

# **Impacts of Oil Palm Schemes on Local Peoples Livelihood**

## **A Case Study from Kampung Selampit, Sarawak**



December 6<sup>th</sup> 2002  
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# **Impacts of Oil Palm Schemes on the Livelihood of Kampung Selampit - A Case Study**



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**March 2003**

## **Abstract**

Malaysia has through the last three decades been using different strategies in order to develop the rural areas. In Sarawak on Borneo a newly implemented development strategy (Konsep Baru) involves the establishment of large scale oil palm schemes using NCR-land. This report is the result of a fieldwork conducted in Kampung Selampit, where such a development scheme was established in 1998. Besides that there has been a federal oil palm plantation scheme (FELDA) since 1988. The main objective of the report is to investigate the main impacts of these development schemes on the livelihood of the villagers in Kampung Selampit. The oil palm plantations has changed the villagers economic and social situation, but also the environment surrounding them. The aim of this report is the investigate these issues.

*Keywords : Oil palm, development schemes, livelihood, environmental impact.*

## Fact sheet of the study area



<b>Village</b>	Kampung Selampit
<b>Population</b>	700+ people
<b>Households</b>	198
<b>Religion</b>	Jagoi Bidayuh
<b>Mean income</b>	RM 400-450
<b>Farming activities</b>	Pepper, hill rice, rubber, tapioca, cucumber and sugarcane
<b>Oil palm plantation</b>	FELDA: 1386 ha established in 1988-89 Raya Oil Palm Plantation (JVC): 9271 ha under cultivation since 1998 (800 ha on abandoned SALCRA plantation)
<b>Climate</b>	Equatorial climate influenced by the Asian Monsoon system: Northeast (November-May), Southwest. (May to September)
<b>Rainfall</b>	Varies between 3000 mm and 4500 mm peaking in December, January and February. Average: 4086 mm
<b>Topography</b>	Flat to very undulating

Map over study area



## **Acronyms**

EIA	Environmental Impact Assessment
FELDA	Federal Land Development Authority
JVC	Joint Venture Company
KK	Ketua Kampung (Headman)
LCDA	Land Custody and Development Authority
NCR	Native Customary Rights
RRA	Rural Rapid Appraisal
SALCRA	Sarawak Land Consolidation and Rehabilitation Authority
SOM	Soil Organic Matter
TSS	Total Suspended Solids
SLDB	Sarawak Land Development Board
U.S.L.E.	Universal Soil Loss Equation

## **Preface**

This report is a part of the joint interdisciplinary course in Sustainable Land Use and Natural Resource Management (SLUSE) to Malaysia in 2003. The report is the outcome of research conducted on a field trip to Kampung Selampit, Sarawak in the period from 14.01.2003 to 02.02.2003.

The target group is everyone with an interest in land development schemes and rural development, but particularly this report is aimed towards governmental officials in Sarawak and natural resource management researchers in general.

## Acknowledgments

First of all, we would like to thank DANIDA for funding this field course and the State Government of Sarawak for granting research permission to do the fieldwork.

We would like to thank people and departments with who we have been in contact during this study. We would especially like to thank the Lundu District Council and FELDA management in Selampit.

We would also like to thank our Malaysian counterparts from the Universiti Malaysia Sarawak (UNIMAS) for the cooperation and the exchange of data after we left Malaysia. It has been a great educational experience working with students from another background. Furthermore we would like to thank all the Malaysian supervisors, teachers and technical assistants. Special thanks to our interpreter Alvin Chen, for his patience and friendliness.

In Denmark, we would like to thank all the SLUSE teachers, especially Ole Mertz (KU), Kristine Juul (RUC) and Tina Svan Hansen (KU). Further we would like to thank laboratory assistant Søren Olsen (KVL) for helping with the soil analysis, Anita Veihe (RUC) and Jens Raunsø Jensen (KVL) for advice about USLE.

Finally we would like to thank the people of Kampung Selampit that made us feel very comfortable and welcome in their village.

Copenhagen, March 2003.

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## 1. Introduction

Through the last two decades Malaysia has developed as a fast growing economy due to an export-oriented policy (Perkins *et al.*, 2001). This development is among other things due to the Malaysian Prime Minister Dr Mahathir, who has been using sometimes rather unusual methods to achieve his goals for developing Malaysia. He has developed the progressive development strategy "*Vision 2020*", which aims to make Malaysia become a fully industrialized country by the year 2020 (internet source 1).

The growth has mainly been based on the industry- and service sector, but much focus has also been put on the agricultural sector in order to diversify national exports, while developing the rural areas through agricultural intensification. Land development schemes with oil palm plantations have long been a part of this strategy. For the last 25 years palm oil production has increased substantially, and the total area with oil palm plantations in Malaysia have increased from 641.791 ha in 1975 (internet source 2) to 3,547,800 ha in 2001 (internet source 3).

This report focuses on the oil palm plantation schemes in the state of Sarawak on Borneo. In Sarawak large-scale development schemes have been a part of the state-governmental policy for developing the rural areas since the late 1960s (Ngidang, 2002). Since then and until late 1980s focus was on establishing rubber and cocoa plantations, involving the rural population in Sarawak. The schemes were designed to develop plantations using resettlement and through SALCRA<sup>1</sup> to develop the native people's NCR-land<sup>2</sup>. Both these development strategies had a high priority on the social aspects, providing jobs, improved welfare, better infrastructure and education to the areas involved.

The Ministry of Land Development Sarawak has during the last five years introduced a new concept (Konsep Baru), a state policy to enable the modernization of the rural population and agriculture. The philosophy behind the concept is to develop *in situ* and with the participation from NCR-landowners to develop their land on large-scale commercial basis in joint venture (JV) with private investors and LCDA<sup>3</sup> or SLDB<sup>4</sup>, working as a trustee or managing agent. The private

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<sup>1</sup> SALCRA, Sarawak Land Consolidation and Rehabilitation Authority.

<sup>2</sup> NCR-land, Native Customary Right-land, which is the land the native people of Sarawak have the right to, if they can prove that they have used the land before 1958 (according to Land Code of 1958).

<sup>3</sup> LCDA, Land Custody and Development Authority, which is the Sarawak Governmental Agency that have the authority to implement development policies.

<sup>4</sup> SLDB, Sarawak Land Development Board.

investors provide the capital, management and know how while the landowners provide the land (and labour) on a 60 years lease basis (Ngidang, 2002 and Ministry of Land Development Sarawak, 1997).

The Konsep Baru, which can be seen as a result of a top-down policy implemented by the state, has been criticized for several reasons. The intention is to develop the rural areas – using the NCR-land - but the native landowners themselves are not actively involved in the process. Most of the criticism has therefore been focusing on the implementation and lack of transparency in the projects and on the leasing period of 60 years (Osman, 2000, Ngidang, 2002). When joining the JVC-scheme the native people may run a big risk, because their land is in most cases considered their largest and most valuable asset (Cooke, 2002). Handing over their land to the private investor therefore means a lot more than just the prospect of a steady income from the joint venture. It may require a big change in their livelihood, because their source of income has changes drastically from being their own small scale farming into being a commercialized business out of their reach to control (Rigg, 1998). This also means, that their farming activities will probably be lessened or none existing. Instead they will have to find off-farm jobs, most often in the plantations. Though this change might mean a larger cash flow among the rural people and in the single households in the rural areas, it creates another need for buying their food supply elsewhere. Socially the plantations also might influence the livelihood of the participating landowners. When many people are not bound to their land anymore e.g. higher migration to urban areas can be expected, or a rise in non-farming activities and household economy (Rigg, 1998). All these changes are not necessarily negative, but it will mean that their livelihood could change dramatically over a short period (Cooke, 2002).

When a JVC-scheme is established it requires a minimum area of 5000 ha of land before the scheme can be implemented. To develop such a large area into plantation is not only a big change for the landowners involved, but also a serious change in the environment. Extensive land uses like secondary forest will be cleared resulting in more risk of soil erosion and run-off to the rivers. Further the cultivation of oil palm requires a lot of fertilizers and pesticides, which can have negative impact on the quality of the water in the surroundings.

The main focus of this report will be to investigate how the oil palm plantation development schemes have affected the indigenous people living in the rural areas. This will be done through a case study from Kampung Selampit, where both federal and JV oil palm plantations are present. The report will focus on how the plantations in the area have affected the local villagers livelihood

concerning living standards and which environmental side effects that have occurred due to the intensification and deforestation.

### **1.1 Objectives**

The main objective for the study is:

**Which impact do the oil palm development schemes (JVC and FELDA) have on the livelihood of the people in Kampung Selampit?**

In order to study the overall objective we find it appropriate to use some more specific research questions:

- How was the JVC scheme introduced in Kampung Selampit?
- How has the presence of the schemes affected the household economies?
- Have there been any changes in the social life due to the implementation of the schemes?
- How has the intensification of the area surrounding Kampung Selampit, affected the environment and thereby the villagers livelihood?
- How does the implementation of the schemes correspond with the political intentions of developing the village?

## **2. Methodology**

The fieldwork in Kampung Selampit involved a combination of both social and environmental studies, in order to enable our group to find the answers to the objectives. Studying impacts from oil palm plantations on the livelihood in the village required information about the general situation in Kampung Selampit, concerning issues like job opportunities, changes in family structure, changes in the environment etc. Indicators of impacts used in order to answer our research objective have e.g. been the respondent's satisfaction of participating in the JVC-scheme and the presence of both schemes in general. Also we wanted to investigate whether the job opportunities have changed their working habits and how the villager's impressions of the environmental situation are.

Given the very limited time of only ten days to do the actual fieldwork, we have chosen to use a quantitative and standardized interviews and a few in depth interviews (appendix 3 a-g) as well as a number of specific natural scientific methods.

### **2.1 Group work**

The interdisciplinary group-work has been very important in order for us to investigate the impacts of the oil palm plantations. We have integrated natural and social science approach in our methods to make sure that the questions asked e.g. in the questionnaires covers all possible aspects of interest.

During the fieldwork high priority was given to make the group work as one unit, instead of separately. The Malaysian and the Danish students worked together interdisciplinary through out the whole period of fieldwork. When meeting our counterparts in Malaysia we realize that we had had a different approach of making structured questionnaires. Our counterpart's questionnaire was mostly based on quantitative questions, expressed as statements, whereas ours to a large extent was written as open-ended questions. The questionnaires we ended out with are therefore a compromise of which neither the Danish nor the Malaysian group was fully satisfied, but yet felt that we could gain useful information.

Working together with people from other disciplines have been challenging and very educational because everyone got the possibility to look at certain issues from more than one perspective and get acquainted with other scientific methods and the use of them. This has also enabled us to have a wider range on our research objectives.

Although intercultural group-work has been a very good experience, we soon discovered that the way we, the Danes, normally work in groups, were not the same as the Malaysian students were used to. The Malaysian group works with a group-leader, which creates a hierarchy in the group. Furthermore there is a differences in age and gender, which creates a clear division of work among the Malaysian students, a division which we often had difficulties in supporting, since everyone were not working equally hard. We are though confident that everyone has gained a lot of positive experience from working together with foreign students, and learned a great deal from trying to reach a common understanding of the problems through long and sometimes hard discussions.

## **2.2 Working with an interpreter**

Using an interpreter was a new experience to all of us, but a very good and certainly very educational experience. Kampung Selampit is a Jagoi-Bidayuh village but we soon found out, that almost everyone speaks not only Bidayuh but also Malay. Therefore we quite early in the process decided to split up into smaller groups because the Malaysian students also would be able to translate from Malay to English. After getting home, we realize, that this might not have been such a good idea anyway, because the translation might be somewhat biased, when the students did it. We are afraid that it might be difficult for a student to strictly translate what is being said without interpreting at the same time. An example of this is, where we in the open ended questions in the questionnaires have noted the answer "lack of transparency", a term which is very doubtful the villagers would have used.

While testing the questionnaires we several times found that questions were understood in more than one way amongst the group-members and therefore translated differently. We tried to reach an agreement by discussing the question thoroughly when rephrasing in order to make the translation correct.

## **2.3 Description of methods**

### **2.3.1 Quantitative and standardized interviews**

The majority of the information from the fieldwork is obtained through the use of quantitative and standardized interviews with the people in the village. There are several reasons for why we have chosen to use this structured way of interviewing people – again most of all because of the time

constraint. A lot of very specific data like current land status, income, general opinion on the schemes, etc., were needed in order to investigate the fieldwork objectives and such data are easy to obtain using a standardized interview and also easy to quantify.

We are aware of lack of information in other aspects when using quantitative and standardized question, since we have left out possible answers, which might have been more appropriate to the respondent, and also may have left out information, which could be relevant for our further investigation.

### **Structured questionnaire with participants**

The main part of the fieldwork was focused on the questionnaire regarding the participants in the JVC oil palm scheme. In investigating the livelihood of the people, our main focus was to obtain the information from the village people themselves. Their view and comprehension of the possible changes due to the schemes was our main interest. Considering the very limited time and the fact that we could only expect to interview the same household once and during late afternoon or night, we needed to develop a quite wide-ranging questionnaire in the sense of covering many different aspects in one. The questionnaire was quite long, approximately one hour, which did not leave much time for additional questions.

The questionnaire contains both quantitative questions expressed as statements and qualitative questions in an open-ended form (see appendix 3a-b). These interviews have been conducted after a random sampling in order not to be biased in our selection of respondents. As the numbers of houses in Kampung Selampit is 198, the number of households interviewed has been set to be at least 30 to get a representative numbers. Each house had in advance a house number, from which we randomly drew 40 numbers, in case some of the houses appeared to be abandoned, people not being at home at the time of the visit or simply not willing to participate in the interview.

### **Shopkeepers questionnaire**

During our stay in the village we saw villagers enjoying alcohol after working hours, and we wondered whether this perhaps was a problem among some of the villagers and what caused this problem. We therefore decided to interview the local shopkeepers, because we assumed they would know such problems best, since they provide some of the alcohol. We developed a short questionnaire for this purpose, but after interviewing seven out of 13 shopkeepers, we found out that drinking was not a problem, and that no connection to the plantations could be made.

### **2.3.2 Focus group interview**

Two focus group interviews were conducted during the stay in Kampung Selampit, one with a women group and another with a small group of elderly men. The reason for using this method was to gain deeper knowledge of both the social structure of the village and also to discuss the different opinions of the impacts of the oil palm schemes on different groups in the village. Prior to the fieldwork no specific groups or questions had been developed, because we needed more specific information about the village before we were able to prepare such a focus group interview.

We discovered that the everyday life of families could be greatly influenced by the presence of the schemes, e.g. via job opportunities both for men and women. On location we therefore decided to conduct a women focus group interview, to look in to these issues. Furthermore we found it interesting to know more about the past in the village, therefore we conducted a focus group interview with the elderly men in the village.

#### **Women focus group**

In this meeting eight local women participated, between the age of 29 and 69. The location was at one of the women's house, in order to have a comfortable atmosphere. All the women joining the focus group knew each other, which made the atmosphere during the meeting trustful and friendly. We had developed a semi-structured interview guideline (see appendix 3d), concerning different subjects such as daily activities, jobs at FELDA/JVC, social life, etc. A few times during the session we managed to create an actual discussion amongst the women, but most of the time the women just answered our questions. This meant that the interview-situation became more or less structured rather than semi-structured as intended. A reason for this can be that the conversation needed to be translated in order for us to understand and continue with the questions, but this might have disturbed the flow in the discussion.

#### **Focus group with elderly men**

Participating in this focus group were 3 elderly men, who were among the people from the ten families who established Kampung Selampit. The idea of the focus group interview was to gain knowledge about the traditional farming in the area. Some ranking and trend lines from RRA were prepared, but we soon discovered that the planned questions could not be asked due to the age of the respondents. Instead the meeting had more character of an informal talk.



### **2.3.3 Key informant interview**

An introductory interview with Ketua Kampung (KK), the vice headman and the local counselor was conducted on the first day of our stay in Kampung Selampit. The purpose of this interview was to gain general information about the village, concerning social and economic welfare, agricultural activities, changes in these activities and to gain general knowledge about the land use issues in the area.

Later during the stay in the village we interviewed several key informants on more specific issues. We interviewed the FELDA management (see appendix 3c) in order to gain knowledge about wages, working conditions and general plantation business. Further more we interviewed a representative from the parents school board (see appendix 3g) and did a final in depth interview with the Ketua Kampung (see appendix 3f) at the end of the fieldwork. We tried to establish a meeting with the JVC management but we did not manage.

To all of these key informant interviews we had developed a semi-structured interview guideline concerning specific relevant issues. None of these interviews were very formal, and it was possible to go in depth with certain issues of interest during the interviews.

### **2.3.4 Field observations**

The Kampung Selampit area is a quite large area including the two plantations and local fields. We therefore arranged several walks and river cruise in the area with different key persons. The walks focused on different issues of interest. On our first day in the village we did a village walk with the KK, vice headman and counselor. The purpose of the walk was as an introduction to the area and to get an idea of the village and how it is structured. A number of times we arranged walks in the plantations and the surrounding fields and cruises along the river to more remote areas. These walks and cruises mainly served as ways to obtain background information on the area and the land uses in Kampung Selampit. Through river cruises we could evaluate impacts from oil palm plantations along the river and identify sampling sites for both soil and water analysis.

### **2.3.5 Environmental investigations**

The environmental impacts from the oil palm plantations are addressed from both a social science and natural science point of view. The respondents were asked about these issues in the questionnaire to get their perception of the situation. The natural scientific investigations are mainly

focusing on soil and water problems connected to the intensification with oil palm as well as the management of the plantations. For this purpose we have combined interviews with key informants with observations in the field and natural scientific methods like water and soil sampling.

The area converted to oil palm plantations is very large (>7000 ha.) and our investigations have therefore been concentrated on selected sites with possible direct or indirect environmental impact on the livelihood of the villagers in Kampung Selampit. For the analysis three sites in different oil palm plantation and one site with traditional farming as reference were selected. The oil palm plantation sites were located on JVC downstream, JVC upstream, FELDA and traditional farming with pepper/ fruit garden on a slope near the village. For each site the soil management were evaluated and where possible, water samples in rivers were taken and analyzed (see site descriptions for soil samples in appendix 1b-c and water samples in appendix 2a-b). In site 1,3 and 4 the area was very undulating, and data for soil erosion assessment via U.S.L.E were collected.

### **Water sampling**

Water samples was collected from seven sites; two samples from two newly established JVC plantations, one sample from a stream running through the mature FELDA plantation, one from the gravity fed supply and one from a stream in the village which is used for secondary water supply when the gravity fed supply is disrupted. From the JVC plantation 2 samples at each site was conducted, one from the Kayan river and one from a small stream running through the plantation, this was done in order to investigate whether the pollution of the Kayan river originate from the JVC plantation or other plantations located further up-stream. The sample from the secondary water supply was conducted in order to evaluate the direct impact of problems with water quality on the villagers.

Water sampling was conducted with equipment from UNIMAS. Some of the data was measured directly *in situ* and some in laboratory. *In situ* pH, DO, TDS, temperature, depth, conductivity and salinity were measured with a hydrolab from UNIMAS. Four samples were collected at each site and analyzed in laboratory for nitrate, ammonia, phosphorous, COD, BOD, turbidity, TSS, TCC and TFC. Unfortunately we did not identify a stream running through an undulating area with traditional farming. To improve the validity of the results this should have been done, but it was not possible due to time constraints. Furthermore samples from more sites should have been collected

and the water quality could have been monitored over a longer period in order to catch seasonal variations.

### **Soil sampling and soil management**

For each site general soil management were evaluated via observation on general topography, steepness of slopes, land use practices, soil cover, drainage, thickness of organic layer, soil type and texture, and direct signs of erosion. On sites with steep slopes and risk of serious erosion, erosion assessment via U.S.L.E. was made on an assumed representative slope. For each slope three sample sites were selected – top slope, middle slope and bottom slope. Furthermore on each sample site a sample was taken of the topsoil (0-10cm), the subsoil (30-40cm) and also the thickness of the A-layer were measured. For the U.S.L.E. assessment slope length were measured and steepness estimated with a clinometer. Soil samples were described for structure and dried before analysed. Two samples, topsoil from top slope and down slope, were analysed for texture via the hydrometer-method and the soil organic matter (SOM) % was estimated. Indications of soil erosion and degradation were further evaluated by triangulation of the U.S.L.E. assessment, thickness of A-layer<sup>5</sup> and change in texture from top slope to down slope<sup>6</sup>.

To assess soil erosion from oil palm plantation and compare it with traditional farming is hard, since traditional farming is very broad ranging from fruit gardens and rubber trees to hill rice and pepper stocks. A lot of experience is also needed, since a lot of the factors have to be estimated from an educated guess. This experience we did not have when we did the sampling, but pictures were taken and shown to experienced persons in Denmark. Especially the crop management factor (C), which should reflect precipitation and ground cover over the whole year/cropping cycle and the erosion-control practice factor (P) are very uncertain and can have a large impact on the result. The equations and variables used are listed and explained in appendix 1b together with the calculations for each site. The fact that we only sampled one slope at each location has also affected the validity of the data. Even though we tried to find a representative slope, this might not be representative for the area as a whole since we did not have time to get a full overview of the area. It was also hard to find a similar location in traditional farming as reference. To improve the validity of the results more locations should have been selected, both in plantations and in

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<sup>5</sup> Thin A-layer indicates that topsoil has been removed through erosion.

<sup>6</sup> More loam (clay and silt) down slope indicates that fine particles in transported down slope through erosion leaving more coarse particles up slope.

traditional farming, but the equipment was only available for one day and the time was in general limited due to all the other tasks.

## **2.4 Validity**

Now, after returning to Denmark, we have realised that several questions were left out which would have been very important knowledge to our understanding of livelihood of the village. For example we failed to ask directly about previous land use activities and therefore we have to rely on information obtained from informal talks and secondary sources. It was our intention to compare farmers life with the life of the scheme participants and workers at present time. Unfortunately we only interviewed a couple of people which only relied on their farming activities, a number which is not sufficient. Had we been more aware of this issue, we easily could have added questions concerning previous land use to our questionnaire.

Furthermore we are not satisfied with our questionnaire in general as mentioned earlier. We find that several of our statements are formulated to incomprehensible, a problem that could have been solved easily, but due to group work atmosphere it was not done. Instead we now feel that the information achieved has not always got the credibility as could have been obtained, if we had rephrased the statements. Also due to the time constraint we failed to conduct participatory activities such as ranking (e.g. changes due to the scheme or land uses), participatory mapping of the area done by the respondents and more focus group meetings. Especially in dept activities with farmer, participants and youngsters would have improved the data collected.

Due to the time constraint changes in biodiversity caused by the deforestation were not analyzed deeply. Only possible direct consequences like reduction in fishing and hunting were dealt with.

### 3. Results and discussion

#### 3.1 Kampung Selampit

Kampung Selampit was established in 1948 by ten families from another area, who wanted to cultivate the fertile land around Kampung Selampit. The village is located at the riverbank of Kayan River. It is accessible by boat and a five km gravel road connected to the main road, or by a small, seldom used, gravel road through the JVC plantation. The Ketua Kampung (KK) though informed us about existing plans of constructing a road from Lundu to Bau, going through Kampung Selampit.

The village today includes 198 households and with approximately 700 residents and consists of Jagoi Bidayuh people with a religious background in Islam, Christianity and other minor religions. Kampung Selampit is situated on NCR land with each household having small plots scattered around the area. People are mainly involved in agricultural activities and work at the oil palm plantations (see appendix 1a).

The FELDA plantation (Sampadi III), located to the east of the river, was established in 1988 – 1989 and covers a total area of 1386 ha, all of it presumed state land though some respondents stated that NCR land was included in the FELDA plantation. The Rimbunan Hijau (JVC) is located to the west of the river. The establishment of the plantation was initiated in 1998, but land is still being cleared and is expected to be finished in approximately six month. The plantation covers a total area of 9271 ha. According to the EIA report 4000 ha, classified as NCR land, are expected to be developed into plantation and the rest of the area is classified as state land. But from the KK we were informed that the amount of NCR land involved covers an area of 7200 ha, which leaves an area of 3200 ha as disputed land.

The first development scheme to be introduced in Kampung Selampit was SALCRA in the early 1990s. Some 600<sup>7</sup> ha were developed, but SALCRA abandoned the plantation shortly after establishment. The area was taken over by Land Custody and Development Authority (LCDA) in 1996 and turned in to a joint venture concept (Konsep Baru) in 1998, where the scheme was introduced to the village. The private company has got 60% of the shares, the landowners 30% and LCDA 10%. Joining the venture as a landowner, consists of three levels of agreements; namely the *trust deed* - meaning that their right to control their land is handed over to the LCDA, the *deed* –

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<sup>7</sup> According to the KK in the village the amount is 600 ha, but according to an EIA report from 1998 the amount is 800 ha

which specifies duties, obligations, commitments and responsibilities of the LCDA and landowners. The third level is the *joint venture agreement* between the trustee and the private company. Not until this level, the actual lease period of 60 years will be initiated (Ngidang 2002).

### **3.2 Introduction of the scheme**

The way the oil palm joint venture was introduced and implemented in the Kampung Selampit area was in a strictly top-down manner (Ngidang 2002). The concept was introduced by people outside the village or by the former KK, and the villagers had no influence but their consent in the launching phase. Implementing the JVC, as a top-down project can seem even more problematic when introduced to people of whom the majority, like in the case of Selampit, is not very well educated (table 3.1). Some of the villagers were positive and saw the JVC as a great possibility to gain income of their land. Others were more reluctant, they were confused and not sure what to expect. But at the end all but three of the respondents joined the scheme.

Some of the respondents stated that they either felt forced by the former headman to participate or by the fact that they thought they had no possibility to avoid the JVC enrollment. Almost 25% stated that they were participating because they were following everyone else and that they did not wanted to be left behind. Both Ngidang and Cooke argues that villagers often, when making a decision of this kind, have a tendency to “follow the rest”, this is due to the fear of being labelled “anti” governmental and of losing their land (Ngidang 2002, Cooke 2002). If this is the case in Kampung Selampit, it is not difficult to understand their decision to participate, even though these respondents stated that at the time of the introduction they were reluctant towards the scheme. A reason for the reluctance among the villagers could be explained by comparing the level of education and their knowledge concerning the concept.

When comparing these two factors (table 3.1), we see this connection to certain extend, especially when none of the uneducated respondents stated that they had sufficient knowledge about the JVC. In general 72% of the respondents has none or only a primary education (Ngidang 2002).

Table .3.1: Cross tabulation of "lack of knowledge on JVC compared with highest level of education

		Highest Education Level				Total
		None	Primary	Secondary	Tertiary	
Lack of knowledge on joint venture concept	Not sure	1	1			2
	Agree	5	8	2	1	16
	Disagree		3	4		7
Total		6	12	6	1	25

From the interviews with the KK we know that the villagers are not directly represented in the management board of the JVC. The Temenggong represents the village<sup>8</sup>, and the KK is sure whether his village and their viewpoints are actually represented or not. This clear lack of transparency in the JVC-concept means that the villagers now, four years after the establishment, have serious doubts on whether they will receive their dividend after the promised years, and whether they will ever get their land back after the promised period of 60 years. The respondents state that the JVC is not always keeping their promises in relation to the payment. The villagers have thus put themselves in a very delicate situation when they joined the scheme, believing that they would be treated in a fair manner by the JVC. Whether the farmers will actually receive the dividend after five years as promised is still to be seen. It came to our knowledge that some of the respondents had not yet received the *Joint Venture Agreement* for signing, which means that the 60 years lease period has not started and therefore the participants can expect this period to be prolonged.

### 3.3 Economic impact

Through the presence of the schemes the respondents were given job opportunities. The jobs offered are mainly as daily/contract worker or supervisor. Working conditions differ from the two schemes. At the JVC workers are paid 10-12 RM compared to 15-18 RM at the FELDA scheme. 73% of the respondents found the wages at the JVC too low compared to 42% at FELDA. At FELDA the monthly paid employees are also given financial help for their children's education and can obtain bonus among other benefits. Furthermore the JVC prefer to hire Indonesian workers according to several respondents. It seems like the thought of creating job opportunities through the

<sup>8</sup>A leader of several KKS in the area

JVC, which was one of the main objectives of the scheme (Ministry of Land Development Sarawak, 1997), is merely a theoretic assumption, since the JVC in practice is not willing to pay salaries competitive compared to FELDA.

Despite of these low wages, the people of Kampung Selampit have now got the possibility of a steady income to cover the monthly expenses. We learned that one of the major expenses was for the children's education. The parents spend in average 26% of their income on this entry. The number is rather high, which indicates the willingness to pay for the children's education but also the need for money. Furthermore we observed that almost 70% of the respondents are owners of at least one television, which indicates the possibilities to buy goods that are not essential for the household. When analyzing our respondent's income and expenses in general, we became aware of the fact that many of them apparently have a deficit in their economic balance. It makes us speculate whether the respondents has got any other source of income, which we didn't have the success to discover. For example we know that people are hunting in the area, an activity that is prohibited. Never the less a deer is sold on the amount of 1000RM, which would make a big difference for an average family. Also we observed newly hunted wild boars in the village almost every day generating an appreciable income. But activities like these did not come to our knowledge through the questionnaires, maybe because of the fact that this hunting is prohibited, but might also because of their perception of such income sources as being of minor importance.

### **3.4 Changes in social life**

As in many other places in Malaysia development is an ongoing process and Kampung Selampit is no exception, though it is not obvious whether it is due to the presence of the scheme or development in general. One of the major changes according to KK and the womens focus group meeting are the organization of the village, which has been divided into five zones, each with their own representative. People within these zones are obligated to help each other and also to conduct other duties, like keeping the zone clean. Also the mentioned increase of job opportunities for the people and women in particular is a significant change. For the women this change might mean, that the time spend on daily activities, could be reduced, but the domestic workload is still the same. The KK though told us that it is mainly the women with children at school age, who are working at the plantation, since the women normally take care of the small children at home. At our women focus group meeting we interviewed a couple of women with small children who actually were or had



been working at FELDA and we learned that although they do not mind working, the heavy workload in the plantation is a problem which make the women wish for better job opportunities, such as factory work or small scale food business. Furthermore were we told that the state government (Department of Agriculture) has started education programs in order to teach women handicraft activities, farming activities and cooking. The women at our focus group meeting are positive towards this progress and they accept that it will give them the possibility to earn an extra income to the household economy.

During our meeting with KK, he told us that the women are seen to have a very important role concerning the children's education, social awareness etc. since they are the ones who spend most time with them. In order to show respect to the women and their role in the society, the women have recently been included in the Village Committee with the inclusion of the Ladies Bureau (Biro Wanita) president.

Through our interview with the KK we learned that more children are attending school compared to the past, but the senior assistant of the school expressed worries that the presence of the scheme have lessened some children's desire for higher education because the opportunity of earning money is more attractive.

An expected impact from the schemes would be a general change in occupation. The majority of the villagers are participants in the JVC scheme, but many still have smaller plots of their own to cultivate. It could have been expected to find a high number of villagers now only or partly involved in working in the schemes. Through our questionnaire we learned that it is actually only nine out of the 28 respondents (figure 3.1) whom are engaged in work at one of the schemes. Where 1/3 is working at JVC and 2/3 is working at FELDA, which indicates that the villagers prefer working in FELDA but still have some reluctance towards working in the plantations. This was also stated by the FELDA manager who told us that they had troubles hiring enough local workers. As the following piechart (figure 3.1) shows, farming is still an important source of income, and seems to have an important value to the landowners.

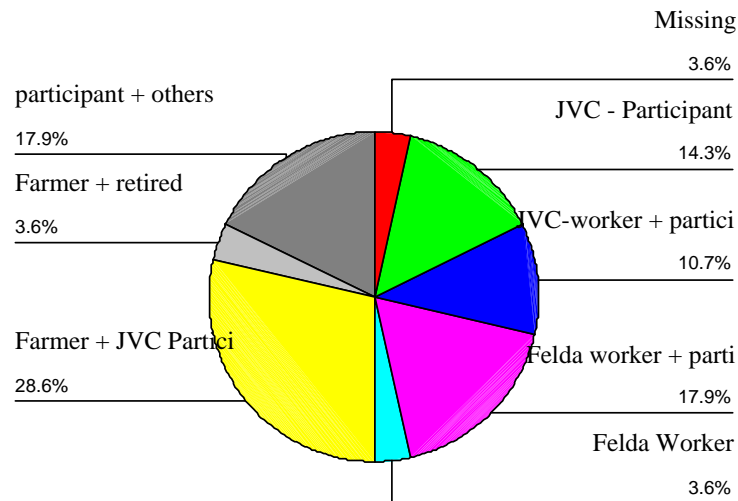


Figure 3.1 Status of the respondents

Based on our interviews with all respondents and the EIA, we get a general view of a village which main occupation prior the schemes were traditional farming of mainly rubber, hill rice and fruits. Cultivation with rubber was a general strategy to insure security on NCR-land (EIA 1998). Now the rubber prices are low and they no longer tab rubber. By participating in the JVC, the villagers have surrendered larger or smaller parts of their land, ranging from 0.8 ha to 50 ha. All in all our respondents has committed 313 ha to the JVC, while they have kept 136 ha, ranging from 0 ha to 20 ha, for their own use. The greater part of them has chosen to keep land in order to continue subsistence farming and in order to have some security for the future. The land still not surrendered to the JVC is cultivated with different crops such as pepper, paddy, fruits and rubber.

### 3.5 Environmental impacts connected to the intensification

A change in land use from traditional farming to more intensive land uses will always result in some kind of changes in the surrounding environment, especially major projects will make changes. Since 1988 it has been required to make an environmental impact assessment (EIA) when converting large areas into oil palm plantations according to the Malaysian law (Kaas, 2001). For the Selampit area, an EIA was made in 1998 before the JVC began to convert the 9271 ha of land along the western side of the Kayan River. In 1988-89 1386 ha along the eastern side of the river was converted into the FELDA plantation.

According to the EIA, the vegetation in the area converted by JVC primarily consisted of logged-over lowland forest and secondary forests from shifting cultivation. These extensive land uses with forest cover have the advantage that they are protective for the soils and the run-off is small (Morgan, 1995). Therefore the main effects from the intensification will likely be more erosion followed by degradation of the water quality. The effects can be more or less pronounced depending on management and the mitigation practices used in the plantations. For the sloping area cover crops and terraces are recommended and pruned fronds should be left on the slopes to decompose in order to minimize erosion. Buffer zones of three times the width of the river or minimum 50 meters should be maintained in order to minimize impacts on the water and at the same time being a corridor to sustain the flora and fauna (EIA, 1998). The environmental impact from oil palm plantations will in general be greatest in the establishment phase since the area is logged or cleared by big machinery before it is cultivated. The soil is in this phase left bare over a period and will be more susceptible for erosion and run-off to the surrounding rivers. Therefore it may look like the negative impacts on the environment is very large, but this will decline over time when the soils is covered by cover crops or weeds and eventually oil palms.

### **3.5.1 Soil management in the oil palm plantations**

The main expected impacts from the intensification are soil erosion and water related problems such as sedimentation and flooding as well as pollution from agro-chemicals<sup>9</sup>. The greatest potential impact in the area comes from the JVC-area upstream that is very undulating. Here the risk of erosion is large and the soil management in the plantation has great influence on the environmental impacts. Unfortunately the management is poor, which affect the environment much more than necessary. On steep slopes no mitigation practices such as cover crops and terraces were observed. The area was in many places already so eroded that the A-layer was washed away. In the FELDA-plantation the soil management seemed more focused on mitigation practices, we observed fronds placed on slopes between terraces. Thin A-layers on steep slopes did though indicate that erosion has been present. To get an indication of the impact of the intensification on the soil, the indicators of erosion from the oil palm plantation are compared with traditional farming as shown in table 3.2.

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<sup>9</sup> N&P-fertiliser and pesticides.

Table 3.2: Results from soil analysis on undulating sites.

Data / sample site	JVC- upstream			FELDA			Traditional farming		
Sample site on slope	Up	Middle	Down	Up	Middle	Down	Up	Middle	Down
Slope (%)	31	31	31	40	22	22	31	31	31
Thickness A-layer (cm)	0	0	7	1	10	10	10	10	10
Soil cover	No cover crops and immature oil palms			Weeds, ferns and mature oil palms			Pepper and grass cover Fruit trees and bushes		
Direct indicators of soil erosion	Rills and gullies			None			None		
USLE assessment *	4560–5700 t/ha/year			48–100 ton/ha/year			4.5–9.0 ton/ha/year		
Texture difference	Not significant			Not significant			Not significant		

(appendix 1c-d) \* Based on Morgan (1995), Foster *et al.* (1981) and Veihe (2003)

The numbers from the table are difficult to compare, since the slopes and soils on the locations are not completely the same. The mitigation practice in the traditional farming was more preservative than observed in other places, which could make soil loss smaller than average. What is though striking is the great impact from the JVC plantation, where the mean annual loss estimated from USLE is around ten times higher than mature oil palm in FELDA and around a 100 times higher than traditional farming. This indicates along with observations of gullies and rills that the erosion at the moment is very bad compared to well managed traditional pepper farming. The adverse impact from the intensification is greatest at the moment, but when no terraces are made, the impacts will likely be high during the cropping cycle even though weeds or cover crops will spread to the area and somehow preserve what is left of the soil.

According to the EIA the plantations are not expected to have any significant adverse impacts on the environment, if all the recommendations on mitigation practices were followed. According to the EIA report the USLE assessment from the affected areas was estimated to be 26.1 t/ha/year. The same EIA has also made a worst-case scenario, where the C-factor<sup>10</sup> is set to be one representing a bare soil, which gives an annual soil loss of 2608 t/ha/year. From observations and analysis of the present conditions the mean annual loss has been estimated to be somewhere between 4570 and 5700 t/ha/year. This is twice as high as the worst-case scenario, which could be due to fact that the A-layer is washed away and the K-factor<sup>11</sup> therefore is higher. It is also likely that it can be due to

<sup>10</sup> C-factor: Crop management factor represents the ratio of soil loss under a given crop compared to loss from a bare soil. The value is depended on the crops ability to retain the soil. The value are ranging between ~0 and 1. The lower the better retaining capacity.

<sup>11</sup> K-factor: The erodibility factor is based on permeability, structure, texture of the soil and the amount of organic matter in the soil. The value is ranging between ~0 and 1. Least susceptible soils have the lowest value.

general assumptions on parameters and/or that the selected slope may not be representative for the whole area. This indicates that the implementation of the oil palm plantation in the area has met the worst-case scenario and maybe even worse. According to Morgan (1995) the general accepted soil loss tolerance, which is defined as the maximum permissible rate of erosion at which soil fertility can be maintained over 20 to 25 years, is 11 t/ha/year. The losses estimated at the undulating locations in both FELDA and especially JVC is over that rate and the long time fertility of these soils can therefore be questioned. This is easily observed by the non-existing A-layer in JVC and might be the reason for the thin A-layer on the steep slope in the FELDA plantation. In the areas that were not undulating the soil management was in general fine and only minor problems with water logging on a few spots were observed.

### 3.5.2 Water quality

Since a large part of the JVC plantation is located far away from the villages it is difficult for the villagers to relate to the soil problem associated to the intensification. The effects on the rivers are more visible, and therefore easier to relate to. The villagers are therefore more concerned of the derived consequences from the run-off than on the direct consequences on the soil.

The villagers remember how the river used to be clear and so narrow that the canopy from the trees could reach each other from the two riversides. The Kayan River that the villagers see today is now around 25 meters wide and murky. There is a clear opinion in the village that the intensification of the land uses to oil palm plantations are the major source of the pollution of the rivers in the area. They only regard them selves, their farming activities and their animal husbandry as minor sources (figure 3.2).

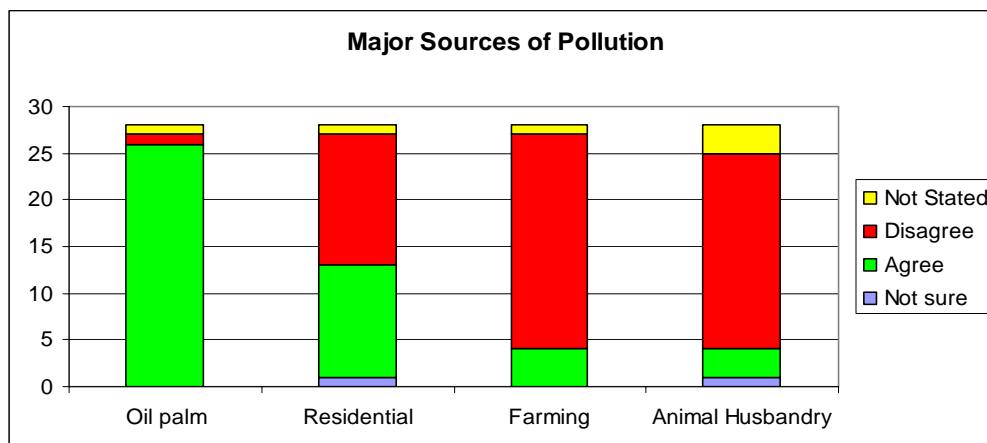


Figure 3.2: Villagers responds to statements regarding the Kayan river.

To investigate what kind of impact the intensification might have had on the water quality, the samples were analysed for the amount of agro-chemicals, oxygen content and demand (COD and BOD), suspended solids and turbidity. The results are in table 3.3.

Table 3.3: results from water samples

Parameter	P1 Kayan Upstream (JVC)	P2 Sg. Munti (JVC)	P3 Kayan Downstream (JVC)	P4 Sg. Bagadin (JVC)	P5 Sg. Sijawang (sec water supply)	P6 Gravity Fed supply (Control)	P7 Sg. Sijata (FELDA)
DO	5.73	6.94	5.79	5.9	5.65	6.81	7.22
Temperature	26.01	25.55	25.83	27.37	27.87	25.8	26.92
Conductivity	12.9	12.4	11.8	13.8	17.7	7.8	31.3
pH	5.0	5.32	4.7	4.48	4.41	6.56	4.83
TDS	8.4	7.8	7.6	8.8	11.4	4.97	20.7
Turbidity	75.5	67	88	84	69	1.94	8.91
Nitrate	0	0	0.0033	0	0	0	0
Ammonia	0.17	0.109	0.33	0.241	0.219	0	0
Phosphorus	0.285	0.363	0.549	0.896	0.282	0	0.089
COD	27	14	12	15	26	10	16
BOD <sub>5</sub>	2.07	3.24	2.12	2.5	1.98	1.73	1.61
TSS	28.25	21.75	72.13	75	42.75	5	19.25
WQI values	76.989	84.627	73.784	72.918	72.992	93.155	84.604
Class	II	II	III	III	III	I	II
Classification	Slightly polluted	Clean	Slightly polluted	Slightly polluted	Slightly polluted	Clean	Clean

Using the Water Quality Index (WQI, see appendix 2d) to analyse the results, it is possible to get an overall indication of the water quality at the moment. The results show that the water quality in general is between class II and III, which is classified as clean or slightly polluted. The gravity fed supply is clean enough to be class I and therefore, according to the WQI, represent the water bodies of excellent quality. But the WQI is not including all off the above analysed indicators such as bacteria, this means that the classification can be classified higher if the bacterial content is taken in to account.

The results from the nutrient analysis shows, that the amount of ammonia and nitrate is relatively low compared to standard values from the Interim National Water Quality Standards for Malaysia (INWQS) (appendix 2c). Whereas the amount of phosphorous is relatively high. Which probably is due to the time of sampling. The samples were taken in the rainy season which is not normally the

season for applying fertilizer. But since young palms need extra nutrients, normal practice is to use ammonium chloride and rock phosphate in the planting hole (EIA 1998; c2-13), which mean that a fertiliser pool is kept in the soil. Periods of heavy rain can result in higher run-off and leaching of nutrients to the surrounding water resources.

The villagers are affected by the environmental impact on the river, since the water sources surrounding Kampung Selampit are of some importance in the daily activities of the villagers, such as fishing, bathing/swimming and sometimes for domestic use, when the gravity fed supply is disrupted. The villagers were asked about different statements concerning the water quality of the river (figure 3.3).

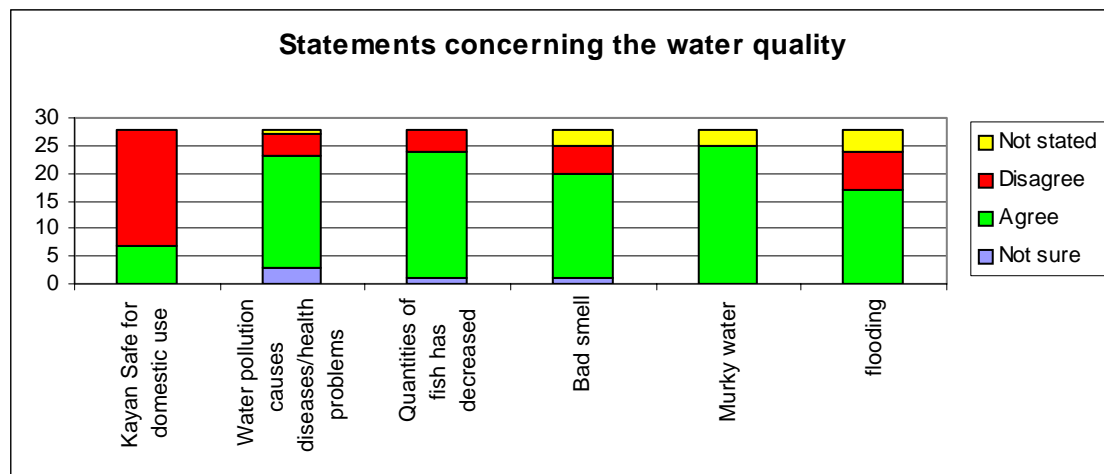


Figure 3.3:villagers responds to statements regarding the Kayan river.

The answers to the statements indicate that the villagers are in general concerned about the water quality. The majority stated that they did not find the water safe for domestic use, that pollution of the river causes health problems and the quantity of fish has decreased.

Even though the villagers are not depended on the Kayan river for domestic use any more, some claimed that they some times have to use it during dry season, when the gravity fed supply is disrupted. To investigate the safety of the water bacterial analysis has been carried out. Samples were only collected from water resources used for domestic use. The classification based on the bacteria content is based on the INWQS index, which means that it is not directly comparable to the results from WQI index. The analysis of the bacteria content (se table 3.4) in the water showed that the TCC-level (Total Coliform count) results in a class I for all samples, which represents water

bodies of excellent quality. The TFC (Total Faecal Coliform) level is very high between class IIB and class IV, which represents water bodies that needs treatment before it is suitable for domestic use. The amount of faecal bacteria is not pathogenic in it selves, but a high level of faecal bacteria increase the risk of other pathogenic organism being present. The bacteria enters the river through runoff from the surrounding areas or village activities, this means it is hard to detect the main source of pollution (Internet source 4). There have been observations of villagers dumping their garbage directly in the river and pig rearing close to the riverbank, which also could be a source of pollution of the water resources.

Table 3.4: Results from bacterial analysis.

Sampling Point	TCC/100 ml	Class	TFC/100 ml	Class
P5 Sg. Sijawang	100	I	600	IIB
P6 Gravity fed supply (control)	2100	I	1100	III
P8 Kayan middle (jetty point)	3000	I	5500	IV

The results from the above table are in conflict with the result from table 3.3, which shows that the water from the gravity fed supply is a class I. It is very difficult to determine which of these results that is most reliable, but the bacterial analysis could have been affected by many factors such as bird dropping where the WQI is a result of 6 factors.

When asked about the Kayan River, the villagers expressed that they experienced problems with murky water, bad smell and flooding (figure 3.3). They expressed that one of the problems of the murky water was that it had made it impossible to see the holy rock of the village, which is located in the Kayan River at a sacred place in front of the village. The clearing of big areas has increased the runoff and thereby the transport of sediment to the river. As it appears from the answer to the statement that the villagers find the water in the Kayan river very murky, which is also confirmed by our water analysis. Neither the turbidity nor the total suspended solids are a direct measure of the water quality, but both can affect the aquatic life. The turbidity level results in a classification between I and IIB, which means that the water is from clean to slightly polluted. The level of the total suspended solids results in a classification between I and III, with most of the samples in class IIA, indicating that the water is relatively clean. The water from the gravity fed supply is classified



as class I for both turbidity and total suspended solids, which represent water bodies of excellent quality.

Most of the villagers also claimed that the quantities of fish have declined, which have decreases their possibility for generating supplementary income from fishing. According to the EIA (1998), the Kayan River is not as diverse as other rivers of Sarawak, but the river used to be of economic importance. It is not possible to know whether the reason only is because of the intensification, but it is very likely the high turbidity and TSS has affected the aquatic life in a negative way (Dobson and Frid 1998).

It is impossible to investigate whether the pollution of sediment is coming from the plantation surrounding Kampung Selampit or from plantations further up-streams, but if sample 1 & 2 are compared it seems that the pollution are coming from both the JVC plantation and from up-stream. The turbidity and the TSS is lower in sample 2 then in sample 1, which can be due to the small bufferzone along the Sg. Munti.

The increased run off from the cleared areas will also likely result in more sedimentation of coarse particles in the rivers. This has raised the riverbed, increased the water level and thereby increased the risk of flooding. From the questionnaire it appears that flooding occur from one to five times a year, the majority of the questioned is only experiencing flooding once a year. The fact that the village was evacuated due to flooding a few days after the fieldwork shows that the villagers is affected by serious flooding.

### **3.6 Scheme policy and the people of Kampung Selampit**

The implementation of the JVC scheme indicated a change in the general development policies in Malaysia. Whereas the SALCRA development schemes included social aspects like improving the general welfare of the rural population in the overall philosophy, the JVC concept merely focuses on ensuring productivity and profit (Ngidang 2002). The direct social focus in the land development schemes has thus changed into more indirect socio-economic benefits. The FELDA scheme is though still including some social benefits.

During our investigations in Kampung Selampit we noticed a possible divergence between the villagers and the JVC in the perception and objective of the Konsep Baru. The villagers expected not only economic improvements due to the 30% shares of the JVC, but also improvements of more

social orientation, whereas the JVC, according to the Ministry of Land Development Sarawak (1997) and Ngidang (2002) is mainly profit minded.

As discussed earlier the lack of transparency towards the landowners concerning the JVC concept is a problem, which is affecting the villagers perception of their role in the joint venture. The LCDA, supposedly acting as the trustee for the village, plays a not very active role in monitoring and coordinating the implementation process. The social responsibility that was an essential part of the prior development schemes (SALCRA) is no longer present (Ngidang 2002). The only benefit to the local people is possible jobs, with low wages according to the respondents in the questionnaire. According to Ngidang (2002) the native population in Sarawak is not permitted to commercially develop their land. Only a private investor is allowed to do so. Therefore if the Bidayuh people in Kampung Selampit preferred to intensify and commercialize their own farming activities themselves this would not be possible even if they had the financial means to do it. Also here the state policy is evidently acting in favor of the private investors and the market forces. The JVC scheme therefore seems to be the only possible solution at the moment for the villagers, if they want to commercialize their farming activities.

The schemes, both FELDA and JVC are having a great impact on the village bringing a lot of both negative and positive externalities along. As a positive externality the villagers mentioned job opportunities and the chance of having a steady income in the future. Furthermore some mentioned improved infrastructure – the construction of a gravel road behind the village on the westside of Kayan river, and also improvements of the gravel road leading to the main road to Lundu. A problem with the oil palm schemes, both FELDA and JVC, though is to make them face and deal with the negative externalities. The villagers are paying the price as the situation is now. They have to take precautions when using the river water, they cannot practice the same fishing activities because of less fish in the Kayan river, they experienced their ancestral burial ground and presumed NCR-land were cleared without their permission etc. When the land is cleared it is very difficult for the natives to claim the land.

### **3.7 Expectations for the future**

When talking about the villagers expectations for the future the majority of the respondents state, that they are hoping to receive the promised dividend from the JVC but several, including the KK,

also state that they have doubts concerning the whole concept due to the lack of transparency. When asked about their thoughts of getting their land back after 60 years, they mainly answered that they are not sure of what to expect, that they have not thought about it or that it is up to their children to decide. Some also mention that the land will be useless after 60 years period, which could be a reasonable concern, when looking at the soil management in the plantation in undulating areas, where no mitigation practices are used and the erosion is high. On the other hand, most of the land is flat, which mean that it will not be a general problem. The time perspective of 60 years seems to make the thoughts about the future difficult to handle to the villagers. The individual plots have been gathered into one common landbank, which makes it difficult to distinguish each plot. The KK mentioned worries about this problem, because no one would be able to make this distinction after that many years. Furthermore the land is not returned automatically to the villagers when the lease is over and they have to apply to the superintendent in order to get it back (Ngidang 2002).

Concerning the more close future it must be mentioned that monocropping, such as palm oil production might involve a certain element of risk. Similar projects such as rubber plantations have shown to fail due to changes in market demand. From the FELDA management, we were informed that the government at the moment is subsidizing plantations for clear-cutting the plantations at an age of 15 year in order to keep the prices high. This indicates that the oil palm market already somehow is insecure and makes the investment in oil palm at the moment more risky. This could result in the project being abandoned before the 60 years and the village will be left with a large area of oil palms that need a lot of work converting the land into other agricultural productions. Due to the villagers doubts concerning the JVC scheme, 16 out of 26 the respondents from the questionnaire stated that their expectations had not been met, and 12 stated that they would withdraw from the project, if they were given the opportunity.

## 4. Conclusion

The main objective of this report has been to investigate the impacts of the oil palm plantations on the livelihood of the villagers in Kampung Selampit. This has been done by looking into specific aspects such as the economic and social situation in the village and also by investigating the surrounding environment.

The JVC scheme has only recently been implemented in the area and therefore it is not possible to give a complete picture of the impact in the area. The plantation is still in the immature phase, which means that the first oil palm fruits have still not been harvested. In spite of this it is still possible to find some indicators of impacts on the livelihood.

From our perspective the general idea of the schemes can be a useful strategy, but as we learned from our fieldwork in Kampung Selampit the top-down conceptualization, implementation and management of the Konsep Baru has not so far been as successful as expected from the respondents point of view. One of the major problems regarding the management is the lack of transparency, which in some cases has caused a feeling of uncertainty towards the participation among the respondents.

Since the plantation is still in its juvenile phase we cannot estimate the complete economic impact. Whether the participants will achieve an economic benefit is still to be seen. But we know for a fact that the 3200 ha land, which is in dispute, several respondents, has not received the 10% cash payment of the lease value as they had expected. Despite these circumstances everybody manage to make a living either through farming, salary work or other activities.

The majority of the participants in the JVC scheme have kept a part of their land, which is used for farming activities. But also the job opportunities show to be a beneficial option, which many of the villagers positively accepts. It could have been expected that this change would have resulted in a higher degree of individuality due to the modernized lifestyle in doing salary work. Such a change was not observed in Kampung Selampit and it seems like the social responsibility is still of great significance among the villagers.

When the JVC scheme was established the EIA report recommended several different aspects in order not to have significant adverse impact on the environment. These recommendations however have not been followed in the undulating areas causing adverse impacts such as erosion and related

problems with murky water and sedimentation. The environmental impact from the schemes have had a great influence on the livelihood of the village, partly because of the obvious visible effects and partly because of the uncertainty related to the soil. The fact is that the villagers themselves also contribute to the pollution in the area e.g. by not having any organized waste-policy.

The future prospects of the soil are also affecting the villagers concerns regarding their land.

The fact that their land is enrolled (not in their possessing) in a period of 60 years creates uncertainty among the villagers. Their land is cultivated with oil palms, a monocrop that can be rather uncertain because of the rising competition on the world market.

What will happen if the demand for oil palm suddenly drops and the JVC leaves the plantation?

Will the village get their land back right away? These questions are not to be answered in this report, but the uncertainty and the lack of transparency are causing the villagers in some ways not to welcome the development scheme.

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[http://www.bnm.gov.my/en/Documents/Periodicals/MSB/2002/11/vi\\_17.pdf](http://www.bnm.gov.my/en/Documents/Periodicals/MSB/2002/11/vi_17.pdf)

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## **Appendix**

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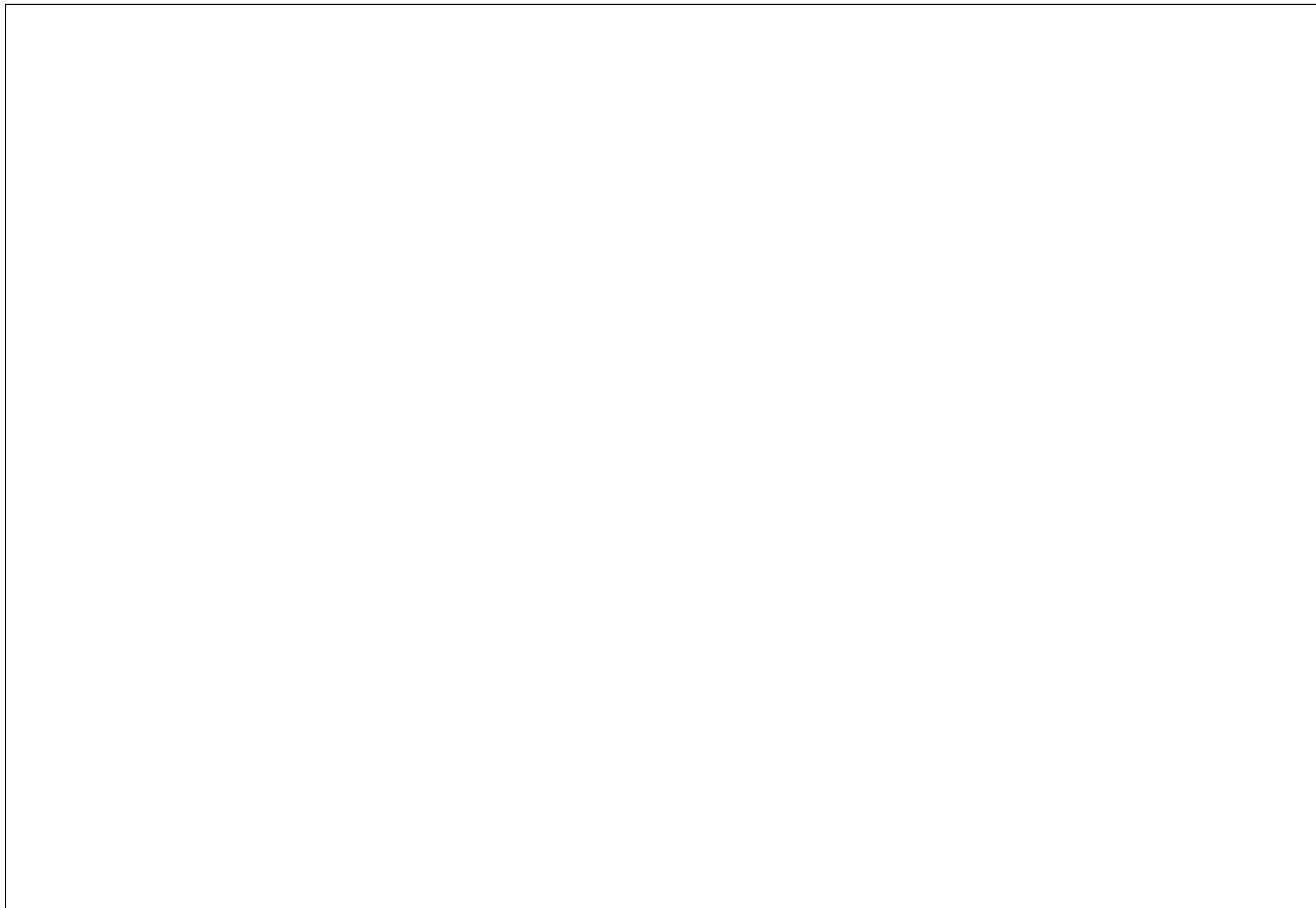




## **Appendix 1a: Soil map of the Selampit area**



- 1: Gley White Podzolic Soila
- 2: Organic Soils
- 3: Red Yellow Podzolic Soils
- 4: Podsols
- 5: Oxisols
- 6: Gley Soils
- 7: Areanaceous Soils
- 8: Alluvial Soils
- : JVC-plantation
- : FELDA -plantation



## Appendix 1b: soil sampling points



## Appendix 1c: Site descriptions

### Site 1: JVC plantation upstream from Kg. Selampit

The area is very undulating and the dominating soils are clayish. The area used to be dominated by secondary forest before it in 2002 was logged and cultivated with oil palms. One assumed representative slope was chosen for soil erosion assessment (U.S.L.E.) and soil analysis (see figure 1) and two water samples were taken in nearby rivers; one in the Kayan River and one in a river that runs through oil palm plantations upland and ends in Kayan River.



Figure 1. *Sample site 1 for soil erosion assessment (3 samples; top, middle and down of the slope)*



Figure 2. *General picture of the area cultivated with oil palm upstream of Kg. Selampit*

**Soil samples and descriptions:**

*Location:* See map

*Classification:* USDA, sandy loam

*Climate:* Annual rainfall about 5080 mm, average annual temperature 26.3°C  
(Perudic soil moisture regime)

*Elevation:* Top hill

*Parent material:* on known

*Land-form:* Very undulating (slopes from 0-30°)

*Land use:* Oil palm plantation (established year 2002)

*Drainage:* Moderately drained

*Erosion:* Clear signs

*Groundwater:* Not observed

*Remarks:* No cover crops, terraces every 10-15 meter, slope 18° or 31%

Description of horisonts:

A: None (washed away),

B: (0- ): no roots, subangular blocky structure

*Location:* See map

*Classification:* USDA, sandy clay loam

*Climate:* Perudic soil moisture regime

*Elevation:* Middle hill

*Parent material:* Unknown

*Land-form:* Very undulating

*Land use:* Oil palm plantation (established year 2003)

*Drainage:* Moderately drained

*Erosion:* Clear signs

*Groundwater:* Not observed

*Remarks:* No cover crops, terraces every 10-15 meter, slope 18° or 31%

Description of horisonts:

A: None (washed away),

B: (0- ) no roots, subangular blocky structure.

*Location:* See map

*Classification:* USDA, sandy loam

*Climate:* Perudic soil moisture regime

*Elevation:* Down hill

*Parent material:* Unknown

*Land-form:* Very undulating

*Land use:* Oil palm plantation (established year 2003)



*Drainage:* Well drained

*Erosion:* Clear signs

*Groundwater:* Not observed

*Remarks:* More sandy, no cover crops, terraces every 10-15 meter, slope 18° or 31%

**Description of horizons:**

A: (0-7cm) no roots, weak subangular blocky structure

B: (7-) no roots, weak subangular blocky structure

Classification of the soils was not possible, since we could not identify boundaries between the subsurface horizons from the auger samples and no deep analysis was done. Most likely the soils are Ultisols or Oxisols depending of the presence of an oxic, kandic or argillic horizon.

**Observations on mitigation management practises:**

*Cover crops:* Hardly present only observed at a few small fragmented areas.

*Terraces:* Not present – only roads to the top. The palms are planted direct on the slopes.

*Pruned fronds:* The oil palms are too young to cut fronds

*Plantation roads and drains:* No drains, roads

*Use of Agro-chemicals:* Not chemicals observed

*Fertilisers:* Not measured in the soil, but some samples where taken from the river

*Pesticides:* Not measured in the soil, but some samples where taken from the river

*Herbicides:* Not measured in the soil, but some samples where taken from the river

*Risparian reserves:* Not reserves observed

*Buffer zones:*

**Site 2: FELDA plantation nearby Kg. Selampit**

The area undulating ranging from very steep to fairly flat slopes. The area has been cultivated with oil palm since 1991. Some water logging observed on flat land, but the area is in general well drained. On steep slopes palm leaves were left on the ground between the terraces covering the soil. For soil analysis and erosion assessment one slope was selected (see figure 4) and water samples were taken in a small stream running through the plantation.



Figure 4. *Sample site 2 for soil erosion assessment (3 samples, top, middle and down of slope)*



Figure 5. *General picture from oil palm plantation near Kg. Selampit managed by FELDA*

**Soil samples and descriptions:**

*Location:* See map

*Classification:* USDA, sandy loam

*Climate:* Annual rainfall about 5080 mm, average annual temperature 26.3°C  
(Perudic soil moisture regime)

*Elevation:* Top hill

*Parent material:* Unknown

*Land-form:* Very undulating (0-30°)

*Land use:* Oil palm plantation (established year 1991), ferns and other scrubs as understory.

*Drainage:* Moderately drained

*Erosion:* no clear signs

*Groundwater:* Not observed

*Remarks:* palm leaves covering steep slopes, terraces, next to a road, slope = 22° or 40%

**Description of horizons:**

A: (0-1cm) not described

B: (1- ) thick to very fine roots, subangular blocky structure

*Location:* See map

*Classification:* USDA, sandy loam

*Climate:* Perudic soil moisture regime

*Elevation:* Middle hill

*Parent material:* Unknown

*Land-form:* Very undulating

*Land use:* Oil palm plantation (established year 2003)

*Drainage:* Moderately drained

*Erosion:* Clear signs

*Groundwater:* Not observed

*Remarks:* crown cover around 95%, slope = 12° or 22%

**Description of horizons:**

A: (0-10cm) thick to very fine roots, weak subangular blocky structure

B: (10-) fine roots, subangular blocky structure

*Location:* See map

*Classification:* USDA, sandy loam

*Climate:* Perudic soil moisture regime

*Elevation:* Down hill

*Parent material:* Unknown

*Land-form:* Very undulating

*Land use:* Oil palm plantation (established year 2003)

*Drainage:* Well drained

*Erosion:* Clear signs

*Groundwater:* Not observed

*Remarks:* More sandy, gleyish, crown cover around 95%, slope = 12° or 22%

**Description of horizons:**

A: (0-10cm) few roots, weak granular structure

B: (10-) gley, no roots, weak subangular blocky structure

**Observations about mitigation management practises:**

*Cover crops:* Not relevant

*Terraces:* Present on steep slopes.

*Pruned fronds:* Fronds placed on slopes between terraces

*Plantation roads and drains:* Few problems with drainage observed

*Use of Agro-chemicals:* No chemicals observed

*Fertilisers:* Measured in stream:

*Pesticides:* Measured in streams:

*Herbicides:* Measured in stream:

*Risparian reserves:* No reserves observed

*Buffer zones:* Narrow buffer zones observed along Kayan River, at some places they eroded away and lacking.

### **Site 3: JVC plantation downstream from Kg. Selampit**

The area is very flat and the soils very clayish. Some water logging observed - especially on roads where machines have compacted the soil. The area cultivated with oil palm was in general well drained from drainage channels. The risk of erosion were assumed to be minimal and therefore no soil samples for U.S.L.E. assessment were taken. Two water samples were taken in the area - one in the Kayan River and one in ? River that runs through the plantation (see figure 5). Buffer zones observed in the area, were at places very narrow and in general not more than 15 meters wide.



Figure 5. *General picture of the area cultivated with oil palm downstream of Kg. Selampit*

**Observations about mitigation management practises:**

*Cover crops:* Not observed

*Terraces:* Not relevant.

*Pruned fronds:* Not relevant

*Plantation roads and drains:* Few problems with compacted roads.

*Use of Agro-chemicals:* No chemicals observed

*Fertilisers:* Measured in stream:

*Pesticides:* Measured in streams:

*Herbicides:* Measured in stream:

*Risparian reserves:* No reserves observed

*Buffer zones:* Narrow buffer zones observed along Kayan River, at some places they eroded away and lacking.

#### **Site 4: Pepper and fruit garden nearby Kg. Selampit**

The site is located in an undulating area with traditional farming with pepper, hill rice, rubber trees and fruit gardens. The upper slope was cultivated with pepper trees and the lower part of the slope was a fruit garden. The bare soil in the pepper field was covered by some kind of grass. One erosion assessment was made and no water samples were taken.

#### **Soil samples and descriptions:**

*Location:* See map

*Classification:* USDA, sandy clay loam

*Climate:* Perudic soil moisture regime

*Elevation:* Top hill

*Parent material:* Unknown

*Land-form:* Undulating

*Land use:* Pepper field, grass as ground cover

*Drainage:* Moderately drained

*Erosion:* No signs

*Groundwater:* Not observed

*Remarks:* terraces every 20 meter, slope = 18° or 31%

#### **Description of horizons**

A: (0-10cm) weak blocky structure

B: (10- ) fine roots, subangular blocky structure

*Location:* See map

*Classification:* USDA, sandy clay loam

*Climate:* Perudic soil moisture regime

*Elevation:* Middle hill

*Parent material:* Unknown

*Land-form:* Undulating



*Land use:* Pepper field, grass as ground cover

*Drainage:* Moderately drained

*Erosion:* No signs

*Groundwater:* Not observed

*Remarks:* terraces every 20 meter, slope = 18° or 31%

**Description of horizons**

A: (0-10cm) fine roots, weak blocky structure

B: (10- ) fine roots, subangular blocky structure

*Location:* See map

*Classification:* USDA, sandy clay loam

*Climate:* Perudic soil moisture regime

*Elevation:* Down hill

*Parent material:* Unknown

*Land-form:* Undulating

*Land use:* Fruit garden with different unknown tree and bush species, around 100% crown cover

*Drainage:* Moderately drained

*Erosion:* No signs

*Groundwater:* Not observed

*Remarks:* Biological activity (earthworms)

**Description of horizons**

A: (0-10cm) fine to thick roots, weak blocky structure

B: (10-) fine to thick roots, subangular blocky structure

## Appendix 1d Texture analysis and USLE assessments

Texture / site	JVC-upstream		FELDA		Traditional farming	
	Top	Bottom	Top	Bottom	Top	Bottom
Clay %	10.4	22.2	20.0	10.4	25.0	22.6
Silt %	19.2	25.6	14.0	19.2	30.0	19.8
Fine sand %	50.2	24.4	30.0	30.2	15.4	17.0
Coarse sand %	20.6	28.0	36.0	40.4	39.6	40.6

### U.S.L.E. Assessment from JVC-plantation

#### Equation

Mean annual loss =  $R * K * LS * C * P$

**Estimating R** (based on Foster *et al.* (1981) and personal communication with Veihe, 2003):

$$R = 0.276P * I30/173.6 = 0.276 * 4085,6 * 75/173.6 \Leftrightarrow$$

$$R = 487.2$$

#### Estimating K

The soils have on average 17% clay, 22% silt, 37% fine sand and 24% coarse sand; organic matter content about 0,4 %. (This corresponds to values in the nomograph of 57% silt + very fine sand - 24% sand - 0.4% SOM - 4 – 4)

Using the nomograph (Morgan 1995), gives a K value of:

$$K = 0.65$$

#### Estimating LS

Slope = 18° (31%) and Length = 120 meter

$$LS = (120/22)^{0.5} (0.065 + 0.045 * 31 + 0.0065 * 31^2) \Leftrightarrow$$

$$LS = 18.0$$

This seems very high because it is very far away from the standard conditions (20 meter and 9%), where the formula is estimated. It has not been possible to find data on how to adopt to such steep slopes, so the general formula from Morgan, 1995 was used as best approximation.

### **Estimating C**

According to Morgan (1995), the C-value for oil palm ranges between 0.1 and 0.3 depending on the size on the roots and the crown cover. Since the area is newly established and no cover crops were observed, the C-value for the site is assumed to be around 1 at the moment, but it will change when the palms grow up and the ground will be covered by scrubs. The C-factor should be adjusted to the cover and rain intensity over the year, but since it is rainy season now and most of the rain comes now when the ground is bare, the C-factor for the first year is set to be 1:  $C = 1$

### **Estimating P**

Terraces every 10-15 meters, but it was more likely a road and they were slightly sloping and did not stop the transport of particles. Further the oil palms were planted at slopes between the terraces. The P-value is there fore assumed to be around 0.8-1:  $P = 0.8 - 1$

### **Soil loss estimation**

$$\begin{aligned}\text{Mean annual loss} &= 487.2 * 0.65 * 18 * 1 * 0,8 - 487.2 * 0.65 * 18 * 1 * 1 \\ &= \mathbf{4560 - 5700 \text{ t/ha}}\end{aligned}$$

Even though the value of some of the factors uncertain and the over all estimate also is uncertain, it indicates that the rate of soil erosion is very high at the moment. This will off cause decline over the years when scrubs will come and the oil palms will grow up to form a connected canopy. The high value are fine in line with the observations on the site, where we observed that the A-layer all ready was washed away from the upper and middle slope. There were also signs on rills and even gully formation, which is an indicator of very serious erosion.

### U.S.L.E. Assessment from FELDA-plantation

The slope was not uniform and therefore the slope was divided into two parts, up slope (1) and down slope (2).

#### Equation

Mean annual loss =  $R * K * LS * C * P$

**Estimating R** (based on Foster *et al.* (1981) and personal communication with Veihe, 2003):

$$R = 0.276P * I_{30}/173.6 = 0.276 * 4085,6 * 75/173.6 \Leftrightarrow R = 487.2$$

#### Estimating K

(1): 20% clay, 14% silt, 36% fine sand and 30% coarse sand; organic matter content about 2%. (Values in the nomograph: 50% silt + very fine sand - 30% sand - 2% SOM - 4 - 4)

(2): 10% clay, 19% silt, 40% fine sand and 30% coarse sand; organic matter content about 4%. (Values in the nomograph: 59% silt + very fine sand - 30% sand - 4% SOM - 3 - 3)

Using the nomograph (Morgan 1995), gives a K value of:

$$K(1) = 0.47$$

$$K(2) = 0.35$$

#### Estimating LS

(1) Slope = 40% and Length = 23 meter

(2) Slope = 18% and Length = 77 meter

$$LS(1) = (23/22)^{0.5} (0.065 + 0.045 * 40 + 0.0065 * 40^2) \Leftrightarrow$$

$$LS = 12.5$$

$$LS(2) = (77/22)^{0.5} (0.065 + 0.045 * 18 + 0.0065 * 18^2) \Leftrightarrow$$

$$LS = 5.6$$

This seems very high because it is very far away from the standard conditions (20 meter and 9%), where the formula is estimated. It has not been possible to find data on how to adapt to such steep slopes, so the general formula from Morgan, 1995 was used as best approximation.

### Estimating C

According to Morgan (1995), the C-value for oil palm ranges between 0.1 and 0.3 depending on the size of the roots and the crown cover. But if the under story is very abundant it will also affect the erosion a lot. On site different scrubs and ferns were observed, and the C-value for the site is assumed to be around 0.05-0.1 at the moment. Off cause the effects has been greater when the plantation was established and when the palm will be clear cutted.  $C = 0.05-0.1$

### Estimating P

Terraces on the upper part of the slope were outward-sloping. The P-value is there fore assumed to be 0.35 (Morgan, 1995):  
 $P(1) = 0.35$

### Soil loss estimation

Mean annual loss (1) =  $487.2 * 0.47 * 12.5 * 0.05 * 0.35 - 487.2 * 0.47 * 12.5 * 0.1 * 0.35$   
= **50 – 100 ton/ha/year**

Mean annual loss (2) =  $487.2 * 0.35 * 5.6 * 0.05 - 487.2 * 0.35 * 5.6 * 0.1$   
= **48– 96 ton/ha/year**

### U.S.L.E. Assessment from Traditional farming

The slope was not uniform and there fore the slope was divided into two parts, up slope (1) and down slope (2).

### Equation

Mean annual loss =  $R * K * LS * C * P$

**Estimating R** (based on Foster *et al.* (1981) and personal communication with Veihe, 2003):

$R = 0.276P * I_{30/173.6} = 0.276 * 4085.6 * 75/173.6 \Rightarrow R = 487.2$

### Estimating K

The soils was very similar and had an of average 24% clay, 20% silt, 41% fine sand and 16% coarse sand; organic matter content about 4%. (This corresponds to values in the nomograph of 61% silt + very fine sand - 16% sand - 4% SOM - 4 – 4)

Using the nomograph (Morgan 1995), gives a K value of:

$$K = 0.43$$

### Estimating LS

(1): Slope = 31% and Length = 56 meter

(2): Slope = 31% and Length = 17 meter

$$LS(1) = (56/22)^{0.5} (0.065 + 0.045 * 31 + 0.0065 * 31^2) \Leftrightarrow$$

$$LS = 12.3$$

$$LS(2) = (17/22)^{0.5} (0.065 + 0.045 * 31 + 0.0065 * 31^2) \Leftrightarrow$$

$$LS = 6.8$$

This seems very high because it is very far away from the standard conditions (20 meter and 9%), where the formula is estimated. It has not been possible to find data on how to adapt to such steep slopes, so the general formula from Morgan, 1995 was used as best approximation.

### Estimating C

The soil was covered by some kind of grass. According to the EIA, the C-value for grass and cover crops ranges between 0.005 and 0.01 depending on the size of the roots. The value is therefore set to be 0.01 at the moment. The value should in principle be corrected for seasonal variation in rain and soil cover, but this was not possible:

$$C(1) = 0.005-0.01$$

$$C(2) = 0.001$$

### Estimating P

Terraces in the pepper field on the upper part of the slope. The terraces on the upper part of the slope were outward-sloping. The P-value is therefore assumed to be 0.35 (Morgan, 1995):

$$P = 0.35$$

### Soil loss estimation

$$\begin{aligned} \text{Mean annual loss (1)} &= 487.2 * 0.43 * 12.3 * 0.01 * 0.35 \\ &= \mathbf{4.5 - 9.0 \text{ ton/ha/year}} \end{aligned}$$

$$\begin{aligned} \text{Mean annual loss (2)} &= 487.2 * 0.43 * 6.8 * 0.001 \\ &= \mathbf{1.4 \text{ ton/ha/year}} \end{aligned}$$

## **Appendix 2a: Water sampling points**





## **Appendix 2b: Site description for the water sampling points**

P1: Kayan upstream.  
Just outside the newly  
established JVC  
plantation. The area is  
dominated by  
undulation.



P2: Sg. Munti, a side stream to Kayan river, upstream from Kampung Selampit. Running through the newly established JVC plantation



P3 og P4:

P3: Downstream from Kampung Selampit in Kayan river, just outside a newly established JVC plantation.

P4 Side stream, running through a newly established JVC plantation. The area is dominantly very flat.



P5: Sg Sjawang, running through an area dominated by peat swamp. The stream is used by the villagers as a secondary water supply.



P6: Gravity fed supply. The dam is located up hill surrounded by secondary forest



P7: Sg. Sijata, stream running through the FELDA plantation



P8: Kayan river just outside Kampung Selampit (the jetty point).

### Appendix 2c: Interim National Water Quality Standards For Malaysia (INWQS)

Parameters	Units	Classes					
		I	IIA	IIB	III	IV	V
BOD	Mg/l	1	3	3	6	12	>12
COD	Mg/l	10	10	25	50	100	>100
DO	Mg/l	7	7	5-7	3-7	<3	<1
PH		6.5-8.5	6.5-8.5	6-9	5-9	5-9	-
Conductivity	Hos/cm	1000	1000	-		6000	
TDS	Mg/l	500	1000	-	-	-	-
TSS	Mg/l	25	50	50	150	300	>300
Temperature	°C	-	Normal +2	-	Normal +2	-	-
Turbidity	NTU	5	50	50	-	-	-
Feacal coliform	Counts/100 ml	10	100	400	5000	5000	-
Total Coliform	Counts/100 ml	100	5000	5000	50000	50000	>50000
Ammonical Nitrogen	Mg/l	0.1	0.3	0.3	0.9	2.7	>2
NO2	Mg/l	L	0.4	0.4			
NO3	Mg/l		7	7		5	
P	Mg/l		0.2	0.2	0.1	-	

Internet source: [www.nreb.gov.my/web/webe/lin1d2.html](http://www.nreb.gov.my/web/webe/lin1d2.html)

## Appendix 2d: Water Quality Index

$$WQI = 0.22 \times SIDO + 0.19 \times SIBOD + 0.16 \times SICOD + 0.15 \times SIAN + 0.16 \times SISS + 0.12 \times SipH$$

- **SIDO** Sub-Index DO (in % saturation)
- **SIBOD** Sub-Index BOD
- **SICOD** Sub-Index COD
- **SIAN** Sub-Index NH 3 N
- **SISS** Sub-Index SS
- **SipH** Sub-Index pH

### Best Fit Equations for the Estimation of the Various Subindex Values

#### Subindex for DO (in % saturation):

$$\begin{aligned} SIDO &= 0 && \text{for } x \leq 8 \\ &= 100 && \text{or } x \geq 92 \\ SIDO &= -0.395 + 0.030x^2 - 0.00020x^3 && \text{or } 8 < x < 92 \end{aligned}$$

#### 1 Subindex for BOD

$$\begin{aligned} SIBOD &= 100.4 - 4.23x && \text{for } x \leq 5 \\ SIBOD &= 108 \cdot \exp(-0.055x) - 0.1x && \text{for } x > 5 \end{aligned}$$

#### 2 Subindex for COD

$$\begin{aligned} SICOD &= -1.33x + 99.1 && \text{for } x \leq 20 \\ SICOD &= 103 \cdot \exp(-0.0157x) - 0.04x && \text{for } x \geq 20 \end{aligned}$$

#### 3 Subindex for AN

$$\begin{aligned} SIAN &= 100.5 - 105x && \text{for } x \leq 0.3 \\ SIAN &= 94 \cdot \exp(-0.573x) - 5 \cdot |x - 2| && \text{for } 0.3 < x < 4 \\ SIAN &= 0 && \text{for } x \geq 4 \end{aligned}$$

#### Subindex for SS:

$$\begin{aligned} SISS &= 97.5 \cdot \exp(-0.00676x) + 0.05x && \text{for } x \leq 100 \\ SISS &= 71 \cdot \exp(-0.0061x) - 0.015x && \text{for } 100 < x < 1000 \\ SISS &= 0 && \text{for } x \geq 1000 \end{aligned}$$



**Subindex for pH:**

$$\text{SlpH} = 17.2 - 17.2x + 5.02x^2$$

for  $x < 5.5$ 

$$\text{SlpH} = -242 + 95.5x - 6.67x^2$$

for  $5.5 \leq x < 7$ 

$$\text{SlpH} = -181 + 82.4x - 6.05x^2$$

for  $7 \leq x < 8.75$ 

$$\text{SlpH} = 536 - 77.0x + 2.76x^2$$

for  $x \geq 8.75$ **River Pollution Status**

Index Value			
Index/Sub-Index	Polluted	Slightly Polluted	Clean
WQI	0 - 59	60 – 80	81 – 100
BOD	0 - 79	80 – 90	91 -100
NH3N	0 – 70	71 – 91	92 - 100
SS	0 - 69	70 – 75	76 - 100

Source: [www.iges.or.jp/jp/ltp/pdf/fr2.pdf](http://www.iges.or.jp/jp/ltp/pdf/fr2.pdf)**Interim Water Quality Classification**

Range of WQI Values	Class	Designated Uses
92.7 - 100	I	Represents water bodies of excellent quality. Standards are set for the conservation of natural environment in its undisturbed state. Water bodies such as those in the national park areas come under this category where strictly no discharge of any kind is permitted. Water bodies in this category meets the most stringent requirements for human health and aquatic life production.
76.5 – 92.6	II	Represent water bodies of good quality. Most existing raw water supply sources come under this category. Body contact activity is not allowed in this water for the prevention of probable human pathogens. To allow for body contact or recreation purposes and conservation of sensitive aquatic species, an additional class i.e. Class IIB is established which



		is not used as raw water supply.
51.9 – 76.4	III	Use primarily for protecting common and moderately tolerant aquatic species of economic value. Water under this classification may be used for water supply with extensive/advance treatment. This class of water is also suitable for livestock drinking.
31.0 – 51.8	IV	Defines water quality required for major agricultural irrigation activities which may not cover minor applications to sensitive crops.
< 31.0	V	Represents other which do not meet any of the above uses.

Source: Ali Memon and Murtedza Mohamed. (1999). Water Resource Management in Sarawak, Malaysia. Universiti Malaysia Sarawak. pp136

## Appendix 3a; Questionnaires

Appendix 4a:

Interview with participants

Interviewer: \_\_\_\_\_

Informant(s): \_\_\_\_\_

Household no: \_\_\_\_\_

Interpreter: \_\_\_\_\_

Place of interview: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Method: Quantitative and open-ended interview.

Informant: stratified random sampling (stratified according to the occupation).

Interview technique: Yes or no, numbers, ranking and open answer

# 1. Household Questionnaire

No.of Household members :.....

Status of Respondent :.....

Members contributing to the household economy	Gender 1=M 2=F	Age	Highest Education Level  1=Primary 2=secondary 3=tertiary 4=non	Status of Occupation  1=Employer 2=Employee 3=Self Employment 4=Housewife 5=Unemployed 6=Other, please specify	Wages/ Income status  1=Daily 2=Monthly 3=Contract 4=Uncertain	Monthly Income (RM)	Employer  1= FELDA 2= RH/JVC 3= Govt. 4= Other, please specify
1							
2							
3							
4							
5							
6							
7							
8							

## Open-ended questions

Participant? (Yes/No)

Area for JVC: (ha)

Area for other land: (ha)

1. Why that ratio?

2. What are your plans for the land that you have not committed to JVC?
3. How was the JVC-scheme introduced in Kampung Selampit?
4. What was your reaction you made when hearing about the scheme?
5. Why do you participate in the scheme?
6. What do you think is the reason for SALCRA to abandon the project?
7. (If JVC) What are your thoughts about having your land returned after 60 years?
8. Has the participation in the scheme increased the income of the household?
9. What advantages has occurred in the household due to the schemes?
10. What disadvantages has occurred in the household due to the schemes?
11. What are your expectations for the future concerning the project?
12. Has the scheme participation meet your expectations?
13. If you had the opportunity to withdraw from the scheme, would you do that?
14. What is your recommendation to improve the JVC-scheme?
15. What are your recommendations to improve the kampung people livelihood?
16. Name, if possible, improvements due to the FELDA scheme, which do you consider advantageous for Kampung Selampit?

17. Name, if possible, disadvantages due to the FELDA scheme that has occurred in Kampung Selampit?

18. Oil Palm Plantation Status

(1=Not sure) (2=Agree) (3= Disagree)

No.	Local Knowledge	1	2	3
1	Prefer to continue with traditional farming			
2	Profit sharing in JVC is not attractive to the land owners			
3	Land ownership under the scheme is good for the landlords			
4	Lack of knowledge on joint venture concept			
5	Lack of information and explanation from the agency involved			
6	Low wages for the employee in JVC			
7	Low wages for the employee in FELDA			
8	Mono-cropping has many disadvantages			
9	Long-term projection is difficult to understand in term of profit sharing.			
10	More attractive offer from other plantation company			
11	The project has good prospect			
12	Fear of environment impact such as water pollution for domestic use			
13	Aware of the palm oil market price			
14	Locals are given priorities in terms of job opportunities in JVC plantations.			
15	Locals are given priorities in terms of job opportunities in FELDA plantations.			

## 2.1 Socio-economic Impacts

(1=Not sure) (2= Strongly agree) (3= Agree) (4=Disagree) (5= Strongly disagree)

No.	Socio-economic Impact	1	2	3
1	Increase in number of youngsters who migrate to urban areas. (No. of family members who migrate: )			
2	Government agencies assist the residents with the socio-economic planning			
3	Activities provided by government agencies improve the society welfare			
4	Government agencies guide the residents to create a handicraft industry			
5	Land owners understand the procedure to legalise the ownership of their land			
6	More infrastructure since the introduction of the JVC-scheme			

### 3. Income & Expenses

#### (a) Sources of income

Source (Agriculture/Fishing)	Area (Ha)	Monthly Income		Yearly income	
		Kg	RM	Kg	RM
1.Rice					
2.Pepper					
3.Vegetables					
4.Fruits					
5.Poultry					
6.Pig rearing					
7.Handicraft					
8.Rubber					
9.Other, specify					
Other Sources of Income					
1.Dividen from JV company					
2.Dividen from ASN/ASB/ASAR					
3.Business/salary/wage					
4.Money Order					

#### (b) Expenses

Goods	Monthly Expenses (RM)	Yearly Expenses (RM)
1.Food		
2.Utilities		
3.Children school expenses		
4.Agriculture purpose (e.g. Fertilizer)		
5.Loan repayment		
6.Entertainment		
7.Transportation		

(c) Investments/savings

Financial institutions/Unit Trust	Amount (RM)

4. Asset Ownership

Item	Quantity	Item	Quantity
1.House		7.Telephone	
2.Car		8.Refrigerator	
3.Motorcycle		9.Chainsaw	
4.Radio		10.Motorboat	
5.Television		11.Motor boat engine	
6.Computer		12.Electric fan	



### Water Related Problems

(1=Not Sure) (2=Agree) (3=Disagree)

	<b>DRINKING &amp; COOKING</b>	1	2	3
1	Water supply from Kayan river is safe for domestic use			
	<b>HEALTH &amp; DISEASE</b>	1	2	3
2	Water pollution of Kayan river causes diseases/health problems			
	<b>FISHING</b>	1	2	3
3	Quantities of fish caught in the river has decreased compared to a few years ago			
4	Quantities of fish species in the river has declined compared to a few years ago			

### Water Quality Issues

(1=Not Sure) (2=Important) (3=Not Important)

5	<b>POSSIBLE SOLUTION FOR WATER QUALITY PROBLEMS AT KAMPUNG SELAMPIT</b>	1	2	3
(a)	Enforce relevant laws & impose fines to those who discharge raw wastewater directly into the Kayan river			
(b)	Education / Awareness programmes			
6	<b>MAJOR SOURCE OF WATER POLLUTION AT KAYAN RIVER</b>	1	2	3
(a)	Oil palm plantation			
(b)	Residential			
(c)	Farming			
(d)	Animal Husbandry			
7	<b>Impacts of Current Water Pollution at Kayan River</b>			
(a)	Bad smell			
(b)	Disease / health effects			
(c)	Murky waters			
(d)	Flooding			
(e)	Siltation / sedimentation of the river			

9. How often does the water supply from gravity feed get disrupted?

10. If the water from the gravity feed is disrupted, is there any other source of water supply?

11. How often do floods occur in Kampung Selampit?

Observations and remarks

### **Appendix 3b:**

Interview with farmer

Interviewer: \_\_\_\_\_

Informant(s): \_\_\_\_\_

Household no.: \_\_\_\_\_

Interpreter: \_\_\_\_\_

Place of interview: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Method: Quantitative and open-ended interview.

Informant: random sampling

Interview technique: Yes or no, numbers, ranking and open answer

1. Household Questionnaire

No.of Household members :.....

Status of Respondent :.....

Members contributing to the household economy	Gender  1=M 2=F	Age	Highest Education Level  1=Primary 2=secondary 3=tertiary 4=non	Status of Occupation  1=Employer 2=Employee 3=Self Employment 4=Housewife 5=Unemployed 6=Other, please specify	Wages/ Income status  1=Daily 2=Monthly 3=Contract 4=Uncertain	Monthly Income (RM)	Employer  1= FELDA 2= RH/JVC 3= Govt. 4= Other, please specify
1							
2							
3							
4							
5							
6							
7							
8							

1. Which activity contributes to the household economy?

2. Which of these activities is most important?

(If more than two activity is mentioned use ranking)

Ranking:

Activity	Ranking
----------	---------

_____	_____
_____	_____
_____	_____
_____	_____

3. Why have you chosen this way of living?

4. How was the SALCRA scheme introduced in Kampung Selampit?

5. Name some of the considerations you made when hearing about the scheme?

6. Why are you not involved in one of the schemes?

7. How was the JVC scheme introduced in Kampung Selampit?

8. Name some of the considerations you made when hearing about the scheme?

9. Why are you not involved in one of the scheme?

10. Name, if possible, improvements due to the oil palm scheme, which you consider advantageous for Kampung Selampit?

11. Name, if possible, disadvantages due to the oil palm scheme that has occurred in Kampung Selampit?

12. Has the schemes changed job opportunities in Kampung Selampit? Yes \_\_\_\_\_  
No \_\_\_\_\_

13. In what way?

14. Has this had an effect on this household? Yes \_\_\_\_\_ No \_\_\_\_\_

15. How?

16. What advantages has occurred in the household due to the schemes?

17. What disadvantages has occurred in the household due to the schemes?

18. Is the infrastructure better now than before the implementation of the development scheme in the village? Yes \_\_\_\_\_ or no \_\_\_\_\_

19. Is it an advantage for the household? Yes \_\_\_\_\_ No \_\_\_\_\_

20. Could you list any changes in your output from farming, which you consider as a result of one of the oil palm schemes?

#### Income & Expenses

##### (a) Sources of income

Source (Agriculture/Fishing)	Monthly Income		Yearly income	
	Kg	RM	Kg	
1.Rice				
2.Pepper				
3.Vegetables				
4.Fruits				
5.Poultry				
6.Pig rearing				
7.Handicraft				
8.Rubber				
9.Other, specify				
Other Sources of Income				
1.Dividen from JV company				
2.Dividen from ASN/ASB/ASAR				
3.Business/salary/wage				
4.Money Order				

##### (b) Expenses

Goods	Monthly Expenses (RM)	Yearly Expense	
1.Food			
2.Utilities			
3.Children school expenses			
4.Agriculture purpose (e.g. Fertilizer)			
5.Loan repayment			
6.Entertainment			
7.Transportation			

##### (c) Investments/savings

Financial institutions/Unit Trust	Amount (RM)

#### 4. Asset Ownership

Item	Quantity	Item	Quantity
1.House		7.Telephone	
2.Car		8.Refrigerator	
3.Motorcycle		9.Chainsaw	

4. Radio		10. Motorboat	
5. Television		11. Motor boat engine	
6. Computer		12. Electric fan	

#### Water Related Problems

(1=Not Sure) (2=Strongly Agree) (3=Agree) (4=Disagree) (5=Strongly Disagree)

	Drinking & Cooking	1	2	3	4	5
1	Water supply from Kayan river is safe for domestic use					
	Health & Disease	1	2	3	4	5
2	Number of people getting sick from using river water is less nowadays					
3	Water pollution of Kayan river causes diseases/health problems					
	Fishing	1	2	3	4	5
4	Quantities of fish caught in the river has decreased compared to a few years ago					
5	Quantities of fish species in the river has declined compared to a few years ago					

#### Water Quality Issues

(1=Not Sure) (2=Most Important) (3=Important) (4=Not Important) (5=Least Important)

6	Possible Solution For Water Quality Problems At Kampung Selampit	1	2	3	4	5
(a)	Enforce relevant laws & impose fines to those who discharge raw wastewater directly into the Kayan river					
(b)	Education / Awareness programmes					
7	MAJOR SOURCE OF WATER POLLUTION AT KAYAN RIVER	1	2	3	4	5
(a)	Oil palm plantation					
(b)	Residential					
(c)	Farming					
(d)	Animal Husbandry					
8	Impact of Current Water Pollution at Kayan River					
(a)	Bad smell					
(b)	Disease / health effects					
(c)	Murky waters					
(d)	Flooding					
(e)	Siltation / sedimentation of the river					

**Appendix 3c:**

**Interview guide for the interview with FELDA management, SAMPADI 3**

- 1. How big is the plantation?**
- 2. When was it established?**
- 3. What is the philosophy behind the FELDA scheme?**
- 4. How did you select this site?**
- 5. Has there been any expansion since the establishment?**
- 6. Are there any plans for expansion in the future?**
- 7. What is the output of the plantation?**
- 7a. What are you doing to improve the situation?**
- 8. How many workers (local/foreigners)?**
- 9. How much is the salary?**
- 10. How is the payment? (daily/weekly) (gender division?)**
- 11. Is there a difference in the women and men's work?**
- 12. Are the workers allowed part time jobs?**
- 13. Can people choose between daily or wholesale payment?**
- 14. Ratio of the age (young/old)?**
- 15. Are the workers provided training? What kind of training?**
- 16. Have you got more job request nowadays?**
- 17. Do you expect an increase in salary in the future?**
- 18. What kind of fertiliser do you use?**
- 19. How far is the bufferzone to the river?**
- 20. Is water logging damaging the palms?**
- 21. What will happen after 25 years, when the palms are not productive anymore?**

**Appendix 3d:**

**Interview guide for women's focus group, Jan. 23<sup>rd</sup> 2003**



**1. Age & number of children, occupation in the household:**

**Daily activities**

- 2. Describe a typical day?**
- 3. What are the daily activities (domestic work)?**

**FELDA/JVC**

- 4. Are many of the village women working in the FELDA or JVC scheme?**
- 5. Why do you work in the scheme?**
- 6. Are there enough work opportunities for women in the area?**
- 7. How do you consider the workload during a day?**

**Social life**

- 8. How is the social life in Selampit, does people stick together?**
- 9. Are there any specific activities only arranged for women in Selampit?**
- 10. Have there been any changes in the social life over the last years?**
- 11. Are there any groupings among people in the village?**
- 12. What kind of entertainment is found in Kampung Selampit?**
- 13. If women are divorced or widows, how do you consider their situation?**

**Economy**

- 14. Generally, do you think the monthly income (both wages and farming for own consumption) of people in the village is enough to support the household?**
- 15. If not, what do people do?**
- 16. Is the economic situation in the village better now, than before the implementation of the FELDA and JVC schemes?**
- 17. How do women generate an income after they reach the age of 55?**

**Future**

- 18. What would be the ideal way of living to you?**
- 19. What could be done to improve the situation of the livelihood in the village?**
- 20. What are your hopes for your children?**

### **Appendix 3e:**

#### **Interview guide for interviews with Shopkeepers**

Date : \_\_\_\_\_  
Shop no/house no : \_\_\_\_\_  
Other occupation : \_\_\_\_\_

1. When did you open your shop?
2. What are the main products that you are selling?
3. Why did you open the shop?
4. From where did you get your start capital?
5. How much is the monthly income?
6. Has there been an increase in the monthly income?
7. What is due to this?
8. Has there been a change in what peoples are buying now?
9. What is the reason for this?
10. Is there a special time of the day where the shop is busier then other times?
11. Is the shop a place where the villager comes for socialising?
12. How important is this for the social life in the village?
13. At what time of the day are peoples drinking?
14. Is there any particular time of year where peoples are drinking more intense?

### **Appendix 3f: Interview guide for interview with the Ketua Kampung**

**How did you get elected for headman?**

**What is the meaning of being a headman?**

**Have there been any changes in general in kampung Selampit?**

**What are your plans for K.S.?**

### **Appendix 3g:**

#### **Interview with the Senior Assistant of S.K.Selampit**

Interviewer:.....

Informant:.....

Place of interview:.....

Date :.....

Time :.....

#### **A.Background of S.K.Selampit**

◆ When was the school built? .....

◆ Total Area .....(ha)

◆ Land status .....

#### **B.Physical Aspects**

##### **Facilities**

◆ How many blocks .....

◆ List of facilities

.....

.....

.....

#### **C.Human Resource**

◆ No.of staff.....

◆ Local.....

◆ Ratio.....

#### **D. Students**

◆ Total No.....

◆ Academic performance.....

◆ Attitude towards education.....

◆ Dicipline/Social problem.....

#### **E.Parents**

- ◆ Role of  
PIBG.....
- ..
- ◆ Awareness on the important of  
education:.....
- ◆ Any parents who don't send their childrens to  
school:.....

F. Govt. assistance for the students.

G. Impacts of the oil palm schemes

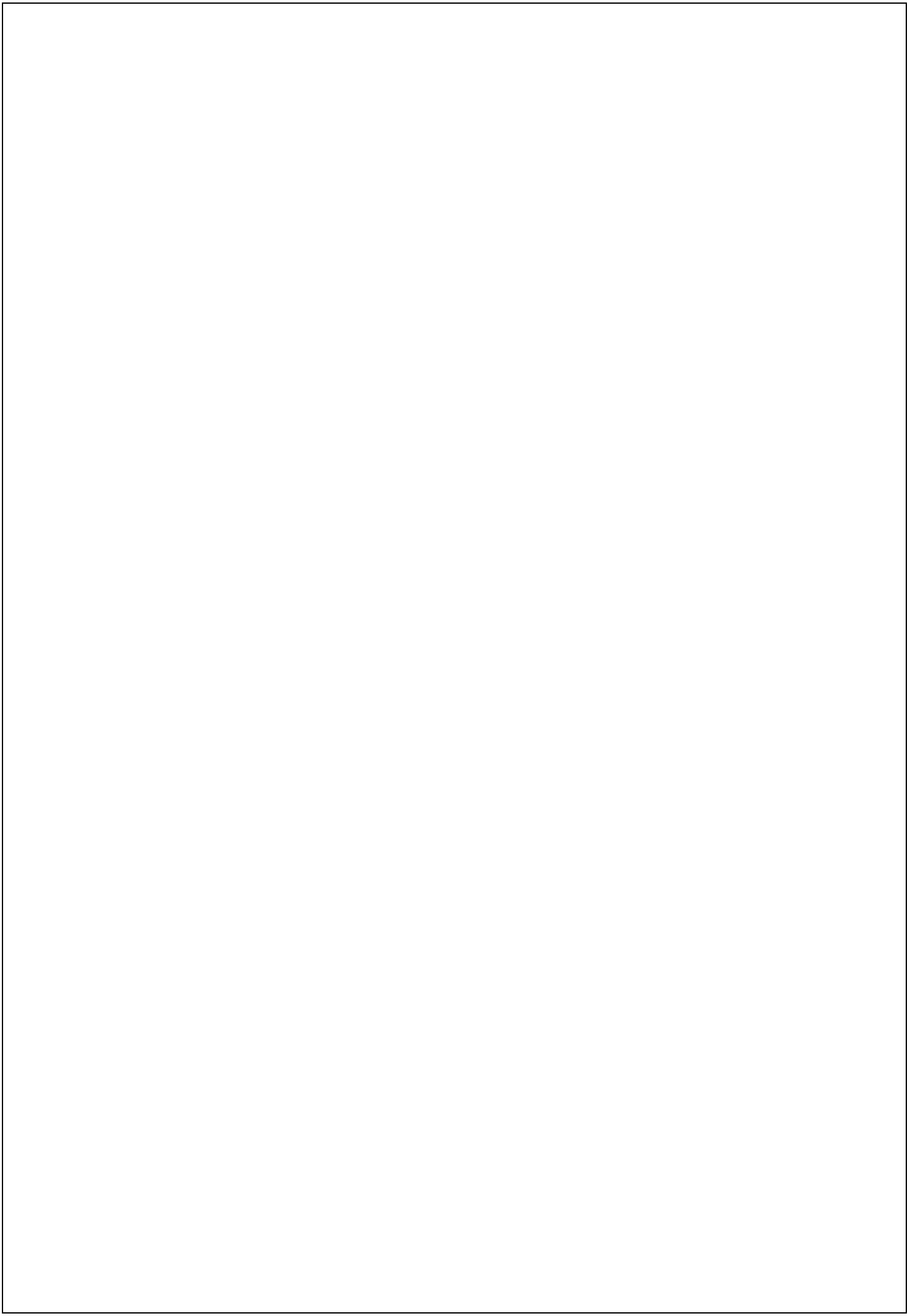
Advantages :

Disadvantages

Other recommendations:

#### Appendix 4: Time schedule and dairy for the Danish students

Date	Activities	Participants
17 <sup>th</sup>	Background interview Village walk	All All
18 <sup>th</sup>	Mapping of village with GPS Testing questionnaire Preparing questionnaires	Tine & Kasper All Sille & Lotte
19 <sup>th</sup>	Presentation in Lundu Preparing questionnaires	All All
20 <sup>th</sup>	River cruise upstream to JVC Plantation walk with worker in FELDA plantation Conducting interviews	All All All
21 <sup>st</sup>	Interview with FELDA manager Field walk with villager Typing in questionnaires Conducting interviews	Sille, Kasper & Tine Sille, Kasper & Tine Lotte All
22 <sup>nd</sup>	River cruise downstream to JVC and newly cleared area. Shopkeeper interviews Interview in Lundu Preparing focus group meeting Conducting interviews	Sille, Kasper & Tine Tine & Lotte Lotte Sille & Lotte All
23 <sup>rd</sup>	Research trip to Gravity fed supply Women focus group interview Conducting interviews Plantation walk with contractor	Kasper Sille, Lotte & Tine All Kasper
24 <sup>th</sup>	Water sampling Water analysis Shop keepers interview Typing in questionnaire Conducting interviews	Sille, Kasper & Tine Sille & Lotte Lotte Lotte All
25 <sup>th</sup>	Water analysis Trying to get interview with JVC manager Bee farm Soil sampling Typing in questionnaires Conducting interviews	Sille & Lotte Lotte Tine & Kasper Tine & Kasper Sille All
26 <sup>th</sup>	Elderly men focus group Preparing the presentation for the villagers Interview with Ketua Kampung	Kasper All Sille, Lotte & Tine
27 <sup>th</sup>	Leaving for Kuching Preparing presentation	All All
28 <sup>th</sup>	Preparing presentation Water and soil analysis Trying to get interview with JVC manager	All Kasper & Tine
29 <sup>th</sup>	Preparing presentation	All
30 <sup>th</sup>	Presentation in Unimas	All



## **Preface:**

SLUSE is an interdisciplinary study between three Danish universities and three counterpart universities in South Africa, Thailand and Malaysia. The purpose of this course is through lectures, research, fieldwork and cooperation with our counterparts to obtain knowledge about the process of conducting development projects.



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## **1. Introduction**

Malaysia is one of the countries in South-East Asia, which has had the most pronounced economic progress. The progress is due to very goal-directed policies, as vision 2020 and the continuous 5-year plans. Some of the aims of these policies are: to increase the development of the rural areas, to equalize the economic and social inequalities, between the rural and the urban areas, to make the agriculture more effective and rational, through change to large-scale farming e.g. oil palm plantation, which will release manpower for an industrial society. The fieldwork study in Kampung Selampit is therefore an attempt to study the effect of this development strategy, more specific SALCRA, FELDA and Konsep Baru (JVC), which includes a series of interesting aspects of rural development in Sarawak, Malaysia. How is it possible to develop the rural areas, and can this be done without reducing the existing environmental and social conditions? Which strategies are used by the government, and how do the local people respond to these strategies, and perhaps more important, what impact do the government development have on the local people?

### **1.1. Fieldwork in Kampung Selampit**

Fieldwork assignment: " *Assess the impact of the abandoned SALCRA land development scheme, which is currently being changed to a joint venture arrangement, and of the FELDA scheme on household livelihoods and natural environment of village lands*".

The main focus of the study will be to work with the people in the village and understanding how they experience the impact of the development schemes, and to what extend the schemes have a positive or a negative influence on their livelihood.

#### **1.1.1 Area introduction**

The focus of this study is specifically on the Kayan River Catchment, under the Lundu district (Figure 1). The Kayan River has its headwaters mainly in the Sampadi Forest Reserve and the areas bordering the Kubah National Park near Kuching. The upper parts of the watershed are mainly in forests, hilly landforms heavily dissected by deep ravines and valleys. The lower half of the river system, however, is running through relatively easy terrain cutting through farmlands, secondary forests and oil palm plantations.



**MAP 1: Batang Kayan Catchment Area**

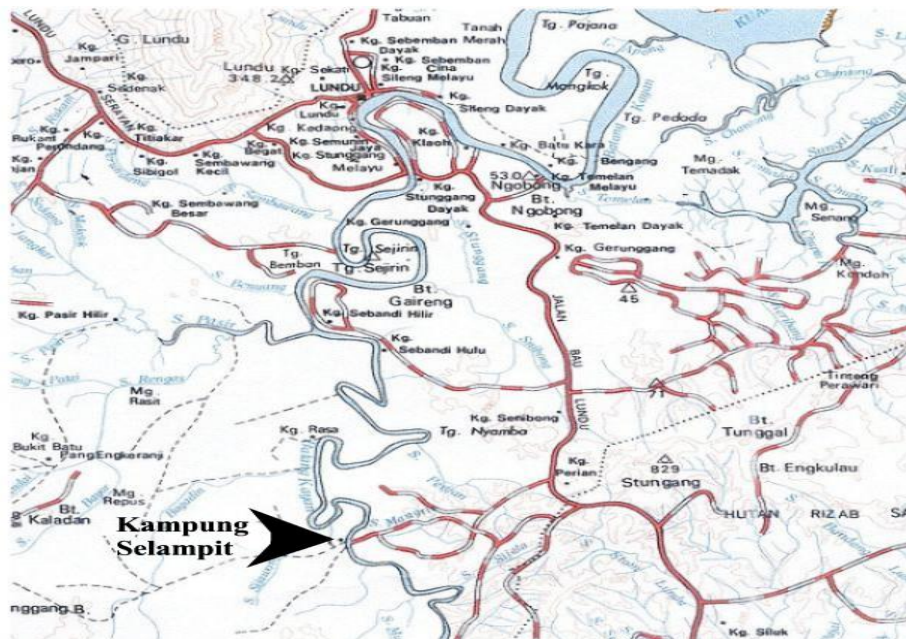
As in most rural areas of Sarawak, agriculture is the main economic activity. In the lower parts of the catchment and in catchments of the smaller coastal rivers north of Lundu town, land development has been dominated by conversions of Native Customary Right (NCR) lands to oil palm plantations, aquaculture and other commercial activities.

Sarawak Land Consolidation and Rehabilitation Authority (SALCRA) and The Federal Land Development Authority (FELDA) established the first oil palm estates in the 1980s. In Lundu district, SALCRA has an estimated 2,173 ha of oil palm plantation. Currently, FELDA has 6 estates in Lundu district, with a total area of about 9300 ha, whereby 7900 ha has already been planted. In 1996, The Land Custody and Development Authority (LCDA) took over the Raya Oil Palm estate (985 ha) from SALCRA. The villages affected by the development are Kampung Kendaie and Kampung Selampit.

### **1.1.2 Kampung Selampit**

Kampung Selampit is located across the river and is only accessible by boat. The majority of the population are of Jagoi-Bidayuh community. Based on the 2001 census, there are 294 houses, consisting of 312 households, with a total population of 1,012 people. The total area of the village is about 9000 ha, of which, about 6000 ha are classified as NCR and 3000 ha as State land.

Proper infrastructure facilities such as roads and water supply have yet to be provided to the village, and it is still uncertain how the relevant authorities will address this matter.



**MAP 2: Location map**

## **2. Project proposal**

The fieldwork assignment is not easy to solve. Not only is it a very broadly defined task, but also does it involve several very different research-aspects, that we will have to investigate in order to make any conclusions on the impacts of the development schemes in the Kampung Selampit area. Therefore we will be working with a study framework (fig.3), in order to keep track of the many different research objects and methods used in the fieldwork.

Our main objective will be the following:

**What impact do the Joint Venture Company, SALCRA and FELDA have on the livelihood of people in the Kampung Selampit area?**

The following study framework (fig.3) is an illustration of how we intend to work during the fieldwork in Kampung Selampit. We have chosen to divide the main object into 5 smaller parts, each linked to different methods.

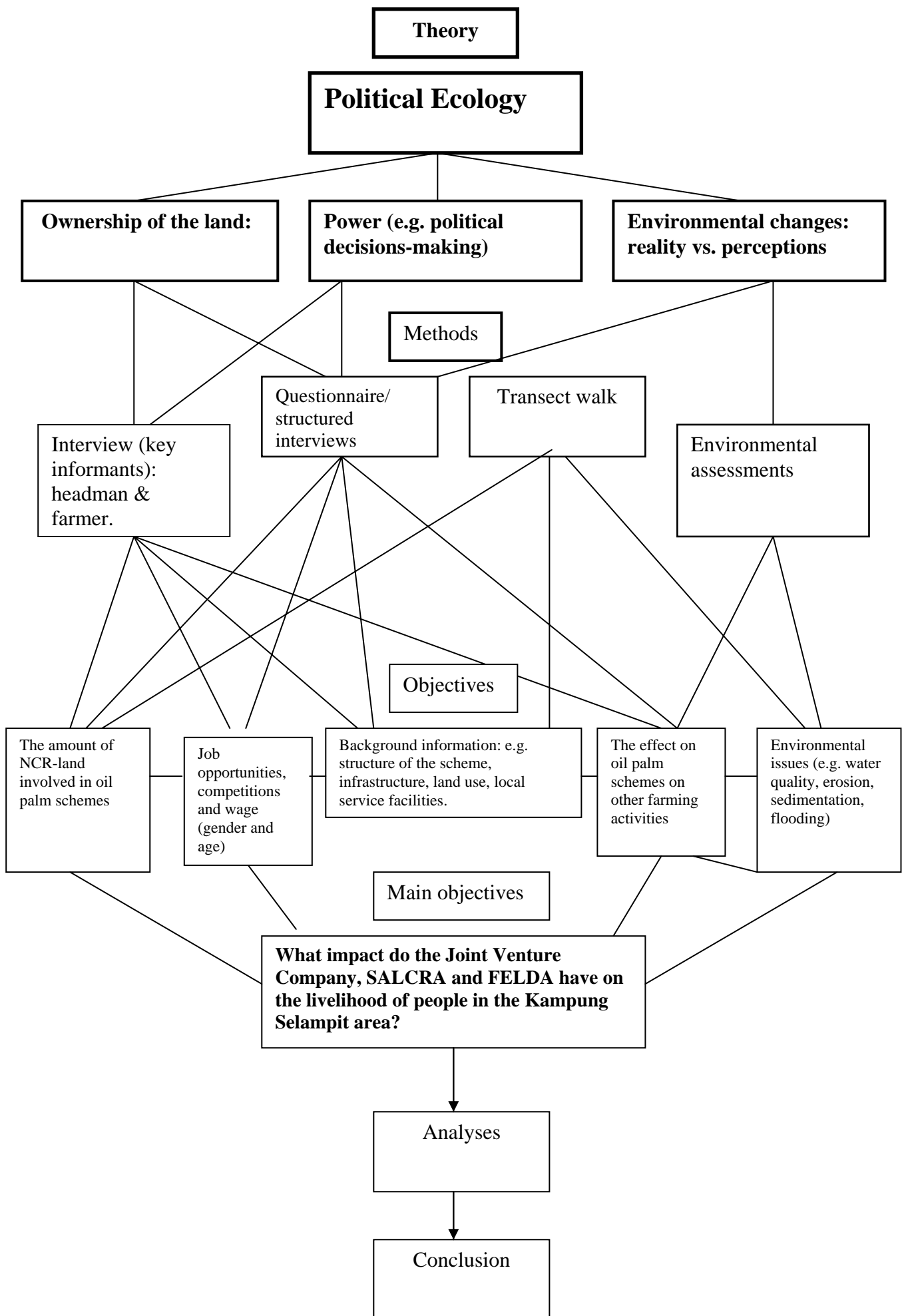


Figure 3. Study framework

## **2.1 Theoretical considerations**

The theoretical considerations concerning the planning of the fieldwork in Kampung Selampit has mainly been focused on the Political Ecology approach. The reason for choosing this theory is its focus on the importance of political decisions and its influence on the implementation area and the livelihood of its peoples. The P.E. will be used to subject the development in the Kampung Selampit area to a critical examination of what interactions between human and environment we can find and examine which conflicts of power there might exist. It will be interesting to focus on the top-down agricultural development schemes in the area and try to analyse how much the local are involved in the decision making process.

## **2.2. Methods**

Due to the fieldwork time schedule (appendix 1) and the nature of the assignment we have chosen to use the basic principles of the RRA (rapid rural appraisal) method as well as a number of specific natural scientific methods (appendix 3). The RRA method is characterised as a method for outsiders learning about a specific situation in a very cost-effective way. RRA involve a *"flexible use of methods, not using a blueprint programme, but adapting in a learning process"* (Mikkelsen 1995:69). The principles of the RRA are to learn from local physical, technical and social knowledge on the site. The many different RRA methods enable us to use a range of methods to crosscheck the information we collect during the fieldwork. And further more the RRA enables us to examine the diversity, in terms of seeking the variability rather than the average (Mikkelsen 1995:69).

We expect to conduct at least 10 questionnaires for each group of FELDA, JVC and traditional farming participants, all in all 30 interviews. The amount is chosen to give a representative section of the population. We do realize that an informer could be involved in more than one of the above-mentioned activities and we will take account of that during the interview and analyse of the information.

To access the impact on the environment we will also use standardised natural scientific methods.

## **2.3 Background information**

The first couple of days in the village will be used to collect different kind of background information such as list and location of available service facilities (school, health clinic, etc.), overview of the infrastructure, the specific structure of the different plantation schemes, and so on.

We intend to obtain these informations by interviewing and conducting a village walk with the headman. Besides that we want to select a small number of key informants, each with a background in FELDA, JVC or traditional farming and if possible and other persons with relevant knowledge of the issues we are working with. By conducting a transect walk with some farmers, we will try to establish a general view of the land use activities and grade of intensification in the area.

## **2.4 The amount of NCR-land involved in oil palm schemes**

As stated in the introduction agriculture is the main source of income for the majority of the people in Kampung Selampit. When the government wants to develop the rural areas, as they are doing in Sarawak with different rural development schemes, ownership of land become a very important issue for all parts involved. For our fieldwork this is also an issue that has to be covered as precise as possible. If land is the most important income source and the most valuable possession to the majority of the Jagoi-Bidayuh community, then division of land and the extend to which people might have go "give up" their land to development schemes becomes a very central issue for us to cover in our research. The situation of not possessing land can perhaps mean not having "anything to say" (politically) in the local community, but most importantly it might mean not being able to control the income of tomorrow.

When investigating ownership of land and specific land use in Kampung Selampit, we intend to use both interviews with key informants (appendix 2), such as e.g. the village headman or a farmer and information gathered from the questionnaires (appendix 2). During this work we expect to gain knowledge about the farmers daily activities, and how they perhaps are involved both in working in the plantation and in their own fields a side.

## **2.5 Job opportunities, competition and wage (gender and age)**

Investigating the job opportunities, competition and wage in the area after the establishment of the different oil palm schemes are central issues if we want to be able to discuss the impact on the livelihood of the people in Kampung Selampit. How are the local people able to generate a fixed income? What job-offers are open in the area? What skills are needed in order to get the jobs, and are there any kind of limitations (regarding gender/age) towards who can obtain these jobs?

Again, using interviews with key informants and questionnaires, we intend to establish an understanding of how the possibilities of generating an income are in the area. Change in land use might also mean change in job opportunities and perhaps new needs for further education or

migration work in areas far from Kampung Selampit. Some people are now working in the plantations, and will have a different form of income, than they used to working as farmers. We intend to investigate how this change has affected the livelihood of the workers.

## **2.6 The effect of oil palm schemes on other farming activities**

The establishment of the three different oil palm schemes in the Kampung Selampit area might have many different effects to the other farming activities. Through questionnaires, interviews with key informants and different environmental assessments we intend to investigate, how the people in the village experience changes in the farming activities due to the plantations. Such changes need not only have a physical character, but can also be specific change *experienced* by the villagers. Actual changes will be difficult to prove, because specific information about the area before our visit not is available. But we can try to cross check our information's, in order to see whether they should be in accordance with each other. At this stage of the planning it is difficult to say, whether this will be relevant at all and we will have to wait until we are on location to judge whether such cross checking's will be possible.

Other effects of the plantation schemes on the usual farming activities may be changes in methods of cultivation, changes in yields, etc., both for better or worse. Also on this issue, we will have to rely on the information given in the questionnaire, interviews and intensification indicators, due to the lack of knowledge about the past situation in the area.

With the use of the questionnaire and interviews we expect to be able to see some kind of understanding of the typical farmers life. What is his/hers strategies for generating income, how does the oil palm schemes affect his/hers adaptability to changes, that is: is there a common motivation for joining the oil palm schemes and leasing out the land for a 60 years period, instead of sticking to the traditional income generating activities.

## **2.7 Environmental issues**

In order to assess the impact of the oil palm schemes on the livelihood of the people in Selampit, environmental externalities generated from the oil palm schemes have to be taken into account. It is hard to value these externalities, but since the effects often are long term, they can become very crucial and expensive for future generations. Therefore we want to investigate the environmental impact from oil palm plantations compared to other land uses in the area. This we would like to do



via both interviews/questionnaires and natural scientific methods. We want to focus on flooding, water quality, degradation of soils, and erosion. We will, if possible, try to assess whether there is a greater run-off from oil palm plantations, which will lead to more sediments transported to the river. This will not only lead to more flooding, but also a worsening of the water quality. We would also like to measure whether there are problems with more pollution from fertilizers and pesticides compared to other land uses. Finally we would like to evaluate the risks of degradation and erosion of soils used for oil palm production. Here as well it could be interesting to know the opinion of the farmers. If they believe that their soils will be degraded after 60 years of oil palm production it might affect their willingness to participate in the schemes. The methods we want to use for soil and water sampling are described in appendix 3.

### **3. Literature review:**

#### **Perkins *et al* (2001)**

- Malaysia is known for its great success in economic development based on an export-oriented policy. As a result of the strategy, the Malaysian investments in primary and manufactured exports have sustained rapid economic growth, over 6 percent a year from 1965 to 1998.

#### **Ministry of Land Development Sarawak (1997):**

- Much focus has been on decreasing inequality and poverty of Bumiputera by development of rural areas. Land development schemes with oil palm plantations have long been a part of this strategy in order to improve rural economy and diverse national exports. The schemes have been a great success on Peninsular Malaysia, but so far not in Sarawak. In order to develop the rural areas on Sarawak, the Ministry of Land Development Sarawak has put up a new concept to convince NCR-land owners to develop their land on large-scale basis in joint venture with private firms.

**Vision 2020:**

- The objective of the above mentioned concept is in fine line with Vision 2020, formulated by the Malaysian Government, which aims towards a Malaysia that is *“fully developed by the year 2020.”* Vision 2020 also states “
- Another statement of Vision 2020 is not to harm the environment - *“Our land must remain productive and fertile, our atmosphere clear and clean, our water unpolluted, our forest resources capable of regeneration, able to yield the needs of our national development. The beauty of our land must not be desecrated – for its own sake and for our economic advancement”*

**Ministry of Agriculture Malaysia:**

- The ministry of agriculture Malaysia describes the plan for the oil palm expansion like this, the *“Increases in palm oil production will be through area expansion and enhancement of productivity. Whilst planting through opening of new areas will predominantly be in Sabah and Sarawak, in Peninsular Malaysia this will be through conversion of other crops as well as the intensified use of idle land”*

**Barlow, C. (2000):**

- Barlow further emphasizes this by describing the goal of the state of Sarawak as being achieved when – *“...all the 1.6 million hectares of Native Customary Lands in the State are successfully developed for such purpose”*

**Osman, S. (2000):**

- The concept has been criticized for threatening and not helping the IPS. Osman who states, *“It is clear that large-scale government development programmes have threatened the IPS. Their land is taken away in the name of development for the benefit of a few....Sarawak government has been promoting the New Concept of Customary Land Development for large scale oil palm plantations. Under this concept, the NCR lands will be leased out for 60 to 90 years. As a result the IPS must will likely lose the rights to their land. Some of the IPS opposes this kind of development, which will rob them of their customary land”.*

**Cooke, F. M. (2002):**

- Cooke (2002) also points out, that IPS finds this form of market involvement as increasing their vulnerability. They “*do not regard themselves as anti-development, but as waiting to participate more fully in development, without risking access to their livelihood*” (their land)

**IDEAL (1999):**

- The NGO IDEAL has evaluated the development carried out by the government, and is shows that it from the indigenes point of view not always is beneficial to their livelihood, which is emphasized by this statement - “*Development does not mean stealing our land, our culture and our dignity as human beings. That is not development, but theft*”.

**Lovei, M. G. and Bradford S. (2002):**

- The World Bank (2002) is in general positive to privatization “*privatisation provides an opportunity to improve the environmental performance of previously state-run operations though more efficient resource use, expanded access to capital, increased investments in cleaner technologies, exposure to foreign environmental management and market requirements, and greater regulatory freedom*”.

**Mohamad, A. L. (1996):**

- The consequence of using that large area for a monoculture is invaluable, Mohamad (1996) describes one the consequences as being harmful to the biodiversity, because of all of the habitats destroyed.

**Briggs, D. *et al* (1997):**

- Briggs *et al* describes another consequence of monoculture as being leaching and weathering of the soil.

**Blaikie, P. and Brookfield, H. (1987):**

- The Phrase “*political ecology*” combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and landbased resources, and also within classes and groups within society itself’

**Bryant, R., L. and Bailey, S. (1997):**

- Bryant and Bailey further states this by discussing the concept of power, which they defines as “*-the ability of an actor to control their own interactions with the environment and the interaction of other actors with the environment*”

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**Vision 2020:**

## Appendix 1: Time schedule of fieldwork (very roughly)

	Fri 17 <sup>th</sup>	Sat 18 <sup>th</sup>	Mon 20 <sup>th</sup>	Tue 21 <sup>st</sup>	Wed 22 <sup>nd</sup>	Thu 23 <sup>rd</sup>	Fri 24 <sup>th</sup>	Sat 25 <sup>th</sup>	Sun 26 <sup>th</sup>	Mon 27 <sup>th</sup>	Tue 28 <sup>th</sup>
Intro and background interview with headman (Preparation)	9 Man days										
Testing and adjusting questionnaires (Preparation)		5 Man days									
Planning village and transect walk (Preparation)		4 Man days									
Village walk with key informants (Participatory mapping)			2-3 Man days								
Transect walk: Land uses and intensification indicators. (Soil sampling)			4 Man days								
Questionnaires/structured interviews with farmers not, partly and fully involved in oil palm schemes. (Timelines and Matrix ranking)			2-3 Man days (Adj.)	5 Man days	5 Man days	5 Man days	5 Man days	5 Man days	5 Man days	5 Man days	
Water and soil sampling				4 Man days	4 Man days	4 Man days	4 Man days	4 Man days	4 Man days		
Free to catch up with unexpected problems										4 Man days	9 Man days

## Appendix 2: Questionnaires

### Interview with farmers:

Interviewer: \_\_\_\_\_  
Informant(s): \_\_\_\_\_ Age: \_\_\_\_\_ Gender: \_\_\_\_\_  
Interpreter: \_\_\_\_\_  
Place of interview: \_\_\_\_\_  
Main income activity  
of the informant \_\_\_\_\_  
Date: \_\_\_\_\_  
Time: \_\_\_\_\_

Method: Quantitative and open-ended interview.

Informant: stratified random sampling (stratified according to the occupation).

Interview technique: Yes or no, numbers, ranking and open answer

#### Household:

- How many people live in the household? \_\_\_\_\_
- How many females? \_\_\_\_\_ Age of the females: \_\_\_\_\_
- How many males? \_\_\_\_\_ Age of males: \_\_\_\_\_
- How many household members contribute to the household economy? \_\_\_\_\_
- Which activity contributes to the household economy?

\_\_\_\_\_

- Which of these is activity is most important?

\_\_\_\_\_

- Which of these is second most important?

\_\_\_\_\_

Which of these is third most important? \_\_\_\_\_

- Why have you chosen this way of living?

\_\_\_\_\_

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- How was the SALCRA scheme introduced in Kampung Selampit?

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- Name some of the considerations you made when hearing about the scheme?

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- Why are you not involved in one of the schemes?

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- How was the FELDA scheme introduced in Kampung Selampit?

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- Name some of the considerations you made when hearing about the scheme?

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- Why are you not involved in one of the scheme?

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- How was the JVC scheme introduced in Kampung Selampit?

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- Name some of the considerations you made when hearing about the scheme?

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- Why are you not involved in one of the scheme?

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- Name, if possible, improvements due to the oil palm scheme, which you consider advantageous for Kampung Selampit?

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- 
- 
- Name, if possible, disadvantages due to the oil palm scheme that has occurred in Kampung Selampit?

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- 
- 
- Has the schemes changed job opportunities in Kampung Selampit? Yes \_\_\_\_ No\_\_\_\_

- In what way?
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- 
- 
- Has this had an effect on this household? Yes\_\_\_\_\_ No\_\_\_\_\_
  - How?

- 
- 
- 
- Which advantages has occurred in the household due to the schemes?

- 
- 
- 
- Which disadvantages has occurred in the household due to the schemes?

- 
- 
- 
- How would you describe a normal day?

- 
- 
- 
- Is the infrastructure better now than before the implementation of the development scheme in the village? Yes\_\_\_\_\_ or no\_\_\_\_\_

- In what way?

- 
- 
- 
- Is it an advantage for the household? Yes \_\_\_\_\_ No\_\_\_\_\_

- Why\_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- Do you consider the school system better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
- If yes, why?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- Is this improvement due to the schemes? Yes \_\_\_\_\_ no\_\_\_\_\_
- Are your children taking more advanced studies, than you did? Yes\_\_\_\_\_ or no\_\_\_\_\_
- What is the reason for this?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- Is the water supply better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Have you got running water? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Due to what?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- Has there been more flooding after the schemes? Yes\_\_\_\_\_ or no\_\_\_\_\_
- What do you consider the reason for this?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- Is the river more polluted than before the schemes? Yes\_\_\_\_\_ or no\_\_\_\_\_

- What do you consider the reason for this?

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- Could you list any changes in the environment, which you consider as a result of one of the oil palm schemes?

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- Could you list any changes in your output from farming, which you consider as a result of one of the oil palm schemes?

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## Interviews with scheme participants

Interviewer: \_\_\_\_\_  
Informant(s): \_\_\_\_\_ Age: \_\_\_\_\_ Gender: \_\_\_\_\_  
Interpreter: \_\_\_\_\_  
Place of interview: \_\_\_\_\_  
Main occupation  
of the informant: \_\_\_\_\_  
Scheme participant in: \_\_\_\_\_  
Date: \_\_\_\_\_  
Time: \_\_\_\_\_

Method: Quantitative and open-ended interview.

Informant: stratified random sampling (stratified according to the occupation).

Interview technique: Yes or no, numbers, ranking and open answer

Household:

- How many people live in the household? \_\_\_\_\_
- How many females? \_\_\_\_\_ Age of the females: \_\_\_\_\_
- How many males? \_\_\_\_\_ Age of males: \_\_\_\_\_
- How many household members contribute to the household economy? \_\_\_\_\_
- Which activity contributes to the household economy?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Which of these is activity is most important?  
\_\_\_\_\_
- Which of these is second most important?  
\_\_\_\_\_
- Which of these is third most important? \_\_\_\_\_

(Instead of the above questions we will conduct a matrix ranking)

Income generating activity:

- How large a part of you land is involved in the scheme?

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- Why this amount?

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- How was the scheme introduced in Kampung Selampit?

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- Name some of the considerations you made when hearing about the scheme?

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- Why do you participate in the scheme?

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- (If JVC) What are your thoughts about having your land returned after 60 years?

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- Name, if possible, improvements due to the oil palm scheme, which you consider advantageous for Kampung Selampit?

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- Name, if possible, disadvantages due to the oil palm scheme that has occurred in Kampung Selampit?

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- Has it increased the income of the household to participation in the scheme?

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- Which advantages has occurred in the household due to the schemes?

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- Which disadvantages has occurred in the household due to the schemes?

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- Has the scheme participation fulfilled your expectations?

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- In what way?

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- How would you describe a normal day before and after participation in the scheme?

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- 
- 
- Would you consider the workload larger\_\_\_\_\_, the same\_\_\_\_\_ or smaller\_\_\_\_\_ since your participation in FELDA/JVC?
  - Has the schemes changed job opportunities in Kampung Selampit?

- 
- 
- In what way?

#### **Infrastructure:**

- Is the infrastructure better now than before the implementation of the development scheme in the village? Yes\_\_\_\_\_ or no\_\_\_\_\_
- In what way?

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- 
- 
- 
- Is it an advantage for the household? Yes \_\_\_\_\_ No\_\_\_\_\_

- Why\_\_\_\_\_
- 
- 
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### Schools and education:

- Do you consider the school system better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Is this due to the schemes?

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- Is the average schooling longer now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Is a larger part of the young generation taking more advanced studies than your generation/ than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Are your children taking more advanced studies, than you did? Yes\_\_\_\_\_ or no\_\_\_\_\_
- What is the reason for this?

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### Water supply:

- Is the water supply better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Have you got running water? Yes\_\_\_\_\_ or no\_\_\_\_\_
- Due to what?

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### Environmental aspects

- Has there been more flooding after the schemes? Yes\_\_\_\_\_ or no\_\_\_\_\_
- What do you consider the reason for this?

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- Is the river more polluted than before the schemes? Yes\_\_\_\_\_ or no\_\_\_\_\_
- What do you consider the reason for this?

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### **Interview with Headman and key informants:**

Interviewer: \_\_\_\_\_

Informant(s): \_\_\_\_\_ Age: \_\_\_\_\_ Gender: \_\_\_\_\_

Interpreter: \_\_\_\_\_

Place of interview: \_\_\_\_\_

Main income activity  
of the informant \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

- How was the SALCRA scheme introduced in Kampung Selampit?

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- How was the FELDA scheme introduced in Kampung Selampit?

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- How was the JVC scheme introduced in Kampung Selampit?

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- What do you consider the purpose of SALCRA?

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- What do you consider the purpose of FELDA?

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- What do you consider the purpose of JVC?

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- How many percent of the total amount of NCR land of Kampung Selampit do you consider involved in the JVC?

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- How would you describe the circumstances during the classification of NCR land?

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- How would you describe the introduction of the SALCRA scheme?

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- How would you describe the introduction of the FELDA scheme?

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- How would you describe the introduction of the JVC scheme?

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- How would you describe the implementation of the SALCRA scheme?

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- How would you describe the implementation of the FELDA scheme?

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- How would you describe the implementation of the JVC scheme?

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- Name some of the considerations you made when hearing about the scheme?

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- (If not involved in scheme) Why are you not involved in one of the schemes?

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- Describe the facilities of the village (school, midwife, electricity, water supply etc.)?

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- Has these facilities changed during the oil palm scheme? And which of them?

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- 
- 
- Is the infrastructure better now than before the implementation of the development scheme in the village? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - In what way?

- 
- 
- 
- Do you consider the school system better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - If yes, why?

- 
- 
- 
- Is this due to the schemes?

- 
- 
- 
- Are younger generation taking more advanced studies, than before? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - What is the reason for this?

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- 
- 
- Name, if possible, improvements due to the SALCRA scheme, which you consider advantageous for Kampung Selampit?

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- 
- Name, if possible, disadvantages due to the SALCRA scheme that has occurred in Kampung Selampit?

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- 
- Name, if possible, improvements due to the FELDA scheme, which you consider advantageous for Kampung Selampit?

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- 
- 
- Name, if possible, disadvantages due to the FELDA scheme that has occurred in Kampung Selampit?

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- 
- 
- Name, if possible, improvements due to the JVC scheme, which you consider advantageous for Kampung Selampit?

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- 
- 
- Name, if possible, disadvantages due to the JVC scheme that has occurred in Kampung Selampit?

- Has it contributed to any disagreement between the villagers and the authorities?

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- What was the output of the disagreement?

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- Has it contributed to any disagreement between the villagers? Yes\_\_\_\_\_ no\_\_\_\_\_

- What was the output of the disagreement?

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- Has the number of inhabitants increased in the village? Yes\_\_\_\_\_ no\_\_\_\_\_

- What is the reason for this?

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- How has this affected the village?

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- Is there an equal gender distribution in the village? Yes\_\_\_\_\_ or no\_\_\_\_\_

- Is there a different age and gender distribution now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_

- Is the work situation better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_

- How would you describe the current labour situation in Kampung Selampit?

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- Is there enough work? Yes\_\_\_\_\_ or No\_\_\_\_\_
  - How would you describe the current migration situation in Kampung Selampit?

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- 
- Is there more migration now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - What do you consider the reason for this?

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- 
- 
- Has the schemes changed the younger generation way of life compared to the pasts younger generation? Yes\_\_\_\_\_ No\_\_\_\_\_
  - Is the water supply better now than before the scheme? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - Due to what?

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- 
- Has there been more flooding after the schemes? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - What do you consider the reason for this?

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- 
- Is the river more polluted than before the schemes? Yes\_\_\_\_\_ or no\_\_\_\_\_
  - What do you consider the reason for this?
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- Has there been any other environmental change during the schemes? Yes\_\_\_\_\_ No\_\_\_\_\_
- In what way?

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- Could you list any changes in the environment, which you consider as a result of one of the oil palm schemes?

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### **Appendix 3: Soil and water sampling (not fully ready now)**

The methods for this part we haven't resolved with our Malaysian counterparts yet. Environmental changes are almost impossible to measure when we don't have any reference from the past.

Therefore we can only measure the status now and compare it with the status in similar areas with other land uses.

In order to evaluate soil fertility/degradation we would like to take some soil samples to measure SOM and compare it with SOM from other land uses. This is a very rough estimate, since soil type is very important for the decomposition rate. Erosion is another factor that is hard to estimate due to many uncertain parameters. There are many models that try to predict erosion, for instance it is possible to use the Universal Soil Loss Equation (USLE):

$$E = R * K * L * S * C * P$$

Where E is the main annual soil loss, R is rainfall erosivity factor, K is the soil erodibility factor, L is the slope length factor, S is the slope steepness factor, C is the crop management factor and P is the erosion practice factor (Morgan, 1995). The model is not directly operational, since there is a lot of variables and they are more or less uncertain since there is a considerable interdependence between some of them. But it can give an estimate that is comparable. The question is whether it is relevant to use much time on a factor like erosion. Often what we see in the field is much more useful. If it is possible to identify erosion cracks and so forth, will this alone give valuable information's.

In order to evaluate water quality we will try to identify a small stream running through an oil palm plantation and compare it with a similar stream that runs through other agricultural land. In the stream we will try to measure the amount of sediments and pesticides, which will give a good indication of the water transported from the given area.

Otherwise we will observe when we are in the fields and try to identify problems and ask the farmers whether the condition have worsened or bettered since the oil palm schemes.