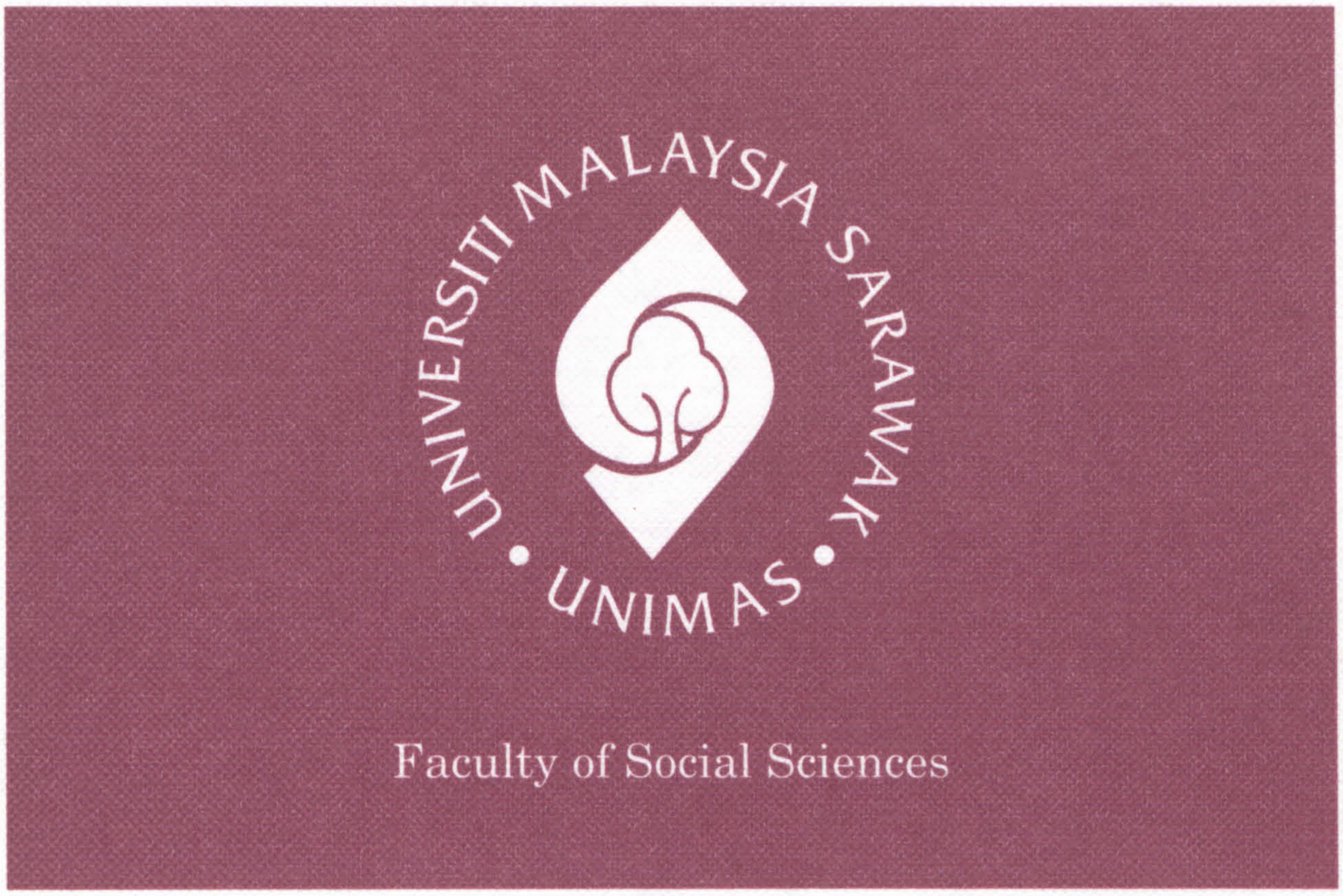

RURAL ROAD NETWORKS AND THEIR ROLES IN ALLEVIATING POVERTY AMONG LOCAL COMMUNITIES IN BAU - LUNDU AREAS KUCHING DIVISION

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Master of Environmental Management
(Development Planning)
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RURAL ROAD NETWORKS AND THEIR ROLES IN ALLEVIATING POVERTY AMONG LOCAL COMMUNITIES IN BAU-LUNDU AREAS KUCHING DIVISION

by

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ABSTRACT

Introduction

Rural development is of high priority for Sarawak, as majority of the population, and mostly of the poor, is living in the rural areas. However, the progress and development programs to these rural areas are always impeded by the lack of proper infrastructure and amenities like efficient road network for transportation and communication. The standard of living for the rural poor, who comprises of mostly the local indigenous communities, are also far from desired when compared with the quality of life of the urban populations.

Economic linkages between transport and poverty are prominent in easing the burden of poverty. It has been observed that efficient transport will reduce poverty, mainly by increasing economic efficiency. As such, efficient transport networks and rural roads are closely related to the living condition of the poorer rural populations.

The contributions of transport operations to poverty alleviation include the increase in the efficiency of resource allocation, the market performance, the flexibility of adjustments and the fostering of economic growth. Poverty are also closely linked to the accessibility of amenities like schools, health clinics, access to economic, employment and social opportunities. As such, there is a need to strengthen the direct role of road networks, accessibilities and transport interventions in poverty alleviations.

Scope of the study

This dissertation studies the role of roads, transport and accessibilities in poverty alleviation, their impacts on the socio-economic status of the local communities, and the social impact assessment of rural roads in the Bau-Lundu areas of the Kuching Division in Sarawak. The study wishes to achieve the following objectives of: -

- *To study the quality of life and socio-economic status of the various local communities along the trunk road and other categories of rural roads in Bau-Lundu areas (General objective);*

- *To study the effectiveness of the different types of roads in Bau-Lundu areas in overcoming the problems of inaccessibility to the rural communities (Specific objective 1);*

- *To estimate the household incomes of residents by the type of road access in Bau-Lundu areas (Specific objective 2);*

- *To study the perceptions of the various local communities along the different types of roads in Bau-Lundu areas towards the current infrastructure developments (Specific objective 3).*

The dissertation is arranged in five chapters with Chapter One on the detailed description on the background of the study, its scope, and the study objectives.

Chapter Two enlists the literature reviews on relevant references and materials pertaining to the effects of road accessibilities on socio-economic impacts and poverty of the rural communities. Chapter Three describes the methodologies deployed in the survey and assessment of the socio-economic impact by rural roads. Chapter Four is the detailed data analysis and discussions on the various attributes of the rural communities affected by rural roads, and Chapter Five presents the concluding comments and statements by the author, based on the scientific researches carried out on the topic.

The study area

Surveys were carried out along the different types of roads in the Bau-Lundu Districts of Kuching Division, with the aim of studying and comparing on the quality of life and standard of living of the rural people living along these roads. Bau and Lundu are two of the many districts in Sarawak, with multi racial populations mainly on agricultural activities. The majority of the local people are Bidayuh, with some Chinese, Malay and Iban. Trunk roads are linking the Lundu town with Kuching via Bau town, and other types of roads like development roads and feeder roads linking all interior villages and communities. Generally, road accessibilities in the study area are considered as efficient and good.

Literature review on the study and survey approaches

Chapter Two has the details on the substantial researches from books, materials, journals, publications from professional institutions, reports from relevant agencies

and dialogue sessions with key informants were carried out in order to gain sufficient information on the issues under study and the concepts on how best to study into the impacts of poverty, accessibility on people, e.g. social impact assessment (SIA). Numerous site visits were also carried out with local government officials to gain first hand news on the characteristics of the people and localities.

Methodology used in the survey

As detailed in Chapter Three, the survey carried out interviews, observations, discussions and questionnaire surveys on the local people and study area. Data collected are processed and analyzed by SPSS for efficient diagnosis of results. A value-grading scheme based on the quality of life and standard of living of the people to derive at a quality-index is used to compare the different standards of living along the different types of access roads.

Data analysis and discussion on results

Data gathered from the survey were analyzed and presented in Chapter Four. General characteristics on the study area and conditions of the existing access roads are described in Part 4.1. Besides the general statistics of the local communities on their distributions by race, locations, household size, academic performances, standard of living are as in Part 4.2. The road system in the study area, as well as their development patterns are detailed in Part 4.3, whereby the effects of such roads on accessibility are described in Part 4.4.

Respondents were asked of their perceptions on roads and accessibility on their opportunities. Majority of the respondents agreed that better accessibilities enable them to enjoy more opportunities economically, on employment, on education, and improved standard of living and better quality of life.

However, analysis tests shown that the quality-index on the standards of living of the different groups of residents along the different types of roads varied and are significantly different. This was based on the level of their availabilities on the basic household facilities at their residence. By similar approach, the monthly incomes of the communities residing along the different types of roads are also significantly different.

General conclusions from the study

By the data analysis done on the information gathered from the survey, it can be seen that roads and accessibilities have sound effects on the quality of life and standard of living on rural communities in the study area. People living better roads are able to enjoy better opportunities, better standard of living and better accesses to facilities provided by the government like medical services, educations, businesses and employment opportunities.

A strengths-weaknesses-opportunities-threats (SWOT) analysis was carried out based on the data collected from the respondents and their perceptions on their current lives, it can be seen that there are more *strengths* than *weakness* brought to the local communities through roads and accessibilities, and there are more *opportunities* than

threats encountered by the people as they are now able to enjoy better facilities and opportunities available in local towns and nearby urban areas.

To conclude, the survey has successfully achieved its initial study objectives in analyzing the roles and effects of roads on the rural local communities.

ABSTRAK

Pengenalan

Pembangunan luar-bandar merupakan satu keutamaan di Sarawak memandangkan kebanyakan daripada penduduknya tertumpu di situ dan rata-ratanya tinggal di bawah garis kemiskinan. Walau bagaimanapun, pencapaian dan pembangunan program ini agak terbatas kerana kekurangan kemudahan infrastruktur dan perkhidmatan seperti rangkaian jalan-raya yang efisyen bagi tujuan pengangkutan dan komunikasi. Tahap kehidupan penduduk di kawasan luar-bandar yang rata-ratanya merupakan penduduk setempat jauh ketinggalan berbanding dengan kualiti kehidupan penduduk di kawasan bandar.

Kegiatan ekonomi yang berasaskan kemudahan pergangkutan merupakan salah satu daripada usaha untuk mengurangkan kadar kemiskinan. Dengan adanya jaringan pengangkutan yang efisyen, ia dapat mengurangkan kadar kemiskinan di kalangan penduduk setermpat. Oleh itu, jaringan kemudahan pengangkutan yang efisyen dan pembangunan jalan-raya di kawasan luar bandar mempunyai hubungkait yang rapat dengan tahap kehidupan penduduk setempat yang mundur di kawasan luar-bandar.

Peruntukan sumber secara efisyen, pertumbuhan pasaran, keupayaan untuk menyesuaikan strategi dengan pasaran semasa dan pengukuhan pertumbuhan ekonomi merupakan antara sumbangan-sumbangan pengoperasian kemudahan pengangkutan yang efisyen dalam usaha mengurankan kadar kemiskinan setempat. Kimiskinan juga mempunyai hubungan yang rapat dengan kemudahan-kemudahan seperti sekolah,

klinik kesihatan, peluang pekerjaan dan peluang-peluang sosial yang lain. Oleh itu, adalah menjadi satu keperluan untuk mengukuhkan peranan dan fungsi jaringan jalan raya bersama-sama dengan kemudahan-kemudahan lain bagi mengurangkan kadar kemiskinan setempat.

Skop kajian

Tujuan kajian ini adalah untuk mengkaji peranan jalan-raya, kemudahan pengangkutan dan
kaitannya dengan pengurangan kadar kemiskinan, implikasinya terhadap status sosial ekonomi penduduk setempat dan implikasi sosial jalan-raya luar bandar di kawasan Bau-Lundu, di bahagian Kuching, Sarawak. Objektif kajian ini adalah untuk:

- *Mempelajari kualiti kehidupan dan status sosial ekonomi masyarakat setempat di sepanjang jalan 'trunk'dan jalan-raya luar bandar di kawasan Bau-Lundu (Objektif Am);*
- *Mempelajari keberkesanan kepelbagaian jenis jalan-raya yang berbeza di kawasan Bau-Lundu dalam usaha menangani masalah kesukaran hubungan dengan penduduk setempat (Objektif Khusus 1);*
- *Menganggarkan jumlah pendapatan isi rumah penduduk setempat yang dapat dihubungkan dengan rangkaian jalan-raya (Objektif Khusus 2); dan*
- *Mengenalpasti persepsi masyarakat setempat di sepanjang jalan-raya yang berbeza di daerah Bau-Lundu dengan pembanguna infrastruktur.*

Thesis ini dibahagikan kepada lima bab dengan Bab Satu menjelaskan secara terperinci mengenai latar belakang kajian, skop kajian dan objektif kajian. Bab Dua menyenaraikan kajian semula penulisan yang mempunyai hubungkait di antara keberkesanan jaringan jalan-raya dengan sosio-ekonomi dan kemiskinan penduduk setempat. Bab Tiga pula menerangkan tentang metodologi kajian yang akan digunakan dalam tesis ini bagi menilai sosio-ekonomi masyarakat setempat yang dikaitkan dengan jaringan jalan-raya luar bandar. Bab Empat akan menerangkan secara terperinci tentang hasil kajian dan perbincangan. Bab Lima pula akan merumuskan dan mencadangaknan langkah-langkah yang mungkin boleh dipraktikkan daripada hasil kajian yang dijalankan.

Kawasan kajian

Kajian akan dijalankan di kawasan Bau-Lundu meliputi kepelbagaian jalan-raya yang terdapat di situ bagi tujuan mempelajari dan membandingkan kualiti dan tahap kehidupan masyarakat setempat di kawasan luar Bandar. Kawasan Bau-Lundu merupakan kawasan di mana kepelbagaian masyarakat majmuk di situ melibatkan diri dalam kegiatan pertanian. Majoriti penduduk di kawasan berkenaan adalah Bidayuh, Cina, Melayu dan Iban. Jalan'Trunk' menghubungkan Pekan Lundu dengan Bandaraya Kuching melalui Pekan Bau manakala jaringan jalan raya lain menghubungkan kawasan-kawasan luar Bandar dengan masyarakat setempat. Secara amnya, jalan-jalan raya di situ dapat dikategorikan sebagai baik dan efisyen.

Kajian semula penulisan

Bab Dua menghuraikan secara terperince mengenai kajian terdahulu yang mempunyai kaitan yang rapat dengan kajian ini. Sumber-sumber yang digunakan termasuklah bahan-bahan rujukan, penerbitan oleh badan-badan professional, laporan-laporan daripada agensi-agensi yang berkaitan serta dialog-dialog untuk mengumpul maklumat yang mencukupi untuk menjalankan kajian ini. Lawatan ke atas agensi-agensi kerajaan akan juga diusahakan untuk mendapat maklumat mengenai ciri-ciri masyarakat dan kawasan setempat.

Metodologi kajian

Kajian meliputi temuramah, pemerhatian, perbincangan dan borang soal-selidik yang akan diedarkan kepada masyarakat setempat di mana kajian akan dijalankan. Data yang dikumpul akan diproses dan dianalisis dengan menggunakan perisian SPSS bagi mendapatkan keputusannya. 'Skim Gred Bernilai' yang berasaskan kepada kualiti kehidupan dan tahap kehidupan penduduk akan digunakan untuk menentukan dan membandingkan kualiti indeks kehidupan penduduk setempat yang tinggal di sepanjang kepelbagaian jalan-raya yang terdapat di kawasan kajian.

Hasil kajian dan perbincangan

Data yang dikumpul daripada kajian ini akan dianalisis dan dibentangkan di Bab Empat. Ciri-ciri am kawasan kajian dan keadaan jalan-raya yang terdapat di situ akan diterangkan dalam Bab 4.1. Selain daripada itu, statistik mengenai komuniti setempat

yang berasaskan kaum, lokasi, tahap kemajuan akademik dan tahap kehidupan akan jelaskan dalam Bab 4.2. Bab 4.3 akan menjelaskan kajian mengenai system jaringan jalan-raya manakala Bab 4.4 menjelaskan tentang hubungan and implikasi jalan-raya kepada masyarakat setempat.

Responden juga akan ditanya mengenai persepsi mereka terhadap keadaan jalan-raya dan peluang-peluang ekonomi yang wujud daripada situ. Kebanyakan daripada responden bersetuju iaitu dengan adanya hubungan jalan-raya yang efisyen, mereka akan berpeluang menikmati lebih banyak kegiatan ekonomi, peluang pekerjaan, pendidikan, memperbaiki tahap kehidupan dan seterusnya memperbaiki kualiti kehidupan.

Walau bagaimanpun, analisis menunjukkan indeks kualiti mengenai tahap kehidupan penduduk setempat adalah berbeza mengikut kepelbagaian polirasi penduduk yang tinggal di kawasan rangkaian jaln-raya yang berlainan. Ini adalah berasasakan kepada jenis-jenis peralatan yang dimiliki oleh para penduduk setempat di tempat kediaman mereka. Dengan menggunakan kaedah yang sama, jumlah pendapatan komuniti yang tinggal di sepanjang rangkaian jalan-raya yang berbeza juga mempunyai kelainan.

Kesimpulan am daripada kajian

Melalui data yang dikumpul dan dianalisis dalam kajian ini, adalah didapati bahawa jaringan jalan-raya yang efisyen mampu meningkatkan tahap kehidupan dan kualiti masyarakat setempat. Penduduk yang tinggal di kawasan yang dihubungkan dengan jaringan jalan-raya yang sempurna mempunyai lebih banyak peluang seperti

kemudahan yang disediakan oleh kerajaan seperti pusat kesihatan, pendidikan dan perniagaan mahupun peluang pekerjaan.

Analisis SWOT menunjukkan lebih banyak kekuatan (Strengths) daripada kelemahan (Weaknesses) dalam persepsi penduduk setempat terhadap rangkaian jalan-raya yang menghubungkan mereka dengan kawasan sekeliling. Kajian juga menunjukkan lebih banyak peluang (Opportunities) daripada ancaman (Threats) dengan adanya rangkaian jalan-raya kerana penduduk setempat dapat menikmati kemudahan-kemudahan yang disediakan serta peluang-peluang yang wujud.

Secara kesimpulannya, kajian ini berjaya mencapai objektifnya iaitu menganalisis dan mempelajari peranan dan implikasi rangkaian jalan-raya kepada masyarakat setempat.

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AZAM	Angkatan Zaman Mansang
BIDS	Bangladesh Institute of Development Studies
EIA	Environmental Impact Assessment
FAMA	Federal Agricultural Marketing Authority
FELCRA	Federal Land Consolidation and Rehabilitation Authority
FELDA	Federal Land Development Authority
GDP	Gross Domestic Product
GIS	Geographical Information System
IFPRI	International Food Policy Research Institute
IRRI	International Rice Research Institute
IT	Information Technology
JKKK	Jawatankuasa Kemajuan dan Keselamatan Kampung (Village Development and Security Committee)
JKR	Jabatan Kerja Raya (Public Works Department)
LNG	Liquified Natural Gas
MDB	Majlis Daerah Bau
MIDCOM	Ministry of Infrastructure Development and Communications
MTR	Mid Term Review
NCR	Native Customary Right
NEP	New Economic Policy
PELITA (LCDA)	Land Custody and Development Authority
PIARC	World Roads Association
PMR	Penilaian Menegah Rendah
RES	Rural Electrification Scheme
RRA	Rapid Rural Appraisal
RS	Remote Sensing
SALCRA	Sarawak Land Consolidation and Rehabilitation Authority
SDI	Sarawak Development Institute
SEDC	Sarawak Economic Development Corporation
SESCo	Sarawak Electricity Supply Corporation

Sg	Sungai (River)
SIA	Social Impact Assessment
SMP	Second Malaysia Plan
SPSS	Statistical Package for Social Science
STPM	Sijil Tinggi Persekolahan Malaysia
SPM	Sijil Pelajaran Malaysia
TMP	Third Malaysia Plan
UPSR	Ujian Penilaian Sekolah Rendah

CHAPTER ONE

INTRODUCTION

1.0 Introduction

In developing countries like Malaysia, and our State of Sarawak in particular, rural development is of high priority for the government, as majority of the population, and mostly of the poor, live in the rural areas. However, progress and development programs to these rural areas are always impeded by the lack of proper infrastructure and amenities like efficient road network for transportation and communication.

The standard of living for the rural poor, who compromises of mostly the local indigenous communities, are far from desired when compared with the quality of life of the urban populations. Majority of the rural poor have long been troubled by problems of inequality in the allocation and distribution of resources, inaccessibility due to inefficient rural road network system and poverty.

In order to be efficient in reducing poverty of the rural communities, it is necessary to define what poverty is. Some regard poverty as the sufficiency of resources or abilities to meet their needs, inequality in the distribution of income, consumption or other attributes across the population, and vulnerabilities encountered by the rural households today, or the probability of falling deeper into crisis in the future. The World Bank (2005) has defined poverty as hunger, lack of shelter, being sick and not being able to seek medical treatment, children not having access to school, illiteracies,

lack of employment opportunities, powerlessness, lack of representation in the political scene and lack of freedom.

Economic linkages between transport and poverty are prominent in easing the burden of poverty. It has been observed that transport reduces absolute poverty mainly by increasing economic efficiency, by lowering costs and prices and enhanced opportunities. As such, efficient transport networks and rural roads are closely related to the living condition of the poorer rural populations.

The contribution of transport operation to poverty alleviation is seen in general, as indirect from the broadly based economic development. They include the increase in the efficiency of resource allocation, the market performance, the flexibility of adjustments and the fostering of economic growth. On the other hand, most direct poverty targeted interventions like schools, health clinics, improved access to economic and social opportunities including labor and product markets and other social amenities depend on transport as a complementary input for their effective delivery (Ganon and Liu, 1997). Transport is an intermediate service and it cannot reduce poverty alone.

There is a need to strengthen the direct role of road networks, accessibilities and transport interventions in poverty alleviations. These require the further understanding on the transport needs of the rural poor, and how their needs would be best met.

It is therefore desirable and timely to assess the prevailing views of the role of transport in poverty alleviation, if not its total eradication. This dissertation studies the socio-economic impacts, and the social impact assessment of rural roads in the Bau-Lundu areas of the Kuching Division in Sarawak. Among other things, the essay will also discuss how some of these socio-economic impacts can be related to accessibility.

The dissertation is presented in five chapters where the reader will be led through the findings, discussions and conclusion. Chapter One presents the Introduction of the essay where detail descriptions on the background of the study, its scope, and the study objectives are included. Chapter Two enlists the literature reviews on relevant references and materials pertaining to the effects of road accessibilities on socio-economic impacts and poverty of the rural communities. Chapter Three describes the methodologies deployed in the survey and assessment of the socio-economic impact by rural roads. Chapter Four is the detailed data analysis and discussions on the various attributes of the rural communities affected by rural roads, and Chapter Five presents the concluding comments and statements by the author, based on the scientific researches carried out on the topic.

1.1 Background of study

The rural areas of Sarawak have been lagging behind in terms of real economic development for quite some time, and good network of rural roads has been considered as one of the important factors necessary to bring these regions into the main stream of development, which is also in line with the vision to push Sarawak into a developed state by 2020, in tandem with the other states in Malaysia.

When these regions are linked with all weather sealed roads in the future, the economic potential would be enhanced, notably in the large-scale agricultural of the rural areas. With the anticipated development, it is hoped that the quality of life of the people in the rural areas would improve tremendously (MIDCOM 2005).

As endorsed by the World Bank and as published in its web site PoveryNet (http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/0,,menuPK:336998~pagePK:149018~piPK:149093~theSitePK:336992,00.html), one of the ways for developing countries to respond to poverty and to move forward in achieving the development goals is to strengthen the capacity of the public sector, to improve and enable climate for private sector activity, and to enhance effectiveness in service delivery in human development. All these measures are merely ineffective without good and reliable infrastructures like electricity and water supplies, and rural road networks.

Sarawak, since its independence through the formation of Malaysia in 1963, has progressed and developed tremendously. However, in order to see the effects of such infrastructure development and its targeted alleviation of poverty among the local indigenous communities in Sarawak, a project has been initialized to study, and collect responses from the affected groups, and their personal perceptions towards the impacts of such developments in improving, or alleviating them from their present environment.

1.1.1 Sarawak

Sarawak lies on the northwest coast of the island of Borneo. One of the thirteen states of Malaysia, it covers an area of approximately 124,449 square kilometers, which is nearly the size of the total area of the eleven states of Peninsular Malaysia, from which it is separated by the South China Sea. It has a long coastline but suffers an absence of good harbors.

Located immediately north of the Equator between latitude 0° 50° and 5°N and longitude 109° 36' and 115° 40' E, Sarawak stretches some 800km along northwest coast of the island of Borneo. Sarawak is separated from Peninsular Malaysia to the west by about 600km of South China Sea and directly adjoins the State of Sabah to the northeast where the sultanate of Brunei forms a double enclave. Inland, the State borders with Kalimantan, Indonesia (ICTU, 2005).

Topographically, Sarawak can be divided into three geographical areas, coastal swampy plains, a belt of undulating country and a mountainous interior. The coastal plains, which covers nearly a fifth of the State and extended along most of the coast, are low-lying, badly drained and filled with swampy vegetation. The belt of undulating country varies in width from 32 to 160 kilometers and merges with the mountain ranges of the southeastern fringe of the interior. The greater part of the State is still covered by rain forests and large areas in the interior are still practically uninhabited.

Being just north of the Equator, Sarawak has a hot and humid climate with temperatures ranging from 22° C to 31° C at midday, and high relative humidity.

Rainfall is particularly heavy from December to February with frequent thunderstorms. The mean rainfall is about 254 centimeters but large areas of the State receive from 300 centimeters to 400 centimeters.

As a developing State, Sarawak is well endowed with natural resources. These include agricultural land, fishing resources, huge areas of forest and varied minerals including oil.

Sarawak is a rich state in terms of its forest products but soils are not particularly suited to intensive agriculture although the majority of the population farm for their livelihood. About 75% of the total area of Sarawak or 93,000 square kilometers is at any time under forest cover. Of this, it is estimated that 33% are under permanent forest. Due to its geographical location, tropical rainforest predominates in Sarawak. The forest is generally heterogeneous in nature. It is estimated that about 10% of Sarawak forests are valuable as commercial timber (Malaysian Information Services, 1990).

This study involved populations from two districts, the Bau District and the Lundu District of the Kuching Division. These two districts are selected as they have the geographical characteristics that best describe the general topographical natures of Sarawak, hilly terrains, ravines, low lying flat lands and flowing streams, good residing multi-racial populations of the different indigenous local communities, generally good representation of the socio-economic of the local communities, in terms of economic growth and development, cultural values, academic achievements and social status.

1.1.1.1 Bau

Bau is one of the twenty-eight districts in Sarawak, situated within Kuching Division. It is an inland district about 35 kilometers by road from Kuching. It has an area of 884.40 square kilometers sharing a common border with Kalimantan Barat, Indonesia. The district capital is Bau Town. The location of the town and the boundary of the study area in Bau District are as shown in the locality map in Appendix I.

Bau town is also known as the 'Gold Town of Sarawak' due to its rich gold ore deposits and gold-mining activities in the past. However, gold mining operations in all the mines had ceased before the turn of this century as the remaining gold deposits deep underground was difficult and expensive to extract, making the operation unviable at the present market price for the gold ore.

The district has a multi-racial population with the majority of the people being Bidayuhs. Based on the 1998 population census, the total population is more then 47, 293, and the compositions of the various races are the Bidayuh (79.52%); the Chinese (11.85%); the Malay (8.46%) and other minorities (0.17%). There are forty primary schools in the District, and nine of them with Chinese as the teaching medium. There are also three secondary schools.

Like any other districts in Sarawak, Bau District has an administrative system whereby the community leaders are appointed by the State Government to look after the administration of the area. In the area dominated by the Bidayuh, one Pemanca is

appointed to look after the district and five Penghulu assist him. There are altogether fifty-three Tua Kampungs under the jurisdiction of the five Penghulu. Similar administrative arrangements are exercised in the Chinese community; where one Pemanca, two Penghulu and three Kapitan are appointed to look after 39 Chinese settlements. However, in view of their small population in the district, the Malay community is appointed with only one Penghulu and six Tua Kampung.

1.1.1.2 Lundu

Lundu lays in the western side of Sarawak, on the west bank of the Batang Kayan (Kayan River), the west of Kuching Division, and not far from the South China Sea. It has an area of 1,812.3 square kilometers, and like Bau, it shares a common border with Kalimantan Barat, Indonesia. The district capital is situated at Lundu Town and it has a sub-district at Sematan with Sematan Town as the sub-district center. Lundu is situated approximately 100 kilometer from Kuching, the state capital, and 70 kilometer from Bau. Its sub-district of Sematan is approximately 28 kilometer away. The location of the town and the boundary of the study area in Lundu District are as shown in the locality map in Appendix II.

The symbols of Lundu Town are the Rafflesia and Orchid Normah. This District is perhaps known for the two national parks located close by - Gunung Gading National Park and Tanjung Datu National Park. The former is home to the rafflesia, largest flower in the world. Popular beaches like Pandan, Sematan and Siar are also found here.

According to the 1997 census, Lundu has a population of 30,090 with its multi-racial compositions of Bidayuh, which can be sub-categorized under the different dialects of Jagoi, Selako and Lara, the Chinese, Malay, Iban and other minorities. The Bidayuhs form the majority of the population.

Nearly 90% of the local populations are engaged in agricultural activities, with the planting of cocoa, pepper, paddy, oil pal, and fruits. Some communities residing near the sea have fishing as their main occupation. The development of agricultural activities in the District has benefited tremendously from statutory bodies and agencies like Federal Land Development Authority (FELDA), Sarawak Land Consolidation and Rehabilitation Authority (SALCRA), Federal Agricultural Marketing Authority (FAMA) Organization, Sarawak Economic Development Corporation (SEDC), Land Custody and Development Authority (LCDA), and Federal Land Consolidation and Rehabilitation Authority (FELCRA). Apart from agriculture, other economic activities of the local communities include employment in local timber logging camps, breeding of silk worms, crabs, tiger prawns, and fresh-water pond aquacultures.

1.1.2 The indigenous communities

Sarawak is home to 27 ethnic groups; people each with their own distinct language, culture and lifestyle. Malays, Melanaus, Chinese, and a smaller percentage of Ibans and Bidayuhs who have migrated from their home-villages for work populate cities and larger towns predominantly (ICTU, 2005). Sarawak is rather distinctive from the rest of Malaysia in that there is only a small community of Indians living in the state.

Here are some brief notes on some of the larger ethnic groups of Sarawak residing in the Bau and Lundu areas: -

1.1.2.1 Bidayuh

Bidayuh is one of the main lowland groups that reside in Sarawak, and is the third largest indigenous group. Originally from West Kalimantan, the Bidayuh are now most numerous in the hill country of Bau and Serian, within an hour's drive from Kuching. Historically, as other tribes were migrating into Sarawak and forming settlements, the meek-natured Bidayuh retreated further inland, hence earning them the name of "Land Dayaks" (ICTU, 2005).

There are five main groups, each speaking a different dialect, the two largest being in the Upper Sadong District, and in part of Kuching District. The largest of the other three groups live in the Bau District and the two smallest in Lundu, all in the Kuching Division. Although five groups do speak different dialects, there are many words common to some or all groups, and there are also many Malay and Sea Dayak words in common usage, according, no doubt, to the extent to which the various groups have had contact with these other groups in the past. The Bidayuh are concentrated in the Kuching Division and are largely rural. They are mainly engaged in the cultivation of dry paddy under the 'shifting cultivation' system. Many of the Bidayuh have been converted to Christianity. Typical of the Sarawak indigenous groups, the Bidayuh are well known for their hospitality.

1.1.2.2 Chinese

The Chinese, one of the immigrants groups, first came to Sarawak as traders and explorers in the 6th Century. They form a significant proportion of the population of Sarawak. Today, they make up 29% of the population of Sarawak and comprise of communities built from the economic migrants of the 19th and early 20th centuries (ICTU, 2005).

Although Chinese contacts with Borneo occurred in the last 1,500 years ago, actual Chinese settlement has been concentrated within the last 1330 years. At the time when the first Rajah arrived in Sarawak; the number of Chinese residing here was negligible. From the 1850s, however, Chinese migration was considerable, attracted by the possibilities in commerce and the gold and antimony of the Bau region. The Chinese are concentrated in the Kuching Division, the Sibu-Sarikei-Bintang region of the lower Rejang, and Miri in the Miri Division. They are basically urban but large numbers are also engaged in agriculture.

Through their clan associations, business acumen and work ethic, the Chinese organised themselves economically and rapidly dominated commerce. Today, the Chinese are amongst Sarawak's most prosperous ethnic groups.

The Sarawak Chinese belong to a wide range of dialect groups, the most significant being Hokkien, Foochow, Hakka, Teochew, Cantonese and Henghua. Hokkien and Mandarin are the most widely spoken dialects. The Chinese maintain their ethnic

heritage and culture and celebrate all the major cultural festivals. The Sarawak Chinese are predominantly Buddhists and Christians. The other immigrants groups that reside in Sarawak include the Indian and Indonesian.

1.1.2.3 Malay

The Malay makes up 21% of the population in Sarawak (ICTU, 2005). Traditionally fishermen, these seafaring people chose to form settlements on the banks of the many rivers of Sarawak. Today, many Malay have migrated to the cities where they are heavily involved in the public and private sectors and taken up various professions.

The Malay is one of the main coastal community groups residing in Sarawak. Malay villages (kampong) - a cluster of wooden houses on stilts, many of which are still located by rivers on the outskirts of major towns and cities, play home to traditional cottage industries. The Malay are famed for their woodcarvings, silver and brass crafting as well as traditional Malays textile weaving with silver and gold thread (kain songket).

More than half of the Malay communities live in the Kuching Division at the southwestern end of the State, and at the other end in the Limbang Division. Ethnically, they are a mixture of races. This is a result of their varied history and the physical and religious assimilation of different people who have settled on the coast of Sarawak. Malay are well represented in most forms of primary production: rice cultivation, rubber, fishing, logging and coconut. They have also traditionally played an important part in administration and other forms of government employment.

The main unifying force among the Malay is Islam; having brought the faith to Asia some 1000 years ago, although survivals of older customs and belief can be observed in many aspects of their lives, particularly the elaborate wedding ceremony. Their religion is reflected in their culture and art and Islamic symbolism is evident in local architecture - from homes to government buildings. The other coastal groups that reside in Sarawak are the Selakau of Lundu and Sematan.

1.1.3 The current situations in Sarawak

In order to better understand the problems encountered by the rural communities in the State, it is important for us to know more about the current situations happening in the State, in particular the infrastructure development, the economic achievements and the development planning undertaken by the State government.

1.1.3.1 Distribution of population and its wealth

According to the 1991 census, 62.6% of the populations are dwelling in the rural areas, and 37.4% are in the urban, a substantial drop from the 82% rural dwellers and 18% urban populations in 1980.

And from a more recent 1995 census, 17% of the State populations were classified to be in poverty. Out of the 66,500 households classified as poor, 62,000 of them were found in the rural. The same 1995 census also revealed that 2.6% of the State

populations were categorized as hardcore poverty. Out of the 391,800 household classified as hardcore poor, 294,200 of them were from the rural areas (SPU, 1994).

1.1.3.2 Economic development and projected growth

Sarawak, being the largest of the thirteen states of Malaysia, is rich in terms of its forest products. Though its soils are not particularly suitable for intensive agricultural activities, majority of the population depends on agricultural farming as their livelihood (Malaysian Information Services, 1990). Forest harvesting (logging) has dominated the forest industry sector in the State, and the large number of job opportunities and the high income generated by the logging sector clearly reflects its importance to the State. Most of those employed are from the rural areas.

Besides forestry, mining is also one of the important sectors in terms of their contribution to the State gross domestic product (GDP) in the previous decades. With current State emphasis on economic restructuring through industrialization, commercialization of agriculture, tourism and human resource development, there would be a significant shift in the economic structure in the 1990s to year 2020. Manufacturing, commercial agriculture and land development, tourism, construction and the services sector have been identified as key growth sectors in the 1990s to 2020.

Sarawak is blessed with an abundance of natural resources. Liquified natural gas (LNG) and petroleum have provided the mainstay of the state's economy for decades. Sarawak is also one of the world's largest exporters of tropical hardwood timber.

However, the state government has imposed strict log-production quotas over the recent years to ensure sustainable forestry management. Sarawak still, however, produces approximately 9 to 10 million cubic meters of logs annually (Minos, 2000).

Manufacturing is also projected to increase the State GDP, generated by high value-added resource based, high capital and technology intensive industries. Agriculture would remain an important sector, as more areas will be developed on a commercial basis through corporate management by private sector, the IADP and RDA concepts. Diversification in other potential areas such as deep sea fishing, aquaculture, livestock and horticulture would also contribute significantly to the sectoral growth (SPU, 1994).

With such vast land expanse, Sarawak has large tracts of land suitable for commercial agricultural development. Approximately 32% or about 4.0 million hectares of the State's total land area have been identified as suitable agricultural land. Nevertheless, less than 9% of this is planted with productive permanent crops, while the balance is still under shifting cultivation for hill paddy, which is estimated at more than 1.6 million hectares. The main commercial crops are oil palm, which has been increasing steadily over the years, sago, and pepper (Minos, 2000).

State GDP is projected to grow at an average rate of 8% to 10% per annum between 1991 to 2020 period; and the per capita GDP is projected to increase from RM4 483 to RM21 350 per annum between 1991 and 2020. The economic structure of Sarawak is largely export-oriented and primary commodities dominated. The primary sectors, i.e., mining, agriculture, and forestry, make up about 40% of the State's total real GDP,

followed by the secondary sector, i.e., manufacturing and construction, with about slightly more than 30% of total real GDP (Minos, 2000).

1.1.3.3 Challenges to the state economy

According to the report Sarawak Economy in Facts and Figures 1994 issued by the State Planning Unit, the State has identified some of the prominent key issues and challenges encountered by the state economy (SPU, 1994): -

- Narrow based economy

  The State's economy is too dependent on the production and export of primary commodities, thus the economy is very much influenced by the external international market trend;

- Low population density and scattered villages

  The vast rural areas of the State with dispersed nature and the small size of many rural settlements, coupled with the poor transportation system make it difficult and expensive to provide basic utilities and services to a bigger proportion of the rural population;

- Inadequate infrastructure facilities

  Albeit the tremendous development achieved by the State economically, undoubtedly, major constraints for development particularly in areas with economic potential and population settlements are still the lacking of

adequate and efficient infrastructure facilities like good road networks, electricity and water supply, and medical services;

- Relatively high cost of production

  The current poor transportation network, especially in the rural areas, has resulted in higher unit cost of providing electricity and water, higher cost of infrastructure development, and limited economies of scale;

- Balance between rapid growth and sustainable development

  Sarawak is a developing state, which is rich in natural resources, both depletable and non-depletable. To accelerate growth through downstream processing in higher value-added activities and diversification into other sectors such as tourism and the development of high and capital intensive industries, the State is to ensure that development could be sustained to benefit of the State in the long run.

Thus in order for Sarawak to prevail in its economy, and towards alleviating poverty of its people, these issues should be well attended.

1.1.3.4 Road network

The Sarawak state government has road development programs, which implement development, feeder, rural and coastal roads basically to cater for the communication links between the trunk roads and the towns or population centers, to other development areas. The construction of such coastal, feeder and development roads

are expected to improve accessibility particularly in areas with large settlement and vast development potentials are given emphasis (Malaysian Information Services, 1993).

In addition to the trunk road projects, there are numerous feeder roads, development roads, coastal roads and rural roads that are in various stages of implementation. These roads are important as they connect the isolated populated centers in the rural and coastal areas to the man roads besides opening up lands for agriculture, commercial and other developments.

The State government is also currently providing and expanding road infrastructures particularly to coastal areas through coastal road network, and to less developed rural areas with economic potential and population settlements. Missing links are being constructed, improvement of road alignment and construction of bridges are also in progress to increase the efficiency and reliability of the First Trunk Road system (SPU, 1994).

Road development for these classes of roads will continue to be of great importance as many populated centers in the coastal areas are yet to be served with road network. With an efficient road network, reliable and efficient infrastructure and basic facilities such as electricity and water supplies will then be able to be implemented to these areas of needs. Such infrastructure will facilitate private development process sector investment and this in turn will help to expedite the development process in the State (Malaysian Information Services, 1993).

1.1.3.5 Development and economic plan

Since achieving its independence through Malaysia, Sarawak has placed strong emphasis on the social and economic development of the rural sector (Malaysian Information Services, 1990). Development programs and plans had since been set up in working towards such targets. The federal government had at the federal level, formulated the New Economic Policy (NEP), which emphasized on the objectives of eradication of poverty and restructuring of society aimed at eliminating the identification of race with economic functions (Malaysian Information Services, 1993).

The New Economic Policy (NEP) has as its overriding goal the promotion of national unity through the two-pronged strategy of:

(i) eradicating poverty by raising income levels and increasing employment opportunities for all Malaysians, irrespective of race, and

(ii) accelerating the process of restructuring Malaysian society to correct economic imbalance, so as to reduce and eventually eliminate the identification of race with economic function.

As announced in the Second Malaysia Plan (SMP), which lasted from 1971-75, the New Economic Policy was presented largely in terms of national unity, which is seen to depend both on the reduction of racial economic imbalances and on the eradication of poverty irrespective of race. Poverty eradication and the correction of racial

economic imbalances have thus been enshrined as the twin objectives of the New Economic Policy.

The Third Malaysian Plan (TMP), from 1976-80, had given more explicit emphasis to poverty eradication. The Plan contains specific policies, programs, and projects to help the poor (Anand, 1983, p. 9).

Rural development policies are also implemented to attack poverty through various measures, which help to raise the productivity of specific subgroups in the population. Such rural development package might include improvements in irrigation facilities, provision of credit and input subsidies, marketing improvements, land development, and education and extension services (Anand, 1983, p. 292). All such plans are aiming in helping the rural poor and in alleviating poverty.

1.2 Problem statement

Sarawak, since its independence through Malaysia, has shown progressive improvements in terms of its economic development and growth, standard of living for the people, infrastructure development, amenities, socio-economic status of its population etc. The country's physical infrastructure has been adequate. Substantial investments in transport and communication facilities and in public utilities had been made since the 1950s, and physical infrastructure has never represented a serious bottleneck for the country's development (Anand, 1983, p. 5). However, the country's effort in poverty reduction among the communities, especially that in Sarawak's rural areas, has been hindered by the lack of efficient accessibilities to

these interior parts of the State, which is occupying an approximate 75% of the total state land area.

As quoted by Colin Ellis in his article *The Role of Secondary Rural Roads in Economic and Social Development in Development Countries*, the role of secondary rural roads in developing countries is to provide accessibility, which will both promote economic growth and contribute to the elimination of poverty. However, poverty is not just shortage of money. It is also a lack of basic needs, which may be a function of isolation and the lack of reliable access to markets, employment opportunities, schools, health facilities and other products and services (PIARC – World Road Association. 1999, p. 9). As such, the fundamental measures towards the alleviation of poverty should be heading towards the construction and improvement of infrastructure facilities in the affected poverty-prone areas.

Strategic planning for poverty reduction has gained significant importance in most governments' development activities, including Malaysia and the state of Sarawak, while maximizing economic growth and narrowing the wealth gap between the rich and the poor. In fact many a times, this gap happens between the urban and rural areas, i.e. most of the rich communities are urban dwellers while most of the poorer populations are in the rural areas.

1.2.1 Accessibility and poverty

Little and ineffective accessibility have caused development of the rural areas hard to achieve. Lacks of mobility of the rural indigenous communities have also caused

unfavorable economic activities. It has been generally proven that poverty and isolation are closely linked. Some roads may have been constructed for fundamental accessibilities purposes, but such have not benefited the poor, who are often worst placed to profit from these simple infrastructures. The better off rich people will usually capture most of the benefits brought by such infrastructure.

There is always the need to build as many rural roads as possible, in a way to converge the gaps between the two extreme. However, providing road access to the poor and isolated rural areas requires proper road networks, thorough planning and active feedback from the local indigenous populations or their representatives such that such infrastructures could be built and be able to meet their accessibility and communication needs.

1.2.2 Roads and its impacts

Road networks interact heavily with the natural environment, both during their construction and usages afterwards. Unplanned roads will not only be less durable, and are likely to cause damages to the environment. In fact, most roads can also be agents of environment destruction, not only because of increased traffic, but also because they open up previously inaccessible areas. Many have neglected that the availability of transport may encourage commercial and economic activities, highly profitable in the short-run, but harmful to the environment and the inhabitants themselves.

Properly and strategically planned, designed and constructed access roads are more favorable in bringing development to the rural poor then those unplanned coarsely built sub-standard roads. Besides providing an efficient way for communication among the rural communities, planned road networks are also vital in enhancing sustainable development.

In order to have efficient planning on the design and construction of effective road networks in the rural areas, maps, fleshed out by local knowledge may be used to identify those areas, which are geographically isolated from the core road networks. Visits to the affected sites must confirm that isolation in fact contributes to the poverty of these affected local indigenous communities, and that improved mobility brought by road networks will help to alleviate poverty.

1.2.3 Inequality and poverty

According to the 1997 statistics, 7.5 percent of households in Sarawak were considered poor, that is, each of such households of average size of 4.8 persons earning RM543.00 per month or less. However, more households in the rural areas were poor, at 11.6 percent, than that of the urban areas, at 2.0 percent. Majority of the households that were poor were Bidayuh. The incidence of poverty is still bad in the rural areas, which is also where the agricultural sector is (Minos, 2000, p. 48).

Generally speaking, the Bidayuh are a rather economically backward community and are still very much left behind in all the modern economic sectors. The vast majority of them, who are living in the rural villages, are still heavily involved in agricultural

pursuits, planting paddy and other cash crops such as pepper, rubber and cocoa, primarily on a family-based, small-scale, labor-intensive and self-subsistent basis (Minos, 2000, p. 44). Max Weber had also stated that inland transportation is common for transportation equipment to be appropriated as a source of income, and services are then compulsorily imposed on specified small peasant holdings (Henderson and Parsons, 1993, p. 257) to improve their economic growth and status.

Poverty has to do with incomes that are low in some sense, rather than the amounts consumed or held of a single commodity. Besides the economic strength, the lack of education is a major factor adversely affecting the ability of an individual to enhance the quality of his life and to advance his economic position. Consequently, the lack of education becomes both a symptom as well as a significant factor contributing towards poverty. Education is thus a major vehicle for the achievement of the objectives of the New Economic Policy, as reported in the Mid Term Review (MTR) (Anand, 1983, p. 237).

For efficient measures towards the effort to alleviate and eradicate poverty in the State, the government needs to have in depth studies and surveys into its poverty bad-hit areas, especially the rural, so that the impacts of its infrastructure developments could be studied and analyzed for better future planning. The following issues form the scope of this study on the survey to see the conditions of the poor in the State, how are the rural communities affected most by their current infrastructures, the different categories of road networks, and how could future planning be targeted towards better problem solving.

1.3 Study objectives

Arising from the above problem statements, and in order to study into the roles of the different types of roads in Bau-Lundu area of the Kuching Division, including the alleviation of poverty among the rural communities, the study could be best summarized into the following scope: -

1.3.1 General objective

This dissertation aims to study the quality of life, the standard of living and the socio-economic status of the local communities in Bau-Lundu areas, and to establish the roles of the different types of road systems in poverty alleviation.

- *To study the quality of life and socio-economic status of the various local communities along the trunk road and the other different categories of rural roads in Bau-Lundu areas;*

1.3.2 Specific objectives

Hence, the survey aims to achieve the following specific study objectives: -

- *To study the effectiveness of the different types of roads in Bau-Lundu areas in overcoming the problems of inaccessibility to the rural communities;*

- *To study the impacts of the different types of roads on the local communities in Bau-Lundu areas;*

- *To study the perceptions of the various local communities along the different types of roads in Bau-Lundu areas towards the current infrastructure developments*

By such study objectives, the dissertation wishes to achieve the target of studying the roles of the different types of roads in the study area, and how are their effects in alleviating the issues of inaccessibility, poverty, quality of life and standard of living of the local communities.

CHAPTER TWO

LITERATURE REVIEW

2.0 Literature Review on Development, Accessibility and their Impacts

Inaccessibility and lack of efficient rural road systems have always been considered as the main obstacles to the prominent problems of poverty and undesirable living conditions of the rural indigenous communities. The standards of living for these rural poor are far from desired when compared with the quality of life of the urban populations. Among other gruelling issues, majority of these rural poor have long been troubled by problems of inequality in the allocation and distribution of resources, unavailability of fundamental amenities like electricity and water supply, medical services, educational opportunities etc.

Poverty may be regarded as not having enough resources or abilities to meet the people needs, inequality in the distribution of income, consumption or other attributes across the community population, and vulnerabilities encountered. The World Bank (2005) has also defined poverty as hunger, lack of shelter, being sick and not being able to seek medical treatment, children not having access to school, illiteracies, lack of employment opportunities, powerlessness, lack of representation in the political scene and lack of freedom. Appropriate definition of poverty should be clearly stated before survey on the socio-economic status of the affected communities could be assessed.

Economic linkages between transport and poverty are prominent in easing the burden of poverty. It has been observed that transport reduces absolute poverty. Efficient transport networks and rural roads are closely related to the living condition of the rural poor. However, it must be realised that transport is only an intermediate service and it cannot reduce poverty alone. There is a need to strengthen the direct role of road networks, accessibilities and transport interventions in poverty alleviations. These require the further understanding on the transport needs of the rural poor, and how their needs would be best met. As such, different types of road systems in their respective localities would have different impacts on the different communities.

This essay aims to study into the socio-economic impacts, and the social impact assessment of rural roads in the Bau-Lundu areas of the Kuching Division in Sarawak. Among other things, the essay will also discuss how some of these socio-economic impacts can be related to accessibility. On-site survey by interviews with the local communities, observation, on-site data collection would be carried out to study in depth, such different types of roads and their impacts.

This section of the report will study and review literature from journals, research papers, reading articles, publications and books by authors in the below related fields. Among other things to be discussed are the concepts of poverty and inequality, impacts of roads and accessibility on poverty, and other related issues. Part studies are also evaluated to assess the methods and analytical approaches used.

2.1 Development policies and framework

Like in any other Third World developing countries, Malaysia with the state of Sarawak in particular, has been affected by the level of poverty and inequity distribution of resources among the various indigenous communities sited in the different locations geographically separated in the urban and rural areas. Its significance had prompted the Malaysian government to design appropriate development policies and frameworks to minimise such disparities. Rural developments for the major parts of the country were thus implemented to serve such purposes, including Sarawak.

The goal of rural development is to improve the well being of the rural populace. This is to be achieved through sustained increases in per capita output and income, expansion of productive employment and greater equity in the distribution of the benefits of growth. These are complemented by greater access by the rural communities to goods and services and other amenities and facilities (Rahman, 2000).

Various plans were carried out and aimed in stimulating economic growth in the rural areas, reducing the rural-urban disparities, and supporting the poverty eradication and societal re-structuring. These have formed the basis of the development agenda for the nation. By and large the major aim of such development is to increase productivity and income, which in turn will bring about reduced poverty. Consequently, the provision of basic infrastructure and services like medical health, education, water, electricity, roads, community centres, improved food and nutrition

likewise would be implemented as these serve as important complementary factors of rural development programmes (Rahman, 2000).

2.1.1 Development policies of Sarawak

Sarawak has a higher incidence of poverty and lags very considerably behind in its infrastructure, manpower and medical facilities when compared with other states in Malaysia. It also has the lowest population density in the country and abundance of suitable land. Since gaining its independence through Malaysia, the development planning in Sarawak is very much influenced by the Peninsular Malaysia experience.

One objective of the First Malaysia Plan was to integrate Sarawak and Sabah into Malaysian economy. The NEP, initiated with the Second Malaysia Plan further stressed on the promotion of national unity through two strategies, i.e. *poverty eradication* and the *restructuring of society*. Therefore, development policies and strategies in Sarawak must be seen in the Malaysian context (Kasim, 1990).

2.1.2 Regional development

Regional development policies pursed by the Malaysian Government were aimed at reducing regional imbalances, not only in terms of economic growth, but also in social, education and health aspects (Husain, 1996). It is supposed to provide the means whereby economic and social development could be attained even in the remote and peripheral areas, with the objective to narrow the disparities in the standard of living between regions by accelerating the rate of growth of the less

developed regions relative to the more developed. On the other hand, the socio-economic objectives of such regional development stressed on the need to improve the rural sector by striving for higher income for the rural workers, employment opportunities in both the agricultural and non-agricultural sectors, and better amenities and services comparable to those in the urban areas (Husain, 1996).

2.1.3 Rural development in the study area

Implicitly rural development is largely concerned with eradication of poverty. Thus rural development programs are aimed at enhancing the income of the rural poor through provision of on-farm and off-farm opportunities, basic goods and services, food and nutrition. These aim to eventually raise the physical well-being, quality of life, productivity and income of the rural poor (Rahman, 2000). Priority should be given to the local provision of basic needs like road, electricity and water and social services, which will initially be infrastructural leading to better access to services. Rural development was to bring about pervasive employment and income opportunities to the rural population, a large number of whom are still poor and impoverished (Rahman, 2000).

In Sarawak, development programs and projects have brought about *changes*, which in turns have brought about *opportunities* for all indigenous races in respect of jobs, employment, income, social status etc. With the availabilities of education and accessibility, people have become more *mobile* and thus are able to participate in the mainstream of socio-economic development of the State. Above all the changes, opportunities, mobility and interactions have resulted in greater *equality* among the

various communities, and the narrowing down of the income and opportunity gaps (Dandot, 1999).

Under the regional and rural development programs implemented in Sarawak, as in the agricultural activities per se, the introduction of cash crops like rubber, pepper and other production has offered better cash income possibilities. Better accessibility to the rural villages by road has also made the communities more mobile and also enables them to market their produce. Most important of all has been the impact of education in opening up the community (Dandot, 1999). Improved public transport services in terms of frequency and convenience have also improved accessibility to such rural remote areas, thus providing more attractive travelling conditions (Ngah, 2003).

2.2 Inequity distribution of resources and its impacts

Definition of poverty in social science study is of great significance, as different version of the term would lead to different scope of study and subsequently different. As published by the World Bank Group in the PovertyNet, poverty may be defined as whether the households or individuals have enough resources or abilities today to meet their daily needs, their hunger, lack of shelter, lack of medical assistance, lack of educational opportunities, lack of employment opportunities, powerlessness, freedom. It may also be regarded as the inequality in the distribution of resources and income, consumption or other attributes across the population.

Neubeck (1979) has defined poverty as first and foremost an economic state, the status of an individual or a family based on the possession of wealth and income. People are poor because they lack money and thus poverty is a matter of economic deprivation, and not character deficiency (Neubeck, 1979, p. 198). Being poor means, essentially, lacking means of subsistence capable of providing what, in this society and at this time, could be considered a secure and adequate standard of living. On one hand, poverty is an absolute state; where by an objective measure the poor are materially deprived to the point where survival often becomes an issue. And, on the other hand, poverty is a relative issue; the poor are materially deprived in comparison with the majority of the population (Neubeck, 1979, p. 199), the phenomenon of inequality in the distribution of resources and opportunities.

2.2.1 Inequality distribution

At any moment in time there is in any society a particular distribution of economic welfare like financial income, economic wealth, etc., which inevitably leads to inequality in living conditions, opportunities, and so on (Lichfield, 1996, p. 89). The distribution of resources is a concern common to most societies. Despite sustained economic growth, inequity and poverty remain issues even in rich countries (Grand et al., 1992, (p. 183). Inequity Distribution of Resources and opportunities among the communities involved in the social survey have frequently been linked with various attributes, including geographical localities and accessibilities; economic income and the social status.

Lichfield (1996) explained that, due to the vast difference in their geographical localities, activities of the towns are spread over an area; therefore it is not possible for all residents to be evenly accommodated in the level of services offered. Some residents may have long walks to their destinations, and infrequent services, whereas others need not. Thus, in choosing where to live, a household will weigh up the various attributes of different locations against each other, of which accessibility by transport is one, and, having chosen, the total attributes of the package will then be traded off against price and opportunities. The other inequities include being proximity to countryside, availability of schools, shops, and local environmental amenities etc.

The opportunities of equal accessibilities have also brought inequalities in financial status and income. The households and individuals do not compete evenly, because of varying income and wealth levels, and consequential access to information and professional help. Consequently, those with lower income are disadvantaged in the competition and the gap of inequality widens. The third attribute in inequalities among the households may be due to the social factor. The young, elderly or infirm are disadvantaged in their mobility. This further reduces accessibility compared with, the youngsters (Lichfield, 1996, p. 89).

Besides the above three factors, Neubeck (1979) has specifically mentioned that inequality, including the economic inequality may also be directly reflected in the amount and quality of formal education the affected households have available. Bright children from poor families are far less likely to go to college and to finish there than are smaller children from more affluent families. Some educational

credentials influence where one will enter the occupational hierarchy, unequal educational opportunities result in wasted talent (Neubeck, 1979, p. 29).

The denial of educational advantages means that many human talents remain hidden and repressed. Talent that goes unrecognized and insufficiently cultivated is not going to be utilized. The shortage of imaginative teachers, inventive medical practitioners, participants in the creative arts, and sensitive administrators and politicians are some of the reasons for such arbitrary denial of advantages. The poor families lack the economic resources to ensure their children an opportunity to higher education. As a consequence, the whole society is poorer both culturally and materially (Neubeck, 1979, p. 2069).

2.2.2 Social impact assessment (SIA)

The issues of rural development, transport, communications and inaccessibility, besides the inequalities as discussed above, have also great social impacts on the communities. Social Impact Assessment (SIA) has been widely used to assess the effects of developments and planned activities on the local communities.

Vanclay (2003) has introduced in his edition of *The International Handbook of Social Impact Assessment, Conceptual and Methodological Advances* the conceptual and methodological advances in the social impact assessment. He further elaborates that the objective of SIA is to ensure that the developments or planned interventions that do occur will maximize the benefits and minimize the costs of those developments, especially those costs deemed borne by the community.

On a similar approach, there are various attributes that need to be studied under SIA, as there is a growing concern about the environmental and social consequences of development efforts (Becker and Vanclay, 2003, p. 56). Among those attributes they render crucial in assessing the impacts on the communities include poverty, quality of life, economic wealth, availability of opportunities for the people etc.

Poverty and gender assessments have long become as some the widely used instruments in development planning. However, as environmental impact assessment (EIA) is currently the most developed and recognized instrument, backed by a legal framework in many countries, to assess on the impact of development activities on the environments, it has also been increasingly used to assess the social and economic impacts of planned interventions (Becker and Vanclay, 2003, p. 56). The effects of the development activities on the level of poverty and the socio-economical impacts on the affected communities have always been included in the EIA.

SIA also studies into the impacts on social and economic values of the households. Social values refer to the quality of life of the people in general and can be expressed in many units like health and safety, housing and living conditions, space for settlement, the value of the environment as a source of food or in-kind income in subsistence economies, and religious and cultural values (Becker and Vanclay, 2003, p. 61). The economic value of an environmental function refers to the monetary value of the goods and services that will be provided by the implementations of such activities. It may be expressed as a monetary value assigned to individual economic activities, like agriculture and employment, to household income, as an overall

indicator on the financial conditions of the population, or to per capita gross regional or domestic product, as an overall indicator for the income of the society as a whole (Becker and Vanclay, 2003, p. 62).

Imbalances between the supply of goods and services provided by the biophysical environment and the demand for these goods and services from societies may help to lead to the identifications of the actual or perceived problems or opportunities (Becker and Vanclay, 2003, p. 63).

2.3 Accessibility and its impacts on poverty

The World Bank has in its web page *Roads and Highways* (The World Bank Group, *Transport* http://www.worldbank.org/transport/poverty/pov_note.htm), listed that there are evident linkages between transport and poverty, and the easing of burden caused by poverty. Shortages of affordable transport caused by inaccessibility have direct impacts on the personal welfare of the households, like their daily trips to work, school, health facilities, recreational facilities etc. Income limitations prevent families from obtaining adequate housing and thereby lead to an inequitable distribution of housing resources (Grand et al., 1992, p. 115).

Gannon and Liu (1997) have also said that the role of transport in poverty reduction through direct interventions is important, but requires careful design, and much can be done in rural transport to help the rural poor.

2.3.1 Rural roads and development

The need to construct or improve as many rural roads as possible went unquestioned by governments. What the government should look more closely at are the viability and sustainability of such rural roads. They are just one of the ways to provide mobility to make services more accessible, but many requirements must be satisfied if they were to be used by those who need them (http://www.ruralroads.org/), including the transportation needs of the people.

The World Road Association (PIARC) had also held its XXIst World Road Congress in 1999 at Kuala Lumpur, to discuss among other things, Asian highways, rural roads and their impacts on development. The Congress seeks to explore the roles of secondary rural roads in a nation's economic and social development and the requirements for the sustainable management of such road networks.

The Congress acknowledged that secondary road systems comprising both local feeder and access road networks provide road transport access for local communities and enterprises, while the networks of collector roads provide access to the primary road network. Secondary road systems are an important, but often overlooked, part of the total transport system of a country or region and can be critical for the social and economic well being of rural communities (PIARC, 1999, p. 6). Colin Ellis has elaborated that the role of secondary rural roads in developing countries is to provide accessibility, which will both promote economic growth and contribute to the elimination of poverty (PIARC, 1999, p. 9).

2.3.2 Roads and environment

Notwithstanding easing the problems of inaccessibility for the local communities, rural and development roads can also be the agents of environmental destructions (http://www.ruralroads.org/), not only because of increased traffic, but also because they open up hitherto inaccessible areas. Roads interact heavily with the natural environment, both during their construction and afterwards. The availability of roads may encourage commercial and economic activities, which are highly profitable in the short run, but harmful to the environment and the inhabitants themselves. The destructed environment may have great impacts on the quality of life of the communities, which is one of the factors contributing to the rural poverty. Offer (1996) related that pursuit of quality of life may be focused on the economic growth, and the striving to increase the flow of traded goods and services. Command of such goods, expressed for convenience in money, provided a clear measure of welfare, both for individuals and the community in a whole. As such, effects by the planning and constructions of rural roads, besides the achievable accessibility, has great impact on the economic status of the communities involved, and subsequently, their quality of life.

2.3.3 Transport and its effects

Transport is a major component of economic activity. Benefits arise from the use of transport because it is necessary to satisfy a wide range of work and leisure demand. Access to transport and fundamental accessibility is necessary if individuals are to

participate in a modern society. Availability of efficient transport also has great impacts on the distribution of income and poverty (Grand et al., 1992, p.157-160).

Grand et al. (1992) further explained that examination of the distribution of income could be spilt into the examination of poverty and the examination of inequality. Poverty may be of concern with the definition and measurement of the numbers of people in the community and extent of the poor in society, while inequality may be of concern with the differences between individuals in income and access to resources (Grand et al., 1992, p. 184). Therefore, it is prominent that transport clearly has its effects on the wellbeing of the people, the community, and the society as a whole.

Transport also has affected the way of life of the rural communities. Transportation may be the keynote for the explanation of the movement in rural population (Turner, 1998, p. 101). With easy accessibility, rural-urban and rural-rural migrations are common. The urban may be called an environment of greater quantitative stimulations than the rural countrysides. The urban cities furnish forceful, varied and artificial stimuli; while the rural countrysides afford an environment of stimuli less strong and more uniform.

As explained by Groves (1998), minds that crave external, quantitative stimuli for pleasing experiences are naturally attracted by the city and repelled by the monotony of the country (Turner, 1998, p. 123). Such phenomenon explains the causes of out-migration, resulted from the availabilities of efficient transport and easy accessibility.

2.3.4 Accessibility and economic growth

Differential access to roads and amenities may result in differential economic performances and rural development, especially in developing countries. Past studies in India and Bangladesh have shown the significant impacts of the accessibilities and amenities on the local communities.

Bayes (2003) has reported past surveys conducted by the International Food Policy Research Institute (IFPRI) in India and Bangladesh, and has realised that roads lead to larger benefits for the rural poor in these developing countries, it is found that roads have the largest impacts on poverty reduction as well as a significant effect on productivity growth.

An academic as well as empirical analysis on the role of roads and amenities in the reduction of rural poverty in Bangladesh was carried out, based on the data set from International Rice Research Institute (IRRI) and Bangladesh Institute Development Studies (BIDS). Some 62 villages were selected and categorised as *developed villages*, where there are access to both roads and amenities like electricity and water supplies, *semi-developed villages*, with an access to either paved roads or amenities, and *under-developed villages* where they are deprived of both paved roads and amenities.

In 1987, only one-tenth of the 62 villages were found to be *developed villages*. By 2000, the share of *developed villages* rose to more than one-fourth, and had increased in tandem with the developments in communication and amenities over the years.

The share of *semi-developed villages* had also marginally declined, implying that some of them had been graduated as *developed villages* in 2000. Similarly, the share of *under-developed villages* had substantially declined, indicating that a large portion of them had also graduated to *developed villages* in 2000.

During the same survey in 2000, cropping intensity was estimated in 179 *developed villages* compared with only 149 in both *semi-developed* and *under-developed villages* in 1987. It was observed in the survey that with increasing access to paved roads and better amenities, *developed villages* led the lead in cropping intensity, which has close relation with research, marketing opportunities and processing activities. It is noticed that with increasing access to paved roads and better amenities, *developed villages* are able to perform better.

On poverty reduction, 33 percent of the households from *developed villages* under study in 1987 were extreme poor, while 31 percent and 27 percent of the households were poor in the *semi-developed* and *under-developed villages*. Another survey in 2000 revealed decline in poverty rate, and was much faster in the *developed villages* than the *semi-developed* or *under-developed villages*. This shows that better access to paved roads and amenities have greater effects in poverty alleviation and eradication.

In terms of production costs, it is also believed that the better development of infrastructure and accessibilities will help to lower the marginal costs of production by shifting the marginal cost curve to the right. The supply curve shifts to the right when farmers face a fall in input prices and a rise in output prices. In Bangladesh, paved roads tend to contribute towards the fulfilment of these objectives. Households

in *developed villages* under the survey also seem to own more agricultural fixed assets than *semi-developed* or *under-developed* villages.

Surveys in Bangladesh, India and China also revealed that with increasing access to paved roads and better accessibility to the rural areas, occupational mobility is evident from cultivation and agricultural wage labour to trade and business and to non-agricultural labour. It could also be found that access to paved roads contributed to a larger reduction in poverty in these countries.

The development of rural infrastructure is gateway to poverty reduction. To contain inequalities, access to education, credit and social services should be raised for lower income deciles. There should be human and financial capital available to the lower segment. Barring rural roads, possibly, the rural populations shall have to live with twin devils, poverty as well as inequality (Bayes, 2003).

2.4 Researches into social life

Researching social life is partly about having the right knowledge, like how to design samples, when to take field notes, how to analyze data, how to lay out questionnaires, how to access to historical archives, and how to get the cooperation of an interviewee (Gilbert, 1993).

Gilbert (1993) has collected in his edition, a good selection of social life research topics by various authors. Important factors relating to social survey are included in his edition. O'Brien states that the survey on social life needs to begin with clear

understanding of the problems in hand and clear definition of survey objectives, besides only describing the scenario. Some of the issues pertaining to the social survey, including gaining accesses to the field of survey, research ethics, ways of collecting data etc. are elaborated in depth.

According to Fitzgerald in his article *Computer-Based Qualitative Data Methods,* not all social researches involve asking people questions. Many are based on documentary evidence including official reports, newspaper, personal records, photographs etc. The management of quantitative data has been revolutionized by the computers, which are being used to assist in handling qualitative data such as interview transcripts. Qualitative data expressed the quality of something, rather than the quantity of it, and the methods enable a more complete picture of a social situation or community to be constructed, rather than for strict theoretical paradigm reasons (Becker and Vanclay, 2003, p. 146).

Secondary analysis opens up quantitative research to those who do not have the resources for a large-scale survey. Research only becomes effective when it is documented and published for researchers, policy makers and others to use and to criticise.

Accessing the social impacts of development projects is a data gathering or research-intensive activity. Analysts and researchers typically make use of a range of methods for gathering information about the people, communities and organizations associated with some past or future interventions or event. They do so in order to describe and

explain what intended and unintended changes have occurred or, more often, what changes might occur in the future.

SIA research is generally a means of collecting and using data for immediate social objective (Becker and Vanclay, 2003, p. 143). Samples of quantitative and qualitative data, collected by primary and secondary sources, are best summarized in the Table 3 (Becker and Vanclay, 2003, p. 145).

Table 1 – Different types of data sources and formats

	Quantitative data	**Qualitative data**
Secondary Sources	Previous surveys Census surveys Official statistics Monitoring studies Maps	Local histories / accounts Previous studies / SIAs Other literatures Newspaper Photos / maps
Primary Sources	Sample surveys Observations	Interviews Discussions / focus groups Workshops Participant observation Photos / video / film

CHAPTER THREE

METHODOLOGY

3.0 Introduction

For a research project to be successful, it is important that suitable and appropriate methods are used to collect data. While there are many proven methods of field research data collection, usually some will be better than others taking into consideration the specific requirements of the particular project and the characteristics of the locality. Even then, whatever method chosen may need to be modified to ensure that there is meaningful collection of data, taking into account the constraints and limitations of the methods and location. Care should also be taken to ensure that there is no bias to the gathering and interpretation of data.

3.1 The study area

Sarawak maybe broadly classified into three principal terrain groups: the alluvial coastal plain, the mountainous interior and the central belt of generally undulating country between the coastal plain and the interior. The alluvial coastal plains, which cover nearly a fifth of the State, extend along most of Sarawak's coastline particularly in the Kuching, Samarahan, Sri Aman, Sarikei and Sibu Division. Alluvial coastal plains are characterised by peat soil, mangrove, nipah and other swamp forests. The area selected under this survey is the Bau-Lundu area of the Kuching Division

Sarawak is a tropical state with an equatorial climate. It is hot and humid throughout the year with average daily temperature ranging from 23°c during the early hours of the morning to 32°c during the day. It experiences two monsoonal changes. The North East Monsoon, which usually occurs between November to February, brings with it heavy rainfall. The South West Monsoon from June to October is usually milder. Despite our monsoon seasons, the climate in Sarawak remains fairly stable throughout the year. Annual rainfall varies between 330 cm to 460 cm for the greater part of the country.

These two districts of Bau and Lundu are selected in this survey as they have the climate and topographic that best describe the general topographical natures of Sarawak, with hilly terrains, ravines, low lying flat lands and flowing streams, good residing multi-racial populations of the different indigenous local communities, generally good representation of the socio-economic of the local communities, in terms of economic growth and development, cultural values, academic achievements and social status.

3.1.1 Bau-Lundu area

Bau is one of the twenty-eight districts in Sarawak, situated within Kuching Division. It is an inland district about 35 kilometers by road from Kuching. It has an area of 884.40 square kilometers sharing a common border with Kalimantan Barat, Indonesia. The district capital is Bau Town. The district has a multi-racial population with the majority of the people being Bidayuh. Based on the 1998 population census, the total Population is more then 47 293, and the compositions of the various races are the

Bidayuh (79.52%); the Chinese (11.85%); the Malay (8.46%) and other minorities (0.17%).

Lundu lies in the western side of Kuching Division, and not far from the South China Sea. It has an area of 1 812.3 square kilometres, and is also sharing a common border with Kalimantan Barat, Indonesia. The district capital is situated at the Lundu Town and it has a sub-district at Sematan with Sematan Town as the sub-district center. Lundu is situated approximately 100 kilometres from Kuching, the State capital, and 70 kilometres from Bau. Its sub-district of Sematan is approximately 28 kilometres away. According to the 1997 census, Lundu has a population of 30 090 with its multi-racial compositions of Bidayuh, which can be sub-categorized under the different dialects of Jagoi, Selako and Lara, the Chinese, Malays, Ibans and other minorities. The Bidayuhs form the majority of the population.

3.1.2 The main local communities and their activities

One of the most attractive features of the state of Sarawak and one, which sets it aside from many of the other Malaysian states, is its cultural diversity. With the 27 distinct indigenous ethnic groups that speak 45 different languages and dialects, Sarawak can be proud to boast racial harmony amongst a population of 2.1 million who adhere to a variety of traditions, practices and religions. With such a melting pot of customs and cultures, Sarawakians enjoy a variety of colourful festivals throughout the calendar year. The cultural diversity also allows Sarawak to be one of the most popular tourist destinations in the region (ICTU, 2005).

There are three main racial communities residing in the Bau-Lundu area, the Bidayuh, the Chinese and the Malay.

Bidayuh is one of the main lowland groups that reside in the Bau-Lundu areas, and is the largest indigenous group in the study area. There are five main groups, each speaking a different dialect. One larger group lives in the Bau District and the two smallest in Lundu. Although the groups do speak different dialects, there are many words common to some or all groups, and there are also many Malay and Sea Dayak words in common usage. They are mainly engaged in the cultivation of dry paddy under the 'shifting cultivation' system. Many of the Bidayuh have been converted to Christianity. Typical of the Sarawak indigenous groups, the Bidayuh are well known for their hospitality.

The Chinese, one of the immigrants groups, forms the second largest community in the Bau-Lundu area. They are basically urban dwellers but large numbers are also engaged in agriculture. Through their clan associations, business acumen and work ethic, the Chinese organised themselves economically and rapidly dominated commerce. Today, the Chinese are amongst Sarawak's most prosperous ethnic groups. The Chinese maintain their ethnic heritage and culture and celebrate all the major cultural festivals. The Sarawak Chinese are predominantly Buddhists and Christians.

The Malay is one of the main coastal community groups residing in Sarawak, and so as in the Bau-Lundu areas. Malay villages (kampongs) - a cluster of wooden houses on stilts, play home to traditional cottage industries. Ethnically, they are a mixture of

races. This is a result of their varied history and the physical and religious assimilation of different people who have settled on the coast of Sarawak. Malay are well represented in most forms of primary production: rice cultivation, rubber, fishing, logging and coconut. The main unifying force among the Malays is Islam.

According to the Department of Agriculture Kuching, the population breakdown based on racial grouping in the Bau-Lundu agricultural districts is as illustrated in Table 2 that follows: -

Table 2 – Distribution of populations in Bau and Lundu Districts by race.

Race	**Bau**	**Lundu**
Malay	3 537	9 210
Chinese	8 778	3 375
Bidayuh	28 357	10 403
Iban	630	3 644
Melanau	62	84
Other Natives	142	67
Others	83	46

(Source: Department of Agriculture Kuching)

Whereas the breakdown of villages and farm families according to agricultural district are as in Table 3: -

Table 3 – Numbers of farming families in the agriculture districts of Bau and Lundu

Agriculture District	**Village Number**	**Farm Families No.**
Bau	74	4 368
Lundu	86	3 861

(Source: Department of Agriculture Kuching)

Major agricultural activities carried out by the farming population in Kuching Division include market gardening which supply fruits and vegetables to the city, pepper and coconut cultivation, livestock rearing like poultry and ruminant animals (small scale only), and aqua culture (commercial breeding of fresh and brackish water fish in ponds and floating cages and the rearing of tiger prawn particularly in coastal areas of Kuching and Lundu districts). Plantation and estate crop like oil palm are found in estates in Lundu and Bau districts.

3.2 The infrastructure development

As reported under the Annual Report 2002 from the Department of Public Works Sarawak, and the other sources from the relevant government agencies, the availabilities of infrastructure facilities for the State of Sarawak, in particular in the study areas of Bau and Lundu are as follows: -

3.2.1 Road network

At the time of joining Malaysia in 1963, Sarawak had only 608 kilometres of roads, centred on the main towns. The end of 2002 opened a total length of

5 203 kilometres of roads opened to traffic, which consisted of 3 684 kilometres of paved roads and 1 519 kilometres of unpaved roads. A total of 310 road projects had been approved for implementation under the 8th Malaysia Plan, consisting of 82 Federal-funded projects and 228 State-funded projects. There were 37 feeder road projects in Kuching Division, which includes Bau and Lundu areas.

The State government is putting in great effort to maintain the existing roads. In 2002, the government maintained a total of 182.43 kilometres of Federal roads, and 856.40 State roads in Kuching Division, including the Bau and Lundu areas. Road maintenance works in Bau and Lundu areas are privatized for better efficient road networks and accessibilities.

The list of existing roads in the study area, their road types and status is as in Appendix III.

3.2.2 Water supply

Currently, there are 88 gazetted water supply authorities in the State, producing approximately 129.860 million litres of water to meet the users' needs. There are already 103 888 water connections by the end of 2002.

In the Bau-Lundu areas, water is pumped from the rivers, treated and piped to the consumers. Bau is sourcing its water from the Sg. Sarawak Kanan, and is having a 3.3 million litres reservoir tank to store the 7.1 million litres of daily

production from the treatment plant. Approximately 21 000 people through the 4 000 water meters are served with an average daily consumption of 4 million litres.

Lundu is sourcing its water from the Sg. Lundu, and is having a 1.6 million litres reservoir tank. Approximately 7 000 people through the 1 500 water meters benefited from this facility.

The list of existing water supply authority in the study area, together with their detailed particulars is as in Appendix IV.

3.2.3 Schools

Under the Educational Program, school projects were being implemented throughout the State. Secondary and primary schools are constructed in all Divisions, including the Bau-Lundu areas.

3.2.3.1 Bau District

There are three secondary schools and 40 primary schools in the Bau District, with nine of them using Chinese as the teaching medium. There are currently 5 260 students in all secondary schools, and 6 633 students in all primary schools. All three secondary schools are boarding schools, while six out of the 40 primary schools boarding school. The highest academic level available in Bau is sijil tinggi persekolahan Malaysia (STPM). Electricity

and water supplies are available to all schools. In order to meet the current needs, all schools are provided with libraries and Internet access.

3.2.3.2 Lundu District

There are two secondary schools and 31 primary schools in Lundu with currently 3 186 students in the secondary schools. Both secondary schools are boarding schools, while seven of the 31 primary schools boarding school. The highest academic level available in Lundu is STPM. Electricity and water supplies are available to all schools. To meet requirements, all schools are provided with libraries and Internet access.

It should also be noted here that schools in these districts are provided with special schemes like text books, nutrition supplements, program susu sekolah, scholarship, Skim Baucer Tuisyen, and Kumpulan Wang Amanah Pelajar Miskin to help out the poorer students. Details of such information are as in Appendix V.

3.2.4 Medical services

Under the Ministry of Health Program, medical projects were being implemented through the State. District hospitals, clinics, dental clinics are constructed, and mobile medical services are being implemented in all Divisions.

According to the Divisional Health Office Kuching, there are currently one 68-bed district hospital built in the 1980s, and six health clinics in Bau District, situated near Batu Kawa, Bau, Krokong, Singgai and Siniawan areas. For Lundu District, there are seven health clinics situated near Biawak, Lundu, Sampadi, Sematan, Stoh Rambungan and Telaga Air areas, and a 52-bed district hospital, which was built during the colonial eras.

Besides hospital and clinics, the government also provides mobile medical services to Bau-Lundu areas via its village health teams and flying doctors services. Other medical assistance provided includes school health immunization and school dental services. Currently, there are three school dental clinics each in Bau and Lundu, and a dental clinic in Lundu District Hospital. It is recorded that 80% to 90% of the local populations have benefited from the local dental health services.

3.2.5 Electricity supply

Currently, SESCo is supply electricity to the town areas of the Bau-Lundu under its Rural Electrification Scheme (RES). However, some rural areas are without SESCo power line, and thus generators are used to supply electricity.

Prior to the data collection, a clear structure of what the study hopes to achieve is required. These included the development of a comprehensive Terms of Reference stating our main and secondary objectives, followed by the compilation of questions, which had to be asked on site to capture the required data. Questionnaire survey is

designed with pre-determined, yes/no responses, ranking exercises and open-ended questions. Literature reviews and researches into the study area, the local communities, their culture, development policies of the state and study approaches are also carried out.

Fine-tuning and adjustments were carried out along the way and a preliminary schedule was also prepared to ensure smooth implementation of data collection.

3.3 Questionnaires and surveys

This served as our main data-gathering instrument. Prior to the collection of data on the field, thorough studies at the targeted area, the Bau-Lundu areas in the Kuching Division were carried out, with pre-survey site visits, studying of maps and satellite images from the relevant agencies to encircle the area of interest, and discussion with the survey supervisor on the scope and magnitude of the study.

Locations of villages along the different categories of road system in the study areas are identified with the help of maps and satellite images, and some surveys with the relevant local government agencies of JKR Bau and JKR Lundu. Based on such information, the survey set to achieve about 80 surveys to different local villages along the various types of rural roads. As the accessibility to such rural villages is relative convenient, due to the availability of road system, more surveys from more villages are expected.

The questions in our questionnaire were wide ranging and designed as a socio-economic base-line survey. We asked questions pertaining to particulars of household members, education status of each and what work these people were currently engaged in. Also included were questions on household income, expenditure, migratory history, employment, level of involvement in farming, as well as their views on the current road system and accessibility and tits impacts on their livelihood. Respondents were also asked for their views on their current standard of living as compared to the past, their material welfare and also what they expect of the future. A sample of the questionnaire is included as Appendix VI.

Even though we had sets of questionnaires, we had to approach this exercise using a survey / interview / question and answer method, as all the respondents had limited literacy. To ensure that they understood the questions and that we captured all their responses, the surveys are carried out with the assistance from the local JKR employees who are proficient in Bidayuh, a dialect, which is widely spoken and understood at the study area.

Though no specific numbers of samples are specified before the survey, it has been worked out that a minimum number of household respondents be included in the survey at various pre-specified road or areas. This is useful as the survey wishes to cover as comprehensive of all areas as possible, and with such plan, it is more feasible to come out with relevant statistics and comments on the quality of life of the various

communities, at their different locations, or the impacts of a certain category of roads on a specific issue, like economic status, and employment opportunities. A draft list of the villages and their respective locations included in the survey is as attached in Appendix VII.

3.4 Interviews

Interviews are arranged, with the help from the employees from the local JKR, to be carried out at any leisure times available. Special arrangement are also made to conduct such interviews at evening hours as it is noticed that most families members are available at their home after working hours. Help from local Village Development and Security Committee (JKKK) are also sought for better in depth surveys into remote and inner areas. As the survey is aimed at random sampling to households, and not as individuals, there is no specific key persons the survey wishes to interview.

The purpose of these interviews was to gain in-depth knowledge in particular areas of interest, which would give us a wider picture of life of the local indigenous communities along the different categories of roads at Bau-Lundu areas, especially from the social-human and socio-economic perspectives. Through these survey sessions, we were able to get first-hand, personal accounts of their respective experiences at the rural areas at Bau and Lundu districts. Care was taken to ensure that responses and information given are not just to please the interviewer, and thus it is necessary to clarify responses when and where necessary and ironing out discrepancies and inconsistencies.

Data collected from such field survey will be computerized and analyzed by the software Statistical Package for Social Science (SPSS).

3.5 Field observations

To gain first hand look and experience, the survey teams also made trips to several locations around the study areas to ascertain the local infrastructure facilities and amenities available to the communities, like the overhead power lines and electricity supply, water pipelines, water headwork and water supply, conditions of roads, availability of bridges, medical services, schools, shops, farmlands, recreational facilities for children, and the general topographical conditions of the areas. These field observations allowed us to have a clearer knowledge and understanding of the study area and the various topics under study, as well as to have conversations with the local people.

3.6 Data analysis

Data from different sources are gathered and collected for this survey purpose, and these data come in different format. Generally, data may come from secondary and primary sources, and in either quantitative or qualitative formats. Data collected are filtered, sorted, and analyzed to support the researches, surveys and findings.

Different types of analysis methods and tools are performed on different types of data.

3.6.1 Secondary sources

Different types of secondary data are collected for this survey. Some of the qualitative data collected include reports and literatures from government agencies, journals, convention papers, relevant publications, photographs and maps of the study area etc. These articles are sorted and arranged for literature review and to support the research findings. Maps and satellite images are overlaid to view the differences and changes at the study area over a period of time, like development activities, construction of roads, bridges, movements of local communities, local agricultural and forestry activities.

Statistical reports and year books from local councils, authorities, government agencies etc. are also gathered for better understanding on the history and behavior of the local indigenous communities.

3.6.2 Primary sources

Primary data are also collected from the survey site for detailed study on the local populations and features of the study area. Qualitative data in the form of interviews, dialogues, and discussions with key person in the study area etc. are collected for better understanding on the way of life and perceptions of the local communities. Photographs taken from the site through sight inspections and during interview sessions are also included for clearer illustrations on some of the site features and characteristics.

Quantitative data from the site through the pre-designed survey questionnaire questions, interviews, and observations are collected, and are computerized for effective analysis using SPSS software. Various types of tests and analysis are possible from the software to meet the different survey objectives.

3.6.3 Quality-index

One of the objectives of this study is to see how the different types of road would affect the quality of life and the socio-economic status of the local communities under study. Under the survey, questions on the availabilities of various basic amenities were included in the questionnaire to capture the abilities of the respondents in furnishing such facilities to satisfy their needs.

In order to effectively compare the standard of living and the quality of life of the respondents living along the different types of roads, *values* are assigned to each basic amenity as listed in the questionnaire, according to their priorities in supporting the needs of some basic quality of life. Individual household families with their feedback on the availabilities of these amenities are judged based on the same set of values assigned. Cumulative totals are generated by SPSS to derive a *quality-index* to compare such scores. The value scheme is as tabulated in Table 4.

Under such judging system, household with better quality of life would score higher value in this evaluation than those with poorer quality of life. The best quality of life would score the maximum value of 21.

Quality-indexes from the different households of different localities with different road types are therefore, reliable sources of information for comparisons on the quality of life of the local populations. The effects of the different road types on the local communities could then be derived and compared.

3.7 Strengths-Weaknesses-Opportunities-Threats (SWOT) Analysis

For effective analysis on the roles of the different types of roads in the study area in alleviating poverty and inaccessibility problems of the local communities, this dissertation has deployed the SWOT analysis, whereby perceptions and responses from the local communities were gathered and categorized under the four areas of: -

- *Strength* - where the responses from the respondents have indicated that roads and accessibilities have brought them betterment;
- *Weakness* - where the responses from the respondents have shown that roads and accessibilities have brought them more worries than good;
- *Opportunity* - where the survey shows that roads have brought hopes to the people;
- *Threat* - where the survey feedback have shown that roads and increased accessibilities have brought them more troubles and good.

By having a good summary of their feedback, and by comparing the numbers of responses in each area, the survey could comment on the perceptions of the people pertaining to the roles of roads and accessibilities in the study area.

Table 4 – Values assigned to variables and their justification in Quality-index

Variables	Values	Justifications
Motor Vehicle	Available=1, Not available=0	Availabilities of such basic amenities signify the better quality of life and the standard of living of the respondents, thus are given higher value of "1"
Motorcycle	Available=1, Not available=0	
TV/Satellite dish/VCD	Available=1, Not available=0	
Refrigerator	Available=1, Not available=0	
Chainsaw	Available=1, Not available=0	
Sewing Machine	Available=1, Not available=0	
Sofa Seats	Available=1, Not available=0	
Hand phone	Available=1, Not available=0	
Electric Fan	Available=1, Not available=0	
Radio	Available=1, Not available=0	
Telephone	Available=1, Not available=0	
Clock	Available=1, Not available=0	
Gas Stove	Available=1, Not available=0	
Types of Building Materials	Concrete+Tiles=3, Concrete+zinc=2, Half-wood+Atap=2 Wood+atap=1	Values are assigned and ranked with the quality of residence owned by the resident, "3" being the best type of residence and "1" being the lowest quality residence
Electricity Supply	SESCo=1, Generator=1, No-electricity=0	Same value for both power supply systems as electricity is of basic needs compared to no electricity power supply
Type of Toilet	Flush=1, Other types=0	Values are assigned and ranked with the quality of toilet system owned by the resident
Type of Kitchen	Gas=1, Other types=0	Values are assigned and ranked with the quality of kitchen stove owned by the resident
Type of Water Supply	JKR-piped=2, Gravity-feed=1, Rain or Well=0	Values are assigned and ranked with the quality of water for consumption received by the resident, "2" being the best treated water supply from JKR and "0" for rain water or well

3.8 Comments on methodology

Taken all research instruments as a package together, our above research instruments can be considered as a form of Rapid Rural Appraisal (RRA) method. In its simplest form, RRA utilizes grassroots research to identify the problems, goals and strategies of households in particular and a community in general. It uses existing knowledge and issues to directly address the relevant issues at hand.

RRA normally involves teamwork, with the teams comprising people from various disciplines. This inter-disciplinary teamwork approach immediately removes the danger of single-perspective bias that can be caused by either a researcher working in isolation, or by a team comprising people from the same technical discipline. RRA is ideally suited for this research study, which is carried out over a short 2-week time frame.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.0 Data Analysis on Findings and Discuss

This chapter of the dissertation highlights the analysis of the data collected from the field survey, the findings derived from such analysis, and general discussions on the topics under studied in this essay, as stipulated in the General Objectives and Specific Objectives.

4.1 General characteristics of the study area

While carrying out the field site survey on the respondents of the Bau and Lundu Districts, the following features and characteristics of the survey site are sighted through observations.

4.1.1 Trunk road

There are infrastructure developments along the stretch of trunk road from Batu Kawa to Bau-Lundu Junction as shown in Figure 1. Water pipes, overhead SESCo power lines, telephone services and proper road signage as in Figure 2 are seen. There are also businesses, agricultural activities and fishing ponds along the trunk road side.

Figure 1 – Water pipe and infrastructure works along Batu Kawa-Bau trunk road

Figure 2 – SESCo and telephone overhead lines along Batu Kawa-Bau trunk road

The stretches of trunk road from Bau to Lundu are of similar characteristics. There are more business activities along the roadside, and in front of the kampong as shown in Figure 3. Religion gathering premises like churches and masjid are also sighted. Council services from MDB like garbage collection bins are seen as in Figure 4.

Figure 3 – Economic activities along Bau-Lundu trunk road

Figure 4 – Council services and SESCo overhead lines at Bau-Lundu trunk road

Ferry services like in Figure 5 are still in operation at the Sungai Batang Kanyan, with 18 hours of ferry services from 6am to 12 midnights daily. The new bridge crossing the river is near completion as shown in Figure 6, and would be opened for traffic by

July 2005. Accessibility of the Lundu population will improve with the opening of the new bridge.

Figure 5 – Existing ferry services at Sg. Batang Kayan, along part of the Bau-Lundu trunk road

Figure 6 – Construction of bridge across Sg. Batang Kayan, along part of the Bau-Lundu trunk road

4.1.2 Feeder road

Roads are generally smaller than the trunk road, with more intense agricultural activities in the villages along these roads. Oil palm plantations from SALCRA are seen in the Kampung Opar area, with gravel road, all as shown in Figure 7 and 8. SESCo power supply is available along these roads.

Some parts of roads under this category are of gravel surfaces, like Kampung Biawak of Lundu. No SESCo electricity supply is available in such interior areas.

Figure 7 – Existing smaller feeder road with SESCo overlines lines at Kampung Opar

Figure 8 – SALCRA oil palm plantation with gravel road at Kampung Opar

4.1.3 Development road

Though categorized as development road, some parts are having good road surfaces and signage, like the Skebang-Bau Road, Sarasot-Bau Road, or Serikin-Bau Road. There are also businesses along these roads, but less agricultural activities on the roadside. Oil palm plantations are seen along the Serikin-Bau and Sarasot-Bau Roads. Government schools and SESCo overhead lines, like in Figure 9, are also seen along the Skebang-Bau Road.

Figure 9 –School with electricity and water supply at Kampung Skebang, Bau

Figure 10 – Infrastructure work at Kampung Rasau, Lundu

Oil palm plantations from SALCRA are sighted in the Lundu District, the Kampung Rasau and Stungkor Lama. Development activities like construction of culverts and bridges across drains are in progress, as shown in Figure 10.

4.1.4 Other types of road

Certain parts of the interior roads are still gravel, like the Kampung Selampit at Lundu District as shown in Figure 11 and 12. SESCo electricity supply is only for the areas nearer to the trunk road. Water collection tanks for either rainwater or gravity feed water supplies are common along such roads. However, certain parts of this road category are having satisfactory road surfaces, like the Kampung Suba Buan of Bau and Kampung Pandan of Lundu.

Figure 11 – Gravel and dusty road at Kampung Selampit, Lundu

Figure 12 – Electricity supply along interior roads Kampung Selampit, Lundu

4.2 General characteristics of respondents under study

Surveyors from one household call to another carried out interviews and data collection in questionnaires in the study area of Bau and Lundu Districts. Most of these interviews were done in the evening hours when the residents were available at home after their day's work.

4.2.1 Distribution of respondents in the study area

A total of 79 respondents were interviewed in this exercise with 41 of them from the Bau District and 38 of them from the Lundu district. A detailed list of the kampong under survey is as Table 5.

Table 5 – Distribution of household by district under study

District	**Frequency**	**Percent**
Bau	41	51.9
Lundu	38	48.1
Total	**79**	**100.0**

4.2.2 Distribution of respondents by race

Out of the 79 respondents interviewed, their distributions in terms of race are as tabulated in Table 6. Some 61 percent of them are Bidayuh, which is the largest local indigenous community in the study area, nine (9) of them are Malay, four (4) of them are Chinese and the remaining five (5) of other races like Iban and others.

Table 6 – Distribution of interview respondents by race

Race	**Frequency**	**Percent**
Bidayuh	61	77.2
Chinese	4	5.1
Malay	9	11.4
Others	5	6.3
Total	**79**	**100.0**

4.2.3 Distribution of respondents by road types

As this study involves in the different types of access roads and their significances on the local communities, the sample of respondents were randomly selected from the various areas accessed via the various types of roads.

According to the road maps available from Jabatan Kerja Raya, the various types of roads in the study area may be categorised under *trunk road, feeder road, development road* and *other types of road.* Council road in Bau and Lundu town area and coastal road along the coastal area were not included in this survey exercise. Detailed localities of such roads are as in Appendix VII.

The distributions of the respondents in terms of types of roads in the Bau and Lundu areas are as tabulated in Table 7. Some 34.2% of the total respondents are from the trunk-road category representing nine households from Bau and 18 households from Lundu, 21.5% from the feeder road category representing 10 households from Bau and seven households from Lundu, 32.9% of the respondent from the development road category represent 17 households from Bau and nine households from Lundu,

11.4% from the other types of road category, represent five households from Bau and four households from Lundu.

Table 7 – Distribution of respondents by districts and road types

Type of access road to respondent residence	**District/numbers of household under survey**				**Total**	
	Bau		**Lundu**		Total nos. of house-hold	%
	Nos. of household	% within district	Nos. of household	% within district		
Trunk road	9	22.0%	18	47.4%	27	34.2%
Feeder road	10	24.4%	7	18.4%	17	21.5%
Development road	17	41.5%	9	23.7%	26	32.9%
Other types of road	5	12.2%	4	10.5%	9	11.4%
Total	**41**	**100.0%**	**38**	**100.0%**	**79**	**100.0%**

4.2.4 Distribution of respondents by length of stay

Of the 79 respondents interviewed, 15 of them have stayed in their present location for less than 10 years (three in the Bau District, 12 in Lundu District), 22 of them between 11 to 20 years (14 in Bau, eight in Lundu), 17 of them between 21 to 30 years (eight in Bau, nine in Lundu), while 25 of them have stayed more than 30 years in their present areas (16 in Bau District, nine in Lundu District). The details are as in Table 8.

Table 8 – Distribution of household by length of stay in the district

District of household under survey	**Respondent's length of stay**				**Total**
	Less than 10 years	11 to 20 years	21 to 30 years	More than 30 years	
Bau	3	14	8	16	41
Lundu	12	8	9	9	38
Total	**15**	**22**	**17**	**25**	**79**

4.2.5 Distribution of respondents by land status

The respondents surveyed in the study areas are having different types of land ownership status, mainly categorised as *NCR-titled; NCR-non-titled* and *leased.* The distributions of the respondents vide such categories are as tabulated in Table 9.

Table 9 – Distribution of respondents by land status in the district

District of household under survey	**Land status of the respondent**			**Total**
	NCR - titled	NCR – Non-titled	Leased	
Bau	0	41	0	41
Lundu	8	29	1	38
Total	**8**	**70**	**1**	**79**

All of the respondents from the Bau District are NCR-non-titled. Out of the 38 respondents in the Lundu District, eight of them are NCR-titled, 29 are NCR-non-titled and one on leased land. In summary, eight of all respondents are NCR-titled, 70 are NCR-non-titled and one on leased land.

4.2.6 Distribution of respondents by household size

The survey studied the general household size of the respondents in both districts. It is realized that 10 out of the 41 families in Bau have less than five members in each household; 29 have household members ranging from six to 10, and only two families have more than 10 members.

In the Lundu District, 14 out of the 38 families have less than five members in each household; 21 have household members ranging from six to 10, and three families have more than 10 members. The details are as found in Table 10.

Table 10 – Distribution of respondents by household size

Household size	**District of household under survey**		**Total**
	Bau	Lundu	
Less than 5	10	14	24
6 to 10	29	21	50
More than 10	2	3	5
Total	**41**	**38**	**79**

In summary, more than half of the respondents under study, i.e. 50 out of the 79 are having household size ranging from six to 10.

4.2.7 Distribution of respondents by academic performance

One of the study targets of survey in the study areas is to explore the academic performance of the local people, after having provided with better infrastructure facilities and road system. The targeted respondents are those household members having reached school education entry age, i.e. age seven. Infants, kids and the elderly beyond such schooling age are not taken into consideration.

The summary on the numbers of household members having attained the various academic qualifications is as tabulated in Table 11.

Table 11 – Distribution of respondents by academic performance in the study area

Academic performance	**Numbers of individuals**	**Percentage out of total 571 individuals included in the survey**
Degree	16	2.8%
Diploma	19	3.3%
SPM	120	21.0%
PMR	52	9.1%
UPSR	65	11.3%
No formal education	17	2.9%

It is seen that out of the 79 households interviewed in both districts, there are 16 individuals representing 2.8% of the population involved in the survey have achieved university degree qualification, 19 individuals representing 3.3% of the survey population have achieved college diploma qualification, 120 individuals representing 21.0% of the survey population have completed SPM secondary education, 52

individuals representing 9.1% of the survey population are in PMR education, and 65 individuals representing 11.3% of the survey population are still in UPSR primary education. Only 17 individuals, representing 2.9% of the survey population have never attained any formal education.

4.2.8 Distribution of respondents by standard of living environment

It has also been observed during the field survey that most respondents now are able to have cleaner and better living environment, including proper access road, garbage disposal, drainage system etc. As presented in Table 12, only three of the 79 respondents have poor unhygienic living conditions, while the rest of 76 have good hygienic living conditions.

Table 12 – Distribution of household by standard of living environment

Condition of living environment	**Frequency**	**Percent**
Poor	3	3.8%
Good	76	96.2%
Total	**79**	**100.0**

4.3 Road systems in the study area

The survey questionnaires also sought the responses from the respondents on the types of road first constructed near their residence when they first stayed at their villages, and the later development of the road system.

4.3.1 Types of first roads to the residences of respondents

From the survey, it is noticed that first roads constructed to the residences of the respondents before 1980 were mostly jungle tracks (31 out of the 79) and only 16 of them were the dusty type of rocky roads. After 1980, more roads, though rocky and dusty, were constructed than jungle tracks like as illustrated in Figure 13 and 14. Details are as tabulated in Table 13.

Figure 13 – Type of gravel road at Kampung Skebang, Bau

Figure 14 – Type of development road at Kampung Selampit, Lundu

Table 13 – Types of first roads and their year built

Year the first road was constructed	Type of first road to respondent's house		Total
	Dusty & rocky	Jungle track	
1995 to 2000	4	5	9
1990 to 1995	6	5	11
1985 to 1990	8	1	9
1980 to 1985	2	1	3
Before 1980	16	31	47
Total	**36**	**43**	**79**

4.3.2 Development of roads in the study area

The survey later also revealed the length of time such first roads had stayed in the study areas, as illustrated in Table 14 that follows.

Table 14 – Development and re-construction of roads in the study area

Year the first road was constructed	**Year the present road was constructed (Year the first road was re-constructed/upgraded)**						**Total**
	After 2000	1995 to 2000	1990 to 1995	1985 to 1990	1980 to 1985	Before 1980	
1995 to 2000	0	9	0	0	0	0	9
1990 to 1995	1	2	7	1	0	0	11
1985 to 1990	0	2	3	4	0	0	9
1980 to 1985	0	1	0	1	1	0	3
Before 1980	3	17	2	11	9	5	47
Total	**4**	**31**	**12**	**17**	**10**	**5**	**79**

Five of such early roads were re-constructed to the present road type in 1980, 10 were re-constructed from 1980 to 1985, 17 were re-constructed from 1985 to 1990, 12 were re-done between 1990 and 1995, 31 were-re-constructed from 1995 to 2000, and four were upgraded after 2000. The development trend illustrated a steady change on the types and quality of roads since 1980.

Table 15 illustrates the types of the present roads constructed in the study area.

Table 15 - Types of present road and the year they were constructed

Year the present road was constructed	**Type of access road to respondent residence**				**Total**
	Trunk road	Feeder road	Development road	Other types of road	
After 2000	0	0	3	1	4
1995 to 2000	12	3	12	4	31
1990 to 1995	5	3	3	1	12
1985 to 1990	9	5	2	1	17
1980 to 1985	1	2	5	2	10
Before 1980	0	4	1	0	5
Total	**27**	**17**	**26**	**9**	**79**

It can be seen that out of the 27 trunk roads in the study area, the first one was constructed between 1980 and 1985, nine of them from 1985 to 1990, five of them from 1990 to 1995, 12 of them from 1995 to 2000.

Out of the 17 feeder roads in the study area, the first four were done in 1980, two were constructed between 1980 and 1985, five of them from 1985 to 1990, three of them from 1990 to 1995, three of them from 1995 to 2000. Figure 15 has good illustration of the type of upgraded road.

Out of the 26 development roads in the study area, the first was done in 1980; five were constructed, as shown in Figure 16, between 1980 and 1985, two from 1985 to 1990, three between 1990 and 1995, 12 of them from 1995 to 2000 and three after 2000.

Figure 15 – Type of upgraded feeder road at Kampung Stass, Bau

Figure 16 – Type of re-constructed development road near Rasau, Lundu

For the other types of roads, two were done between 1980 and 1985, one from 1985 to 1990, one between 1990 and 1995, 4 of them from 1995 to 2000 and one after 2000.

It has to be noted here that considerable length of time, sometimes over span of years, are required in the construction and upgrading of roads, and the survey above only revealed the completed time, not taking into consideration the planning and design period.

4.4 Effects of roads on accessibilities and mobility

Access roads are of importance to the local communities in terms of accessibility and mobility. The survey also looked into the effects of the existing access roads on the respondents.

4.4.1 Distribution of respondents by frequency of travelling

The survey questionnaires studied into the ability of the respondents to travel, and their frequencies in using such access roads. By travel, the survey means the usage of such existing access roads to and fro their residence and destinations like towns, bazaar, shops, workplace, recreational venues, schools and so on.

Table 16 – Distribution of household by travelling pattern and purpose

Traveling pattern and frequency	**Purpose of traveling to town/bazaar/city**					**Total**
	School	Purchase of goods	Sales of products	Leisure	Work	
Daily	2	16	13	15	8	54
Twice weekly	0	12	4	4	0	20
Once weekly	0	2	0	0	0	2
Once monthly	0	3	0	0	0	3
Total	**2**	**33**	**17**	**19**	**8**	**79**

It is shown in the Table 16 that 54 out of the 79 respondents travel by the road daily, 20 of them travel at least twice a week, two of them travel at least once weekly, and three of them once in a month.

Most people commute for the purpose of schooling, procurement of household items, sales of agricultural or homemade products, leisure or for work.

Out of these purposes, 33 of them travel to purchase household items, 19 of them travel to the nearest town or bazaar for leisure, 17 of them travel to trade, eight of them to work, and two respondents who are still students travel to school daily.

4.4.2 Distribution of respondents by method of getting medical care

With the existing access roads, the local communities are able to enjoy better facilities and treatments like medical services. The survey also studied into the availabilities of such medical services, and where do the respondents usually seek for such services.

Table 17 – Distribution of respondents by method of getting medical care

District of household under survey	**Where does respondent seek medical care**		**Total**
	Government health clinic	District hospital	
Bau	0	41	41
Lundu	35	3	38
Total	**35**	**44**	**79**

As shown in Table 17, all the 41 respondents from Bau Districts seek medical services from the Bau District Hospital, which is located near the town. However, only three respondents out of the 38 from Lundu seek medical services from local Klinik Desa, which are available in the inner remote areas of the district. Only three of them seek medical help from the Lundu District Hospital in the town.

These uneven distributions of visits to the district hospitals versus health clinics in the two districts may be due to the locations of the hospitals, and the road networks. In Bau District, though the hospital is in town, it can be easily accessed from all parts through the efficient road networks and good road conditions. However, due to long trunk road and scattered villages in the remote areas along development and feeder roads, though the hospital is in town, the government has also provided seven health

clinics in these remote areas for easy accesses. Chapter II has the detailed locations of these hospitals and health clinics.

4.5 Perceptions of the respondents on the effects of roads, accessibilities and mobility

One of the survey methodologies deployed in the survey is the social impact assessment (SIA) whereby responses and perceptions of the respondents towards the development activities are collected and studied.

With the constructions and availabilities of such road systems in the study area, the survey also wishes to study the perceptions of the local communities towards such developments, and their expectations from such changes.

As whether poverty among the local communities could be eradicated with improved accessibility in the study areas is one of the topics to be studied in this survey, questions related such issues were asked, including *economic status, employment opportunities, human rights, education opportunities, availabilities of amenities, family harmony,* and *traditional culture.*

The tabulated summaries in Table 18 show the responses from the survey on some issues under study. Some 72 of the respondents agreed that with the availabilities of roads, the revenue and income for their families have thus increased, through better trade, work opportunities, and out of the 79 respondents, 78 of them actually expect more benefits than what they are enjoying now. Some 68 of the respondents are now

willing to stay-put in their home villages as there are more opportunities and they don not need to travel far such to seek for better living.

Table 18 – Numbers of household and their perceptions on increased income, better job opportunities, deprived land-rights, expected benefits and acceptance on road network

Topics in discussion	**Agreed/Yes**	**Disagreed/No**
Roads have increased revenue and income for family	72	7
Willing to stay-put in village as there better job opportunities now	68	11
Land-rights have been deprived of due to intruding outsiders	8	71
Would expect more benefits from the improved rural road network	78	1
Good accessibilities by road well received by family	79	0

On the issues of traditional rights, there are eight respondents, who expressed concern over the deprivation of their rights as they can now see outsiders intruding their areas for trade and agricultural activities or job opportunities. However, all the 79 respondents revealed that the availabilities of roads and improved accessibilities to better amenities have been well received by all members of their families.

The following sections will reveal on the responses from the respondents on how the availabilities of roads have affected their way of life. Questionnaires with grades ranges from *(5) Strongly Agree; (4) Agree; (3) No Comments; (2) Disagree; (1) Strongly Disagree* were asked and feedbacks collected.

4.5.1 Economic opportunities and agricultural activities

Some topics pertaining to agricultural activities and resultant the economic opportunities are also included in the survey. These aims in getting responses from the local communities on how with the availabilities of roads could have affected them.

Table 19 – Frequency and percentage of respondents by their perception on various aspects of agricultural practices they are involved in

Perceptions of respondents under survey	**Issues under discussion**							
	Able to send more agricultural products for sale with ease		Able to sell agricultural product afresh, better business		Able to use more fertilizers for diversified farming, better productivity		Able to use machineries, tools and new techniques for better productivity	
Strongly agree	39	49.4%	39	49.4%	26	32.9%	28	35.4%
Agree	38	48.1%	38	48.1%	47	59.5%	38	48.1%
No comments	2	2.5%	2	2.5%	6	7.6%	13	16.5%

From the summary in Table 19, about 98.5% of the respondents agree that the availabilities of roads allow them to send their fresh agricultural products for sales with ease and therefore for better income. Two of the respondents gave no comments on the statement. About 82.4% of the respondents agree that they are now able to practise diversified agricultural farming with fertilizers, with six respondents not commenting. Some 83.5% of them agree that they are now able to use machineries and newer agricultural techniques for better farm productivity. There were 13 who wished to give no comment.

4.5.2 Educational opportunities

The issue of whether the local population have better opportunities in terms of education for their younger generations was of utmost interest during the survey.

Some 97.5% of the respondents agreed on the idea that with improved accessibilities, their children could now enjoy better education and with reduced absenteeism. There were two respondents who did not give any comments. On similar note, about 93.7% of the respondents agreed that their children could now have better access to library books and teacher guidance, with five respondents not giving any comment. Some 91.2% of the respondents agreed that their kids can now have better interactions with peers for discussions and class work but seven of them gave no comments. Of the people interviewed, 92.4% agreed with the fact that their children could now have better access to higher education outside their villages. However, there are five who gave no comments and one respondent who disagreed. The details of such survey are in Table 20. Figure 17 and 18 show some of the schools in the study area.

Figure 17 – Secondary school along Bau-Lundu trunk road

Figure 18 – Primary school along trunk road near Lundu

Table 20 – Frequency and percentage of respondents by their perception on educational opportunities

Perceptions of respondents under survey	**Issues under discussion**							
	Children can attend school with ease, less absenteeism		Children have accesses to libraries books and teachers' guidance		Children can have more intellectual interactions with peers		Children can have easier access to higher education outside village area	
Strongly agree	48	60.8%	36	45.6%	33	41.8%	36	45.6%
Agree	29	36.7%	38	48.1%	39	49.4%	37	46.8%
No comments	2	2.5%	5	6.3%	7	8.9%	5	6.3%
Disagree	0	0.0%	0	0.0%	0	0.0%	1	1.3%

4.5.3 Availabilities of amenities

It has always been said that better road access would lead to better infrastructure facilities like electricity and water supply, medical care, postal and other communication services.

The field survey revealed that about 98.8% of the people agreed that they could have efficient electricity supply from the authority, as there are good road accesses. However, on the issue of water supply, responses from the people varied. About 83.6% of the people commented that they can have efficient water supply after the improved road accesses, however, there are 7.6% of the people who disagreed with such statement, with 8.9% of them not revealing any comments.

Similarly on the medical care from the government, about 95% of the people agreed that they can now enjoyed better medical care from government clinics and hospitals.

However, one respondent disagreed with such statement and three other respondents not having any comments on the availabilities of medical care.

For postal and communication services, 82.3% of the respondents agreed that they can now enjoy better delivery and services. However, there are two respondents who disagreed and 12 of them, or 15.2% of the respondents not giving any comments on such statement. The detailed illustrations are as in Table 21.

Table 21 – Frequency and percentage of respondents by their perception on the availabilities of basic amenities

Perceptions of respondents under survey	**Issues under discussion**							
	Availability of roads can bring efficient electricity supply		Availability of roads can bring efficient water supply		Availability of roads can bring efficient medical services		Availability of roads can bring efficient postal and communication services	
Strongly agree	54	68.4%	39	49.4%	33	41.8%	29	36.7%
Agree	24	30.4%	27	34.2%	42	53.2%	36	45.6%
No comments	1	1.3%	7	8.9%	3	3.8%	12	15.2%
Disagree	0	0.0%	3	3.8%	1	1.3%	2	2.5%
Strongly disagree	0	0.0%	3	3.8%	0	0.0%	0	0.0%

4.5.4 Miscellaneous

Lack of good family ties and union is one of the contributing components to poverty. Some 97.5% of the respondents agreed that with better roads, they could now enjoy better family ties like regular meetings and get-together with relatives during festive seasons and family occasions. There were two respondents who refused to comment.

Of the total interviewees, 98.7% agreed that better roads can bring better living environment with good supply of household items, but there was one respondent who did not comment on such statement.

On job opportunities, 93.7% of the respondents commented that better roads would bring better job employment opportunities. However, five of them gave no comment on the statement. On similar note, 93.7% of the interviewees agreed that there are better land developments with improved road accessibilities, but there were five respondents who gave no comments on the statement. Details of such responses are as in Table 22.

Further surveys on the perceptions of the respondents on the effects of road accesses to their communities were also carried out. As these survey questions concerned with mainly non-physical and abstract issues, responses from the local people varied widely.

Table 22 – Frequency and percentage of respondents by their perception on family ties, quality of life, employment opportunities and land development

Perceptions of respondents under survey	**Issues under discussion**							
	Availability of roads can bring better family ties		Availability of roads can bring better quality of life, cleaner environment & good supply of household items		Availability of roads can bring better employment opportunities		Availability of roads can bring better land development	
Strongly agree	35	44.3%	28	35.4%	30	38.0%	32	40.5%
Agree	4	53.2%	50	63.3%	44	55.7%	42	53.2%
No comments	2	2.5%	1	1.3%	5	6.3%	5	6.3%

Table 23 clearly illustrates the distribution of the respondents and their perceptions on topics discussed.

Table 23 – Frequency and percentage of respondents by their perception on cultural values, differences and impacts of different road types, and stable ruling government

Perceptions of respondents under survey	**Issues under discussion**							
	Availability of roads deteriorate traditional cultural values		Paved roads can bring better development than unpaved roads		Trunk roads can bring more adverse impacts than interior roads		Only stable ruling government can bring better roads to villages	
Strongly agree	4	5.1%	48	60.8%	4	5.1%	48	60.8%
Agree	9	11.4%	29	36.7%	9	11.4%	29	36.7%
No comments	10	12.7%	2	2.5%	10	12.7%	2	2.5%
Disagree	17	21.5%	0	0.0%	17	21.5%	0	0.0%
Strongly disagree	39	49.4%	0	0.0%	39	49.4%	0	0.0%

On the issue of cultures of the local indigenous people, only 16.5% agreed that the availability of road would deteriorate their traditional cultural values, with 10 respondents giving no comments. 70.9% of the interviewees disagreed that their cultural values had been jeopardized.

A total of 97.5 of the respondents commented that the conditions of road have effects on its contributions towards rural development. They agreed that paved road could bring better development then unpaved roads.

On a reverse note on whether trunk road would bring more adverse impacts to the people than interior roads like development or feeder roads, 51.9% agreed with such statement, but 29.1% of them were of the idea that trunk roads would not necessarily

bring more adverse impacts than other types of interior roads. Eleven respondents had chosen not to comment on the statement.

When asked during the interview that whether a stable ruling government is required and able to bring better roads to the local villages, 97.5% of the interviewees agreed with only 2 respondents who did not comment on such statement.

4.6 Other effects of different road types

One of the objectives of this study is to see how the different types of road would affect the quality of life and the socio-economic status of the local communities under study.

4.6.1 Quality of life

Under the survey, questions on the availabilities of various basic amenities were included in the questionnaire to capture the abilities of the respondents in furnishing such facilities to satisfy their needs. A quality-index system, as described in Chapter Three, was designed and used to test, and analyze on the quality of life of the households under survey, based on the availabilities of basic amenities and household items in their residence.

As tabulated in Table 24 below, the highest score attained among the 79 respondents is 20, while the lowest is seven (7). With 21 as the maximum, it shows that 98.7% of the respondents are living in above then average quality of life.

Table 24 – Quality-index of respondents and their representing percentage

Score of Quality-index	Frequency	Percentage
7.00	1	1.3%
11.00	2	2.5%
12.00	3	3.8%
13.00	10	12.7%
14.00	5	6.3%
15.00	9	11.4%
16.00	14	17.7%
17.00	17	21.5%
18.00	12	15.2%
19.00	5	6.3%
20.00	1	1.3%

One of the judging criteria for the quality of life is the type of building materials the residence have for their houses. Figure 19 and 20 show some of the houses along the different types of road in Bau and Lundu District respectively.

Figure 19 – Types of houses along development road seen near Bau

Figure 20 – Type of modern residences seen along trunk road near Lundu

In relation to the quality of life of such respondents living along the various types of roads under study, the summary as tabulated in Table 25 shows that respondents domiciled along the different types of roads have different standard of living and quality of life. Standard deviations ranging from 1.83 to 2.93 show that the survey results are acceptable.

The respondents are enjoying the mean score of 16.67 along the trunk roads, 15.00 along the feeder roads, 15.11 along the development roads, and 16.22 along the other types of road.

Table 25 – Main value of quality-index along the different types of access road

Type of access road to respondent residence	**Mean value of quality-index**	**Numbers of household**	**Standard Deviation**
Trunk road	16.6667	27	1.83973
Feeder road	15.0000	17	2.93684
Development road	15.1154	26	2.19685
Other types of road	16.2222	9	1.85592

4.6.1.1 One-Way ANOVA test

One-way ANOVA test from SPSS shows an F value of 2.988, significant at P = 0.036. This illustrates that there are significant differences on the quality of life and standard of living of the local communities living along the different types of roads in the study area.

4.6.1.2 Post-Hoc test

The above analysis is done for the combined groups of road types on the quality of life and standard of living in general. However, the Post-Hoc test from SPSS, as shown in Table 26, shows different significance values between and within the different types of road.

Table 26 – Post-Hoc test showing the different significance values between different types of road

(I) Type of access road to respondent residence	**(J) Type of access road to respondent residence**	**Mean Difference (I-J)**	**Std. Error**	**Sig.**
Trunk road	Feeder road	1.66667	0.69159	0.131
	Development road	1.55128	0.61376	0.104
	Other types of road	0.44444	0.85976	0.966
Feeder road	Trunk road	-1.66667	0.69159	0.131
	Development road	-.11538	0.69671	0.999*
	Other types of road	-1.22222	0.92081	0.625
Development road	Trunk road	-1.55128	0.61376	0.104
	Feeder road	0.11538	0.69671	0.999
	Other types of road	-1.10684	0.86388	0.652
Other types of road	Trunk road	-0.44444	0.85976	0.966*
	Feeder road	1.22222	0.92081	0.625*
	Development road	1.10684	0.86388	0.652*

* - Significant at 5 percent

There are differences in the quality of life and standard of living for the local communities living along the various types of road: -

- Between *Feeder Road* and *Development Road*
- Between *Other Types of Road* and *Trunk Road*
- Between *Other Types of Road* and *Feeder Road*
- Between *Other types of road* and *Development Road*

4.6.2 Socio-economical Status

Another aspect of the respondents this survey studied is the socio-economical status, including the types of occupations they are able to work as, and the financial income they are able to get from their work activities or employment.

The survey showed that out of the 79 respondents, 18 of them are full time farmers; 53 of them are workers employed in the various employment sectors either in Bau, Lundu or Kuching. Of the 53 employed, 10 are engaged in private sector employment, 43 in public sector and as civil servants. One respondent is an employer operating his own business; and seven respondents are engaged in other work activities. Details of such findings are in Table 27.

Table 27 – Distribution of household by types of occupations

Types of occupation	**Frequency**	**Percent**
Farming	18	22.8
Employed		
Private sector	10	12.7
Civil servant	43	54.3
Employer	1	1.3
Others	7	8.9
Total	**79**	**100.0**

The level of financial income from these different occupational activities also varies, with a skewed distribution, due to the sole respondents who is businessman receiving high monthly income, while the rest of the respondents are mere wageworkers or peasant farmers. The imbalanced distributions and the median of their monthly income are as tabulated in Table 28.

Table 28 – Distribution of household by monthly income by various occupations

Occupation of the respondent	**Mean**	**N**	**Standard Deviation**	**Median**
Farming	769.28	18	521.177	536.00
Employed	1598.88	52	801.540	1360.00
Employer	8000.00	1	.	8000.00
Others	3017.86	7	4270.410	1000.00
Total	**1616.84**	**78**	**1668.010**	**1227.50**

Median value is used in this respect since there is high standard deviation; apparently due to the high income from the sole employer. The report shows that the respondents in the study area generally have a median income of RM536.00 from farming activities, RM1 360.00 from waged employment, and RM1 000.00 from other income generating activities.

The study also shows that monthly financial incomes received from the various types of occupations along the different types of roads are different. Table 29 details and elaborates the monthly financial incomes along the different types of road.

It can be shown here that farming activities along the *trunk road* generally yield higher income than those along the various different types of road, with exception of the sole farmer along *other types of road.* It is observed that farmers living along better roads, like the *trunk road,* are able to have efficient accesses to the market place, thus better businesses.

People residing along the *development road* in the study area could also draw higher salaries from employment, in terms of work frequencies, availabilities of employment opportunities, than those along the various types of roads. However, people residing along the *trunk road* outplay those along the other categories of roads in other work activities, like ad hoc employments, co-agricultural/employment activities and so on.

Generally, monthly incomes are quiet evenly distributed along the various types of roads in the study area.

Table 29 – Distribution of household with their monthly income along the different types of road

Occupation of the respondent	Type of access road to respondent residence	Mean	N	Std. Deviation	Median
Farming	Trunk road	696.00	4	363.553	612.00
	Feeder road	966.67	3	968.366	500.00
	Development road	656.30	10	392.931	536.00
	Other types of road	1600.00	1	.	1600.00
	Total	**769.28**	**18**	**521.177**	**536.00**
Employed	Trunk road	1774.14	21	929.837	1317.00
	Feeder road	1451.55	10	605.881	1410.00
	Development road	1619.38	13	607.277	1500.00
	Other types of road	1289.63	8	934.416	1100.00
	Total	**1598.88**	**52**	**801.540**	**1360.00**
Employer	Feeder road	8000.00	1	.	8000.00
	Total	**8000.00**	**1**	**.**	**8000.00**
Others	Trunk road	6350.00	2	7990.307	6350.00
	Feeder road	2712.50	2	3235.014	2712.50
	Development road	1000.00	3	500.000	1000.00
	Total	**3017.86**	**7**	**4270.410**	**1000.00**
Total	Trunk road	1953.37	27	2211.792	1200.00
	Feeder road	1927.53	16	1979.683	1410.00
	Development road	1177.50	26	683.063	1212.50
	Other types of road	1324.11	9	880.167	1200.00
	Total	**1616.84**	**78**	**1668.010**	**1227.50**

CHAPTER FIVE

CONCLUSIONS

5.0 General Conclusion of the Survey

This concluding chapter will first review the study objectives as spelt out in Chapter One. Having achieved these objectives, it is able to summarise here the findings from the data analysis on data collected during the field survey, which have already been elaborated in detail in Chapter Three. Perceptions of the local people on various key issues as well as their expectations from the rural development activities are also enlisted herewith.

Based on all these, a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis for the study area is also carried out. Major issues relating to accessibilities of the study area from the various perspectives were also discussed to arrive at the final conclusion on the matter.

5.1 Review of objectives

Like as stated in Chapter One, the general and specific objectives of this study are as stipulated overleaf: -

5.1.1 General objectives

This survey aims to study into the quality of life, standard of living and the socio-economic status of the local communities of Bau-Lundu areas, hoping to establish the linkages between the different types of road systems and their impacts on the economic growth and activities, leading to poverty alleviation and eradication.

- *To study the quality of life and socio-economic status of the various local communities along the trunk road and the other different categories of rural roads in Bau-Lundu areas;*

5.1.2 Specific objectives:

The survey aims to achieve the following specific study objectives: -

- *To study the effectiveness of the different types of roads in Bau-Lundu areas in overcoming the problems of inaccessibility to the rural communities;*

- *To study the impacts of the different types of roads on the local communities in Bau-Lundu areas;*

- *To study the perceptions of the various local communities along the different types of roads in Bau-Lundu areas towards the current infrastructure developments*

5.2 Achievement of objectives

Through the use of our various research methods and instruments as outlined in Chapter Two, the survey study has been able to achieve the above objectives during the field survey trips. Specifically, the survey has performed the following activities:-

- Carried out preliminary site research via observations and discussions with officers from the relevant government agencies with a view to gather more information on the study areas;
- Gather information on the physical and demographic characteristics of the study areas using maps, satellite images;
- Design survey tools like interview questions, questionnaire and discussions with UNIMAS resource persons on the scope of information required;
- Brief and dialogue sessions with ground survey teams on the scope of questionnaire and interview surveys, and the expected survey return;
- Carry out site survey with sight observations, interviews, dialogue sessions and questionnaire;
- All data collected from survey are entered to SPSS software for efficient analysis.

5.3 Observations and main issues

From our analysis of data gathered from the survey, the following are some of the observations and main concerns pertaining to the study areas, its local indigenous communities, and their well being, demographically and socio-economically.

- Generally, all areas in the Bau and Lundu Districts are accessible by roads. Though categorized under the respective standards of roads, the road qualities vary but most of them are safe roads passable by motor vehicles;
- Most early roads have been re-constructed or upgraded to better quality and infrastructures, therefore have improved accessibilities to the rural areas;
- Local communities of various races are able to live harmoniously with each others, though majorities of the them are of Bidayuh origin;
- Most of these communities have stayed more than 10 years, some as long as more than 30 years. These are signs to prove sustainability in the living conditions of the study area;
- There have been fair opportunities for the local populations in terms of education, as majority of the respondents are able to achieve good academic qualifications;
- Besides educational opportunities, most people are now able to enjoy good accesses to medical care, good supply of sundry and household items, increased financial income etc.;
- Generally there are differences between the quality of life of the communities living along the trunk road with that of the other types of roads;

5.4 Perceptions of local communities

Summarizing from our research and findings, as well as opinions of the local communities of the study areas: -

- Generally, the people are happy with the development activities implemented by the government, especially on the construction of roads and improved accessibilities to the rural areas;
- Majority of the people agree that there have been increases in opportunities for them in terms of economic activities, financial income, improved agricultural productivity, and education for the younger generations;
- The local communities are happy to enjoy the availabilities of electricity and water supplies, medical care and better communications;
- They are generally glad that families ties and union have improved due to the good accessibilities by road;
- Certain percentage of the local communities are concerned over the increasing deteriorated traditional cultural values, as better accesses to the 'outside' world would prompt their younger generations to be 'westernized' with different cultures;
- Generally, the local people agreed on the fact that rates of rural development are affected by the conditions of the road, i.e. better road quality would bring more development and better quality of life than lower quality roads;
- Majority of the local communities agreed that only a stable and strong ruling government is able to provide them with such good road systems and rural development.

5.5 SWOT analysis

Based on the data gathered, the survey also presents a SWOT analysis for the study area, as tabulated in Table 30.

Table 30 – The *strengths, weaknesses, opportunities* and *threats* of SWOT analysis

Strengths	**Weaknesses**
• Increased financial income • Improved accessibilities by roads • Able to enjoy better amenities like electricity and water supplies • Improved family ties • Able to practise diversified agricultural activities • Children are able to get better education • Better living environment, less dust and health hazard from dusty roads • More rural folks are willing to stay back for work or employment in the rural villages • Good accessibilities are well accepted by all in the local communities	• Some land rights may be at stake as outsider may trespass for economic or agricultural activities • Local people may tend to spend more as they are opened to more leisure and entertainment opportunities • Some youngster may prefer to work outside as they claim they commute to and from their workplace daily • Construction of roads may have caused adverse impacts top the environment, like the water catchment areas (for gravity feed water supply)
Opportunities	**Threats**
• Increased educational opportunities • Increased economic opportunities • Increased agricultural opportunities • Increased employment opportunities • Increased opportunities to travel on better roads, thus safer and more comfortable • Able to seek efficient medical cares fast	• Opened to 'westernized' culture • Increased deteriorated traditional cultures • Intrusions by outside communities

Irrespective to the types of roads the local communities are dwelling along, the above suggests that the study area and its local communities are enjoying more opportunities than threats, and has more strengths than weaknesses.

5.6 Accessibilities by different types of roads and their roles

As shown from the data collected, and the SWOT analysis, it is apparent that majority of the local communities are agreeable to the facts that good accessibilities by road are able to bring more development and improvement to the quality and way of life of the rural people.

As shown in the column on the perceptions of the local people on *whether paved roads can bring better development than unpaved roads,* majority of the respondent agreed that the conditions of the road matters.

Also, as analyzed via the SPSS on the Quality-Index, with respect to the availabilities of basic living amenities and monthly income, in relation to the locations of the respondents along the different types of roads, there are significant differences on how the *trunk road* differs from the other types of roads.

The One-Way ANOVA test from SPSS shows an F value of **2.988**, significant at P = **0.036**. This illustrates that there are significant differences on the quality of life and standard of living of the local communities living along the different types of roads in the study area.

REFERENCES

Anand, S. (1983), *Inequality and Poverty in Malaysia, Measurement and Decomposition, A World Bank Research Publication,* Oxford: Oxford University Press

Bayes, A. (2003), *Beneath the Surface, Roads, Electrification and Poverty Reduction,* The Daily Star 4 (206), accessible http://www.thedailystar.net/2003/12/24/d31224020328.htm, accessed 7th March 2005

Bayes, A. (2003), *Beneath the Surface, Roads, Electrification and Poverty Reduction,* The Daily Star 4 (206), accessible http://www.thedailystar.net/2003/12/24/d31224020328.htm, accessed 7th March 2005

Dandot, W.B. (1999), *Bidayuh Culture and the New Reality: The Contextual and Conceptual Framework,* Sarawak Development Journal 2 (2): 42-58

Ganon, C. and **Z Liu,** (1997), *Poverty and Transport, TWU-23 Discussion Paper World Bank,* accessible http://www.worldbank.org/html/fpd/transport/publicat/twu-30.pdf, accessed 1st March 2005

Gilbert, N. (1993), *Researching Social Life,* London: SAGE Publications

Grand, J.L., C. Propper, and **R. Robinson,** (1992), *The Economics of Social Problems Third Edition,* London: The MacMillan Press Ltd.

Henderson, A.M., and **T. Parsons,** (1993), *The Theory of Social and Economic Organization by Max Weber,* New York: The Free Press

Husain, A. (1996), *Regional Development in Malaysia*, Jurnal AZAM – Development Issues in Sarawak XII (1): 9-11

ICTU (2005), *Sarawak Online Towards a Knowledge-based Sarawak,* accessible http://www.sarawak.gov.my/contents/general-info/general-info.shtml, accessed 30th March 2005

Kasim M.Y. (1990), *Development Policies and Strategies of Sarawak in Relation to Malaysia's Economic Development,* Socio-Economic Development in Sarawak, Policies and Strategies for the 1990s, Angkatan Zaman Mansang (AZAM)

Lichfield, N. (1996), *Community Impact Evaluation,* London: University College London (UCL) Press Limited

Malaysian Information Services (1990) *Sarawak Report (1963-1983),* Malaysian Information Services, Sarawak

Malaysian Information Services (1993) *Sarawak 30 Years of Independence within Malaysia* (1993), Malaysian Information Services, Sarawak

Minos, P. (2000), *The Future of the Dayak Bidayuhs in Malaysia*, Kuching: Lynch Media & Services

MIDCom (2005), Ministry of Infrasturcture Development and Communications http://www.midcom.sarawak.gov.my/web/web_eng/lin_7.html, accessed 27th March 2005

Neubeck, K.J. (1979), *Social Problems A Critical Approach Third Edition*, USA: McGraw-Hill, Inc.

Ngah, I. (2003), *Rural Sustainability: An Examination of the Practice of Sustainable Development, Principles in a Rural Community in Malaysia*, Planning Malaysia – Journal of the Malaysia Institute of Planners 1: 55-70

Offer, A. (1996), *In Pursuit of the Quality of Life*, New York: Oxford University Press Inc.

PIARC – World Road Association. (1999), *Asian Highways and Rural Roads and Development XXIst World Road Congress 3rd-9th October 1999 Kuala Lumpur*

PIARC – World Road Association. (1999), *PIARC Activity Report 1996-1999, From Montreal Congress (September 1995) to Kuala Lumpur (October 1999)*

Rahman, A. (2000), *Effective Model for RGC Development*, Sarawak Development Journal 3 (1): 98-107

SPU (1994) *Sarawak Economy in Facts and Figures* (1994), State Planning Unit Chief Minister's Department, Kuching Sarawak

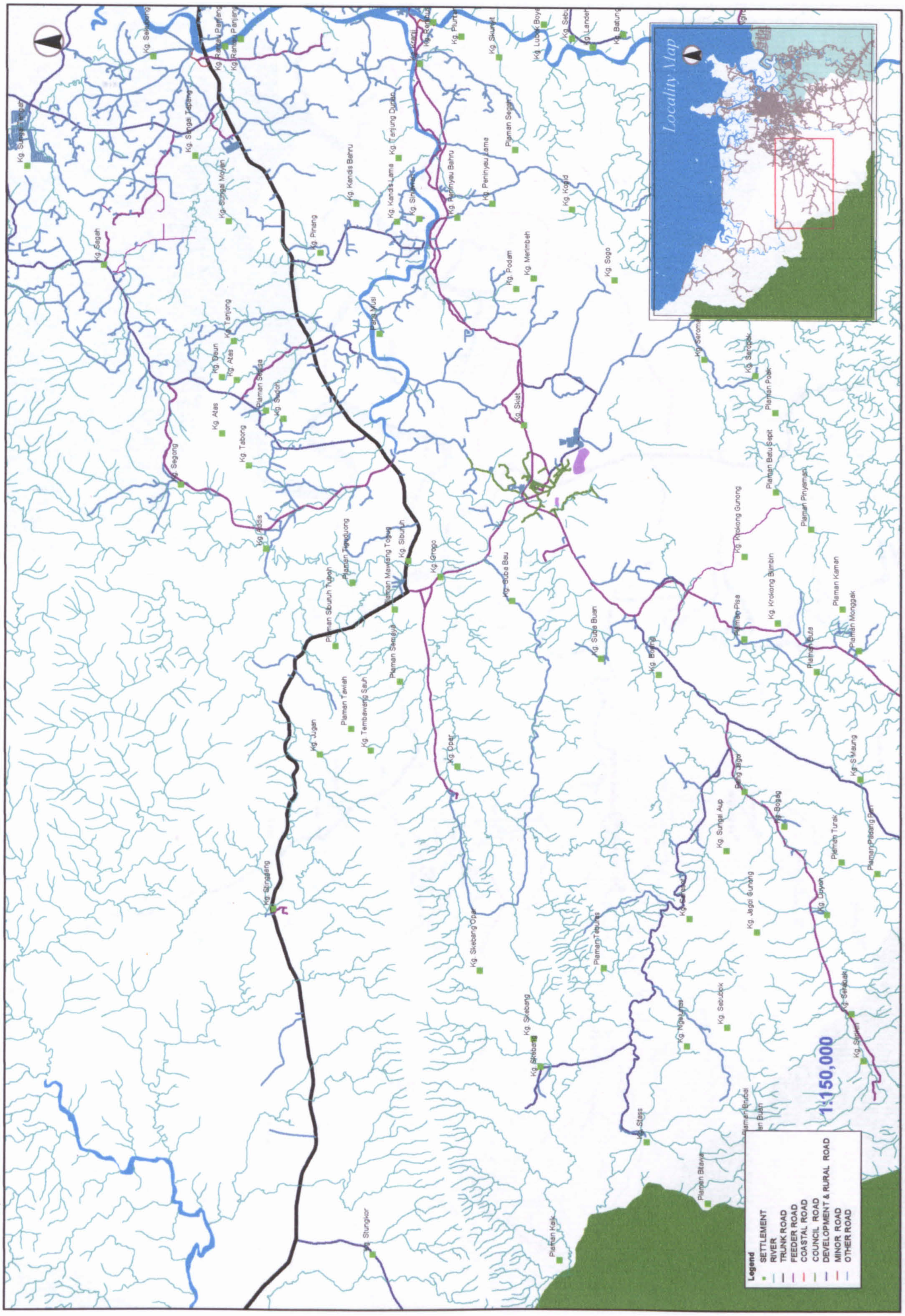
Turner, B.S. (1998), *Social Theories of the City*, New York: Routledge / Thoemmes Press

Windle, J. and **R.A. Cramb,** (1996), *Roads Remoteness and Rural Development: Social Impacts of Rural Roads in Upland Areas of Sarawak Malaysia*, Agricultural Economics Discussion Paper 3/96, Brisbane: Department of Agriculture, University of Queensland QLD 4072

World Bank (2005), *PovertyNet, Poverty Analysis – Overview and Measuring Poverty* http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/0,,menuPK:336998~pagePK:149018~piPK:149093~theSitePK:336992,00.html, accessed 12th March 2005

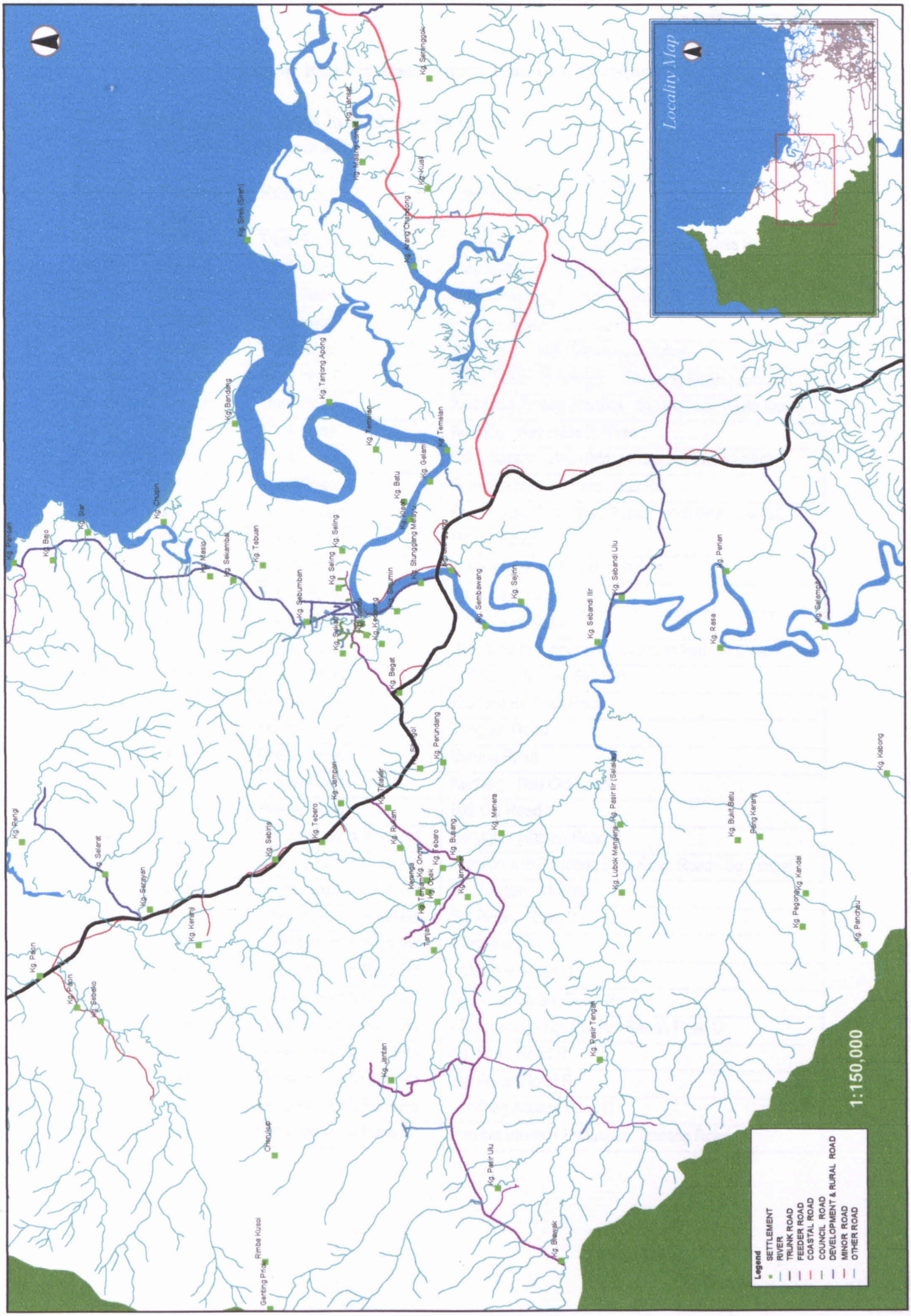
Locality Map Of Study Area In Bau District

APPENDIX I



Locality Map Of Study Area In Lundu District

APPENDIX II



APPENDIX III

List of Road in Bau-Lundu Kuching Division

Table listing existing roads in Bau-Lundu areas

Source: *http://www.jkr.sarawak.gov.my*

District Code	Federal / State	Road Type	Name of Road
Bau 101	Federal	Trunk Road	Sematan - Kuching - Miri - Limbang - Lawas Road
Bau 101	Federal	Trunk Road	Batang Kayan - Selampit Junction
Bau 101	Federal	Trunk Road	Selampit Junction - Bokah Junction
Bau 101	Federal	Trunk Road	Bokah junction - Sg. Topah
Bau 101	Federal	Trunk Road	Sg. Topah - Bau / Tondong Junction
Bau 101	Federal	Trunk Road	Bau / Tondong Junction - Kampung Pinang Junction
Bau 101	Federal	Trunk Road	Kampung Pinang Junction - Sg. Sarawak (Batu Kawa)
Bau 101	State	Trunk Road	Kuching - Bau (Mile 7) Road
Bau 101	State	Trunk Road	Paku Bazaar - Bau (Bridge infront of Civil Centre)
Bau 101	State	Trunk Road	From the New Kuching - Bau Rd
Bau 101	State	Feeder Road	Bau Access Road (Bau Bazaar - Kch Brni Trnk Rd)
Bau 101	State	Feeder Road	Moyan Road
Bau 101	State	Feeder Road	Access Road to Bau Bus Station
Bau 101	State	Feeder Road	Fairy Cave Road
Bau 101	State	Feeder Road	Wind Cave Road
Bau 101	State	Feeder Road	Bidi Road (fr former army Camp to Pedaun Bawah Jnt.)
Bau 101	State	Feeder Road	Bidi Road (fr. new Bidi Rd)
Bau 101	State	Feeder Road	Krokong By-Pass Road
Bau 101	State	Feeder Road	Tringgus Road
Bau 101	State	Feeder Road	Burung Road
Bau 101	State	Feeder Road	Kuching - Bau Old Road
Bau 101	State	Feeder Road	Bidi Old Road
Bau 101	State	Development & Rural Rd	Sengghi - Matang Road D
Bau 101	State	Development & Rural Rd	Junction with Tondong Batu Kawa Road - Sg Tengah
Bau 101	State	Development & Rural Rd	Sg. Tengah - Matang
Bau 101	State	Development & Rural Rd	Sg. Pinang Road D
Bau 101	State	Development & Rural Rd	Musi Road R
Bau 101	State	Development & Rural Rd	Jambusan Road D
Bau 101	State	Development & Rural Rd	Bau - Kg. Serikin Road R
Bau 101	State	Development & Rural Rd	Kg. Krokong - Kg. Pedaun Bawah Road D
Bau 101	State	Development & Rural Rd	Kg. Stass Road R
Bau 101	State	Development & Rural Rd	Kg. Bokah Road R
Bau 101	State	Development & Rural Rd	Tondong Access Road D
Bau 101	State	Development & Rural Rd	Pedaun Bawah - Pangkalan Terbang Road

Table listing existing roads in Bau-Lundu areas (continued)

Bau 101	Federal	Trunk Road	Sematan - Kuching - Miri - Limbang - Lawas Road
Bau 101	Federal	Trunk Road	Sematan - Perigi Junction
Bau 101	Federal	Trunk Road	Perigi Junction - Biawak Junction
Bau 101	Federal	Trunk Road	Biawak Junction - Batang Kayan
Bau 101	State	Feeder	Felda Oil Palm Scheme Road
Bau 101	State	Feeder	Lundu Access Road
Bau 101	State	Development & Rural Rd	Kpg. Selampit Road D
Bau 101	State	Development & Rural Rd	Kg. Sebandi Ulu Road R
Bau 101	State	Development & Rural Rd	Lundu - Sekambal - Siar - Pandan Road D
Bau 101	State	Development & Rural Rd	Biawak Road D
Bau 101	State	Development & Rural Rd	Selarat - Perigi Road R
Bau 101	State	Development & Rural Rd	Sebat Pueh Road
Bau 101	State	Development & Rural Rd	Kampung Stunggang Road D
Bau 101	State	Development & Rural Rd	Seacom Road
Bau 101	State	Development & Rural Rd	Access Road to Government Quarters, Lundu
Bau 101	State	Development & Rural Rd	Pueh Youth Camp Road
Bau 101	State	Minor Road	Kpg. Stunggang Dayak Road
Bau 101	State	Minor Road	Kpg. Stunggang Melayu Lama Road
Bau 101	State	Minor Road	Sebako Road
Bau 101	State	Minor Road	Begak / Teluk Badong Road
Bau 101	State	Minor Road	Kampng Kelaoh Road
Bau 101	State	Minor Road	Kampung Grunggang Kanan Road
Bau 101	State	Minor Road	Kampung Grunggang Kiri Road
Bau 101	State	Minor Road	Kampung Senibong Satu Road
Bau 101	State	Minor Road	Kampung Senibong / Perian Road
Bau 101	State	Minor Road	Kampung Temaga Melayu Road
Bau 101	State	Minor Road	Kampung Temaga Dayak Road
Bau 101	State	Minor Road	Kampung Serayan Hilir Road
Bau 101	State	Minor Road	Kampung Serayan Keranji Road
Bau 101	State	Minor Road	Kampung Sebiris Road
Bau 101	State	Minor Road	Kampung Sedamak / Jempari Road
Bau 101	State	Minor Road	Kampung Paon Road

Water Supply Authorities – Bau-Lundu, Kuching Division

Table listing water supply authorities (WSA) in Bau and Lundu

Source: JKR Sarawak Intranet http://jkrswk/

WSA No.	0102	**Division**	Kuching
Authority	Lundu	**Type**	RPT (Raw-Pump-Treat)
Tank (litre)	1 600 000	**Production (mld)**	1.980
Consumption (mld)	1.051	**Population**	7 062
Nos. of meter	1 358	**O&M Cost**	-
Revenue	413 208.50	**Capacity (mld)**	2.46
Gazette	01/06/1970	**Source**	Sg. Lundu

WSA No.	0103	**Division**	Kuching
Authority	Sematan	**Type**	RPT
Tank (litre)	615 000	**Production (mld)**	0.720
Consumption (mld)	0.611	**Population**	1 919
Nos. of meter	369	**O&M Cost**	-
Revenue	204 938.67	**Capacity (mld)**	1.135
Gazette	01/04/1975	**Source**	Sg. Sebat Basar

WSA No.	0104	**Division**	Kuching
Authority	Siniawan	**Type**	RPT
Tank (litre)	227 000	**Production (mld)**	1.160
Consumption (mld)	0.920	**Population**	3 770
Nos. of meter	725	**O&M Cost**	-
Revenue	239 646.77	**Capacity (mld)**	0.655
Gazette	01/12/1979	**Source**	Sg. Siniawan

WSA No.	0105	**Division**	Kuching
Authority	Bau	**Type**	RPT
Tank (litre)	3 270 000	**Production (mld)**	6.803
Consumption (mld)	4.924	**Population**	19 776
Nos. of meter	3 803	**O&M Cost**	-
Revenue	1 104 725.44	**Capacity (mld)**	7.2
Gazette	01/10/1982	**Source**	Sg. Sarawak Kanan

Statistics on Government Educational Service at Bau - Lundu Areas

	Bau District				Lundu District			
Numbers Of SK	40				31			
Numbers Of SMK	3				2			
Total Student Population in SRK	6633				0			
Total Student Population in SMK	5260				3186			
Highest academic level available	STPM				STPM			
Distribution Of Population	SK		SMK		SK		SMK	
Gender Male student	3428		2547		2388		1557	
Female student	3205		2713		2259		1629	
Race Malay / Bumi	5285		4278		4205		2675	
Chinese	1285		977		412		489	
India	19		4		0		20	
Others(please Specify race)	44		1		30		2	
Facilities available in schools	Electricity	Water Supply	Electricity	Water Supply	Electricity	Water Supply	Electricity	Water Supply
Electricity and Water Supply	32	22	3	3	28	6	2	2
Libraries	40		3		31		2	
Internet Access	40		3		31		2	
Sport facilities								
Extra curriculum activities								
Others(please specify)								
Special Schemes	No. SK	Enrolment	No. SMK	Enrolment	No. SK	Enrolment	No. SMK	Enrolment
Text book	40	6311	3	4525	31	4224	2	2862
Nutrition supplement	32	2167	0	0	24	2017	0	0
Program Susu Sekolah	32	2167	0	0	24	2017	0	0
Biasiswa (BKP + BKPU)	0	0	3	268	0	0	2	178
Skim Baucer Tuisyen	39	2169	0	0	31	1656	0	0
Kumpulan Wang Amanah Pelajar Miskin	33	2363	0	0	31	2945	0	0
Numbers of boarding school	6	686	3	1490	7	801	2	1407
Numbers of day school	34		0		24		0	

APPENDIX VI

Questionnaire & Sets of Questions for Study on Accessibility and Development to Bau / Lundu Areas

Date / Time of Interview : _____

Name of Respondent : _____

Name of Village (Kampong) : _____

District	:	Bau	Lundu		
Race	:	Bidayuh	Chinese	Malay	Others

(Through observations)

Status of Residence	Temporary	Semi permanent	Permanent	
Types of Building Materials	Wood & Atap	Half-wood & Atap	Concrete & Zinc	Concrete & Tiles
Types of Access Roads	Footpath	Jungle Road	Feeder Road	Paved Road
Types of Transportation	Foot	Public Transport	Motor-Cycle	Motor-Vehicle
Types of Agricultural Activities	Subsistence Farming	Commercial Farming	Paddy	Plantations / Non (other works)

Housing, assets and property

Item	Descriptions	Available	Not Available
1	Motor Vehicle		
2	Motorcycle		
3	TV / Satellite dish / VCD		
4	Refrigerator		
5	Chainsaw		
6	Sewing Machine		
7	Sofa Seats		
8	Hand phone		
9	Electric Fan		
10	Radio		
11	Telephone		
12	Clock		
13	Gas Stove		
14	Electricity Supply	SESCo	Own Generator
15	Type of Toilet	Flush / Pour & Pit	River / Not fixed
16	Type of Kitchen	Gas / Wood	Kerosene / Gas/wood
17	Type of Water Supply	JKR Piped / Gravity Feed	Rain / Well

Kampung / household composition, history

1	How long have you been staying here (when you built this house)?					years
2	When was the first road constructed near your house?	Dust / Track		Year		Age
3	When was the present road constructed?	Paved	Bitumen	Gravel	Year	
4	General activities / occupation of your household?	Farming	Working			Others
			Employe	Civil - Private		
5	What is the land status of your house?	NCR		Leased	TOL	Mixed Zone
		Titled	Non-titled			
6	Your household size (number of household members)					ppl
7	How many members of the household are staying back at home for domestic activities?					ppl
8	How often do you travel to bazaar	Daily	2/weekly	1/weekly	1/monthly	1/3 mths
9	Purposes of traveling to bazaar / town / city	School	Medical	Purchase	Sell	Leisure
10	Nos. of household member who achieved (academically)	Deg	Dip	SPM	PMR	UPSR	No formal edu
11	Hygiene and cleanliness of home / surrounding	Low		Poor		Good
		Messy, long-grass		Dirty, unhygienic		Clean, tidy,
12	Where do you seek medical assistance?	Local	Klinik Desa	Dis. Hospital	SGH	
13	What job do you do? (Respondent)	Farming	Employed	Employing	Others	
14	Where do you work? (Respondent)	Own farm	Local farms	Bau	Kuching	Outside Kuc.
15	How Long have you been doing this work? (Respondent)					years
16	Are you full-time worker or only during certain periods of the year	Full-time		Part-time		
17	If working outside own farm (kampong), will you continue working till retirement?	Yes		No		
18	Reasons for #17	Better Future	Better life	Better Living	With Friends	Instructed	Others

Perceptions on impact of roads and accessibility

1	Better opportunities to generate more revenue and my family income has generally increased	**Yes**	**No**
2	Willing to stay-put in the village as better job opportunities (farming) are available	**Yes**	**No**
3	I have been deprived of my 'land rights' (due to outsiders etc.)	**Yes**	**No**
4	I expect more benefits from the improved rural road network	**Yes**	**No**
5	Efficient accessibility by road network well received by all in the family	**Yes**	**No**

Legend for questions below: (5)-Strongly Agree; **(4)**-Agree; **(3)**-No Comment; **(2)**-Disagree; **(1)**-Strongly Disagree

Economic opportunity

Q: With the availabilities of roads to my kampong...

1	I am able to send more of my agricultural products for sale at the market place with ease	**5**	**4**	**3**	**2**	**1**
2	I am able to sell my agricultural products afresh, so more customer will patronize	**5**	**4**	**3**	**2**	**1**
3	I am able to use more fertilizers and diversified crops for better productivity	**5**	**4**	**3**	**2**	**1**
4	I am able to use better machineries, tools and techniques for better productivity	**5**	**4**	**3**	**2**	**1**

Education

Q: With the availabilities of roads to my kampong...

1	My children can travel to school with ease (less absentees)	**5**	**4**	**3**	**2**	**1**
2	My children can have accesses to libraries, books and teachers' guidance in school	**5**	**4**	**3**	**2**	**1**
3	My children can have more intellectual communications with peers	**5**	**4**	**3**	**2**	**1**
4	My children will have easier accesses to higher education outside the kampong area	**5**	**4**	**3**	**2**	**1**

Amenities

Q: With the availabilities of roads to my kampong...

1	I can have efficient electricity supply from SESCo	**5**	**4**	**3**	**2**	**1**
2	I can have efficient water supply from JKR	**5**	**4**	**3**	**2**	**1**
3	I can have efficient medical service from Kesihatan	**5**	**4**	**3**	**2**	**1**
4	I can have other services eg telecommunication, postal, mobile government services etc	**5**	**4**	**3**	**2**	**1**

Others

Q: With the availabilities of roads to my kampong...

1	Family ties are stronger coz members can come home for reunion easily	**5**	**4**	**3**	**2**	**1**
2	Better quality of life, improved & cleaner environment, good supply of household goods..	**5**	**4**	**3**	**2**	**1**
3	Better employment opportunities, in, around and outside kampong / town / district	**5**	**4**	**3**	**2**	**1**
4	Better land development, eg plantation & fishery schemes by agencies leading to dev.	**5**	**4**	**3**	**2**	**1**
5	Traditional cultural values are badly influenced by outside influences, eg westernization	**5**	**4**	**3**	**2**	**1**

Miscellaneous

1	Paved roads can bring better development than unpaved roads	**5**	**4**	**3**	**2**	**1**
2	Trunk roads will bring more averse impacts to the community then interior jungle roads	**5**	**4**	**3**	**2**	**1**
3	Only a stable ruling government (like BN) can bring better roads to the kampong	**5**	**4**	**3**	**2**	**1**

Expenditure, income and saving

Expenditure

Item	Descriptions	Total Monthly Expenditure (RM)	Total Annual Expenditure (RM)
1	Food		
2	Household Utilities Item		
3	Clothing & Accessories		
4	Children Education		
5	Health Care		
6	Transportation & Logistics		
7	Agricultural Tools		
8	Chemicals & Fertilizers		
9	Payment of employee/worker salaries		
10	Repayment of loans		
11	Maintenance of Household Items		
12	Others (Please specify)		

Income

Item	Sources	Unit	Total Monthly Expenditure (RM)	Total Annual Expenditure (RM)
Agricultural				
1	Paddy	RM		
2	Pepper	RM		
3	Oil Palm	RM		
4	Rubber	RM		
5	Vegetables	RM		
6	Fruits	RM		
Others				
7	Animal Livestock	RM		
8	Jungle Products			
Non-Agricultural				
9	Business	RM		
10	Salaries / Wages	RM		
11	Financial Support from Working Relatives	RM		
12	Subsidies	Sacks of fertilizers		
13	Others			
		Total:		

APPENDIX VII

List of Villages and Types of Roads under Survey in the Study Area

District	Types of Roads	Name of Village
Bau	Trunk Road (9 samples)	Kg Siburuh
		Kg Jugan
		Plaman Siburuh Tuboh
		Kpg Stinggang
	Feeder Road (10 samples)	Kg Grogo
		Kg Opar
		Krokong
		Palman Monggak
	Development Road (17 samples)	Kg Gumbang
		Kg Sarasot
		Kg Stass
		Kg Skebang
		Kg Pejiru
		Kg Bogag
		Kg Serikin
	Other Road (5 samples)	Kg Suba Bau
		Kg Suba Buan
Sub-Total	41 samples	17 kampung
Lundu	Trunk Road (18 samples)	Kg Stunggang Baru
		Kg Senibong
		Kg Stunggang Dayak
		Kg Begat
		Kg Sibingol
		Kg Jampari
		Kg Tembaga
		Kg Sebiris
		Kg Serayan Hulu
		Kg Paon
	Feeder Road (7 samples)	Kg Titiakar
		Kg Rukan
		Kg Tebaro
		Kg Jantan
		Kg Opak
		Kg Biawak
	Development Road (9 samples)	Kg Stungkor
		Kg Siar
		Kg Bajo
		Kg Selampit
		Kg Sebandi Ulu
		Kg Sebat
		Kg Melayu
		Kg Sekambal
	Other Road (4 samples)	Kg Rasu
		Kg Sebako
		Kg Pandan
Sub-Total	38 samples	27 kampung
Total	**79 samples**	**44 kampung**