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Foreword.

The SLUSE course emphasises an interdisciplinary working process, bringing together students from both natural science and social science. In the field, however, students mainly focus their efforts in their own disciplines and work in more or less specialized working team. This was also the case for our group, working in location 1, where the 3 Danish students were placed in separate sub teams. In this situation it is the responsibility of each student to collect and record data, to be shared with the other sub teams.
The group member in our location responsible for collecting and analysing natural scientific data; soil sampling and insecticide testing has for unknown reasons decided not to contribute to the writing of this report. Most of the data he collected has not been made available to the remaining group. Since the data from all sub teams is needed to answer the problem formulation, failure of one student to convey data on his specific subject will affect the ability of the remaining students to gain understanding of the interrelatedness of the case.
We have in the report attempted to present an overview of the methods for data collection used by the natural scientific sub team, but can unfortunately only present a few of the findings from this team. Our analysis of these findings has therefore, at best, been sketchy.

Group 1: Ban Wang Tao

Dorte Futtrup Spangsbo

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Introduction

Livelihood can be defined in different ways depending on the subject being studied and the context. When using the term in development countries the aim of livelihood studies are concerned with basic needs also known as sustainable livelihood[1]. In the context of location 1 Ban Wang Tao a broader definition of livelihood is called for we expect basic needs to be filled due to factors presented below.

Proximity and access to markets, where you both buy your input and sell your agricultural output, are important factors affecting farmers´ choice of crop. The choice of crops may not always be a conscious one. If a specific area has only one access road like the Khun Samun Watershed, input and advice from e.g. agricultural extension officers may be presented to the village closest to the nearest town, before it is offered to the more distant villages. This would give the closest village a position as trendsetter when it comes to adopting new crops and farming techniques and leave villagers with a wider range of livelihood choices. Externalities will often be the main catalyst behind change in farming systems. The change in livelihood will then in itself be a factor in land use change, when generated income is invested back into new crops.

Companies, processing agricultural products, seem to a wider degree than before to place their production facilities in the immediate vicinity of their suppliers, the farmers. The obvious location for a new processing plant no longer tends to be in the towns and cities, but instead in more rural areas. One effect of this is that the boundaries between urban and rural areas become less distinct. In rural areas, which before presented its inhabitants with no other option but to make a living through agriculture, jobs are now offered in production facilities. The rural area or village as a whole, gradually becomes less dependent on agriculture. This furthermore widens the choice of livelihood options offered to villagers.

<u>Problem formulation:</u>

-How does the proximity to Nan City affect the livelihood strategies and the land use in Ban Wang Tao?

The problem formulation leads to three key terms that need to be defined:
The first is proximity. This is not just measured as a physical distance but also incorporates access to financial, physical and intellectual input.

[1] Food 2000, 1987;3

Secondly, we need to define the use of the term livelihood in this report. It is the means with which households support themselves and the choices and investments they make in order to secure and improve these means. However, our main focus has been on the households involved in farming operations. Households which derive their income solely from non-farming occupations are not investigated any further.

Finally, and perhaps most crucially, we will define the use of the term land use, since it is plays the role of both cause and effect in relation to livelihood strategies. Land use is in this report defined as what type of crops are grown, what are their requirements, how they are grown and with what frequency. One factor to consider is the proportion of subsistence farming versus cash cropping. This will in return be influencing the livelihood of the individual household.

Research Questions

All students in the group would in their specific work keep the following questions in mind in order to answer the problem formulation:

1) How does land use affect the amount of nutrition's in the soil?
2) How does the classification made by RFD impact the land use?
3) How do livelihood strategies affect the types of crops grown?

It is not possible for us to answer the first research question, because the group no longer has a natural scientist. The second and third questions will be discussed in the relevant parts of the data presentation.

Group Formation:

We decided to split into sub teams each concerned with different subjects related to the problem formulation. The sub team composition was as suggested in the "Basic information" for this course and the teams were as follows:
Team A was the natural science group, who would study the impact of the physical environment. The people in this team was Komchit (DK), Nar (Thai) and Jim (Thai). They were to study the quality of the environment in relation to soil fertility.
Team B was the land use and land tenure team and consisted of Dorte (DK) and Ped (Thai), they permanently had the interpreter Palm in the subgroup. Their sub objective was identification of the extent of land use and intensification in relation to land tenure.

The last sub team was group C, it consisted of Claus (DK) and Hope (Thai), they also had a interpreter Nun permanently in the group, they focused on cash crops, market access and socio-economics.
We didn't make specific sub-objectives for each team, but instead worked from the common questions mentioned above. Many times during the field course two or all sub-teams walked together in the fields or visited factories to have an overall view or of curiosity, which can be seen from our time schedule in appendix 1.

Introduction to the village

Ban Wang Tao is located approximately 20 km from Nan and contains 183 households and 207 families[2] with an average of 4 members.[3] Most of these households depend solely or partly on agriculture. This conclusion is based on our questionnaire survey where 76,7% of the respondents are farmers and 23,3 percent have another occupation[4]. The villagers benefit from the proximity to the market in Nan, which makes the village attractive for migration farmers, 1/3 of the respondents in the questionnaire were not born in Ban Wang Tao, but have moved there with their families or to marry locals. Most of these migrants are men from villages close to Ban Wang Tao. Two of them come from Ban Ka Sai (location 2) and one is from Ban Huai Puk (location 3). A man we interviewed informally had moved to Ban Wang Tao because he was retired and wanted to live in the countryside. Another indicator is that 24 of 30 respondents answered "yes" to the question: Have the number of villagers increased?

Ban Wang Tao has a high information level which again could be related to the proximity to Nan. In the village there is access to public service, news, education and information about health and farming related issues. This is also illustrated by the villagers concern about the situation in Afghanistan. During a session with some of the farmers in the headman's house some of the farmers wanted to know if Denmark was close to Afghanistan, and if it was we where welcome to stay in Ban Wang Tao until the war is over. This means that the villagers either read newspapers or, as satellite discs outside some of the houses show, watch news on TV.
The village is equipped with a school that not only teaches local children, but children from other villages in the watershed as well.

[2] Traynor, C.H, et al, 2001;16.
[3] See Appendix 2 table 1
[4] Appendix 2 table 2

Methodology:

Because of the interdisciplinarity we agreed on using a case related approach. In that way it was possible for the group members to contribute within the different disciplines. Another issue is that we believe in a complex world, we don't think that a problem can be answered within one discipline but that there are several aspects that are interdependent and interrelated and it is our job to try to systematize the problems that the villagers identify and describe them at a higher level. For that purpose the case study as an empirical method is suitable because the case study:

"…. Investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident"[5]

This means that we, within this approach, are able to make the villagers define the overall problems in the village. The structure of the field work makes it possible to study the problem in its own context. The overall case, is the livelihood strategies in Ban Wang Tao which is the phenomenon that is embedded in its context. The context is the surrounding environment, the relations in the village and the farming system that are effected by the livelihood strategies but also the cause of that specific way of life that is characteristic for the village. This makes the case study very comprehensive but also very beneficial to work with when you are a group with backgrounds within natural science and human science. But it is important to remember that our survey is only a snapshot of the village, we only spend two weeks in the field, and during that time we (the Farangs) were very interesting and not a natural part of the village, which means that the villagers where very polite and maybe not behaved as they normally do. This limited time also affects our survey because we had to be very informal with the farmers because they are shy and need time to open up. That is also a reason why we didn't use a tape recorder during the interviews.
We can use the case study to create a picture from different aspects related to livelihood strategies in the village.
In order to do so, we followed the working process as described below.

[5] Yin in SLUSE compendium 2001-2002;13.

Working process

Getting started

First of all we wanted the villagers to define what they felt was the main problem in the village. During our first meeting with the headman, where we introduced our self, we had the opportunity to ask questions about Ban Wang Tao in general. After this informal talk we walked around the village observing and talking to the villagers about the things we noticed. This gave us an overall view of the size of the village and the different things going on in the village. We also visited the TAO office where we interviewed the members of the permanent staff about basic information about Ban Wang Tao.
The following Friday we arranged to join the community meeting where we had prepared an introduction to our self, some overall questions to the villagers to make them define a problem and a mapping game. The purpose of the mapping game was to make the villagers comfortable with us and to see in which direction most of the fields are located. The mapping game revealed to us that most fields are located to the north of the village and that they are supplied with water from a side stream besides the ones all ready shown on the TAO-map.
When asked directly about what they found was the main problems in the village they answered, lack of water both drinking water and water for the fields. The villagers who showed up at the community meeting where later found to not be fully representative of the village population as a whole. Most of the young men apparently choose to stay home and watch Thai boxing on TV since it was Friday.
At the community meeting we made appointments with two farmers about visiting their fields when they where harvesting upland rice. Here we found out that they are concerned about utilization rights. One of the farmers wanted the GPS coordinates for his plot so he could apply for a SPK[6].

Questionnaire Survey:

One of our main tools for acquiring primary data was early in the project phase identified to be through questionnaires. In order for the questionnaires to yield the information desired by all three subgroups, each individual group prepared a list of question that they wanted to be in the final questionnaire. Then these three lists were merged into one list and all overlapping questions were taken out. This combined list of questions was in theory the questionnaire that was to be used in the survey.

[6] The Public welfare department and the Land reform office issue SPK. If a farmer has an SPK document he can not sell or transfer his plots. (Traynor et al, 2001; 42).

The questionnaire was in fact a structured interview with preset wording of questions and a rather rigid sequencing of the questions. The structured interview places lesser emphasis on the communicative skills of the interviewer than semi-structured interviews. However, structured questioning lacks the more qualitative, open-ended questions of the semi-structured interview. As a result the respondent is not sufficiently encouraged to volunteer additional information and subsequently the success of the survey depends on the quality of the questionnaire[7].
In analysing the completed questionnaires more in depth after arriving back in Denmark it is apparent to us that we in the interview situation often stuck too rigidly to the questionnaire and in some cases failed to ask follow up questions to the information given by the villagers. What would ideally have been a semi-structured interview became very much structured by the questions set by the questionnaire. When conducting the survey we worked in the three sub-groups and the style of questioning can have been different from group to group. Due to the limited time available to us in the field, there was no real time to evaluate on the way the questionnaire interviewing was done and certainly no time to do it over.

Once we had decided to make a questionnaire survey we discussed whether it should be conducted supervised or unsupervised. The following strengths and weaknesses of the two approaches are presented below:

Table 1Strengths and weaknesses of supervised and unsupervised questionnaires.

	Supervised Questionnaire	Unsupervised Questionnaire
Pros	-Questions can be explained. -100% response rate. -Can be more qualitative.	-Faster distribution and data collection. -Sample size can be bigger.
Cons	-Time consuming.	-Unanswered questions. -Literacy. -Lower response rate. -No one home to receive.

Initially the survey was chosen to be conducted unsupervised. This was primarily due to the time constraint under which we were working. We felt that we this way could both save time on the individual interview, freeing up time for in-depth follow up interviews and get a larger sample size. In our initial talks with the village head man we learned that the literacy rate among the villagers was excellent and would not be an obstacle to unsupervised questioning. Furthermore, the head

[7] Casley & Kumar, 1988; 14

man, who was more than helpful, informed the villagers about what to do with the questionnaires over the village loud speaker.

We started the questionnaire survey in the village after we had had the first community meeting, where we introduced ourselves to the locals residents. But we could not be sure that all villagers at this point knew who we were and what the purpose of us being there was. In order to make sure that the respondents are fully aware of what the data they provide is used for, we added a front page with a preface to the questionnaires. It briefly introduced the Thai/Danish student group and the purpose of our studies. Throughout the field course we were very conscious not to lead the villagers to believe that we were preparing any kind of development project in the area. Their cooperation should in no way be influenced or biased by anticipation of support or financial assistance from us.

Piloting

In order to see if the chosen method would give us the necessary data we did a pilot survey. This would test both the validity/usefulness of our questionnaire and the effectiveness of unsupervised questions. Our sample for the unsupervised pilot, which would serve as a test, consisted of 10 households. The questionnaires were distributed in the late morning when most or all farmers had already left for their fields. As far as possible we wanted the head of the household (the husband) to fill out the questionnaire since they were the ones primarily cultivating the family fields. When we arrived at a sampled household where the mother of the family or children were home, but not the husband, we asked them to kindly pass the questionnaire on the head of the family and to have him/her fill it out for us to collect the following day. When arriving at an empty house we at first would chose an adjacent house, to the right or the left, but these often also proved to be empty. It was then that we simply decided to leave the questionnaires on the front stairs of the houses. We had as mentioned earlier, supplied the questionnaires with a short preface, describing the purpose of the survey and with information about leaving the completed questionnaires for us to collect. Dropping the questionnaires at households with no one home not only assured the integrity of the random sampling but also saved time, since finding replacement households proved time consuming. We returned the next day to collect the completed questionnaires. 9 out of 10 had filled out the papers and either informed family members about returning them to us or they had simply left them on the stairs where we had placed them the day before. A response rate of 90%

Main Questionnaire Survey

We had several reasons for in the end choosing to do a supervised survey. Even though we were encouraged be the high response rate of 90% we achieved in the unsupervised pilot we were not

completely satisfied with the number of questions left unanswered in the questionnaires. The questionnaire was quite extensive and was comprised of 62 individual questions. At first we considered returning to the households in the pilot sample and do the same questionnaire again, this time under supervision to see if this would give more answered questions. However, we felt that because of the time constraint, there was not room for too much experimentation.
In the end it was decided to conduct the questionnaire survey under supervision for two reasons. One, we expected this to heighten the quality of the responses since we could clarify difficult questions. Secondly, an unsupervised survey would limit the face-to-face interaction between ourselves and the villagers. With only a few weeks to do our field studies we wished to spend as much time in the village as possible. If we chose to make a larger sample, and do an unsupervised survey we would expect to spend a considerable amount of time on data analysis back in Base Camp; time which was better spent in the field. Still, a more in-depth comparison of the quality of responses from the unsupervised pilot and the main supervised survey would have been interesting to make now, after our return from the field. Sadly, the completed pilot questionnaires were discarded due to a misunderstanding in the field and are unfortunately unrecoverable. Doing this pilot did enable us to modify and improve the questionnaire before our main survey and pre-testing of questionnaires therefore proved its usefulness[8].
The final questionnaire can be seen in appendix 3

Sampling.

We did not upon our arrival in the village identify any specific factors which necessitated stratifying our sampling of households for the questionnaire survey. If we had been able to spend more time in the field this would off course have possible and probably very useful, but the village at first glance appeared to be quite homogenous and we decided that households would be selected through simple random sampling. This was done by literally drawing numbers from a hat, numbers of the individual houses. On the village map given to us by the TAO some houses were left blank and through the course of our stay we learned that these were newly build houses that had yet to receive a number. They were not included in the draw, which in hindsight was an error. These households could quite possibly have been outsiders who settled or young people who were starting families and would have been important additions to the sample. They could have been included in the sample in several ways. We could simply have given numbers to the new houses and included them in the simple random sample on an even footing with the rest of the households. By stratifying our sampling in regard to houses without numbers, we could have investigated who these “new” families were and if they behaved differently from the rest of the village. By not including these

[8] Casley & Kumar, 1988; 73.

household in some form or another we failed a chance to establish if there perhaps is significant in-migration as well as the reasons behind.

Sample Size.

After the pilot survey we not only abandoned unsupervised questionnaires, we also made some minor changes in the composition of questions. The actual sample consisted of 30 households chosen by simple random sampling. As discussed above we failed to include newly build houses without numbers, which means that our sample is not fully representative. It was our experience from the pilot that supervised questioning during the day time would be futile since people for the most part were not home but in the field, we would do the interviews in the evenings. This proved to work quite well, the whole family would usually be home and people were not in a hurry to get to their fields as would have been the case with morning interviews. Towards the end of completion of our questionnaire survey we did have a little difficulty catching people at home because of the burial of the former village head man. The funeral lasted 7 days and the whole village participated at one time or another.

Respondents and Reliability:

The survey aimed at gaining information about households as complete units and not just individual farmers. Interviewing all household members would however have been too time consuming and as far as possible we tried to interview the head of the household. As can be seen from appendix 2 table 3, 13 respondents or 43% were women. In quite a few cases these women were in fact head of the
household, yet the figure is not fully representative since the villagers at the time of the field trip were attending a village funeral, lasting 7 days. When doing the survey in the filed we were often told that the husband was at the funeral.

Having said this, it should be noted that usually the entire family was involved in the farm operation in some way or another. As a result wives and older children seemed very knowledgeable about the family farm in terms of yield, fertilizer use, credit and so on. It could on the other hand be discussed if these data were truly reliable[9]. With the head of the household being absent, they now represent the family and may not want to appear unknowledgeable. It could also be that the wife does not have the complete picture of the production. Maybe she answers that they spray their fields only once a year because she only helped spraying one time this year, while the husband might in fact have sprayed the fields twice more without his wife present.

[9]Casley & Kumar, 1988; 21-23.

As an example, in the doing the survey in the field we came across a household where three men were present in the house at the time of the interview, an older man and his two sons. The oldest son was presented as the head of the household; still, the youngest son was the most vocal of the three. Apparently the family owned several rais of teak plantation but had no BAAC loan. This set the household far apart from most other respondents and it was decided to return and do a more in-depth interview. This time only the older man was home, and he actually apologized on his son's behalf for giving false information. Our reason for returning was not that the data from the first interview seemed incredible but that it seemed interesting and worth further study. It turned out that the son, who had in fact been sporting a cast on his arm, had been in a motorcycle accident at the day of the first interview. He had been given injections for the pain and had later been drinking, causing him to be somewhat boastful. The older man was in fact in charge of the family farm. All data, except that about the teak and the BAAC credit proved to be correct. He did have a loan and the teak "plantation" turned out to be 2 dying trees in the corner of a plot.

Interviews with Key Informants

Unlike in the main questionnaire survey which was carried out with quite structured interviews, we used more qualitative topic-focused interviews when approaching key informants for data.
Below you will find a list of key informants interviewed during the field course.

-Head man
-TAO Officials (Sub district Office)
-RFD Officials (Royal Forest Department)
-Middle man
-BAAC Officials (Bank of Agriculture and Agricultural Cooperation)
-Members of crop specific groups
-Silk Worm Factory Manager
-Irrigation Officer
-Reverent at Baptist Rural Life Center
-School Teacher

Observations

A part of the method was observations. We used *Direct informal observations* and *participatory observations* in the sense Yin describes it. Direct informal observations includes information's that

doesn't have to be measures, but instead can indicate something about the case.[10] We used this method in the village walk and in the field walk, where we tried to get a overall view of the every day life among the farmers and how they interact and socialize both when they are in the village and when they are in the fields. We also used this method to compare the wealth in Ban Wang Tao with the other villages in the watershed simply by looking at the houses and the clothes of the inhabitants in the villages.
The participatory observations can be described as a method where the researcher participate directly in the events being researched.[11] We did this method in the fields, where we walked with a farmer to fields where they where harvesting that day and tried to harvest rice with the other farmers to get an idea of the physical work that is a part of every day farm life.
We only did this for a very short time, and because we don't speak Thai we can never have insight in the social life and the interaction between the farmers during the day. We could only see and hear that they where laughing and having fun during the breaks.

Transect walk

In order to visualize the difference between how the farmers should use their land according to RFD's classification and how the farmers actually use their land we made a transect walk. We walked in northern, eastern and western direction from the village to the borders of the fields that belonged to Ban Wang Tao's farmers. Every time their was a change in the crop type we made a waypoint on our GPS. Another purpose was to measure the distance from the village to the borders of Ban Wang Tao's fields and the next sub-district, this was to understand the overall volume of the fields. This was also to examine if there where some natural boundaries for expanding the field area. All these measures are visualized in a map.[12] We also wanted to see the diversity in crops in order to establish how much land was utilized for cash crops.

Participatory mapping

Besides the mapping game, as described earlier we used participatory mapping as a method to gain information's about the borders of the villagers fields and about the type of crop they are growing and how far away the community forest is from Ban Wang Tao. In the first interview with the headman he showed us where the community forest was in a map, but when we got there we found the community house and a sports field and no trees at all, then we asked him again a few days later and he pointed in the same place. So this was an opportunity to find the forest without insulting

[10] Yin in SLUSE compendium 2001-2002;87
[11] Yin in SLUSE compendium 2001-2002;87
[12] see appendix 4

anyone by asking the same question again. The mapping showed us which crops were grown close to and far from the village.

Reflections on the working process.

This part is a reflection of different aspects of the field trip that we have discussed after we arrived to Denmark and started to analyse our data.

Working with Thais

Our group was different from the other because we had an exchange- student from Thailand as one of the Danish team this has been both a good and a bad experience. The good thing is that the Danish-Thai was able to hear all the parts of a interview that the interpreter doesn't translate. Also the Danish-Thai has the ability to make more in dept interviews with the villagers and make them comfortable during the interview. Another benefit is that he was able to "spy" on the villagers informal conversations.
In was clear from the start that some of the Thai had either limited knowledge English or were reluctant to speak it. The interpreters therefore became quite important when we conducted group meetings at the base camp. It was necessary for us two Danish students to constantly remind the 7 Thai-speaking students, including the interpreter, that they had to wait for the translation. It also led to some misunderstandings during the field course. Because 5 group member agree on something that hasn't been translated it causes confusion and frustration in the Thai group when the Danes do something different.
The main language problem was when it came to writing English. This meant that when we prepared our questionnaire the Thais wrote in Thai and we wrote our contribution in English. Then these parts needed to be translated back and forth in order to merge the questions from the three subgroups. The matter was also complicated a bit by the fact that one subgroup consisted entirely of Thais who obviously didn't need to use English as their working language. One result was that no final English version of the questionnaire existed when we first started our survey. This meant that some mistakes and mistranslations were spotted late. One example is the table from the transect walk made by subgroup A, the description is written in Thai and is therefore inaccessible to us.
We attempted to make a habit of sharing information between the 3 subgroups each day, by writing a summary of the work we had done and the results we had gotten

Working with interpreters

As mentioned earlier the combined student group for Location 1 consisted of 3 Danish based students, 4 Thai based students and 2 Thai interpreters. With one of the Danish based students being native Thai there was an interpreter for each native Dane. This was a clear advantage because the sub-groups could then work independently of each other and didn't need to share interpreters as some of the other locations did. The interpreters were themselves undergraduate student from the faculties of humanities of the three Thai partner universities. As far as Location 1 was concerned the two interpreters became an integrated part of the group and functioned extremely well socially. This is obviously due to the fact that they had a lot in common with the Thai group members. We did at times feel that the interpreters, perhaps involuntarily, lost some of the neutrality that we expected they would display in relation to the working process of the group. They consented, may be it silently, with the views presented by the other Thai students and we at times found ourselves "outnumbered" when decisions were to be made about group work and presentations. It was obvious that they were themselves just students and not professional interpreters. We, the non-Thai-speakers were very dependent on constant interpretation when we were out in the field, which required the interpreters to be attentive and focused for long periods of time and off course there were limits to what we could demand of them. One interpreter had experience from the SLUSE field course to Phrae in 2000 and was aware that the translation needed to be as detailed and precise as possible.
To exemplify how the interpreters were used, the preface attached to the questionnaire mentioned that our studies were concerned with sustainable development. To make sure that the use of the term "development" wouldn't be ambiguous and would be misunderstood we used a kind of two-way translation. One interpreter would translate the content of the preface from Thai to English and the other interpreter in the group was then asked to interpret back into English. This two –way translation confirmed the neutral use of the word "development". The misunderstandings that language differences could cause was something we were quite focused on. None of us, Thais or Danes, were native English speakers, yet it was the language used to communicate between the two groups of students and all communication with local villagers had to go through the Thai students and interpreters. As could be expected, data was lost in the interpretation process, but we always tried to make precautions to insure that as much information as possible was passed on to the non-Thai students.

Interdisciplinarity.

The SLUSE program and its Thai partner consortium TUCED brings together people from different academic disciplines to work together on common objectives. The resulting interdisciplinary study

will be less specialized than an equivalent mono-disciplinary study. On the other hand, the interdisciplinary study will present a broader and perhaps more complete picture. Furthermore, added importance will be placed on the practitioner's communication skills and ability to convey his or hers findings. This is due to the fact that one's colleagues usually will have a different approach than one self to the work at hand. Interdisciplinary study is a good approach when the subject field is unclear or very complex. The complexity inherent in an entire community like a village in Northern Thailand where livelihood strategies are related to many interrelated factors and processes makes it well suited for such an approach.

Data presentation and analysis

What we have done is the first part of a case study, we have located the problems in the village and we have obtained an background for the problems and an overview of the livelihood strategies in the village. The next step would be to go back to ban Wang Tao and ask questions about the data that we have analysed so far.

Land tenure:

In 1992 The Royal Forestry Department (RDF) made a classification of land use and according to this, Ban Wan Tao is situated both in the Economic Zone and in Gan Ook. The economic zone means that the farmers can only grow commercial plantations and orchards and that some of the plots are reserved to landless farmers. Gan Ook means that the area is free to human settlement.[13]
As shown in appendix 2 table 4, 50% of our respondents do not have any deeds to their fields. Most of the farmers with deeds have SPK, some have NS3 and a few have PTB5.[14]
Ban Wang Tao has existed for over 100 years and the villagers have traditionally been farmers, over the years the agricultural land has increased and according to our survey more than half of the respondents that answered this question have inherited their land.[15]
If we compare the two tables of how the farmers obtain their land and the type of deed the picture looks like this:

[13] Traynor, et al: 2001;41f.
[14] When you have the NS3 certificate you are allowed to sell, transfer or mortgage land. This deed can be converted to title deed. PBT5 is a tax certificate that shows that they have paid land taxes (Traynor, et al: 2001;42f).
[15] See appendix 2 table 5.

Table 2 Tenure and how land was obtained.

Obtain land \ Deed	SPK	NS3	PBT5	None
Inherent	6	2	1	5
Buy	0	0	1	4
Other	1	0	1	2

This table shows that many farmers have another perception of land owner ship. In the column to the right the table shows that farmers who don't have any deeds to their land has bought or inherited the land. This might be because the village has existed for many years that the villagers have a common knowledge about who own the plots.
It was important to the farmers to obtain deeds and 65 % of the respondents were unsatisfied with their present land tenure[16]. Some of the farmers expressed their concern about the deeds, because they feel as "*criminals according to RFD classification"*[17]

Forest

The use of participatory mapping showed us that the forest in Ban Wang Tao is in the border areas between the sub districts to the east and to the west. The villagers have a common rule with the farmers from the other villages about not using these forest areas for farming which is a natural limitation to field expansion. These forests are also what the headman referred to when he showed us the community forest in the map. The bamboo forest starts about 1 km to the west and a tree forest begins 3 km to the east. This is also here the villagers collect timber to build their houses. When we where there we heard the noise of logging and was told by the local farmer that it was illegal[18]. And the headman once got a fine because he logged timber to build a new house[19].

The villagers are not as dependent of NTFP and doesn't collect as many different things as villagers further upstream. 2/3 of the respondents collected NTFP, but these are mostly bamboo, mushroom and bamboo shoot which can be collected in the bamboo hedge between the road and the plots None of the respondents collected NTFP for selling solely, and most of the respondents used the products for own consumption only a few did both.[20]
This also imply that the economy in the households in the village isn't dependent on these findings, which indicates that the farmers make enough money for a living without support from the wild nature.

[16] see appendix 2 table 6
[17] Informal interview with a farmer, Sunday Oct.14.01
[18] Informal interview with a farmer, Monday Oct.15.01
[19] Smalltalk with headman.
[20] See appendix 2 table 7,8 and 9.

Several villagers weave strips or hat out of bamboo collected either from the community forest or from around their own fields.
One woman weaving bamboo strips as well as doing patchwork reported an average income from this of100 Baht/month with a maximum income of 500 Baht/month. Another villager also collected bamboo for weaving strips and received a price of 4Baht/strip which earned him an additional income of about 120 Baht/month. Families also collected bamboo shoots for own consumption but one family occasionally sold bamboo shoots, which could earn them 30-50 Baht/day.

Intensification and land use

Ban Wang Tao is surrounded by agricultural land, and partly because of the lack of infrastructure field expansion is not an option anymore. This is due to the age of the village, we think that the field area has been expanded together with the development in mobility and by that the opportunity to get further away from the village. Most of the villagers use motorcycle or walk to their plot by narrow dirt roads, and the road to the plots furthest away are so poor that it is impossible to get there by car which also has an influence on further expansion[21]. The average distance to the plots is 2,7 km's and it takes about 2 hours to walk to the plot furthest away from the village in north eastern direction. But as appendix 2 table 11 shows there is a field even further away, about 6 km. This number has to be taken lightly because we have experienced that the farmers have a very vague idea about distances.
But all these data described above means that the villagers have to intensify the existing fields to get more yield pr. year to maintain a livelihood, because they don't have other opportunities. This can be done with fertilizer, pesticides and irrigation systems, but the latter is not an issue in Ban Wang Tao.
Half of the farmers indicate in the questionnaire that they use fertilizer[22]. If the farmers continue to use this method it will lead to a decrease in important nutrients in the soils. What is uplifting news is that among the farmers that use fertilizers a little over 50% uses manure or bio compost[23]. This means that they are aware of the farming cycle where you reuse organic materials instead of wasting them or maybe they can't afford to buy chemical fertilizer. Another major explanation for this is simply that there is ample availability of manure in the village. Many farmers raise pigs and cattle and agricultural extension programs, such as the "Dr. Soil" program, have raised village awareness about the usefulness of organic fertilizers compared to chemical ones.
At the community meeting an Ajarn from Bangkok told the villagers about applying N-P-K and how they could save money if they used the right solution. For the soil in this specific area, he told

[21] See appendix 2 table 10 and 11.
[22] see appendix 2 table 13.
[23] see appendix 2 table 14.

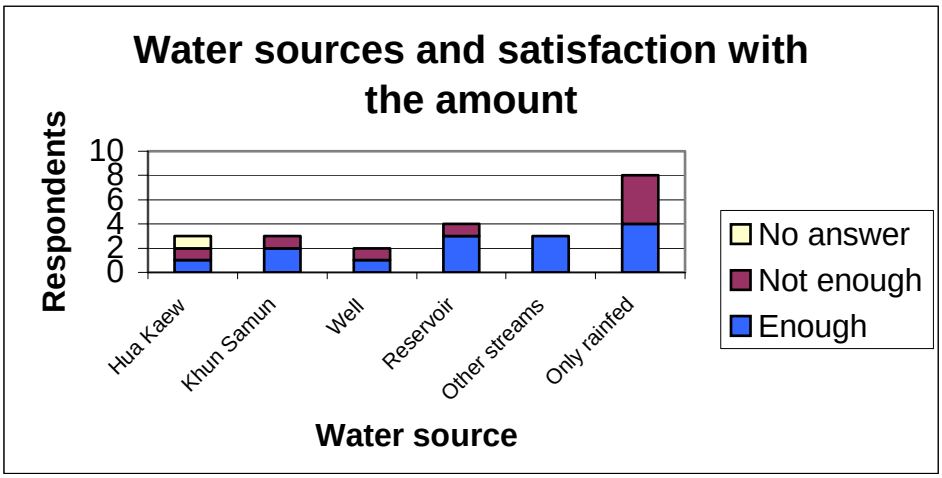
them that they should use 18-12-6 instead of the 15-15-15 they already use. The villagers where very curious and listened carefully to the Ajarn.
Another way to improve the soil is to use rotational cropping as some of the farmers are already doing. During some informal interview farmers told us that they grow rice for consumption, soy beans as a cash crop and that they have a plot which is fallow. The next year they will switch the crop in the rice and soy bean plots so the rice can use the green manure which is left from the root of the soy bean and is full of nitrogen. And the soybean which has the capability to fixate Nitrogen from the air can provide new nutrients for the rice next year. In that way the farmers uses the nature and saves money on fertilizer.
The other option for increased yield per year they can use is pesticides. According to the respondents in the questionnaire, farmers typically spray insecticide or herbicide in their fields 1- 3 times a season. depending on the crop.
Its interesting that non of the farmers use fungicide because Ajarn Arnat told and showed us that this was the common disease in rice[24].

Lack of water

At the community meeting the villagers identified lack of water in agriculture as a main problem in the village. This doesn't correlate with the answers in the questionnaire where more people answered that there was enough water for agriculture. This can possibly be because the amount of water isn't enough to grow more than one crop a year, which again depends on the crop, the water source and the steepness of the slopes on the plots.
The important streams in the agriculture area are Khun Samun river and Hua Kheaw stream. Most of this area is located in the north-eastern part of the field areas, close to Samun river. Beside that, there are two reservoirs in this area that the villagers use for agricultural purpose.
The respondents in the questionnaire uses water from the two streams, the reservoirs, wells and rain water only. If we compare the answer from the water access and the satisfaction with the amount of water we come to the following figure:

[24] see appendix 2 table 15 and 16.

Figure 1Water sources and the amount.



Even with a limited sample this shows that there is very little correlation if any between the water source and the satisfaction of the amount. It seem that there is disagreements within all the water sources except the farmers who gets water from other streams than Khun Samun and Hua Kaew. None of these have enough water which may be caused by factors such as steepness of slopes on the fields or the size of the stream. If it is a small stream it quickly dries.
This could be prevented if the farmers changed to dryland crop as the government suggested in the early 1980's. They made an effort to encourage farmers to change cash crops from cotton and soy bean to cassava which doesn't need as much water[25]. Because of the lower prize for cassava, this never became a success and we didn't spot any cassava plots in location 1.

Groups

Many farmers harvest with support from the Coop which is organized around the
Tha Worn Wat(temple). This involves reciprocal work where the associated farmers need to offer their own labour in return. The poor road to the plots also has an impact on the widespread use of the harvest cooperative among farmers. Since it is almost impossible to get harvest machines to the plots and since the harvest period is only for a few weeks the villagers need to help each other and harvest with hand tools. These cooperation's are depended on the type of crop and is also a way to socialize with other villagers. Agricultural extension programs are operating in the village and many farmers report that they attend meeting or seminars 1-3 times/month. A list of some of the existing groups can be seen in appendix 2 table 17.
The villagers have been the beneficiaries of so called royal projects. One such program involves donating livestock, more specifically cattle to the villagers. Participants in the program will

[25] Riggs 1995;30.

typically receive a bull and a cow or two. The animals are theirs to keep but cannot be resold. Only condition for receiving free cattle through the program is that the first calf must be returned to the royal project. All subsequent calves can be kept or sold. According to the head man 17 families have received cattle through the program, 60 heads in total. Several of the respondents in our questionnaire survey had cows, one said he had received a free cow from the Tha Worn Wat Foundation. This was a Buddhist order, running a temple and monastery in the North-Western part of the village. They also gave seminars on planting passion fruit trees. The establishment of a passion fruit juice factory close to the temple was also a royal project. The plant itself has been auctioned off to a private owner. However, villagers are in this case hesitant to change their cropping pattern and to plant passion fruit trees. Previously, the village had substantial passion fruit production aimed at export until the market gradually faded away and the trees were cut down. This shows that the villagers are critical and relatively well informed and will not just adopt any new product. They will not take a financial risk without knowing there is a market for their cash crops.

It appears that the Tha Worn Wat functions as the administrators of both the passion fruit information project and the free cow project. We did not establish this link between a locally based organisation and the royal project until after we returned from our field studies. As a result, we did not approach the temple administrators for interviews. We did determine how the projects worked and what benefits the farmers gained from them. The project administrators could have given us more secondary data on the specific projects. A body called the 7th Mulberry Extension Group gives advice about growing mulberry bushes and feeding silk worms. This activity is described in the following chapter:

Mulberry Bushes and Silk Worms

A silk worm factory has been establish just south of the village only a year ago and was up and running September 2000. We arranged to see the factory and interview the manager. The factory, which was privately owned by a foreigner, employed 50 Ban Wang Tao villagers from June to January. The other 4 months there aren't enough leaves on the mulberry bushes that the larvae feed on. In wages alone the factory constituted an influx of capital to the village totalling around one million Baht. Average wage is 100 Baht/day which is a decent pay compared the average farm labour wage of 80 Baht/day. see appendix 2 table 18.

Farmers will buy larvae from the factory and feed them mulberry leaves for 20 days in special houses. The larvae are then placed in compartments where they construct the valuable cocoon in 6 days. They are bought in boxes with 22,000 larvae which produce around 30 kg of cocoons. The farmers sell them back to the factory in big sacks, but these are still referred to as "boxes". Only one

box is produced at a time and throughout the mulberry season farmers can feed 10-11 boxes. Farmers purchase a box for 640 Baht, but the purchase price is simply subtracted when they sell the cocoon back to the factory. At an average cocoon price of 100 Baht the farmer will get:

3000 Baht minus 640 Baht = 2,360 Baht/box

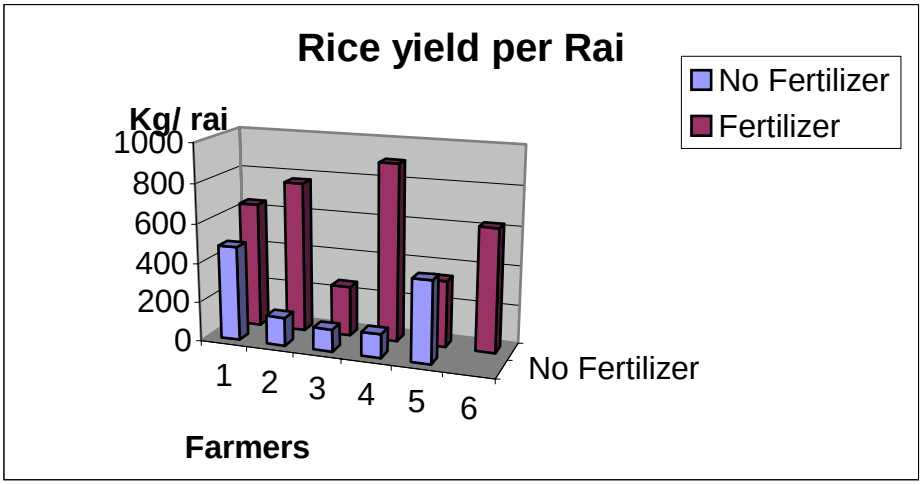
Production of 10 boxes, which is achievable within the 8 month season will generate 23,600 Baht.

Through the village head man we then arranged a meeting with the local silk worm group.
The said that one box of worms require a total of 350 kg of mulberry leaves. The mulberry bush can produce 800 kg/rai of leaves a year and can be cut 11 times/year since it regenerates quickly. 13 families are involved in this type of production, which is very new in the village. Minimal requirements are 2 rai, ideally 5 rai or more. 5 rai will produce 4000 kg, sufficient for 11 boxes. Our questionnaire survey shows that the average mulberry farmer has 3.9 rai. Mulberry needs no fertilizer or pesticides because it reduce the quality of the leaves and subsequently of the of the silkworms. Even spraying of adjacent field could jeopardize the quality.
The relation between the farmers feeding worms and the silk factory could be describe as contract farming. Traditionally, the term contract farming will imply that the buyer(the silk factory) would supply all production input, except for land and labour which is supplied be the farmers. Training and mulberry saplings are in this specific case supplied by the 7th Mulberry Extension Group, just like the farmers grow the mulberry bushes themselves or buy from other farmers in the village. Only input supplied by the silk factory are the worms ready for feeding. But the purchase price is subtracted from the sale price when the farmers sell back the silk cocoon to the silk factory. This could constitute contract farming. The prices seem fairly transparent to the farmers and they know what price to expect for the cocoons. Yet the fact that the only have access to one buyer, could prove a disadvantage to the farmers. If the silk factory suddenly would only pay a fraction of the agreed price, the farmers has no option but to accept. If they were able to find another buyer, it would be too expensive to transport the cocoons. They require refrigeration in order to kill the larvae which would otherwise eat their way out and destroy the cocoon. This risk of being tied to a buyer who can dictate prices can be a factor which will stop farmers from entering the mulberry/silk production.
Planting fruit trees is a long-term investment that will not yield any crop during the first 5-6 years. Engaging in such an investment indicates the individual farmer's perception of his own financial security as well as tenure security. The gains are higher than with an annual crop but will not materialize until sometime into the future. Establishing a longan plantation will require an initial investment of 500-700 Baht/rai and subsequent yields can produce a revenue of 15,000-20,000 Baht/rai per year.

Rice yield:

Rice is grown for consumption and we have though both informal interviews and our questionnaire/semi-structured interview extracted data concerning rice yield. Preliminary analysis shows that rice yield is generally higher on field where fertilizer is being applied. The following is a correlation between yield and the application of fertilizer.

Figure 2 Rice yield per Rai with and without the use of fertilizer.



According to data collected through questionnaire and the community meeting the following yields are obtained:

Table 3 Rice yield per Rai with and without the use of fertilizer.

Without fertilizer:	With Fertilizer:
5 farmers	6 farmers
113 – 480 kg/rai	256 – 900 kg/rai
Average: 254 kg/rai	Average: 588 kg/rai

The estimated rice yield per rai used by the BAAC for calculating loan sizes is 50 barrels of rice per rai for both upland and lowland rice. With an estimated 16 kg/barrel the estimated yield is 800 kg/rai

Since all rice production is for own consumption, it is crucial for each family to insure that the rice output for each year is enough to feed the family until next years harvest. Increasing the annual rice yield per rai not only insures the welfare of the family but can also free up land for growing cash crops.

Rice consumption:

Rice yields are measured with the shell still on the grain and it is usually stored this way to reduce loss due to mice and fungi. The resulting shelled rice is 60-69% of the original weight. A Family of 2 adults + baby consume 32 kg of shelled rice per month. The price is 170 Bht/barrel, 16 kg/barrel. Basic information identifies population size to 780 persons and 207 families. According to this the average family size is 3.77 people. To make a conservative estimate each family member can be counted as an adult, with an adult's annual consumption of rice. Annual rice consumption per adult is 192 kg of shelled rice. The rice yield (with shell) needed per adult is 295 kg of harvested rice. A family of 4 needs an annual rice harvest of total 1180 kg/year. By BAAC calculations the required land size for such a yield is 1180kg/800kg = 1.5 rai. However, since most farmers report lower rice yields per rai this land size will not produce sufficient rice for subsistence. The rice plot sizes we have identified per household are usually 2-8 rai with an average around 4 rai.

There can be several reasons for this discrepancy between yield estimates from the BAAC and reported yields. For one, the BAAC yield estimates can be calculations that would hold true for more intensified rice production in the lowland fields of Central Thailand. However, the BAAC also estimates the yield per rai of upland rice to be 800 kg. Another explanation could be that the lower yields are a result of soil depletion. Since we unfortunately lack natural scientific results regarding soil fertility, this is a hypothesis we cannot test. Information given by one of our key informants, the village head man, might however give an indication of why the farmers achieve lower yields than expected. Credit from the BAAC is strictly for agricultural input. The condition for obtaining a loan is that it is used solely for farming purposes. However, the head man explained how it was a common practice to get a BAAC loan, use half the money for agricultural input and then use the rest of the money for household expenses and purchases. This could explain the low yields. If only a proportion of the loan is actually used on seeds, fertilizers and other input, then the achieved yield will also only be a proportion of what it could be. This could indicate that farmers do not need to optimize the rice yield by intensive production in order to support their families and can instead depend on other sources of income for their livelihood. However, getting lower yields from cash crops than calculated could result in inability to repay the loan, which could gradually sink the farmer into unrecoverable debt.

In fact many farmers were apparently experiencing problems with repayment of loans. Average BAAC loan size was 30,000 Baht in Ban Wang Tao. At a village meeting between BAAC officials and local BAAC members, that we attended, some farmers wanted to know about the possibilities for freezing the repayment of their loans for a period. A BAAC official we interviewed a few days before explained about a recently implemented scheme where the government would pay all

interests on existing loans below 100,000 Baht for 3 years. When asked about whether this was motivated by increasing inability of farmers to repay loans, he indicated that this was only partly the case. Another, perhaps more important reason for the implementation of the scheme was the fact that the bill had been proposed in an election year and was intended to attract rural voters.

Middleman/Market Access

Most cash crops are sold collectively to the middle man, who is a local villager, in fact the head man's brother. Collective bargaining assures the best price. For crops such as maize and soy bean the middleman supplies the seeds for free; in return the farmers are required to sell to only him. The relative short distance to Nan does make it possible to sell your own crops directly at the market. This might will give you a better price per unit, but considering the transport cost and the time spent on selling on your own, this is probably not more profitable than selling to the middle man. Head man said in an interview that this was mostly done by farmers who needed the cash right away.

Conclusion:

An this last part we will attempt to answer our problem formulation; "How does the proximity to Nan City affect the livelihood strategies and land use in Ban Wang Tao".

Having been chosen as the location for the silk worm factory, the village has as a result experienced a change in land use. The farmers now growing mulberry leaves are kind of a testing group, and once more farmers switch to growing mulberry the impact will be greater. Mulberry bushes, usually planted in fields formerly used for maize, require little fertilizer and no pesticides are used because it would leave them inedible to the silk worms. This constitutes a significant difference to the production of other cash crops, which is usually very chemical intensive. This land use change can however not be linked directly to Ban Wang Tao's proximity to Nan since it is far more determined by the proximity to the silk worm factory. We did, on the other hand, find data, indicating that the access to intellectual agricultural input was high. Many officials offered their expertise to the villagers through presentations at community meetings or through various interest groups within the village.
Studying the land use in the village, we discovered that the community forest was a football field and that remaining forest was far from the village. Additionally, areas which by RFD classifications were supposed to be fruit orchards and plantation turned out to be utilized for rice and short-term cash crops, primarily soy beans and maize. One reason for the lack of forest can be found in the fact that the population of the village apparently is increasing constantly. New houses are being erected

in the village. This can be expected of creating pressure on the limited forest. Agricultural land is primarily transferred through inheritance.

Having access to jobs outside of agriculture, presents the households with increasing choices of livelihood strategies. In cases where a family can only support themselves through farming, the options of the family are limited by the input at their disposal, e.g. field size. With the access to wage-income, these limitations are less restricting on the household and the individual. Getting income from other than just running the family farm, might be the reason why most of the farmers in Ban Wang Tao depend only a little on the collection of NTFP. Making long-term investments in fruit trees is an option only available to those holding a title deed or at least a certificate to their land. Obtaining certificates or certificate upgrades to title deeds are factors not actually affected by the proximity to Nan but rather by the location of the villages in regard to watershed classifications. As it happens, being located in the bottom of the watershed, Ban Wang Tao is subject to less stringent RFD regulations.

Considering the question about the proximity to Nan City we have found that this does play a minor factor in relation to the livelihood strategies and the land use in Ban Wang Tao. The proximity to a big town is however an issue that cannot be left out of a complex discussion concerning a complex society.

Appendix 1

10th Oct - Informal interview with headman of the village, Village walk

11th Oct - Village Walk, preparing the community meeting

12th Oct - Community meeting

13th Oct - Make questionnaire

14th Oct - Informal interview with headman. Field walks, in the morning to a rice farm in the northeast and in the afternoon to a intercrop farm to the north. GPS-mapping and informal interviews. Soil samples, hand out questionnaires.

15th Oct -Collect questionnaires. Interview with the irrigation officer south of the village. GPS-mapping and soil samples. Interview with the manager of the Silk factory. Interview with BAAC. Soil samples and transect walk.

16th Oct - Preliminary Interviews, Interview Guide evaluation/modification

17th Oct - Midterm Evaluation

18th Oct - ***Day Off***

19th Oct - Visit location 5, to have something to compare with. Supervised interview.

20th Oct - Supervised interview, transect walk, Participatory mapping

21st Oct - Supervised interview, transect walk, interview with the Baptist reverent.

22nd Oct - Supervised interview, transect walk.

23rd Oct - Prepare debriefing, interview with BAAC manager.

24th Oct - Prepare debriefing.

25th Oct - Debriefing

Appendix 2

Table 1How many members are there in your family?

	1	2	3	4	5	6	7+	Average
Number	0	3	7	12	4	3	1	4,1
%	0	10%	23,3%	40%	13,3%	10%	3,3%	100%

Table 2 Are you an agriculturer?

Yes	No
23	7
76,7%	23,3%

Table 3 Gender

Male	Female	Total
17	13	30

Table 4 Land tenure?

Title deeds	NS3	SPK	STK	None	Others
0	4	11	0	16	2 (TB5)(Tax duty)

Table 5 How did you get your land?

Buy	Inheritance	Trade	No answer	Others
4	15	2	9	1

Table 6 Are you satisfied

Yes	No	No answer
7	19	4

Table 7 Do you collect NTFP

Yes	No
19	11

Table 8 Purpose of NTFP collection?

Selling	Own use/consumption	Both
0	14	5

Table 9 Type of NTFP?

Mushroom	Bamboo shoot	Hemp	Bamboo	Rattan	Wildlife	Vegetables
14	19	1	9	1	3	1

Table 10 Have the number of villagers increased?

Yes	No	No answer
24	4	2

Table 11 Transportation to the field

Walk	Bicycle	Motorcycle	Truck	Taxi	Other
8	1	15			

Table 12 Distance to field?

Average distance km	2,7 km
Closest to Ban Wang Tao	0,5 km
Furthest from Ban Wang Tao	6 km

Table 13 Have you ever used fertilizer?

Yes	No	No answer
9	10	4

Table 14 what type of fertilizer

Chemical fertilizer	Manure	Both	Bio compost	No question
3	3	1	1	15

Table 15 Type of pesticide

	Farmers	Price, bath/ kg
Insecticide:		
359	2	
Novaline	4	
Monochrodofors	2	
Ministry of agriculture	1	
Other	1	
Herbicide:		
Grammox zone	10	
Fugo/Filgo/Fengo	3	
Touch down	2	
Fungicide	0	
No answer	2	

Table 16 Frequency of fertilizer application

Frequency	1	2-3	4+
Farmers	5	7	0

Table 17 Groups in the village

Name of group	Activity	Benefit
Community coop/ grocery shop	Shareholding/ joint selling and buying.	Access to crop benefit
Thaworn foundation (monks)	Seminar on agriculture and fertilizer use	Get one cow free
3 Silkworm		Better prize
3 Soy bean	Sale of product at reasonable prize	Better prize
2 Weaving	Making bamboo strips, embroidery.	Better prize
2 Patchwork	Producing patchwork for sale in another province.	Marketing
Ha Wong (monks)	Training in agriculture recently about passion fruit.	Unity
Savings fund	Low interest loans	Welfare from fund
Housewife group	Making sweets	income
Rice group	Sale of product at reasonable prize	
Cotton group	Sale of product at reasonable prize	
Women group (Go khro ko yo)		
2 BAAC group	Borrow money	Loan, funeral insurance
Coop		
Funeral group		

Table 18 Do you have any additional income?

Yes	No
17	13
56,7%	43,3%

Appendix 3

Appendix 4