

THE UNIVERSITY OF ZAMBIA

**SCHOOL OF NATURAL SCIENCES
DEPARTMENT OF GEOGRAPHY**

**PEOPLE'S PERCEPTIONS AND ATTITUDES
TOWARDS CUTTING DOWN OF TREES IN
CHIEF MOONO'S AREA -
MUMBWA**

MAZUBA MAGUSWI

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CHIEF MOONO'S AREA - MUMBWA**

MAZUBA MAGUSWI, COMPUTER NO.: 96248793

**A Project report submitted to the Department of Geography at
the University of Zambia in partial fulfilment of the
Degree of B.A. Ed.**

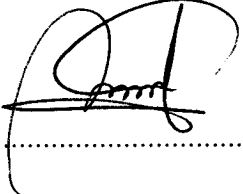
SEPTEMBER, 2002

DEDICATION

I dedicate this report to my Dad, Mr. J. Maguswi and Mum, Mrs. D. Cheelo Maguswi, who through their love and guidance have made me what I am.

DECLARATION

“I MAZUBA MAGOSWI 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 materials referred to have been specifically acknowledged, and that the project report has not been accepted in any previous application for academic award”.

Signature  Date: 16/09/02

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My last regards go to all those people not mentioned above, who in any way or the other contributed to the success of this study.

ABSTRACT

The world's forests are disappearing at a very fast rate due to cutting down of trees indiscriminately. In Africa most people live under the poverty datum line. Therefore, when it comes to economic status, a number of people have quite low income to sustain themselves in the day to day life. The only way possible to earn a living besides subsistence agriculture is to exploit the natural resources for example trees to make charcoal and other products.

This creates competition among the people forcing them cut down trees indiscriminately regardless of the size and volume of trees. Very few, if any are concerned with the adverse effect, that come about from such activities. Hence the perceptions and attitudes of cutting down trees among most people in low income areas leaves much to be desired.

Using structured interviews to obtain information pertaining to people's perceptions and attitudes to cutting down trees and by way of formulating hypotheses to test for significance in Chief Moono's area of Mumbwa a number of factors were established. Among most people in Chief Moono's area, low socio economic status was found to be one of the factors that influence people's perceptions and attitudes towards cutting down trees. And that a number of people are not really concerned with the conservation of trees, while males and females have similar views on the need to protect trees. Moreover, other factors like education, cultural beliefs and age seem to affect the perceptions and attitudes of people to cutting down of trees in Chief Moono's area.

There is need therefore to empower people by way of involving them in the conservation of trees and giving them loans to buy necessary in-puts so that they can concentrate on ploughing land rather than indiscriminate cutting down of trees in rural areas especially.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Most people in rural areas engage themselves in different activities such as farming, hunting, charcoal burning, fishing (those living near rivers and lakes) and so on in order to earn a living. To undertake activities like fishing and charcoal burning, large pieces of forest land have to be cleared from time to time. Unfortunately with the growing population in rural areas, there has been a scramble for these few resources which to many is the source of livelihood. Hence with regards to cutting down trees, everyone would wish to outpace the other person regardless of how big or small the tree is. Therefore, the rate of cutting down trees in most rural areas is quite rapid due to the competition among the rural dwellers. Different reasons could be advanced to why people in rural areas cut down trees indiscriminately. On one hand it could be that most people are ignorant of the consequences that arise from cutting down trees indiscriminately or that people's perception and attitudes towards the natural environment is influenced by a number of factors such as their socio-economic status, cultural beliefs, education background and age chavero (1993).

This study focus on peoples' perceptions and attitudes towards cutting down of trees in chief Moono's area of Mumbwa District in the central province of Zambia.

1.2 Statement of the problem.

With the decline in the socio-economic status of the majority of the rural community and their ignorance of the consequences that arise from indiscriminate use of resources, people in rural areas would use resources (e.g. trees) at their disposal as much as they could in order to satisfy their immediate needs. Very few, if any are concerned with the repercussions that would come out from indiscriminate cutting down of trees for instance. Therefore, the views of many people in rural areas are not compatible with the norms of sustainable use of natural resources, in this case trees.

1.3 Aim.

To investigate the perceptions and attitudes of the local people towards cutting down trees in Chief Moonos area of Mumbwa .

1.4 Objectives.

The following objectives were raised in order to achieve the aim of the research:

- (a) To find out whether the local people in Chief Moono's area are satisfied with the income they realize from selling their farm produce;
- (b) To establish whether the local people in Chief Moono's area are aware of the consequences that result from indiscriminate cutting down of trees.

- (c) To find out whether the local people in chief Moono's area concern themselves with the conservation of trees.
- (d) To compare whether males and females have similar views on the need to protect trees from cutting them down indiscriminately in chief Moono's area.

1.5 Hypotheses.

The following are the hypotheses which were tested;

- (a) There is no significant difference in the way males and females view the need to protect trees from indiscriminate cutting in chief Moono's area.
- (b) There is no significant difference in the age proportion of persons who disagree that cutting down trees indiscriminately leads to environmental degradation.
- (c) People's perception of environmental degradation in chief Moono's area is significantly influenced by the level of educational attainment.

1.6 Rationale.

It has been generally observed by conservationists that the rate of environmental degradation resulting from indiscriminate cutting down of trees is on a rapid increase. Hence without consented efforts the environment as a

whole will degenerate significantly thereby affecting both human beings and other living organisms.

Therefore, this study will help people living in rural areas and are in the habit of cutting down trees indiscriminately to be aware of the consequences that result together with their effects on the environment and the future generation.

Furthermore, the research will help enlighten people with indifferent perceptions and attitudes towards cutting down trees to realize the importance of sustainable use of natural resources both for present and future generations.

With regard to the future endeavours of the researcher, this study will be of significant help in that it will broaden the scope of the researcher and also other students who wish to carry out similar studies.

1.7 Scope of the study.

The study looks at the perceptions and attitudes of people with regard to cutting down trees. Therefore, the study considers how socio-economic status of the people in Chief Moono's area influence their perceptions and attitudes to cutting down of trees. In addition, people's knowledge of the consequences that result from indiscriminate cutting down of trees and their concern with conservation of trees have also been considered. Comparisons have also been made between males and females on their view to protect trees from cutting down trees.

The area under consideration is chief Moono's area of Mumbwa district. But out of about 20 villagers in this chiefdom, only 9 have been considered due to their easier accessibility by the researcher and his local knowledge to the mentioned villagers. Each village had a sample of 6 household heads taken from the village register by way of interval sampling. The aerial extent of the study area is well over 40,000 hectares and was established during my frequent visits over the past 7 years.

1.8 Definition of terms.

1.8.1 Deforestation.

It must be noted that the major cause of loss of forest is deforestation. However, the term is all embracing and is influenced by other factors such as; overgrazing, commercial logging, clearance for agriculture, roads and railways, forest fires, mining and drilling, firewood collection and cutting down trees for domestic usage and living space (Lewis (2000)). Therefore, deforestation has been defined in many ways by various scholars. Some of the notable definitions used in this research include those defined by Stamp (1966) and Grainger (1993).

For instance Stamp (1966) defined deforestation as the clearing or stripping of trees. While Grainger (1993) referred to deforestation as a temporary or permanent removal of forest or woodlands for one purpose or another and he further pointed out that "true" deforestation only occurs when the original tree cover is replaced by a completely different landuse.

Therefore, in a nutshell deforestation can be defined as the loss of woodland or forested area. However, the scope of this research is not to discuss deforestation in its totality but to look at people's perception and attitudes to one of the causes of deforestation, in this case indiscriminate cutting down of trees.

1.8.2 Environmental degradation.

The term environmental degradation has been defined as the state of degeneration or decline to a lower condition, quality or level of the environment stamp (1966).

1.8.3 Logging of trees.

Logging of trees refers to the process of cutting, trimming and hunching of timber stamp (1966).

1.8.4 Attitude.

The term attitude refers to the way of thinking or behaviour towards something ✓
.Hornby (2000).

1.8.5 Perception.

Perception refers to a way of seeing, understanding or interpreting something. ✓
Hornby (2000).

1.9 Review of the Organisation of the report.

In all, the report has 7 chapters. The first chapter is the introduction and includes the following; background to the study, statement of the problem, aim, objectives, hypotheses, rationale, scope of the study; definition of the terms, and the preview of the organisation of the report.

The second chapter looks at literature review and includes an introduction, attitudes and perceptions of people to cutting down trees, perceptions of people to environmental deforestation, effects of cutting down trees and empowering people to abate indiscriminate cutting of trees.

The third chapter describes the study area i.e. its location, physical feature^s, topography and soil, vegetation, climate, population and socio-economic conditions of the people.

The fourth chapter explains the method of the research. Under this chapter the following research methods have been considered; primary data, secondary data analysis, presentation and limitations and problems encountered during the research.

The fifth chapter looks at the results and research findings, tables and figures have been used in some cases to illustrate the results. Furthermore, statistical tests have been included though their full details are shown in the appendix.

The sixth chapter contains the discussion of the research results in light to the major points made in the literature review and objectives of the research.

The seventh chapter looks at the conclusion and recommendations.

CHAPTER TWO.

LITERATURE REVIEW

2.1.0 Introduction

Though not a new phenomenon, the world has witnessed unprecedented change in the physical environment in the recent years due human activities which exceeds the natural one. As a result the world forests are in grave danger. Over half of the original forest cover has been destroyed and things are set to deteriorate unless the current alarming rate of forest clearing is checked (Lewis (2000)). Every minute an estimated 26 hectares of forest is lost (i.e. an area equivalent to 37 football pitches), and it is not difficult to see that if this continues we will be left with a planet devoid of woodland. This would be catastrophic because not only are forests home to some of the important species on earth, but they also play a vital role in regulating the climate and making the planet habitable (Lewis (2000)).

Much of the earth was once covered by trees but the majority of these were cleared long ago to make way for an ever expanding human population. This is particularly true in regions with temperate climate such as Britain and other parts of Europe where agriculture took an early hold of the landscape, and has now greatly reduced forests to thinly pockets spread throughout the land. (Andrew (2001)). It is only in relatively recent years that tropical forests have come under severe attack. On global scale there was twice as much tropical forest at the time of the 20th century as there is today and only around 700 million of the original 1.5 billion hectares remain (Andrew (2001)).

The rate of cutting down trees in Africa is a cause for extreme concern because Andrew (2001) argues that around 4 million hectares of forest are destroyed each year to the extent that 45% of its original forest cover has disappeared.

2.1.1 Perceptions attitudes and of people to cutting down trees.

Although the effects of cutting down trees can be felt everywhere around the world especially in developing countries due to underdevelopment, peoples perceptions and attitudes towards the physical environment in general leaves much to be desired. Hence questions like, are dangers in the physical environment viewed as important by the majority of the people? What are people's perceptions of crisis? And is the present physical environment situation considered as a crisis? Brown (1996) came into play among the conservationists.

2.1.2 Perceptions and attitudes of people to environmental degradation around the world.

Around the world, people have different perceptions and attitudes towards the environment due to their culture beliefs, gender, education and age. For instance the perceptions of the Nalians of South America embody both individual and collective understandings and knowledges. Chevero (2000). Nalians attitudes and perceptions have been historically moulded by their experiences of contact with external ideologies. Their attitude and values towards nature are fundamental to understanding how they have transformed and continue to transform their environment. Furthermore, different worldviews are influenced by the social sector to which people belong and by the adoption of external ideologies.

Chevero (2000), divided the responses of Nalian people into three groups namely old people who deny any degradation, though they gave different explanations of it. For instance old people say that all animals and plants take refuge under the volcano San Martin, in a sort of marginal park called Los Eucautos. The plants and animals are protected by the King of Earth and are not menaced by mans actions. The rivers and mountains have a sort of “perpetuity assurance” that will never end (Chevero (2000)).

A second group largely made up of middle men and women recognise certain deterioration but explain it by using traditional knowledge about natural cycles. They’re conscious of the landscape’s transfiguration, of the limitation in their extraction activities and of the changes in the productivity and diversity of traditional agricultural systems (Chevero (2000)).

They believe that the rainforest has its own process of natural regeneration, even if it may have a very slow rhythm. that the present bad harvest, lack of maize, wind, floods, heat, pests, etc come and go, and all will surely be better in future. (Chevero (2000)). Furthermore, this same group have individuals who clearly perceive the deterioration of the natural environment and try to define its causes and effect. Several believe the cattle to be poisoning the rivers, (Chevero (2000)). They attribute this to the loss of soil fertility and its consequences for productivity in the Milpos and also loss of aquatic lives in the rivers. Moreover, deforestation, climate change, decrease in water resources, pollution, increased garbage and spread of new diseases, all are attributed to environmental degradation (Chevero (2000)).

However, at the other extreme, young people who mostly are in their early 20s do not perceive any deterioration since they have never known the eco-

system's previous complexity, and are not concerned enough to ask about ecological differences with the past Chevero (2000).

Another group of people called Mestizo people have their own perception and attitudes towards the physical environment. According to Chevero (2000), these people do not see deterioration in the environment because they perceive deforestation as a sign of progress. They see degradation of nature as inevitable in the productive development of their communities. As Don Ryes explained in Chevero's (pp 29, 2000) "the cutting down of trees is necessary, the government gave us land to work, not to abandon, therefore we cut down and do not conserve, otherwise how would our children eat?"

For them raising cattle is the natural vocation of tropical lands. They see deforestation but do not worry about the consequences.

2.1.3 Perceptions and attitudes of environmental degradation in Zambia.

In Zambia all natural resources are state owned including forested areas. Nevertheless, in rural areas resources like land and trees in particular are under the auspices of the local community and the traditional ruler who looks after the resources on behalf of his or her subjects. It is in these communal areas where there is rampant cutting of trees indiscriminately because no serious enforcement of rules and regulations towards the conservation or sustainable use of natural resources are put in place. As a result, this type of ownership is associated to the "tragedy of the commons" postulated by Hardin (1968). This theory stipulates that natural resources are owned by the community, each person strives to get the best out of it. Therefore, with this type of attitude,

trees in these areas are cut down indiscriminately and the rate is higher especially with the increasing population.

Communal land is further subdivided into smaller units under village headmen. In addition to the laws of forest resource use imposed by the chief or headman, the forest department has the right to monitor the activities taking place in these lands,. However, Dasman (1964) argues that laws are of no value when there is no one to enforce them, as is the case in most rural areas in Zambia. Hence restricting the use of natural resources would not protect the forest unless people are given an alternative.

2.2 Effects of cutting down trees.

To many people living in country side, the physical environment which surrounds them is fascinating, full of mystery and promise, containing some of the most interesting and diverse products nature has to offer. So it would be a disaster if trees are wiped out from the face of the earth. Once cleared of trees, the topsoil which can take over a thousand years to accumulate can be eroded in just one decade (Lewis (2000)). This makes the land unusable and can then lead to disastrous flooding since there is no soil to soak up the rain.

Forest clearance also leaves human forest dwellers without food or shelter, and leads to the disappearance of ways ^{of} life which has ^{been} existed largely unchanged for thousands of years, (Andrew (2001)). However, potentially the most damaging effects of cutting down trees indiscriminately are in its impact on the planets climate. It has become common knowledge that global warming and greenhouse effect are caused mainly by the build up of carbon dioxide in the atmosphere. Trees and other plants absorb carbon dioxide and produce

oxygen through photosynthesis, whereas animals breathe in oxygen and breathe out carbon dioxide. The destruction of forests has brought about a disastrous imbalance in the amount of carbon dioxide produced and recycled, leading to the build up in the atmosphere, and increased climate change, (Andrew (2001)). In addition to this, trees which are cut down to provide space for agriculture are either buried or left to rot thereby releasing even more carbon dioxide, and clearly this facilitates disaster.

A further consequence of indiscriminate cutting down of trees concerns the scientific possibilities which would be lost with the demise of forest cover. It is estimated that only a small fraction of the plants and animals living in the wild forests have been identified, and some scientists speculate that many of these may hold the keys to finding cures for some most deadly diseases known to man. For instance the United States national cancer institute catalogued some 3000 plants with anti-cancer properties, 70% of which are found in tropical forests (Andrew (2001))

2.3 Empowering people as a means of abating indiscriminate cutting of trees.

There is great need to empower people in rural areas, particularly the less privileged people so that cutting down of trees indiscriminately is brought under control. The benefits of empowering are far greater than physical improvements, for empowerment allows communities and individuals to be effective and take care of their environment and their lives too (Wathern (1995)). People for example when educated on the dangers of environmental degradation, become very responsible. Therefore, the need to invest in people's education among other things becomes inevitable so as to ensure

sustainability and better environment. This is because an educated population is well informed and knows how to take care of its resources without depleting them.

Furthermore, there is need to empower people from under privileged to form such clubs as bee-keeping, gardening, tailoring, nutrition and farming clubs which may help the under privileged with the much needed income in their quest to raise their living standards. For example, according to Capacity Building for Natural Resources Management (CBERM) 1999, the local people in chief Muledema's area have organized themselves in small clubs as outlined above and moreover, new clubs such as poultry farming, fish farming and piggery have been introduced. The result is that the socio-economic status among the club members and their families has significantly improved.

CHAPTER THREE

STUDY AREA

3.1.0 Location

Chief Moono's area is found in Mumbwa District in Central Province of Zambia. The district lies between latitudes 14 degrees and 16 degrees south, and longitude 25 and 28 degrees east as shown in (figure 1). The Chiefdom is situated on the western side of Mumbwa Boma about 10 to 15 kilometers from the town centre (personal observation). The extent of the chiefdom is well over 40,000 hectares.

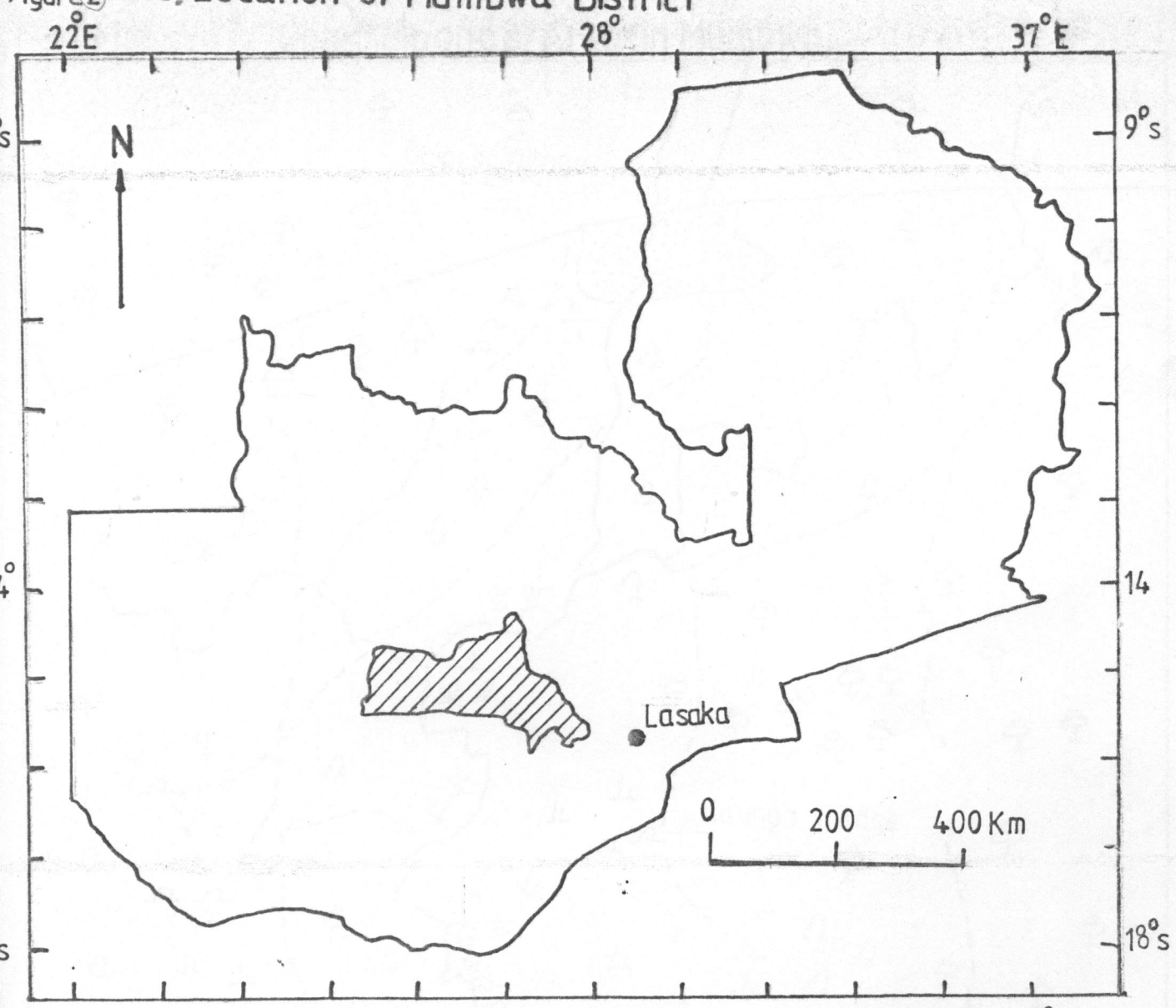
3.2 Physical Features

3.2.1 Topography and soils

As part of the Central African Plateau, the relief of Chief Moono's Area lies between the range of 991 meters and 1113 meters above sea-level in height. It is characterized by undulating terrain and a few isolated mountain ranges (personal observation).

In general the main types of soil found around Chief Moono's Area are the Alfisols. These soil types are slightly leached, medium to slightly acid, red to reddish clayey soils (with fine loamy to clayey top soils), derived from basic rocks, often a mixture of acid rocks (Shalwiindi (1985)). However, on hills and hill ranges, shallow soils derived from acid rocks commonly known as Entisols can be found.

Figure 2 The Location of Mumbwa District

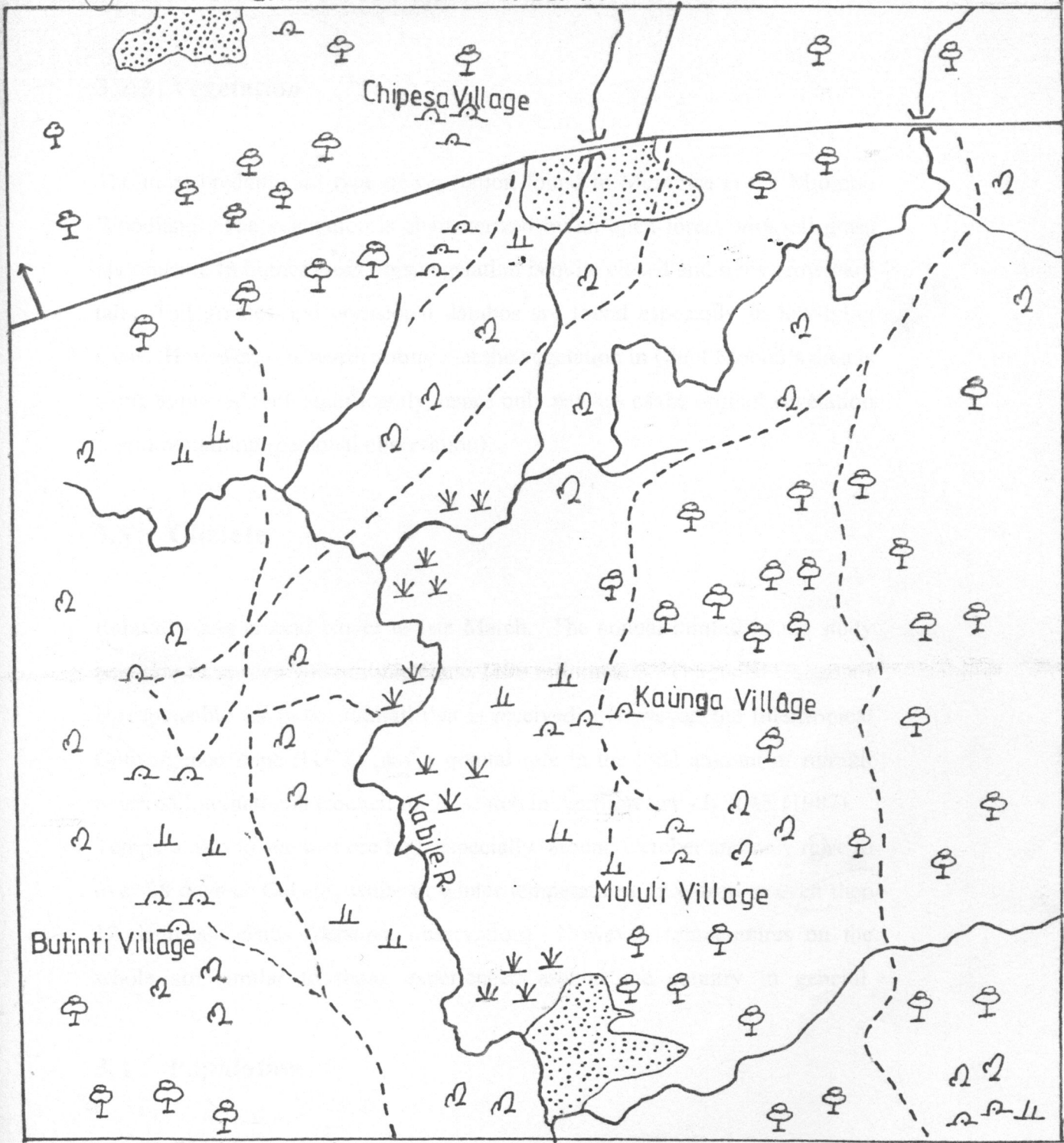


- KEY
- Town
 - ▨ Mumbwa

Adopted From: CSO(2001,pp3) Lusaka.

By: M. Maguswi

Map Showing Settlement and Vegetation Distribution in Chief Moono's Area in Mumbwa. Figure.1



KEY 1:50000

Adopted From: Surveyor General (1973).

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|-----------|---------------|-----|-----------|----|--------------------------|
| ————— | Main Road | ☪☪☪ | Thicket | ▣ | Cultivation & Plantation |
| - - - - - | Other Roads | ☪☪☪ | Woodland | ∨∨ | Marsh / Swamp |
| ☪☪☪ | Hut, Villages | ⊥⊥⊥ | Open Bush | ⌒ | River, with Bridge |

3.2.2 Vegetation

The most predominant type of vegetation found in Mumbwa is the Miombo Woodland. The vegetation is characterized by an open forest with tall grass underneath. In higher areas, this vegetation is quite closed and trees grow very tall. Tall grasses and occasional dambos are found especially in low-lying areas. However, it is worth noting that the vegetation in Chief Moono's area is being tempered with significantly, hence only patches of the original vegetation is still remaining (personal observation).

3.3 Climate

Rainfall starts around November to late March. The annual rainfall in the study area range between 900 millimeters to 1120 millimeters. The moist Congo air is responsible for most rainfall that is received. However, the Intertropical Convergence Zone (ITCZ) play a pivotal role in the total amount of rainfall received (International Council for Research in Agroforestry - ICRAF (1987)). Temperatures in summer are high especially around October and may raise to over 28 degrees Celsius, while in winter temperatures may drop to even then 12 degrees Celsius (personal observation) However, temperatures on the whole are similar to those experienced around the country in general.

3.4 Population

During the first national census of population of Zambia in 1963, the population of Mumbwa district as the whole was pegged at 53,848 people. In 1969, the population rose to 60,138 people and by 1980, the population was growing at the annual rate of 2.9 per cent. By 1990, the population of the

district had risen to 148,927 people (CSO (2001)). Although this shows a very sharp increase in population from the previous one, the population of the district was growing at a very low rate in the period between 1999 and 2000 because in the year 2000 the population was found to be 154,165 people (CSO (2001)). But with regards to the actual population of the study area, it ranged from 100 people to 250 people in individual villages (personal observation). Therefore, in all the population was found to be around 3600 people including women and children.

3.5 Socio-economic activities

The local people's main occupation in Chief Moono's area is agriculture and maize is the major crop grown. However, in recent years cotton cultivation among small-scale farmers has increased tremendously. Other crops grown in the study area include groundnuts, sunflower, millet, cassava and most recently soyabeans (personal observation).

In terms of livestock, most people keep chickens and very few domesticate cattle. Goats and pigs are not commonly kept in the area. Therefore, when it comes to cultivation only a handful of farmers use oxen for ploughing while the rest either hire or use hoes to plough their land.

Peasant farmers are most busy during the rain season from around November to the time when they sale their farm produce between July and October (personal observation). However, a few peasant farmers involve themselves in vegetable gardening especially after harvesting their maize or cotton around late March.

It must be noted that commercial farming is not pronounced in the study area, though the district as the whole has a notable number of commercial farmers. Most local people are subsistence farmers who only grow enough food for their consumption.

Of late the study area has experienced an increase in people who do charcoal burning as a source of income. The people involved in this activity are young men who are usually helped by women. Furthermore, very recently commercial logging of timber has become pronounced in Chief Moono's area due to the coming of firms that deals with logging of timber from South Africa.

CHAPTER FOUR

RESEARCH METHODS

4.1.0 Primary Data

4.1.1 Sampling

Chief Moono's area has over fifteen (15) villages. In order to have a representative data, nine (9) villages were chosen to represent the entire Chiefdom. These were selected on the basis of accessibility from the researcher's point of view i.e. availability sampling.

To get the respondents from the 9 villages, village headmen were consulted so as to use the village registers containing the names of their subjects. From these registers, every third person starting with the first one was selected using interval sampling. The sample elements contained the household heads and in the absence of these head, their spouses were used (especially for those who were married) to represent them. In each village, six respondents were interviewed making the total sample size to be fifty four (54).

4.1.2 Use of scheduled interviews and unstructured interviews

Scheduled interviews with the household heads as shown in (Appendix D) was used during the research. Household heads were interviewed to get information relating to their occupation, education, socio-economic activities and their environmental awareness in general.

The scheduled interviews were preferred because the researcher did not know the education level of the respondents, time and paper was saved since the researcher did not have to go back to collect the responses. Also technical terms were easily explained to the respondents and writing mistakes were greatly minimised because the researcher took it upon himself to write all the responses.

Unstructured interviews with key informants such as the District Forest Officer (DFO) and village headmen were also used as shown in (Appendices E and F) respectively. The essence of interviewing the two groups of people was to obtain supplementary information which would help in the presentation of research results/findings.

4.2 Secondary Data

The main purpose of using secondary data was to show the location of the study area using maps. Two maps have therefore been used, one showing the latitudinal and longitudinal location of the study area while the other one shows vegetation, drainage and some settlements.

4.3 Data Analysis

Both descriptive and statistical tests of data analysis were used. For instance descriptive statistics was used to analyse coded tables and figures which in some cases have been drawn to summarise the data.

On the other hand three (3) statistical tests, in this case Chi-Square were used to test the three hypotheses.

4.4 Problems Encountered

The major problems encountered during the research include lack of transport to move from one village to another and suspicion from the respondents. The researcher had to walk longer distances from one village to the next and in some cases could not find village headmen who were supposed to give permission and the village register to conduct the interviews.

In many instances village headmen were difficult to find because most of them were required to be reporting to the palace of Senior Chief Moono as there was a workshop going on.

Also to be noted is a fact that some respondents including the village headmen were suspicious of the researcher thinking that he had come to spy on government's behalf how people in the study area were exploiting trees. However this problem was overcome upon producing the student's identification card (ID) and the letter of introduction.

CHAPTER FIVE

RESEARCH FINDINGS/RESULTS

5.0 Introduction

This chapter outlines the results of the research such as sampled population characteristics, people's perceptions and attitudes and responses from key informants. The sampled population characteristics included particulars of the respondents together with their socio-economic activities and people's perceptions and attitudes towards environmental degradation. Lastly, supplementary information from key informants namely the District Officer and Village Headman are considered in this chapter.

5.1.0 Sampled population characteristics

5.1.1 Sex and Marital Status

The sample size was 54 and out of these respondents, 61.1 percent were males, while 38.9 percent were females.

In terms of age proportion, 61.1 percent were within 20 and 40 years old, while 38.9 percent were 41 years and above.

The highest percentage of the respondents were married while those divorced were the lowest as shown in table 1

Table 1 Marital Status

Marital Status	Number of Respondents	Percent (%)
Single	12	22.2
Married	33	61.1
Divorced	4	7.4
Widow/Widowed	5	9.3
Total	54	100

5.1.2 Family Size

A total of 44 percent of the respondents had families ranging between 5 and 8 members. Therefore, an average family size in Chief Moono's area can be said to be around 6/5 persons. Below Table 2 shows the family size.

Table 2 Family Size

Range of Family Members	Number of Respondents	Percent (%)
1 - 4	12	22.2
5 - 8	24	44.4
More than 8	18	33.5
Total	54	100

5.1.3 Educational Level

A total of 38.9 percent of the respondents had some primary education, which is the highest percentage of educational attainment, followed by secondary education (31.5 percent). However, none of the respondents had some form of tertiary education as shown in table 3.

Table 3 Educational Attainment

Institution	Number of Respondents	Percent (%)
Primary	21	38.9
Secondary	17	31.5
Tertiary	0	0
Non-Educated	16	29.6
Total	54	100

One major reason to why most people lack tertiary education may be attributed to lack of financial resources to advance further in education.

It must be noted also that 29.6 percent of the respondents had no formal education because of lack of schools nearby and the harsh economic conditions which most people face in rural areas.

5.1.4 Occupation

Only 5.6 percent of the total number of respondents were formally employed and these were untrained teachers at one of the primary schools in the study area. The rest of the respondents (94.4 percent) were informally employed either in charcoal burring, beer brewing carpentry (black smith) peasant farming or logging of timber from May to September.

5.2.0 Major Activities in the Study Area

5.2.1 Number of years in the area

Most people in Chief Moono's area have had lived between 5 and 10 years, followed by those who have lived less than 5 years as shown in Table 4.

Table 4: Period of stay in Chief Moono's area

Number of Years	Number of Respondents	Percent (%)
Less than 5	17	31.5
3 - 10	21	38.9
More than 10	16	29.6
Total	54	100

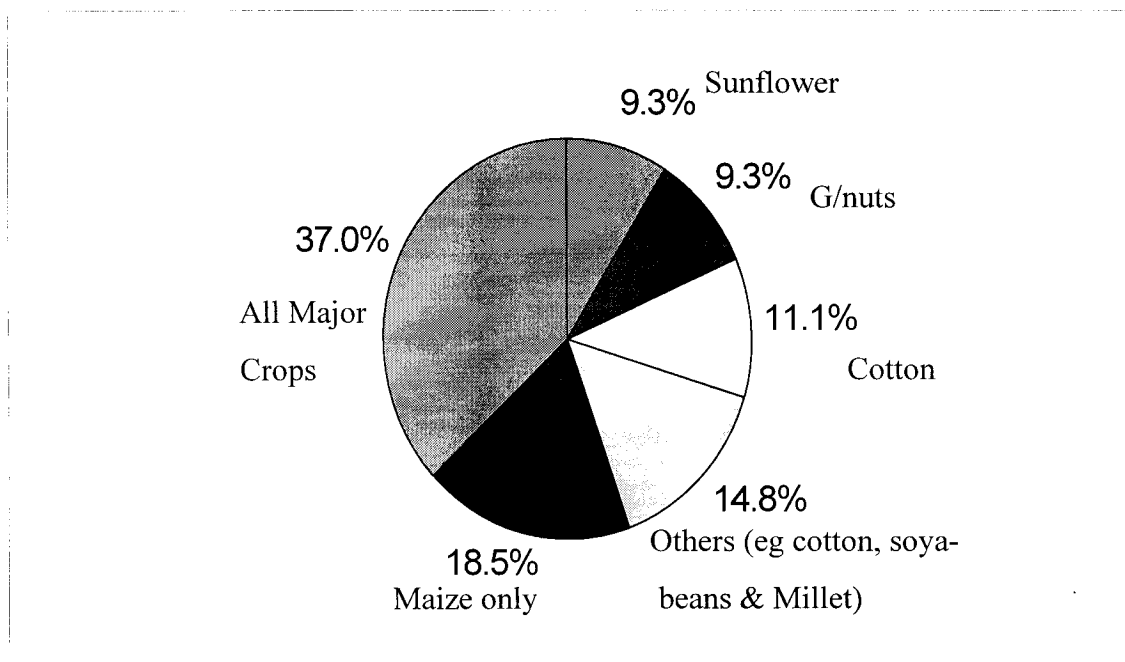
5.2.2 People's Major Economic Activities in Chief Moono's Area

A total of 85.2 of the respondents were involved in some economic activities such as cultivation; hunting, charcoal burning and logging of timber. However, 14.8 percent were mainly engaged in carpentry and beer brewing.

Of those who practiced cultivation, 66.7 percent were shifting cultivators and only 33.3 percent were permanent cultivators. This scenario can be due to the fact that most farmers were unable to buy in-puts such as fertilizers, hence shifting cultivation was the only way of retaining nutrients in the soil since trees once cut down and, provide ash which is rich in plant nutrient.

The major crops grown by most farmers in Chief Moono's area are maize, cotton, groundnuts and sunflower. Infact a total of 37 percent of the respondents grew all the major crops as show in figure 3.

Figure 3: Number of Farmers (in percentage) and types of crops they grow



However, 14.8 of the respondents grew other crops like Soya beans and millet. Furthermore, 18.5 percent, 9.3 percent and the other 9.3 percent are involved in mono-cropping i.e. growing one single type of crop only like maize; groundnuts or sunflower respectively.

After harvest, 53.7 percent of the respondents sold some of their products, while 46.3 percent kept their harvest for home consumption. Perhaps the reasons why some farmers kept their produce after harvest was due to lack of in-puts to grow large quantities, poor soils and above all to ensure food security at home.

The majority of the respondents who sold some of their produce indicated that the money realised from the sales was not enough for their daily up-keep. Thus only 3.7 percent of the same respondents were satisfied with the money obtained from the sale of their produce.

Therefore, it can be concluded that, despite some farmers selling their produce after harvest, the money realised was not enough due to small quantities produced and low market prize for the produce.

5.2.3 Types of In-puts Used During Cultivation

A total of 85.2 percent of the respondents in Chief Moono's area do not apply artificial fertilizers. This is because, the commodity is very expensive and there were no loan schemes for small scale farmers at the time of the research. However, 14.8 percent of the respondents used fertilizer. Apart from a few farmers who uses fertilizers, 37 percent of the respondents use ashes from trees after cutting and burning them. A further 48.1 percent practiced shifting cultivation by clearing land every two to three years.

5.2.4 Crop Yield for the past 5 (five) years

At the time of the research 66.6 percent of the respondents indicated that their crop yield in the last 5 years was declining slowly. This is on account that 44 percent of these same respondents lacked fertilizer, 16 percent attributed the decline to indiscriminate cutting down of trees, 27.8 soil erosion, 11.1 percent change in local climate as shown in Table 5

Table 5: Cause of crop yield decline in the last 5 years

Causes	Number of Respondents	Percent (%)
Lack of fertilizer	16	44
Cutting down trees	6	16
Soil erosion	10	27.8
Change in local climate	4	11.1
Total	36	100

While the majority of the respondents (66.6 percent) attributed the decline of their crop yield to some factors shown in Table 5, 32.5 of the respondents had observed no worked change in their yield and moreover 1.9 percent had recorded an increase in their crop yield.

5.2.5 Local People's Environmental Awareness in Chief

Moono's Area

It is unfortunate to note that only 22.2 percent of the respondents agreed that cutting down trees indiscriminately lead to environmental degradation and the following reasons were eminent in their argument: long draught spells, extremes in temperatures both in cold and hot day season, soil erosion, decline in crop yield over the years.

A total of 77.8 percent of respondents disagreed that cutting down trees lead to environmental degradation because they were benefiting in cutting down trees as shown in Table 6.

Table 6: Benefits of cutting down trees by some respondents in Chief Moono's area

Benefit people obtain from cutting down trees	Number of Respondents	Percent (%)
A lot of money is realised from charcoal burning as opposed to buying in parts	19	39.6
Charcoal use is quicker and does not inconvenience	2	4.2
Too many trees in the bush and are densely distributed	21	43.8
All of the above	6	12.5
Total	48	100

In addition the same 88.9 percent of the respondents supports logging of timbers in the area because trees are plenty and densely distributed. They also argued that logging of trees bring about employment in off season when most villagers are not performing major activities and that trees are God given therefore, everyone is entitled to exploit them as he or she wishes.

5.2.6 Major cause of reduction of trees and why they should be protected from indiscriminate cutting

With 61.1 percent of the respondents indicating that the population of trees in the study area was high, implies that only 38.9 percent disagreed to the notion that trees were many in the bush.

The 38.9 percent of the respondents who described the population of trees being few, attributed the cause of reduction in tree population to; shifting cultivation, charcoal burning, beer brewing (due to excessive use of firewood), and extraction of traditional medicine in the bush.

Although the majority of the respondents indicated that trees were abundant in the study area, 18 percent of these agreed on the need to protect trees from indiscriminate cutting. To the contrary however, 81.1 percent indicated that there was no need to protect trees because they perceived trees to be plenty and abundant.

It is quite ironic to note that when further asked on how the respondents view the need to protect trees, 50 percent agreed that trees were supposed to be protected. While the other 50 percent disagreed.

To test the significance of this perception, it was found that there is no significant difference in the way males and females perceive the need to protect trees from indiscriminate cutting in Chief Moono's area (χ^2 obs = 1.25 χ^2 crit = 3.84, significance level 0.05, degree of freedom = 1 Table 7.

Table 7: Perception of Males and Females on the need to protect trees from indiscriminate cutting in Chief Moono’s Area

Sex	Need to protect trees		No need to protect trees	
	Number of Respondents	Percent (%)	Number of Respondents	Percent (%)
Males	15	55.6	18	66.7
Females	12	44.4	9	33.3
Total	27	100.0	27	100.0

(See appendix A for more details on the calculations)

The reasons advanced on the need to protect trees include: Trees would be depleted within a short time if rampant cutting is left unchecked, there will be excessive soil especially in cultivated and marginalised areas due to uncontrolled run off created by the absence of vegetative material on the environment; Water table will dry up thereby exacerbating water problems in the area; crop damage due to lack of trees to act as wind breakers; Climate change; migration of wild animals from Chief Moono’s are; and lastly land degradation brought about by the absence of vegetation.

The other 50 percent of the respondents did not subscribe on the need to protect trees because in their own opinion, more money was realised from

making charcoal than practising permanent cultivation without the necessary inputs such as fertilizer and that, trees are God given. With no industries in rural areas logging of timber provides the only source of employment to most people in the villages, and that as long human beings live, trees will be there as it has been the case from time immemorial.

With regards to how different groups perceive environmental degradation in Chief Moono's area, a chi-square (statistical test) was used between the ages of 20 to 40 year olds and 42 year olds and above. The two age groups were examined to establish whether there is a significant difference in the age proportion of people who disagree that cutting down trees indiscriminately leads to environmental degradation. It followed that there is indeed a significant difference in the age proportion of people who disagree that cutting down trees indiscriminately leads to environmental degradation in Chief Moono's area (χ^2 obs = 5.79, χ^2 crit = 3.84, significance level = 0.05, degrees of freedom = 1) Table 8

Table 8: Environmental degradation as perceived by different age groups in Chief Moono's area

Age	People who agree that cutting down trees leads to environmental degradation		People who disagree that cutting down trees leads to environmental degradation	
	Number of Respondents	Percent (%)	Number of Respondents	Percent (%)
20 - 40	9	75.0	13	38.9
41 and above	3	25.0	29	61.1
Total	12	100.0	42	100.0

(See appendix B for detailed calculations)

In fact, 40.9 percent of the respondents aged between 20 and 40 years, agreed that cutting down trees leads to environmental degradation while 50.1 percent disagreed. In the other hand only 9.4 percent of these respondents above 40 years agreed that cutting down trees lead to environmental degradation with the other 90.6 percent disagreeing.

It was further observed also (using the Chi-square) that people's perception of environmental degradation in Chief Moono's area is significantly influenced by the level of education attainment (χ^2 obs = 22.56, χ^2 crit = 5.99, significance level = 0.05, degrees of freedom = 2) Table 9.

Table 9: Influence of Educational attainment on perception that cutting down trees indiscriminately leads to environmental degradation

Responses		Educational Attainment			
		Primary	Secondary	Non Educated (formally)	Total
People who agree that cutting down trees indiscriminately lead to environmental	Number of Respondents	1	10	1	12
	Percent (%)	8.3	83.3	8.3	100

degradation					
People who disagree that cutting down trees indiscriminately leads to environmental degradation	Number of Respondents	20	6	16	42
	Percent (%)	47.7	14.3	38	100
Total	Number of Respondents	21	16	17	54
	Percent (%)	38.9	19.6	31.5	100

(See appendix C for detailed calculations).

Even though most of the respondents were aware of the implications brought about by cutting down trees indiscriminately, only 3.7 percent were of the view that the headman be responsible for the protection of trees by ensuring that the rules governing the use of natural resources especially trees are adhered to by their subjects. Table 10 below summarizes further some of the responses people in Chief Moono's area think should be in-charge of protecting trees from indiscriminate cutting.

Table 10: People who should be in-charge of protecting trees from indiscriminate cutting in Chief Moono's area

Person who should	Number of	Percent (%)
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be in-charge	Respondents	
Village Head	2	3.7
Senior Chief	8	14.8
Everyone in the village	17	31.5
Non of the above	27	50
Total	54	100

Otherwise 50 percent of the respondents were not of the view that any of the mentioned people in Table 10 be in-charge of protecting trees from indiscriminate cutting. These feared that if cutting down of trees is legislated by anyone in the chieftom, it will be very difficult to use trees for various activities as this was not the case at the time of the research.

All in all, from the results in general one can notice that although some people in Chief Moono's area are aware of the consequences that result from indiscriminate cutting of trees, it is very difficult to stop them from this scourge without a strong economic empowerment.

In addition the results shows that both males and females have similar views on how to protect trees from being but down. Moreover age and level of educational attainment plays a significant role on how people perceive environmental degradation in Chief Moono's area.

5.3 Unstructured interview with the District Forest Officer

The following results were obtained from the interview the researcher had with the District Forest Officer:

- (a) That the Department conduct the tours through the Extension Officers, but they have difficulties because there are only three officers to cater for the whole district.
- (b) That through the Forestry Act Order Cap 199 of the laws of Zambia, the Forest Department is empowered to arrest people found cutting down trees in protected areas.
- (c) That the department is undertaking some measures like
 - (i) telling people of the benefits obtained from conserving the forests and;
 - (ii) working with other departments like Agriculture to help people in the villages realise the importance of good agricultural practices.
- (d) That the most affected type of timber which is mostly but down in case of charcoal burning is Mukwa (Ptoro Carpus angolensis) because of its high quality value and demand.
- (e) That the Department attributes the exploitation of trees in the district due to high poverty levels in villages.
- (f) That despite benefiting from forestry products and the need to stop exploitation of timber, the country in general is responding positively to the message of sustainable use of forest products.

This is because they have learnt from their counterparts in Southern Province where it has been said that rainfall is on the decline. Also the people in villages are reported to have been greatly affected by the migration of wild animals due to the fact that trees have greatly disappeared.

- (g) That cutting down of trees is rampant in open areas as opposed to forest resources. However, in recent years these resources have been encroached into because Chiefs together with their headmen are allowing both their subjects and Firms to cut trees in protected areas because they (Chiefs) are given a token of appreciation.

5.4 Unstructured interviews with the village Headmen

During the time of the interview, with the village heads, the following results were obtained:

- (a) All the Headmen indicated that as long as it is in open areas, their subjects are allowed to cut down trees and use them in every way possible.
- (b) All the Headmen indicated that their subjects may cut down trees as long as it is the land given to them by the village heads.
- (c) All the Headmen said that indeed there were measures put in place to deter people from cutting down trees indiscriminately especially in protected areas (forest reserves). If subjects were found cutting trees in such area, the village heads through their

'Kapasos' takes them to the police. However, such cases are minimal because there is no 24 hours surveillance due to limited manpower and lack of resources to maintain the protected areas.

- (d) All the Headmen said that they had no say with regards to the Firms which cut down trees because they (Firms) do it with force and usually are allowed by the Forest Department.

From the interviews between the Forest Department's Senior Officer and the Village Heads, it is fascinating to note that the two groups both accuses each other for allowing the firms to exploit timber in the study area, nowonder it is difficult to control the scourge. But on the whole the Forestry Department in the district seems to be better placed to control the scourge.

CHAPTER SIX

DISCUSSION

6.0 Introduction

In this chapter, the discussion is centred on people's perceptions and attitudes towards cutting down of trees indiscriminately and the resulting environmental degradation.

6.1 People's socio-economic status and its effect on the environment in Chief Moono's Area

Socio-economic status in chief Moono's area among the people strongly influences their perception and attitudes towards cutting down trees. For instance with only 3.7 percent of the respondents who were satisfied with the money they obtained from crop production, 96.3 percent were thus dissatisfied. Therefore, these are the same people who mainly are shifting cultivators, charcoal burners, black smiths (carpenters) and beer brewers because they lack agricultural in-puts such as fertilizer to practice permanent cultivation. Nowonder the CBERM (1999) argues that it is vital to empower people in rural communities to be self sustained through the formation of clubs such as poultry, bee keeping, gardening to mention but a few. Hence, when people are economically empowered, especially in rural areas, there are limited chances that they will spend much of their time tempering with trees when they can venture into other activities.

On the whole it can safely be argued that low socio-economic status among the people of Chief Moono's area influences their perceptions and attitudes towards cutting down of trees.

6.2 People's knowledge of the consequences that result from cutting down trees indiscriminately in Chief Moono's Area

Generally it can be said that only a few people in Chief Moono's Area are directly aware of the consequences that come about from cutting down trees indiscriminately because only 22.2 percent of the respondents agreed that cutting down trees lead to environmental degradation. Some of the notable consequences of environmental degradation pointed out include: long dry spells, extremes of temperature in both dry and wet season, soil erosion and decline in crop yield over the past years in Chief Moono's Area. This indicates that these few people are aware of the consequences of cutting down trees indiscriminately because of their personal experience with the past and present environment.

6.3 People's concern for conserving trees in Chief Moono's area

When it comes to the conservation of trees, 50 percent of the respondents in Chief Moono's Area seen to show concern because 3.7 per cent think that village headmen should take it upon themselves to protect trees from being cut down while the other 14.8 per cent are of the idea that the Senior Chief should instead take the responsibility of conserving trees. However, 31.5 per cent

think it is the duty of each and every member of Chief Moono's area to protect trees from cutting them indiscriminately.

Even though a number of respondents show some concern to protect trees, it is difficult to achieve meaningful results because under the communal ownership of resources, every member of the community strives to get the best. Hence the theory postulated by Hardin (1968) known as the "tragedy of the commons" comes into picture.

Although the above observation was based on descriptive statistics, it can be arguably said that the people (50 per cent) of Chief Moono's Area are concerned with the conservation of trees.

6.4 Views of Males and Females on the need to protect trees in Chief Moono's Area

It appears that the views of both males and females on the need to protect trees from being cut indiscriminately are similar. For instance it was established using a chi-square statistical test that there is no significant difference in the perception of males and females on the need to protect trees from indiscriminate cutting in Chief Moono's Area.

Therefore, the null hypothesis is accepted and that the ratio of males to the females who see the need to protect trees is small. For instance of the males who saw the need to protect trees, 55.6 percent were for the idea while 44.4 percent of females also were for the same idea. This may be linked to what Chevero (2000) observed about the middle men and women among the Nalian people who are conscious about the landscapes transfiguration and limitation.

However, these people attribute the limitations to the fact that the raw forest has its process of natural degeneration even if it may have a very slow rhythm.

Therefore, it can be safely said that the perceptions and attitudes of both males and females in Chief Moono's Areas is significantly the same.

6.5 Other factors that influence people's perceptions and attitudes towards cutting down of trees in Chief Moono's Area

To some extent cultural beliefs affect how people in Chief Moono's area perceive environmental degradation. For instance not only did 88.9 percent of the respondents support logging of timber in the study area, but also were of the view that trees are God given and that as long as man lives trees will always be there. This kind of sentiment is similar to What Chevero (2000) found among the Nalian people of South America. The Nalians perceived plants and animals to be protected by the King of the Earth and are not menaced by man's action.

Also it must be understood that the level of educational attainment has an important role on how people in Chief Moono's area perceive environmental degradation in general. Thus the null hypothesis which states that people's perceptions of environmental degradation in Chief Moono's Area is significantly influenced by the level of educational attainment is accepted. It is for this reason that 83.3 per cent of the people who agreed that cutting down trees indiscriminately lead to environmental degradation had attained some secondary education, while only a sum f 16.6 per cent of the respondents who had either some form of primary education or non-education (no formal

education) shared the same view. This clearly shows that education attainment has a significant role on how people perceive the environment. Wathern (1995) believes that there is therefore the need to invest in people's education because sustainable use of resources and a better environment can only be assured when a lot of people are accorded some form of 'higher education.'

Different age groups in Chief Moono's Area perceive environmental degradation in a number of ways. For example the null hypothesis which states that there is a significant difference in the age proportion of people who disagree that cutting down trees in Chief Moono's Area leads to environmental degradation is accepted. This is because only 38.9 percent of the respondents aged between 20 and 40 years disagreed that cutting down trees indiscriminately leads to environmental degradation while 61.1 percent of those aged 40 years above disagreed compared to what Chevero (2000) observed among the Nalians. Some of the middle aged men and women perceived clearly the deterioration of the natural environment and try to define its causes and effects. Perhaps this is the cause to why a few number of respondents aged between 20 and 40 years old disagreed that cutting down trees leads to environmental degradation compared to the over 60 percent of those 40 years and above. The older generation perceive the environment to have a "perpetuity" assurance, that will never end among the Nalians Chevero (2000).

In the final analysis it can be argued that despite being knowledgeable of the consequences by some people in Chief Moono's Area that result from cutting down trees indiscriminately, their perception and attitudes will remain indifferent because of their low economic status and educational background.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.0 Introduction

In this chapter, the major findings based on the objectives of the research and a conclusion have been presented.

7.1 Conclusion

From what has been observed in the results, it can be concluded that people in Chief Moono's Area are economically poor, therefore in the quest of trying to sustain their lives, they end up practicing activities such as charcoal burning and shifting cultivation. Therefore, low economic status among the residents of Chief Moono's Area can be attributed on how they perceive and behave towards cutting down trees.

To some extent, only a few people in Chief Moono's seem to be directly aware of the consequences that may arise from cutting down trees. But on the whole, it can safely said that most people are aware of the consequences that arise from indiscriminate cutting down of trees except that poverty has given rise to most people ignoring the consequences provided people can get what can satisfy their immediate needs after exploiting the forest.

A good number of people in Chief Moono's Area are concerned with conservation of trees because most of them indicated that trees for instance should be protected from indiscriminate cutting by the village headmen, senior

chief and indeed everyone in the. Otherwise, if trees are not protect there may arise a lot of consequences in the environment.

Both males and females in Chief Moono's Area share the similar views on the need to protect trees from indiscriminate cutting. They both agree that trees are supposed to be protected from cutting them down indiscriminately while at the same time a good number of both males and females seem to see no need to protect trees.

All in all, the aim and objectives of the research have been achieved because the needed information on the research were presented through the results or findings of this research,

7.2 Recommendations

The following are some of the recommendations or suggestion that may help abate people's negative perceptions and attitudes towards the sustainable use of natural resources.

- (a) Since most people in Chief Moono's Area are economically poor, there must be a deliberate attempt by the concerned authorities to empower people through giving them loans to buy in-puts so as to lessen the burden of cutting down trees indiscriminately. The loans may be accessed by setting up marketing boards run by the Ministry of Agriculture Food and Fisheries to act as a buyer and loan facilitator.
- (b) Due to the fact that only a few people could directly highlight the negative consequences of cutting down trees, there must be a deliberate

move by the Department of Forest and indeed Non-governmental Organisations that deals with matters of the environment to go in rural areas and educate the masses on the importance of protecting and conserving the resources and the environment.

- (c) With only half the number of those interviewed being concerned on the need to conserve trees, there is need to educate more people on the importance of the environment and the benefits of conserving trees through the District Forest Department by recruiting more Extension Officers who can conduct the door to door teaching of natural resources and their sustainable use.
- (d) Although males and females have similar views on whether trees should be protected from being cut down indiscriminately, more effort may be directed on the need to have more of these two gender groups on the side of protecting trees. This can be achieved by encouraging the local people in villages to form conservation clubs which are headed by both males and females so that more people see the need to protect trees. The formation of these conservation clubs can be through the headmen who must chair them but the District Forest Department must provide moral and technique support to these clubs.

The study focused on perceptions and attitudes of people on cutting down trees in a rural setting. People's socio-economic status and how it affects their perceptions and attitudes towards the use of natural resources were also considered. Lastly people's knowledge of the consequences and whether they are concerned with conservation of natural resources were also looked into

together with the point of views of both men and women on the need to protect trees from being cut down indiscriminately.

Therefore, future studies should focus specifically on culture and how it affect people's perceptions and attitudes towards cutting down of trees. Other studies may look at people's responses to indiscriminate cutting down of trees and the resulting consequences. Finally future studies may look at deforestation in its totality by specifically looking at various factors that bring about it and how people perceive deforestation.

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APPENDICES

APPENDIX A

Chi-Square Test

H_0 : There is no significant difference in the way males and females view the need to protect trees from indiscriminate cutting in Chief Moono's Area.

H_1 : There is a significant difference in the way males and females view the need to protect trees from indiscriminate cutting in Chief Moono's Area.

Perception of Males and Females on the need to protect trees from indiscriminate cutting in Chief Moono's Area.

Sex	Need to protect trees	%	No need to protect trees	%
Males	15 A	55.6	18 B	66.7
Females	12 C	44.4	9 D	33.3
Total	27		27	

$$\chi^2 \text{ obs} = n \left(\frac{|AD-BC|}{n^2} \right)^2$$

$$(A+B)(C+D)(A+C)(B+D)$$

$$= 54 \left(\frac{|15 \times 9 - 18 \times 12|}{54^2} \right)^2$$

$$(15+8)(12+9)(13+13)(19+9)$$

$$= 54 \left(\frac{|135 - 216|}{54^2} \right)^2$$

$$(33)(21)(27)(27)$$

$$= \frac{54(-81-27)^2}{505197}$$

$$505197$$

$$= \frac{54(-108)^2}{505197}$$

$$505197$$

$$= \frac{629856}{505197}$$

$$505197$$

$$= 1.25$$

$$\therefore \chi^2 \text{ obs} = \underline{1.25}$$

Decimal Rules

$$df = K - 1$$

$$= 2 - 1$$

$$= 1$$

$$\therefore df = \underline{1}$$

Critical value at 0.05
significance level

$$\text{Critical value} = 3.84$$

If $\chi^2 \text{ obs} > \text{critical value}$, reject H_0 .

If $\chi^2 \text{ obs} < \text{critical value}$, accept H_0

Since $\chi^2 \text{ obs}$ is less than the critical
value, H_0 is accepted.

NB: n represents the sample size

A,B,C and D represents the number of respondents in each cell

df = degrees of freedom

APPENDIX B

Chi-Square Test

H_0 : There is no significant difference in the age proportion of people who disagree that cutting down trees indiscriminately leads to environmental degradation in Chief Moono's Area.

H_1 : There is a significant difference in the age proportion of people who disagree that cutting down trees indiscriminately leads to environmental degradation in Chief Moono's Area.

Environmental degradation as perceived by different age groups

Age Group	Agree	%	Disagree	%
20 - 40	A 9	75	B 13	38.1
41 and Above (>41)	C 3	15	D 29	69.1
Total	12		42	

$$\begin{aligned} \chi^2_{\text{obs}} &= \frac{(|AD-BC| - n/2)^2}{(A+B)(C+D)(A+C)(B+D)} \\ &= \frac{54(|9 \times 29 - 13 \times 3| - 27)^2}{(9+13)(3+29)(9+3)(13+29)} \\ &= \frac{54(|261-39| - 27)^2}{22 \times 32 \times 12 \times 42} \\ &= \frac{54(195)^2}{354816} \\ &= \frac{2053350}{354816} \\ &= \underline{5.79 \text{ ans}} \\ \chi^2_{\text{obs}} &= \underline{5.79} \end{aligned}$$

Decision Rules

$$df = k-1$$

$$= 2-1$$

$$= 1$$

$$\therefore df = 1$$

Critical value at 0.05 significance level

$$\text{Critical value} = 3.84$$

If $\chi^2_{\text{obs}} >$ critical value, reject H_0

If $\chi^2_{\text{obs}} <$ critical value, accept H_0

In this case since χ^2_{obs} is greater than critical value, H_0 is rejected Hence H_1 is accepted.

APPENDIX C

Chi-Square Test

H_0 People's perception of environmental degradation in Chief Moono's Area is not significantly influenced by the level of educational attainment.

H_1 People's perception of environmental degradation in Chief Moono's Area is significantly influenced by the level of educational attainment.

The table below shows how educational attainment affect the perception that cutting down trees leads to environmental degradation

Response	Primary	Secondary	Non-Educated	Total
Agree	A(o) (E) 1 (5)	B(o) (E) 10 (4)	C(o) (E) 1 (4)	12
Disagree	D(o) (E) 20 (14)	F(o) (E) 6 (11)	F(o) (E) 16 (11)	42
Total	21	16	17	54

NB: O - are observed values

E - expected values

$$E_A = \frac{21 \times 12}{54}$$

$$= 4.67 = \underline{5}$$

$$\chi_A^2 \text{obs} = \frac{\sum(O-E)^2}{E}$$

$$= \frac{(1-5)^2}{5} = \underline{3.2}$$

$$E_B = \frac{16 \times 12}{54}$$

$$= 3.56 = 4$$

$$\chi_B^2 \text{obs} = \frac{\sum(O-E)^2}{E}$$

$$= \frac{(10-4)^2}{4} = 9$$

$$E_C = \frac{17 \times 12}{54}$$

$$= 3.78 = 4$$

$$\chi_C^2 \text{obs} = \frac{\sum(O-E)^2}{E}$$

$$= \frac{(1-4)^2}{4} = \underline{2.25}$$

$$E_D = \frac{21 \times 36}{54}$$

$$= 14$$

$$\chi_D^2 \text{obs} = \frac{\sum(O-E)^2}{E}$$

$$= \frac{(20-14)^2}{14} = \underline{2.57}$$

$$E_E = \frac{16 \times 36}{54}$$

$$= 10.67 = \underline{11}$$

$$\chi_E^2 \text{obs} = \frac{\sum(O-E)^2}{E}$$

$$= \frac{(6-11)^2}{11} = \underline{2.27}$$

$$E_F = \frac{17 \times 36}{54}$$

$$= 11.33 = \underline{11}$$

$$= 11.33 = \underline{11}$$

$$\chi^2_{\text{obs}} = \sum \frac{(O-E)^2}{E}$$

$$= \frac{(16-11)^2}{11} = \underline{2.27}$$

$$= \frac{(16-11)^2}{11} = \underline{2.27}$$

$$= 2.27$$

$$\therefore \chi^2_{\text{obs}} = \underline{21.56}$$

NB: R = Number of Rows

C = Number of Columns

Test for significance

$$df = (R-1)(C-1)$$

df = degrees of freedom

$$= (2-1)(3-1)$$

$$= 1 \times 2$$

$$= \underline{2}$$

Critical value at 0.05 significance level.

Critical value = 5.99

Decision

If $\chi^2_{\text{obs}} >$ critical value reject H_0 .

If $\chi^2_{\text{obs}} <$ critical value is less than the critical value, H_0 is accepted.

But in this case H_0 is rejected since the calculated value of chi square is greater than the critical value.

APPENDIX D

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NATURAL SCIENCES

DEPARTMENT OF GEOGRAPHY

Scheduled interview for residents of Chief Moono's area in Mumbwa

SECTION A

1.0 PERSONAL DETAILS

1.2 AGE:

1.3 SEX:

1.4 MARITAL STATUS:

1.5 FAMILY SIZE:

1.6 EDUCATIONAL LEVEL, Please tick

Primary

Secondary

Tertiary

Non-education

1.7 OCCUPATION

Formal

Informal

Other (Specify)

SECTION B

2.0 Socio-economic activities and people's perceptions and attitudes towards environmental degradation

2.1 How long have you stayed in this area? Please tick

Less than 5 years

Between 5 - 10 years

More than 10 years

2.2 What major economic activity is associated with this are? Please tick.

Cultivation

Hunting

Charcoal burning

Tree logging

Any other, specify

2.3 If your answer in question 2.2 is cultivation, what type of cultivation do you practice? Please tick.

Shifting cultivation

Permanent cultivation

2.4 What are your major crops? Please tick.

Maize

Cotton

Sunflower

Groundnuts

Other(s) specify

2.5 Do you sell the crop you grow

Yes

No

2.6 Is the money you obtain from the sales of crops enough for your daily sustenance? Please tick.

Yes

No

2.7 Do you use any inorganic fertilizers in growing your crops? Please tick.

Yes

No

2.8 If your answer in question 2.7 is no, how do you grow crops? Please tick.

Using ashes obtained from trees which have been cut down and burned.

Applying animal manure

Clearing of virgin land every 2 to 3 years

None of the above

2.9 How can you describe your crop yield in the past 2 years? Please tick

Is slowly declining

No marked change

Is increasing slowly

2.10 If your answer in question 2.9 is slowly declining, what do you think has been the major contributing factor? Please tick.

Lack of chemical fertiliser

Cutting down of trees

Soil erosion

Change in the local climate

2.11 Cutting down of trees leads to environmental degradation

Agree

Disagree

2.12 If your answer in question 2.11 is agree, give at least 2 indicators of environmental degradation.

.....
.....

2.13 People benefit from cutting down trees in this area. Please tick.

Agree

Disagree

- 2.14 If your answer to question 2.13 is agree, give reason(s) for your answer(s). Please tick.
- People realise more money from selling charcoal without having to buy in-puts to make charcoal.
 - Charcoal use is easier and quicker
 - Trees are easily obtained in the bush
- 2.15 Do you support the logging of trees in this area? Please tick.
- Yes
 - No
- 2.16 If your answer in question 2.15 is yes, give reason(s) to that. Please tick.
- Trees are too squeezed in the area
 - People get employed by those companies conducting the logging of trees especially during dry season.
- 2.17 What can you say is the population of trees in this area? Please tick.
- Few
 - Many
- 2.18 If your answer in question 2.17 is few, what is the major cause of this?
- Shifting cultivation
 - Charcoal burning
 - All of the above
 - Other(s) specify
- 2.19 If your answer in question 2.17 is many, is there any need to protect trees from being cut indiscriminately? Please tick.
- Yes
 - No

2.20 Is there any need to protect the rampant cutting down of trees in your area? Please tick.

Yes

No

2.21 If your answer in question 2.20 is yes, suggest reason(s) for that

.....
.....
.....

2.22 If your answer in question 2.20 is no, give reason(s) for that

.....
.....
.....

2.23 Suggest some of the reasons why trees should be protected.

.....
.....

2.24 Who should be responsible for the protection of trees in this area? Please tick.

Village headmen

Senior Chief

Each and everyone in the village

None of the above

APPENDIX E

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UNSTRUCTURED INTERVIEW WITH DISTRICT FOREST OFFICER FOR MUMBWA DISTRICT

The unstructured interview with the District Forest Officer of Mumbwa District was intended to find out:

- (i) Whether the department conduct door to door campaign on the need to protect and involve the local people in planting trees.
- (ii) The extent to which the District Forestry Department in Mumbwa enforces the laws on cutting down trees, and
- (iii) The measures the Department is undertaking to reduce the cutting down and exploitation of trees in the area.
- (iv) The species of trees which are mostly cut down for various uses.
- (v) How the local people have responded to the conservation of trees in the areas and
- (vi) The trend in the density of trees in the past five (5) years.

APPENDIX F

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NATURAL SCIENCES

DEPARTMENT OF GEOGRAPHY

UNSTRUCTURED INTERVIEW FOR VILLAGE HEADMEN

IN CHIEF MOONO'S AREA - MUMBWA

Village Headmen were interviewed to obtain information about:

- (i) Their views on the use of natural resources particularly trees, and
- (ii) To what extent do people (subjects) allowed to cut down trees,
- (iii) Measures if any undertaken to detour people from cutting down of trees indiscriminately for various uses.