

Victoria

UNIVERSITY OF WELLINGTON

*Te Whare Wānanga
o te Ūpoko o te Ika a Māui*



The Road to the Highlands: The Socioeconomic Impacts of the Roads into and Around the Kelabit Highlands of Sarawak, Malaysia.

Kris Moore

February 2012

**School of Geography, Environment and Earth Sciences
Victoria University of Wellington,
Wellington, New Zealand.**

**Submitted in partial fulfilment of the
Master of Development Studies (MDS) Degree**

Abstract

There is an ongoing debate over whether the construction and upgrading of roads in remote rural areas is beneficial for the communities that reside within them. The majority of studies carried out thus far have indicated that the introduction of rural roads may assist in alleviating poverty. However, studies commonly do not consider social measures of well-being and resilience (such as education, health care, and the maintenance of cultural identity and way of life), despite the fact that these are increasingly recognised to be important alongside economic measures. This thesis examined the perceptions of the Kelabit community on the social and economic impacts of the construction and upgrading of the road networks into and around the Kelabit Highlands of Sarawak, Malaysia.

This study is based on a qualitative participatory research design. It gathered data through the use of semi-structured interviews, participant observation, and a literature review (including government documents). In total, 48 community members and eight government employees were interviewed.

Results corroborate the findings in or similar research elsewhere, such as the construction of roads has both positive and negative impacts, including the increased mobility of people and goods, increased access to off-farm employment, the increased availability of undesired products and the facilitation of environmental damage. However this study notes some different conclusions from previous work, and finds there was no observed change in enrolment, dropout rates or absenteeism at the highland schools; no increases in exported produce for sale in the urban centres; creation of tension between community groups; and a notable lack of increase of migration in two of the three rural study sites.

Moreover, this study revealed that there has been a diverse range of impacts experienced by the Kelabit community in relation to the construction and upgrading of the road network into and around the Kelabit Highlands. The study also found significant local differences of opinion regarding the various impacts of the roads. Differences in opinion at a community level were based on the degree of interaction with the roads, as well as the degree to which groups relied on the roads for mobility. This study shows that there is no consensus amongst the Kelabit community on whether the roads should remain and on whether further development of the road networks into and around the Kelabit Highlands should continue.

What can be concluded from this study is that there is still no 'one size fits all' strategy to developing rural communities. Using roads to develop rural communities' can result in a number of community members benefiting, a number of them losing and the rest receiving no evident change. Consequently, at what point do the benefits to some out way the harm to others for the development project to be considered a positive for the community? The debate therefore continues over whether the construction and upgrading of roads in remote rural areas is beneficial for the communities that reside within them.

Acknowledgements

There are many people I would like to acknowledge for their hospitality, advice, support and contributions while I have been working on this thesis. I wish to convey my thanks and appreciation to all of them.

I would like to start by thanking my teachers who have taught me and guided me to where I am now. Without you, I may not have achieved this level of academic achievement and I may not have had the opportunity to conduct this research project. I am truly thankful for the support and knowledge that you have given me. A special thanks goes to my supervisor Professor Philip Morrison and to the Victoria University of Wellington, New Zealand Development Studies staff, Professor John Overton, Sara Kindon, Professor Warwick Murray and Dr Andrew McGregor. Additionally, I would also like to thank Susan Cayless for her help.

A very special thanks to Alister Agan Selliman, John Selliman Kendawang and Helen Buang Aran, for if it was not for you, I may have never travelled to Sarawak, Malaysia to conduct my research. Your help was critical to my thesis. Additionally, you supplied me with relevant knowledge that helped me participate within the Kelabit community.

I cannot thank the Kelabit community enough for all of your hospitality and your collective contribution to my thesis. I just hope that this thesis helps the Kelabit community in the future. I am truly grateful to David Labang, Jeremy Paran, Philip Lenjau and his wife Poline, Jane Iboh, Jaman Riboh Tekapan, Seluma and Stewart at Raja View, Rian John and John Tarawe for their incredible hospitality. Furthermore, I would like to make a very special thanks to Kelvin Egay, Lian Labang, Lucy Bulan and Panai Aran for not only supplying me with incredible hospitality but also for making a very large contribution to the design of my research project. I would also like to express my gratitude to the translators; Lian Labang, Ganang Aran, Joyce Johnson and my translator in Pa Lungan (who wishes to remain unnamed) as I would not have been able to carry out the research with the quality and reliability of data without you.

I would like to acknowledge the Sarawak State Planning Unit for allowing me the opportunity to carry out the research in Sarawak, Malaysia. I would also like to thank the Chair of Malay Studies whose financial support in 2010 (Award number 2350) made conducting research in Sarawak much easier and less stressful.

Lastly, I would like to thank my family and friends who have supported me. You all made the process of writing this thesis much easier. There were times when I thought the thesis would not be completed but you all kept me going and feeling positive. Thank you.

Kris Moore

Contents Page

	Page Number.
Abstract	iii
Acknowledgments	iv
Contents Page	v
List of Figures	viii
List of Tables	ix
1. Introduction	
1.0. Rationale	1
1.1. Aims and Key Questions of the Research	2
1.2. Thesis structure	2
2. Literature Review	
2.0. Introduction	3
2.0.1. Positive and Negative Impacts of Rural Roads	4
2.1. Economic Impacts	5
2.2. Off-farm Employment	7
2.3. Migration	8
2.4. Education	10
2.5. Healthcare	11
2.6. Why Roads Fail to Improve the Mobility of all Rural Residents	14
2.7. Summary	16
3. Transportation, Mobility and Migration in Sarawak, Malaysia	
3.0. Introduction	18
3.1. Transportation and Road Networks in Sarawak, Malaysia	18
3.2. Government Policies for Roads and Transportation in Sarawak, Malaysia	20
3.2.1. The JALB Programme	20
3.2.2. Vision 2020	21
3.2.3. The Ninth Malaysia Plan	21
3.2.4. The Government Transformation Programme (GTP Roadmap)	22
3.3. Agriculture and Roads in Sarawak, Malaysia	23
3.4. How the Road Networks Have Affected the Socioeconomic Aspects of Living in Sarawak, Malaysia	24
3.4.1. Healthcare and Education	25
3.4.2. Social Interaction and Discipline Issues	26
3.4.3. Migration and Remittances	27
3.4.4. Gender Gaps in the Use of Roads and Transport Systems	28
3.5. Environmental Damage Caused By the Construction of Logging Roads in Sarawak, Malaysia	29

3.6. Summary	29
4. The Kelabit Highlands	
4.0. Introduction	31
4.1. The Kelabit Highlands	31
4.2. Transportation into the Kelabit Highlands	34
4.3. The Kelabit People	35
4.3.1. The Kelabit Economy	37
4.3.2. Education and Employment	38
4.3.3. The Kelabit Social and Political Structure	39
4.3.4. The Kelabit Belief System	40
4.4. Demographics in the Kelabit Highlands	41
4.5. The Roads into and Around the Kelabit Highlands	41
4.5.1. The Logging Road to the Kelabit Highlands	42
4.5.2. The Inter-village Roads in the Kelabit Highlands	44
4.5.3. The Concrete Roads of Bario	46
4.5.4. Weather on the Roads	48
4.6. Summary	49
5. The Research Structure	
5.0. Introduction	50
5.1. Research Design	50
5.2. Research Methods	
5.2.1. Triangulation	51
5.2.2. Key Informant Interviews	51
5.2.3. Community Interviews	52
5.2.4. Participant Observation	52
5.3. Sample	53
5.3.1. Community Interviews	53
5.3.1.1. Hypotheses for Community Interviews	55
5.3.1.2. Bario	56
5.3.1.3. Pa Dalih	57
5.3.1.4. Pa Lungan	58
5.3.1.5. Urban Based	59
5.3.2. Key Informant Interviews	60
5.4. Data Collection	60
5.5. Researching in the Kelabit Highlands	61
5.6. Positioning Myself in Relation to the Research	61
5.7. Limitations of Research	62
5.8. Importance of Research	64
5.9. Summary	65

6. Results and Discussion	
6.1. Introduction	66
6.2. Economic Changes	66
6.2.1. Mobility of Goods and the Subsidies	66
6.2.2. The Price of Goods	68
6.2.3. Vehicle Ownership and Usage	71
6.2.4. Transportation Times and Costs	73
6.2.5. Agricultural production	76
6.2.6. Off-farm Employment	82
6.2.7. Remittances	84
6.3. Social Changes	85
6.3.1. Development and Infrastructure	86
6.3.2. Government Officials	88
6.3.3. Changes in Attitudes, Lifestyles and Hostility	89
6.3.4. Mobility of People	94
6.3.5. Current Reasons Preventing Mobility	96
6.3.6. Social Events	96
6.3.7. Migration	99
6.3.8. Education	99
6.3.9. Safety and Security	102
6.3.10. Healthcare	103
6.3.11. The Influence of Outsiders	105
6.3.12. Pollution and Damage	106
7. Conclusion	110
References	123

List of figures

	Page Number
1. Road map of Sarawak.	19
2. How to find the Kelabit Highlands.	32
3. Satellite image of the research sites.	33
4. The MASwing Twin Otter parked at the Bario airport.	34
5. Wet padi cultivation in Bario.	36
6. Water Buffalo aerating the soil in a padi field in Bario.	36
7. Boiling water to extract salt.	36
8. A local man in Bario plays beautiful music on a <i>sape</i> .	36
9. <i>Batu Ritong</i> , one of the many megaliths found in the Kelabit Highlands.	36
10. The view of the Kelabit Highlands from 'The Cross'.	36
11. Bario Primary School.	38
12. The <i>Sidang Injil</i> Borneo (SIB) church in Pa Lungan.	40
13. The maintained logging road in the Kelabit Highlands.	43
14. Map of the Logging Road to the Kelabit Highlands.	43
15. The temporary timber bridge over the Dappur river.	45
16. A 4WD climbs its way up the new inter-village road on its way to Miri.	45
17. The Kelabit Highlands and its Roads.	45
18. Map of Greater Bario.	47
19. The concrete road construction crew setting up metal reinforcing.	48
20. The upgraded section of road between the small bridge and the store lockups in Bario.	48
21. The road the day after heavy rain.	48
22. The view of Bario from Prey Mountain in October 2010.	56
23. The view of Pa Dalih from the inter-village road in October 2010.	58
24. The view of Pa Lungan from a nearby mountain in September 2010.	58
25. Small wooden boats waiting to be used on the Dappur River near Bario.	72
26. The road that links Pa Derung to the rest of Bario Proper.	73
27. The road that links Pa Derung to the rest of Bario Proper.	73
28. Two Kelabit men and a working buffalo on their way home after work.	78
29. A ripe pineapple growing on a hillside in Bario.	78

30. The old health clinic in Bario.	87
31. The new health clinic in Bario.	87
32. The new housing for the health clinic staff.	87
33. The bridge into Pa Dalih.	107
34. Warning, road narrows.	107
35. Sunset over the Kelabit Highlands.	122

List of tables

1. The Ethnic Breakdown of Sarawak.	25
2. The MASwings flight fares.	34
3. Research Schedule.	51
4. Breakdown of Interviews.	53
5. Breakdown of Community Interviews by Gender and Age.	53
6. The four research sites involved in the community interviews.	54
7. Bario Participants by Gender and Age.	56
8. Pa Dalih Participants by Gender and Age.	57
9. Pa Lungan Participants by Gender and Age.	58
10. Urban Based Kelabit Participants by Gender, Age, Current Residence and Place of Birth.	59
11. Goods Price Table.	69
12. Subsidies Price Table.	69
13. The average transport costs in the Kelabit Highlands when using a 4WD in October 2010.	75
14. The cost involved in transporting goods between Bario and Pa Lungan in October 2010.	75
15. The table listing all of the large scale development projects in the Kelabit Highlands.	87
16. A list of the services provided by the Bario and Pa Dalih health clinics.	103

Chapter 1

Introduction

1.0 Rationale

The construction or upgrading of roads in remote rural areas of the developing world has the potential to alleviate poverty and support the development of rural communities (Grootaert, 2002). For this reason, many international donors and Governments from around the world have invested heavily in the construction and upgrading of rural roads. Over the last five years, the Malaysian Government has followed this trend with large investments devoted to the construction and upgrading of rural roads throughout Malaysia but with a strong focus on the states of Sarawak and Sabah. In some areas of Sarawak where the Malaysian Government has been reluctant to construct rural roads due to the high costs, it has negotiated with logging companies to open up the logging roads for public use. The result is greater mobility of rural populations in Malaysia and has increased their accessibility to urban centres and urban goods.

Without an in-depth investigation into the impacts of these roads, it is not possible to say whether these changes are viewed positively or negatively by the affected communities. Within the affected communities there may be individuals or groups that experience no change at all.

The primary goal of this research has been to describe how the construction and upgrading of rural roads in the Kelabit Highlands has been received by the Kelabit community.

I hope that the findings from this research will have three positive outcomes. Firstly, that it will support the affected communities in their understanding of the impacts caused by the construction and upgrading of the roads in their area and facilitate their planning for the future. Secondly, by relaying the views of the local community my findings may help the Malaysian Government to make better decisions on further road network projects in rural areas of Sarawak, Malaysia. The final desired outcome is that the findings will add to the existing literature on the impacts of rural road construction and upgrading in rural areas.

1.1 Aims and Key Questions of the Research

The aim of my research has been to establish the Kelabit community's perspective on the commercially financed logging roads that enter the Kelabit Highlands, the inter-village roads that connect the majority of the Kelabit villages in the Kelabit Highlands together and the upgraded roads in Bario. The aim was to gather local views on how the roads had impacted on the social and economic aspects of living in the Kelabit Highlands and relay their predictions for how the roads might affect the future development of the Kelabit Highlands.

My research set out to answer six key questions in relation to the three road projects -the logging road, the inter-village roads and the upgraded roads in Bario.

1. Who uses the roads?
2. For what purposes are the roads used?
3. How the roads have impacted the Kelabit community?
4. Who in the Kelabit community has benefited from the roads?
5. Who in the Kelabit community has not benefited from the roads?
6. What are the consequences of the positive and negative impacts caused by the road networks construction and its use?

1.2 Thesis Structure

This thesis will begin in chapter 2 by outlining the affects of road construction and road upgrading in rural areas of the developing world. Chapter 3 will continue the investigation into the affects of road construction and road upgrading but will narrow the focus to looking at the context of Sarawak, Malaysia. Chapters 2 and 3 will examine the social, economic and environmental impacts on rural communities caused by road construction and upgrading. Chapter 3 will also give a brief overview of the relevant Malaysian Government policies. Chapter 4 focuses on the Kelabit Highland context and covers both the modern and traditional aspects of living in the Kelabit Highlands, including the three road projects: the logging road, the inter-village roads and the upgrading of the Bario roads. Chapter 5 introduces the research design, methodology, sample, methods of data collection as well as noting some limitations of the research. Chapter 6 presents the results as they relate to living, working and visiting the Kelabit Highlands before and after the construction and upgrading of the road network. Chapter 7 will conclude the thesis and presents a summary of results.

Chapter 2

Literature Review

2.0 Introduction

It can be very difficult for the residents in rural areas of the developing world to get to the urban centres and the markets in order to sell their produce, to find employment, to access education and health care services or to buy farm items and consumer goods (Porter, 2002). It is of even greater difficulty when there is very limited to no road access to the urban centres and markets. The physical isolation that many rural communities experience is often responsible for sustaining their poverty and their vulnerability (Minot et al., 2006). Those in poverty need adequate modes of transport to access clean water, employment, education, health care, and the markets. The remoteness and inaccessibility of many rural communities can also prevent governments from providing basic social services to the isolated communities (Gibson & Rozelle, 2003).

One solution to solving the problem of isolation is to build rural roads that link rural communities to the markets and the urban centres. By providing roads to rural communities, major constraints that reinforce poverty can be removed and the rural communities can be set forth on the path of poverty alleviation (Grootaert, 2002). The World Bank and other donor organisations (such as USAID) view rural roads as been one of the best means of reducing poverty in rural areas. For this reason, the World Bank and other donor organisations have supported governments all around the world with the funding of rural road construction (Grootaert, 2002; Rigg, 2002; World Bank, 1996).

The quality and durability of a road network is a critical factor on a communities' level of mobility and its access to social infrastructure, goods and services (Barrios, 2008; BIDS, 2004; Leinbach, 2000; Olsson, 2009; Warr, 2008; World Bank, 1996). In Bangladesh for example, the quality of the road network was found to play a key role in the level of public resources that were invested in community infrastructure such as paths, roadside shops and market areas (BIDS, 2004). Barrios (2008) showed that areas in the Philippines with the poorest road quality usually had lower rates of school attendance, lower resource investment on education per capita and a lower likelihood that the sick or injured would seek treatment. In 2008, Warr conducted a study of rural roads in Laos and found that his data displayed a strong correlation between the quality of road access and the 'quality of life' in the communities linked to the road network (the better the road access, the higher the quality of life). However Warr went on to state that the observed correlation between the quality of road access and quality of life, may be a result of the government of Laos predominantly improving the road networks in areas that were already more advantaged.

2.0.1 Positive and Negative Impacts of Rural Roads

It has been argued that communities receive both positive and negative impacts from road access. Positive impacts of the construction, maintenance and upgrading of rural roads in the developing world include the improved supply of and access to education (Barrios, 2008; Gibson & Rozelle, 2003; Grootaert, 2002; Hettige, 2006; Jacoby, 2000; Warr, 2008), health care (Downing & Sethi, 2001; Lucas et al., 1995; Matin et al., 2002; World Bank, 1996), employment (Bravo, 2002; Grootaert, 2002; Rigg, 1998; World Bank, 1996), the markets (Bravo, 2002; Khandker et al., 2009; Lucas, et al., 1995), technology (Binswanger, 1993; Hernan, 1996) and government officials (Grootaert, 2002). The construction and upgrading of rural roads also brings benefits such as shorter travel times, cheaper transport costs and lower vehicle operating expenditure (BIDS, 2004; Hettige, 2006; Leinbach, 2000; Lucas, et al., 1995; Olsson, 2009; Warr, 2008; World Bank, 1996). Rural roads can reduce the price of inputs, increase the market size of rural communities and increase the quantity and choice of goods and services that are available to the rural communities (Grootaert, 2002; Jacoby, 2000; Olsson, 2009).

The construction or upgrading of rural roads in the developing world can also have negative social and economic impacts including the reduction of the labour force in rural areas (Adger et al., 2002; Barrios, 2008; Kreager, 2006; Lee & Shamsul Bahrin, 1992; Rigg, 2007), the increasing inequality between the wealthy and the poor (Bryceson et al., 2008; de Haan & Rogaly, 2002; Rigg, 1998) and extra strains on household budgets (Molesworth, 2005). Negative social impacts include the creating of gender and age structure imbalances in the rural communities (Kreager, 2006; Kreutzmann, 1991; Lee & Shamsul Bahrin, 1992; Molesworth, 2005; Rigg, 2007), health issues such as the spread of disease (Grootaert, 2002; UNDP, 2001; Warr, 2008), the introduction or supply of undesired products such as drugs and alcohol (Hettige, 2006; Warr, 2008), undesired behaviours such as theft and discipline issues (Windle & Crumb, 1999), increased traffic congestion and vehicle accidents (Grootaert, 2002; Olsson, 2009), and environmental problems (Grootaert, 2002; Warr, 2008). In addition to the undesired products and behaviours that have come to view due to increased accessibility, there is a major concern that many traditional rural cultures are being lost to a more modern urban culture as a consequence of increased accessibility (Kedit, 1994; Rigg, 2007; Thong & Bahrin, 1993; Windle & Crumb, 1999).

I turn firstly to the economic impacts then the social impacts. The chapter will then finish with an examination of why roads may not always alter or influence the lives of certain communities or individuals in the rural areas of the developing world.

2.1 Economic Impacts

Road networks can set up a process that will see increased input procurement and makes the marketing of produce easier. As accessibility to the rural community's increases, the cost of inputs to those rural communities should reduce as a consequence of cheaper transportation costs. Lower input costs should then ensure that the rural farmers serviced by road networks can acquire an increased quantity of inputs or will enable the rural farmers to invest in other ventures (Barrios, 2008; BIDS, 2004; Binswanger, 1993; Hernan, 1996; Jacoby, 2000; Khandker, et al., 2009; Minot, et al., 2006; Warr, 2008).

In addition to the cheaper transportation costs, those suppliers that had once had the monopolies over the sale of inputs to the rural communities before the road network improvements will now have competition as alternative suppliers become accessible. With greater levels of competition in the sale of inputs to the rural communities, it would be expected that the prices of inputs will reduce (Barrios, 2008).

As well as the reduction in the costs involved in importing inputs into rural communities, the costs of exporting goods from the rural communities to the market will be reduced with new or improved roading. Road networks will allow rural farmers to use new modes of transportation to move their exportable goods more efficiently, at a higher frequency and at cheaper prices (Grootaert, 2002; Jacoby, 2000). The quantity and diversity of goods arriving at the markets will increase and there will be an increase in the geographical size of the markets (Jacoby, 2000). When rural farmers have larger markets in which to sale their goods, the farmers will have greater power to negotiate the price of their goods.

Another economic benefit that rural farmers may gain as a result of improved accessibility and the increase in the size of the markets is that rural farmers can start to diversify and experiment with their crops and even begin to introduce cash crops for the first time. Over time, the farmers can start to specialise in the higher value crops that grow well in their specific area. This in turn should lead to an increase in farmers' incomes (Grootaert, 2002).

Lucas et al (1995) examined the participation of vendors at local markets in Tanzania and found that after road upgrades were completed on the feeder roads that connected the rural communities in the Iringa region to the markets, the number of vendors at the local markets increased and the variety of goods expanded. Vendors subsequently came from further away to sell their produce.

It was stated earlier that the quality of the road network plays a major role. If the quality of the road networks is so influential in establishing the level of benefits a community receives, then it would be expected that upgrading road networks would also benefit the rural community. The literature supports this argument.

The upgrading of the road networks decreases vehicle operating costs and reduces travel time (BIDS, 2004; Hettige, 2006; Leinbach, 2000; Lucas, et al., 1995; Olsson, 2009; Warr, 2008; World Bank, 1996). In the Philippines, Olsson (2009) carried out a study that looked at how the upgrading of a road (63km in length) which linked a study village to its major markets and found that the average fuel consumption was reduced by 35% and vehicle maintenance costs reduced by 44%. Before the upgrading of the road, the average travel time for a return trip between the study village and the major markets was 12-16 hours. After the upgrading of the road was finished, the average time for a return trip was reduced to 7-10 hours. In addition to the reduced travel times and vehicle operating costs, the upgrading meant that the road was usable by all motorised vehicles and could be used all year round. Olsson (2009) also found that when the upgraded roads reduced the vehicle operating costs of transport services, the price of inputs become cheaper and the cost of sending outputs to market decreased.

As a result of the upgrading, food products would arrive at the markets in a fresher condition and therefore receive higher prices. The World Bank (1996) study of an upgraded road network in Morocco found very similar results to Olsson (2009) but also reported that the lower operating costs meant lower fares for the consumers. Furthermore, new transport services were established and private vehicle ownership increased.

In Peru, roads helped in closing the gender gap at the markets. Bravo (2002) states that after road upgrades were made in her study in Peru, the number of women visiting the markets (whether selling or purchasing) increased.

Roads have also been shown to have detrimental effects on the demand for local goods and services. For example, Hettige (1996) points out that porters must compete with intermediate means of transport and motorised vehicles. The poorest porters run the risk of losing their livelihoods as they can often not afford to purchase or hire the equipment needed to compete with new transport services and privately owned intermediate means of transport and motorised vehicles.

Another example is Molesworth's (2005) study that demonstrates how roads facilitated the importation of outside products and how the importation of outside products damaged a community by reducing the sale of locally produced products. Molesworth explained how local Tamang women of Nepal brew beer, distil alcohol and weave cloth for the local market but with the introduction of the new road, the local Tamang women had to compete with mass produced beers, alcohols and cloth from India and China resulting in lower incomes which made the women more dependent on men for financial assistance. As a result women found they had less decision-making autonomy over household financial matters.

On the other hand, road construction or improvement can lead to an increase in the demand for local produce and as a consequence, it can result in resource reallocation (Kreutzmann, 1991; Windle & Cramb, 1997; World Bank, 1996). For example, Kreutzmann

(1991) found that as road networks in Northern Pakistan spread to formally remote areas, land usage would be converted from the traditional subsistence farming practices which supplied food products for the local communities to profitable cash crops. This meant that food products for the local communities had to be sought from outside of the region and therefore at a financial cost to the local communities. The World Bank (1996) also found resource reallocation in their study in Morocco. Two out of the three research locations in their study experienced a conversion from low value crops to high value crops after improvements to the road network ensured that the crops would arrive at the market undamaged.

2.2 Off-farm employment

For most residents of rural areas, farming still remains the main form of employment or survival strategy. It was explained earlier that roads lower farm inputs and can make farming practices more efficient. Farming has been facilitated by road access; however the percentage of people continuing to farm is reducing (especially in Asia). An example of this departure from farming can be seen in Sarawak, Malaysia. The percentage of people in Sarawak working in the agriculture, forestry, livestock and fishing industries dropped from 56.5% in 1980 to only 29.1% in 1999. Meanwhile, during the same period other industries such as manufacturing (16.2% to 22.6%) and construction (14.6% to 27.8%) grew (Malaysian Government, 2000). There are many reasons for the departure from farming. One of the main reasons is that off-farm employment generally has better pay and usually involves less demanding work and shorter hours (Rigg, 1998). In addition to better paid jobs, off-farm employment allows rural households to diversify their income activities and therefore diversify their survival strategies (Grootaert, 2002).

For rural communities that live close to urban centres, roads and transport services provide a channel that allows them to work in the urban centres during their working hours and still return home at the end of each working day. However, large proportions of rural residents do not live near an urban centre and may need to migrate to the urban centres to find off-farm employment.

The construction or the upgrading of roads can facilitate the gaining of off-farm employment (Bravo, 2002; Grootaert, 2002; World Bank, 1996). Roads allow rural residents access to the urban centres where the majority of off-farm employment exist but also have the potential to create off-farm employment within the rural communities. Off-farm employment can be created with the construction of the road itself and any corresponding infrastructure. The World Bank (1996) compared three project zones (zones with upgraded roads) and a control zone (zone without upgraded roads) in Morocco to see whether there was a difference between the average number of days worked outside the household farm in each zone before and after the upgrading of the roads. The number of days worked

outside of the household farm in all three of the project zones had risen by six times compared to before the roads were upgraded. The number of days worked outside of the household farm in the control zone only increased by three times during the same period. Bravo (2002) also presents evidence to support the theory that upgraded roads facilitate off-farm employment. Bravo states that upgraded roads facilitated the movement of rural seasonal workers in Peru. She also found that as a consequence of easier transportation to seasonal jobs, the number of rural seasonal workers travelling on their own increased.

2.3 Migration

The out-migration of rural residents to the urban areas is not a new phenomenon; however throughout the developing world it is an increasing phenomenon. One of the main indirect effects of road construction in rural areas is the increase in migration from the rural areas to the urban centres. Roads act as a catalyst for migration rather than the drive for migration. For example, Farming is increasingly seen (especially by youth) as a low status occupation which involves heavy labour and long hours and as a consequence, less people want to be farmers (Lee & Shamsul Bahrin, 1992; Rigg, 2006, 2007; Windle & Crumb, 1999). For this reason, there is an increasing number of rural residents who desire to migrate to the urban centres in search of off-farm employment. Road access to the urban areas can facilitate those residents with their migration to the urban areas or can allow access to the urban areas that may not have been accessible before. The roads therefore help these migrants in their decision to migrate rather than being the factor underpinning the desire to migrate.

Many rural households believe that migrating to urban centres with the goal to further their education and gain off-farm employment is the best method of alleviating their own poverty and supporting their communities through the sending of remittances (Adger, et al., 2002; de Haan & Rogaly, 2002; Hew, 2003; Minot, et al., 2006; Rigg, 2007). Studies such as Adger et al (2002), Hew (2003) and Barbieri and Carr (2005) go on to state that the migration of rural household members to the urban centres provides flexibility and security to the rural households. Remittances can be sent back and used to invest in the farming operations or support the household during hard times (such as drought or the failing of crops).

Roads act as a catalyst for migration but also allow migrants to return to their rural households more frequently and at lower cost. When migrants return to their rural households, they often bring back with them resources sourced from outside their rural communities. Windle & Cramb (1997) discovered that in Sarawak, Malaysia, the more frequently migrants returned to their rural household, the more they remitted.

Many migrants do not leave their rural communities permanently. Migration can be seasonal or cyclical and may end once a migrant is no longer of working age. Lee & Shamsul Bahrin (1992) also looked at migration in Sarawak and found that the majority of migrants in their study intended on returning to their rural communities after retirement. Returning

migrants not only bring financial benefits but can also bring new knowledge and skills (Adger, et al., 2002). Many migrants who are permanently moving back to their rural communities do not wish to go back to farming. For example, Kreutzmann (1991) conducted a study which looked at the impact of road construction on the communities in the mountains of Northern Pakistan. He found that many of the migrants who returned to their rural communities avoided returning to farming and instead opened small businesses such as shops, private transport services or trades.

While migration can create benefits for rural communities it can also lead to harmful outcomes both to sending and receiving communities. For rural communities, out-migration can cause agricultural labour shortages (Adger, et al., 2002; Barrios, 2008; Lee & Shamsul Bahrin, 1992; Rigg, 2007), create further age-structure and gender imbalances (Kreager, 2006; Kreutzmann, 1991; Lee & Shamsul Bahrin, 1992; Molesworth, 2005; Rigg, 2007), as well as facilitate the loss of traditional customs, norms and practices (Kedit, 1994; Rigg, 2006; Thong & Bahrin, 1993; Windle & Crumb, 1999). For the urban communities, migration can cause congestion and unsustainable rates of urbanisation (Barrios, 2008).

Migration can also cause a significant change in the demographic structure of rural communities. Many studies point out that most migrants are usually the younger members of rural communities. Young adults make up the majority of labour migrants (Kreager, 2006; Kreutzmann, 1991) and for many rural children in the developing world, continuing education into the secondary or tertiary levels often means migrating to urban centres (Kreutzmann, 1991). Generally, male migrants outnumber female migrants (Resurreccion, 2005; Rigg, 2007); however there is evidence to say that the gap between the number of men and number of women migrating is closing (Lim & Oishi, 1996; Resurreccion, 2005). It is also more likely that the wealthier members of rural communities will migrate over the poorer members of the rural communities (Bryceson, et al., 2008; Rigg, 1998). Furthermore, those rural community members who do migrate are usually the more energetic, higher educated and better qualified members in the rural communities (Lee & Shamsul Bahrin, 1992).

When rural residents migrate to the urban centres, they potentially leave behind a gap in their rural community's labour force. If the rural community does not fill the gap, then financial losses may occur or village supplies may run short. This often means that those who are left must either fill the gap or hire help (Kreutzmann, 1991; Molesworth, 2005; Rigg, 2007). Molesworth (2005) found that rural women endured most of the burden from the reduction of work force in their communities. Women had to complete not only their own jobs within the household and the community but also carry out the jobs that the men had left behind when they migrated. Molesworth also found that children were sometimes kept from attending school so that short falls in the community or household labour force could be covered. Girls tended to be withdrawn from school to fill the labour gaps before boys were as girls were not seen to be as much of an economic asset as boys were.

In summary, rural road construction and upgrading can increase the level of migration in rural areas. Those migrating generally only come from particular demographic groups and this has led to problems such as labour shortages which can make the rural way of life very difficult or impossible. On the other hand, the migration of rural residents to the urban centres can lead to positive outcomes for those still in the rural areas. Many migrants still interact with their natal villages and continue to support them with remittances.

2.4 Education

Education is believed to be an important tool in alleviating poverty but education can be hard to access when there are no roads or road quality is poor. Accessing education can also be very difficult when large distances must be travelled or transportation services are too expensive and inefficient.

It is very common for rural children in the developing world to have to walk for hours to get to school or they have to board in school supplied accommodation (Bala, 2002; Gibson & Rozelle, 2003; Hettige, 2006). It is therefore, not surprising that drop out rates and absenteeism are high in many rural communities. Other reasons such as farm and household workloads, cultural beliefs and financial limitations may also play a large role in school drop out rates and absenteeism (Hettige, 2006; Molesworth, 2005). Within the literature there are studies that show that the creation or the upgrading of road networks is a pre-requisite to increasing enrolments, reducing drop-out rates and decreasing absenteeism at rural schools (Barrios, 2008; Gibson & Rozelle, 2003; Grootaert, 2002; Hettige, 2006; Jacoby, 2000; Warr, 2008). Warr (2008) for example found that villages in Laos without road access have lower rates of attendance and lower per capita expenditure on education than villages with road access.

Hettige (2006) revealed that rural roadside communities in Sri Lanka, Indonesia and the Philippines had higher education attainment than off-roadside communities. Hettige also found that on average, the heads of the rural households and their spouses from the roadside communities had completed 6.4 years of schooling, whereas the heads of the households and their spouses from communities without road access only had an average of 5.2 years of schooling.

In 1996, the World Bank carried out a study in Morocco which looked at how roads affected three rural villages. In all three villages, the number of schools and satellite classrooms increased and the recruitment of teachers became easier after road construction and rehabilitation was completed. Additionally, Grootaert (2002) states that better qualified teachers are more willing to work in areas with road access. According to Hettige (2006) roads also provide government officials with easier access to rural schools which means that

supervision, support and resources can be given to rural schools more frequently and more promptly.

As it was stated above, the road quality has a detrimental effect on the accessibility of education. A study by Gibson and Rozelle (2003) found that the areas of Papua New Guinea that had the poorest road quality and the longest travel times to reach the schools also had the highest number of residents who never attended school and the lowest levels of literacy and educational attainment. Both the World Bank (1996) and Khandker et al (2009) found that school enrolments increased after the upgrading of the roads in their studies in Morocco and Bangladesh. Khandker et al (2009) study in Bangladesh showed that the increased enrolment was more pronounced in the secondary schools than the primary schools. This was because primary schools were generally closer to rural communities than secondary schools. While travelling to primary schools is often done by walking short distances (often without the use of the road), travelling to secondary schools involved travelling by foot for up to several hours or travelling along the road with the use of intermediate means of transport or motorised vehicles. Once travelling along the roads became easier, cheaper and more reliable, the prospect of sending children to secondary school became more attractive and worthwhile.

Another significant observation in Khandker et al study is that the increase in girl's enrolment was significantly higher than that of increased boy's enrolment. The World Bank (1996) revealed comparable findings in Morocco. In fact, it was discovered that girls enrolment at primary school increased by 300% after the upgrading of the road network.

The World Bank (1996) also found that after the road networks were upgraded, the quality of education in the rural primary schools improved as a consequence of increased recruitment of qualified teachers and a decrease in absenteeism of both teachers and students.

In summary, educational facilities and their users have benefited from road construction and upgrading. It was found that the construction and upgrading of roads in rural areas increased the enrolment, decreased the drop-out rates and reduced the absenteeism of both students and teachers. Rural residents that had road access to the schools generally had higher educational attainment than those rural residents with no road access. For the schools in areas that have just received road access or road access has been improved, the supply of teachers, school resources and school infrastructure was facilitated.

2.5 Health and Safety

Health care is an essential basic social service and good quality access and transportation play a key role in the staffing and equipping of health centres. Ensor and Cooper (2004) state that the largest barrier for rural residents to access health care is the distance and

time it takes to reach health clinics. For many rural residents without roads or transportation, the distances to health clinics are too long and time-consuming. Those that do make the journeys have to forego are often removed from their subsistence activities or employment for extended periods of time. A World Bank (2001) study in Mozambique found that 38% of respondents did not seek treatment due to the distance they had to travel to reach the nearest health centre.

Downing and Sethi (2001) claim that road access facilitates the provision of health care in rural areas in three ways. Firstly, the local communities have easier access to the health centres. Secondly, mobile health care workers have easier access to the communities. Thirdly, health care services become more sustainable as supplying and staffing rural health care facilities becomes easier with road access.

Downing and Sethi also state that disease management programmes can be implemented faster and more efficiently when there is sufficient transportation. Additionally, Matin et al (2002) found that the health services provided by outreach workers in rural Bangladesh were improved by all-weather roads. Health care services not only witnessed an increase in the number of people using their services but also experienced a higher frequency of use after the upgrading of rural roads (Lucas, et al., 1995; World Bank, 1996). In the World Bank (1996) study in Morocco, the number of rural residents who used the health care services after the upgrading of the road networks nearly doubled. Furthermore, health care services experienced an increase in professional staff, a more reliable supply of medications and the implementation of health prevention programs¹ became easier after the upgraded roads were completed.

There is also an argument that states that there are also many harmful health effects that arise from the construction or upgrading of rural roads and the increase in the number of transport services and private vehicles using the road. The literature shows five harmful problems that relate to the construction or upgrading of rural roads. They fall into three categories, environmental damage, health and safety matters and negative novel influences.

The first and second problems are related to environmental damage. Firstly, Grootaert (2002) and Warr (2008) state that roads facilitated deforestation, mining and erosion as roads make the prospecting and extraction of natural resources easier. When roads are upgraded, larger vehicles can be brought in to clear or mine an area, and larger and more efficient transport vehicles can be used to extract the resources. All of this can lead to major environmental damage that can be harmful to the region and its people. Secondly, an increase in traffic density will generally result in an increase in air and noise pollution (Olsson, 2009).

The third and fourth problems are directly related to health and safety issues. The third problem is that new roads and increased traffic flows can facilitate the spread of diseases

¹ Such as immunization and maternal aid

such as HIV/AIDs (Grootaert, 2002; UNDP, 2001; Warr, 2008). The fourth problem is that an increase in transport services and private vehicles on the roads can result in the increase of road accidents (Grootaert, 2002; Hettige, 2006; Olsson, 2009; World Bank, 1996).

The final problem is an indirect result of the roads. The new or upgraded roads increase the access to urban centres and larger markets. The increased access to urban centres often results in the availability of new goods and services or an increase in previously available goods and services which increase the risk of exposure to negative influences. A study by Molesworth (2005) in Nepal revealed other examples of how increased accessibility can lead to negative nutritional and health impacts. Molesworth found that the variety and quantity of manufactured products with low nutritional value had increased as a result of increased accessibility. Additionally, Molesworth found that many households now used new manufactured foods such as milk substitutes which do not contain any of the nutritional values that are found in dairy products. The traditional foods which are high in nutritional value (such as boiled soya beans, sweet potatoes and popped maize) were being replaced by instant noodles and other synthetic foods which contain almost no nutritional value.

There are however other reasons for the increase in the consumption of manufactured foods over the traditional foods. Molesworth points out that manufactured products are increasing in popularity with rural households as they can usually be stored for longer and are easier to prepare than traditional foods. They also taste good and they give an impression of being a modern urban consumer good.

Another negative health impact that occurred after the introduction of the road in the Molesworth (2005) study was that almost all the adults in the study started smoking manufactured cigarettes. It must be stated that many of the adults in the study already smoked home-grown tobacco; however Molesworth (2005) suggests that manufactured cigarettes have greater negative health impacts. Furthermore, the financial cost involved in purchasing manufactured cigarettes reduces the ability to purchase vital household goods.

In addition to the unhealthy products that become available with increased access, there are also the illegal goods and services such as drugs and the sex trade that become more accessible (Hettige, 2006; Warr, 2008). Not only do rural residents have greater access to illegal goods and services but roads may assist rural residents into the growing and manufacturing of drugs or the entering into the sex trade.

Drugs and the sex trade bring undesired behaviours into rural communities, but they are not the only undesired behaviours that have entered rural communities as a result of roads. Hettige (2006) found that roads allow thieves' access to communities that they may not have been able to reach before. Furthermore, roads enable thieves to depart the scene of a crime easier and faster. Windle and Cramb (1999) stated that there was a common concern from the participants in their study in Sarawak, that 'bad people' would enter their communities now that roads linked them to the urban centres.

In summary, healthcare facilities were found to benefit from the construction and the upgrading of the roads. The staffing and the supplying of rural health clinics were facilitated by the roads. The roads also helped patients to access the health clinics and helped the mobile healthcare workers to attend to patients that still could not access the health clinics. Negative health impacts were also found to be caused by the roads. Many health and safety problems started or increased as a result of the roads. These problems include deforestation and pollution, increased road accidents and the spread of infectious diseases, increased access to undesired or unhealthy goods and services, and undesired behaviours.

2.6 Why Roads Fail to Improve the Mobility of All Rural Residents

The literature that has been presented so far shows how newly constructed or upgraded road networks can have positive and negative impacts on rural communities. There is however, literature that presents other scenarios in which road networks on their own fail to stimulate increased mobility or accessibility. Many studies have shown evidence that simply constructing or upgrading a road network does not guarantee that all of the residents of the rural communities serviced by the road network will experience an increase in mobility or accessibility (Barwell, 1996; Bryceson, et al., 2008; Dalkmann et al., 2008; Dawson & Barwell, 1993; Fernando & Porter, 2002; Johnston, 2007; Khandker, et al., 2009; Leinbach, 2000; Molesworth, 2005; Peters, 2002; Windle & Cramb, 1997). In this section, I will discuss some of these studies.

In many rural areas of the developing world, the rural populations are still farmers whose mobility is usually limited to their local regions and walking remains their main form of transportation. Windle and Cramb (1999) found in their study of rural communities in Sarawak, Malaysia, that even though new road networks had been created to service rural communities, 90% of the residents still walked to their fields and head loaded their inputs and outputs. The road networks did not directly reduce the problem of head loading, but it did shorten the travelling time between the home and the field. It was a similar scenario in Barwell (1996) study of transportation in rural Sub-Saharan Africa. Barwell found that 87% of all trips made by the rural population in his study were still made by foot and were conducted within local areas. In fact, only about 10% of all Sub-Saharan transport demand was for regional travel.

Rural road networks are designed for intermediate means of transport and motorised vehicles, yet the majority of rural residents in the developing world do not own or have access to either (Leinbach, 2000). Predominantly, the literature states that it is the limited finances of rural residents that prevent them from owning their own transportation (Bryceson, et al., 2008; Bryceson & Howe, 1993; Dawson & Barwell, 1993).

When intermediate means of transport or motorised vehicles are found in rural communities, they are usually found in the possession of particular demographic groups within the community (Bryceson & Howe, 1993; Fernando & Porter, 2002; Mahapa & Mashiri, 2001; Peters, 2002). For example Bryceson and Howe (1993), and Mahapa and Mashiri (2001) found that in rural Africa, the possession of IMTs is almost always in the hands of men. Both studies give three explanations for why their possession is found almost solely with men rather than women.

Firstly, within rural Africa, the entitlement to possess intermediate means of transport is mostly based on the need to use the transportation for commercial purposes. As women within the context of rural Africa are usually restricted (by cultural beliefs and socially constructed gender roles) to the domestic duties within their communities, they do not fit the criteria used to entitle possession of intermediate means of transport. Secondly, in some African cultures it is seen as culturally inappropriate for women to possess or operate intermediate means of transport. The final explanation is that women in rural Africa very rarely have the finances to acquire these goods. With gender roles restricting rural African women to the domestic duties within their community, it is very difficult for rural African women to earn the required resources needed to purchase intermediate means of transport or motorised vehicles.

In addition to the inequality found between men and women in regard to the possessing of intermediate means of transport and motorised vehicles, there is also inequality in their ownership between the wealthy echelon and poor echelon. Studies such as Fernando and Porter (2002) and Bryceson et al (2008) found that within rural communities in the developing world, the wealthy echelon experienced greater levels of mobility and accessibility than the poor echelon. All three studies found that it was the poor echelon's limited finances that restricted the poor echelon from purchasing modes of transportation.

Transportation services and infrastructure also play a key role in increasing the accessibility, mobility and migration of the rural communities, however many of the same problems found with the possession or ownership of intermediate means of transport and motorised vehicles reappear with the accessing of transport services. In many rural communities public transport services are often unreliable, are of poor quality, are located too far away or do not exist at all (Bryceson & Howe, 1993; Dawson & Barwell, 1993; Johnston, 2007; Leinbach, 2000; Peters, 2002). Bryceson et al (2008) found that the arrival of transport services (such as buses and truck rental) into rural areas is often dependant on the population density and purchasing power of the area. For these reasons, many rural residents forego the use of the transportation services or must. For many rural residents, the ability to use public transport services still involves walking long distances to reach public transport services as Johnston (2007) found when he investigated public transport use in Garut Regency, West Java, Indonesia.

2.7 Summary.

The remoteness of many rural communities limits the community's mobility and access to external goods and services. Additionally, the remoteness of the rural communities makes it very difficult for governments to provide basic social services in those communities. As a consequence, a large number of studies have found that the remoteness of some rural communities reinforces the remote communities' poverty.

The rural road construction or upgrading in the developing world has had different impacts on different rural communities. The literature presents both the positive and negative outcomes that have occurred as a result of the construction or upgrading of rural roads in the developing world.

Road networks can set up a process that will see increased input procurement and will make the marketing of produce easier. As the access between a rural community and the market increases, the price paid for external goods reduces and the transport costs for sending goods to the market decreases. The construction or upgrading of rural roads reduced travel times and vehicle operating costs. As a result of shorter travel times and lower vehicle operating costs, transport fares also decrease. Furthermore, cheaper transport costs mean that farmers can grow alternative exportable crops. Not only do the crops grown in the community diversify but so do the goods coming into the community.

Healthcare facilities generally benefited from the construction and the upgrading of the roads. The roads facilitated in the staffing and the supplying of rural health clinics. Roads helped patients to access health clinics and the roads facilitated healthcare workers to attend to patients that still could not access the health clinics. On the other hand, many rural communities experienced harmful effects from the construction or upgrading of the roads. Many health and safety problems started or increased as a result of the roads. These problems include deforestation and pollution, increased road accidents and the spread of infectious diseases, increased access to undesired or unhealthy goods and services, and undesired behaviours.

Overwhelmingly, educational facilities and their users benefited from road construction and upgrading. Rural roads can have a beneficial effect on enrolment, absenteeism and drop-out rates in schools in rural areas. It was generally found that the construction or upgrading of roads in rural areas increased enrolment and decreased absenteeism and drop-out rates. Several studies also showed that the enrolment of girls increased and as a result, gender gaps that are so often found in rural schools in the developing world were reduced. Additionally, there are studies that show that residents that have road access to the schools generally have higher educational attainment than those rural residents with no road access. For the schools in areas that have just received road access or road access has been improved, the supply of teachers, school resources and school infrastructure was facilitated.

Farming still remains the main occupation and way of life in the majority of rural areas in the developing world; however farming is holding less appeal for larger numbers of rural residents. Instead, many rural residents are seeking off-farm employment. Roads facilitate the gaining of off-farm employment for rural residents. The roads have done this in several ways. Firstly, the roads allow rural residents access to the urban centres where the majority of off-farm employment exist. Secondly, roadside communities tend to have more off-farm employment than non-roadside communities as the road allows people and goods to move more freely. Thirdly, off-farm employment is created from the construction of the road itself and any corresponding infrastructure.

Mass migration of rural residents to urban centres has been a very common occurrence this century and throughout the last half of last century. Rural road construction or upgrading can increase the level of migration in rural areas. As a result, many rural communities are witnessing the exodus of their residents. Additionally, those that are migrating generally only come from particular demographic groups. This has lead to problems such as labour shortages which can make the rural way of life very difficult or impossible. On the other hand, the literature showed that many migrants still interact with their natal villages and continue to support them with remittances.

There are often individuals or groups within the affected communities that find that the roads do not increase their mobility or their ability to access goods and services. For many rural residents in the developing world, vehicular transportation is unavailable. This can be a result of the rural residents not having access to intermediate means of transport, motorised vehicles. Financial limitations and cultural beliefs were the main reasons for the lack of vehicle ownership and avoidance of using transport services. The literature pointed out that rural females generally had the largest restrictions when it came to use of transportation. Additionally, transport services tend to supply transportation to areas that have higher purchasing power and avoid areas with low purchasing power.

Chapter 3

Transportation, Mobility and Migration in Sarawak, Malaysia.

3.0 Introduction

Within Sarawak, Malaysia, there have always been mobile individuals and communities. In fact many of the Dayak ethnic groups that now reside in Sarawak, Malaysia are believed to have migrated from other parts of Borneo. However, besides the moving of whole communities in Sarawak, it was traditionally almost exclusively high status/class males who experienced the freedom of mobility. Traditionally, Men would use their freedom of mobility to trade, fight, fulfil spiritual practices, attain material wealth and acquire social prestige (Bala, 2002; Windle & Crumb, 1999).

In this chapter I will start by examining the transport systems in Sarawak, Malaysia and the mobility of those that reside in Sarawak, Malaysia. I will then discuss how the road networks in Sarawak, Malaysia have affected the socioeconomic aspects of living in Sarawak, Malaysia. I conclude with a section that details the policies and projects that have been set by the Malaysian Government and relate to road construction, road upgrading, transportation and agriculture.

3.1 Transportation and Road Networks in Sarawak, Malaysia.

Traditionally boat travel and walking were the main forms of transportation in Borneo (Cleary & Eaton, 1992; Windle & Cramb, 1997) and in many rural areas of Sarawak; these two forms of transport still remain the only means of transportation. After World War II, new modes of transportation in the rural areas became available. Air and road travel supplied some rural communities with access to the urban centres which had previously been regarded as too time consuming to travel to. Air travel meant that some of the residents in the most remote communities could now make the journey and transport their goods between their region and the urban centres.

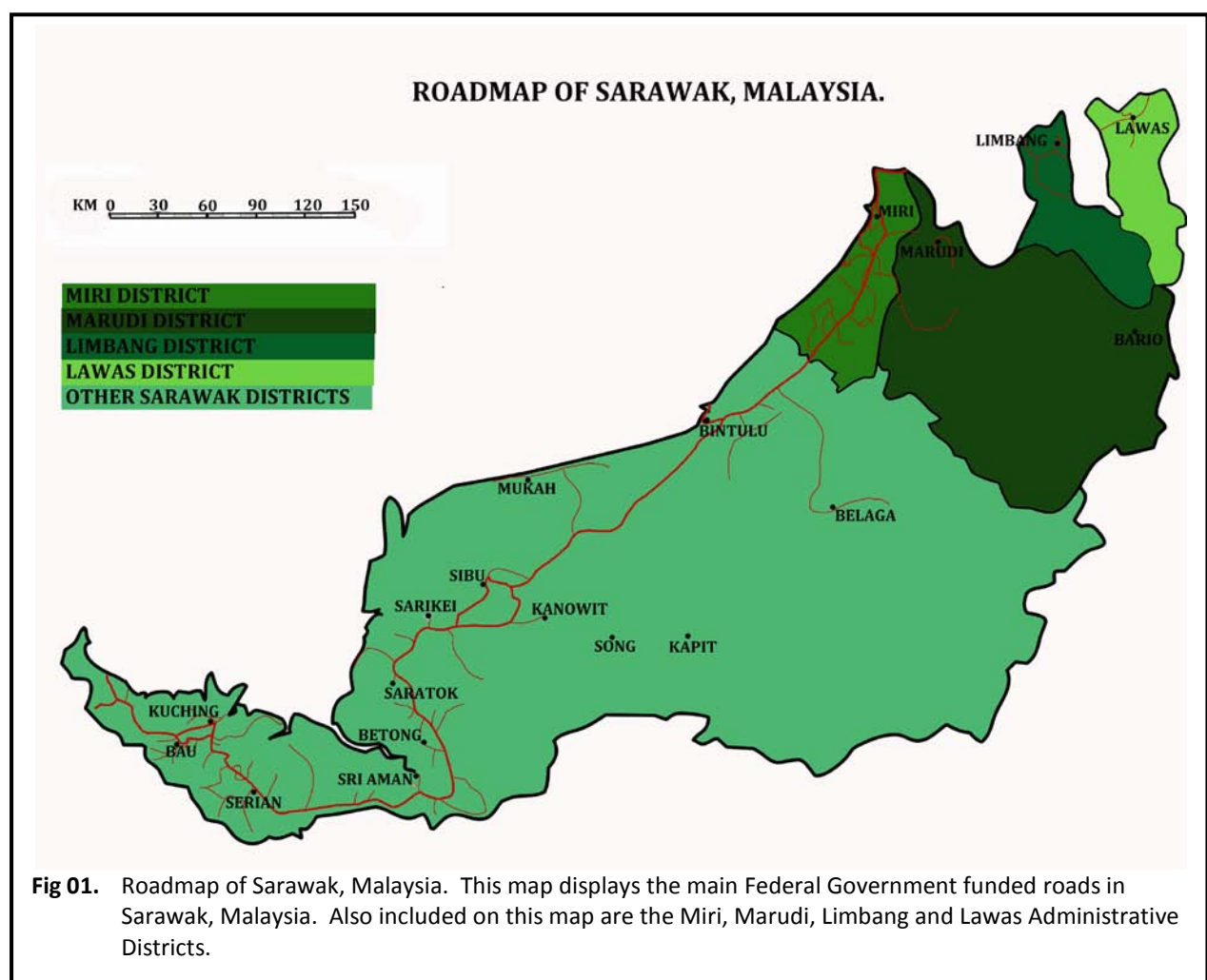
However air travel has two major issues. Firstly, air travel is for most remote rural residents, considered too expensive. Secondly, the landing strips used by commercial air travel companies are located at a limited number of sites, which still leaves a large proportion of Sarawak's remote rural communities without vehicular access.

Road travel is generally cheaper to use than air travel and is now becoming more accessible to a larger proportion of the rural population. Road travel is considered by the Malaysian Government as an important method of reducing poverty in the rural areas and as a result,

the Malaysian Government has invested in the construction of road networks throughout the nation (KKLW, 2010; Lee & Shamsul Bahrin, 1992; Malaysian Government, 2010; Windle & Cramb, 1997). Figure 01 displays the map of Sarawak with the current state roads.

In addition to the road networks that are funded by the Malaysian government, there are the logging roads which are constructed by commercial logging companies. The logging roads connect more and more communities to the Sarawak road network and are continuously spreading their way through the interior of Sarawak (Lee & Shamsul Bahrin, 1992).

The investment by the government and commercial logging companies has meant that more and more rural residents have access to the road networks, yet the low levels of public investment in transport services and their corresponding infrastructure (such as transport centres and bus stops) have continued to limit the mobility of the rural populations in Sarawak (Windle & Cramb, 1997). The majority of rural residents must rely on their own ability to purchase vehicular transport; however limited financial resources restrict the capacity of most rural residents to purchase vehicular transport.



3.2 Government Policies for Roads and Transportation in Sarawak, Malaysia

The Malaysian Government has released many policies that relate to the construction, upgrading and maintenance of the road networks in Malaysia. This section will discuss the more recent National road policies.

3.2.1 The JALB Programme

In 1977, the JALB Programme was established during the Accelerated Rural Road Programme (ARRP). The preliminary goal of the JALB was to increase the number of road construction projects in operation and to increase the speed at which the roads were constructed. During the early stages of road construction under the JALB Programme, most rural roads were only constructed to a minimum standard with the intention to provide basic accessibility. In more recent times, the JALB Programme's focus has changed to the goal of improving and expanding the rural transportation system. As a result, the rural roads are now built or upgraded to a higher standard. This higher standard of road construction involved enhanced road design, better surfacing materials and a higher geometric standard. The roads must now withstand a lifespan of 20 years with orderly maintenance completed every year. The relaying of the surfacing materials is to be completed once every 10 to 15 years after construction is completed (depending on traffic volume). As well as increasing the mobility of rural residents, the higher standard of road construction is intended to assist the movement of heavy and commercial vehicles in the rural areas. It is believed that by facilitating the movement of heavy and commercial vehicles in the rural areas, the development of these rural areas will be accelerated (KKLW, 2010).

Economic growth and to a lesser extent, poverty alleviation are the main driving forces behind the construction and upgrading of rural roads under the JALB Programme. The proposed construction or upgrading of rural roads that obtain the most attention under the JALB Programme are those roads that will encourage and facilitate economic development in the agriculture, estate, manufacturing, service and tourist sectors. Particular focus is placed on those roads that will link remote areas that participate in the sectors mentioned above to the National road networks (KKLW, 2010).

Roads that lead to socio-economic development in rural areas also receive sizeable levels of attention. For example, significant attention is given to roads that work as a catalyst to enable rural residents to gain employment, enhance the access rural residents have to basic public services (such as health care and education) and increase the effectiveness of transportation and communication systems in rural areas (KKLW, 2010).

3.2.2 Vision 2020

In 1991, the Malaysian Government set up 'Vision 2020'. The main focus of Vision 2020 is to have Malaysia recognised as a developed nation by the year 2020. To become a developed nation by 2020, former Malaysian Prime Minister YAB Dato' Seri Dr Mahathir Mohamad stated that Malaysia must overcome nine strategic challenges. Many of the strategic challenges are irrelevant to this paper, so they will not be defined here². The strategic challenge with relevance to this paper is as follows '*Ensuring an economically just society*'.

To ensure that Malaysia has an economically just society, all members of the nation need to be participating in the economic process. Almost all economic activity in Malaysia takes place in the urban areas. This has meant that those that reside outside of the urban areas are often left out of the economic system and therefore have not received the same level of benefits that economic progress has brought to Malaysia. The goal by 2020 is to have a fair and equitable distribution of wealth throughout Malaysia and to ensure that every Malaysian resident has access to the economic system (Mohamad, 1991). Vision 2020 does not specify a detailed plan of action to achieve the goals set forth in the Vision 2020 paper but one of the main indicators for the success of Vision 2020 is that all Malaysians will be moved above the line of absolute poverty. With the largest percentage of those in absolute poverty residing in the rural areas it is important that the rural areas receive adequate access to the urban areas.

3.2.3 The Ninth Malaysia Plan

Since Malaysia gained independence, the nation has been guided by nine Malaysia Plans, with each Malaysia plan running over five year durations. The Malaysia Plans set the nations socioeconomic targets and the processes needed to reach these targets. The first Malaysia plan was established in 1961. The current Malaysia Plan (Ninth) started in 2006 and will be replaced by the Tenth Malaysia Plan in 2011.

In the Ninth Malaysia Plan, Prime Minister YAB Dato' Seri Abdullah Bin Haji Ahmad Badawi stated that there still exists large inequalities between urban and rural residents. In 2004, the income gap between rural areas and urban areas was 1:2.11. The percentage of rural residents below the poverty line (11.9%) was twice as high as the national average. With 37 percent of the Malaysian population residing in the rural areas, the inequalities between the rural and urban areas had to be acknowledged as an important factor impeding on the development of Malaysia. With this in mind, the Ninth Malaysia Plan set about reducing the level of inequality between the rural and urban areas.

² The nine strategic challenges can be found at www.pmo.gov.my/?menu=page&page=1898

The Ninth Malaysia Plan set a target of reducing the income gap between rural and urban areas to 1:2 by 2010 and a narrowing of the national socioeconomic divide which is found between the rural and urban areas. The Ninth Malaysia Plan had set out two methods to achieve the goal of reducing the inequalities between the rural and urban areas. The first method is to facilitate the expansion of the agriculture sector which is the driving force of the rural economy. The government proposed that the expansion of the agriculture sector would be achieved by the opening up of new agricultural areas, expanding the usage of modern agricultural techniques and technology, increasing R & D, improving farming accreditation, introducing product standards and quality, developing marketing capabilities, promote higher levels of private sector participation and increasing rural infrastructure (such as roads). The second method is to increase the level of accessibility rural residents have to basic socioeconomic infrastructure, such as healthcare education and off-farm income. Both methods will require improved accessibility to a large number of rural areas and therefore the creation of new rural roads and the upgrading of existing rural roads.

Although no target was set in the Ninth Malaysia Plan for the number of or length of new rural and village roads to be constructed, it was confirmed that RM2.7 billion would be spent on the rural roads and RM900 million would be spent on village roads.

3.2.4 The Government Transformation Programme (GTP Roadmap)

“We aim to ensure Malaysians living in rural areas are connected to the roads network and have access to housing, electricity and clean water” (Malaysian Government, 2010: p184).

The quote above was made by Dato’ Seri Haji Mohd Shafie bin Haji Apdal in his presentation speech for the Government Transformation Programme 2010 (GTP Roadmap). The GTP Roadmap was launched at the beginning of 2010 and was established to facilitate Malaysia in its effort to overcome the challenges that stand in the way of achieving the goals of Vision 2020. The GTP roadmap gives the facts on the objectives, sets the precise targets and covers in light detail, the processes that will be used to achieve the objectives. The GTP roadmap has been developed in conjunction with the National Economic Action Council’s (NEAC) New Economic Model and the EPU’s Tenth Malaysia Plan.

The GTP roadmap set an initial cost estimate of up to RM18 billion to be spent on basic rural infrastructure over a three year period (2010 – 2012). Of the RM18 billion to be spent on basic rural infrastructure, a very large percentage will be used on the construction or upgrading of the Malaysian road networks. In the GTP roadmap, it was acknowledged that many villages in Sarawak and Sabah are still to be connected to the national road network. With this in mind, the goal set forth in the GTP roadmap for 2012 is to have constructed or upgraded more than 7000km of roads throughout Malaysia, of which, 1900km of roads will be constructed or upgraded within Sarawak and Sabah. It is estimated that these new or

upgraded roads in Sarawak and Sabah will connect 800,000 people to the road networks in Sarawak and Sabah (Malaysian Government, 2010).

3.3 Agriculture and Roads in Sarawak, Malaysia

By the end of the 1980s, it was believed that Peninsula Malaysia was reaching its maximum production with the technology that existed at the time. The main reason for this was that available land for further agricultural development was becoming scarce. The majority of the agricultural land was devoted to oil palm and rubber. In 1990, Peninsular Malaysia had over 80% of the total planted rubber and oil palm production (Poey, 1990).

With new tracts of agricultural land becoming increasingly more difficult to find within Peninsular Malaysia, the search for undeveloped land focused more intensively on Sarawak and Sabah. It was believed that Sarawak alone had over 4.9 million acres (2 million hectares) of land which was suitable for oil palm and rubber cultivation (Poey, 1990).

There were however several constraints in Sarawak that kept the rate of conversion from undeveloped land to agriculturally productive land. Firstly, during the late 1980s it cost 20% to 30% more to produce the same agricultural product in Sarawak, Malaysia as it did in Peninsular Malaysia.

Secondly, Sarawak suffered major labour shortages in the rural areas. Several factors played a role in the rural labour shortage problem. The largest reason for the labour shortage in rural areas of Sarawak was due to the high levels of rural to urban migration that had been occurring within Sarawak. Another reason for the labour shortage in Sarawak was due to the perception that rural life was backward.

Thirdly, Sarawak did not have the sufficient road networks to support rapid agricultural development. Undeveloped land that had been proposed as productive agricultural land could not be reached as vehicular access remained insufficient or non-existent. For those areas that were converted to agricultural land but had insufficient or non-existent road networks, the cost of production still remained too high and therefore uncompetitive (Poey, 1990).

Today, many of the agriculturally productive areas of Sarawak have overcome the three problems listed above. These problems have been overcome with changes in government policies and the investment in transport infrastructure from both the government and the private sector. Large areas of Sarawak have now been converted from virgin jungle to large-scale agricultural plantations and the quantities of agricultural goods exported from Sarawak have increased dramatically. The Department of Agriculture Sarawak (2009) reported that agricultural exports from Sarawak have been growing with an increase in agricultural exports rising from RM1.3 billion in 2000 to RM5.7 billion in 2009.

In spite of this increase, the Kelabit Highlands is still suffering the same problems in the agricultural sector that the rest of Sarawak encountered during the late 1980s and early 1990s. In 2005, the Residents Office Miri Division submitted a proposal entitled '*A Report on the Development of a Highlands Agropolis for Sarawak in Bario Kelabit Highlands*', to the Sarawak State Government. The proposal stated that Bario is an ideal site for agricultural development which will bring further economic development for the Sarawak State.

'Bario occupies a unique highland location in Sarawak. It is already a flagship brand for Sarawak in terms of eco-tourism, its Bario rice, Bario pineapple, Bario salt and soon Bario spice.

There is even greater role that Bario can contribute to the economic development of the State. With altitude above 3,500ft and a land bank in excess of 60,000ha, it is recommended that the government dedicate the development of Bario into a Highland agropolis for Sarawak along the strategies outlined below' (Residents Office Miri Division, 2005: p1).

The proposal outlined four strategic strategies that would facilitate a successful export orientated agriculture industry in Bario. In the first strategic strategy, the Residents Office requests that the Sarawak State Government assist the creation of large scale land development, public utilities and infrastructure (such as roads).

Two roads were proposed as having major importance to the success of the agropolis in Kelabit Highlands. When the proposal was written up, Samling's logging roads had already reached the southern end of the Kelabit Highlands. The Residents Office recommended that an inter-village road between Pa Dalih and Bario be constructed. Additionally, the logging road should be extended to allow the inter-village road to be connected to the logging road (refer to Figure 17).

3.4 How the Road Networks Have Affected the Socioeconomic Aspects of Living in Rural Sarawak, Malaysia.

Sarawak has not only increased the amount of agricultural goods it produces but it has also experienced an increase in its population size. In 2010, Sarawak had a population of 2.4 million which is a 47 percent increase from the population in 1991 and a 20 percent increase from the population in 2000. Although Sarawak's population is increasing, it is not increasing as much as many other states in Malaysia. In 1991, Sarawak had 9.4 percent of Malaysia's population but in 2010 only had 8.8 percent. The distribution of population by gender in Sarawak has remained consistent since 1981 (data unavailable for before 1981) with males holding 3 to 5 percent larger populations than females (Malaysian Government, 2011). Sarawak has a very diverse and distributed ethnic make up as shown in Table 01. The distribution of the population between rural and urban in 2010 reached 50/50 which is

a large change from the 15 percent urban and 85 percent rural population distribution just after Sarawak joined the Federation of Malaysia in September 1963 (Chief Minister of Sarawak, 2010).

With approximately 1.2 million Sarawak residents living in rural areas, rural roads become very important to Sarawak's success as a nation seeking to be considered 'developed'. In this section I will discuss how the rural road networks have affected the socioeconomic aspects of living in the rural areas of Sarawak.

Ethnic Breakdown of Sarawak and Selected Districts					
	Sarawak	Miri District	Marudi District	Limbang District	Lawas District
Malay	462,270	41,559	4,325	10,122	10,933
Melanau	112,984	9,447	430	195	125
Chinese	537,230	70,993	61,901	6,338	3,269
Iban	603,735	65,102	25,547	11,154	927
Bidayuh	166,756	3,692	637	271	168
Other Bumiputera	117,690	20,568	34,016	11,869	16,112
Other	8,103	1,840	322	147	424
Non Malaysian Citizens	62,738	15,030	2,455	863	1,645
Total	2,071,506	228,231	73,922	40,959	33,603

Table 01. This table displays the ethnic breakdown of Sarawak and four Districts within Sarawak. Miri District contains the urban centre of Miri, Marudi District contains the Kelabit Highlands and Limbang and Lawas District neighbour the Kelabit Highlands (refer to Figure 01). The Kelabit people are classified under the title 'Other Bumiputera' alongside the other indigenous groups of Malaysia (excluding Malay, Melanau, Iban and Bidayuh). Sourced from Malaysian Government (2001).

3.4.1 Healthcare and Education

The creation of the roads in Windle and Cramb (1999) study did not increase the provision of health care or education services provided; however existing health care and education services did become more accessible as a result of the new roads. Improved access to the markets also saw an improvement in the diets of many of the participants in Windle & Cramb (1999) study; conversely the improved access to markets meant that there was an increase in the consumption of nutritionally low processed foods. With the increased access to the markets, came an increase in exposure and access to a wider range of consumer products. Windle & Cramb (1999) discovered that some of the participants in their study now had difficulties with managing their finances. It was found that as a consequence of

the increased exposure and access to the wider range of consumer products, some of the participants reported that they were spending more money and at much more frequent rates.

3.4.2 Social Interaction and Discipline Issues

During interviews, Windle & Cramb (1999) asked the participants for their opinions on the impacts of the new roads. One particular subject that came up was that there was less sharing in the roadside communities. It is believed that the lower level of sharing in roadside communities was in part, due to the fact that households in the roadside communities were more independent than those households living in non-roadside communities. In the non-roadside communities, there was a larger reliance on the whole community to supply the goods and services needed within the community, whereas in a roadside community, goods and services can be supplied with greater ease from surrounding areas, therefore specialisation and independence can occur.

Windle & Cramb (1999) discovered that there was a relationship between discipline problems and the increased accessibility that children experienced. The main concern was that children were becoming more defiant and rebellious of their parents. Two main reasons were given for why this was occurring. The first reason was that the increased accessibility that the children now had gave them more choices and the traditional way in which their parents had been brought up to behave was no longer regarded as the only way to behave. The second reason was put down to the fact that the children now had increased contact with urban life, which usually had a very different culture than that that was found in their rural communities. Windle & Cramb (1999) point out that within Malaysia (especially in the urban centres) there is a nationally promoted perception that the 'traditional' way of acting and working is 'outdated and archaic'. It is believed that people need to become more 'modern'.

It is not that the traditional respect youth had for their parents was at risk of being lost, but it was becoming more and more common for the youth to be telling their parents how they should be behaving. It cannot be said that this change in behaviour is a negative influence on society as it will depend on different points of view; however it has resulted in many rural parents in Sarawak finding it increasingly more difficult to discipline their children and teach them their traditional culture and values.

Windle and Cramb (1999) also stated that there was a common concern from their participants, that 'bad people' would enter their communities now that roads linked them to the urban centres.

3.4.3 Migration and Remittances

Improved access to urban centres has meant that many of the rural residents (especially the youth) of Sarawak are now migrating into the urban centres. The main motivations behind the migrating of rural residents to the urban centres are to further their education, to acquire waged jobs, to avoid the hard work involved in farming, or to follow a spouse, get married, or to find someone to marry (Hew, 2003; Lee & Shamsul Bahrin, 1992).

In many areas of the developing world, the earning of money in the urban centres for the purpose of sending remittances back to the rural households has played a major motivation for migrants; however Windle and Cramb (1997) found that remittances from migrants played a very small role in the incomes of the rural households in their study in the Baram area. On average, only 3–11% of rural household incomes came from remittances. What is interesting to note is that roads played a role on influencing the frequency at which remittances were given. Generally, the more frequent migrants returned to their rural household, the more frequent migrants give remittances to their rural household.

Lee and Shamsul Bahrin (1992) conducted interviews with 124 households from the Kayan communities of Long Atip and Long Bedian. Long Atip and Long Bedian are located in a very remote part of the Baram river basin, just north of the Kelabit Highlands. Both communities experienced a large flow of outmigration after logging roads reached their vicinity. From the 124 household interviews, 82.5% stated that at least one member of their household had migrated out of their village. In fact on average, each household had observed three members of their household migrate from their village. 60% of those who had migrated had moved to the urban centres of Sarawak, with the closest urban centres, Miri (42%) and Marudi (10%) receiving the majority of the migrants. There did not appear to be a gender bias in the migrant population, although there was a large bias in relation to the ages of the migrants. 65% of the migrants were aged between 16 and 35 years and no migrant over the age of 40 years.

The Kelabit Highlands is in the Marudi District and over the past 20 years Marudi District has experienced a decrease in population with 71,958 people in 1991 to 63,304 people in 2010). Whereas Miri District which contains the urban centre of Miri has continued to grow with 161,373 people in 1991 to 295,716 people in 2010 (Malaysian Government, 2011). Marudi District is almost completely rural based whereas Miri District is becoming more and more urban based. The majority of the change in population in these neighbouring districts is a result of residents from rural areas seeking further education and off-farm employment in the urban areas and therefore Miri District holds greater appeal.

The studies by Windle and Cramb (1999), Soda (2000) and Hew (2003) demonstrated that the migration of rural residents to the urban centres was not always 'one way traffic'. In fact Soda (2000) interviewed 132 Iban household heads who now lived in a resettlement area near Sibu and found that 75% of the household heads still visited their home

longhouse/village at least once a year and 34.8% made the trip back to their home longhouse/village once a month. In addition to the continuous movement between their home longhouse/village, 14.4% continued to have homes in both the urban centres and their original rural communities. Furthermore 55.3% of the participants in the interviews intended on retiring in their home longhouse/villages. Many of the participants stated that it would be difficult to continue to live in Sibu after they had retired (Soda, 2003). Windle and Cramb (1999) also found that some of the migrants in their study had moved back to their longhouse/villages to retire.

Hew (2003) study looked at how the migration of rural residents to the urban centres of Sarawak affected the family structure. The main focus was on the mobility, behaviours, vulnerabilities and survival strategies of single, divorced or widowed mothers that had at some stage migrated to the urban centres of Sarawak. One of Hew's main findings showed that women who migrated to the urban centres of Sarawak and were now single mothers due to abandonment, divorce or widowhood tended to travel back to their home villages. In fact Hew found that the majority (70.6%) of the single mothers returned to their home villages or natal families. The circular migration shown by these women is used as a survival strategy. In most rural communities in Sarawak, communal support is common place. Within a family, resources are often distributed between members based on the ratio of adult income earners to dependent children. This means that once a single mother returns to her natal family, she will have the support and resources to care for her children.

3.4.4 Gender Gaps in the Use of Roads and Transport Systems

The creation of new road networks in Sarawak has brought benefits in the form of increased mobility to both men and women, though the distribution of these benefits was not equal between men and women. Like the many examples in other developing nations³, men have benefited more than women from the construction of roads in Sarawak. Traditionally almost all mobility was in the form of walking and boat travel, men tended to travel more frequently and travel longer distances than women. Although walking did not facilitate men's mobility more than it facilitated women's mobility, boat travel tended to be much more restrictive for women. Women generally did not own the boats, nor did they usually operate the boats (especially after the introduction of outboard motors). This meant that boat travel for women would typically require the services of an adult male, which in turn would mean that a women's mobility via boat travel was restricted to the availability and approval of adult males. The introduction of road travel in the rural areas of Sarawak has meant that women can now travel alone and can now choose to travel when they want (subject to bus timetables and demand for private vans). Nevertheless, it is generally the

³ Refer to the section entitled 'Why Roads Fail to Improve the Mobility of All Rural Residents'.

case that private vehicles are used more frequently by men and therefore men still benefit to a greater extent from the roads than do women (Windle & Crumb, 1999).

3.5 Environmental Damage Caused By the Construction of Logging Roads in Sarawak, Malaysia.

When roads are built by the State or by State contractors, there are established engineering specifications, construction requirements and regulations for use that are clearly set out to prevent negative social, economic and environmental impacts such as the upheaval of communities, the disruption to the local economic activities, the damaging of sensitive ecosystems and the loss of productive land (Tsunokawa & Hoban, 1997).

In Hong's (1987) book entitled *Natives of Sarawak: Survival in Borneo's Vanishing Forests*, the Food & Agriculture Organization of the United Nations (FAO) states that conventional logging methods in Sarawak can inflict major environmental damage in three ways (felling, extraction and road building). Environmental damage from felling and extraction are self explanatory; however environmental damage from road building requires further explanation. The interior of Sarawak has large tracts of forest that have been or are still under timber concessions. The logging operators generally need logging roads and tractor paths to extract the timber from the forest. The FAO observed that the roads and paths required by logging operators in Sarawak during the late 1980s make up 4% of the total area being logged.

While road construction is taking place, trees and waterways along the roadside are directly exposed to the weather conditions and the dust caused by road use. This exposure can result in the further loss of roadside vegetation. Furthermore, very little attention is given to drainage systems and road run off along logging roads. Without proper drainage, the road will be more prone to erosion damage and waterways are left unprotected from the eroding soil.

3.6 Summary.

Traditionally, the main forms of transport in Sarawak were by walking or by boat. After World War II, Sarawak started to modernise its infrastructure. New modes of transportation (such as inter-city roads) were created and little used existing transportation was developed to be used by the general public (such as air travel). Air travel allowed a large number of rural residents in Sarawak the ability to travel to and fro between their rural homes and the urban centres; however the price of flight fares and the fact that the planes were limited to where they could land meant that air travel only facilitated the mobility of a very small percentage of Sarawak's rural population. The establishment of

roads into the rural areas of Sarawak came much later but were found to facilitate the mobility of a larger percentage of the rural population. The main reasons given in the literature for this is that travelling by road was often cheaper and the roads serviced a greater number of people than air travel did.

The literature that examines how rural roads have affected rural communities in Sarawak have shown that in most cases, roads have increased mobility, migration and accessibility to employment, goods and services. These increases however are said to be different amongst different areas in Sarawak and amongst different demographic groups. Generally males have benefited more than females and the youth tend to have benefited more than the elderly. Additionally, roadside villages benefited to a greater level than non-roadside villages and the closer a village was to the larger urban centres, the greater the increase in mobility and accessibility to employment, goods and services

Chapter 4

The Kelabit Highlands

4.0 Introduction

This chapter will examine the context in which the research was undertaken. The chapter will start with an overview of the Kelabit Highlands and the modes of transportation available when travelling in and out of the Kelabit Highlands. The chapter will then explore the current and traditional way of life of the Kelabit people in the Kelabit Highlands. This will include sections that look at the Kelabit economy, belief systems, social and political structures, education, employment, and the demographic makeup of the Kelabit community. The final section of this chapter will investigate the three road projects: the logging road, the inter-village roads and the upgraded concrete roads in Bario. Included in this section, is a short analysis of how the current roads are affected by the weather conditions and the problems with the roads that can occur as a result of the weather.

4.1 The Kelabit Highlands

The Kelabit Highlands is a remote highland plateau in Sarawak, Malaysia. Figures 02 and 03 show the location of the Kelabit Highlands and the research sites in the Kelabit Highlands. Its average altitude is 1000 metres above sea level. The Kelabit Highlands is located at the very end of the Baram and Limbang rivers. The Kelabit Highland plateau is surrounded by large rugged mountains and dense jungle. The Kelabit Highlands has no official boundary but was stated by the Resident's Office Miri Division as been bounded by the Sarawak-Kalimantan border and an imaginary line that links the following peaks, starting from G. Melepe in the south and heading north over G. Murud Kecil, Bt. Merigong, Batu Iran, Batu Lawi and G. Murud. A detailed map of this area can be found in Figure 17. The Kelabit Highlands contain 16 Kelabit villages which house around 1800 Kelabits.

The Kelabit Highlands has a very distinct physical atmosphere in comparison to the majority of Sarawak. The high altitude of the Kelabit Highlands means that the average temperature (21°C) is significantly lower than the average temperatures in the rest of Sarawak. The Kelabit Highlands is also the driest region in Sarawak with an annual rainfall of 2371mm per year (Resident's Office Miri Division, 2005).

How to Find the Kelabit Highlands

South-East Asia

Borneo

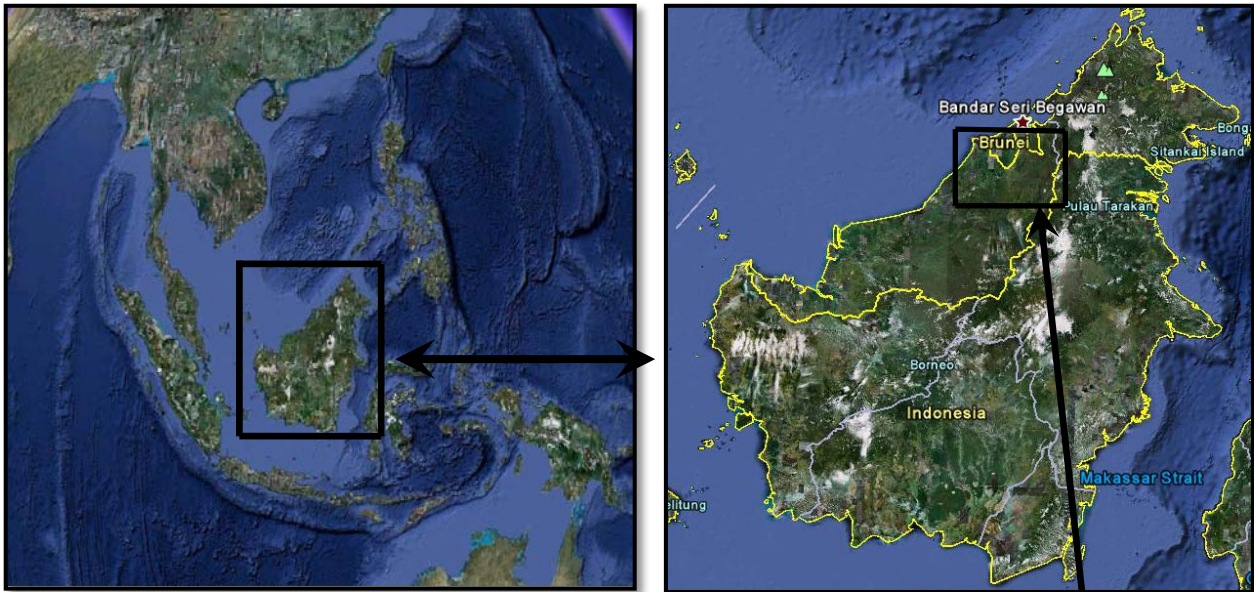
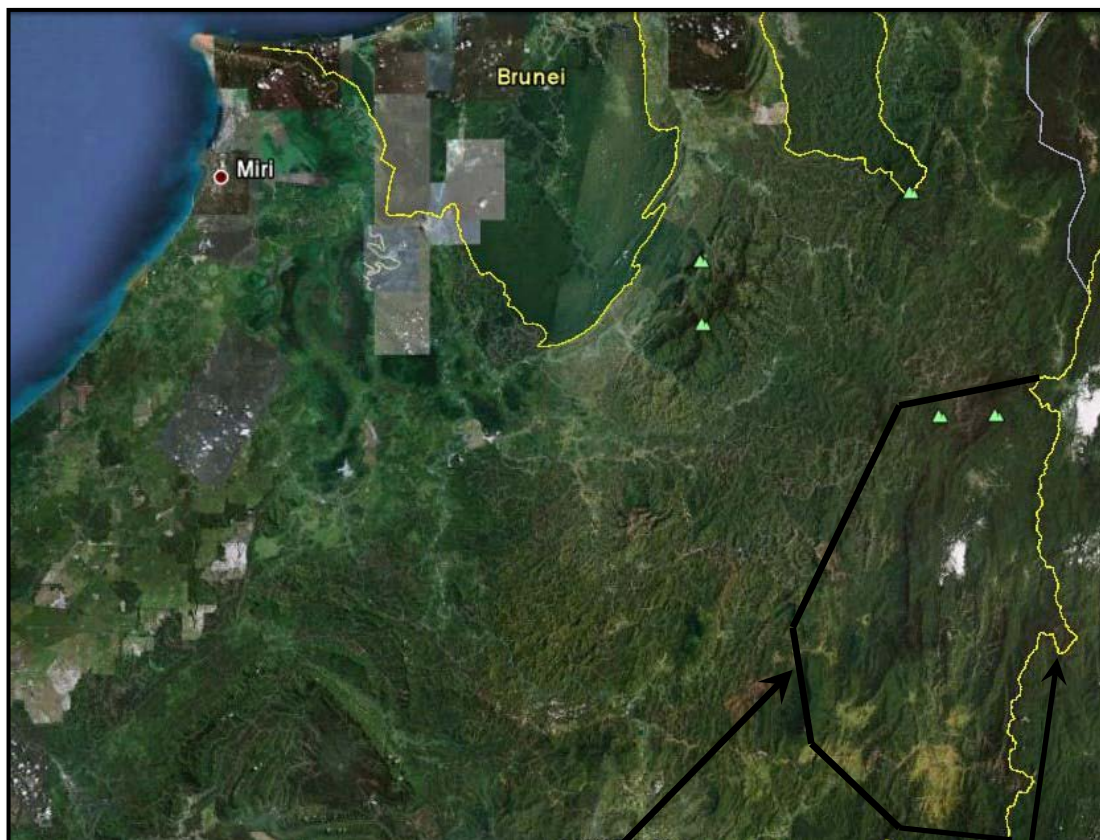


Fig 02. The satellite images of South-East Asia, the island of Borneo and north-east Sarawak. These images display the location of the Kelabit Highlands in Sarawak, Malaysia.
Images adapted from Google Earth (0°50'15.24"N - 114°17'46.93"E) on 20/02/2011.

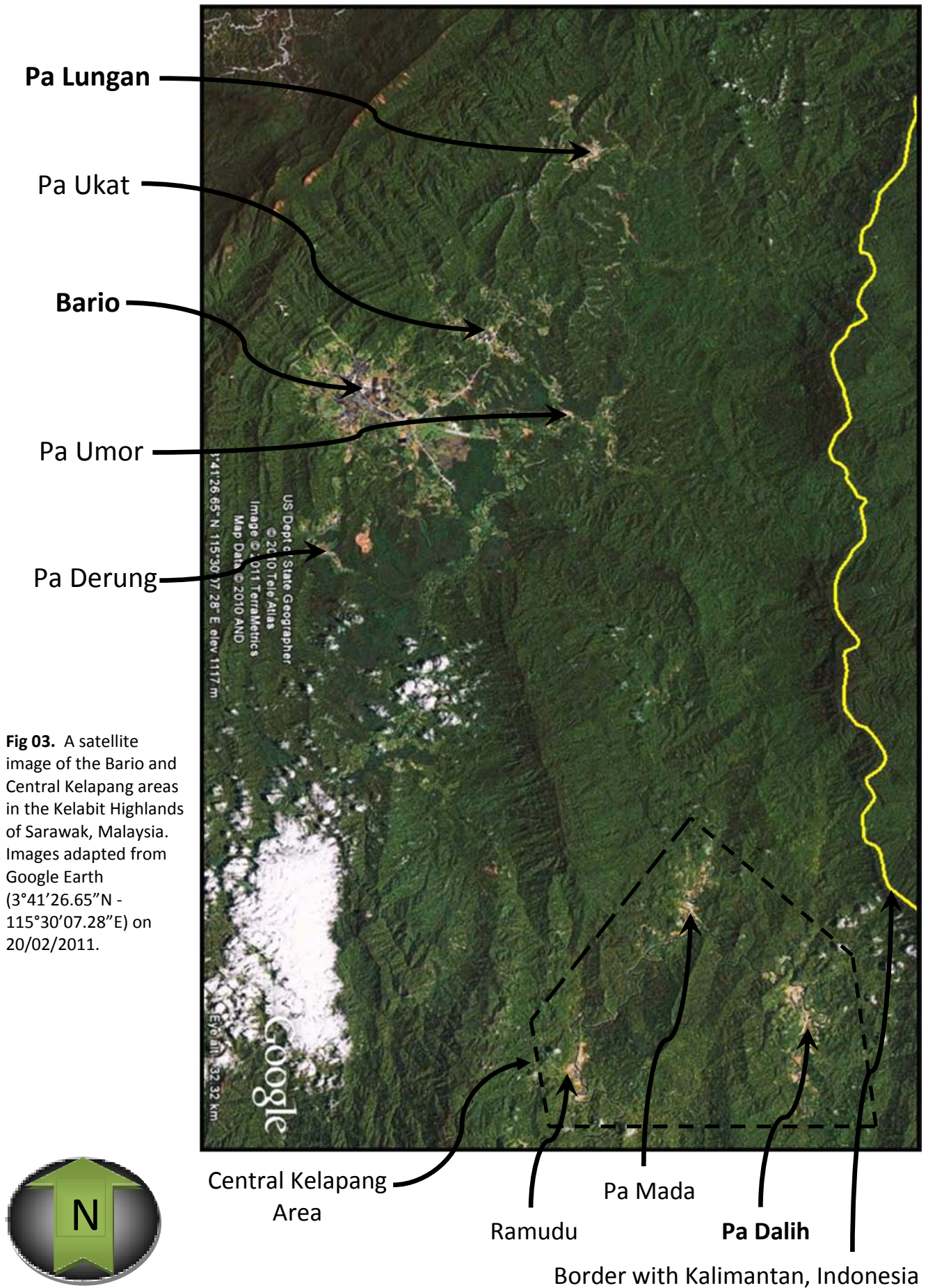
North-East Sarawak,
Malaysia & Brunei



The Kelabit Highlands

Sarawak – Kalimantan
Border

Satellite Image of the Research Sites in the Kelabit Highlands.



4.2 Transportation into the Kelabit Highlands

The Kelabit Highlands has been very isolated up until this century. In the past (after 1960), the only modes of transportation to the urban centres of Sarawak, Malaysia for the Kelabit communities was either via an 18 seater MASwings Twin Otter aircraft (as shown in Figure 04), navigating the rapid filled Baram River by motored long boat or by walking for one month through dense largely unmapped tropical rainforest. As a result, the geographic mobility of the Kelabit communities was very limited. Many of the Kelabits could not afford the fare for the plane (refer to Table 02 for flight fares) and travelling by longboat along the Baram River or walking through the jungle was too difficult and time consuming (Bala, 2002).



Fig 04. The MASwings Twin Otter parked at the Bario airport.

For those that could afford the airfares, other problems arose and still today continue to restrict the transportation of people and goods by air. The carrying capacity of the Twin Otter aircraft is limited to a tare weight of 1000kg. This restricted the number of people and goods that could be transported by air. Another problem is that the weather (heavy rain and fog) can inhibit the planes ability to land in Bario. If this happens then the plane is forced to return to Miri. Since a new concrete runway was constructed in Bario in 1996, the heavy rain has inhibited the planes ability to land a lot less often.

MASwings Flight Fares Bario to Miri					
	Fare	Fuel	Admin Fee	Agent	Total
Adult	70	7	4	10	91
Senior	35	7	4	10	56
Child	53	7	4	10	74
Infant	7	7	4	10	28
Student	35	7	4	10	56

Table 02. The table displays the MASwing Twin Otter flight fares from Bario airport to Miri airport.

Senior = +55 Child = 12 & below Infant = 2 & below.

The flight fares in Ringgit and became effective on the 01/10/2007.

Sourced from MASwings Agent Information Form.

Along with the reasons stated above, the delivery of development (such as Education and Healthcare) by the Malaysian Government has been very limited and costly. However in the latter half of the last decade the level of isolation experienced in the Kelabit Highlands has

been reduced with the establishment of a logging road that links parts of the Kelabit Highlands to the urban centre of Miri. The logging road has created a fourth means of transportation in the form of 4wd vehicle access.

4.3 The Kelabit People:

The Kelabit people are an ethnic group who up until the beginning of the 20th Century have had very little contact with the world outside of what are now known as the Kelabit Highlands. It is unknown when the Kelabit first settled in the Kelabit Highlands. The carbon dating of the megaliths by Sarawak Museum put the Kelabit in the highlands as early as 4000 years ago (Resident's Office Miri Division, 2005).

The Kelabits were predominantly rural farmers (many still continue to be) and warriors who travelled to neighbouring territories to sell their produce, socialise and battle. Those who did travel were very limited in number and had to be of a high status within the community (Bala, 2002).

The Kelabit people have many distinctive cultural values, characteristics and activities. These include the practice of name changing, the Kelabit longhouse, wet padi cultivation (Figure 05), the raising of cattle and water buffalo (Figure 06), salt making (Figure 07), the creation of megaliths (Figure 09) and the many songs (Figure 08) and dances that they performed. Many of the Kelabit communities today still maintain a distinctive cultural identity and for those Kelabits that do still live in the Kelabit Highlands, their rural way of life continues too (Eghenter & Langub, 2008). It is believed that the reason that the Kelabit have been able to maintain a distinctive cultural identity and their rural way of life is owing to the fact that the Kelabits are a progressive and united ethnic group, and that the Kelabit communities had experienced a level of isolation for an extensive period of time (Saging & Bulan, 1989).

The Kelabit communities are not immune from experiencing change. Over time there have been changes to the Kelabit cultural values, ideals and activities due to the interaction with 'Outsiders'. Some examples of change include the abandonment of headhunting and the moving away from the practicing of their own traditional Pagan beliefs (Bala, 2002; Bulan & Labang, 1979; Rousseau, 1989; Saging & Bulan, 1989; Seling & Langub, 1989). The Kelabits are said to have the capacity to meet new challenges and the aptitude to accept new ideas and the changes which are brought on by interaction with outsiders, political change, conflict and development (Amster, 1998; Bala, 2002; Bulan & Labang, 1979; Dickens, 1991; Eghenter & Langub, 2008; Harrisson, 1954, 1959).



Fig 05. Wet padi cultivation in Bario. The fields have just undergone the second planting.



Fig 06. Water Buffalo aerating the soil in a padi field in Bario.



Fig 07. Boiling water to extract salt near Pa Umor.



Fig 08. A Kelabit man plays beautiful music on a Sape.



Fig 09. Batu Ritong. A megalith in Pa Lungan.



Fig 10. The view of the Kelabit Highlands from 'The Cross'. The Cross was erected on a hill located behind Pa Lungan and was constructed to celebrate the second resurgence of Christianity in the Kelabit Highlands.

4.3.1 The Kelabit Economy

The traditional economic system in the Kelabit Highlands revolved around the practice of communal support and working together. It is a system called *baya* (moving together) and its basic principle is that a group of 10 farmers working together can accomplish more in a day than one individual farmer can do in 10 days. The *baya* system also meant that each farm would receive an equal level of attention and effort as the stronger and more physically fit farmers would not only work on their own fields but also on the farms of the less physically fit farmers. Each farm would be worked on in a rotation basis (Saging & Bulan, 1989).

Two other traditional economic systems were also used in the Kelabit Highlands; one of them evolved from the *baya* system and is called *kerjasama* (working together). The other traditional economic system is named *gotong royong*. The *kerjasama* system involves the whole longhouse working together to assist one particular family to complete a task. The payment for this labour would be given to the community church, with the intention that it is supporting the community rather than an individual. The *gotong royong* system (used for community projects such as the maintenance of the school grounds and longhouses) involved the entire village working together with no expectation of financial gain (Saging & Bulan, 1989).

Now a day's, the economic systems in the Kelabit Highlands are more closely related to the capitalist economic structure. The majority of the incomes acquired by the Kelabit community members who still remain in the Kelabit Highlands come from remittances that are sent back to the Highlands from relatives in the urban centres. Other forms of income come from tourism, government pensions, the sale of Bario rice to the urban centres, and the local sale of livestock, rice and other food produce (Amster, 2006; Bala & Harris, 2008; Tarawe, n.d.).

Jiwan et al (2006) conducted an examination of the development projects that had taken place in Bario up until 2006. Jiwan et al interviewed 20 percent of households in seven of the villages in the greater Bario area in 2005 (before the roads from Miri reached Bario). They found that 55 percent of their respondents earned below RM500 a month (below Sarawak's recognised poverty line), 21 percent earned between RM501-RM600 a month and 17 percent earned between RM601-RM1000 per month. No mention was made of the last 7 percent of households. These figures were almost mirrored in figures for occupations. Jiwan et al reported that the three most common occupations amongst the respondents were farming (55 percent), pensioner (21 percent) and government servant (7 percent).

In 2005, 800ha of flood plains and valleys were being used to cultivate rice (Resident's Office Miri Divison, 2005). No data was available for the value of the rice that was harvested but it was stated by one local official that the income received from the sale of Bario rice to the urban centres was 'very minimal'. This was because only small quantities of rice could be

exported to the urban centres due to the high costs of transportation. The majority of the rice was consumed locally.

The income from government pensions is increasing within the Kelabit Highlands as many of the Kelabits that had government jobs in the city but are now retired, start returning back to the Kelabit Highlands and bring their government pensions with them.

The traditional systems have not been completely replaced, but as the Kelabit Highlands has witnessed such vast outmigration (especially of the youth), it is difficult to maintain the old systems as large labour gaps have emerged. The Kelabit that have remained in the Highlands have had to fill the labour gaps by hiring migrant labourers from Indonesia. The migrant labourers are contracted for their services (mostly working on rice cultivation) and are paid in cash payments. It is also very common for their accommodation and food to be supplied during their time working in the villages. Some of the Kelabit have also traded livestock, hunting dogs, salt and other food items for migrant labour (Amster, 2006, 2008; Bala, 2002).

4.3.2 Education and Off-farm Employment

The first school in the Highlands was opened in 1946 and ever since, there has been a strong emphasis on young Kelabits becoming educated (Saging & Bulan, 1989). Today, there are three schools operating within the Kelabit villages in the Kelabit Highlands. Bario Primary school can be seen in figure 11. Education has been positive for the Kelabits as many have excelled and gone on to such professions as doctors, lawyers, government ministers, executives, successful business people, pilots and university lectures.



Fig 11. Bario Primary School.

The Kelabit Highlands has a large imbalance in the age structure of the villages. The majority of youth in the Kelabit Highlands migrate to the cities to gain higher education or off-farm employment (Bala, 2002; Lee & Shamsul Bahrin, 1992). Tertiary education and jobs outside of farming are limited, this has meant that shifting away from the Highlands and moving to the urban areas has become a necessity (Amster, 2008; Bala, 2002; Bala & Harris, 2008).

4.3.4 The Kelabit Social and Political Structure

Traditionally, the Kelabit social classes were split into three groups; the *Parans/Anak Lun Merar* (nobles), the *Pupa/Upaupa* (middle, halved) and the *Anak lun ian ada* (descendants of the less able). The *Parans* were the leaders of the community and were in charge of regulating the social order, resolving conflicts within the community and acting as ambassadors for the community. Each Kelabit community had a single *Penghulu* (headman) who was assisted by two deputies and the *Tua Kampung* (longhouse headman) of each longhouse in the community. The *Penghulu* and his deputies came from the *Paran* group and were elected by the people of the community. The *Tua Kampung's* were generally from the *Paran* group, however if there were no *Paran* in the longhouse, then the *Tua Kampung* would be selected from the *Pupa* group. The *Tua Kampung's* main responsibility was to resolve conflicts within the longhouse and to make the significant decisions that affect the whole longhouse. To help the *Tua Kampung* make decisions and resolve conflict within the longhouse, there exists a Council of elders who were the advocates for the people of the longhouse. To be elected as the *Tua Kamung*, certain leadership qualities had to be met. These qualities included material wealth (such as *belanai* (jars), *ba'o* (glass beads), *tawek* (gongs) and buffalo), reputable lifestyle, charisma, sound judgement and the respect and support of the longhouse residents (Saging & Bulan, 1989).

Since the end of World War II, the social and political structures of the Kelabit communities have undergone a large transformation. National politics, education and religion have heavily influenced the social and political systems of the Kelabit communities. The community headman and longhouse headmen positions still exist, however the election process has changed. The local communities can still nominate candidates for the Community headman's position but the final decision is now made by the Sarawak State government (Hong, 1987). The traditional social class system no longer plays a role in who can be elected as a headman or who can be the key decision-makers within the communities. The Kelabit politicians, the 'educated' Kelabits (usually from the urban centres), those Kelabits in business in the Kelabit Highlands and sometimes religious leaders now play the major role in community decision-making. The RURUM Kelabit (Kelabit association) is now the main advocate for the 'voice' of the Kelabit community (the majority of which reside in the urban centres)⁴.

The Kelabit community are a small indigenous community in Sarawak but are well known for their ability to push for their ethnic interests at the state level. The success the Kelabit community has achieved for their ethnic interests is believed to be owing to the extensive progress the Kelabit community has made in the fields of politics, academia and business (Amster, 2008).

⁴ Egay (pers.com.) received February 2, 2010.

4.3.5 The Kelabit Belief System

The Kelabit traditionally practiced their own pagan belief system. Up until the second half of the 20th century, the Kelabit lived a lifestyle that was controlled by various omens and taboos. The sight and calls of omen animals, the sound of a falling tree and the appearance of other various omens had the power to influence the day-to-day actions and processes of the Kelabit people. Many of these pagan practices created great drawbacks and hardships. For example, the sighting of a certain omen bird in a rice padi field would mean that the padi field would have to be abandoned which in turn, would mean that whatever rice was growing in the padi field would be left to rot. This would often lead to famine (Saging & Bulan, 1989).

A customary system of beliefs and values called *adat* was what controlled the actions and behaviours in traditional Dayak cultures including the Kelabit. *Adat* are a set of unwritten rules and ethics which were valid in both the physical and supernatural world. By following *adat*, behaviours and actions in different environments were strictly followed. Following *adat* meant that the environment remained balanced. If balance in the environment was lost, then the *adat* system had ways of restoring the balance. In traditional Dayak society, *adat* was the system used to help communities to exist in harmony as it is expressed in the following statement.

‘Thus adat provided the individual and his community a coherent world view in both secular and spiritual terms. It was a belief system covering interaction within the community.’ (Hong, 1987: p13)

One of the most influential changes to the Kelabit culture and lifestyle came with the arrival of Christianity in Central Borneo. Christian missionaries arrived in Central Borneo not long after World War II. Christianity was initially met with suspicion and hesitation. The rate at which the Kelabit community converted from pagan beliefs to Christianity grew over time and in 1973, a spiritual revival converted the entire Kelabit population to Christianity (Amster, 2008; Bala, 2002).

Today, Christianity still plays a major role in the lives of almost all the Kelabit people (refer to figures 10 and 12). Kelabit Christian leaders are held in high respect and authority within Kelabit communities (whether urban or rural). Christian holidays such as Christmas and Easter are important dates for the Kelabit, with many families and friends reuniting during these times. Just like education, Christianity has led



Fig 12. The *Sidang Injil Borneo* (SIB) church in Pa Lungan

many Kelabit individuals to migrate to the urban centres in the pursuit to advance their knowledge and faith of Christianity (Bala, 2002).

4.4 Demographics in the Kelabit Highlands

The Kelabit Highlands is the home for a great diversity of demographic groups. As mobility increased in the Kelabit Highlands, the level of migration to the urban centres increased. The main issue with the migration of residents from the Kelabit Highlands to the urban centres is that the migrants generally come from particular demographics which decreases the diversity of demographic groups left in the Kelabit Highlands. Different demographic groups need and desire different infrastructure and resources. Consequently the importance of particular issues within the Kelabit Highlands is changing too. For example, even in 2005 before the road from Miri reached the Kelabit Highlands, there were a disproportionate number of aging parents without grown-up children and young parents who had children attending school in Bario. Only a small number of residents were in the productive age group (18-40) (Jiwan, 2006). The majority of the productive age group from Bario migrated to Miri in search of further education and off-farm employment. This left the older generations to find a way to fill the labour gap that was left behind. As a consequence, labour must be imported into the Kelabit Highlands (at a social and economic cost) from neighbouring areas (Amster, 2006; Bala, 2002).

In addition to the Kelabit people, there are people from many other ethnic backgrounds living in the Kelabit Highlands. The majority of those from non-Kelabit ethnic backgrounds come from four groups. The first group is the Penan. The Penan have set up a community in Bario to access healthcare, education and employment. The second group are the government workers who are from all around Malaysia and come from a very diverse range of ethnic groups. The third group are those that have married into the Kelabit community or have close relations have a member of the Kelabit community and now live in the Kelabit Highlands. The final group are the Indonesians who cross over the border to work in the Kelabit Highlands for short periods of time (usually around the time of planting and harvesting of the rice). The number of non-Kelabit living in the Kelabit Highlands is constantly changing and therefore no data is available for the number of non-Kelabit in the Kelabit Highlands.

4.5 The Roads Into and Around the Kelabit Highlands.

In the following section I will examine the three major roading projects that have affected the residents of the Kelabit Highlands in the past five years. The first roading project that will be examined is the commercially funded logging road which links the Kelabit Highlands to the urban centres of Sarawak. The second is the inter-village roads that link villages in

different parts of the Kelabit Highlands together. The third is the concreting of the internal roads in Bario. This section will then finish with a discussion on the way the weather affects the conditions of these roads.

4.5.1 The Logging Road to the Kelabit Highlands:

The first talk of a road between Miri and the Kelabit Highlands occurred during the Confrontation⁵. Before the Confrontation, the Kelabit villages were more dispersed than they are today. During the Confrontation, many of the Kelabit villages were requested by the government to move to a location that was further from the Malaysian-Indonesian border and closer to the Malaysian army base⁶. As part of moving to new locations in the Kelabit Highlands, the Malaysian government promised the Kelabit community that they would support the building of new housing, build government facilities and construct a road that would connect Bario to Miri. The government over 40 years, has delivered on its promise to support the building of new housing and the construction of government facilities but a government funded, constructed and maintained road between Bario and Miri is still to materialize.

Since the confrontation ended, Kelabit officials have been campaigning for the roads construction. Government officials came and went with promises to build the road from Miri to Bario. Even the 8th and 9th Malaysia plans⁷ dedicated funds for rural roads in Sarawak but still no public road from Miri to Bario was constructed. It was not until concessions for logging in the upper Baram area were sold to commercial logging firms that a road from Miri to Bario started to be constructed.

The logging road between Miri and the Kelabit Highlands (approximately 480km in length) was built and is currently maintained by a commercial logging company 'Samling Global Ltd'. As the logging roads were constructed by a private corporation, the roads themselves are private roads. Samling opened the roads up for public use to help support the communities in the areas where they were logging. An example of the logging road can be seen in Figure 13 while a map of the logging road can be seen in Figure 14.

No data is available on the exact date when the logging roads first reached the Kelabit Highlands. What is known is that by 2005, it was possible to drive along the logging road to an area located at the Southern end of the Kelabit Highlands. The extension of the logging road had been campaigned for by some of the highly influential Kelabit officials for some

⁵ Indonesia and Malaysia fought a small, undeclared war between 1962 and 1966. It became known as the Confrontation in 1963. The war was a result of a belief by Indonesia's President Sukarno that the creation of the Federation of Malaysia was an attempt by Britain to maintain colonial rule in the area.

⁶ The majority of all the villages that moved during the Confrontation moved to the area now known as Bario.

⁷ The 8th Malaysia plan was in place from 2001 to 2005 and was replaced by the 9th Malaysia plan which was in place from 2006 – 2010.

time. In November 2005, the Resident's Office Miri Division joined the campaign with their Kelabit Highland agroplois proposal⁸ to the Sarawak State Government. The logging road was extended in 2006 and finally reached Bario in July 2009. The extension of the logging road was conducted by Samling at their own cost.



Fig 13. An example of a maintained logging road in the Kelabit Highlands.

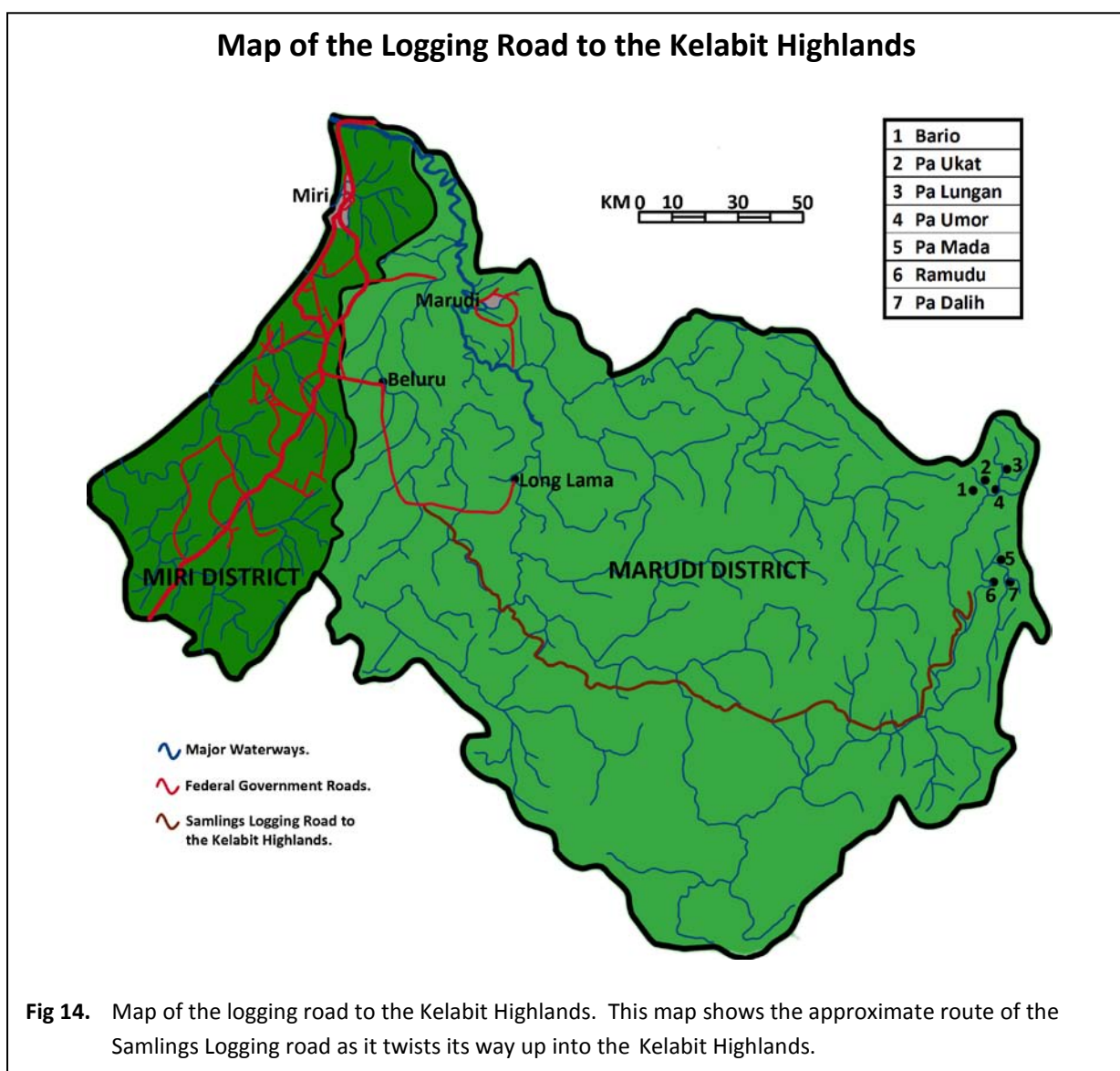


Fig 14. Map of the logging road to the Kelabit Highlands. This map shows the approximate route of the Samlings Logging road as it twists its way up into the Kelabit Highlands.

⁸ The Kelabit Highland agroplois proposal highlighted the development potentials and constraints of Bario. The proposal also offered four strategic decisions that the Resident's Office Miri Division believed would facilitate the further development of Bario.

Samling are responsible for the maintenance of the logging roads, however generally only the roads that still facilitate Samling's logging operations are maintained. However since the logging road was not built by the State or State contractors, there are no regulations on the roads construction or maintenance. Furthermore, Samling only has temporary interests in particular locations. Once the timber is extracted from those locations, Samling will move on, leaving the State government or the local community to continue the maintenance of the roads. It is currently unclear whether the government will take responsibility of the roads once Samling has left.

4.5.2 The Inter-village Roads in the Kelabit Highlands

The jungle paths outside of Bario which link the villages in different areas to each other have been around for longer than anyone can remember and there is no written documentation on how long the jungle paths have been used for. The first inter-village roads were built around Bario in 1963. At that time, the roads were merely walking tracks. To date, the inter-village roads in Bario have been upgraded five times (depending on the road). Figure 17 displays the inter-village roads.

All but one Kelabit village in the Kelabit Highlands is now connected to the road network; however the roads differ in quality and durability depending on where the road is located, the surfacing material used on the road, the quality of drainage around the road and the frequency of maintenance conducted on the road.

One of the most important inter-village roads constructed so far in the Kelabit Highlands is the road between Bario and Pa Dalih. The inter-village road between Bario and Pa Dalih was to be constructed by the government under the 9th Malaysia Plan (2006-2010) as a replacement for the airstrip in Pa Dalih that had been proposed in the 8th Malaysia plan but was later cancelled. The inter-village road between Bario and Pa Dalih was expected to be completed in two sections and when completed, would cover 27km. The completion of the second section was expected in late 2007 (Resident's Office Miri Division, 2005).

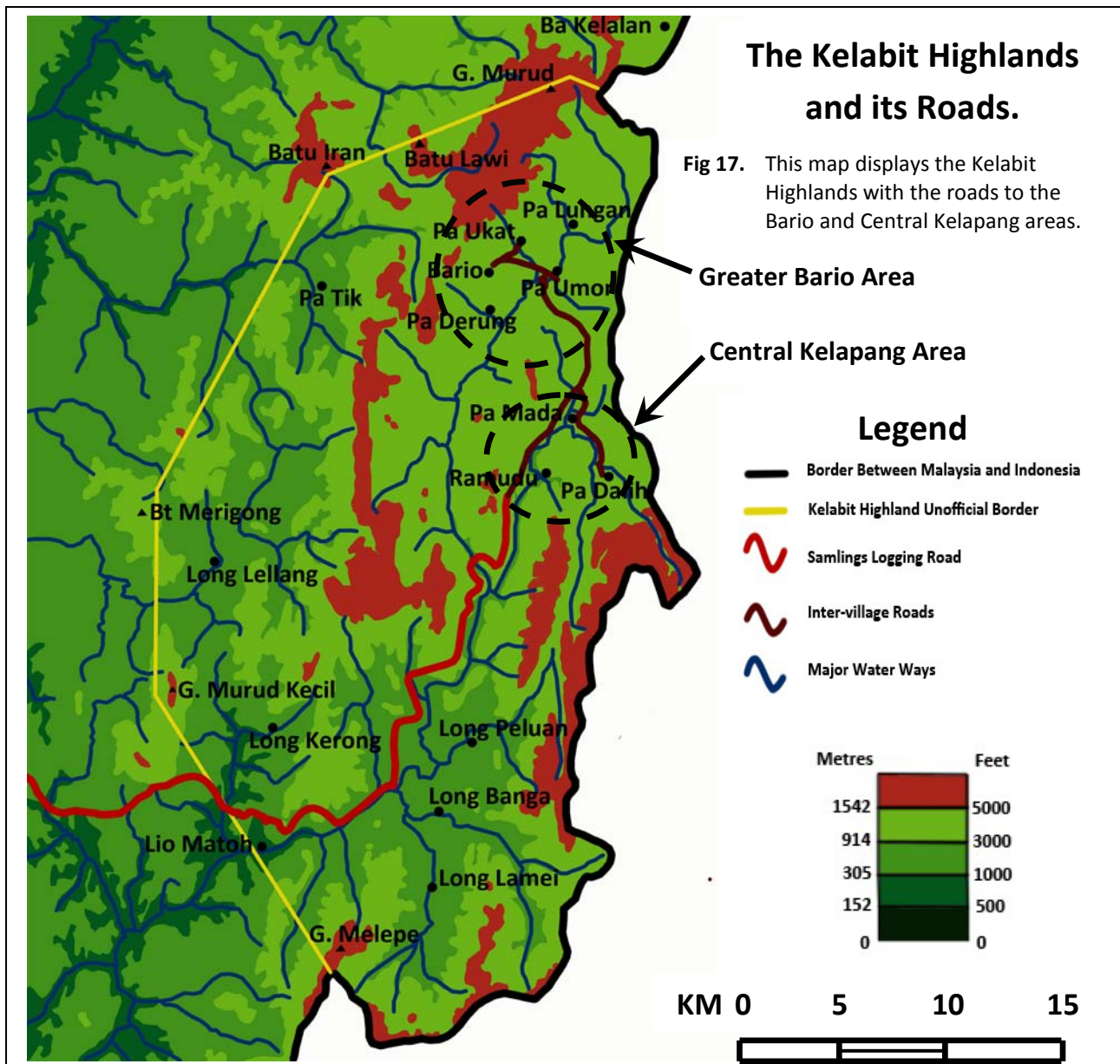
The proposed government constructed inter-village road between Bario and Pa Dalih was never constructed but instead, Samling constructed two extensions to their logging roads which created the current inter-village road between Pa Dalih and Bario. The first extension to the logging road was to Pa Dalih. The second extension came off the road to Pa Dalih and extended to Bario and Pa Umor. The inter-village road can be seen in Figures 15 and 16.



Fig 15. (Left) The timber bridge over the Dappur river, linking Bario to the inter-village road and then on to the logging roads that connect the Kelabit Highlands to Miri (for location of bridge, refer to Figure 18).



Fig 16. (Right) A 4WD on its way to Miri, climbs its way up the new inter-village road just after the timber bridge.



It is expected by several Kelabit officials that the majority of inter-village roads currently in place will become the responsibility of the State Government. In fact, under the National Key Result Areas (NKRA) policy, it is proposed that many of the inter-village roads in the Kelabit Highlands will be upgraded and new inter-village roads will be constructed. This includes the re-surfacing of the inter-village road between Bario and the Kelapang area. Gravel is stated as being the material used to resurface the road between Bario and the Kelapang area. Gravel will also be used to surface a new road between Bario and Pa Lungan.

There is at present, negotiations between Kelabit officials and the State Government, to construct a road from Bario to Ba Kelanan. Ba Kelanan already has a road link with the urban centre of Lawas. If a road was built to Ba Kelanan then the majority of residents in the Kelabit Highlands would have road access to Lawas. Lawas is closer to the Kelabit Highlands than Miri. It is anticipated that the Kelabit communities could market their goods in Lawas. The transport costs to Lawas may be low enough that sending goods to sale in Lawas might be economically viable.

4.5.3 The Concrete Roads of Bario:

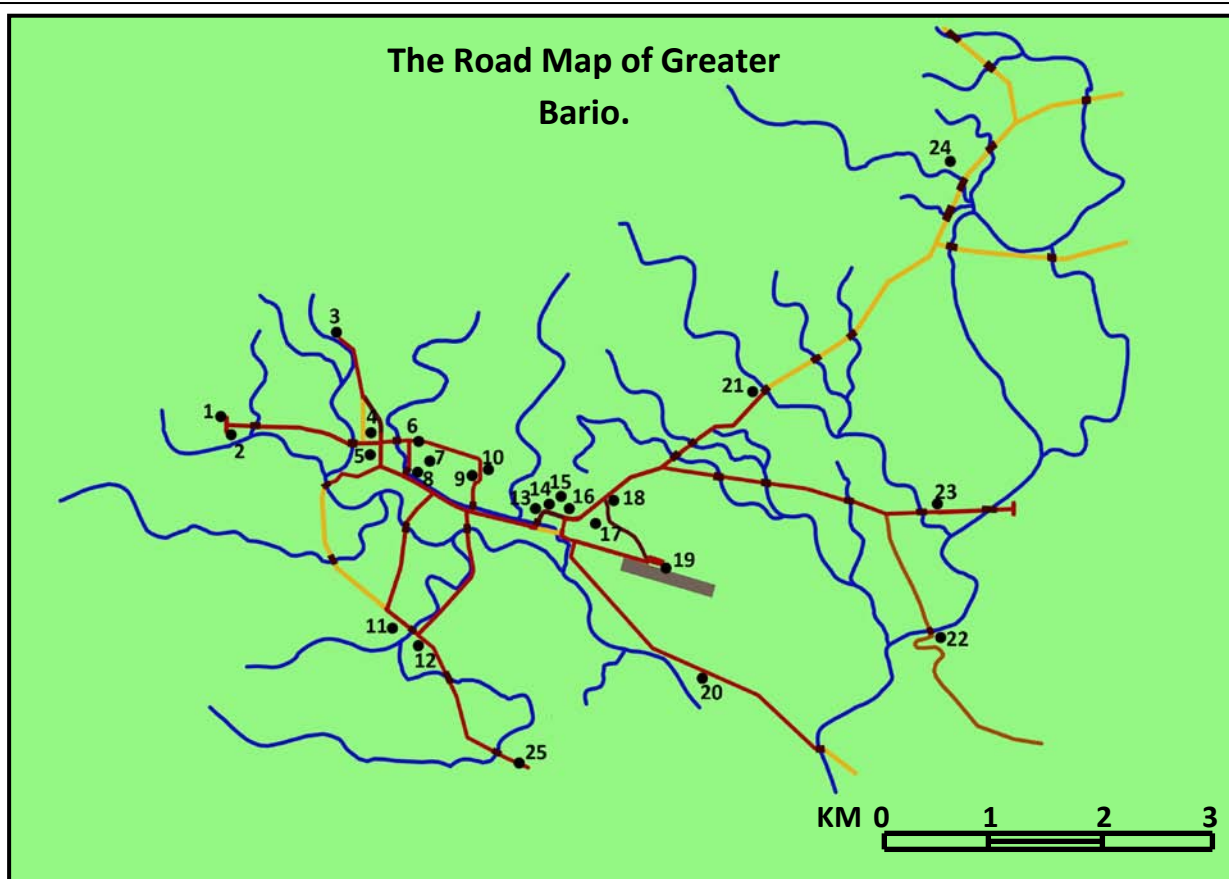
The concreting of the Bario roads has been funded by the Federal Government under the Second Economic Stimulus Package. In March 2009, the Malaysian Government released the Second Economic Stimulus Package with a budget of RM60 billion over two years. The stimulus plan had four thrusts. Thrust 2 held the most importance to the Kelabit Highlands.

Thrust 2 – *Easing the burden of the Rakyat⁹, in particular, the vulnerable groups. Providing basic amenities in rural areas especially electricity and water supply, roads and it includes Sabah and Sarawak* (Malaysian Government, 2009).

With the current budget for the concreting of the Bario roads, only around 20km of road can be concreted (refer to Figure 18 for a road map of Bario). Local leaders were given a large level of autonomy over the road selection process. The roads chosen to be concreted were chosen based the volume of daily traffic using the road and the number of people the road serviced¹⁰. One local leader stated that he expected the less prioritised roads in the Bario area would also receive concrete roads when the government issued more funds. The local Kelabit leader could not say when more funds would be issued. The construction of the concrete road can be seen in Figure 19, while Figure 20 shows the same section of road after completion.

⁹ *Rakyat* translated to English, refers to an 'ordinary citizen' but the term is usually only used by the Malaysian and Indonesian government.

¹⁰ At the time of this research, no official document on which roads would be concreted had been released.



1	Arul Dalan A
2	Arul Dalan B
3	Mini Hydro
4	Arul Layun
5	Bario Asal
6	SMK Bario (lower-secondary school)
7	Community Library
8	Sekolah Kebangsaan Bario (primary school)
9	Ulong Palang B
10	Ulong Palang A
11	Pa Remapur B
12	Pa Remapur A
13	Bario/Baram Police Station and Barricks
14	Store Lock-ups, Café Shops and eBario
15	Sports Hall
16	Government Offices & Facilities
17	Community Refuse Area
18	Labang Longhouse
19	Bario Airport
20	KPG Baru
21	Pa Ukat
22	Temporary Bridge Over Dappur River
23	Pa Umor
24	Pa Lungan
25	Road to Pa Derung

Legend

JKR Proposed Roads

- Existing roads
- Roads still to be constructed

Other Existing Roads

- Other village roads
- Inter-village road between Bario area and Central Kelapang area. Road also links to road to Miri



Waterways

Fig 18. This map displays the Jabatan Kerja Raya Malaysia (JKR) 2005 proposed road map of the Greater Bario Area. Map adapted from *Map of Bario* by Jabatan Keria Raya (2005)

Notes:

- The scale on this map is an approximation and should not be considered as accurate.
- Government offices and facilities (as listed as number 16) include health clinic, Ministry of Agriculture, Ministry of Forestry, Department of Immigration Sarawak and



Fig 19. The concrete road construction crew setting up metal reinforcing that will strengthen the concrete and make a more durable concrete road in Bario.



Fig 20. The final product. The upgraded section of road between the small bridge and the store lockups in Bario.

4.5.4 Weather on the Roads:

In the Kelabit Highlands, when it rains the roads become very soggy and greasy. This makes them very difficult and dangerous to use and when the rain becomes heavy, the roads can become impassable. After heavy rain, the road between the airport and Labang Longhouse (refer to Figure 18) becomes a large stream with the water level rising up to 300mm in some areas.



Fig 21. The road the day after heavy rain. This section of road in Bario becomes very difficult to negotiate after the area has received rain.

In the areas that have high sand content, the roads have been built using the sand from beside the road. While the water flows off the road with little trouble, small eroded trenches often formed where the water has eroded away the sand on its path off the road. This can make the road dangerous as these small trenches can be hard to see (especially at night).

In the areas where clay and stone has been used to build the road, the water does not escape as easily. In fact the water is soaked up by the clay and the clay becomes very

tacky. As a consequence, the tread on tyres and shoes become clogged with clay and traction on the roads becomes very difficult and results in the inability to steer. When this happens, the front steering wheel or wheels aquaplane on the road surface and the vehicle continues in a straight direction until another force is able to stop or change its direction. Braking is also badly affected by the lack of traction between the tyre and the road. Another effect of the tacky clay roads is that a vehicle must use more energy to push itself along the road as the driving tyres can often spin with little to no traction. This can result in the use of more fuel and can damage the vehicles mechanics. As a result, the clay roads can lead to higher vehicle operating costs.

Another problem with the clay roads is that in the locations where they absorb the most water, big holes, channels and other road damage often materialize as it can be seen in Figure 21. The damage to the roads can make the road very difficult to negotiate or can make it impassable, resulting in delays or even the closure of the road.

In Bario after a heavy down pour it is common to see the roads quite empty of vehicle and human traffic. Many of the local coffee shops and small bars suffer as their cliental may not want to venture out or may not be able use the roads.

4.6 Summary.

This chapter has examined the context in which the research took place. The chapter analysed the social and economic aspects of living in the Kelabit communities within the Kelabit Highlands both historically and in the present-day. It has focused on a number of topics that are relevant for this research project. These topics will arise in the results chapter and can be used as an important tool to understanding to research findings. Additionally, this chapter examined the three road projects that make up the road networks into and around the Kelabit Highlands.

Chapter 5

The Research Structure

5.0 Introduction

In this chapter I outline the research framework used in this thesis. This chapter starts by establishing the research design and methodology. The sample makeup, study sites and data collection will then be discussed through the middle of the chapter. The final sections of this chapter will discuss the importance of the research and any limitations that became apparent during the field work.

5.1 Research Design

The main focus of my research was to record the diverse perspectives that the Kelabit community have in regard to the road networks that connect the Highlands to the rest of Sarawak and the villages within the Highlands. The focus of my research was on the perspectives of the participants, rather than simply testing whether the roads have been successful. For this reason I have taken a largely qualitative approach.

The research design involved informal semi-structured interviews and participant observation. Semi-structured interviews were conducted with both community members and key informants. The interviews tended to be conversationally based and generally involved participants answering open ended questions with the ability of participants to digress onto topics that they perceived to be of similar relevance or importance.

Although the focus was on qualitative information, I did collect some quantitative data such as the number of participants who owned their own transportation, the number of times a participant visits an urban centre and the change in food prices between 2006 (before the road) and 2010 (after the road)

The research design was created with a participatory ethos. Members of the Kelabit community helped design the research project right from the selecting of the research topic through to the writing up of the questionnaires. I continuously acquired advice from members of the Kelabit community during the field work. Those members of the Kelabit community that helped can not be named as anonymity is guaranteed in the consent forms. The methods used during the field work were made flexibly enough so that the research design could be changed based on the advice of members of the Kelabit community.

Table 03 presents the research schedule used during this research project.

Table 03: Research Schedule

Dates	Activity
January 2010 - February 2010	Preliminary work - including initial planning and finding key informants and acquiring advice.
March 2010 - August -2010	Literature review Developing methodology in consultation with other stakeholders, Applying for ethics approval Applying for State Government approval (SPU and Department of Immigration of Sarawak) Preparing for field research and continue collecting secondary data.
September 2010 - November 2010	Nine weeks of fieldwork in Malaysia – (five weeks in the Kelabit Highlands and four weeks in the urban centres of Sarawak) The gathering of both primary and secondary data. This included an active participation in the day-to-day community life.
December 2010 - June - 2011	Data analysis and thesis write-up back at Victoria University, Wellington.

5.2 Research Methods

5.2.1 Triangulation

To verify the reliability of participants and the validity of their responses, I used triangulation in which more than one research method was used to collect the data. These included participant observation and semi-structured interviews with key informants and community members. When ever possible, I would compare participant’s responses to written records. For example, I compared a participants statement that claimed that tourism had decreased, with the current arrival–departure journal at the airport and a previous research project on tourism in the Kelabit Highlands that stated the number of tourists visiting the Kelabit Highlands at a date just before the roads were constructed.

5.2.2 Key Informant Interviews

I conducted semi-structured interviews with key informants. Key informants were those participants that were considered to have specialised knowledge on key topics that were related to the research or were able to interpret specific data that came up in other interviews. Some key informants were interviewed more than once. There were several key informants that also played a major role in helping me to establish relationships with other community members.

5.2.3 Community Interviews

I conducted semi-structured interviews with Kelabit community members to obtain the diverse perspectives. Some participants were interviewed more than once. Questionnaires were used as guides in the community interviews; however the interviews were generally very conversational and allowed for the participants to talk about what they wanted to talk about. I believe that this practice worked better than strictly following the questionnaire for two main reasons. Firstly, it allowed the participants to feel more relaxed and secondly, it allowed them to travel off on tangents that often led to other very important information that would not have been discussed if the questionnaire was strictly followed. The drawback to this practice was that some interviews went on for extended lengths of time. The flexibility that I allowed for the community interviews meant that the length of time an interview went for was not a problem on my timetable; however it did mean that I had to employ translators for longer than had been intended. As far as the disruption on the participant's time was concerned, at the start of every interview, the participant was advised that interviews may require 60 minutes of their time but they were free to finish the interview at any time (including going over the 60 minute limit). The majority (90%) of the community interviews were completed within 60 minutes.

5.2.4 Participant observation

As useful as interviews are for acquiring information, there were often gaps of information in interviewees' responses. The interviews, although unstructured and flexible still focused on what I considered to be relevant for the research and what the interviewees' believed to be imperative for stating their perspectives on the road networks. However, there were features in the social lives of the Kelabit community that were not discussed in the earlier interviews but were revealed from my observations of the everyday functioning of the community. For example, participants were asked if they owned any vehicles but were not asked if they were the ones that operated the vehicles. From observing the community, it emerged that although a family may own a 4WD, there was a substantial gender bias in the operating of the vehicle. After this observation, the interviews included questions that identified who operated the family owned vehicles. For this reason and many other examples of observations that uncovered topics and issues that had not previously arisen in the interviews, participant observation became very important to my research.

When I was not conducting interviews, I was partaking in participant observation. While conducting my research field work, I lived amongst the Kelabit community. During my time living amongst the Kelabit community, I attempted to take part in the everyday tasks and activities of the community.

To experience the roads, I travelled along every road within the research sites and between the research sites; however travelling the entire length of the road between Miri and Bario was to higher burden on time and finances.

I used field journals to record information that was gained through participant observation.

5.3 Sample

48 community participants took part in the research. In addition to the community participants, there were also eight participants who took part in the research that represented government services or departments. Table 04 presents the breakdown of the interviews. This table displays the number of interviews undertaken and the categories the interviews fit into.

Breakdown of Interviews	
Individual Community Interviews	45
Completed Questionnaires	3
Police Interview	1
Health Clinic Interviews	2
Immigration Department Interview	1
Agriculture Department Interview	1
Education Interviews	3

Table 04. The Breakdown of Interviews by category

5.3.1 Community Interviews

Community Interviews	
Gender	
Male	32
Female	16
Age	
18 – 25	4
26 – 35	7
36 – 45	11
46 – 55	13
55+	13

Table 05: Breakdown of Community Interviews By Gender and Age.

45 of the community interviews were conducted face to face and a further three interviews were conducted via email. Table 05 displays the breakdown of the ages and gender of the participants in the community interviews.

The selection of the participants for the community interviews was carried out in two ways. The first technique was snowballing. Many of the participants were selected on the advice of key informants and local advisors (including translators). I contacted most of these participants via email and cell phone. For those that did not have access to internet or cell phones, I would go and visit them personally (often accompanied by a key informant or translator).

The other participants in the community interviews were found during my participation within the communities. By participating and living within the communities, I was able to talk to many possible participants that had not been mentioned by my key informants. I

actually found that I could talk to someone on the roadside about what I was doing and this created interest. The word was spread into other parts of the community and other community members who wanted to voice their opinion came forth.

The participants from the community interviews are divided into four groups. It is these four groups that form the basis of the main research hypothesis. These groups are the Kelabit community residing in Bario, Pa Dalih, Pa Lungan and the urban centres. Table 06 presents the four groups and some of their characteristics.

The Four Research Sites.

	Bario	Pa Dalih	Pa Lungan	Urban Based
Road to Urban Centres (2005)	-	-	-	X
Road to Urban Centres (2010)	X	X	-	X
Inter-village Road (2005)	X	-	-	X
Inter-village Road (2010)	X	X	-	X
Airport (2005)	X	-	-	X
Airport (2010)	X	-	-	X
Telephone Connection (2005)	X	-	-	X
Telephone Connection (2010)	-	-	-	X
Cell Phone Reception (2005)	-	-	-	X
Cell Phone Reception (2010)	X	-	-	X
Internet Connection (2005)	X	-	-	X
Internet Connection (2010)	X	X	-	X
Residents Have 4WD Ownership (2005)	X	-	-	X
Residents Have 4WD Ownership (2010)	X	X	-	X
Residents Have Motorbike Ownership (2005)	X	-	-	X
Residents Have Motorbike Ownership (2010)	X	X	-	X

Table 06. This table displays the four research sites involved in the community interviews and some of their characteristics in 2005 and 2006. (X) = Yes (-) = No

For this research, I have been constrained by time and as a consequence it is not possible to carry out a longitudinal study to see how an isolated rural village changes as a road is connect to the village for the first time. For this reason, I chose to conduct my research in three locations within the Kelabit Highlands. By comparing Pa Dalih and Pa Lungan together, it is possible to see at one moment in time, the changes that can occur when a village is connected to a road network. Both villages prior to four years ago had no roads

and the residents of both villages would have to walk through the jungle to get to other villages. If they wanted to travel to Miri, they had to walk to Bario before they could fly to Miri. Now a day's Pa Dalih is linked to Bario and Miri by roads whereas Pa Lungan still has no roads. It is important to acknowledge that Pa Dalih and Pa Lungan are geographically and historically different locations but in 2005 (before the roads reached Pa Dalih) they shared many of the same characteristics (refer to Table 06 for examples). The data collected from each village was used to compare how different research sites that have had different levels of exposure to the road networks, have different opinions of the impacts from the road network. This was done to see if there were patterns that may arise and to see if future predictions could be made for those villages with the least exposure to the road network.

I chose to compare Bario and Pa Dalih because both villages are connected to the road network (within three years of each other) but the two villages have many characteristic differences, the largest being the airport and the number of government departments located in the village. Bario already had direct access (via the MASwings flights) to the urban centres of Miri and Marudi before the road reached Bario. Bario is also the host of almost all government services and departments in the Kelabit Highlands (refer to 'Bario' section below).

I chose to also compare the urban based Kelabit to the three research sites in the Kelabit Highlands because the urban based Kelabit live very different lifestyles to the Kelabit in the highlands and therefore would have very different opinions and representations of the Kelabit Highlands. Additionally, now a day's there is an imbalance of power in decision amongst the Kelabit community that is based predominantly amongst a group of urban based Kelabit.

5.3.1.1 Hypotheses for Community Interviews

I made two hypotheses before under taking the research. The first hypothesis was that the residents in each research site would experience different impacts as a consequence of the road projects and would therefore have different opinions on the impacts experienced in the Kelabit Highlands. The more experience a research site had had with the roads, the stronger their opinion of the roads would be.

The second hypothesis was that the desire for the roads to remain would be strongest amongst the residents of Pa Dalih who depend on the road the greatest and weakest amongst the urban based residents who generally only travel to the Kelabit Highlands to visit family and to get away from the urban areas.

5.3.1.2 Bario

The first sample is the residents of Bario. Bario has an approximate population of 600 residents and is the unofficial centre of the Kelabit Highlands. Almost all the government services and departments that are present in the Kelabit Highlands are found in Bario. These government services and departments include a primary and a lower secondary school, health clinic, Police Department, Immigration Department, Agriculture Department and Forestry Department. Additionally, during this research project, the construction of a kindergarten was taking place.

Bario is also considered the commercial centre of the Kelabit Highlands. Inter-village trade is conducted in the market place which houses 12-unit lock-up shops. Scattered around Bario are many other locally owned and operated shops.

Bario contains ten *Sidang Injil* Borneo churches. Due to the Kelabit communities devotion to Christianity, these churches play a large role in the everyday activities of the Kelabit community in Bario.



Fig 22. The view of Bario from Pray Mountain in October 2010.

Bario	
Gender	
Male	11
Female	6
Age	
18 – 25	1
26 – 35	3
36 – 45	6
46 – 55	5
55+	2

Table 07. Bario Participants by Gender and Age

Bario, like most villages in the Kelabit Highlands, contains a public grass volleyball court. Other outdoor sports such as football are played at the schools fields. Bario also houses an indoor sports hall which can also double as a community hall.

Bario has the greatest access to telecommunication and internet in the Kelabit Highlands. Cell phone reception can be found in almost the entire Bario valley. There is currently wireless internet in several areas of Bario (airport and marketplace) and there is an internet café named eBario that runs during the day.

Bario has been connected to Miri via a road since March 2009. Although most Kelabit villages in the Kelabit Highlands now have access to the road networks, only Bario has a fully functioning airport and concrete runway¹¹.

Seventeen community interviews were conducted in Bario. Table 07 presents the break down of the Bario sample by gender and age. A view of Bario can be seen in Figure 22.

5.3.1.3 Pa Dalih

The second sample came from the residents of the village of Pa Dalih. Pa Dalih is located in an area of the Kelabit Highlands known as the Central Kelapang area¹². Pa Dalih is the largest village in the Central Kelapang area, with an approximate population of 100 residents. A view of Pa Dalih can be seen in Figure 23.

The only school and health clinic in the Central Kelapang area is located in Pa Dalih. There is one church in Pa Dalih and all sporting activity in Pa Dalih is conducted on the school grounds. Only one home stay remains operating in Pa Dalih. There is no marketplace but there is one general store.

Pa Dalih has no functioning phone lines and does not have cell phone reception. Wireless Internet connections are available to the students and staff at the Pa Dalih primary school, and for the health clinic. No internet access is available for households in Pa Dalih. For these reasons, the inter-village roads and the road to Miri play a major role for communication in and out of Pa Dalih.

Pa Dalih	
Gender	
Male	7
Female	4
Age	
18 – 25	2
26 – 35	0
36 – 45	1
46 – 55	3
55+	5

The road from Miri (refer to Figure 17) was connected to Pa Dalih approximately three years before the road reached Bario. This means that Pa Dalih has had a longer experience with the rural to urban road network than Bario and therefore has had a longer period of exposure to the road network.

Eleven participants from Pa Dalih took part in the community interviews. The distribution of the gender and ages of the participants from Pa Dalih are listed in table 08.

Table 08. Pa Dalih Participants by Gender and Age.

¹¹ More details on flights between Bario and Miri can be found in the section entitled 'Transportation into the Kelabit Highlands' and in Table 01.

¹² The Central Kelapang area is found in the south-western end of the Kelabit Highlands and contains the following villages - Pa Dalih, Pa Mada and Ramudu (refer to Figure 17).



Fig 23. The view of Pa Dalih from the inter-village road in October 2010.

5.3.1.4 Pa Lungan

The third sample group reside in the village of Pa Lungan. Pa Lungan still has no road access. Pa Lungan is linked to Pa Ukat via a dirt track which is only accessible by water buffalo or by foot. Pa Ukat is then connected to Bario by a road that can be used by motorbike and when conditions are good, by 4WD (refer to Figure 20). The locals state that Pa Lungan is approximately three hours walk from Pa Ukat and four hours walk



Fig 24. Pa Lungan viewed from a nearby hill.

Pa Lungan	
Gender	
Male	6
Female	2
Age	
18 – 25	0
26 – 35	0
36 – 45	2
46 – 55	3
55+	3

Table 09. Pa Lungan Participants by Gender and Age.

from Bario. The lack of road access directly to Pa Lungan is what makes Pa Lungan an interesting research site as many of its residents have had very little interaction with the socioeconomic impacts that roads can bring.

Pa Lungan has an approximate population of 100 residents; however as there is no school in Pa Lungan, the children must board at the school in Bario and only return to Pa Lungan every second weekend and during school holidays. Therefore the actual population is often much lower than 100 residents during the majority of the year.

Pa Lungan has no government services or departments located in the village. There are three home stays operating in Pa Lungan. Pa Lungan has no market place or general stores.

No telecommunication or internet access is available in Pa Lungan; however there are locations within Pa Lungan that can get cell phone reception but this reception is not consistent or reliable.

Eight participants from Pa Lungan took part in the community interviews. The distribution of the gender, ages and occupations of the participants from Pa Lungan are listed in Table 09. A view of Pa Lungan can be seen in Figure 24.

5.3.1.5 Urban Based Kelabit Community

The fourth sample group are the Kelabits who are urban based. Currently there is a larger population of Kelabits living in urban centres than there are in the Kelabit Highlands¹³. For this reason, the urban based members of the Kelabit community make up an important group in this research. Not only is the urban based Kelabit population larger than the total Kelabit population in the Kelabit Highlands, but the urban based Kelabit population play a larger role in the decision making of development projects that occur in the Kelabit Highlands. As a result, decision making can be biased more towards the needs and aspirations of the urban based Kelabit.

Twelve Kelabit participants from different urban centres took part in the community interviews. The distribution of the gender, ages, occupations and current residence are listed below in Table 10.

Urban - Based Kelabit			
Gender		Current Residence	
Male	8	Miri, Sarawak, Malaysia	6
Female	4	Kuching, Sarawak, Malaysia	2
Age		Bintulu, Sarawak, Malaysia	1
		Limbang, Sarawak, Malaysia	1
		Johor Bahru, Johor, Malaysia	1
		Hamilton, New Zealand	1
		Place of Birth	
		Kelabit Highlands	6
18 – 25		Outside the Kelabit Highlands	6
26 – 35			
36 – 45			
46 – 55			
55+			

Table 10. Urban Based Kelabit Participants by Gender, Age, Current Residence and Place of Birth.

¹³ The Kelabit populations living in the Kelabit Highlands and living in the urban centres of Sarawak, Malaysia are constantly fluctuating between the two locations; however the ratio today is believed to be around 7:3 in favour of the urban centres.

5.3.2 Key Informant Interviews

From the participants that took part in the research, there were 18 participants that were considered as key informants. Twelve of the key informants reside in the Kelabit Highlands and the remaining six key informants reside in Kuching, Bintulu and Miri. The key informants consisted of eight individuals on behalf of government organisations and ten individuals (from within the individual community interviews) who were identified as having specific knowledge that was required to enable the completion of this research.

5.4 Data Collection

Of the total 56 interviews, I personally carried out 53 of them with informal face to face semi-structured interviews. The other three interviews were conducted by email with the use of pre-made questionnaires. Both the informal interviews and the questionnaires involved the collecting of qualitative and quantitative data. Although the questionnaires did not allow the level of flexibility that the informal interviews had, the participants that completed the questionnaires only, presented me with information that matched the high quality of responses that I was receiving from the majority of the interviews.

All participants were given an information sheet explaining the research project. For those that could not read English, the information sheet was translated orally. Consent forms were completed for all of the interviews¹⁴. Every participant in the community interviews was informed that their names would never be used unless they wanted it to be added to one of their statements. The consent form also allowed the participant to choose an alternative name if so required. Key informants were given opportunity to be identified as them personally, as the organisation they represented or not identified at all.

The community interviews were conducted at participants' homes, places of work and food outlets. In almost every community interview, the interviewees chose the location of the interviews. The rest of the community interviews were conducted upon first meeting the interviewee and were generally conducted on the spot.

In addition to the interviews, I kept a field journal which was used to note any observations that I believed to be relevant to the research and I collected data such as the prices of items in the shops, and the number and type of vehicles using the road.

¹⁴ For those participants that could not read or write in English, their consent to use any information they provided was performed verbally. Their names (or alternative name) was placed on the consent form, a note was made that consent had been given verbally and then the consent form was signed by the translator as a witness.

5.5 Researching in the Kelabit Highlands

The Kelabit Highlands have been a very popular place to conduct research in part because the Kelabit Highlands climate makes it a very pleasant environment to work¹⁵. The Kelabit community are very friendly and generally very supportive to researchers. For these reasons, many non-Kelabit decide to conduct research in the Kelabit Highlands¹⁶.

With so many non-Kelabit conducting research in the Kelabit Highlands, there is bound to be problems with understanding participants' responses or the misinterpretation of the collected data. Bala (2002) pointed out how some research conducted in the Kelabit Highlands by non-Kelabit has lead to incorrect representations of the Kelabit culture and language and had the potential to lead to hostility from other ethnic groups and the questioning of the authenticity of non-Kelabit researchers conducting research in the Kelabit Highlands.

As a non-Kelabit, there is always the potential that I could misunderstand participants' responses or misinterpret collected data. I have therefore employed a technique that was based on participatory research methods. During my time in the field, I lived and participated with the Kelabit community. I attempted to immerse myself in the everyday way of life. I was however limited to the activities that the Kelabit community were willing to allow me to participate in and the particular activities that were practiced at the time of year I was living in the Kelabit Highlands. This immersion into the everyday lifestyles of the Kelabit community gave me a better understanding of the participants' responses from the community interviews.

5.6 Positioning Myself in Relation to the Research

As a *lun buda* (white person) I am viewed as an outsider by the Kelabit community and therefore I encountered some limitations. These limitations include my own biases, a reluctance of some community members to share information with me and an inability to claim to completely understand the Kelabit world view.

I am a white male who was born and raised in New Zealand. I went through the New Zealand education system and I have been influenced by aspects of a New Zealand way of life. This means that a lot of how I understand the world is shaped by what I have experienced in New Zealand. As a researcher, I can never claim to be a completely neutral observer. Although I attempted to come across as neutral as possible, I can not deny that

¹⁵ The Kelabit Highlands has a much cooler average temperature and a lower average level of humidity than the rest of Sarawak. The average temperature in the Kelabit Highlands as stated by the Residents Office Miri Division (2005) is 21.2°C. The Residents Office Miri Division also states that the Kelabit Highlands is the driest place in Sarawak.

¹⁶ Bala (pers.com.) received November 2, 2010

some of my understandings and perspectives of the world and the systems within it did come up in conversations with members of the Kelabit community. From my experience, I find that conversations that took place out in the field worked best when both parties shared information. Not only did sharing my own experiences and knowledge help to stimulate conversation but it also helped to make the participant feel more comfortable and trusting. I did however resist from discussing my perception of the roads and the roads impact on the community.

Before I started my research I had previously experienced living in Sarawak, Malaysia and have lived with several Kelabit families. During the earlier experiences I had while living in Sarawak, I had experienced living in Bario and I had visited Pa Lungan. There was no road between Miri and Bario and the inter-village roads were minimal at this time. This experience had given me a good understanding of the rural Kelabit way of life; however I still obtained advice from key informants to ensure I was respectful and considerate to the Kelabit community.

5.7 Limitations of Research

One of the main limitations in the data collection was that some of the interviews had to be translated. Four languages are often spoken in the Kelabit Highlands. These languages are Kelabit, Bahasa Malay, Penan and English. Although English is spoken by a large number of the Kelabit community, there are members of the community who can not communicate in English. Unfortunately, English was the only language that I could communicate in fluently and therefore I required a translator. All interviewees had the choice of what language they would respond in. The problem with working with more than one language is that there are responses in one language that can be hard to directly translate to the other language. Problems can occur with the delivery of the translation too. For example, the major points in a response maybe lost as the response is translated and passed between participant, translator and then interviewer. Additionally, there is the potential that the translators own biases may become intermixed with the translations. However I do not have any reason to believe that this was a problem in this research project.

The language barrier not only limited my ability to conduct interviews with those that could not communicate their responses in English but it also meant that I could not arrange meetings with them or even talk to them on a social basis without the help of a translator. This narrowed the possible participant sample during the times that I had no translator accompanying me.

I did intend on selecting the participants for the community interviews, to ensure that I had an even cross section of the Kelabit community. I had hoped that by selecting my participants, I could have an even distribution of males and females, participants from all

age groups (excluding under 18 year olds) and community members from the lowest levels of political and social influence to the highest levels of political and social influence. Very earlier in the field research I realised that this was not going to be possible. As a result, my samples did cover a cross section of the Kelabit community but the sample was not evenly distributed. For example, the number of male participants in the community interviews was twice that of the female participants. One of the main reasons for this is that the male population in the Kelabit Highlands far out numbers the female population. In fact the sample may not be an evenly distributed sample but the distribution is a good representation of the actual demographic distribution in the Kelabit Highlands.

Another problem with the sample was that all of the participants were self selected. There were many residents that were not interviewed but had very significant perceptions and experiences with the roads. Many of these residents refrained from being interviewed in fear of prosecution. Several other residents believed that their opinions were unimportant because they were simply 'farmers'. Although nothing was said to me, it is highly likely that some residents did not trust me as I was non-Kelabit and therefore they questioned why I was conducting the research.

The participant selection was also restricted as a result of the time of year that I visited the Kelabit Highlands. The timing of my research was based on the issuing of a research permit from Sarawak State Planning Unit (SPU) and a research/work visa from Department of Immigration of Sarawak, Malaysia. My arrival in the Kelabit Highlands coincided with the end of the second planting of wet padi. During the period between the completion of the second planting and the harvesting of the rice, many of the Kelabit community travel to visit friends and family in the other villages or the urban centres. The population in the Kelabit Highland research sites was significantly reduced during the initial research period. This made it difficult to find participants early in the field work. For example, one of the first research sites I visited was Pa Lungan but when I arrived there, I discovered that approximately one third of the Pa Lungan residents had already travelled to locations outside of Pa Lungan.

One additional limitation should be mentioned here. There were a few times when I felt that certain participants answered questions based on what they perceived I wanted to hear. Although it is difficult to establish whether this was happening, I did find one case where a key informant confirmed my suspicion by presenting physical evidence that contradicted many of a particular participant's responses. Due to the unreliability of those responses, all of that participant's responses were eliminated from the data collected and the participant was excluded from the study. It is possible that other participants also gave me unreliable data and that I was unable to identify this data as unreliable.

5.8 Importance of Research

My research will provide a framework for a small sample of the Kelabit people to express their views on the construction of the road that links the Kelabit Highlands to Miri, and the maintenance and upgrading of the road networks within the Kelabit Highlands. Additionally, I believe the perceptions of the Kelabit people demonstrate any changes in the level of mobility and migration due to the roads. As in most cases, the level of mobility and migration that takes place and the corresponding impacts which come from this mobility and migration fluctuate from place to place, culture to culture and situation to situation. Local studies of mobility and migration are therefore necessary to describe the positive and negative impacts of increased mobility and migration on the local area and to explore the adaptive strategies needed to support and sustain the local area (Ananta et al., 2001; Hugo, 1982; Rigg, 1998).

The results from the research will be beneficial in three ways:

- 1 My research gives the Kelabit community an opportunity to express their views on the roads and may help the Kelabit community to plan for the future.
- 2 I believe my research may help the Sarawak State Government to understand the Kelabit Highlands context and the needs and desires of the Kelabit communities. With an enhanced understanding of the Kelabit Highlands context and the needs and desires of the Kelabit people, the Sarawak State Government can more effectively and efficiently support the Kelabit communities.
- 3 This thesis will add to the literature on the impacts of rural roads and on mobility and migration of people in remote rural areas of South-East Asia. While many studies have discussed the economic impacts of rural roads in South-East Asia, little research has been done on the social impacts of the rural roads in South-East Asia. Furthermore, the majority of studies use Western techniques that attempt to measure the success or failure of rural roads. For many rural communities in the developing world, these Western techniques do not consider the views and desires of the local people and therefore miss information that local communities (or groups within local communities) consider important. My research will look at the perceived economic and social impacts of rural roads from a cross section of the Kelabit community. This research will add to a body of knowledge of which there is currently limited published information. Additionally, I believe that my thesis will also add to the literature that exists on the Ninth Malaysia Plan (2006–2010).

5.9 Summary

This chapter has provided the research framework for this thesis. The chapter has covered the research design and how the data collection was carried out. It has been presented in this chapter, that the research design was based on a qualitative approach and a participatory philosophy. Additionally, this chapter has discussed the limitations to which this research design has encountered. Nevertheless, as it was discussed at the end of this chapter, the research conducted in this thesis will have very important outcomes and therefore is of great importance to the participants, the Malaysian government and to the academic literature.

Chapter 6

Results

6.0 Introduction

The construction of the inter-village roads in the Kelabit Highlands and the logging roads that connect the Kelabit Highlands to Miri have created both economic and social impacts on the Kelabit Highlands. The concreting of the Bario roads is also expected to bring economic and social impacts on the Bario area. This chapter will examine the impacts that have already arisen as a result of the three roading projects and will discuss the perceived impacts that could arise in the future. The first half of this chapter will discuss the economic impacts that the road has had on the Kelabit Highlands, while the second half will discuss the social impacts.

6.1 Economic Impacts

The Kelabit Highlands has experienced a large number of economic impacts as a result of the construction of the inter-village roads and the logging road. This section will discuss these economic impacts with an examination of how the roads affect the mobility and price of goods, vehicle ownership and usage, transport costs, agricultural production, off-farm employment and remittances.

6.1.1 Mobility of Goods and the Subsidies

The facilitated mobility of goods was the second most deliberated aspect of the road networks impact on the Kelabit Highlands. Almost every participant from Bario and Pa Dalih stated that they believed that the road had had positive impacts on the Kelabit community both in the Kelabit Highlands and in the cities of Miri and Marudi. For many residents of Bario and Pa Dalih, the road has allowed them to bring goods not previously possible. For example, a very common story in both Bario and Pa Dalih was that people were now able to build, maintain or modernise their homes.

“You can bring in things like fuel, things to build a house, cement. Before the road, you could not bring in heavy things. I now have a good toilet with tiles. Can bring in plywood now which is important because it is cheaper to get plywood from town and bring it up here than buy timber from up here.” (Participant 25)

Every participant from Pa Dalih and almost all the participants from Bario bought goods from outside of the Kelabit Highlands. For the Bario residents, it is a mix of road and air transport that is used to transport goods. The mode of transport used when moving goods between Miri and Bario is generally based on the size and weight of the goods. The road has allowed the residents of Bario to bring more goods from the urban areas as weight is not as limiting as it is with air transport. However with more goods coming direct from the urban centres, the shops in Bario are losing clientele. Additionally, a number of goods are prohibited on the MASwings flights from Miri to Bario and therefore those goods must come by road.

For the Pa Dalih participants, the majority of their purchased goods are bought in Miri and then transported directly to Pa Dalih via 4WD. Before the road connected Pa Dalih to Miri and to Bario, there was a very small quantity of goods from outside of the Kelabit Highlands arriving in Pa Dalih. Several Pa Dalih participants stated that before the road reached Pa Dalih, they would trek to Bario and purchase goods from the shops in Bario. The quantity of goods the Pa Dalih residents would purchase was restricted to the amount they could carry on the eight to ten hour return trek to Pa Dalih. Now that the weight of goods is less of a problem, the Pa Dalih residents are now only limited to the amount of goods they can afford to purchase and transport.

Almost all of the Pa Lungan residents purchase goods from outside of Pa Lungan but a much smaller number purchase goods directly from outside of the Kelabit Highlands. There are two main reasons, the first being that it is very difficult and expensive to transport goods (especially large quantities of goods) to Pa Lungan. The second reason is that the average incomes of Pa Lungan residents are significantly lower than the average incomes in Bario and therefore, Pa Lungan residents have a harder time paying for goods from outside the Kelabit Highlands.

With increased access to goods from urban areas, there has been an increase in the amount of unhealthy goods (such as alcohol, cigarettes and processed foods) entering the Kelabit Highlands. This has caused financial, health and safety concerns¹⁷ as one Penan lady in Bario noted,

“Traditionally the Penan did not have cigarettes or alcohol or drugs. Some young Penans work just to earn money to pay for cigarettes and alcohol.”

(Participant 11)

The roads have not only increased the movement of goods into the Kelabit Highlands but have also helped the residents of the Kelabit Highlands to send farm produce to friends and family outside of the Kelabit Highlands. The residents of Pa Dalih used to find it very difficult to send farm produce to the cities but now the road has meant that the Pa Dalih residents

¹⁷ For more information on the health and safety problems and concerns, refer to the subsections entitled ‘Healthcare’ and ‘Safety and Security’

are not restricted to transporting only what they can carry. As a result Pa Dalih had the largest increase in the amount of farm produce sent to the cities. Half of the Pa Dalih participants stated that they now send farm produce to friends and family in Miri.

Before the road from Miri reached the Kelabit Highlands, there were only three ways to transport goods to the Kelabit Highlands (as described in more detail in the chapter 'The Kelabit Highlands'). The easiest and most popular was by plane; however there is a lot of confusion amongst the Kelabit communities on what is permitted to be transported on the MASwings flights. Posters in the airports in Miri and Bario display items that are not permitted but these posters are out of date and do not display all of the items that cannot be transported on the flight between Miri and Bario¹⁸. Additionally, items that were once allowed on the flights (such as bags of cement) became prohibited on the MASwings flights just after (in 2009) it was announced that the logging road from Miri would link with Bario. The transportation of items by 4WD is far more lenient. Almost any item can be transported by the 4WD transporters as long as it's not over 1 tonne and is legal.

6.1.2 The Price of Goods

The roads have enabled the transportation of items that are prohibited on the MASwings flights or are too heavy to be transported by the Twin Otter aircraft. Because of this, the price of transporting these items has been reduced. For example, before the road from Miri connected to Bario, it was still possible to bring in bags of cement via the plane but only limited amounts could be brought in and as a consequence, a bag of cement cost around RM200. Now that bags of cement are transported by 4WD, more bags can be brought in and as a consequence, the price paid for a bag of cement in Bario has reduced to only RM50 (a reduction in price of 75%). This has meant that a larger proportion of the residents in the Kelabit Highlands now have access (whether it's physical or financial access) to heavy items or goods that are prohibited on the MASwings flights.

The majority of unsubsidised goods that were sold in the Kelabit Highlands before the road from Miri connected to the Kelabit Highlands remain around the same price as they were before the road was constructed (when taking inflation and urban price rises into account). This is a result of 4WD transport fares per kg of cargo being loosely set at the same price as the MASwings transport fares per kg of cargo. Table 11 shows the prices of a selection of available goods in Bario in 2006 before the logging road from Miri reached Bario and in 2010 after the logging road reached Bario.

¹⁸ The goods that are not on the prohibited poster but are known to be prohibited on the MASwings flights between Miri and Bario are as follows: fuels such as petrol, diesel and LPG, mechanical machines that run on fuel such as generators, selective chemical products such as paint and some building materials such as cement

Goods Price Table

Goods	Bario 2006	Bario 2010	% Change	Miri 2006	Miri 2010	% Change
1 Small battery	2.00	2.50	25% Increase	0.90	1.90	111% Increase
1 big battery	5.00	2.50	50% Decrease	1.20	1.90	58% increase
1 pair rubber shoes	9.00	15.00	67% Increase	6.00	9.90	65% Increase
1 bar of soap 100g (Dove)	4.00	4.50	12.5% Increase	1.85	1.90	2% Increase
1 bottle shampoo (Sunsilk 100ml)	6.00	8.00	33% Increase	3.00	4.00	33% Increase
1 packet detergent (Trojan)	5.00	6.00	20% Increase	2.40	4.00	67% Increase
50 page exercise book	1.00	1.20	20% increase	0.30	0.80	166% Increase
Eraser	0.50	1.00	100% increase	0.30	0.80	166% Increase
2b pencil	0.50	1.00	50% increase	0.30	0.50	67% Increase
1 grade C eggs	0.70	0.70	No Change	0.30	0.30	No Change
1 packet table salt 450g	3.00	3.00	No Change	0.75	1.00	33% Increase
1 can Coco-cola – 325ml	3.00	3.00	No Change	1.80	1.80	No Change
1 can Tiger Beer – 325ml	6.00	5.00	17% Decrease	3.00	4.00	33% Increase
1 can Orenjeboom – 325ml	5.00	4.50	10% Decrease	2.50	4.00	60% Increase
1 Bottle Borneo water – 500ml	2.50	3.00	20% Increase	0.70	0.70	No Change
1 Bottled water – 1500ml	3.00	6.00	100% Increase	1.30	1.50	15% Increase
1 Cup of tea "O"	1.00	1.00	No Change	1.00	1.50	50% Increase
1 Cup of Nescafe "O"	1.00	1.00	No Change	1.00	1.50	50% Increase
1 Cup of Milo "O"	1.80	1.00	44% Decrease	1.00	1.50	50% Increase
1 Cup of Kopi "O"	1.00	1.00	No Change	0.80	1.50	88% Increase

Table 11. This table presents a sample of goods that are available in Bario and the prices of the goods in Bario and Miri in 2006 and in 2010. All the prices in this table are in the Ringgit.

Subsidised Goods Price Table

Good	Bario 2006	Bario 2010 Without Subsidy	Bario 2010 With Subsidy
1 litre of petrol	5.00	4.00	1.85
1 litre of diesel	5.00	4.00	1.75
1 LPG Gas cylinder–14 kg	130.00	60.00	25.90
1kg bag of sugar	4.00	4.80	2.20

Table 12. This table presents a sample of the subsidised goods in Bario with a comparison of prices in Bario in 2006 and in 2010 with the subsidy and without the subsidy. All the prices in this table are in the Ringgit.

The largest factor leading to a reduction in the price of the goods is the federal government subsidies that were introduced after the road from Miri reached Bario (2010). The Federal government provides subsidies on selected goods as long as they are transported into the Kelabit Highlands via the road¹⁹. The goods that are subsidised include flour, sugar, salt, rice, cooking oil, petrol, diesel and LPG. The fuel subsidies (petrol, diesel and LPG) are covered by a subsidy scheme called the 'fuel-transport subsidy scheme for rural areas'. The main purpose of the fuel subsidies was to help rural communities with power generation for general household power requirements (such as cooking and lighting) and agricultural purposes (such as farm vehicles and machinery). The goods are purchased in Miri at Miri prices and are then transported to the designated village to be sold for the Miri price with the Federal government paying for the transport costs. Table 12 presents a sample of the subsidised goods sold in Bario with a comparison between the prices in 2006 and 2010.

The Federal government opened up the contracts to transport the fuel to the villages. The transport contractors present their suitability for the transport tasks and their transport fare prices to the federal government. The transport contractors do not have to be locals and therefore local contractors must compete with non-local contractors. The Federal government then selects the contractors to carry out the transporting of subsidised goods. Those contractors that are selected must honour their transport duties and must maintain the same transport fares till the end of the contract. When the fuel arrives at the approved destinations, the fuel must be sold at the same price as it was bought in Miri. No mark-ups are permitted. If it is found that mark-ups on subsidised goods is occurring, then the contract to the transporter will be cancelled and no new contract will be issued until the next round of contracts are negotiated.

The subsidies have had a large effect on the communities in the Kelabit Highlands. Since fuel subsidies were introduced in the Kelabit Highlands in 2010, there has been an increase in the number of 4WDs, motorbikes, generators and gas cookers in the Kelabit Highlands. Even Pa Lungan which still has no road has seen an increase in the number of generators and gas cookers in the village since the subsidies started. Before the road construction and fuel subsidises, there was often fuel shortages but these fuel shortages no longer occur.

Not only has the number of generators in the Kelabit Highlands increased but the length of time generators are run for each day has also increased. Before the subsidies started, generators were generally only used during the preparation and consuming of dinner. Now it is common to hear the generators operating till midnight and sometimes beyond. As a result, the use of electronic devices such as televisions and radios has also increased.

Another major change that fuel subsidies have brought to the Kelabit Highlands is that a very large percentage of Kelabit residents now use LPG gas cookers to cook food and boil water.

¹⁹ This subsidy is just for the Kelabit Highlands and is issued through the Ministry of Domestic Trade and Consumer Affairs. There are no official documents available on these subsidies.

This has benefited many people in the community as now they do not have to find firewood, the wood does not have to be stripped from the jungle and their houses do not fill with unhealthy smoke. One negative affect of the subsidy on LPG however is that the Penan who used to go to the jungle and collect firewood and then sell it in the villages have less income.

In Pa Dalih, subsidies started in January 2010 and were expected to end in November 2010. A local official stated that she was unsure whether the subsidies would be reissued. Even if the subsidises were reissued, it would not be until June/July 2011. The official in Pa Dalih did not confirm why the subsidies in Pa Dalih were ending in November while subsidies elsewhere continued. It was suspected by one official in Bario that one of the distributors or transporters of the subsidised goods for Pa Dalih had been marking up the prices of the subsidised goods and therefore the contract for the distribution of subsidised goods in Pa Dalih had been cancelled by the government.

6.1.3 Vehicle Ownership and Usage

When it comes to vehicle ownership, there is a large disparity between the villages but the length of time a village had been connected to the road to Miri had very little influence on the number of vehicles in the village. Pa Dalih which has been connected to the road to Miri for around five years had fewer vehicles per capita than Bario who had only been connected to the road for less than two years. The factor that appeared to have the most influence on vehicle ownership per capita for roadside villages in the Kelabit Highlands was the number of off-farm employment opportunities available in the village.

Bario had the largest number of vehicles (4WDs, motorbikes, tractors and construction machinery) both per capita and in total. It is said that before the road from Miri reached Bario, there had been only ten 4WD vehicles altogether in Bario (Resident's Office Miri Divison, 2005). It is now estimated that there is around 70 4WDs in Bario (not always at the same time). This is a large increase when you consider that it has only been two years since the road from Miri to Bario was completed and that Bario only has a population of around 600 permanent residents. Almost all of the 4WDs in Bario are used to support off-farm employment. Pa Dalih which has very few off-farm employment opportunities only has one resident who owns a 4WD.

Motorbikes are the most common form of vehicular transport in the Kelabit Highlands. Bario has experienced a large increase in motorbike ownership since the road from Miri reached Bario. Pa Dalih had no motorbikes before the road from Miri reached Pa Dalih but since the road connected to Pa Dalih, some residents started bringing motorbikes into the village. However motorbike ownership in Pa Dalih still remains low.

It is now common to see people (especially children) riding around Bario on Mountain bikes. Mountain bikes were around before the road connected Bario to Miri but not at the number that can be seen in Bario today.

Bario is the only Kelabit village in the Kelabit Highlands where the residents own farm equipment (such as tractors) or construction vehicles (such as diggers). The Department of Agriculture has also delivered several farm vehicles (such as power tillers and harvesters) to Bario but these vehicles are said to be sitting idle at present. The number of farm and construction vehicles has increased dramatically since the road from Miri connected to Bario.

Before the roads reached Pa Dalih, other than walking, the main form of transportation around the Central Kelapang area was by small wooden boats (as seen in figure 25). Boats are still used but the number of people now using boats has reduced since the inter-village roads were constructed in the Central Kelapang area.



Fig 25. Small wooden boats waiting to be used.

Unsurprisingly, Pa Lungan which is not connected by a road had no motorbikes in the entire village, nor did it have any 4WDs, tractors or mountain bikes. What Pa Lungan did have was a large number of buffalo, of which three of the eight participants from Pa Lungan continue to use buffalo to transport goods between Pa Lungan and Bario. The majority of participants from Pa Lungan stated that they would use a motorbike or 4WD if there was a road to Pa Lungan. In spite of this, many of them said that the cost of purchasing a motorbike or 4WD would hamper their ability to own.

There was a large gender gap when it came to operating vehicles. From the interviews and my own observation, all transporters were male and almost every vehicle larger than a motorbike was operated by a male. Women were definitely using motorbikes but if there was a male and a female on a motorbike it was the male operating the motorbike. In Pa Lungan, where the main method of transportation other than walking is via buffalo, no buffalo were operated by women as it is believed that women cannot control a buffalo. What should be pointed out here is the fact that men also outnumber women in the highlands by quite a substantial number and all though this does not explain why women are not operating the larger vehicles, it does go some way into explaining why it is possible to see such a disproportionate number of male drivers.

In the traditional Kelabit culture, the possession of certain items such as Chinese jars and glass beads was a way of establishing or confirming social status within the community (Bala, 2002). Now day's vehicle ownership has become a status symbol. For the Kelabit

community in the Highlands, vehicle ownership demonstrates success. Being successful is very important in the Kelabit culture as illustrated by the following statement from a key informant in Bario.

“Last Christmas, so many cars. Cars I have never seen before. People want to show off their car here you know. I have car so everyone in my family wants car too. Having car is like having dignity. It’s like a status symbol. Culturally, bringing your car proves your doing well. It makes our parents proud when they see we are doing well and they live longer when they are proud and happy”. (participant 6)



Fig 26. (Left) & Fig 27. (Right) The road that links Pa Derung to the rest of Bario Proper. Travelling on the back of a 4WD from Pa Derung to the centre of Bario was five times faster than the walk from the centre of Bario to Pa Derung.

6.1.4 Transport Times and Costs

Transport costs between Miri and the Kelabit Highlands generally remain unchanged. Most of the transport fares for freight between Miri and Bario are loosely based on the transport fares of the MASwings flights. When an individual is travelling to Bario from Miri with only 10kg of cargo, it is cheaper for them to purchase a ticket on a MASwings flight than it is to rent a seat in a 4WD. However if a family of five who have their own 4WD were to travel from Miri to Bario, then it would be cheaper for them to travel by 4WD. The MASwings flight between Miri and Bario are much faster at approximately one hour while travelling by 4WD takes between 12 – 16 hours depending on the whether and road conditions.

Flying or transporting goods on a MASwings flights between Miri and Bario are subject to availability. Depending on the time of year, the MASwings flights can be booked up for weeks in advance. Travelling by 4WD can however be completed at anytime as there is a large number of transporters available (especially in Miri) and they generally make the trips based on the costumers needs rather than on a schedule like the MASwings flights.

Before any roads connected to Pa Dalih, the residents of Pa Dalih had to walk to Bario (for around 8 to 10 hours) before they could catch a flight to Miri. The residents of Pa Dalih can still walk to Bario but since the road connected Pa Dalih to Bario, the 4WD has become the only form of transportation because no one walks between the two villages anymore. This has meant that there is now a financial cost to travelling between Pa Dalih and Bario. Travelling by 4WD does shorten the travelling time dramatically. Depending on the whether, the 4WD trip between Bario and Pa Dalih takes between two to three hours.

The other option for Pa Dalih residents is to travel directly by 4WD between Pa Dalih and Miri. If an individual is travelling with 10kg or less of cargo then travelling by plane from Miri to Bario and then by 4WD between Bario and Pa Dalih costs approximately the same amount as travelling directly from Miri to Pa Dalih via 4WD. However, if someone is travelling with a larger amount of cargo, then travelling directly between Pa Dalih and Miri is the cheaper of the two options.

The road between Miri and Bario does not appear to have changed the number of people coming into the Kelabit Highlands by plane and therefore the demand for transportation from the airport to other destinations within Bario is still at a similar level to what it was before the completion of the road. However, there are a larger number of transporters now operating within Bario. This has lead to greater competition between the transporters but has not lead to lower fares for the costumers as vehicle operating costs remain high even after fuel subsidies are taken into consideration. It was stated by several transporters and by one of the key informants that vehicle operating costs are expected to reduce once the concrete roads are completed. As a consequence of lower vehicle operating costs, it is expected that transport fares around the Bario area will decrease.

One complaint that came up several times was that the transport fares for locations outside of Bario were not consistent and they fluctuated between transporters. Currently there are no regulations for the fares that transporters can charge costumers for 4WD transportation into or around the Kelabit Highlands. As this research was taking place, negotiations were continuing on price regulations for transport fares but it is unclear whether these regulations will be followed as most transporters are private contractors and therefore have no obligation to follow the regulations. The current average transport costs for 4WD transportation outside of Bario are shown in table 13.

There has been no change in the modes of transport available between Bario and Pa Lungan. Consequently, transport costs between Bario and Pa Lungan remain the same. These transport costs are shown in table 14.

4WD Transportation Costs	
RM200 per person from Pa Dalih to Miri but you have to go when someone is already going there.	
RM50 per person from Pa Dalih to Bario but you have to go when someone is already going there.	
RM1200 to charter the entire 4WD from Pa Dalih to Miri	(Can carry up to 1000kg)
RM300 to charter the entire 4WD from Pa Dalih to Bario.	(Can carry up to 1000kg)
RM1600 to charter the entire 4WD from Bario to Miri.	(Can carry up to 1000kg)

Table 13. The average transport costs in the Kelabit Highlands when using a 4WD in October 2010. The transport costs stated in this table are solely based on the averaging of the transport costs that were stated in the interviews and not from an official document. The prices are the same for travelling the opposite directions.

Transport Costs Between Bario & Pa Lungan
A buffalo will cost RM75 to carry 120kg from Bario to Pa Lungan (One return trip per day)
A person will charge RM1/kg to carry goods from Bario to Pa Lungan (maximum weight between 10-30kg). (One return trip per day)
It costs on average RM1600 to purchase a working buffalo

Table 14. The transport cost involved in transporting goods between Bario and Pa Lungan in October 2010.

The transporters suffer great financial costs to keep their vehicles operating. If their vehicle breaks down outside of Miri, then the financial costs to repair the vehicles can reach uneconomical levels. Furthermore, if the vehicle breaks down, the transporter will be left with no income. The length of time the vehicle is out of order increases if the vehicle breaks down outside of Miri. The following two statements describe these problems in greater detail.

"I repair myself when I can but sometimes have to get mechanic to come all the way from Miri. Mechanic finds the problem then must go back to Miri to get parts and then has to come back to do the repairs. If the parts are small, they can come by plane, if they are heavy they must come by 4WD. This can all be very expensive."

(Participant 14)

"We don't have a proper mechanic. At present, I try to diagnose the problems with my car (4WD) over the phone. Already been 3 months since my car broke down, so I have had no income for 3 months. Costs around RM3000 a month to keep the car running."

(Participant 15)

In summary, the transport costs involved in transporting goods and travelling in person into the Kelabit Highlands today remain very similar to what they were before the road from Miri reached Bario. Both MASwings and 4WD transporters operate with very low margins but still must compete and therefore transport costs between the two remain

similar and are unlikely to decrease unless their own operational costs decrease. Travelling by road between Miri and the Kelabit Highlands takes a longer period of time than travelling by plane however travelling by road can be conducted at almost any time whereas travelling by plane is subject to availability and scheduled times. Travelling between roadside villages in the Kelabit Highlands has become more expensive as many residents now travel by 4WD or motorbike rather than by walking. 4WD transporters within the Kelabit Highlands also operate on low margins. Using 4WDs or motorbikes within the Kelabit Highlands does reduce travelling time and more goods can be carried in one trip which can also save time. The saved time from travelling by 4WD or motorbike allows more time for other activities and tasks like farming however the high costs of transport still restrict the amount of agricultural produce grown in the Kelabit Highlands.

6.1.5 Agricultural production

The majority of crops grown in the Kelabit Highlands are for internal consumption. There is a small quantity of rice which is exported from the Highlands to the cities for commercial purposes; however the quantity of rice exported from the Kelabit Highlands has not changed as a consequence of the road construction. It is believed that the demand for Bario rice in the cities is much higher than the amount that is exported there. Most farmers that I talked to said that if transport costs were lower, then more rice would be grown and then sold in the cities. Therefore transport costs still limit the quantity of rice that is exported out of the Kelabit Highlands.

For the farmers who export Bario rice to the cities, the price they receive per kilogram has increased since the road was constructed. This is more likely the result of food prices increasing throughout Malaysia rather than as a consequence of road construction. However, the price the farmers receive per kilogram for their rice from the local market has not changed.

There is conflicting information in regards to whether the quantities of crops grown in the Kelabit Highlands has increased or decreased as a consequence of road construction. The Department of Agriculture (DoA) stated that there was no change in the quantity of crops produced in the Kelabit Highlands; yet a number of participants stated that they believed the quantity of rice produced in the Kelabit Highlands had decreased due to three factors. Firstly, subsidized rice that is imported into the Kelabit Highlands has been replacing the demand for some of the locally grown rice. The ease of buying imported rice has meant that the hard work involved in growing rice appeals to fewer of the local residents. Secondly, in areas such as Bario, there is more off-farm employment available which often pays better than farming and payment is received more regularly. Thirdly, many farmers are reaching ages where they are unable to look after their farms. It is not uncommon to see

old padi fields completely overgrown. Many of the youth have refrained from taking up farming and instead find off-farm employment locally or migrate out of the Highlands in search of higher education and off-farm employment in the cities.

As a consequence of the decrease in the number of local residents working on the farms, there has been an increase in the number of Indonesian based labourers on the farms in the Kelabit Highlands. The majority of farm workers are hired on contracts. These contract wages for farm labourers have increased slightly since the road reached the Kelabit Highlands, however it is not believed to be as a result of the roads influence.

Although there are padi fields that have been abandoned within the immediate village areas, there has been an increase in the number of farms along the road to Miri just outside of Bario and Pa Umor. What is most interesting about many of these new farms is that many of them underwent vegetation clearing before the road was constructed. In fact, when the residents of Bario became aware of where the road would be located, a number of community members went out along the planned route of the road and claimed new areas to farm. The majority of these new farms are growing produce such as pineapples, cinnamon and tapioca. Additionally, some of these farms have been developed to breed livestock to potentially export to the urban areas. An official in Bario stated that before livestock can be successfully bred and exported to Miri, the road to Miri must be upgraded so that larger trucks can be used on the road and vehicle operating costs can be reduced.

Land has been devoted to alternative crops such as pineapples (as seen in figure 29) and cinnamon but this started before the road from Miri reached the Kelabit Highlands. The Kelabit community was told that if they grow pineapples they would be able to market them in the cities but this is yet to happen as it is still too expensive to transport the pineapples to the cities and therefore the pineapples from the Kelabit Highlands cannot compete financially with the pineapples that are grown closer to the cities and sold for around RM2.

There has been an increase in the amount of improved seeds and fertilizers used in the Kelabit Highlands. Improved seeds and fertilizer are now brought all the way up to the Kelabit Highlands by 4WD. More seeds and fertilizer can now be brought up as weight is no longer as much of a barrier as it was when the plane was the only form of transportation.

There has not been a change in the amount of herbicides and pesticides entering the Kelabit Highlands. The Kelabit Highlands does suffer from pests and weeds that hinder the growth of agricultural produce but many farmers in the Kelabit Highlands want their farms to remain organic and therefore do not use herbicides or pesticides. However if farms in the highlands become commercialized, then they may need to use herbicides and pesticides to ensure the farms are sustainable in a commercial sense.



Fig 28. Two Kelabit men and a working buffalo on their way home after work. This buffalo's main job is to drag timber from the jungle to a more appropriate location to be processed.



Fig 29. A ripe pineapple growing on a hillside in Bario. Tapioca can also be seen growing amongst the pineapples.

The average price of farm inputs has increased due to the increased use of fertilizer. The road has had very little influence on the cost of farm inputs as the price of importing goods remain based at the cost of flying in the goods by plane. The only change due to the road is in the amount that can be brought in. There is the subsidy on fuel, but fuel is not a major farm input as the use of farm equipment is still very minimal.

The use of farm equipment has not changed as a result of the road. Many farmers still prefer to use buffalo (as seen in figure 28) instead of tractors and other mechanical farming equipment. The main reason why some farmers are reluctant to use farm machinery is that the machinery is introduced to areas in the highlands where it is ineffective. The following statement from a Pa Umor resident illustrates this point.

"Since the road is in now and with UNIMAS there is a chap who is doing mechanical farming who is coming in November (2010) to introduce this machine to the farmers here. But what I warned them is, a lot of government departments and government agents come in last time. The chief man always says Bario proper itself, introduce it to Bario. But Bario proper itself is peat soil, mechanization is not practical. Go outside – Pa Lungan, Pa Ukat and Pa Umor or down south – Ramudu, Pa Dalih and Pa Mada. This is areas where the soil is fertile and it's not peat soil. This way the machines don't sink. It was meant to happen back in 2003 but was cancelled due to lack of interest (Bario area only). This year there were two power tillers brought in. And again they were given to Bario. Harvesters have been brought to Bario in the past but it didn't really work because people didn't make use of them. They should start somewhere else in a place where the soil is good, hard ground. Not for places where it sinks. If it works outside, only then people will think it's a good thing. There is demand for Bario rice, but not enough grown. Mechanical planting and harvesting may solve this".

(Participant 5)

Two power tillers were brought into the Kelabit Highlands by land after the road from Miri reached Bario, while a harvester was brought in pieces by a chartered plane before the road reached Bario. Both the power tillers and the harvesters were brought up at a cost covered by the Department of Agriculture (DoA). The power tillers and the harvester were brought up to Bario to help modernise the rice production in the Kelabit Highlands and to make farming rice more mechanical, freeing up labour for other activities such as off-farm employment or the growing of cash crops. The DoA has limited funds and as transporting by charter plane is extremely expensive, it is believed that if the road did not exist then the DoA would not have brought the power tillers up to Bario. The big slow machinery is now brought up on logging trailers to the end of the maintained logging road but then the machinery must be driven the rest of the way. This final distance can take a long time and can be heavily influenced by the weather and road condition.

The motorbike and 4WD have facilitated farming in the Kelabit Highlands. Many participants stated that the motorbike reduced the travelling time of farmers to and from their farms. Additionally, the motorbike and 4WD enabled greater ease in the movement of farm produce and inputs. Many of the participants believe that the 4WDs can help in the exporting of farm produce to Miri. At present, almost all the 4WDs that travel down to Miri from the Kelabit Highlands are empty. If the empty 4WDs could be loaded with farm produce from the Kelabit Highlands, then the produce could be marketed in the cities. The high transport costs still remain a barrier to this happening.

Traditionally the only live stock that was kept in the Kelabit Highlands was buffalo. According to the DoA, the number of buffalo reared in the Kelabit Highlands has increased; however several community participants stated that the number of buffalo in the Kelabit Highlands has reduced since the roads reached the Highlands.

“There are less buffalo now. Along the tracks like the track to the salt springs outside Pa Umor, there is grass growing along the side of the track. The buffalo used to keep it down just like lawn mower but now the tracks are getting over grown. Where are all the buffalo gone? There is the fear that people are coming in at night and stealing the buffalo by truck”. (participant 5)

The major difference in livestock ownership comes from introduced stock such as sheep and cattle. The sheep farms existed before the construction of the road network. There is also one cattle farm currently in operation in the Kelabit Highlands. The road from Miri to the Kelabit Highlands has made it easier for livestock farmers to bring livestock into the Kelabit Highlands as well as making it easier to export lamb and beef to the cities of Sarawak. Consequently, this has led to an expansion of livestock farming in the Kelabit Highlands with two areas along the inter-village roads being cleared for cattle farms while this research was being undertaken. Transport costs still remain an obstacle in transporting

livestock and for this reason; there is still very little money to be made in livestock farming in the Kelabit Highlands.

The amount of locally grown and gathered produce sold within Bario remains approximately about the same. If anything, locally grown and gathered produce sold in Bario has decreased due to subsidized goods from Miri. In Pa Dalih the market has decreased due to migration²⁰ and therefore the amount of produce grown and gathered in Pa Dalih has also decreased. It was stated by one participant in Pa Dalih, that she was now able to send some of her produce to Miri by 4WD where it would be sold on her behalf. At present, there is demand for produce from Pa Lungan²¹ in other villages, however as it is difficult for the farmers of Pa Lungan to get larger quantities of their produce to the markets in other villages, there has not been an increase.

One of the major concerns relating to the roads for the agricultural sector in the Kelabit Highlands is that the construction of the roads has resulted in pollution and the damaging of farms and farm buildings. Some of the participants stated that paddy fields are suffering due to the dirt that is disrupted by road use and construction. The dirt pollutes the waterways that feed the paddy fields. Several participants declared that

“Things grow better before the road was made” (participant 31)

In Bario, it was stated by one participant that the upgrading of the road in Bario resulted in damage to his roadside barn. In Pa Dalih, there has been a decrease in the number of bees seen around the village since the road reached Pa Dalih. Whether the reduction in bees is a consequence of the road is unknown. The pollution and damage caused as a result of road use and construction is covered in more detail in the section entitled ‘Pollution and Damage’.

The road networks have facilitated the jobs done by the DoA (implementing and monitoring agricultural projects, providing training and education on agricultural techniques, and implement quality assurance systems). The number of visits made by DoA officials has increased. As a consequence of the road networks within the Kelabit Highlands, the DoA officials now have easier access to a greater number of areas and can now reach these places much faster.

The DoA staff still use the plane as their mode of transportation in and out of the Kelabit Highlands. Before the road from Miri reached the Kelabit Highlands, all goods which were sent in or out of the Kelabit Highlands by the DoA were transported by plane. Today, the goods for the DoA are sent in and out of the Kelabit Highlands by plane and 4WD. Goods

²⁰ There was a large migration of residents from Pa Dalih after the road from Miri was connected to Pa Dalih.

²¹ Pa Lungan has been stated by the DoA as having the highest quality rice in all of the Kelabit Highlands. Pa Lungan has held this title for many years. Additionally, Pa Lungan and its surrounding forests contain many goods that are in demand in other parts of the Kelabit Highlands and the urban centres of Sarawak.

such as fertilizer can now be brought into the Kelabit Highlands by road which means that larger quantities of it can be brought into the Kelabit Highlands. It was revealed however that due to the rough state of certain sections of the road network, many goods (such as bottles of weed killer) arrived in damaged condition. Additionally, goods can be delayed as a consequence of the transporters becoming held up by the wet weather and bad road conditions.

The DoA would like to see a few alterations to the roads that they believe would result in benefits for the Kelabit community. Firstly, replacing the road surface with tar will make the road safer, save travelling time and goods will arrive faster, in better condition and more consistently. Secondly, adding speed bumps on the village roads will reduce dust.

In summary, after the road between Miri and the Kelabit Highlands was completed, farming still remains the main livelihood pursuit in the Kelabit Highlands and the majority of the produce grown on the farms still continues to be for internal consumption with only a small quantity of rice exported to the urban centres. The amount of rice exported to the urban centres for sale at the urban market remains consistent with the level it was before the road was completed however the amount of farm produce sent to friends and family in the urban centres has increased. There has been an increase in the land cleared for alternative crops (such as cinnamon and pineapples) and livestock (such as cattle) since the inter-village roads were constructed. The construction of the roads has led to pollution and damage to the farms and farm buildings. Some of the participants stated that paddy fields are suffering due to the dirt that is disrupted by road use and construction. The DoA state that the construction of the road from Miri to the Kelabit Highlands and the inter-village roads have facilitated their jobs and has resulted in an increase in the amount of fertilizer and improved seed but has not increased the amount of herbicides and pesticides that are imported into the Kelabit Highlands. Furthermore, the roads have facilitated with the introduction of new farm machinery into the Kelabit Highlands. A major indirect impact the roads have had on the agriculture industry in the Kelabit Highlands is that the number of locals working on the farms has decreased due to increased migration in the Central Kelapang area and an increase in off-farm employment in Bario.

6.1.6 Off-farm employment

Farming still remains the main occupation in the Kelabit Highlands; however in Bario, there is currently a large influx of off-farm employment opportunities. The number of local people working in farming has therefore reduced within Bario and Pa Dalih since the roads connected the two villages to Miri. The reasons for this reduction differ between the two villages. Pa Dalih has not witnessed a move to off-farm employment within the village but has experienced an exodus of residents to Miri as a result of increased access to the urban centres and the off-farm opportunities in the urban centres. Those that have migrated and

found employment in the urban centres still support their families and communities in the Kelabit Highlands by sending back remittances.

For Bario residents, there has been a large increase in construction work opportunities with a number of government funded construction projects taking place within Bario. These construction projects are listed in Table 13. As a result, the majority of the off-farm employment in Bario is in the trades (such as building, concrete laying, painting and plumbing) and in the transportation of construction materials. The new off-farm job opportunities have a greater appeal (especially to the youth) than farming as these jobs pay out at a higher rate and pay out more regularly than farming does.

“There is now less farming going on. Because of the roads, there are so many more jobs available and these jobs are fast money. Like collecting timber because it earns more than the farm and it’s almost immediate. After one month, they can sell it off; whereas farming is about 6 months, only then do you get your return”. (participant 5)

Although the construction projects in Bario have led to an increase in off-farm employment for the Kelabit community, the Kelabit community are unable to take full advantage of the available jobs. For example, the construction of the concreted roads in Bario employs a large number of labourers; however many of these labourers are from outside the Kelabit Highlands. The construction of the concrete roads was issued to private contractors from outside of the Kelabit Highlands. In the negotiations for the concreting of the roads, Kelabit officials managed to push for a bylaw that stated that the contractors had to employ as many locals as was possible. Due to low pay rates and heavy work schedules, the number of locals employed on the concreted roads is constrained. One local official stated that the contractors knew that they could employ Indonesian labourers for around RM30 a day, while the locals were generally unwilling to work for that level of pay as jobs such as tourist guiding will pay at least RM80 a day.

Additionally, the contractors required labourers who would work every day over the duration of the entire job. Many locals are unwilling to work every day as they still had responsibilities to their families and community that could not be completed if they worked every day for the road contractors. The local officials knew the reservations of the local labourers and understood that the contractors had to work to a schedule and a budget. The local officials negotiated with the contractors and as a result, jobs such as the transporting of road materials (which pays at a sufficient local rate) from the local quarry were opened up to the locals. The locals would register their interest in working as a transporter and everyday several locals would be employed as transporters. This way the individual local labourer could take the days off they needed to support their family and community and yet there would still be another local that could work those days.

The road maintenance jobs within Bario are issued to local contractors and are all carried out with local labour. It is not possible to put an exact number on the number of locals who are employed in the construction, upgrading and maintenance of the roads in the Kelabit Highlands as the number is always changing.

Other off-farm occupations have also been affected by the roads and the logging operations that occur along certain sections of the road. The most influential change the road as produced is in the tourist industry. Here there is some confusion as several participants believe that the number of tourist arriving in the Kelabit Highlands had decreased whereas other participants stated that the number of tourist arriving remains the same. In 2003, the number of tourist arriving in Bario was estimated at 1000 per year (Rodger, 2005). The tourist arrival and departure journal states that from the 1st October 2009 to 30th September 2010, 894 tourists registered their arrival in Bario. An airport official estimated that an additional 100 - 150 tourist may have failed to fill in the journal or had come up to the Kelabit Highlands by 4WD. As a result, the number of tourists in 2003 before the roads were constructed was similar to the number of tourist arriving in 2010.

Two changes to the tourist industry in the Kelabit Highlands may have lead to the belief that the tourist numbers have reduced. The first is that there are now larger groups coming into the Kelabit Highlands and less individuals or small groups. Trek force, Green force and World Challenge all have programs running in the Kelabit Highlands. These groups hire fewer guides per person than individuals or small groups do. Additionally, these groups use the home stays less than individuals or small groups.

The second change is that some of the most popular tourist treks are now unusable. This is a direct effect of the construction of the roads and the logging along the roads. The Bario Loop was one of the most popular treks in the Kelabit Highlands. The Bario Loop was a world renowned 4-5 day trek around the Southern end of the Kelabit Highlands (including trekking around the Central Kelapang area). The Bario Loop does not exist anymore for three reasons. First of all, the track is not maintained anymore because it has been replaced by the inter-village road. Before the road existed, the local villages were promised money by the government to maintain the tracks. Secondly, the tourists come up to the Kelabit Highlands to walk through the virgin jungle and view the wildlife. Travelling along the new roads does not provide the experience that the tourist desire and therefore the tourist are not guided around the Bario loop along the roads. Thirdly, the logging operations (both local and commercial) along parts of the Bario Loop deter tourist as the tourist generally do not want to see trees been cut down. Additionally, the logging has lead to a reduction of wildlife in the area and therefore tourists have less opportunity to view the wildlife.

As a result of the changes in the tourist industry in the Kelabit Highlands, there is now less work for the guides. Almost no tourist travel to the Central Kelapang area now. This has left the guides and home stay operators in the Central Kelapang area with no income. Pa Dalih still has one home stay operating thanks to an increase in the number of urban based

Kelabit and government officials visiting Pa Dalih. The increase in the number of urban Kelabits and government officials visiting Pa Dalih is said to be a result of the increased accessibility of Pa Dalih from Miri.

Although the construction of the inter-village road has caused the decommissioning of the Bario Loop, several members of the Kelabit community have ideas on how they can use the roads to support the tourist industry in the Kelabit Highlands. Two of these ideas were discussed in detail. Firstly, after the surfacing of the Bario roads is complete, a local entrepreneur intended to purchase bikes that could be rented by tourists. The second idea came from a local tour guide from Pa Umor who has plans for horse trekking and horse and cart rides along the inter-village roads. Both of these ideas have the potential to increase tourism and off-farm employment in the Kelabit Highlands but both rely on large levels of initial funding which must be sought before these ideas can become a reality.

The art and handicraft industry in the Kelabit Highlands has been facilitated by the roads. Bario has one resident artist who produces large abstract paintings and has his own studio and gallery. The road has enabled him to bring up cans of paint which he would not have been able to bring up by plane due to MASWings policies. The road has also helped the owner/operator of the local Penan handicraft store in Bario. The roads have helped her to find and transport resources (such as rattan) for her handicrafts as well as making it easier for her to get to other villages where she teaches other people to make high quality handicrafts. Although the roads have facilitated these two residents with their ability to produce their art and handicrafts, the roads have had no affect on the sale of their work and they both still rely on other employment opportunities (including farming) to support themselves.

6.1.7 Remittances

In Kelabit culture, the family is a very strong unit. As a unit, family members support one another in different ways. It is therefore very common for family members who are working in the urban areas to send money and other rations to their families in the Kelabit Highlands. It is also common for those who work as farmers in the Kelabit Highlands to send their produce down to family members in the urban areas. In this section, I will refer to all of these contributions as remittances.

The road network has provided another means by which remittances can be transferred between family members living in different parts of the country. For the majority of people that send or receive remittances, they use a combination of road and air transportation. It is generally the case for those that send remittances to decide what mode of transport to use to send the remittances based on the quantity and weight of the remittances. For those that received remittances via the 4WD, the frequency and/or quantity of remittances

received have increased. In the urban based interviews, all those that sent remittances by 4WD had increased the frequency and amount that they sent remittances. Those that only receive remittances via the plane have seen no change in the frequency and/or quantity of remittances received. Many of the participants received their remittances during the visit from family members from the city or when they went to visit their family in the city. For many of these participants (especially in Pa Dalih), the frequency that these visits occur had increased due to the greater accessibility that was provided by the road. As a consequence, these participants receive remittances more regularly. For many of the residents of Pa Lungan, the frequency or quantity of remittances has not increased as the remittances must still be carried from Bario to Pa Lungan.

For those that have experienced an increase in the quantity and frequency of remittances they received, there are economic benefits such as economic stability and larger purchasing power. The increase in the quantity and frequency of remittances sent to the Kelabit Highlands has also produced social benefits. For example, a number of residents stated that as the quantity and frequency of remittances increased, so to do their investment in private and community infrastructure such as the building of new houses, the modernising of longhouses and the maintenance of the local church buildings.

6.2 Social Impacts

The logging road that connects the Kelabit Highlands to Miri and the inter-village roads within the Kelabit Highlands have created a large number of social impacts on the Kelabit Highlands. In the second half of this chapter I will cover many of these social impacts and will discuss the changes that these impacts have caused. This half of the chapter will look at how the new roads have affected development and infrastructure, mobility and migration of people, attitudes and lifestyles, healthcare and education, road safety and security, and pollution and environmental damage within the Kelabit Highlands.

6.2.1 Development and Infrastructure

For 40 years before the road, there had been little to no development in the Kelabit Highlands, but since the road from Miri reached the Kelabit Highlands, development in Bario has increased at a high rate. For example the hydro powered generator has been rebuilt, a cell phone network was set up and there are now inter-village roads between the greater Bario area and the Central Kelapang area. The development and construction includes government infrastructure, private housing and the clearing of land for alternative agricultural pursuits (refer to table 15). Figures 30, 31 and 32 show examples of the development of government infrastructure.

It was stated by several Kelabit officials that a large percentage of the government infrastructure that had been constructed or is currently under construction would have been built in the Kelabit Highlands regardless of the road from Miri; however it would not have been built as rapidly as it has been or it would have been built in other locations within the Kelabit Highlands. The main reason for the large increase in development and construction has been due to the increased accessibility of Miri. The road has made it easier and cheaper to transport construction materials such as cement, bricks, roofing iron and plywood from Miri to Bario. For example, before the road from Miri reached Bario, it would cost RM200 for one bag of cement in Bario but now a bag of cement will only cost RM50. Furthermore, the road has made it cheaper to bring in machinery such as trucks, rollers and diggers.

As well as the government and Samling funded development, there has been an increase in private development since the road from Miri reached the Kelabit Highlands. For example, many kitchens have been converted to allow the use of LPG cookers rather than open fires. The converting of many of the kitchens is due to three main reasons, two of which are directly related to the use of the road from Miri. Firstly, the road has made it easier and cheaper to bring in gas cookers. Secondly, the government subsidy on LPG brought by road has meant that cooking with LPG is now feasible. The third reason is that those that have experienced modern urban living outside the highlands desire similar living conditions in the highlands. The increase in private construction is not limited to the kitchens. In fact there is a large increase in the construction of new houses or upgrading of old houses. The increase in private construction is the result of two factors, an increase in remittances and resources sent by road from the urban centres and a rise in the incomes of those working on the government funded development and construction projects. This is demonstrated in the statement below from a local Bario official.

“When the road comes in, people build nice houses. For two reasons – firstly easier to get materials and the road gives pride in the area”. (Participant 6)

In Pa Lungan, there has been almost no development. All of the Pa Lungan residents that talked about development in Pa Lungan stated that they believed that it was a consequence of having no road that had lead to the lack of development in the village. The following statement is from a resident in Pa Lungan and it nicely sums up how the majority of the Pa Lungan residents feel about the building of a road from Bario to Pa Lungan.

“I support it – we have been suffering. No development. If road comes here, government might provide more infrastructure. It will make our life easier. Easier to get to Bario. We have wanted for a long time. Our parents wanted it and their parents wanted it. They have been asking the government for a long time. We need a road – we are so far behind in development. Roads will help to bring things like water pipes”.
(participant 38)

Development Projects in the Kelabit Highlands Since Construction of the Road from Miri to the Kelabit Highlands		
Job Description	Funded by	Contracted to
Logging road (Miri – Kelabit Highlands)	Samling	Samling
Inter-village roads	Samling	Samling
Bailey bridge and current timber bridge	Samling	Samling
Concreting of primary Bario roads	Malaysian Government	Non-local contractors
Maintenance of secondary Bario roads	Malaysian Government & Local residents	Local contractors
New health clinic	Malaysian Government	Non-local contractors
Health clinic staff housing	Malaysian Government	Non-local contractors
New Police staff housing	Malaysian Government	Local contractors
Kindergarten	Malaysian Government	Local contractors
Levelling of Pa Dalih football field	Samling	Samling
Pa Dalih concrete volleyball court	Malaysian Government & Samling	-
Reconstruction of hydro powered generator	Malaysian Government & Local residents	Non-local contractors

Table 15. The table listing all of the large scale community development projects in the Kelabit Highlands between 2006 - 2011.



Fig 30. (Left top) – The old health clinic in Bario. Formerly located next to the lock-up shops and other government facilities.

Fig 31. (Right top) - The new health clinic in Bario. Still under construction in 2010. The new clinic is located on the same site as the old clinic. The new health clinic is larger than the old one, will contain more up to date equipment and will employ more staff.



Fig 32. (Right Bottom) – The new housing for the health clinic staff still under construction. These houses are located next door to the new health clinic.

6.2.2 Mobility of Government and Kelabit Officials in the Kelabit Highlands

Before retirement, the former Pemanca/Kelabit Chief used the logging roads to go to other villages to conduct official business and to visit his people. Using the road was faster and more convenient than walking. Additionally, being able to travel by 4WD enabled him to reach villages he would not have been able to reach if he had to walk. Although being able to travel by 4WD facilitated the former Pemanca's ability to travel to other villages for official business, he still found the journey difficult. The former Pemanca stated that the condition of the road makes the journey hard on the body, especially for the older generations.

The number of government officials and experts visiting Bario has increased. Some come by plane, some come by road. It is hard to say whether it is solely an impact of the road that has increased the number of government officials visiting Bario. Had it not been for the road, the same number of government officials may have arrived but they would have all come by plane. Nevertheless, the main reason for the increase in government officials visiting Bario is due to the increased construction of government funded infrastructure.

The number of government officials visiting Pa Dalih has also increased. One official from Pa Dalih stated that the increase in the number of government officials visiting Pa Dalih is directly related to the increased accessibility Pa Dalih now has as a result of the new road. The principle of Pa Dalih primary school had also experienced an increase in government officials visiting the school since the road was constructed.

Although there has been an increase in the number of government officials visiting Pa Dalih, there is scepticism within Pa Dalih on whether the government will carry out their promises that they make while visiting Pa Dalih. One example that came up many times was that the government had promised to build a runway in Pa Dalih but then withdrew the offer and told the residents of Pa Dalih that the government would build and maintain a surfaced (such as tar/concrete) road from Pa Dalih to Bario. Although there is now a road between Bario and Pa Dalih, it is neither surfaced, nor is it maintained. There are areas along the existing road that will collapse very soon if the road is not maintained. The government has been informed but the road currently remains unmaintained.

Pa Lungan by contrast has not experienced any change in the number of government officials visiting the village. The residents of Pa Lungan have experienced numerous government officials arriving in the village and declaring promises of development for the village (such as the construction of a road between Pa Lungan and Bario); however the delivery of the promised development is to this point, minimal²².

²² The Department of Agriculture is active in Pa Lungan and have carried out agricultural development in Pa Lungan (such as supplying improved seeds).

6.2.3 Changes in Attitudes, Lifestyles and Hostility

There is growing individualism in Bario since the road networks connected Miri with Bario. This individualism can be seen in two ways. Firstly, there is a traditional community system where community members would work together and share the rewards. For example, the government would issue contracts for track maintenance to the longhouses. Longhouse members would each contribute to the labour and the money would be divided equally amongst the longhouse members. In spite of the community system, now a day's individuals are claiming the government contracts for themselves, completing the job themselves or with hired labour and then securing the profits for themselves. This has resulted in a loss of income for many community members.

The second way individualism can be seen is with the increased claims of individual ownership. Before the inter-village roads arrived in the Kelabit Highlands, no one made exclusive individual claims to land and resources, now there is arguing and fighting over land and resources that are now accessible due to the roads. There is real potential for the tension to erupt and create fractures in the community and result in undesired behaviour and violence within the community. The following statement from a resident of Bario illustrates the changes in attitudes and the growing individualism in the Bario area.

"Since the road, it has changed many of the lifestyles of the people, things in their life now, so this will affect so much on part of the Kelabits culture which will be completely changed. Because of development, everyone going towards that direction and forget so much of the value of the culture, such as helping the community, helping each other and respect. This road - I have seen so much changes among the people here because of the road. Now people claiming land along the road. There is disputes on land and timber and that changed a lot of our culture. There is no respect towards one another. They become thinking so individualistic. So this is very bad. Very negative for the locals. They see things different now. Many people don't respect the culture of 'respect the headman'. In our culture we have procedures about how we do anything that is going on around our community here. We always go to the headman for concerns and before we can do things by ourselves." (Participant 10)

The growing individualism displayed by some of the Bario residents was not the only change in community interaction that created concern. The increase in vehicle use within Bario has lead to changes in the way people interact with each other while travelling between locations. The traditional greetings and hand shake that are offered by people as they pass one another has been used for generation after generation but is now on the decrease. One reason for this is that more people are travelling with vehicles now rather than walking and as a consequence, they are travelling faster and stopping less often to interact with other road users. The statement below was made by an urban based Kelabit who visits the highlands regularly and has witnessed the changes in social interaction.

“In the past when you walked past someone, you stopped to greet each other and talked and shared the news. This is what made Bario so nice and comfortable. Now a day’s when your on a motorbike, it’s harder to do that, instead you just pass each other and don’t greet”. (Participant 51)

Another concern for many residents in the Kelabit Highlands is that the increased access to the urban centres and urban goods has meant that lifestyles in the Kelabit Highlands are becoming more ‘modern’. For the majority of participants, the modernisation that the Kelabit Highlands is experiencing is a positive outcome for the Kelabit community; however there is a fear from some of the Kelabit community that as the more modern lifestyle spreads, the traditional Kelabit culture and way of life will be lost.

It was stated by many of the residents that the modernisation is just part of the development of the community. This brings to light a very important dilemma that arose during the interviews and had not been hypothesised before the research took place. This dilemma was that the majority of the residents could be split into three groups based on a plurality of interest in the development projects and their perceived goals for community development.

The first group were those with economic interests in the development of the Kelabit Highlands. Those community members in this group usually held some influence or attempted to influence decision making on the development projects in the highlands. This group was made up almost solely of residents from Bario and the urban centres. The second group were those that romanticised about the traditional culture and way of life in the Kelabit Highlands and desired that the highlands remained relatively unchanged. This group desired little to no economic development in the highlands, however the development of social infrastructure (such as healthcare and education) in the highlands was an exception. This group had members that ranged from those that had influence through to those that had none. The majority of this group were from the urban centres. The interviews in this study revealed that at the current time, only a small level of tension between the first and second groups however there is a strong possibility that this tension could result in conflict within the community. The third group was the largest amongst the participants and was made up of those that had no influence on the decision making of development projects and/or had little to no knowledge of the development projects but appreciated the development because the majority of it made life easier in the highlands. This group was spread throughout all of the research sites and was mostly made up of farmers and the pensioners who had returned to the highlands from the urban centres. The first and third groups viewed development in the highlands as a positive outcome for the Kelabit community however the second group felt that the development (particularly attempts at economic development) was creating negative impacts on the Highlands.

In many ways the tension found between the first and second groups emulates John Kuser's theory which states that community tension over development is created from two fundamentally different primary goals of development. Kuser (2007) found that two groups within a community are often created based on their understanding of development. The two groups are split based on those who believe that the primary goal is development "in" community and those that believe that the primary goal is development "of" community. Kuser defines development "in" community as a setting in which political, social, and economic development activities transpire. Economic development works to increase activity and stability in the production, distribution, and consumption of products and services within a community. The community and its locality are treated as a business. The foremost attention is focused on the efficient use and maintenance of community resources. For this reason, the adaptability and malleability of the community's resources to the changes in the markets and environments are of major importance to the community. The paramount objective of development "in" community is economic development. Conversely development "of" community is defined as development that requires attention to cohesive and integrating structures and is focused on the creating and maintaining of community activities, organizations and institutions that reinforce interactional ties among the residents of the community. Those that support development "of" community, perceive community as the quality of relationships among residents of a locality that serves as an underlying factor in a community's welfare.

One possible solution to the tension is to have as many of the community members involved in the establishment of the goals for the community's development and the planning of how to accomplish these goals (de Souza Briggs, 2007; Kuser, 2007; Maser, 1997). Furthermore, the more diverse the community members are in the democratic process of community development, the more accurately the community will be represented (Maser, 1997).

Community development is the instrument through which community members can empower themselves. By participating in the community development planning and implementation, community members can increase their ability to control their own lives and their community environment. This should ensure a more equal environment for community members as well as creating stronger community relationships through mutual efforts to resolve shared problems. Additionally, those community members that do participate often gain a sense of accomplishment and belonging through shared learning and service (Kuser, 2007; Maser, 1997).

Community development is a process of organization, facilitation, and action that allows people to create a community in which they want to live. If that which they create is in harmony (both social and environmental), then they are providing a sustainable legacy for future generations and any new community members that arrive. Community development is therefore a method that can create sustainable development that can be applied while

still allowing and encouraging people to act as catalysts for sustainable social change at the community level (Maser, 1997).

Maser (1997) states that there are three components needed for sustainable community development. The first component is to ensure that all of those that are involved in the community development process understand all of the other community member's values and perceptions of the development process. The second component is to educate the community members on their connection to the social/environmental problems that may arise throughout the development planning, implementation and beyond (both locally and globally). The final component is to teach the community members to plan strategically to ensure that any resulting development is sustainable, equal and for the good of future community members.

At present, these three components are not been carried out as the majority of planning and implementation of development in the Kelabit Highlands is carried out by government officials and only a very limited number of Kelabit officials (of which, the majority live in the urban areas). It is therefore unlikely that the current development within the Kelabit Highlands will be sustainable and equal. This statement is supported by the number of residents (particularly from the second group) that stated that the current development that is occurring in the Kelabit Highlands will be short lived and that once Samling's logging concession ends, the roads will shut down and the implementation of development within the Kelabit Highlands will reduce dramatically and possibly become stagnant. As many of those with these concerns are not involved in the planning and implementation of development in the Kelabit Highlands, many of the concerns go completely unnoticed.

What must be acknowledged here is that ensuring that all community members get to voice their opinion or take part in the planning and implementing of development in the Kelabit Highlands, is currently not an easy process to implement as traditional national and community²³ politics were never all-inclusive or democratic.

Another change that has occurred in the Kelabit Highlands since the construction of the roads is the way some community members identify or represent the highlands now. The road network into and around the Kelabit Highlands has had a major affect on the way parts of the Kelabit Highlands appear.

"Development is destroying the traditional look and feel of the place" (Participant 14)

"The whole stretch between Bario and Pa Umor, I remember talking to (name excluded) about it. They said (in a negative way) about when they went back after the road was built, how wide and big the road was and it's the same thing with me, I mean I cried because all the familiar stops we used to have are all gone. The little streams

²³ As explained in the chapter entitled 'The Kelabit Social and Political Structure'.

and the trees, just those familiar spots have gone with the construction.”

(Participant 51)

Both of the statements above refer to how the roads have changed the look of parts of the Kelabit Highlands and also demonstrate how the changes affected the emotional connection many Kelabit's have with the Kelabit Highlands. The source of their emotional connections to the Kelabit Highlands or to particular settings or locations within the Kelabit Highlands is based on their sense of place.

Places are often considered as bounded settings where social relations and identities are created. A sense of place plays a critical role in the creating and sustaining of individual and collective identities. One's sense of place is associated to individual human and social processes which generate emotional connections to particular settings and/or locations. It is this sense of place that can trigger positive feelings such as attachment, satisfaction, security and spiritual elevation but can also trigger negative feelings such as fear, disgust and failure (Johnston et al., 2000).

When a place holds a sense of attachment and significance for an individual, the individual is drawing upon desires, memories, and experiences of other people. In most cases, an individual's sense of attachment to a place is the product of the interaction between people at a particular setting or location. Entikin (1990) found that individuals tended to centre their attachment to a place based more on their social relations with their community and family than on the physical features within the setting or location. The individual's sense of attachment is therefore as much social as it is personal.

For these reasons above, it is important to acknowledge and deliberate over the way the sense of place held by the individuals and communities have of a particular place as changes to their sense of place can result in the loss of positive feelings, their connection to the place and potentially the social relations with other community members. All of which can be detrimental to the health and unity of the community. Conversely, a change to their sense of place can be a positive as it may stop negative feelings towards the place and create new positive connections and social relations.

In the case of the Kelabit Highlands, it is possible to see that for many Kelabit community members, their sense of place has changed as a result of the roads. As it can be seen in the two statements on the earlier page, for some of the community members, the change in their sense of place has left them feeling upset and frustrated. Two urban based Kelabits even went as far as stating that they did not desire to return to the Kelabit Highlands due to the changes that had occurred since the road was constructed. Both had experienced a change in their sense of place and as a result, they felt less attachment to the Kelabit Highlands.

In summary, changes have not only occurred in the physical landscape of the Kelabit Highlands as a result of the construction and upgrading of the roads but as it was shown in

this section, major changes are taking place amongst the Kelabit community as well. Individualism is growing amongst the community members and as a result traditional community systems are disappearing, many community members are finding themselves without traditional local employment and arguing over community resources is increasing. Even the way some people interact when travelling to their destinations has become more individualistic and this has caused many residents to worry whether the friendly and supportive nature of the highlands will be lost. Other residents worry that as changes occur in the Kelabit Highlands; community members will lose their attachment to the highlands and will move away or not visit. One of the major changes in attitudes and hostility occurred when the roads were first considered. This is a result of a split in the community on whether the roads should exist and to what extent economic development should be allowed to occur. The split in the community has caused a low level of tension but has the potential to cause more. Although not all of these changes can be said to be caused by the new roads, many of impacts appeared or increased after the roads were built and therefore any future road development in rural areas should acknowledge the potential of these changes and plan to reduce their negative effects on the local communities.

6.2.6 Mobility of People

“If I don’t want to go this morning, I want to go tonight, that is a good thing about the road, you can go when you want too”. (Participant 7)

As one farmer from Bario illustrated in the statement above, the road has meant that the Kelabit community can now travel to and from the Kelabit Highlands when they please. Before the road from Miri reached the Kelabit Highlands, transportation between Miri and Bario was completely controlled by the MASwings flight schedule. For those that now have their own transportation, departure time can be at any time. The chartering of 4WD transport for those that do not have their own 4WD is relatively flexible and therefore travelling by chartered 4WD can generally be made at anytime. Furthermore, now movement between roadside villages can also be completed at anytime as travelling in the dark is no longer a limiting factor.

The majority of Bario residents continue to use the plane as the main form of transportation to Miri. The demand in 2010 for tickets to Miri on the MASwings flights remains consistent with what it was in 2006, before the logging road reached the Kelabit Highlands. The only real change in the frequency Bario residents travel to Miri was with those that travel by 4WD or have been able to get free rides with those that are already driving to Miri. One participant from Bario stated that the roads had provided him with increased mobility as his fear of flying meant he had difficulty leaving the Kelabit Highlands before the road was constructed.

By contrast, the frequency that the residents from Pa Dalih travel to Miri has increased. There is no airport in the Central Kelapang area and therefore these residents had to walk to Bario before they could catch a plane to Miri. The walking restricted the travelling of many of the residents from the Central Kelapang area. The road has now meant that there is no walking involved and residents of the Central Kelapang area can now get a ride by 4WD to the airport in Bario or can travel direct to Miri from the Central Kelapang area.

There has also been no change in the frequency that residents from Pa Lungan travel to Miri. The main reason for this is that the distance and time it takes to walk from Pa Lungan to the airport in Bario deters many of the Pa Lungan residents from making the trip more often. Some of the older Pa Lungan residents fear that they will no longer be able to walk to Bario soon and hope that a road is constructed to Pa Lungan before they are no longer able to walk.

The logging roads have increased vehicular mobility through the jungle. This has allowed people the ability to explore and enjoy parts of the jungle that they may not have been able to experience before due to inaccessibility. For a number of participants, travelling by road has made the trip between Miri and the Kelabit Highlands into an adventure or a sight seeing excursion as demonstrated by the statement below from a young urban based Kelabit.

“The journey is much more an adventure instead of following the aeroplane. At least I can enjoy the view by the road. Maybe can stop by and take some pictures, stop by and maybe eat somewhere in the jungle for picnic, then continue. You can’t do that on plane”. (Participant 48)

The frequency resident’s from Pa Dalih travel to Bario has decreased. Most of the participants do still travel to Bario in order to travel to Miri by plane. With 4WD access, the Pa Dalih residents do not have to have an overnight stay in Bario as the 4WD can pick them up and drive to the airport before check in all within a couple of hours²⁴. Before the inter-village roads were built, a Pa Dalih resident would have to trek from Pa Dalih the day before the flight.

Several participants who originated from Pa Dalih but now live elsewhere acknowledged that the walking needed to reach Pa Dalih before the inter-village roads were built put them off the idea of travelling back. This is said to have been a common occurrence amongst those that had moved away from the Central Kelapang area. More former residents of the Central Kelapang area are now said to be returning to visit their natal villages as it is shown in a former Pa Dalih resident’s statement below.

²⁴ The time taken to travel between Pa Dalih and the airport in Bario depends on the weather and road conditions. Several local transporters stated the trip take one and a half hours to complete in good weather and good road conditions

“When Pa Dalih did not have a road connecting to Miri or Bario, it would take me a whole day to walk from Bario to Pa Dalih. I would start at 6am and not arrive at Pa Dalih till 8pm. I did not go to Pa Dalih for 10 years because I knew I had to walk. But once the road was built, I started going back to Pa Dalih twice a year.” (Participant 52)

6.2.7 Current Reasons Preventing Increased Mobility

The road has not facilitated the mobility of all of the Kelabit community. For many Kelabit community members, the financial cost of purchasing or using motorised vehicles limits their ability to make use of motorised vehicles. Furthermore, the transport fares for 4WD transportation is still out of reach for some of the Kelabit community members.

The main reasons given by those participants that only travel in and out of the Kelabit Highlands by plane was that travelling by road was rough and took too long. The rough road and the longer length of time it took to travel between Miri and the Kelabit Highlands by 4WD was stated as being very difficult on the elderly, pregnant women, children and their caregivers. The statements below were given by an elderly man and middle aged mother from Bario.

“It is very difficult to use the car all the way from Miri because I am old man, body feels a bit of pain and all that.” (Participant 9)

“Children need to eat; sleep and general kids stuff but they can’t do that during a 12 hour 4WD trip.” (Participant 2)

For some other members of the Kelabit community, the trip by 4WD is considered ‘unsafe’ or ‘scary’. A number of the participants that talked about the safety concerns involved in travelling by 4WD said that the safety concerns (such as on coming logging trucks, inefficient road surfacing and the large dangerous drops off of the side of the roads) prevented them from using the 4WD transportation.

6.2.8 Social Events

The *Sidang Injil* Borneo (SIB) church holds church functions in all of the Kelabit villages in the Kelabit Highlands. The number and frequency of church functions conducted in the Kelabit Highlands appears not to have changed as a consequence of the road construction. These functions would have occurred no matter whether the roads existed. However, it was stated by one of the officials of the church functions that it would have involved longer periods of time to complete the functions as those conducting the functions would have had to walk to the villages outside of Bario. As a consequence of having to walk to the other villages, the whole process would have been more physically exhausting and therefore many of those that take part now would not have been able to take part in the functions

located outside of Bario before the roads construction. On the other hand, one of the limitations of using the road for transporting church officials to villages outside of Bario is that the church receives the financial cost of chartering the 4WD transportation.

The Highlanders sport carnival is an annual sporting event where Kelabits can come together in one place to socialise and participate in sporting activities. The Highlanders sport carnival had been running for 20 years but has not been held for the last two years due to financial constraints. It is expected that the sporting event will start up again next year. The Highlanders sport carnival is hosted in Miri but there is now talk in Bario of hosting the sporting carnival there. It would never have been possible to host the sports carnival in Bario before the road from Miri was connected to Bario. The MASWings flights into Bario would not have had the capacity to transport the number of people that would be coming into Bario for the sports carnival; however with the roads, those that could not get flights, can now come up by 4WD. The road from Miri to Bario had not been completed by the time the last Highlanders sports carnival was held and therefore the road has not had an opportunity to facilitate the Bario residents in attending the Highlanders sports carnival. Although the road from Miri to Pa Dalih did exist during the last Highlanders sports carnival, no mention of the Highlanders sports carnival was made in the interviews in Pa Dalih. It is therefore not possible to say whether the road has facilitated the ability of Pa Dalih residents to attend the Highlanders sports carnival.

The only sporting event mentioned in the Pa Dalih interviews was the football games in Kalimantan, Indonesia. Pa Dalih has a football team that travels to Kalimantan, Indonesia to play football. The only mode of transport is by walking through the jungle and therefore the roads have not facilitated the Pa Dalih football teams ability to travel to their football games.

There were other social events that the roads have helped people to attend. Weddings and name changing ceremonies²⁵ are very common events for the Kelabit communities and they are almost always held in Miri. In the past, the residents of the Kelabit Highlands would have had to go by plane however for many of the residents; the price of the airfare prevented them from attending the events. Many of the participants stated that they could now travel to more social events in Miri as they were now able to get a free ride from friends or family that were already driving down to Miri for the social event. Furthermore, the residents of the Central Kelapang area and Pa Lungan would have to walk to Bario to use the plane. Now the residents of the Central Kelapang area can go direct to Miri by 4WD

²⁵ In Kelabit culture, there is a unique tradition of name changing. Name changing occurs when there is a change in the family situation such as *Burak Lua* (the birth of the first child to a married couple). In this situation, two generations (parents and grandparents of the child) have their names changed to signify the birth of that child. Name changing ceremonies are held to celebrate the occasion and these ceremonies were traditionally the largest ceremonies held each year.

which saves time and energy; however Pa Lungan residents still have to walk to Bario before they can travel to Miri.

Walking will be required by any resident of Pa Lungan who attends a social event outside of Pa Lungan. It is the requirement of having to walk (for a minimum of three hours) that prevents many of the Pa Lungan residents from attending social events outside of Pa Lungan as it is stated in the following account from a Pa Lungan farmer.

“Can be hard to enjoy ceremonies, I sometimes feel so tired after walking. Day events are not worth while as it takes so long to go any where and back”.

(Participant 35)

All of the participants in the interviews in Pa Lungan said that they would attend more social events if there was a road connecting Pa Lungan to Bario.

Religious festivals play a major role in the lives of most Kelabits. Christmas and Easter are very important occasions in Kelabit culture and as a consequence many Kelabits travel to see friends and family during these times. It is very common for the flights out of the Kelabit Highlands to book out weeks before Christmas and Easter. MASwings provides extra flights around Christmas but this is still insufficient to cope with the demand. The road from Miri has given the Kelabit communities an alternative mode of transportation and therefore facilitated in bringing Kelabit friends and families together for Christmas. What is most interesting about how the roads have facilitated the Kelabit community during Christmas is that before the road from Miri existed, almost all the movement of the Kelabit communities was into Miri; however this pattern was altered last Christmas (2009). The following statement from a home stay operator in the Bario area best illustrates this change in the pattern of movement during the Christmas holidays.

“Last Christmas was the most interesting Christmas. Nobody turned up during the day; it was the same faces you see every year. But it was during the night. From ahhh, 10 o clock (pm), normally we have the one car out there, by 10 o clock we had the first three, later more people came. There was no more spaces to park left, people had to park out on the road. The house was full. We should have expected this with the opening of the road. Actually we ran out of supplies. I expect this Christmas we will have to be well prepared. At Christmas you didn’t expect locals (Urban based Kelabits) to come back home. There are a few faces that I have not seen them for the last ten years. So the funny thing is I think that could be the trend for the future, the wife and children fly by air, the men come by land, yea I think that is the new trend. So the men will bring all the supplies because there is a limited weight for the plane”. (participant 5)

Before the road connected Bario to Miri, it was hard to provide enough resources to host big social occasions and events (such as Christmas and Easter celebrations) due to the limited space on the MASWings flights. Even those that fly in from Miri are constrained to weight

limitations and therefore can only bring in a limited amount of supplies. However, many of the supplies that increased in use during social events (such as diesel for generators) could not be brought up by plane. There are shops within Bario that sell supplies such as cooking oil and diesel but the purchasing of enough supplies from the local shops can be very expensive. Now that the road from Miri connects to Bario, supplies can be brought up by 4WD which helps to solve the problem of running out of supplies. Another result of having more supplies is summed up in the following statement from a Bario resident.

“The outcome of that (more things being brought in) is they stay longer. If you come by plane you only stay say two days but you come by road you stay longer because you think about how the trip is so long, plus you want to finish all the food you brought before you go”. (participant 6)

6.2.9 Migration

Almost all studies that have looked at the impacts of newly constructed rural roads show that the migration of residents from roadside villages increases due to the roads increasing the accessibility of urban centres. This is the case for Pa Dalih. Since the road reached Pa Dalih, the population in Pa Dalih has been decreasing. The principal at Pa Dalih primary school stated that the school role had dropped by at least 30% since the road reached Pa Dalih.

It is however a different story in Bario. The population has not dropped by any significant amount that would imply that the road has increased migration out of Bario. This may be in part, due to the fact that Bario had already experienced massive out migration since the 1960s. The main cause of the migration was put down to the desire for higher levels of education, and better paying, less labour intensive jobs in the city. The construction of the runway in Bario facilitated the migration of residents from Bario. On the other hand, Bario is experiencing a slow circular migration pattern as those that left in the 1960s are now returning to Bario to retire. It was often stated that if electricity is made more accessible in Bario and the transportation of goods via the road continues, then more of the retirees will return to spend the rest of their lives in Bario.

6.2.10 Education

The literature showed that the construction and upgrading of rural roads in developing nations brought many benefits to the education facilities in the rural areas. These benefits included increased enrolment, decreased drop-out rates and absenteeism as well as enabling rural facilities to bring in more goods and technology. Furthermore, many rural education facilities received new infrastructure after roads facilitated the movement of government officials and building materials.

The Kelabit Highlands has three schools. Bario has two schools, a primary school and a lower secondary school. The third school is the primary school in Pa Dalih. The roads do not appear to have had an influence on the enrolment rate in either of the schools in Bario but the roads have had a major effect on the enrolment rate at Pa Dalih primary school. Since the road to Miri reached Pa Dalih, there has been a dramatic reduction in the population of Pa Dalih due to migration to the cities of Sarawak²⁶. The principle of Pa Dalih stated that the migration of so many families from Pa Dalih in the last two to three years has lead to a 30% reduction in a normally consistent enrolment at Pa Dalih primary school. Absenteeism of students and staff has not changed in any of the three schools since the roads were constructed or upgraded. The drop-out rate of all three of the schools also remains the same as it was before the roads were constructed or upgraded.

The upgrading of the roads within Bario is expected to help the children who live in Bario to get to school each day. The children who board at the schools travel to their home villages every second weekend and on some school holidays. The inter-village roads have made it easier for these children to get home and back again. The principle at Pa Dalih primary school stated that the roads have meant that the trip is easier for children of Pa Mada and Ramudu as they no longer have to walk through the jungle to get to school. Additionally, the children can get to school faster now as they can now come by motorbike or 4WD; however the families of the children must supply their own transportation in most situations.

Samling offers a solution for the transportation of children from roadside villages with no schools. The parents of the children from outside of Pa Dalih and Bario can request that Samling provide the transportation of their children from their village to their school. The parents must write a letter to Samling to request the transportation of their children. The letter must be accompanied by a letter from the schools P.T.A. If approved, Samling will provide transportation for the child/children at no cost to the families. The children of Pa Lungan have benefited the least from the roads as they still must walk for around four hours to get to school in Bario.

The roads have facilitated the staff of the schools in several ways. Many of the school staff from all three schools are originally from outside of the Kelabit Highlands and therefore they often desire to leave the Kelabit Highlands during the school holidays. It is very common for the flights to be fully booked during the school holidays and therefore the road allows the school staff an alternative mode of transportation for when they are travelling in or out of the Kelabit Highlands. Another way the roads have facilitated the teachers of the primary schools in Bario and Pa Dalih is that the teachers participate in interschool teachers' retreats which involves the teachers from one school travelling to the other school. This gives the teachers a chance to relax, connect, socialise and learn from one another. The majority of

²⁶ The majority of the migration from Pa Dalih is to Miri.

all the teachers live on the school grounds, so the roads generally have no influence on the teacher's ability to get to work on a daily basis.

School supplies now come up to the schools in the Kelabit Highlands via the road. The road's have made it easier to bring up school supplies and has meant that more school supplies can be brought up at one time. This has meant that school supplies have become cheaper and therefore the schools can spent the money they have saved on other school related items and activities. The transportation of the majority of school supplies is paid for by the government; however the families of the school children still must supply their own basic school supplies such as exercise books, pens and pencils.

All three of the schools have boarding facilities. The majority of the food packages for the boarding facilities come up to the Kelabit Highlands from Miri via the road. For the boarding facilities in Bario, fresh meat continues to be transported by plane. The delivery of the food for the boarding facilities has become more reliable and consistent since the schools converted to transporting the majority of their food via the road.

The government offers the contracts for the delivery of school supplies to private transport contractors. The best suited contractors will be given the transportation jobs. The contractors do not have to be local and therefore local transport contractors must compete with transport contractors from outside of the Kelabit Highlands.

Another positive aspect of the road for the schools is that the fuel subsidy has meant that the schools have converted from using fire wood to using LPG to cook the food at the schools boarding facilities. This is not only healthier for those cooking the food but is better for the environment and is less damaging on the kitchen buildings.

Pa Dalih is the only school of the three that has experienced the construction of additional school infrastructure since the roads were constructed. Samling provided the machinery and labour to flatten the Pa Dalih primary school football field. Furthermore, during the construction of the concrete volleyball court at Pa Dalih primary school, Samling provided the transportation of around 100 bags of cement. If Samling was not building the roads in the Kelabit Highlands, the volleyball court may not have been built and the football field would not have been flattened.

A new dining hall and kitchen for Bario primary school is to be built soon. The dining hall will double as a school hall when needed. It is believed by the principle of Bario primary school that the dining hall and kitchen would be built even if the road from Miri did not exist; however it is expected to be built faster, cheaper and with greater ease as the building materials can now be brought into Bario by road.

Soon to open in Bario is the first government funded kindergarten in the Kelabit Highlands. The Kindergarten may have been built whether or not the roads had been constructed but the roads have made it easier to complete the construction of the kindergarten.

6.2.11 Safety and Security

In the literature, it was a rise in vehicle related accidents and the increased influence of urban culture which was the most common safety issues that appeared in relation to the construction and upgrading of rural roads.

The reported vehicle related accidents on the roads in the Kelabit Highlands before the upgrading and construction of the roads stood at zero and it remains the same today. However, while this research was taking place, there was a major tractor accident on a farm in Bario. Although the accident itself had nothing to do with the road networks, it is something that must be considered as it is expected that more farm equipment (such as tractors) will arrive in the Kelabit Highlands now that there is road access. One concern that arose several times during the Bario interviews was that once the Bario roads had been concreted, the speed of vehicles using the road would increase and this would endanger all the road users (especially the children and elderly).

There is also a fear within the Kelabit community that the road will allow the importation of undesired goods and behaviours such as drugs, thievery and prostitution. This fear is not unfounded as many of the studies that look at the impacts that occur when remote communities acquire road access to urban areas found that the remote communities often experienced the introduction or increase of undesired behaviour and the supply of undesired goods (Windle & Cramb, 1999; Hettige, 2006; Warr, 2008).

The police state that there are no illegal drugs in the Kelabit Highlands and from those members of the community that discussed the fear of drugs coming into the Kelabit Highlands, none of them had seen or heard of illegal drugs entering the Kelabit villages in the highlands. However the supply and use of legal drugs such as alcohol and tobacco had increased as a result of the road. The Bario police stated that in their opinion, the only negative aspect of the road into the Kelabit Highlands was that the road had increased the accessibility to alcohol. Many of the community members that took part in the study were also worried about the quantity of alcohol that had become available in Bario. Since alcohol became more abundant, many of the residents of Bario had witnessed an increase in anti-social behaviour and gambling. Although gambling is not necessarily bad, one Bario resident stated that he had seen young males spending large portions of their wages on gambling.

The police also stated that theft which existed before the road to Miri was constructed remained at the same level, there is no prostitution, the amount of physical violence remains very low and the police cells have still yet to be used. There were however undesired behaviours that had increased as a result of the road. The undesired behaviour that got the most emphasis was the fighting (non-physical) over land that had now become easily accessible for farming as a result of the road. This fighting is discussed in more detail along with the increase of individualism in the section entitled 'Changes in Attitudes and Lifestyles'.

The Bario Baram police force did have some suggestions that they believed would make the road networks and the community safer. They included adding speed bumps on the kampong/village roads to reduce the speed of the vehicles using the roads, using gravel on the inter-village roads and better maintenance carried out on the highland road network.

6.2.12 Healthcare

The literature on the construction and upgrading of rural roads provided evidence to show that the construction and upgrading of rural roads brings benefits to healthcare services and facilitates the rural communities' access to healthcare facilities. However, it also demonstrated that negative health impacts such as increased road accidents, spread of infectious diseases and increased access to unhealthy goods and services can occur as a result of the new or upgraded roads.

There are two health clinics in the Kelabit Highlands (Bario and Pa Dalih). The Bario health clinic currently has four staff members which comprises of one medical assistant, two community nurses and one attendant. Once the new clinic is completed, one additional medical assistant and one attendant will join the current medical staff. The Pa Dalih clinic is much smaller in size, with only one medical assistant and two local community members who support the medical assistant. Table 16 lists the services provided at the clinics.

The Services Provided at the Clinics.
Follow ups/Regular checkups
Basic assessments – colds, low risk illness's, sprained limbs etc.
Medication Distribution (issued from city)
Immobilisation of broken limbs.
Basic elderly care
Hypertension
Flying doctor authorisation.

Table 16. A list of the services provided by the Bario and Pa Dalih health clinics.

If the patient is really sick or injured, then they must go to Miri or Kuching. Unless it is a life threatening illness or injury, the patient must find and pay their own way to Miri. It is the patients' choice as to the mode of transportation they take. If it is life threatening, then the flying doctor can be called and the trip is free²⁷.

²⁷ The flight is paid for by the government. Each clinic is allocated a budget and it is from within this budget that the flying doctor is paid for.

The majority of the time, the flying doctor flies direct to and from Kuching but in rare cases the flying doctor will fly from Miri. The patient must then find their own way back from Kuching or Miri once they have departed from the hospital. For the Bario area, the flying doctor only performs emergency calls; however in Pa Dalih the flying doctor plays a larger role in providing health care such as conducting all the immunizations. Immunizations are all done at the Bario and Pa Dalih health clinics. Patients from outside Bario and Pa Dalih must make their own way to the clinics. The flying doctor service comes up to Pa Dalih every month but not at regular intervals. Additionally, the flying doctor brings up Pa Dalih's entire health clinic supplies, whereas Bario's health clinic supplies are brought up by plane. As neither of the two clinics uses the road to bring up supplies, the road has had no effect on the delivery of health clinic supplies.

There is no over-land transportation provided by the government for health related problems. If an injury occurs outside of a village with a health clinic, then the patient must make their own way to the clinic, there are no mobile health workers. The medical assistant in Pa Dalih did state however, that if transport is provided, then he would travel to areas outside of Pa Dalih.

If a pregnant patient is not high risk, then the delivery can be done at the Bario health clinic. If the pregnant patient is high risk then they are referred to Miri hospital, but must make their own way there. However, a high risk pregnant patient from a low socio-economic group will have their airfare paid for by the government. They must however catch the public MASwings flight to be entitled to the free transportation. All pregnant patients who use the Pa Dalih health clinic are referred to Miri.

On average the medical assistant in Pa Dalih is visited by one patient a day. No statistics were given for the average number of patients who receive health care from the Bario health clinic. Neither of the two clinics has seen a change in the number of patients that visit the health clinics since the road network connected to their villages.

The participants from Pa Lungan were asked how frequently they visited a health clinic. Most of them stated that they never visited the health clinic and several of them stated that when they were ill or injured, they would just pretend that they were fine and did not need medical assistance. The main reason given by Pa Lungan residents for the low uptake of medical assistance was that travelling to a health clinic took too long and was too difficult especially when one was ill or injured.

The roads have facilitated the job of the health clinic in Pa Dalih more than it has for the health clinic in Bario. The medical assistant in Pa Dalih stated that the road had facilitated his job in three ways. Firstly, the road has made it easier to refer patients to Miri. Secondly the medical assistant from Pa Dalih must go to Miri once a month to submit paperwork; the road makes this task easier. If the road is not blocked, he can go direct to Miri. If the road is blocked he can go to Bario and then fly to Miri. All his transportation is paid for by the

government (as long as it's official). Thirdly, the road provides another form of communication which is important as there is no phone. He does however have limited internet access.

One positive feature of the logging road was that knowledge can be shared with greater ease. When one medical assistant from one clinic goes down to Miri or Kuching and learns something new, the medical assistant from the other health clinic can travel along the inter-village road to receive the new knowledge rather than having to go all the way to Miri or Kuching.

6.2.13 The Influence of Outsiders

One of the largest concerns for the Kelabit community is the influence and impact that 'outsiders' are having on the Kelabit Highlands. Participants who mentioned outsiders in the interviews were asked who they considered to be outsiders. The main response to this question was 'any non-Kelabit with the general exception of tourists'. Tourists were often excluded from the outsider category because they were usually short term guests who generally have very little influence on the Kelabit culture, do not interfere with the political and social dynamics of the Kelabit Highlands, are law abiding and generally behave in a manner expected of a guest.

In the Bario and Pa Dalih interviews, the most commonly stated negative impact was that 'outsiders' were hunting illegally. There were two main aspects of illegal hunting that caused the most concern. Firstly, there was no way of knowing who is out in the jungle and where they are hunting. Whenever a local goes out hunting, the rest of the community are generally aware of where the hunting is taking place and there is less chance of anyone being accidentally shot. This is not the case with non-local hunters as they are not legally authorized to be hunting and therefore do not inform any locals of their hunting location. Additionally, local hunters generally only discharge their gun when they believe they have a guaranteed hit on the prey, whereas there is no guarantee of this from non-local hunters who have been known to fire many shots in the general direction of the prey.

The second problem of outsiders hunting in the Kelabit Highlands is that there is no way to monitor the quantities and types of prey and whether they are using extremely destructive and illegal techniques. The locals generally only hunt for local consumption and have done so over numerous generations without any major loss of wildlife, whereas it is believed that many of the non-local hunters are hunting in the Kelabit Highlands at a non-sustainable level and then returning to the urban centres to sell what they have caught for financial gain. This makes it hard for local hunters to hunt sustainably as they are unable to monitor the numbers of wildlife that are taken from the jungle. Furthermore, illegal hunting

methods are employed by some non-locals. These illegal techniques not only kill what the hunters are after, but often kill everything in the immediate vicinity.

“Hunters from outside come here. We just take what we need; they take as much as they can. It is getting hard to hunt. This is the last frontier – it is our supermarket”.

(participant 36)

The non-local hunters are generally not seen within the village environment and therefore have little influence on the Kelabit culture or way of living within the Kelabit Highlands. However the road has increased the accessibility of the Kelabit Highlands and it is expected by many of the Bario and Pa Dalih residents that this increased accessibility will lead to an increase in the number of ‘outsiders’ coming to visit or live in the Kelabit Highlands. Many of the residents want to ensure that the land in the Kelabit Highlands remains under Kelabit guardianship²⁸ (under Native Customary Land) and hope that it will never be under the ownership of non-Kelabits. There is a major concern within the Kelabit community, that if the Native Customary Land rights are removed then the Chinese will come in and buy all the land and businesses within the Kelabit Highlands.

Another major concern that arose in the interviews was that ‘outsiders’ bring things with them to the Kelabit Highlands that can alter or damage the Kelabit culture and way of life. People of different ethnic groups come up to the Kelabit Highlands and bring with them, their own culture and way of life. It is feared especially by some of the urban based participants, that with so many new influences, the villages may be induced into adopting new cultural values and ways of living (such as that found in the modern urban settings of Sarawak, Malaysia). The main anxiety was that the influences of outsiders would induce anti-social traits such as disrespect and alternative behaviour such as drug taking and gambling.

6.2.14 Pollution and Damage

“How I wish Bario is kept as natural as ever...for the future generations. We already have more than enough cities in the world”. (Participant 49)

The sentiment above is very similar to the attitudes of half of the urban based Kelabits that participated in this study. Often with development comes sacrifice and losses. For the Kelabit Highlands, the creation and use of the road network has lead to pollution and environmental damage. In fact, pollution and environmental damage that is either directly or indirectly caused by road construction and road use holds the largest concern amongst those that took part in this study. Road construction and use in the Kelabit Highlands has been the cause of water, air and rubbish pollution as well as deforestation and a loss of

²⁸ The Kelabit people do not own any land in the Kelabit Highlands but they do have guardianship over large areas of the Kelabit Highlands under Native Customary Land rights.

wildlife. Furthermore, development often modernises communities and therefore can alter the way a community looks and functions.

Road construction and road use has caused the polluting of waterways with soil erosion and road run off. During road construction dirt is cleared to make the path wide enough for vehicular access. In other parts of the road, soil must be brought in to level areas to make the road flatter or wider. The movement of the dirt will usually result in the disturbance of the vegetation and waterways. Additionally, water and wind is able to erode freshly disturbed soil to a greater degree than it can with undisturbed soil. Once the road is constructed, it needs regular maintenance to help prevent or lessen erosion. Road use also causes the disturbance of the soil and therefore can cause erosion problems just as road construction can but at a much smaller scale.

The polluting of the waterways with eroded soil has the potential to be a major problem for the communities in the Kelabit Highlands. Already residents of Bario and Pa Dalih are experiencing problems caused by erosion and road run off.

“The paddy fields are not so good because of dirt going into waterways”.

(Participant 31)

“Waterways become polluted from erosion and road wash off. Bad for fish life”.

(Participant 11)



Fig 33. (Left) The bridge into Pa Dalih. Half of the bridge has fallen away and the other half is very dangerous to use when the surface is wet. The bridge is in this condition due to the weather, light vehicular use and lack of maintenance.



Fig 34. (Right) Warning, road narrows. Erosion and a lack of efficient drainage caused a large section of road to slip away into the jungle and the waterways. This section of road is located between Pa Dalih and Pa Mada.

Additionally, the lack of maintenance conducted on the inter-village roads has meant that large quantities of soil have eroded from sections of the road network. This erosion can be seen in figures 33 and 34. Not only has the erosion polluted the waterways but it has also

made the road more dangerous to travel along. This brings up a very important dilemma. Unmaintained roads have already shown that they cannot last long against the weather and the disturbance from vehicle use. What is to become of the road once Samling finishes its logging operations in the Kelabit Highlands and consequently cease to continue the road maintenance on the road from Miri to the Kelabit Highlands? This question was deliberated over by a large number of the participants.

The road network into and around the Kelabit Highlands has had a major affect on the way parts of the Kelabit Highlands appear. There is a fear that the roads will damage the 'traditional look' of the Kelabit Highlands and will therefore deter the tourist from visiting.

The construction of the roads in the Kelabit Highlands has involved a large level of deforestation along the road's path. The deforestation has disturbed the wildlife in the area. Many of the local hunters stated that it was becoming harder to find wildlife in the areas with the roads.

Air pollution was brought up several times but the air pollution was not a consequence of engine exhaust fumes but was instead because of the dirt and dust that is created by the disturbance of the road surface. Many Bario residents complained that when a vehicle went past dust would rise into the air which would make it uncomfortable to breath. Many residents believe that the concreting of the Bario roads will reduce this problem. In Pa Dalih, it was stated by several residents that fruit and wild vegetables grew less and were of smaller sizes on the roadside due to dust from the road²⁹.

There is also a lot of rubbish pollution along the road between Bario and the Central Kelapang area (especially on the final approach to Bario). What is most interesting about this rubbish is that the majority of it is beer cans. This brings up a very important question, who is drinking the beer while on the roads, is it the driver? If it is the drivers, how much are they drinking while driving? Could this be a safety issue that needs to be looked into?

A lot of the pollution and environmental damage in the Kelabit Highlands is not caused by the road directly but is a consequence of the activities that take place along the roads such as logging and illegal hunting.

The majority of the roads in the Kelabit Highlands were constructed by Samling for the purpose of facilitating the extraction of timber from the jungle and the transporting of it to the commercial centres. Without the roads commercial logging would not be economic. At the same time without Samling, the road from Miri to the Kelabit Highlands would not exist, nor would the inter-village roads around the Central Kelapang area and between the Central Kelapang area and the Greater Bario area. For the communities in the Kelabit Highlands, the logging is the sacrifice that they had to pay to have theses roads.

²⁹ The dust settles on the plants and disrupts the plants ability to carry out its normal processes.

The logging in the Kelabit Highlands is not just conducted by Samling, but is also conducted by the locals. Although the locals have been cutting down timber for as long as anyone could recall, it was never at the level it is carried out today. Nevertheless, the increased level of local timber extraction still pales in comparison to the timber extraction of Samling. The main reasons for the increase in local timber extraction are that the roads have made it easier to access and transport the timber and the locals want to extract as much timber for themselves before the timber companies take it all.

A major concern the Kelabit community has with the logging is that it is becoming very difficult to find suitable timber for building boats, houses and other wooden structures. Local timber supplies have become very expensive which is making it more difficult for the poorer community members.

The logging has led to the polluting of the waterways as the soil is disturbed and in parts left exposed. This increases the ability of rain and wind to erode the soil. Additionally, logging operations have destroyed the habitat and food supply of the wildlife and as a consequence, there is less wildlife in the area. It is also suggested by several participants that the deforestation is the cause of the increased average temperatures that has been experienced in the Kelabit Highlands over the last decade.

Logging, road use and road construction have had detrimental effects on the wildlife in the Kelabit Highlands. This fact was stated by a large number of hunters that took part in the study. All the hunters who hunted in the areas near the logging reported seeing less wildlife in those areas since the logging operations started.

In summary, the Kelabit Highlands has experienced pollution and environmental damage in the pursuit of development. Road construction and the utilization of the roads in the Kelabit Highlands has caused water, air and rubbish pollution to occur. By far, the worst of the pollution is from the erosion of soil along the road network. Additionally, increased deforestation has also taken place since road construction started. As a result of the deforestation, there has been a decrease in wildlife particularly around the road networks. The loss of wildlife is not solely due to the deforestation but can also be attributed to the increase in illegal hunters that now have easier access to the Kelabit Highlands. The pollution and environmental damage caused by the road construction and utilization have shown to have had detrimental effects on the Kelabit Highland landscape and the way of life of the Kelabit Highland communities and therefore any future planning of road construction in rural and remote areas should take these problems into consideration before road construction starts.

Chapter 7

Conclusion

Many of the findings in this study matched what was found in other studies of similar nature such as the construction of roads has both positive and negative impacts, including the increased mobility of people and goods, increased access to off-farm employment, the increased availability of undesired products and the facilitation of environmental damage. However this study notes some different conclusions from previous work such as there been no observed change in enrolment, dropout rates or absenteeism at the highland schools, no increases in exported produce for sale in the urban centres, the creation of tension between community groups, and a notable lack of increase in migration from two of the three rural study sites. For this reason, it is clear that studies must be conducted in individual areas and amongst different demographic groups to ensure that all of the actual changes and impacts are revealed. Generalising from previous studies cannot capture the final impact of constructing or upgrading roads in rural areas. This conclusion will therefore retrace the findings of my research and will ensure that the particular context related impacts are brought to attention.

This thesis has examined the perceptions of a diverse group of the Kelabit community on the social and economic impacts the construction and upgrading of the road networks into and around the Kelabit Highlands has had on the Kelabit Highlands and the Kelabit community.

Triangulation was employed where possible by using multiple research methods, repeating interviews and by comparing collected information with official documents and key informants responses.

There were three core limitations in this research project. One of the main limitations was that translators had to be used on 18 of the 53 face to face interviews. The problem with working with more than one language is that there are responses in one language that can be hard to directly translate to another language. Problems can also occur with the delivery of the translation as major points in a response maybe lost as the response is translated and passed between participant, translator and then interviewer. Additionally, there is the potential that the translators own biases may become intermixed with the translations. Although these problems with having to have interviews translated had the potential to transpire, no incidents gave me reason to believe that these problems did take place.

The language barrier was also a factor in another limitation of the research. I was unable to communicate fluently with a large number of residents and therefore I was unable to arrange meetings with them or even talk to them on a social basis without the help of a translator. This factor narrowed my sample when I had no translator accompanying me.

My sample was also narrowed as a consequence of the participants being self selecting. There were many residents that were not interviewed but had very significant perceptions and experiences with the roads. Many of these residents refrained from being interviewed in fear of prosecution, believed their opinions were of no significance or questioned my legitimacy as a non-Kelabit conducting research on a highly political and controversial issue in the Kelabit Highlands. As a result of the problems stated above and the sample recruitment techniques that I had to adopt (due to time and financial restraints), my sample was not random.

Chapter 2 outlined the affects of road construction and road upgrading in rural areas of the developing world. Chapter 3 examined how Sarawak has experienced the construction and upgrading of roads in the rural areas. Chapter 4 focused on the Kelabit Highlands and an outline of the Kelabit people and their way of life. These three chapters set the scene for chapter 6 of the thesis which reported the results from the interviews.

The majority of the participants considered the enhanced mobility of people and goods to be the most significant and influential impacts of the roads into and around the Kelabit Highlands and that this was in general a positive impact.

The logging road between Miri and the Kelabit Highlands had facilitated the mobility of goods in several ways. The logging road allowed the residents of the Kelabit Highlands to bring more goods from the urban areas due to the weight of goods becoming less of a limiting factor. Additionally, being able to transport goods via the road meant that goods that were not permitted on the MASwings flights could be brought into the Kelabit Highlands. Almost any item can be transported by the 4WD transporters as long as it's not over 1 tonne and is legal.

The facilitated mobility of goods that the road has brought had also helped the residents in the Kelabit Highlands to send goods to the urban centres. At this point in time however the goods sent to the urban centres remain almost exclusively for the supply of friends and family in the urban centres. This remains the case as the transport costs still remain too high to economically sustain the sale of local produce at the urban markets.

There are a number of goods that have now become cheaper in the Kelabit Highlands as a consequence of the road between Miri and the Kelabit Highlands. The ability to transport items that are prohibited on the MASwings flights or are too heavy to be transported by the Twin Otter aircraft has meant that the price of these items has decreased. Additionally, once the road allowed the transportation of goods into the Kelabit Highlands via 4WD, the Malaysian government issued subsidies on certain goods such as fuel, sugar, salt, flour and rice as long as it was transported along the road and with contracted transporters. These subsidies have had a major affect on the communities in the Highlands. Residents are now able to purchase a wider range of goods.

The subsidies on fuels (petrol, diesel and LPG) have had the largest impact of all the subsidised goods. Since fuel subsidies started, there has been an increase in the number of 4WDs, motorbikes, generators and gas cookers in the Kelabit Highlands. The subsidies on fuel have meant that the residents of the Kelabit Highlands can now use their generators, gas cookers, motorbikes and 4WDs more regularly and for longer periods of time. Furthermore, since the road from Miri reached Bario and fuel subsidies started, the roadside villages in the Kelabit Highlands no longer suffer from fuel shortages.

The majority of previously available unsubsidised goods that are sold in the Kelabit Highlands remain around the same price as they were before the road from Miri connected to the Kelabit Highlands. This is a result of 4WD transport fares per kg of cargo being loosely set at the same price as the MASwings transport fares per kg of cargo. The transport costs remain high as the transporters suffer great financial costs to keep their vehicles operating. If their vehicle breaks down outside of Miri, then the financial costs to repair the vehicles can reach uneconomical levels.

With no construction of a road or upgrading of the track between Bario and Pa Lungan, there has been no change in the modes of transport available between Bario and Pa Lungan. Transport costs for transporting goods between Bario and Pa Lungan remain unchanged.

Since remittances or resources can now be sent from the urban areas to the highlands via the road, the quantity and the frequency have increased. Additionally, more people from the urban centres are now returning more often to the Kelabit Highlands and as a result, money and resources that are invested in the highlands has increased.

The facilitated mobility of goods into and around the Kelabit Highlands has however resulted in several negative impacts. These include the increase in the amount of unhealthy goods such as alcohol, cigarettes and processed foods entering the Kelabit Highlands. Furthermore, with more goods coming direct from the urban centres, the shops in Bario are losing clientele.

Although illegal drugs are not believed to have entered the Kelabit communities in the Kelabit Highlands, it is a major concern of a large number of the Kelabit community that the increased mobility of people and goods into the Kelabit Highlands may result in the introduction of illegal drugs. There is a request from a number of the Kelabit community members that the Malaysian Government help to prevent drugs entering the Highlands.

Since the road between Miri and the Kelabit Highlands was constructed, there has been mixed results in terms of its use. The majority of Bario participants continue to use the plane as the main form of transportation to Miri and there has been very little change in the number of times the majority of residents from Bario travel to Miri. The frequency that residents from Pa Dalih travel to Miri has increased but as a consequence, the frequency in which Pa Dalih residents travel to Bario has decreased. With no new road there has been no

change in the frequency that residents from Pa Lungan travel to Miri or to Bario. Any change in the frequency that urban based Kelabit travel to the Kelabit Highlands appears to be based on the mode of transport used. Generally, only those urban based Kelabit that now travel by 4WD showed any significant change in the frequency that they travelled to the Kelabit Highlands.

One of the important consequences of the opening of the logging road is the larger numbers of urban based Kelabits that are returning to the Kelabit Highlands for church events and religious festivals. There were three main reasons given for this increase. Firstly, having 4WD access from Miri to the Kelabit Highlands meant that the limited seats available on the MASwings flights to the Kelabit Highlands no longer constrained the number of people that could travel to the Kelabit Highlands at any one time. Secondly, larger quantities of goods could be brought up to the Kelabit Highlands and therefore larger numbers of people can be hosted. Additionally, the urban based Kelabits can now transport more of their own rations, items and gifts. Thirdly, the construction and upgrading of the inter-village roads have made it easier for the urban based Kelabits to travel to most of the Kelabit villages in the highlands.

The logging roads have increased vehicular mobility through the jungle, providing access to places that the plane did not reach or were too long to walk to. This was more obvious in the Pa Dalih as the road functioned as their only long distance form of transportation and their only form of communication as there is no phone connection and the internet access is very limited. Additionally, the roads have allowed people the ability to explore and enjoy parts of the jungle that they may not have been able to experience before due to inaccessibility. For a number of participants, travelling by road has made the trip between Miri and the Kelabit Highlands into an adventure or a sight seeing excursion.

The road has not facilitated the mobility of the entire Kelabit community however. For many in the Kelabit community the financial cost of purchasing or using motorised vehicles limits their ability to make use of motorised vehicles. Furthermore, the transport fares for 4WD transportation are still out of reach for many in the Kelabit community. The rough road and the length of time it takes to travel between Miri and the Kelabit Highlands by 4WD makes it very difficult on the elderly, pregnant women, children and their caregivers to travel this way. Finally, some of the Kelabit community considered travelling by 4WD on the rough roads to be 'scary' or 'unsafe'.

When it comes to vehicle ownership itself, there is a large disparity between the villages. The length of time a village had been connected to the road to Miri had very little influence on the number of vehicles in the village. The factor that appeared to have the most influence was the number of off-farm employment opportunities available in the village. As a result Bario had the largest number of vehicles, both per person and all together. Bario was also the only village in the Kelabit Highlands where the residents own farm equipment and construction vehicles.

Walking and riding motorbikes are the most commonly used modes of transport within localised areas of the Kelabit Highlands. Between areas such as Bario and the Central Kelapang area, the main form of transportation has become the 4WD. Boats are still used in the Kelabit Highlands but the number of people now using boats for transportation has reduced since the inter-village roads were built. No residents from Pa Lungan owned or operated motorised vehicles but a number of the Pa Lungan residents continue to use buffalos to help with the transportation of goods.

There is a large gender gap when it came to the operating of vehicular transportation. It is generally the case that all vehicles larger than a motorbike in the Kelabit Highlands are operated by male drivers. The majority of motorbikes in the Highlands are operated by males; however there are a large number of females who operate motorbikes on a day to day basis. In Pa Lungan where buffalos are used to transport goods, no women operated the buffalo as operating the buffalo is considered a 'mans job'.

Now a day's vehicle ownership has become a tool to create or maintain a social status within the Kelabit community. The creation or maintenance of ones social status with the ownership of a physical item is not new to the Kelabit culture. Just like traditional items like Chinese jars and glass beads showed how successful you were, the ownership of a vehicle in the Kelabit Highlands has similar significance.

Increased migration is often the result of improved mobility in rural areas and the increased accessibility rural residents have to the urban areas. This was not the case for all the villages in the Kelabit Highlands. Of the three villages in the study, only Pa Dalih actually experienced an increase in migration as a result of the new road networks. Once the road to the Kelabit Highlands was completed, the accessibility of the urban centres increased substantially for the Pa Dalih residents and as a result, the migration of Pa Dalih residents to the urban centres increased. Bario residents also found that the urban centres were more accessible after road construction however there was no significant change in migration from Bario to the urban centres. The main reason for this is that the Bario residents had easy access to the urban centres (in the form of air travel) before the road from Bario to Miri was constructed and had therefore already experienced the large levels of migration that Pa Dalih is now experiencing. With no new road Pa Lungan residents experienced no increase in their accessibility to the urban centres and correspondingly, have not experienced any change in migration. These results show a possible pattern where providing a rural community with access to urban centres for the first time may increase migration but simply adding another form of transport which increases the access the rural residents have to the urban centres does not guarantee an increase in migration.

The increased access between the Kelabit Highlands and the urban centres of Malaysia has increased migration of Pa Dalih residents to Miri but it has also increased the number of returning migrants move back to the Kelabit Highlands. Although many of those returning were retirees and had stated that they had wanted to retire in the Kelabit Highlands

anyway, it was generally noted that the increased mobility of goods due to the road, played a large role in their final decisions to move back to the Kelabit Highlands.

Farming still remains the main occupation in the Kelabit Highlands however in Bario there is currently a large increase in off-farm employment. The majority of the off-farm employment is found in or around the Bario area, mainly in the transportation and construction industries which expanded after the road from Miri reached Bario. It was stated that most of the construction jobs such as the building of the health clinic and kindergarten would have occurred whether the road existed or not however the road accelerated the process.

Although the development in Bario has lead to the increase of off-farm employment for the Kelabit community, they are unable to take full advantage of the available jobs because many of the contractors set pay rates at a substantially lower level than alternative, pre-existing employment such as working as a tourist tour guide. Also contractors require that employees work all day, everyday. For many locals, working all day, everyday is not an option because they have other unpaid obligations to their farm, families and community.

The art and handicraft industry in the Kelabit Highlands has been facilitated by the roads. The roads have made it easier to bring or find materials for art and handicrafts in the Kelabit Highlands. Additionally, thanks to the roads, the local teacher of Penan handicrafts can now travel to other areas of the Kelabit Highlands to teach others to make high quality handicrafts.

The most influential negative impact from the road construction on off-farm employment in the Kelabit Highlands occurred in the tourist industry. The construction of the inter-village road and the logging along the roads has caused areas of the Kelabit Highlands to be viewed as been unusable for eco-tourism. The largest affects were felt in the Central Kelapang area, where a world renowned jungle trek (the Bario Loop) was decommissioned as a result of three factors related to road construction and the logging operations. The track is no longer maintained as a result of it been replaced by the inter-village road. Before the road existed, the local villages were promised money by the State government to maintain the tracks. The tourists came up to the Kelabit Highlands to walk through the virgin jungle and view the wildlife. Travelling along the new roads does not provide the experience that the tourist desire and therefore the tourist are not guided around the Bario loop along the roads. Furthermore the local and commercial logging operations along parts of the Bario Loop deter tourist as the tourists generally do not want to see trees been cut down. The logging has also lead to a reduction of wildlife in the area and therefore tourists have less opportunity to view the wildlife. A consequent of these changes is that some areas of the Kelabit Highlands such as the Central Kelapang area have experienced a complete loss of tourism and as a result they have experienced a major reduction in off-farm employment.

There are several Kelabit community members who have ideas on how the construction and upgrading of the roads in the Kelabit Highlands could support the tourism industry and increase the number of off-farm employment opportunities in the Kelabit Highlands. These ideas include horse trekking, horse and cart rides and mountain bikes for rent. If these ideas become a reality, there will be more activities for tourists, tourist may spent more money in the Highlands and there is the potential that tourist numbers may increase as a result of the Kelabit Highlands offering a unique tourist experience in Malaysia.

Although the number of off-farm employment opportunities continues to grow in the Bario area, farming is expected to remain the main source of subsistence for the Kelabit Highland residents. The majority of crops grown in the Kelabit Highlands are for internal consumption. There is a small quantity of agricultural produce that is exported to the urban markets (rice) and family members in the urban areas (rice, salt, pineapples and other wild fruits and vegetables). The quantity of agricultural produce exported for sale in the urban markets has not changed with the building of the road however the quantity of agricultural produce sent to urban based Kelabits has increased.

Land has been cleared for agricultural purposes along sections of the new inter-village roads mainly for alternative crops such as pineapples and cinnamon. Land was devoted to alternative crops before the road networks linked the Kelabit Highlands to Miri as a result of the Kelabit communities been told that if they grow pineapples they would be able to market them in the cities. However this is yet to happen as it is still too expensive to transport the pineapples to the cities. Land is also currently being cleared for livestock. Livestock were raised in the Kelabit Highlands well before the roads were built but it is hoped that the roads will help to increase the livestock industry in the Kelabit Highlands.

The motorbike and 4WD have facilitated agricultural pursuits in the Kelabit Highlands. Both have facilitated with the transporting of farm equipment and produce. Additionally, the motorbike and 4WD reduce the time spent travelling to and from the farm and therefore frees up more time for other pursuits.

There has been no change in the amount of herbicides and pesticides entering the Kelabit Highlands, however there has been an increase in the amount of improved seeds and fertilizers used in the Kelabit Highlands. The average price of farm inputs has increased as a result of the increased use of fertilizer.

The construction of the roads has lead to pollution and damage to the farms and farm buildings. Some of the participants stated that paddy fields are suffering due to the dirt that is disrupted by road use and construction. The dirt pollutes the waterways that feed the paddy fields. Additionally, several participants stated that dust from the roads disturb the natural processes needed for roadside vegetation to grow. One participant declared that road construction had resulted in damage to farm buildings but no compensation has been offered by the road contractor.

The road networks have facilitated the job done by the Department of Agriculture (DoA). The number of visits made by DoA officials has increased. As a consequence of the road networks within the Kelabit Highlands, the DoA officials now have easier access to a greater number of areas and can now reach these places much faster. The roads have also meant that the DoA can import more equipment as the weight of equipment and the transportation costs are less of a restriction. It is believed that equipment such as the recently acquired power tillers that were provided by the DoA would not have arrived in the Kelabit Highlands if it was not for the road.

For 40 years before the road, there had been little to no development in the Kelabit Highlands, but since the road from Miri reached the Kelabit Highlands, development has increased at a high rate. The development and construction included government infrastructure, private housing and the clearing of land for alternative agricultural pursuits. Almost all the development of government infrastructure has occurred in Bario. Pa Dalih has experienced an increase in private construction but very little other development. Pa Lungan has experienced no increase in private construction and no government funded development.

The main reason for the large increase in development and construction is due to the increased accessibility of Miri. The road has made it easier and cheaper to transport construction materials such as cement, bricks, roofing iron and plywood from Miri to Bario. Furthermore, the road has made it cheaper to bring in machinery such as trucks, rollers and diggers.

The majority of participants from the Bario interviews stated that the development projects in Bario are a positive outcome of the roads for the Kelabit community; whereas a number of the urban based participants stated that the same development projects in Bario are in fact a negative outcome of the roads. The difference between the two research sites seemed to be based on the fact that many of the Bario participants saw the development projects as a modernisation of the Kelabit Highlands that would benefit the Kelabit Highlands, both socially and economically; however some of the urban based participants saw the development projects as the breakdown of the traditional Kelabit culture and way of life. These differences demonstrated how those that live in the Kelabit Highlands and those urban based Kelabits who only visit the Kelabit Highlands on their holidays or special occasions have a different understanding of Bario and have different views on how they would like to see Bario in the future. The two different views have the potential to lead to tension between the two groups as one group (urban based Kelabit) has a greater level of influence over the decision making for development projects in the Kelabit Highlands.

The Kelabit community in Bario has experienced a growth in individualism since it was officially announced that work would start on the road that would connect Bario with Miri. It was stated by a large number of the Bario participants that there has been a move away from the traditional communal systems and an increase in the level of individualism

amongst the locals. Two major concerns emerged. One of the major concerns was that there was a large amount of arguing that was occurring over newly accessible land along the road side. The other concern is that individual community members are taking all the government contracts that in the past were issued to entire longhouses/villages and therefore other community members miss out on possible employment and payment.

Modernisation in the Kelabit Highlands has been facilitated by the road between Miri and the Kelabit Highlands and the inter-village roads. Walking, which was the traditional mode of transportation is decreasing as vehicle transportation replaces it. The increase in vehicle use within Bario has lead to changes in the way people interact with each other while travelling between locations. It was stated in the interviews that back when most people used to walk around Bario, people used to stop, chat and share information but now many people just drive past each other with very minimal interaction.

Education in the Kelabit Highlands has had minimal changes as a result of the construction of the road to Miri and the inter-village roads. Hettige (2006) correlated studies from Sri Lanka, Indonesia and the Philippines and found that roadside communities had higher educational attainment than non-roadside communities. Gibson and Rozelle (2003) found that areas of Papua New Guinea that had the poorest road quality and the longest travel times to reach the schools had the highest number of residents who never attended school and had the lowest levels of literacy. If these findings were to be reflected in the Kelabit Highlands, then it would be expected (especially in Pa Dalih) that the new or upgraded roads in the Kelabit Highlands would increase enrolment and attendance rates, decrease drop out rates and improve grades (through higher literacy levels). However, there were no substantial changes in grades. The roads had had no influence on the enrolment rate, dropout rate or absenteeism in the schools in Bario. It was stated by school officials in Bario that the dropout rate and absenteeism at the Bario schools was almost non-existent amongst the Kelabit children before the construction and upgrading of the roads and it remained the same after the construction and upgrading of the roads. The reason given for this was that the children that had received easier access between their family homes and the schools from the new or upgraded roads were boarding at the schools and therefore their journey to school each day was unaffected by the roads. The primary school in Pa Dalih had also experienced no change in absenteeism and in the dropout rate however the number of students enrolled at the school had dropped dramatically. After the road from Miri reached the Central Kelapang area, there was an increase in migration to the urban centres and as a result, the enrolment rate at the primary school in Pa Dalih has dropped by 30%.

The inter-village roads have made it easier for the children who board at the schools and travel to their home villages every second weekend and on some school holidays to get home and back to school again. The upgrading of the roads within Bario is expected to help the children who live in Bario to get to school each day.

One benefit that all three schools stated was that school supplies now come up to the schools from Miri via the road. The roads have made it easier to bring up school supplies which meant that more school supplies could be brought up at one time. This has meant that school supplies have become cheaper and therefore the schools can spend the money they have saved on other school related items and activities.

The construction and upgrading of the road networks into and around the Kelabit Highlands have had minimal impacts on the healthcare services in the Kelabit Highlands. Furthermore the road networks played almost no influence on the use of the healthcare services by local residents. Pa Lungan residents who had no road did state however that they would use healthcare services more frequently if there was a road between Pa Lungan and the closest healthcare facility in Bario.

The reported vehicle related accidents on the roads in 2004 before the upgrading and construction of the roads stood at zero and it remains the same in October 2010. One concern that arose several times during the Bario interviews was that once the Bario roads had been concreted, the speed of vehicles using the road would increase and therefore endangering all the road users (especially the children and elderly)

With increased accessibility to goods from the urban areas, there is a major concern within the Kelabit community that illegal drugs will infiltrate the Kelabit Highlands. However the police in Bario currently state that there are no illegal drugs in the Kelabit Highlands. Many of the Kelabit community members are also worried about the quantity of alcohol that has become available in Bario. Since alcohol became more abundant, many of the residents of Bario had witnessed an increase in anti-social behaviour and gambling.

As far as other undesired behaviours are concerned, there is no prostitution, theft which existed before the road to Miri was constructed remains at the same level, the level of physical violence remains very low and the police cells have still yet to be used. There were however undesired behaviours that had increased as a result of the road. The undesired behaviour that got the most emphasis was the heavy arguing over roadside land.

One of the largest concerns for the Kelabit community was that the increased accessibility 'outsiders' had to the Kelabit Highlands would result in negative influences and impacts on the Kelabit Highlands. The most commonly stated negative impact the road from Miri has had on the Kelabit Highlands was that 'outsiders' are now coming into the Kelabit Highlands and are hunting illegally. The illegal hunting has made it difficult for local hunters to find game and made hunting sustainably impossible. Additionally, as those conducting illegal hunting do not declare where their hunting, it can be very dangerous for locals to travel around the jungle. Another major concern that arose in the interviews was that 'outsiders' bring things with them to the Kelabit Highlands that can alter or damage the Kelabit culture and way of life.

Road construction and use in the Kelabit Highlands has resulted in water, air and rubbish pollution as well as deforestation and a loss of wildlife. The road construction and use has resulted in the polluting of waterways with erosion and road run-off. Additionally, dust from the road creates air pollution and can cover roadside vegetation. The roads have also indirectly damaged the environment as activities that are performed along the roads such as logging and land clearing lead to deforestation, erosion and the loss of wildlife.

As much as the Kelabit community appreciate the benefits the road between Miri and Bario have brought for the community, many are very disappointed that it has occurred at the cost of the environment. Almost all of the participants stated that they were against commercial logging. A few of the participants, although strongly opposed to commercial logging, accepted that without commercial interests in the Kelabit Highlands, the road would not have been constructed. For this reason, those participants accept the logging in the Kelabit Highlands as a necessity to the modernising of the villages within the Kelabit Highlands. Nevertheless, the majority of participants stated that they wanted the Government to take over the maintenance of the road.

Furthermore, road construction has altered the look of the landscape. The Kelabit people are generally closely tied to the land and often have strong spiritual and emotional connections to areas in the Highlands. As a consequence, there are a number of members of the Kelabit community that are upset by the roads impairing their spiritual or emotional connection to the landscape.

Similarly, the roads have increased the accessibility of urban goods to the Kelabit Highland residents. One outcome of this increased accessibility to urban goods is that the roadside villages are becoming more modernised. As the villages continue to acquire more urban goods and modern infrastructure, the villages lose their 'traditional feel'. For some of the Kelabit community, their spiritual or emotional connection to the Kelabit Highlands is tied to the 'traditional feeling' of the Kelabit Highlands and therefore the modernising of the villages impairs their spiritual or emotional connection to the Kelabit Highlands.

Once the road is constructed, it needs regular maintenance to help prevent or lessen erosion. This is not happening on the logging roads that are not currently being used for timber extraction, nor is it happening on the inter-village roads within the Central Kelapang area and between the Central Kelapang area and the Bario area. As a consequence, many areas along the roads have become dangerous or have the potential to become dangerous if maintenance is not carried out soon. The lack of maintenance on the roads is a major concern for a large number of the Kelabit community in the Kelabit Highlands. On the other hand, the majority of the Bario roads are currently being maintained or upgraded to concrete. The majority of the Bario residents are believed to be in support of the upgrading of the Bario roads and are thankful of the Government for funding its construction.

This study has examined the perceptions of a diverse group from the Kelabit community and found that the opinions and perceptions of the Kelabit community were very diverse when it came to the impacts from the construction of the logging road, the inter-village roads and the upgraded roads in Bario.

The main design of this research was to analysis four research groups from the Kelabit community (residents from Bario, Pa Dalih, Pa Lungan and the urban centres). These groups were chosen because it was hypothesised (refer to section entitled 'Hypotheses for Community Interviews' in the Research Structure chapter) that the opinions and the impacts that were experienced would be different for each group due to their interaction with the roads and the characteristics of the groups and their places of residence. These hypotheses were verified as the impacts from the construction and upgrading of the roads did in actual fact affect different villages in different ways, just as it affected different demographic groups within the villages in different ways.

The opinions of the participants and the rates of road use varied largely between the three villages in the study. The participants from Bario were divided on whether they were in favour of the logging roads existence whereas there was an overwhelming bias in favour of the continuing existence of the road from the residents of Pa Dalih largely because the residents of Pa Dalih rely on the road for their personal mobility and the mobility of goods to a larger degree than the residents of Bario. Many of the participants from Bario still preferred to use air travel as their main form of transportation to destinations outside of the Kelabit Highlands. For Pa Dalih residents, the choice to use air travel still involved travelling to Bario, usually by 4WD. The Pa Dalih residents therefore, need to use the roads anytime they are travelling to the urban centres of Sarawak, Malaysia. These results support the hypotheses.

The residents of Pa Lungan on the other hand who have no direct access to the logging road, had very little to say about the road. In fact, the overwhelming consensus in Pa Lungan was that as the road did not reach them, the road had no relevance to them and therefore they had no opinion on the logging roads existence. It would appear in the Kelabit Highland context that the opinions on the impacts of the road networks therefore depend on the rate of use, experience and the level a village relies on the roads. This also supports the hypotheses.

What was not hypothesised before the research took place was that the majority of the residents could be split into a further three groups based on a plurality of interest in the development projects. The first group were those with economic interests in the development of the Kelabit Highlands. Those community members in this group usually held some influence or attempted to influence decision making on the development projects in the highlands. This group was made up almost solely of residents from Bario and the urban centres. The second group was the largest amongst the participants and was made up of those that had no influence on the decision making of development projects

and/or had little to no knowledge of the development projects but appreciated the development because the majority of it made life easier in the highlands. This group was spread throughout all of the research sites and was mostly made up of farmers and the pensioners who had returned to the highlands from the urban centres. The first two groups view development in the highlands as a positive outcome for the Kelabit community however the final group does not. The final group were those that romanticised about the traditional culture and way of life in the Kelabit Highlands and desired that the highlands remained unchanged. Although this group desired little to no development in the highlands, the development of healthcare and education in the highlands was an exception. This group had members that ranged from those that had influence through to those that had none. The majority of this group were from the urban centres. The interviews in this study revealed a small level of tension between the first and third groups however there is a strong possibility that this tension could result in conflict within the community in relation to the ways in which future development in the Kelabit Highlands can take place.

This thesis exhibited as many of the impacts caused by the roads as appeared during this study, however it would be interesting to examine the scenario in later years as there are many other factors that will appear in the near future. Three of the most important questions that should be considered are –

What will happen when the logging operations end in the highlands and the logging companies no longer maintain the road to Miri?

What benefits or harm will the residents of Bario experience once the upgrading of the Bario roads is complete?

Will tensions over future development in the Kelabit Highlands result in conflict amongst the Kelabit community?



Fig 35. The sun sets over the Kelabit Highlands.

References

- Adger, W. N., Kelly, P. M., Winkels, A., Huy, L. Q., & Locke, C. (2002). Migration, Remittances, Livelihood Trajectories, and Social Resilience. *AMBIO: A Journal of the Human Environment*, 31(4), (358-366).
- Amster, M. H. (1998). *Community, Ethnicity, and Modes of Association Among the Kelabit of Sarawak, East Malaysia*. Ph.D Dissertation, Brandeis University.
- Amster, M. H. (2006). Narrating the Border: Perspectives from the Kelabit Highlands of Borneo. In A. a. W. Horstmann, R.L. (Ed.), *Centering the Margin: Agency and Narrative in Southeast Asian Borderlands*. U.S.A: Barghahn Books.
- Amster, M. H. (2008). The Social Optics of Space: Visibility and Invisibility in the Borderlands of Borneo. *Space and Culture*, 11, (176-196).
- Ananta, A., Anwar, E. N., & Miranti, R. (2001). *Age-Sex Pattern of Migrants and Movers: A Multilevel Analysis on an Indonesian Dataset*. Asian Meta Centre Research Paper 1. National University of Singapore. Singapore.
- Bala, P. (2002). *Changing Borders and Identities in the Kelabit Highlands: Anthropological Reflections on Growing Up in a Kelabit Village Near the International Border*. Kuching, Malaysia: Unit Penerbitan Universiti Malaysia Sarawak.
- Bala, P., & Harris, R. (2008). Potential Users Profile and Existing Communication Pattern among the Rural Community of Bario: A Need Analysis for the Development of a Telecentre. Retrieved 10/02/2010, from www.unimas.my/ebario/paperwork4.html
- Barbieri, A. F., & Carr, D. L. (2005). Gender-specific Out-migration, Deforestation and Urbanization in the Ecuadorian Amazon. *Global and Planetary Change*(47), (99-110).
- Barrios, E. B. (2008). Infrastructure and Rural Development: Household Perceptions on Rural Development. *Progress in Planning*(70), (1-44).
- Barwell, I. (1996). *Transport and the village, findings from African Village-level travel and transport surveys and related studies*. Sub-Saharan Africa Transport Policy Program (SSATP Working Paper No.23)
- The World Bank and Economic Commission for Africa.
- BIDS. (2004). *Poverty impact of rural roads and market improvements and maintenance project of Bangladesh*. Dhaka: Bangladesh Institute of Development Studies.
- Binswanger, H. p., Khandker, S.R., and Rosenzweig, M.R. (1993). How Infrastructure and Financial Institutions Affect Agricultural Output and Investment in India. *Journal of Development Economics*, 41, (337-366).
- Bravo, A. (2002). The Impact of Improved Rural Roads on Gender Relations in Peru. *Mountain Research and Development*, 22(3), (221-224).
- Bryceson, D. F., Bradbury, A., & Bradbury, T. (2008). Road to Poverty Reduction? Exploring Rural Roads Impact on Mobility in Africa and Asia. *Development Policy Review*, 26(4), (459-482).
- Bryceson, D. F., & Howe, J. (1993). Rural Household Transport in Africa: Reducing the Burden on Women? *World Development*, 21, (1715-1728).
- Bulan, L., & Labang, D. (1979). The Kelabit Harvest. *Sarawak Museum Journal*, 48(new series), (43-52).
- Chief Minister of Sarawak. (2010). Real Sarawakians in 1Malaysia. *Speeches*. Retrieved from <http://chiefministertaib.sarawak.gov.my/en/media-centre/speeches/view/real-sarawakians-in-1malaysia>
- Cleary, M., & Eaton, P. (1992). *Borneo: Change and Development*. New York: Oxford University Press.
- Dalkmann, H., Hutfilter, S., Vogelpohl, K., & Schnabel, P. (2008). Sustainable Mobility in Rural China. *Journal of Environmental Management*, 87(2), (249-261).
- Dawson, J., & Barwell, I. (1993). *Roads Are Not Enough*. London: Intermediate Technology Publications.

- de Haan, A., & Rogaly, B. (2002). Introduction: Migrant Workers and Their Role in Rural Change. *Journal of Development Studies*, 38(5), (1-14).
- Department of Agriculture Sarawak. (2009). Official Website of Department of Agriculture Sarawak, from <http://www.doa.sarawak.gov.my/>
- Dickens, P. (1991). *SAS The Jungle Frontier: 22 Special Air Service Regiment in Bario Campaign 1963-1966*. London: Arms and Armour Press.
- Downing, A., & Sethi, D. (2001). *Health Issues in Transport and the Implications for Policy*: Department for International Development (DFID).
- Eghenter, C., & Langub, J. (2008). Past Meets Future: A Trans-border forum for a sustainable future for the Highlands of Borneo. *Borneo Research Bulletin*(Jan).
- Ensor, T., & Cooper, S. (2004). Overcoming Barriers to Health Service Access: Influencing the Demand Side. *Health Policy Plan*, 19(2), (69-79).
- Entikin, N. (1990). *The Betweenness of Place: towards a geography of modernity*.: Basngstoke: Macmillan.
- Fernando, P., & Porter, G. (2002). *Balancing the Load: Women, Gender and Transport*. London: Zed.
- Gibson, J., & Rozelle, S. (2003). Poverty and Access to Roads in Papua New Guinea. *Economic Development and Cultural Change*, 52(1), (159-185).
- Grootaert, C. (2002). *Socioeconomic Impact Assessment of Rural Roads: Methodology and Questionnaires*. A comissioned work for the Roads and Rural Transport TG and the Transport Economics and Poverty TG.
- Harrisson, T. (1954). Outside Influence on the Upland Culture of Kelabits of North Central Borneo. *Sarawak Museum Journal*(6), (104-120).
- Harrisson, T. (1959). *World Within: A Borneo Story*. Singapore: Oxford University Press.
- Hernan, L. (1996). *Morocco: Socioeconomic Influence of Rural Roads*. Washington D.C.: Impact Evaluation report, Operations Evaluations Department, World Bank.
- Hettige, H. (2006). *When Do Rural Roads Benefit the Poor and How?* : Asian Development Bank.
- Hew, C. S. (2003). The Impact of Urbanization on Family Structure: The Experience of Sarawak, Malaysia. *SOJOURN*, 18(1), (89-109).
- Hong, E. (1987). *Natives of Sarawak: Survival in Borneo's Vanishing Forests*. Malaysia: Institut Masyarakat.
- Hugo, G. (1982). Circular Migration in Indonesia. *Population and Development Review*, 8(1), (59-84).
- Jacoby, H. G. (2000). Access to Markets and the Benefits of Rural Roads. *The Economic Journal*(110), (713-737).
- Jiwan, D., Paul Chai, P.K., Teo, G.K., Jiwan, M. (2006). *Intergrated Highland Development in Bario, Sarawak, Malaysia: An Overview*. Paper presented at the International Symposium: Towards Sustainable Livelihoods and Ecosystems in Mountainous Regions., Chiang Mai, Thailand.
- Johnston, D. C. (2007). These Roads Were Made for Walking? The Nature and Use of Rural Public Transport Services in Garut Regency, West Java, Indonesia. *Singapore Journal of Tropical geography*, 28, (171-187).
- Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (2000). *The Dictionary of Human Geography 4th ed*. Oxford, UK: Blackwell Publishers Ltd.
- Kedit, P. M. (1994). Cultural Symposium II: An Agenda for Cultural Readaption. *Sarawak Museum Journal*, 68(new series), (1-6).
- Khandker, S. R., Bakht, Z., & Koolwal, G. B. (2009). *The Poverty Impact of Rural Roads: Evidence from Bangladesh*. U.S.A: University of Chicago.
- KKLW. (2010). Rural Roads Programme (JALB) Retrieved 09/09/2010, from www.rurallink.gov.my/rural_road
- Kreager, P. (2006). Migration, Socila Structure and Old-age support networks: a comparison of three Indonesian Communities. *Ageing and Society*(26), (37-60).
- Kreutzmann, H. (1991). The Karakoram Highway: The Impact of Road Construction on Mountain Societies. *Modern Asian Studies*, 25(4), (711-736).

- Lee, B. T., & Shamsul Bahrin, T. (1992). Mobilizing the Unmobilized Interior of Sarawak: Patterns of Outmigration in the Baram Valley. *Malaysian Journal of Tropical Geography*, 23(2), (61-68).
- Leinbach, T. R. (2000). Mobility in Development Context: Changing Perspectives, new interpretations and the real Issues. *Journal of Transport Geography*, 8, (1-9).
- Lim, L. L., & Oishi, N. (1996). International labor migration of Asian women: Distinctive characteristics and policy concerns. *Asian and Pacific Migration Journal*, 5(1), (85-116).
- Lucas, K., Rutachokozibwa, V., & Tagora, E. (1995). *The Njombe-Makete Road: An Impact Assessment of an ATAP Funded Road Improvement Project*. Dar es Salaam, Tanzania: Mimeo.
- Mahapa, S. M., & Mashiri, M. (2001). Social Exclusion and Rural Transport: Gender aspects of a road improvement project in Tshitwe, Northern Province. *Development Southern Africa*, 18(3), (365-376).
- Malaysian Government. (2000). *Yearbook of Statistics Sarawak*. Kuching: Department of Statistics, Sarawak branch.
- Malaysian Government. (2001). *Year Book of Statistics 2000*. Malaysia: Department of Statistics,.
- Malaysian Government. (2009). Second Economic Stimulus Package Retrieved 03/12/2010, from www.rangsanganekonomi.treasury.gov.my/index.php?option=com_content&view=article&id=59&Itemid=78&lang=en
- Malaysian Government. (2010). *GTP Roadmap*. Malaysian Government.
- Malaysian Government. (2011). *Population and Housing Census of Malaysia: Preliminary Count Report 2010*. Malaysia.
- Matin, N., Mukib, H. B., & Khanam, D. (2002). Women's Empowerment and Physical Mobility. In P. P. Fernando, G. (Ed.), *Balancing the Load: Women, Gender and Transport*. London: IFRTD/Zed Books.
- Minot, N., Baulch, B., & Epprecht, M. (2006). *Poverty and Inequality in Vietnam: Spatial Patterns and Geographic Determinants*. Washington D.C.: Research Report 148. International Food Policy Research Institute.
- Mohamad, D. S. D. M. (1991). *Vision 2020: The Way Forward*. Paper presented at the The Way Forward presented by His Excellency YAB Dato' Seri Dr Mahathir Mohamad, Malaysian Business Council. www.pmo.gov.my/?menu=page&page=1898
- Molesworth, K. (2005). *Mobility and Health: The Impact of Transport Provision on Direct and Proximate Determinants of Access to Health Services: A pre-draft for Discussion and Development*. Swiss Tropical Institute.
- Olsson, J. (2009). Improved Road Accessibility and Indirect Development Effects: Evidence from Rural Philippines. *Journal of Transport Geography*(1), (476-483).
- Peters, D. (2002). Gender and Transport in Less Developed Countries: A Background Paper in Preparation for CSD-9. Retrieved from www.earthsummit2002.org/workshop
- Poey, K. C. (1990). Problems and prospects of commercial-scale Agricultural Development in Sarawak. In A. M. M. Salleh, H. Solhee & M. Y. Kasim (Eds.), *Socio-economic development in Sarawak: policies and strategies for the 1990s*. Kuching, Sarawak: Angkatan Zaman Marsang (AZAM).
- Porter, G. (2002). Living in a Walking World: Rural Mobility and Social Equity Issues in Sub-Saharan Africa. *World Development*, 30(2), (285-300).
- Resident's Office Miri Divison. (2005). *A Report on the Development of a Highlands Agropolis for Sarawak in Bario Kelabit Highlands*. Miri Division.
- Resurreccion, B. P. (2005). Women In-between: Gender, Transnational and Rural-Urban Mobility in the Mekong Region. *Gender Technology and Development*, 9(1), (31-56).
- Rigg, J. (1998). Rural-urban Interactions, Agriculture and Wealth: A Southeast Asian Perspective. *Progress in Human Geography*, 4(22), (497-522).
- Rigg, J. (2002). Roads, marketization and social exclusion in Southeast Asia. What do roads do to people? In L.-e. V. Bijdragen tot de Taal- (Ed.), *On the road: The social impact of new roads in Southeast Asia* (Vol. 158, pp. (619-636)).

- Rigg, J. (2006). Land, Farming, Livelihoods, and Poverty: Rethinking the Links in the Rural South. *World Development*, 34(1), (180-202).
- Rigg, J. (2007). Moving Lives: Migration and Livelihoods in the Lao PDR. *Population, Space and Place*(13), (163-178).
- Rodger, C. (2005). *A Case Study of Ecotourism in the Kelabit Highlands: Is it Sustainable?* Masters, Lund University, Sweden.
- Rousseau, J. (1989). The People of Central Borneo. *Sarawak Museum Journal*, 61(new series - Part III), (7-18).
- Saging, R. L., & Bulan, L. (1989). Kelabit Ethnography: A Brief Report. *Sarawak Museum Journal*, 61(new series - Part III), (89-118).
- Seling, D., & Langub, J. (1989). The Orang Ulu: An Overview. *Sarawak Museum Journal*, 61(new series - Part III), (19-36).
- Soda, R. (2003). Development Policy and Human Mobility in a Developing Country: Voting Strategy of the Iban in Sarawak, Malaysia. *Southeast Asian Studies*, 40(4), (459-483).
- Tarawe, J. (n.d.). e-Bario: The Kelabit Gift to Malaysia, from http://i4donline.net/ATF/2007/fullpapers/John_ATF07ABS115.pdf
- Thong, L. B., & Bahrin, T. S. (1993). The Bario exodus: A conception of Sarawak urbanization. *Borneo Review*, 4(2), (113-128).
- Tsunokawa, K., & Hoban, C. (1997). *Roads and the Environment: A Handbook*. Washington, DC.: World Bank, Technical Paper No 376. The World Bank.
- UNDP. (2001). Land transport and HIV Vulnerability: A Development Challenge. UNDP South East Asia HIV and Development Project. . Retrieved from
- Warr, P. (2008). How Road Improvement Reduces Poverty: The Case of Laos. *Agricultural Economics*(39), (269-279).
- Windle, J., & Cramb, R. A. (1997). Remoteness and Rural Development: Economic Impacts of Rural Roads on Upland Farmers in Sarawak, Malaysia. *Asia Pacific Viewpoint*, 38(1), (37-53).
- Windle, J., & Crumb, R. A. (1999). Roads, remoteness and rural development: Social impacts of rural roads in upland areas of Sarawak. In K. V.T. (Ed.), *Rural development and social science research: Case studies from Borneo*. Williamsburg: Borneo Research Council.
- World Bank. (1996). Kingdom of Morocco Impact Evaluation Report: Socioeconomic Influence of Rural Roads. Fourth Highway Project. Retrieved from
- World Bank. (2001). *Poverty Reduction Strategies Sourcebook*. Washington DC: World Bank.