

## **PREFACE**

The 2001 SLUSE field trip to Thailand took place in the Khun Samun Watershed, Nan Province, Northern Thailand from Oct 8<sup>th</sup> to Oct 27<sup>th</sup>. Thai students from the TUCED program and Danish students from the SLUSE program from different universities and disciplines worked together in 6 different groups. The overall purpose of the field trip was to introduce students to work with interdisciplinary methods in the field as well as working inter-culturally. Each group was then to write a report about their fieldwork.

After returning from Thailand the Danish-based groups decided to join the contribution from each group in one combined paper. The paper will consist of a common introduction, followed by the six individual reports, and a common data presentation and methodological discussion. Finally there will be a common conclusion to the overall objective.

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## **PART I: INTRODUCTION**

The SLUSE program focuses on natural resource management issues and research methods in a development perspective. In this context a lot of emphasis is put on the choice and role of the research methods and the influences of these methods on the achieved data and subsequent results.

Working with research methods in the field it is necessary to determine what geographical research level will be in focus. Working with five different villages in a small watershed the main focus of our study will be on levels 5 to 8 of the following.

1. Global level: The global need for consensus and international policies and conventions concerning environmental issues.
2. Thailand vs. global interest: Giving signals to the international society concerning willingness to participate in international policymaking and implementation.
3. National level: National interest and national policymaking as well as macro economic considerations. Preventing unsustainable use of natural resources and devastating catastrophes.
4. Regional level: Implementation of policies in regional departments.
5. Provincial level: Implementation of the conservation and watershed policies with a flexible approach considering the specific characteristic of each area.
6. Watershed level: The influence of conservation and watershed policies on all the villages in Khun Samun Watershed.
7. Village level: The influence of conservation and watershed policies on the individual villages.
8. Household level: The influence of conservation and watershed policies on the livelihood and agricultural practices of individual households.

In 1988 serious flooding and mudslides in southern Thailand killed many people. This was linked to careless logging practices upstream and led to a total logging ban throughout the country (Anderson, 1993; Rigg, 1993). In the same period Thai forest policy turned around from promoting timber industries into a very strict forest conservation policy. In 1992 the cabinet classified National Forest Reserves into 3 different zones: Conservation, Economic and Agricultural. Many farmers had encroached on forest in response to growing population and needs and had settled in what latter became a conservation zone, thus turning farmers into illegal settlers without prospects of secure tenure (Rigg, 1993).

In 1994 Thailand faced its most serious water shortage in 30 years, with farmers facing a dry season with insufficient irrigation water. The problems of too much water in the wet season and too little in the dry season was linked to the decline in forest cover in the mountains. It is believed that the forests act as sponges, holding backwater in the rainy season and slowly releasing the water throughout the year for the benefit of the irrigated paddy fields in the lowlands (Rigg, 1995). Watershed management is used as a tool in the fight against deforestation.

Being a clearly defined geographical area a watershed is ideally suited for a comparative study of villages and the land use therein. The physical properties of the watershed mean that land use practices or changes within these as well as local attitudes may have an impact on all villages in the watershed.

In our studies we were to investigate land-use in the villages located up through the watershed and what effects this land use had on the livelihood security of the local population and on the environment?

The Khun Samun watershed is located close to Nan city in Nan province. It is a sub-watershed in the Nan basin and covers about 128 km<sup>2</sup>. The elevation varies from 300 to 800 m above sea level. The northern part of the watershed is mountainous and mainly covered with secondary forest. It changes gradually into lowland further south before the Khun Samun River joins the Nan River.

Most of the watershed is classified as National Forest Reserve Zone C, which indicates that it should be conserved as forest and that exploitation is prohibited. In the Southern-most part of the valley, towards Nan, a major part of the valley is classified as E-zone, which indicates that economic forest-related activities are allowed within certain limitations. However, a number of villages with associated agricultural fields can be found in the valley. The villages in the Northern part of the watershed are predominantly inhabited by hill-tribe groups, Mien (or *Yao* in Thai) and Khamu, while Northern Thai (*Khon Muang*) dominate the villages in the Southern most part. The villages are apparently younger the further upstream in the watershed they are located. The hill tribe villages have been established in relation to communist insurgency in the 1970's and early 1980's. This politically and national security motivated settlement was only partially organized and the villagers chose the villages locations themselves; this land was not officially allocated to these new villages i.e. no title deeds were issued.

The age structure indicates that the watershed can be regarded as an agricultural expansion area, with the most recent expansion, taking place further upstream in the watershed. The infrastructure in the watershed is a common problem with decreasing accessibility the further upstream one moves.

Thus it would be expected that the distance to the economical centers i.e. the markets of Nan would have an effect on the land use. This leads us to the overall hypothesis:

**Land-use intensity in the villages in Khun Samun watershed diminishes the further it is located (diminished accessibility) from the lowland and the city of Nan.**

Each group had their own objectives to work from but these should in some way be related to the above hypothesis. It was then up to the groups to cooperate to determine whether the simple hypothesis could be verified or if more complex explanations were called for. Five of the groups had various villages in the watershed as their area of study and group number 6 had the whole watershed as study area.

During and after the field course the 6 groups aimed at identifying some indicators of agricultural intensification in order to compare the achieved results. These results will be discussed in Part II and concluded on in Part III.

Part II consists of reports from the 6 different groups, which will form the basis for the overall conclusion to the overall hypothesis.

**PART II: REPORTS FROM GROUP 1-6**

### **PART III: PRESENTATION OF COMMON RESULTS AND DISCUSSION OF BIASES**

The purpose of part III is to present the results from location 1 – 5. Although the overall objective of the fieldwork in the Khun Samun Watershed has been to look into the agricultural intensification in the villages, the five groups each developed their own research questions and hereby variables, objectives and working questions. Moreover, not all disciplines were presented in all groups which some of the results in the table below also reflects. In the following we wish to discuss the different biases in connection to the comparison of the results and making general conclusions.

In the table below some of the results of the field studies are shown. However, it is important to keep in mind that these data are gathered by five different groups containing group members from a number of students from many different disciplines. A variety of methods have been used in the fieldwork to gather the information and this can lead to various biases in a comparison of the results. Although the groups worked on having the same indicators for agricultural intensification, this only worked out partly. The villages differed and each of them had interesting aspects to look further into according to history, geographical situation etc. Inter co-operation between the 5 groups and the group 6 as well, was aimed. However, in order to compare all the results the co-operation should have been strengthened as well as similar approaches and methods should have been applied in the different groups.

The sample sizes of the household surveys also vary from simple random sampling to more stratified sampling methods see Part II. Of the groups that have made stratified sampling some have sampled on the basis of income and others on geographical location. Furthermore, the groups all had different questions in their surveys and interviews and these have been asked differently.

Different units have also been used for measuring the e.g. yield. This has made the comparison questionable as some of the units had to be changed. As mentioned in many of the chapters in Part II there are certain biases connected to using interpreters. All the 5 groups have worked with many interpreters from different disciplines and therefore different understandings of the terminology used in the field study. Therefore precautions should be taken when drawing conclusions on the data gathered as some of it might be biased due to language barriers.

Thus one can question whether to compare the results at all. Therefore Part IV is a general outline of the trends observed and analysed during the fieldwork. In order to make a more reliable conclusion the inter co-operation between the groups should have been better organised from the beginning, and common indicators on the various main issues developed and same methods applied. Coordinating the interview guides and questions better before the fieldwork could also have been done. This would however have been very time consuming. The overall purpose of making such a field study should be in mind before planning to compare results as shown below.

Table: Agricultural intensification results from location 1-5

Indicators	Location 1	Location 2	Location 3	Location 4	Location 5
<b>Average fallow</b>	0 yrs	6 months - 1 yr	3 - 4 yrs	0 - 1 yrs	0 yrs
<b>Type of crops/ cash crops</b>	Rice, maize, longan, linchee, rambutan, mulberry, teak, beans, vegetables	Rice, maize, longan, cotton, linchee, rambutan, mulberry	Rice, maize, longan, cotton, linchee, rambutan, soybeans, jack, org.black bean	Rice, maize, longan, cotton, linchee, oranges, rambutan.	Rice, maize, cotton, linchee, orange, mulberry
<b>Migration</b>	Some		Some		50% of hh have migrants
<b>Fertiliser</b>	15-15-15 (NPK)	SSP and CAN	21-0-0, 15-15-15 (NPK)	CAN, 21-0-0	21-0-0
<b>Pesticides</b>	Novaline	4 % use on maize and upland rice		Yes	Mostly: Monocrotophos
<b>Herbicides</b>	Gramoxone	40 % use on upland rice. 48 % use on maize	Gramoxone	Yes	Gramoxone
<b>Off-farm income (average per hh), (min max) in sample, number of hh who have al. income)</b>	App. 30.000 Baht in average per yr.	92 % had off farm income. 24.466 Bath average per hh per yr. (Max: 96.000. Min: 1.680 per yr.)	25.200 Baht per yr.	47,2 % of income total income.	1.000 Baht per yr. per hh
<b>Loan size (number of hh who have loan, average, min- max size of loan, formal- informal)</b>	30.000 Baht in average per yr. 74% of farmers have loans. Mostly BAAC and village found	92 % have loan. 84 % with BAAC. r: 12 % Average loan size: 25.000 Baht on average per hh. (Max. 70.000. Min: 2.000)	50 % have loans. 24.400 Baht in average per yr.	30,7 % og hh have loans.	8-10.000 Baht if any
<b>Distance to fields (average)</b>	2,7	2	4,5		4,5
<b>Farm size (rai)</b>	11	20,5	42	13 - 15	10 - 15
<b>NTFP (how many hh, and what is mostly collected, use)</b>	63 % collect. 74 % collect for consump. 26 % collect for sale as well. Bamboo, bamboo shoot, mushrooms.	100% hh collect, 44% sell. Bamboo, firewood, bamboo shoots, mushrooms	100 % dependent. Bamboo, bamboo shot, roots.	100 % hh collect. 4,3 use for selling.	Bamboo, rattan, sugar palm
<b>Irrigation (type and extent)</b>	Yes. Streams and wells	Self dug ponds, streams, 6-7 irrigations for low land rice	Mobile pump.	Yes	Mobile pump.
<b>Machinery not simple tools only motorised.</b>	Grass cutter, mobile threshing machine	Simple tools, grass cutter	Spray pumps	Few have grass cutter or threshing machine.	No
<b>Tenure (number of hh with no title deed, no. of rai with no title deed)</b>	NS3: 12 % SPK: 33 % PBT5: 6 % No title deeds: 48 % of households	69 % of rai owned by farmer is PBT5. 5 % SPK 6 % NS3	None	No	PBT5

Source: SLUSE fieldwork carried out in the Khun Samun Watershed, Thailand October 2001

## PART IV: CONCLUSION

As stated in Part I; Introduction our main hypothesis was to determine whether the land use intensity diminishes the further it is located (diminished accessibility) from the lowlands and the city of Nan, or not. Most conclusions in Part II bear the evidence that the hypothesis can be verified. However the explanation is more complex than that.

Common for all the villagers is that none of them have access to more land for agricultural purposes and therefore have the same need for intensification of their present land. For location 1 and 2 there is simply not land available and for location 3-5 and partly location 2 the C-zone prohibits further encroachment of the area.

Basically all villages have little or no money to buy inputs, like fertiliser and pesticides, the farmers are compromising with the needs of the soils to produce a good crop and thereby intensifying the agricultural production. Even though the farmers with no land certificates (especially in location 3-5) can get loans from different sources, they are in a dilemma, as these loans have to be paid back within a year, which not many subsistence farmers are able to do. With some land certificates, on the other hand, the farmers will be able to get a more suitable loan from the Bank of Agriculture and Agricultural Co-operatives (BAAC) and thereby get the necessary funds to intensify the production. Location 3-5 are, as mentioned, in the C-zone, which means that none of the households have land certificates. As land certificates are demanded in order to achieve loans through BAAC, the possibility to obtain loans and invest in agricultural purposes are limited and can only be achieved through an organisational approach. Location 1 and 2 have on the other hand easier access to loans because more households have land certificates, and higher loan sizes indicates a higher degree of investments. There are also big landholders and more commercial land use in the locations closer to Nan, which have intensified production.

Another significant issue, which supports our main hypothesis, is the geographic dimension of the watershed. As you go further upstream in the watershed the slopes gets steeper, the distances to the fields from the living areas are longer and working conditions become more complicated and demanding, which then again affects the possibility to intensify the agriculture. Beyond location 4 there is only a dirt road leading to location 5. The remoteness as well as the bad road conditions for location 5, involves many difficulties, both according to access to input- and output markets, as well as hospitals and other necessities.

Besides the accessibility of the more remote areas, other constraints influence the level of intensification. Number of rai per household seems to decrease as further upstream you go. The same counts for the average off-farm and agricultural income. Characteristic for location 3-5 is subsistence farming and in these villages migration seems to be an alternative strategy to maintain livelihood. Lack of labour, due to migration affects intensification seriously as many of the households actually have available land but not enough labour to work on the land so the land is either abandoned or taken over by relatives. Migration means that the labour is missing in the households and thereby the families are not able to put the necessary labour into their fields to intensify their production. These problems are not identified in location 1-2.



The households in location 1 and 2 are economically better off and the villages seem more dynamic. Intensification is higher, they have easier access to loans, which they take advantages of in order to invest in agricultural purposes. Furthermore approximately two thirds of the households collect NTFPs that are both used for own consumption and sale, whereas every household in location 3-5 collect NTFPs mainly for own consumption. However, alternative income like collecting NTFPs seems to be an important part of consumption up through the watershed.

The last main constraint to intensification in the Khun Samun Watershed is the different people that have settled there. They have different tradition and cultures and this may affect the agricultural intensification as they have different ways of cultivating the soil, as we see it.

The overall conclusion is that yes, accessibility is affecting the agricultural intensification, but the picture is more complex as there are other factors like labour, economy, land tenure and culture, that affects the degree to which the fields in the Khun Samun Watershed are intensified.