

**THE ENVIRONMENTAL AND SOCIO-ECONOMIC
OF MODES OF TRANSPORT. A CASE STUDY OF CHILANGA
PERI-URBAN.**

BY

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**THE ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS OF MODE-
OF TRANSPORT. A STUDY OF CHILANGA PERI-URBAN.**

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**A Project Report Submitted to the Department of Geography at University of
Zambia in partial fulfilment of the Degree of B.A.ED.**

October, 2004.

Dedication

To my dad, mum, sisters and brothers and my late brother in law for being my encouragement.

Declaration

"I Kilembe Lizzie declare that this report has been composed and compiled by me and that the work recorded has been done by me, that the sources of all material referred to have been specifically acknowledged and that the project report has not been accepted in any previous application for academic award".

Signature:.......... Date:.....29 October, 2004.....

Acknowledgements

Firstly, I give thanks to God who was with me always, followed by my supervisor Mr Kapungwe who directed me. Then my family for their continued support and encouragements.

Lastly, my friends for their worthwhile criticism and encouragements.

socio-economic activities of people; bicycle, feet, bus and car enables people reach various places where activities take place and do the activities; bicycle, feet, truck and bus transport goods, inputs, outputs and resources from points of production to points of consumption. The feet, bicycle and bus transport cause delays of activities. Feet and bicycle are slow and tiresome while bus is fast but takes time to reach areas due to traffic congestion and bus drivers wait for buses to fill up hence causing delays. Bus and car cause people to do activities at a cost in that they are required to pay a fare for being transported. Bus cause people to gain low profits because fares for the goods carried are high.

People's perception and attitude to the impact of transport are that something should be done to eliminate and lessen or alleviate the impacts of transport on the environment and socio-economic activities.

In conclusion, the objectives of the research were achieved. The modes of transport used were found to be non-motorised and motorised transport. The modes of transport were found to have an impact on the environment and socio-economic activities.

List of Abbreviations

| | |
|--------|---------------------------------------|
| CSO | Central Statistical Office |
| KDC | Kafue City Council |
| SDA | Seventh Day Adventist |
| TamZam | Tanzania Zambia |
| UCZ | United Church of Zambia |
| ZESCO | Zambia Electricity Supply Corporation |

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CHAPTER ONE

INTRODUCTION

1.1. Introduction

Chapter one is the introduction of the report. It outlines the background of the study, statement of the problem, aims and objectives, research questions, rationale scope of the study, definition of items and a preview of the organization of the report.

1.2. Background of the study

Transport is the movement of people, goods and services. It is important for development because it facilitates movement to and from places. Transport constitutes many modes which include motorised modes such as cars, buses, trucks, vanettes and non-motorised such as feet, bicycles, draught animal power. Other modes include aeroplanes, water transport and rail transport. The modes of transport are used for socio-economic activities. Transport is used to access jobs, education, health and other amenities, markets and resources important in raising the standards of living of people.

Though transport is an important activity, it has effects on the environment depending on different modes. Motorised modes of transport affect the environment more than non-motorised, because some of the impacts it has are adverse and irreversible. It is therefore, inevitable to carry out the study in Chilanga to find out how modes of transport affect both the socio-economic activities and the environment.

1.3. Statement of problem

Today, there is an increase of use of transport to bring about development; transport facilitates movement of people, goods and services. Transport provides access to jobs, amenities, markets and resources, hereby bringing about development. Transport, though plays a vital role in development, it affects the environment negatively. It is against this background that a research on environmental and socio-economic impacts of transport was prompted.

1.4. Aim

To assess the impacts of different modes of transport on the environment and socio-economic activities of people.

- To find out the impacts of transport on the environment.
- To find out the socio-economic activities people engage in.
- To find out the impact of transport on socio-economic activities.*
- To find out people's perception and attitudes towards the effects of transport on the environment and socio-economic activities.

1.6. Specific questions

- What are the modes of transport used in Chilanga?
- What are the impacts of transport on the environment?
- What are the socio-economic activities of the people of Chilanga?
- What are the impacts of transport on socio-economic activities?
- What are the perceptions and attitudes of people towards impacts of transport on the environment and socio-economic activities?

1.7. Rationale

Transport is critical to development (Transport Policy, 2003). Development cannot take place without transport. Transport plays a role in development by conveying or moving goods and services from one place to another.

In 1991, Zambia adopted a market-oriented economy with aims of bringing about growth and hence each sector of the economy experienced some changes. The change is mainly the adoption of privatization and liberalisation strategies. In the transport sector, private investment has been encouraged so as to have an efficient transport system to stimulate production and development.

Today, we see enormous modes of transport each aiming to bring about development. Each mode, be it motorised or non-motorised, has an effect on the environment. Some of the effects are dangerous to the environment in that the accumulation of it can cause serious damage and hence irreversible. It is in this light that I have placed attention on the modes of transport used for socio-economic activities, their impacts on socio-economic activities and environmental impacts.

We have concentrated much on other environmental effects caused by other source, it is time we considered the effects of transport though, they do not show the impacts there and then, once accumulated, they are difficult to reverse, if we are to achieve

environmental sustenance. This result will help in making appropriate policies, but will consider both environment and development. It will in one way or another answer some of the environmental effects that we do not know the cause yet and will help us come up with proper strategies on how to manage our environment. Last but not the least; add to the interactive that will help the country as a whole in education, as knowledge and development in terms of planning.

1.8 Scope of Study

The study is limited to the studying the environmental and socio-economic impacts of modes of transport used by the people of Chilanga. The report examines the modes of transport used by people of Chilanga, the impact of transport on the environment, the socio-economic activities people engage in, the impact of transport on the socio-economic activities of people and the attitudes and perception of people towards the impact of transport on the environment and socio-economic activities of people.

1.9 Definition of Terms

Attitude- the way people think and view something (Hornby, 2000).

Environment – a natural world in which people, animals and plants live (Hornby, 2000).

Impact - the powerful effect that something has on something (Hornby, 2000).

Modes of Transport - a particular type of transport (Hornby, 2000).

Perception – an idea or belief people have as a result of how they see or understand things (Hornby, 2000).

1.10 Preview of the Organisation of report

The project report comprises of additional six chapters. Chapter one gives the introduction to the study, problem statement, objectives, and rationale, scope of study and definition of key terms in the report.

Chapter two consists of literature review relevant to the topic under study. Chapter three looks at the study area giving information on location, relief and drainage, climate, social and physical structures and economic activities.

Chapter four outlines the methodology used, which highlights sources of data, sampling procedure, limitations of the study and data analysis and presentation.

Chapter five gives the findings of the research. Chapter six deals with analysis and

discussion of results and lastly chapter seven gives the conclusion by summarizing and showing if the objectives of the study were met. The recommendations are also given in the chapter consisting of suggesting on what should be done to alleviate and eliminate the impacts and improve on development.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of Transport

The Oxford Dictionary (2000) defines transport as a system for carrying people or goods from one place to another using vehicle, road, etc. Benson (1994) also defined transport as a means of satisfaction by the movement of goods and passengers so that accessible goods may be moved to those parts where consumers require them or consumers may be moved to those areas or parts where service facilities such as health care, education, entertainment and recreation may be enjoyed. Therefore transport is a system and a means of movement from one place to another.

2.2 Evolution of Transport

Transport is not a recent activity; it started long ago ever since man came into being or existence. The first form of transport was the nomadic movement of man himself from place to place. Man used his feet as a means of movement in order to access or search food. Man afterwards started using animal to provide transport. Such animals include camels, horses, dogs, donkeys, reindeers and elephants. These used to carry light articles and heavy loads conveyed by sledge (Eaton, 1953).

Rollers were another form of transport used as well as dragging an object in the past. Then came use of wheeled vehicle, which was a wheelbarrow type of kind of two-wheeled cart drawn, by man or beast.

After the dawn of civilization, the discovery of metals led to the making of improved type of tools. Together with industrial revolution, which brought in the internal combustion engine, railway grew up. There was use of electric or diesel power in road and rail transport. Change from wooden sailing to steel steam ships took place. There after air transport emerged, then fixed wing aircrafts, helicopter and hovercraft were used. Other transport methods, which emerged included, pipelines, conveyors and cableways (IAMM, 1973).

2.3 Development of Transport in Zambia

Transport in Zambia before 1890 was mainly walking (Haefele and Steinberg, 1965). People moved from place to place in search for land, food and to trade. In the 1890's the railway line was built to link landlocked Rhodesia with the coast. A line was constructed from Beira to Salisbury in Southern Rhodesia to provide means of transport and communication for settlers.

Another line was built from South Africa through Bechuanaland now Botswana to Bulawayo in Southern Rhodesia. Further extensions Northwards enabled the railway to reach Broken Hill in Northern Rhodesia (Zambia) in 1908. This was for accessing mineral wealth. After independence, planners turned their attention to the provision of alternative routes for Zambia's external trade due to political instability in South Africa, Angola, Mozambique and then Rhodesia (Haefele and Steinberg, 1965).

2.4 Main Modes of Transport in Zambia

The main modes of transport in Zambia include, Air, Road, Water and Rail Transport (Transport Policy, 2003).

2.4.1 Road Transport

Road Transport of Zambia covers the most extensive area. It is the fastest and most reliable mode of transportation in Zambia for the movement of freight and passenger traffic. In 1994, millions of tons of imports and exports were transported by road indicating that road transport is an engine of growth and the key to increased production and incomes in the country (Transport Policy, 2003).

According to the Transport Policy Document (2003), it is estimated that vehicle usage per day has doubled. Majority of these are passengers respectively. Road transport seems to be the widely used mode in Zambia for not only economic activities but also social activities.

Zambia has gazetted road network of approximately 37,000km of which 6,476km are bituminous and surfaced to class standard. Gravel and earth roads account for 8,478km and 21,967km respectively. In addition, there are about 30,000km of ungazetted community roads, comprising tracks, trails and footpaths.

2.5 Transport and Development

Transport facilitates movement. Transport provides means by which countries develop. Transport brings about physical access to jobs, health, education and other amenities, without it life suffers; without physical access to resources and market, growth stagnates and poverty cannot be reduced (Ackerman, 2004).

Transport no matter what mode is used is important in facilitating success in activities people engage in. most common is agriculture. Failure of agriculture is partly due to transport. Areas favoured with transport links outlying areas with the rest of the country hence causing the mobility of agricultural inputs and outputs to markets. Access to these markets improves and facilitates the development of agricultural economy.

Other activities, both social and economic involve movement of people as well as materials or goods, as society becomes more mobile, significant changes occur in living and working patterns.

2.6 Transport and Environment

Transport has an effect on the environment. The effects depend greatly on the mode of transport being used. In general the effects include noise pollution, air pollution, water pollution and land pollution (Strickland, 2004). Certain modes of transport such as air, automobiles and trains produce loud noise on the environment. Emissions of gases from the internal combustion of the engine of automobiles and train pollute the air. Chief gases emitted include carbon dioxide, carbon monoxide that contribute to global warming and greenhouse effect which acts like a glass in the green house. It traps the heat off the sun and keeps the earth warmer than it otherwise would be (Benson, 1994). Other effects include forest resource depletion.

2.7 The Institutional and Legal Framework

2.7.1 Institutional Framework

The Ministry of Communications and Transport is responsible for the overall policy formulation and monitoring of the transport sector. The policy key issues in the transport sector are to determine the level of sustainable investment to distribute investment between competing transport modes, to offer fair pricing and creation of infrastructure for the services offered to develop appropriate infrastructure and to regulate the industry (Transport Policy, 2003).

There are problems of lack of an adequate institutional framework as well as lack of clearly defined responsibilities. The responsibilities for planning, preparing design standards, construction and maintenance of roads are fragmented among government institutions charged with road infrastructure development and management i.e. Ministry of Communications and Transport, Road Department of Ministry of Works and Supply, Department of Infrastructure and Support Services in the Ministry of Local Government and Housing, Department of National Parks and Wildlife services in the Ministry of Tourism, Environment and natural Resources and to some extent the Ministry of Finance and National Planning for Social recovery with rehabilitation of community roads.

2.7.2 Legal Framework

The legal framework needs to be reviewed to be more facilitative and supportive. Legislation to be revised including railway act, civil aviation act, inland water shipping act, merchant shipping act, roads act and traffic act.

CHAPTER THREE

STUDY AREA

3.1. Introduction

This chapter discusses the study area of Chilanga. It looks at the position or location of Chilanga, Relief and drainage, climate, historical background of Chilanga, Administrative structure, population, physical and social infrastructure.

3.2. Position or Location

Chilanga is between 13°30'S and 20°15'S AND 28°20'E. in Kafue District, Lusaka province of Zambia (Fig. 1).

3.3. Relief and Drainage

Chilanga has a relief structure, which is mostly hilly. The drainage of Chilanga composes of few streams, some of which are seasonal. The rocks found in the area are mainly granite and limestone rocks

3.4. Climate

Chilanga experiences climatic conditions that are typical of the Central African plateau with three (3) distinct seasons, Matenga, (2000). Namely the cool and dry season lasting from mid April to mid August; a hot and dry season lasting from mid August to October; and a hot and rainy season lasting from mid November to early April.

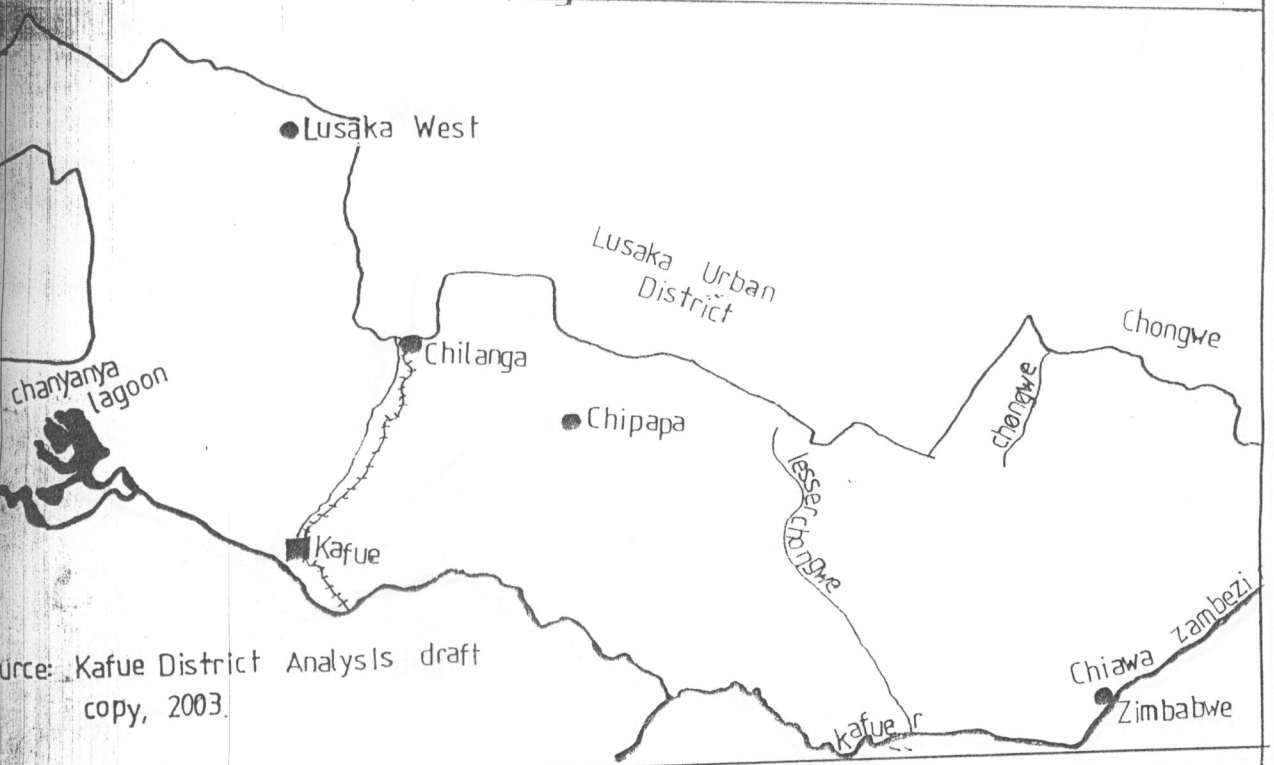
3.5. Historical Background

Chilanga is found in Kafue District, found along the line of rail and Great North Road. It emerged as an urban area or center with the establishment of Chilanga Cement Factory and Turner Asbestors Product (TAP)

3.6. Administrative Structure

The Kafue District Council (KDC) governs Chilanga. Chilanga is under the Chiefdom of Chieftainess Chiyaba. Chilanga has a multi-ethnic population with all Zambian tribes represented in the District.

Fig.1 Location of Chilanga in Kafue District



Source: Kafue District Analysis draft copy, 2003.

0 40 km

KEY

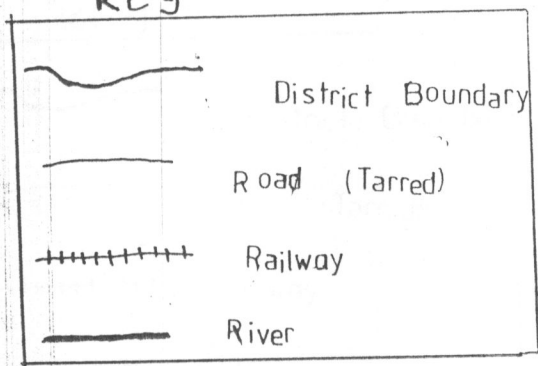
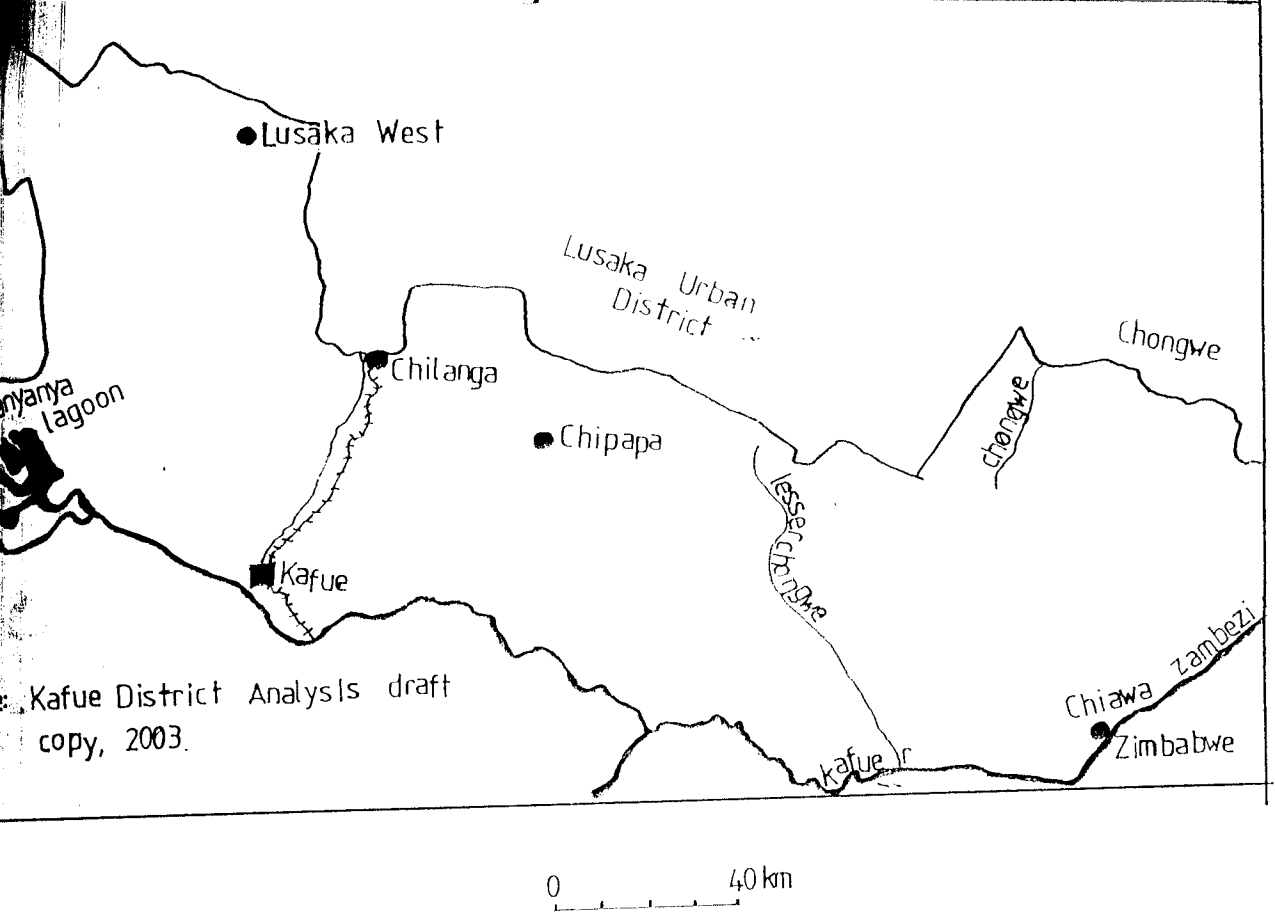


Fig.1 Location of Chilanga in Kafue District



KEY

| | |
|--|-------------------|
| | District Boundary |
| | Road (Tarred) |
| | Railway |
| | River |

3.7. Population

Chilanga has a population of 6,543 people, 3,777 being males and 3,266 females. Chilanga has 1,231 households. Table 3.1. Summarises the population of Chilanga. Its population density is 6⁺ people per square kilometer (Matenga, 2000). The population is evenly balanced between males and females. The population comprise mainly of the youth.

Table 3.1. Population Statistics of Chilanga

| HOUSEHOLD | MALES | FEMALES | TOTAL |
|-----------|-------|---------|-------|
| 1,231 | 3,277 | 3,266 | 6,543 |

Source: 2000 census of population and housing, Zambia Analytical Report, Vol. 10 (2003).

3.8. Physical and Social Infrastructure

Chilanga has road and rail infrastructure. The main road runs through Chilanga called Great North Road, from Lusaka, through Chilanga to Kafue and Livingstone. Similarly the rail line runs through Chilanga from Lusaka to Livingstone. Chilanga also has a network of tarred roads, gravel roads, paths, tracks and trails.

Chilanga accommodates different social infrastructure, which include, health infrastructure such as clinics, education infrastructure such as schools and colleges, recreation facilities such as zoo, botanical garden, golf course, bars and shopping facilities.

3.9. Economical Activities

The economy of Chilanga is composed of manufacturing industry, service industry, subsistence and commercial agriculture; formal and informal activities.

Manufacturing industries include Chilanga Cement factory, which produces cement for the whole country and for export and Turner Asbestors Product, which produces asbestos. Service industries include ZESCO, Telecommunications, and Postal Office.

CHAPTER FOUR

RESEARCH METHODS

4.1. Introduction

This chapter discusses sources of data collection, sampling procedure, analysis and presentation and limitations experienced during data collection.

4.2. Sources of data collection

There were two main sources of data collection in this study, namely, secondary and primary data.

4.2.1. Secondary data

Secondary data were collected from geography department, the main University of Zambia library. Central Statistical Office and Environmental Council of Zambia. From the libraries various types of literature on the mode of transport, environmental effects of transport and population characteristics of people were obtained.

Literature related to this study was reviewed in order to find out the work done by others and the gap in their study.

4.2.2. Primary data

Primary data was collected through structured questionnaire distributed to respondents. The Environmental Council of Zambia was interviewed using structured interview in order to collect information on the environmental impacts of transport.

4.3. Sample procedure and sampling

Random sampling method was used to sample the population. The area study composed of 246 households, of which 36 households were selected. The selection was done by procedure of lottery technique, where the households were numbered and selected from a box. 36 respondents were chosen because it is representative. It is at least more than 10% of the households.

4.4. Limitations

Lack of cooperation by respondents was a main limitation. They seemed not to be interested in answering the question asked of them. Some were afraid because of

rumours about Satanists. Another limitation was that of respondents taking time to fill in questionnaires. They took two or three weeks, others lost the questionnaires in the process. The research also experienced a problem of translating into vernacular languages; most people did not know English especially those who attained primary level of education. The other problem is that the respondents were never available, because they were always at work, hence follow ups took up most of my time.

4.5. Data analysis and presentation

The following statistical techniques used to analyse and present the data. Percentages, tables of frequencies were used to summarise the findings. Data is presented in form of tables and graphs.

CHATER FIVE

PRESENTATION OF FINDINGS.

5.1 Introduction

The chapter presents the research findings. The findings are presented in accordance to the objectives set on which basis the data was collected. This chapter will present the findings on the characteristics of the sample, the modes of transport used by the respondents of Chilanga, the impact of transport on the environment, the socio-economic activities people engage in, the impacts of transport on the socio-economic activities and the perception and attitudes of people towards the impact of transport on socio-economic activities of people.

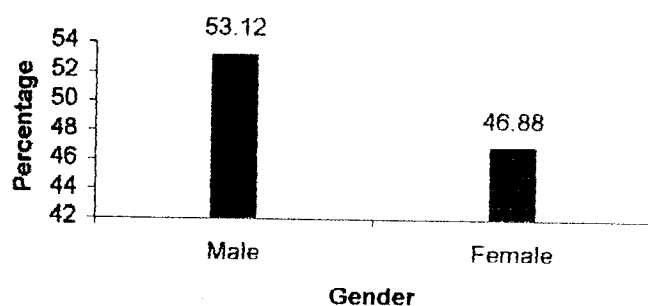
5.2 The characteristics of the sample

The characteristics of the sample include the Gender, the Age, Marital Status, Educational level and Occupation of Respondents.

5.2.1 Gender of Respondent

A total of 53.12% were male and 46.88 % were female. Males dominate the females because the size of population of males is larger than for females.

Figure 3: Gender of respondents



Source: Field data (2004).

The Relationship between Gender and Modes of Transport is shown in the table below. Only 75% males and 25% females use car. A total of 39.29% males and 50.71% females use bus. Truck is used by all males representing 100% while females

do not. A total of 57.14% males and 42.86% females use feet. Bicycle is used by all males representing 100% while females do not.

Table: 3 Relationship between Gender and Modes of Transport used ($\chi^2=11.95$, $df=4$, critical 13.28, accept H_0)

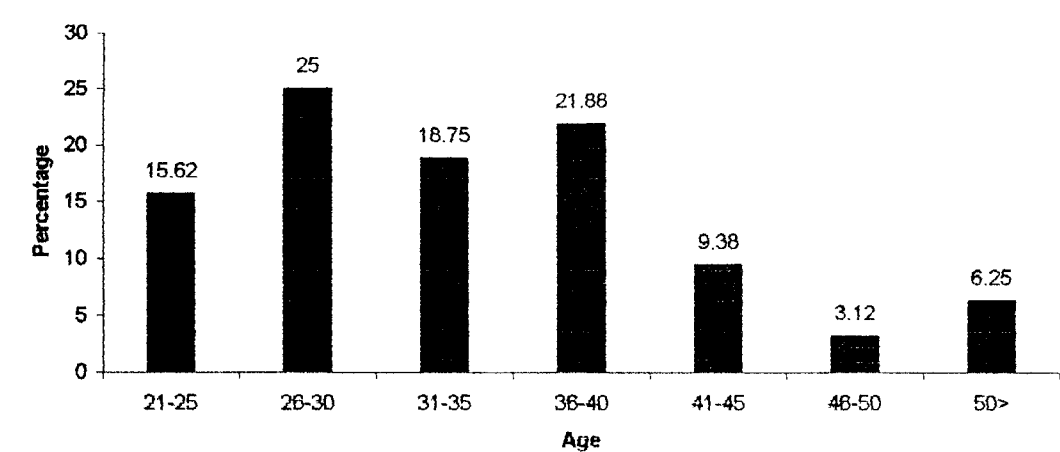
| Gender | Car | | Bus | | Truck | | Feet | | Bicycle | |
|---------|-----|-----|-----|-------|-------|-----|------|-------|---------|-----|
| | F | % | F | % | F | % | F | % | F | % |
| Males | 6 | 75 | 11 | 39.29 | 3 | 100 | 12 | 57.14 | 7 | 100 |
| Females | 2 | 25 | 17 | 60.71 | 0 | 0 | 9 | 42.86 | 0 | 0 |
| Total | 8 | 100 | 28 | 100 | 3 | 100 | 21 | 100 | 7 | 100 |

Source: Field Data (2004)

5.2.2 Age of Respondents

There are age group of people ranging from age group 21-25 to 50>. The age group 26-30 has highest percentage of respondents with 25%, followed by age group 36-40 with 21.9%, 31-35 with 18.8%, 21-25 with 15.6% then 41-50+ with 18.8%.

Figure 4: Age of respondents

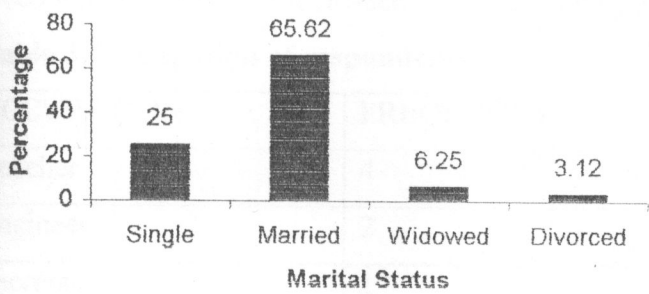


Source: field Data

5.2.3 Marital Status of Respondents

A total of 65.62% of the respondents are married followed by the singles with 25%, then widowed with 6.25% and divorced with 3.12 %. This implies that most people in Chilanga are married.

Figure 5: Marital status of respondents

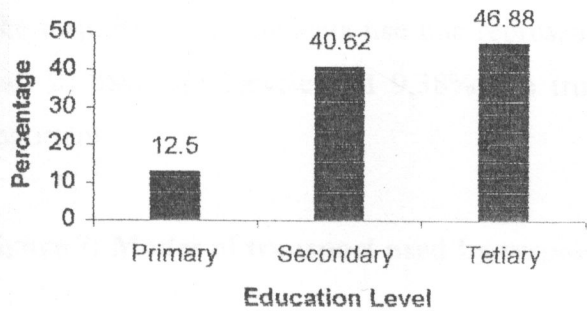


Source: Field Data (2004)

5.2.4: Educational Level of Respondents

A total of 49.88% of the respondents have attained tertiary education, followed by secondary attainment of education with 40.62% and primary education attainment with 12.5%.

Figure 6: Education Level of Respondents



Source: Field Data (2004)

4.2.5 Occupation of Respondents

Occupation reflects the socio-economic activities people engage in.

Table 3: Occupation of respondents

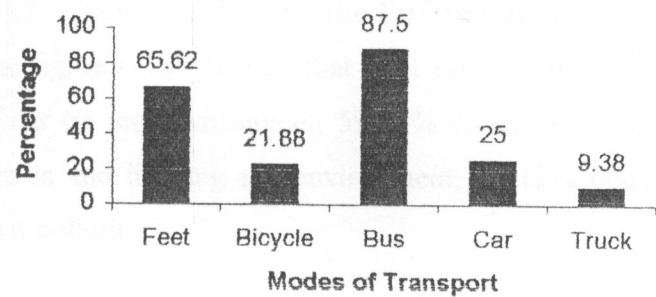
| OCCUPATION | FREQUENCY | PERCENT |
|---------------|-----------|---------|
| Teacher | 4 | 12.5 |
| Engineer | 2 | 6.25 |
| Secretary | 1 | 3.12 |
| Clerk | 1 | 3.12 |
| Businessman | 4 | 12.5 |
| Farmer | 2 | 6.25 |
| Accountant | 1 | 3.12 |
| Casual Worker | 17 | 53.12 |
| TOTAL | 32 | 100 |

Source: Field Data (2004)

5.3 Different modes of transport used by Respondent

The majority of respondents use bus representing 87.5%, 65.62% use feet, 25% use Car, 21.88% use bicycle and 9.38% use truck. This shows that bus and feet are important.

Figure 7: Modes of transport used by respondents of Chilanga



Source: Field Data (2004)

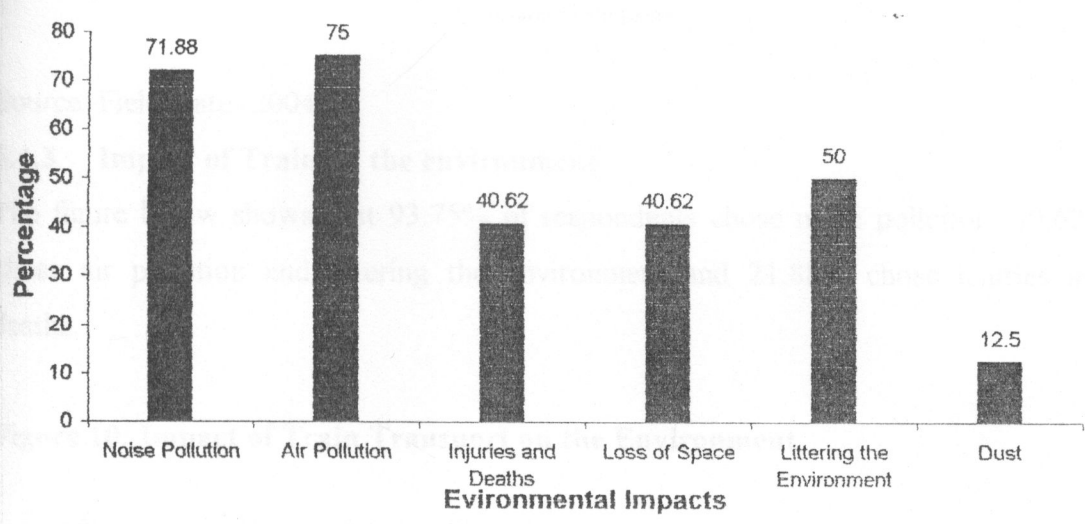
5.4 Impact of Transport on the environment

Every mode of transport has an impact on the environment the impacts of transport are summarised in the tables below

5.4.1 Impact of Bus on the environment

Bus transport has many impacts on the environment. The figure below reveals that 75% of the respondents chose air pollution as an impact of bus transport, 71.88% chose noise pollution, 50% chose littering on the environment, 40.62% chose loss of space and injuries and deaths lastly 12.5% chose other impacts which include dust pollution.

Figure 8: Impact of Bus Transport on the Environment

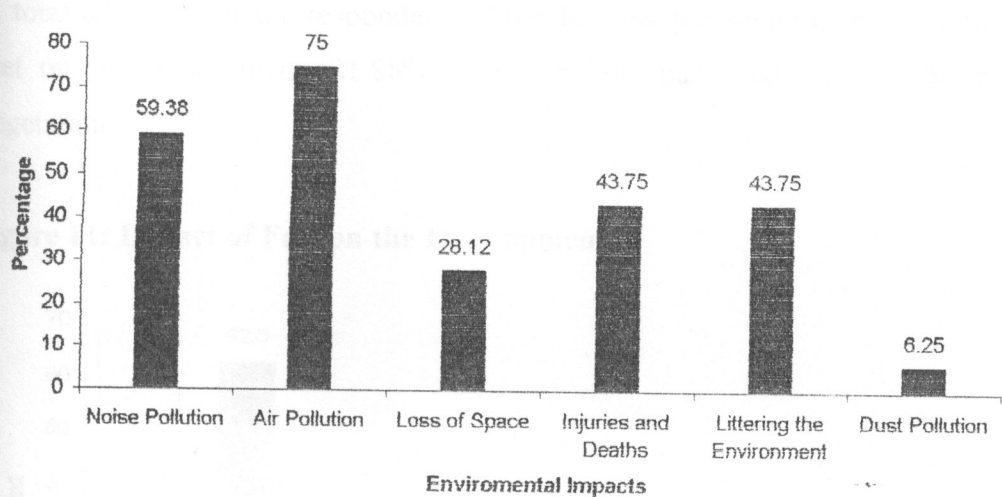


Source: Field Data (2004)

5.4.2 Impact of Car on the Environment

The figure below reveals that 75% of the respondents chose air pollution as an impact of car on the environment, 59.38% chose noise pollution, 43.75% chose injuries and deaths and littering the environment, 28.12% chose loss of space and 6.25% chose dust pollution.

Figure 9: Impact of Car Transport on the Environment

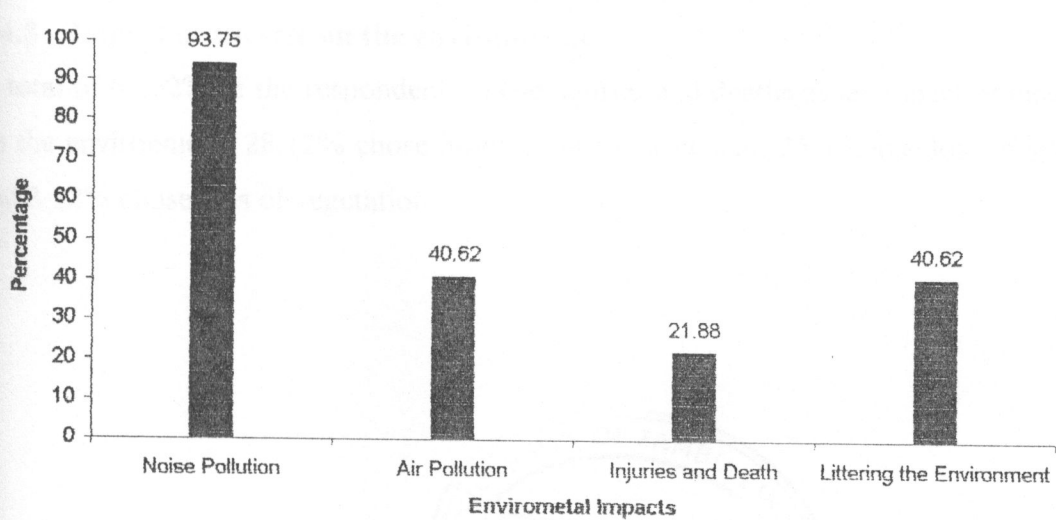


Source: Field Data (2004)

5.4.3 Impact of Train on the environment

The figure below shows that 93.75% of respondents chose noise pollution, 40.62% chose air pollution and littering the environment and 21.88% chose injuries and deaths.

Figure 10: Impact of Train Transport on the Environment

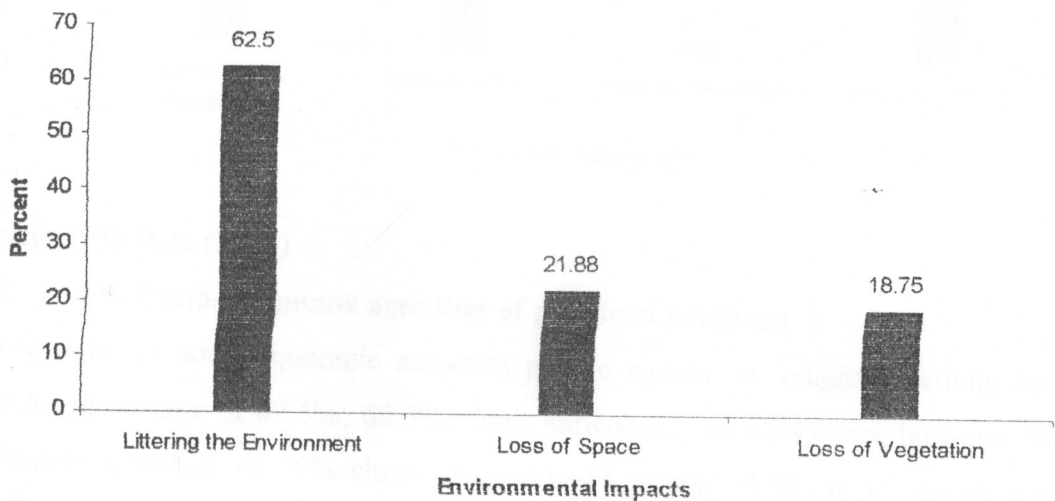


Source: Field Data (2004)

5.4.4 Impact of Feet on the environment

A total of 62.5% of the respondents chose littering the environment as an impact of feet on the environment, 21.88% chose loss of space and 18.75% chose loss of vegetation.

Figure 11: Impact of Feet on the Environment



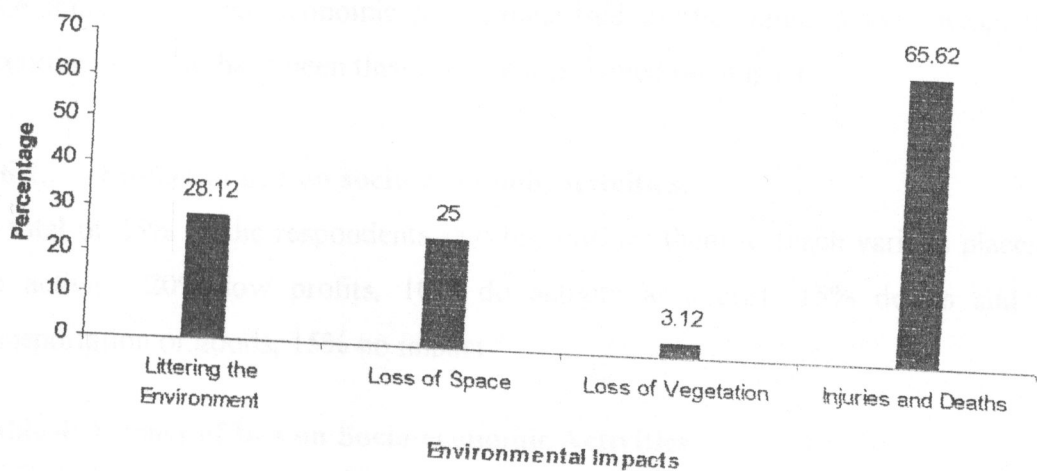
Source: Field Data (2004)

5.4.5 Impact of Bicycle on the environment

A total of 65.62% of the respondents chose injuries and deaths as an impact of bicycle on the environment, 28.12% chose littering the environment, 25% chose loss of space and 3.12% chose loss of vegetation.



Figure 12: impact of Bicycle on the Environment



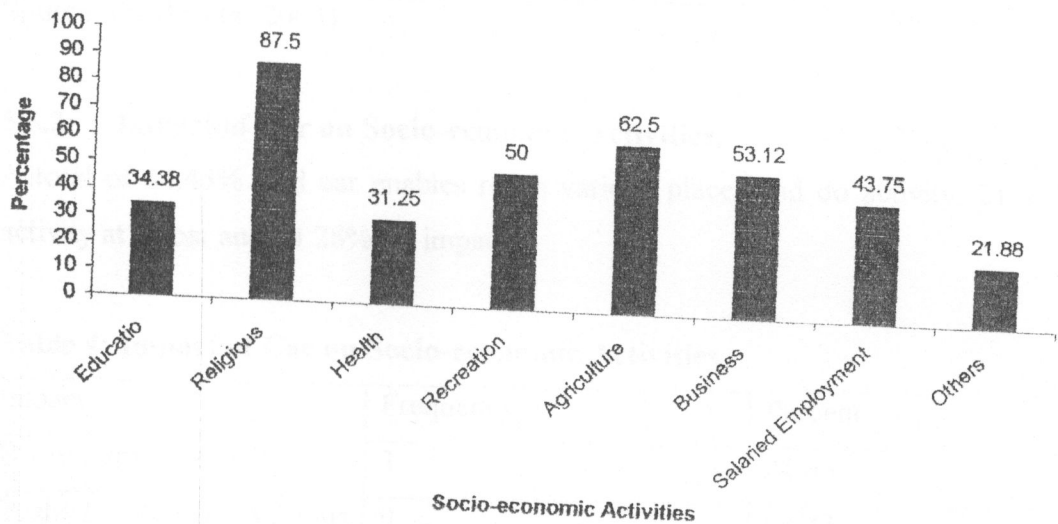
Source: Field Data (2004)

S

5.5 The Socio-Economic activities of people of Chilanga

There different socio-economic activities people engage in. religious activity has a highest percentage of 87.5%, 62.5% chose agriculture, 53.12% chose business, 50% recreation activities, 43.75% chose salaried employment, 34.38 chose education and 31.25% chose health.

Figure 13: Socio-economic Activities People Engage in.



Source: Field Data (2004)

5.6. Impacts of Modes of Transport on Socio-economic Activities

The impact of socio-economic are summarised in the figure below. Respondents according to what have been their experiences named the impacts.

5.6.1. Impact of bus on socio-economic activities.

A total of 25% of the respondents said bus enables them to reach various places and do activity, 20% low profits, 10% do activity at a cost, 15% delays and 15% transportation of goods, 15% no impact.

Table 4: Impact of Bus on Socio-economic Activities

| Impact | Frequency | Percent |
|-------------------------------------|-----------|---------|
| Low Profits | 4 | 20 |
| Activity Done at a Cost | 2 | 10 |
| Delays | 3 | 15 |
| Enable Reach Places and do Activity | 5 | 25 |
| Transportation of Goods | 3 | 15 |
| No Effect | 3 | 15 |
| TOTAL | 20 | 100 |

Source: Field Data (2004)

5.6.2 Impact of Car on Socio-economic Activities.

A total of 64.43% said car enables reach various places and do activity, 21.43% do activity at a cost and 14.28% no impact.

Table 4: Impact of Car on Socio-economic Activities

| Impact | Frequency | Percent |
|--|-----------|---------|
| Do Activity at a Cost | 3 | 21.43 |
| Enables Reach Various Places and do Activity | 9 | 64.43 |
| No Impact | 2 | 14.28 |
| TOTAL | 14 | 100 |

Source: Field Data (2004)

3.45% use of non-motorised transport and 3.43% environmental sustenance should be found.

Table 7: People's attitude and perception towards environmental impacts of transport

| PEOPLES ALTITUDE AND PERCEPTION | FREQUENCY | PERCENT |
|---|-----------|---------|
| service car and bus regularly. | 6 | 20.69% |
| regular checkpoints on road. | 7 | 24.14% |
| need for new technology. | 3 | 10.35% |
| educational awareness. | 4 | 13.79% |
| use of bins. | 4 | 13.79% |
| use of non-motorised transport. | 1 | 3.45% |
| bicyclist patrons and pedestrians. | 1 | 3.45% |
| transport rules. | 2 | 6.9% |
| environmental sustenance should be found. | 1 | 3.43% |
| TOTAL | 29 | 100% |

Source: Field data (2004)

7.2. People's attitude and Perception towards the impact of Transport on Socio-Economic Activities.

The table below summarises the responses people gave towards the impact of transport on socio-economic activities. 16.67% said there should be caravans, 33.33% said modes of transport should be fit for use and 50% said modes of transport should be cheap affordable and effective.

Table 8: People's attitude and perception towards the impact of transport on socio-economic activities.

| PEOPLES ATTITUDE AND PERCEPTION | FREQUENCY | PERCENT |
|---|-----------|---------|
| buses should have caravans | 3 | 16.67% |
| modes should be fit for use | 6 | 33.33% |
| modes of transport such as buses and cars should be cheap affordable and effective. | 9 | 50% |
| TOTAL | 18 | 100% |

Source: Field data (2004)

CHAPTER SIX: DISCUSSION OF RESULTS

6.1 Introduction

The chapter discusses the results of the research. The discussion is based on the characteristics of the sample, the modes of transport used, the impact of different modes on transport on the environment, the socio-economic activities people engage in, the impact of different modes of transport on socio-economic activities and the attitude and perception of people towards the environmental and socio-economic impacts of transport.

6.1 Characteristics of the Sample

The distribution of gender was balanced because both male and female house heads were respondents to the research carried out in Chilanga. Both male and female use bus, car and feet as a mode of transport. Whereas males use bicycle and truck as a mode of transport females do not. Females have less access to bicycle and truck transport because of the perception they have against bicycle as the form of transport for males alone while truck naturally is not for carrying people but goods. They do not use truck because most of the females do not engage in activities that require the use of truck transport.

Distribution of age groups show that Chilanga has a youthful population because most of the respondents were found to be between ages 21-40 years old. The youthful population is considered as an economically active population because they are able to actively work and bring about development. The reason why Chilanga has a youthful population is because people migrate to Chilanga in search of employment. The life expectancy of Zambia is at 50 years old (CSO, 2000) implying that most people live up to the age of 50 years hence there are few people above the age of 50 years old.

Many people of Chilanga are married, with only a small proportion of people who are single, widowed and divorced.

All respondents have attained a form of education. A large proportion of respondents have attained tertiary education. This type of education involves college and university education. The followed by secondary education and a few primary

educations. This scenario shows that there is high literacy in Chilanga in that all respondents have been exposed to education.

There are a wide variety of occupations in Chilanga among respondents. The occupations include teaching, farming, accountancy, business, clerical work, engineering, secretarial, and causal work. There is a vast range of socio-economic activities in Chilanga that people engage in.

6.3 Different modes of transport used by people

Mulenga (1992) wrote that in peri-urban and rural areas of Zambia the main modes of transport used include motorized (automobiles) and non-motorized (walking, cycling and animal draught power) and water transport in those areas with rivers. The research carried out in Chilanga shows that the modes of transport available and used are motorized (bus, car and truck), rail and non-motorized (walking and cycling). People in Chilanga widely use bus and feet transport to move to places more than car, bicycle and truck transport. Feet and bus transport are easily accessible to people than car, bicycle and truck. This is due to the fact that bus transport offers public transport service to people of Chilanga taking them to different places. Bus transport is available at any time between 05:00 hours and 22:00 hours everyday. Bus transport is available because it has been favoured by the market economy that Zambia adopted in 1991. The market economy created an enabling environment to attract private investment in transport sector (Transport Policy, 2003) private individuals and companies own buses and hence offer public transport. Buses also carry large quantities of goods. Buses are very fast and cover both long and short distances. Bus transport is the only available motorized transport that is cheap that people would use to travel to places. Feet transport on the other hand is owned by people and under their control. It can be used at anytime anywhere. Feet transport is used on the daily basis and is the only form of transport that connects to other modes of transport. It is a mode of transport that is slow yet used because people have no option. Feet transport covers a distance up to 30 km (Mulenga, 1992).

Car, bicycle and truck transport are not widely used because people have less access to them. Car transport is fast, covers long distances comfortable and carries few goods. It is not widely used because few people own it and offer public transport service. Car transport is expensive to hire and use. Those who own cars complained that they spend a lot of money on fuel and hence resort to use bus transport which is

cheaper. This has discouraged people from using car transport. Bicycle is less accessible by people though it is fast carries goods and covers long distances. This is so because the availability of buses has attracted people to using them rather than bicycle. The women said bicycles are for men alone hence they do not use them and men said they do not have time to use bicycle. This has contributed to the low use of bicycle. Truck transport is the least used of all the forms of transport available in Chilanga. It is not widely used because few engage in activities that require the use of trucks. Truck transport is designed to carry bulky goods and hence suitable for use in activities such as agriculture, quarrying and construction activities.

6.4 Impact of modes of transport on environment

Transport uses the environment, hence causing alterations on the environment. Researches done in America by Ackerman (2004), Benson (1994) and Strickland (2004) show that motorized transport affects the environment by causing air pollution, noise pollution, water pollution, injuries and deaths, congestion or loss of space, loss of trees and amenities. The research conducted in Chilanga peri-urban on both non-motorized and motorized transport shows that: motorised transport cause air pollution, noise pollution, littering on the environment, injuries and deaths, loss of space and dust pollution while non-motorized transport cause littering on the environment, injuries and deaths, loss of space and loss of vegetation.

Both motorized and non-motorized transport cause littering on the environment. Littering on the environment have for long been attributed to commercial, industrial and domestic causes. Transport is found to play a part in littering of the environment. Feet transport is the major cause of littering on the environment. As people move from place to place they tend to throw things about on the environment such as papers, plastics, empty tins and containers. Bus transport also contributes more to the littering of the environment. Bus passengers have a tendency of eating whilst on the move and throw the peels of food, plastics and containers through the windows on to the environment. Though bins were introduced in buses people still don't use them. Feet and buses are major contributors to littering on the environment because a lot of people use them. Bicycles, cars and trucks contribute little to the littering on the environment, because they carry few people and spill little carriage on the environment.

Both non-motorised and motorized transports have an impact of loss of space except for a train. Transport occupies space (Ackerman, 20004) loss of space is most evident in bus transport. This is so because buses operate on the daily basis at every time and hence congest the roads they travel on. Cars also cause congestion on the environment because they use the same road with buses and other motorized transport adding to the number of modes on the road. Feet and bicycle transport use mostly footpaths and other tracks. In these tracks they cause congestion because large masses of people travelling from place to place.

Cars, buses and train cause air pollution while feet and bicycles do not. Cars, buses and train use fuel as energy for movement. The engines of these form of transport combust the fuel to release energy. In the process of combustion, gases are released into the air causing air pollution in form of smoke through the exhaust pipe. Gases released include carbon monoxide, carbon dioxide, nitrogen oxides, lead and sulphur dioxide (Strickland, 2004). These gases are harmful to the environment and human beings.

Cars and buses contribute largely to air pollution on the environment of Chilanga, train contributes little because it rarely operates. According to Ackerman (2004) motor vehicles account for 90% to 95% of lead and carbon monoxide and carbon dioxide emission, 65% to 70% of nitrogen oxides. Strickland (2004) in his study found out that motor vehicles contribute 74% of carbon dioxide and 43% of nitrogen dioxide.

Carbon monoxide is a poisonous gas, which intoxicates the air. When breathed in by people their blood is poisoned. Carbon monoxide also causes nervous system impairment. When carbon monoxide combines with hemoglobin, it forms carboxy hemoglobin, which is useless for respiratory purposes and hence leads to death. Lead is another poisonous gas emitted by automobiles. It causes blood poisoning and liver and kidney damage. Carbon dioxide is a greenhouse gas, which threatens to increase surface temperatures. Nitrogen oxide reacts with water to resulting acid rain, which is harmful to plants and buildings by causing plants to dry up and buildings to corrode. Sulphur dioxide increases breathing rates of people, suffocation, a feeling of air starvation and aggravates asthma and chronic bronchitis. It also causes impairment of pulmonary functions, respiratory irritations of throat and eye irritations (Dara, 2004)

Noise pollution is much evident in motorized modes of transport. The chief emitter of noise was found to be train. Bus and car transport contribute to noise pollution. Noise

from train is heard at high pitch when it hoots upon reaching and leaving the station. Noise is also heard when the flange of the wheel rubs against the rail. Noise from cars and buses is as the result of internal combustion of engines. They are noisy when starting from the stop and coming to the stop, when over speeding, hooting on traffic and applying brakes.

Noise on the environment interferes with communication of people. Noise tends to disrupt conversations of people. Noise also interferes with working efficiencies of people. Noise disturbs people doing various activities because it catches their attention causing them to lose concentration, for instance when a noise car or bus passes, people would stop doing their activities to see what car or bus is causing the noise. Noise irritates people causing distress and emotional disturbance. Noise scares away animals and birds.

Feet and bicycle transport have an impact of loss of vegetation while cars, train and buses do not. Cars, buses and train have infrastructure they use to travel on such as roads and rail line. Feet and bicycles use footpaths and tracks. Bicycle and feet have created paths everywhere causing loss of grass and trees. This is so because people trample and bicycle move on grass and trees are cut to create way for transport. The loss of vegetation has led to formation of soil erosion on these paths.

Whereas bus, train, car and bicycle cause injuries and deaths feet does not. They cause injuries and deaths when they run over people. The injuries and deaths are due to careless driving on the part of cars and buses and careless cycling of bicycles. Sometimes the accidents are as a result of loss of control, misfortune and pedestrian not being cautious when crossing the road.

Other impacts include dust pollution caused by cars and buses. These forms of transport stir up the dust as they move along side the road and gravel roads. Dust when inhaled has health effect on people, which is respiratory illness such as cough, and flu. Dust also causes poor visibility on the environment.

6.5 Socio-economic activities of people of chilanga

There are various socio-economic activities that people engage in. these activities are important in bringing about socio-economic development. The major socio-economic activities people engage in include: education, health, recreation, religious, agriculture, business and salaried employment.

6.6 The impact of modes of transport on socioeconomic activities of people in chilanga

Socio-economic activities require transport in order to take place. Transport ensures movement of people, goods and services from place to place. Larger volumes of trips are made by people to utilize social and economic facilities located at different places. Transport opens up mere economic opportunities for dwellers by ensuring access to markets. Transport also ensures the flow of goods (Holmeier, 1973) transport affects the production of goods and commodities and the prices of goods that are offered for sale.

Research carried out in chilanga reveals that bicycle, car, feet and bus enables people reach various places where socio-economic activities are taking place. People are enabled to have access to various activities, which are important in bringing about development. Transport has helped people access various activities and these activities are being carried out. Though feet and bicycle transport are slow and car and bus transport are fast. They have enabled people to travel to places where activities take place.

Feet, bus and bicycle transport have enabled transportation of goods, outputs, inputs and resources. For instance, agricultural and business activities require movement of goods, inputs and outputs. These activities use feet, bicycle and bus transport. Bus transport is mostly used by the people engaged in business activities they use bus transport to transport goods for sale to the market such as poultry, bread and vegetables. Farmers to transport inputs such as fertilizers and pesticides also use bus. Feet vend bicycle are used mostly for transporting agricultural produce from field to storage place because the morphology of the land is undulating and has no roads for buses and trucks to move on.

Bus, feet and bicycle cause delays of the activities. Feet and bicycle are slow and hence cause people to reach late for activities. Bus cause delays of activities because it takes long to reach various destinations. Bus is a fastest mode of transport but delays in reaching various destinations because bus drivers wait for the buses to get filled up, in the process-delaying people with schedules activities. Traffic congestion also causes buses to delay in reaching places.

Car and bus transport cause people to do activity at a cost. People traveling to places using bus transport have to pay a fee. Bus transport providers aim at maximizing profits and hence charge people for using buses. To travel within chilanga people pay

k800, from Chilanga to Makeni K1500, from Chilanga to Lusaka K2000 and from Chilanga to Kafue K4500. Car also cause people to do activity at a cost because they pay for using them and the owners of cars have to buy fuel for their cars which is expensive.

Bus cause people to gain low profits, in agricultural and business activities. Bus is used for transporting inputs; goods purchased to Chilanga for use by farmers and for sell by businessmen. Farmers and businessmen are charged for the goods carried. Most people complained that the charges are high and when they calculate profit is low.

Many people said transport have no impact on their activities. This could be because people have not realized that transport can have an impact on their activities.

6.7 Attitude and Perception of people towards the impacts of transport on Environment and Socio-Economic activities.

Peoples perception and attitude towards the environmental impacts of transport are that there should be regular checkpoints on roads to assess which vehicles produce a lot of smoke. People felt that this would help reduce on the effects of noise and air pollution on the environment.

Vehicles should be serviced regularly. Vehicles should be taken to the garage to be serviced in order to check for faults, repair them and certify them fit for use. Servicing will help reduce the effects of air and noise pollution on the environment and also reduce on the likelihood of occurrence of accidents.

New technology should be invited in Zambia, which should include use electric vehicles and train. This will help eliminate emissions of gases into the air

Education awareness should be implemented. There is need to sensitise people and motorists on the environmental impacts of modes of transport. This will help bring or promote awareness and build consciousness in people on environmental issues. People and motorists will then try to work together to save their environment from damage.

Use of bins should be reinforced in buses. Most of the bins in buses are used for storing money.

Non-motorized modes of transport should be encouraged and welcomed to make a balance with motorized modes of transport. This will help lessen the effects of air and noise pollution.

Cyclist and pedestrian paths should be created in areas that are prone to congestion. There should be designated paths for cyclists and pedestrians to reduce on illegal paths.

Transport rules should be made so that people and motorists are guided. Transport rules should include at what speed people should travel

Environmental sustainability should be found. Ways of preserving that environment should be found.

Modes of transport such as bus and cars should be cheap, affordable and effective to enable people do their activities effectively. The modes of transport should be fit for use. For instance, people should be free to walk and cycle this would determine how effective they would do their activities. Buses should have caravans to enable people carry a lot of goods. People are limited in transporting goods because buses do not have caravans. Buses have limited space to carry bulky goods. Hence use of caravans will help people do their activities effectively.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1. Introduction

This chapter concludes what has been discussed in chapter six and tries to show if the objectives are achieved. It also gives the recommendations.

7.2. Conclusion

Transport is an important means through which people develop. It facilitates movement of people, goods and services from one place to another.

The people of Chilanga use both non-motorized and motorised transport, which include bus, car, truck, bicycle and feet. Bus and feet transports are widely used modes of transport, while car, bicycle and truck are the least used modes of transport.

Transport has adverse effects on the environment. The effects of transport for motorized transport include air pollution, noise pollution, littering the environment, loss of space or congestion, injuries and deaths and dust pollution. The effects of non-motorized transport include littering the environment, loss of space, loss of vegetation. Bicycle alone causes injuries and deaths.

People in Chilanga engage in various socio-economic activities. These include health, religious, recreation, education, agriculture, business and salaried employment. To carry out these activities transport is used. The modes of transport used have an impact on socio-economic activities. Bicycle, feet, bus and truck cause transportation of goods, outputs and resources. Car, bicycle, feet and bus enables people to reach various places where activities are taking place and do the activities. There are five positive impacts of transport.

The negative impacts of transport people use include that car and bus cause people to do activities at a cost because they are required to pay for being moved to places. Feet, bicycle and bus cause delays of goods, people and services. Bus causes people to gain low profits because they are charged a lot for carrying goods. Few people only highlighted the impacts of transport on socio-economic activities. This could be due to the fact that many people do not know that transport can affect the activities of people.

The attitudes and perceptions of people toward environmental and socio-economic activities are as follows: people reacted to the fact that transport has an impact on the

environment and gave suggestions as to what should be about the impacts. Car, buses and other motorized transports should be serviced regularly. There should be regular checkpoints on the roads; there is need for new technology that involves use of electricity as energy for movement of transport. Education awareness should be conducted on transport and environment issues; transport rules should be formulated pedestrian and bicycle paths should be created and environmental sustenance should be found.

People's reactions towards impacts of transport on socio-economic activities are that buses and cars should be cheap, affordable and effective to enable them do activities effectively, people should be fit to work and cycle, buses should have caravans to enable carry a lot of goods.

7.3. RECOMMENDATIONS

The environment is an important entity that should be preserved. It supports us by providing air, land, water, food, shelter and other essentials for life. Therefore, the following recommendations should be favourably taken into consideration.

- Environmental impact assessment should be carried out in all areas that use the modes of transport in order to address environmental concerns. There is need also to know how far and much transport has affected the environment.
- The policy makers of transport system should seriously take into consideration the impacts of transport on the environment. The policies made determine the use of modes of transport and hence appropriate policies should be made.
- Environmental law concerning transport should be made in order to regulate the environmental impacts of transport.
- All motorists, cyclists and pedestrians should have education on the impacts of modes of transport on the environment. This awareness will help people to try and safeguard the environment from damage.
- Private transport providers should have rules and regulations aiming at protecting the environment. The private transport service providers have their main interest of profit maximization.
- Need to research more on the causes of accidents on the roads; to help identify which safety measures are appropriate.

- Need for appropriate regulatory measures on vehicle noise and fumes, which can be an effective protection against environmental pollution. Effective traffic management should be enforced in order to reduce traffic congestion.
- Integrated transport facilities should be promoted. All modes of transport should be used to strike a balance between non-motorised and motorized transport.

Reference

- Ackerman, R.O. (2004). The World Bank, Transport and Environment, World Bank, Washington DC.
- AIMM, (1973). Transportation, AIMM, Sydney.
- Dara, S.S. (2004). Environmental Chemistry and Pollution control, S. Chand and Company Ltd.
- Eaton, E. J. (1965). Elements of Transport, Sir Isaac Pitman and Sons Ltd, London.
- Haefele, E.F. and Steinberg, E.B (1965). Government's control on Transport, an African case, The Bookings Institution, Washington D.C.
- Hofmeier, R. (1973). Transport and Economic Development in Tanzania, Welforum Verlag Monchen GmbH, German
- Hornby, A.S. (2000). The Oxford Dictionary of Current English, Oxford University Press, Oxford.
- Matenga, C.R. (2000). Kafue District Profile, Ministry of Environment and Natural Resources, Lusaka.
- Mulenga, C. (1992). Transport in Zambia (Problems and Prospects), Institute for African Studies, Lusaka.
- Peake H, S.(1994). Transport in Transition, Earth Scan Publications Ltd, London.

APPENDIX 1

CHI SQUARE TEST COMPUTATION

Use of modes of Transport by Gender

H₀: There is a significant relationship between Gender and Modes of Transport used.

H₁: There is no significant relationship between Gender and Modes of Transport used.

χ^2 critical is 13.28

Result: χ^2 -calculated value = 11.95

Discussion: Accept H₀

Conclusion: H₀ accepted

APPENDIX II

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NATURAL SCIENCES

DEPARTMENT OF GEOGRAPHY

Questionnaire to access information on the Environmental and Socio-economic impacts of Transport

Dear Respondent,

I am a fourth year student at the university of Zambia carrying out a research on how the mode of transport affect the environment and socio-economic development of people. You have been selected randomly to answer the questions in this questionnaire. I assure you that the answers you will put forward will be treated as strictly confidential. The research that I am carrying out is for academic purposes .Please feel free to answer the questions given.

INSTRUCTIONS

Please tick the appropriate response in the space () or filling the blanks (_____).

BACKGROUND INFORMATION

1. What is your sex? Male () Female ()

2. What is your age?

3 What is your Marital Status?

Single ()

Married ()

Widowed ()

Separated ()

Divorced ()

4 What is your highest Education level?

Not been to school ()

Primary Education ()

Secondary Education ()

Tertiary Education ()

5 What is your Occupation?

SECTION B

MODES OF TRANSPORT

This section seeks to find out the modes of transport you use?

6 What modes of transport do you use?

Feet ()

Train ()

Bicycle ()

Truck ()

Car ()

Bus ()

Others, please specify

8. What modes of transport do you own?

Bicycle ()

Car ()

Bus ()

Truck () Wheel barrow ()
Others, please specify _____

9. What modes of transport does your family use?

Feet () Truck ()
Bicycle () Train ()
Car () Bus ()
Others, please specify _____

10. What modes of transport do the people in your community use?

Feet () Bus ()
Bicycle () Train ()
Car ()
Others, please specify _____

11. How far do you each mode of transport you have mentioned? Please fill in the table below.

| MODE OF TRANSPORT USED | HOW FAR YOU USE TRANSPORT |
|------------------------|---------------------------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

12. Which modes of transport do you use daily?

13. Which modes of transport do you use frequently?

Why do you use them frequently?

14. a) Which modes of transport do you use rarely?

b) Why do you use them rarely?

SECTION C

ENVIRONMENTAL IMPACTS OF MODES OF TRANSPORT

This section seeks to find out the effects of the modes of transport on the Environment.

15. How long have you stayed in Chilanga? _____

16. Have you noticed any change on the environment from the time you have been staying in Chilanga?

Yes () No ()

If yes, what change?

MOTORISED TRANSPORT

17. What impact has car on your environment?

Noise pollution () Air emissions ()

Air pollution ()

Injuries and deaths ()

Loss of space ()

Loss of trees ()

Water pollution ()

Garbage disposal ()

Others, please specify _____

18. What impact has bus on the environment?

Noise pollution ()

Air emission ()

Air pollution ()

Injuries and deaths ()

Loss of space ()

Loss of trees ()

Water pollution ()

Garbage disposal ()

Others, please specify _____

19. What impact has train on the environment?

Noise pollution ()

Air emission ()

Air pollution ()

Injuries and death ()

Loss of space ()

Loss of trees ()

Water pollution ()

Garbage disposal ()

Others, please specify _____

NON MOTORISED TRANSPORT

20. What impact has walking on your environment?

Injuries and deaths ()

Loss of trees ()

Loss of space ()

Water pollution ()

Garbage disposal ()

21. What impact has cycling on the environment?

- Injuries and deaths ()
- Loss of trees ()
- Loss of space ()
- Water pollution ()
- Garbage disposal ()

SECTION D

This section seeks to find out how your socio-economic development has been affected by the modes of transport you use.

22. What social activities do you engage in?

Education ()

Religious activities ()

Health activities ()

Recreation activities e.g sport, picnics etc ()

Others, specify _____

23. What Economic activities do you engage in?

Agriculture ()

Fishing ()

Business activities (income generation activities) ()

Quarrying ()

Employee ()

24. What modes of transport do you use for each activity you have ticked above. Fill in the table please.

| ACTIVITY | MODE OF TRANSPORT USED |
|----------|------------------------|
| | |
| | |
| | |
| | |
| | |
| | |

25. Why do you prefer using the above modes of transport for each activity? Fill in the table please.

| ACTIVITY | MODE OF TRANSPORT USED | REASON |
|----------|------------------------|--------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

26. What impact has each mode of transport you use on your activities?

| ACTIVITY | MODE OF TRANSPORT USED | IMPACT |
|----------|------------------------|--------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

SECTION E

ATTITUDE TOWARDS THE ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS OF MODES OF TRANSPORT

27. what value has the environment of chilanga to you? _____

29. What should be done about the effects of the modes of transport on the environment of chilanga?

30. Which modes of transport do you think are the best for any social and economic activity?

| | |
|-----------|-------------|
| Car () | Walking () |
| Bus () | Cycling () |
| Truck () | Train () |

31. What should be done to the modes of transport you use to enable you perform your social and Economic activities?
