COPING WITH CHANGE

Impacts On Livelihood And Natural Resources in Rumah Jungang, Loagan Bunut National Park Sarawak

Rumah Jungang

SLUSE Programme 2003

– Interdisciplinary Joint Basic Course on Natural Resource Management

Coping With Change

Impacts On Livelihood And Natural Resources in Rumah Jungang, Loagan Bunut National Park Sarawak

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The paper is prepared during the Interdisciplinary Joint Basic Course on Natural Resource Management (15 ETCS); SLUSE programme

Final Report
The 2nd of April 2004

SLUSE – Sustainable Land USE
Roskilde University Centre
University of Copenhagen
The Royal Veterinary and Agricultural University

Abstract

This study investigates the changing livelihood in the Iban community of Rh. Jungang, Tinjar River, Loagan Bunut National Park, Beluru Sub-District, Miri Division, Sarawak, Malaysia. This is our objectiv:

> *What are the livelihood strategies of Rh. Jungang, and how has the implementation of LBNP and the livelihood strategies of Rh. Jungang community affected each other with respect to the management of the natural resources and, finally, what expectations to alternative income generating activities do the inhabitants of Rh. Jungang community have, with emphasis on the potential of an oil palm project?*

The livelihood of Rh. Jungang is characterised to a large extent by the fact that most of the income of Rh. Jungang comes from remittance. Further, the community has experienced and rapid decline in farming, subsequently rice-farming. The longhouse is experiencing a migration of both male and female members, leaving behind the youngest that are not off to boarding school, the eldest and those who have not had their luck in finding jobs elsewhere.

Loagan Bunut National Park, which is located across the river, was gazetted without consideration for the fact that Rh. Jungang and other bordering villages have traditionally used the land. Compared to other factors like the general competition for land and timber the establishment of the National Park has had a minor effect on the livelihood of the community. The ban on timber extraction from the National Park seems to be the most significant restriction from a longhouse perspective. Hunting activities may have changed, but a decrease in the number of game might as well have caused this decrease and not the National Park. In terms of farming, most members of the community do not acknowledge the National Park and thus utilize their old plots within the National Park as they always have, however, since it is not very intensively farmed and the plots are small, impact is most likely to be minor. It could be argued, however, that the community has suffered an unjustified loss.

The community claims to have land-rights over land which they utilised staying at their previous longhouse Long Ajoi. According to Native law (Adat) the longhouse, together with three other longhouses that were also part of Long Ajoi, cannot claim this land since the original longhouse has split into four and settled elsewhere. It is also highly uncertain if the land can be claimed legally as Native Customary Land since it is not presently cultivated. Nevertheless, plans have been made to implement an oil palm project, probably with the main purpose of becoming able to claim the land legally theirs before someone else. The plan included all four longhouses but seems to have failed due to internal disagreements on landrights, money and usage of the area. The proposed oil palm area is also home to a waterfall which some community members want to utilize as a tourist attraction. The oil-palm area is, according to our observations, not very suitable for such an activity due to prevalence of steep slopes and possibly inadequate soil types.

Abbreviations

DANIDA	Danish International Development Aid
DOA	Department of Agriculture
EIA	Environmental Impact Assesment
FELDA	Federal Land Development Agency
GPS	Global Positioning System
JVC	Joint Venture Company
LBNP	Loagan Bunut National Park
LBNPHQ	Loagan Bunut National Park Head Quarters
LCDA	Sarawak Land Custody and Development Authority
MOT	Ministry Of Tourism
NCL	Native Customary Land
NP	National Park
NPHQ	National Park Head Quarters
NRM	Natural Resource Management
OPP	Oil Palm Project
PRA	Participatory Rural Appraisal
PSF	Permanent State Forest
PSFO	Peat Swamp Forest
RM	Ringgit Malay
RRA	Rapid Rural Appraisal
Rh.	Rumah (village/longhouse)
SFD	State Forest Department
SLC	Sarawak Land Code
TPA	Totally Protected Area
UNDP	United Nations Development Program
WWII	World War II (Two)

They should not make a National Park here because there are enough in other places. They should not have as many National Parks in Sarawak because the land is the only way we can survive.

Women focus-group

My land is my wife – how can I share?

Mr. Joseph Wee, Assistant Director, Agricultural Department, Miri Division

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Preface

This field course report is the written result of the authors' participation in the SLUSE[1] Interdisciplinary Joint Basic Course on Natural Resource Management (year 2003). The purpose of the report, as related to obtaining the SLUSE Certificate, is to document our research process and findings during the fieldwork, 24th of January to 14th of February in Rh. Jungang, Sarawak, Malaysia.

The target groups of the paper are all people with an interest in environmental and development issues and problems in developing or less developed countries.

Acknowledgements

We would like to thank DANIDA for providing this great opportunity for us to extend our educational abilities in the important field of natural ressource management (NRM). We would also like to thank our fellow students and co-workers from UNIMAS (Universiti Malaysia, Sarawak) Lai Chin Moi, Christina Lau, Jasmine Kho, Lai Kui Fong, Nicholas ak Bujang, Isaacs Victor Isaacs, their university teachers and lecturers as well as our own within the SLUSE programme and Robert Malone for organising. Gratitude also goes to Hillary Jungang and the people of Rh. Jungang for welcoming us so warmly into their lives and to the LBNPHQ Customer Service Assistant for his time. A special thank goes to our interpreter Olivia Anak Jikus whose help has reached far beyond an interpreter's responsibility and been invaluable. Finally we would like to thank our supervisors from Copenhagen University, Tina Svan Hansen (Institute of Geography) and from Roskilde University Center, Kristine Juul (Institute of Geography), who guided, represented and looked after us on the field course.

April 2nd 2004

Anne-Katherine Scharling Karen Damgaard Hansen Mette Kuhlmann

[1] The Danish University Consortium on Sustainable Land Use and Natural Resource Management (SLUSE) comprises three Danish universities and facilitates education and research on a wide range of topics pertaining to sustainable land use and natural resource management. The overriding ambition of the consortium is *"to develop interdisciplinarity with the view to formulate a univocal perception of the problems and solutions with regard to land use and land stewardship"* (SLUSE 2003).

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1. Introduction

Malaysia has faced a multitude of challenges, most often invoked by a top-bottom approach to development. Both the historical factors and especially the speed with which the recent economic development has occurred have put pressure on the natural resources (Brookfield et al. 1990, Hong 1987, Cleary & Eaton 1995). This pressure now raises questions of rights to land, economic turn-over versus sustainable use and is an issue of greatest concern for the peoples traditionally depending on the land resources to sustain a living - such as the Iban.

Several hundred thousand indigenous people (overall called Dayaks), reside in and around the forests of Sarawak (Hong 1987: 2, Airriess 2000: 344). These forests are of great economic importance if the goal of turning Malaysia into a developed nation by the year 2020, as promised by recently resigned Prime Minister Mahatir Mohammad, is to be reached (Hong 1987: 123, Europe Factbook 1999: 671-673). Large-scale logging and conversion of forest into plantations, mainly oil-palm, are currently the two main economic activities in Sarawak, (Hong 1987: 131, Brookfield et al. 1990: 101). The Iban and other indigenous tribes who have lived in the forests for centuries hence pay a large price for the development of the nation through loss of rights to land and continuous degradation of the natural environment, which traditionally has provided for them (Hong 1987: 61).

Through centuries the Dayaks have established their own, well-functioning laws (Adat) adapted to their tradition of shifting cultivation. The rules of the Adat dictated, and to some degree continue to dictate, how boundaries should be marked. The way land was traditionally possessed was through the act of clearing and cropping, subsequently planting fruit trees. Part of the longhouse-land is owned by the longhouse-community as a whole for everyone to gather forest products from and some is owned by individual households, passed on from generation to generation (Ngidang 2003; Freeman 1992, Soda 2001). Under the Brooke rule all land was viewed as government land, leased 100 years at a time. This system was overruled by the Sarawak land code of 1958, which demands that any claims to native customary land (NCL) must be based on proof that the land had already been cultivated before that year (Ngidang 2003). The native customary land, according to the Sarawak Land Code (SCL) cannot be titled, only the user rights are implied. In practice, this means that although the land is held under NCL-rights these rights are not always enough to secure the land. (Horowitz 1998).

Land right issues are of great importance also for the area of this study, which is the Loagan Bunut National Park (LBNP) (see Diagram 1.1 and 1.3) and its surroundings,

(located by the Tinjar River, Beluru Sub-District, Miri Division). Around and within this national park (NP) various indigenous groups have settled into eight different communities, some well before WWII. Not much undisturbed forest remains outside the relatively inaccessible peat swamp forests of LBNP, as the area has been exposed to long term settlement, logging and plantation development, which also means that land is becoming an increasingly restricted resource.

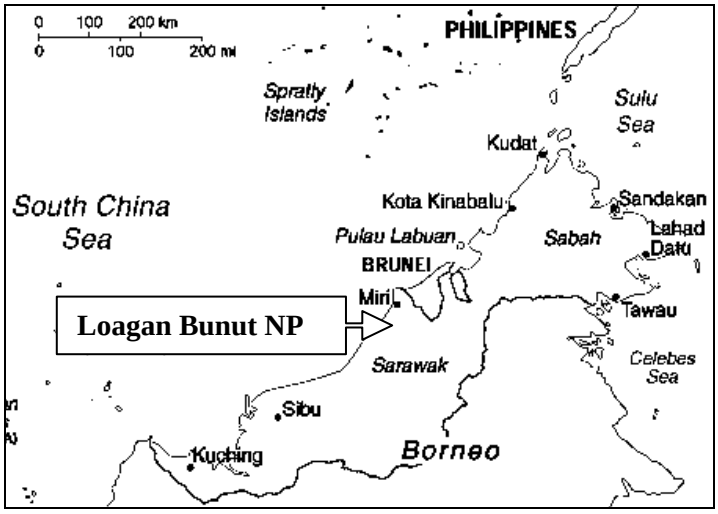

Diagram 1.1: Map of the East Malaysian states Sarawak and Sabah (World Fact Book 2003).

One of these communities is the Iban community of Rumah (Rh.) Jungang which is the subject of this study. Logging and plantations in the surrounding areas and the establishment of the NP has inflicted major changes in the living conditions for the Rh. Jungang community. Old practices like hunting and fishing have strongly declined, both because they have become illegal with the establishment of the NP, but also because fish and wildlife are no longer found in abundance. The last few years have, in other words, brought many changes to Rh. Jungang and an interesting question to ask is, therefore, how the inhabitants cope with these changes in terms of change in livelihood strategies. Compared to earlier, many of the residents are now working in Miri and other places and only come back for festivals etc. Currently the community is in the phase of constructing a new longhouse just in front of the present one, a task which is planned to take two years, during which many of the residents have taken work outside the long house in order to raise enough money for the building costs.

1.1 Area Of Study

The NP comprises a total area of 10,736 ha of which the largest natural lake in Sarawak, the Loagan Bunut lake, occupies 650ha. The Permanent State Forest (PSF) has been logged several times and the most valuable timber species thus removed, but it is still host to a great diversity of special plant species. Rh. Jungang is situated to the northwest of the NP. In the adjacent part of the NP the soils are dominated by peat swamp and alluvial floodplains consisting of clay and silt (Hon & Gumal, 2003). Although PSFs are generally poor in wildlife diversity and abundance, they do contain a number of

endangered species and peat swamp specialist species. The NP further works as spawning ground and refuge for a large number of fish species (Hon & Gumal, 2003)

The people of Rh. Jungang were forced to abandon their original longhouse at Long Ajoi after it was burned by the Japanese during WWII and they subsequently fled to Marudi. In the 1960s they moved back to the region settling in the new Long Ajoi. Later, the longhouse split into four longhouses Rh. Jungang, Rh. Ramba, Rh. Linggi and Rh. Umping. (Focus-group with elderly inhabitants, see diagram 1.2 and 1.3, appendix L). Rh. Jungang longhouse is now located 45 minutes by boat from the main town of Lapok.

Date	Event	Effect to Community
1945-1946	Japanese Occupation	Longhouse was burned Not enough food Everybody moved to Marudi
1950	Clinic	Maternity Ward
1960	Move to Long Ajoi	Build new longhouse TR Medan-TR Taja-TR Jungang
1963	Flooded (16 m in 4 days)	Stayed temporarily at their temuda land Government provide them with food
1970	School starts	8 longhouses send their children to school
1983	Government assistance	Distribute poultry, planting material (fruits), farm tools, wheel barrows etc Fish pond subsidy Communal rice mill
1991	First logging company	Job opportunity, timber road
1994	Generator (TR)	
2000	Assistance by Politician	Water tank by State Assemblymen YB Sylvester Entri
2000	Political differences	Longhouse split up into 4 longhouses

Diagram 1.2: Timeline for Rh. Jungang

These historic dynamics have had great impact on the legal land rights for the four longhouses. In 1938 the people of Long Ajoi were given legal land titles to part of their land. (see diagram 1.2) Originally the people of Long Ajoi were allocated rights to settle and cultivate by the Berawan from Long Teru, who were the first settlers in the area to claim land rights. Although Rh. Jungang is still exercising the rights to the former land of Long Ajoi (area proposed for plantation), according to the Adat these rights were restricted to the people of Long Ajoi and were hence lost when the longhouse split into four and settled outside the original area (Freeman 1992). According to the Malaysian land code the area is not recognised as belonging to Rh. Jungang.

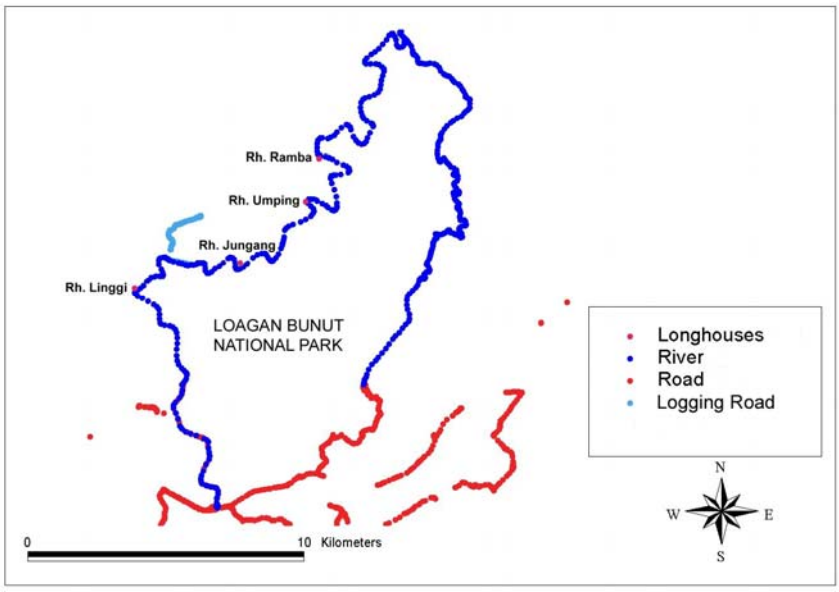

Diagram 1.3: GPS map

1.2 Objectives

The above has lead to the following objective of this report:

> *What are the livelihood strategies of Rh. Jungang, and how has the implementation of LBNP and the livelihood strategies of Rh. Jungang community affected each other with respect to the management of the natural resources and, finally, what expectations to alternative income generating activities do the inhabitants of Rh. Jungang community have, with emphasis on the potential of an oil palm project?*

This objective is put forward because the development in the area has caused the community of Rh. Jungang to change their livelihood strategies. What constraints have been inflicted on the community when it comes to the use of land? How has the longhouse coped with this change? These questions are of great relevance if one wants to understand what effects the setting up of a NP can have on the people residing in and around the NP. Therefore, we put forward the following working questions:

1. What benefits and restrictions has the gazettement of the LBNP had on the livelihood strategies of Rh. Jungang?
2. What other factors have influenced the livelihood strategies of the community?
3. How are the activities of Rh. Jungang affecting the natural resources of LBNP and community land?
4. What are the likely environmental consequences of establishing an oil palm plantation?
5. What impact may the establishment of an oil palm plantation have on the land distribution and rights within the community?

1.3 Structure Of The Paper

Where the first chapter has given an overall introduction of the project area, history and prospects, the second chapter will focus on methods used. Chapter three will seek to explain the livelihood strategies of Rh. Jungang followed by a presentation and discussion of our findings on the interaction between the NP and the village in chapter four. Chapter five will further discuss the proposed plantation project, the underlying motives and the possible impacts on both the community and the environment. Concluding points will be given in chapter six.

2. Methodology

This report is based on the fieldwork carried out, supplemented with relevant theoretical information. The research conducted took its starting point in our interest in uncovering the socio-economic and ecological implications of the establishment of LBNP and the proposed oil palm plantation (OPP). For this purpose we used a mix of social scientific research methods, supplemented with a few natural scientific methods, such as field visits, where soil and water sampling were conducted.

In the sense of cross-checking data from different methods, **triangulation** has been an important part of this study. Most of the methods used during our short time in the field were used in collaboration with our Malaysian counterpart. Both qualitative and quantitative methods were used, however, with an emphasis on qualitative methods. This approach has been deliberate and based on the idea that conflicts over natural resources can be difficult to quantify and later categorise. The strength of the qualitative methods lies in their ability to give in-depth insight of people's perceptions, attitudes and livelihoods. Also these methods can help clarify how the Ibans of Rh. Jungang perceive the LBNP and the option of an OPP as well as how the NP authorities actually perceive and manage the existence of the local communities surrounding the NP.

It should be noted that the Rh. Jungang inhabitants exhibited certain patterns when participating in the exercises, depending on social status and individual personality. The headman was in example very eager and participated in as many exercises as possible, - a fact which may have influenced the information flow in an unintended direction.

2.1 The Different Methods

The field trip to Rh. Jungang was a limited 10 days, which proved a serious time constraint on our use and choice of methods. Prior to the fieldtrip a flexible timetable was made to ensure sufficient time to conduct and try as many relevant methods as possible, something we saw as an integrated part of our course objective. In this aspect we differed to our Malaysian counterparts whose main objective was to gather the right information. The timetable was consequently, and as expected, subject to constant change; interviews were moved from mornings to evenings, samples were taken depending on availability of guides, weather conditions etc. The final **fieldwork calendar** can be seen in appendix B.

The applied methods can be divided into the following categories:

Socio science methods

RRA methods (Rapid Rural Appraisal)

- Participatory mapping
- Matrix ranking
- Institutional diagram
- Seasonal calendar (including division of work between gender)
- Trend analysis
- History timeline

Interviews

- Household survey (structured interview using a questionnaire as check-list)
- Key-informant interview
- Focus group discussion

Natural science methods

- Soil samples
- Water samples
- Topography estimation
- GPS
- Direct observation

2.1.1 Rapid Rural Appraisal

Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) cover a range of information gathering techniques which are aimed at learning directly from community members based on how they analyse their own situation. (Danida 1996: 110) According to McCracken et al. cited in Furze et al. (1996: 56) both are governed by the two core principles: “optimal ignorance” and “triangulation” which respectively imply that it is not possible to know the object of the research completely and that the use of several different sources of information and techniques is essential.

RRA is used to gather extra information about a specific topic, information which is not necessarily obtained through interviews. The visualisation techniques (mapping, matrix, institutional diagram, seasonal calendar etc.) often make it easier for the participants to pass on information. (Selener et al. 1999: 11). The visualisation techniques also help minimise the effect from the indirect transfer of the interviewer’s values on the outcome of the study i.e. aiding the optimal ignorance aspect.

The PRA methods are used in development planning to identify community problems and to plan solutions with the active participation of the community members (Selener et. al. 1999: 3). Our reasons for using PRA methods were multifold but especially based on the fact that participatory approach enabled us to not only obtain information about the community and different aspects of the Iban's livelihood, but also created a more informal arena which allowed for a broader exchange of information. It was also a good way to get an overview (participatory mapping for area overview and institutional diagram for institutional environment) as well as to get more specific information that was a result of discussion between the participants e.g. matrix ranking. Thus, the PRA methods provided a different kind of information than the one-person interviews could give, and therefore we found that the two types of methods supplemented each other in a constructive manner for our research situation.

One of the key factors stressed in PRA is that the researcher should limit their role to that of a facilitator of the method; problems and solutions has to come from the community themselves. It has been our experience that it was difficult to stay in the role of facilitator: Sometimes we had to give direct examples to get the exercise going. This often made the participants pick up our example and use it to build on. Consequently this implies less objectivity in some of the exercises.

We will argue that what we did was not PRA but in fact RRA. The methods are the same, but in RRA the objective is for the researcher to gain knowledge. In PRA the objective is for the community in the end to be able to come up with solutions to the community problems. This was not the case. The following methods were designed to cover all the working questions, however, with different angles.

The purpose of the **Participatory Mapping** (Appendix H and I) exercise was to get a quick overview of the location, information about the physical nature of our study area, and to find out what things the people of Rh. Jungang consider as locally important. In order to also get an insight into the gender-related perceptions we specifically asked both a group of men and of women to draw maps. In the men's group the headman had tried the exercise before and therefore took the leading role. The number of participants decreased in this group during the exercise. Contrary to this, the women's map was a joint project where more and more women participated as the exercise went along. The maps exposed different kinds of information to us, e.g. the women were very keen on getting the river and side rivers accurate, and they were also more focused on the nearby area with the clinique, the school etc. They drew paddy fields in LBNP but they did not explicitly draw the NP on their map. The men drew a map of a much bigger area. They did not put paddy fields on their map, but instead a detailed river system, logging roads,

a newly implemented fish pond, neighbouring long house communities as well as the LBNP. Surprisingly they omitted the proposed OPPion area. It was originally intended to form another focus-group with the intention of drawing a map over the oil-palm area, but due to time-constraint this was omitted.

The **Matrix Ranking** (appendix G) was made to gain information on community preferences regarding use of farmland and the input/ output of different crops produced. This made it easier for us to specify our questions in our interviews regarding use of farmland. The matrix ranking was conducted by two farmers, the Headman and another young man who had knowledge of crops, market value etc. The participants made a list of the 10 crops they considered most important. In general, agreement was quickly reached on the points (score) given, whereas scoring the different crops themselves proved more difficult. As a supplement we intended to make a matrix on forest products, however, after a few days in the longhouse it was evident that the informants did not want to tell us the truth about their hunting and gathering patterns. We found it difficult to use the overall "score" as a result, since the score is dependent on our own choice of criteria and as such is more useful as a correlative estimate the factors in-between. We consider the criteria "importance" the most important finding from the matrix ranking.

For the **Institutional (Venn) Diagram** (appendix F) session unfortunately only two women were available. We explained the exercise but it soon became obvious that the participants did not understand the exercise. We had asked our participants to write down all the institutions which they regarded as important in their lives and which are present today. The information we attained through this exercise was not quite what expected even though it did include information on the different institutions (including both individuals and organisations), which the villagers felt had influence on their livelihood. The participants managed to list quite a few institutions, but it was all things which they would like to be present in the future and we thus did not get any information on present institutions besides the clinic in Long Teru. The list of institutions they would like to be present in the future turned out to be the main findings from this exercise.

The **Seasonal calendar** (appendix E) was designed to provide information on local farming practices, connections between rice production and religious festivals and division of work between men and women. Among other things, the results from this method showed that, according to their perception, only three crops were seasonal, namely: hill- and wet rice and maize. It also turned out that women and men participated equally in agricultural work. Another seasonal calendar (appendix P)

related to the water availability was further made during the focus group discussion with the women. The aim here was to check for any connection between use of water (river and rain) and their health status according to time of the year. This exercise showed a correlation between water availability and health problems in the drought period.

The previously mentioned **timeline** (see chapter 1 diagram 1.2) was made during the focus group discussion with the elderly people of the longhouse and conducted by five people above the age of 50. This age group was deliberately chosen as it was anticipated they would be capable of making the timeline most comprehensive i.e. taking the timeline as far back as possible. The exercise gave us important dates in the development of the community and also what activities and events had had the most pronounced effect on the community as a whole. This combination of participants and technique proved very successful.

Both a men's and a women's **trend analysis** (appendix N & O) was made during their respective focus group discussions. The men's was designed to focus on showing how the importance of rubber and paddy has decreased whereas the women's trend analysis focused on the trend in several food products; rice, fish, wild meat etc. All showed a decline. One of the most important aspects of designing a trend analysis is to use clear questions (Selener et al. 1999: 134)

2.1.2 Interviews

The main interview method we used was a semi-structured **household survey** (Appendix A) in the form of a questionnaire combined with open-ended, in-depth questions. This is the most structured method of the qualitative interview methods (Casley & Kumar 1988: 14). The reason for it being semi-structured is that it allows the informants to give answers, which we did not anticipate. It is, further, less time consuming than, for instance, informal and topic focused interviews. The most obvious restriction with this method is the risk of actually conducting fully structured interviews (Casley & Kumar 1988: 14). To ensure an overall standard interview process we engaged in a thoroughly discussion about the questionnaire and aims of the survey with our Malaysian colleagues both prior to and during the study. Due to the time constraint the use of a questionnaire required that two groups had to conduct interviews simultaneously. Emphasising the necessity of reaching a compromise and the time spent on this task is essential because having different interviewers generally increases the risk of an uneven standard and process (Furze et al.: 1996: 58). The overall frame of the questionnaire was organised by topic with few open-ended in-depth questions concerning the NP and the OPP issue under each topic. This was done to give us exact

and organised information on issues of concern for the community and also helped to identify possible key-informants. The questionnaire was pre-tested on one village member and consequently shortened considerably (1½ hours).

The second type of interview we conducted was **key-informant interviews** (Appendix D). These interviews were planned topic-wise and were conducted with key-persons such as village leaders in the four longhouses, a farmer and the management staff of LBNP. The final choice of informants was decided on a day to day basis. The terms key-informant- and in-depth interviews are in this context interchangeable.

Finally four **focus group discussions** were conducted These are typically used by researchers looking into the impact an issue has or is expected to have in the future on either a particular group or the whole community as such (Furze et al. 1996: 75) and are in this way very relevant for our study topics. We had groups of 4-5 individuals. The four discussions were carried out with men, women, elderly (>50 yrs) and young people (15-24 yrs) respectively. We are aware of the most common weaknesses connected with this method, namely actually getting groups which are relevant for the topic researched, our own limited experiences as facilitators and with guiding discussions as also stressed in Furze et al. (1996:76). The reason for conducting focus group discussions was based on the concern that there will always be dominating individuals or groups in the community who may not be the best representative for the issue researched. By use of focus groups a forum was created, which not only enabled us to gain an insight in these representative groups' perspectives, but also to obtain this knowledge without violating traditional practices and offending anybody. The focus group discussions were overall relatively successful. The biggest problem encountered was with the focus group with the young people where people in the longhouse not part of the chosen group still sat in and listened. In this situation we experienced the restrictive effect this had on the respondents, which became evident as eventually people left. This implies a reduced reliability of the answers. For future references it could be advantageous to place the session in a remote, neutral ground.

By living in part of our study area we acquired firsthand impressions through **direct observation** to verify the information provided by the different data collection methods and makes us appear less threatening to the people of Rh. Jungang – a fact which has the potential of providing more reliable information. The observations made have been recorded in diaries.

2.1.3 Natural Scientific Methods

In order to assess the state of the river water, which is a vital part of Rh. Jungang´s existence, **water samples** from the jetty (right in front and upstream) were taken and analysed for the presence of colibacteria as well as the levels of eutrophication and siltation (see chapter 3, diagram 3.4). The sampling spots were chosen in order to be able to compare the results, e.g. to see if there was a difference between water at the outflow from the longhouse as compared to an upstream sample where only the "background" pollution from other activities is present. Triangulation was intended in exploring the connections between the waste-disposal habits of the longhouse, the quality of the water and the general health condition in the longhouse (seasonal calendar, womens focus-group, direct observation). Water-samples were also taken in order to assess the potential for a proposed fish-pond.

Soil samples (Appendix K) were taken inside and outside the NP and can be characterised as "indicative", meaning that the purpose was not to get a statistically adequate sample, but only to get an impression of the prevalent soil condition. The fields were mainly placed next to the river where the soils are mainly fluvial deposits and thus rather uniform, differing mostly in the degree of water-saturation, as reflected by the greyish colour. The goal for our Danish group was originally to get samples that could tell us something about the different crops and soil management practices´ impact on the soil by comparison of samples, but this turned out to be an unrealistic goal since, due to flooding, it was not possible to go to very many places, time also not allowing for a great number of samples. Due to shifting cultivation being prevalent we realised it would have been very complicated to conclude anything in terms of the impact from different soil-uses, so the approach of "indicative soil-sampling", which was what our Malaysian counterparts called it, was more realistic and served merely as a means of understanding more about the soil resource base available to Rh. Jungang. For the proposed OPP area the case was different since the site was more inland and undulating, the soil type consequently varying considerably. However, only two samples were made due to the shortness of the trip and the inaccessibility of the remaining area. Those two samples, however, showed very well the variability of the soils here. The samples were attempted analysed (pH, Nitrogen, Phosphate, Potassium and Sulphur) by using test-kits brought from Denmark, but it turned out not to work out very well since no significant levels could be detected, so the analysis had to be carried out later on in a laboratory.

Through a cursory **topographical assessment** it was intended to explore the adequacy of the proposed OPP area for the purpose in terms of slope, according to the existing EIA guidelines for OPPs in Sarawak. EIA is a tool for planning practices, developed for incorporating environmental considerations into project decision making and is

mandatory by Malaysian law for agricultural projects > 500 ha (Sai, L. J. 2002: 8). Originally it was intended to explore the slopes *in situ,* but realising the extensiveness of the area and the wilderness one would have to go through it was not a realistic option to walk the area with a compass and a clinometer. Only a small part of the area was visited and the slope was observed. Subsequently a contour map was acquired containing height curves and on this basis the terrain has been attempted evaluated (Appendix M).

GPS points were taken at the sites visited and subsequently entered into a map to verify the positions of the various sites. It is an easy task to get the coordinates by the use of a hand-held GPS and the results are useful in getting a better overview of an area where previous mapping is not sufficient to determine locations. It would have been relevant to walk the borders of the proposed OPP area with a GPS, but realising how extensive the area is, time did not allow for such an expedition.

2.2 Co-operation With Our Malaysian Counterpart

Our group consisted of three Danish and six Malaysian students with whom co-operation was initiated prior to the actual field trip. The group work was in general characterised by being multidisciplinary and multicultural and as such influenced by both our different academic disciplines and experiences as well as the structural differences between the two SLUSE country programmes. As an example our two groups worked towards different objectives and had different approaches i.e. the Danish group's problem-, methodology-, and process oriented way of working, in contrast to a result and "fact" oriented focus. This difference was a common denominator throughout the fieldstudy and the source of some interesting discussions most clearly seen in the process of simplifying the household interview. Balancing the groups' focus was attempted by for instance arranging evening discussion to sum up the day's findings and plan the next day.

Initially the two groups also differed with regard to the natural scientific methodology. I.e. indicative soil sampling versus scientific soil sampling. Here the Malaysian groups' local knowledge of the soil conditions was very beneficial. A fact which made our research easier was that there was almost no language barrier between the Iban and the Malaysian students. This provided more information, gave the Danish group more time with the interpreter and initiated much social contact.

In retrospect, an underlying simple cause of divergence between our two groups lies in the different group compositions. Compared to the three of us, our counterpart's group was more heterogeneous, explained by the number of participants (six Malaysians) as

well as their internal group structure. Being with the Malaysian students has all in all enabled us to gather more information than would otherwise have been possible, as well as made us realise the importance of having a common goal and open communication.

2.3 Reliability And Validity Of Our Methods[2]

In order to qualify ones research the goal is to produce objective information. This is more often an ideal than actually possible. Never the less all research must be as reliable and valid as possible.

Reliability is the degree to which the finding is independent of accidental circumstances of the research, and validity is the degree to which the finding is interpreted in a scientifically correct way. (Kirk and Miller 1986: 20, quoted in Mikkelsen 1995: 208).

These two points have been emphasised during the whole process and we have strived to be critical in obtaining the information and describing the methods and process. There are, however, certain circumstances which have made our research less reliable and valid.

Firstly, the experience of doing fieldwork was new to all three of us and the great amount of information that was given to us was sometimes overwhelming. It was difficult on the spot to select the relevant information and to ask the "right" questions, which leaves us with a lack of information or "unclarified" information. Secondly, the interview processes etc. were often modified/ restricted by external factors. E.g. our expected respondent at LBNPHQ was "substituted" with a recently hired Customer Service Assistant, who did not have all the information asked for. The choice of respondents was often dependent on who happened to be available at the given place and time. This has for certain resulted in an over-representation of the people who stay around the longhouse the most. For instance, for the women's´ focus group and the institutional diagram it was partly the same women performing the exercises. To be correct, in order to prevent a one-sided representation of the inhabitants random sampling should have been performed but this was impossible due to the limitations in our own and the respondents´ time-schedules.

Methodological triangulation, involving cross- checking obtained information by use of a multitude of methods, was used to qualify our research. The use of interviews and RRA-methods proved productive and gave us a lot of information on the interaction between the NP and longhouse. The 16 household-surveys, gave us a relatively reliable

[2] For a thorough discussion on reliability and validity see Neumann 1997: 138-146.

picture of the livelihood in the longhouse, although some answers clearly were not true i.e. regarding sensitive issues such as income statements, where expenses were made to be much larger than income, use of pesticides and hunting practices. In these latter cases the respondent would often provide details of the issue but conclude by dismissing any use. Concluding misleading information was given in these circumstances is further based on direct observation and resonance in the attempt to improve the reliability. E.g. a respondent who stated he did not hunt was in possession of a gun and had antlers of a local deer. Further one woman told us she was 31 years old and her oldest son 27 years. These few examples serve to show that the data and our conclusions should be treated with care and one should be careful not to draw general conclusions from the collected data.

A fact which has benefited the validity of the findings lies in our multiple academic disciplines and traditions, which has facilitated a more diverse database and also broadened our vision in analysing the data.

Generally the use of an interpreter can make the information gained less reliable due to misunderstandings in the translation process and cross-checking information is therefore highly important. Contrary to this, having a good interpreter is invaluable and can also generate additional information and “open doors”. The information we gained through our methods all relied on the use of an interpreter who herself was an Iban graduate student at the University of Malaysia, Sarawak (UNIMAS) and a former SLUSE-Student. We consider the information obtained as very reliable as we could not have wished for an better interpreter and benefitted not only academically but also with regard to social conduct and behaviur in the longhouse.

3. Livelihood Of Rumah Jungang

Knowledge about the local livelihood[3] is essential for the understanding of the present situation. Thus, in this chapter we will present and discuss our findings on demography, cash income, subsistence and future requested services.

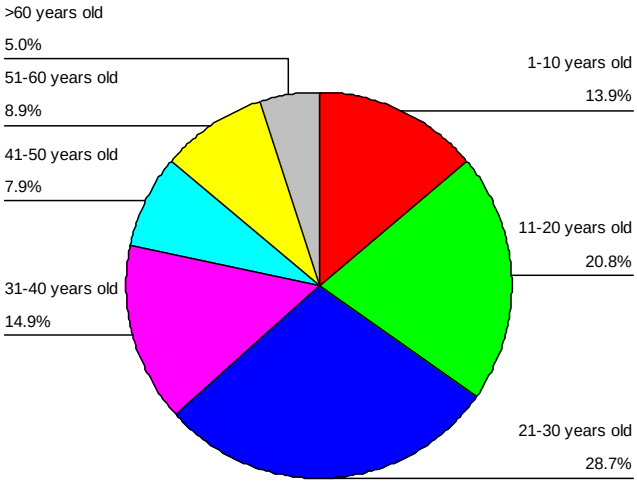

Diagram 3.1: Rh. Jungang sorted by age

3.1 Demography

Rh. Jungang is comprised of 17 families (bileks[4]), in total 101 individuals (48 women and 53 men). Diagram 3.1 presents a picture of the longhouse demopgraphy. It must be noted that a large part of the young people accounted for here have migrated (see below).

3.1.1 Migration

In the age-group 11-20 years 60% (14/23) have migrated. The migration is even greater in the next catagory with 82% (23/28), of the 21-30 years old not living in the longhouse. The total out-migration of the inhabitants accounted for as still being household members is 52%. If

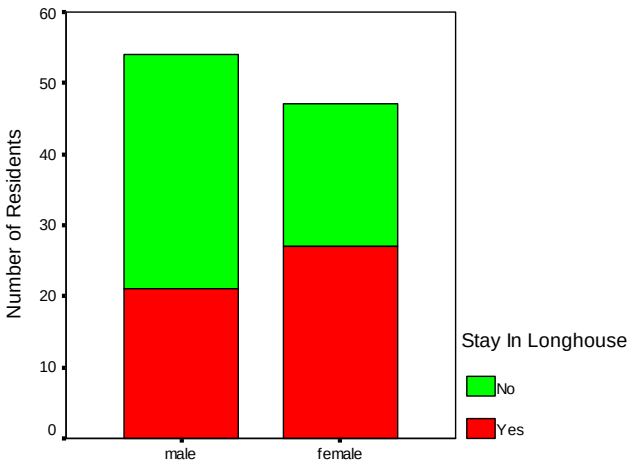

Diagram 3.2: Migrationpattern for Rh. Jungang

[3] We define a sustainable livelihood as Chambers and Conway (1992) in Scoones (1999): "A livelihood comprises the capabilities, assets (including both material and social ressources) and activities required for means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural ressource base".

[4] The Iban community dwell in a longhouse made up of bileks (closed privat compartments) and the ruai (public space), a large common corridor running through the whole longhouse.

this pattern continues, which according to young people´s focus group it probably will, pose an immediate threat to the existence of the longhouse within a generation or two. In line with Soda (2001), only the youngest and the older generation will then persist. (Soda 2001: 10). In figure 3.2[5]. One can see that a greater part of the men migrate compared to the women. Most of the men migrate looking for work, typically in construction, logging and oilpalm, while many of the migrated women have married outside the longhouse or sought jobs in shops or factories (men´s and women´s focusgroup, Soda 2001: 99ff). In order not to loose contact with these relatives the community has imposed a fine if the relatives do not return once a month.

The migration pattern also creates problems of landownership. E.g. in household number five the whole household had migrated and only revisited the longhouse a few times a year. They still claimed they possesed land but, according to Soda (2001), land-rights are transferred if an Iban family migrates permanently.

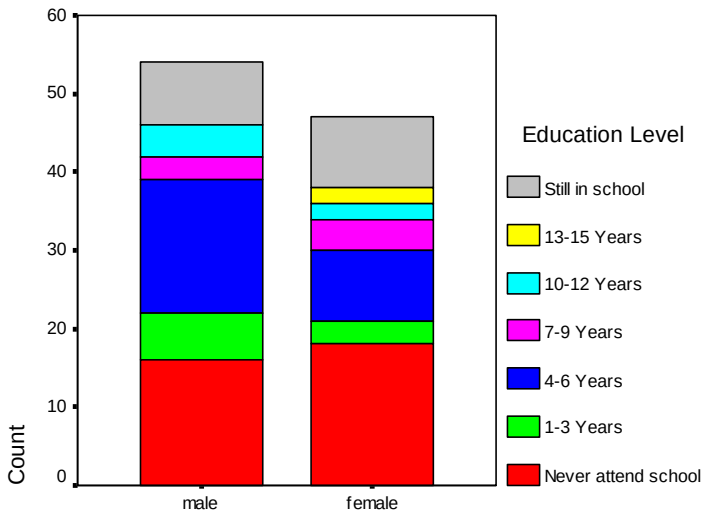

Diagram 3.3: Education level for Rh. Jungang

3.1.2 Education

One thing which is provided for the community today is education anf the community uses the local boarding-school to a great extent. According to our household-survey only two men under the age of 20 have never attented school and most community members under the age of 30 have 4-6 years of education. 11 out of the 51 people in the agegroup 11-31 years have 7-15 years of school and 14 of the children are counted as still in school. From figure 3.3 one can see that many both men and women, especially from the older generation, have never attented school. Of the people who were 41+ years only 17% (4/23) have attented school. Our findings indicate that the educationlevel is rising. This we see as an important factor for the migration-pattern since the better educated youth will be looking for more advanced job oppotunities in the cities. (Soda 2001: 100). If these more advanced jobs are avaliable is, however, more uncertain.

[5] The young children attenting the closeby boardingschool we have not counted as migrated.

According to key-informant interviews and the mens´ focusgroup the women could do more for the education and general stimulation of the children. Many of the women, considering themselves housewifes, did not take very much part in their childrens´ lives. One informant stated as one of the three biggest problems for Rh. Jungang "*lack of stimulation from the women staying around the longhouse which results in children being bored"*. According to Soda (2001) this is a common problem for longhouses in this demographic situation, women stating they are "happy to get away from the tedious longhouse and gossip". This we find to fit well with the description of the situation for the remaining women in Rh. Jungang.

3.1.3 Public Services

No electricity is so far provided, so the only source of electricity in Rh. Jungang is generators. Each familiy has their own generator. Every household has its own toilet with a septi-tank leading underground in order to avoid pollution of the river water. Part of the water supply comes from the collection of rainwater (one rain water tank/ household) (HH) which is usually sufficient for drinking and cooking all year round. In the dry period (June to September) all washing and bathing has to be done in theriver (Womens focusgroup). An interesting observation from the institutional mapping session was the information it revealed regarding institutions and services, which the informants would like to have in the area, but which were lacking at present. It was not the purpose of the exercise to give us this information but it was the most useful information we gained for the institutional diagram. These services were: Telephone service, pipe water, fishpond, electricity, road to Lapok, spandex roof on longhouse, waterpump, more watertanks, closer secondary school -the present school is in Lapok.

3.1.4 Water Impact

One major problem with the use of water is that, according to the water-samples, the coliform bacteria count is 800 (CFU/100 ml) at the Rh. Jungang Jetty, 510 of those being faecal coliform. 800 total coliform is suitable for washing and bathing but 510 faecal coliform is not, if the usage is as decribed. The river-water is not suitable for drinking, the limits for drinking water being 100. (Water Quality Standards for Malaysia, appendix I). One reason for the high faecal coliform count could be the fact that the septi-tanks tend to get flooded by river-water during periods of high water-levels, such as the one experienced during the study period, something which could also be noted by the smell. Sewage leakage is also supported by the high NH_3-nitrogen levels compared to the reference-spot, ammonia being indicative of recent sewage pollution (Radojevic & Bashkin, 1999). This level of NH_3 makes the water unsuitable

for drinking (Water Quality Standards for Malaysia, appendix I). The situation with Phosphorus-eutrophication seems to be the other way around, the reference spot upriver containing somewhat higher levels, but not serious pollution (Radojevic & Bashkin, 1999), which is strange considering all the laundry being washed by the jetty.

Parameter	Unit	S1 (Upstream of Sg. Ajoi)	S3 (Jetty, Rh. Jungang)
Temperature	°C	25,13	25,18
Dissolved Oxygen (DO)	%	10,5	61,38
Dissolved Oxygen (DO)	mg/l	0,68	4,91
Total Dissolved Solids, TDS	mg/l	0,025	0,012
Turbidity	NTU	0	627,4
pH		6,32	6,39
COD	mg/l	14	14
Nitrogen, Nitrate	mg/l	0,01	0,01
ammoniacal-nitrogen	mg/l	2,02	0,613
Phosphorous	mg/l	0,1239	0,0446
Faecal coliform	CFU/100ml	440	510
Total Coliform	CFU/100ml	120	800
Depth	M	0,2	1,432

Diagram 3.1.4 : Water sample results

The high levels of total dissolved solids (TDS) are attributable to siltation from the logging activities further up river, which has a serious effect on aquatic life. The older inhabitants have been witnessing the shift towards extremely low water visibility since logging started in the seventies. The results for Dissolved Oxygen is a measure of the adequacy of the water for containing oxygen-demanding life. DO can be low due to pollution with organic material (Radojevic & Bashkin, 1999). The results seem unreliable since the reference-area chosen would be depleted of life at such a low DO. Considering it is after all the same river, the difference in values does not seem valid, 4,91 mg/l already being at the very low end for the water to support fish (Radojevic & Bashkin, 1999). It must be noted that water-sampling was performed at a time of high water levels and strong current, meaning dilution is fast. Samples at other times may show different results.

3.2 Subsistence Economy

From the questionnaire it can be seen that all of the villagers gather wild vegetables for own consumption, close to everybody have fruit-trees and rear livestock, most of them grow their own vegetables while 7 of 17 grow some wet rice for own consumption. In accordance with Soda (2001) we found that there has been a shift away from hill rice toward wet-rice. Despite this decline we experinced that both hill- and wet-rice were considered the most important crops in the cropmatrix. and only wild vegetables outscored the rice.

The level of subsistence, based on the amounts spent on food every month (average of 210 RM/HH/month) seems not to be very high, but it still is significant to some extent, since all the villagers are practising some wild-food gathering and growing of cultivated crops.

According to the trend analysis (appendix N,Q), the amount of fish consumed has decreased significantly since 1970 when logging started to increase. Production of domesticated meat (pigs, chickens and ducks) was steady until around 1970 where it started to decrease because of lack of appropriate grounds for keeping them free-grazing. Consequently, they started to keep them in cages in the house-unit instead. The lack of appropriate space for animals is interesting also in a land-perspective.

The rice-production and thus the consumption of own rice has decreased steadily from 1965 to its present level, reached around 1990. In the same period the average age of the farmers has gone up. Today mainly the old people do the farming. This trend has been experienced in the Soda study also (Soda 2001: 104-105). Concurrently, the purchase of industrial products has gone up and rose steeply towards the year 2000. It still seems, looking at the trend-lines that are drawn into the same figure to operate in relativity, that the purchase of goods has not been able to keep up with the amounts originally produced/gathered in the village, which could be interpreted that there has been a considerable decrease in availability of food. Especially it is the protein sources that have been lost. The fact that meat is very expensive to buy, combined with the fact that fish and meat sources have disappeared, means that the diet of the people of Rh. Jungang is very likely to have become much poorer in protein. The women also claimed that they try to substitute the missing meat with vegetables. The meat has not been substituted with wild meat since only of few of our informants claimed to hunt. However, at several occasions our informants were nevertheless capable of describing the taste of e.g. fruit-bats, barking-deer and wild boar.

3.3 Money Income Activities

Household-survey showed that the largest occupation was that of housewife. Of the money income- generating jobs the men occuppied by far the most. Here construction and farming were the most common, followed by logging. The large group called “other” covers a wide range of jobs in the cities, like waitress or office clerks, for both men and women.

3.3.1 Income

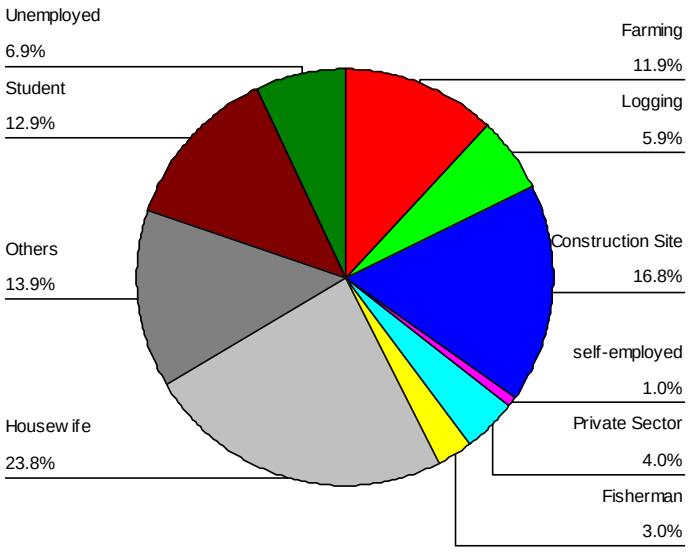

Diagram 3.5: Occupation for Rh Jungang

The most striking feature when going through the questionnaire-stated income sources of each household is the very high dependence upon remittance from family-members outside the longhouse, which is in accordance with the findings of Soda (2001: 103). When adding all money income for the longhouse per year we reach 82.850RM. Divided per HH this is just below the official poverty limit. This amount should, however, not be accepted as being the true income of the longhouse, but rather as a rough estimate. Out of this amount 86,18 % (71.400RM) comes from remittances. A very high amount. The remittance is, however, very unevenly distributed between each household (50RM to 1000RM a month). (Household-survey*).*

Cash-crops and livestock are a minuscule part of the economy. Only 12% (2/16) earn some cash on fruits/vegetables/rice. This is a deviating feature from the neighbouring longhouses where an average of 87% cultivate paddy, 32% as a cash-crop, while 59% sell fruits (UNDP 2003). The small shop, earning about 3000 RM/year and the transport business are the only businesses within the longhouse. Each activity is run by one family, making this income unevenly distributed. The conclusion is that the people of Rh. Jungang are totally and utterly dependent on their family-members elsewhere.

To understand the extremely high degree of income from the men working outside the village it is important to mention that this situation is partly due to a common longhouse strategy in order to earn enough to build the new longhouse. So, partly it can be ascribed to the lack of jobs within the village and partly to a conscious plan to maximise income during the building phase. But looking at the migration pattern one has the impression of a longhouse slowly but surely being depopulated.

3.4 Concluding Remarks

It will not be totally off to describe the longhouse as a place for youth who cannot find jobs and thus reluctantly engage in agriculture and for the aged who have given up working outside the longhouse. The longhouse serves as insurance to the people living away from the longhouse, since they can always return if their luck in finding jobs in the cities or elsewhere fails. Further, the longhouse is cheap since rent is free.

4. Interaction Between Rumah Jungang And The LBNP

An important scope of this study has been to evaluate the impact on the community of the gazettement of LBNP in 1991 and also to try to understand the possible impact the villagers have on the protected area.

The gazettement has meant that the people who had hitherto farmed the land or to an extent depended on its timber and wild plants since they came to the area now have been legally restricted in their land use. The regulation was enforced without any compensation, since Rh. Jungang did not have legal claims to the land in question. It is, however, clear from our findings that most people in Rh. Jungang still use their fields within the NP (questionnaire, direct observation) although only the Berawan of Kajan Sigeh have the rights to use their NCL and to fish in NP waters.

4.1 Use Of The Loagan Bunut National Park

In order to research the issue it is essential to understand their situation pre- and post-NP gazettement.

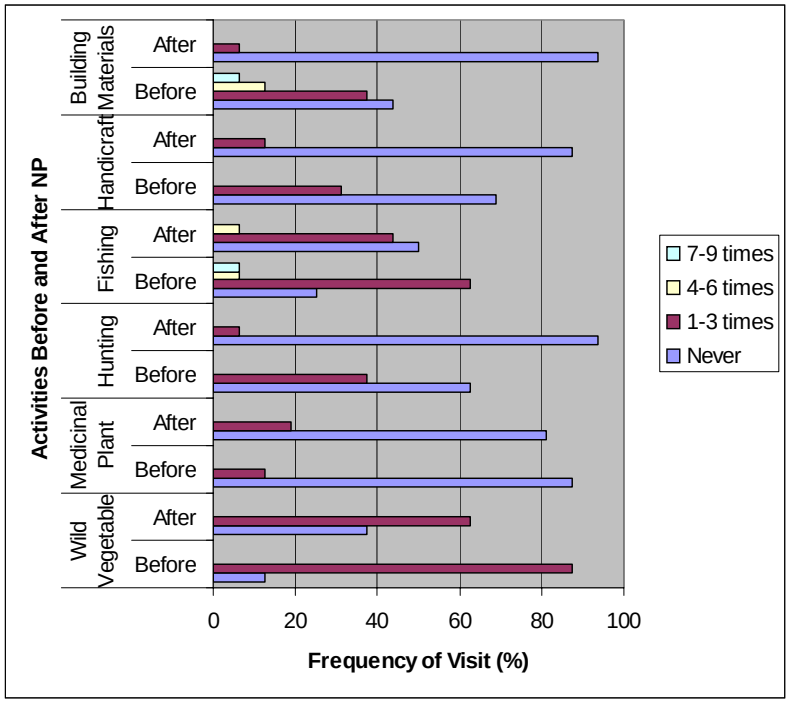

Diagram 4.1: Use of the Loagan Bunut National Park by Rh. Jungang

The Berawans, Ibans and Penans in the area traditionally have a mutual understanding to hunt and farm within each other´s tribal boundaries by acquiring permission from the tribe leader. This mutual understanding still exists today (UNDP 2003: 49, mens focusgroup). The co-existence of official -and native land-rights over the same area is the cause of much confusion. E.g. when asked whether they know how to apply for a special allowance to extract resources from the NP everyone suggest that NP authorities should be addressed directly or through the headman. However, when asked if they have ever actually applied, the answer is generally that they have the right to extract from their own plot, so there is no need to.

Examining the level of use of the NP for different purposes pre- and post NP gazettement, the answers to the questionnaire showed an overall decline in use for all but one purposes, but only a complete stop for hunting and logging. (see diagram 4.1)

Our research showed that with regard to their present dependence on the NP resources gathering of wild vegetables is the most important activity. Vegetables are an important part of their diet (food trend line) and considering the number of visits for picking them, 65 per month, LBNP is a good source. To assess the actual impact from picking, and not only dependence, upon this resource it was asked whether there were some plants inside the NP, which could not be found outside it. The predominant answer was no, which leads to the conclusion that impact from picking is probably not detrimental to the stock. It also leads to the conclusion that the NP is primarily restricting the community in that they have to go further in order to find wild vegetables- that is, if the ban was obeyed. 44% (7/16) claim they would have cleared more land inside the NP had it not been gazetted. Proximity was also the main criteria when asked to describe the optimal plot during men's focus group. Even though the swampy and flood-prone characteristics (questionnaire) of the NP area make these statements unrealistic, the importance of proximity based on a decrease and shift in work force (kids in school, young people working outside the longhouse, mainly elderly people doing agricultural work) should be noted and the restriction felt could thus be valid.

Soil samples (appendix K) confirmed that the riverine alluvial soils are generally saturated with water because of the flooding and characterised by being uniformly clayey (about 30%), with reduced conditions (grey spots, relatively high pH) and generally few roots, indicating the difficult conditions for plant growth, even for wet rice when the soil is like this all year round. Such conditions are said to be prevalent for soils in the NP. The guide informed that the most exposed plots are only cropped with a certain interval, based on the experience that floodings occur at those intervals.

Before 1990 the monthly number of logging-visits by the Jungang community was approx. 65 per month and after 1990 it is claimed to be zero. Since illegal logging is a sensitive issue it was mainly direct observation which indicated a low reliability in these answers. The facts are that firstly, the timber-trees that are valuable either for personal use or as a considerable source of cash-income, are more abundant inside the NP and this is where they have traditionally extracted the resource, e.g. to build the former longhouse. Secondly, out of the 16 households in Jungang, 15 possess logging equipment, something which at least confirms the potential existence of illegal logging. Thirdly, a clear statement was given when visiting a small household near the Jungang longhouse who consider themselves part of Rh. Jungang. Here the man bluntly admitted

that he frequently logs in the NP and showed his sizeable chainsaw. Accordingly, UNDP (2003: 36) claims that small-scale illegal logging still continues by the Tinjar in the vicinity of residential areas.

The extent of fishing in LBNP has strongly decreased, but it has not phased out. As an off-the-record information we were told that they used to catch fish of the wallago species at grounds that were identified as spawning grounds. The catch used to be 40-50 /day, but has dwindled to about 3-4/day last year.

4.2 Ecological Impact

Diagram 4.2 shows the ecological vegetation (forest) zones of LBNP. To strictly assess the level of Rh. Jungangs impact on the natural resources within the NP and its surroundings it would have been necessary to perform measurements on the ecological elements affected. This was outside the scope of the study. The most significant threat from the agricultural practices is probably the slash-and-burn technique, which poses a fire-hazard to the PSF (Hon & Gumal, 2003, Key-informant: B).

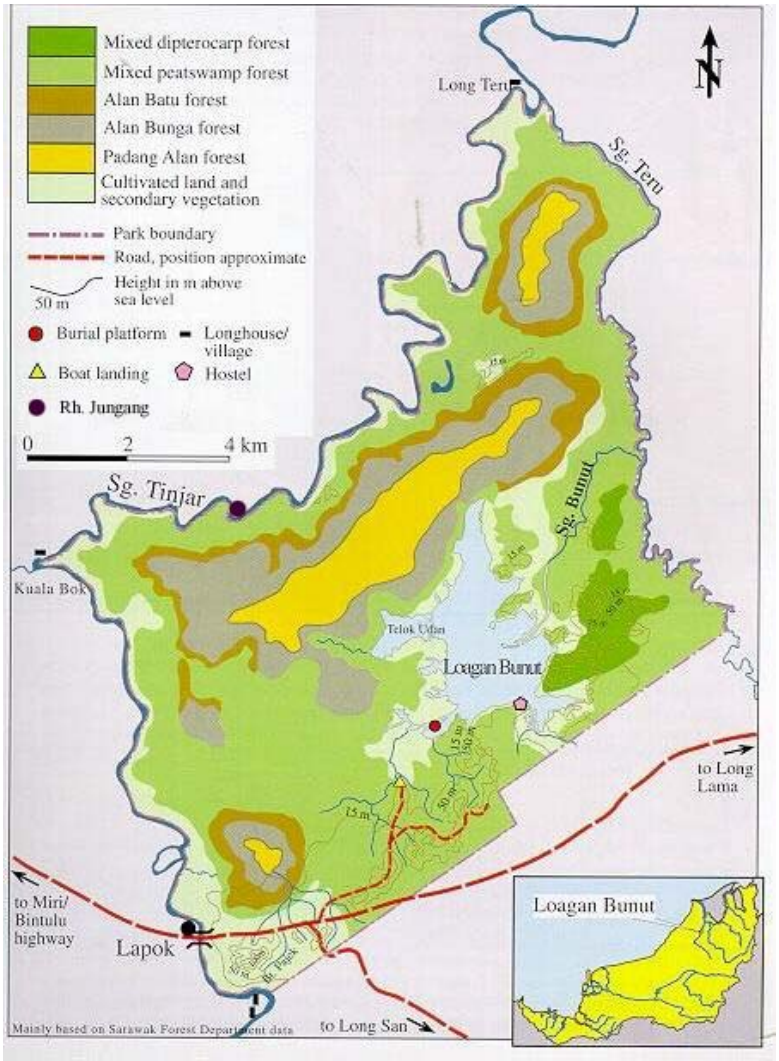

Diagram 4.2: Map of Loagan Bunut National Park
Source: UNDP 2003 with addaption

The practice of fishing in NP waters has declined, although it is hard to obtain data on the true catch due the obvious low reliability of the stated numbers. Adding up the catches of the various villages around the NP who are fishing illegally the problem could be significant (Hon & Gumal, 2003). As mentioned, the extent of logging is difficult to assess but, as for the fishing, it is likely to be significant if adding up the logging activities of all the communities.

4.3 Perceptions Of The NP

The inhabitants' perception of the NP can be anticipated to be "coloured" by our presence in that they as a consequence of their livelihood practices may have had an interest in disclosing information and emphasising the NP as a restriction. A statement like *"we need our land, not another National Park"* was for instance encountered. However, keeping in mind that NP-rules are not strictly obeyed, most of them could see the purpose of the NP (young focus group and womens focus group). For example, the women's focus group expressed that they initially were very concerned about restrictions from the gazettement but that they have realised it is still possible for them to use the NP to a wide extent (vegetables, fishing, sea-snails, etc.) and that the NP has a good purpose in terms of habitat for animals.

The applied "laissez-faire" attitude of the LBNP management towards the continued use by the Ibans is evident, e.g., only one case of illegal logging encountered since the gazettement despite specific official rules and penalties decided upon in the case of violation, rare patrolling also sending a signal that rules are not so strictly enforced (Key informant H). The continued use can be explained by several factors, one of them being that the NP authorities are not very strict in the enforcement of the rules because they recognise the injustice of granting rights only to one single community out of the eight communities who traditionally used the land. A different explanation could be that the resource-use within the NP is to some degree considered "self-regulatory" since it is the community of Kajan Sigeh that lends the rights and who will also act upon any violations of these rights (i.e. if the other communities extend the use of the NP beyond the agreed upon).

When asked directly about special agreements to let Rh. Jungang community use their traditional land the NP-representative said he could not answer, which also indicates the difficult position they are in.

4.4 Involvement In Management Of The NP

In assessing the mutual impact from the two actors (Rh. Jungang and the NP) it is also essential to identify any positive effects to get the full picture. According to Key-informant H a board has been established, which includes local tribe-people. This is essentially a very good initiative, which unfortunately only includes the Berawans who already have all the advantages of monopoly on the area (Key informant D and UNDP). Efforts to involve other neighbouring longhouses have been close to zero. Under the Ministry of Tourism (MOT) efforts to educate NP-guides, boatmen and arranging homestay programmes have been considered, but again priority was given to the

Berawans from the old and the new Kajan Sigeh villages. According to our research the only attempt to engage all the communities around the NP has been a handicrafts course, initiated by the MOT. The actual impact has, however, been limited due to the approach chosen of selecting representatives from the villages based on inappropriate criteria, which did not result in the transfer of the handicraft-skills to the other community members. In Rh. Jungang it is consequently considered a failure (Key-informant C). In order to win the support of local communities toward an NP it is vital to give the local residents an economic incentive such as tourism, otherwise the local communities can be caught in a squeeze between development and conservation. Both of which limit their access to land (Colchester and Erni 1998: 300-302).

During the young 's focus group hope was expressed to be able to work in the NP. As a positive consequence of the establishment, the NP provides scope for further development in the area, something which is much desired. This is also based on the fact that 87,5% (14/16) of the households in Rh. Jungang have high expectations for tourism in the LBNP, while 75% (12/16) of the households were positive towards further development of tourism, a trend also found by the UNDP. (UNDP 2003: 55). It is a fact that more and more tourists visit Sarawak each year (Wildlife Conservation Society and Sarawak Forest Department 1996: 50ff,). According to the same source, Loagan Bunut NP has the second highest density of primates among 12 selected locations (TPA's and Non-TPA's) and out of 8 locations Loagan Bunut shared second place in most sitings of Hornbills. (1996: 76-77). If this still is true the LBNP holds great potential as a tourist attraction.

There is a very good chance that tourism will bring money and jobs to the area. One income generating activity in regard to tourism is the weaving and woodcarving for which the community has already received training from UNDP. We, however, have our doubts whether tourism development will in fact benefit the people in Rh. Jungang very much. There are plans to make an educational ethno-botanical trail in the NP , but actual plans that include homestay with the longhouse and trails that could lead across the NP to the longhouse are not yet considered (Key-informant H).

Looking at Niah NP one longhouse situated on the way to the Niah Cave has had a homestayprogram for some years. Almost no tourists have come. This was due to two reasons, 1.) the tourists did not know that the longhouse had a homestayprogram and 2.) the NPHQ in Niah did not give information about the activity to the tourists visiting, because they were eager to keep guests at the NPHQ to boost the number of people using the NPHQ facility. This scenario could become true in LBNP as well since tourist numbers are still very small. Last year (2003) the LBNP was visited by 135 foreign

tourists and 3.227 domestic tourist, totalling 3.362 visitors, less than one percent of all tourists in Sarawak.

Further, there is a lack of activities in the area. The NP only has two trails, one of 260m and one of 720 m. As one of our informants stated, the biggest problem in regard to tourism at the moment was lack of access to the NP via roads. The present road is in poor condition. All of these problems have been encountered by Butler and Boyd (2000) who, when analysing the tourism of the Annapurna-area in Nepal, finds that four things have to be fulfilled in order to attract tourists. They are 1.) Access, 2.) Accommodation, 3.) Attractions and 4.) Activities. In LBNP the access is poor, the accommodation is of low standard, the attractions such as the lake, the forest and the wildlife is present but the activities such as trails and boatservices are of limited standard. We would like to add a fifth requirement and that is Awareness/PR. If the tourists are not made aware of the NP and of the possibility of staying in the longhouses they will at best come and stay at the LBNPHQ, not benefiting the longhouse as such.

5. Future Income Generating Activities

The traditional livelihood strategies of Rh. Jungang are undergoing a multitude of modifications. In this chapter we focus on two possible livelihood strategies for the future and to what extent they are evaluated as feasible. Both activities are not in connection with the NP.

When first trying to pinpoint our overall objectives, a preliminary survey was conducted based on the optimal ignorance approach. The aim was to identify which alternative income generating activities are viewed as relevant by community-members. The results indicated that an Oil Palm Project (OPP) is of greatest interest, followed by wet rice farming and growing vegetables. However, when asked which activity would be most beneficial to the community as a whole two of the four participants said aquaculture.

5.1 Fish Pond

Having a fish pond was an integrated part of their previous livelihood strategy and attempts had already been made to establish one at their present location by cutting away vegetation in a wet area located relatively far away from the longhouse. The idea was to make it a community responsibility meaning one household would be in charge on a daily rotation basis (mens focus-group).

The feasibility of the fish pond project as an alternative income generating activity is possible and would likewise have a considerable subsistence impact. The fish will also contribute to the present lacking protein source and maybe even help to halt fishing in the Tinjar River. The water inflow conditions are relatively sound for the purpose despite the dissolved oxygen content of 0,78mg/L compared to the recommended minimum of 5 mg/L for a warm water aquatic system (Radojevic & Bashkin 1999). This divergence btw our readings and the overall positive assessment of the project feasibility is ascribed to inaccurate readings. The pH value (6,24) was in the range between unpolluted surface waters (6,5-8,5) and swamp waters (5,5-6,0) (Radojevic & Bashkin 1999). The pH is further sufficiently high to allow existence of

Parameter	Unit	S2 (Pond Water)
Temperature	°C	25,42
Dissolved Oxygen (DO)	mg/l	0,78
Conductivity	µs/cm	0,027
Salinity	ppt	0
Total Dissolved Solid, TDS	mg/l	0,017
Turbidity	NTU	0
pH		6,24
COD	mg/l	21
Nitrogen, Nitrate	mg/l	0,1
ammoniacal-nitrogen	mg/l	1,27
Phosphorous	mg/l	0,1082

Diagram 5.1: Water quality at the fish pond

snails and crustaceans, - species considered relatively sensitive in an aquatic system (Radojevic & bashkin, 1999). In any case it is expected that the project will be aided by the Department of Agriculture (DOA) (Key-informant A).

5.2 Oil-Palm Plantation

The prospect of an OPP as an alternative income generating activity plays an important part in Rh. Jungang. This should be in corporation with the other three longhouses previously part of Long Ajoi. The OPP is to be situated on the jointly owned land. Decisions about such shared land requires, according to the Adat, that all communities involved agree. (Key-informants A, E, F and G; Horowitz 1998).

The key-informant interviews revealed that a land committee between the four villages initially showed an interest in an OPP proposal. Different versions of what followed were, however, given by the different communities. In Rh. Ramba the reason for the villagers not agreeing is either that they are afraid the land will be sold off or simply that it is too soon. In Rh. Linggi the refusal was due to the presently running concession in their part of the area. Rh. Linggi also stated the importance of observing a neighbouring OPP prior to an establishment. It was pointed out that a delegation from the Sarawak Land Custody and Development Authority (LCDA) have in fact paid a visit in order to conduct a survey in 2003.

5.2.1 Environmental Feasibility Of The OPP

To assess the feasibility of the OPP a visit was paid to the south-eastern part of the proposed area. The aim was to get an impression of the area in terms of location (GPS points), terrain, soil and surroundings. The findings obtained could have been more thorough but in practice it is complicated to get the overview of an area this size. The size has been estimated based on a contour map (Appendix M) and the borders drawn by the 4 headmen, not on GPS points. It is approximately 40 km2 (4000 ha). (see diagram 5.2)

The terrain at the south-eastern border of the area had some very steep slopes many of which we estimated to exceed those upper limits of slope recommended by the Sarawak EIA Guidelines, which is 33° (NREB). Magnifying the map, contour lines showed that especially the south-eastern part right north of the old Long Ajoi is highly undulating, slopes of 40-50º being prevalent. The large central part of the outlined area is more moderately sloping, ranging roughly from 5-20º of slope.

Regarding the soil suitability for an OPP, the field visit, despite taking only two soil samples, showed quite effectively the great variation of the soil (appendix K). One sample was classified a sandy Entisol with no development of horizons, the other sample being an extremely clayey Ultisol. The two samples can not tell us anything about which is the predominant soil-type, but it gives a clear indication that variation is great, most likely to be related to the very undulating terrain. It would have been interesting to see samples of the flatter, central part of the area. If the extent of sandy Entisols is great, then oil palms will be rather unproductive unless supplied with considerable amounts of fertiliser. In terms of terrain, the south-eastern part of the proposed area is not suitable for oil palms and the resulting erosion is likely to affect the Tinjar river which is running close by (WWF, 2000).

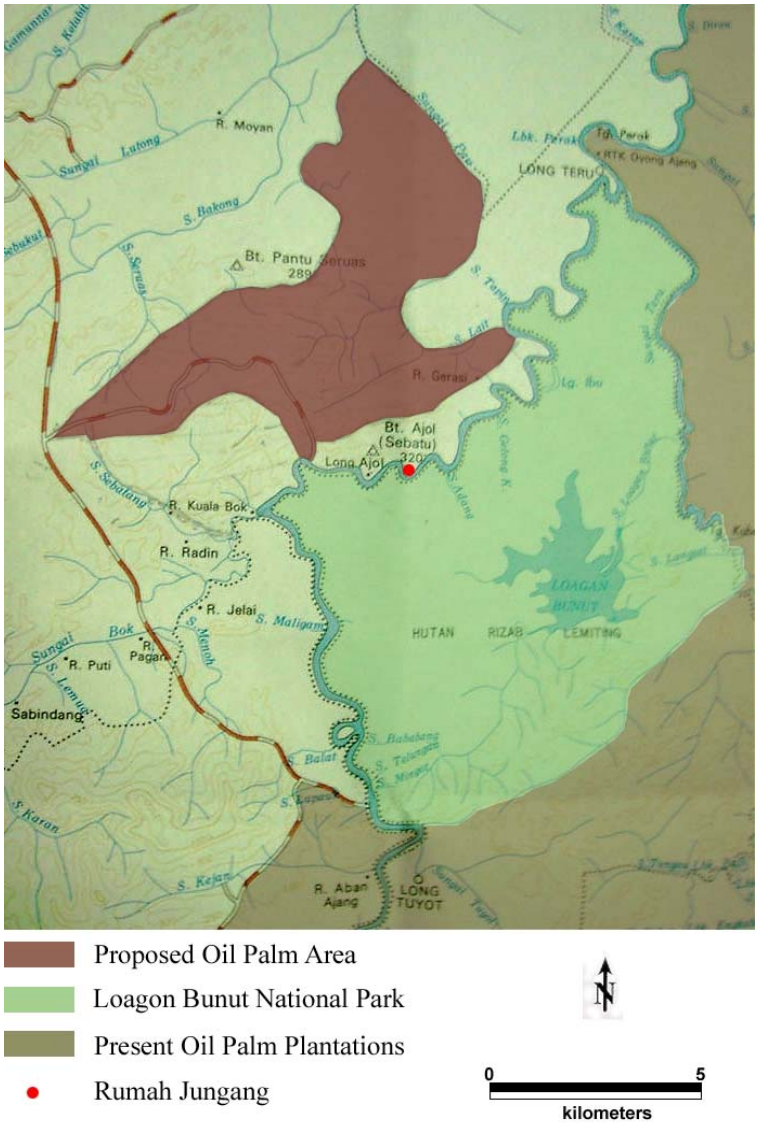

Diagram 5.2: Map of LBNP, present oil palm plantations and proposed oil palm area

One important realisation made during the trip was that EIAs are not what they appear to be on paper. According to supervisors (Dr. Gabe, Dr. Jopen (UNIMAS) and Ib Larsen (NREB)), no matter unsuitability according to environmental guidelines, an oil palm project would be approved if there are profits to be made. This is partly due to the fact that the companies who have specialised in carrying out the EIAs are hired directly by the oil-palm companies, meaning that they are hardly objective in their work (Memon).

5.2.2 Financial Feasibility

The possibilities considered for financing the oil palm scheme consist in three options:

1.) A joint venture company (JVC) where LCDA acts as an intermediary between private corporations and farmers with land titles. These are handed over for a period of 60 years to the LCDA, in exchange for 30 % shares of the joint venture. The Sarawak Land code (SLC) does, however, not guarantee the returning of the land titles (Ngidang 2003) and the farmer/ land-owner is also not given any representation in the board of directors of the company.
2.) Own investment.
3.) Government support, DOA grants subsidies in the form of seedlings, fertiliser and pesticides. It is also possible to get a one-off grant of 800 ringgit ($210) per hectare to build roads and other infrastructure for smallholder oil palm projects (Atimes 1999).

The JVC option is clearly the most affordable since it does not need any initial capital. However, it requires established NCL rights since companies will not invest in land that is not legally acknowledged, i.e it is an insecure investment, and neither will the LCDA mediate such land (R. Malone, pers. comm.). Our research shows that the villagers of Rh. Jungang predominantly suggest that the investment should be a JVC with only a few suggesting the scheme should be subsidised only by the government. Government subsidies could be realistic, although it is still unclear whether establishment on unlawful land would get subsidies. Government support still requires that some initial capital is available. Investing independently is the only option in case the other two options are excluded due to lack of land rights. The option of investing independently could be viable, but for the entire area to get established (clearing, terracing, buying input, planting, creating suitable roads) would require more savings than seems to be available in any of the longhouses.

A feature that could influence on the rights to the land, is that presently it is only farmed to a small extent because of its remoteness and size. Some of it is under a logging-concession which is about to run out. One of our key-informants stated that the land had not been surveyed, indicating that they have no formal rights to it (Key-informant G). When asked, all confirm that only the Sungai Pau area (comprising 1/5) is held under an old title (obtained 1932), but still all four headmen emphasise that they still consider the whole area as belonging to the four longhouses. No year can be given for the clearing of the rest of the land, but it is in general considered to be before 1958. However, if they cannot prove this, their rights will not be legally accepted.

5.2.3 Motivation For The OPP

Since there are not many other options for the longhouse communities to crop an area this size with their traditional small-scale cropping, an OPP would be a relevant extensive land-use solution. Actively using the area plays an important part in the legal claims to land. The communities´ motives of trying to obtain land-rights this way is supported by UNDP (2003).

The interviews with the 4 headmen showed that the benefits in their view will be the improved infrastructure and employment opportunity whereas some regarded it as "easy money" meaning that they would get the profits without having to work. In Rh. Jungang nearly all the respondents were interested in a job there**.** The expectations they have for plantation-work salary are generally uniform (men 20 RM/day, women 15 RM/day). Generally, OPP jobs are considered as low wage jobs, which has lead to import of foreign labour especially from Indonesia.

Another implicit reason for supporting the OPP lies in the fact that it is also considered a means to attract people presently working outside the longhouse back to the community (young focus-group, Key-informant D) and thus an important way of preserving the village.

5.2.4 OPP - A Realistic Option?

A part of the area, owned by Rh. Umping exclusively, hosts a nice waterfall where they expect to get tourists. This land-use could become conflicting with the plantation. Rh. Umping seems to have unrealistically high expectations altogether. Their refusal to participate was due to the fact that in previous negotiations they demanded 2RM per oil palm that was planted, and they were unhappy about the arrangement also because of not receiving any profits for the initial three years. Based on the key-informant interviews with the four headmen it seems complicated to come to the needed consensus between the four communities to establish an OPP, so this is the first hurdle to get across. In Rh. Jungang the people are, however, predominantly positive towards the idea, although there exist conflicting views.

Regarding the possibility of getting land authorities´ approval to join a JVC it would have been very interesting to have an interview with a land-officer. The villagers themselves seem to believe it is an option, while R. Malone (SLUSE coordinator at UNIMAS and educated in law) claims it is not possible, also due to the unwillingness of companies to invest in land where ownership is not settled. Visiting in 1999, LCDA

must have informed the local council about the options, but no details of this visit were given.

Environmentally, the project is not necessarily feasible as defined by the EIA guidelines for OPP's in Sarawak, but chances are that the plan would go through, as long as the legal framework is in order.

Finally, there are, of course, also other factors to take into consideration in order to estimate the acceptability for the project, such as species diversity and wildlife living in the secondary forest, something there was not enough time to look into. Not to forget that an oil palm plantation will also limit the capability for animals to move in and out of the park, since almost all land surrounding the NP will then be oil palm.

6. Conclusion

What are the livelihood strategies of Rh. Jungang, and how has the implementation of LBNP and the livelihood strategies of Rh. Jungang community affected each other with respect to the management of the natural resources and, finally, what expectations to alternative income generating activities do the inhabitants of Rh. Jungang community have, with emphasis on the potential of an oil palm project?

In analysing the answers reliability must be considered. How objective were the respondents? Did our stay and specific questions not pose a risk, which influenced the answers? For instance, the extent of hunting, logging and fishing in LBNP has been difficult to assess, so by triangulation we conclude that these activities have decreased but not ceased and are now executed more in secret.

The most striking feature of Rh. Jungang is its demography. The community has experienced a migration-trend. Half of the community-members now live elsewhere. The women have also started to migrate because their husbands stay away for longer periods. This leaves the longhouse half empty, filled with the elderly, children not old enough to go to boarding school and those few who have not found money income jobs elsewhere. This migration has led the longhouse to totally depend on remittance which equals almost 80 percent of the money income for the community as such. Further, the migration has caused farming to decrease. Less than 1/3 of the bileks now have rice fields.

Regarding the use of LBNP, the community still farms there but has largely stopped clearing of new land. Collection of wild vegetables has declined but is still happening every day, while the more seriously regarded offences to the park such as logging, hunting and partly fishing have greatly declined.

Ecological impact on the park could be the in the form of risk of forest fires in connection with slash-and-burn, and also the fishing in the fishes spawning waters. The modest use of the NP, however, does not appear to be a grave threat to the environment, but of course it depends on whether a completely untouched NP is the aim. Nevertheless, if the use was legalised, then over-exploitation would be quite likely to occur. This leads us to the fact that the people of Rh. Jungang, although still using the park to some extent, have been affected by the gazettement, but have learned to cope with it by, for instance, finding other sources of timber and clearing land elsewhere if they need to expand. Considering the shift away from agriculture and the heavy

migration, expansion does, however, not appear to be a significant problem to the community, also given that the soils inside LBNP are considered poor for cultivation. One counterbalance here is the proximity of fields located in the NP. The wildlife is already sparse, so hunting is mainly restricted by the lack of game.

Concerning the perception of the park, it can be anticipated that there is a more positive view on it than had the protection of the park been better enforced than is the case. Considering the levels of continued use, it is likely that if a stronger enforcement of the bans of extraction for the park is established, then it will have a more serious impact on the strategies of Rh. Jungang and the perception would, accordingly, be more negative.

The NP has so far brought only limitations to the community. Benefits could come in form of tourists, which we, however, consider unlikely for quite some time since access, accomodation, activities and ackonowledgment for tourists is limited. Regarding alternative income generating activities in order to counteract the factors that pull the community in the direction of extinction, i.e. lack of job opportunities and migration, an oil palm plantation is highest on the list. There are also high hopes for a fishpond, a project of smaller scale, which would affect the community subsistence positively.

Secured rights in the form of an old land title exist for a fifth of the proposed oil palm area, the rest, according to Iban tradition (Adat), does no longer belong to the 4 communities. The Sarawak legal system, as it is, is not likely to grant them the native customary rights (NCR) either, but it can be concluded that the OPP is suggested partly as a way to gain NCR. If the four communities do not plant it themselves, then a company may get permission to do so and the vague rights they have to the land could be disregarded entirely. This is an example of the way politics and law can lead landuse in a not always appropriate direction.

Whether the oil palm plantation is feasible is highly unlikely. There is the problem of financing the arrangement, the most realistic way being a Joint Venture with a company, mediated by the LCDA. Again, the present lack of land rights are an obstacle to finding an investor and possibly also to getting the approval from the land custody.
The physical preconditions for an OPP seem not to be appropriate for the extent of the area outlined. Slopes in the southeast part are very steep which would cause major erosion due to the total clearing of the soil necessary for establishment of oil palms. Soil samples showed great variability and it would require more thorough investigation to see if soils are suitable for the production. Finally, an OPP would mean the loss of the remaining area which today can be described as a buffer-zone between oil palm plantations and the peat swamp forests.

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List of Appendixes

Appendix A

Interview Schedule for householdsurvey

A. Respondent Profile

1. Name: _____ 2. Household No.: _____
3. Interviewee: Head / Member 4. Ethnicity: a. Iban b. Others _____
5. Religion: a. Christian b. Adat c. Bahai d. Others _____
6. Marital Status: a. Single b. Married c. Others (Specify)_____
7. Sex: a. Male b. Female 8. Age:_____
9. Communal Position:_____
10.

B. Household Profile

10. The number of years you lived in this area _____

No	I Relationship	II Gender	III Age	IV # of yrs in school	V Place of birth	VI 1st occupation	VII 2nd occupation	VIII stay in longhouse	IX If No, where?	X Participate in Agriculture
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

Instruction:

I. Household relationship
1=Husband/Wife 2=Son/Daughter 3=Parents 4= In-Law 5=Grandchildren
6= Great Grandchildren 8= Brother/Sister 9= Relatives

IV. Household members' education level, i.e. # of years in school (including respondent)
1= Never attended school 2= 1-3 years 3= 4-6 years
4= 7-9 years 5= 10-12 years 6= 13-15 years

IV. Place of birth
1= Rh. Jungang 2= Rh. Numpang 3= Rh. Linggi
4= Rh Umping 5= Rh Ramba 6= Others

VI/VII Household Primary/ Secondary Occupation
1= Farming 2= Logging 3= Construction Site 4= Self-employed
5= Government 6= Private Sector 7= Fisherman 8= Housewife 9= Others

VIII If not staying in the longhouse, where do they stay?

Appendix B

Fieldwork Calendar

24. January 2004
- Departure from Denmark to Malaysia

25. January 2004
- Arrival in Malaysia
- Sightseeing in Kuala Lumpur
- Departure from Kuala Lumpur to Sarawak, Miri
- Arrival in Miri 11.00 p.m.

26. January 2004
- Short Briefing
- Departure from Miri to Lapok, Rh. Jungang
- Arrival at Rh. Jungang
- Welcome ceremony (All)
- Supervision meeting with Robert (All)
- Discussion on Methods (All)
- Preliminary Rapid Appraisal Questions Discussions (All)
- Conducted Preliminary Rapid Appraisal hh# 3, 10, 13, 14, 16 (All)

27. January 2004
- Discussion of Objective and Working Questions (All)
- Discussion and adjustment of questionnaire (All)
- Testing of questionnaire (Mette, Christina, Nicholas, Jasmine, Ms. Lai)
- Discussion and adjustment of questionnaire (Mette, Christina, Nicholas, Jasmine)
- Prepare presentation (All)
- Evening Group Discussion (All)

28. January 2004
- Prepare presentation (All)
- Presentation for the supervisors (All)
- Group discussion after presentation (All)
- Discussion of questionnaire (All)
- Interview guidelines for the 4 longhouses (Mette, Anne-Katherine, Christina, Jasmine)
- Participatory Mapping (All)

29. January 2004
- Key interview in Rh. Ramba and Rh. Umping (Mette, Nicholas, Christina)
- Field trip up Tinjar river (right side of long house (Karen, Anne-Katherine, Isaacs, Ms. Lai, Mr.Lai)

- Soil Analysis (Isaacs, Ms. Lai, Mr. Lai, Karen)
- Key interview in Rh. Linggi (Anne-Katherine, Isaacs, Mr. Lai)
- Discussion of Nat. Science methods and field trips (Karen, Anne-Katherine, Mr. Lai, Isaacs)
- Discussion of Social Science Methods (Mette, Christina, Jasmine)
- Participatory Mapping (All)
- Typing information (Nicholas, Jasmine)

30. January 2004
- Discussion and prepare questionnaire (Mette, Karen, Christina, Nicholas)
- Typing in Questionnaire (Jasmine)
- Field trip to paddyfield up Tinjar river (Anne-Katherine, Isaacs, Mr. Lai)
- Interview guidelines to focus group (Karen, Mette)
- Field trip to Oil Palm Area and soil samples (Anne-Katherine, Karen, Mette, Mr. Lai)
- Supervision from Tina (Karen, Mette, Anne-Katherine)
- Testing of Questionnaire hh# 7 (Mette, Karen, Nicholas, Christina)
- Evening discussion (All)

31. January 2004
- Questionnaire in hh# 2, 7, 8, 11 (Mette, Christina, Nicholas, Jasmine)
- Field trip to fish-pond (Karen, Anne-Katherine, Mr. Lai, Isaacs, Ms. Lai)
- Preparation of key informant interview (Karen, Mette)
- Field trip to orchards and rice fields LH side and NP side (Karen, Anne-Katrine, Ms. Lai, Isaacs, Mr.Lai.)
- Supervision from Kristine (Karen, Mette, Anne-Katherine)
- Typing information (Nicholas, Jasmine)
- Evening Discussion (All)
- Supervision from Kelvin (All)

1. February 2004
- Preparation of focus group (Karen, Anne-Katherine, Mette)
- Questionnaire in hh#12 (Mette, Jasmine, Isaacs)
- Questionnaire hh# 16 (Mette, Karen, Jasmine)
- Field trip to fish pond revisited+rice paddies (Isaacs, Ms. Lai, Anne-Katherine, Mr.Lai)
- Water Analysis (Isaacs, Ms. Lai, Anne-Katherine, Mr. Lai)
- Key Informant Interview (Karen, Mette)
- Typing information (Nicholas, Jasmine)
- Focus Group Young People (Karen, Mette, Anne-Katherine, Nicholas, Christina)
- Focus Group Men (Karen, Mette, Anne-Katherine, Mr. Lai, Nicholas)

Appendix C

Land cods and how to claim NCL

Under the Brooke rule all land was viewed as government land, leased 100 years at a time. This system was overruled by the Sarawak land code of 1958, which demands that any claims to native customary land must be based on proof that the land had already been cultivated before that year.

All land is thus categorised into 5 categories (land codes), defined by who can own title to it (Cramb & Wills, 1990):

(1) Mixed Zone Land. No restrictions in who can acquire title.
(2) Native Area land. Only legally defined natives (i.e., Dayaks and Malays, but not Indians or Chinese) can own it.
(3) Native Customary Land (ca. 11,7% of total (Wildlife Conservation Society and Sarawak Forest Department 1996). This land cannot be held under title, but is subject to native customary rights.
(4) Reserved Land. Land held by the government or as a reserve, mainly forest reserves.
(5) Interior Area Land. A residual category.

What does native customary rights then consist in? According to the native Adat, native customary rights to land means rights of ownership, while the term according to the SLC signifies only the user rights. In practice, this means that although the land is held under native customary rights these rights are not always enough to secure the land, logging companies frequently ignoring the law and the administrative mechanisms for enforcing it being weak (Horowitz 1998).

Claims to NCL can be based on (1) aerial photos taken before 1957, (2) a permit or certificate pursuant to order No. VIII, 1920, (3) records kept by native Courts pertaining to disputes of land claim, (4) proclamation or modification made under the forest ordinance or (5) physical occupation of the land coupled with evidence as is the case for the Berawan who have native customary land rights within the LBNP based on remnants of burial pillars (Ngidang 2003).

Appendix D

List of informants used for key-informant interviews

From the Loagan Bunut National Park Headquarter

Mr. Taijan 4.2.04: Customer service assistant.

From Rh. Jungang:

Mr. Jungang ak Hillary 1.2.04: Headman
Mr. Rini 4.2.04: Farmer
Mr. Kamis 5.2.04: Communitymember with most knowledge
Mr. Pasang 1.2.04: Worker in loggingcamp

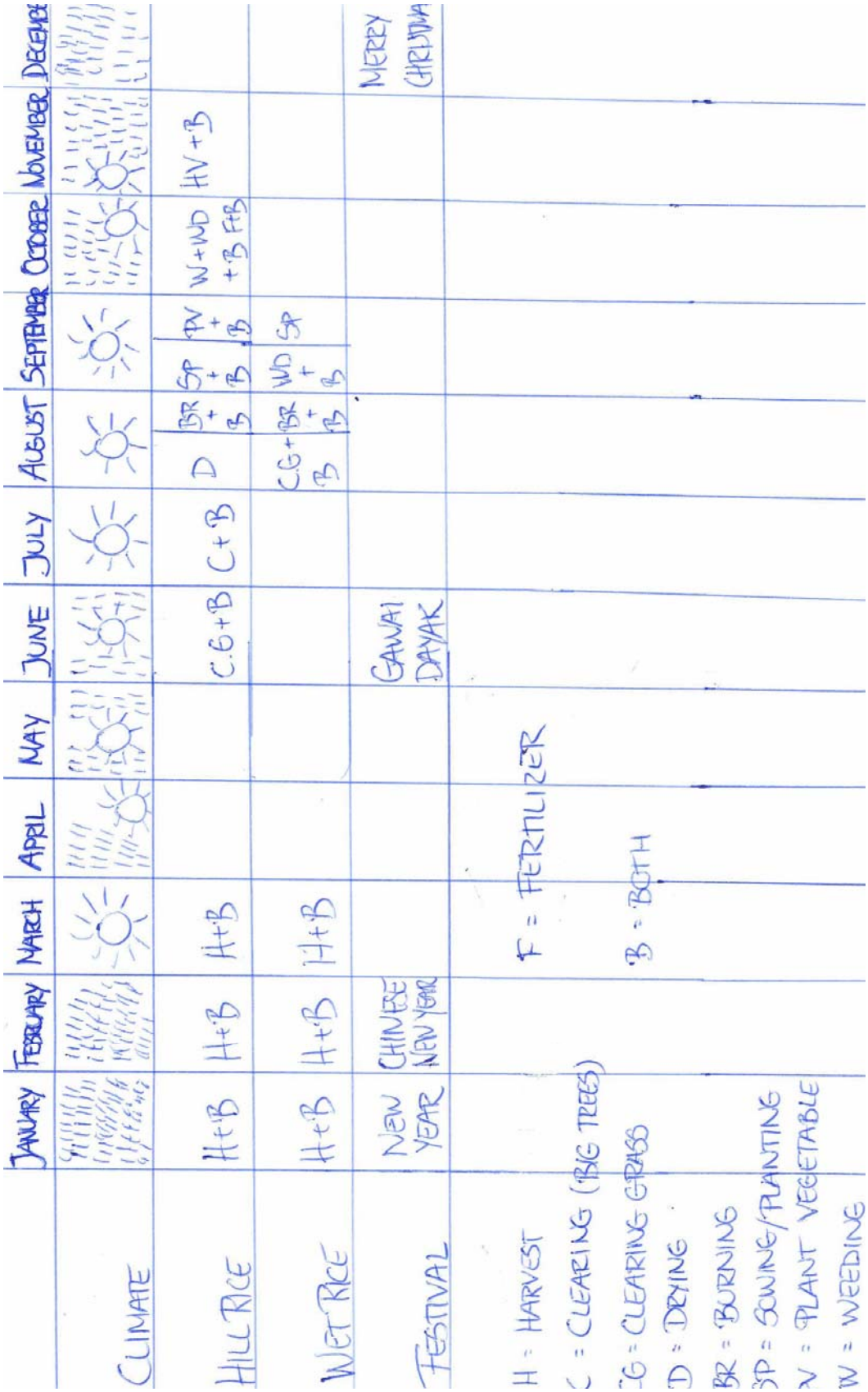
From Rh. Linggi:
Mr. Ramba ak Achup 1.2.04: Headman

From Rh. Ramba
Mr. Umping ak Awing 1.2.04: Headman

From Rh. Umping
Mr. Linggi ak Medan 1.2.04: Headman

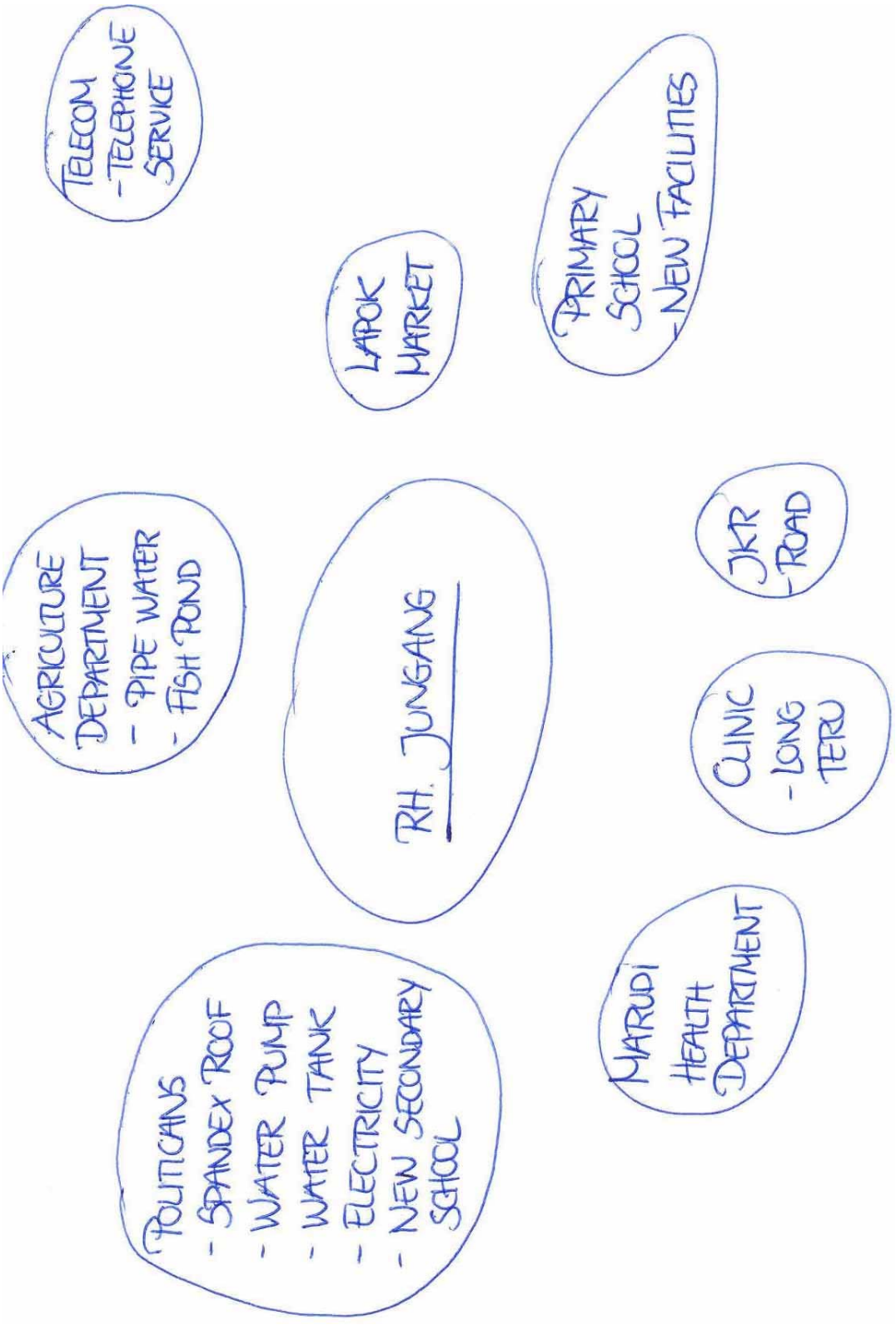
Appendix E

Seasonal Calendar (copy of original) 02/02/2004



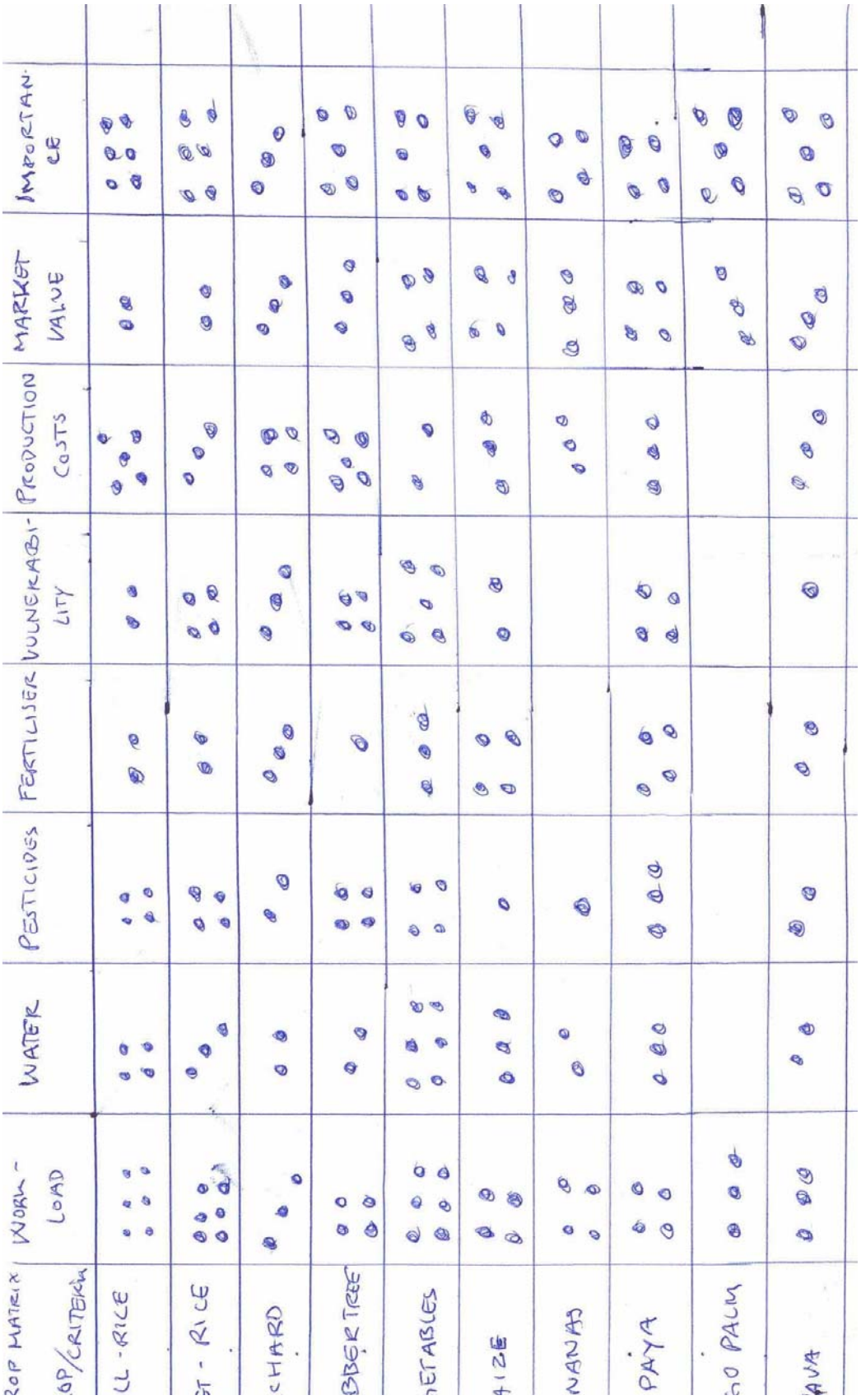
Appendix F

Institutional Diagram (copy of original) 05/02/2004



Appendix G

Matrix Ranking (copy of original) 04/02/2004



Appendix H

Participatory Map Men (copy of original) 28/01/2004

Appendix I

Participatory Map Women (copy of original) 28/01/2004

Appendix J

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 kinds is permitted. Water bodies in this category meets the most stringent requirements for human health and aquatic life production.
76.5 – 92.6	II	Represents 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 prevention of probable human pathogens. To allow for body contact or recreation purposes and conservation of sensitive aquatic species, an additiona class i.e. Class IIB is established which is not used as raw water supply.
31.0 – 76.4	III	Use prmarily for protecting common and moderately tolerant aquatic species of economic value. Water under this classification may be used for water supply with extensive/advanced 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 water which do not meet any of the above uses.

Standards for Malaysia (DOE, 1993)

		Classes				
Parameter		**I**	**II**	**III**	**IV**	**V**
NH_3N	mg/L	0.1	0.3	0.9	2.7	>2.7
BOD	mg/L	1	3	6	12	>12
COD	mg/L	10	30	60	100	100
DO	mg/L	7	5-7	3-5	<3	<1
pH		6.5-8.5	6-9	5-9	5-9	-
Elect. Cond.	µS/cm	250	500	-	-	-
Total suspended solids	mg/L	25	50	150	300	>300
Turbidity	NTU	20	100	-	-	-
T. Hardness	mg/L	*	250	-	-	-
Cd	mg/L	0.01	0.01	-	-	-
Cu	mg/L	0.03	0.02	-	0.2	-
Fe	mg/L	0.3	1.0	-	-	-
Pb	mg/L	0.02	0.02	5.0	5.0	-
Mn	mg/L	0.1	0.10	0.10	0.20	-
Ni	mg/L	0.05	0.05	0.20	0.20	-
Zn	mg/L	0.4	0.4	2.0	5.0	-
NO_3	mg/L	7.0	7.0	-	-	-
P	mg/L	0.2	0.2	-	-	-
Aldrin/Dieldrin	µg/L	0.00	0.02	0.02	-	-
Lindane	µg/L	0.00	0.4	2.0	-	-
T-DDT	µg/L	0.00	0.1	0.1	-	-
Endosulfan	µg/L	0.00	10.0	10.0	-	-
Heptachlor epoxide	µg/L	0.00	0.05	0.05	-	-
Total coliform (col/100 mL)		100	1000	5000	50000	-
Faecal coliform (col/100 mL)		10	200	500	2000	-

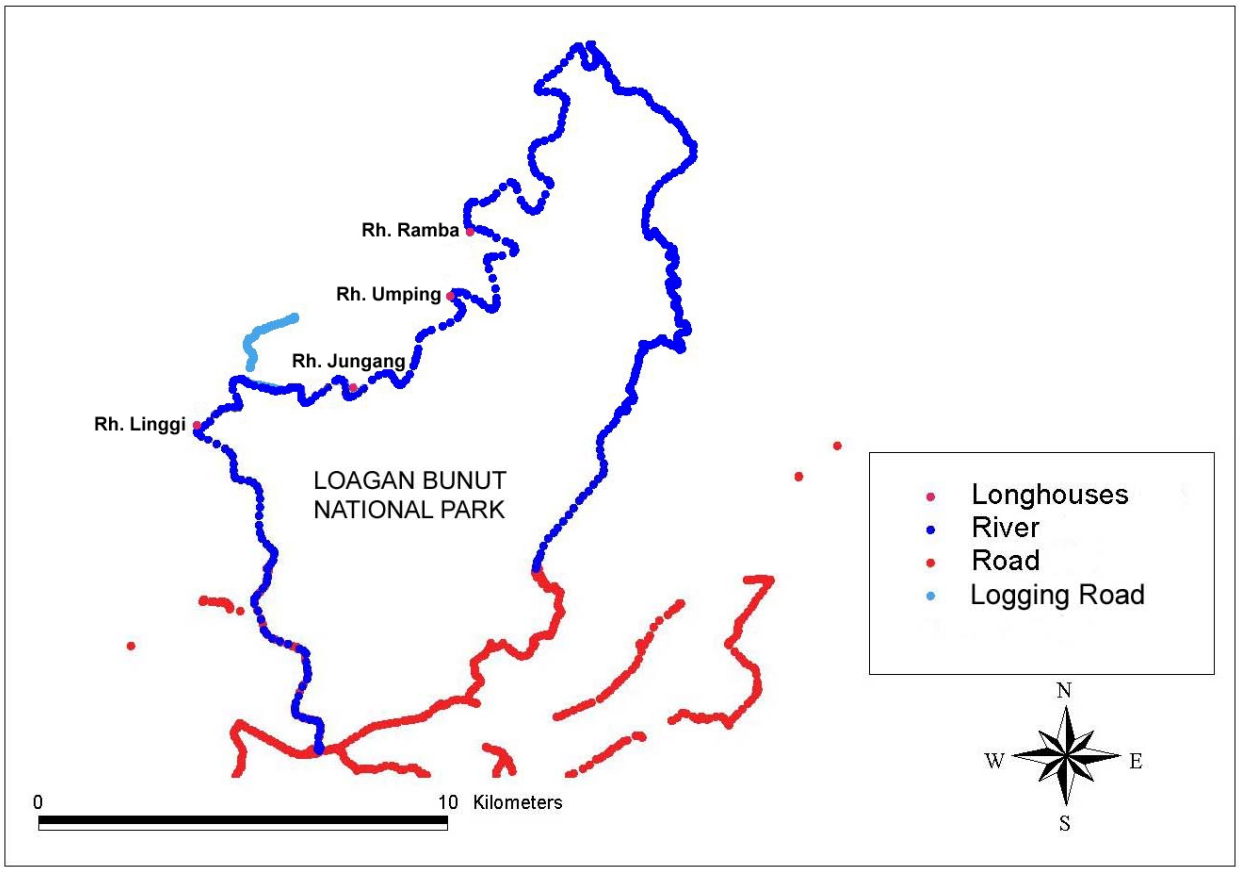
Appendix K

Soil Samples Results

	+cmol/kg						Micromhos/ cm					
Sample	**Ca**	**Mg**	**K**	**Na**	**%Carbon**	**Wet PH**	**Wet**	**% Nitrogen**	**(ppm)P**	**%Clay**	**%Silt**	**%Fine**	**%Coarse**
Jungang Pond A	1.38	1.27	0.34	0.18	2.48	4.8	30	0.29	242	19.17	25.93	4.06	50.85
Jungang Pond B	0.42	1.18	0.18	0.19	1.02	4.8	20	0.19	203	35.33	27.54	1.68	35.45
Jungang Pond C	0.68	2.84	0.11	0.24	0.68	5.0	20	0.18	192	47.80	23.26	2.00	26.94
Jungang OP1 A	0.83	0.76	0.20	0.15	1.98	4.2	30	0.24	118	24.50	13.19	7.22	55.09
Jungang OP1 B	0.96	0.39	0.11	0.14	1.01	4.7	20	0.17	96	32.28	19.69	1.75	46.28
Jungang OP1 C	0.82	0.26	0.08	0.15	0.66	4.8	20	0.13	82	41.88	14.71	1.58	41.82
Jungang OP2 A	0.18	0.16	0.11	0.18	1.47	4.1	30	0.17	37	5.10	3.4	4.08	87.43
Jungang OP2 B	0.14	0.05	0.06	0.16	1.04	4.8	20	0.13	36	8.38	6.59	1.80	83.23
Jungang OP2 C	0.08	0.02	0.02	0.10	0.68	4.9	20	0.09	25	13.39	0.56	1.90	84.16
Jungang PAD 1A	3.78	4.16	0.30	0.17	1.43	5.4	20	0.24	301	32.92	36.48	2.22	28.38
Jungang PAD 1B	1.78	2.60	0.16	0.14	0.76	5.2	20	0.17	196	21.39	24.06	1.07	53.48
Jungang PAD 1C	1.06	2.53	0.13	0.18	0.71	5.1	20	0.17	238	26.41	25.70	1.07	46.82
Jungang	3.34	3.56	0.24	0.19	1.62	5.2	20	0.29	388	29.66	36.02	13.63	20.69

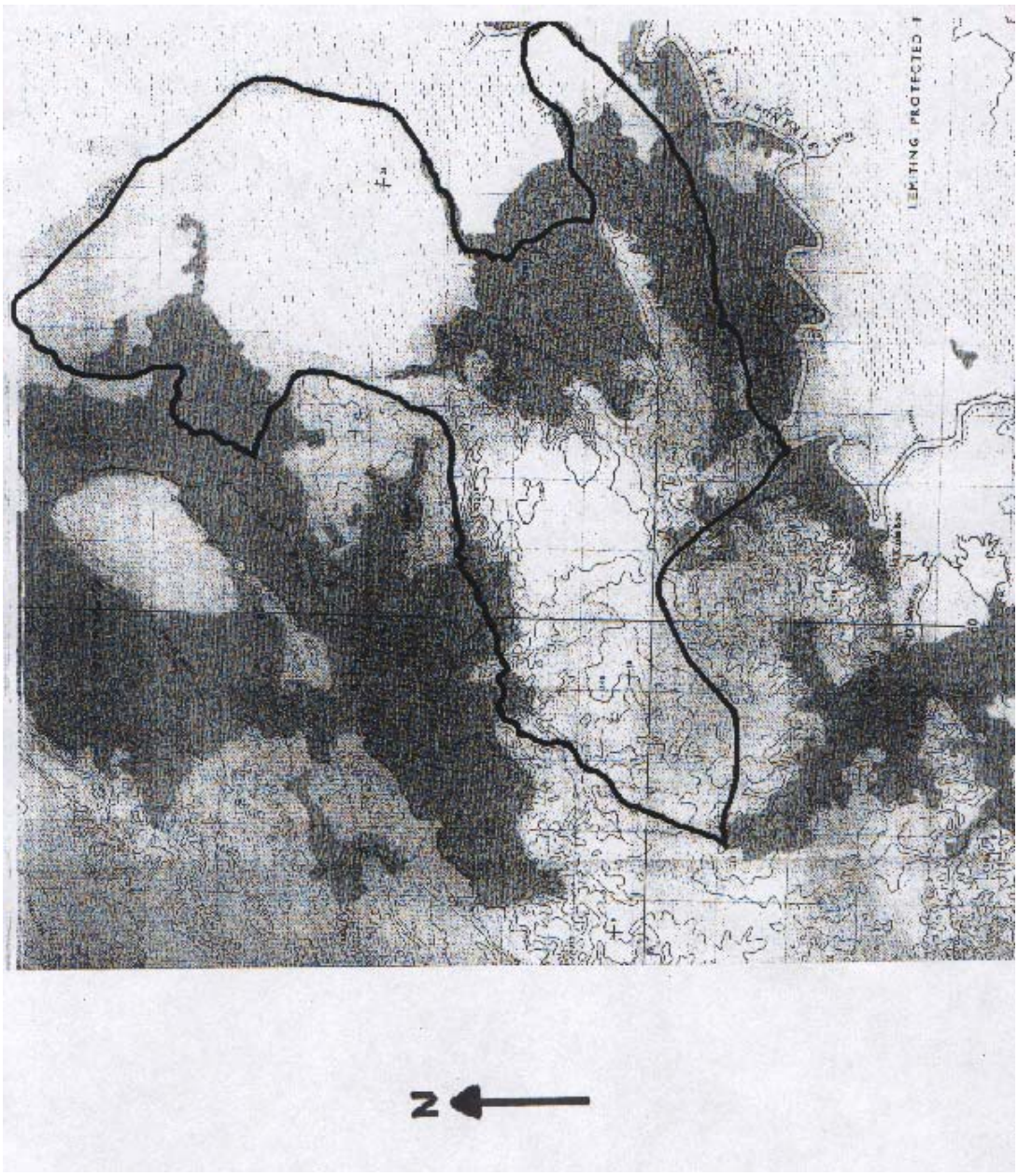
Appendix L

Map Made From GPS-Points



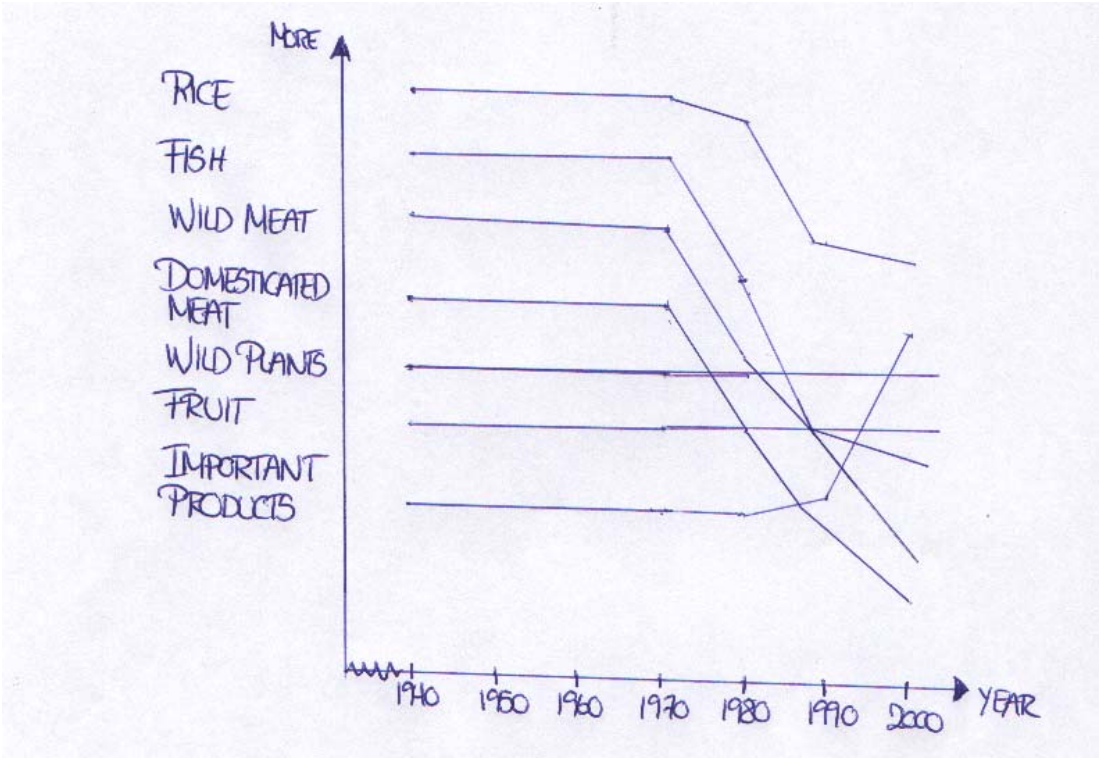
Appendix M

Countour Map



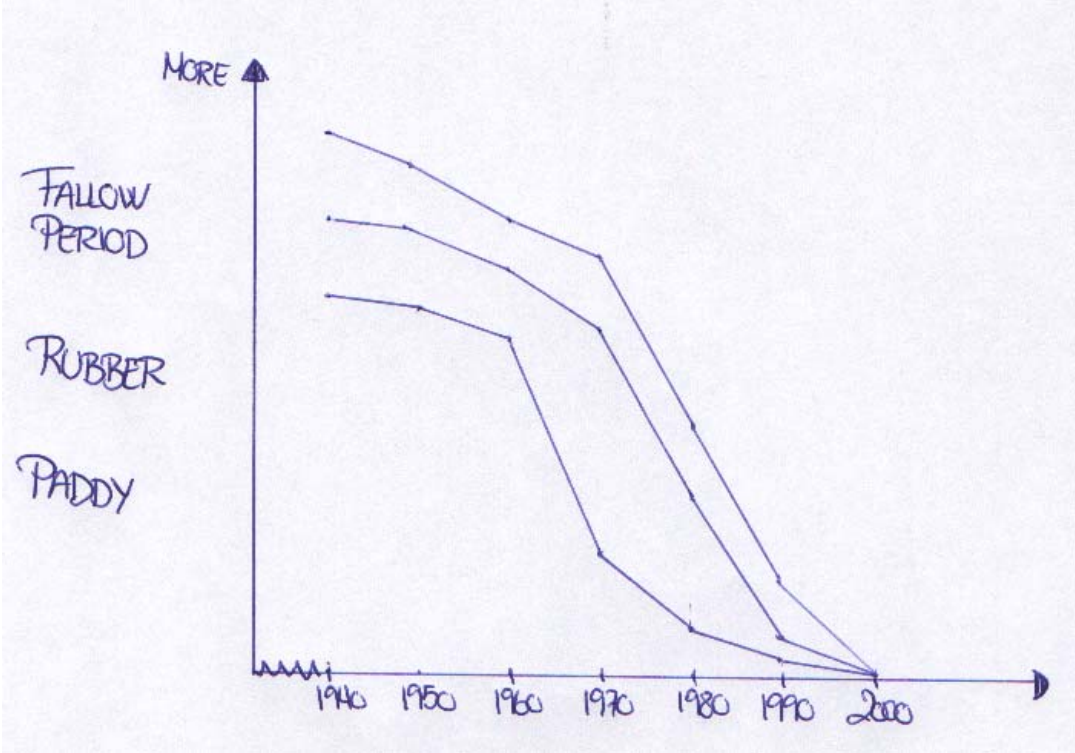
Appendix N

Trend Analysis Food crops (copy of original 02/02/04)



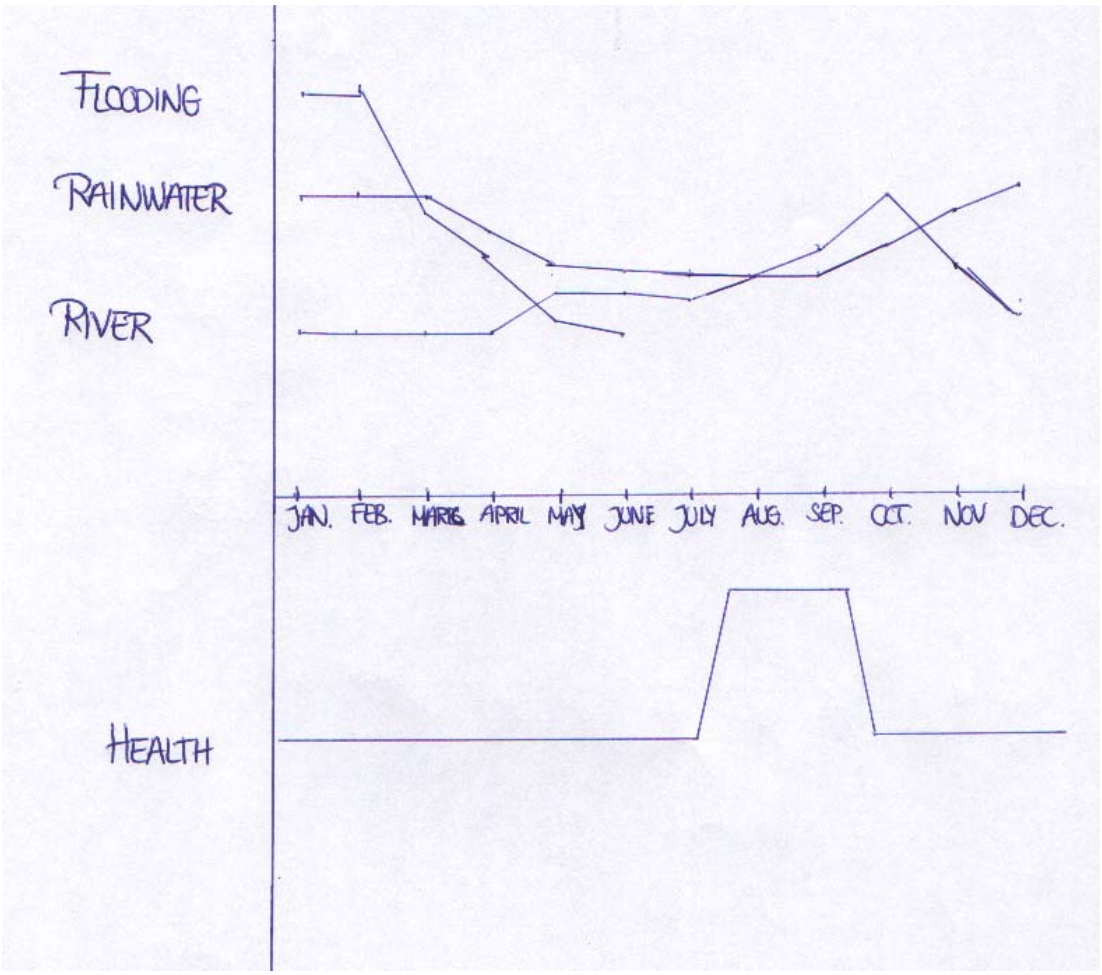
Appendix O

Trend Analysis Fallow, Paddy and Rubber (copy of original 01/02/04)



Appendix P

Sesonal Calendar Water (copy of original) 02/02/2004



Appendix Q

Final Synopsis 12.12.2003

Coping With Change

Impacts On Livelihood And Natural Resources in Rumah Junggang, Loagan Bunut National Park Sarawak

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The paper is prepared during the Interdisciplinary Joint Basic Course on Natural Resource Management (15 ETCS); SLUSE programme

Synopsis

The 12. of December 2003

SLUSE – Sustainable Land USE
Roskilde University Centre
University of Copenhagen
The Royal Veterinary and Agricultural University

1 Introduction

Malaysia has faced a multitude of challenges, most often invoked by a top-bottom approach to development. Both the historical factors and especially the speed with which the recent economic development has occurred have put pressure on the natural resources (Brookfield et al. 1990, Hong 1987, Cleary & Eaton 1995). This pressure now raises questions of rights of land, economic turn-over versus sustainable use and is an issue of greatest concern for the peoples traditionally depending on the land resources to sustain a living - such as the Iban.

The forests of Sarawak are of great economic importance if the goal of turning Malaysia into a developed nation by the year 2020, as promised by recently resigned Prime Minister Mahatir Mohammad, is to be reached (Hong 1987: 123, Europe Factbook 1999: 671-673). 73,2 percent of the national timber production stems from eastern Malaysia (Airriess 2000: 357). The forests provide raw materials for a wide range of products for both export and national consumption and the use of this resource is, therefore, seen as a prerequisite for jobs, prosperity and money for the nation as a whole. Large-scale logging and conversion of forest into plantations are the two main economic activities taking place in Sarawak, (Hong 1987: 131, Brookfield et al. 1990: 101). The forests are home to several hundred thousand indigenous people in Sarawak (overall called Dayaks), of which the Iban and Bidayuh are the most numerous in Sarawak (Hong 1987: 2, Airriess 2000: 344). They and other indigenous tribes have lived in the forests for centuries, and hence pay a larger price for the development of the nation through loss of rights to land and continuous degradation of the natural environment which traditionally has provided for them (Hong 1987: 61).

No exemption to this is the Loagan Bunut National Park (LBNP), Tinjar River, Beluru Sub-District, Miri Division, Sarawak. Around and within this national park (NP) various indigenous groups have settled into eight different communities, some well before WWII. LBNP was gazetted as a NP only in 1990 and comprises an area of 10,736 ha. Not much undisturbed forest remains outside the relatively inaccessible peat swamp forests of LBNP, as the area has been exposed to long term settlement, logging and plantation development. At present the park authorities and the communities are involved in a UNDP funded project aimed at training the local communities in tourism management. (SLUSE Field Course 2003: 3)

One of these communities is the Iban community of Rumah (Rh.) Junggang which since the year 2000 has been located 45 minutes by boat from the main town of Lapok and on the border of LBNP. It is the livelihood strategies of this community which is the focus of this paper.

1.1 Area of Study

The introduction of commercial farming, logging, migration, the NP and tourism have all contributed to major changes in the livelihood strategies of the inhabitants. Old practices like hunting and fishing have almost vanished, both because they have become illegal since the NP was established, but also because fish and wildlife are no longer found in abundance (SLUSE Field Course 2003: 7). The last few years has, in other words, brought many changes to Rh. Junggang and the interesting questions to ask are, therefore, how the inhabitants cope with these changes, what factors lie behind their livelihood strategies and how these strategies work.

The people of Rh. Junggang claim to have lived in the area well before WWII. At that time they were allocated rights to settle and cultivate by the Berawan from Long Teru. The longhouse consists of 17 households, approximately 130 persons. For those staying in the longhouse, the main agricultural activity is wet rice farming and not, as is traditional Iban, the cultivation of hill rice. However, many of the residents are working in Miri and other places and only come back for festivals etc. A small number of inhabitants work for the local logging company. (SLUSE Field Course 2003)

Most of the fields cultivated by the community are located outside the NP, but some inhabitants still cultivate land within the NP. Some shifting cultivation is practised, but not on the NP side of the river. According to villagers, lack of manpower due to young people working in the cities has not caused a decrease in agricultural production, as labour saving techniques, such as state subsidised fertilizers, have compensated for the shortages. (SLUSE Field Course 2003)

Villagers are not yet involved with any oilpalm plantation, but have made a request to the state to establish a joint venture oilpalm plantation (JVOP). Four longhouses along the river have created a joint committee to enhance the creation of this plantation. Most of the land in question for the project is at present fallow. The inhabitants are also interested in future income possibilities deriving from tourism; this could be either through ‘homestay’ or through commercialisation of handicrafts etc. (SLUSE Field Course 2003)

1.2 Objective

The above has lead to the following objective of this report:

How has the implementation of LBNP and the livelihood strategies of Rh. Junggang community affected each other with regard to the management of the natural resources and what effects will the implementation of a joint venture oilpalm plantation have on the present livelihood strategies and the state of the natural resources?

This objective is put forward because the development in the area has caused the community of Rh. Junggang to change their livelihood strategies. What constraints have been put on the community when it comes to the use of land? How has the longhouse coped with this change? These questions are of great relevance if one wants to understand what effects the setting up of a NP can have on the people residing in and around the NP. Therefore, we put forward the following working questions:

6. What benefits and restrictions has the gazettement of the LBNP had on the livelihood strategies of Rh. Junggang?
7. What expectations to and/or motives for alternative income generating activities do various groups of inhabitants of Rh. Junggang have?
8. How are the livelihood strategies of Rh. Junggang affecting the natural resources of LBNP and community land?
9. What are the likely environmental and socio-economic impacts from the JVOP?
10. What impact will the JVOP have on the land distribution and rights within the community?

2 Methodology

This chapter presents, explains and critizises the different data collection methods which we plan to use during the fieldstudy in order to answer our working questions and ultimately our objective.

The limited 10 days in the field will undoubtedly prove a very heavy time constraint and consequently put emphasis on planning. Collaboration between nationalities and social- and natural scientists is, therefore, a must in order to succeed.

2.1 The different methods

We plan to use the following methods during our field study (see appendix):

Socio-economic methods

RRA methods (Rapid Rural Appraisal)

- Participatory mapping
- Matrix ranking
- Institutional diagram
- Seasonal calendar (including division of work between gender)

Interviews

- Household survey (structured interview using a questionnaire as check-list)
- In-depth interview
- Focus group discussion

SWOT-Analysis

- Discussion after fieldwork on strength, weaknesses, opportunities and threats to:
    - Rh. Junggang
    - The NP
    - The JVOP

Natural science methods

- Soil samples
- Water samples
- Topography estimation
- Terrain mapping
- Vegitation transects
- Direct observation of the area, the NP and the JVOP-area with informants

A large part of the information we gain during the field study rely on the use of an interpreter. This can make the information less reliable since misunderstandings in the translation process can occur and meanings consequently change. These misunderstandings and changes can in the worst case lead us to make false conclusions, which makes it highly important to cross-check the obtained information.

2.1.1 Rapid Rural Appraisal

We plan to use **participatory mapping** (Appendix D) in order to get a quick overview of the location in which we are. The **institutional diagram** (Appendix F) will show which institutions

are present in and around the community (Selener et al. 1999: 22). The diagram will also give us an idea of who to talk to and maybe a more solid base for asking questions. The plan is to carry out the participatory mapping and the institutional diagram as early as possible in the fieldstudy. Further, we plan to use different **matrix rankings** (Appendix G) in order to get the informants to compare the importance of different crops, forest products and jobs. Finally we plan to make a **seasonal calendar** (Appendix E). This calendar will tell us how work is divided throughout the year as well as which groups conduct the work. The calendar is planned to be made during each of the focus-group discussions, as a way of cross-checking the information given to us.

2.1.2 Interviews

The main interview method we plan to use is a semi-structured **household survey** (Appendix C) in the form of a questionnaire combined with open-ended, in-depth questions. This is the most structured method of the qualitative interview methods (Casley & Kumar 1988: 14). The reason for it being semi-structured is that it allows the informants to give answers, which we did not anticipate. It is, further, less time consuming than, for instance, informal and topic focused interviews. The most obvious restriction with this method is the risk of actually conducting fully structured interviews (Casley & Kumar 1988: 14). To ensure an overall standard interview process we seek to thoroughly discuss the questionnaire and aims of the survey with our Malaysian colleagues prior to the study. The use of a questionnaire instead of the more loosely structured check list is also based on the fact that our group is composed of so many interviewers, which increases the risk of an uneven standard and process (Furze et al.: 1996: 58). The last part of the household survey consists of a few in-depth questions concerning the NP and the JVOP, which will give us exact and specific information on issues of concern for the community and help to identify possible key-informants.

The second type of interview we plan to conduct is **in-depth interviews** (Appendix I). These interviews are not planned with precise questions but with topics, which the informants should give information about. These interviews are to be conducted with key persons such as village leaders and management staff of LBNP. The final choice of informants for the in-depth interviews will be decided upon once we are in Rh. Junggang.

Finally we will conduct a limited number of **focus group discussions** (Appendix H). These are typically used by researchers looking into the impact an issue has or is expected to have in the future on either a particular group or the whole community as such (Furze et al. 1996: 75) and are in this way very relevant for our study topics. We will have groups of 6-10 individuals. The groups shall consist of individuals with common characteristics e.g. age and gender. We are aware of the most common weaknesses connected with this method, namely actually getting

groups which are relevant for the topic researched and our own limited experiences as facilitators and with guiding discussions (Furze et al. 1996:76). In Rh. Junggang we plan to conduct focus group discussions with women/men and elderly/young persons. The reason for this is based on the concern that there always will be dominant individuals or groups in the community who may not be the best representative for the issue researched. By use of specified women/men and elder/younger focus groups we can create a forum where we can not only gain an insight in these representative groups' perspectives, but also obtain this knowledge without violating traditional practices and offending anybody. We plan to use these groups because we anticipate that the women do the main part of the agricultural work, the men have money income, the elderly have the knowledge to compare the past with the present and make us aware of longterm changes and the young people can tell us something about their plans for livelihood strategies in the future.

2.1.3 SWOT-Analysis

This method we plan to use in our analysis of the impacts from the NP and the JVOP on the people of Rh. Junggang and their environment. After the field study we discuss strengths, weaknesses, opportunities and threats to a certain project or development path which we have observed through our data collection methods. This is done in order to identify, analyse, compare and visualise the overall development strategy undertaken by Rh. Junggang (Selener et al. 1999: 95).

2.1.4 Natural scientific methods

A natural scientific approach will also be made in order to assess what impact the villagers have on the natural resources within and outside the NP and the possible impacts of converting a large piece of land into a JVOP. With regard to the latter, the methods applied should be seen as a means for comparison with data available from Environmental Impact Assessments (EIA) already undertaken for similar projects in Sarawak. EIA is a tool for planning practices, developed for incorporating environmental considerations into project decision making and is mandatory by Malaysian law for agricultural projects > 500 ha (Sai, L. J. 2002: 8). Since permission for JVOP's are only considered for areas larger than 5000 hectares, we assume that a such has been or is being undertaken for the Rh. Junggang proposal. Assessing the JVOP area by the following methods will give us an indication of whether, for instance, severe erosion has already occurred and waters are already affected by siltation or pesticides, in which case we can state that the impact from the JVOP will have a relatively smaller impact on the surroundings than had it been unaffected until present.

A large part of the sampling will concern taking soil and water samples for analysis *in*- and *ex-situ*. All samples will be analysed in conjunction with information obtained via previously described methods, especially former and present landuse, flood history and cropping and conservation factors. Soil- and water-sample locations will further be recorded via the geographical positioning system (GPS).

Soil-sampling (Appendix J) points will be attempted to cover representative fields according to soil type, topography and cultivation methods and crops. Practical wise this means we will choose sample points characterised with an immediate homogeneous landscape (even vegetation type/cover, no abrupt topography changes etc). It is estimated that about 20 sampling points from the JVOP area (SJVOP), the fields inside NP (SNP) and the fields outside the NP (SF), respectively, should be sufficient. The field samples (SNP and SF) will be taken so they can be compared, e.g. a rice field or a pepper-section on either side of the river. From the SNP and SF the primary parameters of interest concern the level of nutrients for plant growth and physical properties. These will reveal if there are certain problems regarding farming systems depleting the soil, soil compaction, erosion or excess levels of chemicals. In the JVOP area the focus will be on classifying the soil type and soil physical properties in order to evaluate present levels of disturbance and the suitability for a JVOP in terms of erosion-risk.

Water-sampling (Appendix K) from water-bodies most important to the villagers. The water-samples will give information about the river water quality status and suitability of the water for bathing, drinking and the aquatic life in general in the Loagan Bunut area. For this purpose, river water pollution from both point and non-point sources based on population, livestock, agricultural inputs etc will be evaluated and samples taken at various points of confluence, up-stream, mid-stream and down-stream. The parameters of interest are the biological oxygen demand (BOD), total suspended solids (TSS), pH, dissolved oxygen (DO), turbidity, Ammoniacal Nitrogen, total phosphorus (TP), Fecal Coliform Count and Total Coliform count. These will among other things enable us to evaluate levels of eutrophication, siltation and bacterial pollution. The water samples will be evaluated in conjunction with information on the general (e.g. drainage) and historic hydrology of the areas with special attention on floodings.

Topography estimation (Appendix L) will only be possible at a general level according to: flat/ undulating/ very undulating. This information will, however, be very important when analysing the soil samples since the topography can explain even small variations. An example could be a field located on a hillside. The levels of slope will be important for assessing the risk of erosion from an oilpalm plantation. Since we are not experienced with this type of assessment we plan to

use a clinometer to get an idea of the steepness and hence to "calibrate our eyes". Hopefully we can come up with estimated percentages of the land in various steepness categories.

Terrain mapping (Appendix M) by use of GPS will be attempted in order to produce a visual overview of the general land use, in particular the cultivated area (either single fields or whole agricultural area) inside and outside the NP and the JVOP area. The GPS recordings will further enable us to estimate the relative sizes of the fields according to location (NP or outside NP) and crop. Information on factors of interest, such as points with severe risks of flooding, areas of conservation interest, and religious/ traditional places obtained from personal references (key-informants/ interviews/ direct observation etc) will also be identified to location and included on the maps.

Vegetation transects (Appendix N) in part of the JVOP area, still to be identified, will be conducted according to species diversity and obvious ecological function, e.g. stabilizing effect. It will not be attempted to make a detailed flora-description. This can give us an indication of the biodiversity in the area and the impact of removing present vegetation. Presence of protected species will also be attempted identified, however, more likely based on key-informant information or literature study. The species diversity will be estimated by counting the amount of different species (based on clearly visible morphological differences) within a 1 meter area on either side of a 20 meter long transect made by a measuring tape.

By living in part of our study area we acquire firsthand impressions through **direct observation** to verify the information provided by the different data collection methods and makes us appear less threatening to the people of Rh. Junggang – a fact which has the potential of providing more reliable information. A complementary tactical technique to obtain information will be by emphasising that we are students and not authorities who could cause biased answers from our respondents. The weakness in presenting and emphasising ourselves as students is that we may not be taken as seriously as if it was an "official research study". The observations made will be recorded continuously in diaries. We will further aim at being attentive to the advice of the inhabitants of Rh. Junggang concerning optimal places for visual observation etc. The direct observation will give us a chance to see fields, the NP and hopefully other areas of importance to our study.

3. Collaboration with counterparts

Since our objective is more or less given, we expect to work closely together with our Malaysian counterparts. We plan to make sub-groups which to a large extent will focus on either the

influence of the JVOP on Rh. Junggang, the influence of the NP on Rh. Junggang and the influence of the people in Rh. Junggang on the NP. If we are to succeed during this field-course we have to overcome our academic differences. We also acknowledge our Malaysian counterparts´ superior in-depth knowledge about local issues and see this as a major benefit.

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List of Appendices

Appendix A: Data Needed

Demography	**Village**	**Landuse**	**Land and water impacts**	**Tenure rights**	**NP influence**	**JVOP**	**Other influence**
Number of residents	Working tasks for groups	Crops	Soil: Nutrient availability and levels of degradation	Do they own the land they live on	What do you collect in the NP today	Where is the proposed area for oil palm	Lapok
Age	Powerstructure	Cashcrops – food crops	Water quality, sources of pollution	Do they own the land they cultivate on	What did you collect earlier in the NP	What is there now on that site	Market
Gender	Religion	Yields	Impacts experienced by villagers	What papers do they have on tenure	Do you have fields on the other side of the river	Inventory	Shops
Education	Watersupply	Domestic Animals	Crops, yields, cultivation methods	Why do they think it is their land	What do you grow there	Expectations from villages. They do not have same	Logging
Difference in income	Health care	Forest products	Map of cultivated land	What have they been promised by NP about land	How long have you had fields on the other side of the river	Expectation from NP	Tourism
Marriage status of the heads of households	Traditions	Location of fields	Correlated changes	What tenure rights do they have inside NP	Fields on the other side of the river prior to NP establish-ment	Expectations from JVOP Partner	Alcohol
Members of households living elsewhere	How was farming in old days	Cultivation methods	Mitigation measures used	What can they do/ not do on their land			Miri
Health and diseases	Why new longhouse	Do they clear new land - where	Land history				
	Relations to NP and other villages	Landuse in future					
	Livelihood strategies						
	Where are things located						

Appendix B: Timetable

Timetable for SLUSE 2003-2004 Fieldcourse, Rumah Junggang

Date	Morning	Afternoon	Evening
24/01			Leave Denmark
25/01	Transfer	Transfer	Arrive Miri, Sarawak
26/01	**All:** Joint preparation with Malaysian Students	**All:** Joint preparation with Malaysian Students	Evening off.
27/01	**All:** Leave Miri Obtain permission to enter LBNP before leaving Lapok. Make appointment to interview management at LBNPHQ and land official	**All:** Arrive Rh. Junggang	**All:** Participatory Mapping
28/01	**All:** Interview with Headman Identify key-informants Test household survey and make changes	**All:** Final discussion on methods including household survey and baselinestudy	**All**: Redrawing of maps and Evening Discussion*
29/01	**All:** Present final proposal to supervisors	**Soc.:** Household survey with 4 households **Nat.:** Locate key-informants in Rh. Junggang/non-residents and for JVOP. Arrange interviews	**Soc.:** Institutional diagram **All:** Evening Discussion*
30/01	**Soc.:** Household survey with 1 household **All:** Field observation and NP field area visit.	**Soc.:** Household survey with 4 households **Nat:**. Visit JVOP plot (locate). Prepare focus groups discussions	**All:** Focus group discussion with farmers/residents of JVOP land.
31/01	**Soc.:** LBNPHQ to interview management of NP. **Nat.:** Interview with farmer, begin terrain mapping and topography estimations	**Soc.:** LBNPHQ to interview management of NP. **Nat.:** Continue (NP)	**Soc.:** Prepare Matrix Ranking.: **Nat.:** Village terrain map **All:** Evening Discussion*
01/02	**Soc.:** Matrix ranking with group of men. Field observation with Nat. Group if time allow. **Nat.:** JVOP: Terrain mapping, topography measurements & soil sampling.	**Soc.:** Household survey with 4 households **Nat.:** JVOP: Terrain mapping, topography measurements & soil sampling.	**Soc.:** Redraw of Matrix **Nat.:** Terrain map JVOP **All:** Evening Discussion*
02/02	**Soc.:** Matrix ranking with group of women and focus-group discussion.	**Soc.:** Matrix on work with men. Household survey with 2 households	**Soc.:** Redraw of Matrix **Nat.:** Terrain map NP

	Nat.: NP:Topography measurements soil sampling in NP, Terrain mapping	**Nat.:** NP: Topography measurements soil sampling, Terrain mapping	**All:** Evening Discussion*
03/02	**Soc.:** Focus-group with older people **Nat.:** Water samples near village	**Soc.**: Matrix on work with women and Seasonal calendar **Nat.:** Water- sampling in NP area.	**Soc.:** Redraw of Matrix **All:** Evening Discussion*
04/02	**Soc.:** Focus group discussion with men **Nat.:** Water- sampling in JVOP.	**Soc.:** Focus group with young people. **Nat.:** Water sampling/ soil sampling if neccesary.	**All:** Evening Discussion*
05/02 **I A-K's Birthday**	**All:** Day off to see LBNP	**All:** Day off to see LBNP	**Soc.:** Redraw of seasonal calendar **All:** Evening Discussion*
06/02	**Soc.:** Interview with leader of oil-palm committee **Nat.:** Finish reconnaisance - and production of JVOP map. Vegetation transects JVOP	**Soc.:** Interview with non-residents of the longhouse if there are any. **Nat.:** Finish reconnaisance - and production of JVOP map. Vegitation transects (JVOP)	**All:** Evening Discussion*
07/02	**Soc.:** Household survey with 2 households****	**	**All:** Evening Discussion*
08/02	**	**	Farewell party
09/02	**All:** Transfer to Miri	**All:** Transfer to Miri	Evening off
10/02	**All:** Preparation of debriefing	**All:** Preparation of debriefing	Evening off
11/02	**All:** Debriefing in Miri	Afternoon off	Farewell dinner
12/02	Danish students no program	Danish students no program	Danish students no program
13/02	Morning off	Afternoon off	Leave Miri, Sarawak
14/02	Arrive in Denmark		

*Evening discussion: Small discussion on today's findings and planing for the days ahead. Problems to be discussed. Maybe the discussion has to be at another time because there are no one in the longhouse during the day and most of the household surveys and interviews has to be done in the evening.

** Days left empty allow us to rearrange because this schedule does not turn out to be realistic or it allow us to ad further exercises.

Appendix C: Questionnaire for household survey

Date: Time: Household number:

Name of Respondent:

Respondent Profile

Religion: Marital Status: Communal positions:

Family Profile

Family member	Gender	Age	Years of Education	Main occupation	2nd occupation	Contribution to household	Money contribution	Perm. living in longhouse
1								
2								
3								
4								
5								
6								
7								

* Respondent list himself/herself first **Money contribution in Ringgit Malay (RM)

1. What is your households' main source of money income?_____

Settlement and rights

2. How long have you lived in this area? _____
3. Where did you move from? _____
4. What was the reason for moving here? _____
5. Have any of the members of your household moved elsewhere since you build the new longhouse?____
6. What common land do you share?_____
7. How much land do you own?_____
8. Do you have any titlepapers on the land?_____

Agriculture

9. How many fields do you have?_____

10. Where are the fields located?_____
11. Do you harvest more or less crop now after the longhouse has moved?_____
12. Do you have less land since the longhouse moved?_____
13. Do you use artificial fertilizer and pesticides?_____
14. Do you use manure?_____
15. For what crop do you use artificial fertilizer and pesticides?_____
16. For how many years have you used pesticides and artificial fertilizer?_____
17. Do you cultivate any of the following crops?_____

Crop	Yes/No	Est. size	Own use	For sale	How much for sale	Do you own the land	Side of river
Wet rice							
Hill rice							
Tobacco							
Rubber							
Fruits							
Pepper							
Vegetables							
Other							

* If other please state ** Est. size in what they measure in *** For sale in what they measure in

18. Do you have enough land to support your household?_____
19. Do you buy any food? If – yes – What do you buy?_____

20. How many times per week do you collect any of these products?

Wood:	Vegetables:	Fish:		
Fruit:	Others:			

* If other please state

21. Where do you collect these products? This side of the river or the other side?

Wood:	Vegetables:	Fish:		
Fruit:	Others:			

22.What animals do you have and how many?

Chicken:	Pig:	Duck:	Cow:		
Goat	Others:				

23. How many times per week do you eat:

Meat:	Fish:	Vegetables:		
Fruit:	Mushrooms:			

Health

24. How is the general health of the people living in your household?_____
25. How often do you and your family go to the clinic?_____
26. How long time does it take to get to the clinic?_____
27. Have you had any serious illnesses. e.g.

Malaria:	Dengue:	Tuberculoses :		
Bilharze:	Other:			

* If other please state

Open-ended questions: The NP, the JVOP, the move of the longhouse

1. Who decided where you could build the new longhouse?
2. How has the NP affected you?
3. What do you know about the land on the other side of the river?
4. What would you like to change about the NP?
5. In the future - what job possibilities do you expect the people in your household to have?
6. How are you involved in the JVOP?
7. What information have you been given about the JVOP?
8. Would you like for Rh. Junggang to join the JVOP?
9. What is good about the JVOP?
10. What would you like to change about the JVOP?
11. Who do you think is going to work in the JVOP?
12. Can you and your family handle the work you do now if you are going to work in the JVOP?
13. If no, what work would you stop doing?
14. Where would you place the JVOP?
15. What is your main problem concerning agriculture?
16. How has the lack of labour affected you household?
17. Do you cultivate less land?

Approach:

It will be much easier to conduct the interviews if we have one asking questions and one writing the answers. It is up to the person conducting the interview to sense if the informant has valuable information besides the already given info. At the end of each interview we should remember to ask if the informant has any questions for us. They might not know exactly who we are and why we are in their village.

Appendix D: Participatory mapping

Expected data: Map of the area, rivers, lakes, fields, crops, longhouse, school, forest, other villages, oilpalm plantations, national park, towns (Lapok), and land classifications (private, state etc.).
Materials needed: Big pieces of paper, crayons, and small pieces of paper (post-it). Pens for redrawing of the map, white A4 paper.

Approach:

1. Inform about the exercise: That we would like them to draw a map of the area. Those who would like to participate can do so
2. Divide people into groups of men and women.
3. We should not ask questions. This will only give the participants ideas of what to draw and thus ruin the idea of the map showing us what they place emphasis on.
4. If we miss information in the end then we can ask for it to be added.
5. The maps will be redrawn onto paper which can be presented in an appendix in the final report.

Appendix E: Seasonal Calendar

Expected data: Religious cermonies, making of handicrafts, rainfall, collection of wood, collection of wild plants for food, medicine, farming cycle (sowing, weeding, harvesting, preparation of soil), money income, hunting, use of LBNP for collection of wood, plants and animals, distribution of workload over the year.

Materials needed: Big paper and crayons.

Limitation: Maybe the people of Rh. Junggang do not use a calendar based on our months. The method has to be adapted accordingly.

Approach:

1. Inform participants about the exercise.
2. Make the chart on a big piece of paper. Fill in the first category (e.g. dryseason / wetseason). Let participants fill in. Then add next category.
3. Ask specifically to products from the NP.
4. Ask hypothetically to the JVOP.

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Dry season												
Wet Season												
Hill rice												
Wet rice												
Pepper												
Rubber												
Oil-palm												
Durian												
Other fruits												
Vegetables												
Other cashcrops												
Product from NP												
Hunting												
Fishing												
Handicraft prod.												
Off-farm work												
Ceremonies												
Wood												
Cooperat work												

* C=Clearing SP=Sowing/Planting W=Weeding P=Pesticide F=Fertilizer H=Harvest WO=Women M=Man B=Both Example: SP+W= Sowing/Planting by Women

** Questions which cannot be answered with C SP W P F or H should just be marked with X

Appendix F: Institutional Diagram

Expected data: List of institutions and individuals which the participants feel influences the longhouse. Which on that list that are have been good and not so good to the people of Rh. Junggang. Who has much influence and who has little influence.

Materials needed: Big piece of paper and crayons. We have to have at least some participants who can read and write.

Approach:

1. Draw the longhouse on a big piece of paper.
2. Inform about exercise
    a. Big circle much influence. Little circle little influence.
    b. Close to longhouse = good for longhouse, fare from longhouse = does not understand longhouse.
3. Ask about the JVOP and NP if they do not draw these.
4. Make sure they only draw what is present now (except JVOP) if they talk about things which are not present today let them make a list of things they would like to be present in the area (e.g. electricity, running water, church etc.)

Appendix G: Matrix ranking

Expected data: A matrix which tells us something about which crops, forest products, jobs they prefer.

Materials needed: Big paper and small stones or other very small objects which can be moved around as the discussion develops. Participants who can read and write.

Approach:

1. Inform about the exercise
2. Draw the matrix.
3. Inform about that 6 is good and 1 is not good.
4. Let the informants choose the crops to put in. Ask them to list the 10 most important crops.
5. Remember to convert the points so that all points in a matrix are either good or bad points

Crop matrix

Crop/Criteria	Output per ha.	Workload	Water	Pesticides	Fertilizer	Vulnera-bility*	Prod. cost	Market value	Impor-tance	Score

* Diseases and pests

Forest product matrix

Product/Criteria	Time spent on colleting	The most collected	Easy to collect	This or the other side of the river**	Importance	Score	Remarks
Rattan							
Ferns							
Mushroom							
Fish							
Animals							
Timber							
Herbal medicin							

* Let the participants state which "wild products" they collect.

** X=This side of the river Y=That (the NP) side of the river

Work matrix

Work/criteria	Food security	Money	Family	Health	Importance	Score
Farmer						
JVOP						
Logging						
NP						
Lapok						
Miri						

* Let participants state the jobs they consider. Ad them in one at a time

Appendix H: Focus group discussions

Expected data: Differences in attitudes towards NP, oil palm scheme, other groups in the longhouse etc.

Materials needed: Women/men, young/old.

Approach:

1. Inform about the exercise
2. Have a list of topics which you want to discuss with the group
3. Ask the questions straight this will show the participants that you know what you are after and give a much better discussion.

Discussion with women
Attitude toward JVOP
Do you understand the JVOP?
Would you like it to be realised?
Attitude toward the NP
Expectations for jobs
Expectation for education possibilities
Impacts of JVOP
Impacts of NP

Discussion with men
Attitude toward JVOP
Attitude toward the NP
Expectations for jobs
Expectation for education possibilities
Impacts of JVOP
Impacts of NP

Discussion with old people
History of longhouse
Good and bad changes
Former landuse (more or less today)
Impacts of JVOP
Impacts of NP

Discussion with young people
Expectations for future
Good and bad about present situation
Impacts of JVOP
Impacts of NP
What will you like to change in the future

Discussion with people particularly affected by JVOP
Loss of rights to land
Consequences for them- expectations for future
History of the JVOP
How do they experience the situation
Conflicts over JVOP with other community groups

Appendix I: Key-informants

List of key-informants with the topics we want to discuss with them.

Headman
Movement of Longhouse, Use of land across the river, Flod history, Location of JVOP (where and who desided), How will the JVOP affect you livelihood, How has the NP changed you livelihood.

Leader of oilpalm committee
Plans for Oil-palm plantation, history of JVOP, Flora and founa in the area, Ecology of oilpalm area, Land use changes, Change in labour avaliability, Motivation for JVOP, Who are the partners in the JVOP, What changes will the JOVP give to Rh. Junggang, When do you expect to start making money on the JVOP (Economic revenue prospect)

Management at LBNP
Village influence on NP, NP influence on village. Expectations to tourism (also for villages). Village landuse earlier, now and in future. Fauna estimation.

Land official (hopefully in Lapok, but most likely in Miri)
What plans does the government have for the JVOP
What plans does the government have for the NP
What landrights does the villagers have?
Base-line information

Farmer (women and men)
Crops. Yields. Cropping intensity. Cropping calendar. Problems related to growth conditions. Tillage, pesticide- and fertiliser methods and extent of these measures. Other cultivation techniques (burning?) Labour input. Recent changes in cultivation, future plans regarding this issue. Working in NP and JVOP, infrastructure, forieng workers.

Person from longhouse residing away from the longhouse
Attitude toward Oil palm scheme, Attitude toward the NP, Expectations for jobs, Expectation for education possibilities, Expectations for development of the longhouse.

How often do you come back to the longhouse.
How do you support your family in the longhouse (with money)
How many familymembers do you have in the longhouse?

Persons from other longhouses
Land rights, who own the area of the JVOP. Fauna, Waterlevels

* Remember in the end of each interview to ask the informant about who other he/she thinks we should talk to. This may provide us with some names of persons we have not thought of.

Appendix J: Water sampling

Expected data: Chemical and particle pollution levels and level of eutrophication.

Materials needed: chemical agents, titration-apparatus, pH-meter, boiler, laboratory glasses, pipettes, containers for storage (signifying: we don't know yet!).

Approach: A water pollutant is any "biological, physical or chemical substance present at excessive levels capable of causing harm to living organisms" (Radojevic & Bashkin 1999: 139). For water analysis, the biochemical oxygen Demand (BOD), which is defined as the amount of oxygen necessary to decompose organic matter in a unit volume of water (Radojevic & Bashkin 1999: 141), eutrophicating elements such as phosphorus, Ammonia, Nitrate, and turbidity, the suspended solid (TSS?) content as well as the pH, will be analysed. Colibacteria will also be tested for. Depending on what pesticides are used in the area, it will be attempted to measure the presence of the ones most widely applied. Depending on sampling equipment available the analysis will be undertaken both during and after the field study, which will require that samples are marked and stored properly.

Appendix K: Soil sampling

Expected data: Levels of nutrients available, extent of erosion, impacts from soil management.

Materials needed: Soil test kit, sampling-spade, digging spade, penetrometer, Equipment for hydrometer, ring infiltrometer, colour chart. Containers for storage.

Approach: The available soil test kit will enable us to determine availability of nutrients: Exchangeable N, P & K. To get a full view of a soils´ properties, samples from both top-soil (0-10 cm) mid-soil and sub-soil (30-40 cm) will be analysed. Simple finger-assessment methods or hydrometer will be applied for determining physical properties (aggregation and particle size) and colour-data are relevant for determining chemical conditions and SOM. Profile photographs will be taken and samples will be brought home for further laboratory analysis if necessary (micro-nutrients, exact carbon-measurement). Additional samples for nutrient-availability will be brought home in the form of dried plant- samples if there appears to be a particular problem in that direction.

Appendix L: Topography estimation

Expected data: Topography of the terrain. Percentages of the area with slopes 0-10 °, 10- 20°, 20-35°, 35-°

Materials needed: Clinometer, measuring tape, two persons, two transportable poles, note-book for measurements.

Approach:

1. Two persons place themselves with a pole on the two spots between which the slope needs to be recorded. The measuring tape is stretched and the distance between the two spots noted.
2. The person below places the clinometer at a fix-point relative to the pole and aims for the corresponding point on the pole above.
3. The slope is noted.

After some clinometer-measurements within the different slope-categories, we start to estimate the total area (%) in the slope categories by visual estimates

Appendix M: Terrain Mapping

Expected data: Two maps of the general land use/ crops/ points with severe risks of flooding, areas of conservation interest, and religious/ traditional use on community land from inside and outside the NP as well as the JVOP area.

Materials: GPS, notebook, (measuring tape?)

Approach: The GPS recordings will be taken in the middle of points of interest (e.g top of a hill) or along the borders (cultivated fields) and drawn on a map to give us an overview of the study area. The points/areas are expected to be identified by villagers/ key-informants or by direct observation.

Appendix N: Vegetation Transects

Expected data: An overview of the biodiversity level in the area and the impact of removing present vegetation in part of the JVOP area

Materials needed: Measuring tapes **(**minimum 20 meters**),** notebook

Approach: The species diversity will be estimated by counting the amount of different species (based on clearly visible morphological differences) within a 1 meter area on either side of a 20 meter long transect made by a measuring tape.