The effects of land development schemes on land use and livelihood in Kampung Sessang

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Preface

This field course report is the written result of the authors' participation in the SLUSE Interdisciplinary Course on Land Use and Natural Resource Management (2008). The purpose of the report, as related to obtaining the SLUSE Certificate, is to document our research process and findings during the fieldwork, 7th of March to 20th of March in Kampung Sessang, Sarawak, Malaysia.

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List of abbreviations

BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
DBH	Diameter at Breast Height
DID	Drainage and Irrigation Department
DO	Dissolved Oxygen
EC	Electrical Conductivity
FELCRA	Federal Land Consolidation and Rehabilitation Authority
FRA	Forest Resource Assessment
GPS	Global Positioning System
IADA	Integrated Agricultural Development Area
IADP	Integrated Agricultural Development Project
IRRI	International Rice Research Institute
MARDI	Malaysia Agricultural Research Development Institute
NAL	Native area land
NAP	National Agriculture Plan
NCL	Native customary land
PRA	Participatory Rural Appraisal
SALCRA	Sarawak Land Consolidation and Rehabilitation Authority
TCC	Total Coli form Count
TFC	Total Faecal Count
TOL	Temporarily occupied land
TSS	Total Soluble Solid

Acknowledgements

We would like to express our gratefulness to the Faculty Of Life Sciences, Denmark for giving us the opportunity to do this field study and to our teachers Andreas de Neergaard and Michael Eilenberg. The chance to try out methods in a real life context has been a great learning experience, and has taught us that there are things you simply cannot learn from reading books.

We would also like to thank our Malaysian counterparts, Geri, Tze and Elizabeth for a pleasant collaboration during our field trip. It has been a great experience, both socially and academically, to work interdisciplinary and internationally. Furthermore we would like to thank the Malaysian supervisors and our interpreter Nur Sara Shahira for their support during our stay in Sarawak.

Last but not least we would like to thank the Penghulu Maslem Elin, Chighu Haja, Mr. Abong Mong and Mr. Rajali for their assistance and the people of Sessang for making us feel welcome and for the patience they have shown during our interview sessions. It has been fun and interesting to experience everyday life in Kampong Sessang.

Abstract

Kampung Sessang has been the focus of many land development schemes seeking to develop land in the Roban area, including Oil Palm, paddy, Pineapple, coconut and mushroom schemes.

Sessang has traditionally been involved in Paddy rice farming for own consumption, but in the recent years, both paddy fields and forest areas around Sessang have given way to the Governments oil palm development goals.

This study sets out to explore the effect of the land development schemes on the livelihood and land use of the villagers in Sessang. More specifically the study seeks to investigate what the major sources of food and income n the village are, how the villagers make use of their own land and whether or not the development schemes have had an influence on this. Added to this it will be examined to what extend the villagers use the natural forest in the area and whether or not the access to the forest has decreased. Finally the study will investigate the way the villagers organize themselves when engaging in the development schemes.

The main findings are that Sessang over the past 50 years has gone from mainly being focused on subsistence farming to an income-based economy. While the villagers still use the forest, it is not considered an important resource. There is a great enthusiasm towards the Oil Palms as they have led to a development of the area and gives the villagers a secure supplementary income.

Table of contents

Preface 2
List of abbreviations 3
Acknowledgements 4
Abstract 5
Table of contents 6
List of tables 7
List of figures 7
List of authors 8
1.0 Introduction 9
    1.1 Background 9
    1.2 Objective 11
    1.3 research questions 11
    1.4 Study area 12
2.0 Methodology 17
3.0 Results/discussion 21
    3.1 Sources of income 21
    3.2 Sources of food 29
    3.3 Access to and use of forest products 32
    3.4 Tenure relations 43
    3.5 Organization 46
    3.6 Effects of Oil Palm on Soil and Land quality 48
4.0 Conclusions 56
5.0 References 57
6.0 Appendices 59
    6.1 Synopsis 59
    6.2 List of methods and data 79
    6.3 Results of FRA 80
    6.4 Interview guide for structured interview 83
    6.5 Resource Mapping images. 84

List of tables

Table 1 – Increment in number of households in Sessang…….14
Table 2 - Scoring exercise……..…25
Table 3 – Yearly calendar……...…28
Table 4 – Transect walk of Sessang……35
Table 5 – Resources available in the forest 50 years ago and today……...38
Table 6 – Land classifications…….43
Table 7 - Chemical properties of the soils in Sessang…….49
Table 8 - Chemical properties of the river……...51
Table 9 - Water Sampling Location and General Conditions……..51
Table 10 - National Water Quality Standards (NWQS)……..52

List of figures

Figure 1 – Main areas of occupation……22
Figure 2 – Source of income according to the main activity……....23
Figure 3 – Income sources related to main occupation……24
Figure 4 – Sources of food products…….29
Figure 5 – Resources maps……...33
Figure 6 – Use of forest products……..36
Figure 7 - Use of forest products related to main occupation……...37
Figure 8 – Use of forest products related to age……...38
Figure 9 - Land classification in Sessang…….44
Figure 10 - Oil palm cultivation……....45
Figure 11 – Level of education…….46

List of authors

Chapter	Author
1.0 Introduction	
1.1 Background	Franklin
1.5 Study area	Sarah
2.0 Methodology	Jakob
3.0 Results/discussion	
3.1 Sources of income	Sarah
3.2 Sources of food	Sarah
3.3 Access to and use of forest products	Jakob
3.4 Tenure relations	Gopinath
3.5 Organizational structure	Jakob
3.6 Long-term sustainability	Franklin
5.0 Conclusions	Sarah, Jakob

1.0 Introduction

1.1 Background

This study took place in Sessang, a village in Sarawak, a province of Malaysia. Like most Malay communities, the residents of Kampung Sessang rely on agricultural activities as a source of their livelihood (Jomo et al, 2004; Norwawi, 2002). Each household in the village has its own plot of land averaging between 5-8 acres, and 70% of this land area is used for rice cultivation, especially wet rice cultivation with fruit trees interspersed on the remaining parts of the land. Although subsidies for wet rice cultivation ceased in the 1970s, villagers still continue farming for their own consumption (Devisschaer, 2007).

The State Government of Sarawak has during the last decades aimed at transforming the rural economy through large-scale agricultural land development. This goal is to be achieved by developing the NCR land[1] into commercial plantations. (forever.com/sam/sarawak/articles/landrights.html). According to the State Government, the NCR lands are mostly kept idle, under-utilized and unproductive (Ministry of land Development 1997:16). The new NCR land development strategy is based on the promise, that this idle and fragmented native land can be consolidated into "land banks", which can be developed to large-scale commercial plantations. This strategy is a way of bringing together native landowners (with their land), the private sector, (with its capital and expertise) and the government, acting as trustee to manage the interests of the landowners. The native landowners lease their land to the plantation, with options of becoming shareholders of the plantation.

In Sessang, oil palms are the main plantation crop besides the wet rice cultivation and have been identified as the main source of income to the people. According to the Head of the village, about half of the people are involved in these plantations, especially when their lands were leased to SALCRA[2]. The Sarawak Ministry of Land

[1] **NCR land**- ***Native Customary Rights Land***: NCR land are under the Sarawak Land Classification Ordinance, categorized as land in which native customary rights, whether communal or otherwise, have lawfully been created prior to 1st January 1958 (forever.com/sam/sarawak/articles/landrights.html).

[2] **SALCRA**- ***Sarawak Land Consolidation and Rehabilitation Authority: S***ALCRA has been empowered to develop all categories of land but priority is given to the development of NCR land in Sarawak for agricultural purposes by establishing plantations. It started as a 100% state agency, but has changed into a joint venture company where the private company is the main economic driver but where the government still has great influence on the management of the plantations.

Development acknowledges that around 1.5 million hectares of land are today recognized as NCR land. In 1999 close to 300,000 ha of this land where converted to oil palm plantation. The ambition is that oil palm plantation will cover 1 million ha in 2010 (Cooke 2002:193). Meeting these goals depends on people's acceptance of the official aims and wishes to invest their land in the development schemes. The Ministry of Land Development has therefore been running a comprehensive campaign, trying to persuade people to give up their subsistence livelihood and instead lease their land to plantations (Cooke 2002:195,200ff). The comprehensive reorganization of the economy in Sarawak brings along extensive social and environmental changes. In order for a state managed development scheme to succeed, it is therefore essential that the development fits needs and strategies in the communities. For that reason it is necessary to be aware of how people respond to and incorporate the development scheme in their livelihood strategies, how the scheme fits with old practices and which positive and negative impacts the development scheme has on different people’s livelihood. Likewise it is important to look at probable environmental side effects that might arise from such developments.

1.2 Objective

The objective of the study is to investigate the effects of Government land development schemes on land use and livelihood of the villagers of Kampung Sessang.

1.3 research questions

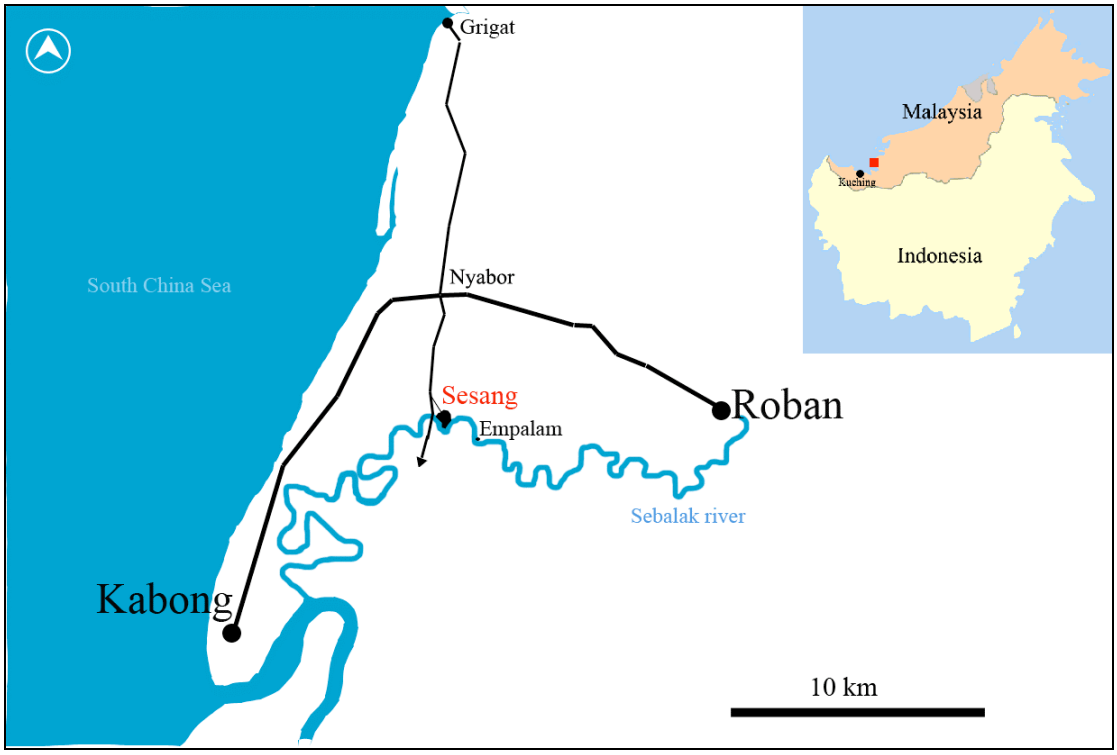
In accordance with our milestone, the research questions for the study are:

a. What are the main sources of income and food for the villagers of Sessang, and how has this changed?
b. How do the villagers use their own land and how has this changed?
c. How has the use of and access to forest products changed?
d. How has the tenure status changed in the village of Sessang?
e. How do the villagers of Sessang organize when engaging in land development schemes?

1.4 Study area

Sessang is a Malay village situated in the State of Sarawak, about 5 hours driving north of Kuching. The village is located along the Sebelak River, close to the coast of the South China sea. The road leading to Sessang is good and affords access to the main road Roban-Kabong in 5 minutes and the two cities in 20 minutes drive.

(See picture 1)



Picture 1 – Location of Sessang. Sessang is located along the Sebelak river between Roban and Kabong.

To the north Sessang is mainly surrounded by Oil palm schemes and paddy rice fields to the south. A secondary forest is scattered in small patches around the village. In the southern part, there is a big scheme of 5000 ha belonging to the minister. Currently it's covered by forest, but it will be converted into oil palm plantations. Most of the lands included in schemes have titles, while lands used for paddy fields and the idle lands are only registered.

Sessang - A village surrounded by schemes.

The first scheme appeared in the 60'ies. Some villagers became smallholders of Coconut under government subsidies. The schemes ended in the 70'ies as the coconut trees were very sensitive to flat water and the price was low.

In 1992, SALCRA (Sarawak Land Consolidation and Rehabilitation Authority)

wanted to establish an oil palm plantation in Sessang and sent one officer to negotiate an agreement. A group of villagers created a joint venture with the government and a private company. They would get 30% of the benefits by leasing their land to SALCRA for 25 years. The first harvest was in 1996 and the villagers got the dividend after a few years, when profit was made. FELCRA, the federal agency and PORIM (Palm oil research industry) also started implementing oil palm later on. Today, half of the population of Sessang is involved in some way in the oil palm plantation (leaser or worker in the scheme or smallholder of own land). 70 household are involved in SALCRA managed schemes, while 30 households are involved in FELCRA managed schemes.

Other schemes are also present, e.g. a mushroom scheme implemented by a private company and a government pineapple scheme. The last project to be implemented is called IADA (Integrated Agriculture Development Area). It was initiated in 2008 and employs 20 villagers.

The land surrounding the village is mainly used for oil palm in small scale, paddy rice, fruit gardens of coconut, bananas and pineapple. Within the village, every house is surrounded by a homegarden where people plant fruit trees and other plants for own consumption.

Picture 2 - Kampung Sessang. Every house in the village is surrounded by homegardens

Sessang has more than 1000 inhabitants living in 214 colourful houses, all standing in piloti because the area is often flooded. In the past, the houses were built of Nipa palm and Nibong, two products collected from the forest. Today the new houses are constructed in bricks. People have had access to electricity and treated water since the 80'ies. The maintenance of the homegardens and the participation in the waste collection illustrate the will to provide a well-kept village.

Sessang is a Malay village, with a majority of Muslims. The major mosque is situated in the new area of the village and another site of prayer is located in the old part. The

Head of the village is the Penghulu, who represents Sessang in the region. Two headmen are elected to each be responsible for a part of the village. Sessang has historically had good political connections and is known to support the government.

The first sign of population in Sessang was 480 years ago when people from Sibu made a camp along the Sebelak river. The name " Sessang " means the people moving from one place to another.
Table 1 shows the increment in the number of households in the village.

Years	1950	1970	1990	Today	Future
Number of households	18	60	100	214	+ 120

Table 1 – Increment in number of households in Sessang. Today there are 214 households in Sessang. The village is now undergoing it's fifth extension to make room for additionally 120 households.

Expansion of the village

The increasing population has created various extensions of the village. 4 stages of extensions are indicated on the map shown in Picture 3.

Stage 1

During the British ruling in the 19th century, it was a little settlement along the river of 18 houses. At this time, Sessang was surrounded by jungle. The life was oriented to the river. People lived essentially from subsistence farming and fishing. They were going to Roban by the river to sell some products and to buy salt and gasoline and other basic needs.

Stage 2, 1960- 1980

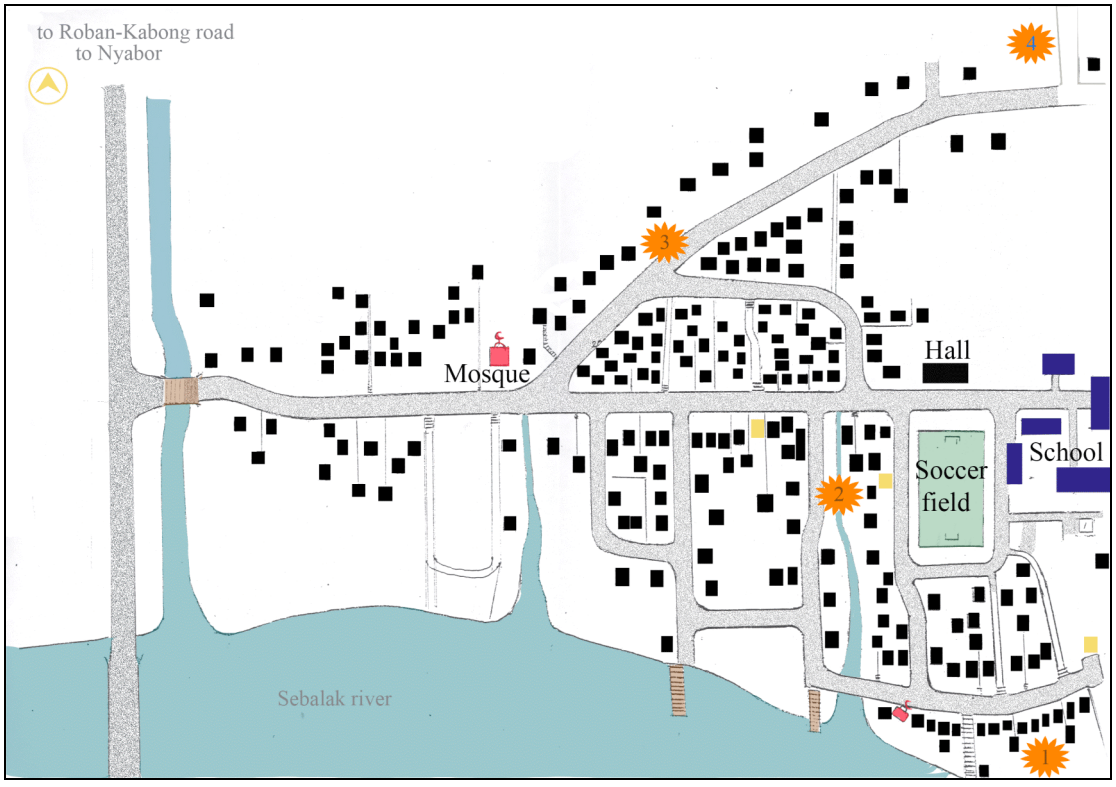
At this time there were 60 households. The fishing activity was still a major occupation whereas hunting was a spare time activity. But both activities declined during the 70´s. Different facilities were built, e.g. the football field or the community hall where people meet during festivities. The primary school was constructed in 1963.

Stage 3, 1990-2008

Between 1990 and 2008, the number of households has increased from 100 to 214. As previously mentioned many schemes were implemented in the 90´ies, which gave new job opportunities. Today, the major income is obtained from oil palm plantation, and employment in the government and private sectors. New infrastructures were constructed and renovated.

Stage 4, future project

The increasing population pushes the village to create new space for future inhabitants. A plan has been projected to give room for 120 new households in the northern part of the village.



Picture 3 – Infrastructure of Sessang. The village has been subject to four extensions because of populations growth. The extension of the villages is indicated by the orange coloured numbers (1-4). The soccer field, community hall and the school were built form 1960-1980.

The primary school

Picture 4 – The primary school

The school welcome 100 children from 7 to 13 years old from Sessang and the surrounding areas. Some children stay in the boarding school during the week. They receive scholarships from the government. After the primary school, the children have to go to Kabong to attend secondary school.

The level of education has increased. In the past, a few pupils were attending school and many were going to help in the fields. Today the majority attend the school. The new pupils expect to find qualified work.

2.0 Methodology

In order to answer the above given research questions a combination of social- and natural science methods were applied. Information collected thus consists of qualitative as well as quantitative data. Each research question will be analysed from various angles using different methods in order to triangulate the research and thereby obtain more reliable data.

A **community mapping exercise** was carried out on the first day, in order to get an overview of the village and the households. The purpose of the exercise was to get the villagers to draw a map of the infrastructure of Sessang, including individual households, households of key informants (Penghulu, Headmen etc.) and important facilities (School, shops, community hall etc.).
The selection of participants was not based on a random sampling, but rather it was sought to get as diverse a group of people as possible (mainly key informants and young and elderly, men and women). The community map created during the exercise served as a great tool to plan and carry out the rest of the fieldwork.

A **PRA scoring exercise** was conducted with the same group of people that participated in the community mapping. The purpose of the exercise was to get the villagers to score different crops and food products according to various criteria. This gave an overview of the source of income and food, the land sizes, market values of certain products and the resistance towards diseases.

Added to this a **yearly activity calendar** was constructed with the same group of people. The purpose of the exercise was to estimate how time and resource consuming the different activities are and which activities that are given the highest priority. The calendar also enables us to see whether there are periods during the year where income of food and money is lower than others.

A **transect walk** was also conducted on the first day, in order to examine how the land in the immediate proximity of the village is used and what natural resources that are available. The group experienced some logistical problems when planning the transect walk. Because of the size of the village, the wet paddy fields surrounding the village and the meandering river next to the village, it is quite difficult to walk in a straight line when doing the transect walk. It was therefore decided to follow one of the main roads

going through the village. The road goes from one bank of the Sebelak river to another. One of the village elders accompanied the group on the transect walk and explained what the different areas were used for. Using a GPS, marks were plotted and transferred into Google earth to create a map of the walk.

A series of **semi-structured interviews** with inhabitants of Sessang were conducted in order to get information on the household's main sources of income and food, the size and use of their own land and forest products. The interviews were conducted on a household level, with the heads of the households. 40 of the 214 households in Sessang were interviewed. The 40 households were chosen randomly by giving each household a number. The village elders assisted the groups by contacting the selected households and setting up appointments for the interviews.
The interviews where conducted as a combination of structured and semi-structured interviews in order to get quantifiable data but also allow the interviewer to explore new issues during the interviews. The interview guides used thus consisted of a set of fixed questions regarding sources of income and food, use of forest products and size and use of the villagers own land (See the interview guide in Appendix ?) and a set of more open questions regarding land tenure, organization, opinions about the land development schemes.

In depth **interviews with key informants** were carried out in order to get detailed information on specific topics and to supply background information for the study.
Interviews with the village **Penghulu** and the **two headmen** were carried out in order to get a historical background of the village, the development history of Sessang and the involvement in the land development schemes in the area. Added to this, it is considered a gesture of courtesy to follow the order of the hierarchy in the village when seeking information about Sessang. An interview with a representative of **FELCRA** was conducted in order to get information on the development schemes under FELCRA, the organization of the schemes and the working conditions for the workers in the Oil Palm plantations. Both Indonesian and local plantation workers were interviewed. **Inhabitants of the neighbouring village of Empalam** were interviewed in order to get an opinion about the Oil Palm schemes from a group of people who are affected by the development but don't receive a direct benefit from the schemes. Three households in Empalam were interviewed about their main sources of food and income and their opinion about the land development around Sessang and the clearing of the forests.

A **PRA resource mapping exercise** was carried out, by asking a group of villagers to draw a map of the areas surrounding Sessang, marking the different land uses and important sources of natural resources, such as fish, vegetables, timber, fruits, game etc. After completing the map, the group was asked to draw map showing what the same area looked like 50 years ago. The purpose of this exercise is not to get an accurate map of land use changes in the area, but rather to get an impression of what the villagers consider to be the most important sources of natural resources, what they consider the dominating land uses to be and what changes that has occurred in the area during the last 50 years. The participants for the exercise were coincidentally rather than randomly picked, as the choice of participants for practical reasons was based on who was available at the time.

A **Forest Resource Assessment** (FRA) was conducted in order to assess the available forest resource in the area around Sessang, including the available food products, timber trees and animals. One of the village elders with experience working in the forest accompanied the group. One sample plot of 10x10m, consisting of four subplots of 5x5m was made. In the four subplots each species of woody plants were identified and measured in terms of height and diameter at breast height (DBH). Non-woody plant species were identified and counted. The purpose of the sample plot was not to do a complete forest inventory, as one single sample plot does not cover the variation in terms of species composition and tree sizes in the entire forest area. Rather the purpose of the sample plot was to let the students experience in practice how a forest inventory is made. Besides the sample plot, the assessment consisted of observations of trees, plants and animals sighted while walking in the forest and of discussions with the village elder about what species that are available in the forest today compared with 50 years ago.

A **PRA Tenure mapping exercise** was carried out in order to get an overview of the tenure status in Sessang. A group of villagers was asked to draw a map of Sessang, marking what type of land titles that was held to the individual plots of land in the village.

Soil samples were collected from three different fields namely a paddy field, the forest area and an oil palm plantation to be used for a **soil suitability assessment**. Water

samples were collected at two different points namely the upstream and downstream from the village in order to do a **water quality assessment**. The objective of this exercise was twofold. The first was to assess the fertility of the soil by measuring the nutrient status and comparing them with the nutrient requirements of the different crops grown in the area. Second, to assess the environmental sustainability of the various development projects by looking at the various changes that have occurred in the soil and the river surrounding the area since the start of these projects, the future impact of these projects on the environment and what amendment and management practices could be recommended.

The soils samples collected were then analysed for pH, EC, NO_3^-, P, OC and K.

3.0 Results/discussion

3.1 Sources of income

The development activities in Sessang have affected the sources of income of the villagers. In the past, many people were subsistence farmers, producing food for own consumption and receiving a small income from selling products at the local market. The income depended very much on the period of the year and on the harvest. Today, the majority of the villagers receive a stable salary from non-farming activities and purchase most food products at the market. Various factors have contributed to these changes.

As always when choosing a sample size, you run the risk of simplifying too much and thereby loosing the real picture. The work presented here is mainly based on 40 semi-structured interviews with randomly picked households in Sessang. The respondents have been divided into four groups according to their main occupation: “worker of non farming activities”, “pensioner of non farming activities”, “farmer” and “worker in scheme” (See figure 1). On one hand, 72% of the respondents are or were involved in non farming activities: 26% of them are pensioners and 46% are actual employees of the government and of the private sectors working as teachers, employees of the government projects or business men. The private and the public sector represent 50% of the non-farming activities each. On the other hand, 23% of the respondents are involved in farming activities: 23% are farmers working on their own land and 5% working in the oil palm schemes.

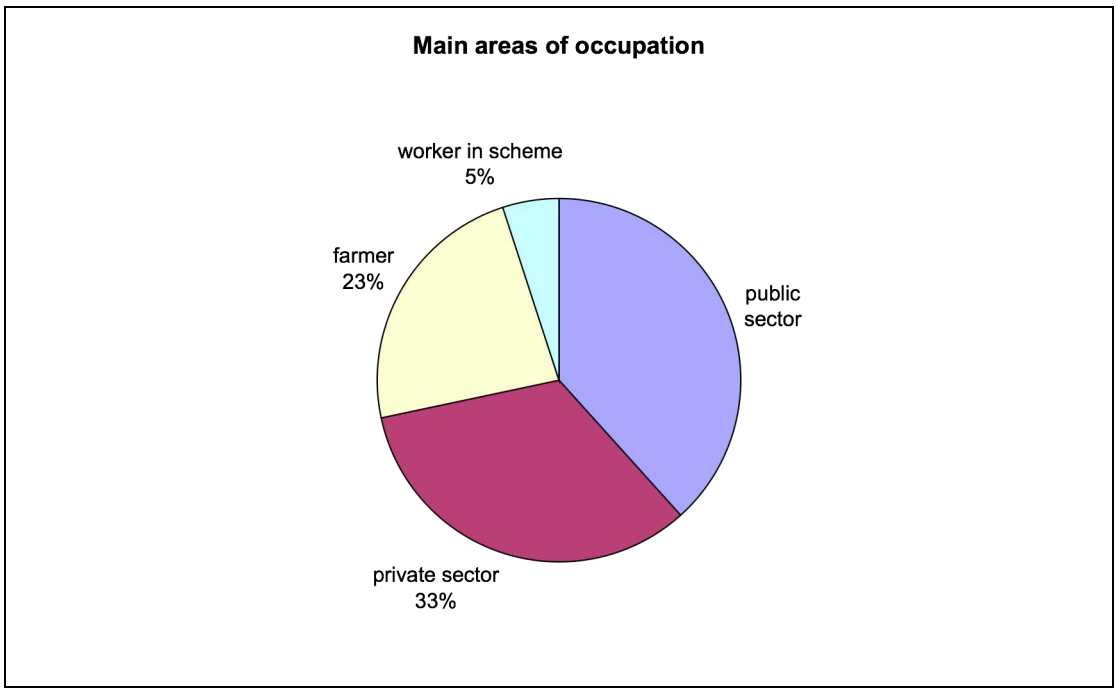


Figure 1 – Main areas of occupation. The 40 respondents have been divided into four different categories, based on their main occupation: “worker of non farming activities”, “pensioner of non farming activities”, “farmer” and “worker in scheme”.

In the past, the majority of the people in Sessang were living of subsistence farming. They received an income from selling paddy, fruits, forest products and fish when they produced large enough amounts, but this was no regular income. Today, the majority receive their main income from off-farm work (see figure 2) and mainly produce supplementary food for own consumption. The income received from food production is very low compared to the income received from salaries, remittances and leasing the land to oil palm schemes. However, the food still has a non-monetary value. The change in the main activities could be explained by an increasing level of education amongst the villagers. When the school children are asked what they want to be when they grow up, some say they want to be doctors, teachers or policeman but no one mentions farming. This example suggests a trend, that it is considered more attractive to have a qualified job and a better pay. By working for the government people receive a fixed salary every month and a pension when they retire. In the private companies, they receive higher income. The farmers on the other hand are often working harder but not receiving an equivalent income compared to their labour input.

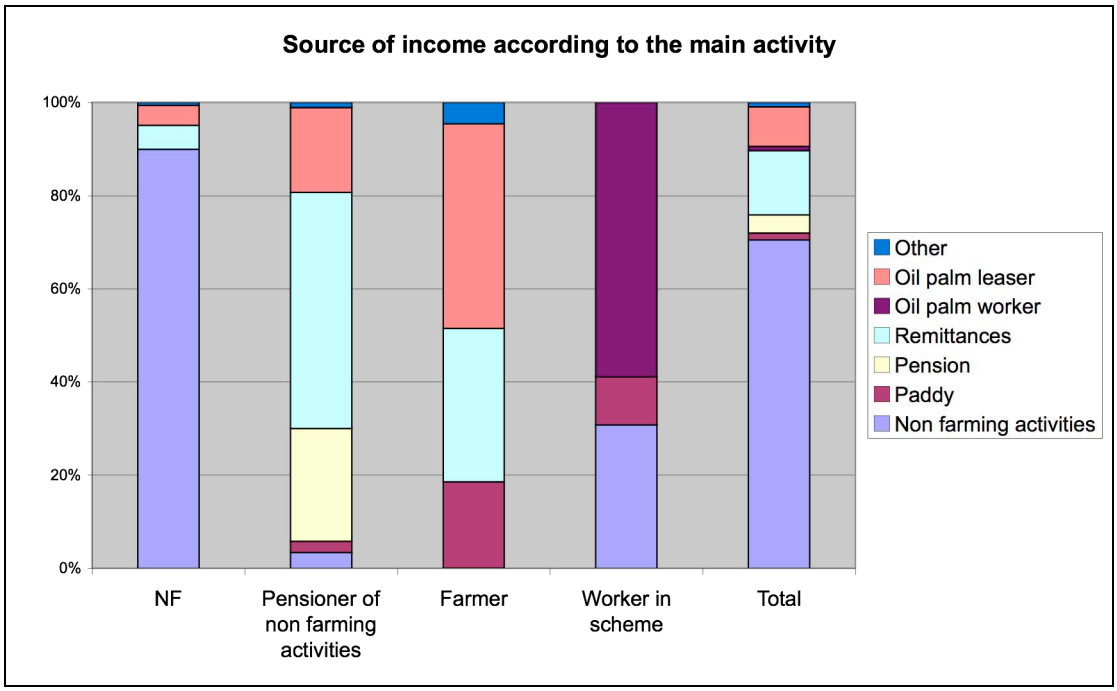


Figure 2 – Source of income according to the main activity. The 40 respondents have been divided into four different categories according to their main occupation, worker of non-farming activities (NF)”, “pensioner of non-farming activities”, “farmer” and “worker in scheme”. The most important sources of monetary income are the non-farming activities, the remittances and the income from leasing land to oil palm schemes.

The youths of Sessang

Picture 5 – Youths of Sessang

A large part of the inhabitants of Sessang are either children or old people. Many youths leave the village in order to earn more study or work in the urban areas. Some stay in Sarawak, in the surrounding cities or in Kuching; some live in the peninsula. They often send money to their family, and the remittances actually make up an important secure share of the income. We asked the locals why many youths don't work in farming activities in Sessang. Their answer was that the youths don't want to be farmers anymore. That is one reason why people lease their land to the schemes. The youths don't want to work in the plantations either because the salary is too low compared to the effort. The lack of local labourers in the plantations has been solved by the migration of young Indonesian workers who accept to work more than the local for less money.

All villagers are still engaged in various activities and thereby supplement the income from their main occupation. The workers of non-farming activities receive 90% of their income from their salary and only 10% from wet rice farming or selling fruits. The high income enables them to purchase their food at the market, whereas their own production is used as supplement. At the contrary, the pensioners of non-farming activities and the farmers are very much dependent on other sources of incomes. They are therefore planting paddy, fruit trees or work in companies to get other sources of income. They very much depend on the remittances too, which cover respectively 50% and 30% of their income (See figure 3).

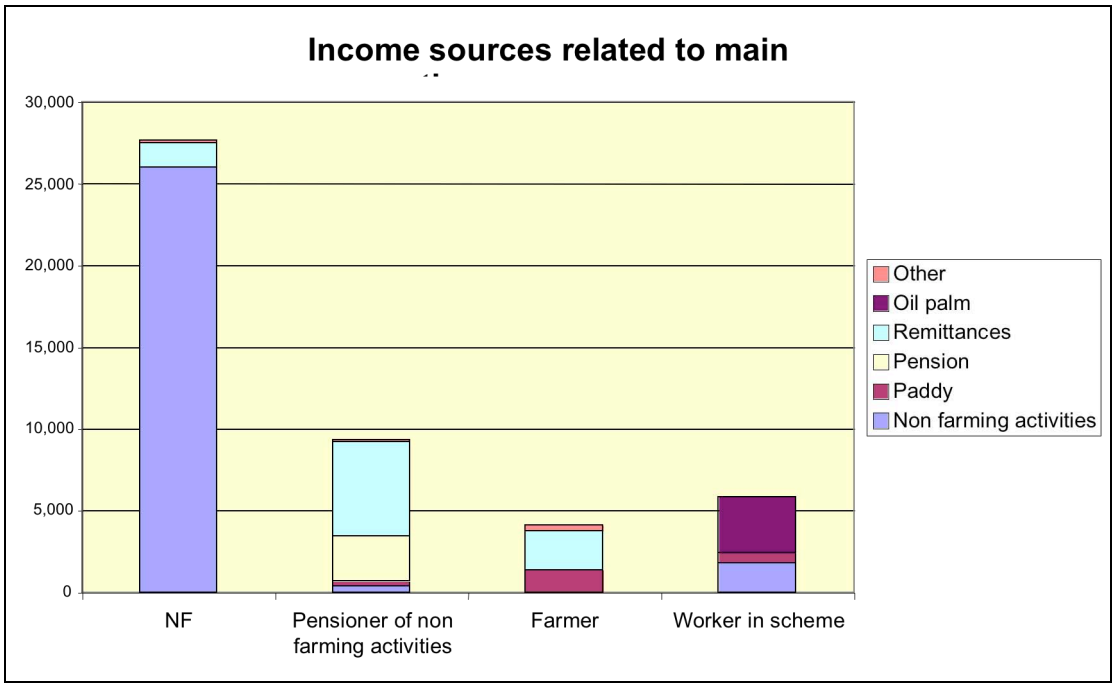


Figure 3 – Income sources related to main occupation. The 40 respondents have been divided into four different categories according to their main occupation, worker of non-farming activities (NF)", "pensioner of non-farming activities", "farmer" and "worker in scheme". While the people involved in non-farming activities receive 90% of their income from Salary, the pensioners and farmers need to supplement their main activity with other income generating activities.

The level of income is extremely divergent from one group to another. The workers of non-farming activity receive approximately 25,000 Rm, the pensioner 2500 Rm, the oil palm worker 4000 Rm and the farmer 1500 Rm per year from their main occupation. In other words, the people working in non-farming activities earn 5 to 6 times more than a farmer or a worker in a scheme. The plantation workers are therefore very dependent on other income generating activities as they receive a low income from their main monetary income source.

All four groups receive money from selling rice. The income is marginal for the non-farmer and the pensioner though, and covers only 1% to 3% of the main income. In comparison, the income from selling rice represents respectively 20% and 10% of the main income for the farmer and the plantation worker. Overall, the rice represents only 3% of the income. One reason for this is the low market price of rice. During the scoring exercise, the villagers scored the market value of the rice very low, whereas oil palm scored very high. Rice is still an important activity for the village since many produce it for own consumption. Paddy fields thus take up 70% of the land area owned by the households (Se table 2). The harvest occurs once per year (march) and the rice is sold in May. Added to this, Sessang is planning to implement a new paddy scheme of 734ha on the other side of the river in 2012. The goal is to increase the production from

one harvest to two harvests per year. People expect to earn more money from the paddy in the future.

Resources / Criteria	*Oil palm*	*Padi*	*Livestock*	*Coconut*	*Homegardens*	*Fruit trees*
Income	Land owners ••• Workers •	•	•	•	-	-
Land requirement	••••	••	•	•	-	-
Productivity/ha	•••	•	-	-	-	-
Market values	••••	•	-	••••	•	•
Food consumption	-	•••	•	•	•	•••
Resistance to diseases	•	•	•	•	•	•

Table 2 - Scoring exercise. Respondents are asked to rank different resources from 1-5 (one being the worst and 5 being the best) according to different criteria, Income, land requirement, productivity/ha, market value, food consumption and resistance to diseases.

The income from the other activities laying on the natural resources represents only 2% of the general income but vary between the groups. Concerning the income made from fruits and vegetables it is very low as most of it is planted for own consumption in the homegardens, but some respondents do plant fruit trees in order to sell the produce. However, as illustrated in the scoring exercise, the market value is low. For this reason many people consider converting their land into oil palm to get a higher income. The income made by the forest products is almost insignificant. The majority of the people who collect forest products use it for own consumption and a few farmers are selling it at the market. Finally the income made by fishing and the livestock is very low too.

Another change in the source of income is caused by the implementation of oil palm plantations in the area. Half of the villagers of Sessang are involved in oil palm plantation in one way or another as leasers, workers or smallholders. The implementation of oil palm in the 90'ies has had a positive impact on the income but surprisingly, it covers less than 10% of the general income of the villagers. Therefore the income from the oil palm must be seen mainly as a complementary income, except for some smallholders and major landowners who lease large portions of land.

The amount of income from oil palm plantation varies according to the role of people in the plantations. Only 5 villagers work in the plantations today. They receive a salary

every month which represent more than half of their income. Often, they don't have time for many other activities but some find some extra income from the paddy or from non-farming activities. None of the workers lease land to the schemes. They receive a low salary compared to salaries received for non-farming activities. Depending on the job inside the plantations, the salaries vary between 10RM to 20RM per day whereas a teacher from the secondary school receive around 70RM per day. We interviewed some villagers who used to work in the plantations at the beginning of the 90'ies. They said they stopped because they were not satisfied with the salary. Now, many Indonesian migrants work in the plantations. They accept to work even more than the locals and are paid often less.

The leasers of the schemes receive money twice a year in July and December (see table 3). The leasers don't depend on it as they already receive a salary from their main occupation but it is an easy way to get extra money without any effort. That's one of the reasons why the oil palm is so popular. The smallholders are actually the people who benefit the most on the oil palm. They are persons who already have a big capital and decided to plant oil palm by themselves. The advantage is that they earn 5 times more than they do with SALCRA or FELCRA. Some other villagers leasing their land to schemes are thinking to convert their land into oil palm as they know now how it works. But the majority prefers to renew the contract with SALCRA as it represents a secure income and they don't have time to be smallholders.

The Indonesian workers

In 2006, 18000 Indonesians were working in the Betong area. The women are from Kalimantan and used to be paddy planter. They came to Malaysia alone for a 2 year contract. They want to go back home afterwards because their families are still in Indonesia. They work from 7AM to 3PM. Oil palm is their only source of income. They say they are satisfied with the salary as the value of the Indonesian money is low compared to the Malaysian ringgit.

In Empalam 100% of the workers in the plantations are local, whereas in Sessang the Indonesian workers are in majority. For instance, 12 Indonesians and 5 locals are working in the FELCRA plantations. The 3 Indonesian women working are living in the village with a local family and the 9 Indonesian men are living in the plantations. But FELCRA is going to build a house for the women in the plantations. Some villagers we interviewed said that FELCRA don't want the Indonesians to live in the village as they are here only to work. These villagers explained that it was even better to live separately to avoid social problems. The local worker we interviewed didn't mention any problems with the Indonesian of the plantation. But according to the Indonesian workers interviewed, their relations with the locals inside the plantations are limited because they are divided in groups. When the Indonesians work with the locals, the locals are the leaders.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Agricultural activities												
Padi	harvest					rest		clearing	planting		weeding, fertilizer & insecticide application	
Oil palm	Harvesting then maintenance (weeding, pruning, fertilizer application…)											
Fruit trees	Harvesting then maintenance (weeding, fertilizer application…)											
Cash income												
Padi					selling							
Oil palm												
Leasers								payment				payment
Workers						salary each month						

Table 3 – Yearly calendar. A group of people were asked to make a yearly calendar over agricultural activities and cash income. While smallholders cultivating Oil Palm, earn more money, leasing land to schemes is an attractive solution as you don't need to do physical labour.

Oil palm plantation is very popular in Sessang. It makes a good profit in a short time as you get dividend after 3 years, whereas it takes 6 years for Coconut. The oil palm has a high market value with a stable price so the dividends are good and it makes people confident. Oil palm is a symbol of the economical development of the area. The schemes provided by the government are an easy way to get money without any effort (no work, no investment, but secure income). For those reasons, people would like to see more oil palm plantations. Some villagers don't participate in the schemes. This could for example be due to the scarcity of land. Especially migrants often don't own any land in Sessang. It is difficult to find land because the prices are still increasing so nobody whish to sell it. But they don't want to work either in the plantations because they won't be satisfied with the salary. Finally, others preferred to see the evolution of the oil palm schemes before they decide to participate.

With the implementation of oil palm and the increase of non-farming activities, the source of income is changing in the way that the majority of the villagers are getting richer. People involved in oil palm are getting a good extra income as oil palm has a high market value. So the incomes from the fruit trees, the vegetables or the forest products are going to decrease in favor of cash crops. Nevertheless, the homegarden are going to stay a source of fruit trees for own consumption.

3.2 Sources of food

The change in the land uses and in the activities has consequences on the way people collect their food. As explained in the previous part, the food was mainly produced in the past whereas today it is mainly purchased at the market. The following diagram illustrate the sources of different food products, distinguishing between purchase and production.

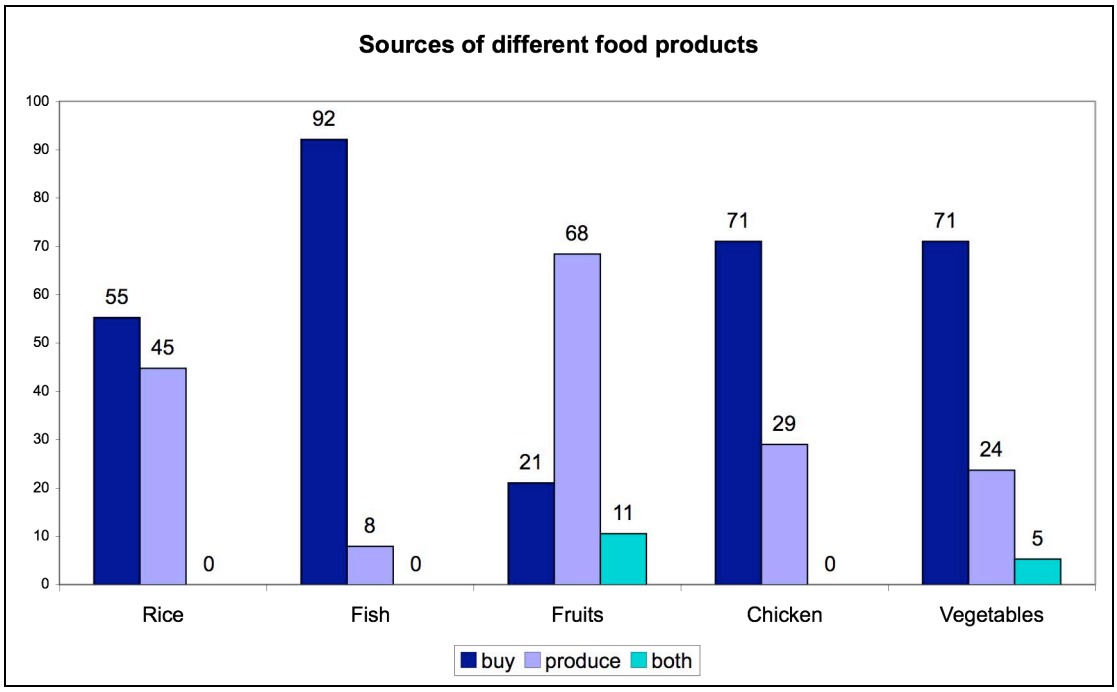


Figure 4 – Sources of food products. The 40 respondents are categorized in three different categories depending on whether they buy or produce different food products. Fruits are the only products being produced in larger quantities than purchased.

The paddy is the primary farming activity in Sessang. It is and has always been the major source of food. Before, many villagers used to produce it. Now, many of them, especially the workers and the pensioners of non-farming activities, buy it from the farmers of the village or from the market in the surrounding cities. Sometimes, when people have enough land, they lease it to paddy farmers and receive bags of rice in return.

Sessang is located next to the Sebelak River, but the fishing activity is very low. In the past, people fished in the river, but this activity has decreased since the 70´ies. When asking the villagers why they don't fish anymore, they give two different reasons. First of all, there is hardly any fish left in the river. The cause this may be pollution of the river, since people in the 70'ies used a poison taken from a plant to collect huge amounts of fish. However this practice was forbidden by the government later on. The

second reason is the crocodiles. Even though we didn't see any crocodiles during our stay in Sessang, the villagers constantly talk about them and fear them. They claim that it is very dangerous to fish in the river.

However, both of these reasons where somewhat contradicted by the villagers of Empalam who live along the Sebelak river too. The inhabitants of Empalam are fishermen According to them, the river is full of fish. Regarding the crocodiles, they say: "As long as you do not disturb the crocodile, the crocodile will not disturb you." So another possibility may be that the reason why the villagers of Sessang stopped fishing, was actually because more attractive activities (E.g. Oil Palm) was made available to them.

Crocodile – The monster of Sebelak River

Picture 6 – Crocodile.

Taken at a Crocodile farm.

People often use the word "infestation" when they talk about the crocodiles in the Sebelak river. One story that is often told is about a man who got attacked by the crocodiles. All they found of him was his head. This very head is supposed to be at the morgue right now. Taking these things into account, one would expect it to be impossible to put your hand in the water without being eaten by a crocodile.

Therefore, the group decided to take a closer look at this "crocodile problem". However, after searching the rivers at night with flashlights (as advised by the locals), at three different locations, seven nights in a row, we still haven't seen a living proof that there are crocodiles in the river.

The villagers often emphasize on the economical development of the village and compare their way of life with the other Malay villages, such Empalam, Kabong or Grigat. Sessang has traditionally focused more on the land than on the river. Some villagers are fishing in the river but not so many and for most of them it is only for

spare time. Moreover, since Sessang got access to the road (1990'ies), people are not using the river anymore to go to the market in Roban or Kabong.

At the opposite, the fruits are still produced by the majority. Every villager in Sessang has a homegarden surrounding his house and plants fruit trees for own consumption. Some of them have land around the village where they cultivate coconut, pineapple or bananas mainly for own consumption. People accord importance to the homegarden as it is a source of secure food. But the vegetables and the chicken are often not from the homegarden as 70% of the respondents purchase it at the market.

With the time, people depend less and less on the natural resources of their surroundings. The majority purchase rice, fish, chicken and vegetables at the market. The exception is for the fruit which are still produced in the homegarden. The farmers are the group who produce mainly and the worker from non-farming activities are the group who essentially buy as they receive a good income.

3.3 Access to and use of forest products

The immediate answer when you ask a villager of Sessang what they use the forest for is: *"It will be converted to Oil Palm plantations"*. There is logic to this answer since it roughly sums up the development in the village of Sessang over the past fifty years.

This development is clearly illustrated by the results of the resource mapping exercise conducted with the villagers of Sessang. When asked to draw a map showing the use of the land surrounding the village and the most important natural resources they basically draw Oil Palm plantations. Small areas along the roads are covered with paddy or rubber and south east of Sessang on the other side of the river there is a plot of secondary forest (See figure 1).

When we asked the villagers to draw a map showing what the same area looked like fifty years ago, the picture is very different. Along rivers and roads areas covered by coconut trees, paddy or rubber trees. However, the areas that are today covered by Oil Palm plantations used to be covered by both primary and secondary forests (See figure 6).

A resource mapping exercise gives us an impression of how the participants have experienced the land use changes in the area. In the two maps we see that not only do the participants draw areas with forest or oil palm, they clearly distinguish between secondary and primary forests and between oil palm plantations managed by SALCRA and FELCRA. It was especially interesting to notice that when dealing with the task of drawing the resource map of 2008 the first things the participants put on the map was Sessang and the oil palm plantations. Roads, rice fields, rubber plantations and everything else was added afterwards using the plantations as reference points. The resource map of 1960 thus tell us that they used to know the forest very well and that it was probably an important resource for them.

The map of 2008 on the other hand tells us that today Oil Palm is probably the most important resource. Comparing the resource maps with a satellite image of the area we see that the resource maps are not far from the real picture (see picture 7). This tells us that the villagers are used to looking at maps of the area and that the maps a probably very reliable. Based on the resource maps it seems safe to conclude that there was a big available forest resource in the 1960'ies and that it was frequently used by the villagers. Today most of the forest areas have been replaced by Oil Palms.

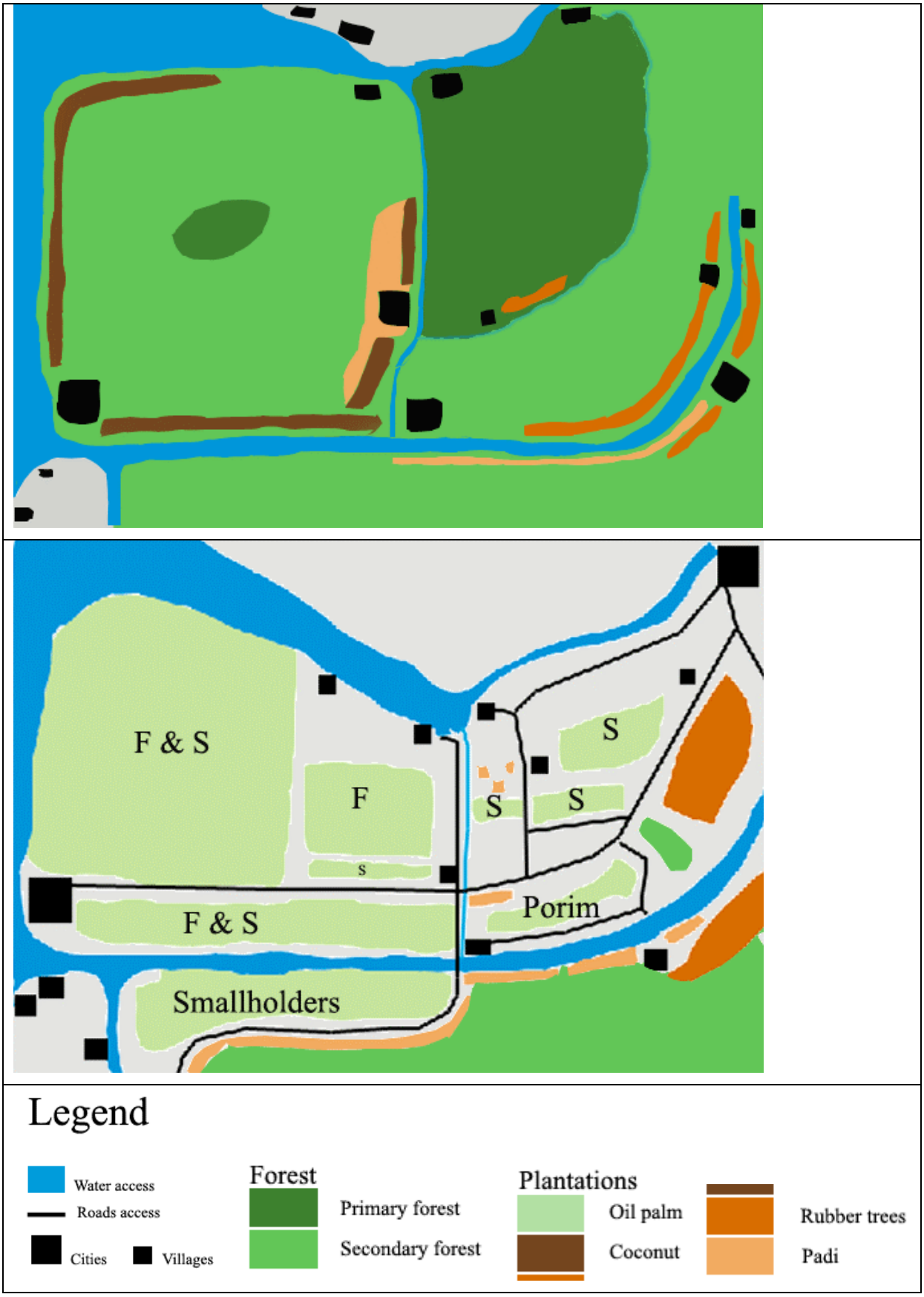
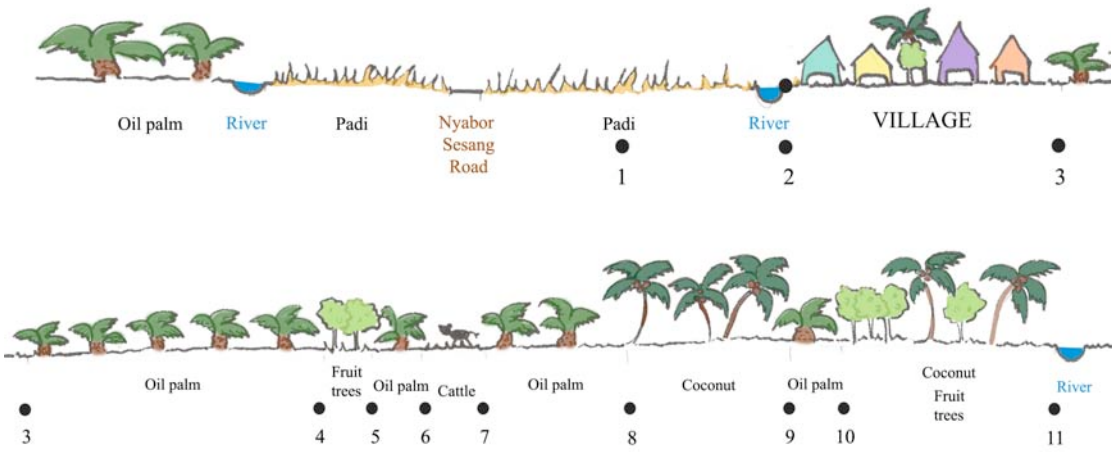


Figure 5 – Resources maps. The figures illustrate resource maps of the areas surrounding Sessang in 1960 (Top) and 2008 (Bottom). The figures are simplified maps based on drawing made by villagers of Sessang. To see the original resource maps see appendix 6.5. On the map of 2008, "F" refers to Oil Palms plantation manage by FELCRA while "S" refers to SALCRA.

Picture 7 – Map of the area surrounding Sessang. Aerial photograph, provided by Google Earth.

The resource mapping exercise gives us an overall picture of the resources in the areas around Sessang. A transect walk on the other hand gives us information on what types of land uses and resources that are within the immediate proximity of the village. Looking at the results of the transect walk (See table 4 and picture 8) we see that the land surrounding the village is mainly used for food production (Paddy, coconut, banana, and cattle), small holder Oil Palm production or large Oil Palm plantations. Comparing the transect walk with the resource maps we can se that the picture was very different fifty years ago, since the forest areas used to be very close to the village. Today, the access to the forest is restricted further by the meandering river Sebelak. It is probable that this limits the use of the forest today.



Point	1 – 2	2 – 3	3 – 4	4 – 5	5 – 6	6 – 7	7 – 8	8 – 9	9 – 10	10 – 11	Total
Distance	unknown	500 m	600 m	100 m	100 m	100 m	300 m	300 m	100 m	400 m	> 2.5 km

Table 4 – Transect walk of Sessang. The table illustrates the land use types encountered during the transect walk. "Marks" related to the GPS marks plotted on Picture 8.

Picture 8 – Transect walk route. The points 01-11 indicate the GPS marks made during the transect walk. The transect walk was made by following a main road going through Sessang.

During the semi-structured interviews the respondent where asked whether or not they collect any products in the forest (See figure 6). 49% of the respondents replied that they collect products in the forest. To "use" the forest is in this context very widely defined. Both people collecting forest products on a daily and a yearly basis or less have been included.

The main resource collected is food products, such as fruits or vegetables. These were collected by 49% of the respondents, while 26% collect wood in the forest and only 3%

hunt in the forest. During the interviews it was noticed that a lot of the households have animal trophies, such as the horns of Pelunjuk (deer) and Kancil (Mouse deer) or the skin of Pangolins[3]. When asked about the trophies, the respondents replied that they had purchased the trophies elsewhere. It is difficult to determine whether or not this is true, because hunting in the forest, being an illegal activity, is a controversial issue. It is therefore possible that hunting in the forest occurs more frequently than expressed by the villagers.

Regarding the collection of wood, we learned from the semi-structured interviews that a few of the villagers harvest construction wood from the forest and sell this in the village. There are no legal restrictions to harvest wood in the forest, but most valuable timber species have already been removed. Most villagers therefore prefer to purchase wood at the local sawmill in the nearby village of Serekei, since you can get a better quality of wood and larger dimensions.

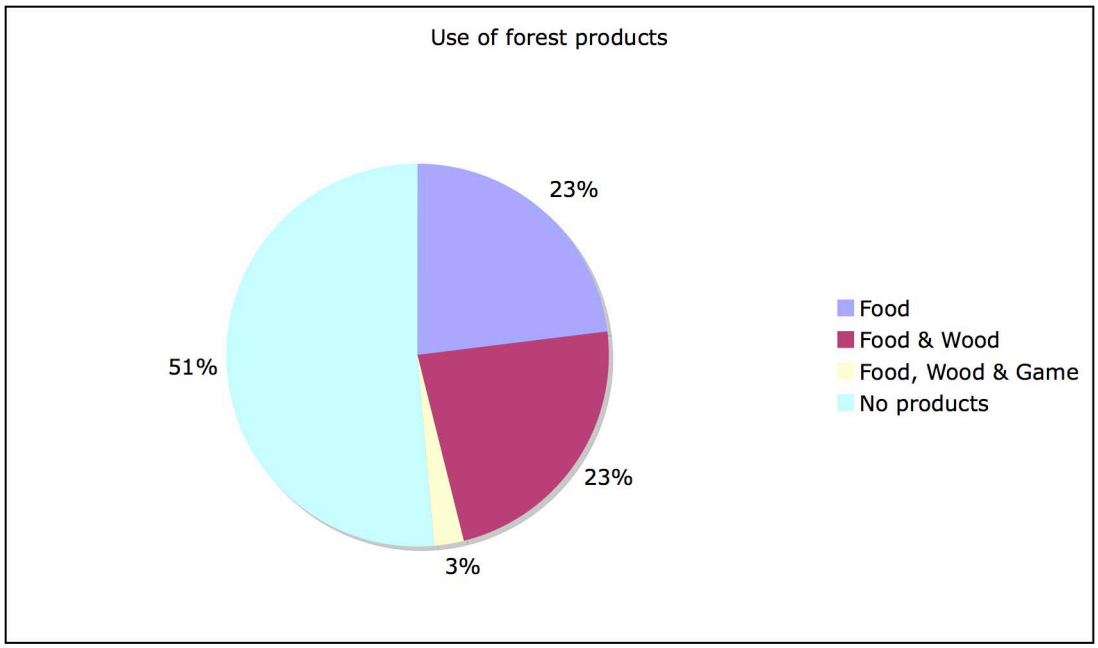


Figure 6 – Use of forest products. The figure illustrates how many of the 39 respondents that collect respectively "Food", "Food and wood", "Food, wood and Game" or don't collect forest products.

In order to relate the use of forest products to peoples occupation we have divided people into three different categories, people doing off farm work (teachers, headmasters, seamstresses, policemen, security guards etc), people doing manual labour (paddy farmers, workers in the Oil Palm plantations etc.) and pensioners.

When comparing how many people from each occupation group that harvest products from the forest we see that all three groups of people use the forest. While 39% of the

[3] A 75-102 cm long scaly ant eating animal. Scales are usually sold to the Chinese who use it for medicinal purpose.

people doing off farm work and 43% of the pensioners use the forest 73% of the people doing manual labour use the forest (See figure 7). These figures can probably be explained by the fact that the people doing off-farm work and the pensioners rely very much on respectively their income and pension or remittances to buy food. The forest products would therefore serve as a supplementary source of food. The people doing manual labour on the other hand often produce food for own consumption and have a very limited monetary income. This makes them less likely to buy food. The forest may therefore serve as a safety net for them during periods of low yield.

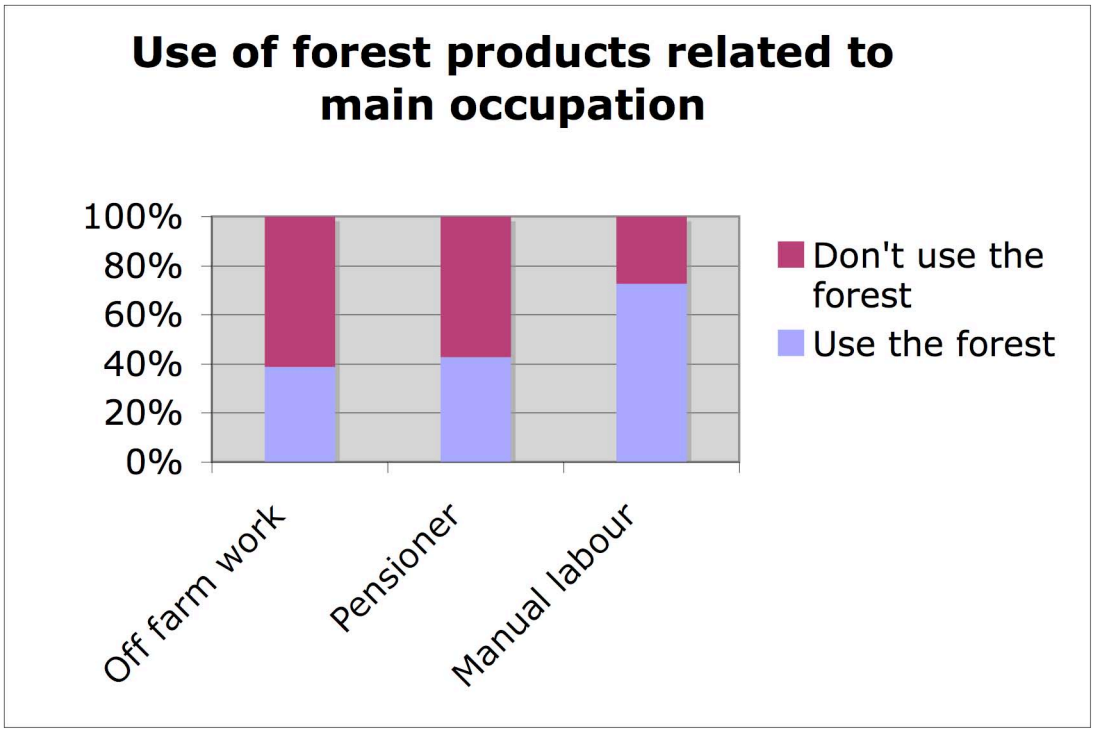


Figure 7 - Use of forest products related to main occupation. The 36 respondents are divided into three categories, respectfully Off-farm work", "Pensioner" and "Manual labour" depending on their main occupation. The figure illustrates how many percent in each group that use the forest.

Relating the use of forest products to age, we see that all respondents from below 40 years to more than 70 years harvest products from the forest. The age classes with the highest percentage of people using the forest are respectively 60-69 (60%) and 50-59 (58%), whereas 50% of the people above 70 and 38% of the people from 40-49 and below 40 is using the forest (See figure 8). It is interesting to see that the people above 50 years (even above 70) use the more than people below 50 years. A possible explanation may be that the people above 50 years have been using the forest during their childhood and therefore continue to use it today, whereas the people below 50 have not been doing this to the same extent.

The results seem to be somewhat in contradiction with figure 7, showing that mostly manual labourers use the forest, since we could expect these to be among the youngest people. It is important to note though, that the survey includes pensioners as young as 50 years and 62 year old farmers. The average age of the manual labourers is 49.8 years.

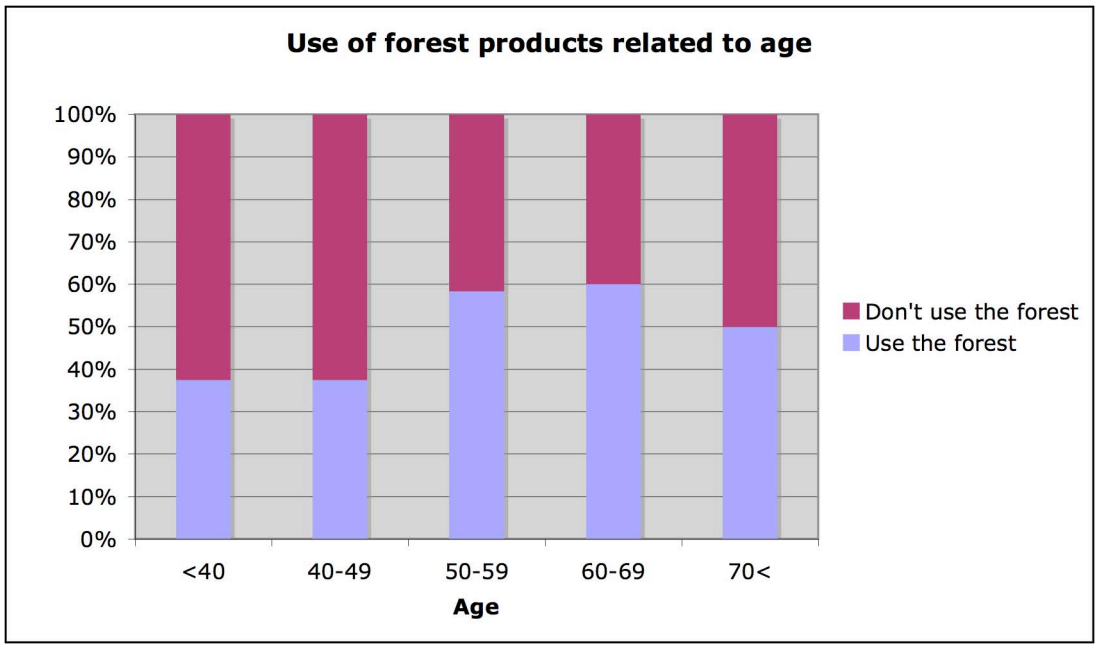


Figure 8 – Use of forest products related to age. The 37 respondents are divided into five different age groups. The figure illustrates the percentage of people using the forest in each age group.

The Forest Resource Assessment (FRA) was carried out to get a picture of the available resources in the forest today compared with 50 years ago and what species that are used by the villagers. The remaining forest areas around Sessang are secondary peat forest areas. From the FRA we learned that the forest had quite an abundant resource of timber trees, fruits, medicinal plants, animals, birds, fish and other food products 50 years ago (See table 5).

Species	**Available 50 years ago**	**Available today**
Timber trees	Ramin (*Gonystylus bancanus)*	
	Jongkong (*Dactylocladus strenostachys*)	
	Jelutong (*Dyera* sp.)	
	Meranti (*Shorea* sp.)	
	Selam (*Canarium* sp.)	X
	Seladah (*Canarium* sp.)	X
Wild fruits	Wild mango/Raba (*Mangifera* sp.)	

	Serait (*Nepheleum* sp.)	
	Asam Paya (*Zalacca confertus)*	X
Medicinal plants	Sembung tree (*Blumea balsamea*)	
Animals	Wild boar (*Sus barbatus*)	
	Deer	X
	Monkey	
	Mouse deer	X
	Bear	
	Snake/Pyton	
	Squirrel	X
	Pangolin	X
	Fox	X
Other edible products	Midin	X
	Rattan	X
	Paku uban/keruk	
	Palah shoot	X
	Nibong shoot (*Onchosperma tigillarium*)	
	Nipa shoot (*fruticams* sp.)	
	Rotan shoot (*Calamus* sp.)	
	Leletup (*Passiflora foetida*)	
Fish	Keli fish (*Clarius* sp.)	
	Belau-u fish (*Chana* sp.)	
	Toman fish (*Chana* sp.).	

Table 5 – Resources available in the forest 50 years ago and today. In the two columns on the right is illustrated which species that were/are available in the forest around Sessang respectively 50 years ago (left) and today (right). The list is in no way exhausted, and more species could doubtlessly be added. The information is based on interviews with local people and personal observations from the forest.

The picture of the forest today is a very different one, especially when looking at the timber trees. There is only a limited amount of timber trees left in the forest (such as Selam trees and Seladah trees (*Canarium* sp.)), and these are generally small in sizes.
The location selected for the FRA is currently being cleared for Oil Palm cultivation. As a part of the so called "Block clearing" all the valuable timber species were removed a few years ago. The remaining forest will be cut down and left to decompose for five years, after which Oil Palm cultivation will begin. This is well reflected in the result of the FRA. The selected sample plot gives a somewhat typical image of a secondary forest where all valuable timber trees have been removed. The forest is dominated by small sized trees and shrubs. For more detailed results of the FRA se Appendix 6.3. From interviews with the villagers using the forest we learned that the villagers mainly collect the fruits and vegetables available in the forest, but that only a few people extract timber. Most animals are gone, however there are some deer, mouse deer, squirrels, pangolin and foxes left.

Having established that 49% of the villagers of Sessang use the forest and that the access to the forest has drastically decreased over the past 50 years, the next logical step is to find out what the villagers think about this development.
After doing 40 semi-structured interviews we didn't find a single person who thought the conversion of forest to Oil Palm plantations was a directly negative thing. The general opinion expressed by the respondents was that the Oil Palm plantations bring development, land titles and money to Sessang. Many elderly people consider the Oil Palm as a good pension plan, since you will get money for 25 years without having to do any physical work. Added to this, many people wish to leave productive land to their children. While both young and old people use the forest, they don't consider it to be an important resource any more, but rather as unproductive. Some even consider the reduction of the forest area as a positive thing, since the forest used to be a source of pests, such as monkeys and wild boars destroying their fruit trees and crops. Even when asking the villagers if they don't mind that every single plot of forest is converted to Oil Palm plantations you get a univocal reply, they prefer the Oil Palms.
One respondent illustrated the general opinion very well: "*Oil Palm is forest too!"*

The shift in the food and income generating activities experienced in Sessang may also have an influence on the perception towards the Oil Palms. As mentioned in section 3.1, 50 years ago the villagers of Sessang were mainly involved in food production for own

consumption, whereas today off farm employment is an important source of income. As a consequence of this, more people buy food products today than they used to. Loosing the forest as a resource of food would therefore not be considered as a great loss.

When asking the landless and resource poor households, who don't derive a direct benefit from the Oil Palms, about their opinion on the development, a few respondents expressed concern that they will loose an important resource when the forest disappears. However, they still see the current development as a good thing because they believe they get employment opportunities.

Sessang & Empalam – Two opposites

The village of Empalam is an interesting case story when comparing it to Sessang.

Even though the two villages are both Malay and located less than 3km apart, they are extremely different. Sessang is a well organized and well developed village with good infrastructure, newly built brick houses and clean streets. Empalam is the exact opposite.

The village consists of very old wooden houses built on stilts. In order to get to Empalam you will have to pay a local boatman to take you across the Sebelak river, since no proper roads lead to the village. Once you get inside the village you mainly walk on wooden bridges or small dirt roads. Everywhere garbage is lying around.

Empalam has a population of about 700 people, who are mainly fishermen or subsistence farmers. Some are involved in small holder Oil Palm cultivation, and some people own small plots of Oil Palm plantation on the other side of the river.

The villagers frequently use the forests around Sessang to hunt or gather wood and vegetables. When we asked the villagers of Empalam what they thought about the forest disappearing, they say they are very happy about the development. They have seen the development in Sessang and hope that the Oil Palm plantations will someday bring development to Empalam as well.

"*If we get more Oil Palm in the area, maybe the government will build a road to Empalam.*" – Villager of Empalam

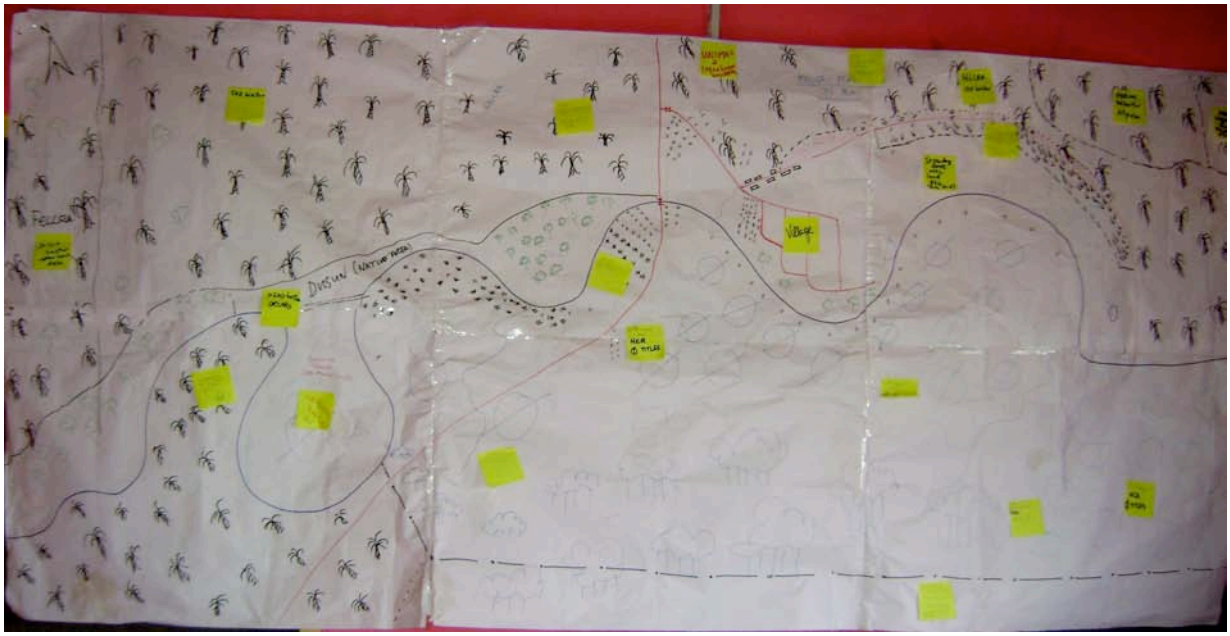
Picture 9 – Kampung Empalam

3.4 Tenure relations

The land tenure relation exercise conducted with the different households and village headmen reveal the information about different land categories and the land changes with relation to government schemes. The land was categorised into five different classifications (See table 6).

Mixed zone land	No restriction on who can hold title to the land.
Native area land	Land that can be held by the natives under the title.
Native customary land	In Sarawak there was in existence a system of land tenure based on *adat* (native customary laws). That system remained virtually the same over the following century. Native customary rights to land consisted of rights to cultivate the land, rights to the produce of the jungle, hunting and fishing rights, rights to use the land for burial and ceremonial purposes, and rights of inheritance and transfer. According to native ideas, the clearing and cultivation of virgin land confers permanent rights on the original clearer.
Reserve land	This is state land used for various purposes such as protected forest and national parks.
Temporarily occupied land	State land leased by the individuals for a specific period of time.

Table 6 – Land classifications. Land is classified in five different categories, Mixed zone land, Native area land, Native customary land, Reserve land, Temporarily occupied land.



Picture 10 - Tenure mapping. Map made by villagers of Sessang during a PRA tenure mapping exercise. The purpose of the exercise was for them to draw a map of Sessang, including the different land titles related to different plots of land.

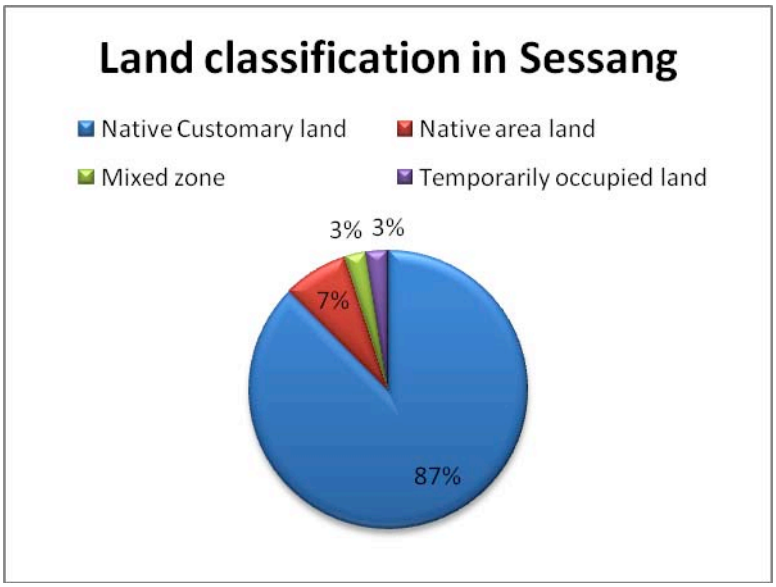


Figure 9 - Land classification in Sessang. The figure shows the distribution of land in the five different categories of land.

Among the five different land classifications, more than 87% of the household posses native customary land (Figure 8), while 7% own Native Area Land (NAL).Temporarily Occupied Land is possessed only by 3% of the households. The reason behind this land distribution is that huge tracks of NCL were inherited from their pioneer ancestors still exhibits high level of area whereas TOL is possessed by migrants with the permission of government for specific period of time.

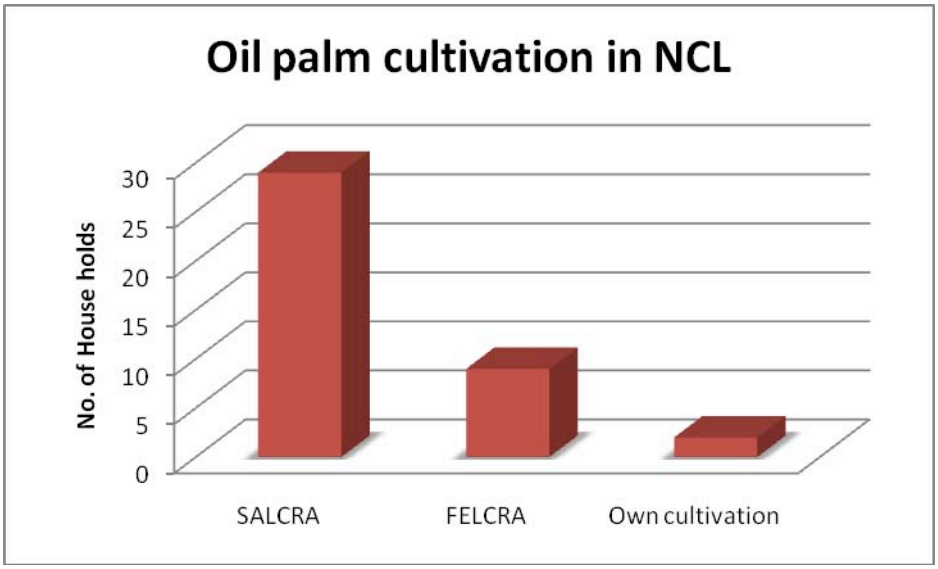


Figure 10 - Oil palm cultivation. The Figure illustrates the ammounts of land uder development by respectively SALCRA, FELCRA and own cultivation.

In depth interviews and questionnaire revealed that most of the NCL in village is occupied by Oil palm plantations with government schemes such as SALCRA and FELCRA (figure 9). From the time when the notion of land development was first mooted in 1960 the main purpose of the programme has been to develop NCL. So all the government policies direct towards NCL, SALCRA which occupies major area acts as a custodian of NCL, where land rights and ownership are protected and guaranteed by the government. These lands are to be given back to owners after 25 years with a document of title in perpetuity guaranteed by the government. (Dimbab ngidang, 2002). FELCRA occupied the second major area which is established as cocoa based scheme and later abandoned earlier plan to replant these farm with oil palm due to poor terrain. Own palm oil cultivation is carried out by households who are wealthy and able to meet out the expenses. On other hand although some natives do have the financial means to commercially develop their lands they are not allowed to do so only the private sector is now permitted to develop these land resources.

In order to get a land title from SALCRA it is necessary to be able to prove that you have been cultivating the land. Historically Sessang has been paddy farming, while both Grigat and Empalam are fishing villages. In Sessang it is very clearly marked who owns the individual plots of land. This enables the villagers of Sessang to prove they own the land. This makes it easier to get a title from SALCRA.

3.5 Organization

When you compare Sessang with the surrounding Malay villages, like Grigat or Empalam one of the first things that strike you is that Sessang seems better organized, with a better infrastructure and more expensive houses.

If you start to ask about development schemes you quickly get the impression that Grigat and Empalam would like to get their land developed, but that they find it hard to be included in the development schemes. In Sessang on the other hand, the villagers are involved in various development schemes, including Coconut, Pineapple, mushroom, Paddy and the Oil Palm scheme, which is by far the largest one. One is therefore led to ask, "*Why is Sessang such an interesting place to develop?*"

One relevant factor to look at is the level of education. If we divide the respondents into two different categories, respectively educated (Teachers, headmasters, government officials and policemen etc.) and uneducated (Farmers, plantation workers, tailor, tractor driver etc.) based on their occupation we find that 49% of the respondents fall under the category "educated" (See figure 10). Four of these (11% of the respondents) are either government officials in the DID or retired government officials.

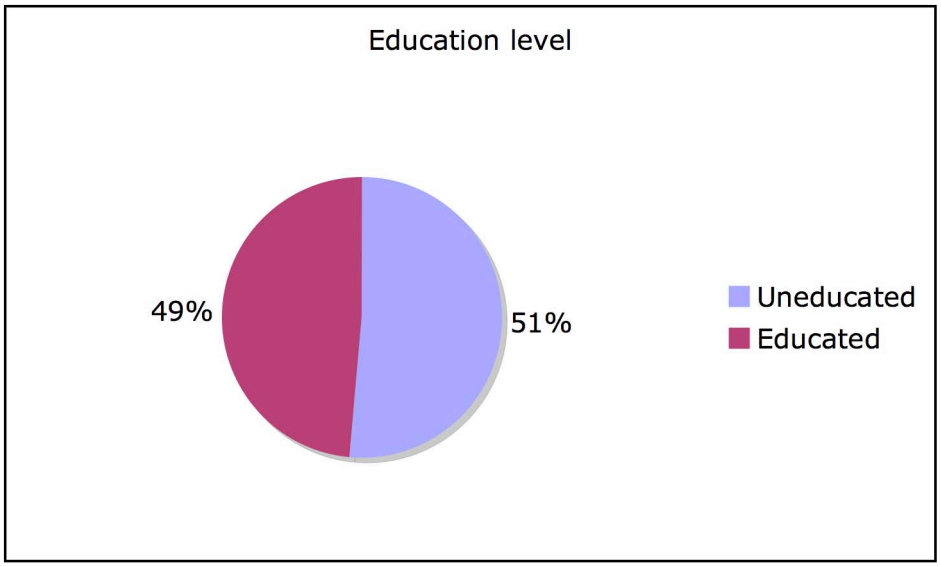


Figure 11 – Level of education. The 37 respondents are divided into two categories, "Educated" and "uneducated" based on their occupation. Educated thus refer to occupations demanding a formal education (Teacher, Headmaster, Policeman, Government Official etc.) while "Uneducated" refer to occupations demanding no formal education (Farmer, Plantation worker, Sawmill worker etc.)

Educated or uneducated is a very crude division and must be used with caution since it says nothing about the real level of education. "Educated" can thus refer to both 10 years of primary school or a university degree. The paddy farmer and the government official may have the same level of education.

This being said, we may assume that people with a formal education or people who work within the government system would be more capable of finding out what development schemes that are initiated in the area and how to apply for these. Especially the government officials would have a benefit since they are likely to have good contacts within the system. In comparison, the group of SLUSE students working in the Iban village Alit found that 62% of the villagers dropped out of school before completing it and 17% never attended school. 34% had a secondary education, while only 3% had a tertiary education. Alit is generally considered to be one of the least developed villages in the area.

We are unable to compare the percentage of educated people in Sessang with Empalam, since we don't have the same amount of data from Empalam. However, from the three interviews conducted in Empalam, we learned that the main occupations in Empalam are fishing, farming, logging and working in the Oil Palm plantations. When asked directly if there were any schoolteachers or government officials living in the village, the three respondents said they didn't know. While the list of occupations is in no way exhausted, it seems safe to conclude that much less than 49% of the people in Empalam are teachers, headmasters and government officials.

When asking the villagers of Sessang why they think Sessang is so well developed compared to Grigat and Empalam they generally mention three reasons. First of all, Sessang has got a good Penghulu. This is a fact that most of the villagers put a lot of pride into, since the Penghulu represents the community. A good Penghulu is therefore expected to be able to promote the village and to attract the attention of the decision makers. Especially the former Penghulu of Sessang is getting a lot of credit for his good connections with the politicians and because he has been able to get a lot of land titles and land developments schemes to the village. During one of the interviews we learned that the former Penghulu is even a close friend of the Chief minister of Sarawak and that he frequently is meeting with the ministers.

Secondly it is mentioned that Sessang is better organized than the other villages.

As soon as they get news about a development scheme or other important events, the Penghulu will call a meeting. This enables the interested landowners to coordinate applications for the schemes. Grigat is often mentioned as an example of a village where the Penghulu is not doing his job properly, and fails to organize the villagers.

The thirdly reason is that unlike most other villages, Sessang has not been reluctant to engage in development schemes. For this reason Sessang was one of the first areas to be developed. The big success in Sessang has now led the other villages to become

interested in the development schemes. It thus seems like there is an elite group of educated landowners in Sessang with good political connections who have actively been seeking out development schemes and organizing applications for these.

"Kampung bestari"	By the side of the road, a big poster is informing us that we are entering "**Kampung bestari**" - ***the best community in the district***. The villagers of Sessang are very proud of their community and won't hesitate to tell you this. Upon our arrival, the village elders very quickly pointed out for us that we were very lucky to be in Sessang. The economic advancement and the development of the village during the decades is certainly one of the reasons for this. Today, the village is furnished with good access and infrastructures.
	

When asking FELCRA the same question, the two main reasons mentioned are that Sessang has a lot of land owners who have been willing to participate in development projects and secondly that these owners have titles to their lands. In order to make the development projects cost efficient, FELCRA needs to have a big consistent block of land to develop, as this reduced transportation costs and costs of developing the infrastructure. FELCRA thus needs a big group of people owning land in the same area who wish to have it developed. Regarding landownership, it is very important to distinguish between FELCRA and SALCRA. FELCRA, being federally owned, have no rights to give people titles to their land. FELCRA can therefore only develop land if the owners have already got titles to it. SALCRA on the other hand is owned by the Sarawak state, and have the authority to give people titles to their land. In practice however, it seems that villagers are unable to distinguish between the two.

The fact that Sessang is so well organized, lots of people have titles to their land and that people have not been reluctant to participate in development projects would therefore make it attractive for FELCRA to develop.

3.6 Effects of Oil Palm on Soil and Land quality

Location	pH $_{(H2O)}$	EC $(mScm^{-1})$	P (µg/g)	K	NO_3^-	%N	%C
Paddy 1							
0-25cm	5.2	0.32	0	low-medium	No	Not	
detected	7.83						
25-60cm	5.8	1.33	0.18	low-medium	No		
0.7337	6.951						
Paddy 11							
0-25cm	5.1	0.25	0.12	low	No		
1.228	7.36						
25-60cm	5.4	1.69	0.44	medium-high	No		
0.6818	6.241						
Oil Palm							
0-25cm	3.7	0.47	-	not detected	No	Not	
detected	8.695						
25-60cm	4.5	0.32	-	low	No		
0.7338	2.529						
Forest							
0-25cm	3.9	0.32	0.44	not detected	No	Not	
detected	11.27						
25-60cm	3.9	0.40	0.44	not detected	No	Not	
detected	9.362						
60-100cm	4.0	0.22	0.18	low	No		
1.105	5.348						

Table 7 - Chemical properties of the soils in Sessang

The study revealed that most of the soils in the study area are peat soils belonging to the soil order histosols. The pH values of the soils shown in table 7 were between 3.7 and 5.8, indicating that the soils are acidic. The acidity of the soils is ranging between medium to extremely acid (Brady, 2001) with the highest occurring at the surface layer of the oil palm field and the lowest in the sub-surface layers of the paddy fields. This is possibly due to the large amount of organic materials found on the surface of the soils and the release of humic acids to serve as electron acceptors to facilitate decomposition (Bradley et al., 1998). The high rainfall in the area coupled with the peaty nature of the soils could have also resulted in leaching of most of the basic cations that would counteract the acidity of the soil, hence the high acidity of the soils. The low P and K values detected could be attributed to the high acidity of the soils.

There was no NO_3^- detected probably because most of the areas were flooded. The flooding may have resulted in the conversion of all the NO_3^- to NO_2 which will

eventually get escaped into the atmosphere. The total carbon was higher in the top soils of all the fields than in the sub-layers and may probably have resulted from the large amount of organic residues on the surface of the soils. The highest, however, occurred in the forest with the lowest on the paddy fields. The reason may be the high exposure of the paddy fields to sunlight, facilitating decomposition of the organic substances than in the forest which has a very dense canopy.

It was observed that most of the lands in Sessang are used for paddy cultivation. Although these soils are pretty conducive for rice cultivation, IRRI (2005) identified that very low pH values are likely to be a constraint to rice production. Thus, for optimum yields to be obtained, the acidity of the soils by necessity has to be reduced to the optimum levels of 6-7 by liming. However, liming is seldom practiced in the village. This could possibly be due to the cost involved in applying lime.

The EC represents the salinity of the soil. EC values between 0 and 2 $mScm^{-1}$ indicate a total salt concentration of < 0.15%. Effects of salinity on $mScm^{-1}$. Although these values are within acceptable limits, there seems to have been an increase in the EC values compared to what was recorded by Ismail et al. (2001) which ranged between 0.095 and 0.136 $mScm^{-1}$. This suggests the possibility of free lateral flow of salt water into the subsiding land from the sea surrounding the village. The recorded pH and EC values are, however, typical for natural and undisturbed peat ecosystems (MARDI, 1996; Okazaki et al., 1989).

Parameter	Unit	Class IIB Limits*	Water Samples	
			WS 1 downstream	WS 2 upstream
In situ				
DO	mg/l	5-7	3.07	5.18
pH	-	6-9	7.07	7.03
Salinity	ppt	-	0.13	0.01
Laboratory				
COD	mg/l	25	33	2
BOD_5@20°C	mg/l	3	3.79	0.36
TSS	mg/l	50	3.38	5.60
NH_4-N	mg/l	0.3	0.87	0.10
NO_3-N	mg/l	7	0.09	Not detected
Phosphorus	mg/l	0.1	0.66	1.11
TCC	Count/100ml	5,000	777	472
TFC	Count/100ml	400	984	535

Table 8 - Chemical properties of the river
** Compliance limits are extracted from Class IIB of the National Water Quality Standards (NWQS).*

	WS1	WS 2
Location	Lower stream of River Sebelak, near to the Kampung Sessang.	Upper stream of River Sebelak, near to the Saratok Water Treatment Plant.
Width (m)	50	15
Water level	High	Moderately high
Turbidity	Muddy	Clear
Water colour	Yellowish	Brownish
Water flow	Fast flowing	Slow flowing
Temperature	26.54° C	24.85° C

Table 9 - Water Sampling Location and General Conditions

Parameters	Units	Classes					
		I	IIA	IIB	III	IV	V
Ammoniacal Nitrogen	mg/l	0.1	0.3	0.3	0.9	2.7	> 2.7
BOD_5	mg/l	1	3	3	6	12	> 12
COD	mg/l	10	25	25	50	100	> 100
DO	mg/l	7	5-7	5-7	3-5	<3	<1
pH		6.5-8.5	6-9	6-9	5-9	5-9	
Salinity		0.5	1			2	
T.S.S.	mg/l	25	50	50	150	300	>300
Temperature	^{o} C	Normal	Normal	Normal	Normal	Normal	Normal
F. Coliform *	counts/100ml	10	100	400	5000[1]	5000[1]	
Total Coliform	counts/100ml	100	5000	5000	50000	>50000	
Phosphorus	mg/l		0.2	0.1			

Table 10 - National Water Quality Standards (NWQS) for Malaysia

The DO measures the content of oxygen dissolved in water. A high DO level indicates that the water quality is good. The result shows that the oxygen content in WS2 is higher than WS1. This may be because the WS2 is collected closer to the Saratok Water Treatment Plant and that this water has not been polluted or influenced by any human activities. Meanwhile, the WS1 was within Class III of NWQS, meaning that the water would require extensive treatment in order to be used as drinking water. However the water is still suitable for non-sensitive species of fish. The villages further away from the JKR road (especially Kampung Empalam) still rely on rainwater and river Sebelak for all their portable water requirements. Rainwater is often collected and stored in big polythene tanks for cooking, drinking and washing purposes. The river water is also used, especially for washing and bathing.

The pH of the water samples is stable within these two water sampling areas. The pH of the water falls within the range of pH 7. This is good for both human and aquatic use especially, for the villages that depend on the river. The salinity of the water samples is quite different which may be due to the location of the water that has been collected. The location of the WS1 is near the South China Sea whereas the location of WS2 is further inland. Thus, the high salinity level of WS1, hence its relatively high pH may have resulted from sea water intrusion. BOD is the commonly used parameter to indicate the amount of pollution due to organic materials. COD is used as a measure of the oxygen equivalent of the organic matter content of a sample that is susceptible to oxidation by strong chemical oxidants. High BOD or COD values would indicate that

the water quality is poor. The BOD levels at the water sampling points were detected at 3.79 mg/l at WS1 (Class III of the NWQS) and 0.36 mg/l at WS2 (Class I). The COD levels at WS1 and WS2 were detected at 33 mg/l (Class III) and 2 mg/l (Class I) respectively. This indicates that the river has somewhat been polluted.

The nutrient levels in the water for aquatic as well as terrestrial flora, is indicated by the levels of nitrogen and phosphate. The Phosphorus levels for both samples were within Class III of NWQS. This may be due to the natural peat water discharge and the waste substances from both human and animals around the river. The ammoniacal nitrogen (N) and nitrate-N levels in the WS2 were within Class I of the NWQS. The nitrogen level in WS1 was low, however, the ammoniacal nitrogen level in WS1 was within Class III of NWQS. The amounts detected indicate that there was no or minimal pollution from any external source upstream from the site or from the site itself.

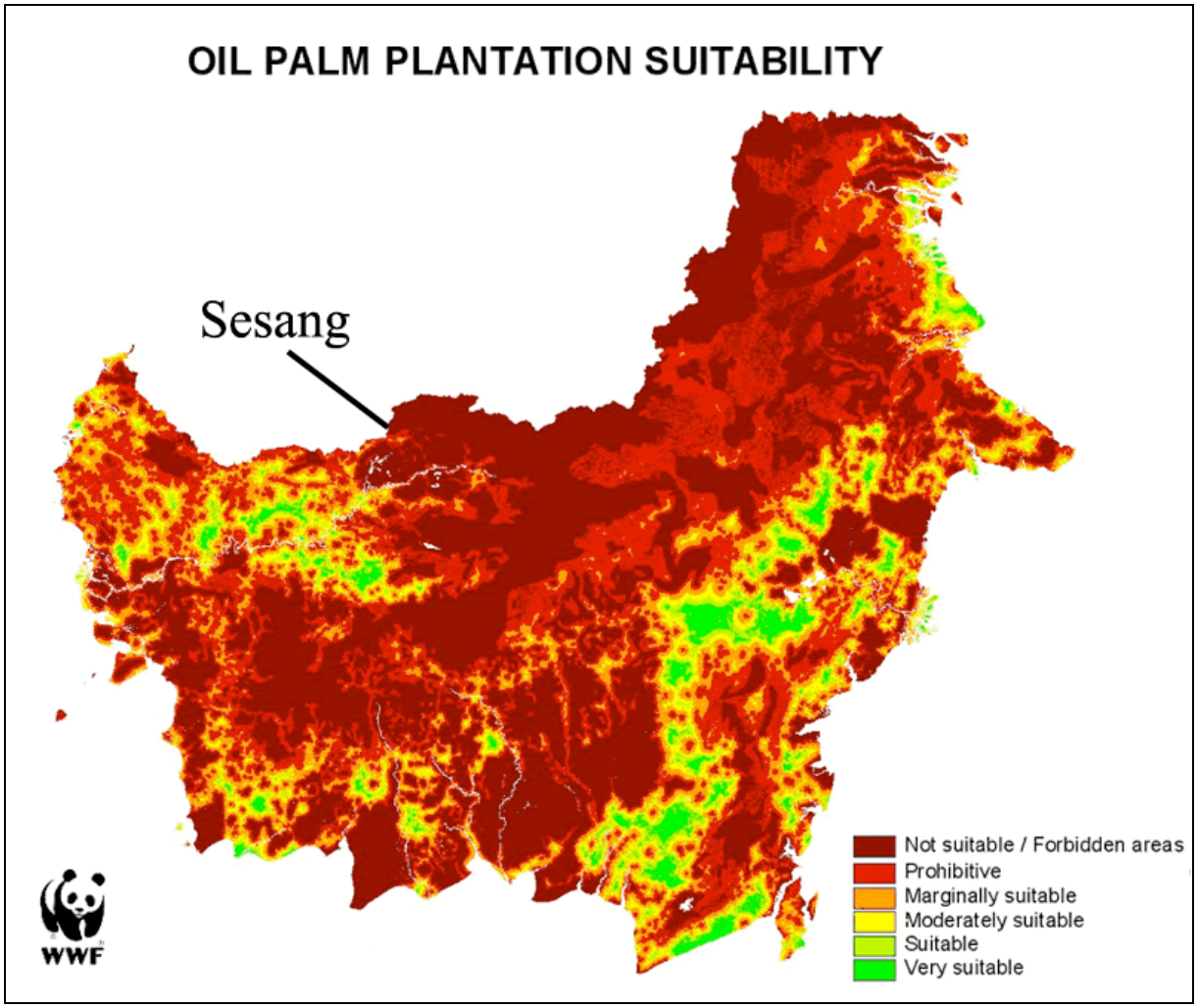
The presence of *Eschericia coli* in the water indicates that other harmful but less easily detectable pathogens may be present in the water. The water qualities in terms of TCC were found to be within Class IIB of NWQS. Meanwhile the TFC levels were within Class III of NWQS. The faecal count may be a result of the discharge of animals that stay in the forest surrounding and the discharge of the waste from humans along the village, although they have the facilities to dispose them.

These results indicate that there has been some level of pollution of the river. The water samples were taken from two distinct points. WS1 was taken from the lower stream of the river near to village and WS2 was from upstream of the river near Saratok Water Treatment Plant. Between these two sampling points, there are many other villages and there are different land use practices taking place. Thus, even though the results indicate that there has been some level of pollution of the river in the village, we cannot conclusively say the main source of the pollution is from the Kampung Sessang since the activities of the villages in between the two sampling points could also cause pollution of the river.

Environmental Sustainability

A study on the environmental sustainability of oil palm was done even though this was not part of the initial focus of the study. The figure below shows the suitability of oil palm in Borneo. Most of the areas in Borneo including Sessang are not suitable for oil

palm cultivation. However, there is increasing conversion of vast under-utilized lands to oil palm plantations in these areas.



Picture 12 – Oil Palm plantation suitability on Borneo. (WWF 2006)

There is currently a proposal to convert most of the lands in Sessang to paddy, oil palm and pineapple plantations. Most of the lands in Sessang have a high potential of subsidence due to their peaty nature. The continuous cultivation of the land will eventually result in the destruction of the peat. This unique and valuable resource will be lost forever. The underlying mineral soils that will be left may have poor fertility, requiring high inputs to maintain productivity and may render farming such areas uneconomic. Jamaludin (2002) emphasized that a high level of management is therefore needed to minimize the occurrence of undesirable consequences, which can lead to the drastic subsidence, and rapid disappearance of the peat.

Our studies to find out the effect of the oil palm on the quality of the river indicated that there has been some level of pollution of the river which is reflected in the results obtained when the quality of the river was analyzed. There was an increase in the BOD

and COD from upstream to downstream of the river. Even though the activities of the residents of the villages in between the two points of sampling could have an impact on the water quality, we can somewhat attribute the change in the quality of the river to the leaching of nutrients from the oil palm fields as a result of the herbicides and pesticides used in the cultivation. The long term effects of this could be worrying.

Economic Issues

This study was also designed to assess the economic issues prevailing in the village regarding the oil palm. The Malaysian palm oil industry which is economically large and diversified is seeking that it be fed with more oil palm products to keep it viable. According to the latest statistics, the planted area at the end of 2002 stood at 3.67 million hectares. This represents about 60% of the total 6.075 million hectares designated for agriculture under the National Agriculture Plan (NAP) (1998-2010) (Yusof and Chan, 2004). This is an indication that more and more people are venturing into the oil palm business.

There is currently an impetus for individuals in the village to grow oil palm on their own. This drive has stemmed from the economic profitability associated with the production. They are of the opinion that they will earn more income when they cultivate the oil palm by themselves than when they renting their lands to FELCRA or SALCRA. This opinion has been more consolidated by the huge profit realized from small holding individual families who are not affiliated to both SALCRA and FELCRA. There is a general impression that most people wish to continue cultivating oil palm. On the whole, its ability to subsist under inimical conditions coupled with its current escalating prices worldwide makes it economically reliable and gives the oil palm a bright future

4.0 Conclusions

76% of the villagers of Sessang are or were involved in non-farming activities. These activities make up 70% of the income generated in Sessang. The Oil Palm schemes have given job opportunities to the resource poor and at the same time serve as a secure complementary income to half of the households. The development in the area has resulted in a change of income sources and livelihood strategies. The majority of the villagers used to produce food for own consumption, where as today the majority have a monetary-income based economy and choose to buy food instead.

Many people still grow paddy and fruit for own consumption. The homegardens serve as an important complementary source of food.

The forest area has decreased significantly over the past 50 years and most animals and valuable timber species are gone. 49% of the villagers use the forest, but they don't consider it to be an important resource. The general opinion is that the conversion of forest areas to Oil Palm is a good thing since it turns unproductive forest into income generating areas. Even the resource poor people who don't receive a direct benefit from the Oil Palms are satisfied with the development, because they think it will give them job opportunities in the future.

The fact that you can be granted land titles when joining the Oil Palm schemes gives the villagers an incentive to participate.

Sessang has an elite group of well-educated and well-informed people with good political connections who manage to attract the attention of development schemes.

Sessang is an attractive place to develop because it is well organized, with good infrastructure and because there is a large group of people with titles to their land.

While the oil palm has brought development to Sessang and given the villagers a secure complementary income, the environmental sustainability of the Oil Palm development is more uncertain. Since most of the soils in the village are peat, the future of the oil palm may be at risk if management practice that could reduce the rate of subsistence of the land and the further disappearance of peat are not adopted.

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6.0 Appendices

6.1 Synopsis

An assessment of the effects of land development schemes on land use and livelihood in Kampung Sessang

Synopsis

February 2008

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Introduction

Our study will be taking place in Kampung Sessang, a village in Sarawak, a province of Malaysia. It is situated along the Seblak River, close to the new coastal highway leading to Betong. There are 241 houses with a total population of more than 1000 people.

Like most rural Iban communities, the residents of Kampung Sessang rely on agricultural activities as a source of their livelihood. Most of the farming activities of these people are characterized by shifting cultivation, but with a focus on subsistence farming (Jomo et al, 2004; Norwawi, 2002). Each household in the village has its own plot of land averaging between 5-8 acres, and 70% of this land area is used for rice cultivation, especially wet rice cultivation with fruit trees interspersed on the remaining parts of the land. Although subsidies for wet rice cultivation ceased in the 1970s, villagers still continue farming for their own consumption (Devisschaer, 2007).

Background

The State Government of Sarawak has during the last decades aimed at transforming the rural economy through large-scale agricultural land development. This goal is to be achieved by developing the NCR land[4] into commercial plantations. (forever.com/sam/sarawak/articles/landrights.html). According to the State Government, the NCR lands are mostly kept idle, under-utilized and unproductive (Ministry of land Development 1997:16). The new NCR land development strategy is based on the promise, that this idle and fragmented native land can be consolidated into "land banks", which can be developed to large-scale commercial plantations. This strategy is a way of bringing together native landowners (with their land), the private sector, (with its capital and expertise) and the government, acting as trustee to manage the interests of the landowners. The native landowners lease their land to the plantation, with options of becoming shareholders of the plantation.

[4] **NCR land**- ***Native Customary Rights Land***: NCR land is under the Sarawak Land Classification Ordinance, categorized as land in which native customary rights, whether communal or otherwise, have lawfully been created prior to 1st January 1958 (forever.com/sam/sarawak/articles/landrights.html).

In Sessang, oil palms have been the main plantation crop besides the wet rice cultivation and have been identified as the main source of income to the people. According to the village penghulu, about half of the people are involved in these plantations, especially when their lands were leased to SALCRA[5]. The Sarawak Ministry of Land Development acknowledges that around 1.5 million hectares of land are today recognized as NCR land. In 1999 close to 300,000 ha of this land was converted to oil palm plantations. The ambition is that oil palm plantation will cover 1 million ha in 2010 (Cooke 2002:193). Meeting these goals depends on people's acceptance of the official aims and wishes to invest their land in the development schemes. The Ministry of Land Development has therefore been running a comprehensive campaign, trying to persuade people to give up their subsistence livelihood and instead lease their land to plantations (Cooke 2002:195,200ff).

The comprehensive reorganization of the economy in Sarawak brings along extensive social and environmental changes. In order for a state managed development scheme to succeed, it is therefore essential that the development fits needs and strategies in the communities. For that reason it is necessary for planners to be aware of how people respond to and incorporate the development scheme in their livelihood strategies, how the scheme fits with old practices and which positive and negative impacts the development scheme has on different people's livelihood. Likewise it is important to look at probable environmental side effects that might arise from such developments.

Problem statement

Kampung Sessang has now been plagued by scarcity of land (NCR land) and the subsistence farming which was practiced by the people has been considered unattractive by the government (Hansen & Mertz, 2003). This in addition with increased opportunities for off-farm jobs have resulted in great changes in their livelihood strategies. These problems have been more intensified by the environmental degradation caused by oil palm plantations. Besides forest fragmentation, forest resources and biodiversity loss, palm oil plantations have a large effect on river water quality. One of the largest effects on the environment is caused during the first development phase of the plantation, when forest is cleared (in Malaysia with preference using zero-burning practices) and land is prepared to be planted.

[5] **SALCRA**- ***Sarawak Land Consolidation and Rehabilitation Authority***. SALCRA has been empowered to develop all categories of land but priority is given to the development of NCR land in Sarawak for agricultural purposes by establishing plantations. It started as a 100% state agency, but has changed into a joint venture company where the private company is the main economic driver but where the government still has great influence on the management of the plantations.

There is now increasing pressure on the government to alienate certain portions of the state land for village use. This has prompted us to consider issues of both environmental and societal concern in this study. We believe that the changes in land use as a result of the various land development schemes have severe impacts on the livelihood of the inhabitants. Moreover, we also envisage these changes in land use changing the societal structure regarding ownership of land.

Objective and research questions

The objective of the study is to investigate the effects of different Government land development schemes on land use and livelihood of the villagers of Kampung Sessang.

In accordance with our milestone, the research questions for the study are:

f. **What are the main sources of income and food for the villagers of Kampung Sessang, and how has this changed?**
g. **How do the villagers use their own land and how has this changed?**
h. **How has the use of and access to forest products changed?**
i. **How has the tenure status changed in the village of Kampung Sessang?**
j. **How are the land development schemes organized and who are the main decision-making actors?**

The first question seeks to determine what sources of income and food that are most important to the villagers, and whether the land development schemes have caused this to change. When determining main sources of income and food it is not enough to simply identify the sources that supply the largest amounts. A source supplying a small but secure income might very well be valued higher than a source supplying a high but insecure income. Likewise, food sources covering important dietary needs (e.g. proteins and vitamins) might be valued higher than food sources supplying larger quantities of food. In order to answer the question it is therefore necessary to identify all sources and to rank these according to quantity and importance. Added to this it is necessary to find out what sources of income and food the villagers used to have and which of these they don't have any more.

The second question focuses on how the villagers in Kampung Sessang use their own land and whether or not the land development schemes have changed the role the villagers' own land play in their economy and diet. To best assess this, various information is needed, among these, the size of the farmers field, what crops are cultivated, what role does the production play (complementary/subsistence), how high priority the management of the fields have, intensity of management, time and resources spent in the field, are there problems with seasonality, and the farmers own perception of how these factors have changed.

The third question deals with the villagers use of and access to forest products, including firewood, game, medicinal plants, fruits etc. Forest areas have an important

role in many rural areas because of their safety-net function. The purpose of the question is to compare the role of forest products in the livelihood strategy of the villagers of Kampung Sessang today and in the past. information included in the analysis will consist of, the distance between the forest and the village, the size of the forest, changes in forest cover over time, the condition of the forest (untouched/heavily logged), an assessment of the forest resource (basal area, diameter distribution, species abundance etc.), a list of products harvested and the role they play in the economy and diet of the villagers, a list of products harvested in the past and identified constraints to access the forest products.

The fourth question relates to the tenure status in Kampung Sessang and whether these have changed as a consequence of the implementation of land development schemes. In order to shed light on the tenure status it is necessary to identify the land that is owned by the villagers, the land they have leased, land owned by the government and land owned by private companies. It is also relevant to compare the quality of land owned by the villagers compared to the government owned lands in Sessang. Ultimately it will also be relevant to find out what land the villagers have been managing in the past and whether they trust the government in land tenure issues.

The fifth question seeks to examine the organizational structure of the land development schemes and to identify the main decision making actors. In order to analyse these issues, it is relevant to find out, who has access to the schemes and who decides who can join the schemes? Who has right to harvest the products and how are the benefits shared? How are management decisions made and who decided to implement the schemes (top down/bottom up).

Methods

In order to answer the above given research questions a combination of social- and natural science methods will be applied. Information collected will thus consist of qualitative as well as quantitative data.

A **transect walk** will be conducted in the initial face of the fieldwork, in order to get an impression of the village and the surrounding areas. The aim is to gather information about the natural resources available and to make observations about the area surrounding Kampung Sessang. Two transect walks going different directions will be conducted in order to cover the diversity of the area.

In depth **interviews with key informants** will be carried out in order to get detailed information on relevant issues and supply background information for the study. Interview with the **head of the village** will give background information on the village, the village history, an overview of the households and the organizational structure of the village and help us to identify other key informants. He will also be able to give information on the land development schemes that have been implemented in the area and what households that have participated in them. (Appendix 3)

An interview with a relevant **government official** will give us detailed information on the tenure status and land development schemes in the area, and the government plans for area. Interviews with the **persons in charge of the different schemes** will give us information on the history and purpose of the schemes, as well as the number of households involved, what participants that holds which rights and how the benefits are shared. (Appendix 8)

In order to get information on the use of and access to forest products, interviews will be conducted with local professional **hunters** and **traders** of forest products in the area.

Semi-structured interviews will play an important role in the study, since it enables us to conduct a series of qualitative yet comparable interviews with a number of people. Villagers participating in respectively the oil palm scheme and the wet rice scheme as well as villagers who are not participating will therefore be interviewed in order to get comparable information about their main sources of income and food and their use of their own land and the forest products available in the area. (Appendix 4)

A **Participatory Rural Appraisal (PRA) ranking exercise** will be conducted with groups of households participating in the different schemes and those not participating

in any schemes, in order to quantify and compare the sources of income and food according to both quantity and importance. (Appendix 6)

A daily and a yearly activity calendar will be constructed for the groups of households in order to estimate how time and resource consuming it is to participate in the different schemes and what priority they give their own land. The calendar will also enable us to see whether there are periods during the year where income of food and money is lower than others. (Appendix 7)

By doing a **PRA mapping exercise** we will be able to get an impression of how the villagers see their own village and the surrounding areas and what they consider to be the most important sources of natural resources and tenure status. By asking them to draw a similar map of what the village and the surrounding areas looked like ten years ago we can get an impression of what major changes the villagers think have occurred during the years. The mapping exercise will be compared with **aerial photographs** and **GPS mapping** in order to relate the maps drawn by the villagers with the real situation. (Appendix 5)

A **Forest Resource Assessment** (FRA), including size and condition of the forest, distance to village and the composition of trees, will be conducted in order to examine the available forest resources and whether or not the local villagers frequently use it.

An **assessment of the villagers' own land** will be carried out in order to determine what purpose they serve in the diet and the livelihood. It will be examined what types of crops the villagers generally cultivate on their land, and the management intensity of the individual plot of land.

A **land suitability assessment** of the land used for the oil palm plantations, the wet rice fields as well as land not included in the land development schemes will be conducted in order to compare the quality of the land at the different locations. The assessment will include measurements of acidity, salinity, drainage, infiltration and fertility.

Water samples will be collected at inlets and outlets of the wet rice fields as well as in the nearby river, both upstream and downstream from the village, in order to measure differences in biological oxygen demand and the nutrient loading.

In Appendix 1 is included a schematic presentation of data needed and the relevant methods to be applied. In Appendix 2 is included a preliminary time schedule for the fieldwork.

Sampling strategy

Since Kampung Sessang has 241 households and a population of more than 1.000 people it is not feasible to do a thorough quantitative analysis within ten days of fieldwork. The strategy chosen is therefore to do a qualitative analysis using social science methods and to support the findings with quantitative data obtained through natural science methods. Each research question will be analysed from various angles using different methods in order to triangulate the research and thereby obtain more reliable data.

It is assumed that the two largest land development schemes currently operating in Sessang is the Wet Rice Scheme and the Oil Palm Scheme. The interviewed persons will therefore be grouped into three groups, respectively people participating in the Wet Rice Scheme, people participating in the Oil Palm Scheme and people not involved in any land development schemes. Sampling will be done by using the "Snowball" method, meaning that informants will be asked to name other people that might have relevant information concerning our study. The aim is to do semi-structured interviews with at least six farmers from each of the three groups. People participating in semi-structured interviews will also be invited to the PRA sessions. The PRA exercises will all be conducted with groups of six people.

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Appendix 1 – Schematic presentation of data needed and methods applied.

Topic	Data needed	Method
Source of income and food	List of food products used and their sources. List of sources of monetary income. Ranking according to quantity and importance. List of food products used in the past and their sources. List of sources of monetary income in the past.	Semi-structured interview PRA ranking exercise PRA – Daily/Yearly activity calendar
Use of own land	Size of field. Species cultivated. Role of products in economy and diet. Priority of production. Time and resources spent. Management intensity. Seasonality issues. Assessment of changes that have occurred.	Observation Semi-structured interview PRA - Matrix ranking PRA – Yearly seasonal calendar PRA mapping exercise Assessment of own land
Forest products (access/use)	Distance to forest. Size of forest. Changes in forest cover over the years. Condition of the forest. Assessment of the resource. List of products harvested today and the role they play List of products harvested in the past. Constraints in access.	Interviews with key informants Semi-structured interview Observations FRA PRA resource mapping (past/present) Transect walk Aerial photograph GPS mapping
Tenure status	List of households. Tenure status today. What land is owned by the	Semi-structured interview Interview with Government officials Interview with Head of village.

	villagers. What land do they lease. What land is owned by the government. What land is owned by private companies? Is there a difference in quality between the government owned land and the land owned by villagers. Do the villagers trust the government in tenure issues.	Land suitability assessment Water quality assessment
Organization of schemes.	Who has access rights. Who has withdrawal rights. Who has management rights. Who has exclusion rights. Who has alienation right**s.**	Semi-structured interview Interview with persons responsible for development schemes.

Appendix 2 - Preliminary time schedule for fieldwork

Date	Location	Franklin	Gopinath	Jakob	Sarah
5	University	Agree with counterpart students on synopsis.			
6	Village	Meet with head of village. Transect walk/get an overview of the area.			
7	Village	Semi-structured interview.	Semi-structured interview.	Semi-structured interview.	Semi-structured interview.
8	Village	Semi-structured interview.	Semi-structured interview.	Semi-structured interview.	Semi-structured interview.
9	Village	Interview with State Forest Officer (SALCRA)	Interview with State Forest Officer (SALCRA)	Interview with persons in charge of schemes	Interview with persons in charge of schemes
		PRA – mapping			
10	Village	Semi-structured interview.	Semi-structured interview.	Semi-structured interview.	Semi-structured interview.
		Preliminary presentation of findings.			
11	Village	Soil sampling	Assessment of farmers management of their own land.	Forest resource assessment.	Water sampling.
		PRA – mapping			
12	Village	Soil sampling	Assessment of farmers management of their own land.	Forest resource assessment.	Water sampling.
		PRA – Ranking and daily/yearly calendar			
13	Village	Soil sampling	Assessment of farmers management of their own land.	Forest resource assessment.	Water sampling.
		PRA – Ranking and daily/yearly calendar			
14	Village	GPS resource mapping			
15	Village	GPS resource mapping			
16	Village				
		Goodbye party			
17	Roban	Present data to civil servants			
18	Kuching				
19	Kuching	Sum up work.			
20		Social gathering			

Appendix 3 - Guide for interview for the head of village:

1. List of households – Who is participating in the different schemes?
2. Evolution of the population since 1970

- Demography : migrants, labour flows
- Age
- Sex
- Activity (farmers, salary…) and % of men and women
- Education (school, university)

3. Identification of other key informants.
4. What have been the major changes of land use in the past few decades? How has it influence the evolution of the infrastructures in the village?
5. Do you think that the government decisions for the land tenure have positive consequences in your village? Why?
6. What development schemes have been implemented in Sessang?
7. What private companies are operating in the area?
8. Ha of land that is still under the NCR status (uncultivated land)?
9. What are the major conflicts due to the land use tenure? Are they still going on?

Appendix 4 – Guide for semi-structured interviews

GPS location of the household:

Name (Head of household):

Number of people living in the household:

Source of income and food

1. Sources of monetary income
    a. Employment in schemes
    b. Own production
    c. Remittances
    d. Pension
    e. Subsidies
    f. Other

2. Source of food
    a. Involvement in schemes
    b. Own production
    c. Purchased at market
    d. Livestock
    e. Collection of forest products
    f. Fishing
    g. Other

3. Land tenure status
    a. How many do you own? Since when?
    b. How much land did you have 10 years ago?
    c. Do you lease anything?
    d. Do you think that having a title is important? Why?
    e. How do you use your land?
    f. Did you sell some land? Why?
    g. Are you involved into a scheme? If yes, which one?
    h. Factors influencing your participation (or not) into the scheme: profit, less work…

4. Use of the own land
    a. What are the main crops you grow?
    b. How much time do you spend on your own field?
    c. What is your main use of your own land? (consumption/commercial purpose?)
    d. What crops did you grow ten years ago?
    e. Do you have a better productivity than ten years ago?

f. Do you have a better quality of land than ten years ago?
g. Do you use fertilisers?
h. Do you have any mechanical equipment?
i. Do you get subsidies?
j. Do you have major constraints on certain lands (irrigation problems)

5. Natural resources
   a. Which resources do you use now?
      - From the plantation
      - from the river
      - from the forest
   b. What are they used for?
   c. Has your access to some natural resources decreased?
   d. Do you use different resources today than you did prior to the implementation of the land development schemes?

6. Organizational structure of the land development schemes

If the person is involved in either the wet rice or oil palm scheme:

a. For how long have you been participating in the scheme?
b. What benefits do you get?
c. What expenditures do you have?
d. Who decides who is allowed to join the scheme?
e. How are management decisions made? (Top down/collective decision making?)

If the person is not involved in land development schemes

a. Why are you not involved in any schemes?
b. Would you like to join?
c. What benefits/negative impacts do you feel you get from the schemes?
d. Have you been involved in any schemes in the past?

Appendix 5 – Guide for PRA mapping exercise

Purpose: To compare sources of natural resources and tenure status today and prior to the implementation of the development schemes.

Participants: Six persons, two participants of the Wet rice scheme, two participants of the Oil Palm scheme, two people not participating in the schemes.

Expected results:

2 Maps of the natural resources

1st map - Draw a map of your village, including:

- the village and the surroundings (infrastructures)
- the water
- the forest
- The different fields (NCR, SALCRA…) and for each explain what crop is used.
- Other important natural resources

2nd map - Draw a map of your village as you remember it prior to the implementation of the development schemes, including the same factors.

2 Maps of the tenure relation.

3td map

- Indicate the location of Kampung Sessang
- What land do the villagers own?
- What land does the government own?
- What land do private companies own?

4th map

Draw a map of your village as you remember it prior to the implementation of the development schemes, including the same factors.

Appendix 6 – Guide for PRA ranking exercise

Purpose: To identify the main sources of food and income and to rank these according to quantity, importance and other relevant factors identified by the villagers.

Participants: Maximum six persons, two participants of the Wet rice scheme, two participants of the Oil Palm scheme, two people not participating in the schemes.

Expected results: A schematic presentation of the major sources of food and income and their importance.

	Employment in oil palm plantation.	Involvement in Wet rice scheme.	Production of cash crops.	…
Secure income				
High income				
Easy work				
Low labour input				
…				

Result of income source ranking exercise

	Involvement in wet rice scheme.	On farm production.	Collection of forest products.	…
Good bulk producer.				
Important complementary diet.				
Low labour input.				
Requires land.				
…				

Result of food source ranking exercise

Appendix 7 – Guide for PRA Daily/Yearly calendar exercise

Purpose: To create a schematic presentation of a working day and a working year for the people participating in the different development schemes.

Participants: Maximum six persons per exercise. The participants will be divided into three groups: Participants of the Wet rice scheme, participants of the Oil Palm scheme, people not participating in the schemes.

Expected results: A schematic presentation of a working day and a working year of the three groups of people, including main activities, levels of income and expenditures.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Activity												
Income												
Expenditures												

Yearly calendar

Appendix 8 – Guide for interview with persons responsible for development schemes.

1. Personal
    a. What is your role in the scheme?
    b. Do you live in the village?
    c. Are you from the village? If not, since when are you here?
    d. Who are you working for? (Government, private company…)

2. Implantation of the scheme
    a. When did the scheme start? Who decided to do it?
    b. What were the major changes on the environment of the village?
        - land use changes,
        - land tenure changes,
        - new infrastructures
    c. Did you have any constraints due to the implantation of the scheme?
    d. Soil constraints (erosion, bad quality…)
    e. water (drainage)

3. Decision making
    a. Who decides who can join the scheme?
    b. What is required of a person to join?
    c. What is the cost of joining the scheme?
    d. How are the benefits of the scheme divided?
    e. Who makes the management decision and how are they made?
    f. Does people who are not involved in the scheme receive any benefits?

4. Work
    a. What kind of job did your scheme created? (Off farm…)
    b. Could you give an average percentage of the people working in the scheme from the village and people from outside?
    c. Could you give an average percentage of the people under 30 years?

5. Conflicts
    a. When the scheme starts, what was the reaction of locals? Did you have meetings with the villagers before the creation of the scheme?
    b. Do you feel that the locals agree with the scheme? (compare before / now)
    c. If not, do you think there is a way to cooperate with the farmers who ask for more land?
    d. Do you often meet the villagers to speak about what is going on in the scheme?

6. Livelihood
    a. What are the impacts of the scheme on people's monetary income?
    b. How has the crop prices evolve since the creation?
    c. What are the main consequences of the scheme on people activities?

7. Future
    a. How do you see the future? (Increase of land? social activities in the village? job opportunities?)

6.2 List of methods and data

Method	**Data**
Semi structured interview	40 semi structured interviews of households
Interviews with key informants	Penghulu 2 headmen FELCRA Plantations worker Male indonesian workers Female indonesian workers Inhabitants of Empalam
PRA scoring	1 map
Yearly activity calendar	1 calendar
Transect walk	1 cross section
FRA forest ressource assessment	
Community mapping	1 map
Ressource mapping	2 maps : in 1950 and today
Tenure mapping	1 map
Soil suitability assessment Water suitability assessment	Result of analysis

6.3 Results of FRA

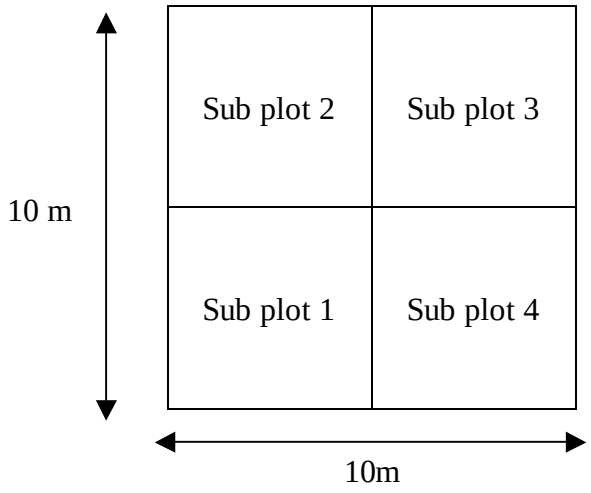
11 March 2008
Geri, Gopinath, Jakob, Tie

Objective
The objective of the Forest assessment is to get an idea of what natural resources are available in the forest areas surrounding the village of Sesang and to recall what resources were available in the prior to the reduction of the forest area.

In the past
40 years ago there were abundance of timber trees in the forest such the Ramin (*Gonystylus bancanus*), Jongkong (*Dactylocladus strenostachys*), Jelutong (*Dyera* sp.) and Meranti (*Shorea* sp.).The wild fruit available in the past were wild mango or Raba (*Mangifera* sp.), Serait (*Nepheleum* sp.) and Asam Paya (*Zalacca confertus)*
The Medicinal plants were Sembung tree (*Blumea balsamea*). The animals found before were wild boar (*Sus barbatus*), Deer, Monkey, Mouse deer, Bear and Snake/Pyton. The birds consist of Bubut, Tegok, Tekukur, Keruak, Pipit hitam, the brown pipit, Spider hunter, Swallow, Glamenkite/eagle, Chinese Egret, Bidada or enggang, Temegu/Magrina and the Cooker-Dove.
Resource of foods from forest like Midin, Paku uban or keruk, palah shoot, asam paya, Nibong shoot (*Onchosperma tigillarium*), Nipa shoot (*fruticams* sp.), Rotan shoot (*Calamus* sp.), Leletup (*Passiflora foetida*). Fish commonly found were Keli fish (*Clarius* sp.), Belau-u fish (*Chana* sp.) and Toman fish (*Chana* sp.).

Present situation
There are limited types of timbers such as Selam tree, Seladah tree (*Canarium* sp.) that can still be found in the forest though they are generally still small in sizes.
The present site of forest where the plot survey is carried out is being cleared for oil palm plantation. Block clearing of the forest is going on after timber woods were extracted few years ago. Forest resources were practically removed to give way for agricultural activities. The removal of biomass could affect the carbon cycle. Decomposition of biomass increases the volume of organic matter in the soil.

A plot of 10m x10m is divided into four subplots in which each sub plot divided into 5m x 5m for the purpose of forest inventory. Each species of woody plants in the plot are identified and measured in terms of height and diameter at breast height (DBH). The numbers of the remaining plant species in each sub plot are counted.



Sub plot 1:
Woody Plant

Common name	Scientific name	Height	DBH
Simburuk	*Stemonurus* sp.	5 m	5.0 cm
Simpoh	*Dillenia* sp.	10 m	11.9 cm
Simpoh	*Dillenia* sp.	10 m	10.9 cm
Upik	*Parishia maingayi*	12 m	26.1 cm
Terentang	*Lampnosperma* sp.	15 m	11.5 cm
Rantap		5 m	6.0 cm
Ubah	*Eugenia* sp.	8 m	11.5 cm

Non-woody pioneer species

Common name	Scientific name	Total number
Lasu	*Pandanus* sp.	10
Asam Paya	*Zalacca confertus*	20
Midin		30
Aphemetic		1
Paipers		20

Sub plot 2:
Woody Plant

Common name	Scientific name	Height	DBH
	Baccaurea sp.	8 m	5.4 cm
Upik	*Parishia maingayi*	8 m	4.7 cm
Ako	*Xylophia cordifolia*	15 m	16.3 cm
Ubah	*Eugenia* sp.	12 m	14 cm
Terentang	*Camnosperma* sp.	20 m	20.5 cm

Non-woody pioneer species

Common name	Scientific name	Total number
Lasu	*Pandanus* sp.	25
Asam Paya	*Zalacca confertus*	1

Midin		15

Sub plot 3:
Woody Plant

Common name	Scientific name	Height	DBH
Simburuk	*Stemonurus* sp.	22 m	16.6 cm
Ubah	*Eugenia* sp.	8 m	9.2 cm

Non-woody pioneer species

Common name	Scientific name	Total number
Lasu	*Pandanus* sp.	35
Midin		33

Sub plot 4:
Woody Plant

Common name	Scientific name	Height	DBH
Benuah	*Macaranga* sp.	30 m	22.4 cm
Medang	*Gironnirea* sp.	10 m	8 cm
Medang	*Gironnirea* sp.	10 m	9.3 cm

Non-woody pioneer species

Common name	Scientific name	Total number
Lasu	*Pandanus* sp.	25
Midin		30

The selected sample plot is a typical image of a secondary forest where all valuable timber trees have been removed. There is a great species diversity in the forest and it is mainly dominated by small sized trees.

6.4 Interview guide for structured interview

1 – Family backgrond.

Name

Age

Nr. of people in household

Main job/activities

2 – Sources of income

- Employment
- Schemes
- Remitances
- Pensioner
- Subsidies
- Others

3 – Source of food

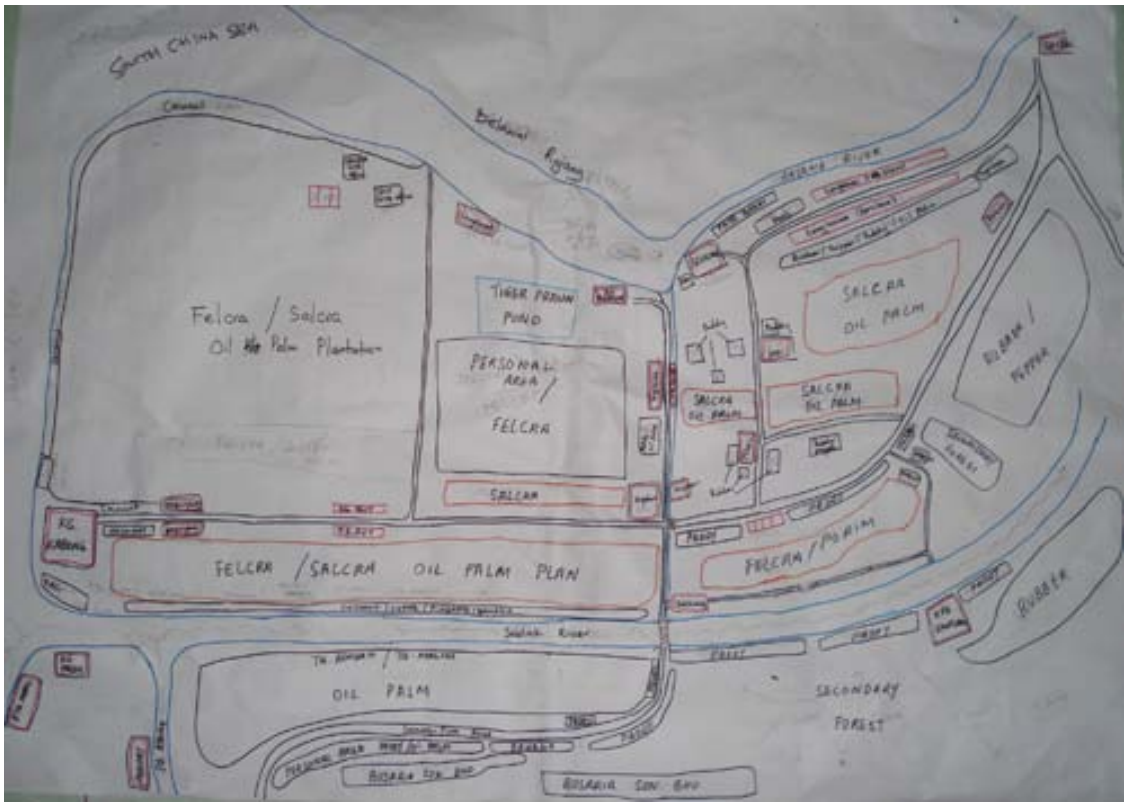
- Own production (Paddy)
- Chicken
- Livestock
- Forest products
- River
- Homegarden
- Others

4 – Forest products

- Timber
- Fruits
- Vegetables
- Game

6.5 Resource Mapping images.

Resources map 1960



Resource map 2008