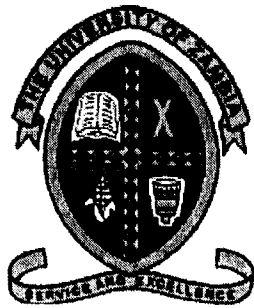


**PRESSURE OVER LAND IN SHIFTING
(CITEMENE) SYSTEM OF LAND USAGE:
A CASE OF CHIEF KATUTA'S AREA OF
LUWINGU DISTRICT.**



BY

MWEPYA SHITIMA E.

94121877

UNZA

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**This Research Project was presented to the Department of
Geography on 28th APRIL 2000 in partial
fulfillment for the award of the degree of Bachelor of Arts with
education BA Ed.**

[Geography – Single Subject major]


DECLARATION

I, MWEPYA SHITIMA EPHRAIM declare that this dissertation has been composed by me and that all the work presented is mine. I personally drew all the maps and diagrams and the sources of all materials used have been specifically acknowledged. This paper has never been previously submitted for any academic award.

MWEPYA SHITIMA EPHRAIM.



Approved



DEDICATION

I dedicate this work to my parents Mr. SHITIMA CHABALA and Mrs. KAUNDA CHAMBO SHITIMA for their sacrifices and love.

Also to my beloved wife Sharon Mulenga for her patience and being always there to lean on in turbulent academic times. Our two kids, Nancy and Charles Shitima for depriving them my attention when they needed it most.

ACKNOWLEDGEMENTS

This academic trip has been a long and tedious one, which required a lot of support financially, morally and emotionally in order to complete it.

I owe this success mostly to my parents for their enduring financial and moral support and also to my brothers and sisters who had to forgo their own opportunities.

I wish to pay special tribute to my Supervisor Mr. Kajoba G. M. for his tireless guidance and the firmness, which was at times essential to prod me on. The lecturers in the Geography department and my colleagues in the single subject major programme have been of great help.

I will also remain indebted to Chief Katuta, the five village headmen and all the hardworking Citemene farmers for supplying me with the information I needed. In the same vein, mention has to be made of the Luwingu District Agricultural and Forestry Officers as well as the Central Statistical Office in Lusaka for their assistance.

Academic work of this magnitude often gives one emotional upheavals and I would want to thank my roommate Chanda Stephen and my close friends like Banda Richard for being understanding and supportive. All those who offered me support in one form or another but not specifically mentioned are deeply appreciated.

However, any inaccuracies or errors detected in the document are entirely mine.

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ABSTRACT

Pressure over land is a common phenomenon especially in agricultural rural areas. This is the case in Chief Katuta's area where citemene cultivation is practised.

The aim of the study was to find out the underlying cause of the apparent shortage of agricultural land for citemene cultivation in the area and to investigate the effect of the increasing barter trade on the Kalomboshi Protected Forest, which has been encroached upon.

The booming barter trade in agricultural crops and modern consumer goods has been linked to the apparent shortage of cultivation land as well as the clearance of several dense "Mateshi" forests and encroachment on the Protected Kalomboshi Forest. The reason is that the trade has induced people to clear larger and multiple gardens to increase production for the market as soil fertility declines with loss of primary forests.

The research has shown that Citemene can be stabilized by mound gardening, the cisebela method, other income-generating ventures and it has been argued that the barter trade should be sustained in order to raise living standards of the local people.

It has also been shown that the apparent conflict between agricultural land use and conservation could be resolved if settlements are sited away from the Protected Forest and the management of the forest should involve local people in order to be sustainable.

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CHAPTER ONE

INTRODUCTION

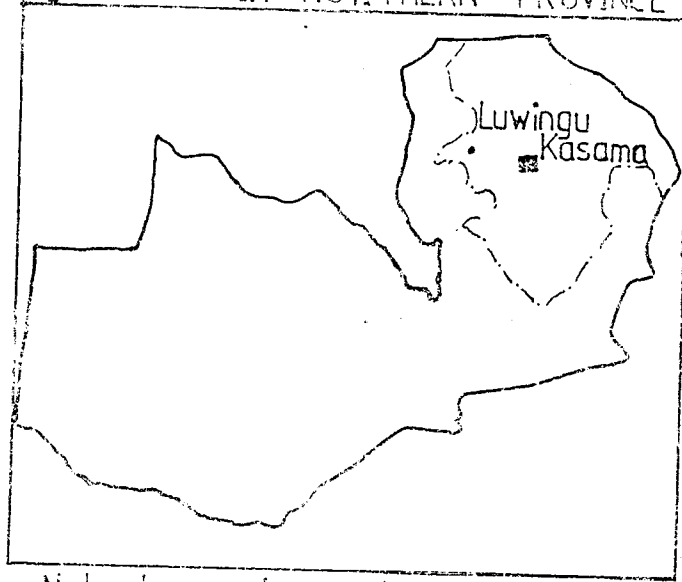
In recent years, Chief Katuta's area (fig I and 2) has witnessed increased economic activity based on barter trade in modern consumer goods like clothes. These are exchanged with crops such as millet, cassava and groundnuts, which are grown under the citemene system of cultivation. It would appear that this trade has led to the apparent shortage of citemene cultivation land and the consequent encroachment on the protected forest, the Kalomboshi Protected Forest Reserve.

In this area, high rainfall of over 1000 mm per annum and acidic soils have rendered the land infertile. To compensate for these poor soils, people practise the slash and burn (Citemene) system to provide the ash, which enhances soil fertility. Under this large circle citemene variant, trees are cut at breast height and the branches and twigs gathered at some selected central place to form a circular garden site. Then, the dry branches are set ablaze between October and November just before the on-set of the rains. As the rain starts, seeds of the crops are planted in the thick ash left behind by fire. This ash acts as fertilizer to the impoverished soils.

The major crops grown under citemene agriculture in this area include cassava (Manihot utilisima), which is the staple food crop. It is valued for its tubers, which mature after three to four years, (Hellen 1948; 84). The crop is also popular because of its resistance to drought and ability to be stored for long periods of time. It therefore contributes to the food security of households practising the citemene system.

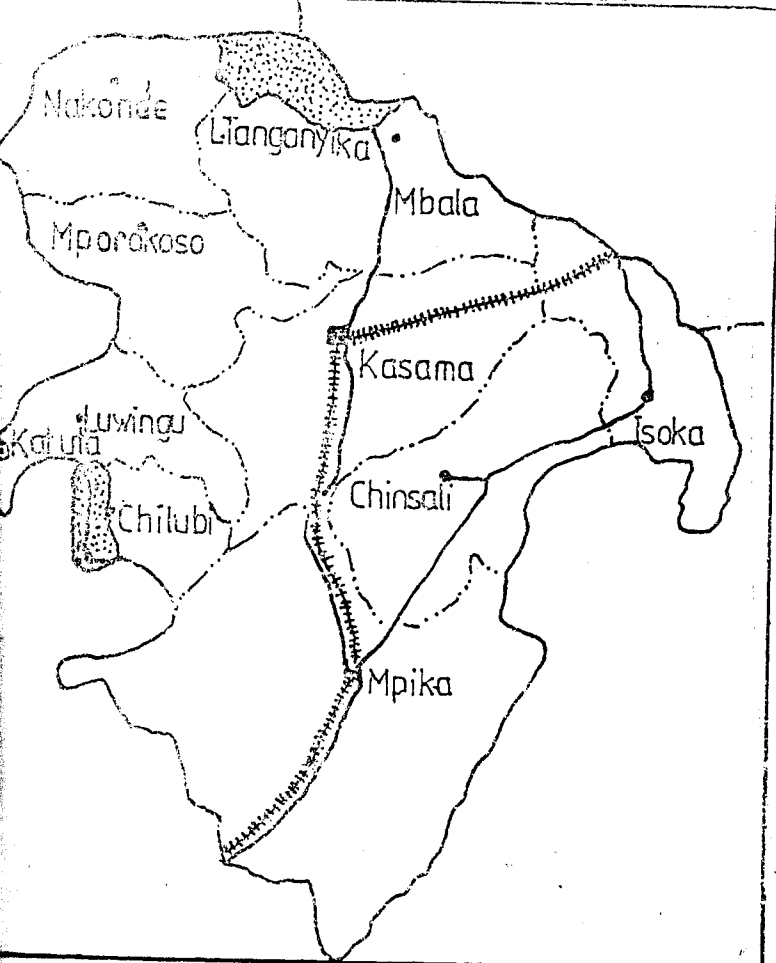
Millet (Eleusine coracona) is another important crop grown under citemene in the area. Traditionally grown for beer brewing, finger millet tolerates wet conditions and can also be stored for a long period in granaries. Groundnuts are also an important crop in the area. Other crops grown under citemene in the area include maize (Zea mays) and

Fig 1: LUWINGU IN NORTHERN PROVINCE



Not drawn to scale

2: CHIEF KATUTA'S AREA IN LUWINGU



KEY

| | |
|--|-------------------------|
| | Provincial headquarters |
| | District headquarters |
| | Railway line |
| | Lake |
| | Study area |
| | District boundary |
| | Provincial boundary |

Source: GRZ, (1990)

Scale 1:100,000

several cucurbits such as pumpkins and cucumbers planted in the first year of the cycle. Maize is only eaten green on cobs and not processed into maize-meal for porridge or nshima. As such, it is not considered to be an important crop in the area especially that hammer mills are scarce if not unavailable.

People practise short sequences, beans or groundnuts are grown in the second year under the cassava crop. In this way, the legumes restore nutrients to the soil for other crops such as cassava. The plot is used in this way for four to six years before being abandoned. However, a new citemene garden plot is cleared every year to ensure that the household has access to all crops in the sequence at any one time. As a result, this ensures relative household food security.

In recent years, Chief Katuta's area has been experiencing an apparent shortage of land for cultivation in form of virgin forests to clear for new gardens. It is important for a citemene farmer to clear a virgin piece of land because primary forests provide sufficient ash to fertilize the soil. Besides, the virgin land itself has relatively more fertile soils than what has been cultivated before. As a result, people from far-flung villages in Chief Katuta's area are converging on the remaining primary forests. This has led to several conflicts over land in the area. People are also moving longer distances to find suitable forests to clear. This has forced several families to resort to the old practice of shifting to their new plots of land, (Mitanda). This is leaving most villages desolate and the Chief in the area has intervened on several occasions urging people to remain in villages.

Initially, certain forest types, particularly the dense "Mateshi" were not cleared for citemene. They were considered too thick and a haven for flora and fauna or biodiversity. However, these are now being cleared indiscriminately due to the shortage of the most suitable forest types. Besides, people have started claiming ownership rights to certain pieces of land and excluding others from cultivating such land. In the past, all land was open to all members of a given village.

The other recent phenomenon in the area is the booming barter trade involving crops grown under the citemene system. This includes the exchange of groundnuts with second hand clothes, salt, soap and other items. Millet is no longer only grown for brewing beer but is another important commercial crop and can be exchanged for bicycles, radio cassettes, sewing machines and other expensive goods. In certain instances, cash is also used to purchase crops from the citemene farmers. Other farmers, mostly the young and energetic ones also take their crops, mostly groundnuts to the Copperbelt towns where they fetch a good price especially just before the on-set of the rains.

1.10 Statement of the Research Problem

There is an apparent shortage of land for cultivation under the citemene system in Chief Katuta's area. This has led to the encroachment on the Kalomboshi Local Forest number 202. Besides, several dense "Mateshi" forests are being cleared systematically at the expense of their ecological role as habitats for biodiversity. There is also a lot of barter trade or transactions going on involving crops grown under the citemene system.

Therefore, the research intended to investigate what could be done to stabilize citemene, maintain the increasing barter business activity in a semi-permanent and sustainable way while preventing further encroachment on the protected forest.

1.20 Research Aim

The research aimed at finding out the major cause of the pressure on cultivation land in Chief Katuta's area.

1.30 Research Objectives

The following were the specific objectives of this study:-

- 1) To find out the means of stabilising citemene cultivation practices while encouraging production for the market to raise incomes.
- 2) To establish the nature of the increasing barter trade and see how it can be sustained.
- 3) To find out how the apparent conflict between agricultural land-use and the conservation of the protected forest could be resolved.

1.40 Research Hypothesis

1. The barter trade in crops grown under the citemene system has significantly contributed to the apparent shortage of cultivation land in the area.
2. People in Chief katuta's area are encroaching on the Kalomboshi Protected Forest because they are clearing larger and multiple garden plots to increase production for the market.

1.50 Rationale

It is of practical importance to study this sudden land crisis in the area as the root cause of the problem may be identified. The identification of the real problem, it is hoped, will help policy makers and community leaders find ways of stabilising the agricultural practices enhance food security in the area and protect the Kalomboshi Local Forest No. 202 which is being encroached upon.

The study has also contributed to the existing knowledge in the field of conflict resolution in natural resource management and the stabilisation of traditional agricultural systems such as citemene.

1.60 Organisation of the Report

In chapter two, literature relevant to the subject has been reviewed while chapter three gives the location and characteristics of the study area. In the fourth chapter, the methodology followed in the study is outlined and the sources of data, sampling procedures and sample size highlighted. This chapter also presents difficulties encountered during the whole study.

In chapter five, research findings are presented. This forms the analytical part of the report ending in a concise summary of the findings. The last chapter concludes the study re-stating the summary of the findings and offering recommendations to solve the studied problem and also suggesting further areas of study of this land problem.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature on shifting cultivation in general and the citemene system in particular. It also focuses on the aspect of trade in crops under a purely subsistence system of agriculture.

The practice of the citemene system of cultivation is an ingenious strategy to overcome the problem posed by impoverished soils due to leaching. As noted earlier, cutting down trees and later burning them is aimed at providing the ash, which enhances soil fertility.

It has been argued by some scholars such as Yudelman, (1964), that the citemene system of cultivation is suitable to existing environmental conditions in Africa under which it has been practised. This system has been in existence for a long time under conditions of low population levels, (Yudelman 1964: 12). Others, however, like Pritchard, (1979) have contended that the practice contributes to the destruction of forests, which took a long time to grow.

2.10 Advantages of the Citemene System

In areas of impoverished soils due to leaching induced by high rainfall, the citemene system is a viable alternative. As Yudelman, (1964: 13) has argued, an African producer was economically rational in engaging in the extensive use of land under citemene. This was due to the lack of capital and his reliance on inadequate family labour. Therefore, the only abundant resource was land in form of forest resources. As such, he had to use these extensively under the citemene system of cultivation.

Moore and Vaughen, (1994: 43) also noted that citemene is a very flexible system and adaptable to change. They pointed to the spread of cassava cultivation under citemene in the Northern Province supplanting millet as a staple crop. This was a radical change, which, required flexibility. Cassava was preferred, as it is more resistant to drought and can support a relatively larger population. The system also allows for the time to engage in other economic activities such as fishing thereby broadening the income base and also enhancing people's nutritional status. The two authors concluded that cassava cultivation could support relatively higher population densities.

Michie, et al, (1973), have praised shifting cultivation systems including citemene for providing enough food for rural masses under poor soils with no use of machinery or chemical in-puts in tropical Africa. Indeed, areas under citemene have survived recent drought-induced food shortages without recourse to government food aid. The case in point is the food relief programme of 1997/98 season in Zambia when the Southern Province, predominantly under hybrid maize cultivation required more food aid than the Northern Province where the citemene system of cultivation is widely practiced. Hellen, (1968: 93), observed earlier that traditional indigenous agricultural systems are products of centuries of adaptations to the environment and therefore are bound to be more resilient.

Although the use of fire in citemene cultivation has been roundly condemned by most authors such as Richards (1939), as primitive, it has several advantages. Apart from providing the ash for fertilizing the soil, the fire destroys almost all the potential weeds sparing farmers from the tedious task of weeding. Besides, most of the pests to crops such as insects are destroyed by the fire rendering costly pesticides irrelevant. It has also been identified as the easiest and most suitable method of clearing land given the low economic status of most rural citemene cultivators, (Michie, et al 1973: 157).

Infact, the system of citemene agriculture is not static but dynamic. It has evolved over a long period of time with a lot of modifications along the way. It is this transition to a permanent system of cultivation, which is in ecological balance, and therefore more

sustainable that should be facilitated. As Kajoba (1993), notes, the techniques of soil selection and sequences practised by the Bemba are advanced agronomic methods. Besides, crop rotation, interplanting and underplanting are viable techniques, which can facilitate a transition to a semi-permanent system of cultivation. It is however, emphasised that there is need to improve and modernise this system so that a permanent system of cultivation which is sustainable is achieved. This will ensure the achievement of food security at the household, community and ultimately national level, in view of the increasing population.

2.20 Negative Effects of Citemene on Woodlands

The vast literature on Citemene is riddled with condemnation of the system for its contribution to deforestation. In Zambia for example, Chidumayo, (1979: 16), estimated that at least 90 000 hectares of woodlands was being lost to citemene each year. After trees are cut at breast-height, burning aggravates the problem by scotching the upcoming offshoots. As a result, Siddle, (1971), points out that trees whose branches are lopped off take about fifteen to twenty years to regenerate. On the other hand, those cut at breast-height can only be expected to recover after thirty-five years.

Moreover, the citemene system is an extensive method of land use involving the clearance of larger portions of land in relation to that actually planted. Schultz (1976: 46), noted that the ratio of cleared area to that actually planted with crops ranges from 1:6 to about 1:10 depending on the quality of the woodland involved. Describing the large circle citemene system, Moore and Vaughen (1994: 25) revealed that the ratio of cleared land to that actually cultivated, is 1:10. But as Allan (1965: 487) explained, this ratio varies with the quality of the forests, being small with dense primary forests and larger with scattered secondary forests. As such, dense primary forests are preferred by citemene cultivators both due to the efficiency of work and the relative fertility of the soils.

The Food and Agriculture Organisation, (FAO, 1957), lamented about the destructive nature of citemene to trees as new clearings have to be made each year. The organisation further cautioned that any attempts to produce for the market under the citemene system to raise standards of living without altering production techniques would accelerate destruction of forests, (FAO, 1957: 160). This is because larger, if not multiple gardens would be made to increase production for cash. The system in its original form is strictly subsistence and cannot sustain commerce. As an extensive method, production can only be increased by bringing more land under cultivation, which entails more damage to the forests.

2.30 Efforts to Stabilise the Citemene System

In 1907, the British South African Company (BSA), alarmed by what it considered a wasteful method of cultivation banned the cutting of trees but rescinded the decision later due to the famine that followed (Hellen, 1968: 203). The colonial British administration also attempted to stabilise citemene especially in the Abercon (Mbala) and Isoka districts beginning in 1938. This citemene control system involved the provision of sufficient woodland for perpetual gardening to existing village populations. As a result, people were resettled in an area of 3 000 square miles (777 000 hactres), allowing 17 500 people a rotation of fifteen cutting blocks to be used in succeeding years. They regulated burning of the bush to allow for the recovery of trees. Infact, burning could only be done early in the dry season (Allan, 1948: 447). Subsidiary gardens such as village cassava mounds were also encouraged.

In the 1950s, the British Colonial Administration also made limited efforts to stabilise the citemene system by sponsoring some Peasant Farming Schemes. For example, in 1957, it provided oxen to settlement schemes in Bemba country, (Richards, 1948). However, it has to be mentioned that this colonial effort was the promotion of hybrid maize at the expense of traditional crops. In a way, this was inappropriate as people were alienated from growing crops they understood better and this introduced the need for expensive chemical fertilisers. Kajoba (1996: 60) has suggested that efforts should be aimed at

stabilising the agricultural traditional systems. He advocates for the provision of extension services to citemene farmers so as to enable them make a transition to a semi-commercial production, not necessarily on the basis of hybrid maize. Instead, more research should be done on traditional crops and a market provided for them.

The post – independence government of Zambia have been managing forest resources through statutory instruments. For example, the Forest Act No. 39 of 1973 cap 311 provided for the establishment and management of Local Forest Reserves. This was to ensure conservation and protection of forests and tress.

More recently, the new Forest Act No. 7 of 1999 shows government intentions to involve people more in the management of forests. Under section (v) of the same Act, there is a provision for the designation of certain, Local Forests as Joint Management Areas in conjunction with the local people. This is to be on pilot basis and intends to target the most encroached upon forests, (GRZ, 1999). Hopefully, this will resolve problems affecting such forests as the Kalomboshi Local Forest.

Besides, cooperating partners such as the Norwegian Agency for Development, NORAD are helping government to establish a long time soils productivity, research, programme. For example, the Soil Productivity Research Programme, (SPRP), at Misamfu, Kasama is aimed at producing more permanent farming systems in high rainfall areas. The targeted farming systems for improvement include citemene and fundikila among other activities, (GRZ, 1991: 128)

It is clear from the literature surveyed so far that the citemene system of cultivation has served its communities well. However, the system is basically subsistence and attempts to convert it into some commercial enterprise only aggravate its destructive nature to forests. Therefore, serious attempts need to be undertaken to stabilise this cultivation system while ensuring sustainable management of forests for this and future generations.

CHAPTER THREE

3.0 LOCATION AND DESCRIPTION OF THE STUDY AREA

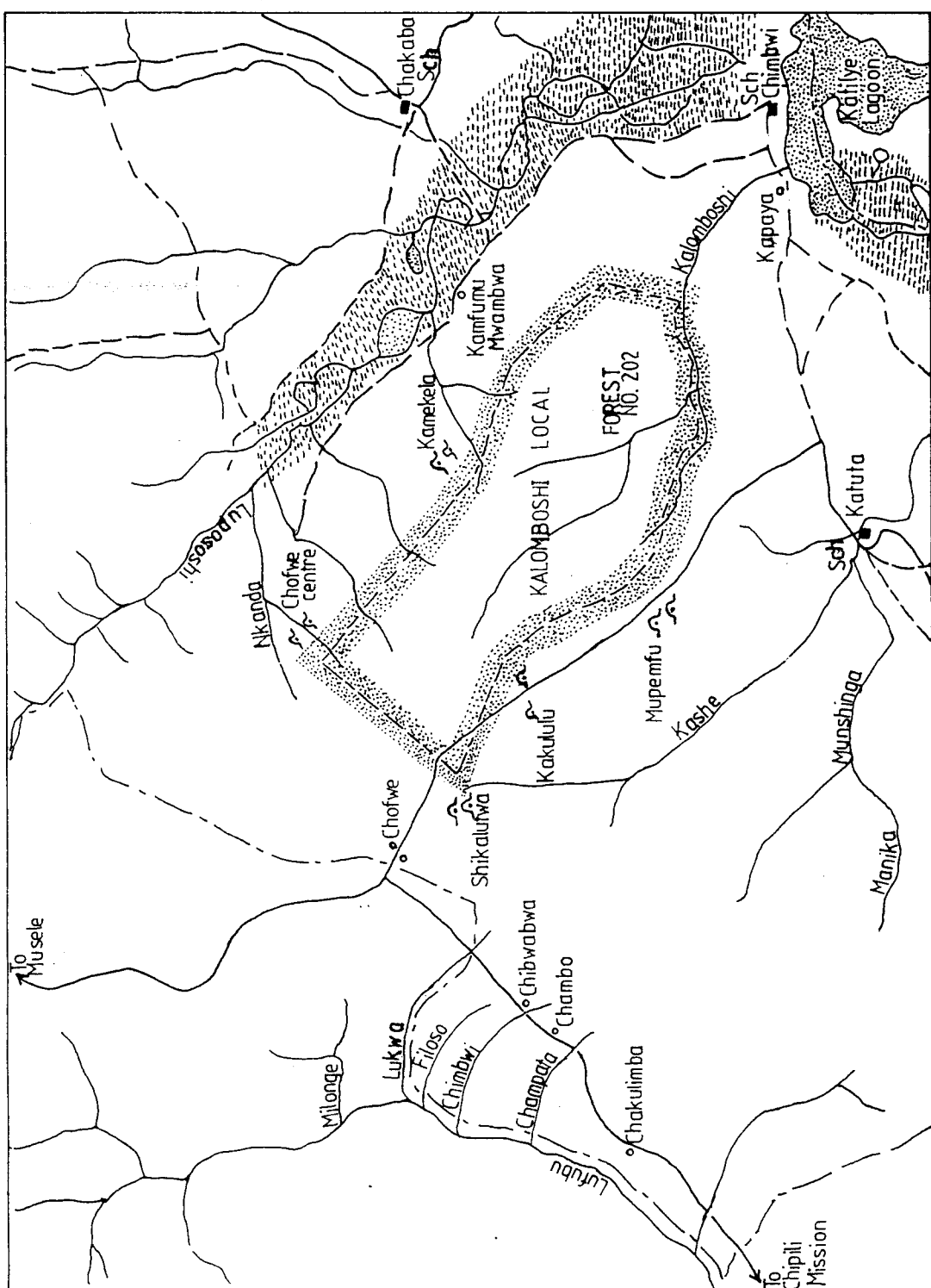
The study area is in Luwingu District of the Northern Province in Chief Katuta's area, (Fig 3.0). Luwingu lies about 160 kilometres, to the South-West of Kasama. The district is served by a gravel road from Mansa enroute to Kasama. There are other feeder roads into the periphery of the district like the one connecting Chief Katuta's area to the Mansa-Kasama one and to the district headquarters. The study area consisted of five villages; Katuta, Kamfumu/Mwambwa, Kakululu, Chambo and Kapaya scattered in Chief Katuta's area where cultivation land has become scarce.

The area enjoys warm-wet summers and cool-dry winters. The mean temperatures, like most parts of the Northern Province are 23.5 °C for October, which is the hottest month, and 17.5 °C for July, the coolest month. Rainfall in the area comes in summer beginning around October and ending in April or late March. The mean annual rainfall ranges from 800 mm to 1200 mm (Holden, 1983). The area lies on relatively flat plateau of about 1200 m above sea level.

Predominantly, vegetation consists of miombo woodlands in Chief Katuta's area. These are deciduous forests and were initially very dense but are gradually giving way to sparse inferior secondary vegetation. The old thick forests are now rare mainly due to clearance for agricultural activities. Besides, the cutting of trees for timber has also contributed to the decimation of the forests. There are no exotic forest plantations in the area, but there is one indigenous forest, the Kalomboshi Local Forest, No. 202, which is being encroached upon.

The major economic activity in the area is subsistence farming, mainly the citemene cultivation system. It is the major source of livelihood for the majority of the people. A wide variety of crops are grown under this system with millet, cassava and groundnuts being the most important ones in Chief Katuta's area.

MAP SHOWING CHIEF KATUTA'S AREA



KEY

| | |
|--|---------------------|
| | Maintained Road |
| | Motorable Track |
| | Provincial boundary |
| | River or Stream |
| | Forest Reserve |
| | Lagoon |
| | Swamp |
| | Village |
| | Recent Settlement |
| | School |

There is also the rearing of domestic animals such as cattle and goats on a small scale. Infact, the rearing of animals is so insignificant that there are only a few herds of cattle. On a household level, chickens are kept for their meat and also used in various social obligations.

In recent years, barter trade, involving crops has become an important economic activity. The crops such as millet and groundnuts are exchanged for various items. For example, second hand clothes or 'Salaula' as they are commonly known are bought mainly through the barter trade. Although cash transactions involving crops also take place, this is not wide spread and on a very small scale.

Fishing is also an important subsistence economic activity practiced in the area. The fish caught from the various streams in the area are an important source of proteins for the people in the area lacking game animals. This is also used in the barter trade with crops as most fishermen are not renowned farmers and depend on such exchanges for their food such as cassava and millet. Therefore, there exists some flow of crops from areas where fish is not caught on a large scale such as Katuta's palace to the Katilye lagoon near Kamfumu village and a reverse flow of fish to the former.

CHAPTER FOUR

METHODOLOGY

4.0 Introduction

This chapter serves to present the methods that were used to obtain data for the study. It outlines the main types and sources of data, the sample size and sampling procedures employed. The problems and constraints encountered throughout the study are also presented.

4.10 Sources of Data

There were two major sources of data for the study. The major one was the survey by which the researcher obtained primary data by interviewing citemene farmers and community leaders in the area. The other sources were documents from which secondary data was obtained.

4.11 Secondary Data

The University of Zambia Main Library was the major source of documented data in form of literature on the citemene system as a traditional agricultural practice, its prospects and limitations and also information on conflict resolution in natural resource use. The Ministry of Agriculture, Food and Fisheries provided information on the production capacity of the citemene system and the efforts taken to stabilise the system from encroaching on the Protected Local Forest. The other source of information on forestry issues was the department of Forestry in the Luwingu District.

4.12 Primary Data

In order to obtain Primary data for the study, interview schedules were used. This was devised to solicit information from citemene farmers in the study area about shortage of

cultivation land or forests, sizes and numbers of their citemene gardens, their production levels, the barter trade and household food security of their homes. In order to get more information and also to countercheck the accuracy of information obtained from farmers, separate interview schedules were devised for the Chief, village headmen, the Agricultural extension Officer and the Forestry Officers in the area. The emphasis to these community leaders and officers was on the forest encroachment, barter trade, production levels and food security.

4.13 Methods of data Collection.

Secondary data was obtained by reviewing relevant literature while primary data was acquired by interviewing citemene, farmers using an interview schedule. Besides, discussions with officials such as agricultural and Forestry officials also yielded primary data.

While in the field, observation was utilised especially that of the barter trade activities as the field study almost coincided with the peak of the trade. The other aspect of the study which was observed was the deforestation caused by citemene especially in the protected forest as well as storage facilities for the crops in the area.

4.20 Sample Size and Sampling Procedure

The sample size, which was used, consisted of fifty heads of households involved in citemene cultivation in Chief Katuta's area. These were the people who were actually interviewed using the interview schedule shown as (appendix 1) in this report. The interview schedule was personally administered by the researcher as the literacy levels were very low in the study area.

The sampling procedure employed was the multi-stage or cluster one. Under this technique, five villages were first randomly selected from the Chief's Village Register as the first cluster. This was necessary as there was no comprehensive list of citemene

farmers in the area from which respondents could be sampled at once. The villages sampled were, Katuta, which is the Chiefs' palace, Kamfumu-Mwambwa, Kapaya, Kakululu and Chambo.

At the second stage of sampling or the second cluster, it became necessary to use a weighted sample, as there were variations in the population sizes of the villages. Katuta, the Chief s headquarters and the largest, contributed fifteen respondents followed by Kamfumu-Mwambwa with eleven, as it was also relatively larger than the remaining three villages, which provided eight respondents each. This was intended to give a true representation of the populations in the villages involved. In each village, respondents were selected randomly from the list of households constructed by the researcher with the help of a given village headman. All these respondents were selected using the simple random method.

4.30 Field Observation

While in the field, observation was utilised especially that of the barter trade activities as the field study almost coincided with the peak of the trade. The other aspect of the study, which was observed, was the deforestation caused by citemene especially in the protected Kalomboshi Forest as well as storage facilities for the crops in the area.

4.40 Data Analysis and Methods of Processing Data

Data processing was done manually using a calculator in evaluating the responses on the interview schedules. The data was analysed qualitatively and quantitatively using the Chi Square test. Where applicable, findings were tabulated and graphical representation utilised as shown in chapter five of this report.

4.50 Problems Encountered During Fieldwork

One of the major problems encountered by the researcher was reaching the villages, which were scattered far apart. Although the researcher was lucky to have a bicycle at his disposal to cycle to such villages, the harsh weather of the rain season often gave him unforgettable lessons, as fieldwork was conducted at the beginning of the rain season (November/December). The other hurdle was that of quantifying the produce of the farmers in the absence of records. This left the researcher with no alternative but to rely on estimates given by farmers from their recollections and also augmenting such information with the possible carrying capacity of their granaries.

The task of going back to some respondents not accessed at initial attempts was quite taxing especially that it involved cycling for long distances, in some cases to meet only one absentee respondent. Otherwise the response was good from all those who were selected and there were no refusals to answer questions.

CHAPTER FIVE

5.0 PRESENTATION AND ANALYSIS OF RESEARCH FINDINGS

This chapter presents the findings of the study. It demonstrates the pressure over cultivation land in the area. The increasing barter trade in the area is also discussed and related to the cultivation practices in the area.

5.10 Characteristics of the Sample

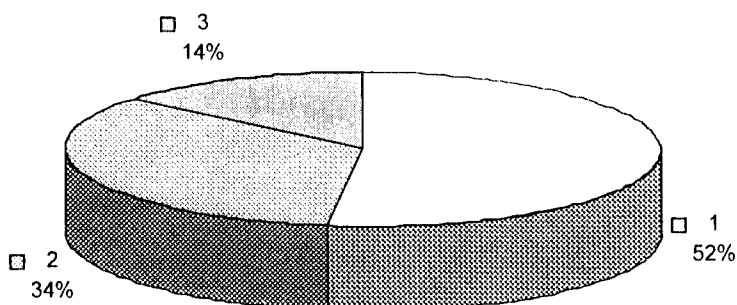
The study targeted fifty heads of households involved in the citemene cultivation system. In the sample obtained, thirty-eight respondents or 76% were males while twelve or 24% were females. Among the female respondents, four or 33.3% of them were heads of households either as single, divorced or widowed while eight or 66.7% were married. On the overall, forty-five respondents or 90% of the sample were married.

Most of the respondents fell in the (15 - 64) year's age group making up thirty-nine of them or 78% of the total sample. Infact, there were no respondents aged below fifteen years and only eleven or 22% of the total sample were sixty-five years or older. This indicates that it is the economically active people who are engaged in citemene cultivation in the area.

The educational attainments of the respondents revealed that seventeen or 34% of them had no schooling while twenty-six or 52% had been to primary school and only seven respondents or 14% of the total sample had attained secondary education. In all, forty-three respondents or 86% of the total sample either had no education or only went to primary school as shown in figure 4.

FIG 4:

EDUCATIONAL LEVELS OF RESPONDENTS



KEY

1 = Primary Education

2 = No Education Attained

3 = Secondary Education

Source: Field Data.

The education level attained by the farmer is an important factor in the success of their agricultural activities. It helps farmers to plan effectively how to manage their enterprises and in the allocation of their produce to various uses. Besides, it would also enhance their bargaining power during the sale of their crops. Generally, a farmer's efficiency and consequently their success is affected by the level of education which are not so high in Chief Katuta's area as the above analysis reveals.

Generally, the household sizes among respondents were small with twenty-five of them or 50% of the sample having less than five persons in their households. Infact, only two respondents or 4% of the total sample reported household sizes of over ten members. The remaining twenty-three respondents or 46% of the sample had households ranging

The remaining twenty-three respondents or 46% of the sample had households ranging from five to ten persons. Therefore, household sizes in the area are quite small and the consumption levels are not expected to be very high. This is likely to have an impact on the supply of labour, as the family is a major source of labour in the subsistence citemene system of cultivation.

5.20 Citemene Landuse Practices

The practice of shifting to the plots when clearing gardens is quite common in the area with twenty respondents or 40% of the total sample revealing that they shift to the "Mitanda" when preparing their gardens. Unlike in the past when people shifted to the "Mitanda" to scare away animals and birds from their crops, this is now done due to the long distances involved before reaching the suitable forests. It indicates the growing scarcity of suitable forests for citemene cultivation in the area.

It was also discovered that individualization of forest cultivation land has become common in the area. About forty-two respondents or 84% of the sample claimed to have exclusive rights to some land although none had legal title deeds. This is a new phenomenon as seventeen or 40% of the landowners acquired it within the last five years and sixteen or 38% of the landowners did so from six to ten years ago as shown by table 1.0. All those who own land acquire it through their usufruct rights. Only four women or 8% of the respondents owned some land and most likely these got their land through their husbands, as they were all married. All the single women had no land of their own showing how disadvantaged unmarried women are in terms of land ownership.

Table 1.0

OWNERSHIP OF LAND BY RESPONDENTS

| SEX | OWNED LAND | DO NOT OWN LAND | TOTALS |
|---------------|------------|-----------------|-----------|
| MALES | 38 | 0 | 38 |
| FEMALES | 4 | 8 | 12 |
| TOTALS | 42 | 8 | 50 |

Source: Field Data

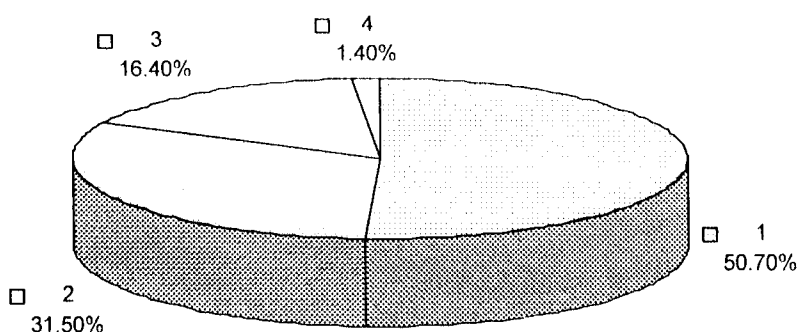
As shown by table 1.0, all the thirty-eight male respondents had ownership to some cultivation land constituting 90% of the landowners. None of the single or unmarried women had land and the four women with land were married and most likely acquired it through their husbands. This reflects the dominance of the male folk in the ownership of land in Chief Katuta's area. All the fifty respondents surveyed use traditional tools "of the axe and hoe in their cultivation practices.

5.21 Encroachment on Kalomboshi Protected Forest

Although only seventeen of the respondents or 34% of the sample admitted to have cleared gardens in the protected forest, information obtained from the Chief and the Agricultural Extension Officer indicated that the figure could be higher. Even the extensive damage done to the forest supported the views of the Chief and the Agricultural Extension Officer. But respondents were jittery to discuss encroachment on the forest due to their previous encounters with forest officials. It was not possible to map the extent of encroachment due to the absence of recent aerial photographs.

The study revealed that twenty-three respondents or 46% of the sample cleared virgin forests for their citemene gardens either in the protected forest or elsewhere. The remaining twenty-seven constituting 54% of the sample resorted to secondary forests due to the shortage of virgin forests. Those who cleared the dense, thick "Mateshi" forests during the three years preceding the study were twenty-one or 42%. These gave varied reasons for clearing "Mateshi" as shown in figure 5.

FIG 5: REASONS FOR CLEARING DENSE 'MATESHI' FORESTS.



KEY

1 = Shortage of suitable open forests

2 = More fertile soils in "Mateshi"

3 = easy task for women

4 = Others

Source: Field Data.

The shortage of suitable open forests in the area was the major reason identified for clearing dense "Mateshi" forests by most respondents. It was also revealed that soils in the "Mateshi" were more fertile especially when compared to that in the overused secondary forests. Besides, clearing the dense "Mateshi" forests is perceived to be a relief to women who do not have to collect dry branches of trees from afar. This is because the ratio of the cleared area to that actually cultivated is almost 1:1 under "Mateshi" gardens. As such, there may not be need for women to gather branches to the central place.

Infact, citemene farmers themselves are aware of the shortage of forests and thirty-five respondents or 70% of the sample admitted that it was a serious problem. In a bid to compensate for this shortage and perhaps also due to the poor quality of soils in

secondary forests, most people have resorted to clearing large or multiple gardens. For example, twenty-nine respondents or 58% of the sample said that they cleared more than one citemene garden each year. This is intended to increase their production at the expense of forest resources.

5.22 Sizes of Citemene Gardens and Production Levels

On the average, citemene gardens in the area ranged from 1.5 limas to 2 limas (0.4 hactres to 0.5 hactres) in size. In the 1996/97 season, nineteen respondents or 38% had gardens ranging from one to two limas, ($\frac{1}{4}$ to $\frac{1}{2}$ hactres) while three or 6% had garden sizes of 2.5 limas or larger.

Those clearing garden sizes ranging from 1.5 limas to 2 limas increased from nineteen in 1996/97 season to twenty-three or 46% in 1997/98 season. Even those who cleared garden sizes of 2.5 limas or larger increased by one farmer to four in 1997/98 season or 8% compared to only three or 6% in 1996/97 season.

The expansion in garden sizes reflects the desire to increase production on dwindling forest resources. It may also indicate that the poor quality of forests has led to an increase in the ratio between the cleared land to that actually cultivated. People have to clear larger areas of poor secondary forests to make citemene gardens.

Generally, production levels of crops in the area are not very high. For example, in 1996/97 season, the average number of millet produced in the area was only 4.6 x 90-Kg bags per household. Infact, in that farming season, nineteen respondents or 38% of the sample produced less than 5 x 90-Kg bags of millet. In the same 1996/97 fanning season, about sixteen respondents or 32% had five bags or more while fifteen of them or 30% of the sample did not grow millet that year. Most of these were displaced through the several land disputes involving landowners while others could not just secure suitable forests.

The average millet production per household declined from 4.6 x 90-Kg bags in 1996/97 to only 3.4 x 90-Kg bags in 1997/98 season. This could be due to the decline in soil productivity as poorer secondary forests are brought under cultivation of millet. This decline in production of millet occurred although more people grew millet crop as compared to the 1996/97 season. Fifteen people among respondents did not grow millet in 1996/97 season while only eleven or 22% never grew millet in 1997/98 season. This implies that the increased pressure on forest resources is resulting in reduced yields per capita. For example, twenty-seven respondents or 54% of the sample only produced less than five bags of millet as compared to nineteen or 38% in the previous season. Infact, only twelve respondents or 24% of the sample had five bags or more in 1997/98 season compared to sixteen or 32% in 1996/97 season. The number of people growing more millet is declining rapidly as more and more people obtain poor yields. This is shown in tables 2.0 and 3.0 below.

TABLE 2.0

ESTIMATES OF MILLET PRODUCTION IN 1996/97

| NUMBER OF 90 KG BAGS PRODUCED | NUMBER OF RESPONDENTS | % OF THE TOTAL SAMPLE |
|--------------------------------------|------------------------------|------------------------------|
| NONE | 15 | 30 |
| 1 - 4 | 19 | 38 |
| 5 - 8 | 10 | 20 |
| 9 - 12 | 5 | 10 |
| 13 - 16 | 1 | 2 |
| TOTALS | 50 | 100 |

Source: Field Data.

The production levels of millet in 1997/98 season among respondents' yields the picture depicted in table 3.0. As stated earlier, it shows a decline in average millet production from the 1996/97 season levels. Besides, there is a decline in the number of respondents who never grew millet. Infact, a lot of people produced fewer numbers of millet bags

than in 1996/97 season while only a handful produced more than five bags in 1997/98 season. All these factors contributed to the decline in average millet production by 1.2 x 90 Kg bags of millet from 4.6 x 90 Kg in 1996/97 to only 3.4 x 90 Kg bags per household in 1997/98 season.

TABLE 3.0

ESTIMATES OF FINGERMILLET PRODUCTION IN 1997/98

| NUMBER OF 90 KG BAGS PRODUCED | NUMBER OF RESPONDENTS | % OF THE TOTAL SAMPLE |
|--------------------------------------|------------------------------|------------------------------|
| NONE | 11 | 22 |
| 1 - 4 | 27 | 54 |
| 5 - 8 | 6 | 12 |
| 9 - 12 | 5 | 20 |
| 13 - 16 | 1 | 2 |
| TOTALS | 50 | 100 |

Source: Field Data.

The trend reflected by the two tables indicates a decline in millet production per capita. This could be due to the shortage of suitable forests compounded by impoverished soils in the overused secondary forests being cleared. As a result, 54% of the farmers produced less than five bags in 1997/98 season as compared to only 38% in 1996/97 season despite the increase in the number of people growing millet from thirty-five to thirty-nine between the two farming seasons. It is this reduction in production, which has forced farmers to clear larger or multiple gardens to make up for the reduced yields.

In the case of groundnut production, the average yields per household declined from 2 x 90Kg bags in 1996/97 season to 1.88 or 1.9 x 90 Kg bags per household in 1997/98 season. In 1996/97 season, thirty-four respondents or 68% of the sample produced below five bags of groundnuts. This figure of farmers harvesting less than five bags increased

to thirty-six or 72% in 1997/98 season. While four respondents or 8% produced between five and eight bags in 1996/97 season, the number fell to three or 6% in 1997/98 season. The number of those who never grew groundnuts dropped from twelve or 24% in 1996/97 season to eleven or 22% in 1997/98 season. This is shown in tables 4.0 and 5.0.

TABLE 4.0

ESTIMATES OF GROUNDNUTS YIELDS IN 1996/97

| NUMBER OF 90 KG BAGS PRODUCED | NUMBER OF RESPONDENTS | % OF THE TOTAL SAMPLE |
|--------------------------------------|------------------------------|------------------------------|
| NONE | 12 | 24 |
| 1 - 4 | 34 | 68 |
| 5 - 8 | 4 | 8 |
| TOTALS | 50 | 100 |

Source: Field Data.

The production of groundnuts in 1997/98 shows a decline from the 1996/97 levels. For example, the average production fell from 2.0 x 90 Kg bags in 1996/97 to 1.9 x 90 Kg bags per household in 1997/98 season. Besides, there was an increase in the number of farmers producing below five bags from thirty-four or 68% in 1996/97 to thirty-six or 72% in 1997/98 season as shown in table 5.0. Those producing more than five bags declined from four or 8% in 1996/97 season to only three or 6% in 1997/98 season.

TABLE 5.0

ESTIMATES OF GROUNDNUTS YIELDS OF 1997/98 SEASON

| NUMBER OF 90 KG BAGS PRODUCED | NUMBER OF RESPONDENTS | % OF THE TOTAL SAMPLE |
|--------------------------------------|------------------------------|------------------------------|
| NONE | 11 | 22 |
| 1 - 4 | 36 | 72 |
| 5 - 8 | 3 | 6 |
| TOTALS | 50 | 100 |

Source: Field Data.

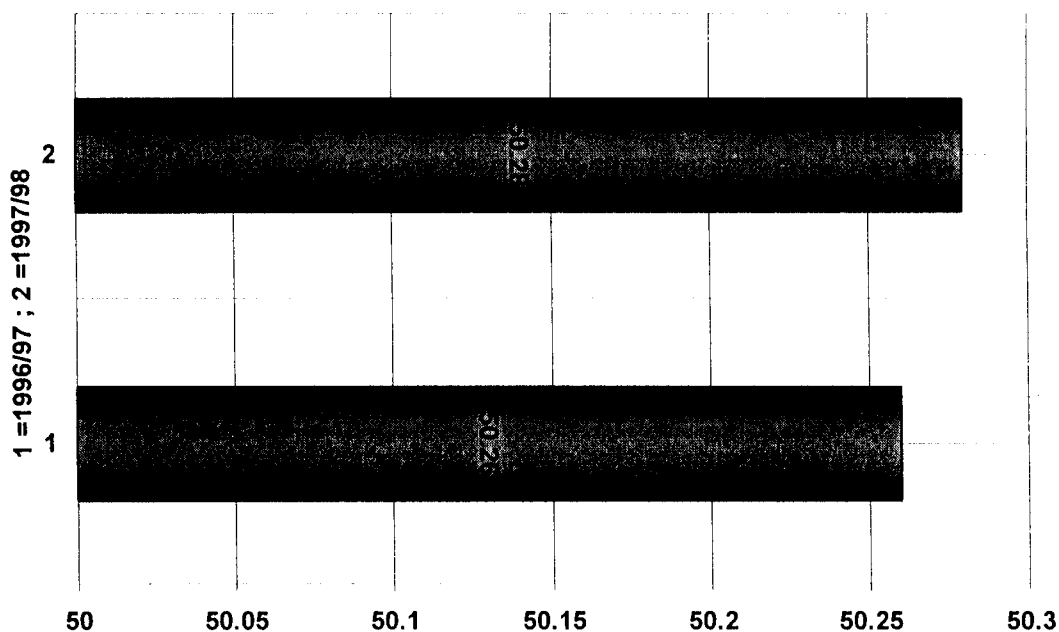
Cassava is the staple food crop in the area and the mainstay of the citemene system. The estimates of cassava harvesting showed that an average of 50.26 Kg per household were harvested in 1996/97 season. The situation remained constant by 1997/98 season with an average of 50.28 Kg per household harvested in 1997/98 season. All these average yields were converted from the number of baskets of dry cassava based on the estimated number of such baskets making up a 90-Kg bag of cassava. This was found to be only viable way of estimating cassava yields, as harvesting is not an annual exercise but a continuous one. Therefore, computations were based on the average number of days in a month a household harvests cassava and the number of such baskets used.

When one considers the amount of cassava consumed at home as compared to the total amount harvested, a different picture emerges. For example, in 1996/97 season, respondents kept dried cassava in baskets equivalent to 46.5 x 90-Kg bags per household for home consumption on the average. But this reduced to an average of 45.3 x 90-Kg bags per household kept for home consumption in 1997/98 season. This shows a decline of 1.2 x 90-Kg bags over the two farming seasons. For the two years there was a continuous discrepancy between production and the amount kept for home consumption indicating the existence of some trade involving cassava.

While this discrepancy between production and the amount left for home consumption may appear moderate, it has to be borne in mind that these are average estimates and the actual situation could be quite serious. Infact this difference could contribute a lot to the lack of food security at several households. For example, ten households or 20% of the total sample admitted that they were facing food shortages especially during the rain season. During the study, trucks loaded with bags of dry cassava were encountered even in areas that have never been accessed by vehicles before. Such areas are normally impassable to vehicles due to the lack of good feeder roads and are only served by footpaths. But traders who hire trucks to ferry the crops they accumulate through the barter trade have found a way out of this dilemma by utilising bush tracks followed by timber-carrying trucks. This trade has certainly undermined food security in the area as people dispose of crops normally reserved for rain season.

People in Chief Katuta's area depend on cassava as a staple food crop and can hardly resort to maize grain even if it was available. Besides, the lack of hammer mills in the area makes maize not a viable alternative. As such it is important for people to keep enough of the crop for food and not use it so extensively in the barter trade, as is the case now.

Fig. 6. Estimates of Average Production per Household in 90 Kg Bags Equivalent in 1996/97 and 1997/98 Season.



Source: Field Data.

As shown by figure 6 above, cassava harvesting did not change much over the two agricultural seasons under review. The average equivalent number of harvested per household only increased slightly from 50.26 x 90 Kg in 1996/97 to 50.28 x 90-Kg bags in 1997/98 season. However, the use of the harvested crop is what clearly shows the effect of the barter trade in the area involving cassava as explained in preceding paragraphs.

The apparent stability in cassava production could most likely obscure widespread variations in actual quantities harvested by individual households, as it is based on the average yields. Besides, the estimates were based on the assumption of households using some average size of basket to harvest their crop. As such, the actual situation could be expected to vary slightly from this estimated average level. Whatever the case, what is indisputable is that people are using cassava as a commodity of exchange in the barter trade which has been highlighted by the discrepancy between the quantities harvested and those actually used at home. In some cases, the quantities disposed of through the trade are quite substantial, undermining the food security of such households.

5.23 Uses of Crops Produced

The most effective way of understanding the trends in agricultural production is to consider how the produce is used. This is also important in order to assess the food security situation in the area.

The number of bags of all crops sold for cash in Chief Katuta's area is not very significant. For example, the average number of bags sold for cash among respondents in 1996/97 was only 3.78 x 90-Kg bags per household. This remained almost constant at 3.8 x 90-Kg bags of crops in cash sales in 1997/98 season. On the overall, 89.6 % of the crops produced in 1996/97 season were kept for home consumption, 5.4 % of the crops were sold for cash while 5 % of the produce was used in the barter trade. In 1997/98 season, the share for home consumption declined from the average of 89.6 % to 70.4 %. Notably, the barter trade gained significantly from a mere 5 % of the crops produced in 1996/97 to 25.4 % in 1997/98 season! The share of crops going to cash sales declined from 5.4 % of the produce in 1996/97 to only 4.2 % in 1997/98 season.

In 1996/97 season, twenty-two respondents or 44 % of the sample did not keep any millet for home consumption. Infact, even those who kept some crops for home consumption, kept very small quantities. For example, twenty-five respondents or 89.3 % of those who

kept some millet for home consumption reserved less than five bags per household. Only three respondents or 10.7 % of those who kept some millet for home consumption kept over five bags in 1996/97 farming season. The number of those selling all their millet produced declined from twenty-two or 42 % from 1996/97 to 1997/98 farming season. However, even during this farming season the majority of people kept very small quantities of millet for home consumption.

In 1997/98 season, twenty-eight respondents or 96.5 % of those who kept millet for home consumption only kept less than five bags. On the other hand, those keeping more than five bags for consumption declined from three in 1996/97 season to only one or 3.5 % in 1997/98 season. This clearly indicates that people are keeping smaller quantities of crops for home consumption while selling more in the barter trade. On the average, millet home consumption declined from 2.9 x 90-Kg bags in 1996/97 to 2.6 x 90-Kg bags in 1997/98 season. The way crops were used in the area over the two seasons under review is shown in figure 7 and 8.

Figure 7 and 8:

The Different Uses of Crops Produced under Citemene Cultivation in Chief Katuta's Area.

Figure 7

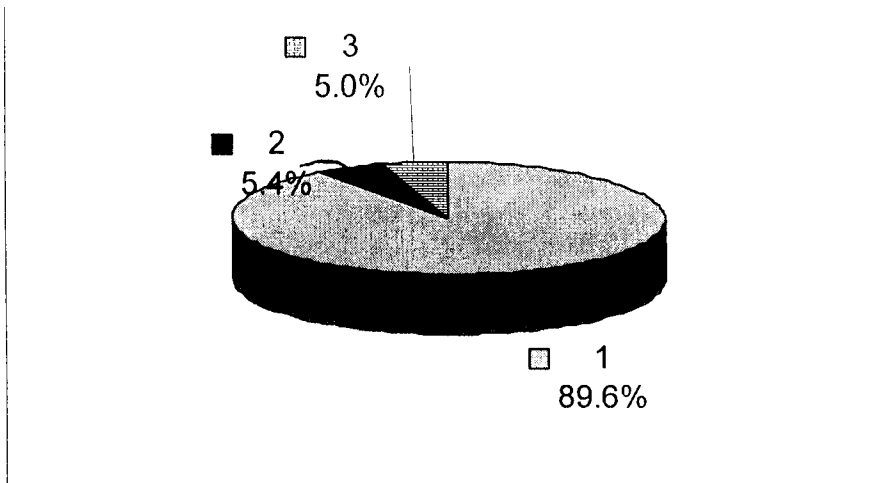
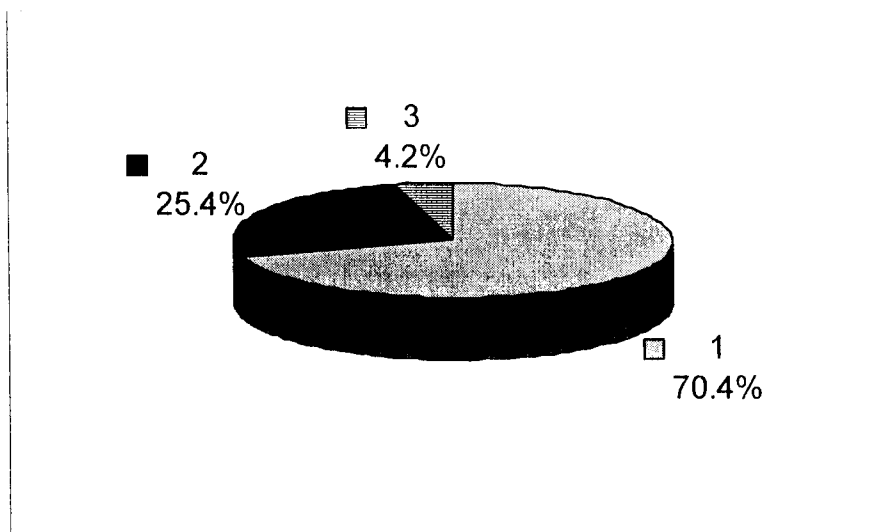


Figure 8



KEY

1 = Home consumption

2 = Barter trade

3 = Cash sales

Source: Field Data.

One of the crops mostly used in the barter trade are groundnuts. The average number of groundnut bags kept for home consumption per household in 1996/97 season was only 2.5 x 90-Kg bags. Among those who kept some groundnuts for home consumption, twenty-one respondents or 42 % kept less than five bags while nineteen respondents never left any groundnuts for home consumption. In 1997/98 season, twenty-seven respondents or 54 % of the sample kept less than five bags for home consumption in the 1997/98 season. Infact, twenty-three respondents or 46 % disposed of all their groundnuts produced as compared to nineteen or 38 % in 1996/97 season. This serves to show that people in the area are selling most of their groundnuts produced leaving little for home consumption.

In fact, forty-nine out of the fifty respondents or 98 % of the total sample revealed that they do not only produce for home consumption but for sale especially through barter as well. This could explain the expansion in the sizes of the citemene garden and the tendency to have more than one garden each year. It is a strategy to increase production for the barter trade. This has exerted a lot of pressure on forest resources contributing greatly to the apparent shortage of cultivation land in the area.

5.30 The Nature of the Barter Trade

The major buyers of the crops produced through citemene cultivation in Chief Katuta's area are individual traders, the infamous "brief case" businessmen. In the 1996/97 farming season, forty nine respondents or 98 % of the sample, sold their produce to such traders. This was done through the barter trade where crops were exchanged with other commodities ranging from clothes to consumer goods such as bicycles and sewing machines.

It was also revealed that farmers rarely set the terms of exchange of their crops with other goods. About twenty-six respondents or 52 % of the sample explained that village headmen set the terms of exchange of crops in each village. However, nineteen

respondents or 38 % of the sample identified the traders as the ones who set the terms of exchange. The remaining five respondents or 10 % of the sample mentioned other groups such as village committees as responsible for setting terms of exchange. Infact, all the five headmen clarified that they only presided over transactions involving local products such as crops and fish, but that involving "urban merchandise" were pre-set by traders themselves. This shows that traders are the major determining factor of the exchange terms in the barter trade in the area.

Some of the "urban merchandise" exchanged with crops in the area include soap and salt, cooking utensils, second-hand clothes commonly known as "Salaula", bicycles, radio cassettes, sawing machines and others. Notably, bicycles featured quite prominently with nineteen respondents or 38 % of the sample stating that they had bought one in the two years proceeding the study. In most cases, bicycles were exchanged with a lot of bags of millet or groundnuts. In the case of millet, farmers paid an average of 15 x 90-Kg bags of millet to buy a single bicycle. As production hardly reaches such levels per individual farmer, farmers have to find other means to supplement their produce in order to purchase a single bicycle. Such means include slaughtering a cow or goats and exchanging the meat with millet, which they pay the trader for the bicycle. When groundnuts are used to purchase a bicycle, the average number of bags was eight, which also called for extra sources of the crop besides the farmer's produce. As such, all the farmer's produce is spent on a single commodity at the expense of household food security.

This practice leaves farmers with almost nothing for home consumption undermining the household and in the final analysis community food security in the area. For example, ten respondents or 20 % of the sample admitted that they were having food shortages at their homes. Further investigations revealed that out of these ten respondents, eight of them or 80 % had bought a bicycle each in the previous two years. Infact, the Chief and the local Agricultural Officer indicated that the number of households facing food shortages in the area is quite high. This is largely a result of farmers disposing off their crops through barter trade, leaving little, if any for home consumption.

5.40 Stabilisation of Citemene Cultivation

The cultivation system in Chief Katuta's area is unstable mainly due to its reliance on forests. This is because the growing of cassava, the staple food crop and millet seem to be closely tied to clearance of trees. But most headmen, four out of five or 80 % of them thought that growing cassava in mound gardens was viable and could help stabilise the cultivation system. It would ensure the continued growing of cassava at one plot for longer periods thereby minimising the pressure over forests.

In Kamfwnu-Mwambwa village, the headman explained that people had already started growing sorghum as a way of averting the problems posed by the shortage of trees. He further explained that the system does not require an annual clearance of gardens as sorghum grows well in mounds. It would eventually replace cassava as a staple crop due to the reliance of cassava and millet cultivation on dwindling forests. Generally, the growing of hybrid maize was dismissed by most people especially headmen who felt that the dependence on chemical fertilisers makes the system too expensive. Besides, the absence of hammer mills in the area would mean that maize is grown for sale while the citemene system continues for subsistence in a dual agricultural system that failed in previous years. As such, the idea of mound gardens seems to be a viable alternative although it precludes the cultivation of millet, which requires ash as fertiliser.

There is a relatively new method of cultivation evolving in the area especially at Kamfumu-Mwambwa village - which started facing shortages of trees earlier. This technique is referred to as the "Ciscabela" and involves neither extensive clearing of trees nor making mounds. Under this system, land is tilled just after the rains when soil is still soft and has a lot of undergrowth such as grass. The plot is left to dry and the grass is later burnt at the same time like citemene gardens and prepared for sowing. This method is very popular in this village as it also facilitates the growing of millet. Once adopted in other villages, it would greatly help stabilise the cultivation system in Chief Katuta's area.

The Agricultural Extension Officer in the area suggested the setting up of other income generating ventures so that citemene continues to play its traditional role of subsistence. While people grow crops only simply for home consumption, they would earn income from other sources to enable them participate in the broader money economy while ensuring household food security. All these alternative methods presented would help stabilise the cultivation system by increasing food production while reducing pressure over the dwindling forest resources.

5.50 Protection of the Forest Reserve

The Kalomboshi Local Forest is almost beyond redemption. This is because extensive damage has been inflicted on the forest for more than three years of encroachment. When the encroachment on the forest by citemene cultivators began, people used to hide their gardens in the interior thickets away from the road in fear of detection. But later, they began clearing trees openly. Although the forest was established in the 1960s, encroachment only started less than ten years ago. One of the major reasons for this was the gradual encroachment of settlements within the buffer zone of the forest. The management system of the forest also failed to integrate the local people in decision-making let alone share the benefits from the forest with them. For example, the bee-keeping project within the forest embarked upon in the 1980s did not benefit the local people as the harvested honey was whisked away to the District Headquarters. This has made people feel alienated from their own resources engendering the perception that it is government property and not theirs.

Although there is very little of the forest left to preserve, any effort to do so should involve the local community. This is because failure to do so defeats the purpose of sustainable forest management as local people feel alienated from it and may not take measures to preserve it. As such, people need to be involved in the decision-making process on how best to manage the forest and they should also benefit from such efforts. At the time of the study, people who had cleared gardens in the forest had been allowed by the local forest officers in the District to harvest their crops and never to clear any

more new gardens. However, this measure will be difficult to implement with the lack of forest officers in the area to monitor activities and also considering the long time it takes crops like cassava to be ripe for harvesting. However, all the five headmen and the Chief stressed that they are discouraging the practice. But with people settled right on the fringes of the forest reserve, it will not be easy to protect the Kalomboshi Local Forest - reserve.

5.60 Sustaining the Barter Trade

It was revealed by all the five headmen that the barter trade existed in their villages. Further, the headmen clarified that they have limited control over the trade as they only regulate transactions involving local products such as crops, fish and meat from domestic animals such as cattle. But traders themselves regulated trade involving “urban merchandise”. The terms of exchange in such trade are mostly unfair to the villagers as they are exploited by paying more of their crops or produce for such goods.

According to the community leaders, one way of sustaining this trade is by forming Farmers' Associations, which would enhance the bargaining power of the farmers. Such associations would also standardise the terms of exchange for crops and urban merchandise to reduce the irregularities. Three of the five headmen felt that local farmers should have a chance of selling their crops for cash, which they could later spend on other items to avoid the unfair exchange terms of the barter trade. For example, one farmer sold fourteen (14 x 90 Kg) bags of millet for a second hand bicycle. Another gave away a fully-grown bull for a second hand radio cassette estimated to be valued at less than a hundred thousand kwacha. But the bull could have fetched as much as K350,000.00 according to the prevailing prices in the area at the time. Such unfair transactions are common in the area even when it comes to items like cloth, 'Fitenge'.

CHAPTER SIX

CONCLUSIONS⁹ RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

6.0 INTRODUCTION

This chapter summarises the major findings of the study and also offers recommendations for the solution of the problem identified earlier. It, also poses a challenge for other researchers to consider pursuing some of the gaps of knowledge identified during the research.

6.10 CONCLUSIONS

The aim of the study was to find out the major cause of the pressure on forestland in Chief Katuta's area. Its specific objectives were: to assess the nature of the barter trade and the see how it would be sustained; to find out the means of stabilising citemene cultivation practice while encouraging production for the market to raise incomes. It was also intended to investigate the apparent conflict over the forest resources between agricultural use and conservation of the Kalomboshi Protected Forest and how such conflicts could be resolved. It was hypothesised that the barter trade in crops grown under the citemene system of cultivation was significantly contributing to the apparent shortage of cultivation land in the area. It was further tentatively asserted that people in Chief Katuta's area were encroaching on the Kalomboshi Protected Forest because they were clearing larger and multiple garden plots per person to increase production for the market.

Fifty farmers from five villages in Chief Katuta's area were randomly selected and interviewed using an interview schedule. It has been established that the rampant barter trade in crops has significantly contributed to the apparent shortage of land for cultivation. It has also been shown that farmers are clearing larger or multiple citemene

gardens to increase production for the barter trade at the expense of household food security. The encroachment on the Kalomboshi forest is closely related to the barter trade, which has induced pressure over forests by transforming the subsistence citemene system of cultivation into a semi-commercial one. The future management efforts of the Kalomboshi forest should involve the local people to ensure sustainability. The alternative methods of cultivation to citemene in the area could include the mound gardens, cisebela and integration of farming with other income-generating activities. These could minimise pressure over the forests and stabilise the farming system.

The local farmers feel somewhat exploited by the merchants of "urban" goods who set exorbitant terms of exchange. Barter trade should probably be monitored by local leaders and farmers encouraged to form Farmers' Groups in order to enhance their bargaining power, although this has to be done in the context of a liberalized economy.

6.20 RECOMMENDATIONS

1. In order to stabilise the cultivation system in the area, other alternatives to the citemene such as mound garden, the cisebela technique and the integration of subsistence farming with other income-generating ventures should be explored in the area.
2. The peasant farmers in the area need to mobilise themselves into Farmers' Groups to strengthen their bargaining power in the trade.
3. In order to enhance the protection of the Kalomboshi Forest, there should be a clearly defined buffer zone between the forest and human settlement. The future management strategy of the forest should fully incorporate the local people in both decision-making and enjoying the benefits accrued from the forests.

4. There should be an improvement in the transport networks in the area to enable peasant farmers access urban markets easily so that they can fully participate in the broader money economy. This will help them, buy other goods with cash and strengthen their bargaining power in the barter trade.

6.30 SUGGESTIONS FOR FURTHER STUDIES

The subject of pressure over land in rural areas is a broad one, which requires detailed studies from several interrelated factors. As such, this study can never claim to be exhaustive and therefore throws a challenge to other researchers to consider carrying on from where it has left.

For example, population dynamics in the area vis-à-vis natural increase and in-migration from such areas as the nearby Ng'umbo region and the likely impact of such dynamics on the natural resource base of the area, need to be studied.

Moreover, the literacy levels in the area and how that may explain the inefficiencies in the agricultural systems in the area in relation to management of the produce is worth another study.

APPENDIX 1. 1

The Effects of Sizes of Citemene Gardens on the Encroachment on the Kalombomboshi Protected Forest.

| | $\leq 1/2$ hactres | $\geq 1/2$ hactres | Totals |
|---|--------------------|--------------------|-----------|
| Encroached on the Kalomboshi Forest | A 5 | B 14 | 19 |
| Did not encroach on the Kalomboshi Forest | C 24 | D 7 | 31 |
| Totals | 29 | 21 | 50 |

H_0 : There is no significant relationship between the sizes of citemene gardens cleared and encroachment on the Protected Forest.

H_1 : Encroachment on the Kalomboshi Forest is because people are clearing larger citemene garden plots.

$$(a + c) = 29$$

$$(b + d) = 21$$

$$\chi^2 = n \frac{([AD - BC] - n/2)^2}{(A + B)(C + D)(A + C)(B + D)}$$

Rejection level = 0.05

df = 1 (C - 1) (r - 1)

$$\chi^2 \text{ observed} = 12.62$$

$$\chi^2, \text{ critical} = 3.84$$

$$\therefore \chi^2 \text{ observed} > \chi^2 \text{ critical}$$

CONCLUSION

Since Chi-square observed is greater than χ^2 critical at the 0.05 level of significance, we reject the null hypothesis.

Therefore, the encroachment on the Kalomboshi Forest is because people are clearing larger citemene garden plots.

gardens to increase production for the barter trade at the expense of household food security. The encroachment on the Kalomboshi forest is closely related to the barter trade, which has induced pressure over forests by transforming the subsistence citemene system of cultivation into a semi-commercial one. The future management efforts of the Kalomboshi forest should involve the local people to ensure sustainability. The alternative methods of cultivation to citemene in the area could include the mound gardens, cisebela and integration of farming with other income-generating activities. These could minimise pressure over the forests and stabilise the farming system.

The local farmers feel somewhat exploited by the merchants of "urban" goods who set exorbitant terms of exchange. Barter trade should probably be monitored by local leaders and farmers encouraged to form Farmers' Groups in order to enhance their bargaining power, although this has to be done in the context of a liberalized economy.

6.20 RECOMMENDATIONS

1. In order to stabilise the cultivation system in the area, other alternatives to the citemene such as mound garden, the cisebela technique and the integration of subsistence farming with other income-generating ventures should be explored in the area.
2. The peasant farmers in the area need to mobilise themselves into Farmers' Groups to strengthen their bargaining power in the trade.
3. In order to enhance the protection of the Kalomboshi Forest, there should be a clearly defined buffer zone between the forest and human settlement. The future management strategy of the forest should fully incorporate the local people in both decision-making and enjoying the benefits accrued from the forests.

4. There should be an improvement in the transport networks in the area to enable peasant farmers access urban markets easily so that they can fully participate in the broader money economy. This will help them, buy other goods with cash and strengthen their bargaining power in the barter trade.

6.30 SUGGESTIONS FOR FURTHER STUDIES

The subject of pressure over land in rural areas is a broad one, which requires detailed studies from several interrelated factors. As such, this study can never claim to be exhaustive and therefore throws a challenge to other researchers to consider carrying on from where it has left.

For example, population dynamics in the area vis-à-vis natural increase and in-migration from such areas as the nearby Ng'umbo region and the likely impact of such dynamics on the natural resource base of the area, need to be studied.

Moreover, the literacy levels in the area and how that may explain the inefficiencies in the agricultural systems in the area in relation to management of the produce is worth another study.

APPENDIX 1. 1

The Effects of Sizes of Citemene Gardens on the Encroachment on the Kalombomboshi Protected Forest.

| | $\leq 1/2$ hactres | $\geq 1/2$ hactres | Totals |
|---|--------------------|--------------------|-----------|
| Encroached on the Kalomboshi Forest | A 5 | B 14 | 19 |
| Did not encroach on the Kalomboshi Forest | C 24 | D 7 | 31 |
| Totals | 29 | 21 | 50 |

H_0 : There is no significant relationship between the sizes of citemene gardens cleared and encroachment on the Protected Forest.

H_i : Encroachment on the Kalomboshi Forest is because people are clearing larger citemene garden plots.

$$(a + c) = 29$$

$$(b + d) = 21$$

$$\chi^2 = n \frac{[AD - BC] - \frac{n}{2}}{(A + B)(C + D)(A + C)(B + D)}$$

Rejection level = 0.05

df = 1 (C - 1) (r - 1)

χ^2 observed = 12.62

χ^2 , critical = 3.84

$\therefore \chi^2$ observed > χ^2 critical

CONCLUSION

Since Chi-square observed is greater than χ^2 critical at the 0.05 level of significance, we reject the null hypothesis.

Therefore, the encroachment on the Kalomboshi Forest is because people are clearing larger citemene garden plots.

APPENDIX 1.2 2 x 2 Contingency Tables

Contribution of the Barter Trade to the Shortage of Forestland for Citemene Cultivation.

| | Engage in Barter Trade | Do Not Engage in Barter Trade | Totals |
|------------------------------------|------------------------|-------------------------------|-----------|
| Face shortage of cultivation land. | 34 | 1 | 35 |
| Have no land shortage. | 15 | 0 | 15 |
| Totals | 49 | 1 | 50 |

Ho: The barter trade in crops grown under citemene system has no effect on the apparent shortage of cultivation land in the area

Hi: The barter trade in crops grown under the citemene system has significantly contributed to the apparent shortage of cultivation land in the area.

Level of Significance = 0.05

Degree of freedom = $(C - 1)(r - 1)$

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

$$= 1$$

$$\chi^2 \text{ observed} = 4.26$$

$$\chi^2 \text{ critical} = 3.84$$

$$\therefore \chi^2 \text{ observed} > \chi^2 \text{ critical}$$

CONCLUSION

Since the observed chi-square value is greater than the critical one, the null hypothesis can be rejected at the 0.05 level of significance.

Therefore, the barter trade in crops grown under the citemene system has significantly contributed to the apparent shortage of cultivation land in the area.

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APPENDIX 1

TITLE: Pressure over land in a shifting (Citimene) system of land usage: A case of chief Katuta's area of Luwingu District, Northern Province.

Interview Schedule

Interview Schedule No:

DATE:

SECTION A:

PERSONAL DETAILS.

Mark [] on appropriate answer.

1. (a) Gender: (i) Male [] (ii) Female []
(b) Age []
2. Marital status
(i) Single [] (ii) Married [] []
(iii) Separated [] (iv) Divorced []
(v) Widowed []
3. Household size
(a) Below 5 []
(b) Between 5 and 10 []
(c) Over 10 [] []
4. Level of education
(a) None []
(b) Primary []
(c) Secondary []
(d) Tertiary [] []

SECTION B

SHORTAGE OF CULTIVATION LAND

5. Do you shift to your gardens when you are preparing them?
(a) Yes [] (b) No []
(c) Sometimes [] []

6. Do you have your own plot of land where you make your gardens? []
- (a) Yes [] (b) No []
7. If answer '6' above is Yes, can someone else clear forest for his garden in the area without your permission? []
- (a) No [] (b) Yes
- (c) At a fee (d) Others []
8. When did you acquire that piece of land []
- (a) Less than five years ago []
- (b) Between 5 to 10 years ago []
- (c) More than 10 years ago []
9. What tools do you use in your farming activities []
- (a) Axe and hoe [] (b) Oxen []
- (c) Plough [] (d) Tractor []
- (e) Others []
10. Have you ever cleared a garden in the Kalomboshi Protected forest? []
- (a) Yes [] (b) No []
11. Do you employ other people in cultivating your gardens? []
- (a) Yes [] (b) No []
- (c) Sometimes []
12. Do you clear virgin forests for your chitemene garden each year? []
- (a) Yes [] (b) No []
13. If answer to 12 above is No, when did you last clear a virgin forest for a chitemene garden? []
- (a) Less than 3 years ago []
- (b) Five years ago []
- (c) More than five years but less than 10 years []
- (d) More than ten years ago []

14. Have you ever cleared a dense forest (Mateshi) for a chitemene garden in the last three years?

(a) Yes [] (b) No []

15. If answer in 14 above is yes, explain why you cleared 'Mateshi' for a garden

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

16. Is there enough land for cultivation in your area?

(a) Yes [] (b) No []

(c) Do not know [] []

17. How many different gardens do you have?

(a) One [] (b) 2 to 4 []

18. Estimate the size of your gardens in limas?

(a) 1 Lima []

(b) 1.5 to 2 Limas []

(c) Over 2 Limas []

SECTION C

PRODUCTION LEVELS AND SIZES OF GARDENS

19. What are the major crops you grow?

(a) Millet [] (b) Cassava []

(c) Groundnuts [] (d) Others [] []

20. What was the size of your chitemene garden in ?

(i) 1996/97 [] (ii) 1997/98 [] []

21. How many 90kg bags of the following crops did you produce in: 1996/98,

| | 1996/97 | 1997/98 |
|-------------------|---------|---------|
| (i) Finger millet | [] | [] |
| (ii) Groundnuts | [] | [] |
| (iii) Cassava | [] | [] |

22. How many bags of the above crop did you keep food in:

| | 1996/97 | 1997/98 | |
|-------------------|---------|---------|-----|
| (i) Finger millet | [] | [] | |
| (ii) Groundnuts | [] | [] | |
| (iii) Cassava | [] | [] | [] |

23. Do you clear more than one plot for the chitemene gardens each year?

- (a) No [] (b) Yes []
(c) Sometimes [] []

SECTION D

USE OF CROPS PRODUCTION

24. Do you use all the crops you produce for consumption?

- (a) Yes [] (b) No []

25. If answer in 24 above is No. What do you buy with your crops?

- (a) Bicycle []
(b) Radio cassette []
(c) Sewing machine []
(d) Second hand clothes []
(e) Salt and soap []
(f) Any other (explain) []

26. How many 90kg bags of your crops did you sell for cash in:

- (i) 1996/97 [] (ii) 1997/98 [] []

SECTION E

NATURE OF BARTER TRADE

27. Who buys your crops?

- (a) Individuals traders [] (b) Organised marketing company []
(c) Crop buying agents [] (d) Others, explain [] []

28. Do you set the terms of exchange of your crops?
 (a) Yes [] (b) No. [] []
29. If answer in 28 above is No, who sets the terms of trade?
 (a) The chief []
 (b) Village headman []
 (c) The buyers []
 (d) Any, other explain [] []
30. Do you face shortages of food at your house?
 (a) No [] (b) Yes [] []

APPENDIX II

ASSESSMENT BY FORESTRY OFFICERS

1. When was the Kalomboshi Forest Reserve established?

2. In what year did the encroachment of the forest by chitemene farmers begin?

3. What do you suspect to be the reasons for the encroachment on the forest reserve?

4. How can this encroachment on the forest reserve be stopped?

AGRICULTURAL OFFICER

1. Do people produce enough food for themselves in the region

2. If answer in 1 above is Yes, is the surplus produced sufficient to sustain barter trade.

.....
.....

3. What efforts is your department making to stabilise the chitemene system.

.....
.....

APPENDIX III

INTERVIEW SCHEDULE FOR HEADMEN

1. Is there a shortage of cultivation land in your village?

2. Are there disputes over cultivation land among your subjects/

(a) No [] (b) Yes [] []

3. If Yes, how many of such disputes did you attend to in:

(i) 1996/97 [] (ii) 1997/98 [] []

4. Are their shortages of food for some households in your village at certain periods of the year?

(a) No [] (b) Yes [] []

5. Do people in your village exchange most of their crops with other consumer goods?

(a) Yes [] (b) No [] []

6. Have people from your village cleared forest in the Kalomboshi Forest for their gardens in the past three years?

7. What should be done to stabilise chitemene cultivation in the area?

.....
.....

8. Do people in your village grow cassava in mould gardens besides that grown in the chitemene?

.....
.....