SLUSE Field Report

Based on fieldwork in the Mae Yom Watershed in Phrae Province,
Northern Thailand between the 19th and the 29th of october 1999.

The impact of the Mae Yom National park on livelihood Strategies in Ban Na Luang

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Introduction to Northern Thailand

Thailand has experienced a rapid economic growth since the 1950's. The growth was initially related to the use of natural resources, but has become increasingly dependent on urban-based manufacturing industry. In 1994 agriculture's share of GDP had declined to only 12% despite the fact that it employs 60% of the labour force (Fairclough & Tasker 1994:22).

Thailand once relied heavily on timber as a source of foreign exchange but since the 1970's Thailand has been a net importer of timber. In the period from 1950 to the end of the 1970's the rice production increased by more than two thirds. This increase in production was based on expansion of farmland into the forest areas surrounding the central plains (Hirsch 1993:27-31).

Another factor contributing to the deforestation was the construction of roads to remote and isolated areas, which opened up for clearance of farmland and logging. In 1963 the area covered by forest was estimated to be 53% but in 1986 the official estimation was 25-29% and unofficially 15%. This is the main reason why more than one quarter of the land in Thailand is considered to be heavily affected by soil erosion today (Hirsch 1993:15).

For the ruling elite, the issue of environmental degradation is related to the question of how long the resource base can sustain a continued industrial and commercial development. The environmental degradation has caused concern and resulted in changes within the national environmental policy. An example is the aim of leaving 25% of the land area as commercial forest and 15% as natural forest. This is pursued through different policies as afforestation programs, attempts to stop further encroachment through resettlement programs or granting of usufructuary rights, and not least supporting a change from extensification towards intensification of farming practices as expansion is no longer desirable (Hirsch 1993: 15,16,20).

The building of larger and smaller dams in the northern part of the country is part of this intensification. It has resulted in an increase in the water supply, leading to higher yields in particular areas (Cohen and Pearson 1998). The integration of the farmer into the market through intensification and change from subsistence production to cash production has forced the farmer to be part of a cash economy. This is causing problems for many poor farmers, as there is not equal access to financial support. One factor limiting access to loans is not having title deeds because title deeds are often necessary to obtain loans from banks. Nevertheless there exist other ways of obtaining loans for example the Bank of Agriculture and Agricultural Co-operative (BAAC), agricultural co-operatives (AC) or private moneylenders.

More than 60% of the peasants in Thailand are estimated not to have legal titles to their land. Included in this group are hill tribes like Karen, Yellow Leaf or Hmong. Besides poor land rights they often have limited citizen rights or none at all, which causes these people to be badly treated in conflicts with the Thais. As a result they often live under different conditions than the Thais (Hongladarom, 1999).

Since the 1980's the government has had development programs aiming at improving the living conditions for the poorest sections of the rural population through projects improving basic infrastructure and employment opportunities (Phongpaichit & Baker 1999:64). Also, there have been developmental programs focusing on instruction of farmers on farming practices.

In spite of the goal of a more equal geographically distributed development, most industries remain situated in the area around Bangkok, which in 1991 produced 52% of GDP, though it only contains 15% of the population (Fairclough & Tasker 1994: 22). The income gab between rural and urban Thailand has made hundreds of thousands of rural people migrate on a seasonal or permanent basis in order to support their families at home or leave agriculture behind them for good.

Study area

The above mentioned aspects are reflected in our investigation which was carried out in The Mae Yom Watershed, in between the 19th and the 29th of October 1999.

The Mae Yom Watershed is situated in the Yom River basin in the sub-humid tropical climate zone. There are three seasons, the rainy season, the cold season and a hot season. The rainy season is between the middle of May to the end of October. At the Yom Watershed Research Station, the average annual rainfall was measured to 1216mm in the years 1990-96. Almost 90% of the rain fell in the rainy season with intense rainfall in August and September. The rainy season is followed by the cold period which is also characterised as dry, from November to February, and from March it gets warmer again and there is more rain, but it is still relatively dry (Rungrojwanich, 1998).

In the Northern part of the Mae Yom Watershed, surrounded by forest, the highland villages Na Luang and Tha Wa are situated. The villagers are primary farmers dependent on rainfed maize cultivation. Both villages face the problem of isolation but are affected by different forest classifications; the forest around Na Luang is classified as National Park whereas the part surrounding Tha Wa is classified as National Forest Reserve.

In another part of the highland is Ban Pak Huai Oi situated. Here exist a Thai village and a Hmong village close to each other. Still, their living conditions are very different, which influences their agricultural and livelihood strategies.

In the irrigated lowland three different villages, Ban Klang Thung, Ban Huai Khum and Ban Wang Din, are situated. The cultivation of irrigated rice is the main agricultural activity and the water supply is, or has been, a scarce resource. The water supply in Ban Klang Thung and Ban Huai Khum has been improved due to the building of two medium scale dams. This has led to a larger crop variety and a possibility to grow two or three crops a year. In Ban Wang Din this is not the case, and all the fields lay fallow during the dry season.

Outline of the report

The report is divided in six parts, which correspond to the six villages studied. The first two parts discuss to which extend the livelihood-strategies of the farmers in Ban Tha Wa and Ban Na Luang have been effected by official restrictions on use of natural resources. This question is elaborated from different angles. The Na Luang part focusing broadly on livelihood-strategies and the Tha Wa more specifically on agriculture. The third part discus the possibilities for farmers in Ban Wang Din to increase their income in a sustainable way. Both, on-farm and off-farm income generating activities will be analysed. The fourth part discusses sustainability through the impacts the medium scale Mae Song Reservoir has had on the land use strategies employed by the farmers in Ban Klang Thung. The fifth part discusses how different land use patterns are sustainable, in an area with two different kinds of population groups. The sixth part is an analysis of the effects of the Mae Tang Dam on the agricultural production and of the changes in relation to sustainability.

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Mae Yom
Phrae

Preface

This preface is a description of the villages Na Luang and Tha Wa. It is meant as a contextualisation of the issues to be discussed in the respective fieldreports. Although the two groups have worked with different objectives and used different methods to collect data, we have some general information that is common for both villages, which is what we will now present. The data is primarily collected through interviews and references are only submitted when literature is used.

Introduction to Ban Tha Wa and Ban Na Luang

The villages Na Luang and Tha Wa are situated in the northern part of the Mae Yom Watershed in the Phrae Province, with Tha Wa situated approximately 7 kilometres south of Na Luang. The villages are both placed in a narrow valley, which in the Na Luang area is approximately 400 m above sea level and around Tha Wa the valley is about 500 metres above sea level. A tributary to the Mae Yom River runs through the valley, which is surrounded by hills from 600-1100 metres above sea level.

Ban Na Luang was founded in an uncertain past (at least more than 100 years ago), by people from the Sa district in the Nan Province. The settlement i Tha Wa began in the same time, but existed as a branch of Na Luang until 1979 when Tha Wa became an independent village with its own Village Committee. The infrastructure in the area is not very developed, however Na Luang is connected with Na Fai village to the north by a road eventually leading to Song and Phrae. The last 15 kilometres toward Na Luang is a dirt-road, which continues to Tha Wa village to the south, but from here the dirt-road ends in a track that goes further south to the paddy-fields and to the west connects the village to other villages.

Vegetation and soil

It is not likely that there is any primary forest left due to logging and shifting cultivation that was practised earlier. The natural forest is however, depending on the soil conditions, either Dry Dipterocarp or Mixed Deciduous Forest. DDF grows on shallow compacting soils that usually have a low fertility, where MDF are found on deeper and more fertile soils (SLUSE board 1999a). Only overall soil classifications have been made for the area (Ministry of Agriculture and Cooperation 1990).

Classification of land

The classification of land in Thailand is a rather confusing topic, and many areas are usually affected by various regulations. In order to try and understand the regulation of the natural resources in Tha Wa and Na Luang, we have tried to illustrate what different classifications Na Luang and Tha Wa is limited by, which can been seen in appendix 1-3. We will return to the actual consequences of the different classification.

As mentioned in the introduction to the Mae Yom Watershed, logging has together with expanding agriculture resulted in heavy deforestation and degraded forest. Therefore the government made different laws in order to regulate the forest resources. In 1941 the government adopted the Forest Act, which should stop deforestation in areas designated as forest reserves. The National Forest Reserve Act followed 1964, which was implemented when realised that the Forest Act did not work (Forvaltning af den thailandske skovressource 1998:57-58). Among other things, the Natural Forest Reserve Act prohibited cultivation inside National Forest Reserve (Feder et al. 1988). As land already under cultivation was designated as National Forest Reserve this resulted in a situation, where farmers were cultivating their land illegally. Furthermore RFD[i] got authority by the National Park Act in 1961 to establish national parks, where no use of natural resources were allowed. The Forest Act, the National Forest Reserve Act and National Park Act are all administrated by different parts of the RFD (Forvaltning af den thailandske skovressource 1998:57-58).

When the government has implemented new laws with the purpose of improving the regulation of forest resources, they did not abandon already existing laws, which resulted in a situation, where different laws worked at the same time.

Parallel to the different acts regulating the forest resources, the whole area of Thailand has been divided in different zones in order to optimise and regulate the general development of the country. The land was divided in three zones; conservation zone, economic zones and agricultural zone. The C-zone would include Natural Forest Reserve, National Parks, Wildlife Sanctuaries and mangrove forest, which still should be administrated by the RFD, where as the agricultural zone and the economic zone would be administrated by the Land Reform Department. It has not been possible to find sources describing the function of the A- and E-zone, but the farmers can according to the RFD-officer in Song apply for land in the E-zone.

When the Thai government in 1979 realised the importance of conserving the forest in order to manage water resources on which the agriculture is very dependent, a third classification was made.

Forest area was divided in five different zones from 1A to 5, with different grades of restrictions on land use. Most limits are on areas classified as 1A, as this is considered most important to watershed management (SLUSE-board 1999b).

The area around Na Luang and Tha Wa, and thereby the situation under which the villagers legally can use the natural resources, have naturally been influences by the different laws and classifications mentioned above.

The area around the villages was defined as Forest Reserve in 1941 and furthermore as National Forest Reserve in 1964. The village-areas and their belonging paddy-fields were excluded, but still under Forest Reserve Act. From then on it was officially illegal to cultivate the slope-fields. When the Mae Yom National Park was established in 1986 around Na Luang with the border running north of Tha Wa, further restrictions were put on the land-use in this area. Inside the national park the Forest Act, the Natural Forest Reserve Act as well as the National Park Act are all valid at the same time, see appendix 1.

Parallel to division of the land described above, Ban Tha Wa is situated in an E-zone of approximately 7-8 square kilometres. This zone is surrounded by a C-zone, which also covers the national park, except Na Luang village area and probably the paddy fields. According to the land-zone map this area is neither classified as A- or E-zone, see appendix 2.

In relation to watershed management the valley in which Ban Na Luang and Ban Tha Wa are situated is classified as zone 3, whereas the slopes are classified as 1A. As the valley around Ban Na Luang is very narrow, the area of zone 3 is bigger near Ban Tha Wa, see appendix 3.

Social structure

Ban Na Luang presently consist of approximately 630 inhabitants distributed in 144 households. In Ban Tha wa the population is 318, living in 67 households.

As far as we know all the villagers are Thai and Buddhist's (except from some yellow leaf-people living in or around Ban Tha Wa) . The family-pattern in the villages[ii] is based on matrilocal extended stem families[iii]. The pattern of matrilocal residence was for various practical reasons not always followed, but the villagers stress the importance of living near kin as they can help one in the farm and in case of sickness. Kin also help each other to raise money for paying of dowry (between 10.000 and 50.000 bath to the wives family), but in case of a bad harvest each household depends on its own ability to either borrow or raise money through labour.

It is normal to divide the land equally between all children, which means that a married couple from the same village will be able to cultivate land inherited from both sets of parents.

Institutions

A village committee of 23 members administrate each village, consisting of one headman, two vice headmen and 20 members from the village. The functions of the village committee is to take initiative to development projects in the village, enforce village laws, administrate government funded poverty alleviation loans, pass on information from government agencies to the villagers, settle conflicts etc. In Na Luang this is done through different sub-committees; governmental-, health-, development-, social welfare-, treasury, - and education committee. The headman elects the members of these committees. Whether this also counts for Tha Wa is not certain. Na Luang and Tha Wa are part of the Sa Ieb Tambon (sub-district), Song Amphore (district), Phrae Province.

Several interest groups exist in both villages. Common for them is, that they function as co-operatives and aim at providing their members economical support. The groups are; the maize group, a funeral fund, BAAC (Bank of Agriculture) group, and the farmers wives group. In Na Luang there is also a saving group. Beside the economic dimension of these institutions they are having organisational impact, as the farmers realise that they together can achieve certain advantages. In Tha Wa these groups are promoted by the extension-officer.

Livelihood

The villagers in Na Luang and Tha Wa are primarily farmers cultivating paddy rice for consumption and maize for sale as well as some peanuts, fruit trees, and vegetables. The villagers are more or less self-sufficient with alimentation. Their stable food, paddy rice, is supplemented with vegetables and fruit from their homegardens, poultry, fish from the river, NTFP and occasional game from the surrounding forest[iv]. Apart from cash crop farming in both villages can supplement their income with sale of NTFP, local employment and labour-migration. According to the household-surveys carried out in Na Luang and Tha Wa nearly all villagers own land, ranging in Na Luang from 3-34 rai and in Tha Wa from 4-70 rai[v] (1 rai = 0,16 hectare).

Tenure

The question of land-rights is, as in the rest of Thailand, quite complicated (Feder et al. 1988). The situation in Na Luang is, that most people have NS3 on their paddy fields. NS3-papers are issued by

the Department of Land and can only be obtained in areas outside forest reserve. This is considered to be a secure document, but is not a real title-deed, but a certificate of use that can be transferred into NS4 which is a full title deed. NS3 enables the owner to sell, transfer and legally mortgage the land, and in practice NS3 is often considered to be as secure as NS4 (ibid.:11). In Tha Wa the farmers have not obtained NS3 to their paddy-fields, the reason for this is unknown, but as the whole tenure-situation is very complex, our impression is, that the farmers do not know the rules and procedure to gain land-rights. In both villages, some of the farmers used to have STK to parts of their slope fields. STK is a temporary use-right, issued by the RFD, which can be given to land inside National Forest reserve, and must be seen as a compromise from the resolution prohibiting agricultural cultivation inside land classified as National Forest Reserve (Feder et al. 1988). STK cannot be sold or mortgaged legally, but in practise land with STK-right is sold and mortgaged locally. STK were issued in Tha Wa and Na Luang after the establishment of the NP and were valid in a five-year period. When they expired 5-10 years ago the RFD collected them. The villagers in Na Luang were apparently promised SPK, which also is a temporary usufruct certificate, but issued by the Land Reform Office (ibid.:19), but they have still not received it. This indicate that some of the land including slope-fields around Na Luang is classified as either A- or E-zone, as the Land Reform Department is responsible of issuing land-rights in these zones. In Tha Wa the villagers told they were promised new STK-papers, which is contradicting if Tha Wa is situated in an E-zone, but the villagers might not have correct information on this matter. Neither received any land-rights yet. In both villages farmers are cultivating land where land-rights never have been granted.

As we have seen the villages Tha Wa and Na Luang are in many ways similar, the villagers also have some different conditions under which they can make a living. The differences are mainly due to restrictions on the use of natural resources. The following description, analyses and discussion of Na Luang and Tha Wa – as these were investigated by different groups with different objectives and disciplinary composition - are not meant to be strictly compared.

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[i] RFD – The Royal Forest Department. established in 1896 to issue logging concessions and control deforestation (Forvaltning af den thailandske skovressource 1998:54)

[ii] this was investigated in Na Luang only. but as the pattern found there corresponds with the general family structure in Thailand (Potter 1976. Limanonda 1995). we assume it to be similar in Tha Wa.

[iii] This means it is the norm for newly weeds to move into the household of the woman where they will live for a couple of years and help the parents in law on their fields. When they have children they will normally get a share of land and construct a house of their own. ideally close to the parental house of the woman. The youngest daughter is expected to stay in the parental house after marriage to take care of the parents when old.

[iv] The main NTFP-products are mushrooms. bamboo-shoots, honey, pak-wan. ant-eggs. firewood. construction-material, game.
[v] Some of this could be fallow-land

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SLUSE-board
1999a *"Introduction to study-area"*. 12-09
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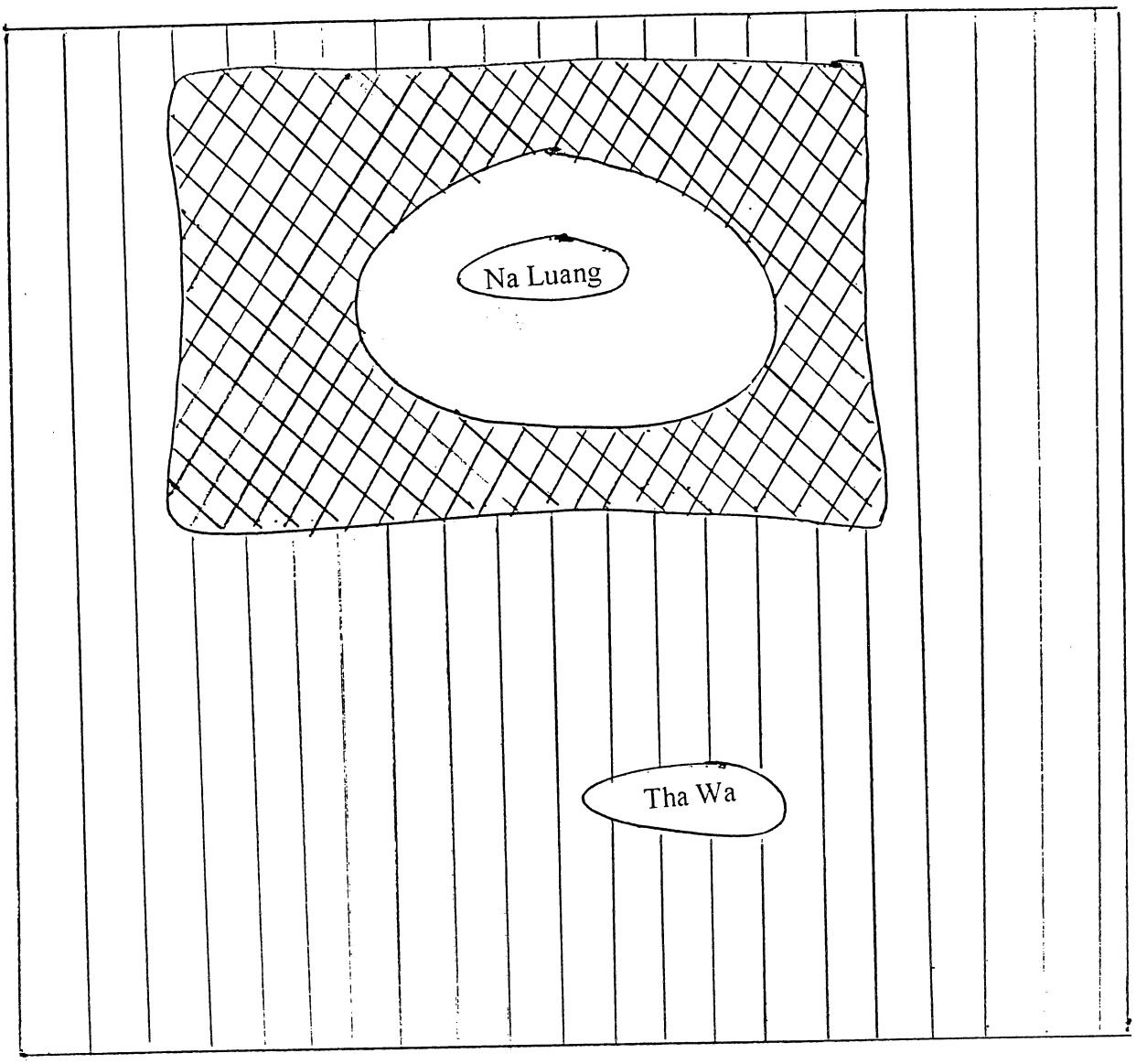
Appendix 1

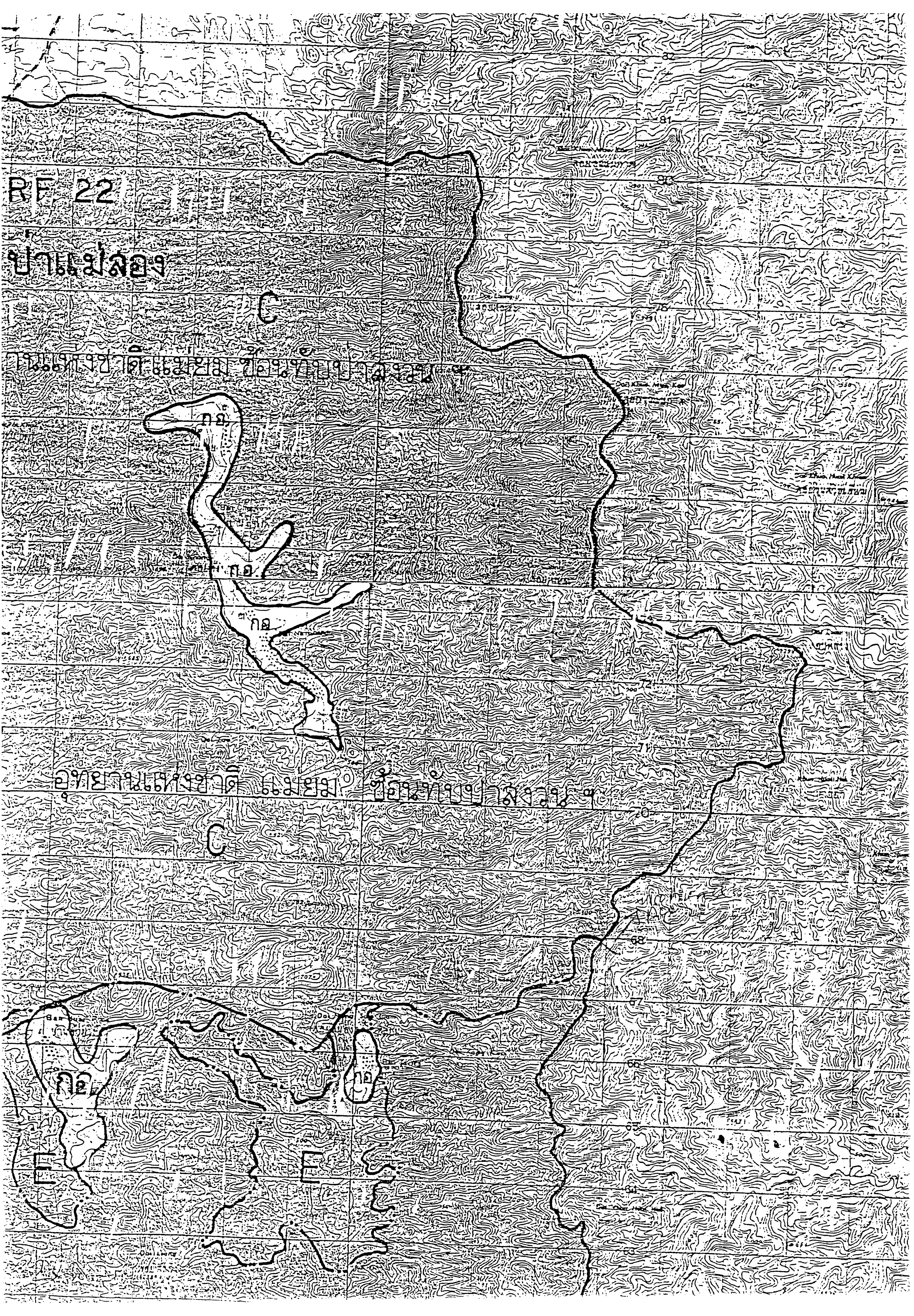
Model of acts regulating forest-resources in the northern Mae Yom Watershed



Forest Act

National Park Act

National Forest Reserve Act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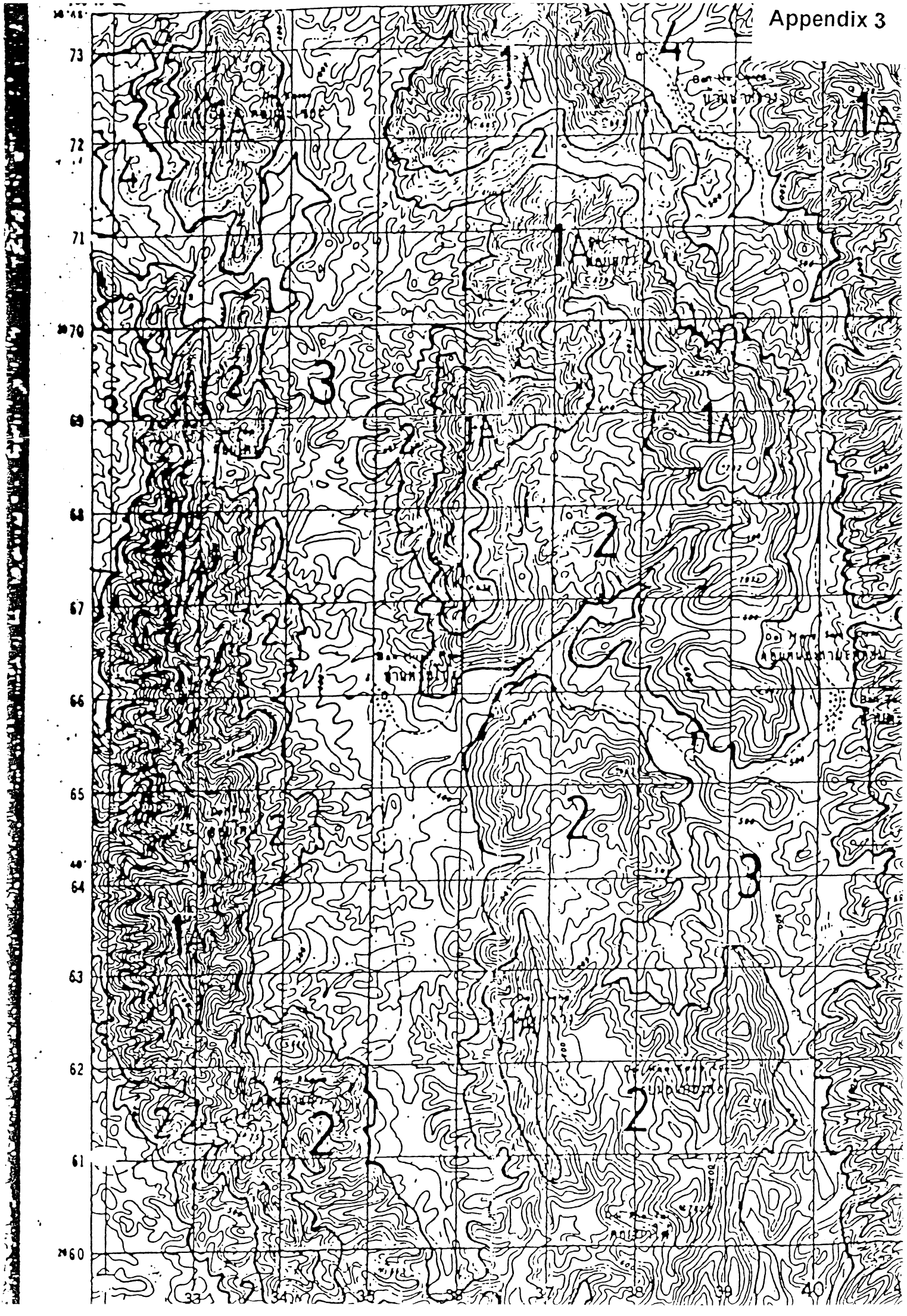
Appendix 3



Introduction

Our fieldwork location was Ban Na Luang village, which is situated in an area that was declared National Park in 1987. We found this site interesting because it gave us the opportunity to investigate the impacts of a National Park on the surrounding society.

As the corner stone in the traditional type of conservation is protection from human intervention, conflicts will often arise between local villagers and the administrators of the national park as people depend on the natural resources to be restricted when a national park is established (Blaike & Jeanrenaud, 1996). The people living in or near protected areas often derive little or no economic benefit from conservation, at least not in a short time-perspective (Wells 1992) . These conflicts can result in poor achievements of the national park objectives as people can be forced to use the same resources illegally.

The Thai approach towards conservation has not been any different than the general described above. The establishment of NP's was an acknowledgement that population growth, commercial logging and expanding agriculture had degraded natural resources. In the past local communities were not taken into consideration in the planning of conservation projects (Ghimire1994). A consequence of this was that many communities became illegal squatters, as the land they had inhabited for many years was suddenly designated to be a conservation zone. At the same time the national growth policy has resulted in large infrastructural constructions for instance like dams, with high degrading impacts on the environment or large commercial re-plantations, as described in the general introduction to the Mae Yom Watershed. In both cases the result was evictions and mass resettlement schemes, which caused a lot of resistance. This growing opposition against national policies contributed to the emergence of a strong social movement, working to secure the rights of the local people.

In Mae Yom the local communities have not been integrated in the management of the national park, but people have been allowed to continue cultivating their land, which has been excluded from the national park, and this is a change compared to conservation projects in the past.

Nevertheless we believed the national park to have some impact on the livelihood strategies pursued by the villagers in Ban Na Luang, as a consequence of the restrictions on natural resources-use caused by the establishment. This assumption led us to the following overall objective of our investigation:

Which impact the establishment of the Mae Yom National Park has had on the livelihood strategies from the villager's point of view.

The villager's point of view is investigated, as we believe local participation in managing local resources is a necessity, in order to gain the objectives of the nationalpark. To investigate the impact of the nationalpark on the livelihood-strategies in Ban Na Luang, we worked with the following hypothesis:

1. Our main hypothesis was that the prohibition of expansion in the NP combined with the population-growth would have forced the villagers either to choose alternative livelihood-strategies, to intensify their agricultural production, or to engage in illegal activities as expansion or use of NTFP's. (Between 1977 and 1997 the population growth was 50% in Na Luang.)
2. Another hypothesis was that the growing importance of NTFP had increased the pressure on the resources and indirectly on the formal or informal village institutions regulating the resources, assuming that some institutions existed.
3. As we believed part of the villagers' livelihood strategies to be illegal our last hypothesis was that there would be visible conflicts between RFD and the villagers.

Limitations

Due to the disciplinary composition of the group (will be described in the methods), we have not emphasised the economic aspects of the livelihood-strategies pursued by the villagers, which we find would have improved our ability to draw conclusions considerably.

In Spite of realising that the cultural aspects of resource use are important, we did not investigate the issue of local natural resource management from a cultural or religious angle, as we did not believe it would be possible to investigate these aspects in the time we had available.

Concept clarification

Livelihood-strategies: Livelihood strategies we perceive as the different activities people engage in to secure their need for food and cash, and is thereby a wider concept than a farming system approach, as all activities contributing the household economy is included.

Institutions: We use a broad definition of institution where institutions are the rules-in-use and this is both for formal and informal institutions (Ostrom 1992).

Outline of the report
The report is divided in three parts:

1) Description and discussion of methodology.
2) Description and discussion of findings of the main livelihood-strategies pursued by the villagers.
3) An overall discussion of our findings in relation to our objective and the three hypotheses – which will end with a short conclusion.

Methodology

Inter-disciplinary and inter-cultural group-work

The Danish part of our group consists of a student of anthropology, forestry, human geography and human geography cum international development studies. The Thai-part of the group consisted of students from human and natural geography, watershed-management, soil-science and forestry.

Our problems in Denmark before arriving in Thailand were primary related to communication. After succeeding in creating a "common language" we found our interests and methods to be quite similar and /or mutual complementary. Our perspective was mainly social scientific, which coursed some problems when meeting the Thai-students who were far more natural scientific in their approach. The disciplinary composition within the group made it impossible to work together in sub-groups with the same background.
Unfortunately we never succeeded in creating a true common project with the Thai-students, as we mutually included the other's proposals without much debate or compromising. As we were much more well prepared than the Thai-students, who had only met once, our suggestions came to dominate. The Danish tendency to dominate could well be explained by cultural differences in the way of discussion, scientific approach and so on. But we have no chance of knowing as our main obstacle to establishing an equal relationship was the language-barrier (the Thai-students did not master English very well).

Description of methods

We considered that our questions would best be answered through the use of case-studies. This was due to the belief, that by investigating specific cases in depth, we would gain a better understanding of not only the strategies people use to survive but also the motivations behind them as well as the socio-economic context within which they are conducted.

To enable us to select the most interesting cases for more in-depth studies the ideal situation would have been to make a survey of the whole village. But the amount of households combined with the time available forced us to limit the survey to a smaller amount of household – to construct a representative and manageable sample or mini-model of Na Luang. For this purpose we aimed at interviewing 20 % of the households. Because we expected the headman to posses a considerably knowledge of the households, and because we were working under a time limit we discussed to let the headman help us chose our cases. But as we feared the headman to be biased, we decided instead to make our own sampling. Geographically we expected some income related pattern of settlement as well as a tendency to live together in family-clusters. As we wanted to avoid interviewing only members of a few families and/or only from one income-strata we decided to make a geographically stratified random sampling instead of a totally random one. We thus selected every fifth household, starting from house-number one.

Before engaging in the survey we found it necessary to get some background information about the village. So we chose as our first method to interview the headman and the teacher about general issues, as well as to gather as many secondary data as possible. The type of interview chosen for this was semi-structured interviews. We prepared some topics of interest, which we used as a guideline for both interviews. In relation to the secondary data, we did not spend sufficient time getting an overview and translation of data obtained from the headman and the health-centre, to be able to use it.

We decided to use structured interviews in the household-survey in order to get comparable data. In appendix A there is a copy of the interview-guide. One Thai-student and one Danish student together with an interpreter carried out the interviews. Our objective of the survey was to identify the present livelihood-strategies and the changes caused by the establishment of the NP. Founded in the assumption, that the socio-economic status of the household would influence the chosen livelihood-strategies we posed questions regarding– members, age, educational level, years in the

village. To identify the livelihood-strategies of the households today and before the establishment of the national park, we posed questions regarding main-working activities presently and in the past. In relation to the agricultural land-use we wanted to clarify the relative importance of each activity in relation to crop, consumption, sale and time/work-load. Regarding the use of NTFP we wanted to identify which products they use/used and their relative importance in relation to consumption, time/work-load and sale, and to find out if people considered the productivity to have increased or decreased compared to 15 years ago.
We gathered information on the size of land cultivated by each family, today and before the NP to gain an impression of the rate of expansion per household. As we expected the possession of tenure rights to be important for the land-use-practises conducted by the households we posed questions about the tenure-situation of each household before the NP and now in order to identify the extend and types of tenure in Na Luang. We also posed questions about the extend of technology used for farming, as a means to identify a connection between tenure situation, amount of land and level of intensification. We ended the interview with an open question on peoples feeling toward the NP, and hoped thereby to get a personal statement as a supplement to the more quantitative data.

After the first experiences with the interview-guide we realised the necessity of simplifying and clarifying some of the questions. The reversed interview-guide was unfortunately not ready to use until half of the survey was conducted. The most important change was the inclusion of a question about the household income. We had wrongly anticipated this sort of questions to be sensitive why we had not included it in the first version. Unfortunately we were not consistent in asking about net/gross income, which combined with the small sample made it difficult to use these data as a parameter for the selection of households.

Next step in the process was to gather all the information from the survey to facilitate us with an overview whereby to select interesting topics and cases for further investigation. We decided to fill in all the data in a big table and conclude it by making some descriptive statistic on the material. Due to time-constraints we did not make any conclusion until we arrived in Bangkok, but used the table as a source of information where from each subgroup could choose households that seemed interesting in relation to the topics.

Discussion of methods used in relation to the household-survey

We might have approached the problem differently. As an example we could probably have spared the informants for many questions about land-use beginning with a participatory work-shop. There invited farmers could have helped us identify crops and NTFP used by the villagers and their respective seasons, what technology was used for which crops, identifying institutions and influence, and identifying problems/interesting topics. Participatory ranking and matrix scoring could have been used to get an idea of the relative and absolute importance of the different crops and NTFP. This method was rejected due to fear of bias, chaos and lack of participation, but could maybe have been a more rational use of the limited time for gaining much of the basic information we asked for in the survey. The main purpose of the survey was to gain information, which could be the base for selection of cases. For this purpose the survey could have been more goal-oriented if based on more detailed local knowledge. As it turned out we gained a lot of "obvious" data due to the fact that the livelihood strategies of the villagers were much more homogeneous than expected. However we did not get information about institutions, conservation-strategies or the details about labour and migration, which would have been helpful for the selection of cases.

We realised that many of the questions posed in the household survey were sensitive, due to the restrictions on use of natural resources. It was therefor extremely important to make the informants feeling comfortable with the interview-situation as well as create confidence. It might have helped us establishing a faster rapport with the villagers if we had chosen to go out in the fields to make the structured interviews while helping harvesting maize. The experience we had with participant observation/interview showed it helped the informant relax. It could well be that the participation helped confirm that we were not officials, and the rumours about foreigners harvesting maize sure increased people interest in and knowledge about our presence.

The idea of gathering all the data from the household-survey in a table was very good. But because of time-constrain we did not have the time to get a common overview, which made the selection of cases maybe somewhat more random than expected, anyhow the table did work as a good tool for the separate subgroups. Furthermore when filling out the table we realised that even though we all used the same interview-guide, the quality of data were differing. For example as we did not discuss what kind of additional observation to make visiting people in their homes, the observations varied a lot, and it was therefore not possible to compare between the different households

Next step...
The first half of the fieldwork went with gathering the above-mentioned information, which enabled us to see our objective in relation to the local context. Next step was trying to decide which aspects to investigate further in order to answer our working question. These aspects were:

1. The implications of tenure for intensification of agricultural production
2. The national park's impact on expansion and the conflict between NP regulations and local praxis.
3. Local efforts to conserve the environment with focus on the use of Non Timber Forest Products.
4. The possibilities and constrains for choosing alternative labour-strategies.

Sub-group method: Tenure

From the household-survey we had some information about the tenure-situation. Although some farmers had explained, that the RFD had collected some of the STK-papers in the village, it still looked like households within the village were in different situation. We found it interesting to see, if the question of tenure had any impact on the farmers' choice of agricultural practise in relation to the choice of either intensification or expansion in order to increase the agricultural production. This we wanted to investigate using semi-structured interviews with selected households from the survey. Semi-structured interview was chosen as we found it important that the villagers should explain their own situation. We also found it relevant to analyse the soil-quality on the fields belonging to the selected households, in relation to possible intensification. Finally we found it relevant to see if we could demonstrate a change of land-use over time, understood as the area cultivated and illustrate this change on a map. Our idea was to measure the cultivated area around the village, which we could compare with aerial photos from 1983 and topographic maps from 1991. We also wanted to take soil-samples and make GPS measurements on all the fields belonging to the selected households. It turned out this plan was way too ambitious due to limited time, so we chose to measure GPS on selected fields belonging to the interviewed households, to see if we could show whether they had expanded or not. The fields were situated close to the forest when possible, in order to compare the soil under cultivation with soil-samples taken in the forest
As it is no longer possible to expand the paddy-fields we found it most relevant to investigate the slope-fields. Furthermore it seemed like everybody cultivating paddy-rice possessed NS3 to their paddy-fields, and it would therefore not be possible to make comparisons.

We chose to select eight cases, from which we could choose some special interesting households for further interviews if there was time for this. The cases were selected from 5 parameters, which were: size of land belonging to the household, tenure, change in tenure, income, and level of technology used in the production. With 8 cases it was not possible to choose households in a way that gave us the opportunity to isolate the parameters, but we found it important to select households that presented extremes as far as we could on theses 5 subjects. Unfortunately we did not have time to interview all the selected households, so we ended up with 6 interviews.
The information of income was as described earlier not fulfilling, but when possible we took this parameter into consideration. It can be discussed if the information gathered in the household-survey were reliable at all, as questions concerning especially the amount of cultivated land was very sensitive. It turned out that the selected households were not so different as we thought, and that the situations of some of the households were different than described in the survey-table.

In the semi-structured interviews we posed questions regarding where fields belonging to the household were situated. We were also interested in whether rights to land determined the possibilities of loaning money as well as their marketing possibilities and connection to extension-workers. We furthermore found it relevant to know if there were any possibilities of expanding land and finally how the villagers perceived the question of tenure.
We prepared questions for each of these topics, but it turned out that there were far too many aspects to gain insight in when only talking to the informants for one hour. As we found all the aspects very important we did not exclude any, and the amount of data are therefor not equal in between the interviews.

Soil-samples

On each field were taken three samples in a depth of 15 centimetres respectively upper-slope, down-slope and if possible from the forest to have this as a reference to soil-properties of non-cultivated land. The samples were dried and then the three samples from each spot were mixed and analysed with the a simple soil-kit in order to determine texture, colour, pH, EC, content of P and K. In Bangkok to the content of organic matter in the soils were analysed. The slope-gradient was also measured by GPS and a compass.

The data collected could be useful discussing specific cases but were too meagre to conclude anything general on a village level. As data from the semi-structured interviews are not suitable for case-stories, we have chosen not to include the results from the soil-samples in the discussion on findings.

Mapping

In Bangkok we made maps of the change over time for two fields belonging to one household. As the scale of the aerial photos and the topographic map were not the same, extrapolation was done by hand, the accuracy of the maps are therefor not precise. Furthermore the insecurity of the GPS is up to 100 metres, and therefore the accuracy of the findings can be discussed. To get the best result, several GPS-measurement was done on the outskirts of the fields. Working with maps and aerial photos always is an interpretation, and making own maps an interpretation and simplification of reality. Unfortunately these aspects were not discussed in the group.

Unfortunately no Danish students participated in making the maps and soil-samples, therefor we cannot discuss the details regarding these methods in depth, and the findings of these methods have not been given first-priority.

Sum-group method: Forest products

The household survey showed that most households have been utilising the forest recourses in one way or another for decades. From the same survey we got an idea of which forest practices and extracted forest products that is and was most common.

We found it interesting to further investigate whether the villagers due to NP had changed their behaviour in regard to choice of main utilisation site, methods of extraction, kind of extracted products and amount of extracted products. Furthermore we wished to investigate whether the forest users had had or did have any conscious or non-conscious behaviour that prevents overexploitation of the utilised forest resources. Finally we wished to get an overall idea of the amount and kind of products sold before as compared with today, and to whom or where such products are sold.

To obtain data on the above mentioned we first of all made a structures interview guide (see appendix G). This guide contains general questions regarded to our objectives on the commonly used NTFPs today and before NP. Originally we intended to use this guide in a mini survey consisting of 10 of the households from our previous survey. These 10 households were selected on

behalf of the following criteria: The household should collect NTFPs very often today and before NP and have one member that had an age that could provide reliable information on the situation before as well as to day. One half of these households should be selling product and the other not, the idea behind this was later on to compare these to analyse whether this had an influence on there behaviour in the forest. Furthermore the selected 10 households should include at least one household that had a lot of land, had very little land, was very rich and was very poor to be able to find any relation between behaviour and amount of land and amount of income.
Due to lack of interpreters at this stage in the survey we only managed to use the guide on tree households. Due to this we decided to find a key informant to provide us with the information. In this search we ask about 10-15 villagers to point out a key informant on the issue. The typically answer we obtain by doing this was: "*everybody in the village have sufficient knowledge on forest products to help you*". Besides the use of this key-informant we used simistructured interviews methods when interviewing two shopkeepers, one middleman, the medicine man, and other relevant persons who could provide us with relevant information. Furthermore companioned by informants we went on two forest-walks in the main utilised forest areas, and on one in the sacred forest. During these trips we utilized GPS primarily to measure the location of these areas. Furthermore we used participatory and own observations, primarily to obtain information on how products were collected and how exploited the areas was, and to determine vegetation types.

Sub-group method: Institutions
The area of investigation was the local institutional aspects of natural resource management; what kind of institutions were directly relating or being important for the villagers natural resource management and land-use in general. With a special focus on institutions who practised some kind of regulation of use of natural resources.

The investigation was divided in semi-structured interviews with key informants providing us with information on the institutional setting on both regional and local level and semi-structured interviews with selected households.
We selected the Village committee, as it is a key institution in a local context and key officials within RFD as it is the main institution responsible for the management of the NP.
We chose the households for further interviewing from different criteria but securing that opposing opinion were represented within each category. This provided us with several categories of extreme cases. The criteria for selection of households for further interviews were;

frequency of use, opinion on the necessity of the NP, practise of expansion of farmland, wealth and compliance with formal or informal rules

Sub-group method: Migration and labour

From the survey we knew that the labour activity of the interviewed households had increased during the last fifteen years with around fifty percent, and that one third of the households presently had one or more absent members due to migration. We anticipated local labour market and migration to be two alternative income-generating strategies open to farmers, who due to the limitation of expansion and the rising cost of intensive agricultural production could have been forced to make a living out of something else than farming or supplement their income through off-farm activities. For testing this assumption we choose to interview the families of the absent members and those engaged in labour-activities about the type of job, place of work, contribution to the household economy, time used on labour and the motives behind choosing one of the strategies. We also wanted to learn about the families feelings toward these strategies and their future plans.

As we learned from an interview with the headman that several migrants had returned home due to the economic crisis, we wanted to confirm this information, and what situation newly returned migrants were facing in Na Luang. Therefore we selected some additional households with returned migrants that didn't figure in the survey.

As it is increasingly recognised that much rural-urban migration is circular rather than permanent in the sense that migrants don't plan to leave their village for good, we found it important also to look into the incentives (push/pull factors) of returning home.

A total number of 11 households were selected for semi-structured interviews.

For various reasons we ended up mainly interviewing the relatives of the migrants. This is off course a serious bias regarding the actual factors leading either to migration or returning home. We therefore also lack information on how the migrant situation was experienced by the migrant themselves.

General bias

Bias can be discussed infinitely, but for the purpose of this report we find four aspects of major importance. The use of interpreters was a challenge for various reasons. First of all the interpreters were not professionals, and their abilities differed – in general they were very competent, but one

for example had some troubles knowing the difference on past and present, male and female. Secondly their position as fellow students was both an advantage and a disadvantage. During the preparation at the base-camp we were maybe too eager to include the interpreters as participating members of the group, which gave us valuable information but maybe also led to the problem of them interfering too much during some of the interviews. The fact that we used three different interpreters was a potential problem regarding the exact wording of the questions – they only used little time to decide on common translation. The word potential explain the problems of using interpreter in a nutshell – we were off course not able to control how the questions were asked and how much of the answers was translated, how much explained and how much forgotten.

The second bias is related to the reliability of data involving time-perspectives. As our focus was changes, time played an important role in our survey. We tried to relate the time span 15 years to e.g. the age of the informants children, but in spite of this we must conclude that it might be unrealistic to expect informants to be able to remember that far back. It is also possible that we did not manage to be consistent in the way of asking. That the data obtained were not always reliable we realised in further interviews; for example an informant was in the survey cited for having worked as a migrant 15 years ago, when it turned out it was only last year.

The third bias is the sensitive questions posed about the amount of rais the villagers cultivated, the tenure-situation and the collection of NTFP, which actually is prohibited. It was e.g. very peculiar how most farmers cultivated exactly 15 rais, which is the size of land possible to cultivate legally if having STK. It was obvious that the farmers feared we co-operated with the RFD or other officials, and in several occasions we found out, that the information gathered in the survey were not reliable when interviewing the farmers again. It is to be further discussed if information gathered on these topics are reliable at all.

Finally it can be discussed if the households selected were extreme enough. After doing the survey we realised that by coincidence we did not interview a shop-keeper, tractor-owner or the rice-mill or other deviating radically as we found out the village were rather homogeneous. Considering we wanted extreme cases it would have been a good idea to interview the households which livelihood-strategies differs from the normal.

Validity of data

When analysing the data, we are aware that the basis of which to draw conclusions is very meagre. This is especially due to the limited time spend with the informants. We arrived in the middle of the

maize harvest, and this put a natural limit to the time the informants could spare to talk to us. This obstacle combined with our own time limitations made it impossible to re-interview our informants and also to contact new informants if realising that the selected ones were not suitable. Our initial intention was to build our analysis around cases. As mentioned earlier this was due to the belief that by investigating specific cases in depth, we would gain a better understanding of not only the strategies people use to survive but also the motivations behind them as well as the socio-economic context within which they are conducted. This was however not possible as we decided not to bother the households with succeeding interviews.
We did select the informants from specific criteria though, to cover both extremes and representative cases found in the survey. Therefore we do believe that we can justify our analysis, but in the same time we urge the reader constantly to bear in mind the limitations of data, whereupon we base our generalisation.

Agriculture in Ban Na Luang

As the villagers in Na Luang spend their main working-time with farming, we find it appropriate to say, that their livelihood-strategy are in general focused on agriculture. As mentioned in the introduction to the villages investigated in location 1, the farmers in Na Luang are more or less self-sufficient with alimentation, but they spend a considerable time cultivating cash-crops with maize as the dominating cash-crop. The agriculture is therefor depending on the local conditions as well as the village's connection to the domestic market where the maize is sold.

The production of agricultural products, depend on a number of factors. These are connected to the ecological factors (which we have not investigated) as well as the structural and institutional basis the society provides, these are the aspects we will discuss in this chapter. In order to evaluate if and how the NP has influenced agriculture in Na Luang our focus will be on the socio-economic factors present in Na Luang and to some degree the general developments influence on agriculture during approximately the last 15 years. The cultural aspect of agriculture will not be investigated.

The landscape around Na Luang is characterised by a limited area of flat land in the valley and the surrounding slopes. It is only possible to cultivate one crop of paddy-rice a year, as there are no possibilities of storing water for agricultural purposes. The slope-fields are in general quite steep, in some places with a gradient up to 45%, and with no use of terrace constructions. The management

of these fields are therefor important in relation to avoid soil-erosion, and the steep gradients on these fields are not suitable for the use of machinery.

Changes in agricultural production

There have been some change in the crops grown in Na Luang during the last 15 years as it can be seen in table 1. Our data derive from our survey of 27 households which is not enough to quantify the changes but we believe the numbers describe a tendency.

Today most farmers grow paddy-rice exclusively for home-consumption and maize as the main cash-crop. The number of farmers cultivating paddy-rice has increased a little, while maize is a far more important crop today than before, where the main cash-crop was peanuts. Highland-rice has also decreased. There has been an increase in vegetables and fruit production, which both are grown for home-consumption and for sale. The development has been towards more production of cash-crops. As a increasing numbers of farmers have started to grow fruit-trees, this could indicate that the villagers have invested in more long-term farming-practices. This was explained by some villagers, as an attempt to raise the income from cash-crops. Apparently these investments have had very limited success, as the yield is not sufficient to sale.

Tabel 1.The number of households growing different crops from our survey of 27 households.

Crop		Paddy rice		Highland rice		Corn		Peanut		Vegetables		Fruit trees	
Sub. Or sale?		Sub.	Sale	Sub.	Sale	Sub.	Sale	Sub.	Sale	Sub.	Sale	Sub.	Sale
Now	No	23	0	3	0	1	26	4	6	10	4	3	4
Before	No	19	0	10	0	0	11	5	13	5	1	0	0
Change	No	+4	0	-7	0	+1	+15	-1	-7	+5	+3	+3	+4

Sub. = subsistence use = house consumption.

Concerning animal husbandry this is a very limited activity in the village, see table in appendix E. Most households though have chickens. Two out of 27 households have pigs, which is the half compared to 15 years ago. There has been a decrease in the number of households keeping buffaloes, which could be because of the mechanisation of the agriculture. Today it is common to use tractors when preparing the soil before planting instead of buffaloes. 3 households have buffaloes today compared to 15 years ago and one farmer told us the buffaloes were kept as security, if the household were short of cash.

Farming-systems and inputs

The agriculture in Na Luang is today permanent. The villagers usually grow maize during the rainy-season, sometimes followed by another crop as for instance peanuts or soya-beans in the dry-season, and then leave the fields fallow for a short period before maize again is planted.

The level of technology is quite equal within the households, see table 2. Beside the use of tractor for preparing the soil and when transporting the harvest from the storage-huts, all the fieldwork is done by hand. When possible they use a four-wheel tractor, but when the slope-fields are too steep a two-wheel tractor is used, occasionally though ploughing have to be done by hand.

Most farmers use chemical fertilisers on their maize-fields, and the use of herbicides is also widespread, which usually is applied in the beginning of the maize-season. Some farmers expressed that the reason why only few uses herbicides in the paddy-field is a fear of contaminating the water.

Tabel 2 - Number of households using farming technologies

Area use	Fertiliser		Manure		Pesticide		Herbicide		Irrigation		Other chem.	
	Users	%	Users	%	Users	%	Users	%	Users	%	Users	%
Paddy-rice	18	67	4	15	10	37	9	33	17	63	1	4
Maize	25	93	1	4	11	41	19	70	2	7	0	0
Peanut	0	0	0	0	2	7	3	11	0	0	0	0
Vegetable	2	7	1	4	0	0	3	11	3	11	0	0
Fruit trees	3	11	0	0	1	4	2	7	1	4	0	0

Intensification and access to credit

In the household-survey we did not investigate the change over time in the use of technology. Our informants from the semi-structured interviews explained, that they started to use herbicides recently, while most have used fertiliser for a long time. Some of the households interviewed recently started to use hybrid seeds. These innovations together have increased the productivity compared to earlier times, but have also resulted in a farming-practise more dependent on capital.

A common statement obtained from the majority of the household interviewed was, that the present productivity is inadequate to sustain their future livelihood. Considering this it seems evident to us, that development of the agricultural production has to happen through further intensification, as extension is no longer a legal option, which will be discussed later.

This makes it impossible to avoid the issue of the different institutions supporting agricultural production as all our informants depended on access to credit to buy chemical inputs and hybrid seeds.

It turned out that some of the institutions are biased very much towards helping the richer section of farmers leaving the poor farmers to high interest loans given by local "*capitalists*" as the private moneylenders in the village are called. The BAAC is one example as several farmers gave as reason for not being a member that is was too expensive even though it is a state institution presented as a welfare program with the purpose of helping small farmers (Hirsch, 1993). Members have to donate between 250-400 baht a month to the funeral fund besides membership of the agricultural co-operative was mandatory as well which obliges the farmer to buy inputs and sell maize to them. Some farmers mentioned that beside the expenses to the funeral fund, they also have to pay 500 baht per month to be a member of BAAC. Only 2 of the informants borrowed money from BAAC, and a informant estimated that 173 of the villagers were members of the BAAC-group.

The loans from the poverty alleviation program Kor Kor Kor Jor were administrated by the headman. It turned out he was one of the local 'capitalist' and that he did take advantage of his official position to gain personal profits.

"We sell all the maize to the headman and we have to buy seeds, fertilisers and herbicides from the headman as well.....then we can get money from the Kor Kor Kor Jor program" (Interview with farmer).

There are a few local institutions as the saving-group and the farmers wife group from where the villagers can borrow money at a low interest, but it seems like the loans from these groups are quite small.

All the informants except one borrowed money from private *"capitalists"*, with 5% interest rates per month. If they do not sell the maize to the capitalist the interest rises to 10%. The practise concerning private loaning is, that the farmers either borrow money or receive all or some of the inputs needed in the production. After the harvest the capitalist extracts the price for inputs from the money paid to the farmer for the maize.

The 'capitalists' seem to be a very powerful institution in the village on who the villagers are very ependent. *"If I sold to someone else I might get a better price but I'm afraid that the capitalist might get angry and he doesn't want to borrow money to me again"* (Informant)

The validity of a few statements like these can be questioned, as it is impossible for us to know what local conflicts and groupings of power exists in the village. Our impression of the institution of the VILLAGE COMMITTEE as being corrupt corresponds though with findings of Hirsch who find the headman

"thus in the ironic position of principal representative of state and capital in the village, whose wealth and therefore ultimate power base is founded on illegal or semi-legal activities...."(Hirsch 1993, p.111)

According to the girls who worked in the kitchen during our stay in Na Luang, there are 6 persons in the village who are rich enough to borrow out money. Three of them owns a truck and three owned a four-wheel tractor. The villagers are depending on these persons to transport their maize to the market. One informant explained, that although he could sell his maize in another town for 4 baht per kilo, it would not be a better business as he had to pay for the truck although the local middle-man only paid him 3 baht per kilo maize.

To us it seems like the farmers are trapped in a vicious circle. Some informants expressed gratitude towards the capitalists for being helpful others complained, but most farmers expressed that they prefer the situation today, which in total give them more money to spend on commodities

The bottom line is that the farmers have no other options than to borrow from the capitalist.

To us it seems to be a serious problem, that the villagers depend on a few persons in the village providing expensive loans. The local dependency on these persons we considered a barrier for innovating the agriculture, as the loans are very expensive and most farmers seems to be trapped in a debt-circle, which gives them very little space for experimenting with alternatives, that eventually could improve their situation. The development towards a more capital-intensive agriculture therefor seems to have increased the difference between the villagers as only a few persons have had the possibility to invest in transport or have accumulated enough capital to loan out money. It is easy to imagine that farmers in a debt-circle can be forces to sell or mortgage their land if for instance the harvest fail.

Extension-service

In relation to intensification of the agriculture in Na Luang, the impact from extension-workers can be discussed. The information was contradicting when talking about the extension officers. On one hand they all expressed, that the contact was very limited, and they would not know who to contact to get help increasing their production. On the other hand most have started to use hybrid seed and herbicides, probably introduced by extension-workers. There are different kind of extension operating in the village though. In Tha Wa an officer from the provincial agricultural office in Song comes to the village once a year, which we assume are the same in Na Luang. Farmers borrowing money from BAAC also gets advise from the Agricultural Co-operative, which probably are a more

regular service. If this is the case the more rich villagers will have another advantage of being a member of BAAC besides the cheap interest.

One informant stated, that the villagers did not rely on the extension-officer, but helped each-other and used local knowledge, this household did use hybrid seeds though, but it is a possibility that they learned from other villagers. Another farmer told, that he followed an advise from the extension-worker investing in peanuts which failed. Weather the failure was due to a bad advise in the given circumstances or the farmer were not able to manage this crop, we are not able to assess, but the informant lost faith in the extension officer.

Expansion

Expansion used to be the traditional way of increasing the agricultural production, and there have been plenty of forest to clear in the past, although some of the land around Na Luang might not be suitable for agriculture due to the steep slopes and low soil-quality. After establishment of the national park this was no longer a legal option to the farmers in Na Luang. In the household-survey most farmers explained, that they had cleared land, but this was done more than 15 years ago. The area under cultivation around Na Luang has expanded though during the last 15 years, which for example can be seen on the maps in appendix F1 and F2 showing the expansion of fields belonging to household 5. Our results from the household survey showed that the average area cultivated per household has increased from 7 rai 15 years ago to 16 rai today, which must have coursed considerable expansion[i].

According to informants there were still considerable expansions taking place in the first years of the nationalpark, as there was no demarcation of the nationalpark boundary, which made control difficult. As the demarcation began in 1996 the authorities to some degree recognised these expansions as they placed the benchmarks outside existing fields. This in reality meant, that the village area excluded from the nationalpark was enlarged.

Common for RFD, the village-committee and the farmers was, that they agreed upon that RFD would accept no form of expansion in the future. The issues of control and enforcement were unclear though. Some farmers admitted having expanded recently, another farmer had removed the boundary benchmark. According to the RFD national park officials this should be difficult as they claimed the boundary was inspected regularly. The fact was though, that none of the violators had been caught yet. Never the less the majority of the farmers were generally so concerned over the

consequences of violating the rules that they claimed they did not dare risk an expansion. If caught they would face a fine and imprisonment if they were unable to pay it.

Tenure

According to all informants in the semi-structured interviews, the question of tenure did not have any practical influence on either their possibilities of loaning money or their contact to extension-workers. This was only asked in relation to STK-rights, and BAAC claimed that SPK or NS4 was necessary in order to loan money individuaaly (Tha Wa-group's interview with BAAC in Song). This indicates that tenure does influence villagers' possibilities of bigger investments, as they can borrow maximum 20.000 baht in the group-loans, which is the only way to obtain loan if they do not have title-deeds. All the informants did express though, that rights to the land were very important. All felt it important to have a proof that they were cultivating land belonging to them. Some expressed fear that RFD should inco-operate their land in reforestation-programs. Others felt uncomfortable cultivating the land illegally, this was stated by informants who had never had STK. Although informants explained that they were only cultivating *"day by day"*, some have started to grow perennial crops which is a long term investment. This was done on slope-fields where no-one at the moment have legal rights, which indicate that at least not all farmers avoid to make long-term investments. One informant explained, that the villagers would have to experiment, as they could not make a living of growing maize.

Summary

There has been some development of the agriculture in Na Luang during the last 15 years with more focus on cash crops and to some extent an increase in the use of chemical inputs. Both are resulting in increased dependency on cash economy and in praxis loans. This development may to some extend been induced by extension-workers, but villagers do explain they only have limited contact to and faith in those. The majority of farmers said that the present landholdings were not enough to sustain their livelihood and they blamed the NP for this. This give reason to believe, that this cash dependency will increase in the future as further expansion is no longer possible which only leaves further intensification as an option to increase agricultural outputs. The question of tenure does not seem to have had any influence on the strategy pursued by the villagers in relation to intensification or expansion.

Forest products today and before NP

The main objective of this chapter is to analyse whether the forest resources, the villagers' utilisation of these, their importance and the amount extracted has changed, due to the establishment of NP.

The presently natural forest resources compared with the ones before NP

Due to years of utilisation all the forest of Na Luang is presently secondary forest (Mr. Wichawutipong). This is according to several informants mainly due to the large amount of timber, that over time have been extracted from the forest. No or very little deliberately planting has ever taken place in this forest (Headman & Ass. Director of NF). The existing forest-types are according to us a result of natural succession. Two types of forest dominate the forest today: Dry Diptocarp Forest (**DDF**) and Mix Deciduous Forest (**MDF**). Two main types of MDF are present; MDF with Teak (*Tectonia Grandis*) and MDF without Teak (Mr. Jintana). Both forest types are generally found on relatively pore soils. The soil observed in DDF seamed however to be more poor than those in MDF (Mr. Jintana and own observations).

In the Northern forest of Ban Na Luang DDF is dominating. In the Eastern, Western and Southern forests both DDF and MDF are found (Mr. Wichawutipong). Findings of the forest-walks showed, that it is very difficult in practices to estimate whether it is MDF or DDF that form the largest part of these forests. The main reason for this is that a transition zones consisting of a blend of these two types was observed to exist. However compared with today we find it likely that there was more MDF with Teak before NP. This is based on findings, which showed that logging of timber in some parts of the forest only ended a few years ago.

A minor part of the present forest consists of a more moist forest type with both native and exotic semi-evergreen and evergreen species, but these types of forest we only observed around rivers in the main valley.

The main uses of the forest resources today compared with the ones before NP

The survey showed that the people of Na Luang utilise the forest resources in different ways. Table 3 gives an overview of the wide variety of forest plants, that are utilised and their main uses.

Table 3. Estimated number of the forest plant species, that people of Ban Na Luang utilise; and villagers main uses of these plants.

Plant-type	No[1]	Main uses
Bamboo (grass)	5	Bamboo-shots are used as a vegetable. Bamboo-culms are used for construction (ex. of walls and floors), fencing and handicrafts (ex. Mats and baskets). Bamboo-leaves are used for roofing.
Bush	2	Young shoots, flower and leaves of *Pakwan* are used as a vegetable. Branches and leaves of another specie are used for dye.
Palm	1	Leaves for decoration.
Tree	16	Wood for house-construction, poles, fences, furniture, tools, firewood and charcoal.

Notes to Table 3. 1: The estimation of the number of species are based upon the Thai names of utilised forest plants listed in appendix G. As this list only consists of those forest plants the villagers mentioned during our survey, the true number of utilised species is likely to be larger, than those in the table.

In addition to utilisation of the plant resources, the villagers collect edible red-ant eggs, bee-honey and a least 9 species of edible mushrooms (se appendix G) in the forest. Besides this the forest is utilised for hunting to obtain meat from ex. barking dear, wild pig, squirrels, lizards, mole-rat and a number of bird species. Other protein sources are obtained from the water resources of the forest by fishing and catching ex. scrimps, edible turtles, crabs and frogs. Finally the villagers keep buffaloes in the forest. The buffaloes are among other things used as draught animal, primarily to take out wood from the forest.

The findings show that, the utilised resources are the same as before NP. Changes are that villagers did collect rattan and a number of medicine-plants before, and furthermore some kept elephants in the forest.

The reason for the decreased collection of medicine-plants is accordingly the former medicine man; the tradition of using traditional herbal medicine nearly has disappeared. NP indirectly has caused the disappearance of the elephants, as RFD according to informants since 4 years has enforced the ban on elephants, which considerably increased the risks of using them. This ban on elephants is a part of the national politic against logging.

The presently location of the main utilised forest areas compared with the ones before NP

The survey showed that the majority of the forest products utilised in Ban Na Luang are obtained from both DDF and MDF, and we find no reason to believe this has changed over the last decades. The findings show that the majority of *Pakwan* is collected in DDF, but that the majority of red ant eggs and bamboo are collected in MDF. Whereas mushrooms, firewood and timber are obtained in both DDF and MDF. On behalf of our findings, it is not possible to estimate whether MDF or DDF is the most important or most utilised forest type of the people of Ban Na Luang.

The findings on type, location and concentration of infrastructure in the forest gave only a very wage idea of where people go most frequently and what forest type is most exploited. Overall the infrastructure in the forest was found to be extremely poor in regard to the number of users, the frequency of use and in regard to the products transported. This could indicate that some of the main extraction areas today might not have been the main extraction areas for many years. According to our findings the villagers extract most of their forest products from the Southern and Eastern forests of Ban Na Luang. The Northern and Western forest are also utilised, but in a much lesser extent. The main reason given for this was that the Northern forest is located further away from the village, than the other forests. Even though it was not mentioned of any informants, it could however also be due to that DDF dominates in the Northern forest, and thus do not have such a large variety of useful products as the other forests. Two main reasons were given for not utilising the Western forest in any larger extent: Compared with the Southern and Eastern forest there are not as many useful products to extract in this forest, and access is more difficult, due to higher slope gradients.

The main NTFP collecting sites today in comparison with before NP

No findings indicate that there is or has been a main collecting site for firewood. Mr. Law states that: "*there presently is plenty of firewood, which can be found everywhere around the village*" and that he himself collects it in NP about 20 minuets away.

Presently according to Mr. Law most villagers collect mushrooms in two different forest areas in NP, which are not accessible by motorcycle. One area is 3 hours and the other is 2 hours walk away from the village. These sites were also according to Mr. Law the main mushrooms collecting sites before NP. According to other informants there are additionally two other site, where most villagers presently goes to collect mushrooms and/or bamboo. These forest areas are also fare away from the village, as they according to them are located just north of Tha wa in short walking distance to the east and west side of the main road towards Na Luang. Both sites are thus located inside NP. On behalf of own observations one of these sites (the western forest) is a mix of MDF and MDF with Teak. According to the same informants the area west of the road is though more frequently used of people from Na Luang, than the area east of the road. The reason they gave for this was; that the eastern area is used by to many people, and mainly by people that comes from other villages than Na Luang or Tha wa. In spite of this there were according to the informants no conflicts between the non-local and local users.

Bamboo is additionally according to Mr. Law collected by a large number of villagers in another dense forest with Teak (= MDF with Teak), which is located in NP 3-4 hours walk away from the village, but is also assessable by motorcycle. According to Mr. Law this area was only used by very few collectors of bamboo before NP, as most instead went to collect bamboo at a site only 2-3 minutes walk away from the village. Furthermore he stated that the reason why the bamboo is collected much further away today than before, is due to that the cultivated area has extended in Na Luang. This has happen according to Mr. Law in such an extent, that the forest which started only 2-3 minutes walk from Mr. Law's house before NP, now starts 3-4 hours walk away.

As for *Pakwan* this is according to Mr. Law collected of most villagers in forest area in NP without Teak and bamboo (= DDF) 2 hours walk away from the village. This area is not accessible by motorcycle. Before NP the main *Pakwan* collecting site was according to Mr. Law only about 15 minuets walk away.

Overall the above findings show that the main collecting sites of bamboo, *Pakwan* and some mushrooms are located considerably further away than they were before NP. Even though some areas are accessible by motorcycles, this indicates that the time used on collecting products has increased. Besides this it shows that the establishment of NP has not prevented villagers from moving even further inside NP to collect NTFPs.

The number of households that uses the forest today and before NP

Table 4 shows the findings of what the informants answered, when asked; which kind of NTFPs their household collects today and collected 15 years ago and if their household did hunt, fish or keep buffaloes today and 15 years ago.

Table 4. The number of households of 27 surveyed households in Ban Na Luang , that collected different NTFPs, hunted, kept buffalo and fished in 1999 and before NP (Household survey, 1999).

Use of forest	Bam-boo	Mush-room	Fire-wood	*Pak-wan*[1]	Red ant eggs	Honey	Rattan	Hunts	Fishes	Keeps buffalo
No in 1999	20	19	15	15	7	2	0	12	8	2
No before NP	20	20	16[2]	14	8	2	3	17	7	13
Changes in no from before NP to 1999	0	-1	-1	+1	-1	0	-3	-5	+1	-11

Note to table 4: 1: *Pakwan* is the Thai name of the leaves, young shoots or flowers of *Sauropus sp.*2: Note that the no of households that collected firewood before NP is remarkably low, in regard to that most households most probably couldn't afford to bye substitutes of firewood before NP.

Table 4 shows that the difference in number of households that fishes and collects bamboo, mushrooms, firewood, *Pakwan*, red ant eggs and honey today and before NP is negligible. A majority of the households collect and did collect before NP at least one of the following NTFPs:

bamboo, mushrooms, firewood and *Pakwan*. About one out of four households do and did practice collection of red ant eggs and fishing.

Furthermore table 4 shows that the number of households that hunts and keeps buffaloes today is significantly lower than before NP. Even though the number of households, that went hunting before NP, was larger than today, hunting is still practised by about half of the households. The decrease in hunting was explained to be either due to fear of being caught by RFD, or to be due to lack of time due to agricultural obligations.

RFD pointed out that all villagers get their construction timber form their local forest (Mr. Wichawutipong). General observation showed that all houses in Ban Na Luang (except the Medical Health Centre) are constructed of wood (primarily Teak). Most houses are old, but a few houses are new or under construction. Several of these recently constructed houses were considerably larger than the average, and do mainly belong to the "capitalist". Wood planks of different ages were to be found besides several houses. All the floors and walls in the houses, most of the fences around the houses and furniture was of wood (primary Teak, but Red Wood was also common). It is thus likely, that local timber is still used to a large extent in the village.

Economical and other non-economical importance of the forest products, and other uses of the forest today and before NP

The survey showed that the products that the villagers obtain from the forest are primarily for home-consumption. Only in cases of surplus the products are also sold. This was also the case before the NP. The forest products that are and were generally used for selling are: at least two kinds of bamboo shoots, at least six kinds of mushrooms, *Pakwan*, red ant eggs and honey.

Table 5 shows the findings of what the informants answered, when asked; which kind of NTFP were of economic importance to the household in 1999 and 15 years ago.

Table 5. The number of households of 27 surveyed households in Ban Na Luang, that sold different NTFPs, buffaloes and products obtain from hunting and fishing in 1999 and before NP.

Cash-product	Bam-boo shoots	Mush-room	Fire-wood	*Pak-wan*	Red ant eggs	Honey	Rattan	Huntin g product s	Fishing product s	Buffalo
No in 1999	6	5	0	4	4	2	0	1	0	3
No before NP	7	7	0	4	4	2	1	1	0	7
Changes in no from before NP to 1999	-1	-2	0	0	0	0	-1	0	0	-4

The difference in number of households selling NTFPs today and before NP is negligible. The only exception to this is the buffaloes, as their importance today has decreased significantly.
Besides these products additional products are sold today: Our findings showed that, at least one household sells furniture made of wood; and a non confirmed number of the approximately 10 households producing charcoal today sell this product, when they produce a surplus. Besides the furniture and charcoal production, there are no findings on, that the villagers today sell timber, or get any other income from sale of wood or other refined forest products.
Which forest products - if any - that were refined before NP, was not investigated under the field-study. However the structured interview showed other income generating activities in relation to the forest before NP. At least two households' main working-activities were logging. In both cases both the husband and wife were labour workers in the forest and used elephants in their work. One household used a hired elephant and the other was working for a non-local logging company.
According to informants illegal logging in the area did stop about three years ago. One informant stated the reason as: *"It became too dangerous because of increased enforcement by RFD"*. This informant was doing illegal logging for the Ass. Headman, who owned an elephant for this purpose only.
Another explanation could be that there according to most informants are hardly any larger commercial trees left in the forest. Perhaps illegal logging is still practised to some degree on commercial bases, but we have no proof of this. This is an indication though, that the establishment of NP directly or only indirectly have caused some changes in the main working-activities (labour in the forest) of some households.
Overall the findings show that there seem to be no correlation between the NP and the number of households selling forest products, nor the kind that they sell. RFD do not unofficially accept collection of forest products in NP for the purpose of sale (Ass. Director of NP). It is likely though, that RFD do not have the necessary resources to prevent the sale.
The households sell their NTFPs to a local middleman. According to three NTFP collectors there is two local middlemen, who operates in the village. One of these middlemen however denied when asked, that she was selling NTFPs. According to the other middleman all the NTFPs are sold to non-local middlemen, who again sell all the products on markets outside the village. These findings shows, that the prices paid to the NTFP collector for his/her products are below the market prices obtained outside the village.

The majority of the forest products have an economical importance, even if they do not directly contribute to the household income. If the forest products were not collected and today's consumption level was to be maintained, these products or substitutes would either have to be bought or cultivated. The last option is only possible in some cases. By collecting forest products the households thus saves money and land.
Furthermore many of the eatable forest products can be regarded as important nutritive supplements and/or variation in their daily meal. Other forest products can be seen as very important in regard to construction of houses, farm huts and corn-storage huts. Besides this many of the forest products contributes to the maintenance of several cultural practices.

The amount of forest products obtained and available today compared with before NP
The overall findings of the survey showed, that most informants was of the opinion, that there still are plenty of the most commonly used forest products available, with the exception of large trees for construction purposes. However other households expressed that there are less products available in the forest today than before NP, due to the increased numbers of collectors. Most of the informants, that expressed that there still is plenty of products, did also agree on that the number of collectors have increased in the last decades, due to the population increase in the same period. On the other hand several informants expressed, that due to lack of time they did not go as often to obtain forest products today as they did before NP. There were given two different explanation for this; either it was due to the location on which they could obtain a larger amount of a specific products was further away today than before NP, or it was because they did spend more time doing fieldwork now than before NP. The increased fieldwork was due to that they expressed that they had increased their acreage of maize fields. In addition to this the survey findings shows as well, that the season for time consuming farm work and some of the season of forest products overlap (see appendix H). As an example red ant eggs and *Pakwan* is in the same period, as when land is prepared for maize cultivation and planting of maize. Another example is, that the season of most mushroom species and half of the bamboo collecting season is the same in which weeding has to be done in the newly establish maize fields and when the rice-fields has to be prepared for planting. In all these finding indicate that the households, which have extended the acreage of maize-fields probably, do not have sufficient time to collect as many NTFP's as before NP.

Regulation on or conservation of natural resources

Overall the above mentioned findings show, that the National Park Act's ban on collecting forest products have not significantly changed the number of households collecting each specific kind of NTFP nor fishing. During an interview the Ass. Director of NP stated that: *"no use at all is allowed in NP"*, and he had no knowledge of any collection of NTFPs. Later during the same interview it turned out, that this was an official statement.

Our findings reflect that in practice the rules followed deviate considerably from the official legislation. Collection of NTFPs is prohibited, but some RFD officers acknowledge that if the villagers were forced to comply with NP regulations, it would for some destroy their possibilities of sustaining their livelihood, and the collection for home-consumption is not considered to be a threat against the forest. *"..some NTFPs can be collected due to a unofficial compromise... but in reasonable amounts for consumption only.....a strict enforcement would not be fair to the villagers"* (Director of NP). This has resulted in praxis where collection of NTFPs for consumption is not enforced.

The issue of hunting is more complicated. The Ass. Headman claimed, that RFD closes their eyes to the occurring hunting. The Ass. Director of NP supported this, but the Director of NP denied that this was the case.

In addition to the national laws, Village Committee has also a set of rules on the utilisation of the natural recourses in the local area of Ban Na Luang. Such restrictions are though limited to prohibition of logging and protection of the river banks (Headman). In praxis Village Committee allows logging of timber for construction purposes, but in what an extent they allow logging is not clear. The villagers and members of the Village Committee claim, that they send applications to RFD for permissions to log trees. RFD on the other hand denied that this was a fact (Director of NP). But it seems though that VC (Village Committee) is aware that they are on thin ice on this issue: *"Use of timber for construction for house is allowed, but if someone is caught the headman is not responsible in any way"* (Ass. Headman).

The village rules are to some degree enforced as people actually have been fined for logging trees on river banks. In average three persons a year are fined (Ass. Headman).

In addition to VC rules there is a cultural religious praxis, that has to do with conservation of natural recourses. This praxis has resulted in that there inside the village still is a relatively large

sacred forest (with DDF, MDF and MDF with Teak) where villagers of religious courses do not extract any products from (School principal, forest guides and own observations).
Besides the above mentioned village law and cultural praxis, we found no other local regulation of resources based on neither traditions nor local institutions. Even if several informants feared that there would be no large trees left for future generations, no one thought of the surrounding as a common pool recourse (CPR) that needs regulation. According to Gibbs & Bromley (1989) mutual organised management of CPR depend upon a common set of rules and norms that are based upon interdependence among the users. In Na Luang the findings showed that such a interdependency exists through kinship, working relations and reliance on the same resource. However the rationality behind such regulations seems to be to pursue individual benefits: *"the ones who finds, extracts or uses the natural resources first has always been entitled to keep it"* (Mr. Law). This makes local management of the forest as a CPR impossible (Ostrom, 1990).
The forest has been under formal regulation for many years before NP by the Forest Act and later by the Forest Reserve Act, but according to a 60-year-old informant there were no restrictions on use of natural resources for the villagers prior to the establishment of NP.
Formal regulations make it questionable to talk about open access, but the situation described resembles open access. Today there are too many regulations to talk of open access – except in the issue of collection of NTFPs (except game). The access is quite open as there is no enforcement of rules, and the fear of RFD seems to be the main motivation for compliance to NP rules.
"If there wasn't any land there would be no regulation by the village committee....in the contrary they would be the ones to clear the land, to get the best land for them selves" (Mr. Law). This quotation also indicates that the rationality of the ruling elite (members of VC) is exploitative and overrules other villagers needs or CPR concerns.

Labour

So far we have discussed the changes in farming and collection of forest products - in this chapter we will look at the alternative livelihood-strategies persued by the people in Na Luang, and see how far the establishment of the national park have influenced people's decisions to seek alternative livelihood-strategies. First we will look into the labour possibilities available in the village and secondly discuss the motivations for migration as these were the two activities which we found the villagers engaged in.

Labour-market in Na Luang

Most interviewed households took part in a reciprocal exchange labour network through which family members and sometimes also close friends and neighbours helped each other doing the labour-intensive part of farming: "*.. the neighbours come to help because they know I am harvesting. Then I have to remember them and help them as well. .. itís a kind of interdependency - it is infinite*", is how one informant explained the system. Only one informant depended on hired labour (he was quite well of, had 28 rais of land and no children presently living in the village). Notwithstanding, the headman estimated that 30 % of the labour-active population was occasionally engaged in paid day-labour in the village, and the survey showed that 56 % of the households interviewed had a least one adult member doing occasional labour-work (these figures may also include migrants).[ii]

The actual labour possibilities in Na Luang are restricted to farm-labour on a day to day basis during peak -season and a very limited amount of construction jobs, at a 60-70 bath per day salary (100 bath a day for the most heavy tasks). The only attempt to establish alternative income-generating activities, has been a project under the farmers wives group with the aim of training the women to make handicrafts. It stopped, however, when government support was cut. Also there was no market for the products and, according to the headman, no time.

According to the survey the actual amount of people engaged in labour had risen with around 50% compared to before the NP was established. We only found one household though that depended entirely on labour work, from which the one person engaged could earn an average of 400 bath per month (they had no land as they had had to mortgage it to pay for a funeral). Most of the informants expressed a wish for more employment, and complained about the lack of opportunities especially during dry-season, when there is no farm work and only occasional construction jobs to get in the village.

Labour-Migration

Labour-migration seems to be a quite new phenomenon in Na Luang. According to the headman and the semi-structured interviews, migration on a larger scale started only approximately 5 years ago. The first pioneers are the main vehicle for facilitating friends and family with information on labour-opportunities in other provinces, and establishing the needed contacts; "*My daughter heard about the job from neighbours who worked for the company, they came home for a festival and told about the possibilities*"(Mother to daughter working in shrimp-factory in Sa Mut Pra Korn province) is a common explanation given for how the migrants found their jobs. The headman

estimated that around 60 persons had been away working in other provinces in recent years. Because of the economic crisis many had been fired and returned home, but approximately 20 persons are still away. Because of the nature of migration the villagers in Na Luang have not experienced to come back finding their land taken by somebody else, as we learned had been the case in Tha Wa. Villagers of both sexes were engaged in construction and service jobs mainly in Bangkok and Phrae province, while around ten young women were, or had been, employed in a Japanese shrimp-factory in Sa Mut Pra Korn province. Some of these had even gone to Japan to be trained at the mother-company.[iii]

According to the headman, permanent migration had so far only occured due to marriage outside the village. The migration from Na Luang can thus be divided into two types: Semi-permanent migration which is done for a longer period but does not imply any intention of a permanent change in residence. And what is normally called seasonal migration, but which will here be referred to as short-term migration as we did not interview anybody who had done this on a repetitive basis.

Semi-permanent migration

Semi permanent migration from Na Luang is, as far as we learned from the interviews, only done by young unmarried people, who have yet not inherited land. This pattern was further confirmed by the headman. We did not find any correlation between the amount of land owned by the parents and the tendency to migrate. The prospects of the youngsters who were, or had been, engaged in semi-permanent migration ranged from inheriting 1,5 rai to 14 rai of land from their own parents. The migrants contributed to the parentís economy with around 10.000 bath per year (one gave only occasional presents, and another 4-500 bath in connection with the yearly visit home). Apparently most often the money is spend on items such as television sets, refrigerators, and motorcycles.

One mother explained the reason why her two children were working in Bangkok like this : "*Because they were bored of cultivating - every year the same thing. And we do not have much land, so the money they can earn from maize is only enough for the day to day survival. It is very hard. That is the reason why they had to leave home - to send home money to help the family*". In this statement we find two types of motives - the need of money related to lack of land and a feeling of boredom with village life. She further explained that her children had actively sought the jobs by calling relatives in Bangkok and asked them to help find employment.

The second motivation was the one most frequently mentioned. It was not the need of extra cash, but rather the youngsterís feeling of boredom in the village, the lack of any alternatives to farming, which is seen as hard work, combined with the curiosity to experience the big city where life was considered more exiting and comfortable, that was given as explanations for migrating[iv]. Even in the case of a very land-poor household, where 6 out of 7 children had done semi-permanent migration, the mother believed her children would have migrated even if the national park regulations had not put a limitation on expansion. This pattern was underlined in the way parents related to their childrenís migrating: *"But let her have fun, there is nothing else to do here than farming"* (father to daughter working in Sa Mut Pra Korn), *"..we need to let them go when they want to experience civilisation"*(father to daughter who had been to Sa Mut Pra Korn). The seeking of employment for those using this explanation had been rather opportunistic, as the typical statement; "*..you get invited to work*", indicate.

None of the interviewed parents were themselves considering migrating, saying they were either too old or had responsibilities for smaller children, and that they preferred the peaceful and quiet village life from the city.

As already mentioned the economic crisis had meant that some people had lost their urban employment and had had to return. Another effect of the crisis had been a rise in living expenses, meaning that people had returned to the security of subsistence farming. But apart from this special situation people seemed in general to find it more economically rational to return home when having a family of their own. As a father to a returned son answered when asked whether his son and daughter in law would consider going back to Bangkok if the labour-situation improved: "*No, because now they have children here. It is normal that young people migrate but come back to have children. Because the children need to be taken care of, to go to school. This is not economically possible in Bangkok. When we live here we can bring home some vegetables, NTFP and agricultural products. There is no need for money*". Another reason was the obligation of looking after old parents, plus the opinion that the city might be an interesting place for teenagers, who were ì*curious to know everything*î, but no place for an adult trying to raise a family. The village life was in this relation described as hard work but peaceful and quiet, a quality that could well outweigh the comforts of the city.

Even if migration has become an increasingly important livelihood-strategy, and, in the light of the limited possibilities of agricultural expansion, the most evident economic alternative for the villagers in Na Luang, several factors indicate that permanent migration is still not considered a

desirable option - at least not for those that we know of presently engaged in this activity. The cost of raising a family is considerably lower in Na Luang, where one also has the security of kinship, plus the obligation of taking care of old parents. Moreover the new pattern of getting only two children[v] might put an extra pressure on children to settle down in the village in the future. It is also to be seen if some of the youngsters will eventually adapt too much to city-life to be interested in returning. Until now, young migrants have actually returned when marrying, and are generally expected to do so by their parents, who think they will have enough land to offer them to live off, even if only a little share. One mother suggested they could set up a small shop, and a father expected the government to be able to help them with land if necessary. But at the same time they express doubts about there being enough land for future generations.

Short-term migration

The motivation behind short-term migration seems, in contrast to the semi-permanent type, mainly related to push-factors such as lack of money. The instances of short-term migration were done by middle-aged farmers with family-obligations, who had migrated to raise extra money for paying off debt. (We only interviewed three informants who had been engaged in this type of migration, but the tendency was affirmed by the headman). The destination had been dependent on opportunities and wages.

Short-term migration seems so far to be a recovery strategy[vi] for raising money in times of urgent need. This could, however, be explained by the very recent introduction of migration coupled with the depression of the job-situation due to the economic crisis. If not permanent migration, then circular[vii] rural-urban migration would be a likely supplementary livelihood-strategy in the future for the farmers in Na Luang, as it already is in many Northern and North Eastern villages in Thailand (Fuller et al 1990, Parnwell 1999), offcourse provided the labour market in urban Thailand improves. An indicator of this is the widespread strategy of taking paid day-labour in the village when possible, the wish for more employment generally expressed, and the surplus labour available during dry-season.

Discussion

As we have seen, the villagers in Na Luang are engaged in different strategies to sustain their livelihood. When discussing the impact of NP on the villagers livelihood-strategies, it is obvious that in theory there are posed severe restrictions on the use of natural resources around Na Luang, on which the villagers are dependent. In practise though, the situation is more complex; there have been compromises from the ban on resource use, and naturally the situation in Na Luang has been influenced by various factors related to the general development of the surrounding society.
We will now discuss what impact NP has had on the livelihood strategies in Na Luang, which will be done in relation to the four hypothesis we mentioned in our introduction, and further more take into consideration the villagers own perception, as well as how we understand the causal relations determining the changes that have occurred during approximately the last 15 years.

Before the establishment of NP the agricultural production could be secured or improved through both expansion and intensification. With the NP one could expect intensification to be the only option. But as far as we have observed the NP has not prevented expansion as it has happened considerable during the last 15 years. Now this seem to be changing. Today RFD seems determined not to allow further expansion of agriculture, as landmarks have been put up along the boundary of the NP. It can be discussed though, if this means a tightening of the regulations or just a delayed implementations of existing policies. The villagers expressed, that these landmarks do make a difference compared to before. Although some openly told that they could just move the landmarks, the overall impression is that the villagers actually do fear RFD and will not risk encroaching illegally As the landmarks have been put up recently their effect might decrease over time, if not RFD actually do arrest encroachers, which have not been the case yet. We believe this leave the farmers with only one option - further intensification. The farmers perceive the NP to be the cause of their future hardship, as they in general want more land.

It can be discussed though, if the farmers under different circumstances would be able to increase their productivity by expanding any further. They are already now cultivating marginal land, where the quality of the soil as well as the steep slopes put constraints on cultivation. This would limit the real benefit from new expansions compared to the labour invested. Those who take paid labour during peak-season would probably be interested in expanding land anyhow. And, as we know,

some have actually expanded recently. On the other hand several informants said that lack of time was the reason behind not having any livestock and not collecting more NTFP (many NTFP are collected during peak agricultural seasons. See appendix. This could be an indicator that the total labour-surplus in the village during peak-seasons is fairly low. As the population-growth seems to have reached a momentum, we imagine this would, NP or no NP, had lead to a decrease of total expansion in the future. When this situation should occur, and what would be most rational (which of course is not the only determinant) to do labour or cultivate marginal lands in the future we will leave as open questions.

The general trend for agricultural development in Thailand has for long been toward intensification (see the general introduction). We therefor believe that the intensification in Na Luang is more related to this general development than an impact of NP. It can be discussed though if the government will spend many resources developing Na Luang situated in a national park in the periphery, compared to areas classified as suitable for agriculture.

To sum up the findings on permanent / semi-permanent migration, the analytical tools of push and pull factors can help clarify how far the establishment of NP and the ensuing limitations on land have influenced people's decisions of migrating. Push factors define the constrains in the place of departure that makes it impossible to satisfy ones needs. Pull factors define the information that persuade people that more attractive opportunities can be find in the place of destination (Kosinski &Prothero 1975:4).

Leaving Na Luang		Returning to Na Luang	
Push-factors	**Pull-factors**	**Push-factors**	**Pull-factors**
Lack of money	City more exiting and comfortable	Urban unemployment	Security of subsistence
Lack of land	Expectation of higher income in the city	High cost of living	Family obligations
			Peace and quiet

The decision to stay or move is, as has been shown, a combination of the above listed factors. It is likely that the push-factors mentioned in some of the cases are related to the establishment of NP, but even here it could well be that the greater involvement in the cash-economy, that is not special for Na Luang, is more influential in creating needs not possible to fulfil in the village. That there are no such possibilities could on the other hand be caused by the isolation, which will probably not be reduced because of the location inside a NP. The lure of modern city life seems to be the younger

people's main motivation for migrating, but as much as this acts as a powerful pull-factor away from Na Luang in youth, the greater security and peacefulness pull them back to the village when they grow older. The motivation of this age-group does not seem to be related to the constraints of NP, on the contrary, their expectations and actual pattern of returning point towards a general optimism regarding the possibilities of future subsistence in the village. Even in the few cases where a general lack of land and money was mentioned, the young migrants were expected to return eventually to take up farming. The overall impression must therefore be that the NP has not, so far, led to any major alteration in peoples' main livelihood strategy, which continues to be farming in Na Luang.

The question is whether this strategy is realistic, or if the parents are just doing wishful thinking ? This is of-course a question difficult to answer, but we will try to look at the tendencies. As the population-growth seems to be in control now, it is not likely that a surplus of labour will be causing future migration. On the contrary there might be a lack of labour in the future when the effects of the fertility decline and the pull-effect will continue to result in migration. Regarding the possibilities of acquiring land, the fertility decline ideally means that no further constrains will be put on the amount of land available, despite of the pattern of equal inheritance. On the other hand, it is uncertain if people will be able to sustain their livelihood from the land they got. The farmers themselves stated several times, that they were not even able to sustain their livelihood as it is now. And they did not believe that it would be possible to intensify further. As described in the chapter about agriculture this was due to their limited trust in extension-service, but at the same time some actually did gain higher outputs as a result of implementing new varieties, pesticides and herbicides. The informants expressed , that they would not be able to increase their production, even if they had unlimited access to economic means.
We have not investigated the ecological factors of the agricultural practise in Na Luang, and are therefore not able to discuss what kind of intensification or change of existing farming-systems is appropriate to the situation in Na Luang. We have observed some important socio-economic barriers of intensification though, which are related to extension-service, access to credit and limited access to market.

It turned out that we were partly wrong assuming that some village institutions were regulating use of natural resources. Partly because a village law is existing and it was actually enforced to some

degree, but at the same time our findings showed that there was no sign of local regulation of NTFP. The collection sites have been pushed further away by the expansion of farmland, and at the same time more people collect and some of them use motorcycles which increases the area of extraction considerably. No one considered this a particular problem as there are plenty of resources just further away. The same is partly true for the case of timber trees. Several informants expressed concern over the lack of large trees for future use close to the village but no one expected timber trees to be planted without financial support.

We see this perception to be strongly related to a situation where natural resources are abundant. Our findings show strong indications that some resources are becoming scarce. If use of motorcycles becomes necessary to collect the resources in question within a day those without a motorcycle will experience a situation of scarcity. The aspect of what we see as a widening of economic differentiation within the village is also influencing the perceived need for regulation. The villagers who are in the position to determine village regulation of resources are those who ride motorcycle. When they do not experience the situation of scarcity why should they advocate for regulation. The rules the ruling elite, the "capitalists" follow make up an institution and as long they can pursue their rules there will probably be no change. An example of this is the Ass. Headman who according to an informant did not stop illegal logging before the risk of getting caught got to high.

The NP regulations were not at all as rigid as we on forehand supposed, actually there were amazingly open to interpretations. The absence of conflicts is only possible due to the fact that RFD themselves deviated from the official rules and did take the needs of the villagers into consideration as they allowed several compromises. The compromise on collection of NTFP and acceptance of a certain level of expansion when putting down the benchmarks are acknowledged by RFD. Hunting is probably accepted to some extent as well. According to the Ass. Director some animals were abundant and therefore hunting on these animals was unofficially accepted. When the Director stated that hunting was not a part of any compromise, we consider this an official statement as such a compromise can not be officially acceptable. We assume the issue of cutting trees for construction is too controversial for RFD to admit a compromise but the existence of several new houses indicates otherwise. RFDs motivations behind the compromises can be questioned though. There is no doubt that the Director of the NP thought a strict enforcement would be unfair to the villagers

but the question is if RFD under any circumstances would be able to enforce rules prohibiting people to eat plants from their 'backyard'.

Our findings showed that three spheres of overlapping layers of rules existed. All three containing both informal and formal rules. One is the NP authorities, the second sphere is the village law administrated by the VC and the third is village practice. See figure appendix I.

Maybe a side effect of these compromises is that the villagers really have not found out where the limit for use is. They seem to justify all illegal activities they are engaged with 'compromise' and as long as practically no enforcement of any kind takes place who can blame them for interpreting the rules. It has to be said though that RFD is perceived as a threat and this constrains the villagers in their use of natural resource use.

On several occasions informants expressed environmental concerns mostly on the importance of the watershed. We believe this to be a result of environmental education practised by RFD at community meetings etc. and in the school. When considering our findings we find it questionable however how profound this concern is.

This relates to the purpose of establishing the NP. We find it interesting, that the villagers on one hand recognise the necessity of protecting the forest, but on the other hand state that they feel the limitations on expansion as a serious constraint and a consequence of NP

In our opinion our findings on the overall use of natural resources by the villagers justify NP. It seems to us – and to some informants that if no NP existed even more trees would have been logged and more land cleared for farming with the Village Committee in front.

Conclusion

The answer to our first hypothesis is that the villagers have not been forced to choose alternative livelihood strategies yet. As the ban on expansion has not been implemented effectively until recently the impact will first show later. Which impact it has depend on the population growth and as we think it is possible that population has reached its momentum the future need for land may not be as serious as perceived now. The rise in migration is not directly connected to the establishment of the NP as young people migrate to experience the city life. We think that in the end migration might have more impact on the livelihood situation than the NP as people return with new consumer needs that the present standard of living will have difficulties to fulfil.

The use of forest products have not decreased significantly due the establishment of NP.

The answer to the hypothesis of whether formal or informal village institutions are put under pressure by the increased pressure on the natural resources must be that as local institutions regulating use are very passive we have to answer no.

The last hypothesis of visible conflicts between RFD and villagers also have to be answered negatively. The main reasons were the compromises on land use and the lack of enforcement on rules in general.

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[i] As some of the families interviewed in the survey were not established 15 years ago, they do not figure in these numbers, and the data from 15 years ago thereby only covers 22 households.

[ii] The discrepancy between the apparent preference for helping each other and the actual number doing farm-labour could be explained by the fact that 2/3 of the households interviewed about labour-exchange came from zone 1 (Na Luang is divided in four administrative zones. Zone 1 was divided from the rest of the village by the river), where several informants held the opinion that the extended exchange labour system functioned better than in the other zones, due to the fact that they cared more for each other. Besides of caring, the literature points to the fact that this traditional institution is most widespread in villages with an equal land distribution, as one needs a share of land to participate, while more land-rich peasants hire labour instead of engaging in the time-consuming exchange (Potter 1976: 168). If this is the case (this argument is purely hypothetical due to the lack of data) a decreasing prevalence of the exchange labour institution could indicate an increasing economic inequality. This could well be a possibility in Na Luang as land is getting scarcer, and there are no rules against selling or mortgaging land, which could be the last resort for peasants trapped in debt in an increasing capital intensive agricultural system. Meaning that some would be able to increase their land holdings by buying up the land of poor peasants, giving that more land-rich peasants would engage labour and more land-poor peasants be forced to engage in labour-work.

[iii] Besides good connections, a starting capital of 30.000 bath was sometimes needed for the factory jobs (or perhaps only for joining the trainee programme in Japan?). This money was paid to guarantee the company that the girl would stay till the end of a four-year contract, whereupon the money would be returned.

[iv] Mills 1997 has found similar explanations to be prevalent among young migrant women from the North-East working in Bangkok

[v] Most informants above the age of 30 had more than 6 siblings while the informants between 20 and 50 years old had approximately only gotten two children, on the ground they would otherwise be poor. This fertility decline has also been facilitated by a very effective birth control programme that has been enforced since 1972. 90% of the fertile couples were using birth control, female sterilization being the most popular form (information based on survey, semi-structured interviews and interview with the leader of the health centre)

[vi] "Recovery strategies are preserving and short term aimed at recovering and adapting to sudden changesî (Dietz el al. 1992 cited in Mertz et al. 1999 : 135)

[vii] Circular migration can be defined as "a great variety of movements, usually short-term, repetitive, or cyclic in nature, but all having in common the lack of any declared intention of a permanent or long-lasting change in residence" (Zelinsky 1971:255-6, cited in Fuller et al 1990:535)

Appendix A

Structured interview guide/questionnaire for overall household survey

Location code:	Date: /10-1999

Main-informant's sex (female or male?):	Age:

1. *How many years have your family lived in this village?*
2.

Household member (nr 1, 2, 3…)					
Sex (m or f)					
Age					
How many years have the person been to school?					
What have the person's main working-activity been during the past year?					
What were the person's main working-activity 15 years ago?					

Household member (no 5,6,7…				Absent member	Absent member
Sex (m or f)					
Age					
How many years have the person been to school?					
What have the person's main working-activity been during the past year?					
What were the person's main working-activity 15 years ago?					

3.

What main activities have the household-members been doing during the past year?	Where have these activities taken place?	Which of these activities have your household in general been spending the most time on during the past year? (ranking)	Which of these activities have your household in general earned the most cash from during the past year? (ranking)	What was it like 15 years ago?

4. *Do you think the changes in your main working-activities of your household have been good or bad?*

5. *What were the main crops your household cultivated 15 years ago?* (rice, maize, cassava, fruits, ect.)
5a. *What kind of animals did your household keep 15 years ago?* (buffalo, pigs, ducks, chickens, ect.)
5b. Ranking (from 1 to X) of importance of the different main farming activities in the household 15 years ago:

Main land-use	Land-area	Cash-income/sale	Household use/non sale	Time/work load	Cash income	Household use	

6. *What have been the main crops your household have cultivated during the past year or two?*

6a. *What kind of animals have your household kept during the past year or two?*

6b. Ranking (from 1 to X) of importance of the different main land-use in regard to farming activities in the household during the last year or two:

Main land-use	Land-area	Cash-income/sale	Household use/non sale	Time/work load	Cash income	Household use	Have the productivity decreased or increased?*

* Compared to 15 years ago. Increased = + Decreased = - No change = 0

7. Ranking horizontally (from 1 to 6) of factors that influence selecting of crops for cultivation

Factor/ Types of crops	Household consumption	For sale	Cost of product	Area suitability	Difficulties to plant and care	Government subsidies

8. Technology used to increase the productivity of crops - Yes or no?

	Chemical fertiliser	Manure	Pesticide	Irrigation	Machinery	

9. What main product did your household collect from areas outside your main cultivated fields 15 years ago? (mushrooms, firewood, bamboo…)

9a. Ranking (from 1 to X) of the importance 15 years ago of the different kind of NTFP collected 15 years ago:

Main NTFP	Cash-income/sale	Household use/non sale	Time/work load	Cash income	Household use

10. *What main product have your household collected from areas outside your main cultivated fields during the last year or two?*

10a. Ranking (from 1 to X) of importance of the different kind of NTFP collected during the last two years:

Main NTFP	Cash-income/ sale	Household use/non sale	Time/ work load	Cash income	Household use	Have the productivity decreased or increased?*	Frequency**	Have frequency decreased or increased?*

* Compared to 15 years ago. Increased = + Decreased = - No change = 0

** E. g: Three times a week = 3/week

11.

	Presently (in rai)	15 years ago (in rai)
How many rais of land do/did your household have?		
Do/did you have any paper (land right) on your land? *What kind?*		

12. *Have your household applied for more land?*

If yes - *How much in rai?*

Is this plot of land presently cultivated?

13. Mapping

Ask the informant to mark his fields/plots on the map including what kind of paper he has on the different plots

Ask the informer to point out where he has applied for more land – if any

14. *What do you think about having the nationalpark surrounding your village?*

Soil property

No	pH	N	P	K	LR* (kg/rai)	Slope (%)	Texture	Note
1								
2								
3								

Lime requirement

Apendix B

The structured interview-guide on NTFP, that was to bee used in a limited number of the 11 selected households. These questions was to be left out of the survey as soon as these questions were answered by minimum 3 households. The reason for this was that we would then assume the answers given to be repressive for the remaining households as well.

Household No and informants:

Which kind of forest product do you collect?	Thai name[1]	What do they grow on or live on? (Name of host)	In what period of the year can the product be collected?	What do you sell the product for pr kg?	Were do you mainly collect the product?	(Other comments)
Mushroom 1	Het lom					
Mushroom 2	Het kone					
Mushroom 3	Het kardong					
Pak wan	Pak wan					
Bambooshot 1	Nor rai					
Bambooshot 2	Nor sai					
Bambooshot 3	Nor bong					
Bambooshot 4	Nor hoop					
Red ant eggs						
Firewood 1						
Firewood 2						
Firewood 3						
Firewood 4						

Notes to table:

1. The NTFP's in the table is the name of the ones that was given in the previous structured household survey.

The structured interview-guide 2 on NTFP, that was to bee used in all the 11 selected households:

Household No and informants:

Which of these forest products do you collect? (Thai name)[1]	How many times do you collect the products during the season?[2]	Frequency - Did you collect the product more or less in 1984* than today?[3]			Where do you collect the product?** How many minutes walk is this from your house?	Was the collecting site different in 1984*? Please explain the differences.	Is there many other who collects the specific product in the same area?		Was there more, the same or less people collecting the same product in the same location in 1984*?		
		More	Same	Less			Yes	No	More	Same	Less
Het lom											
Het kone											
Het kardong											
Other Het											
Pak wan											
Nor rai											
Nor sai											
Nor bong											
Nor hoop											
Other Nor											
Red ant eggs											
Firewood											
Other NTFP's											

NTFP's	Is the collecting site inside or outside the NP?		If changes in collecting site - Was the former collecting site inside or outside today's boundary of the NP?	In regard to the amount you collect - is this more, the same or less than the other collectors?			Which product do your household sale[4]?	Which products do most villagers sale?	Which products did you sale in 1984*[5]?	Which products did other villagers typically sale in 1984*?	Who do you sale your products to?
	Yes	No		More	Same	Less					
Het lom											
Het kone											
Het kardong											
Other Het											
Pak wan											
Nor rai											
Nor sai											
Nor bong											
Nor hoop											
Other Nor											
Red ant eggs											
Firewood											
Other NTFP's											

Notes to the tables:
* Whenever a questions contain the year "1984" this year was when the question was asked substituted with
"synonym" such as "when your daughter was born" - "when your son started school".... The information to such "synonyms" were found on behalf of the foundings in the structured household survey.
** When this question was to be ask, the idea was that the informant should draw a simple map of the location of main collecting areas in regard to the village. By doing this the informant was to be provided with different coloured pencil, so that each product had a specific colour on the map.
1. The NTFP's mentioned are the ones that were mentioned in the structured household on NTFP's.
2., 3., 4. & 5. This questions were also ask in the structured household survey, but the answers given were either lacking or not precise enough to make comparisons between the households.

Do you know of a person who goes very often to the forest and collects products and that as well did this before 1984*?

We would like to see where and how you collect the products form the forest. Would you be interested in taking us on such a walk? If so when do you have time for this?

Appendix D

Interview with household 66

The interview is in the morning but husband is not present and wife do not have time enough for interview.
The informant considers the funeral fund to be the most important grp. The household is also member of Tor Kor Sor (?) which is a loan program. The loan is 4000 baht and they receive the money as seeds, fertiliser and money.
The reason for not being a member of the corn grp. was unclear but something about having to pay for membership.
(Interview in the evening)
Has there been a forest grp. like there is a corn grp. today?
There is no replantation or other organised forest grp. but all the villagers are concerned about their duty of protecting the forest.
Any regulation of use of forest?
Cutting trees in the watershed is fined with 500-5000 baht and many people have been fined.
Rules for use of timber for construction?
You have to ask RFD in Na Fai for permission if you want to cut trees in your own field
What if there are no trees on your land?
VC will help and sign paper for application for RFD and then you can cut trees where ever even in the NP
Are there any zones of use?
There is no such thing but maybe in the future.
Why protection of the forest?
Cutting of wood will effect the water supply in our fields and especially water supply from the mountains.
Will there be timber in the future?
No, not if villagers continue their practice. But then there is the replantation program but cutting down of trees from this program also require permission from the district office.
3000 baht per year for 10 rai of land replanted. But 3000 is not enough money it is not worth it.
Teak covers for other plants and herbs. Many are interested but practically it is not possible because it requires NS3.
What about expansions?
Villagers have to expand little by little. There is no sign of receiving the land titles the government has promised. But no expansion across the boundary.
What will villagers do when the boundary is reached?
Expansion is not possible because of landmarks.
What about the time before landmarks were posted?
Yes then expansion was possible because the government paid no attention. The landmarks were posted in Mai-June 1999. After the posting RFD came to recheck whose land was next to whose and we were promised paper later.
When there was expansion into the NP does that mean that landmarks were posted at the end of existing fields?
Yes
Land beyond poster means expansions in this year?
Yes
Are rules of no expansion followed?
Depends on the person. Families will punish family members who expands because it is the duty of all to protect the forest – and it gives a bad name to the whole family.

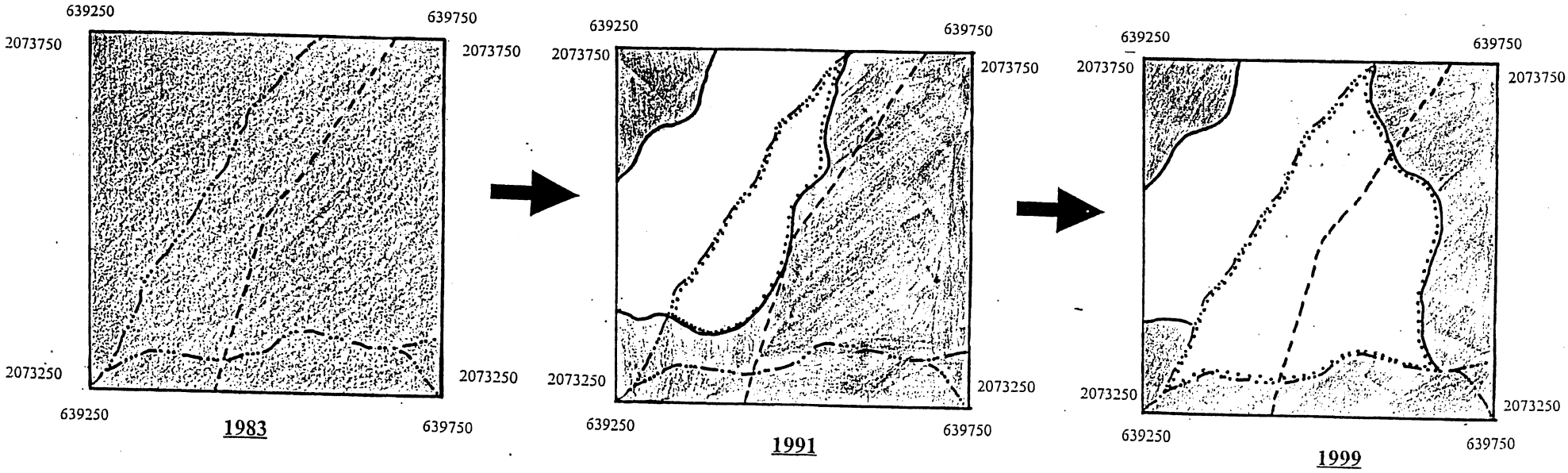
Appendix E

Husbandry

Husbandry		Buffalo		Pig		Chicken		Other	
Sub. or sale?		Sub.	Sale	Sub.	Sale	Sub.	Sale	Sub.	Sale
Now	No	2	3	2	2	14	3	1	1
Before	No	13	7	4	5	13	0	1	1
Change	No	-11	-4	-2	-3	+1	+3	0	0

According to the table only 14 out of 27 households (52%) keep chickens, if they did not mention chickens themselves, everybody agreed to this when asked directly. It is therefore likely, that the villagers do not consider chickens as husbandry and that the real number therefore is higher.

CHANGE LANDUSE OF HOUSEHOLD NUMBER 5



SYMBOL

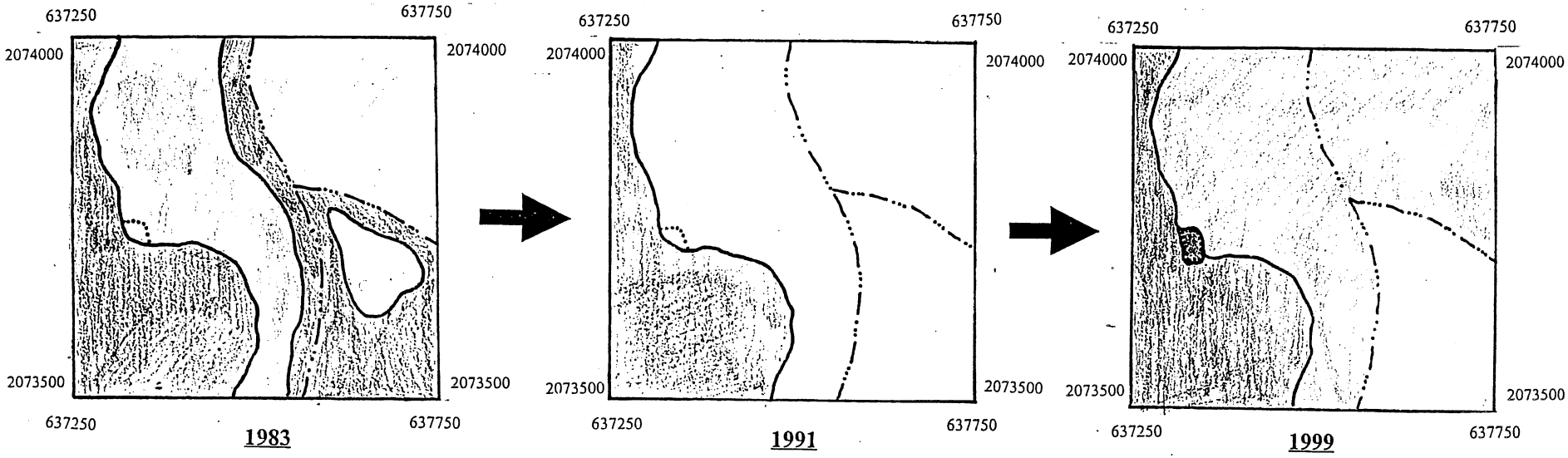
- Stream
- Cut off boundary
- Boundary landuse household No.5 (NO STK)
- Forest Area
- Crop field

N

300 0 100 200 300 m.

Appendix F1

CHANGE LANDUSE OF HOUSEHOLD NUMBER 5



SYMBOL

- Stream
- Boundary land use household No.5 (STK)
- Forest Area
- Paddy field
- Crop field
- Tamarind

N

300 0 100 200 300 m.

Appendix F2

Appendix G

Two types of forest dominate the forest today: Dry Diptocarp Forest (**DDF**) and Mix Deciduous Forest (**MDF**). Two main types of MDF is present; MDF with Teak (*Tectonia Grandis*) and MDF without Teak (Jintana, 1999; Wichawutipong, 1999). There are four main characteristics difference in the vegetation composition between MDF and DDF: 1)Teak is found in MDF, but not in DDF; 2) There is typically much more bamboo in MDF, than in DDF; 3) The bamboo species in MDF are typically much taller, than those in DDF; and 4) There is much less grass cover in MDF compared with DDF. Besides this both forest types are generally found on relatively pore soils. The soil observed in DDF seamed however to be more poor than those in MDF (Jintana, 1999 and own observations).

Type of forest vegetation used in 1999
Mushroom species. *Ex Het dan, Het hop, Het kardong (=Het kradong?), Het kone, Het lom, Het mongon, Het pak (=Het pa?), Het rom and Het yang.*
Grass (bamboo) species. Ex *Kaw lam, Mai khao ram, Nor bong, Nor hoop, Nor rai, Nor sai, Nor sang* (= *Nor san*?), *Pai san* (= *Pai sai?*) and *Ton leam.*
Bush species. Ex *Sauropus sp.* (= *Pakwan*) and *Ton Kram*
Palm specie: *Cycas spp. (=Purom)*
Tree species. Ex. *Diptocarp spp.* (ex. *Diptocarp sp.* = *Tong yang*), *Hopea spp.* (= *Kija*), *Lagerstroma spp., Mai hge, Mai kap, Mai ngae* ("Golden ring tree"), *Mai pau* (= *Mai paw*?), *Mai pop, Mai yang, Mai yap* (= *Man yap*?), *Mange, Shorea spp.* (ex *Shorea obtusa* (= *Tonghe* or *Toeng*), *Shorea sianensis* (= *Rung* or *Ton pau*), *Tectonia grandis* (=Teak (Golden Teak =*Sak ton* and Black Teak =*Sak kequi*)) and *Xelia spp.* (ex *Xylia kersii* (= Red wood = *Mai dai*), *Xylia odorata* (= Red wood =*Tong dang* = *Mai dang*).

APPENDIX H

Activity calendar for the people of Ban Na Luang

Average diurnal temperature and rainfall, yearly climatic seasons for the Yom Watershed Station (Rungrojwanich et al., 1998) and season of various presently working activities in Ban Na Luang.

Month	J	F	M	A	M	J	J	A	S	O	N	D
Max. and min. Temp. in ^0C[1]	33 | 14	35 | 16	38 | 18	38 | 22	36 | 24	34 | 24	39 | 24	33 | 24	33 | 24	34 | 21	33 | 18	32 | 14
Rainfall in mm[2]	9	9	34	48	194	120	201	253	242	83	19	6
Climate seasons	cold	cold	hot	hot	rainy	rainy	rainy	rainy	rainy	rainy	cold	cold
Activity seasons:	J	F	M	A	M	J	J	A	S	O	N	D
Labour work[3]												
Land preparation[4]												
Maize cultivation												
Peanut or soyabean cultiv.												
Wet rice cultivation												
Hunting & fishing												
Logging & firewood coll.												
Red ant egg collection												
Pakwan collection												
Bamboo shoot[5] collection												
Mushrooms[6] collection						d+h+l+ k+p		ka	ka	l+k		

Notes, 1: The mean annual temperature is 34 ^0C. 2: The total annual rainfall is 1216 mm. 3: Labour work do not include field work. 4: Land preparation for cultivation. 5: The table shows only the season for the following tree bamboo shoots: *Nor bong*, *Nor hoop*, *Nor rai* and *Nor sai*. 6: The table shows only the season for the following six mushroom species: d= *Het dan*; h= *Het hop*; ka= *Het kardong*; k= *Het kone*; l= *Het lom*; p= *Het pak*.

Appendix I

Diagram of rules in use