

Livelihood Strategies under Resource Constraints

SLUSE Joint Basic Course 2000

Field Work in Phrae Province, Northern Thailand,
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Location 1: The Villages Ban Khuang Chompoo and Ban Na Rai Diao.

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Abstract

This report is an analysis of livelihood strategies and natural resource management in two small villages in Northern Thailand. Point of departure is the limited natural resource base and apparently few and small income sources. The investigation concentrates on why villagers continue a livelihood strategy centred on agriculture, when resources are limited and income low.

Different factors are found as explanations to the continuation of present livelihood strategies. Some are physical like limited water supply and some are due to present farming practice. Other factors are social capacity of the villagers and socio-economic structures as possibilities of occupation. Finally, the possibilities and limitations in the institutional structures such as where and how to get credit and funds.

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1. Introduction to Northern Thailand

"...Although economic differences exist between South East Asian countries, they have similar environmental problems, such as: overexploitation of their natural resources, deforestation, decrease in land fertility ..." (DANCED, 2000)

The above conditions of natural resource management and land use in South East Asia are reflected in rural Thailand, which has been increasingly linked to market economy, hence urban and global economy, like in many other countries in the region. (Buch-Hansen, 2000)

Since the 1950's Thailand has experienced a rapid economic growth. This was initially based on a use of the natural resources, but has become increasingly dependent on manufacturing industry in the urban areas. In 1994 about 60% of the labour force was employed in the agricultural sector, but its share of GDP was only 12 % (Fairclough & Tasker 1994:22).

The economic crisis in 1997 has once again shifted emphasis on the agriculture sector, creating greater pressure on the natural resource base. Presently, all land suitable for agriculture has been used (DANCED 2000:10). This was partly due to many temporary workers in the cities lost their job and returned to farming. The ones suffering most were the small-scale farmers being dependent on off-farm income (Buch-Hansen, 2000).

Since the 1970's Thailand has been a net importer of timber, primarily because the growing rice production in the country has been based on expansion into forest areas. From 1950 to 1980 the rice production increased by more than two thirds. This has contributed to severe environmental degradation in many areas (Hirsch 1993:15). But on the other hand, the growing paddy rice production created the economic surplus in the 1950's and 1960's. Today 25% of Thailand's paddy fields are located in the North (Buch-Hansen, 2000).

At national level the environmental degradation caused concern and resulted in changes within the national environmental policy. The 7th (1992-1996) and 8th (1996-2001) National Economic and Social Plans put an emphasis on integration of economic and social development and natural resource management. This issue was furthermore addressed by the new Constitution from 1997, which encouraged public participation in the protection and management of Thailand's environment and natural resource base. The constitution addresses the important role of community based organisations and local institutions, and decentralisation of government programmes implementation is presently promoted. One example is the formation of the Tambon Administrative Organisations (TAO) on sub-district level (DANCED 2000: 13-15).

Various development projects are aiming at improving the living conditions for the poorest part of the rural population. This includes improving basic infrastructure and employment opportunities and instruction in farming practices (Phongpaichit & Baker 1999:64).

Different policies attempt to stop further encroachment of forests in Thailand. The aim is to leave 25% of the land as commercial forest and 15% as natural forest. This is being pursued through different policies as afforestation programmes, resettlement programs or granting of usufructuary rights, and not least supporting a change from extensification towards intensification of farming practices (Hirsch 1993: 15,16,20). In the 1960's, the expansion of agricultural land was 45% per year and today it is 1% per year (Buch-Hansen, 2000). A reason for the big expansion of agricultural land in the 1960's and 1970's was the government focus on agricultural export, supported by subsidies, taxes and other economic and political means (Baker & Phongpaichit, 1998).

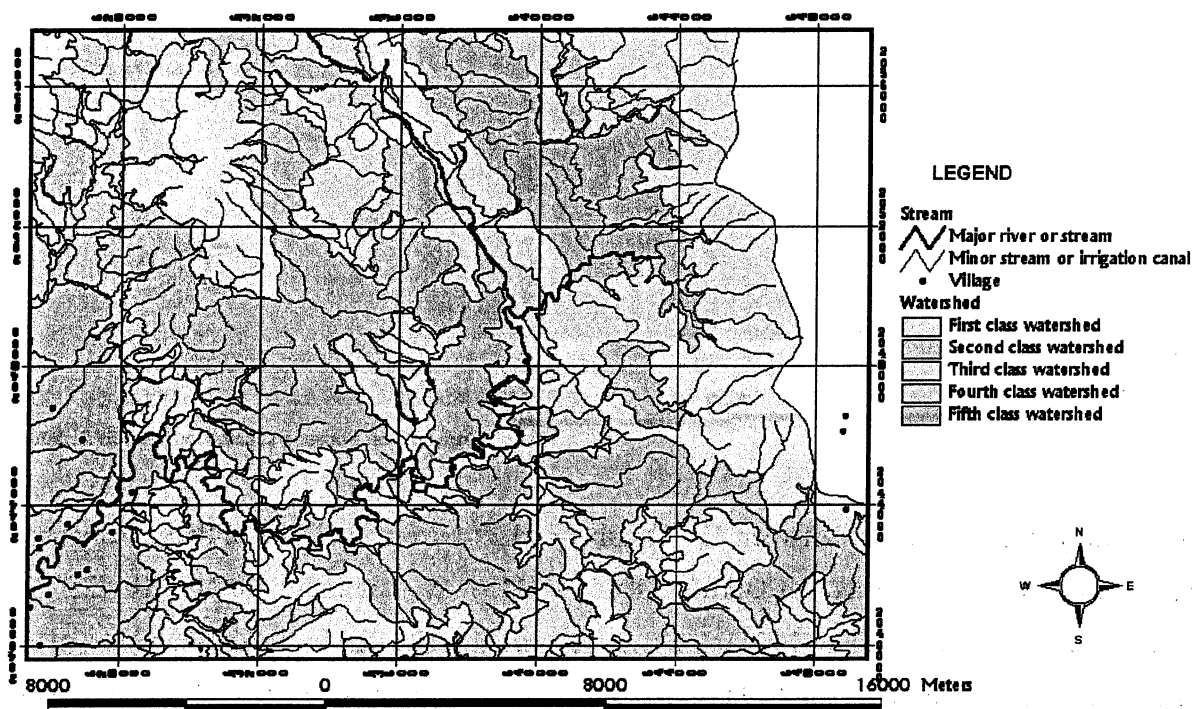
The building of dams in the northern part of Thailand is part of this intensification. In particular areas this has led to increased water supply, higher yields, a change from subsistence to cash crop production and integration into the market economy (Cohen and Pearson 1998). The dependence of the cash economy has caused problems for many poor farmers, who have a low income and limited access to financial support. To obtain a loan from a bank the farmer needs a title deed, and this is a constriction to many of the poorest farmers in the rural areas. The farmers have to find ways of supplementing their low income or finding credit, and this often involves loan from the Bank of Agriculture and Co-operative (BAAC), private moneylenders, the Middleman or the State.

Until now, relatively low population and expanding agriculture have not forced the majority of farmers to invest in intensification of agriculture and the use of agricultural input is still relatively modest for most of the farmers. But other commercial, export oriented farmers are closely related to agribusiness companies providing seeds and other agricultural input. (Buch-Hansen, 2000)

Thailand's position as natural resource and agricultural exporter is often related to the increasing deforestation and environmental consequences, such as irregular flooding and a total logging ban was the outcome of the flood in 1989 (Bello et al., 1998). Deforestation is especially considered as an ecological problem in Northern Thailand, because the area is the main water supply to the Chao Phraya Basin and the central plain. The remaining forest in the north constitutes the main watersheds and water flow irregularities in these areas have potentially huge impact on water supply and quality, e.g. siltation from soil erosion in the lower areas (Bello et al., 1998).

In order to protect the watersheds, a classification with different watershed classes was introduced. Map 1 illustrates the classification of Song Watershed, situated in Mae Yom Watershed, Northern Thailand. The map also indicates the villages, in which the four groups of students in the SLUSE Field Course did investigations (highlighted with yellow), which are situated in WSC2, WSC4 and WSC5. The northern villages were studied by location 1, the

Watershed classification

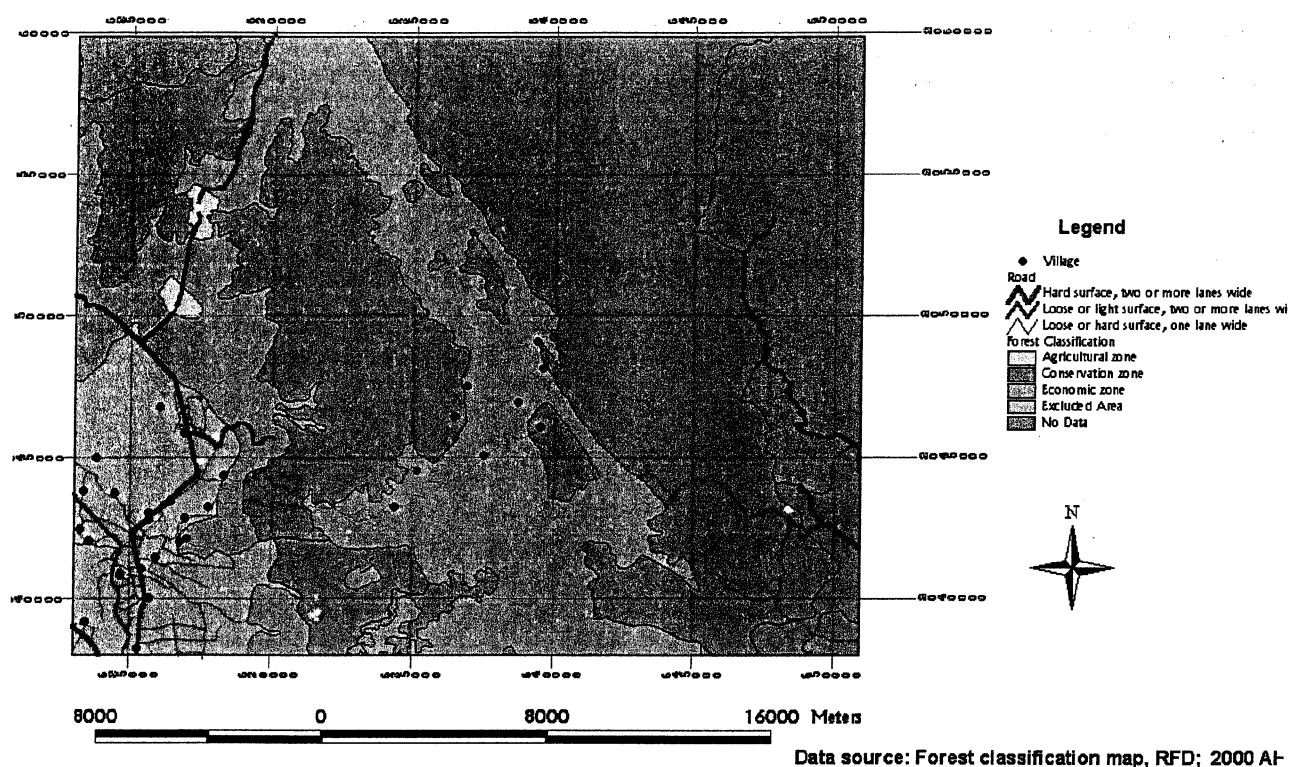


Data source: Topographic map, 1992, Thai Survey Department and watershed classification map unknown date, RFD; 2000 AH

south-western villages by location 2 and 3, and the eastern most village by location 4.

One example of the government policy for conserving the remaining forest is the classification of land use in different zones. Map 2 shows The Royal Forest Department's classification in agricultural, economic and conservation zones. These zones are related to various restrictions such as prohibition of timber extraction and agricultural land use purposes.

Forest Classification in Song Watershed



The field study was carried out between 13th October and 3rd November 2000 in Phrae Province, located in Mae Yom Watershed on latitude 18°25' - 18°39' N longitude 100°10' - 100°25' E, covering an area of approximately 406 km². Song Watershed is situated in the sub-humid tropical climate zone. The annual rainfall is 1200 mm and almost 90% fall in the rainy season in August and September. The cold and dry season is from November to March, when it starts getting warmer again (Rungrojwanich, 1998).

1.1 The Study area

The investigation was carried out in the two villages Ban Na Rai Diao (NRD) (197 households and a population of 785) and Ban Kuang Chompoo (KCP) (91 households and a population of 315) (Mingtipol et al. 2000:14-15). KCP separated from NRD 22 years ago and the villages are located only four km apart in the northern part of the watershed. Most of the villagers are farmers, who depend on rainfed maize and rice cultivation, but also collect several NTFPs. The villages are situated in a valley surrounded by commercial plantations and conservation forest. Agricultural extensification is therefore limited.

Both villages face the problem of mainly water restrictions. The farmers don't have the possibility of using water from the newly established Song Reservoir because of their higher elevation. This

makes their situation different from the farmers in the other investigated villages at the Sluse field course (location 2 and 3). In the rainy season some of the farmers can make use of water from a small stream. In order to minimize water as a limiting factor the farmers have constructed some few ponds and in NRD a minor irrigation system. Still, only few of the farmers are able to grow more than one crop a year per field.

The above information led to some crucial questions and objectives. First of all an objective was to find out how the villagers are able to live in an environment apparently characterized by several physical and economical resource constraints. Why do the villagers continue their present livelihood as farmers, when agriculture apparently are facing so many constraints and give only a very low income? To analyze this issue we found it necessary to try to understand their motives and decision criteria. What are their alternatives and do they have any alternatives at all? These objectives have been highlighted in the following problem formulation:

1.2 Problem Formulation

Why do the villagers continue their present livelihood strategies, centered on agriculture, when natural resources are limited and income low?

-What are the main constraining factors, and how are the villagers able to sustain under these conditions?

-Do the constraining factors lead to divergent livelihood strategies in the two villages?

The concept of livelihood strategies will be used as an analytical framework, in order to analyze the interdisciplinary integration between socio-economic and natural science processes in a local context. Due to heterogeneity in terms of access to and control over resources, acknowledging complexity and diversity is essential. To uncover and explain processes in the rural communities it is argued that a livelihood approach can be useful (Birch-Thomsen et al.:32).

The livelihood framework is understood as the background conditions and trends, resources, institutional processes and organizational structures that in combination give the possibilities of pursuing a way of living in a specific context (Brock:3, appendix 1, Scoones, 1998:1).

At the core level the livelihood strategy framework will be used for examining household or individual access to, utilization and allocation of resources, while at the secondary level focus is on how local livelihood strategies are influenced by the interaction with markets and political institu-

tions and with environmental and social conditions. This is being done in relation to the problem formulation.

As seen from appendix 1 the livelihood framework consists of many variables. In this paper emphasis will be placed on identifying the specific constraining factors among the livelihood resources and background conditions in the project area. Point of departure is the limited natural resource base. With a recognition of the limited agricultural output, and also in order to encircle the objective, further investigations have been concentrating on the alternative income possibilities in the area.

1.3 Outline of the report

The report is divided into four parts. The first part is describing the methods used in the field work. Next is presentation and analysis of field work findings. This part is separated into physical findings, socio-economic issues and funding and credit possibilities. Third part is a discussion of the different findings in order to answer the problem formulation. This part also includes a discussion of the methods used. Fourth part is the conclusion.

2. Methodology

This section deals with the different methods used to get the needed data, and the reflections that lead to why different methods were chosen. To a certain extent bias and advantages of the methods will also be discussed but more general reflections about the usefulness of the methods will be found in the discussion later in the report.

In order to use the livelihood concept as point of departure it was considered appropriate to get as wide as possible array of data concerning the villagers daily activities. This wide array of data formed the foundation upon which an operationalisation of the livelihood concept later could be formed. This procedure was followed because the apriori empirical knowledge of the location unfortunately was very limited, implying that it was difficult beforehand to gain a contextual interpretation of the livelihood concept. The method chosen to get a wide array of data was open-ended interviews in the case of the headmen and structured interviews in the case of the households. To get more detailed information about selected issues, semi-structured interviews in the case of selected key informants. In addition soil samples were conducted in an attempt to link the influence of physical conditions on livelihood.

2.1 Open-ended interviews and questionnaire

Point of departure was interviews with the headman from KCP and with two assistants of the headman in NRD, conducted by the whole group. These interviews were made in order to get

basic information about the two villages and to get the first impression of the villages. Three subgroups were formed, according to field of study; social science, economics, and agro-ecology. A working plan was made in order to insure that all knew what the groups were doing. Group discussions concerning the general procedure were postponed. From the information gained from the first interviews each field subgroup prepared questions, which afterwards were discussed by the whole group. From this discussion a common questionnaire for all the households in both villages were made. The headmen were later on used as key informants for extra information in a few informal interviews. After the first day of interviewing the guide was slightly adjusted.

2.2 Sampling and structured interviews

The informants for the main survey were selected by taking 15% of the households in each village. 30 households were selected in NRD and 15 household in KCP.

The sample was made by information obtained from the local Health care Center in NRD. The Center had information about both villages listed according to the location of the houses. There was a total of 90 households in KCP and 187 in NRD. Every seven household from each list was chosen as informant in order to get a representative random sampling of the households according to locality. In total 45 households were selected.

The 45 household interviews were made in new interview-subgroups according to the following criteria:

- In each group there should be one Danish student in order to learn interculturally from each other
- In each group there should be one Thai student understanding the northern dialect, in order to have a proper understanding and a proper conversation with the villagers
- If possible there should be a student from each field subgroup in each interview subgroup in order to secure the questions were proper formulated and to follow up on interesting issues in his/her field

The groups were formed as shown in the following table:

| Field \ Interview | Group 1 | Group 2 | Group 3 |
|----------------------|-------------|--------------|-------------|
| Economic | Lis | Peter | Ae |
| social science | Ore | Noon | Henrik |
| agro-ecology | Toy | Dao | |
| Translators | Moe | Or | Yui |
| Connected supervisor | Ajarn Picul | Ajarn Wanana | Ajarn Arnat |

In the case of household interviews structured interviews were chosen since the selected sample were quite huge. Structured interviews are more time effective but the dis-advantage of course is

that they also tend to be more superficial. During the interviews qualitative information was gained through observation and improvised questions were added to the questionnaire. This made the interviews a kind of a hybrid between a structured and a semi-structured interview. After finishing the household interview in each of the villages the whole group gathered to discuss and summarize the collected data. This was done in order to make a general characteristic of both villages. The questionnaire can be found in Appendix 6.

2.3 Semi-structured interviews

After the collected general information from the survey, an informal socio-economic subgroups was established and the remains of the original economic subgroup regathered. The original intention was that each subgroup should select households of special interest and do extended interviews of these selected households. This path was not followed, because it was found more appropriate to conduct interviews with other key informants, chosen accordingly to the different subgroups objectives. The semi-structured interview was chosen, because this method gives a possibility to pursue interesting issues during the interview. The semi-structured interviews were centered around a few central questions. The interviews started with some polite questions about general issues to create a good atmosphere. Afterwards the essential issues were encircled.

2.4 Soil sampling and test

The agro-ecology group proceeded the work with making soil test. The fields were chosen from the main survey. Households who had either no fields or fields located outside the village were subtracted. The headman helped with the selection and with finding the fields. In total 19 households in NRD and 9 households in KCP were chosen. The fields were chosen according to the importance of the crop grown, which means the farmers most productive field was chosen. After the soil samples had dried in the shade, they were crushed and the texture was estimated according to USDA Texture Triangle (Soil Survey Staff, 1944). Ph was measured in the soil suspension, using the Kasetsart Testkit and the EC measured with an EC-meter.

2.5 Dataprocessing

GIS maps were made in Arc View using different themes from the Mae Song Sub Watershed database. The maps show the distribution of watersheds, land use and land tenure. The location of the fields used for the soil sampling from the selected households were also plotted into these maps. The quantitative information from the household survey was processed in a statistical database programme (SPSS). The results can be seen in tables throughout the report.

Figure 1: Crop Calendar

| | Apr | May | Jun | July | Aug | Sep | Oct | No | Dec | Jan | Feb | Mar | Apr |
|---------------------------|-----|--------------|--------------|------|-------------|------------------|----------------|----|-----|-----|-----|-----|-----|
| Ban Na Rai Diao | | | Maize | | | | | | | | | | |
| | | | | | <i>Rice</i> | | | | | | | | |
| | | | | | | <i>Mung bean</i> | | | | | | | |
| | | | | | | | <i>Tobacco</i> | | | | | | |
| | | | | | | <i>Cotton</i> | | | | | | | |
| Ban Khuang Chompoo | | Maize | | | | | | | | | | | |
| | | | | | <i>Rice</i> | | | | | | | | |
| | | | | | | <i>Mung bean</i> | | | | | | | |
| | | | | | | | <i>Cotton</i> | | | | | | |

Source: Information from survey

Maize is the first crop to be planted in May or June, which correspond to the importance of this crop as the main cash crop. Also, maize can be planted in the beginning of the rainy season, whereas rice has to be planted in more moistures soil after it has been raining for some time. Rice is planted in August and mung bean in September. If the farmer has more than one plot the time for planting and harvesting will be displaced. The planting and harvesting is done by the farmer him/her-self with help from rest of the family. If the farmer can afford it he might choose to hire wage laborers. Another solution is taking part in the work parties. The crop calendar is very similar for the two villages, but the frequency of the crops grown is different. Most farmers in both villages grow maize (NRD: 81% and KCP: 100%), and this is exclusively for selling. Farmers in NRD have a tendency to grow more different crops than farmers in KCP. 36% of the farmers in NRD grow rice for consumption and 36% grow mung bean for selling. Some 7% grow tobacco and cotton for selling. 20% of the farmers in KCP grow rice for consumption (the farmers with more than one plot - otherwise only maize is grown). These results can be seen from table.. which shows the frequency and purpose of the different crops.

Table 2: Frequency and purpose of crops

| Variable | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|---------------------------|-----------------|-------|--------------------|-------|
| | Frequency | % | Frequency | % |
| Purpose of growing | | | | |
| Maize | | | | |
| Selling | 25 | 100.0 | 15 | 100.0 |
| Consumption | - | - | - | - |
| Both | - | - | - | - |
| Total | 25 | 100.0 | 15 | 100.0 |
| Rice | | | | |
| Selling | - | - | - | - |
| Consumption | 11 | 100.0 | 3 | 100.0 |
| Both | - | - | - | - |
| Total | 11 | 100.0 | 3 | 100.0 |
| Mung bean | | | | |
| Selling | 11 | 91.7 | 1 | 100.0 |
| Consumption | - | - | - | - |
| Both | 1 | 8.3 | - | - |
| Total | 12 | 100.0 | 1 | 100.0 |
| Tobacco | | | | |
| Selling | 2 | 100.0 | - | - |
| Consumption | - | - | - | - |
| Both | - | - | - | - |
| Total | 2 | 100.0 | - | - |
| Cotton | | | | |
| Selling | 2 | 100.0 | 1 | 100.0 |
| Consumption | - | - | - | - |
| Both | - | - | - | - |
| Total | 2 | 100.0 | 1 | 100.0 |
| Tamarind | | | | |
| Selling | 3 | 100.0 | 2 | 100.0 |
| Consumption | - | - | - | - |
| Both | - | - | - | - |
| Total | 3 | 100.0 | 2 | 100.0 |

Source: Information from survey.

For soil preparation, most farmers from both villages plow the soil. About 80% of the farmers from both villages use fertilizer. No farmers in the samples had livestock and therefore didn't use organic fertilizer. The common formulas used are 16-20-0, 46-0-0 and 15-15-15 respectively. They add fertilizer to the fields once a crop calendar². These formulars are not optimal according to the chemical analysis of the soil samples, because P still be lacking after fertilizing with 46-0-0 and 15-15-15.

71% of the farmers in NRD use insecticides compared to 25% in KCP, and almost 100% of the farmers from both villages use herbicides.

² According to the Agro-ecology subgroup the farmers didn't know how much fertilizer, insecticide and herbicide to add and just did it randomly.

As part of the analysis of livelihood strategies, the farmers were asked why they had chosen the crops they had, and to rank their crops according to importance to the household.

The farmers in KCP rank maize as number one and choose to grow it mainly because it is easy to grow, gives money and is more drought resistant than rice. Some farmers do not question the crop choice, they grow maize because "that is what farmers do here."

The farmers in NRD also rank maize as number one and grow it to get money. If they are among the ones who have enough water to grow rice they will do this, so that they don't have to buy it and therefore save money. Maize are grown mainly on the fields away from the village, because it needs only very little care, whereas mung bean are grown closer to the village.

To get an idea about constraining factors, the farmers were asked to rank the problems affecting farming:

BNR:

1. Insufficient water and lack of water in dry season (52%)
2. Lack of fund (23%)
3. Low price of products (16%)

KCP:

1. Low price of products (50%)
2. Insufficient water and lack of water in dry season (29%)
3. Lack of fund (14%)

The farmers in BNR mention the insufficient water supply as the main constraint, whereas this factor is only ranked second in KCP. Indeed, KCP is located more upstream than BNR, but BNR have the irrigation system and more ponds though. And still, farmers from both villages mention the rain as the main water source, so it seems as they have the same water supply. So why this difference? A reason might be that the farmers in KCP are more in need of cash money, because they have to buy rice for consumption and therefore are more concerned and unsatisfied with the price they get for their products. The problem of low prices and lack of funds are discussed further in the socio-economy part of the report.

3.2 Subconclusion

The land distribution and size of plots is more diverse in KCP than in NRD. Farming strategies are very similar and lack of water inhibit the farmers in both villages to harvest more than once or twice a year. Maize is the main crop and is grown exclusively for selling. Rice is grown more in NRD than in KCP and only for consumption. Low price of products is more problematic in KCP, probably because they are more in need of cash money than the farmers in NRD.

4. Socio-economic issues

The following section will analyse information about different socio-economic aspects in NRD and KCP in relation to the livelihood strategies. The issues touched upon are income of the household, occupation, educational background and land tenure.

4.1 Income

The data concerning income level and expenses should be considered with reservation. The respondents are assumed to have limited perception of their accurate income and expenses. But still the collected numbers can be taken as a kind of guideline to get an estimate of the income level and distribution.

Table 4 in the Appendix 4 view the frequency of the different income intervals in the two villages. The general picture is, that in NRD there seems to be a more equal distribution of income compared to KCP. This might be connected to the fact that KCP is a newly established village that has attracted both innovative settlers and poor farmers implying a more polarized population, compared to the more homogeneous NRD. The distribution of fieldsize in the two villages confirm this statement, since KCP tend to have a more unequal distribution of land than NRD.

It is striking that farming expenses make up such a large proportion of total income. One wonders how the farmers are able to survive. Since no cases of malnutrition etc. were encountered it is evident that the villagers to a certain extent are dependent upon subsistence farming. In NRD this picture was confirmed, since most of the respondents grow rice for own consumption. Furthermore, most of the respondents in both villages affirmed they during season collect NTFP such as bamboo shoots, mushrooms etc. for eating. In KCP the picture is more confused, because only very few of the respondents were able to grow rice. Therefore the farmers in KCP are more vulnerable to price fluctuations, since they to a greater extent are dependent upon cash cropping. Hence the recent economic crisis at the macro level probably have had a more devastating impact upon KCP. The impression that KCP villagers to a greater extent tended to have 'unspecified' alternative income sources³ could very likely be a consequence of these more severe economic conditions.

³ Keyinformants from the Police Station in Song and the Forestry Department confirmed that there was a widespread amount of illegal activities going on. This concerned mainly small scale drug trade and illegal logging.

Some villagers also supplement their income with additional labour work. Villagers getting remittances - mostly from children working in Bangkok - also seemed to be quite common. Just as common was supporting grandparents.

4.2 Education and occupation

The educational background for the villagers in NRD and KCP are quite similarly. The general picture is that they mainly have compulsory school only and few have secondary school (see table 3). The younger generation seems to continue in secondary and even further.

Table 3: Education for the respondent

| Education | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|-------------------|-----------------|----------|--------------------|----------|
| | Frequency | per cent | Frequency | per cent |
| None | 3 | 9.7 | 2 | 13.3 |
| Compulsory school | 20 | 64.5 | 11 | 73.3 |
| Secondary school | 8 | 25.8 | 2 | 13.3 |
| Total | 31 | 100.0 | 15 | 100.0 |

Source: The table is made on basis of the main survey.

It is general recognized that poor education leads to poor jobs and few possibilities. The educational background of the villagers could therefore be seen as one factor keeping the villagers in their present livelihood situation. This can be underpinned by the occupation found in the villages. Most are farmers and they often have some seasonal additional labour work. Very few live from only labour work or other job as following table shows.

Table 4: Main occupation of the respondent

| Occupation | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|------------|-----------------|----------|--------------------|----------|
| | Frequency | Per cent | Frequency | Per cent |
| Farmer | 27 | 87.1 | 14 | 93.3 |
| Labor | 3 | 9.7 | - | - |
| Others | 1 | 3.2 | 1 | 6.7 |
| Total | 31 | 100.0 | 15 | 100.0 |

Source: The table is made on basis of the main survey.

The alternative occupation found in the villages is at a very small scale. As an example NRD have four very small shops that doesn't seem to make much profit, a garage, and a few small projects, which will be treated further in the section about funding.

4.3 Land Tenure

The land tenure situation in Thailand is quite diffuse for several reasons. First of all the land rights are controlled by different Government Agencies, which are both under the Ministry of Interior and the Ministry of Agriculture and Co-operatives. Furthermore the rights to land is

given via a lot of different certificates. These certificates can be divided into certificates which give property rights and certificates which give temporary rights to land use. Some certificate given to agricultural land use are within the reserved forest areas. This create a conflict about land being used for agriculture or reserved forest. Finally, a lot of land is squatted, this is especially in reserved forest areas (Mingtipol et al. p. 30-32).

The certificates found in NRD and KCP are the NS3, STK and SPK. Table 5 shows the attribute of these certificates.

Table 5: Land Certificates

| Certificate | Thai name | Legal status | Used as collateral | Department issued by | Restrictions/ stipulations |
|-------------|--------------|---|--------------------|---------------------------|--|
| NS3 | Nor-Sor-Sarm | Secure; enables farmers to sell, transfer, or mortgage land; can be converted to title deed (NS4) | Yes | Department of Land | Issued only for land outside forest reserves; ownership can be challenged if land lies fallow longer than five years |
| SPK | Sor-Por-Kor | Usufruct, can only be transferred by inheritance | No | Land Reform Office | |
| STK | | Usufruct, can only be transferred by inheritance | No | Royal Forestry Department | Issued only for land inside forest reserves; only plots up to 15 rai; state reserves right to revoke usufruct right if restrictions violated |

Source: The table is based on Mingtipol et al. p. 33-34

Certificates for the houses in NRD are mostly NS3 (80.6%), while in KCP most of the houses have SPK or no certificate (see table 6). This is probably due to the fact that settlement in NRD is older than the settlement in KCP. This could indicate some failure or very slow processes in the administrative system or indicate that settlers simply squatted the land. However, the latter was not found in the investigation. The respondents asked had either bought their houses or they've got it from heritage.

Table 6: Housing certificate

| Certificate | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|-------------|-----------------|----------|--------------------|----------|
| | Frequency | Per cent | Frequency | Per cent |
| None | 4 | 12.9 | 3 | 37.5 |
| NS3 | 25 | 80.6 | 1 | 12.5 |
| SPK | - | - | 4 | 50 |
| STK | 2 | 6.5 | - | - |
| Total | 31 | 100.0 | 8 | 100.0 |

Source: The table is made on basis of the main survey.

Having a NS3 certificate for the house gives possibilities of borrowing on mortgage in a private bank. This indicates that farmers in NRD, where almost all have NS3 for their houses and many for their fields as well, have better possibilities of loan. However, the investigation doesn't show any major difference between the villages.

In NRD SPK, NS3 and STK certificates for the farmland are all very common. At the same time there are villagers who didn't have any certificate at all. This gives a picture of a very diverse tenure situation. In KCP most had SPK certificate (more than 50%) for their field land and quite a few didn't have any certificate at all (25%) (see table 7).

Table 7: Farmland certificate in each household

| Certificate | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|--------------|-----------------|----------|--------------------|----------|
| | Frequency | Per cent | Frequency | Per cent |
| none | 2 | 6.5 | 3 | 25 |
| NS3 | 11 | 35.5 | - | - |
| SPK | 6 | 19.4 | 6 | 50 |
| STK | 5 | 16.1 | - | - |
| none and SPK | 1 | 3.2 | 1 | 8.3 |
| NS3 and SPK | 3 | 9.7 | 2 | 16.7 |
| none/NS3/SPK | 1 | 3.2 | - | - |
| none/SPK/STK | 1 | 3.2 | - | - |
| others | 1 | 3.2 | - | - |
| Total | 31 | 100.0 | 12 | 100.0 |

Source: The table is made on basis of the main survey.

Most of the fields are located near the houses. The GIS map made of the villages (see Appendix 5) shows that the certificated land is close to the villages. This indicates that the farmers without a certificate are also the ones with fields located far from the villages. This was confirmed in the interviews. Furthermore, the fields without certificate are often situated in or near the forest reserves areas. These fields might be pre-empt and in case of strict Government control these farmers might lose their land.

In general the farmers in both villages seemed to have some knowledge about the rights associated with the different types of certificates, although this knowledge was limited to some ideas about possibilities of collateral and heritage.

Among others Tietenberg (1996, p.41) argues that private property rights in a well-functioning market economy will lead to more efficient use of resources. If this is the case, some problems could be solved by giving the farmers property rights to their land. But if private property rights lead to efficient use, the farmers who have the NS3 certificate should be expected to utilize their

land more efficient. However, in this investigation there is only a little indication, if any at all, that the ones with NS3 should be more efficient than the ones with SPK, STK, or without certificates. This could be due to a not well-functioning market, or the farmers being more oriented towards farming for consumption than farming for selling.

Probably it would improve the livelihood for the villagers if they got property rights to their land, but this alone can probably not change much. An argument for this could be that farmers with NS3 (or NS4) easily can loan money in a private bank. But it seems like both the courage and the initiative to make investment is missing. Furthermore, it might be that the farmers don't have enough land to get a proper loan.

If too much land is given free on the market, rich people (especially from Bangkok) might come and buy up land for recreation, status etc. This could lead to an even more difficult situation for small farmers, because land might be more expensive and some indebted farmers might get trapped to sell and end up even worse.

4.4 Sub-conclusion

Income level in the two villages seems to be low. Villagers survive by growing crops for consumption, collecting NTFPs, doing some additional work and having other small income sources. The educational level is quite basic and alternative job possibilities are limited. The land tenure situation is diffuse. Some have private property, some have right to agricultural use, and some do agriculture without any right to the land cultivated. These restrictions influence the livelihood possibilities of the villagers. But villagers manage under these conditions without living in poverty.

5. Funding and credit possibilities

Funding is essential for most development in rural areas and money is often seen as the main restriction for starting a business, projects, or other investment. This part analyses the possibilities villagers in NRD and KCP have for funding of different small scale and agricultural projects, as these projects are seen to be a possible way of generating alternative income and thereby increase the possibilities of livelihood strategies. According to the questionnaire and semi-structured interviews this includes the Middleman system, the Bank of Agriculture and Government support.

5.1 Description and Analysis of the Middleman System

Two interviews were conducted concerning the Middleman system. One with the assistant of the Middleman in NRD and one with the (perhaps former) Middleman in BCP. The task of the middlemen is to provide the farmers with fertilizers, seeds, chemicals and plow service. The Middleman hands out these services on credit and waits for his payment until the harvest period, where

the farmers sell their yields to the middleman. The Middleman in NRD charges a price for fertilizers that are higher compared to the market price (380 baht for 50 kg 46-0-0 fertilizer compared to a market price of 340 baht,). Buying price of the yield was in NRD 2.80 baht/kg maize and in KCP 3.10 baht/kg. The market price is 2.80 baht/kg. The difference in price between NRD and KCP can be related to rapid price fluctuations that the KCP Middleman hasn't responded to yet. It wasn't made clear whether the Middleman in KCP still was active. The price of 3.10 might be the price from a previous year. On the contrary the Middleman in KCP claimed he made a profit of 100 baht for 50 kg of fertilizer and 100 baht per bottle of chemical herbicide. The prices in absolute terms are unknown, but it is evident the KCP middleman's prices are significantly higher than both market price and the NRD Middleman price. This gives the KCP MM a rationale for offering a higher buying price. This high buying price tempts the farmers to join the system but they are forced to buy input at an extravagant rate implying a higher degree of exploitation crop-market to the more conventional Middleman system in NRD. On the contrary the farmers in KCP can choose to use the services provided by the Middleman in NRD. In theory this means the KCP Middleman is allowed a profit margin above the NRD level that equals the transportation cost between the two villages. If the profit increases above this level farmers will choose to pay the transportation cost and use the Middleman in NRD instead. The Middleman chooses 1) buying price of yield and 2) selling price of fertilizers etc. so profits are maximized but subject to the "transport cost constraint". But this can not explain the rather counter intuitive result that the KCP Middleman chooses to sell yields for a lower price than he buys them at, since the services provided by the Middleman is rather price inelastic since the farmers really have no alternative, because of the lack of very needed funds so the above model describes reality pretty well according to this point.

The above analysis rests on an assumption that the NRD Middleman is known among KCP villagers and interested in providing them with his service. This we don't know about. But the "analysis" shouldn't be taken as an authoritative interpretation of the Middleman system in BCP, but rather as a constructed scheme or an ideal type, that hopefully illustrates some of the mechanisms of a Middleman system. A major criticism of the analysis is the same as with all other kind of economic analyses; it assumes actors are rational. It is evident that non-rational motives play a significant role in the farmers' behaviour. Farmers might be reluctant to shift marketing channel because they feel unsafe about it. If a farmer chooses to use another channel he might also be subject to some kind of social sanctions from other villagers because he is breaking the pattern of conformity. Also there might be some kind of a patron-client relationship between farmer and middleman. The Middleman might be a provider of some kind of social security that is unmoneta-

alized. But it should be noted that these considerations are pure postulates. Unfortunately there's no empirical findings supporting them.

Several of the farmers in both of the villages mentioned either the Middleman system or lack of funds when questioned about problem ranking. This means that the Middleman system and credit restrictions in general constitutes part of the constraints imposed on the villagers livelihood. A likely consequence of the Middleman system in a malign scenario could be that the farmers are tied to a dependency to the middleman. The farmers need the credit in order to survive but because of the unfavourable conditions they are unable to improve their capacity for production implying a continuing need for credit. This vicious circle can be very hard to escape. But the policy-conclusion is not to dismantle the Middleman system, since it is still a provider of very needed credit, even though the terms are unattractive. The disappearance of the Middleman system means that the farmers loose a source of credit. The solution, of course is to provide the farmers with alternative sources of credit that are more attractive compared to the Middleman system, so it either disappears or improves from the perspective of the farmers.

5.2 Bank of Agriculture and Debt Situation

An interview was conducted with the Bank of Agriculture (BAAC), since 55% of the interviewed farmers had loan in that bank. The bank was established in order to overcome the Middleman problem (Phongpaichit & Baker, 1995). But some farmers mentioned that the amount of the loans weren't big enough and also there was a single respondent who claimed that the bank discriminated against the newly established young farmers. Unfortunately the interview with an employee of the bank couldn't reveal information concerning these controversial issues. Instead the employee spoke in more general terms about the procedure of getting a loan and he also mentioned some empirical data about the lenders in NRD and KCP. The following section briefly summerize and analyze these information.

The bank basically provides three different kinds of loans. Short term (1-1.5 year) for inputs such as fertilizers etc., middle term (1.5-5 years) for fixed investments like machines etc, long term (up to 20 years) for land investment. During our basic information interviews of the villagers, it wasn't made clear which type of loan that was the most common in KCP and NRD. During the procedure of getting a loan the bank demands four documents; house record, ID card, marriage certificate and land certificate (if any). From our perspective the land certificate is of central interest, since we discovered a significant difference in the type of land certificate between KCP and NRD. NRD tended to have a higher proportion of the more attractive NS3 certificate compared to KCP. But according to our modest sample the NRD villagers didn't seem to have a

higher amount of debt compared to KCP, indicating that land certificate isn't a significant variable when considering access to loan. On the contrary the bank employee informed that the amount of borrowers in KCP is less than in NRD because they don't have enough land for collateral. But it wasn't made clear whether he spoke in absolute or relative terms. According to the basic information questionnaires the share of farmers with loans were the same in the two villages; 56% in NRD and 54% in BCP.

The average size of loan in KCP is 90.000 Baht compared to 42.000 in NRD indicating that KCP farmers doesn't face stricter credit constraints compared to NRD. The bank employee informed that 50 % of the borrowers in KCP have a bad record (doesn't pay back on time) compared to 40 % in NRD. Even though the record condition concerning loans of the village isn't part of the general procedure, it is evident that the bank is more reluctant to lend out money to farmers in a village that has a high proportion of farmers with a "bad" record. This can be supportive of the statement that at least newly established farmers in KCP face a more strict credit constraint compared to their counterparts in NRD.

To conclude, the impact of credit constraint seems to be a restricting factor on the villagers livelihood. But it is hard to quantify to what degree. Most farmers ranked credit constraint as number two or three, if mentioned, when asked about problem ranking. This indicates that the credit constraint isn't the most severe constraint on the villagers livelihood. In that regard The Bank of Agriculture should be seen as an appropriate device, that undoubtedly have helped the farmers. On the contrary, it is evident that the bank doesn't fulfil all the villagers needs concerning credit. It was also our impression that even though the bank has a strict procedure for granting loans, arbitrary criterias seem to play a role. The credit conditions of the two villages therefore remain subject to improvements. Seen in a broader perspective credit restrictions might lead the farmers in a kind of poverty trap that can have severe environmental consequences. The argument goes that farmers because of their poverty are forced to actions that in the short run are profitable but in the long run undermine the resource base they are dependent upon (Barbier, 1993). We don't have any agro-ecology findings that indicate the resource base of NRD and KCP is in danger of being degraded. But our findings in that regard might be insufficient. On the contrary, it wasn't our impression that the farmers were in a state of desperate poverty, indicating that they are not forced to ruthless exploitation of the resource base. But environmental degradation caused by poverty should always be considered as a constant potential threat.

5.3 Government support

In the following the possibility of Government support will be analysed. This is based mainly on an interview with the assistant to the head of District Agricultural Extension Office and an inter-

view with the assistant to the head of Sub-district Administration Office. These two Government Agencies are important according to support of rural villages.

The Government of Thailand offers many kind of support to development in the villages in the rural areas. For example there is a special fund for poor farmers, where villagers has to sets up a committee to administrate the funds. This committee can then support the poor farmers by giving them fertilisers for free etc. Another example is the Saving Bank. To get a loan here villagers have to organise a group, which over a period put money into an account. After a period of stable payments, and good economic performance in general, the group can get a low interest-rate loan for (almost) any kind of investment.

The government support is not only given in different ways but also from many different GA's (Governmental Agencies). Most of the GA's are administrated from the Central Government but have regional and local offices, which make informational and educational activities and help the population with applications for funding. An example of such a GA is the Agricultural Extension Office.

Agricultural Extension Office (AEO)

There are in all eight district AEO (Samnakngan gaset Amphur) in the Province of Phrae and one is the Song office. This office is again split into sub-district AEO's, which deal with practical information and co-operation with the villages.

The district office gets information about the villages through the sub-district offices, who meet the headmen on a regularly basis. At district level the main tasks of AEO are to:

- be co-ordinator between central office and sub-district,
- be advisor in emergency cases
- giving general supervision to farmers (including supervises in how seek funds), and
- administrate funds.

The Song district budget is normally around 300.000 baht per year. This amount can be transferred to other districts in the case of emergency.

AEO funding

The AEO gives funds to farmers and especially small scale farmers. Funds from this office are given to three groups; agricultural groups, housewife groups, and youth groups.

An Agricultural group gets different agricultural inputs. For example fertiliser can be sold to the farmers for about 100 baht below market price. But AEO don't give any direct capital support. The agricultural group in the sub-district is organised as one group with approximately two hundred farmers.

Youth groups are funded by grants. For instance a school can be given money to grow vegetables, keep livestock and improve the nutrition-standard of the scholars. This could be seen as a way of empower the future villagers and give them skills to improve their living.

A Housewife group can be supported by loans of minimum 100.000 baht and maximum 300.000 baht. If the loan is paid back within five years there is no interest rate and this has until now been the case.

Selection of projects is done by the district-governor. An estimate of ability to pay back the loans is the main selection criteria. The projects are initiated by the villagers themselves by adoption of ideas from other villages or new ideas, which need further supervision.

The office receives approximately ten applications from housewife groups a year. There are at least twenty persons in a group and a group may receive around 200.000 baht.

Sub-district Administration Office (TAO)

The TAO (Ong-gan borihan sown tambon) is interesting in this research since it seems like more and more of Government funds to rural areas goes via TAO. TAO is a new institution set up five years ago, with a more decentralised structure than traditional centralised GA's in Thailand. This was done in order to empower the local and rural population and to create a democratic local environment. The TAO is therefore in itself an interesting institution, because goals like this, if achieved, might affect and maybe change livelihood strategies in the villages.

The TAO has, as the name indicate, an office in each sub-district in Thailand. Despite the intention of decentralisation, TAO need the budget to be approved by the Ministry of Finance each year. Each TAO has three government officers employed and appointed directly from central government. But what differs from other GA's is the elected political officers from the local areas, who is in charge of the administration, planing and policy making. These political officers are elected for a period of four years and two people are elected from each village, which gives 24 in Tao Poon sub-district. The headmen from the twelve villages are also automatically members of the TAO, though this is about to change, so that all representative from the villages will be elected.

TAO funding

The funding of development projects is administrated and approved by the TAO, and is given as a grant in form of capital, wages, tools and equipment for production etc.

Only groups can get support and two references are required; one from the headman and another from the village committee. When applying no collateral nor assets is needed.

In 1999 the TAO of Tao Poon funded following community projects in NRD and KCP:

| <i>Ban Na Rai Dieo</i> | <i>Ban Khuang Chompoo</i> |
|----------------------------|--------------------------------------|
| Sewing project | Sewing machines for a sewing project |
| Road building project | Building of water system |
| Reservoir building project | |

Projects' applying for funds this year (2000). Already in the five-year-plan, but funds not given yet:

| <i>Ban Na Rai Dieo</i> | <i>Ban Khuang Chompoo</i> |
|------------------------|--|
| Weaving project | Supplement meals for pre-school children |
| | Handicraft; making baskets |

Community Projects are approved according to a five-year-plan for the village. In case it is not in the plan but is 'a good idea' it can be approved on a TAO committee meeting. The five-year-plan is made by representatives from TAO according to a community meeting held by the TAO representatives in the villages.

This new institution could be a way of changing present livelihood and increase development in the rural areas. However, this will depend on the funds given from the central Government, and if the Agency is able to motivate the villagers to create new projects or expand existing practices. Furthermore this institution could lead to a stronger local democracy, which again could lead to a higher awareness of own development and thereby make changes in the rural areas.

Case study

To see how the governmental support is working in practice, a bottom up approach is now followed. This is done to analyze the constraints and possibilities for the project making process at villages level. This case include villagers view on difficulties and restrictions concerning Government support and income-generating activities. The information is gained from interviews with the Headman from NRD and KCP, a woman responsible for public relation in a sewing group and the secretary from a housewife group trying to establish a pig production.

The general impression is that the villagers have limited knowledge about funding possibilities. The Headman and the leader of the Chopsticks factory in KCP said that most of the villagers show very little interest in making groups. According to the leader of the Chopsticks factory villagers are too afraid of taking risks and prefer to continue their agricultural activities as they have always done. A point also supported by the survey done in the villages.

As illustrated above some projects have been initiated by the villagers and supported by the TAO. Even though not mentioned by TAO, villagers in KCP have applied TAO for supporting a road-

building project and the construction of a water reservoir. None of the groups have got an answer. Furthermore some villagers have joined together and saved money in the Saving Bank, but they still haven't found out what kind of project to initiate.

So even though taking risk, initiatives, and knowledge about possibilities might be limited, the picture of the villages is also that some people are trying to do something to improve their living.

In NRD two Community groups were presently functioning according the Headman, namely a Sewing group and a Pig group.

The Sewing Group has existed for 5 years and was initiated by 3-4 women. They don't work permanently, only when they get material from the Middleman, and at the moment they don't have work. The group include 15 women who work regularly, and some extra women who sometime work in their free time. There are no rules or restrictions to be a member. Women from the village will come to the house of the informant when she gets material from the Middleman, and ask her if they can become members. All of them have their own sewing machine, which they bought themselves (pay-off), and according to the informant the group doesn't get any financial support at all. This information is contradictory to the information from TAO - on less there is another sewing project in the villages receiving TAO support, but this possibility is doubtful due to the few cases of community groups in NRD. This indicate that the reliability of the information about financial support of the sewing group is doubtful, but this could be due to the informant seeming quite mistrustful about the role of TAO, and the informant could therefore have an interest in not telling the truth about TAO.

Due to the informant, a problem for the group is the Middleman. They have to work hard and get too little money from him. But they have to use him because the market in the village is too small to support the production and it is hard to find another marked. Furthermore they don't have money to buy the material themselves.

The Pig Group consists of 30 housewives and has existed for a long time. In the beginning it wasn't a pig group, just a group of women who wanted to get some additional income in the off-season period.

The housewives had a meeting with a supervisor from the Agricultural District Office, who told them about the possibilities of getting money for feeding pigs, and therefore they started this. The supervisor also told them how to organize the group and how to apply for money from TAO. Now they are waiting for the approval.

The two cases are quite different according to the role of the Government support. The representative of the sewing groups didn't like TAO. Together with the impression of the villagers as not knowing very much about the Government funding possibilities and some statements of not understanding given information indicate that there is a missing link between the official system and the villagers. Therefore, some villagers might not consider official support as a possible way to change their livelihood. Even though the institutions exist, this seems to have a limited influence on the villagers decision-making when choosing their strategies for livelihood.

The pig farming case indicate, however, a relative good co-operation between the government extension workers and the villagers. The informant from the pig group was quite satisfied about the TAO and trustful in getting money granted. But since the TAO is a relative new GA it is impossible to say if these projects are actually changing the livelihood strategies in the villages.

Sub-conclusion

Different GA offers different kind of support to development projects in the villages. However, what is actually going on in the villages seems to be limited and in a small scale. But some projects are initiated and some are trying. Development will properly be a slow process with the size and speed of projects, but this could change if TAO will succeed in their goals of development and democracy.

6. Discussion

6.1 Findings and results

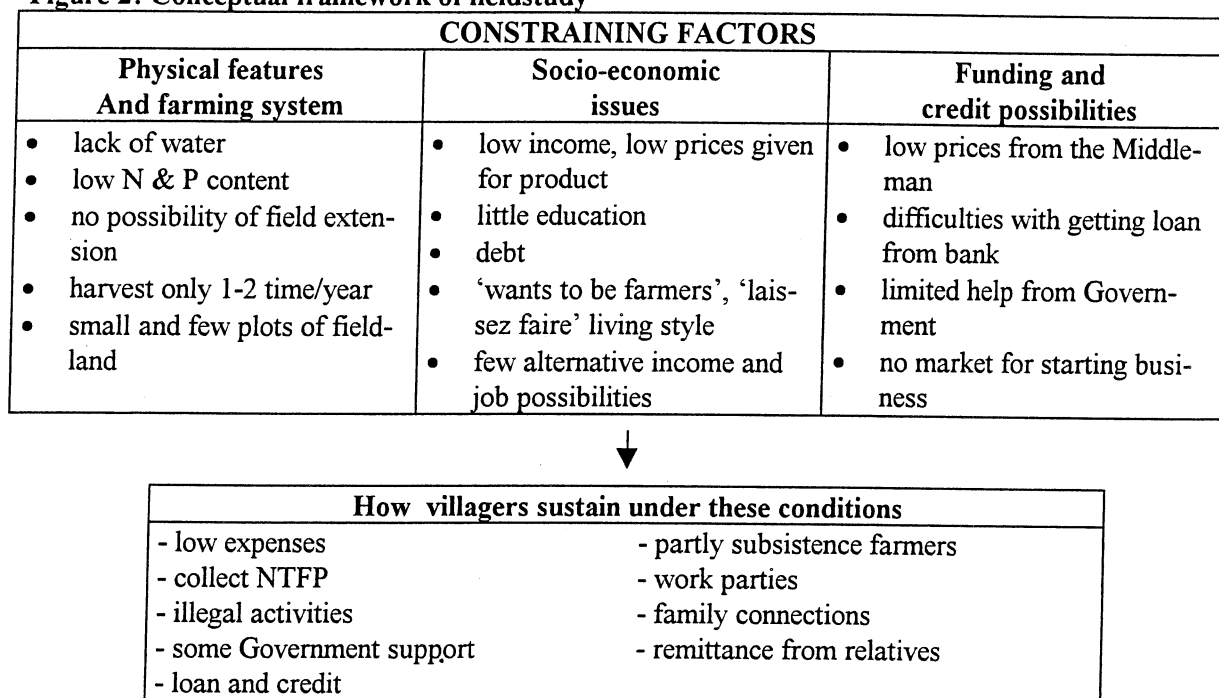
The following section will try to link together the different findings and see if there are any possible causal relationship between them. This is done to give an overall indication of why villagers continue their present livelihood strategies. Since no definite conclusion can be made on the available finding, this discussion is looking upon general tendencies and give suggestions for relations. Furthermore the two villages will be treated together, since, in general terms, no reason were found to differentiate among them.

Many factors seems to constrain the villagers in improving their livelihood and make changes in their daily live. These factors are quite diverse. Some are physical factors as no possibility of field extension and harvest only once or twice a year. Some factors are more based in social structures like a low level of education and a tendency to 'do what the other villagers do' (which means small scale farming). Other factors are due to economic structures such as no alternative job possibilities and a dependency on credit from a Middleman or the BAAC.

However, villagers sustain and have a daily live under these conditions. They manage without malnutrition and are not living in poverty. This is done by being partly subsistence farmers having

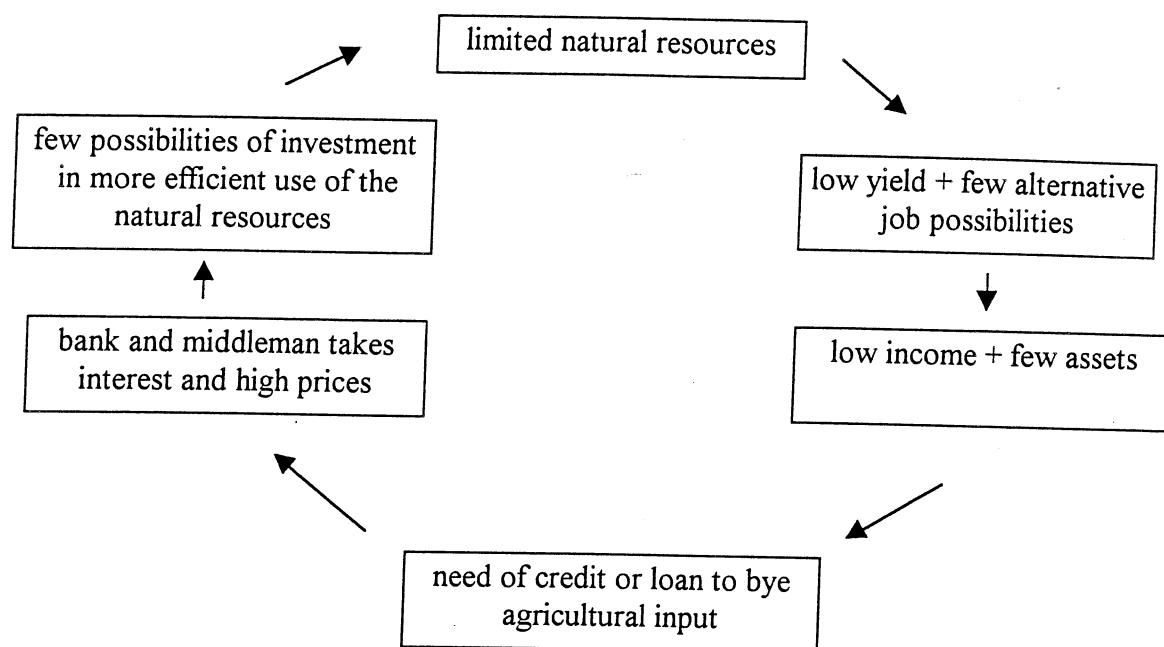
small gardens and collecting NTFP. Furthermore they support their family and some get remittance from relatives working in the towns. By the use of collective workparties they help each other and save expenses on wages. Some get support from Governmental institutions and most get small loans from BAAC or the middleman. This is summarised in following figure.

Figure 2: Conceptual framework of fieldstudy



When looking at all these factors together it is difficult to see, and dangerous to conclude, if one (or a few) factor(s), are determinant for the other. Anyway, it tempting to try to set it up as a chain of elements, or in other words a 'vicious circle'. The circle could be described as follows: Villagers have a limited natural resource base, which lead to low yields. This along with the few possibilities of alternative income gives a low income, which again give a need of money from outside to finance agricultural input and other expenses. This is mostly done via the Middleman system or the BAAC, and getting credit or funding from these institutions demands a pay back with interest. This, together with low prices of the products, leaves limited surplus to invest in other alternative production or in making more efficient land use like using irrigation systems or improvements in efficient use of their limited natural resources. Therefore low yield and low income continue and the circle is complete. This is illustrated in following figure.

Figure 3: 'Vicious circle' - keeping villagers in present livelihood strategies



This is a very simple description of the villages, but it gives a picture of how constraining factors may be connected and why the villagers seem to have a tendency to continue their present livelihood strategies. It could also indicate a complexity of the problems in the villages by putting the question: If villagers want to change their livelihood - then where should the circle be broken? Drawn like this, it could look like if one parameter were improved the rest will follow, but reality is more complex than a model like this.

Setting up this framework could be seen as putting the villages in a static position. This is not the intention and the scheme should be seen as a image of how the present situation could look like. However, the development going on seems to be going slow. The new institution TAO may lead to development in the future and the fact that the younger generation is getting a higher education may also lead to a change. If economic development in Thailand continues to grow, more people might move to the towns, which will also change the conditions in these small villages.

6.2 Methods and bias

This section discuss different bias that might influence the results presented in the report. This is done by a discussion of the methods used, the fieldwork and the analysis.

Intercultural bias

An essential aspect of working interculturally is working with translators. It took time for the co-operation to work perfectly smoothly. Working with even the best of translators should always

be considered as a source of error. Words might have different meanings and connotations in different cultures. More basic, translators might be reluctant to translate everything word by word because parts might be considered irrelevant, what it definitely isn't. Furthermore questions are difficult to ask and formulate in an easy and understandable way. This made it difficult for the translators to translate it in a straight forward manner.

Another bias occur in the intercultural meeting with the local villagers. To what extent are 'we' able to understand 'them'? Our own unconscious stereotypical picture of 'rural' people might distort the view of the reality 'we' are exposed to. Also the local villagers might have a tendency, due to politeness, to give the interviewer the answers they think he/she wants to hear. According to these issues it was of course a great help to work with the Thai's, who had a better cultural understanding and could prevent misunderstandings, although they might have similar problems due to fact that they come from a different social class and hence are unfamiliar with the 'rural way of life'.

Language barriers and interdisciplinary work, and different academic backgrounds made the group work difficult, time consuming and might have reduced benefit from eachothers advantages. Time spend on this kind of discussion could have been spent on discussing on additional fieldwork methods, which could have been relevant to use. For instance more participatory methods to reveal details about the livelihood strategies. However, the quantity of data shown in this report were only possible to obtain in a big group.

Sampling bias

Three of the households in KCP were chosen arbitrarily outside the sample because the headman didn't know where the chosen respondent lived. This could be a bias, but since none of these households were extreme cases it is not expected to be a problem. In NRD a few households were also chosen outside the sample because the respondent were not at home. Instead the neighbour were chosen, which limit this bias.

Also, some of the households seemed to be deleted from the Health Care Center record book for unknown reason. This is a minor bias since the cases were very few.

The representative sampling were made to reflect the whole village but should only be seen as tendencies. It would have been desirable with a bigger sample to get a more valid survey. Never the less, these tendencies seem reliable since they correspond to information gained from field observation and key informants.

Interview bias

Some of the people in NRD were interviewed in front of the temple. Therefore it was not possible to gain qualitative and extra information from their houses.

Another issue is the difficulties of getting accurate information concerning expenses and income of the households. They might not know the exact values, because it is composed of different variables and because they are living 'one day at a time'.

Another aspect is the atmosphere during interviews. If the respondents for some reason were mistrustful or suspicious they might not tell everything.

Bias also occurs when getting divergent information. Maybe from the same informant or different informants giving divergent information about an issue. This information is rechecked when possible and only used when it seems reliable. It is, however, an appraisal and therefore still biased. When information is doubtful it is discussed in the analysis.

Subgroup bias

Some bias is likely to occur when information from the different subgroups is gathered. Working with a fixed and common questionnaire is not a big problem, but working with data from a specialized subgroup can be biased. In this report the results from the soil samples, soil tests and statistical data processing may have this bias since this work was done by subgroups of only Thai students. These biases are tried eliminated by using only transparent data and by methodology discussions in the field.

7. Conclusion

Throughout the report NRD and KCP have been compared to see if the identified constraining factors lead to divergent livelihood strategies in these villages. The general conclusion is that they are more similar than divergent. However, some differences were found. First, most farmers in NRD grow rice for consumption, while only a few in KCP have this possibility. Therefore the villagers in KCP are more dependent on the cash economy. Secondly, farmers in NRD tend to take additional labour work, which is not the case in KCP. Finally KCP seems to do more illegal activities than NRD, though in a small scale.

Several physical constraints to the livelihoods in the villages were found. Insufficient water ranks as the most severe, but also important is the limitation of field extension. Furthermore, the possibility of harvesting more than once a year is restricted to a few farmers in NRD, and in general the soil around both villages is characterized by low content of N & P. Anyway, villagers sustain a living by their modest yields, collecting NTFPs and some forest products.

Various socio-economic issues were found to be constraining. Poor alternative job possibilities, a general low income and little education are all factors limiting the villagers possible livelihood strategies. Their present living depends among other things on family connections such as remittances from relatives and on community relations such as work parties.

The institutional condition in the area is as well limiting as creating possibilities for livelihood strategies. Credit from BAAC and Middleman and funding from other Governmental Agencies give small possibilities of investment, although this put farmers in a dependency. Never the less, these institutions do bring some possibilities for improving livelihood.

These factors are lightly to play an important role in keeping the villagers in a position, where agriculture is a central part of the livelihood strategies. The different constraining factors might have a causal relation and be mutually reinforcing. A main conclusion is, however, that even though agriculture is the main source of income, and under these conditions indispensable because it is partly for subsistence, a 'diversification strategy' with having various small additional income sources is used to sustain a living.

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APPENDIX 1: THE SUSTAINABLE LIVELIHOODS FRAMEWORK

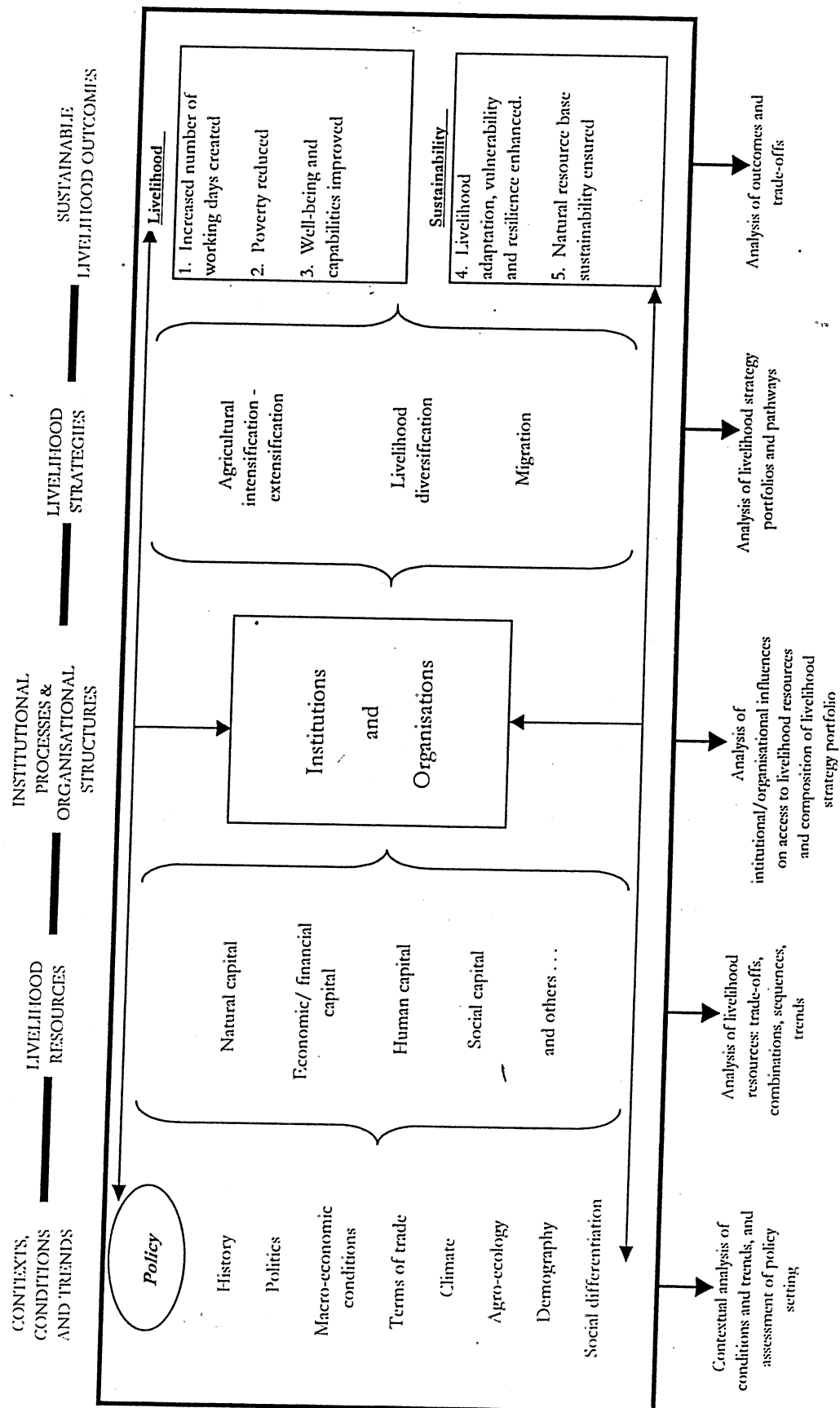
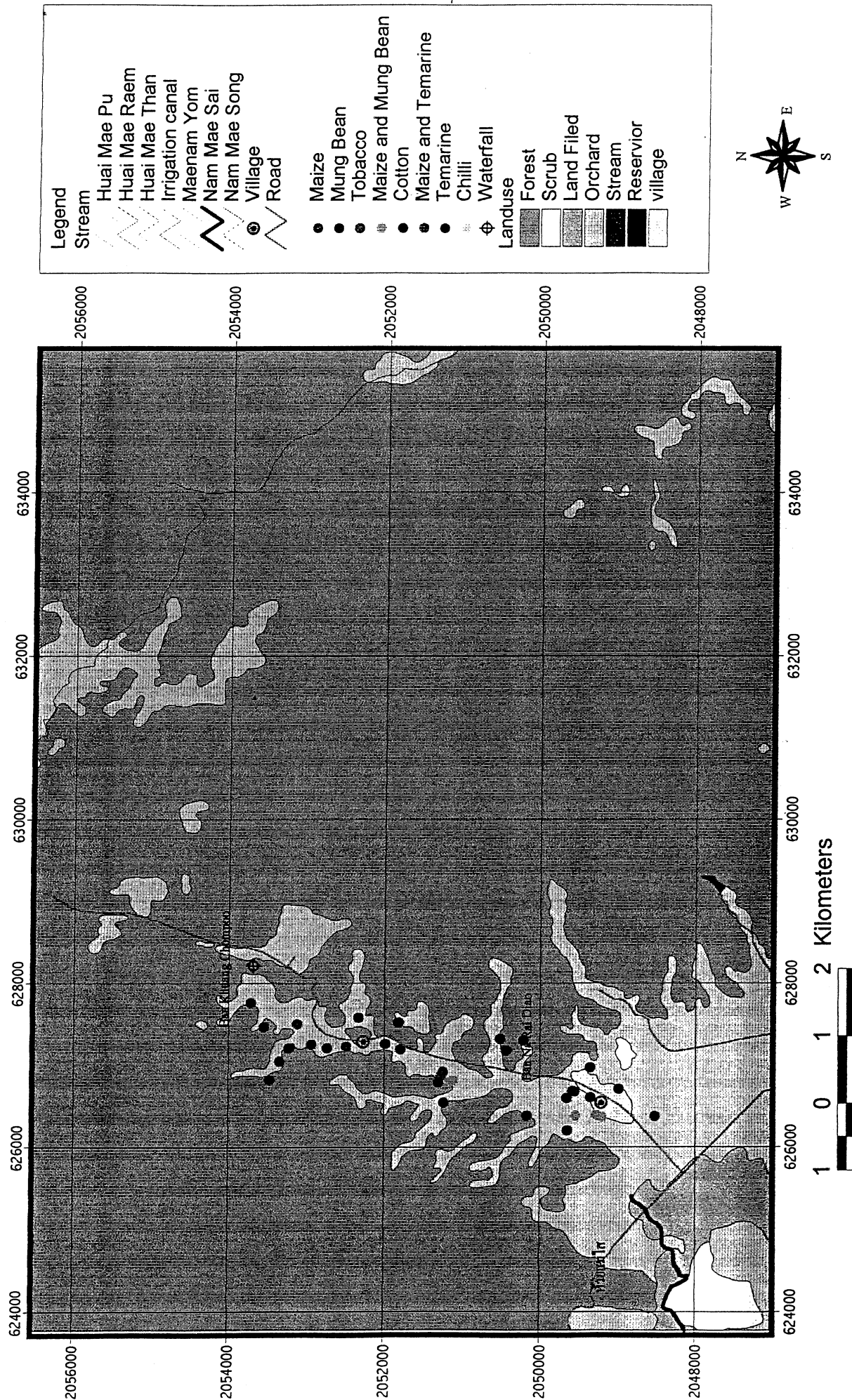


Figure 1: The Sustainable Livelihoods Framework (Scoones 1998:4)

APPENDIX 2: LOCATION OF SOIL SAMPLES, CROPS & LAND USE

Soil Sampling Ban Na Rai Diao and Ban Khuang Chompoo



APPENDIX 3: RESULTS FROM SOIL TESTS

Ban Na Rai Diao

| No. | Name | address | Crop | Texture | Colour | pH |
|-----|--------------------------|---------|------------|-----------------|-------------------------|-----|
| 1 | Mrs. La Kattiya | 26 | maize | sandy clay | dark brown | 7,2 |
| 2 | Mr. Suwan Thonghak | 32/1 | mung bean | clay | dark brown | 7,4 |
| 3 | Mrs. Yord Ngernton | 7 | mung bean | silty clay | dark brown | 7,5 |
| 4 | Mr. Tib Jaiboon | 119 | maize | silty clay | dark radish brown | 7,2 |
| 5 | Mrs. Puan Pewmanee | 36 | cotton | silty clay | very dark grayish brown | 7,3 |
| 6 | Mr. Sriyon Gunga | 118/1 | mung bean | clay | dark brown | 7,5 |
| 7 | Mr. Songram Srisaket | 35/1 | mung bean | sandy clay | brown | 7,3 |
| 8 | Mr. Prachan Srisen | 3/1 | tobacco | sandy clay | brown | 7,2 |
| 9 | Mr. Thoe Sansook | 76/1 | mung bean | silty clay | brown | 7,5 |
| 10 | Mr. Tan Muangmanoi | 10/1 | mung bean | silty clay loam | dark brown | 7,3 |
| 11 | Mr. Jaran Wongsaratanasi | 97 | mung bean | sandy loam | brown | 7,3 |
| 12 | Mr. Mart Pewmanee | 112 | mung bean | silty loam | brown | 7,2 |
| 13 | Mrs. Jan Janta | 62 | maize | silty clay | dark yellowish brown | 7,6 |
| 14 | Mr. Lee Ngernton | 41 | sandy clay | clay | dark brown | 7,7 |
| 15 | Mr. Boonmee Jaitham | 82/2 | mung bean | clay | dark brown | 7,3 |
| 16 | Mrs. Wimolrat Biengsang | 46/2 | mango | silty loam | dark brown | 7,4 |
| 17 | Mr. Sutin Karabag | 21/3 | maize | silty clay | dark yellowish brown | 7,3 |
| 18 | Mr. Promma Jindakam | 12/1 | sesame | silty loam | dark yellowish brown | 7,5 |
| 19 | Mr. Tanom Chaiyaboon | 100 | mung bean | sandy clay | brown | 7,5 |
| | | | mung bean | silty clay | very dark grayish brown | 7,4 |
| | | | mung bean | sandy clay | dark brown | 7,6 |

Ban Khuang Chompoo

| No. | Name | address | Crop | Texture | Colour | pH |
|-----|------|---------|------|---------|--------|----|
|-----|------|---------|------|---------|--------|----|

KCP:

| | | | | | | |
|---|------------------------|------|-----------|-----------------|-------------------|-----|
| 1 | Mr. Peg Guntasorn | 9 | maize | clay | dark radish brown | 7,5 |
| 2 | Mr. Sak Keha | 53 | maize | loam | dark brown | 7,7 |
| 3 | Mr. Mool Archeep | 32 | tamarind | clay | dark brown | 7,4 |
| 4 | Mr. Prasong Wongmiboo | 44 | maize | silty clay | dark brown | 7,2 |
| 5 | Mr. Prayoot Archeep | 14/1 | maize | silty clay | dark brown | 7,5 |
| 6 | Mr. Somboon Sa-iebkong | 5 | tamarind | sandy clay loam | brown | 7,5 |
| 7 | Mr. Preecha Jomkam | 28 | maize | silty clay | brown | 7,6 |
| 8 | Mr. Satit Pewmanee | 50 | maize | silty clay loam | dark brown | 6,9 |
| 9 | Mr. Montri Jitpayak | 16 | mung bean | sandy clay | dark brown | 7,9 |

NRD:

| C(mS/cm) | NH ₄ ⁺ | NO ₃ ⁻ | P | K | Remark |
|----------|------------------------------|------------------------------|----|---|-----------|
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | high land |
| 0,2 | VL | VL | VH | H | low land |
| 0,2 | VL | VL | VH | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | H | H | |
| 0,2 | VL | VL | H | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | L | L | H | |
| 0,2 | VL | VL | H | H | |
| 0,3 | VL | VL | H | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | H | H | |
| 0,2 | VL | L | M | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | VL | L | H | |
| 0,2 | VL | L | L | H | |

| C(uS/cm) | NH ₄ ⁺ | NO ₃ ⁻ | P | K | Remark |
|----------|------------------------------|------------------------------|---|---|--------|
|----------|------------------------------|------------------------------|---|---|--------|

KCP

| | | | | | | |
|--------|----|----|----|----|---|--|
| 12,2 | VL | VL | VL | L | H | |
| 12,6 | VL | VL | VL | L | H | |
| 13 | VL | VL | VL | VH | H | |
| 13,4 | VL | VL | L | L | H | |
| 12,1 | VL | VL | VL | L | H | |
| 11,2 | VL | VL | VL | L | H | |
| .1mS/c | VL | VL | VL | H | H | |
| .2mS/c | VL | VL | VL | L | H | |
| .2mS/c | VL | VL | VL | L | H | |

Appendix 4

General information of Ban Na Rai Diao and Ban Khuang Chompoo Tao Pun Sub District ,Song District

Table 1 General Information

| Variable | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|----------------------------|-----------------|-------------------|--------------------|-------------------|
| | Frequency | Valid per cent | Frequency | Valid per cent |
| Gender | | | | |
| Male | 18 | 58.1 | 10 | 66.7 |
| Female | 13 | 41.9 | 5 | 33.3 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Status | | | | |
| Head of household | 19 | 61.3 | 9 | 60.0 |
| wife | 8 | 25.8 | 6 | 40.0 |
| Son/daughter | 3 | 9.7 | - | - |
| Son/daughter in law | 1 | 3.2 | - | - |
| Total | 31 | 100.0 | 15 | 100.0 |
| Age | | | | |
| 20-30 | 3 | 9.7 | 2 | 14.3 |
| 31-40 | 6 | 19.37 | 3 | 21.4 |
| 41-50 | 9 | 29.03 | 5 | 35.6 |
| 51-60 | 9 | 29.03 | 3 | 21.4 |
| 61-70 | 3 | 9.7 | 1 | 7.3 |
| 70-80 | 1 | 3.3 | - | - |
| Total | 31 | 100.0 | 15 | 100.0 |
| Member of household | | | | |
| 1 | 1 | 3.2 | - | - |
| 2 | 6 | 19.4 | - | - |
| 3 | 7 | 22.6 | 3 | 20.0 |
| 4 | 13 | 41.9 | 10 | 66.7 |
| 5 | 4 | 12.9 | 2 | 13.3 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Education | | | | |
| None | 3 | 9.7 | 2 | 13.3 |
| Compulsory school | 20 | 64.5 | 11 | 73.3 |
| Secondary school | 8 | 25.8 | 2 | 13.3 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Occupation | | | | |
| Farmer | 27 | 87.1 | 14 | 93.3 |
| Labor | 3 | 9.7 | - | - |
| Others | 1 | 3.2 | 1 | 6.7 |
| Total | 31 | 100.0 | 15 | 100.0 |

Table2 Social Information

| Variable | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|---|-----------------|-------------------|--------------------|-------------------|
| | Frequency | Valid per cent | Frequency | Valid per cent |
| Area for housing (rai) | | | | |
| ≤ 1 | 26 | 83.8 | 14 | 93.3 |
| > 1 ≤ 5 | 5 | 16.2 | - | - |
| > 5 | - | - | 1 | 6.7 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Number of agriculture land plot | | | | |
| 1 | 17 | 54.8 | 4 | 33.3 |
| 2 | 9 | 29.0 | 3 | 25.0 |
| 3 | 5 | 16.1 | 4 | 33.3 |
| 4 | - | - | 1 | 8.3 |
| Total | 31 | 100.0 | 12 | 100.0 |
| Area of agricultural land (rai) | | | | |
| 1-5 | 8 | 25.8 | 3 | 25.0 |
| 6-10 | 15 | 48.5 | 2 | 16.7 |
| 11-15 | 6 | 19.3 | 1 | 8.3 |
| 16-20 | 2 | 6.4 | 2 | 16.7 |
| 21-25 | - | - | - | - |
| 26-30 | - | - | 1 | 8.3 |
| 31-35 | - | - | - | - |
| 35-40 | - | - | 1 | 8.3 |
| 40 up | - | - | 2 | 16.7 |
| Total | 31 | 100.0 | 12 | 100.0 |
| Housing certificate | | | | |
| none | 4 | 12.9 | 3 | 37.5 |
| NS3 | 25 | 80.6 | 1 | 12.5 |
| SPK | - | - | 4 | 50 |
| STK | 2 | 6.5 | - | - |
| Total | 31 | 100.0 | 8 | 100.0 |
| Farmland certificate in each household | | | | |
| none | 2 | 6.5 | 3 | 25 |
| NS3 | 11 | 35.5 | - | - |
| SPK | 6 | 19.4 | 6 | 50 |
| STK | 5 | 16.1 | - | - |
| none and SPK | 1 | 3.2 | 1 | 8.3 |
| NS3 and SPK | 3 | 9.7 | 2 | 16.7 |
| none/NS3/SPK | 1 | 3.2 | - | - |
| none/SPK/STK | 1 | 3.2 | - | - |
| others | 1 | 3.2 | - | - |
| Total | 31 | 100.0 | 12 | 100.0 |
| length of stay (years) | | | | |
| 1-10 | 1 | 3.3 | 2 | 15.4 |
| 11-20 | 2 | 6.3 | 5 | 38.4 |
| 21-30 | 15 | 48.4 | 4 | 30.8 |
| 31-40 | 5 | 16.0 | 2 | 15.4 |
| 41-50 | 7 | 22.7 | - | - |
| 51-60 | - | - | - | - |
| 61-70 | 1 | 3.3 | - | - |
| Total | 31 | 100.0 | 13 | 100.0 |

Table 3 Agro-Ecology

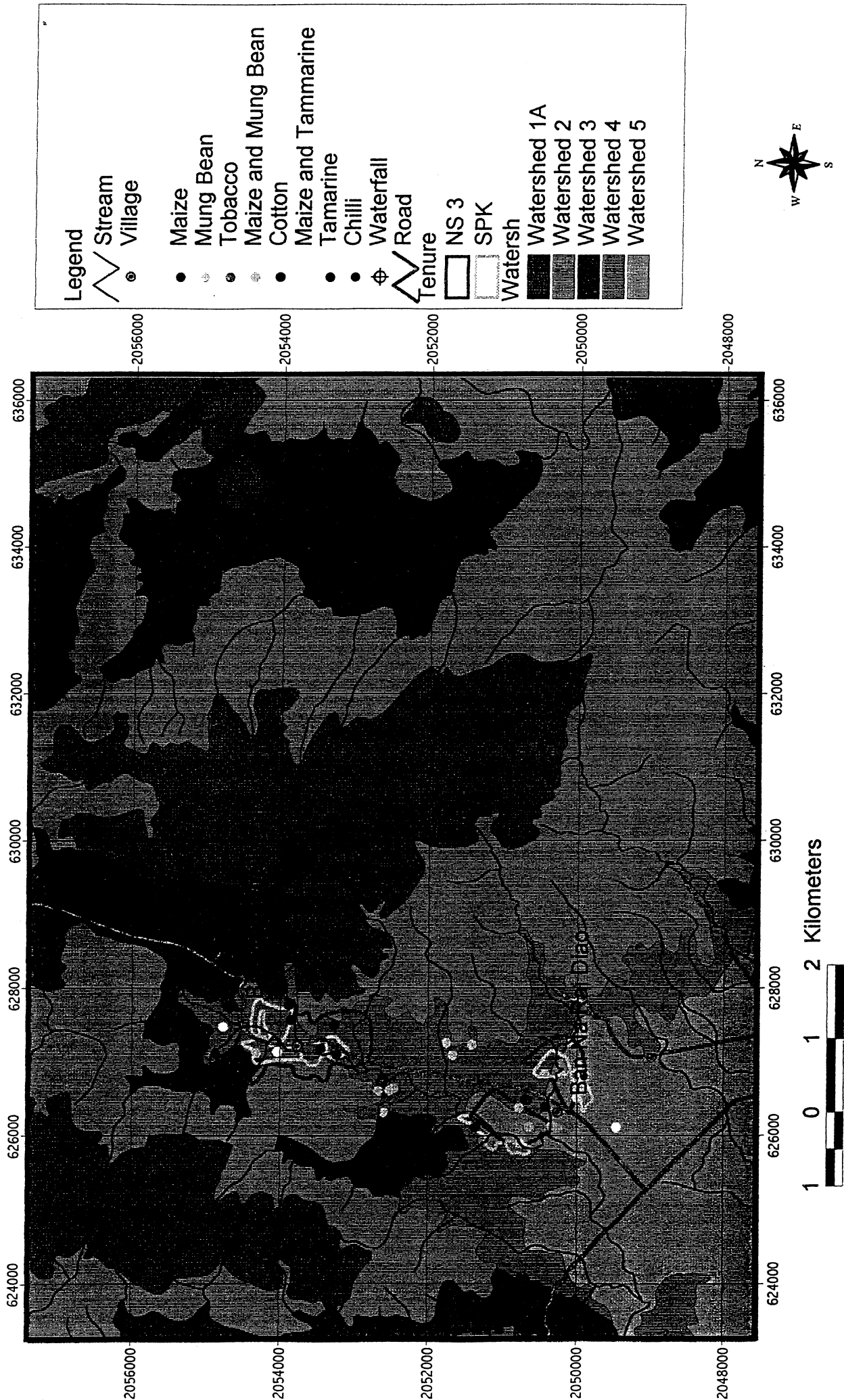
| Variable | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|-------------------------------|-----------------|-------------------|--------------------|-------------------|
| | Frequency | Valid per cent | Frequency | Valid per cent |
| Purpose of growing | | | | |
| Maize | | | | |
| selling | 25 | 100.0 | 15 | 100.0 |
| consumption | - | - | - | - |
| both | - | - | - | - |
| Total | 25 | 100.0 | 15 | 100.0 |
| Rice | | | | |
| selling | - | - | - | - |
| consumption | 11 | 100.0 | 3 | 100.0 |
| both | - | - | - | - |
| Total | 11 | 100.0 | 3 | 100.0 |
| Mung bean | | | | |
| selling | 11 | 91.7 | 1 | 100.0 |
| consumption | - | - | - | - |
| both | 1 | 8.3 | - | - |
| Total | 12 | 100.0 | 1 | 100.0 |
| Tobacco | | | | |
| selling | 2 | 100.0 | - | - |
| consumption | - | - | - | - |
| both | - | - | - | - |
| Total | 2 | 100.0 | - | - |
| Cotton | | | | |
| selling | 2 | 100.0 | 1 | 100.0 |
| consumption | - | - | - | - |
| both | - | - | - | - |
| Total | 2 | 100.0 | 1 | 100.0 |
| Tamarind | | | | |
| selling | 3 | 100.0 | 2 | 100.0 |
| consumption | - | - | - | - |
| both | - | - | - | - |
| Total | 3 | 100.0 | 2 | 100.0 |
| Fertilizer formula use | | | | |
| 46-0-0 | 4 | 16 | 3 | 25 |
| 16-20-0 | 18 | 72 | 6 | 50 |
| 15-15-15 | 3 | 12 | 1 | 8.3 |
| 20-20-20 | - | - | 2 | 16.7 |
| Total | 25 | 100.0 | 12 | 100.0 |
| Insecticide | | | | |
| yes | 17 | 70.8 | 3 | 25.0 |
| no | 7 | 29.2 | 9 | 75.0 |
| Total | 24 | 100.0 | 12 | 100.0 |
| Herbicide | | | | |
| yes | 23 | 95.8 | 12 | 100.0 |
| no | 1 | 14.2 | - | - |
| Total | 24 | 100.0 | 12 | 100.0 |
| Soil preparation | | | | |
| plow cover | 23 | 100.0 | 11 | 91.7 |
| others | - | - | 1 | 8.3 |
| Total | 23 | 100.0 | 12 | 100.0 |

| Variable | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|--|-----------------|-------------------|--------------------|-------------------|
| | Frequency | Valid per cent | Frequency | Valid per cent |
| Soil improvement | | | | |
| crop rotation | 14 | 66.7 | 1 | 33.3 |
| rest period of land | 7 | 33.3 | 2 | 66.7 |
| Total | 21 | 100.0 | 3 | 100.0 |
| Water sources for agriculture | | | | |
| rainfed | 25 | 96.2 | 12 | 100.0 |
| irrigation | 1 | 3.8 | - | - |
| Total | 26 | 100.0 | 12 | 100.0 |
| Drinking water sources | | | | |
| ground water | 19 | 61.3 | 6 | 40.0 |
| rainfed | 5 | 16.1 | 9 | 60.0 |
| buy | 7 | 22.6 | - | - |
| Total | 31 | 100.0 | 15 | 100.0 |
| Washing water sources | | | | |
| pipe water | 9 | 29.0 | 1 | 6.7 |
| ground water | 22 | 71.0 | - | - |
| mountain pipe water | - | - | 14 | 93.3 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Kind of collected FP | | | | |
| bamboo | 4 | 50.0 | 4 | 80.0 |
| teakwood | 2 | 25.0 | - | - |
| firewood/charcoal | 2 | 25.0 | - | - |
| a perennial trees | - | - | 1 | 20.0 |
| Total | 8 | 100.0 | 5 | 100.0 |
| on what purpose (FP) | | | | |
| consumption | 8 | 100.0 | 5 | 100.0 |
| selling | - | - | - | - |
| both | - | - | - | - |
| Total | 8 | 100.0 | 5 | 100.0 |
| Kind of collected NTFP | | | | |
| bamboo shoot | 4 | 17.4 | 2 | 14.3 |
| mushroom | - | - | 1 | 7.1 |
| bamboo shoot and mushroom | 17 | 73.9 | 9 | 64.3 |
| bamboo shoot/mushroom/ ant's egg | 1 | 4.3 | - | - |
| bamboo shoot/ mushroom/vegetable | 1 | 4.3 | 2 | 14.3 |
| Total | 23 | 100.0 | 14 | 100.0 |
| On what purpose (NTFP) | | | | |
| selling | 1 | 4.3 | 1 | 6.7 |
| consumption | 18 | 78.3 | 12 | 80.0 |
| both | 4 | 17.4 | 2 | 13.3 |
| Total | 23 | 100.0 | 15 | 100.0 |
| Agriculture-problem ranking | | | | |
| lack of land use and land certificate | 2 | 6.5 | - | - |
| lack of fund | 7 | 22.6 | 2 | 14.3 |
| insufficient water | 16 | 51.6 | 4 | 28.6 |
| middle man | 1 | 3.2 | 1 | 7.1 |
| low price | 5 | 16.1 | 7 | 50.0 |
| Total | 31 | 100.0 | 14 | 100.0 |

Table 4 Economy

| Variable | Ban Na Rai Diao | | Ban Khuang Chompoo | |
|--------------------------|-----------------|-------------------|--------------------|-------------------|
| | Frequency | Valid per cent | Frequency | Valid per cent |
| Total income | | | | |
| None | 1 | 3.22 | - | 0 |
| 1-10,000 | 5 | 16.13 | 2 | 13.33 |
| 10,001-20,000 | 10 | 32.26 | 5 | 33.33 |
| 20,001-30,000 | 6 | 19.35 | 1 | 6.67 |
| 30,001-40,000 | 3 | 9.68 | 2 | 13.33 |
| 40,001-50,000 | 3 | 9.68 | 4 | 26.67 |
| 50,001-60,000 | - | 0 | - | 0 |
| 60,001-70,000 | 2 | 6.45 | - | 0 |
| 70,001-80,000 | - | 0 | - | 0 |
| 80,001-90,000 | 1 | 3.22 | - | 0 |
| More than 90,000 | - | - | 1 | 6.67 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Mean | | 28,427.26 | | 36,573.33 |
| Minimum | | 3,000 | | 2,000 |
| Maximum | | 89,500 | | 48,600 |
| Household expanse | | | | |
| up to 2,000 | 6 | 40 | 16 | 51.61 |
| 2,001-3,000 | 6 | 40 | 9 | 29.03 |
| 3,001-4,000 | 1 | 6.67 | 4 | 12.9 |
| 4,001-5,000 | 1 | 6.67 | 1 | 3.23 |
| 5,001-6,000 | 1 | 6.67 | 1 | 3.23 |
| Total | 31 | 100.0 | 15 | 100.0 |
| Mean | | 2,378 | | 2,780 |
| Min | | 1,000 | | 1,200 |
| Max | | 6,000 | | 6,000 |
| Farming expense | | | | |
| up to 3,000 | 7 | 33.33 | 2 | 18.18 |
| 3,001-6,000 | 5 | 23.81 | 4 | 36.36 |
| 6,001-9,000 | 4 | 19.05 | 2 | 18.18 |
| 9,001-12,000 | 2 | 9.52 | - | - |
| 12,001-15,000 | 2 | 9.52 | 1 | 9.09 |
| 15,001-18,000 | - | - | - | - |
| 18,001-21,000 | - | - | - | - |
| 21,001-24,000 | - | - | 1 | 9.09 |
| more than 24,000 | 1 | 4.76 | 1 | 9.09 |
| Total | 21 | 100.0 | 11 | 100.0 |
| Mean | | 2,378.39 | | 2,780 |
| Min | | 1,100 | | 1,800 |
| Max | | 27,000 | | 100,000 |
| Debt | | | | |
| up to 10,000 | 3 | 15 | - | - |
| 10,001-40,000 | 9 | 45 | 4 | 36.36 |
| 40,001-70,000 | 6 | 30 | - | - |
| 70,001-100,000 | 2 | 10 | 4 | 36.36 |
| 100,001-130,000 | - | - | 2 | 18.18 |
| 130,001-160,000 | - | - | 1 | 9.09 |
| Total | 20 | 100.0 | 11 | 100.0 |
| Mean | | 39,600 | | 80,000 |
| Min | | 7,000 | | 40,000 |
| Max | | 100,000 | | 140,000 |

Watershed and Tenure : Ban Na Rai Diao and Ban Khuang Chompoo



Appendix 6

Household Questionnaire

Location 1: Ban Na Rai Diew and Ban Kuang Chompoo

() Na Rai Diew () Kuang Chompoo Interviewer

INTERVIEWEE BACKGROUND

Name:

Status and gender :

Address:

Location: x : y :

Household Members:

| Status (Husband,wife, son, daughter, etc.) | Gender | Age | Education | Studying now (Y/N) | No. of working hour on farm (hrs./day) | Work as labour (Occupation) |
|---|--------|-----|-----------|--------------------------|--|-----------------------------------|
| Leader of HH | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

SOCIAL

1. How many Rai and no. of field do you have ? Total Plot..... Rai.....

House Rai Certificate..... () own () rent

Plot1..... Rai Certificate..... () own () rent

Plot2..... Rai Certificate..... () own () rent

Plot3..... Rai Certificate..... () own () rent

2. If it is not your own field, from whom do you rent it ?

() Government which plot.....

() Neighbour which plot.....

() Outside the village which plot..... where.....

Why not in the village?

3. Do you know what right this certificate give you? If yes, please specify?

.....
.....

4. Were you born here? () Yes () No

If not, where are you from?

How long have you been here?

5. How did you get your land ?

() buy For how long years.

() from heritage For how long years.

() preempt For how long years.

AGRO-ECOLOGY

1. CULTIVATION

Crop Calendar

| Type of crops | Size of area | Rank | Month | | | | | | | | | | | |
|---------------|--------------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 1. | | | | | | | | | | | | | | |
| 2. | | | | | | | | | | | | | | |
| 3. | | | | | | | | | | | | | | |
| 4. | | | | | | | | | | | | | | |
| 5. | | | | | | | | | | | | | | |

(rank 1 = the most important)

Why is it the most important

.....

Why have you decided to grow these crops ?

Crop Analysis

| Type of crops | Advantage | Problems | Solutions |
|---------------|-----------|----------|-----------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | | |

Fertilizer input

| Type of crops | Fertilizer input | Formula | Frequency | Price (Baht/kg) | Quantity (kg) |
|---------------|------------------|---------|-----------|-----------------|---------------|
| 1. | | | | | |
| 2. | | | | | |

5. Problem Ranking (1= the most serious problem)

What is your most important agricultural problem ?

| Agricultural problem | rank | Solution |
|--|------|----------|
| Lack of land use and land certificate | | |
| Lack of fund | | |
| Insufficient water | | |
| Soil degradation | | |
| Lack of labour | | |
| Distribution and marketing | | |
| Lack of government and private sector help | | |
| Decreasing yield | | |
| Others (specify) | | |

ECONOMY

1. What are the income sources for this household ?

AGRICULTURE:

| CROPS | TOTAL QUANTITY | SELLING QUANTITY | PRICE (Baht/unit) | INCOME (Baht) | MARKETING |
|-----------|----------------|------------------|-------------------|---------------|-----------|
| Rice | | | | | |
| Maize | | | | | |
| Sesame | | | | | |
| Cassava | | | | | |
| Mung Bean | | | | | |
| Tobacco | | | | | |
| | | | | | |

OFF-FARM:

| SOURCE | INCOME (Baht /time unit) |
|--------------------------------|--------------------------|
| NTFP | |
| Labour (all household members) | |
| | |
| | |
| | |
| Own business | |
| | |