UNIVERSITY OF COPENHAGEN

INTERDISCIPLINARY LAND USE AND
NATURAL RESOURCE MANAGEMENT

The variation of livelihoods in Kampung Bayur in relation to migration and off-farm employment

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Date of submission: April 8th, 2016

Number of words: 6.918

Abstract

Different social and natural science methods have been applied in order to answer the problem formulation. Through a questionnaire survey and a focus group general trends in the access to and the usage of the land have been determined to assess the livelihoods of the people in Kampung Bayur. The condition of the soils in and around the village is not good. Although this state requires more data the 19 soil samples show a clear indication of why the usage of fertilizers is abundant. The ongoing fertilization on the fields for agriculture might have an effect on the soil conditions.

The availability of land resources affects the opportunities for future generations to engage in agricultural practices within the village. Through semi-structured interview it is clear that the question of inheritance of the land play a central part of the migration patterns seen in Bayur. This lack of possibilities combined with government policies of raising the education level of the nation changes the mindset of the rural population. Historical time-lines from the gender groups and the headman show significant technological advances in the recent decades. This had contributed to the well-being of the residents but also brought forth a vision of having a stable and good income from an urban job. The migration and off-farm employment patterns are often crucial for the rural residents as they benefit from remittances from the relatives with an off-farm life. This gives the households more opportunity as many household are farming for subsistence, a wider range of navigation in livelihood strategy and might even create a divide between those household who receive little or no remittances changing the social interactions in the village.

Acknowledgements

First of all I would like to thank Headman KK Solomon Achu Ak Sarin for being so generous, kind and helpful during our stay in Kampung Bayur. I would also like to thank the people of Bayur for helping us with gathering data and applied our methods.

The lecturers of both University of Malaysia Sarawak (UNIMAS) and University of Copenhagen (KU) have made a fantastic course in an amazing setting. The time they spent preparing before, under and after the course is greatly appreciated to make the course work as smooth as it did.

Thankful thought are also send towards the other Bayur group for taken care for as much of the data treatment after the return, although unfortunate events had to separate us the field work with according to plan and useful data was gathered for the project to be written.

Table of content

List of figures

List of tables

1. Introduction

The transformation of Malaysia from a developing to a developed country involves a lot of changes. The economy of Malaysia has grown steadily as in many other South-East Asian countries which have contributed to a rise of the average wealth standards in the country and Borneo (Drabble, 2004). Rural-urban linkages have high priorities from the government (EPU, 2010) bring along changes in socio-economic as well as natural science aspects such as land-use changes (Mertz et al., 2005). A way to understand and examine these changes for the individual or a small community is to use an interdisciplinary study combining both natural and social science methods. Natural sciences give an instrumental and calculated insight into the natural conditions surrounding the problem, and the social sciences help the researcher investigate how people deal with the settings they are subject to and why they think and act in this certain setting as they do (Kalof et al., 2008).

This paper is introduced with a literature review which evaluates important social and natural changes that has occurred in Malaysia in the recent decades. The literature review highlights specific scientific aspects used for narrowing down on an interesting subject and identifying a knowledge gap in the literature. This knowledge gap is base to create a problem formulation and related research questions. Then, the first encounter with the village is explained and how this encounter has an effect on the methodology and usage of the methods. How the methods are used is briefly explained as well as important alterations in the usage of the methods from the classic method theory. The results from each method are then presented and the main points highlighted. Finally, the discussion will use all the previous sections to elaborate and connect all the main points into a conclusion of the problem formulation.

1.1 Literature review

The transformation of the landscape in both Western (Peninsular) and Eastern (Borneo) Malaysia is substantial and affects the environment as well as the people living in the areas that have been subjected to change (Hansen, 2005 & Ichikawa, 2007). Due to the stable warm and wet conditions dominating the Earth's equator in Asia, the countries on this imaginary line is optimal for planting oil palms. There has been an increase in the demand for palm oil during the last two centuries, and the countries able to plant this resource have taken advantage of this demand (Lecture – Land use changes in the Tropics). Brady and Weil (2010) classify the Sarawak soil as ultisols meaning that

the soils are often acidic and low in plant nutrients. They are highly weathered and with the recent trends of converting forest into agricultural land this process is strengthened.

According to IMO (2005), migration can be a result of poverty since poor individuals have no opportunities available for sustaining themselves and they must seek a life elsewhere for a chance of survival. The “Brain drain” is an expression for losing the educated population from areas. This is especially hurtful in poor areas as the lack of opportunities for an educated population will push them towards places where the possibilities are abundant. A younger generation has the potential of being this educated group and will most likely move away from the rural areas to find education. Returning to the areas they left is often not likely to occur as there is too little to return to (IMO, 2005).

Remittances also play a huge part in the rural-urban migration patterns and in the economic survival of the people living in these rural areas. The children or close relatives who migrate tend to send money to those who helped them move away from the rural areas. But as this transfer happens informally and money usually being a sensitive subject, it is difficult to estimate the size and, thus, the importance of remittances (IMO, 2005).

Adat is a local Dayak word for the rights of the people over their lands and the usage of this land (Colchester et al., 2007). The specific definition of adat and meaning behind this saying is difficult to translate into a modern context. According to Colchester et al. (2007), the government has tried to tighten and limit the definition of adat into Native Customary Rights (NCR) in the last century. A piece of land with this term attached gives the government the power to decide the compensation of the owners if the land is to be used for government facilitated projects. The confusion, regarding which title the specific farmer has, becomes even greater when the government does not publish the title of the land.

Before entering the village, the only information regarding Kampung Bayur was found in the description of the village from University of Malaysia Sarawak (UNIMAS) (ILUNRM, 2016). The village was described as recently founded in 1948 and consisting of 85 households. The community group is Iban Remun and their livelihoods depend on subsistence farming which includes cultivation of rice, both swamp and hill production, pepper, rubber and a few households that are engaged in oil palm plantations. The households of the village found ways of living through subsistence rice planting, cash crop production and off-farm employment in other farming

areas or in urban areas. Land right issues and technological advances such as electricity, water supply and paved roads have contributed to a rural-urban migration and a larger amount of the villagers in Bayur finding off-farm employment (ILUNRM, 2016).

Literature states that there are different angles in understanding the processes behind these social aspects e.g. migration, land rights, and how these affect the population of a specific country. What is not examined are the effects of these aspects on a more local level and how it affects a smaller community such as Kampung Bayur, Sarawak in the setting described above. Therefore, it is interesting to examine if a holistic approach to these processes through social and natural methods can be used to conclude what effect these trends have on the local level. This paper's problem formulation takes the pre-mentioned factors into account and looks as follow.

2. Problem statement and research questions

The aim is to investigate the livelihoods of the villagers in Kampung Bayur through examining access to and usage of land, as well as the current condition of the land. Furthermore, it will be evaluated which socio-economic factors contribute to migration and off-farm employment, and how these factors influence the social interaction between people in Kampung Bayur.

The problem formulation will be examined in this paper through research questions and furthermore important sub-questions, which can be found in Appendix 9.1. There are three research questions for this specific problem formulation:

Research question 1: What are the key factors and main activities contributing to the livelihoods of the people in Kampung Bayur?

Research question 2: How do the land use practices affect the land conditions and what is the current status of the land?

Research question 3: Which socio-economic factors dominate the migration and off-farm employment, and what effects do these have on the social interaction between people in Kampung Bayur?

3. First impressions of the village

Figure 1: A satellite image from Google earth of Kampung Bayur, Sarawak, Malaysia in 2015 as the 2016 satellite image is blocked by clouded.

We entered the village around 10-11 am on a Tuesday. After greeting ten to twelve different men, six to seven women introduced themselves. The women seemed more open, chatty and friendly than the men. When all the people of the welcoming ceremony were seated, the headman held a speech where he explained that the lack of people at the ceremony was due to the fact that we were in the middle of the harvesting season and most of the villagers were out in the fields harvesting rice. This notion was not further thought through at the time as lunch was being served quickly after the speech. After eating lunch we introduced ourselves to the people attending the ceremony in English, which then would be translated by one of the two interpreters that was with us. The students from UNIMAS then presented themselves in Iban as they spoke the tongue of the village.

The headman's English abilities were quite good and the introductory conversation was conducted in English the whole time. Shortly after, we were given a tour around the house and shown our sleeping quarters. Later that day, five students and two interpreters went on a house visit to one of the people attending the welcoming ceremony. We were offered coconut water, bananas and a bottle of rice wine. We had a nice and insightful conversation about the village with the woman who was the head of the household.

The introduction to the culture and the rationale of the people living in Bayur had an impact on the methodology, how it would be used and also the angle to the project. Time turned out to be an important factor due to harvesting session and since the villagers, especially the women, were very friendly and willing to speak to us and getting around to enough people for the required data could, thus, be an issue. The men of the village were harder to reach as they were shy and only became very friendly when alcohol was involved. This would in turn affect the actual product of the interview if they were in this state.

4. Methodology

An interdisciplinary angle is required to be able to answer the problem formulation. A combination of both social and natural science methods is optimal for going into depth with the specific research area. This section explains how the methods were used in field to find relevant data to cover the knowledge gap formed by the literature review and background information.

4.1 Collaboration with counterpart

Communication between the Danish students and the students from UNIMAS before meeting and forming one group in Malaysia helped formulate an overall purpose of the study. The overall purpose of the research was identical but there was some direction issues on how to get there contributing to a discussion of one final problem. As we entered the village, the problem formulation and research questions was still not completely sorted out. Getting an overview of the village, having informal conversations with villagers and the headman assisted the process of finding a combined problem formulation for both groups.

4.2 Conducting the questionnaire survey

To generate quantifiable data, we used questionnaire style interviews. This mixed method was practiced due to circumstances experienced in the village. According to Babbie et al. (2002), a questionnaire can be administrated through face-to-face interviews. After a few days of observation and informal conservations with people of Kampung Bayur, the conclusion was that the main part of the villagers was not able to read and/or write. A face-to-face administration of the questionnaire was, therefore, preferable to self-administration in order to generate valid data. These short interviews would also be used to locate key informants for longer semi-structured interviews (SSI) with more in-depth questions. The questionnaire style data would be gathered by 2-3 students and an interpreter. The interpreter knew the purpose of the short interview and power

relation between interviewer and interpreter was sometimes a problem. The questionnaire survey consisted of questions regarding household structure e.g. family members, ages and working activities as well as farming activities, land rights and housing situations (Appendix 9.1.1.1).

4.3 Semi-structured interviews

For almost any research there is a budget constraint and it is, therefore, important that no excessive time is spent on unnecessary interviewees. In our specific case, key-informants were needed which required a purposeful sampling (Neergaard & Ulhøi, 2007). These key-informants were selected based on as mentioned in section 4.2. The interviewees were asked if they were willing to participate in a longer interview another day and, if they agreed, a time, often during the evening, was set and two interviewers and an interpreter would return at the appointed time. The purpose of the SSI was to uncover opinions and reflections on important topics in order to answer the problem formulation such as; life in the community of Bayur, economic and social conditions, legal matters regarding land and land conditions as well as farming and off-farm employment.

An interview guide for obtaining the right data from the villagers was developed during the stay in the village. The questions were tested for their usefulness in obtaining the right data and some of the questions were taken out due to misunderstandings by the interviewee. The guide was made ready for navigating through questions that had already been asked and open questions leading to unexpected subjects (Appendix 9.1.3.1)

4.4 Participatory rural appraisal

Participatory rural appraisal (PRA) is a term for a set of methods used for estimating or judging the nature or value of something or someone (Mikkelsen, 2005). It is participatory as the researcher engages in the study which usually takes place in a rural setting. The different methods involved with PRA require different amounts of preparation from basically no preparation to trial and error tests (Mikkelsen, 2005).

4.4.1 Alternative transect walks

When visiting an unknown place, you easily get lost and lose the sense of direction, and a method to overcome this obstacle is using transect walks (Mikkelsen, 2005). The first two days of our stay at Kampung Bayur three transect walks were conducted to get an overview of the house, the villagers, the farming areas and general areas of interests. Using the headman and his insight of the village for the transect walks was very useful as he could show places that was interesting for

the research. The transect walk was not used in the normal theoretical sense as it held no greater value to do so but still GPS-tracked (Appendix 9.1.5)

4.4.2 Community mapping

The headman had invited his aunt and a family from the village to his house for us to talk with. We decided to take advantage of this and make a community map with them to get a personal overview on the village. The headman was the one controlling the pen and the villagers visiting the house were contributing with ideas on how to draw the map. We put in the main roads in the village and the main road going from Serian to Balai Ringin to give a scale to the participants. This could be difficult for the participants to understand and the outcome could be affected by the lack of understanding a map viewed from above. It was explained that the starting point e.g. the road was made from a satellite image and that they should draw farming areas as well as the most important structures of the village.

4.4.3 Participant observation

As part of a participant observation method we went rice picking with the headman's family. This was interesting and gave a good insight into the amount of time spent in the field picking rice for subsistence. We helped the headman's wife and daughter-in-law pick hill rice on a small plot of land 15 minutes' walk from their house.

4.4.4 Focus groups – preference matrix and historical time-line

The participants' self-assessment of crop, goods or everyday items is a good indication of the value a specific object holds. Matrix ranking uses comparison of objects as an indication of the people's criteria (Mikkelsen, 2005). To make the progress of ranking and the discussions of the crops easier for the participants to focus on, a table with the known crops and livestock of the village was put on A1-paper horizontally and different criteria put vertically so each crop could be assessed at the same time based on one criterion. A piece of paper was covering the rest of the criteria until the discussion of the first criterion was over.

Crop Criteria	Padi Paya	Padi Bukit	Pepper	Rubber	Oil Palm	Fruit trees	Fish pond	Animal farming	Vegetables	Wild vegetables
Importance										
Subsistence										
Income (cash crop)										
Low labor Requirement										
Ease of cultivation										
Fertilizer										
Pesticide										

Table 1: A ranking matrix used in the focus group the 10th of March. The crops are to be assessed by different criteria.

During the short interviews the villagers where asked if they wanted to participate in a focus group where they would assess the importance of their crops. On the evening the 10th of March, eleven women and five men, thus, discussed different aspects of their available crops. Each participant had a stone which could be used to evaluate the crops – the more stones the greater value the crop had for the criterion. The groups were told to agree on the value the specific criterion had for the specific crop.

The focus group was also used to form a historical time-line where the most important events would be assessed by the participants of the focus groups. The headman had already made his own time-line on the introductory days and was not involved in these historical time-lines. The aim was to see the difference from the villager's point of view on the most important events. The starting point of the time-line on an A1-paper was in 1948 where the village had been settled in what is now called Kampung Bayur and the end of the time-line was in 2016.

4.5 Soil sampling

As part of evaluating the natural conditions surrounding the livelihoods and what effect the soil conditions might have on the livelihoods in the village, soil sampling was conducted. Three different sites with three different crops i.e. rice field, oil palm and uncultivated land would be examined and its soil taken back to Denmark for laboratory testing. During a SSI with one particular farmer, he mentioned that his soil was getting worse and asked if we wanted to do soil sampling on his land. Following our problem formulation, this notion had our attention and we added one location to our soil sampling summing up to four locations.

The data gathered from the social and natural methods can now be processed and the relevant results made presentable for explaining the problem formulation. The data gathering is subject to

the bias as the researchers gathered data for the project in smaller groups and the process could have been different from group to group. The usage of the methods as described in the previous section and the consequences of these will be discussed after the results are presented.

5. Results

In the following sections the most relevant data is presented and the general findings are briefly commented. An Iban custom is revealed as a result of using social methods, the quantifiable data is presented as diagrams and graph, the qualitative data's main points has been structured and the main results from the soil sample analyses has calculated to average values and put into a table.

5.1 The Iban people of Bayur

The Iban people of Bayur were generally very friendly and didn't turn down a short conversation or small talk when passed by in the village. These short conversations would often turn into a questionnaire and time was saved through random sampling for the questionnaire. Not all the questionnaires were obtained this way, house visits were the most common method for obtaining data for the survey. The house visits also served as a more comfortable setting for interviewees, a known place which would relax the mood and loosen the tension. A custom of the Iban or even the Malay people was revealed during these house visits. Hot or cold refreshments were served more often than not during these visits and could be coffee, fruit syrup and water or milo.

5.2 Questionnaire data

A total of 48 households were participating in a short interview leading to questionnaire style data (Appendix 9.1.2). This data were put into Microsoft Excel and made presentable for figures in form of diagrams. The sample size is always 48 e.g. the 48 household that was interviewed. The diagrams and GPS tracking images are made by Sofie Terp Clausen of Bayur group 1.

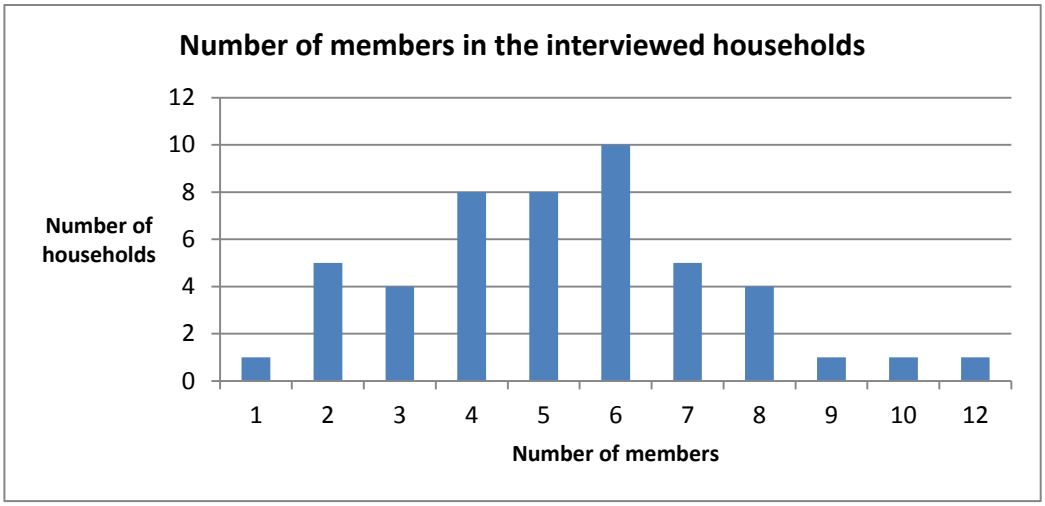

Figure 2: The number of members in each interviewed households and the number interviewed households

Figure 2 shows the number of household members and how many households that consist of a certain amount of people. The data revealed that the average interviewed household in Bayur consists of 5.3 household members.

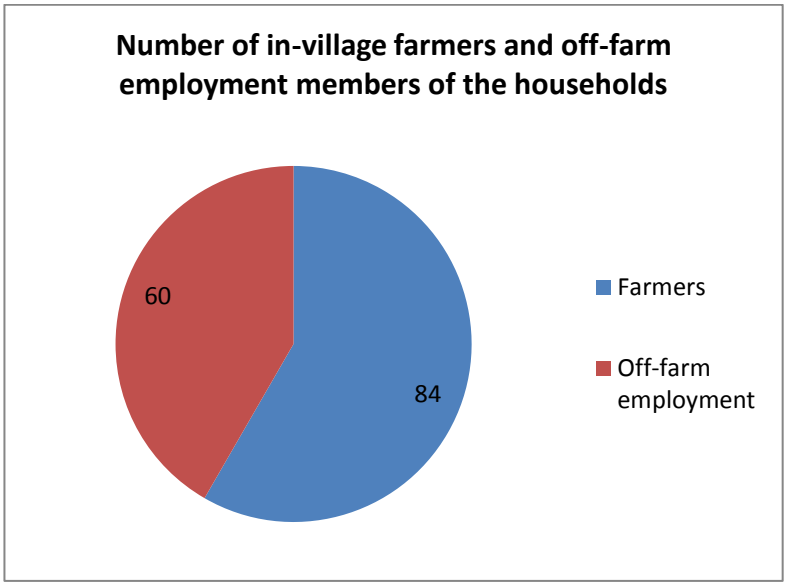

Figure 3: Number of in-village farmers and off-farm employment members of the households from the questionnaire survey

The number of farmers and off-farm employment members of the household is almost equally distributed throughout the village (Figure 3). What this figure does not show is if the individual household only consists of off-farm employment members, only farmers or both.

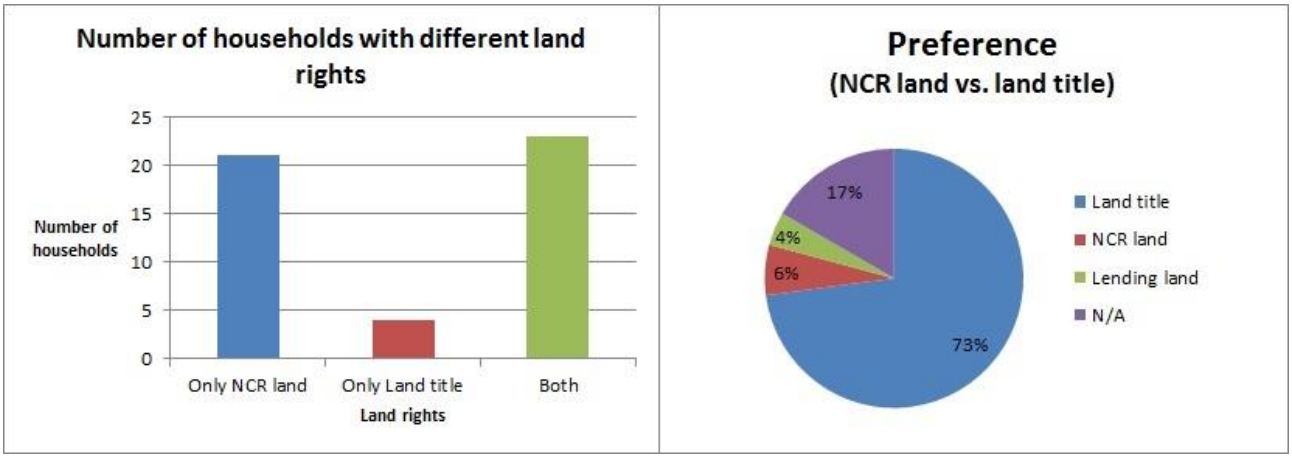

Figure 4: The land rights of the interviewed households (left) and the preferred land rights (right)

Figure 4 (left) shows the number of villagers having different rights over their lands. Out of these households and their current land rights, the preference for land rights is shown in Figure 4 (right). Most of the interviewed households in Bayur prefer land title.

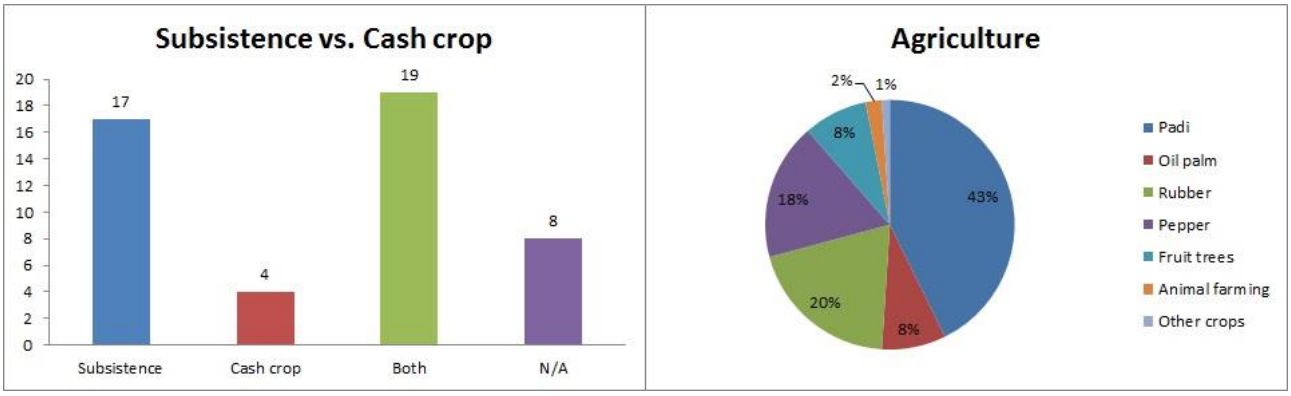

Figure 5: The number of households producing crops for subsistence, cash or both (left) and the diversity of agricultural practices in the households (right)

Figure 5 shows the outcome of the farming practices of the interviewed people of Bayur. The most likely outcome of the farming practices is either subsistence farming or both subsistence farming and cash crop production. The agricultural diversification is shown in the figure to the right; padi, rubber or pepper is farmed by approximately 80 % of the interviewed farmers.

5.3 Semi structured interview

The SSI guide consisted of several main topics corresponding to the problem formulation for specific questions would be posed to the interviewee (Appendix 9.1.3.1). This interview guide is a result of a test-interview consisting of more questions and carried out by too many people. This test-interview gave a clear indication of the maximum amount of persons needed to be present and

a shortening of the questions asked. However, although it was a test-interview, the interview gave some good answers regarding the problem formulation, which could be merged with the data from the interviews. On the basis of all the SSIs some interesting and useful topics are highlighted in the following sections (Appendix 9.1.4).

The community of Bayur has changed a lot in the last couple of decades. The village is much nicer to live in now than before due to new utilities such as water, electricity and paved roads. The community spirit has also changed since they lived in longhouses, food is not shared as before and individual choices of food and production give the farmers a greater diversity of farming. There is not a total agreement whether living in longhouse is preferable to living in individual houses; the villagers have benefits and disadvantages of both housing situations. The same disagreement goes for security; some see the individual house as safer than the longhouse whilst others do not.

Economic conditions of the villagers were deemed as a sensitive subject and the data regarding this subject is vague and, thus, needed some interpretation. This interpretation will be subject to biases as the questions posed were expected to generate data for explaining the research questions. There was no intention to ask directly if the villagers received remittances from off-farm relatives. The structure of the questions revealed that relatives helped by buying stuff or bringing money for their relatives in the village. If a member of the household living in the village had an off-farm employment, this income would most be used on food, education, bills, fertilizers and savings. Some of the elderly participators mentioned that they received a government-funded pension but it was unclear if all the elders would receive this. Having relatives living in the urban areas or household members with an off-farm employment had an impact on the choices regarding lifestyle that the household would take.

Land rights and inheritance turned out to have a much greater impact on the land use practices and social life in the village than expected. The family tree grows and the more children and grandchildren the villagers get, the smaller each land plot gets that is passed on. The land needed to sustain this many families is not available and the children and grandchildren might not have the necessary requirements for continuing in the village. Closely related to inheritance is the mindset of the younger generation who will take over the land from their parents. The older generation does not believe that the new generation will get the same experience and knowledge of farming practices when they go to school as much as they do. There is also a social acceptance that an off-farm employment without agricultural labor equals a better life. There are possibilities

for a higher education which a lot of the villagers never had a chance to get and a stable job with a good salary.

5.4 Participatory rural appraisal

The PRA methods were conducted as described in the relevant literature (Mikkelsen, 2005). As no one in the group had any experience with PRA methods in a foreign setting, the process of conducting the different methods was closely related to the literature. The PRA methods also had a significantly smaller role than what was anticipated by the Danish students before leaving for Malaysia. Most of the data that was collected through e.g. transect walks, participant observation or community mapping was used as insights and settings for other methods such as soil sampling and SSIs. The focus group with the historical time-line and the preference matrix, however, generated important data for the problem formulation itself.

5.4.1 Preference matrices

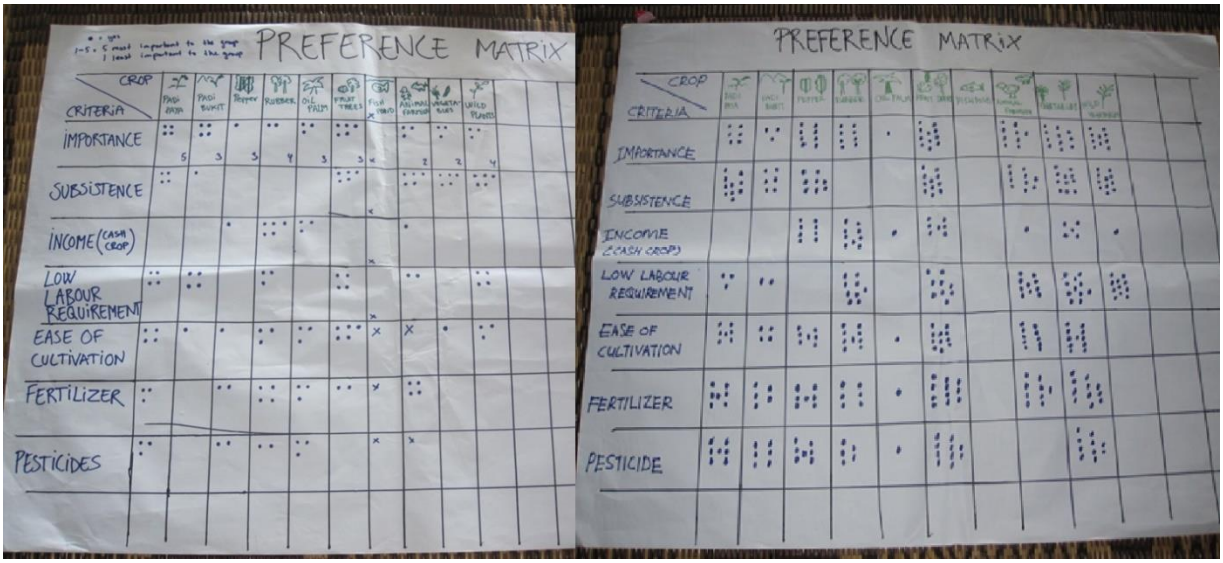

Figure 6: The result of the focus groups' discussion of different crops assessed by specific criteria. The male group's matrix is located on the left and the female group's matrix is on the right

The preference matrices from the focus groups are shown in Figure 6. The male group’s matrix is located on the left (five participants) and the female group’s matrix is located on the right (11 participants). The “crop” fish pond was not used as none of the participants was using fish ponds in their farming practices. Actual agricultural products such as rice, pepper, rubber and fruit trees score highest in both matrices.

5.4.2 Historical time-line

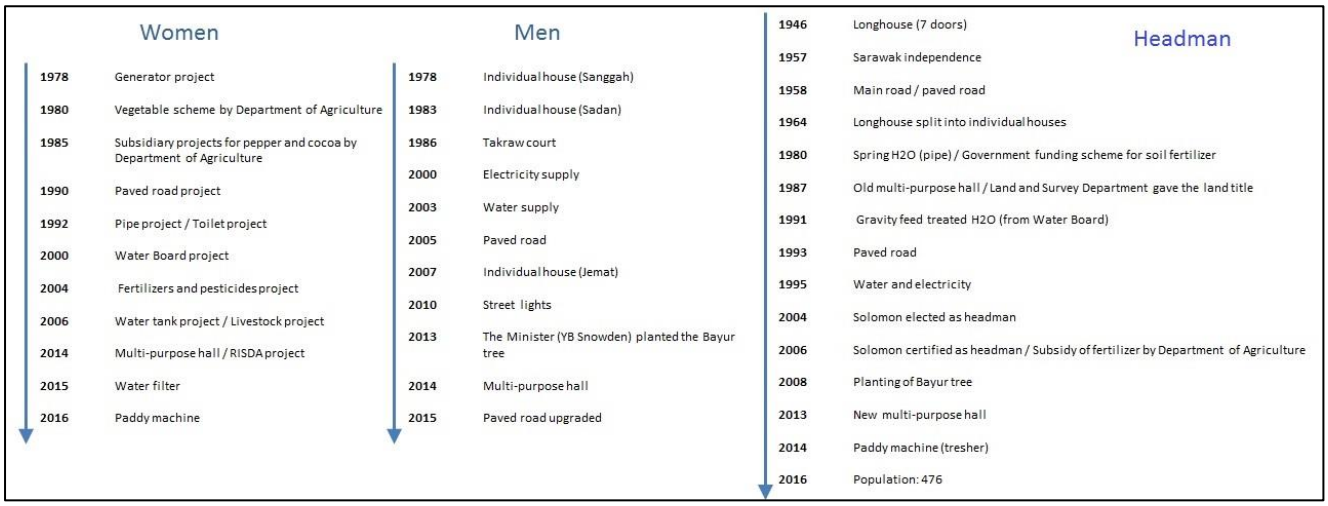

Figure 7: Comparison of the focus groups' and the headman's historical time-lines

The historical timeline shows the interests of the different groups (Figure 7). It is noticeable that all groups have the technological advances and utilities such as water, electricity and paved road. This aspect might be a product of or be influenced by the processes described in the literature review (Section 1.2).

5.4.3 Alternative transect walks

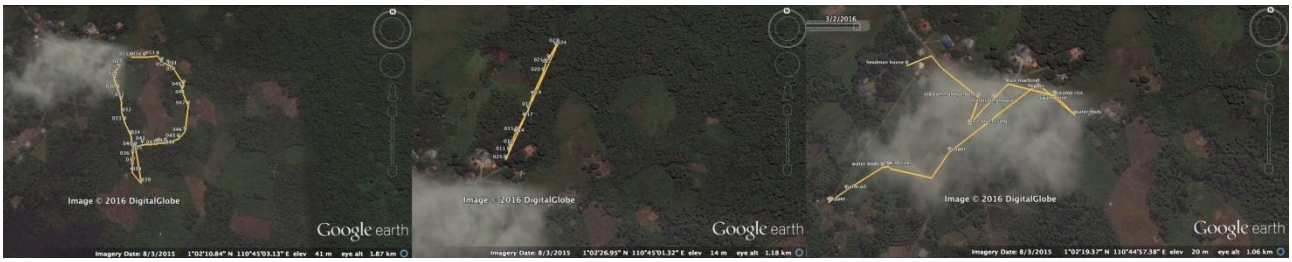

Figure 8: GPS tracking of the transect walks in Kampung Bayur. Made by Sofie Terp Clausen

The transect walks were expected to have a greater impact on the study but as the transect walks took place it was realized that they would be more useful for generating an overview of the village, the structure of houses and farming areas that could be used for soil analyses (Figure 8).

5.4.4 Participant observation

Helping the headman's family with picking rice gave a valuable insight into the labor-intensive work that the farmers have to put into growing rice. And this was only the act of picking rice, the rice processing would come afterwards which would add more time spent on growing rice. These

findings will be taken into consideration when assessing the possibilities of off-farm employment and migration.

5.5 Soil samples

Figure 9: the geographical placement of where the soil sample took place.

One of the locations was in a swamp rice field which was under a lot of water at the time. This condition of the field forced us to use the auger instead of digging a hole to take samples from. The uncultivated area that was appointed to us by the headman was very small, only a few square meters and options for good soil sampling locations were difficult. It was, therefore, determined that only two locations would provide the soil samples, giving the area of the uncultivated land.

Site	Profile	Replicate	Crop	Soil Bulk Density (g/cm3)	N %	C %	MnoxC (mg/kg)	Average
1	-	R1	Wet padi	0,16	0,75	11,42	1440	4,9
2	P1	R1	Oil palm	0,14	0,14	1,83	252	5,0
2	P2	R1	Oil palm	0,13	0,07	0,61	36	4,1
3	P1	R1	Uncultivated	0,08	0,21	5,87	756	4,2
3	P2	R1	Uncultivated	0,12	0,08	0,98	-108	4,9
4	P1	R1	Pepper	0,11	0,21	3,36	312	4,6
4	P2	R1	Pepper	0,10	0,10	1,28	312	4,5

Table 2: The average values from the 19 sites are calculated and the amount of carbon oxidized in the solution, pH values, the C% and the N% is shown of the sample plots in the different profiles. The measurement of the oxidized carbon and pH-values is done at the University of Copenhagen Department of Plant and Environmental Science.

It is noticeable that the top layer of the wet padi and the uncultivated land has the highest C/N ratio indicating that the highest amount of carbon is at the top layer. The organic material embedded in a rice field is much larger than between the stocks in the pepper field where the sample was taken. Composition of organic material happens very slowly in wet areas (Brady & Weil, 2010). The amount of plants found in the uncultivated land contributes to high amount of carbon in the top layer. The bulk density is lowest in the uncultivated plot, this could be a results of compaction not happening here as much as the other sites. The organic material in the top layer is not subject to people or machinery pressuring from above (Appendix 9.1.6).

The results are always biased and heavily influenced by the process they are subject to in order to become refined data. The process of producing results is not done solemnly by me and details of the processes can be lost. Discussions on the methods, data gathering technics and the products of these can now be discussed.

6. Discussion

For the project to be valuable, it is important to use the methods correctly and knowing the benefits and disadvantages of each method being used. In the following sections it will be discussed if the process of obtaining valid data for answering the research questions has been correct and if the data is useful for answering the problem formulation.

6.1 Collaboration with counterparts

Merging the problem formulations of the two groups (Danish students and students from UNIMAS) was not as difficult as expected due to the purpose of the studies being almost identical. This was credited to communication between the two groups before meeting in Malaysia encouraged by the lecturers of the program. The students from UNIMAS were generally quiet during discussion and agreed on most points that were made during these discussions. It could be because they always agreed with the Danish students but their points of view on specific matters had to be dragged out through personal interaction e.g. asking their opinion in the discussion sessions. Another factor that played a large role in the data gathering process was the students from UNIMAS's ability to speak the local language. In questionnaire sessions with an unequal amount of Danish students and students from UNIMAS, the conversation between the interviewee and the students from UNIMAS would sometimes not be interpreted as it went too fast. There was no notes taken by the students from UNIMAS and this data was, therefore, lost.

6.2 Validity of the data

The validity of the data from the interviews can, among other aspects, be examined through the setting under which the sessions took place. The setting is important for the thought processes behind the participant's answers and if the person is feeling comfortable answering personal and sensitive questions (Gilham, 2000). Another aspect is the physical and mental state of the participant. There might be inconsistencies in the questionnaire data as some locals would start drinking early. This only involves a small portion of the population in Bayur and the physical state of the participants is not taken into consideration as most of the participants were excited to have visitors. The SSIs were mainly conducted in the interviewee's house at their preferred time of the day. An indication of interviewee being comfortable in this setting was that the participants usually did not ask what the questions would be used for. In a more public setting, the interviewee could be suspicious of people listening to the answers given and the data would be biased (Gilham, 2000). The answers to the questions from the questionnaire and SSIs came within the participants' own homes and are not viewed as biased through the setting.

6.3 Methods and data

The geographical position of the village close to the main road and not far from Balai Ringin can influence the work diversification of the people of Bayur and the rural-urban linkages (EPU, 2010). Figure 3 show how many of the people in Bayur work on their farms or have off-farm employment. Conclusions on factors dominating migration and off-farm employment based on proximity to the road are not particularly viable. Instead, tendencies in land rights situations, farming practices and land conditions are assessed through triangulation of the data gathered from the different methods used to generate a more liable conclusion.

According to Babbie et al. (2002), questionnaire data can be collected through different gathering processes. For this study, the method used was face-to-face interview due to certain circumstances in village as mentioned in Section 4.2. Using this interaction, a lot more data can be gathered e.g. through facial impression or body language when the participant is asked a question. The idea behind face-to-face interview is also to get an on-sight impression of the participant and the answers to the questions. A disadvantage of using the face-to-face interaction is the sequence of when the questions will be asked, how they are asked and when, since different interviewers have different ways of conducting an interview. Despite the inconsistency, the interviews seem to have obtained viable data for making statistical observations regarding number of family members, land

rights situation, working activities and farming practices in Bayur (Section 5). For a complete evaluation of the livelihoods of the people in Bayur all the houses needed to be interviewed. As time was a constraint, the results states that approximately 60% of the houses in Bayur were interviewed (Section 5.2). Not all the households in Bayur were interviewed and the assumptions regarding general tendencies in farming practices, income, land rights situations and land conditions is backed up by triangulation.

Figure 5 shows the agricultural activities of the interviewed households and the ratio of crops being used for subsistence or as cash crops. The short interview and the SSIs indicate that rice is primarily used as subsistence and rubber and pepper as cash crops. The recent trend in the world market rubber demand has halted the tapping of the trees and pepper is viewed as the optimal crop for generating income (Figure 6). The assumptions regarding land use practices are strengthen through the data from the preference matrices. Criteria such as importance, low labor requirement and ease of cultivation underline what practices dominate the agriculture in Bayur (Section 5.4.1). As the percentage show in Figure 6 only 20 % of the households have a pepper production. This could indicate that money does not only come from agricultural practices.

There was a language barrier for the Danish students due to the local language being unique and, thus, an interpreter had to be used. When a message is passed through an interpreter, it can lead to language mistakes and the specific point of the question may be lost in translation (Desai & Potter, 2006). There are both positive and negative aspects of this power position (Harrison, 2006). A positive side by using a local interpreter is the knowledge and local feel for sensible subjects that the interpreter has. The short interview had a very short introduction and little time for the interviewers and interviewee to establish trust. The sensitive subject of money or help through remittances was, therefore, rarely brought up. Instead, the longer SSIs were used to ask questions regarding this subject without asking about remittances directly (Appendix 9.1.3.1). Remittances from relatives seemed to have an important role for the recipients, in this case the farmers in Bayur, allowing them to buy food from nearby towns, buy extra fertilizers or repairs for the house (Section 5.3). The opportunities for those who receive remittances are greater and they do not depend on trading with other people in the village for getting the needed supplies. As described by IMO (2005), the amount of remittances is difficult to assess and the data could not answer this either. Using an anonymous questionnaire survey with categories with different amounts of money received by relatives would have been a way of measuring it. More data is also required to

confirm if remittances have an actual effect on the social interaction between the people of Bayur e.g. the effect on sharing and trading produce or commodities in the village.

Another sensitive subject that required a local interpreter's feel was land rights. The literature states that definition of land rights is elusive and the rights over one's land can, therefore, be a sensitive subject. As seen in Figure 4 most of the households in Bayur would prefer land titles over NCR land. The insecurity of government taking the NCR land as highlighted through some of the SSIs also increase the parents' mindset regarding a stable and secure income. Some of the questions in the SSI revolved around this subject (Appendix 9.1.3.1) and the interpreter could formulate the question in a sensible manner. Inheritance became a major subject as generation after generation inherited the same plot of land. This plot of land would be split between all siblings and afterwards their children. The tendency is closely connected to the description of migration patterns by IMO (2005) where a potential migrant cannot stay and does not return because there is too little to return to, in this case too little actual land to farm. The social aspects of the land practices and the land-uses seem to have great impact on the livelihoods of the people in Bayur and the natural conditions could potentially affect the livelihoods just as much.

As mentioned in a previous section, a farmer asked us to do soil analysis on his pepper field as he had a feeling that the soil was getting worse (Section 4.5). His statement combined with the data from the short interviews and SSIs regarding how valuable fertilizer was, was very interesting (Section 5.3). The headman accompanied three out of four soil sampling sessions and even participated in method by digging the hole. When the ring samples were collected his help became too extensive and even added a great source of error. If the ring was not completely packed he would take some soil luckily from the same layer and put into the ring. This was not frowned upon by the students from UNIMAS, so the soil was packed and sealed. This procedure can have affected the results of the analysis and, therefore, the usefulness of the samples. The analysis of the soil samples shows the farmer's pepper field's pH-values being lower compared to the other field sites (Table 2). Optimal conditions for farming usually revolve around a neutral pH-value i.e. as close to 6-7 as possible (Breuning-Madsen & Krogh, 2005). The pH-values show the need for fertilizers as this specific soil is on the acidic side of the scale as the literature also states (Brady & Weil, 2010). Conclusions on soil quality based of 2-3 samples from each plot are difficult easily subject to large errors. The soil in the plot can vary a lot and more soil samples from the same plot

as well as from different fields with the same crops would have generated a more reliable estimate of the soil quality and conditions.

As mentioned, the women in Bayur were usually the chattiest persons during short interviews or SSIs (Section 3), and for methods as the focus group a gender separation was chosen for everybody to be heard. Both groups mentioned utilities such as electricity, water and paved road indicating that these technological advances have played an important role in the history of the village. However, the male group focused on material advances such as a new Takraw field and the multi-purpose hall whereas the female group mentioned different development projects which was more likely to develop the community's health and living standards (Figure 7). As the male group consisted of mainly young people the utilities being recently implemented was dominating the time-line. The development Malaysia has experienced in the recent decades is accompanied by government policies and macro-level decision making such as education policies (MOE, 2013). An increase in migration or off-farm employment patterns especially amongst the younger generation is a result of more opportunities which was expected to increase due to a better infrastructure (EPU, 2005). Other macro-level decisions such as the school reform require Malaysian children to attend school till the age of 17. This affects the amount of hours spent on other things such as farming practices. This was indicated by in one of the SSIs were it was explained why the new generations will lack in farming experience and probably seek elsewhere for other types of jobs (Section 5.3).

The collaboration with the counterparts was disappointing as informal conservations and bonding was limited through internal grouping of the students from UNIMAS. In the discussion session their knowledge and opinions were difficult to come by. Nevertheless, the research was carried out and the methods applied to gather useful data for discussion and finally a conclusion on the problem formulation.

7. Conclusion

Through quantitative data general trends in the access to and the usage of the land have been determined to assess the livelihoods of the people in Kampung Bayur. Land is preferred to be owned through land title for the individual households as the security of having title land is greatly valued. However, many of the household have both NCR and title land on which they cultivate crops. Rice is primarily for subsistence whereas pepper and rubber are used as cash crop. The condition of the soils in and around the village is not good and the usage of fertilizers is abundant. The government supports the individual household with fertilizers to use for the rice and at times for pepper and rubber. The ongoing fertilization on the fields for agriculture might have an effect on the soil conditions. It requires a greater field study on the soil to conclude if this is true.

The availability of land resources affects the opportunities for future generations to engage in agricultural practices within the village. Inheritance of the land is split between siblings and the land becomes smaller each generation and migration can be the only option. The possibilities of education combined with government policies of raising the education level of the nation changes the mindset of the population. The younger generation is not confined to the village and agriculture practices are experience in the same way as the older generation did. The prospect of having a stable and good income from an urban job is viewed as having a better life where hard manual labor through agricultural practices is not the only choice for surviving. The rural residents benefit from remittances from relatives with an off-farm life. The households that receive remittances from the migrants have more opportunity and a wider range of navigation is terms of livelihood strategy. This fact might create a divide in the village between these households and those households who receive little or no remittances. They might be more willing to sharing and helping each other in order to get the needed produce or commodity, changing the social interactions in the village.

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9. Appendixes

9.1 Methods

Method applied	Number of methods
Questionnaire	46
SSI	7
Soil samples	19
Transcet walks	3
Focus groups	1
Community map	1
Participant obs.	1

Table 3: The number of methods applied in the field

Research question	Subquestion
Research question 1: What are the key factors and main activities contributing to the livelihoods of the people in Bayur?	**1.1 What is the current situation regarding land rights of the people in Bayur?**
	1.2 What agricultural activities dominate the village of Bayur?
	1.3 What are the current livelihood conditions of the people in the village that have off-farm employment?
	1.4 What are the differences in livelihood of people of migration-based work and in-village farming (using 'livelihood framework' method, based on examples from both groups)
	1.5 How many, if any, of the households have access to NCR lands?
	1.6 Are there any land right issues and can land right issues be overcome by having households with legal ownership over lands?
Research question 2: How do the land use practices affect the land conditions and what is the current status of the land?	**2.1 What are the reasons for choosing the specific crops that are planted on the people's farms**

	2.2 What are the soil conditions in the cultivated land and what are the optimal soil conditions for the current cultivated crops? (oil palm, rubber, pepper, swamp rice, hill rice)
	2.3 What are the soil conditions in uncultivated land and which crops could potentially be used to cultivate this land? (oil palm, rubber, pepper, swamp rice, hill rice)
	2.4 How does the fertilizers used have an impact on the soil condition?
Research question 3: Which socio-economic factors dominate the migration and off-farm employment, and what effects do these have on the social action between people?	**3.1 What are the reasons for choosing in-village farming?**
	3.2 How does a household benefit from having some members work off-farm and others with in-village farming?
	3.4 What role does remittances play for farmers?
	3.5 How does the off-farm employment affect the workforce available to farming practices?
	3.6 What is the difference in income depending on migration based work/in-village farming? (consumption patterns, savings etc.)
	3.7 What other social structural factors affect whether a land is cultivated or not?

Table 4: Research questions and importan subquestions

9.1.1 Quantitative data

As the village consisted of approximately 476 people a quantification of different variable was decided to help get an overview of the population sample. Restricting the time-consumption of this task a questionnaire was proposed to collect data of useful characteristics. A questionnaire consists

of a series of open-ended or close-ended questions which participants will answer, often anonymously. The outcome from the survey is easily quantifiable data to generate a statistical overview of the population's characteristics (Babbie et al., 2002).

Before writing questions and determining the size of the questionnaire it is important to define what the survey is used for. A small scale questionnaire might consist of a few short open or closed questions or a question table. The responses from the survey are easy to handle and categorize and data can quickly be evaluated. There are some drawbacks in using a small questionnaire. Short questions often generate short answers which lacks deeper interpretation value. If one wishes a wider interpretation scale a larger scale questionnaire is needed. This type of survey might help identify patterns and groups of different interests. With a lot of long and extensive questions both open and closed the data outcome will be immense and time consuming to analyze. Therefore the size of the questionnaire and the amounts of questions within the survey depends on the usage of the questionnaire (Babbie et al., 2002).

9.1.1.1 Questions for the questionnaire survey

Question 1	Family name/number
Question 2	Number of household members
Question 3	Number of close family members not living in Bayur
Question 4	Age of household members
Question 5	Number of farmers in household
Question 6	NCR Land
Question 7	Titled land
Question 8	Number of off-farm employments in the household
Question 9	Lived in a longhouse previously
Question 10	Prefers longhouse or individual
Question 11	Crops on the land
Question 12	Subsistence use or cash crop
Question 13	Does off-farm members still live in Bayor?
Question 14	Remittences
Question 15	Preference of NCR or title land

Table 5: Questions for questionnaire survey

9.1.2 Data from questionnaire survey

Family name/ number	Number of household members	Number of close family members not livin	Age of household members	Number of farmers in household	NCR Land	Titled land	Number of off-farm employments in the household	Lived in a longhouse previously	Prefers longhouse or individual	Crops on the land	Subsistence use or cash crop	Does off-farm members still live in Bayur?	Remittences	Preference of NCR or title land

		g in Bay ur												
47	7		75	previous	1	0	3	1	Long house	Fruittrees, paddi	Subsistence	Kuching	1	
52	7	2	58, 54, 2	2	1	0	1	1	Both	Hill paddi, swamp padddi	Subsistence	Kuching, Balai Ringin	0	Title
Suli	6		40,14,13,8,1	2	0	1	[1]	0		Hill paddi, pepper	Subsistence	Balai Ringin	0	
49	6	2	18, 25, 7, 7, 47, 50	2	1	1	2	1	Individual	Pepper, hill and swamp padi, oil palm, fruit trees	Both	no	0	NCR
56	6	0	15, 10, 8, 1	1	1	1	0	1	Long house	Hill and swamp padi, pepper, rubber	Both	no	0	Title
8	7	3	29, 31, 24, 1, 7	1	1	1	4	0	Individual	Pepper, rubber, swamp padi	Both	no		
2	5	3	46, 46	2	1	1	0	0	Individual	Pepper, rubber, swamp + hill padi, oil palm (big)	Subsistence	no		Title
51	4		30,25	1	1	1	1	0	Individual	Padi	Subsistence	yes		NCR
21	5		59, 48, 55	3	1	0	0	1	Individual	Maize, tapioca, padi	Subsistence	no	0	Title
27	6	0	31	1	1	0	2	1	Individual	Padi	Subsistence	no	0	
29	8		56	1	1	0	1	1	Individual				1	Title
88	5	1	48, 46	2	0	1	0	1	Both	Swamp padi, pepper	Both	no	0	Title

24	3	1		0	1	0	2	0				yes	0	
15	6	2	65, 43,	2	1	0	0	1		Pepper, swamp padi, oil palm	Both	no	0	NCR
64	8	2	65	2	1	1	1	1	Individual	Rubber		yes		Title
7	6	4	74, 68	2	1	1	0	1	Both	Hill padi, rubber, pepper, fruit trees	Both	no		Title
66	6	3	58, 50, 14	2	1	1	1	1	Both	Oil palm, rubber, pepper, swamp and hill padi	For now subsistence	no		Title
6	5	3	62, 64	2	1	1	0	1	Individual	Swamp padi, rubber, Durian, fruit trees	Both	no		Title
31	9	0	70, 74, 33, 17, 12, 13, 31, 6, 0.4	2	1	0	1	currently	both	Swamp padi, fruit	Subsistence	yes		Title
19	4	0	49, 45, 20, 13	2	1	0	0	0	Individual	Hill padi, fruit trees	both			Title
22	6	0	42, 38, 20, 18, 14, 6	2	1	0	0	0	Individual	Hill padi. Rubber, pepper	both			Title
26	4	4	59, 45, 18, 20	3	1	0	0	1	both	swamp padi, rubber, pepper	both			Title
57	5	0	32, 25, 8, 5	2	1	0	0	0	both	swamp padi, pepper	both			Title
80	8	0	37, 32, 16, 14, 11, 6, 3, 20	2	1	0	0	1	both	swamp padi	Subsistence			Title
87	7	1	41, 35, 16, 14, 10, 7, 1	0	0	0	1	0	both					
43	1	3	59	1	1	1	0	1	Individual	Rubber, padi	Both	no		title
14	12	1		7	0	1	0	0	Individual	palm oil	cash crop	no		title
62	2	6	45, 74	1	1	0	0	0	both	swamp padi	Subsistence	no		title
84	7	1	45, 38, 18, 16, 12, 10, 2	2	1	1	1	1	both	swamp padi	Subsistence	yes		title
18	8	1	70, 57, 37, 29, 27, 9, 5, 7, 2 weeks, 2 weeks	3 or 4	1	1	1	1	Individual	oil palm, rubber and fruit	cash	yes		title
57	2	6	66, 30	2	1	1	0	currently	both	hill padi, rubber	both			title
/	6	0	75, 51, 38, 9, 12, 15	2	1	1	0	1	both	padi, rubber, chickens, duck, pigs	both			title

20	3	0	38, 27, 7	0	0	0	1	1	Individual	no		yes		
61	6	0	72, 28, 2, 9, 44	2	1	0	1	1	Individual	swamp padi, pepper	both	yes		title
89	4	0	41,41,12,11	2	1	0	0	0	Individual	swamp padi, pepper, rubber	both			title
82	3	0	26, 25, 7	2	1	0	1	0	Individual	swamp padi	Subsistence	yes		title
72	5	0	58, 45, 25, 23, 21	2	1	0	3	1	both	swamp padi	Subsistence	yes		title
74	4	0	50, 41, 24, 22	4	0	0	0	1	Individual	swamp padi	Subsistence			lending land
75	2	0	25, 20	0	0	0	2	0	Individual	no		yes		
73	2	0	61, 53	2	0	0	0	1	Longhouse	swamp padi	Subsistence			lending land
59	2	0	66, 24	1	1	0	0	0	Individual	swamp padi, pepper, rubber	Both			title
58	4	0	73, 63, 42, 7	4	1	1	0	0	Longhouse	Hill padi, rubber, pepper	both			title
60	4	4	46, 50	2	1	0	6	1	Individual	Swamp padi, Pepper, pigs, rubber	Both		yes	Title
44	4	0	42	0	0	1	4	0	Individual	0	0	0	0	Title
38	3	5	44	3	1	0	5	0	Individual	Hill padi, rubber, oil palm	Cash crop	yes		title
41	5	2	44,24,26, 18	0	1	1	3	0		rubber		yes		title
43	5	2	47, 28, 26, 24, 14	0	1	1	3	0	Individual	fruit trees	Subsistence	yes		title
36	10	8	69	1	1	1	8	1	Individual	oil palm	cash crop	no		title

9.1.3 Interview

Different informants give different information and it important to choose the correct informants. Key informant interview are valuable if specific subject are to be investigated. Finding the key informant can be time consuming. The environment and setting for this type of interview is important. Other types of informants can be chosen by random sampling through which different types of interviews can take place. An informal conversation interview has no predetermined questions and the interviews are built on and emerge from observations. A lot of different information - might not be relevant at all. Organizing the data can be difficult and maximum attention from the interviewer is needed if the data is to be useful.

A semi-structured interview (SSI) distinguishes itself from a structured interview by being more informal. There is a structure and purpose to the SSI but the interview is open to changes and there is possibility for approaching the specific problem from different angles. Therefore, it is a method that requires a lot of practice and focus from the interviewer's side.

A closed quantitative interview is closely related to a questionnaire survey. The questions are determined in advance and the responses are fixed. This means that data analysis is simple and easy categorized. The researcher can ask many respondents these questions in short time period. A disadvantage of this type of interview is that the respondents have to fit their answers into the interviews/researchers answers/categories, this can distort the respondents' true meaning.

9.1.3.1 Interview guide for semi-structured interview

Introduction

First of all, thank you for spending your evening talking with us, we really appreciate that. This interview is about you and what you're saying, we are here to listen and understand the things you say. We are interested in getting your opinions and experiences, so there are no wrong answers.

Community of Bayur

Have you lived in a longhouse? If yes, how was it? If no, what do you know about it?

- What is Bayur like today?
- Do you trade or share food with each other? If yes, who?

Do you collaborate with someone farming?

- If yes, who? And what are the benefits of the collaborating?

Economic and social

What do the different family/household members contribute with money- and labor-wise?

On what do you spend money? (Maybe: What do you buy? When?) (Ask about the distribution.)

Do you save up any money? If yes, for what?

(Consider their former answer before asking following questions):

Is there anything you would like to buy? How will you get the money? Does anyone help you with money?

Legal matters and land condition

What rights do you have over the land you farm? (If not answered in the questionnaire part)

Are there any difficulties with rights over land? What about permits for fertilizers, pesticides, insecticides etc.?

What about permits or access to seeds or seedlings?

Is there anything else you think we should know about legal matters concerning farming?

- If they have NCR-land; would they rather have the title?(only if not answered in questionnaire)
- Why?

Have you noticed any changes in the land conditions? (Ask about differences between crops or fields that sometimes lay fallow and fields that don't.)

- Weather patterns, fertilizer etc.

Farming or city job

Why do you farm?

- Other options? (Maybe ask: If it was today, would you do something else? Why?)

What do you want for your children to do when they grow up?

Or: Will you children inherit your land and farm it?

9.1.4 Notes from SSI

Household no. 52 – date: 7/3-2016 – at time: 10.30 am

Household head: Dungat, age: 54

One of their daughters is working in Balai Ringin as a waitress and has a son + husband – they are living in Bayur. One daughter is unemployed and lives in Bayur – helps to take care of the grandchild and in the field sometimes. One son died 7 years ago and the other son/daughter lives in Kuching.

They just built a pepper plantation which according to them is less manual labor and good thing because they were getting old. They were not interested in oil palm because of age but wanted oil palm if they were younger. Vegetables are grown for own consumption but if they get extra they will sell to the villagers – maize was sold last year.

NCR land was inherited from the father (3 siblings shared the lands), but doing their own things on the land they inherited. No. 52 might have option if harvest fails by planting at the siblings.

Fertilizers were very important because the soil was not good enough to grow the needed yield for subsistence. Planting rice on the same spots every year – no fallow to give the soil a break (Swamp). Could have been the soil conditions worsening because its mono-culture and the amount of fertilizers needed. It was not an option not to use it – they would have to buy it if not given.

Got 50 bags of padi this year – which is a lot.

If they were plans on building a new long house she would like to join by living there because of the community feeling. Right now they share and trade food between houses.

They wanted to live in Bayur and it was never a question to move.

Important events changing the structure of the village – water, electricity, paved road

Effect of climate – it became much hotter because of the removal of jungle (forest area) and a lot more space for the sun to come in.

They wanted their kids to have a "better" life with higher education, more stable jobs that doesn't take as much labor or manual effort.

Also because young people don't care about agriculture and maybe don't have the same cultural attachment to native customs. And the experience will never be the same because they have to go to school instead of helping in the field.

Extra money: if they got some extra cash from selling vegetables or timber (husband) – they would spend it on firstly: food, secondary: savings, third: fertilizers

Household no. 64 – 7/3-2016 – at time: 20:00

Interview with the household head and wife as well as their son who is living in the house now. The son's family used to live in 6 different places before moving back to Bayur.

The son – age: 40's is a teacher at Balai Ringin

Introduction

First of all, thank you for spending your evening talking with us, we really appreciate that. This interview is about you and what you're saying, we are here to listen and understand the things you say. We are interested in getting your opinions and experiences, so there are no wrong answers.

Community of Bayur

Have you lived in a longhouse? If yes, how was it? If no, what do you know about it?

The son has not lived in the longhouse, too young since the old longhouse burned. The elders (age 65, 63) used to live in the longhouse but moved out in 1963 due to fire burning it down.

- What is Bayur like today?
    - *Most of the villagers mind their own business if not close relative => not a lot of trading or sharing. This belonged in the past (50s, 60s, 70s)*
- Do you trade or share food with each other? If yes, who?
    - *Only relatives*

Do you collaborate with someone farming?

Collaboration with the family with farming and sharing food. If someone helps in the field you have to help them back or pay them money for the work. It is a mutual agreement between those who are willing to help.

- If yes, who? And what are the benefits of the collaborating?
    - *Easier to do and good karma – those who can't do all the work (elders) by themselves gets help from the family.*

Economic and social

What do the different family/household members contribute with money- and labour-wise?

Picking fruits – usually the whole family. The son of the elders has a stable income through being a teacher.

Other family members will bring food and cash to the family when they visit – it is a tradition according to this family. It is also a good way of repaying what their parents have given to them as kids.

The elders in the family get a pension (elder pension) – don't know if this the same of everybody who is older than a certain age.

On what do you spend money? (Maybe: What do you buy? When?) (Ask about the distribution.)

Priority of money: (Insurance is paid through the salary from the teaching job)

1. *Food*
2. *Education (only said it was money for the canteen at the school)*
3. *Bills*
4. *Holidays => other enjoyments*

Do you save up any money? If yes, for what?

1. *Saving up for future education for the children.*
2. *Holidays*

(consider their former answer before asking following questions):

Is there anything you would like to buy? How will you get the money? Does anyone help you with money?

A house in the city (Kuching) is the ideal situation but it also depends on the children.

Legal matters and land condition

What rights do you have over the land you farm? (If not answered in the questionnaire part)

Are there any difficulties with rights over land? What about permits for fertilizers, pesticides, insecticides etc.?

No difficulties in getting fertilizers for the land or with the government (yet).

They get 5 bags of fertilizers pr. Family for both padi and pepper.

Didn't receive fertilizers for rubber yet

What about permits or access to seeds or seedlings?

The seeds they can get from the government is commercialized can be used to plant/harvest twice a year. They only got 1 harvest a year.

Would like the seeds that produce rice twice a year but haven't gotten any yet

Can be used to sell some rice to others

Are there anything else you think we should know about legal matters concerning farming?

- If they have NCR-land; would they rather have the title?(only if not answered in questionnaire)
- Why?

Have you noticed any changes in the land conditions? (Ask about differences between crops or fields that sometimes lay fallow and fields that don't.)

They noticed a lower output from the padi fields even though they use fertilizers on the padi. The cycle is: Plant, harvest, burn the dead plants, plant again.

- Weather patterns, fertilizer etc.
    - *The clearing of the forest in Borneo is causing a lot of fog which can kill the rice plants because of the lack of sun (only hill padi gets affected by this)*. Pepper does not have a problem with this phenomenon

Farming or city job

Why do you (not) farm?

The son chose to be a teacher because of the stable income – didn't want to be a full time farmer.

The farming he does now is small scale and after work and in the weekends with the family. Gives a source of joy to farm part time.

- Other options? (Maybe ask: If it was today, would you do something else? Why?)

What do you want for your children to do when they grow up?

Them to be happy and have a good life – they can choose whatever they want to do.

Or: Will you children inherit your land and farm it?

The son will inherited to land and split it with the rest of the family (siblings).

Interview

Household no. 6 – date: 9/3-2016 – at time: 19:00 pm

Household head: Disa

Introduction

First of all, thank you for spending your evening talking with us, we really appreciate that. This interview is about you and what you're saying, we are here to listen and understand the things you say. We are interested in getting your opinions and experiences, so there are no wrong answers.

With a purpose explained

Community of Bayur

Have you lived in a longhouse? If yes, how was it? If no, what do you know about it?

Mentioned that they have lived in the longhouse (only the wife) and she hadn't told him anything about how it was to live there.

Asked how long Disa had lived in Bayur: since 1976

- What is Bayur like today?
    - *Had Bayur changed during the period? He said that the utilities had changed a lot like water, electricity and life is way more comfortable now.*
    - *Had people changes during the period? He said they have changed for example if people have extra fish they don't share it, they sell it to each other and make some money there. People have to buy everything themselves – this was a good thing because you can get what you want when you want it (individually).*

- Do you trade or share food with each other? If yes, who?

Do you collaborate with someone farming?

- If yes, who? And what are the benefits of the collaborating?

Economic and social

What do the different family/household members contribute with money- and labour-wise?

Joined the army in 1980 and spent 23 years there until he re-signed in 2003.

On what do you spend money? (Maybe: What do you buy? When?) (Ask about the distribution.)

Do you save up any money? If yes, for what?

(consider their former answer before asking following questions):

Is there anything you would like to buy? How will you get the money? Does anyone help you with money?

The savings go towards the future (plans?) but they do get a pension salary from the government job.

Legal matters and land condition

What rights do you have over the land you farm? (If not answered in the questionnaire part)

Are there any difficulties with rights over land? What about permits for fertilizers, pesticides, insecticides etc.?

So far the government supplied the fertilizers and pesticide and you get more if you have an agreement with the government (government plan).

> ***Would you like to be in that plan?*** *He said it depends on the government, some places the government supplies machines but here it is too hilly.*

What about permits or access to seeds or seedlings?

Are there anything else you think we should know about legal matters concerning farming?

- If they have NCR-land; would they rather have the title?(only if not answered in questionnaire)
- Why?

Have you noticed any changes in the land conditions? (Ask about differences between crops or fields that sometimes lie fallow and fields that don't.)

- Weather patterns, fertilizer etc.

Farming or city job

Why do you farm?

During the army period he had some agricultural training, He said he wanted to come back to Bayur to farm (maybe something with his health).

Are you farming the crops you wanted to farm? *Yes, padi – rubber for subsistence and rubber for cash when the price is good.*

The padi is enough for subsistence, the kids will buy extra things for them when they come home – they sometimes buy other stuff for them as well.

- Other options? (Maybe ask: If it was today, would you do something else? Why?)

What do you want for your children to do when they grow up?

Or: Will you children inherit your land and farm it?

Extra note

He was a former government employee and was obs. on that his name should not be included in the report – this could also have affected some of his answers during the session.

He mentioned that government employees get pension and that other citizens don't, so he has it a bit more easy.

Household no. 61 – date: 10/3-2016 – at time: 13.00 am

History of family in longhouse:

Father used to live in longhouse (now lives in this household), and she, the mother who is the interviewee, lived in longhouse as a child in Antayan. She enjoyed that it is possible to talk to everyone and communicate with each other in a longhouse, and she mentions the parties and gatherings, and the ability to share things as something very nice about living in a longhouse.

However she also mentions that the possibility of fighting with each other is higher, and that sometimes people show less respect and are noisy.

She mentions that they still share a lot of things in the individual housing situation that they are in now, though not at the same level as in the longhouse.

Family economy:

Both their animals (large quantities of ducks and chickens, as well as a pig) and their crops (a lot of lime, as well as padi paya and pepper) represent their main income. In regards to savings and priorities concerning their money, their main priority is to save up for educational fees for their children. Aside from that their main expense is food.

Issues/aspects in regards to land:

The family have both NCR and titled land. She tells us that it is her impression that without fertilizers, the rice crops are not good. She worries that she wont be able to continue to receive fertilizers from the government, because they are very expensive. She tells us that her household has bought all plants and seedling themselves, not receiving anything in that category from the government. She tells us that, aside from padi, it is very hard to apply for, and receive, seeds and other supplies from the government. It is expensive to get the government to measure the land, so getting titles on their NCR lands is not in the cards for them. She does tell us however, that they have now applied for some chicks from the government.

About fertilizers:

When she just started planting padi, it was not necessary in the same way to use fertilizers. But now, when everybody is using it, it has become very necessary. Heavy rains might ruin the crops, so the rainy season is particularly difficult. Rain and rats sometimes destroys the padi, and fertilizers help them rebuild their crops faster.

Alternative agriculture (animals)

Animal agriculture helped them through a rough period where the crops were failing. They saw the need for an alternative to the drowning crops, and decided to buy ducks and chickens and start farming that as well. Today she still very much enjoys farming animals, because she loves animals, and wishes to expand both in regards to animals and crops. When they started doing agriculture, none of them know how to do it, so they experimented and got lucky.

Hopes and wishes for the future:

Their main priority is their three children's' futures. She wishes for them to be able to get as much education as they want, so that they will not have to struggle as much as she has, and so that they can support themselves better than she has been able to. She mentions that she would like it if any of her children took over the farm, but that she would only want this if this were what her children wanted for themselves

Household 81: Richard (Palm oil farmer)

Richard have lived in a longhouse, 1967. The social life in the longhouse was different, it was less respectful against each other, between the neighbours. The advantages was that you worked together, shared food and if someone got sick everyone helped.

The family have been living in their own house for 20 years and they feel more secure having their private house. An advantage with having your own house is also that you can for example keep it clean easier. The people in the village still trade and help each other even if everyone have private houses.

The family plant padi which enables them to save some money but the palm oil plantation is their biggest income (with 300 oil palms). They farm the field within the family.

Richard and his wife is taking care of their grandchildren (They have not been working for 9 years) and focusing their energy on planting their fruit trees.

Their main expense is food and the second largest expense is health as well as saving for the grand children's future. Before the grandchildren were born they focused more on spending money on their house. They used the money from the pepper-field to repair the house.

Their oil palms are on titled land while their fruit trees are on NCR land. They are not so concerned about the land because it belongs to their son now and in the past oil palm or SALCRA

did not exist. They didn’t use fertilizers in the past, only pesticides. Today they need to make the land more productive - even the fruit trees.

They bought their own seeds and plants.

Richard and his wife do not have education and therefor don’t know the conditions of the soil (Although, during the interview - they point out several times how much they need fertilizers). They do farming because they want to live in the village where it’s peaceful and quiet.

They want their grandkids to have an education so that they can support their own families, also because they are concerned about future resources (that the land isn’t big enough for all the kids when they grow up).

Household 84: The house opposite to the headman (New in the village)

The husband who is from another village have not lived in a longhouse but his wife has. It was a long time ago and she only lived there for 4 years - her parents lived in longhouse but she can’t remember them talking about how it was. This family have lived in Bayur for 3 years but they still feel like they are new in the village. Previously, they have moved around a lot but now they want to stay in Bayur.

They got tired of living as nomads but still say that they did learn a lot from it.

The woman in the family used to be a housewife but wanted to be able to save more for the kids so started farming.

They just started padi farming, which they never had done before. They choose padi because the price of rice is going up. The woman in the family learned from the others in the village how to do the planting.

They don’t have any plans to have more crops because they have limited land area and it is far away (The husband inherited the land) - but maybe in the future.

The kids are helping with the harvesting when they are not in school.

The children want in the future to continue their studies or apply for jobs (stewardess - wants to see the world and travel, teacher, doctor). But at the same time they want to help their parents.

The parents think that the kids future depend on their own interests and that it's completely up to themselves but at the same time school is important.

They still save for their kids education and the house.

Both the parents are not that good at english which is why they think is important that their kids learn.

SSI household 7, 8/3 2016 with Joseph Dari, evening (In report called John, and his wife; Tina)

Present: Joseph and his wife Trudi

Interviewer: Cecilie, Note-taker: Nazifah, Translator: Valach, Observer: Simon (KU SLUSE teacher)

Introduction given.

We talked earlier about why he has a gate, and here we asked him to elaborate.

J: The gate gives security from animals and maybe also people.

How is the village of Bayur? The atmosphere and social life.

J: Peaceful so far, and everybody are relatives, so it is important to have good relations with other people, and as a prayer leader he should show a good attitude. He likes that he gets to influence people as a prayer leader.

Do you share or trade food with the other villagers?

J: sharing food is common, like fruits, padi and other crops that they have in extra. They share with relatives or neighbors.

(asked to give example)

J: last evening he gave fruit to the neighbors.

How many people help with farming in your fields? DO you collaborate with anyone farming?

J: Just the two of them(husband and wife). He collaborates with RISDA with rubber and AIDA with fish pond and with MPB with pepper. They have subsidize for pepper from government.

We asked whether their children supported them with cash.

J: Sometimes the kids help with money and sometimes they help the kids if they are in need. The kids helped with buying the car, so they can go to town to sell crops or buy food or other groceries.

Asked if they have pension.

He has pension(he worked 30 years in the government), the wife does not have any pension because she has always been a housewife besides farming.

Asked if sells crops

He sells the extra crops like padi, fruit, vegetables.

Asked if they save up money

They did not save up money, the money just flows. They save only very little, because of the economy making things more expensive.

He has applied for a permit to commercialize his fish pond, which they at this point only use for subsistence use. He wants money to fence in the fish pond to protect it from animals once he gets approval.

Asked about fertilizer

J: Given by RISDA once a year in a fixed schedule, and there are no problems with it. For rubber they have to sign an agreement for 5 years to get fertilizer and afterwards they will have to buy it themselves.

Asked about diffeculties with acces or permits for seeds and seedlings.

They have no problem with the padi, because they get it within the village and trade with each other. For the vegetables usually they get it from any shop. The rubber seeds they got from RISDA.

Is there anything else you would like to tell us about legal matters concerning farming?

J: He would like to have machines to help with farming, because it is hard work now that he ages. It is difficult to get machines at his age, because the agreements with the government are 10 year deals and he only has small scale farming. Last year he sent in an application for the machines for the fish pond, but has yet to get an answer.

Asked about changes in the soil and land

Because of the fertilizers and herbicides supply he does not experience any changes.

Asked about changes in the weather

There is more heavy rain now a day and sometimes it is still dark at 6 am compared to previous years.

Asked why he still does farming?

He want to maintain his health by having activities and also the extra income is helpful.

Asked about his opinion on young people migrating to town.

J: they have more education and want to have a secure job and a better life. Working with farming takes a lot of energy, it is heavy work compared to working in town. They are nether interested in farming and want the fixed income. The children though help with the farming when they have time of or during holidays.

Asked is the children then enjoys farming

They like to do farming but are not interested in doing it for the rest of their life.

Asked about if the children will inherit the land and what they might do with it

It depends on the children, as long as they don’t sell the land. Maybe they will do something with it one day together.

Asked if they have any questions for us or about the project.

What will you do with the project and the results? Do we just take it to Denmark?

Answered that the results depend on our analysis and results, but that we will try to make sure the report gets to the villagers. Explained that it is an interdisciplinary project and that we look at Bayur from all angles, natural science and social, to understand as best as possible.

After the interview we also talked about the traditional weave that the wife used to make patterned fabric with. They sometimes sold it, but only on demand. It was very beautiful and impressive, on a huge frame of bamboo. The pattern is traditional Iban.

9.1.5 GPS tracking

A GPS tracker was brought along on the trip. The model was Garmin Etrex 10 and was very easy to control and get GPS point. The GPS has a vertical measurement error of +/- 15 meter and horizontal measurement error of +/- 3 meter.

The GPS point were put into a computer and through Google earth used for tracking where the transect walks took place and the soil sample locations. As there was no transect walk in a straight line an elevation profile was not made.

9.1.6 Soil samples

Figure 10: Locations for soil sampling - four different sites

9.1.6.1 Soil analysis – structure and texture

To determine the structure of the layers in the soil, different methods within this method are used. The first step in this method is to determine the granular structure of the aggregates in the soil. This is sometimes impossible if a sandy soil is being examined where there are no visible aggregates. If this is not the case, one gentle shakes the soil in the hand to get clear view of the single aggregates to see their shape. This can either be one of the four principal soil shapes: spheroidal, platy, prismlike or blocklike (Brady & Weil, 2010), and whether these aggregates are structureless, weak, moderate or strong. Furthermore the soil moist consistency can be determined

by how easily they brake under pressure in categorizes between loose where the soil does not cohere at all to extremely firm and rigid where it breaks between the hands and when stood on. Another way to examine the texture is through the feel method as described by FAO (2006):

TABLE 25
Key to the soil textural classes

				– % clay
1	Not possible to roll a wire of about 7 mm in diameter (about the diameter of a pencil)			
1.1	not dirty, not floury, no fine material in the finger rills:	sand	S	< 5
	• if grain sizes are mixed:	unsorted sand	US	< 5
	• if most grains are very coarse (> 0.6 mm):	very coarse and coarse sand	CS	< 5
	• if most grains are of medium size (0.2–0.6 mm):	medium sand	MS	< 5
	• if most grains are of fine size (< 0.2 mm) but still grainy:	fine sand	FS	< 5
	• if most grains are of very fine size (< 0.12 mm), tending to be floury:	very fine sand	VFS	< 5
1.2	not floury, grainy, scarcely fine material in the finger rills, weakly shapeable, adheres slightly to the fingers:	loamy sand	LS	< 12
1.3	similar to 1.2 but moderately floury:	sandy loam	SL (clay-poor)	< 10
2	Possible to roll a wire of about 3–7 mm in diameter (about half the diameter of a pencil) but breaks when trying to form the wire to a ring of about 2–3 cm in diameter, moderately cohesive, adheres to the fingers			
2.1	very floury and not cohesive			
	• some grains to feel:	silt loam	SIL (clay-poor)	< 10
	• no grains to feel:	silt	SI	< 12
2.2	moderately cohesive, adheres to the fingers, has a rough and ripped surface after squeezing between fingers and			
	• very grainy and not sticky:	sandy loam	SL (clay-rich)	10–25
	• moderate sand grains:	loam	L	8–27
	• not grainy but distinctly floury and somewhat sticky:	silt loam	SIL (clay-rich)	10–27
2.3	rough and moderate shiny surface after squeezing between fingers and is sticky and grainy to very grainy:	sandy clay loam	SCL	20–35
3	Possible to roll a wire of about 3 mm in diameter (less than half the diameter of a pencil) and to form the wire to a ring of about 2–3 cm in diameter, cohesive, sticky, gnashes between teeth, has a moderately shiny to shiny surface after squeezing between fingers			
3.1	very grainy:	sandy clay	SC	35–55
3.2	some grains to see and to feel, gnashes between teeth			
	• moderate plasticity, moderately shiny surfaces:	clay loam	CL	25–40
	• high plasticity, shiny surfaces:	clay	C	40–60
3.3	no grains to see and to feel, does not gnash between teeth			
	• low plasticity:	silty clay loam	SICL	25–40
	• high plasticity, moderately shiny surfaces:	silty clay	SIC	40–60
	• high plasticity, shiny surfaces:	heavy clay	HC	> 60

Note: Field texture determination may depend on clay mineralogical composition. The above key works mainly for soils having illite, chlorite and/or vermiculite composition. Smectite clays are more plastic, and kaolinitic clays are stickier. Thus, clay content can be overestimated for the former, and underestimated for the latter.
Source: Adapted from Schlichting, Blume and Stahr, 1995.

Figure 11: FAO (2006) description of soil texture analysis

9.1.6.2 C/N ratio

Calculations of Permanganate Oxidizable Carbon in the soil sample are done through following equation:

MnoxC (mg/kg) = [0.02 mol/l – (a mol/l)] * (9000mg C/mol) * (0.02 l solution/0,002 kg soil)

0.02 mol/l is the initial solution concentration, ‘a’ is the concentration measured in the supernatant, 9000 mg is mg C oxidized by 1 mol of MnO_4, 0.02 l is the volume of $KMnO_4$ solution reacted and 0.02 kg is the weight of the soil being used

It is determined how much Carbon is oxidized in a solution of 0.02 M $KMnO_4$ in 0.1 M $CaCl_2$ at pH 7.2 by determining the bleaching of the purple $KMnO_4$ solution by a handheld spectrometer (soil method descriptions 2016).

9.1.6.3 Calculating pH values

To measure the pH-value of a specific soil the sample must be prepared in a 1:2.5 soil:water solution. Afterwards the following steps are needed in order to calculate the exact pH-value.

1. Weigh 10.0 g of soil in a 50 mL Falcon tube
2. Add 25 mL of milliQ water
3. Shake for 20 minutes
4. Leave for 30 minutes – for the sediment to settle
5. Calibrate the pH meter using the pH 4 and pH 7 buffer solutions (See manual)
6. Clean the electrode with milliQ water between each measurement. Collect the liquid in a glass.

When all samples have been measured the Falcon tubes (with content) and the milliQ water in the glass are collected in a plastic bag.

9.1.7 Participatory rural appraisal

PRA-methods can be divided into three main diversions: Space-related PRA methods such as resource mapping, time-related PRA which deal with seasonal ranking or matrices and relational PRA e.g. Wealth ranking, cause-effect diagram, Venn/Chapati.

9.1.7.1 Transect walk

According to Mikkelsen (2005) a transect walk is used to construct a cross-section map of an area of interest. The walk is done a straight line from one point e.g. a farmer's house to the end of the farmer's land. The land types and different scenarios are noted down along the way through observation and discussion with the farmer. It is important that the key person i.e. farmer is participating as problems can be indicated.

9.1.7.2 Preference matrix

Matrix ranking can be used as an indicator of the value of items through self-assessment. The informant's valuation of object within a certain topic generates a view on what is important and what is less important. Different stakeholders or group might evaluate items differently and it is important to separate these potential social groups. This also lessens the possibility of a dominant figure to control the discussion and hereby the outcome.

9.1.7.3 Historical time-line

A historical time-line can be used to gather information regarding recent changes and historical events which might have affected the village.

9.1.7.4 Community mapping

With the help from the community important structures and location can be identified through participatory mapping. Depending on the researchers intension with the map different natural or social aspects can be read from the map. All age groups and type of gender should be included as different social groups might have different opinions on important structures. There might also be hidden information within these groups.

9.2 Synopsis

Agriculture and income generating livelihood strategies in Bayur

Group members:
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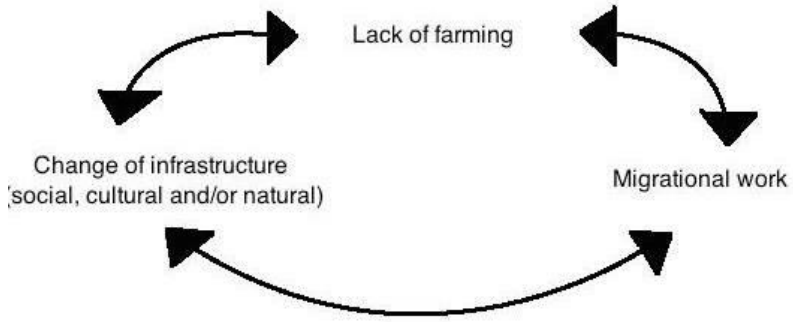
8 April 16
Thematic Course: Interdisciplinary Land Use and Nat (SLUSE)

Introduction

The village of Bayur is located on the third larges island in the world, Borneo in Southeast Asia (WWF, 2015). Bayur is a village with little agriculture (almost only sustenance crops, and mainly padi rice). Instead of growing cash-crops, the villagers migrate to urban areas where they perform menial work. We find it interesting to investigate why the village has this type of infrastructure, and what effects it may have on the social structures of the village. In order to find this out, we plan on investigating both the social and the natural attributes of the village, through interviews, transect walks, questionnaires for the social aspects, as well as soil and water samples for the agricultural and natural values of the area (ILUNRM, 2016).

Examining the infrastructure of the village, is one of the key interest of this report. It will be investigated whether the preliminary information that there is a lack of income generating agriculture is correct, and whether this lack of income generating agriculture could be because the

people of the village choose to migrate to other villages and urban areas for work (because of cultural and social changes, possibly due to urban influences and fluctuations in cash-crop prices) or that they have felt a need for work-migration (possibly due to lack of land ownership, or poor soil quality). This can be seen through the push and pull effect where either the lack of farming (e.g. due to land rights or poor soil) → migrational work → change in infrastructure of village → possible change of social and cultural patterns or, change of social and cultural patterns (e.g. due to urban influences or changes in cash-crop prices) → migrational work → lack of farming. Or, it



is a circular effect that reinforces itself as in figure 1.

Figure 1. Circular effects of livelihood patterns.

Statement of objective and research question

The aim is to understand the livelihoods of Bayur villagers where migration and off-farm employment are dominating factors, and what the social, economic and environmental reasons are behind income-generating agricultural production not being widely practiced in the village. Furthermore, the aim is to examine how this livelihood structure influences the social context of the village.

On the basis of this, the following research questions have been developed:

RQ1: What are the key factors and main activities contributing to the livelihoods of the Bayur villagers?

What are the most practiced off-farm employments?

What agricultural activities dominate the village of Bayur?

What is the difference in income depending on migration based work/in-village farming? (consumption patterns, savings etc.)

What are the differences in livelihood of people doing migration-based work and people doing in-village farming (using 'livelihood framework' method, based on examples from both groups)

What are the reasons for choosing off-farm employment?

What are the reasons for choosing in-village farming?

How does a household benefit from having some members work off-farm and others with in-village farming?

How does the agricultural activities have an impact on the social structures?

RQ2: What are the social, economic and environmental conditions affecting the potential utilization of uncultivated arable lands?

How many, if any, of the households have access to NCR lands?

Why do some of the household have legal ownership over lands and other have not?

How many, if any, of the households have access to l3ands, NCR or legal, which are not currently being cultivated and why are they not currently being cultivated?

Does the government own cultivated or uncultivated lands in the village?

How does the off-farm employment affect the workforce available to farming practices?

What other social structural factors affect whether a land is cultivated or not?

Relevant literature

Organisation dealing with the protection of culture. Link to article about NCR in Sarawak: Link

Report on State, Communities and Forests in Contemporary Borneo: (including specific definitions of NCR): **Link**

Report suggesting a fiduciary doctrine as an alternative to the "NCR land" way of dealing with land rights: (fiduciary doctrine: the government administers the land, but has a moral obligation to do what is best for the society at stake): **Link**

Masters thesis on Iban societies, development policies and NCR land: (seems very good, the author lived with an Iban community for 1,5 years): **Link**

IDEAL report on logging and indigenous peoples' rights: (IDEAL is the Institute for Development of Alternative Lifestyle, and is mentioned as a source in a lot of the relevant material): **Link**

Suitability of Soils for Oil Palm in Southeast Asia: **Link**

Maintaining soil fertility (WWF): Link

Government of Malaysia official statistics: Link and Link

Ongoing development projects

In the last three decades in Sarawak, Malaysia, there has been an increasing global demand for palm oil, and therefore the general opinion of policy makers has been that oil palm cultivation was the best way for the farmers of rural Sarawak, to develop out of poverty and into modern agriculture and livelihood standards (R. A. Cramb & P. S. Sujang 2016). The government has therefore tried to reduce diversified agricultural practices, also called shifting cultivation and swidden cultivation, by a number of different laws, including one that forbids the burning of fields (Hansen et al. 2006). The government has favored large-estate over smallholder production by leasing out state land longterm to private companies or privatized government agencies, thereby securing the land for oil palm plantations, by thereafter leasing it out to private farmers under the condition that there will only be planted oil palms (Cramb & Sujang 2016).

Land owners of unused land have been the focus of the government of Malaysia in converting forest areas into oil palm production. There has been some degree of resistance of converting into largescale commercial farming, partially due to the lack of flexibility in these large-scale schemes, although it does grant the farmers advantages of land use rights, which can otherwise be difficult to obtain. Because of these disputes over land rights, there has been a trend in Sarawak to experimentally and desultory cultivate a piece of land, just to keep the government from claiming it for palm oil production (ibid.)

Laws and regulations

Because of these prominent disputes, it has seemed necessary to develop a deeper understanding of land rights, seen from the angle of both the government and the local peoples. According to native Iban customs, adat is the native customary rights belonging to the peoples. Through the adat, land ownership is obtained by felling of virgin rain forest (kampong),and cultivating that

land. Clearing virgin rain forest and cultivating the land creates a permanent right to that area of land. Native Customary Rights (NCR) lands, are lands where the indigenous peoples have cultivated the land since 1957 or earlier, giving them the legal rights to the land, should they continue to cultivate it; if the owner of the land cannot prove that their bilek-family has cultivated the land since then, they have no way of keeping it, should companies or even the government choose to want to use the land. (Freeman, 1970: 105).

Local context

The village Bayur was established in 1948 and currently contains around 85 households and is located in the area of Sarawak, Malaysia. The community group is Iban Remun Their livelihood to a large extent depends on subsistence farming which includes cultivation of rice (with swamp rice as the most trivial), pepper and rubber and a few households that are engaged in oil palm plantations. Besides farming, it is also common for community members to leave the village to seek employment in adjoining urban areas. The river near the village, Krang River, is mainly used for fishing since there can be found various species of fish and shellfish in this river which is sometimes sold and used as a source of cash income (ILUNRM, 2016).

Methodology

This analysis intends to have two branches of study: one is to examine the occupational and agricultural infrastructure of the village (in regards to work-migration patterns, farming patterns etc.), and why it might be the way that it is, and the other is to examine which impact these factors then have on the social infrastructure of the village.

In order to gather the data needed to answer the established research questions, and to further gain a deeper understanding of the social and natural structures in the village of Bayur, various methods have been identified and will be conducted. These methods include both social and natural sciences, which will inevitably overlap to some degree. The people of the village are the undisputed experts of the characteristics of the area, equally social and natural, and will therefore by our primary source of information. Thus, in order to find out about the reasons for the infrastructure of the village, interviews and questionnaires will be used as a way of approaching the people of the village, combined with unstructured interviews during transect walks (and when an opportunity presents itself). These transect walks also function as a way creating a community mapping (CAS), as well as a ‘family tree’, by gaining a wider

understanding of the structure of the village, both in regards to social aspects and natural resources. The natural resources will furthermore be examined in depth through soil and water samples, to establish their condition.

Number of group members	All (5)
Expected time (h)	4

Transect walks

A transects walk with the individuals allows the surveyor to observe the extent and range of the village. The villagers are able to show important features of the field area. During the transact walk information regarding the topographic and ecological can be collected. Informal interviews may arise when walking and the interviewees will be confident to talk about local histories, ownership and land rights, local ecological knowledge, mythology or resource use and management of the land of village (Strang et al. 2010) To get an overview of the field location and the village as whole a transact walk is a methods to experience it first hand and not on satellite image.

Family tree

A family tree constructed by individuals in the village preferably elders of the village as they might have greater knowledge of their ancestors (assumption). The family tree will be accompanied by an "event locator column" and a timeline to identify e.g. migration, land rights/heritage patterns. A formal interview/focus group/participation observation or a discussion between villagers on their heritage or family history will generate knowledge on when settlement in Bayur happened, what the land rights look like in the eyes of the villagers and how heritage is passed down and to whom.

This methods requires a notion on the sensitive of the subject for example based on a interview with the headsman. The migration might bring up or emotional situations or land rights/heritage can be dispute topics in the village.

Number of group members	≥2
Expected time (h)	4

PRA method: Community Mapping (CAS)

Community mapping is a social method that is used for a territorial construction of a map alternatively a drawing over the community by villagers on the specific location (The community territory map, 2016). This method will be applied to enable a overview of for example Bayur's land units, soil types, natural resources, households from villagers perspective. This will be carried out by firstly explain our expected outputs and the material that are available for them to create the map (paper and different colored pens). This method is out carried together mapping based on a satellite map of the village.

Number of group members	≥2
Expected time (h)	4

Soil Sampling

Soil sampling is a method that combines knowledge from several different natural science disciplines, such as geography, geology, chemistry and biology. Soil sampling allows researchers to get a scientific understanding of the soil fertility components of a certain area/field. Components of the soil are measured as both inherent parameters (mineralogy and soil texture) and dynamic parameters (Soil organic matter (SOM), acidity, nutrients, water) (FAO, 2006; Bruun, 2016a & 2016b).

This method will be used on Bayur to determine chosen parameters of soil fertility within selected sampling sites (both cultivated and uncultivated land) in relation to the optimal soil conditions for the locally grown crops. Samples from cultivated sampling sites will be used to understand the local conditions for growing crops, while samples from uncultivated sampling sites will be used to understand which local crops this land would be suitable to plant here, if any. This scientific natural science method of soil sampling will be compared to the local perceptions of soil conditions in the cultivated and uncultivated areas in Bayur.

Specific sampling sites will be determined in dialogue with the local farmers through the CAS method (as previously described), this includes the local perceptions of soil conditions/fertility.

As the aim is to understand the average conditions of the selected fields, it is recommended that random sampling is used. Additionally, at least 3 samples will be taken from each sampling site, accumulating to a total of 9 samples per field (the final amount of samples will be determined once time constraints become clearer, aiming for replicability and consistency of the samplings).

Possible soil parameters that can be tested for the Malaysia field studies are: Total Organic Carbon, Permanganate Oxidizable Carbon, Total Nitrogen, pH, and EC. Which parameters to test for will be determined on the basis of the optimal soil conditions for the local crops (see appendix 4).

Number of group members	≥3
Expected time (h)	8

The practical method of soil sampling, e.g. soil profile sampling, soil core sampling, augering, will be determined on the basis of the soil conditions in the suggested sampling sites in the Bayur area.

Number of group members	≥2
Expected time (h)	8

Water Sampling

Specific methods to be used for water sampling will be determined in collaboration with the Malaysian students and professors specialising in water quality.

Possible measuring are: Water temperature, dissolved oxygen, pH, salinity, biochemical oxygen demand (BOD), chemical oxygen demand (COD) (using Merck Environmental Kit, Model SQ118), nutrients (ammonium-N, phosphorus, nitrate); measured using Hach Kit, model DR700, total suspended solids (TSS), microbial level in water (Faecal coliform count (FCC) and total coliform count (TCC) using Paqualab system)

Interviews

In order to obtain a deeper understanding of the social, cultural and economic infrastructure of the village, interviews will be conducted with primarily the headman of the village, but also with relevant village members. Furthermore, as described in the section about transect walks, informal interviews should be carried out in situ, whenever the opportunity arises (Strang et al. 2010). The method of conducting the interviews will be through a semi-structured technique, where questions are prepared, yet allowing impulsive and relevant questions and topics from the students and the interviewees respectively, encouraging the interviewees to "...use their own words and develop their own thought." (Denscombe

2007: 176). An interview will not be conducted by more than two group members, where one functions as the main interviewer, and the other functions as a note keeper, as well as making sure that all relevant questions has been asked. For structuring the data obtained in the interviews, a matrix will be created and brought to the field, for noting down time, place, name of interviewee, whether it was taped and whether it needs to be transcribed at a later time. In regards to the level of participation vs. observation, these types of semi-structured interviews will be of an observational nature.

Questionnaire / Survey

Before writing questions and determining the size of the questionnaire it is important to define what the survey is used for. A small scale questionnaire might consist of a few short open or closed questions or a question table. The responses from the survey are easy to handle and categorize and data can quickly be evaluated. There are some drawbacks in using a small questionnaire. Short questions often generate short answers which lacks deeper interpretation value. If one wishes a wider interpretation scale a larger scale questionnaire is needed. This type of survey might help identify patterns and groups of different interests. With a lot of long and extensive questions both open and closed the data outcome will be immense and time consuming to analyze. Therefore the size of the questionnaire and the amounts of questions within the survey depends on the usage of the questionnaire. (Rea & Parker, 2005)

Number of group members	≥2
Expected time (h)	6

Sub-method: Focus Groups

A focus group is a form of interview, where you interview a couple of people at once. The benefit of this method is to create debate between the participants and therefore obtain diverse data because of group dynamics, than you possibly could in a classic one-on-one interview setting. The interviewer(s) should try to direct the discussion in the desired direction by posing questions and making sure everybody gets speaking time. A focus group is also an excellent way of observing group dynamics and relations between people, for instance in a village where people already know each other. It can also be a way of preserving time by getting as much information as possible at once, rather than doing many individual interviews about. Depending on the scope, you can arrange homogenous or mixed groups, where a homogenous group could possibly provide more specific knowledge and a mixed group could possibly provide more diverse knowledge.

Sub-method: Timeline

The timeline method is useful for understanding the history of for example a community. The interviewer

would ask the interviewee to draw a timeline of events, with the possibility of narrowing it down to events of a certain kind for instance social events or agricultural events, though they might affect each other, which should be taken into account. The timeline method will be practical for giving an historical overview of events in the village that we might hear about from other methods like the formal in informal interviews throughout the field work. A timeline could help verify the order of events which we could come to doubt because of language differences or sheer mass of informations. The setting for this method could be at the same time as the community mapping method.

Number of group members	≥2
Expected time (h)	4

Sub-method: Visual method

After the initial couple of days, when we have hopefully establish a relation with the people of the village, disposable cameras will be distributed to a selected group, who will then be asked to photograph aspects of their lives (this might be the food that they eat, their family members, their migrational-working place, things that are important to them, etc.) Through this method it is our hope to gain an exceptional insight into aspects of the village that are otherwise unseen by us, since it will be from the perspective of the people of the village.

Number of group members	≥2
Expected time (h)	1

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APPENDICES

Appendix 1: Expanded method descriptions

Transect walks

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Specific sampling sites will be determined in dialogue with the local farmers through the CAS method (as previously described), which includes the local perceptions of soil conditions/fertility. As the aim is to understand the average conditions of the selected fields, it is recommended that random sampling is used. Additionally, at least 3 samples will be taken from each sampling site, accumulating to a total of 9 samples per field (the final amount of samples will be determined once time constraints become clearer, aiming for replicability and consistency of the samplings). Possible soil parameters that can be tested for the Malaysia field studies are: Total Organic Carbon, Permanganate Oxidizable Carbon, Total Nitrogen, pH, and EC. Which parameters to test for will be determined on the basis of the optimal soil conditions for the local crops (see appendix 4). The practical method of soil sampling, e.g. soil profile sampling, soil core sampling, auguring, will be determined on the basis of the soil conditions in the suggested sampling sites in the Bayur area.

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After the initial couple of days, when we have hopefully establish a relation with the people of the village, disposable cameras will be distributed to a selected group, who will then be asked to photograph aspects of their lives (this might be the food that they eat, their family members, their place of migration-based work, things that are important to them, etc.) Through this method it is our hope to gain an exceptional insight into aspects of the village that are otherwise unseen by us, since it will be from the perspective of the people of the village.

Appendix 2: Outline of Questionnaire

1. How many family members are there in your household?
2. How many adults are there in your household?
3. How many generations are there in your household?
4. Does your household grow any crops?

a. Yes - which? (make option of choosing whether it is the children, adults or elderly who work in the fields) b. Are they for subsistence use or for sales? (make schedule)

c. No - do you buy produce from a market?

5. Does your household grow padi?

a. If yes, what kind of padi?(insert different kinds of padi, incl. other-option)

6. Does your household have access to lands appropriate for agriculture?

a. If yes, is the soil good for growing crops?

7. Do any of the family members go to nearby villages to work? If yes, how many? (make option of choosing whether it is the children, adults or elderly who go to other villages to work)
8. Do any of the household members to go urban areas to work?
a. Yes (make option of choosing whether it is the children, adults or elderly who go to urban areas to work) b. Are these family members still living in Bayur?

Appendix 3: Outline of interview with headman

First we want to thank you for letting us come to your village and do research for our studies.

We want to understand the reasons why income-generating agricultural production is

Not widely practiced in the village, as it is in many villages in Sarawak. (Maybe even start with super basic questions: what defines this village? Is this a farming community, or a community of migrational work? Etc. Just so that we do not seem presupposed in any way)

How long have you been headman of Bayur village?

What is your role as headman?

Are there any concerns in your village?

As we explained earlier we're dealing with maybe some sensitive subjects to complete our research. Is there subjects you want us to avoid or not talk to the villagers of Bayur about?

Disputes

Land rights

Development projects

Oil palm plantation

We know from our lecturers that you have applied for a rice scheme development program, can you explain about this project and what it will do for the village?

Have the village changed in regards to livelihood strategies?

Did it used to be a farming community, or has it always been prone to migration?

If it used to be a farming community, when did it change?

Why do you think it changed?

Migration patterns

Appendix 3: Optimal conditions for agriculture

Crop	Temperature °C	pH	Soil	Other
Swamp rice				
Hill rice				
Oil palm plantations				
Rubber				
Pepper				
Fish species				

Appendix 4: Sample templates

Soil sampling

Sampling description

(FAO, 2006)

Date	
Waypoint	
Coordinates	
Profile number	
Slope	
Photo	

Vegetation	
Land use history	
Comments	

Sample ID	Horizon	Sampling depth	Colour	Comments

Codes	Master data
Site #	ex. Fung's maize field
P#	profile
D#	depth in cm
R#	replicate
Example	
Site 7 - P2 - D3 - R1	Fung's maize field - Profile 2 - 20-30 cm - Replicate 1

Site descriptions (e.g. Farmer name)	C/U*	Crop	code used
			Site 1
			Site 2
			Site 3
			Site 4
			Site 5
			Site 6
			Site 7
			Site 8
			Site 9

*C/U: Cultivated/Uncultivated

Appendix 5: Data-Matrix

Problem statement	Research question	Sub questions	Expected data obtained	Methods	Equipment	Possible problems with the method
The aim is to understand the livelihoods of Bayur villagers where migration and off-farm employment are dominating factors, and what the social, economic and environmental reasons are, as to why income-generating agricultural production is not widely practiced in the village. Furthermore, the aim is to examine how this livelihood structure influences the social context of the village.	**RQ1:** What are the key factors and main activities contributing to the livelihoods of the Bayur villagers?	**1.1** What are the most practised off-farm employments?	The composition of off-farm employment	Questionnaire	Pens, questionnaire form	Language/Communication
		1.2 What agricultural activities dominate the village of Bayur?	The composition of agricultural activities	CAS	A3 paper, pens (preferably several colours), print-out of Bayur satelite map, plastic sheets, permanents markers	Willingness of local villagers to participate. Potentially limited knowledge in the village of maps.
		1.3 What is the difference in income depending on migration based work/in-village farming? (consumption patterns, savings etc.)	If households with more off-farm employment have a higher income/consumption and why they have off-farm employment	Questionnaire	Pens, questionnaire form	Language/Communication
		1.4 What are the differences in livelihood of people of migration-based work and in-village farming (using 'livelihood framework' method, based on examples from both groups)	What their perception of the village is compared to other villages (where oil palm production is significant)	Focus groups	Notebooks, pens, audio recorder	Controlling individuals - silent individuals Gender roles, age, social status
				Interviews	Notebooks, pens, audio recorder	The circumstances of during the interview - at home, work, formal setting Intepretation problems
		1.5 What are the reasons for choosing off-farm employment?	Why they choose off-farm employment	Interviews (semi-/un-structured)	Notebooks, pens, audio recorder	Language/Communication. Local villagers understanding of the interview situaiton.
		1.6 What are the reasons for choosing in-village farming?	Why they choose in-village farming	Interviews (semi-/un-structured)	Notebooks, pens, audio recorder	Language/Communication. Local villagers understanding of the interview situaiton.
		1.7 How does a household benefit from having some members work off-farm and others with in-village farming?	Villagers view of benefits of off-farm work and in-village farming to village households	Interviews (semi-/un-structured)	Notebooks, pens, audio recorder	Language/Communication. Local villagers understanding of the interview situaiton.
		1.8 How does the agricultural activities have an impact on the social structures?	To gain an insight in social relations of the villagers	Interviews (semi-/un-structured)	Notebooks, pens, audio recorder	Language/Communication. Local villagers understanding of the interview situaiton.
				Questionnaire	Pens, questionnaire form	Language/Communication
				Visual Method	Desposible cameras, notebooks	Lack for interest in participating of the villagares, the picture quality, and the risk of not getting the cameras back from the participants.

Continued on text page

The aim is to understand the livelihoods of Bayur villagers where migration and off-farm employment are dominating factors, and what the social, economic and environmental reasons are, as to why income-generating agricultural production is not widely practiced in the village. Furthermore, the aim is to examine how this livelihood structure influences the social context of the village.	**RQ2:** What are the social, economic and environmental conditions affecting the potential utilisation of uncultivated arable lands?	**2.1** How many, if any, of the households have access to NCR lands?	Be able to understand the villagers own perception on what is their land, where they have their production and where there potentially could be production	Transect walks	Notebooks, pens, audio recorder	Only showing the good places of the village Disputes
		2.2 Why do some of the households have legal ownership over lands and others have not?	Be able to undertand the land rights situation in the village	Transect walks	Notebooks, pens, audio recorder	Sensitive information
				CAS	A3 paper, pens (preferably several colours), print-out of Bayur satelite map, plastic sheets, permanents markers	
		2.3 How many, if any, of the households have access to lands, NCR or legal, which are not currently being cultivated and why are they not currently being cultivated?	Be able to understand the land rights situation in relation to current or possible cultivation of arable land	Transect walks	Notebooks, pens, audio recorder	
				CAS	A3 paper, pens (preferably several colours), print-out of Bayur satelite map, plastic sheets, permanents markers	Willingness of local villagers to participate. Potentially limited knowledge in the village of maps.
		2.4 Does the government own cultivated or uncultivated lands in the village?	Get a overview of land rights and the governments role in this	Transect walks	Notebooks, pens, audio recorder	
				Formal interview with the headman	Notebooks, pens, audio recorder	
		2.5 How does the off-farm employment affect the workforce available to farming practices?	Understand the workforce capacity for agricultural purposes in the village	CAS	A3 paper, pens (preferably several colours), print-out of Bayur satelite map, plastic sheets, permanents markers	Willingness of local villagers to participate. Potentially limited knowledge in the village of maps.
			Understand the off-farm employment's affect on the workforce capacity	Interviews (semi-/un-structured)	Notebooks, pens, audio recorder	Language/Communication. Local villagers understanding of the interview situaiton.
		2.6 What other social structural factors affect whether a land is cultivated or not?	Identify unexpected social structural factors of influence	Observation		
				Through the methods used for answering other sub-question		
		2.7 What are the soil conditions in the cultivated land and what are the optimal soil conditions for the current cultivated crops? (oil palm, rubber, pepper, swamp rice, hill rice)	Get at scientific overview of the cultivated land	Soil sampling	Plastic bags, paper, sieve, sampling tool, (GPS)	Rainy day - equiment knowledge
			Get a overview of the villagers perceptions of the cultivated land	Transect walks	Notebooks, pens, audio recorder	
		2.8 What are the soil conditions in uncultivated land and which crops could potentially be used to cultivate this land? (oil palm, rubber, pepper, swamp rice, hill rice)	Get at scientific overview of the uncultivated land	Soil sampling	Plastic bags, paper, sieve, sampling tool, (GPS)	Rainy day - equiment knowledge
			Get a overview of the villagers perceptions of the uncultivated land	Transect walks	Notebooks, pens, audio recorder	
		2.9 Are there any issues with the current water quality of the rivers used for fishing (affecting species, continued fishing practices?)	A better understanding of the water conditions of river that is not used anymore and the river that is now used for fishing	Water sampling	(GPS)	Dependent on supervisor support or Malaysian students knowledge
				Transect walks	Notebooks, pens, audio recorder	
	Methods for overall understanding*	Overview of village agriculture, household capacity, etc.	Agricultural areas, local agricultural systems and knowledge, household workforce capacity	CAS	A3 paper, pens (preferably several colours), print-out of Bayur satelite map, plastic sheets, permanents markers	Willingness of local villagers to participate. Potentially limited knowledge in the village of maps.
		General understanding of village	Get a overall understanding of the general aspects and background of the village	Understanding/ice-breaker with the village - social interaction	Pens, paper	Openess of the villagers of Bayur
				PRA or observation participation: social activities with the villagers	Pens, paper	
		Overview of village history	Interview with elders or headman to put into perspective the events of the generations	Timeline, Family tree	Pens, paper	Informal conducts

*for decisions on sampling sites, possible informants for further qualitative methods, etc.

Appendix 6: Field work time schedule

	February		March				
Time Scheme	28	29	1	2	3	4	5
Before noon	Arrival Kuching	Group work + Shopping	Arriving at village - village welcome	Formal interview with the headman	Transect walk	Proposal presentation at Ranchan Park	Getting ideas for possible
				Translate Questionnaire	Translate Questionnaire		Soil sampling
							Vis. method: disp. cam
Afternoon				Participatory methods	Participatory methods - fishing		CAS
				Transect walk	Family tree		Family tree
					Community mapping		
Evening				Continued planning	Continued planning		Compiling information
				Compiling information	Compiling information		Air-dry the soil
					Preparing for presentation		
				Active field work days			Active field work days

Continued on text page

March						
6	7	8	9	10	11	12
problems from the participatory methods						
Soil Sampling	Water sampling	Water sampling		Focus groups		
Questionnaire	Interviews with elders	Interviews		Timeline	Final presentation (Venue: Ranchan Park) Night: Farewell party of each village	9.00-12.00: packing - 13.00 leaving village
Compiling information	Compiling information	Compiling information	Compiling information	Compiling information		
Air-dry the soil			Preparing for presentation	Preparing for presentation		
Active field work days						