Variety of Livelihoods in Kampung Bayur

A study of land resources and urbanisation

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ABSTRACT

Bayur is a village located in the State of Sarawak, Malaysian Borneo where the fieldwork and collection of data for this project took place. The village was established in 1946 and is today constituted of 80 households. This report gives an understanding of the variety of livelihoods in Bayur by examining household structures, access to and usage of land, the specific conditions of the land resources as well as investigating which factors that are connected to the socio-economic factors that influence the social infrastructure in Bayur, urbanisation being a primary reason. The basis for the report is collected data from methods such as interviews, questionnaires, transect walks, focus groups and soil samplings. From this, it can be concluded that the condition of the land recourses is not optimal for cultivation of oil palm, pepper or swamp rice based on low fertility and pH-levels and the growing need for fertilisers, which concludes that the conditions of the soil is not a driving factor of off-farm employment. Furthermore, it is illustrated in this report that the socio-economic infrastructure is highly influenced by urbanisation and modernisation, and that this has lead to, and continues to lead to, substantial changes in the livelihoods of the people of Kampung Bayur.

KEYWORDS

- Bayur
- Sarawak
- Urbanisation,
- Soil conditions
- Livelihoods

PREFACE

This report is a result of a project in the Interdisciplinary Course: Land Use and Natural Resource Management, 2016. The project was made up by preparations, fieldwork and report and took place in Denmark and Malaysia (Kampung Bayur). The data were collected during the period of 28th of February-12th of March in field. The project was interdisciplinary and carried out by a collaboration of students from University of Copenhagen and Universiti Malaysia Sarawak.

The students that have signed below had equal participation in the project including fieldwork and creating of this report.

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INTRODUCTION

This introduction will provide a brief overview of the context in which the study area is placed both regionally and locally, as well as a justification of the problem statement based on the experiences from the conducted fieldwork.

Background

The village of Bayur, which lays the basis for this field study, is located in the southern part of Malaysian Borneo, more specifically in the State of Sarawak. Sarawak consists of a population of approximately 2.67 million people (State Planning Unit, 2014). In 2012 the Borneo Post published statistics indicating that only 52% of the population of Malaysian Borneo lived in rural areas and that the migration towards urban areas may cause this percentage to decline further by 2015 (Borneo Post, 2012).

From 2011-2014 the Sarawak region has experienced only minor changes in the agriculture. The planted area of main crops consists primarily of oil palm, an area corresponding to approximately 10 times the size of the total area of rice cultivation in the region. The primary crop planted in the region, is then oil palm, followed by rubber and rice, with both pepper and cocoa making up very small areas of cultivation in comparison (State Planning Unit, 2014).

According to Cramb and Sujang (2016), experts in agricultural development and environmental science, focusing their research on Sarawak in particular, it has been a main interest of the government of Sarawak to drive modernisation over the past three decades, working to develop agricultural practices and general livelihood standards (R. A. Cramb & P. S. Sujang 2016; 129-130).

Local context

The village of Bayur was established in 1946. The headman of the village reports a population of 476 people. Based on the fieldwork conducted, the estimated number of households in Bayur is 80. Bayur consists of an Iban Remun population that primarily identifies as Christians.

Initial analysis of the quantitative data from the questionnaires (figure 1), done in preparation of the final presentation and therefore influencing the decision on the final problem statement, indicates that the primary agriculture is rice (padi), with swamp rice being the most trivial, followed by rubber and pepper. Only a few households are engaged in oil palm plantations. Their livelihood depends, to a large extent, on subsistence farming, however some crops such as pepper, rubber and oil palm, are also sold at nearby markets or, in the case of oil palm, to larger corporations. Besides farming, it is also common for community members to leave the village to seek employment in adjoining urban areas. It is estimated, based on the quantitative data collected, that 42% are in some way engaged in off-farm employment (see appendix 2). The Krang River near the village is used for fishing, and the fish are either used for subsistence or sold, however research indicates that this activity is seasonal, and to a large extent identified as a hobby by the villagers (Household 1).

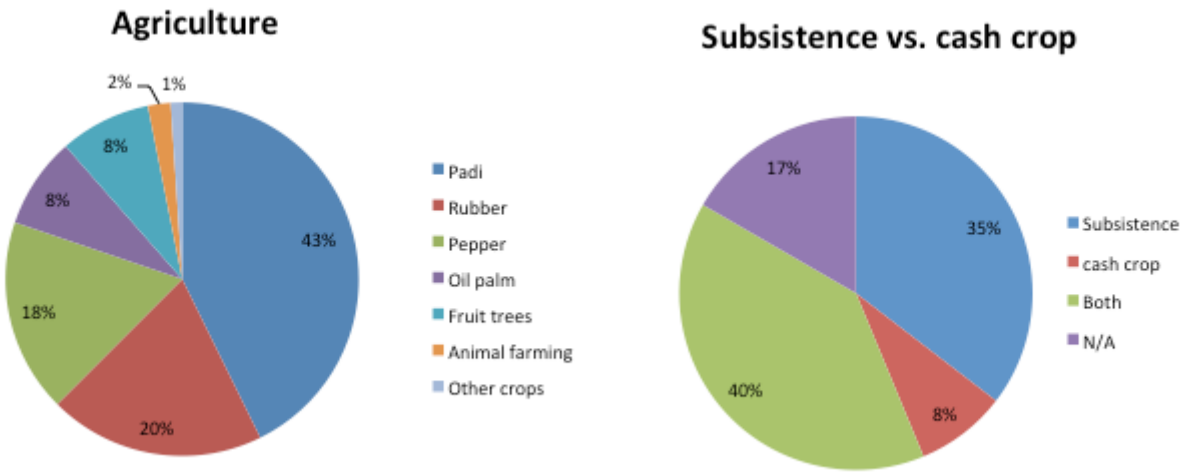

Figure 1: Graphs illustrating the agricultural practices of Bayur. (based on primary data collection – see also appendix 2)

Literature review

External literature sources were used to facilitate and structure the analysis of the collected data, such as literature on theories of urbanisation and literature on optimal soil conditions.

The social science quantitative and qualitative data was analysed and discussed on the basis of the literature regarding urbanisation, including Freeman's Report on the Iban (1970), Robinson & Crenshaw's Integration into Global Society (2014), and Maneepong's article on urbanisation in Southeast Asia (2012).

The analysis of the soil sampling results have been conducted on the basis of available literature and data on optimal soil conditions, from sources such as FAO (1998 & 2006), Sahapatsombut et. al. (n.d.), and the Department of Agriculture, South Africa (2001).

Identification of the problem statement

Based on the general information above, as well as the quantitative data collected and the general experience during the fieldwork, changes were made to the problem statement and the related research questions throughout duration of the fieldwork.

It became evident during the fieldwork that more and more young people were seeking off-farm opportunities in urban areas, either in close proximity to Bayur or further away in Peninsular Malaysia, and that this had an effect on the social structure of the village. The problem statement was therefore developed around understanding the reasons behind this rural-urban movement, including the internal implications regarding the village social structures and available natural resources, as well as the external pull factors from urban areas.

On the basis of the above, the following problem statement was chosen:

The aim of this research is to:

- Understand the variety of livelihoods in Bayur by examining household structures, access to and usage of land;
- Examine the specific conditions of the land resources;
- Investigate how urbanisation is connected to the socio-economic factors that influence the social infrastructure in Bayur.

The following research questions were developed to facilitate the research process:

1. What are the key factors and main activities contributing to the livelihoods of the people in Bayur?
2. How does the land use practices affect the land conditions and what is the current status of the land?
3. Which socio-economic factors dominate the urbanisation and off-farm employment, and what effects do these have on the social infrastructure in Bayur?

METHODOLOGY

Participatory Rural Appraisal

Obtaining understandings of Bayur structure and history

In order to gain a deep understanding of both the spatial, social and physical aspects of Bayur, a series of methods were taken into use. Deep engagement with the people of the village was a main priority, and proved very effective in gaining knowledge and understanding of the village. The primary method must definitely be said to have been living in the community, constantly engaging with the people and customs of Bayur. As we were able to stay with Solomon, the headman of Bayur, throughout the entirety of the fieldwork, we were given a special opportunity to constantly be engaged in the field that we were studying, never completely leaving the physical or social framework of our studies.

Early in the period of fieldwork, Solomon helped us by creating his family tree, as well as a community map and timeline, to identify e.g. migration, land rights, agricultural patterns, access to utilities etc., which was a great help in gaining the initial understandings that we needed to proceed. In order to obtain a broader understanding of these matters, so that our information did not only stem from Solomon's understandings, activities with the people of the village was prioritised, and a focus group was arranged between the inhabitants of Bayur, who assisted us greatly in generating knowledge of important aspects and occurrences in the village, in the eyes of the community.

These methods required an understanding of the sensitivity of the subjects, which was partially obtained through an interview with the headman, as well as informal conversations with the people of the village, prior to the more formal interviews and activities. More on these methods later in the chapter.

Transect walks and community mapping

Another method of gaining knowledge and understanding of the village, was doing transects walks with the inhabitants of Bayur. This allowed us to observe the extent, range and boarders of the village, both physical and social. During the

transect walks, we were shown important features of the village and field area, accompanied by information regarding the geographic areas, which helped to create a deep understanding of the practical use, as well as social meaning, that the inhabitants assign to the spaces in and around the village. Informal interviews inevitably arose during these walks, and as expected, the people whom we walked with seemed 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)

Through the transect walks, an overview of the community started to materialise. In order to create a more thorough and accurate community map, Solomon, the headman, as well as willing participants from Bayur, was asked to create a map of the village. This method was applied to enable an overview of Bayur's land units, agricultural types, soil types, natural resources, households, and social and spatial limits in general, seen through the eyes of the villagers.

Focus groups

In order to gain an understanding of the agricultural practices in the village as well as the village dynamics it was decided during the first days of the fieldwork to do a focus group interview. A focus group interview allows the researchers to not only ask questions one-on-one with the interested persons, but also to create a dialogue between the participants and therefore obtain diverse data because of group dynamics. Using focus groups as a participatory method can be an excellent opportunity to observe group dynamics and relations between people, for instance in a village where people already know each other. Additionally, it was chosen for this research project as time was limited and it can be a way of preserving time by getting more information from more people at once, rather than doing many individual interviews.

The focus group was structured around the aim to produce a preference matrix of agricultural practices and a historical timeline of the village. In order to obtain as much data as possible and to get an insight into the differences within the

village, the focus group was divided into two groups – one all male and one all female.

By asking the focus group participants about the subsistence use, income generation agriculture, labour requirements, cultivation, and fertiliser and pesticide use, the preference matrix presents an overview of agricultural practices and priorities within the village.

As for the timeline exercise, this is useful in understanding the history of the community and can help to verify events, and the order of events, which might otherwise have been lost due to language differences or sheer mass of information. The timeline exercise was also repeated with headman Solomon alone, as to get his perspective on the village history as well.

SSI and quantitative methods

Quantitative method, Questionnaire

Through informal conversations with villagers of Bayur we quickly found that certain questions that we would ask them seemed to recur, and we started to build a questionnaire with the scope of getting as much quantitative data as possible throughout our stay. This was realised as we managed to collect data from (number) household by casually knocking on doors and introducing ourselves and the reason for our visit. Furthermore this method was purposely also a way of establishing contact to as many villagers as possible, which we found important for making our research as comfortable for all parties involved. It felt more polite to ask for help with for example soil samples or semi-structured interviews, knowing we had taken the time to meet people before asking for more of their time. Practically the questionnaires were carried out in teams of approximately 3 people, two students and one interpreter, were one or both researchers would ask the questions and the interpreter would translate back and forth.

Semi-structured interviews

During the fieldwork we conducted (number) scheduled semi-structured interviews with villagers of Bayur, who had agreed to lend us their time for a more in depth interview than the ones conducted during the collection of quantitative data. We typically made the appointments after having done a questionnaire session with them, if we felt that they had more to say and would be good informants on the subjects we were starting to realise would be the focus of our research. Though we got a lot of qualitative data from the more informal talk when doing the questionnaires, we got the opportunity to ask more into the reasoning behind their answers and therefore semi-structured interviews gave us different data than the questionnaires. The data was also different because of the framework being more formal, giving both interviewers and interviewees a platform to talk about the scope of our research and what was expected of them as interviewees in terms of their rights to not answers, anonymity and to speak their mind freely.

GPS and village maps

Three different types of maps were used and/or produced during the fieldwork. The first was a community mapping exercise, as previously mentioned. This exercise produced an initial overview of the Kampung Bayur. 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. Due to the placement of this exercise in the first days of the fieldwork, it was carried out only with the headman and as a free drawing. This drawing was the further developed in collaboration with the headman, as we gained more knowledge of the village and started discussing possible soil sampling sites.

Secondly, we asked the headman to see any official maps of the village that he might be in possession of. In response headman Solomon provided us with a village overview map (see appendix 7), which included households, as well as household numbers and names, streets and essential community buildings, such as the community halls and churches. This map was used as a basis for

quantitative and qualitative interviews, ensuring a geographical coverage and thereby increased data validity.

For the purpose of mapping the soil sampling and transect walks, we decided to use a GPS. Using a GPS allows for accurate data on soil sample sites and transect routes, and for these to be placed onto satellite images to illustrate the data collection visually. Additionally in the case of this field study, it also allows us to show the random sampling used for soil collection. The GPS coordinates were placed into QGIS to produce satellite maps of the soil sampling sites (see appendix 6), using Bing aerial images. Google Earth was used for the transect walks, as QGIS was presenting difficulties in processing the route/track data (see appendix 6), additionally Google Earth offers the possibility of seeing the elevation profile. The GPS also made it possible to extract precise coordinates and elevation data to present in the soil sampling spread sheet (see appendix 6).

Soil sampling

To be able to determine chosen parameters of soil nutrient content and fertility within selected sampling sites (both cultivated and uncultivated land) in relation to the optimal soil conditions for the locally grown crops, several soil samples were conducted. This method enabled a further scientific understanding of the soil fertility components in certain areas/fields. This method was used to conclude if soil fertility is a contributing factor to the choice of off-farm employment in the village of Bayur.

Samples from cultivated sampling sites were; Palm oil, pepper and swamp rice. These were used to understand the current conditions of the soil and thereby also growing conditions for the cultivated crops. At the same time, samples from a uncultivated sampling site was used to be able to compare the impact on the soil from current factors such as, fertilisers, kind of crop and methods of farming etc. The specific sampling sites was determined in dialogue with local farmers and based on the most common cultivated crops in the village. An aim for replicability and consistency of the samplings was important in the sampling.

The practical methods used were soil profile sampling (oil palm, pepper and uncultivated) and augering (swamp rice), this because of the texture of the soil.
The samples were taken from 4 different sites with 3 replicates from each site (with an exception of 2 replicates at the uncultivated area). The samples were taken with a random selection, this to be able to create as a correct average overview of the soil as possible. The low replicate number was due to resource and time restrictions. All samples where dried for at a minimum of 24 h. It is to be mentioned that two of the replicates from the palm oil sample were compromised during laboratory work and were not included in the calculations for that site.

Analysis

Starting analysis of structure and texture of the soil samples where decided in field in Kampung Bayur. The following analysis were then carried out in the laboratorium in Denmark. This to be able to conclude the parameters of Carbon, Nitrogen and pH through the following methods: Total Organic Carbon, Total Nitrogen, Permanganate Oxidizable Carbon (which is a method used for estimating labile soil organic carbon) and pH-value. For further information on specific analysis procedures, see soil analysis manual (ILUNRM, 2016).

THEORY

Urbanisation

The enduring trend of urbanisation started with the industrialization, which made it possible for people to pursue work at factories in the city for a living rather than practicing small-scale agriculture in rural areas (Sumita Chaudhuri 2015:1-2). With the transportation possibilities of the time, it was impractical to continue to live in rural areas and obtain factory jobs, hence urbanisation, where people migrated to live permanently in the city (ibid.:1-2). Today urbanisation is a global trend, which is happening exceptionally fast in developing countries, creating socioeconomic and environmental problems, for example large slums, crime and pollution that the governments, companies and societies in general cannot keep up with (Chaudhuri 2015:2; The World Bank 2013; Forbes 2015).

By 2015 half of the world's population live in cities, and the development is predicted to continue and accelerate (Forbes 2015). There are though exceptions to this tendency, as the increase in citizens in some mega-cities is starting to slow, which according to Sumita Chaudhuri (2015) indicates "significant rural development in the region" (Chaudhuri 2015:2). She suggests that the focus of urbanisation studies should include considerations about the region as a whole and not just the urban areas, because of the undoubtful interconnectedness that exist between rural and urban areas (ibid.:2, 206, 208-10). People, politics, produce, waste, information and economy all link the urban and rural (ibid.:210).

Remittances are considered an important contributor to rural poverty reduction and the money the migrants send back to their families is also an investment in their own social safety net (ibid.:210). Beyond contributing with money, the remittances introduce new business strategies and lifestyles to the rural areas, thereby practicing a form of social remittance introducing modern and urban identity, technology and education to their hometowns (ibid.:210).

RESULTS ANALYSIS

Soil sampling results

Through both the physical and chemical soil analysis, the following data was concluded. This section will also evaluate and compare these data to optimal conditions for each type of crop. It is to note that tropical soil can vary to a large extent within an area, which can influence the data and therefore the results (Rainforest Conservation Fund, 2016). A further factor that affect the growth of crops is temperature, where the optimal temperatures for the different crops correspond to the temperature of a tropical area such as Kampung Bayur (Rainforest Conservation Fund, 2016). For more detailed information and specific numbers, see appendix 8.

Acidity or basicity

The pH-values of the soil were in average low on 4.6 for all sample sites (see figure 2). The range showed that the lowest pH of 3.86 was measured in the uncultivated land and the highest measured pH of 5.23 was in the palm oil plantation. The fluctuations in pH value at the different sites are low, and the average pH is 4. This shows that all plots have an acidic level of pH value. The optimal pH levels for the sampling sites are around 4.6 for oil palm (Sahapatsombut *et. al*., n.d.), 5.5-6 for pepper field (Department of Agriculture, 2001), and 6-7 for swamp rice (FAO, 1998). This indicates that the pH value for the palm oil plantation is suitable since that crop can grow in acidic environments (Sahapatsombut *et. al*., n.d.). Regarding the uncultivated area (See figure X), it is common in tropical areas that the soil is poor in nutrients and have a low pH value, which correlates with our measures (FAO, 1998; WWF, 2016). At the pepper site the pH was low, which can be seen as an indication that the sampled field is not in optimal condition, and that the area have a lack of lime or dolomite, which could be corrected with a type of fertiliser (Department of Agriculture, 2001; FAO, 2016). Swamp rice fields can in general cope with a high fluctuation of pH-values, which implies that despite the measured pH for this site, it can still be a suitable area for the crop (FAO, 1998).

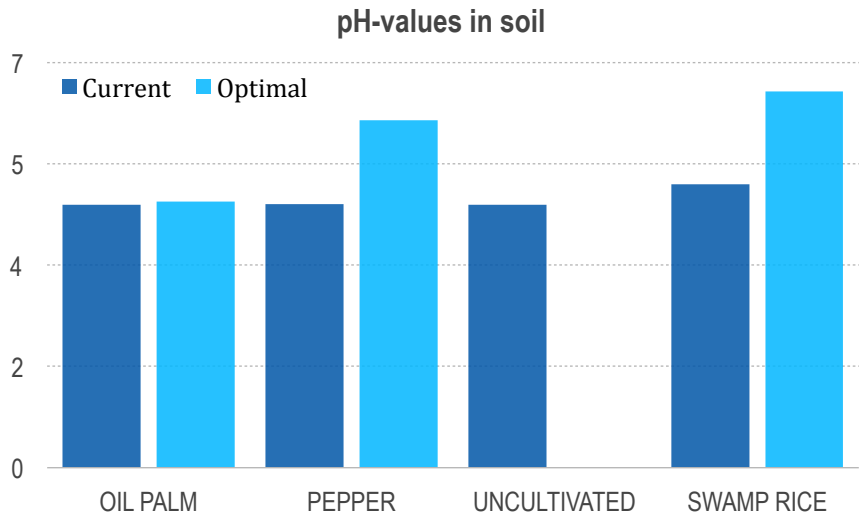

Figure 2: pH-values for oil palm, pepper field, uncultivated land and swamp rice field compared to optimal pH values for corresponding crops.

Carbon & Nitrogen

The measurements of the MnoxC show ranges of average values between 144 mg/kg in the palm oil field to 1440 mg/kg in the swamp rice field. The high measurement in the swamp rice field can for example be explained by the water adding oxygen, and when the field gets flooded, the added water will be beneficial for the MnoxC value (FAO, 1988). The oil palm, uncultivated area and pepper field all had low measured values. The C/N analysis showed that the average values of C/N ratio range between 11,02 in the palm oil field to 19,64 in the uncultivated area. This high average is however affected by spikes in the measurments, for example a meaurment of 36,42 in the uncultivated area. This shows that the ratio of C/N in the sampled areas are quite high, as the ratio is typically between 8-17 (PerkinElmer, 2010).

Importance of crops

The data that was obtained from the agricultural preference matrix showed results that supported our suspicions from the sampled soil. The preference matrix showed that fruit trees and vegetables were the most important crops according to the women, where as rice were the most important crop according to the men. This indicates that men and women in the village have different perceptions of their agriculture (see appendix 5, Focus group). Rubber and pepper are their biggest sources of income, which is dependent on the current market price. Oil palm is however the crop that could potentially provide the

highest income (See appendix 2, Quantitative). The market price and the opportunity of harvesting for subsistence use, can also serve as a reason behind peoples' preference for types of crops, and not necessarily the crop that is most suitable for that type of soil. When all of these parameters are weighed together, it suggests that rice is the most preferable crop for the farmers in the village, which can be correlated with the fact that rice is a tolerant crop, when cultivated in suitable conditions.

Fertilisers

Almost all farmers in the village use fertilisers and pesticides to some extent, and claim that it would not be possible to farm without it (Household 61, SSI). According to the farmers it is a trigger to see others fields being more productive, which makes them add even more fertilisers. This indicates a certain condition of the soil and that the methods of farming put a lot of strain on the soil.

In summary of the soil conditions for the selected fields, the measured and analysed data compared to the optimal conditions for these crops shows an indication of low fertility and that the conditions for the rice and pepper crops are not optimal. However, the conditions for the oil palm field indicate a moderate suitability. This conclusion is as mentioned supported by the collected information from questionnaires, focus groups and interviews with the owners of the lands, as well as farmers in the village.

Micro-level trends

From collectivism to individualism

The Ibans used to be a nomad people, frequently moving around, and finding new ways and places of living (Freeman, 1970: 49-50, 143). A theory related to this might then be that a strong community and sense of collectivism has been important for such a way of life, because it isn't possible to build up a security net of physical objects, and obtain a stable economy, when one is nomadic, in the same way as is possible when one is stationary.

> *"Individualism pertains to societies in which the ties between individuals are loose; everyone is expected to look after himself or herself and his or her immediate family. Collectivism as its opposite pertains to societies in which people from birth onwards are integrated into strong, cohesive ingroups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty."* (Hofstede, 1980: 51, in Lange et. al. 2012: 504)

As the Ibans then settled down in permanent villages, it is possible that this collectivism was manifested in the longhouses, as many of our informants reported that the primary advantages of living in longhouses were that you worked together, shared food and, if someone got sick, everyone helped (Household 81, 6, 52). A member of one of the other households recalls the collaborative approach that there used to be, saying that if someone helped you out in your field, you had to help them back, or pay them money for the work - that it was a mutual agreement between those who were willing to work together (Household 64).

Today, almost all of the households in Bayur are individual, and living lives that are not depending on the other people of the village. One of the households describe the difference in the community in the past, to the way it is now, in the lack of sharing, saying that if people have extra fish today, they do not share it, they sell it to each other and make some money. People have to buy everything

themselves – and that this is a good thing, because you can get what you want when you want it (Household 6).

Thus it seems that Kampung Bayur has made a transition from being a community defined by collectivism, to a community where individualism is more practiced. A supporting factor in this, is the fact that sharing and trading is no longer something that is done amongst others than family members – as a member of household 7 points out, almost everyone in Bayur are relatives, meaning that most people are either born or married into the village. The inhabitants of household 84 confirm this: they moved to Bayur three years ago, after having lived a nomadic life for many years. They do not have any familial ties in the village, and reports that even though they have lived there for three years, they still feel like they are new in the village.

Finally, the question of why this shift from collectivism to individualism has happened arises. In the following chapters, several possibilities will be examined, moving from local, micro level factors that have occurred within the village, to global trends on a macro level, and how these have had a push and pull effect on the social infrastructure of Kampung Bayur.

Access to utilities leads to independence

One of the main aspects in answering this question is most likely that the village gained access to utilities in 1995. It is feasible that the levels of dependence of each other in a community become lesser when everyone has access to treated water and electricity, as it facilitates basic necessities as personal hygiene and cooking within the home. As the dependence of each other decreases, the need to live in longhouses is no longer there. This newfound independence might have opened up new ways of considering possible ways of life, and where a wish to separate from the other families of the longhouse might have been impossible in the past, it has now been made possible. When asked about the negative aspects of living in a longhouse, the majority of the interviewed families talked about privacy and safety, mentioning that the neighbours would often not show respect by being noisy at night, and that it was harder to feel safe because it was

a mutual responsibility to keep doors locked etc. A member of household 81 described that the social life in the longhouse was different; that it was less respectful against each other, and that they feel more secure now, having their own private house.

Amount of land is naturally dwindling

Access to land is imperative to farming within the village. As Richard from household 81 pointed out during the interview, the amount of land that a person inherits will inevitably become smaller and smaller for each generation that passes. If a man has access to one field within the village, and he has four children, that field will have to be divided in four. When those four children then have children of their own, their fourth of the original field will have to be split into yet another amount of smaller portions, and finally, the amount of land that is inherited is too small to farm. This is another natural effect of the relatively new stationary lifestyle, which clearly has consequences on the social structures, including the transition from collectivism to individualism – if there is no land to farm, there is no choice but to choose other types of income.

Less big-scale farming/wish for "a better life"

A result from this dwindling of automatic access to land within the village will then naturally be to have less farming. When interviewing the different households, it was clear that the households with the most affluent lifestyle, who lived off of their farming, was the households who had oil palm plantations. If a family is not able to provide their children with enough land to have such plantations, it seems like a natural development that the parents then invest in other ways for their children to have a future: the clear majority of the interviewed households reported that savings for their children's education was in their top-three priority (Households 81, 52, 64, 61, 6). Furthermore, most of the parents in the households who had children of 18 years or younger stated that they wanted their children to have an easier and better life than they had themselves, and that they found education to be very important.

Educational Act – mandatory education for children

In relation to education, another important point can be made. During the past generation, governmental policies have secured mandatory education for children. In the 1970's it was introduced that children was to begin nine years of mandatory education between the age of 6 and 15, though this was not enforced by law. In 1996 the Education Act was implemented, and in 2007 the nine years of mandatory education was enforced by law (Hajar, 2014). This fundamental education, which usually lasts until the children are 18 years old, can be imagined to not only provide the children with a wish to proceed in the educational system, but also represent a great investment, as the children has already obtained the foundation needed to provide not only themselves, but also their family, with a more wealthy life. As the interviews confirmed, both the children and the parents prefer continued education and urban employment, rather than a continuation of the family farms. One of the interviewed mothers stated that she wishes for them [her children] 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 (Household 61). Another point made in relation to this, was that because of the mandatory education, the children are not taught about agriculture, and do not have a natural interest in it. A member of household 52 stated that young people do not care about agriculture, and that they possibly do not have the same cultural attachment to native customs. She mentioned that the experience would never be the same, because they have to go to school instead of helping in the field.

Macro-level trends

Urbanisation in Bayur

During our fieldwork we experienced that a household in Bayur would often have more than one way to ensure their livelihood. They would have an array of subsistence farming activities, the most common being swamp or hill rice cultivation, vegetables gardens or gathering from the forest, fruit harvesting and often some chickens, ducks, fish, snakes or pigs, while also growing and selling cash crops like pepper, rubber or fruits, while only very few owned oil palms. If they had anything extra of the subsistence crops or animals, they would typically sell them at the nearby market in Balai Ringin to add to their cash income. When asked in the focus group session, many of, especially the women, expressed the importance of the subsistence crops for their household's livelihood, indicating that they are still fairly reliant on their subsistence farming or at least that they see it as a safety net, should the cash crops fail or the prices drop, an insecurity of the agricultural trade we often heard them express during talks and interviews (see appendix 5, Focus group). One woman told us that her rice harvest had failed one year because of heavy rain and rats, so they had bought some ducks and chickens to be sure they would have something to fall back on, and that this had helped them through an economic rough patch. Another example of this are the rubber trees, which many of the villagers currently had on their land, but no one we talked to bothered to tap them because of the low prices on rubber at the moment, while a couple of years back they had all planted rubber because the price was good. Some of the interviewed villagers mentioned that they made a good sum of cash on their pepper, but that no one could know for sure whether the prices would drop in half a year, thereby underlining the economic uncertainty of being a farmer.

Remittance Dependency

So while most villagers had cash income from their farming activities, the households also had other ways of securing cash. One or more of the household members would have city jobs, like shop clerk, waitress, teacher, cook or police officer, or be otherwise employed by companies in large-scale agriculture, timber or construction. Otherwise it seemed to be very common to have daughters or sons remit their parents money, food or other commodities frequently. This is illustrated by the example of the couple in household 7, aged respectively 74 and 68, who are married pensioners living alone together. They have four grown children who all live other places than Bayur, but when they come to visit they will bring food or money and they helped buy their a big, new

pick-up truck that John and Tina use in their farming activities and for driving to the nearby towns or market to either sell their own produce or buy commodities. Another villager, a 40 year old high school teacher from household 64, expressed to us during an interview, that giving money to your parents was the natural thing to do, as a way of repaying them for all they had given the children growing up.

These examples and the practices in Bayur village in general are in coherence with the urbanization tendencies earlier described in the theory chapter, where people migrate away from rural areas to work but nonetheless do not cease maintaining their bond to their village through remitting some of the earned cash to their relatives in the village (Chuthatip Maneepong 2012:210). Considering the aforementioned insecurities the villagers felt about their subsistence crops and the continuing inflow of cash from cash crops because of the unpredictability of future market prices, it would seem that the extra money from remittances is the safety net under the households of Bayur, and that this keeps many of them from suffering too badly the strains of poverty, together with their strategic insistence on many different sources of subsistence.

An Easier Life through Education

Being a paid worker is in Bayur seen as securing a stable income compared to farming, and they are very conscious of, that education gives you access to these jobs, which is something they all underlined when talking about their children and what they wished for them. Many of them spoke of an easier life in the city, with stable income and less manual labour, and therefore paying school tuition was one of the things many of them spend a lot of money on, to give the children the best opportunities for a good life.

The remittances in Bayur were the middle aged and younger generation who benefitted from the government's policies about children receiving 9 years of education since the 1970's, making it possible for them to pursue other careers than farming (Hajar, 2014). Having gotten more education some of them were able to obtain a city job, which often require a certain amount of skill (Hansen & Mertz 2006:146).

Modernisation and Cultural Change

Remittances are as mentioned, besides cash, a source of modern and urban lifestyles and technology, which they introduce to the rural areas on their visits to their villages (Maneepong 2012:210). With the mayor improvements in the 80's and 90's in Bayur of the paved road, electricity and water pipes, new opportunities opened up for

connections between the rural and urban domain, and thereby also modern commodities, among those cell phone signal and 3G. Many of the villagers in Bayur have acquired a television and some even smartphones which they use eagerly to take pictures and make phone calls with, instantly and effortlessly connecting them with their family members and remittances in the cities and their friends and kin in other nearby villages, something that would not have been possible a decade or more ago.

The increased connectedness with the surrounding world is most likely also the reason for a number of changes in their society and culture, where they as mentioned earlier in this report, used to live very dependent of one another, sharing bounties of harvest and hunt as well as helping each other in times of scarcity, where they today no longer as freely share food with each other or help each other with the harvests, which many of the villagers expressed as being one of the major changes to the community.

DISCUSSION

The following section identifies whether the soil conditions in the area of Kampung Bayur is a possible factor to why people in the village chose off farm employment, and whether the present land use practices have an impact on the current soil conditions. This will be based on the results and analysis presented above.

Soil conditions as a factor to off-farm employment

As seen through the results from collected data and analysis, current soil conditions for palm oil, pepper and swamp rice are not optimal. With this said, the conditions for these specific areas can still be seen as moderately suitable for some types of cultivation, based on their resilience and the artificially created fertility of the soil. In terms of low fertility and soil quality as a factor behind choosing off farm employment, it can be considered a contributing factor, however not a driving one. This statement is supported by the residents of the village, whom expressed their concern regarding soil fertility on their land (e.g. household 49, questionnaire). A contributing element to this statement is that when trying to locate an uncultivated area for soil sampling, the headman Solomon and other farmers in the village had problems finding that type of area. This suggests that a majority of the land connected to the village is cultivated and farmed.

Perceptions of soil fertility

One additional note that came across in analysing the data was that it became obvious that the women and men of the village did not have the same perception of their fields, soil and agriculture in general. This fact could potentially affect their choice of crops and farming practices (see appendix 5). Since women consider fruit and vegetable more important, while men favour rice, it can affect the impact on the soil. This in the sense that they use more fertilizer and pesticides on the fruit and vegetables plantations, than they do on the swamp rice field. Both male and female farmers state that they think animal farming is important and useful for subsistence, which could be an opportunity to ease the

current pressure on the soil in the sense of natural manure. An example is one farmer who had both several types of crops and rearing of animals, which he/she bought and sold in the city. Buyers also came to the village to purchase his/her products. This shows that there is alternative land use practices as well as a blend between farming and working in the city (Household 61, SSI).

The low fertility of the soil can instead be seen as a driving factor in the use of fertilizers and pesticides, rather than off farm employment. As the farmers express that they keep applying more and more fertilizer in order to maximize the productivity of the soil and growth of the crops, they thereby also create a dependence on fertilizers for a strong and sufficient harvest (SSI & Questionnaire). This in it self is a land use practice that can have a future affect on the prospects of having agriculture on these lands.

Physical aspects

Several people in the village, including headman Solomon, mentioned that the water in the nearby river Krang could no longer be used, and that they have noticed, when fishing, a decline in fish species as well as amount of fish in the river. This implies that nitrogen and sulphur from the fertilizers runs down, ending up in the river. This suspicion is enforced by the fact that a lot of the fields are located on a elevation with slopes towards the river. The elevation of the village protects them from flooding during rain season. This, together with the fact that there is acid rain adding to the river and fields. The rain is acidic to the extent that headman Solomon told the students that if you got wet in the rain it was necessary to wash it of with treated water, otherwise you would get a headache. These factors suggest an extensive use of, if not even over usage of fertilizers that secondarily end up in the water, contributing to a larger impact on the environment in the area of Bayur.

The area of Sarawak have around 250 rain days each year, it is a heavy forceful rain that escalates the process of nutrient drainage (Selective Asia, 2010). This is due to leaking, which also contributes to the amount of fertilizers that needs to be added to increase production rates for the crops. The texture of the soil has a

role in water capacity, where it is mostly in this area clay and loam. This type of texture has a low capacity to hold water, which results in nutrient drainage. This also affects the use of pesticides, which will not be preserved in the soil (Agvise, n.d).

Generational changes

From the analysis of the quantitative and qualitative data, it is evident that there has been a major shift in circumstances and opportunities in the past generation, for the people in Kampung Bayur. The change from a collectivist society, to an individualistic one, has lead to a move in independence, and it has given the people in Bayur the opportunity to select the type of lifestyle that they want. It is a development that has enabled the inhabitants a higher degree of control over their life circumstances. This can for instance be seen in regards to present and future socio-economic factors: the ability to create a reliable income by either having a controlled and stabile produce from farming, or by having a steady job in a nearby town, which in turn would often allow the household to create savings. This enables parents to let their children proceed into further education, thereby giving them to ability to choose whether they want to stay in the village, or leave to get education and careers in the urban areas. Many of the informants reported to have adult children working in Kuching and Kuala Lumpur, and that this had not been a possibility for them, when they were young (Household 81, 6, 7). Two primary things can be said to cause this change – the push-effect of factors in the village, and the pull-effect of urban factors.

Urban pull and village push

As previously mentioned, some of the push-effects from within the village are land rights. As was clear from the gathered quantitative data, the vast majority of the land rights in Kampung Bayur are Native Customary Rights lands (appendix 2). However, from the qualitative data it seemed that the actual quality of the soil was not a push-factor as such, because most people had the opportunity to get fertilizers from the government. A defining factor though, was that the amount of land access is decreasing with each generation, slowly eliminating the natural incitement to continue farming within the village.

Another push-factor in regards to land rights is that the growing individualism in the village might possibly create an increase in vulnerability. If a particular family had problems with partially destroyed or even completely failed crops in the past, they would be able to share the yield of the other families. Today, the households are on their own, and are, as previously mentioned, even competing with each other. This was clear by the informants telling us that they needed fertilizers to compete with the quality of the other families' crops.

Gaining access to utilities, especially electricity, as well as obtaining reliable economies, has also resulted in a strong push-effect. The influence of the urban culture is quite literally brought into the living rooms of the people in Bayur, through television and social media. In most of the visited households, a television would be broadcasting news or American movies and TV-shows, presenting the people of Bayur with an alternative lifestyle: urban life.

A change of mind

An interesting matter in regards to this, is looking at the reasons for this change in possibilities – a large part of the reason is undoubtedly the physical and structural changes: getting access to roads, electricity and treated water, having less available land within the village, and having mandatory education for the children etc. However, another interesting point is that a part of the change can also be thought to be due to an influence on the mentality of the people of the village, leading to changes in wishes and priorities. As it was pointed out in the previous chapters, almost all of the interviewed parents said that they wanted their children to have an education and a career, in stead of having the same life as a farmer, as they had had themselves (Household 61, 84, 86, 6 et. al.).

Returning to the aspect of having access to television and social media, it is conceivable that these media are changing the minds of the people of the village. What they are presented with in the television is the pop-culture, showing young people with urban lives and careers, not to mention the self-promotion going on in social media. This type of lifestyle is glorified through the different media platforms, making it the most desirable – not only for the young people, but also

for the parents, who expressed a wish for their children to have this type of life. This is a change from the previous generation, where it was expected – and respected - to continue the family farming, as several of the households informed us (Household 52, 61, 6 et.al.).

Finally, it is interesting to note how the village has gone through major transformations in the past generations. From initially being nomads, not depending on physical space, yet depending greatly on each other, to settling down in a village where agriculture, economy and investments in the future were of high importance, and where they were slowly able to edge away from co-dependency. Finally, in the present situation, the new generation can be said to be returning to the nomadic lifestyle, freeing themselves from the physical ties, and working to obtain an even greater independence than their parents.

When doing fieldwork challenges and issues with the chosen methods will inevitably appear, therefore it is important to understand how these may affect the outcomes of your research. Some challenges and issues can be handled by minor changes to the chosen methods and their application, were others might be more difficult to control and may in turn impact the outcome of the results. The following parts discuss some of the challenges encountered during this field study.

Modernisation and global civil society

As mentioned in our synopsis and introduction in this report, the drive to modernise has been a main interest of the government in Sarawak for three decades, working to develop agricultural practices and general livelihood standards (Cramb & PSujang 2016:129-130). They have done so by different strategies, among those banning the burning of fields to drive farmers away from practicing shifting cultivation, while strongly promoting large-scale, commercial agriculture. The government has for example rewarded private companies or privatised government agencies with long term leases on land with the condition that there be planted oil palm (Cramb & Sujang 2016:131 ; Hansen et al. 2006:136). As previously mentioned, the government also made school

mandatory, and secured better infrastructure by paving roads throughout the rural areas (Cramb & Sujang 2016:134 ; T. S. Hansen & O. Mertz 2006:146).

As previously argued, modernisation and urbanisation is happening in Bayur, where many of the inhabitants have urban jobs, and they want their children to get longer educations and better jobs. We will further argue that these tendencies are part of a globalisation process, which according to Robison & Crenshaw (2014) is thought to be Westernisation in disguise (Robison & Crenshaw 2014:81-82). Globalisation is traditionally understood as the development of a world economy and a world market, where nations trade across borders, but today it is recognised as more than that; the emergence of a "global civil society" is also a part of globalisation, where Western norms, values and institutional forms are adopted by developing countries (ibid.:82).

The Western way

Robison & Crenshaw (2014) argue that when international trade is as extensive as it is, the dominant part will pressure the other to conform to certain ways of structuring organisations or work, which technologies should be used, besides also bringing along diverse cultural artifacts (ibid.:82-83). For reasons having to do with the extensive colonisation that the Western countries practiced throughout the 19th and 20th century, the West today is the dominant part in trade with developing countries. This causes a distinguishable Western template of cultural practice to be spread globally, including the political concept of the nation-state, democracy, mass education, minority rights, population control and environmental protection (ibid.:82). Because of the power that the West exerts over the developing countries, the indigenous population and organisations will try to internalise Western ways of thinking and acting to give them legitimacy in the face of the new world order, both nationally and internationally (ibid.:82-83). An example could be how the government of Sarawak is focusing on bettering educational levels of its citizens and their general livelihood standards, by promoting large-scale cash crop agriculture instead of shifting cultivation, which is by many seen as being a backwards practice with connotations of poverty (Hansen & Mertz 2006:146).

Building from that, Robison and Crenshaw (2014) suggest that power relations are not the only way to explain the described trend, and argue that social diffusion is also involved. Social and cultural diffusion is more likely to happen when the host country is structurally and institutionally alike to the donor country, and has good enough communication channels to transmit the material and immaterial culture to as many as possible (ibid.:83-85). The big cities create a good platform for diffusion and social innovation, as they have dense population and are connected technologically to other big cities. The cities also have broad range of connections to the developed world, exposing its inhabitants to international mass media, thereby sustaining innovation and industrialisation (ibid.:84).

In conclusion, it is arguable that governmental policies help to facilitate a snowball effect of cultural change in rural areas like Bayur, by exposing the village to the cultural diffusion and sense of legitimacy in Western ways, stemming from the global civil society linkages in the urban areas. We argue that what is happening locally in Bayur is a part of a global trend, connecting and urbanising the rural areas through technology and people migrating to the cities, that will lead to Bayur becoming more Westernised over time and more connected to the global civil society.

Method Discussion

Participation of the villagers

During both the focus group session and interviews it quickly became clear that there were a tendency in the village that might affect our fieldwork results; the men did not speak as much as the women. When going around from house to house and doing interviews, both in the case of questionnaires and SSIs, if the woman of the household was present, she was more likely to be the one speaking. This was one of the reasons for choosing to do the focus group session in two groups – one all male and one all female. By doing so, we were hoping to mitigate the issue of the men being more quite. However during the session it became clear that even in a group only with men, they were a lot quieter than the group of women sitting close by. Due to the provided space we did not separate them more, though on the basis of the knowledge we have now, it would be interesting to see if it had made a difference had the women not been present at all. The women tended to be a lot more active, both in answering questions and in socializing during the focus group session. This resulted in more comprehensive timelines from the group of women and a more challenging process in finishing the men's timeline, where we had to break minimal interference a bit to start the process.

Living at the headman's house

Even though staying at headman Solomon's house brought a lot of benefits, including easy access to maps and quick engagement with some villagers, it may also have limited our access to some information. Living in the headman's house means that we were being shown what the headman felt was interesting for us to see, potentially leaving out interesting details about other parts of the village life. On one side we could utilize his network to reach out to the villagers for informal interviews, transect walks and soil sampling, on the other hand finding our own interest persons and resources might have given us a different perspective on the village and their natural resources. Considering accommodation possibilities is therefore key in determining your entry approach when doing fieldwork of this kind.

Application of methods

Though the decision on methods were prepared at home, changes usually have to be made once in the field, as the reality might be different from the assumed situation. In the case of soil sampling, it is here important to consider which type of sampling you want to do, based on which results you are aiming to get. In this case we had to use an auger on one of the fields as the rice season meant that the swamp rice fields were flooded. Comparing auger samples to ring samples may create some inconsistencies in the data comparison. One natural science method that was planned, but did not end up being used, was the water sampling, as the river nearby was only used in periods and the fishing activities were not directly related to primary income activities or subsistence. Additionally, social science methods, such as participatory methods and interviews are always dependent on the respondents' level of participation, and are often developed on the basis of the reality you meet. In this case the interview guides were changed after the first couple of days in the village as we became more clear about what we found interesting about that village in particular. The focus group was created on site, as it was a collaborative effort between the Danish and Malaysian students and therefore we did not have much time to tailor it based on test runs or experience, in that sense it was a one-shot exercise, where the process and the results proved equally important.

Interdisciplinary group work

Working in an interdisciplinary group proved, from the beginning, to challenge everyone's use of terms and methods. It quickly became clear that the different disciplines had, sometimes widely, different understanding of the same terms or the use of specific terms, which resulted in a continuous mitigation and learning exercise throughout the duration of the field study period. Additionally, the differences in experience levels when it came to different methods affect the application of those methods. Due to this the results may very slightly based on who participated in the application of the method that specific day. However, it proved as a great learning experience for all, as we would try to put the group members in charge of the methods with which they had more experience, the other group members would then join them in the discussion and application of

those methods, to learn as much as possible from each other. Aside from the focus group, that required a smaller group of facilitators, everyone got the opportunity to participate in the different social and natural science methods.

CONCLUSION

In order to establish and understand the variety of livelihoods, conditions of land resources and how the urbanisation is connected to the socio-economic factors that influence the social infrastructure in the village of Bayur, several methods were used to collect and analyse data. This in order to obtain the aim of this project. It can be stated that the conditions of land resources are not optimal for cultivation of oil palm, pepper or swamp rice mainly due to the low fertility and low pH-levels of the fields. However, conditions for these specific areas can still be seen as moderately suitable for some types of cultivation, based on their resilience and the artificially created fertility of the soil. With this said, it can be concluded that land resource conditions or practices are not considered as a driving factor, but yet a influential on, of off-farm employment. Soil conditions can instead be seen as a triggering factor in the usage of fertilisers and land use practice choices. It can therefor be stated that even if the quality have a certain role, the access to and size of land is a determining factor in farmers choice to have or not have agriculture. This in the sense of land rights as well as the problem of dividing inherited land.

As previously discussed, the push effect that is going on in the village, combined with the pull effect of the urban areas, is creating a natural draw towards the cities, and all that they entail; education, careers and independent lifestyles are becoming more and more of a priority, and life within the limits of Kampung Bayur is fading with each generation. The influence of urbanisation is clear to see, and it obviously has a strong influence on the village. In rural areas all over the world, urbanisation is having an increasing influence, and thus, the development in Kampung Bayur can be seen as a natural reaction to those movements. Through the mandatory school system, the pavement of roads and the access to utilities, the urban tendencies have quite literally reached into the villages, causing significant changes to the physical and social structures of the village. Whether the village would have gone through the same development without the influence of urbanisation is hard to say, but it most likely would not have happened in the same fast pace as it has: primarily during the past

generation. However, foreign influences is not a new phenomenon in Sarawak, and there might thereby also have been alternative kinds of influences before the times of urbanisation, facilitating the transition into a society that seems to be decidedly open to the urban future that conceivably lies ahead.

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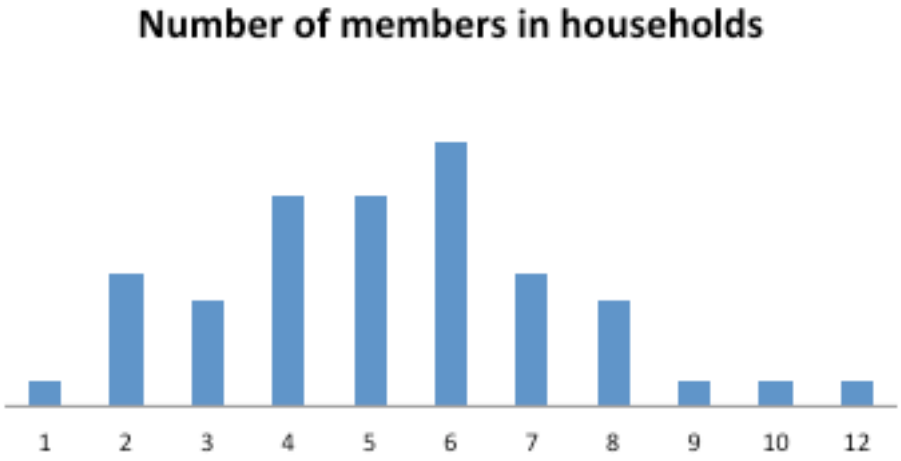
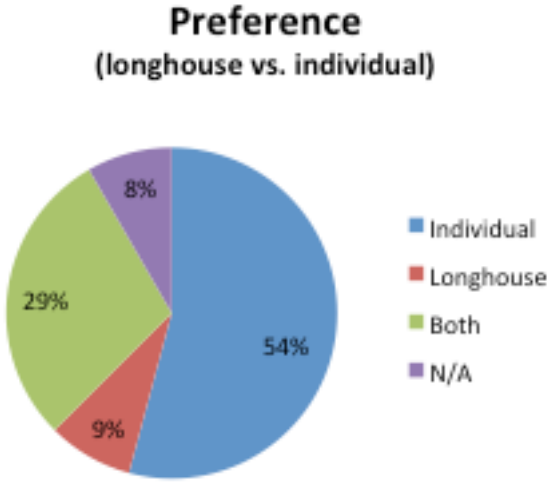
APPENDIX CONTENT

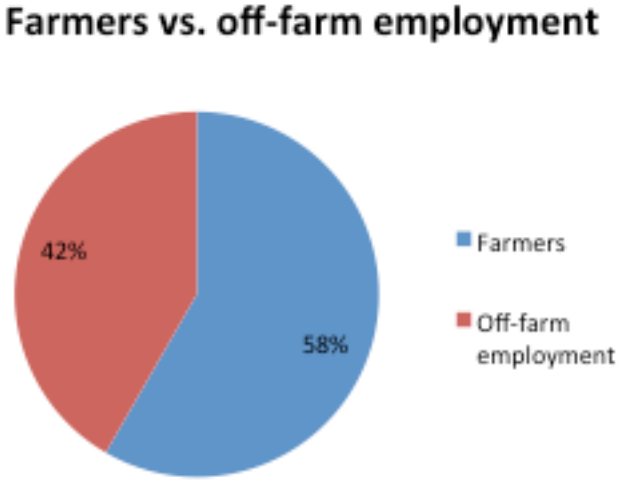
APPENDIX 1: Overview of applied methods

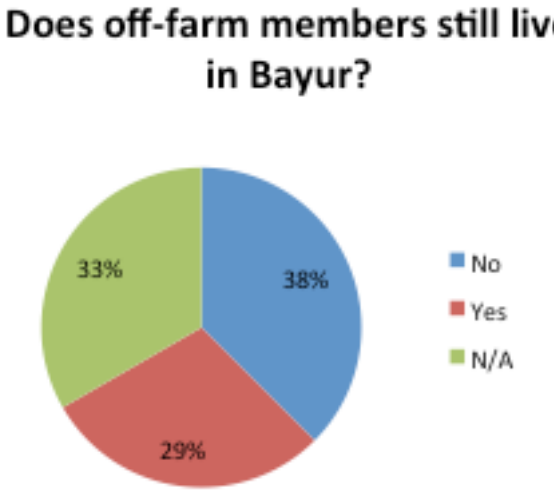
Methods applied	Number
Transect walks	3
Questionnaires	48
SSIs	8
Focus groups (preference matrix and timelines)	2
Community maps	1
Soil samples	11
GIS and Google Earth maps produced	8
Headman's family tree	1
Headman's timeline	1
Rice harvesting (participation)	1

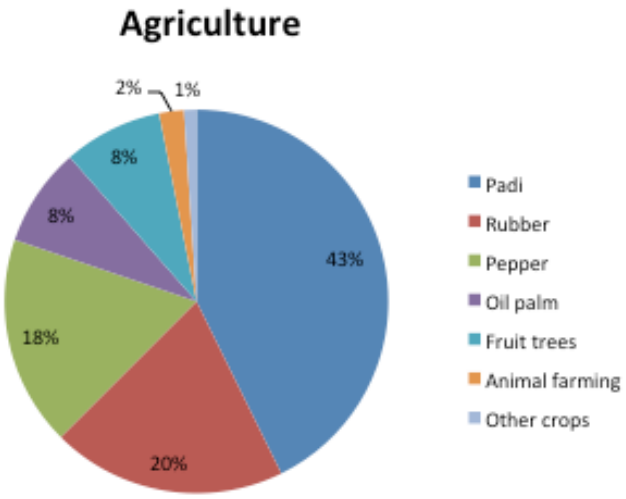
APPENDIX 2: Quantitative findings

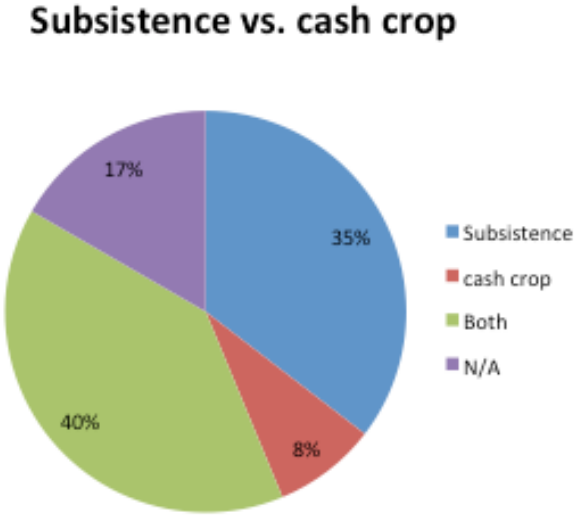







Does off-farm members still live in Bayur?
38%
29%
33%
No
Yes
N/A


Agriculture
43%
20%
18%
8%
8%
2%
1%
Padi
Rubber
Pepper
Oil palm
Fruit trees
Animal farming
Other crops


Subsistence vs. cash crop
35%
8%
40%
17%
Subsistence
cash crop
Both
N/A

APPENDIX 3: Questionnaire Guide

Family name/number	Number of household members	Number of close family members not living in Bayur	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 Bayor?	Remittences	Preference of NCR or title land

APPENDIX 4: Semi-Structured Interview Guide

Questions for semi-structured interview

If not asked during a Questionnaire session

1. What is your name?
2. How old are you?
3. How many people are in your household?
    a. What are their ages?
4. How many farmers?
5. Have you always lived in Kpg. Bayor?
6. Where did you move from?
7. Why?
8. Do you own land in or around Bayor?

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 Bayor

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

- What is Bayor 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 labour-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?

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?

- 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?

APPENDIX 5: Focus group session

Focus group participants: Women

Name	Age	Crops
Ninia	44	Oil palms
Mony	59	Rubber
Misi	63	Pepper, Rubber, Padi
Rose	51	Padi, Pepper, Rubber
Suli	40	Padi (hill), Rubber
Secilia	48	Padi
Paun	70	Pepper, Rubber, Padi
Duyah	58	Pepper, Rubber, Padi
Wani	48	Padi
Dorothy	25	Padi, Pepper
Dion	48	Pepper, Rubber, Padi

Women	
Total participants	11
Average age	50.36

Focus group participants: Men

Name	Age	Crops
Kennedy	43	Padi (hill), oil palm, fruit trees
Stangah	66	Rubber, oil palm, fruit trees, animals
Martin	45	Padi (swamp), rubber, fruit trees, animals
Franky	23	Padi (swamp), oil palm, fruit trees
Solomon*	65	Padi (swamp), pepper, rubber
Alan**	19	*helps on farm + school*

Men	
Total participants	5
Average age	43.5

**Seperate historical timeline with Solomon (headman) - therefore he was asked not to participate in the historical timeline part of the focus group session*

***Joined at the focus group for the historical timeline only*

Focus group participants: Women

Participants: 11
One stone each to place as yes/no answer
*Importance (group ranking): each crop ranked on an scale of 1-5, 5 being most important, 1 being least important

	Padi paya	Padi bukit	Pepper	Rubber	Oil palm	Fruit trees	Fish pond	Animal farming	Vegetables	Wild vegetables/ plants
Importance	6	3	8	8	1	11	-	9	11	10
Subsistence	10	6	8	0	0	11	-	10	11	11
Income (cash crop)	0	0	8	9	1	7	-	1	5	1
Low labour requirement	3	2	0	9	0	9	-	10	11	11
Ease of cultivation	7	4	7	9	1	11	-	10	11	0
Fertilizer	7	5	7	6	1	11	-	9	11	0
Pesticide	7	6	7	5	1	10	-	0	10	0
Importance (group ranking)*	5	5	5	4	0	3	-	4	3	2

Focus group participants: Men

Participants: 5
One stone each to place as yes/no answer
*Importance (group ranking): each crop ranked on an scale of 1-5, 5 being most important, 1 being least important

	Padi paya	Padi bukit	Pepper	Rubber	Oil palm	Fruit trees	Fish pond	Animal farming	Vegetables	Wild vegetables/ plants
Importance	4	4	1	2	3	5	-	3	3	3
Subsistence	4	1	0	0	0	5	-	5	5	5
Income (cash crop)	0	0	1	5	3	0	-	1	0	0
Low labour requirement	4	4	0	3	0	4	-	2	0	4
Ease of cultivation	4	1	1	3	3	5	-	0	1	3
Fertilizer	3	0	2	4	3	2	-	4	0	0
Pesticide	3	0	2	2	3	0	-	0	0	0
Importance (group ranking)*	5	3	3	4	3	3	-	2	2	4

APPENDIX 6: GIS and Google Earth maps

Overview map: village and sample sites

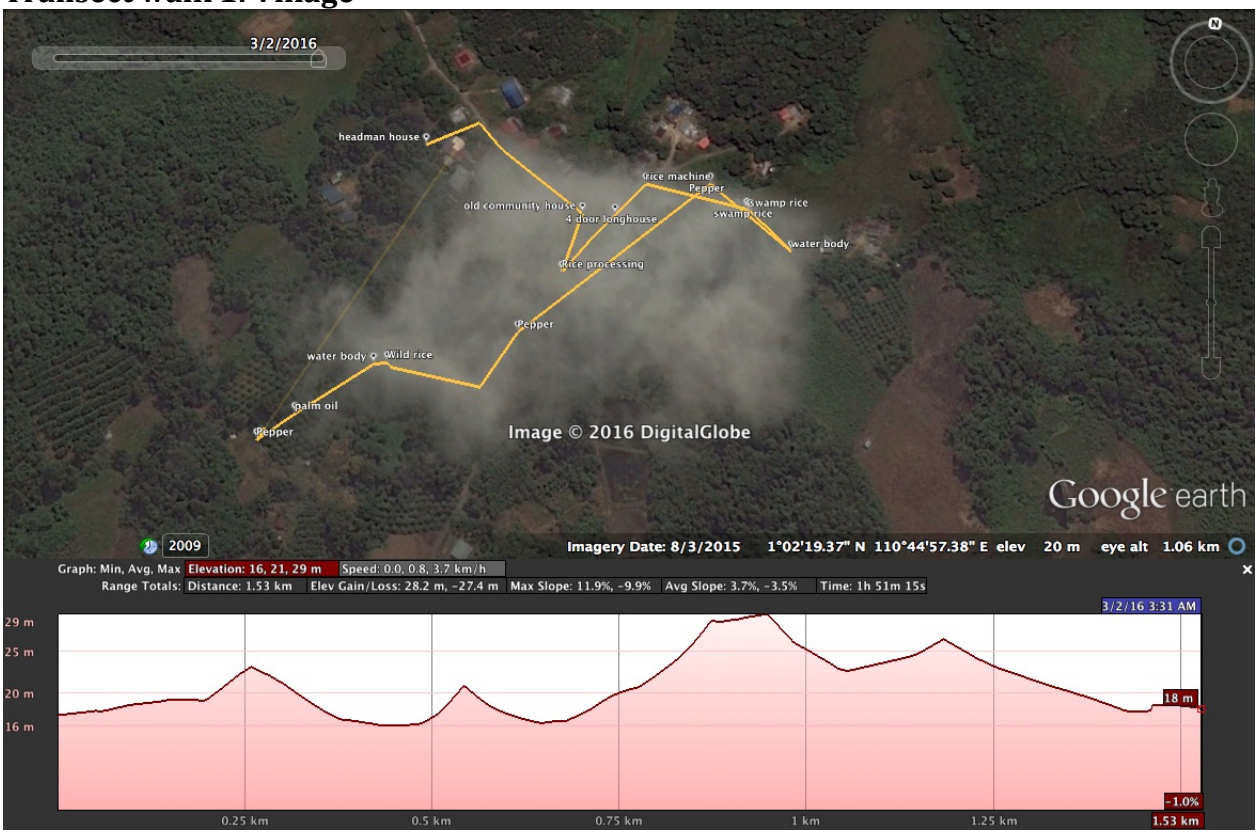
Soil sample site 1: Swamp rice

Soil sample site 2: Oil palm

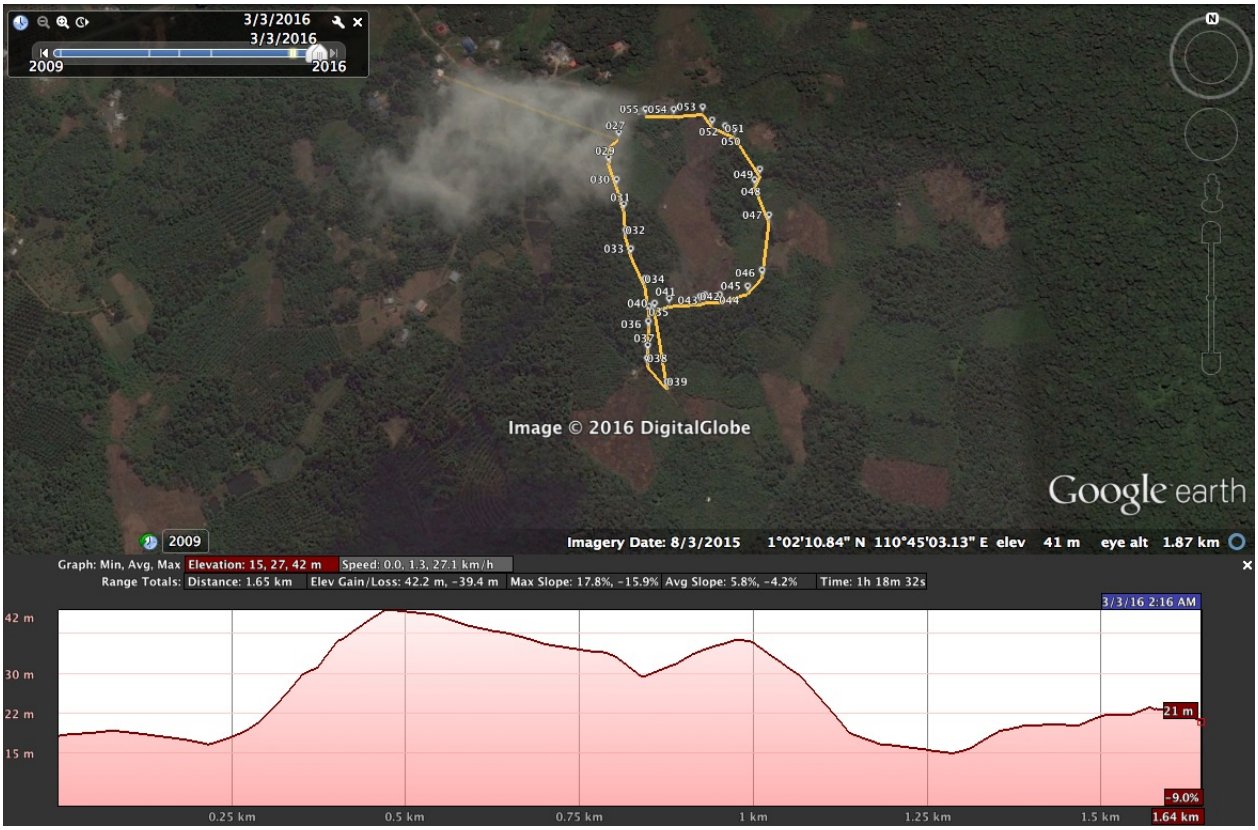
Soil sample site 3: Uncultivated

Soil sample site 4: Pepper

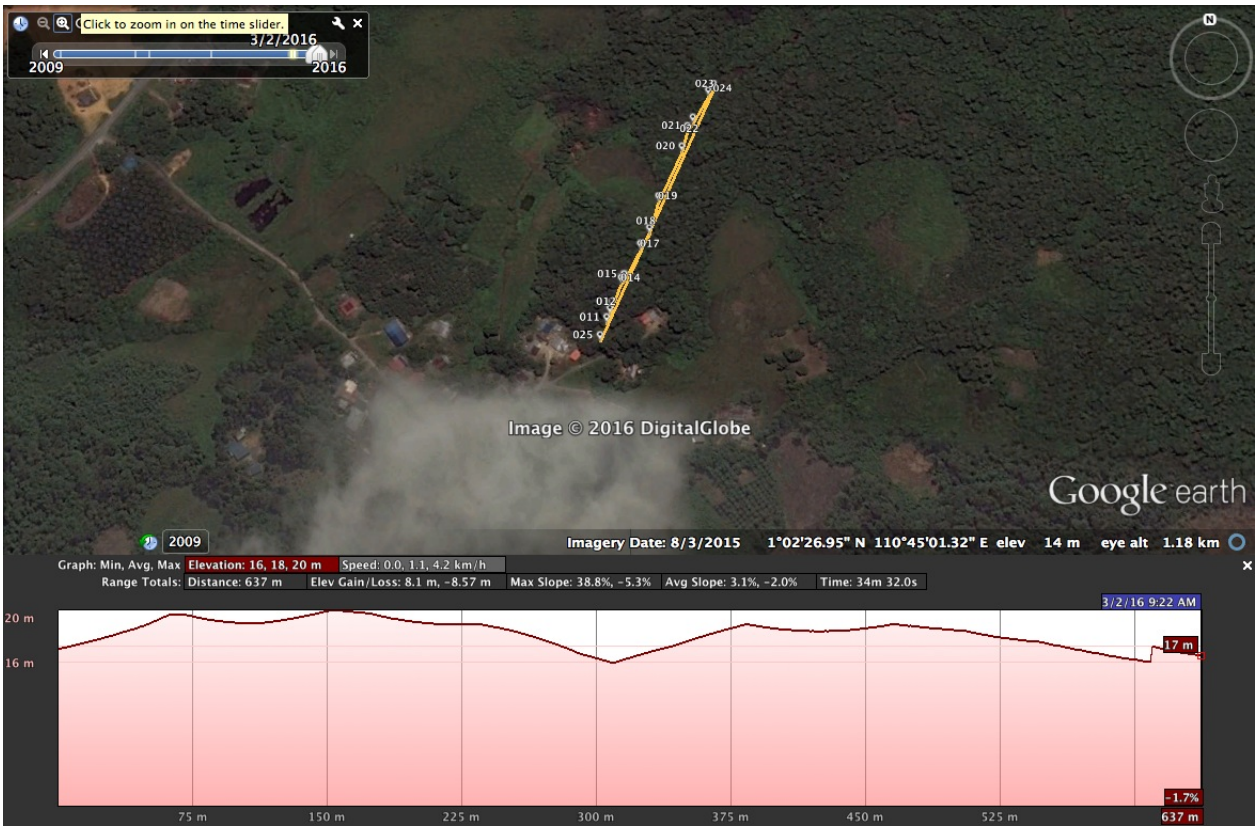
Transect walk 1: Village



Transect walk 2: Fields

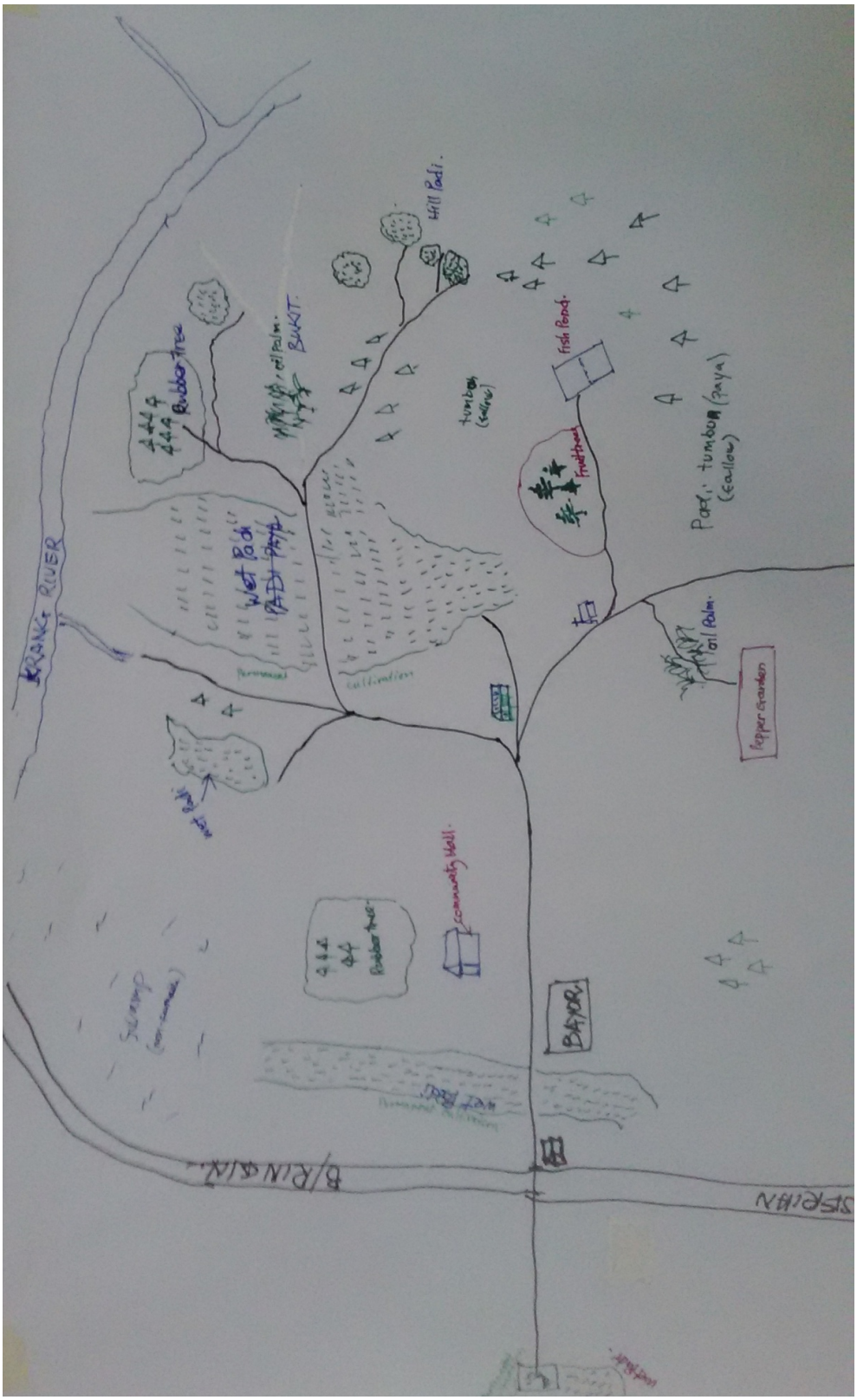


Transect walk 3: River



APPENDIX 7: Village maps

Community map (in collaboration with headman Solomon)



Village map (provided with headman Solomon)

APPENDIX 8: Soil data

Field data

Site	Crop	Method	Terrain	Sample elevation	m.a.sl (GPS)	Coordinates	Profile	Layer (cm)	Replicate	Texture	Colour (code)	Colour (name)
1	Wet padi	Auger	Slight slope	Low	2.61*	1° 2'30.98"N 110°44'52.38"E	-	-	R1	Silt loam	10yr 2/2	Very dark brown
1	Wet padi	Auger	Slight slope	Mid	4.92*	1° 2'29.66"N 110°44'51.50"E	-	-	R2	Silt loam (rich clay)	5yr 2.5/1	Black
1	Wet padi	Auger	Slight slope	High	4.06*	1° 2'29.11"N 110°44'50.42"E	-	-	R3	Silt loam (rich clay)	10yr 2/2	Very dark brown
2	Oil palm	Ring	Hill area	Low	12.99	1° 2'22.02"N 110°44'1.72"E	P1	0-10	R1	Clay loam	10yr 4/1	Dark grey
2	Oil palm	Ring	Hill area	Low	12.99	1° 2'22.02"N 110°44'1.72"E	P2	10-36	R1	Silty clay	10yr 8/6	Yellow
2	Oil palm	Ring	Hill area	Low	15.03	1° 2'21.96"N 110°43'58.92"E	P1	0-19	R2***	Sandy clay loam	10yr 5/4	Yellow-ish brown
2	Oil palm	Ring	Hill area	Low	15.03	1° 2'21.96"N 110°43'58.92"E	P2	19-48	R2***	Sandy clay	2.5yr 7/6	Yellow
2	Oil palm	Ring	Hill area	High	25.89	1° 2'21.48"N 110°44'0.73"E	P1	0-8	R3	Silt loam (poor clay)	10yr 5/2	Grey-ish brown
2	Oil palm	Ring	Hill area	High	25.89	1° 2'21.48"N 110°44'0.73"E	P2	8-37	R3	Silty clay	10yr 6/2	Light brown-ish grey
3	Uncultivated	Ring	Flat area**		-6.27	1° 2'27.18"N 110°45'17.41"E	P1	-	R1	Sandy loam	2.5yr 5/4	Light olive brown
3	Uncultivated	Ring	Flat area**		-6.27	1° 2'27.18"N 110°45'17.41"E	P2	-	R1	Clay loam	2.5yr 8/6	Yellow
3	Uncultivated	Ring	Flat area**		0.85	1° 2'26.91"N 110°45'17.41"E	P1	-	R2	Silt loam	10yr 3/1	Very dark grey
3	Uncultivated	Ring	Flat area**		0.85	1° 2'26.91"N 110°45'17.41"E	P2	-	R2	Clay loam	10yr 7/4	Very pale brown
4	Pepper	Ring	Slope	High	13.39	1° 1'49.50"N 110°45'2.52"E	P1	0-3,5	R1	Silt	10yr 3/1	Very dark grey
4	Pepper	Ring	Slope	High	13.39	1° 1'49.50"N 110°45'2.52"E	P2	3,5-31	R1	Clay loam	10yr 6/4	Light yellow-ish brown
4	Pepper	Ring	Slope	Mid	11.15	1° 1'49.29"N 110°45'2.01"E	P1	0-5	R2	Silt loam	10yr 3/1	Very dark grey
4	Pepper	Ring	Slope	Mid	11.15	1° 1'49.29"N 110°45'2.01"E	P2	5-33	R2	Sandy clay	10yr 7/4	Very pale brown
4	Pepper	Ring	Slope	Low	8.11	1° 1'49.18"N 110°45'1.42"E	P1	0-3	R3	Silt loam	10yr 3/1	Very dark grey
4	Pepper	Ring	Slope	Low	8.11	1° 1'49.18"N 110°45'1.42"E	P2	3- 30	R3	Sandy clay	10yr 7/4	Very pale brown

**Averages based on 5 sample holes per sample*

***Surrounded by the river on 3 sides*

****Oil palm leaves may have previously decayed here*

Laboratory data

Soil information
Weights
Density
C-N Analysis
PoX
pH

Site	Profile	Replicate	Crop	Start weight (g)	Extracted weight (g)	Weight after grind (g)	Soil Bulk Density (g/cm3)	Average: Bulk Density (g/cm3)	Weight (MG)	N %	C %	C/N Ratio	Average: N %	Average: C %	Average: C/N	Weight (g)	Absorbance (550. Onn)	Result M/L (konc)	Calculated: MnoxC (mg/kg)	Average MnoxC	pH-value	Average
1	-	R1	Wet padi	190,6	10,08	200,68	0,19	0,16	54,6	1,03	16,74	16,5493	0,75	11,42	15,1779	02.50	0,208	0,001	1368	1440	4,77	4,9
1	-	R2	Wet padi	228,28	10,1	214,18	0,23		61,8	0,53	7,67	14,8154				02.51	0,084	0	1440		4,97	
1	-	R3	Wet padi	68,14	10,18	57,96	0,068		65,9	0,7	9,84	14,1691				02.50	0,037	−0,001	1512		4,95	
2	P1	R1	Oil palm	147,04	10,04	137,05	0,147	0,14	59,7	0,15	1,42	9,746	0,24	1,22	11,0202	02.50	1,868	0,018	144	144	5,23	4,54
2	P2	R1	Oil palm	165,7	10	155,7	0,165		58,8	0,05	0,31	5,9726				02.51	2,246	0,021	−72		4,18	
2	P1	R2	Oil palm	/	/	/	/		/	/	/	/				/	/	/	/	/	/	
2	P2	R2	Oil palm	/	/	/	/		/	/	/	/				/	/	/	/	/	/	
2	P1	R3	Oil palm	130,67		130,67	0,131		53,1	0,13	2,23	17,3317				02.52	1,647	0,015	360		4,69	
2	P2	R3	Oil palm	101,03		101,03	0,101		54,1	0,08	0,91	11,0306				02.54	1,947	0,018	144		4,06	
3	P1	R1	Uncultivated	75,95	10,03	65,92	0,076	0,09	60,3	0,16	2,46	15,7425	0,14	3,43	19,6426	02.52	1,771	0,017	216	324	4,56	4,54
3	P2	R1	Uncultivated	109,16	9,95	99,21	0,109		57,5	0,08	1,16	14,3748				02.51	2,715	0,026	−432		4,9	
3	P1	R2	Uncultiva	75,4	9,96	65,44	0,075		52,1	0,26	9,28	36,4255				02.51	0,329	0,002	1296		3,86	

			ted																		
3	P2	R2	Uncultivated	139,1	10	129,1	0,139		58,2	0,07	0,8	12,0274				02.52	1,836	0,017	216		4,83	
4	P1	R1	Pepper	92,02	9,98	82,04	0,092	0,11	67,4	0,22	4,45	20,8973	0,16	2,32	14,2111	02.52	1,161	0,011	648	312	4,45	4,55
4	P2	R1	Pepper	98,07	9,97	88,1	0,098		64,8	0,1	1,22	12,7555				02.51	1,427	0,013	504		4,45	
4	P1	R2	Pepper	120,15	10,01	110,14	0,12		67	0,21	3,09	14,93				02.51	2,022	0,019	72		4,45	
4	P2	R2	Pepper	120,76	9,98	110,78	0,121		59,8	0,12	1,51	12,5088				02.54	2,009	0,019	72		4,45	
4	P1	R3	Pepper	109,47	10	99,47	0,11		56,4	0,21	2,53	12,0433				02.55	1,814	0,017	216		4,84	
4	P2	R3	Pepper	92,13	10,01	82,12	0,092		63,9	0,09	1,12	12,1319				02.53	1,571	0,015	360		4,63	

Weight is measured without bag weight (5,81) g.

APPENDIX 9: Data matrix

Problem statement	Research question	Methods	Expected data obtained	Contributes to	Equipment	Possible problems with the method
The aim of this research is to: Understand the variety of livelihoods in Bayur by examining household structures, access to and usage of land; Examine the specific conditions of the land resources; Investigate how urbanisation is connected to the socio-economic factors that influence the social infrastructure in Bayur.	**RQ1:** What are the key factors and main activities contributing to the livelihoods of the people in Bayur?	Questionnaire	Quantifiable data on the household structures, jobs, farmers, off-farm employment, NCR land vs. land titles, crops, etc.	Overview of the livelihoods in Bayur	Questionnaire guide, pens, paper	Vailidity of findings based on coverage (percentage) of the village
		Informal interviews	Informal information on livelihoods	Overview of the livelihoods in Bayur	Pens, paper	Willingness of local villagers to participate / limited consistency questions asked
		Transect walks	Informal information on livelihoods	Overview of the livelihoods in Bayur	Pens, paper, GPS	Villgers' knowledge and willingness to share knowledge
		Focus group	Agricultural practices and the villagers view of these	Overview of the agrilcultural practices of the village (including the importance as seen by the groups)	A1 paper, permanent markers (several colours), stones	Number of participants / level of participation
		SSI	More in-depth information on livelihoods and key factors influencing these	Key factors and main activities of livelihoods in Bayur	Interview guide, pens, paper	Participation by the villagers / securing interviews
	RQ2: How does the land use practices affect the land conditions and what is the current status of the land?	Soil sampling and tests in the field	Soil samples for further testing and initial on-site tests (colour, texture)	The land use practices' affect on the land conditions	Auger, rings, shovel, GPS, plastic bags, measurement tape, hammer, permanent markers, soil colour book, overview of soil types (texture)	Weather conditions / knowledge of equipment
		Soil tests in laboratory	pH values, C and N, Permanganate Oxidizable Carbon	The land use practices' affect on the land conditions	Isotope-Ratio Mass Spectrometry (IR-MS), Permanganate reagent, a glass beaker, glass bottle. graduated cylinder, destilled water, pipette + tips. falcon tubes, plastic flasks, plastic pipettes, Falcon tubes, plastic container for waste	Knowledge of equipment and testing procedures

	*(**RQ2**: continued)*	Focus group	Overview of agricultural practices	Land use practices	A1 paper, permanent markers (several colours), stones	Number of participants / level of participation
		Questionnaire	Overview of NCR and title land	Land use practices and status fo the land	Questionnaire guide, pens, paper	Vailidity of findings based on coverage (percentage) of the village
		Transect walks	Informal information on land use and soil conditions	Land use practices and status fo the land	Pens, paper, GPS	Farmers' knowledge and willingness to share knowledge
	RQ3: Which socio-economic factors dominate the urbanisation and off-farm employment, and what effects do these have on the social infrastructure in Bayur?	Questionnaire	Quantifiable data on the social infrastructure	Overview of social infrastructure	Questionnaire guide, pens, paper	Vailidity of findings based on coverage (percentage) of the village
		Informal interviews	Informal information on the social infrastructure	Overview of social infrastructure	Pens, paper	Willingness of local villagers to participate / limited consistency questions asked
		Transect walks	Informal information on the social infrastructure	Overview of social infrastructure	Pens, paper, GPS	Villgers' knowledge and willingness to share knowledge
		SSI	Socio-economic factors, urbanisation trends, off-farm employment patterns	Understanding of the trends influencing/guiding the urbanisation	Interview guide, pens, paper	Participation by the villagers / securing interviews
	Methods for overall understanding	Community map	Village overview, agricultural areas, local agricultural systems and knowledge, households, roads, etc.	Overview of village agriculture, household capacity, etc.	A1 paper, permanent markers (several colours)	Willingness of local villagers to participate. Potentially limited knowledge in the village of maps.
		Participatory methods	Informal information that might not otherwise be shared in semi-structured exercises	PRA or observation participation: social activities with the villagers	Pens, paper	Willingness of local villagers to open up and share knowledge
		Timeline, Family tree	Interview with villagers and headman to put into perspective the events of the generations	Overview of village history	Pens, paper	Informal conducts

APPENDIX 10: Field work plan

Tentative fieldwork plan

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Morning		Village history (w/ headman) Transect walk: Fields	Transect walk: Hill rice	Proposal presentation	Questionnaire	Soil sampling (swamp rice & oil palm)	Soil sampling (uncultivated)	Questionnaires	Questionnaire Soil sampling (pepper)	SSIs	Final presentation
Afternoon	Welcome ceremony Planning (w/ headman) Transect walk: Village Informal interviews	Transect walk: River Questionnaires Community mapping (w/headman)	Presentation preparation		Questionnaire	Questionnaire	Questionnaire	SSIs Focus group	Questionnaire SSIs	Preparation for final presentation	

APPENDIX 11: Synopsis

Synopsis

SYNOPSIS, BAYUR

Agriculture and income generating livelihood strategies in Bayur

Group members:
Alexander Buch-Larsen, Anne-Sophie W. Frausing, Cecilie Jasmin Fugl Rasmussen, Claudia Kassim, Karen Agustine, Nazifah Nuh, Sofie Terp Clausen and Stina Jansson
24 February 16
Thematic Course: Interdisciplinary Land Use and Natural Resource Management (SLUSE)

INTRODUCTION

The village of Bayur is located on the third largest 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 interests 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 one of two things might have happened: either it has started with a 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 it has started with a change of social and cultural patterns (e.g. due to urban influences or changes in cash-crop prices) → migrational work → lack of farming. Ultimately it might have resulted in a circular effect, which reinforces itself. (See figure 1)

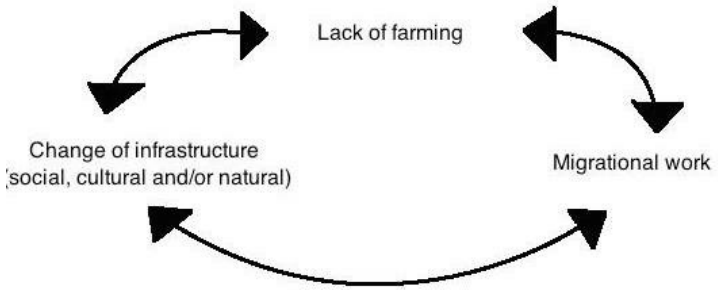


Figure 1. Circular effects of livelihood/infrastructural patterns.

Statement of objective and research question

The aim is to understand the livelihoods of the people living in Bayur, 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.

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 do 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 households have legal ownership over lands whilst others do not?
- 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?
- 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

- Organization 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

SYNOPSIS, BAYUR

Ongoing development projects and current/historical trends in the area

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 long-term 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 large-scale 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 in regards to land rights

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.

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.

Number of group members	ALL (5)
Expected time (h)	3

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 method 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, or 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 instance Bayur's land units, soil types, natural resources and households, from the perspective of the people of the village. This will be carried out by firstly explaining our expected outputs and the material that are available for them to create the map with (paper and different colored pens). This method is out carried together with 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. 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.

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)

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

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.

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

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	≥4
Expected time (h)	8

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APPENDICES

Appendix 1: Expanded method descriptions

Transect walks

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Soil Sampling

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.

Water Sampling

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

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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.

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 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. Are there subjects you want us to avoid or not talk to the villagers of Bayur about?

These subjects might be:

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

Sampling code system

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

em statement	Research question	Sub questions	Expected data obtained	Methods	Equipment	Possible problems with the method
he aim is to understand the hoods of Bayur villagers where ation and off-farm employment minating factors, and what the l, economic and environmental sons are, as to why income-ating agricultural production is widely practiced in the village. hermore, the aim is to examine ow this livelihood structure ences 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 villagar the picture quality, and the risk of not getting t cameras back from the participants.

Continued on text page

The aim is to understand the lihoods of Bayur villagers where gration and off-farm employment dominating factors, and what the ial, economic and environmental easons are, as to why income-erating agricultural production is t widely practiced in the village. rthermore, the aim is to examine how this livelihood structure uences 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 Malaysia 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

lecisions 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						