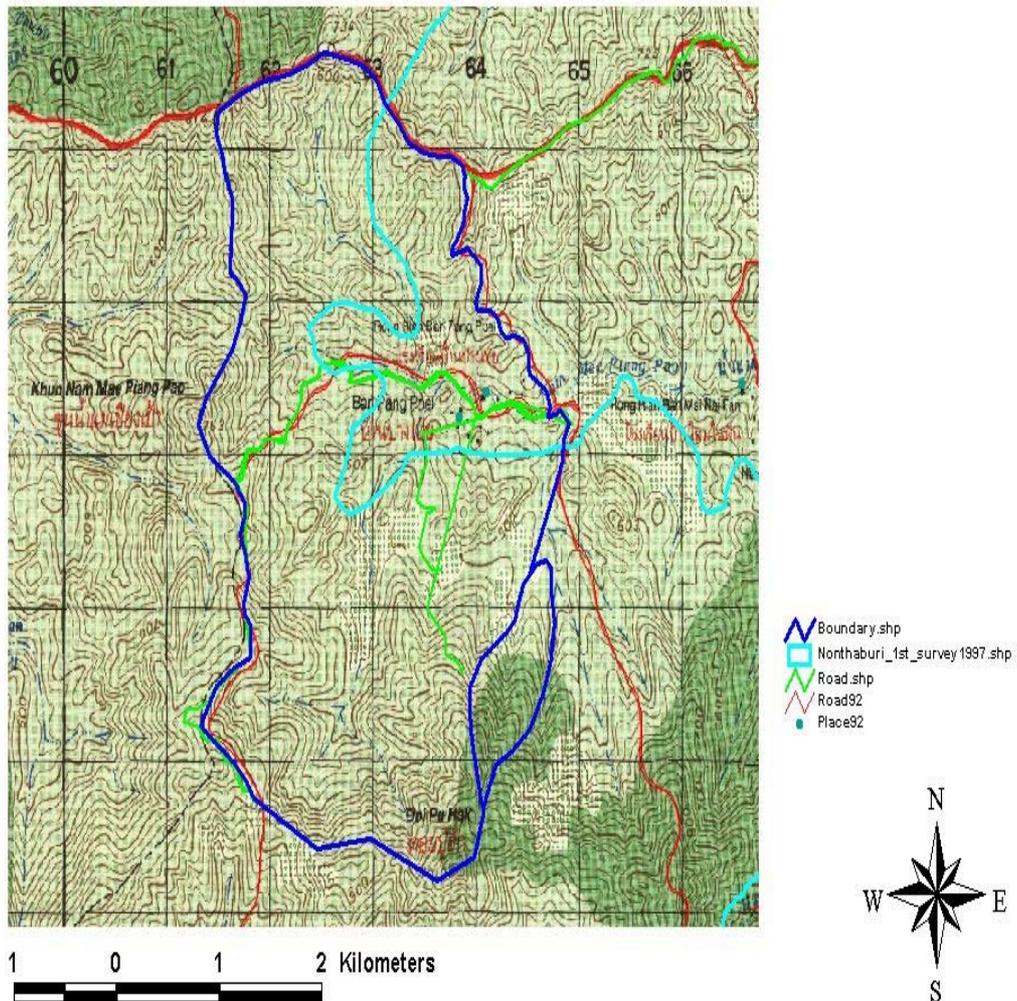
If owning a land certificate the majority of respondents mentioned that they would take better care of the fields, either by planting more trees or improving agricultural practices. They would take loans if necessary. At present their activities are very limited because they fear for losing the land. Only one respondent answered that he would sell it and invest the money in a family shop (Interviews). This information does not correspond with information from the external key informants (appendix G), stating that the villagers were not granted land certificates because experiences from other villages showed that subsequently they would sell the land and encroach on more forested area. This does not seem to be an option since there is not really any land available.

5.6. External Policies Concerning the National Park

Map 1 below shows the boundary of the proposed national park. It reveals that most of the agricultural area used by the villagers is in the proposed park area. Statements from the government officials and from local villagers corresponded, that the formerly proposed border has been renegotiated with the local villagers to exclude their agricultural land.

Map 1: Proposed National Park border overlap with agricultural area of the village

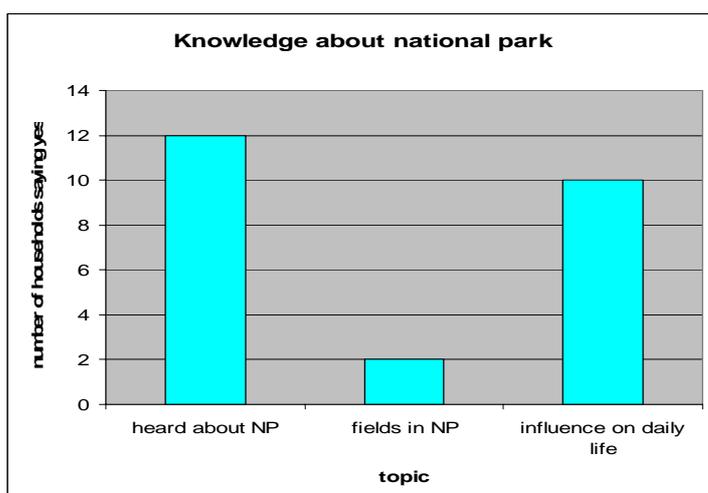
location 4



Turquoise line is the national park border, the national park area is to the left of the line. The blue line is the area where the villagers have their fields within. Source GPS and field observations.

A total of 12 households out of 19 had heard about the National Park, Out of these 12 households 2 rich households indicated that they had fields in the park area. A total of ten out of the 12 indicated that they thought it would affect their daily life (figure 4.31).

Figure 4.31: Villagers knowledge about national park



(Source: questionnaire)

The expected influence of the national park on the villagers daily life were loosing agricultural land, loosing access to NTFP's and improvement of forest quality. A total of six villagers think that they will loose agricultural land, distributed as three poor, one middle and two rich. A total of two distributed as one poor and one rich thinks that it will lead to improved forest quality. Two of the rich household thinks that it would lead to loss of access to forest products (table 4.1).

Table 5.5 Statements about Expected Influence from the National Park

Statements/income class	Poor	Middle	Rich	Total
Loss of access to agricultural land	3	3	5	11
Improved forest quality	1		1	2
Loss of access to NTFP's			2	2

The major impact the proposed national park will have is the loss of access to the forest, leading to loss of NTFP that are available in the forest. According to the borders of the national park, the exact borderline is not clear. The villagers have made a request for excluding the land they use for agriculture, meaning that this area will not be a part of the national park. Whether this request will be honoured is not certain – it seems like there is a lack of confidence in the government as regards the issue of the national park.

Whether or not the proposed national park will have an effect on their land, the general answer is that the effect will be that they cannot encroach more land.

5.7 National Park Part Analysis

Most of the agricultural land of the villagers is within the park area, but the exact border is still unknown; since some negotiations are going on to exclude the agricultural land of the villagers from the park.

All the household members that were interviewed had a Thai citizenship, but none of them had a land certificate. The results of the lack of land certificate are that they invest less in their land resulting in destroying the soil which is having a negative effect on the income, and will in the future result in higher lack of food. There is another side of this picture being the government saying the reason for not giving the people a land certificate lies in past experiences, where the people sold the land with certificate and went further into the forest to find new land. Who to believe is hard to say, because according to interviews only one out of nine would sell his land to invest in a shop. The rest would

invest in the land to improve the soil. The reasons for not investing in the land were for all the possibility for loosing the land to the government (interview).

Another factor in relation to the government, the National Park Authorities, was the insecurity when talking about being able to trust the government concerning the national park border. When asked directly villagers said that their agricultural land was excluded. This picture changed at last community meeting and was quite clear: they were all showing anger towards the national park and the government. Whether or not this change is caused because lack of knowledge about the national park and its effect until we confronted them and gave them some information is hard to say, but it can also be caused by them finally showing that they were actually concerned about the park.

6.0 ANALYSIS

As mentioned earlier the sustainable livelihood framework has been used to identify the key elements, factors and relationships with in the village that will be affected by the proposed national park. The data collected was categorized and analyzed in terms of four livelihood assets, namely: social relations, household economics, agricultural system, and access to natural resources. The interrelationship between these assets, the external environment, policies, infrastructure and services, and their impact on the villagers' existing livelihood strategies as a result of the national park is what we will try to capture and analyze in this chapter.

6.1 Analytical discussion

Traditionally the tribal people were independent, living of subsistence agriculture. People supporting themselves through subsistence agriculture use the resources that surround them such as water, land and forest. The Hmong people were doing slash and burn cultivation, with longer cultivation periods followed by abandonment (Collins, Sayer and Whitmore 1997). In our study village the Hmong are now stationary, which among other things is signified by well developed infrastructure (roads, electricity, schools, social center) and they have also been planting fruit trees. Their previous way of living is no longer possible due to high population pressures. They still practice some kind of rotation

system, which is mostly done by the rich households, due to their larger amount of fields. For middle and poor people using the rotation system it is not always an option because of the limited amount of land. In order to support their families they cannot afford to leave a field for fallow (interview). Another alternative would be to use fertiliser, which is also not an option for the poor, because they cannot afford it, and do not have the same opportunities to get credit as the middle and rich. The implications of continuous cultivation of the same fields were shown in our soil sampling. The nutrient level was low and there were some soil erosion. When asked about their yields, several farmers indicated that it was decreasing (interview).

Another factor limiting agricultural production is the low availability of water. The major problem is not the absolute amount of water, but the production area with fields located on steep slopes above the water sources.

Apart from the constraints imposed on the local people from the ecological system there are some political issues that influence their lives. In a modern Thai society where Southern valleys have long been cultivated, the Northern hills are the only forested area left (Collins, Sayer, Whitmore 1997). The Government is therefore keen to preserve this last forest resort, leaving non-Thai hill tribe people in a bad spot, since they have no land certificates and therefore no official recognized right to use the land (Ghimire 1998).

In the present situation the people in Pan Poie village are living in an area that is actually forest reserve. Theoretically they are not allowed to use the land and the forest in their neighbourhood because it is restricted conservation forest. It seems as if the government has realised that its policies are not realistic and is more or less ignoring these trespassers. But there is still a desire from the government to preserve the forest and the latest means of doing so is through creating national parks. In this case the proposed Nanthaburi National Park. Officially the proposed border has been renegotiated to exclude the agricultural area of Pan Poie, but this can be a way to silence the crowds. It can be discussed if it will at all be possible to exclude all the agricultural land which is not a

contentious area, so this will be hard to do without getting the unwanted island of fields within the park.

Most of the national park area used by the villagers is converted into agricultural land, with some remnant forest on the top of the ridges. Multiple forest products are used from this forest such as raw materials for construction (timber and bamboo), firewood and NTFP's. The villagers depend a lot on NTFP's as a supplement, especially poor people having less agricultural output. The forest is disturbed from burning and logging and the lower parts of the forest contain a lot of bamboo and not that many trees. In relation to the forest the people have some kind of agreement with the government, that they can collect NTFP's, use all the bamboo they want and cut trees for personally use. When and how an individual can cut trees is determined by the village committee. The type of management practiced by the villagers is restricted use and the making of fire breaks. The villagers do not have any incentives to get rid of the bamboo and re-grow the forest, since they will not be allowed to use the upcoming trees anyway.

The lack of land tenure, ownership or user rights affect the investment in both agriculture and forestry. This insecurity caused by the lack of tenure etc. and not knowing what will happen tomorrow leads to a reduction in the investment because, they do not know if they will get the benefits from it. The lack of investment can also be due that they cannot afford it; since existing investments were primarily done by rich people. They had been planting linchee trees. The poor people do not have the same option to do so, because they do not have the means to the investment. If they had land titles they could use these as collateral for loans. But giving people land titles runs another risk of the people selling these titles and encroaching on more land.

In relation to forest management it can also be expected to be improved if the villagers had some kind of security that they would get the benefits from their effort and, if they had trust in that the government would not come and take the forest if the conditions were improved. The current government structure where agreements made between one

government official and the villagers, might not apply when another official comes along. This also leads to increased insecurity for the local people.

All the above mentioned factors influence the villagers' daily life in several ways. It not only makes it hard to survive the traditionally way, but also makes the parts of their livelihood that is dependent on agriculture and forest insecure. This has led to the villagers finding alternative solutions.

Non-agricultural work has become a very important source of income for many of tribal people (Lewis, 1984: 24). In Ban Pang Poei village a larger number of households in the middle and rich groups are working in the non-agricultural sector, whereas the poor are all dependent on agriculture. According to Parnwell (1993) it is possible to see a differentiation in the household speaking of migration. This differentiation takes a variety of forms, including variations in levels of income, size of land-holding, the size of the household, stage in the life cycle, levels of education, contact in and knowledge about other locations. Clearly not all households are in the position to afford the cost of migration (Parnwell, 1993: 94-105).

According to the wealth ranking a households level of disposable income is a function of the amount of land owned and the level of agricultural production, which will have a significant bearing upon its ability to afford the transportation and other support cost of the migration. The middle and rich families are less dependent on the agricultural sector, because of the income from the non-agricultural sector. They have moved away from the self-consumption system to a more market dependent system. It is possible for them to hire labour doing the task formerly undertaken by the migrant. It is also possible for them to purchase the goods they will not be able to grow themselves.

In the village the poor households have fewer members than the middle and rich. The absence of one or more household members may have a significant influence on the levels of production and income from agriculture. On the other hand if labour is plentiful

as especially in the middle households, migration may have the effect of raising the labour productivity.

The higher income the middle and rich households have because of the non-agricultural income and from growing cash crops, make them able to use agricultural input, such as chemicals. The poor households also use chemicals for their crops, but as can be seen in accordance to expenditures they do not spend a lot on money on input.

The income level of the households influences factors such as education and qualifications, which again influence the migration. According to the problem ranking education is required for getting work in the city, at least to find a work where you earn sufficient money to send back home and cover the loss for not being a part of the income in the village. The poor households are less educated than the middle and rich making it hard for them to find a job. The lack of education is caused by the lack of money making them unable to pay the school fees, therefore only making them able to reach ninth grade. Though should be mentioned that it can be that some children even do not reach that level because they have to work for the family.

As mentioned in the problem ranking, it is difficult for tribal people without any Thai citizenship to migrate. According to the law, people without this citizenship are not allowed to migrate. From our samples all the respondent had a citizenship, and would therefore not have any influence on their ability to migrate. But as mentioned before, we did not manage to cover a representative part of the poor population, and we assume that the people in our sample belong to the “elite”. There might be marginalised people in the village that do not have citizenship.

In the village there is a network with migrants and people staying in the village, migrant are sending back money and giving new migrants a network (Interviews and PRA).

As a conclusion the impacts that the national park will have on the villagers are multiple, especially for those without the possibility to turn to non-agricultural work.

7.0 CONCLUSION

7.1 National Park

What exactly is going to happen with the land used by the villagers that is in the park is still unknown. Probably some land will be excluded, some not. Even though the agricultural land might be excluded from the park, it will still have an impact due to that no expansion of agricultural land will be possible which limit future agricultural practices. Furthermore even though the villagers will be allowed to collect NTFP's for own consumption in the park, their access to forest products will be limited.

7.2 Social Structure

The poor and to a certain degree the middle income people will be more heavily affected than the rich since they are more depending on the land for cultivation. It can also be assumed that they are more likely to be the ones loosing their fields since they are late comers and it can be expected that their land is in the periphery of the agricultural area, which is more likely to be included in the national park.

7.3 Land Use

Nobody in the village has land legal ownership of land. e.g land certificates. Some villagers have till now had a reserve certificate allowing them to cultivate their land and giving them some kind of security in disputes. These certificates have been cancelled due to the national park. According to villagers they will invest more in their land planting trees, applying more input, focus more on cash crops if they had land certificates. According government officials experiences from other villages, they tend to sell the land to if they get title deeds and there after go to the forest to clear land. The general perception is that lack of security leads to investment in short term crops. Security affects investment in two ways first people are sure to get the benefit from there investment and for poor people having no other collateral it might serve this purpose.

7.4 Production System

Soil samples indicate that there is erosion on the upper slope. The nutrient levels are also very low, indicating that the current land use is not sustainable, in the sense that the villagers will not be able to keep on doing what they are doing for an unlimited amount of time. Addition of nutrients could improve the soil fertility but it might be hard to do without pollution of water. This will of course be related to when and how the fertiliser and chemicals are going to be applied. Limiting intensification is income and location of land upland fields, meaning that rich people have better opportunities for intensifying their land. The area of production is not suited for the heavy cultivation pressure that is practiced at the moment.

7.5 Water

The water problems are not really related to the national park, but are due to climate and altitude. The major problem being that the fields are above the water sources. Taking the topography of the area into consideration it would not make sense to place the water reservoir in the national park, and this would thus not be affected by the NP. Another issue is the quantity and the quality of the water, which would be considered to improve from the NP, since the water sources in the village spring from the NP area. Less extensive use of this area and more forest cover can improve both water quality and quantity.

7.6 Forest

The villagers are very dependent on many types of forest products. The community forest is dominated by bamboo and is disturbed from recent fires and logging activities. Use of the community forest is regulated by local community, they make fire breaks, use of bamboo freely, collect NTFP's freely, need permission village committee to cut trees to repair or build houses their house. The villagers have adapted to using bamboo as a resource because it is the most plentiful and they are allowed to use it. There is no management in place to change the composition; most likely due to lack of incentives. The local people are allowed to use the bamboo, but they are not allowed to use the trees. As the benefit from managing the forest would not fall to them anyway they are not

interested in this. In a way the government is preventing the people from doing proper management by not giving them incentives to do so.

7.8 Political Structure

There seem to be a lot of understanding about the needs of the local people from government officials, a general theory behind this is that the peoples basic needs should be fulfilled before they can consider things like nature conservation. As a part of this the TAO has been authorized to negotiate with the government on where the NP border should be placed. Apart from this the local villagers do not seem to have power.

8.0 PERSPECTIVES

No matter if the national park will remove the livelihood of the villagers or not, their current practices are not sustainable and there will be changes anyway. Catalyzing this process is the development of the surrounding Thailand and the increasing population density.

In the livelihood framework used to structure this report the outcomes from different livelihood assets available together with outside influences make up livelihood strategies. When changes are imposed on people, people have to change their livelihood strategies in order to adapt to these changes. The options that the people have when meeting restrictions on land use and forest access are generally speaking diversification, agricultural intensification and migration. If the sustainability of the system should be taken into account neither diversification nor intensification of agricultural production seems like a valid options. The production in the area concerned has a marginal surplus. This leaves migration as the better choice, it will take time and be a struggle, but eventually the kids will be leaving the village to seek other challenges.

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Appendices

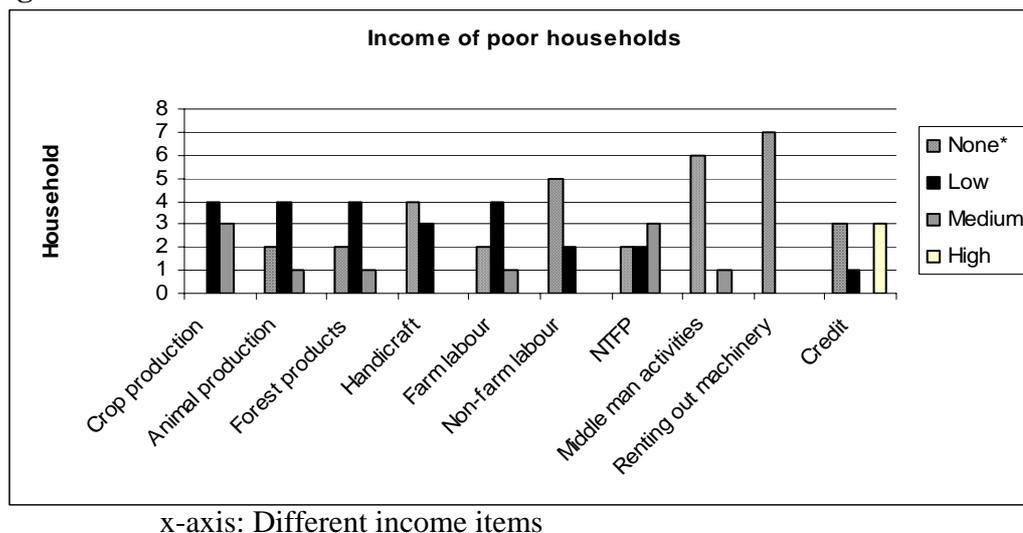
Appendix A

Household Economics

A.1 Income

In the 7 poor households the main income is from the agricultural sector, followed by the animal production (5 households), forest products and NTFP (figure 4.1). These are mainly for own consumption, with only a little amount being sold, mostly NTFP also classified mostly as a medium income. The income from non-farming labour is the selling of few product and handicraft, which is normally only made for selling if ordered. Their share of the total household income is very low. A few of the poor household are having a low amount of credit (4 households), though the credit is having a high significance for the total household income.

Figure 1

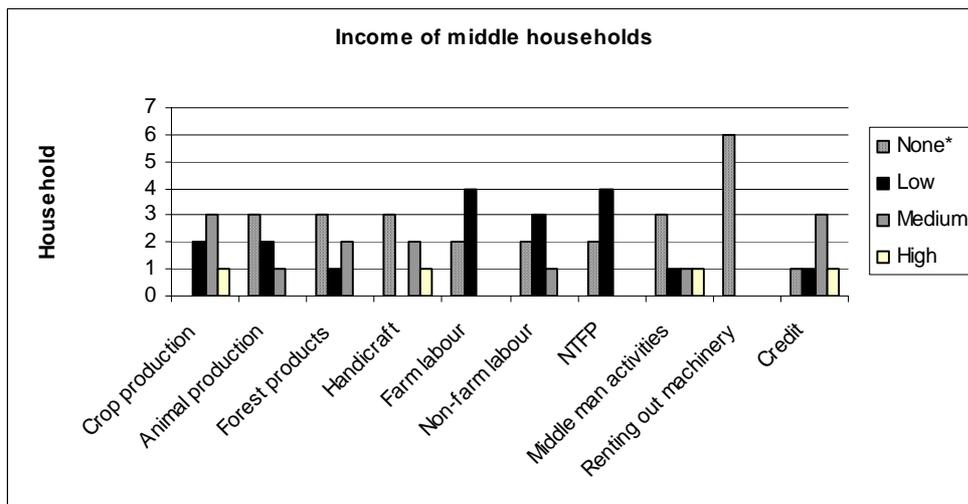


*The amount of total income, measured by the respondent (source: data from questionnaires)

In the 6 middle households all have income from crop production, but the income from the agricultural sector is higher, ranging from low till high in significance, with most weight in the medium. Animal production, forest products and NTFP are less important for the total income compared to the poor household (figure 4.2). This could be caused of the higher amount off farm-labour, non-farming labour, handicraft and middle man

activities playing a bigger role in the income for the middle households, making them less dependent on the income from the agricultural sector and forest products. All the households have credit except one (figure 4.2).

Figure 2



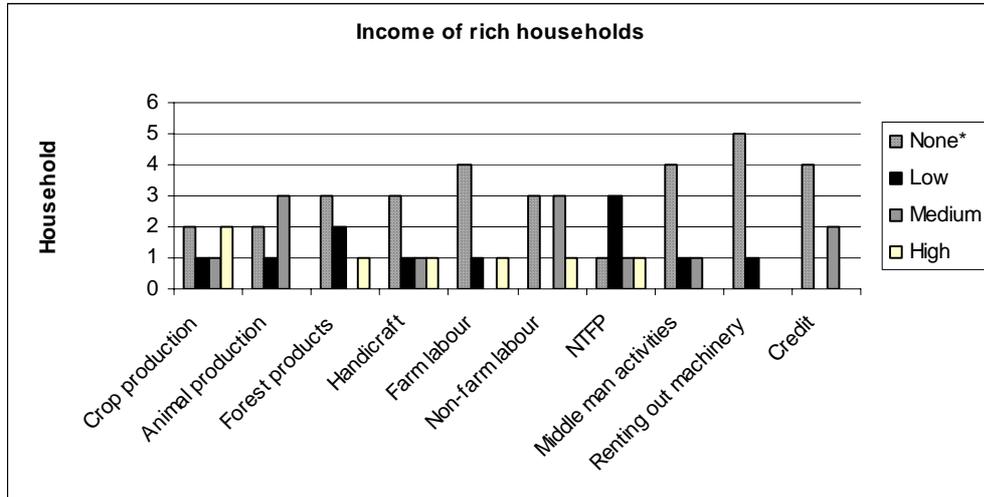
x-axis: Different income items

*Amount of total income, measured by the respondent (Source: data from questionnaires).

In the 6 rich households two have not got any income from crop and animal production (figure 4.3). The 4 household with income from agriculture, farm-labour and forest products are having a higher income from these than the middle. They have a higher income from the non-agricultural sector (3 middleman activities, 4 non-farm labour).

Only two households have a credit and for them the credit play a medium role for their total income.

Figure 3



x-axis: Different income items

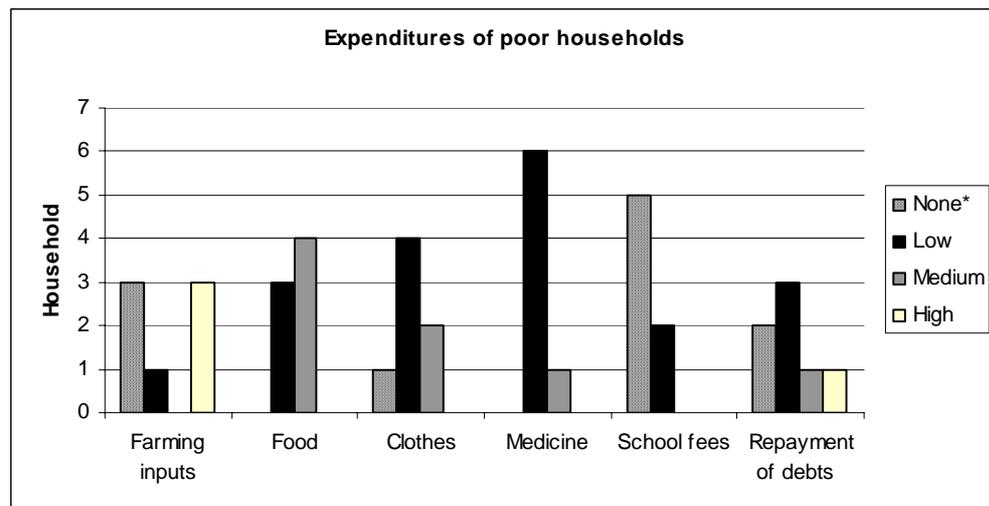
**Amount of total income, measured by the respondent (Source: data from questionnaires)*

In both the middle and rich household rice crops are mainly used for own consumption, and if any left the rest are for sale.

A.2 Expenditures

Having a low income in the poor household is affecting the expenditures, which is also being low. In the agricultural input it is possible to see a higher expenditure than in the others (3 high, 1 low - figure 4.4). School fees are very low if any. Repayment of debt is playing a role for the households having credit, but these expenditures are mostly low.

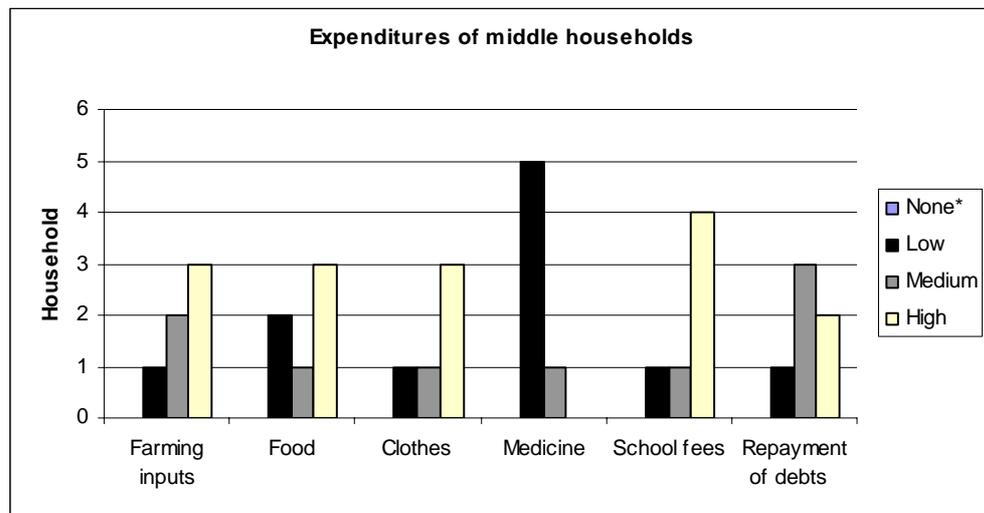
Figure 4



**Amount of total expenditures, measured by the respondent (Source: data from questionnaires). X-axis: Different expenditures*

They are in general having high expenditures in all categories asked, such as farming inputs, food, clothes (3 high) and school fees (4 high - figure 4.5). Expenditures on food are as well very high which probably is caused of the selling of their own agricultural products, because they mainly grow cash crops, as mentioned earlier. Repayment of debts is playing a less role, but is still a medium to high expenditure.

Figure 5

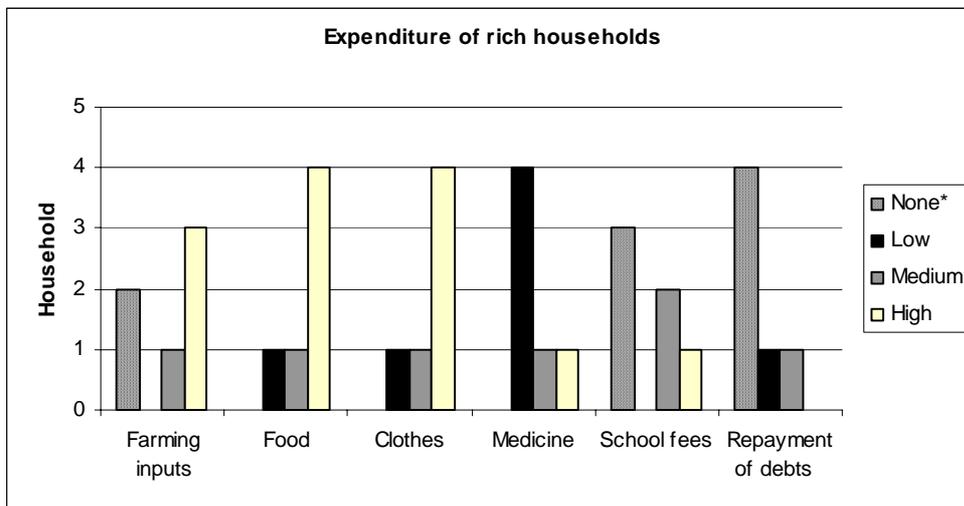


X-axis: Different expenditures

**Amount of total expenditures, measured by the respondent (Source: data from questionnaires)*

The rich households are having the highest level of expenditures of the 3 groups. Especially on food the expenditures are high which probably is caused of the less income for their own consumption that they have from the agricultural sector (figure 4.6). They, like the middle households grow a lot of cash crops used for selling, which makes it necessary to buy their food for consumption. As well, two rich households do not have any income from the agricultural sector. Expenditures on the other factors are generally high, though in the repayments of debts they have less expenditure than in the middle households because only two households have credit.

Figure 6



X-axis: Different expenditures

**Amount of total expenditures, measured by the respondent (Source: data from questionnaires).*

Generally all have a bigger income from agriculture, and for the middle and rich households the income from non-agriculture at times is the same as the agricultural, because they do not need to buy the food. Two rich households do not have any income from agriculture which makes the income and expenditures from non-agriculture bigger. The agricultural expenditures are higher than non-agricultural, because of the inputs used for agriculture (interviews).

Appendix B

Access to natural resources

B.1 Soil sampling - Methodology

The samples are taken from 3 farm householders (Poor-middle-rich) and 1 slope, which covered by upland rice, bamboo forest and top community forest. To compare the difference between the agriculture land and forest soil, soil samples were taken from an upland rice field, a bamboo forest and a community forest located on top of the mountain.

➤ Poor family

The poor family has only upland rice field, which covered by weeds, close to water resource. We divided the field into three parts, the top, middle and bottom part, from which we took samples respectively.

➤ Medium family

The medium family has three kinds of rice cultivate system and a lichee field. The fields are well organized, have irrigation ditches, not so much weed and close to a pool. During the visiting, we found some pesticide empty bottles under the lichee trees, which indicated that there is pesticide input.

1. Lowland rice (Paddy system): we took 5 points from the field and mixed
2. Lowland rice (Wet system): We took 5 points from the field and mixed.
3. Upland rice: due to the bamboo just be cut down in the field, it is hard to walk to through, we only took 2 samples, one from the upper slope, the other from the bottom part.
4. Lichee field: we took 5 points from the field and mixed them together.

➤ Rich family

Upland rice field and vegetable yard next to each other and the vegetable yard just beside a stream; Lichee field located on the other slope, close to another water resource. There is few maize plant sparked on the river bank, which actually can not be called field, so we did not take sample there. The fields looks be well cultivated, not so much weeds, especially the vegetable yard shows the high agriculture intensification, no weeds and has irrigation system.

- Lichee field: It is located on a slope, the samples was taken from the upper, middle and bottom part of the slope.
- Upland rice field: The rice be grown on a quit flat slope, we took 5 points from the field and mixed them together.
- Vegetable Yards: We took 5 points from the field and mixed them together.
- Agriculture land and Forest soil study

1. Forest soil

The samples were taken from the community forest, firstly we did a 40m*40m square in a comparable good condition part of forest which located on a slope in the North-west of the village, then took the sample from 9 points and mixed them together.

2. Agriculture soil

Under the forest, there are a bamboo forest and an upland rice field, we took 1 sample from the bamboo forest, 1 sample from the upper field, 1 from the middle part and 1 from the bottom field.

Table 1. Soil analysis result

Soil sample /
 Bang pang poei
 village

		Soil>2mm(%)	Texture	PH	NH4+	NO3	P	K
1	P-R(T)	50	silt clay loam	5.5	VL	VL	L	L
2	P-R(M)	47	clay	6.0	L	VL	L	L
3	P-R(B)	38	clay	6.5	L	VL	L	L
4	M-R(L) PADDY	61	silty clay	6.5	VL	VL	L	L
5	M-R(L) DRY SYTEM	72	clay	6.5	L	VL	L	L
6	M-R(UT)	69	clay	6.5	L	VL	L	L
7	M-R(UB)	41	silty clay	6.5	L	VL	L	L
8	M-LINCHEE	17	silty clay	6.5	VL	VL	L	L
9	R- LINCHEE(T)	30	silty clay	6.0	L	VL	M	L
10	R- LINCHEE(M)	26	silty clay	6.5	M	L	L	L
11	R- LINCHEE(B)	26	silty clay loam	6.5	M	L	L	L
12	R-R(U)	29	clay	6.5	M	M	VH	L
13	R-V	35	silt loam	7.0	L	VL	VH	L
14	E- F(BAMBOO)	32	clay loam	6.5	L	L	L	L
15	E-R(T)	55	clay loam	6.0	VL	VL	L	L
16	E-R(M)	37	clay loam	6.5	VL	L	L	L
17	E-R(B)	28	clay loam	6.5	VL	L	M	L
18	CF	39	clay	6.5	VL	L	M	L

B.2 Water Sampling

Table 2 . Water sampling result

Source	GPS	Temp.	PH	Sal.	DO	TDS	Conduc	Waterfl ow speed	Water	Stream	Water	Stream
		(C)		(%)	(mg/L;%)	(mg/L)	(us/cm)	(m/sec.)	Width(m)	Width(m)	Heigth(m)	Height(m)
Upper Pao stream	0664002/ 2085213	17.7	7.99	0.1	8.96;101.3	109.1	218	2.33	1.20	3.30	0.06	1.10
Upper See Pan	0661956/ 2085517	20.2	8.29	0.1	8.64;101.5	159.5	319	-	-	-	-	-
Outlet Pao	0663466/ 2085458	19.9	7.70	0.1	10.12;120.8	101.0	202	7.9	1.00	2.50	0.27	0.85
Joint of Pao+SeePan	0663466/ 2085458	19.5	7.73	0.1	10.34;121.6	109.5	219	3.12	-	-	-	-
Outlet SeePan	0663466/ 2085458	18.5	7.74	0.1	9.77;111.2	132.9	266	2.93	0.52	2.20	0.05	0.27
Outlet Salai	0663587/ 2085359	19.9	8.25	0.1	9.77;111.2	122.3	245	15.50	1.74	3.59	0.03	0.60
Joint of SeePan+ Pao+Salai	0663587/ 2085359	19.8	8.20	0.1	23.8;277	116.5	233	12.47	2.50	4.7	0.05	0.90
Upper Salai	0663584/ 2085358	20.4	8.26	0.1	10.10;1119.9	135.4	271	12.98	0.80	3.72	0.10	0.70

Table 3 Fresh water Invertebrates

Fresh Water Invertebrate

Source of water	Freshwater Invertebrate	Amount				Result	Conclusion
		Small	Medium	Big	Score		
Upper of Pao stream	River Crab	/	1	/	10	Excellent water quality	Rather clean-clean water
	Stocky Dragonfly	5	1	4	7	Good water quality and eatible	
	Diving Beetle	1	/	/	5		
Outlet of Pao Stream	Rosy Crab	/	2	/	7	Good water quality and eatible	Rather clean-clean water
	Freshwater Shrimp	9	/	/	4	Poor water quality and eatible	
	One-tail Dragonfly	/	2	1	7	Good water quality and eatible	
	Stocky Dragonfly	2	1	1	7		
	Commen Dragonfly	8	/	1	7		
Salai Stream	Freshwater Prawn	1	2	6	8	Good water quality and eatible	Rather clean-clean water
	Fresh Shrimp	21	10	8	4	Poor water quality and eatible	
	Waterfall Grab	2	3	4	3		

B.3 Forest Inventory

One stick was sat in a corner and 90 degree angles made with the compass determined the direction of the next corners. 40 meters were measured with the measuring tape and another stick was put. On the cord that was tied from one corner stick to another, a band was tied around it for every ten meters. At every 10 meter band a cord was tied from one side of the grid to another finalizing the grid.

40x40 meter plot divided into 10x10 meter squares was laid out (see appendix xx). In each plot all trees with a diameter above 4.5 cm, had their diameter measured and where possible the species was determined. The number of seedlings was counted. In Each plot occurrence of stumps, deadwood and signs of fire was noted. The height of tree with a high diameter, a midrange diameter and a low diameter was measured. Further more the slope of the plot was measured and the position of the plot was measured.

Table 4 Information of Forest inventory plot

species	TP/ha	Ba/ha
Aporosa villosa	19	0,202
Bombax ceiba	25	0,189
Bridelia retusa	13	0,090
Buhenia sp.	25	0,616
Canarium subulatum	19	0,398
Cratoxylum cochinchinense	6	0,012
Dalbergia species	38	0,522
Gardinia sutepensis	25	0,097
Gluta usinata	56	0,687
Harrisonia perforata	6	0,069
Irvingia malayana	19	0,572
largerstromia sp.	13	0,115
litrocarpus sp.	413	5,843
Oroxylum indicum	13	0,107
Paretha indica	13	0,047
Phyllanthus emblica	6	0,022
Pterocarpus macrocarpus	113	1,292
Semecarpus cochinehinensis	6	0,216
Shorea obtusa	200	4,873
Shorea siamensis	281	4,348
Spondias pinnata	56	0,696
unknown 1	6	0,017
unknown 2	6	0,013
unknown 3	6	0,014
unknown 4	6	0,022
unknown 5	6	0,025
unknown 6	6	0,011
unknown 7	6	0,154
Vitex peduncuralis	44	0,334
Wendlandia tinctoria	44	0,173
total	1494	21,774

B.4 Forest Transect

One 32x6 meter plot and four 50x6 meter plots were laid out succeeding each other up the slope. In each plot all the trees with a diameter above 4.5 cm was measured and where possible the tree species was determined. Occurrence of stumps and signs of fire was noted. For the purpose of analysis the plots were separated according to the change in forest type, so that plot 1-4.5 was considered as the lower plot and plot 4.5-5 was considered as that upper plot.

Table 5. Forest Transect

species	TP/ha lower plot (1032 m ²)	TP/ha upper plot (360m ²)	TP/ha total
<i>Anogeissus acuminata</i>	39	0	39
<i>Aporosa villosa</i>	0	28	28
<i>Bombax ceiba</i>	10	0	10
<i>Bridelia retusa</i>	10	0	10
<i>Brownlowia peltata</i>	19	28	47
CAFI	10	0	10
<i>Canarium subulatum</i>	10	0	10
<i>Croton grandifolia</i>	10	0	10
<i>Croton roxburghii</i>	19	0	19
<i>Dalbergia rimosa</i>	10	0	10
<i>Dalbergia species</i>	19	28	47
<i>Dalbergia stipulata</i>	19	0	19
<i>Dimocarpus longan</i>	10	0	10
<i>E. subumbrans</i>	10	0	10
<i>Gardinia sutepensis</i>	0	83	83
<i>Grewia lacei</i>	29	28	57
<i>Irvingia Malayana</i>	10	0	10
<i>largerstromia sp.</i>	0	28	28
<i>litrocarpus sp.</i>	0	28	28
<i>Mangifera caloneura</i>	10	0	10
<i>Miliusa velutina</i>	0	28	28
<i>Oroxylum indicum</i>	39	0	39
<i>Pterocarpus macrocarpus</i>	58	28	86
<i>Pterospermum acerifolium</i>		0	28
<i>Quercus kerrii</i>	19	0	19
<i>Shorea obtusa</i>	0	56	56
<i>Shorea siamensis</i>	0	472	472
<i>Spondias pinnata</i>	10	0	10
unknown	0	28	28
<i>Vitex canescens</i>	0	28	28
<i>Vitex limonifolia</i>	10	28	37
<i>Wendlandia tinctoria</i>	0	111	111
Total	378	1056	1433

Appendix C

Name of village funds

Some of these budget foundations include (PRA):

- The Funeral Foundation or Fund³.
- TAO foundation.
- One million baht Fund⁴.
- Poverty foundation or the Gor-Kor-Kor-Jor Fund⁵.

Appendix F

Results of Internal key informant interview

Table 6 Crop calendar

Table 6.1 Rice (50 household)

Activities	Period											
	Jan	Feb	Mar	Apr	May	Jan	Jul	Aug	Sep	Oct	Nov	Dec
Cut away												
burn												
weeding												
grow												
weeding												
Put in fertilizer												
harvest												

³ This fund was established five years ago. It is a self help initiative by villages that mobilizes funds for use when someone dies in the village.

⁴ This was introduced in the village in 2002 and is especially used as source of loan funds for investment in agricultural and handcraft activities.

⁵ It is a fund from the Community Development Department that provided 280,000 Baht for poverty eradication in the village. There are 80 committee members in charge of the fund in the village.

collected														
นวด														
transport														

Table 6.2 Maize

activities	Period												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Cut away	_____												
burn				_____									
grow					_____								
weeding					_____	_____							
Put in fertilizer							_____	_____					
harvest								_____	_____				

Seed, 1 container/rai

Table 6.3 Ginger

activities	Period												
	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
plough		_____	_____										
dig		_____	_____										
trace			_____										
grow			_____	_____									
weeding					_____	_____	_____						
Put in fertilizer					_____		_____						
harvest								_____	_____				

-Fertilizer, first time 15-15-15(N-P-K), second time 13-13-21

-Seed, breeding stock 250 kilograms /rai. The price of ginger breeding stock is about 3-18 baht. The farmer start to sell young Ginger.

-Breeding stock is brought from outside the village, to avoid of disease.

-Yields, highest 5280 kg/rai; worst is 1980 kg/rai

Table7 NTFP calendar

kind	Period to collect	Place	purpose	Amount and price	Characteristic of trade and management	Comparison from past to now	Householder amount
Bambo shoot	June - Aug	Utilization forest & origin watershed forest	Eat / sell 1:2	5 tons 3-6baht/kg	Asking for permission from the owner	Not much shoot	20
mushroom	June - Aug	Origin watershed forest & utilization forest	Eat / sell 2:1	500kg 10-20baht / kg	Sell in the village, sell at the intersection of branch road	In the past, the amount is more than now, both quantity and number of customer	20
Broom grass	Jan - Apr	Origin watershed forest & utilization forest	sell	5-6tons 5-18baht/kg	Sell to middle man	They can not sell in the past	Every household
	All year	Original watershed forest	Eat/sell 4:1	200kg 10baht/kg	Sell in the village and intersection of branch road	In the past, there are more than now.	10
Banana flower	All year	Original watershed forest	Eat/sell 4:1	700kg 3baht/kg	Sell at the intersection of branch road	There were more in the past	10
	All year	Salai stream and Tong Tung stream	Eat / sell 4:1	500kg 10 baht/kg	In town	Now is more than past	10
honey	Feb - Apr	Origin watershed forest & utilization forest	eat	50 bottle 100 baht/bottle	Inside community	Decreasing because forest is decreasing	10
	Oct - Dec		eat	20kg 100 baht / kg	Inside community	increasing	10

Appendix G

Results from external key informant interviews

Topic/ Informant	Topic/ Informant	TAO	National Park Authority
National Park Border	Demarcation was done by the government in the first place, will now be renegotiated with officials and local Tao representatives.	The TAO tries to come up with a boundary that allows the villagers to meet their needs together with government officials.	The border is being redemarcated to exclude agricultural land. When the reserve forest area was made no technology was available to detect people living in the area.
Local People	There basic needs have to be covered for them to be able to consider nature conservation.	Major problem in the difference in needs and belief between the local people and the government. Villagers are afraid of the NP.	Cannot be blamed because they don't know better.
NTFP's		Prohibited in the NP, but an agreement for collection for own consumption can be made.	It is illegal to collect anything from the park, but practically local people can collect NTFP for their own consumption in the park
Community Forests	Local people makes the regulations themselves except that no commercial logging may occur. Powerful people have more access to forest products than marginalized People. Afraid that people will sell the CF area and turn it into agricultural land. CF's are not legally recognized		Are not legally declared, but preservation of the forest are in the interest of the local people as well.
Control			There will be guarded checkpoints where people can enter and exit the park, but they might not be used.

Topic/ Informant	Topic/ Informant	TAO	National Park Authority
Agricultural land	People can keep their agricultural land to support themselves, but behaviour impacting the park or downstream people will be punished. RFD tries to reduce shifting cultivation, so that each family have on 5 plots.	Population need more land for agriculture	Can keep the land they are cultivating at the moment, but they are not allowed to expand. Each family should have 15 rai, some have 100 rai, fallow land might be taken
Subsidies	Not always accepted by villagers, they want to keep their land. Farmers establishing rubber plantations get 600 baht/rai.		No subsidies will be given. The local people are doing something wrong so they should compensate the government.
Land certificates	Will not be issued, but people will get an exemption. Afraid that they will sell the land to capitalists and encroach on more forest area afterwards.		
Future	Aware that everybody is doing something illegal, so they try to compromise instead of focussing on the law.		Even though the growing population might need more land in the future, there will be no renegotiation after this.

(Source: Summary of external Key informant Interview)

Appendix H

Activities carried out and Participation of each group member

Day	Activities	Who Participated
Tuesday Jan 13	-Met with our Thai counterparts, and a group meeting where we planed and distributed tasks according the specialization of each member.	All group members
Wednesday 14 Jan	-Continue group work with the Thai Students, meeting with the headman, and arrange community meeting.	All group members
Thursday 15 Jan	-Planning for project presentation; Project presentation	All group members
Friday 16 Jan	Community meeting. Transect walk through the village for getting general overview of the village.	All group members
Saturday 17 Jan	Location of agricultural area and forest the fields and other land marks with GPS, soil sampling; Preliminary analysis of data	All group members
Sunday 18 Jan	Planning PRA Conducting PRA,	All group members
Monday 19 Jan	Preliminary analysis of PRA data, planning of further action Adjusting Questionnaires	All group members Moses, Maria and Ida
Tuesday 20 Jan	Pretesting of questionnaires Conducting questionnaires Forest inventory Preparation of midterm evaluation TAO interview	Moses and Maria Moses and Maria Liang and Ida All group members Thai students
Wednesday 21 Jan	Preparation of Midterm evaluation Midterm evaluation	All group members
Thursday 22 Jan	Day off in Nan	
Friday 23 Jan	Watershed management unit interview Conducting questionnaires Key informant interview Soil sampling	Ida Maria and Moses Thai student Liang + Thai students
Saturday 24 Jan	Questionnaire Water sampling Soil Sampling Testing of soil sampling	Moses & Ida Thai students Liang + Thai students Liang
Sunday 25 Jan	Forest Transect Indepth interviews Water sampling Soil testing	Ida & Liang Moses and Maria Thai Students Liang
Monday 26 Jan	National Park Interview Plan for the community meeting;	All group members All group members
Tuesday 27 Jan	Community meeting Debriefing note preparation	All group members All group members
Wednesday 28 Jan	Debriefing note preparation	All group members
Thursday 29 Jan	Final presentation	All group members
Friday 30 Jan	Leaving	All group members

Appendix I Questionnaire Questions