

**SERVICE CENTRE PLANNING FOR RURAL
DEVELOPMENT: A CASE STUDY OF MWENSE
DISTRICT.**

By

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**A dissertation submitted to the University of Zambia in partial
fulfilment of the requirements of the degree of Master of
Science in Geography.**

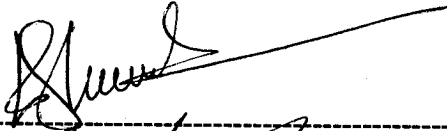
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2005



DECLARATION

I, Elie Shumba (Student Identification Number 24539368), do hereby declare that this dissertation is a clear testimony of my own personal effort and experience during field research. The report is being presented to The University of Zambia for the very first time since it has never been presented anywhere else. All published works and materials used here have duly been acknowledged.

Signed: 
Date: 05/06/2006

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THE UNIVERSITY OF ZAMBIA

APPROVAL

THIS DISSERTATION BY *MR. ELIE SHUMBA* ENTITLED: "*SERVICE CENTRE PLANNING FOR RURAL DEVELOPMENT: A CASE STUDY OF MWENSE DISTRICT*" IS APPROVED AS FULFILING THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN GEOGRAPHY OF THE UNIVERSITY OF ZAMBIA.

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ABSTRACT

This study is meant to provide information about the local structure of service centers to facilitate effective planning for rural areas so as to improve them and the welfare of the rural dwellers. To foster development, it is important to identify the problems of the present distributive system of goods and services with a view to devising an effective system that will allow equitable distribution.

To analyse the structure of service centers in Mwense and assess its usefulness, settlements have been ranked in order of importance and functional gaps identified on the basis of appropriate methodology. The study measured the settlement pattern of service centers and identified proper locational priorities for the deployment of services at the right places.

It is noted that there is a significant correlation between centrality and population size of settlements and the distribution pattern identified with its implication on the location of service outlets on the basis of the application of central place theory. An attempt has also been made to identify settlements that are partially served or not served at all. The study has consequently identified that the present structure of central places may be inadequate for fostering development hence corrective suggestions have been made.

This is on the understanding that due to limited funding, optimum use must be made of available funds to effectively benefit most people, hence the need for effective service center location to avoid the heavy expenditure incurred from uninformed planning and to avoid uncalled for duplication in the deployment of services.

The expectation of this study is that it will draw attention of stakeholders to issues of rural development and also influence investment and future rural development policy. This is because such studies are critical since service centers serve as catalysts for spreading developmental innovation.

DEDICATION

To Yvonne, whose love, care and support have never failed; and Nkosinathi, for whom this has been done.

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It is obvious, none of the persons mentioned here are in any way responsible for my findings or opinions nor for any possible errors or inaccuracies.

Above all, realizing that apart from Him I can do nothing, I give all the glory to God Almighty.

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LIST OF ACRONYMS

1. BOMA British Overseas Military Administration (old colonial use, now District Headquarters)
2. B.S.A.C. British South African Company
3. CDF Community Development Fund
4. CMML Christian Missions in Many Lands
5. DCU District Co-operative Union
6. DRC Democratic Republic of Congo
7. DSA District Situation Analysis
8. FNDP First National Development Plan
9. GRS *Gesellschaft fuer Regionale Strukturentwicklung*
10. GRZ Government of the Republic of Zambia
11. IRDP Integrated Rural Development Programme
12. MDC Mwense District Council
13. MDDCC Mwense District Development Co-ordinating Committee
14. MDHMT Mwense District Health Management Team
15. NFSP National Fertiliser Support Programme
16. NGO Non-Governmental Organisation
17. OPD Out – Patient Department
18. SEA Standard Enumeration Area
19. TNDP Third National Development Plan
20. ZAMSIF Zambia Social Investment Fund
21. ZAMTEL Zambia Telecommunications Corporation
22. ZESCO Zambia Electricity Supply Corporation

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OPERATIONAL DEFINITIONS OF TERMS

1. **Centrality:** The degree to which a settlement serves its surrounding area. This depends on the ease of access to the settlement and the range of goods and services provided.
2. **Central Place:** A settlement or nodal point, which, by its functions, serves an area around it for goods and services.
3. **Dispersed Settlements:** Settlements (farms and homesteads) spread across the landscape.
4. **Function of a Place:** What services the place offers to its surrounding area; what it does and what activities take place there.
5. **Hierarchy of Functions:** This is associated with the level of functions ranked in order of importance hence there arise higher-level, middle-level and lower-level functions.
6. **Locational – Functional Gaps:** Settlements that are either under-serviced or not served at all but which due to their population sizes deserve to have particular services.
7. **Median Centre:** The point at which travel distance for all the population in a particular area to converge is lowest.
8. **Nucleated Settlements:** Settlements (farms and homesteads) in clusters.
9. **Range of Goods:** The furthest distance measured in time and cost over which either a customer would be prepared to travel to obtain it or a supplier travel to provide it.

10. **Services:** The needs of the population made available by service providers. These may include education, health care, transport, communication and agricultural advice.
11. **Service Centre:** A settlement or nodal point, which provides goods and services to its surrounding area.
12. **Threshold Population:** The minimum number of people needed to support a good or service.
13. **Village:** A small settlement, surrounded by countryside and predominantly of an agricultural role. It is under the leadership of a village headperson.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Rural areas in Zambia generally lag behind urban areas in terms of development and have continued to be unattractive hence losing much of the human-power necessary to help develop them. The need for rural development cannot, therefore, be over emphasized. Efforts to develop rural areas are on a constant basis being made although they do not seem to have made great impact, and when funding for development is made available it does not seem to reach the intended goal due to “infrastructural and organizational problems” (Times of Zambia, 2004, p.1).

Since Zambia suffers from inequalities and regional imbalances or locational – functional gaps, it is necessary that planning for poverty alleviation and provision of equity in the distribution of goods, services and opportunities for economic growth should be done in the most efficient manner. According to Singh and Singh (1988), “an appropriate planning is the best media to provide maximum benefit to the maximum number of people by exploiting the provided resource and may lead to the balanced development of the region” (Singh and Singh, last, p. 329).

The provision of services and other related commodities constitutes a major aspect of planning. The planning process involves the formulation and implementation of programmes designed to allocate these services to those localities, which demonstrate a high degree of demand for the service (Jamal, 1972). Planners have sought to either identify or set up growth centers in rural areas where investment might be allocated to provide better services for surrounding areas and employment opportunities (Carr, 1997). The accessibility of these services is also important. Thus a sound knowledge of the existing structure or organizational framework is very important for effective planning and the consequent development of any area to take place.

This study was directed towards identifying and ranking service centers or central places in Mwense district in Luapula Province with a view to identifying locational-functional gaps

(areas either unserved or underserved) and further, making recommendations for improvements.

1.2 Theoretical Background

Several studies based on the operational features of the central place theory have been done in Zambia. These studies fall under two broad categories, academic ones on one hand, and planning works on the other hand.

Academic studies mainly sought to explain the evolving and existing systems. One such study was a comparison of Mazabuka and Serenje Districts in 1970 by Siddle. Jaeger (1980) did a study of Kasempa District while Graaff and Wood (1984) worked in Western Province. There have been studies done in Southern Province and in Mpika District of Northern Province by Van den Berg (1983).

Planning studies include the work of Doxiadis Associates done in the late sixties covering the whole country. In Central Province, the Department of Town and Country Planning Research Unit did a study as part of a regional plan for the province. In Southern Province German consultants did a similar study in 1971.

The present study is an attempt to extend service center planning studies to Luapula Province at District level and it is hoped that it will not only prove to be a worthwhile addition to the existing case studies in the country but will also play the role of explaining the evolving and existing system in Mwense. It is also hoped that the study will provide a useful planning aid.

1.3 Statement of the problem

Rural areas are by and large perceived as very unattractive and backward areas. This perception, real or imagined, has led to migration to urban areas (Ohadike, 1981). Ohadike (1981) further observes that the problems of the pronounced and continuing drift of rural dwellers to urban areas are associated with the problem of correcting the social inequalities in the provision of services between urban and rural areas. The migration has further entrenched

the backwardness of the rural areas by depriving them of their valuable young and virile labour force.

These areas, therefore, have to be made attractive and the welfare of the rural people improved. To do so, there is need to find out what planning policies are in place for the delivery of services and goods. It is important to identify the shortcomings of the existing distributive system that could, as a result, negatively affect the process of service delivery and general effort at achieving development.

The argument stands that there should be, in place, an effective distributive system of service centers to fill the locational-functional gaps. Such a situation would enable equitable distribution of goods and services, and the effective utilization of the scarce funding for development projects.

1.4.1 Purpose of the Study

The purpose of this study was to analyse the structure of the existing service center system in the district and make an assessment of how useful the system may be in the present circumstances.

1.4.2 Objectives

The specific objectives of the study were:

- i. To identify service centers and rank settlements in Mwense District on the basis of hierarchy of functions. The hierarchy of functions is related to the idea that certain goods and services appear within certain threshold populations hence a hierarchy of central places arises in an area.
- ii. To identify locational-functional gaps in the local service center system.

- iii. To, objectively, measure the pattern of distribution of villages and of selected services with a view to determining tendency towards nucleation (clustering) or dispersion.
- iv. To propose a distribution of socio-economic services by identifying proper locational priorities for the deployment of facilities at the right places.

1.4.3 Hypotheses

- i. There is a significant correlation between centrality (the functional importance of a place based on the number and variety of goods and services provided) and population size of settlements in the study area.
- ii. The distribution pattern of villages is significantly dispersed making the location and provision of goods and services predominantly difficult.

In addition to these hypotheses there were research questions to cover objectives numbers one and four.

Research questions

- i. Which places make up the service centers of the district and which ones are overserviced, adequately serviced, underserved or not serviced at all?
- ii. Is the prevailing structure of service centers in the district adequate to properly foster development?

1.5 Significance of the Study

Despite the continuing increase in urban population and the proliferation of towns and cities, rural settlements still dominate much of the world's occupied land. Much of the world's population lives in rural areas and the great bulk of land is used for rural activities. Rural

settlements have also been the subject of considerable academic investigation and the object of much political and economic activity (Bunce, 1982).

Mwense district has potential for development and studies on the district can bear an influence on investment and future rural development policies. Such studies may also serve the purpose of attracting the attention of administrators, planners, scholars and non-governmental organizations to issues of rural development and it is hoped the study will highlight issues that may be useful for future research. It is also hoped that the study will prove to be a useful addition to the already existing case studies that have a bearing on rural problems in developing countries, particularly in Zambia.

Funding for development in developing countries is limited hence optimum use must be made of available funds, whenever they are available, to benefit the most people in the most effective way. This leads to the vital role of planning. The argument stands that the prevailing structure of central places may no longer be useful nor indeed adequate to properly foster development, hence the need for new patterns, which this study sought to establish by way of making recommendations. The study was expected to reveal gaps that needed to be 'filled' to facilitate equitable distribution of resources so as to induce development.

It should be noted that if proper location of service centers and functions was made in appropriate places, it would lead to avoidance of the heavy expenditure that would otherwise be incurred if location was made on the basis of 'trial and error' kind of planning or on the basis of expediency. Thus, such a study is important for the planner so that unnecessary duplication in the deployment of services is avoided, being mindful of the limited funding.

Furthermore, as Singh and Singh (1988) have pointed out, a study of service centers in relation to rural development is indeed critical since service centers serve as a catalyst for the spread of innovations of development. They are the nodal points in injecting the energy for transforming rural areas.

1.6 Organisation of Text

The presentation of Chapters follows the following format. In Chapter 2, a review of related literature is made bringing out the main features of central place theory and its application in Africa and Zambia in particular. An overview of rural development strategies in Africa has also been included.

Chapter 3 focuses on the geographical setting of the study area looking at its situation, climate, cultural aspects and reasons for choosing this study area. Chapter 4 is an explanation of the research methodology followed in undertaking the study. Chapter 5 deals with data analysis. This is where service centers have been identified, their hierarchy determined and the system of service centers discussed.

An account of the research findings and resulting interpretation for all six categories of services is the subject of Chapter 6. The last Chapter, 7, finalises the study by providing a summary and by dealing with the drawing of conclusions and making recommendations. References and appendices follow thereafter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review includes three parts, (i) an explanation of the central place theory, (ii) a discussion of the application of the theory in different parts of the world, particularly in Zambia, and (iii) an overview of rural development strategies used in Africa with special reference to Zambia.

2.2 The Central Place Theory

Walter Christaller (1966) published a book in which he attempted to demonstrate a sense of order in the spacing and function of settlements. His suggestion was that there was a pattern in the distribution and location of settlements of different sizes and also in the ways in which they provided services to the inhabitants living within their sphere of influence. Christaller termed such settlements as central places (regardless of the level of the service provided). His theory was based upon studies done in southern Germany and this work has contributed a great deal to the search for order in the study of settlements (Waugh, 1995).

The centrality of a place refers to its functional importance. This depends on the number and variety of goods and services it provides for the people who live there, and the area around it. A central place may therefore vary in size from a small village to a conurbation or primate city and it also forms a link in a hierarchy (Carr, 1997).

Christaller (1966) had two principles underlying his theory, the range and the threshold of goods and services. The range of a good or service is the furthest distance measured in time and cost over which either a customer would be prepared to travel to obtain it or a supplier travel to provide it (Carr, 1997). It is dependent upon the value of the goods, the length of the journey and the frequency that the service is needed. The range of a good and service is illustrated in Figure 1.

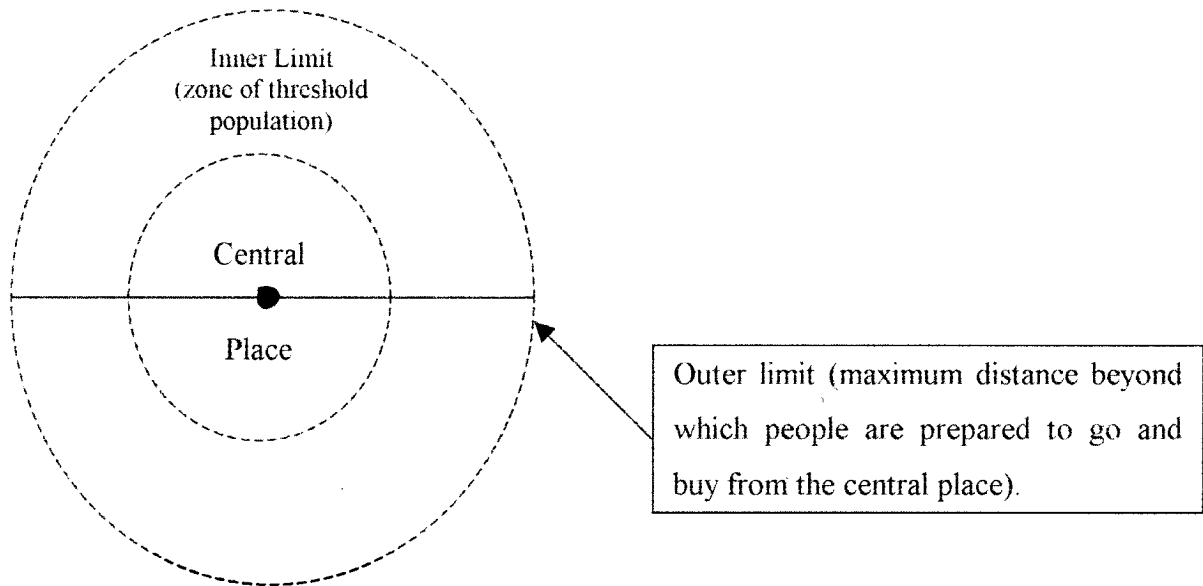


Figure 1. The range of a good or service (after Munyowenu, 1996).

The thresholds of a good or service is the minimum number of people needed to support it. The frequency with which a good or service is required and its cost determine the size of the threshold needed to support one outlet.

2.3 The Central Place Hierarchy and Classification of Settlements

Within any region the hierarchy of central places can be established by classifying each central place according to the highest order service it supplies. At the top of the hierarchy will be the largest central place in a region, with a catchment area not only large enough to support more than one outlet for all the order of goods and services present in a center smaller than itself, but also at least one outlet for each of the higher goods and services not present in these smaller centers. Below this leading central place, the hierarchy progressively descends to the lowest order. It follows that at each level in the hierarchy, a central place will support an order of outlet not present in the central places of lower levels and also all the types of outlet evident in these smaller central places (Carr, 1997).

By arranging the hexagons in different ways, Christaller (1966) was able to produce three different patterns of service or trading areas. He called these $K=3$, $K=4$ and $K=7$, where K is

the number of places dependent upon the next-higher-order central place. It should be noted that where $K=3$, for instance, the trade area of the third-order (i.e. the highest central place is three times the area of the second order central place, which in turn is three times larger than the trade area of the first-order (lowest) central place. This $K=3$ lattice is an arrangement of central places according to the marketing principle (McBride, 1980). In this situation, Christaller envisaged a hierarchy of central places such that a number of them rose in a geometric progression from the highest to the lowest level. The geometric progression for a $K=3$ situation would, however, involve the following sequence: 1,2,6,18,54,162 and so on.

Christaller (1966) has provided scholars and planners with an objective model with which they can test the real world. The purpose of central place theory is to identify some of the prominent elements in certain types of patterns and some of the factors, which might lie behind them. It is to be taken or understood as one of the tools available when seeking to describe and understand particular patterns in the world. It remains up to the potential user, therefore, to decide whether the theory would be of use in a particular situation or not. The theory has, for example, assisted geographers and planners to locate new services such as retail outlets and roads.

Carr (1997), notes that even when a potential user has identified a region as being amenable to a central place type of analysis, it is important that as analysis proceeds, some of the underlying assumptions made by Christaller should be relaxed to allow the modifying effects of reality to come into play.

2.4.0 Central Place Theory Studies

The first study on central places was done in 1933 by Walter Christaller himself, when he formulated his thesis on the structure of settlements in southern Germany. His “works had little impact in Germany at the time, and it was not until their introduction into the United States in the 1940s and the 1950s that their value was realized” (Haggett, 1983 p. 368). Since then many studies based on his model have been undertaken worldwide.

For measuring centrality Christaller used the number of telephones as an indicator of the range of central goods available in a town. Using telephone data, he defined the centrality of a town

as equal to the number of telephones in the town, minus the town's population multiplied by the average number of telephones per population in the town's complementary region. Later researchers have used different criteria to measure centrality and the model has been further extended and refined to give more realistic representations of the real world complexities of human settlement.

2.4.1 Central Place Studies in Africa

One study, which is worthy of mention, is that done by Grove and Huszar in 1964 as cited by Van den Berg, (1983). It has been identified as a classical central place study in tropical Africa. In the study a functional hierarchy of central places was developed for the whole of Ghana and five levels were distinguished in the central place hierarchy of the country. The five levels were identified by allocating points to the services available in each center.

Abiodun (1967) did a study on urban hierarchy in a developing country. This was done in the Ijebu province of Nigeria. She used the method of principal components analysis to determine the hierarchy. The study identified three classes of central functions out of 28 initial functions covering seven settlements. By this method it was also possible to explore the functional magnitude of settlements, group the settlements and make conclusions.

Henkel, in 1979, did some studies in Kenya where he identified 471 central places in western Kenya. For the central places he produced a correlation matrix of 49 variables which were meant to give information about the services existing in central places and also took account of the significance of the individual central establishment. The principal components analysis method was used, where eight factors were extracted to produce a 'centrality factor.' Factor scores at all central places were finally calculated to depict centrality.

Other studies have been done in several other countries notably Congo, Tanzania, Uganda, Zimbabwe and indeed Zambia, among others.

2.4.2 Zambian Studies

A number of studies have been undertaken in Zambia. Leo Van den Berg (1983) outlines a great variety of such studies ranging from the more academic ones, which sought to explain the evolving and existing system, to planning documents that were of a more prescriptive nature.

Academic studies include one by Siddle (1970, p.277) in which he compared the prevailing "single centre" rural schemes in Zambia with the possibility of developing a "widespread pattern of many nodes". In the comparative study of Mazabuka and Serenje Districts, he identified a naturally evolving system of nodes, which was rather disjunct in Serenje, but more comprehensive and regularly spaced in Mazabuka. He, therefore, proposed that an incremental planning approach be followed as a rationalized version of an already emerging natural growth pattern. This, he argued, would create stronger and more effective service centers.

Jaeger (1988) conducted a study of Kasempa District where he also observed an evolving nodal system and he showed that as a result of various previous influences, the nodal pattern lacked consistency and was incomplete. He pointed out the lack of an intermediate level of service centers between the district capital and the local service centres.

Other works of academic nature were done by Graaf and Wood (1984) in Western province, and by Van den Berg (1983) in Southern Province and particularly in Mpika District of Northern Province. The Mpika case study discussed the system of service centres in the district in order to establish the spatial relationship between government and private services. The author also discussed the dynamics of the central place system in the district both historically and in terms of future possible trends.

The planning documents on the other end include the work of Doxiadis Associates entitled 'Organising the Countryside' which was conducted in 1967 and 1969. It dealt with all the service centres in Zambia, proposing a three-stage hierarchy of villages, rural townships and market towns. As Van den Berg (1983) rightfully argues, it appears that the plans for new service centres drawn up by Doxiadis were of little or no use as they were very general.

In Southern Province, a study was done by German consultant known as the Gesellschaft fuer Regionale Strukturentwicklung [G.R.S.] (1971). The study started with a survey of the existing distribution of services and then suggested an improved hierarchy of service centres. An analysis of the existing level and future prospects for the agricultural, industrial and service development was made. Indices of centrality were compiled for each settlement to identify the nature of the system of service centres operating in the province and 56 centres were identified. In the planning proposals, the existing system of central places was upheld apart from recommending the addition of certain functions up to an 'optimal' standard. The study accepted the actual distribution but no areas were identified of places deprived of services and no proposals were made for re-grading of certain centers or the establishment of new ones.

The Department of Town and Country Planning Research Unit [DTCPRU] (1973) did some work in Central Province. In this work, the grading of the existing service centers was undertaken and proposals for a hierarchy of nucleated service centers were formulated. To identify existing central places, four types of central facilities were used namely education, health, administration and marketing; and a point system was employed to distinguish the four categories of central facilities. This led to the identification of 289 service centers and four grades of centers were distinguished. The characteristics and distribution of these service centres were then discussed and an assessment of their adequacy was also done. Suggestions were made to improve and strengthen the system of service centres. This was to be done by upgrading a number of existing centres, selected on the basis of 'growth potential.' The study also formulated standards of service provision.

2.5 An Overview of Rural Development Strategies

Hill and Thomsen (2001), quoting Ellis and Biggs, outline an overview of the evolution of rural development in Africa from the 1960s to date. The 1960s are characterized as the era of modernization, the 1970s as state intervention, the 1980s as market liberalization and the 1990s as participation and empowerment. Ellis and Biggs further contend that there have been two major paradigm shifts in the application of rural development strategies. Firstly, the mid 1960s emphasized the role of small farms as the solution for growth and development. The second shift was the 1980-1990 change from the top down autocratic approach to rural development,

characterized by external technologies and national-level politics, to the bottom up, grassroots or 'process' approach. The latter approach sees rural development as a participation process that empowers rural dwellers to take control of their own priorities for change.

A schematic outline of the sequence of phases in rural development practice in low-income countries occurring as a series of overlapping transitions has been identified by Hill and Thomsen (2001, p. 14) as follows, "... from community development (1950s) to the emphasis on small-farm growth (1960s); to continuing small-farm growth within integrated rural development (1970s); from state-led rural development (1970s) to market liberalization (1980s); to process participation, empowerment and actor approaches (1980s and 1990s); to the emergence of sustainable livelihoods as an integrating framework (1990s); and to mainstreaming rural development in poverty reduction strategy papers (2000s)."

Cleaver (1997) identifies six early strategies used by developing countries for dealing with rural development. These include Integrated Rural Development Programs (IRDP) which provided investment needed for development in a specific region within a country; Single Crop Development Projects undertaken for specific crops; Agricultural Credit Projects managed by government owned parastatal banks using donor loaned funds; Free-Standing Agricultural Services for agricultural research or livestock services; Irrigation Projects in arid or low-rainfall areas; and Rural Schools and Health Facilities meant to construct schools and health facilities.

The majority of the projects, with of course a few exceptions, were generally unsuccessful. Cleaver (1997) blames this failure on a number of factors including policy deficiencies, failure to have projects embedded in indigenous institutions, poor coordination, inefficient management practices and corruption among others.

These failures prompted the need for change in approach thus some projects were phased out and there has been adoption of new strategies. These have seen the inclusion of issues such as the use of government line agencies over project management units; integrated decentralized planning as outlined by Singh and Singh (1988); local rather than expatriate management, and a national orientation rather than a regional or commodity focus. Economic and agricultural

policies were designed to encourage private sector development, market development, reduction of price distortion, and market deregulation.

The merits and demerits of the new strategies are also currently being assessed to see how far they are effective in bringing development.

CHAPTER THREE

GEOGRAPHICAL SETTING OF THE STUDY AREA

3.1.0 Situation

The study area (Figure 2) comprises the entire rural expanse of Mwense district extending over an area of 6,718 sq. Km. Mwense extends from longitude 28°30´ east to 29°30´ east and stretches over a degree of latitude from 10° to 11° south of the equator.

The district, whose center is located 110 km north of the provincial headquarters, Mansa, shares boundaries with Kawambwa district to the north, Luwingu district to the east, Mansa district to the south, and an international boundary with the Democratic Republic of Congo, to the west, in the form of the Luapula River.

3.1.1 Physical Features

In terms of relief, the study area is broadly divided into three geological features namely the Mbala–Kawambwa Plateau (hereafter referred to as the Plateau), the Mweru Depression (hereafter referred to as the valley), and the Muchinga Escarpment. The plateau forms the eastern part of the district rising from 1250 m to 1500 m above mean sea level.

Drainage is primarily provided by the Luongo River, which together with numerous other streams, flows into the Luapula River. The Luongo River also forms Musonda Falls on the southern end of the district, a source of hydro electric power for some parts of Luapula Province.

The valley forms the eastern part of the district covering the area between the escarpment and the Luapula River. At its lowest, it lies at 918 m above mean sea level and at about 1100 m at the foot of the Muchinga Escarpment (Mwense District Development Coordinating Committee, [MDDCC], 2003). The Muchinga Escarpment is a narrow strip of steep slopes rising from 1100 m in the valley to 1250 m on the plateau. It separates the two main landforms mentioned above.

3.1.2 Climate

Mwense receives rainfall ranging between 1000 mm and 1500 mm per year. Rains start in early November and have a climax occurring in January and February. Little or no rain is received in April, which marks the end of the rainy season. The plateau area experiences humid climate with a mean annual rainfall of 1,200 mm being part of the high rainfall zones in Zambia. The valley climate is described as sub-tropical with a mean annual temperature of 25 degrees celcius (Mwense District Development Coordinating Committee, [MDDCC], 2003).

3.1.3 Cultural Aspects

Mwense has a population of 105,759 people (52,479 male and 53,280 female) located in one township and 368 villages (Central Statistical Office [CSO], 2001). The villages are found in seven Chiefs' areas namely Chief Kashiba, Chief Mulundu, Chief Mutipula, Chief Lubunda, Chief Lukwesa, Chief Katuta and Chieftainess Mwenda. The district population density stands at 16 people per sq. km. The population is quite youthful with 58 per cent of the total being between 0-14 years old. It must be noted that population densities on the plateau are lower than those in the valley.

Economic activities in the district include, apart from tertiary ones, farming, fishing, making of traditional crafts such as baskets, reed mats, straw hats and other items, and trading. Though trade is mostly done on cash basis, the barter system of exchange is still important. There is also some hunting done on the plateau area but this is on a very small scale. These agrarian, fishing, traditional crafts industry and trading activities have provided the purchasing power and service needs of the rural communities.

3.2 Choice of Study Area

Mwense district was chosen to be the area of study for the following reasons:

- i. The district can be taken to represent a unique rural district reflecting low income and sparse population hence problems of service provision can clearly be seen.
- ii. Established as a separate district from Kawambwa on 1 January 1978, Mwense appears to lag behind the other already established districts in terms of development in the province. The district's capacity to handle development projects is only at level II according to Zambia Social Investment Fund (ZAMSIF) 2004 assessment, and it lacks many of the major services found in the other districts in the province.
- iii. Service center related studies have been done in most other provinces but nothing unique or specific to Luapula has so far been done.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

The study is based on data collected from the District headquarters and villages in Mwense. The study area was visited during the months of April and May in 2005. The fieldwork lasted two months. In conducting the field survey the researcher was assisted by two research assistants, an A-Level Geography student and teacher trainee and a school leaver. In the field much time was spent on making an inventory of services and goods provided in different villages. A questionnaire (Appendix A) meant to acquire an aspect of customer behaviour was also administered to 75 household heads across the district.

4.2 Data Collection

Data were collected on the basis of the type of services provided. Thus six categories were identified namely education, health, transport and communication, trade and commerce, agriculture and administration.

4.2.1 Secondary Sources

Data on education were collected in the form of the numbers of all types of schools currently existing in the district. These lists were obtained from the District Education Board Secretary's Office. Data on medical facilities, which included the number and various levels of rural health centers and health posts, were obtained from the District Health Management Board. The information collected included location of the service outlets concerned. The District Council provided information pertaining to the available numbers and location of facilities including council markets, retail shops, market stalls, liquor stores, wholesalers and grinding mills. These lists, however, only included facilities that were licensed by the Council. The Council also provided information about the road network and bus stops in the district. The Post Office supplied information about the location of postal services in the district and logistical problems encountered in the operations of the office. Data on agriculture relating to the provision of

extension services and co-operative societies were made available by the district office of the Ministry of Agriculture and Cooperatives. Information about administration was obtained from the office of the District Commissioner, the District Council, the Police and Courts.

An inventory was made of all facilities of various categories of services provided after field visits that verified information on various aspects obtained from various district offices (See Appendix B). Information for education, agriculture, health, judiciary, transport and communication was accurate as these outlets on the ground agreed with the supplied information. However, for trade and commerce, a few discrepancies were found, as there were a number of retail shops that were in full operation but were not captured by the Council. These were included in the inventory since they were fully functional. These included shops at Kapena, Mulonga, Kanyemba and Mutima.

Census data providing population figures and census maps were obtained from Central Statistical Office (CSO). Population figures were obtainable down to Standard Enumeration Area (SEA) level and in cases where it was difficult to get the actual population for a particular village or settlement, recourse was made to village registers kept by the village headmen. This was in particular the case with Lwanda village in Chief Mwenda's area. The Ministry of Health also provided population figures based on 2000 population census, which were useful for comparison and verification's sake.

In conducting the field trip and making the inventory, topographical maps for the district obtained from the Surveyor General were used. These, however, being largely outdated, only provided a starting point in locating outlets and villages. Census maps for the 2000 Census of Population and Housing provided more accurate information about location of services.

These, together with various National Development Plans, the District Situation Analysis document among others made up the secondary sources of data. The field survey served the purpose of producing the inventory of service outlets and verifying map information.

4.2.2 Primary Sources

Interviews with government officials in the concerned ministries, district council officials and the Sub-Planning Committee of the Mwense District Development Coordinating Committee (MDDCC) provided an insight in the locational priorities followed when deploying services and the difficulties encountered including levels of accessibility to the goods and services provided. These interviews were in the form of non-scheduled structured format (Appendix F).

In an endeavour to have a component on customer behaviour thus avoiding misleading results, to help substantiate the gaps identified through data analysis and also provide background information useful for explaining the district structure and making recommendations, questionnaires were administered to a sample of 75 household heads in the district.

To obtain the sample, the multistage sampling technique was employed. To begin with, the district was divided into the seven Chiefs' areas namely Kashiba, Katuta, Lubunda, Lukwesa, Mulundu, Mutipula and Mwenda. This constituted the first population from which a random sample of three areas was drawn using the lottery method. The three Chiefs' areas chosen were Katuta, Mwenda and Lukwesa.

In each of these three areas villages were listed. Each list corresponded to a sub-population of villages from which a random sample of villages was selected. The villages chosen from Katuta Chiefdom include Chisokobwe, Katuta, Tangwa, Kabuunda and Musaalula (Mweshi). Mwenda Chiefdom had Lwanda – Luminu, Bunda Chunsu, Chikaya, Mwenda (Ntondo-Mukangwa) and Kamani. In Lukwesa Chiefdom the villages picked were Kasonge, Chilolo (Kawama), Muna (Lukwesa), Kapamba and Chibunse (Kapena).

Lastly, from each of the 15 villages, which constituted the sample of villages, a list of households was drawn. These lists were obtained from village headmen. From each list a random sample of five households was drawn and this amounted to the total sample of 75 households. All the 75 household heads were interviewed using a questionnaire.

A sample of 75 respondents out of the total district household head population was chosen to reduce the cost of compiling long lists of the total population, and also to reduce travel

expenditure as respondents were spread over a large area. Thus the multiphase sampling method was employed. This method, according to Bless and Achola (1990) can cut down expenses because a higher number of respondents would mean high travel costs and great loss of time. The cluster sampling, by selecting only a few geographical areas (in this case three chiefs' areas) reduced travel costs and time and also allowed for careful planning of the data collecting process.

CHAPTER FIVE

DATA ANALYSIS

5.1.0 Identifying Service Centres

A service center or central place is a settlement that provides goods and services for the population living in the settlement and for the population in the surrounding area (McBride, 1980). Van den Berg (1983) identifies that the site that has been chosen by a supplier of goods and services as an outlet, whether permanent or temporary, can be termed a central place. Service centers are an intrinsic and important factor in development. They act as growth centers – places where innovation and other ingredients will be channeled to surrounding areas.

To prove the central places existing in Mwense, a multiple – variable technique was used which involved consideration of six types of central functions or indicators as follows:

- (i) Education (Community, Basic and High Schools of all types).
- (ii) Health (Rural Health Centres of all levels, Rural Health Posts and Ambulance Services).
- (iii) Transport and Communication (Types of Road Links, Bus Stops, Post Offices, Postal Agencies and Stamp Vendors).
- (iv) Trade and Commerce (Council Markets, Wholesalers and Retail Shops, Liquor Stores, Market Stalls and Grinding Mills).
- (v) Agriculture (Extension Services Camps and Cooperative Societies) and
- (vi) Administration (Police Stations or Police Posts, Magistrate Courts, and Local and Circuit Courts).

It has been assumed that a settlement having a facility or more from any of the six categories listed above and functioning to cater to the needs of the surrounding area is identified as a service center.

As a result, out of 368 settlements, 75 have been identified as service centers. These are shown in Figure 3. The number constitutes 20 percent of the total number of settlements in the entire area of study. These service centers are associated with distinct services of particular magnitude

making them nodal points that serve not only their own population but also the inhabitants of surrounding areas. This notion has been identified using various phrases such as central place, growth pole or growth center among others. In Zambia, in order to rectify shortcomings of previous development policies, the growth places approach was adopted during the Third National Development Plan (TNDP) and consequent ones (GRZ, 1979).

In this study, the settlement system is considered in relation to the servicing system and its organization. In such a situation, “service centres serve as a catalyst for the spreading of innovations of development – the nerve or nodal point in injecting transformation energy in the rural areas,” (Singh and Singh, 1988 p. 331). These centers, as a result, enable people to exercise control from the central place (administration), have a center of exchange of goods (marketing), and process resource materials efficiently (manufacturing). Exercise of control and exchange of goods are identified as the primary functions of service centers and it is in this context that the service center system is discussed here.

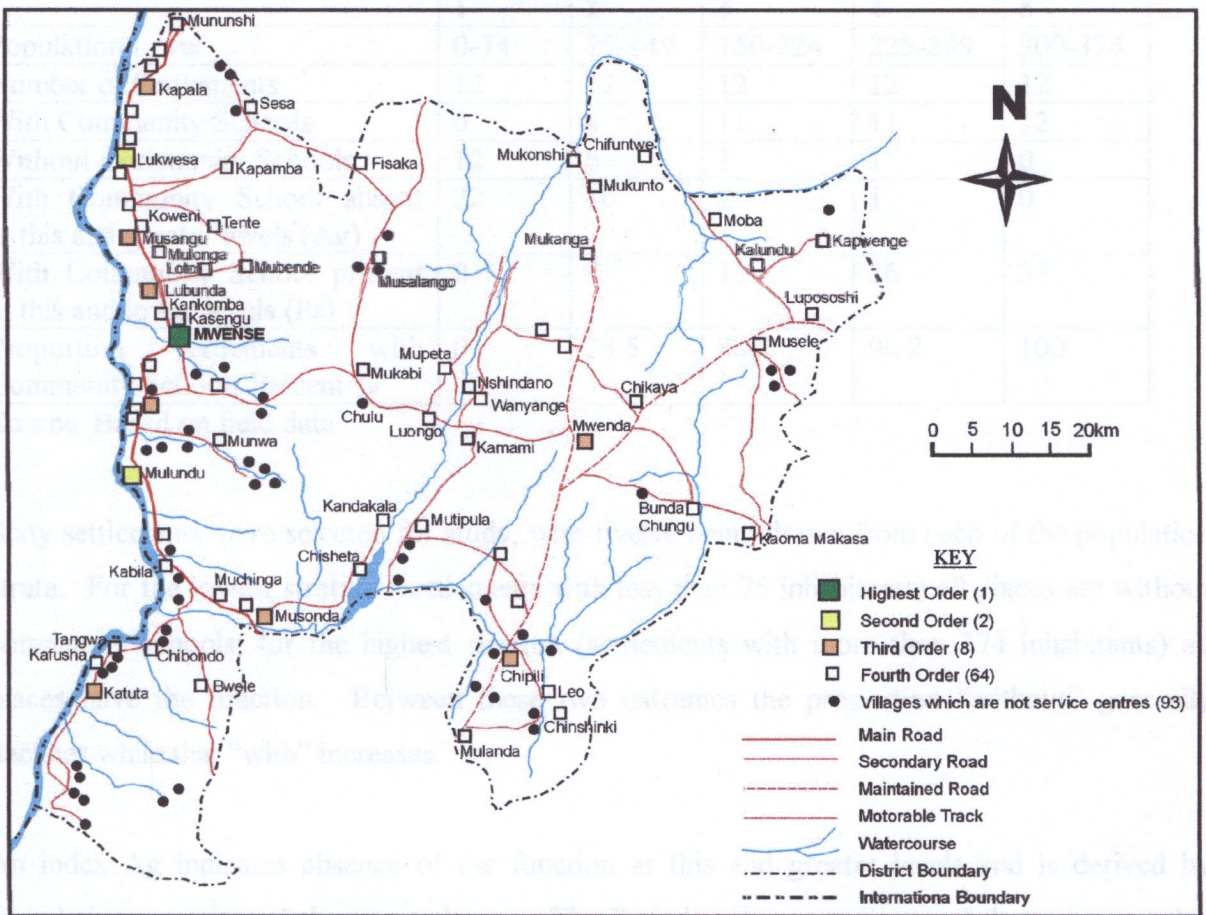


Figure 3: Service Centres in Mwense District

5.1.1 The Hierarchy of Service Centres

Service centers have been identified in reference to their particular individual functions and the functional magnitude. To achieve this, twenty four functions were used and their score values determined. Score values were determined on the basis of the level of functional hierarchy, which was determined and identified using threshold population of functions. The Reed Muench method (Haggett and Gunawardena, 1964) was applied to derive the population threshold.

5.1.2 Determination of Median Population Threshold PT_{50} for Selected Functions/Services in Mwense District.

Table 1 Determination of Median Population Threshold for Community Schools in Mwense District

	1	2	3	4	5
Population Level	0-74	75-149	150-224	225-299	300-374
Number of Settlements	12	12	12	12	12
With Community Schools	0	4	11	11	12
Without Community Schools	12	8	1	1	0
With Community School absent at this and greater levels (Ag)	22	10	2	1	0
With Community School present at this and lower levels (Ps)	0	4	15	26	38
Proportion settlements with Community Schools Present %	0	28.5	88.2	96.2	100

Source: Based on field data

Sixty settlements were selected for study, with twelve being drawn from each of the population strata. For the lowest stratum (settlements with less than 75 inhabitants) all places are without community schools; for the highest stratum (settlements with more than 374 inhabitants) all places have the function. Between these two extremes the proportion "without" generally declines while that "with" increases.

An index Ag indicates absence of the function at this and greater levels and is derived by cumulative summing of the two columns. The Ps index shows presence of the service at this

and smaller levels and is also derived by cumulative summing of the two columns in the opposite direction. Thus using these indices a final value is computed of the proportion of settlements with the function at each of the five population levels using the formula $\frac{100 \times Ps}{Ps + Ag}$

Table 1 shows that for settlements from the second stratum (with population between 75 and 149) only 28.5 per cent had community schools but that for the third stratum (with population between 150-224) the proportion has risen to 88.2 per cent. The median value lies somewhere between these values and its exact position of the 50 per cent point has been estimated by:

$$\frac{50 - 28}{88 - 28} = \frac{22}{60} = 0.36$$

The median value lies 36 per cent of the distance between the mid-point of stratum 2 and stratum 3. With an interstratum distance of 75 inhabitants the median value is

$$112 + 0.36 (75) = 139 = PT_{50}$$

Note that 112 is derived by summing up the mid-point values of the two population strata 2 and 3 (which is 37) and the intrastratum distance of 75.

Thus $75 + 37 = 112$

Therefore, the median population for community schools is a settlement with about 139 inhabitants. The value for PT_{50} has also been obtained graphically by plotting the values of Ag and Ps from Table 1 on the same set of axes as shown in Figure 4. The value is obtained where the curves for the two parameters cross – that is at the population value at which the number of settlements without the service at this and smaller sizes is equal to the number of settlements with that function at this and greater sizes.

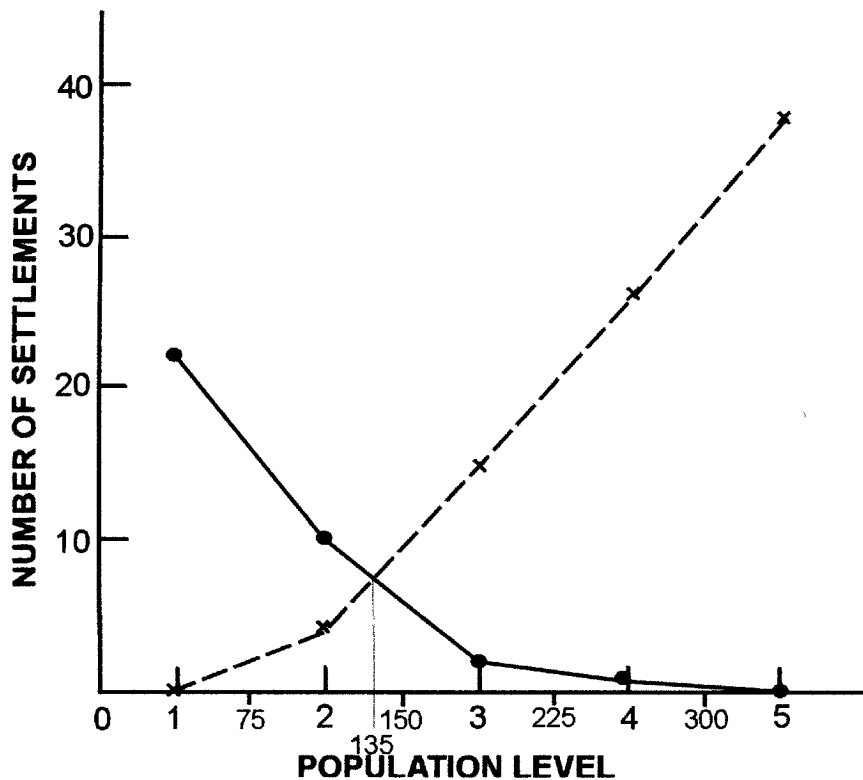


Figure 4: Median Population Threshold for Community Schools in Mweruse District

Table 2 Determination of Median Population Threshold for Agricultural Extension Services Camps in Mweruse District

	1	2	3	4	5
Population Level	0-749	750-1,499	1,500-2,249	2,500-3,249	3,500-3,999
Number of Settlements	6	6	6	6	6
With Agriculture Camps	0	6	6	4	6
Without Agriculture Camps	6	0	0	2	0
With Camps absent at this and greater levels (A)	8	2	2	2	0
With Camps present at this and lower levels (P)	0	6	12	16	22
Proportion settlements with Camps Present (%)	0	75	85	88.8	100

Source: Based on field data

$$PT_{50} \text{ (Median Population Threshold)} = \frac{50 - 00}{75 - 00} = \frac{50}{75} = 0.66$$

$$\text{Thus } 375 + 0.66 (750) = 870 = PT_{50}$$

The median population for agriculture camps is a settlement with population of about 870 inhabitants. This is graphically illustrated in Figure 5.

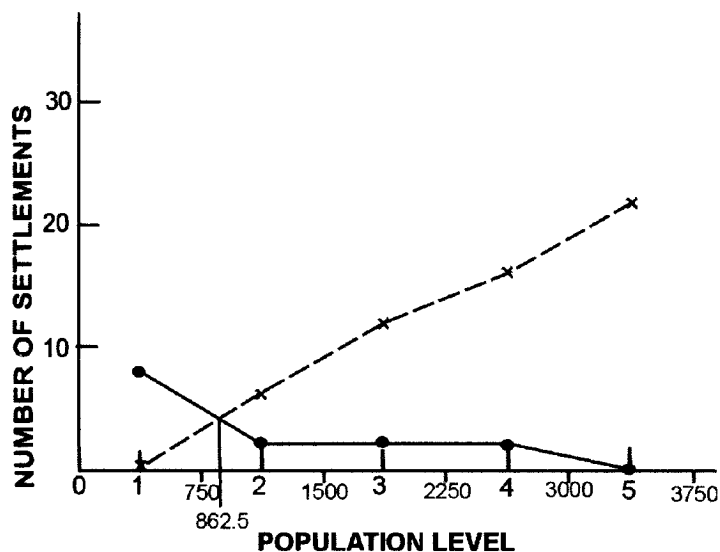


Figure 5: Median Population Threshold for Agriculture Camps in Mwense District

Table 3 Determination of Median Population Threshold for Rural Health Centres in Mwense District

	1	2	3	4	5
Population Level	0-999	1000-1999	2000-2999	3000-3999	4000+
Number of Settlements	12	12	12	12	12
With Rural Health Centres	0	1	7	2	12
Without Rural Health Centres	12	11	5	10	0
With Centres absent at this and greater levels (Ag)	38	26	15	10	0
With Centres present at this and lower levels (Ps)	0	1	8	10	22
Proportion of Settlements Centres Present (%)	0	37	34.8	50	100

Source: Based on field data

$$\text{Median Population Threshold (PT}_{50}) = \frac{50 - 50}{100 - 50} = \frac{0}{50} = 0$$

$$\text{Thus } 3,500 + 0 (1000) = 3,500 = \text{PT}_{50}$$

The median population threshold (PT₅₀) for Rural Health Centres and Health Posts is a settlement with about 3,500 inhabitants. This has also been graphically illustrated as shown in Figure 6.

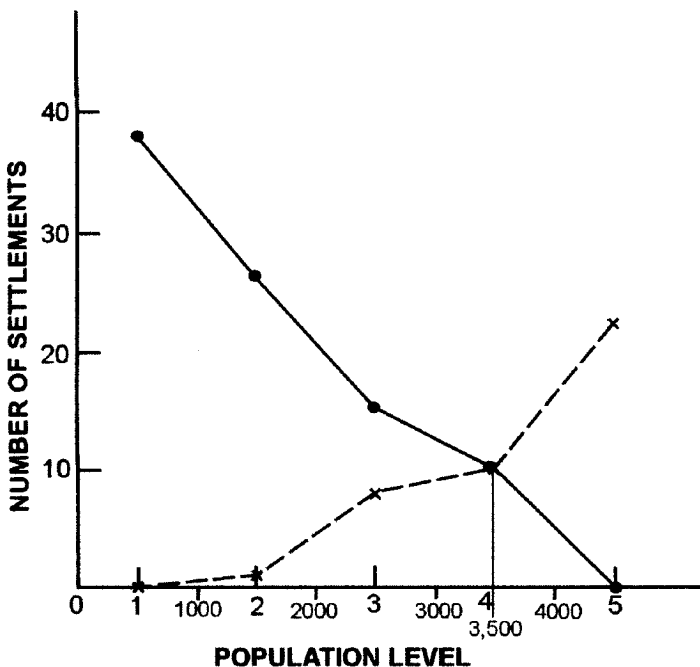


Figure 6: Median Population Threshold for Rural Health Centres in Mwense District

Table 4 Determination of Median Population Threshold for Retail Shops and Council Markets in Mwense District

	1	2	3	4	5
Population Level	0-999	1000-1999	2000-2999	3000-3999	4000+4999
Number of Settlements	5	5	5	5	5
With Retail Shop and Market	0	1	5	3	5
Without Retail Shop or Market	5	4	0	2	0
With services absent at this and greater levels (Ag)	11	6	2	2	0
With services present at this and lower levels (Ps)	0	1	6	9	14
Proportion of Settlements with services present %	0	14	75	82	100

Source: Based on field data

$$\text{Median Population Threshold (PT } 50) = \frac{50 - 14}{75 - 14} = \frac{36}{61} = 0.59$$

Thus $1,500 + 0.59 (1000) = 2,090$

The median population threshold for both retail shops and council markets (which are found in the same settlements) is a settlement with about 2,090 people. This has also been worked out graphically as shown in Figure 7.

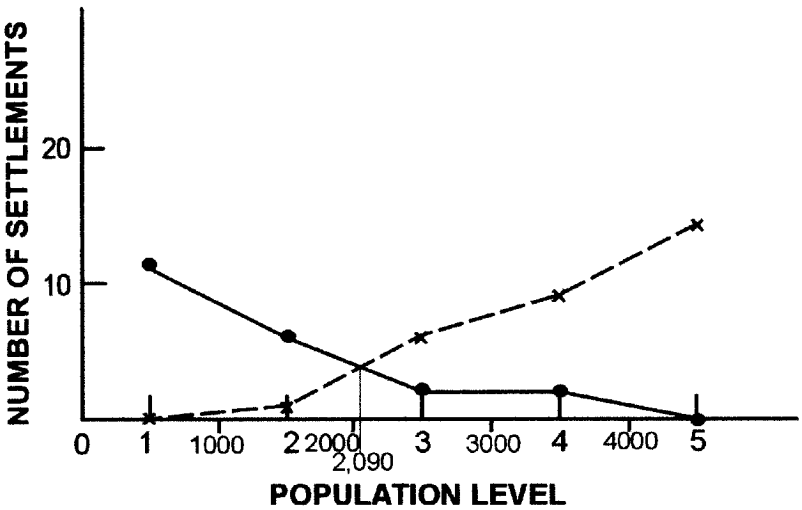


Figure 7: Median Population Threshold for Retail Shops and Council Markets in Mwense District

Table 5 Determination of Median Population Threshold for Local Courts in Mwense District

	1	2	3	4	5
Population Level	0-749	750-1499	1500-2249	2500-3249	3250-3999
Number of Settlements	5	5	5	5	5
With Local Courts	0	2	3	3	5
Without Local Courts	5	3	2	2	0
With Local Court absent at this and greater levels (Ag)	12	7	4	2	0
With Local Court present at this and lower levels (Ps)	0	2	5	8	13
Proportion of Settlements with Local Court Present %	0	22	55	80	100

Source: Based on field data

$$\text{Median Population Threshold (PT 50)} = \frac{50 - 22}{55 - 22} = \frac{28}{33} = 0.84$$

$$\text{Hence } 1,125 + 0.84 (750) \Rightarrow 1,125 + 630 = 1,755$$

The median population for local courts is a settlement with about 1,755 inhabitants. This PT 50 value has also been determined graphically as indicated in Figure 8.

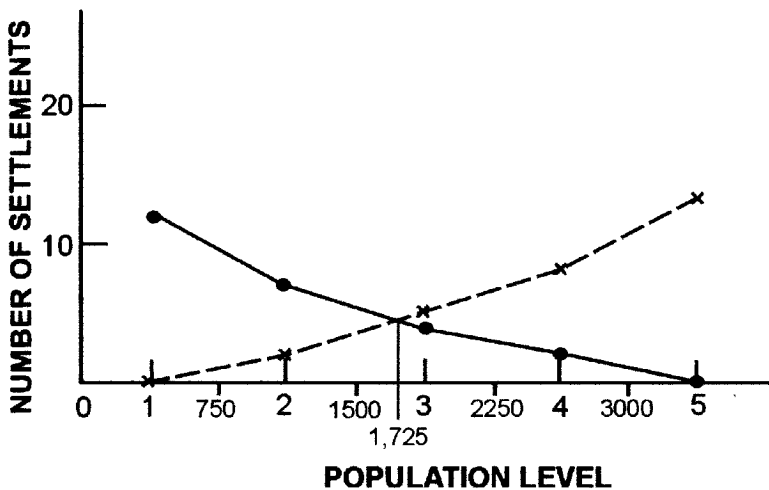


Figure 8: Median Population Threshold for Local courts in Mwense District

Table 6 Determination of Median Population Threshold for Bus Stops in Mwense District

	1	2	3	4	5
Population Level	0-999	1000-1999	2000-2999	3000-3999	4000-4999
Number of Settlements	5	5	5	5	5
With Bus Stops	0	1	2	3	5
Without Bus Stops	5	4	3	2	0
With Bus Stops absent at this and greater levels (Ag)	14	9	5	2	0
With Bus Stop present at this and lower levels (Ps)	0	1	3	6	11
Proportion of Settlements with Bus Stops present %	0	10	38	75	100

Source: Based on field data

$$\text{Median Population Threshold (PT 50)} = \frac{50 - 38}{75 - 38} = \frac{13}{38} = 0.34$$

Hence $2,500 + 0.34 (1000) = 2,840 = \text{PT50}$

The median population for bus stops is therefore a settlement with a population of 2,840 inhabitants as illustrated in Figure 9 as well using the graphical method.

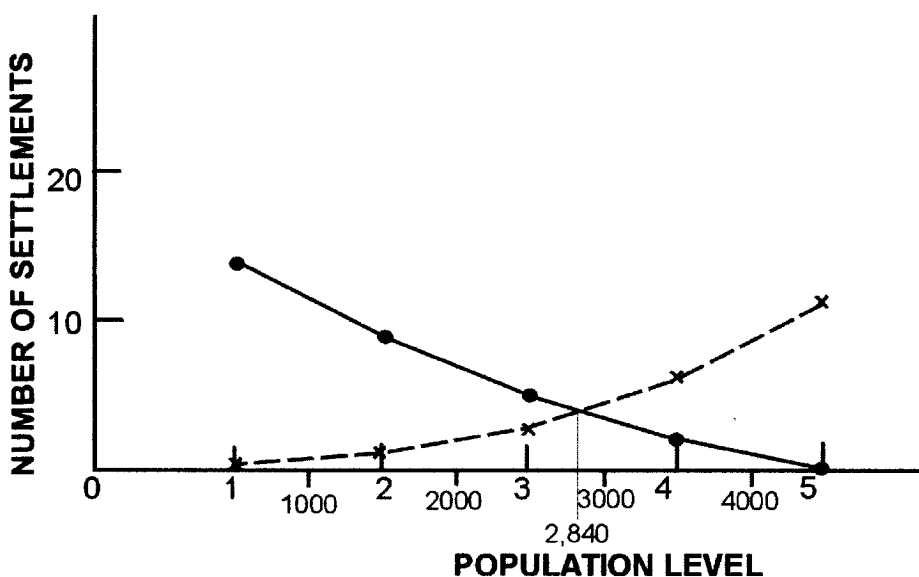


Figure 9: Median Population Threshold for Bus Stops in Mwense District

Table 7 Determination of Median Population Threshold for Co-operative Societies in Mwense District

	1	2	3	4	5	6
Population Level	0-99	100-199	200-299	300-399	400-499	500-599
Number of Settlements	10	10	10	10	10	10
With Cooperative	0	0	0	8	10	10
Without Cooperatives	10	10	10	2	0	0
With cooperatives absent at this and greater levels (Ag)	32	22	12	2	0	0
With cooperatives present at this and lower levels (Ps)	0	0	0	8	18	28
Proportion of Settlements with Cooperatives present %	0	0	0	20	64	100

Source: Based on field data

$$\text{Median Population Threshold (PT}_{50}) = \frac{50 - 20}{64 - 20} = \frac{30}{44} = 0.68$$

$$\text{Hence } 500 + 0.68 (100) = 506.8 = 507$$

Thus the median population for cooperative societies is a settlement with about 568 inhabitants.

Table 8 Determination of Median Population Threshold for Basic Schools in Mwense District

	1	2	3	4	5
Population Level	0-199	200-399	400-599	600-799	800-999
Number of Settlements	10	10	10	10	10
With Basic Schools	0	7	4	7	10
Without Basic Schools	10	3	6	3	0
With Basic Schools absent at this and greater levels (Ag)	22	12	9	3	0
With Basic Schools present at this and lower levels (Ps)	0	7	11	18	28
Proportion of Settlements with Basic Schools Present %	0	37	55	87	100

Source: Based on field data

$$\text{Median Population Threshold (PT}_{50}) = \frac{50 - 37}{55 - 37} = \frac{13}{18} = 0.70$$

$$\text{Hence } 500 + 0.7 (200) = 640 = \text{PT}_{50}$$

The median population for basic schools is therefore a settlement with about 640 inhabitants.

The population threshold is “defined as the minimum number of consumers required to support a given service and is identical with the classical concept of the lower limit of a good,” (Singh, 1976 pp. 177-78). This is because functions differ in terms of the size of the population necessary to sustain that function. For functions whose numbers were too few to apply the Reed Muench method, the Statistical Median was used to determine population thresholds. It

has been used with higher order functions, this being appropriate because the method suffers from over estimation of the value in the case of lower order functions (Singh, 1994).

5.1.3 Determination of Median Population Threshold by Statistical Median Method.

Higher Order Services

For higher order services where only one facility is present in the whole district, the population of the settlement where it is found is automatically taken to represent the threshold population. Services in this category include Grade I High School, Post Office, Wholesalers, Police Station and Magistrate Court. All these are located in Mwense hence the threshold population taken is 8,518. Thus the threshold population for such services is a settlement with about 8,518 inhabitants.

Table 9 Determination of Median Population Threshold for Grinding Mills in Mwense District

Number	Settlement	No. of Functions	Population
1	Mwense	7	8,518
2	Lukwesa	2	5,741
3	Musonda	2	3,212
4	Musangu	1	4,967
5	Kashiba	1	3,967
	Total	13	25,495

Source: Based on field data

Thus 25,495 the total population is divided by the number of functions (13) to give a threshold population for grinding mills of 1,961.

Table 10 Determination of Median Population Threshold for Stamp Vendors in Mwense District

Number	Settlement	Population
1	Chibondo	525
2	Mumpolokoso	908
3	Kashiba	342
4	Kamami	367
5	Musalango	401
6	Lwamfwe	649
7	Kawama	382
8	Musungampashi	355
Total		3,929

Source: Based on field data

The threshold population for stamp vendors has been derived by dividing the total population of the eight settlements that have the service by the total number of settlements ($3,929 \div 8 = 491$). Thus the threshold population for stamp vendors is a settlement with 491 inhabitants.

Table 11 Determination of Median Population Threshold for Liquor Stores in Mwense District

Number	Settlement	Population
1	Mwense	8,518
2	Lukwesa	5,741
3	Mulundu	5,123
4	Musangu	4,057
5	Kashiba	3,967
6	Musonda	3,212
7	Chipili	2,061
Total 46		32,679

Source: Based on field data

The total population of the seven settlements with liquor stores (32,679) is divided by the number of settlements (seven) to derive the threshold population for liquor stores. This is calculated to be 2,971 inhabitants.

Table 12 Determination of Median Population Threshold for Market Stalls in Mwense District

Number	Settlement	No. of Functions	Population
1	Mwense	19	8,518
2	Lukwesa	10	5,741
3	Kapala	8	5,074
4	Musangu	4	4,057
5	Musonda	3	3,212
6	Kashiba	2	3,967
		Total	30,569

Source: Based on field data

The total population figure for all the six settlements (30,569) is divided by the total number of functions (46) to provide the threshold population for market stall, which stands at 665 (30,569 ÷ 46 = 665).

Thus all settlements having a population that satisfies the population threshold of a particular function should have that function.

Using the threshold populations for the 24 selected functions; these functions were then arranged in descending order. This arrangement of threshold values, illustrated in Table 13, shows clear gaps between the functions, the first gap being found between Magistrate Court and Police Post. The second gap lies between Ambulance Service and Liquor Store. The third gap occurs between Local Courts and Agriculture Extension Services Camps. Thus four levels of functional hierarchy have been identified according to gaps. To account for the differences in the level of function of different settlements each function has been given a unique value (weightage) in relation to the threshold population. The weightage value or score values together with the threshold of population of all the twenty four functions are given in Table 13.

Table 13: Functions, Threshold Populations and Score Values in Mwense District

Serial No.	Function	Population Threshold	Score Value (Weightage)
1.	High School (Grade I)	8,518	4
2.	Post Office	8,518	4
3.	Wholesaler	8,518	4
4.	Police Station	8,518	4
5.	Magistrate Court	8,518	4
6.	Police Post	3,592	3
7.	Rural Health Centre	3,500	3
8.	Rural Health Post	3,500	3
9.	Ambulance Service	3,500	3
10.	Liquor Store (Bar)	2,971	2
11.	High School (Grade III)	2,903	2
12.	Bus Stop	2,840	2
13.	Council Market	2,090	2
14.	Retail Shop	2,090	2
15.	Sub-Post Office	2,061	2
16.	Postal Agency	2,061	2
17.	Grinding Mill	1,961	2
18.	Local Court	1,755	2
19.	Agriculture Camp	870	1
20.	Basic School	640	1
21.	Market Stall	611	1
22.	Co-operative Society	507	1
23.	Stamp Vendor	491	1
24.	Community School	139	1

Source: Based on field data

It can be seen that the functions in Table 13 tend to cluster themselves within clearly defined population size groups and appear to produce four levels of hierarchy. The lowest group with a function is generally found in population size between 100-999 including such functions as

agricultural camps, market stalls, basic schools, co-operative societies, stamp vendors and community schools. The second group appears to be clustering between population size of 1,000 – 2,999, and these include liquor stores, grade III high schools, bus stops, council markets and retail shops. Others are sub-post offices, postal agency, grinding mills and local courts. The third group tends to cluster between 3,000 – 4,000, in which group are found rural health centers and health posts, ambulance services and police posts. The fourth group, which tends to cluster with populations exceeding 4,000, comprises grade 1 high school, post office, wholesalers, police station, and magistrate court. These four clusters are summarized in Table 14 and make up the levels of functional hierarchy. These levels have been quantified by giving an appropriate weightage for each level. The first and lowest level is allotted a score of 1, the second a score of 2, the third 3 and the fourth level a score of 4. Thus all functions in a particular level are taken to have equal importance.

Table 14: Levels of Functional Hierarchy in Mwense District

Functional Hierarchy	Range of Population Threshold	Functional Score	Number of Functions
First level	Above 4,000	4	5
Second level	3,000 – 4,000	3	4
Third level	1,000 – 2,999	2	9
Fourth level	100 - 999	1	6

Source: Based on field data

Table 15: Hierarchy of Settlements in Mwense District

Class	Nomenclature	Score	Number of Settlements
I	District Centre	4	1
II	Sub-District Centre	3	2
III	Central Village Centre	2	8
IV	Service Village Centre	1	64
V	Dependent Village	0	293
Total (All Categories)			368

Source: Based on field data

5.1.4 Determining the Hierarchy of Service Centres

The task here was to assign appropriate weightage to different services so as to determine the functional or centrality score of each service center. Centrality scores have been obtained by multiplying the weightage (score value) allotted to a particular level by the quantity of a particular function at that particular level for each settlement having the function. For instance, Mupeta which has a basic school, a rural health center, an agriculture extension services camp and a circuit court, has been allocated a centrality score of 07. The service center only has one facility of each function thus each quantity, i.e. 1, is multiplied by the score value of the function as follows: Basic School $1 \times 1 = 1$; Rural Health Centre $1 \times 3 = 3$; Agriculture Extension Services Camp 1×1 and circuit (mobile) court $1 \times 2 = 2$. This gives Mupeta a centrality score of $1+3+1+2=7$. In this way, centrality scores have been calculated for all the service centers in Mwense district. The centrality scores and populations of service centers are shown in Appendix C. These scores of service centers in the district structure vary from a minimum of 01 to a maximum of 124.

5.2 The System of Service Centres

The system of service centres in Mwense district is discussed in three parts as follows:

5.2.1 Hierarchy and Function

None of the functions used as indicators occur in 293 settlements. Thirty two settlements have a score of 1 each; eleven have a score of 2 each; four have a score of 3 each; three have a score of 4 each; again three have a score of 5 each; six have a score of 7 each; two have a score of 8 each; only one each has a score of 9, of 10, of 11 and of 15; while two have a score of 18 each, and one each has a score of 21, of 24, of 33, of 36, of 37, of 56, of 63 and of 124 respectively.

Table 15 shows that these settlements fall into five groups, i.e., first, second, third, fourth and fifth order respectively. This classification indicates that the system of service centers in Mwense is hierarchical and there is one place at the highest level, two at the second-highest,

eight at the third level and 64 at the lowest level. Below this are found 293 dependent villages as shown in Figures 10 and 11.

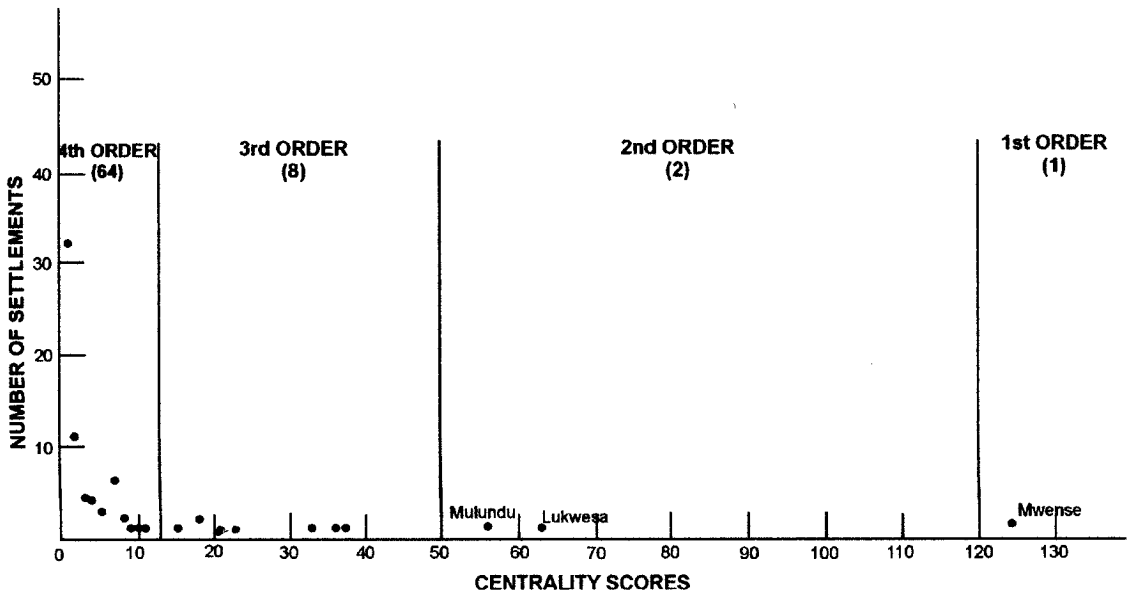


Figure 10: Hierarchical levels of service centres

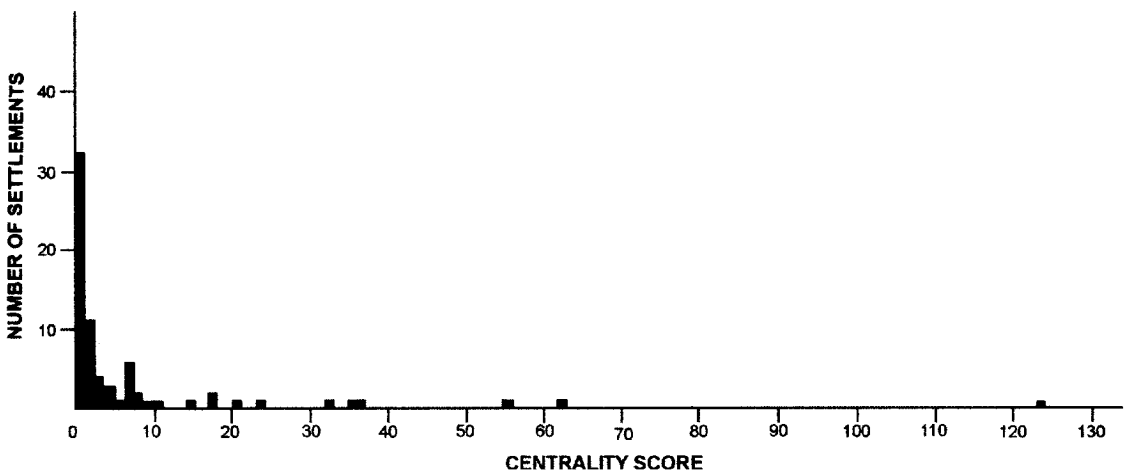


Figure 11: Service centre hierarchy grouped on the basis of a 'Crucial Curve'

The 75 service centers among 368 settlements give a ratio of one center for nearly every four settlements. This gives a rough approximation of a $K=3$ value when classified into four orders. They number 1,2,8 and 64 and this suggests that the role of market functions is evident.

The levels of hierarchy can further be illustrated by identifying characteristic functions associated with each level of settlement hierarchy. To achieve this, one typical settlement is chosen from each level as an example. Table 16 shows a list of typical settlements and the functions associated with the five levels.

Mwense township, the headquarters of Mwense district, is found at the apex of the functional hierarchy, followed by two sub-district centers of Lukwesa and Mulundu in the second order. It will be noticed that Mwense Township enjoys some considerable level of prominence. The third order consists of eight centers including Kapala, Musangu, Lubunda, Kashiba, Musonda, Katuta, Chipili and Mwenda. All of them, except Kapala, Chipili and Musangu are chiefs' headquarters. Also apart from Chipili and Mwenda, which are found on the plateau, all others are located in the valley area, along with the first and second order centers. This situation denotes the lopsided nature of economic development in the district.

Sixty-four (64) centers make up the fourth and lowest order of service centers in the district structure. These are characterized by low level functions such as community schools and co-operative societies. They are also the most widely distributed. Almost fifty percent of them are in the valley region and the other half is on the plateau, thus indicating a higher concentration in the valley area since its area is smaller than that of the plateau.

Thus a hierarchy has been identified in the district service center structure fulfilling the first objective of the study. Table 17 gives the distribution of central functions in the district for the year 2005.

Table 16: Typical Settlements and Associated Functions in Mwense District (2005)

Level	Settlement	Functions	Centrality Score
1	Mwense	High School, Basic School Rural Health Centre, Agriculture Camp, Council Market, Retail Shop, Liquor Store, Market Stall Post Office, Magistrate Court Police Station, Bus Stop, Grinding Mill, Cooperative Society, Community School, Local Court.	124
2.	Mulundu	Basic School, Rural Health Centre, Agriculture Camp, Council Market, Retail Shop, Market Stall, Liquor Store, Local Court, Police Post, Bus Stop, Grinding Mill, Cooperative Society, Community School.	56
3.	Lubunda	Basic School, rural Health Centre, Agriculture Camp, Cooperative Society, Retail Shop, Council Market Bus Stop, Local Court, Chiefs' Headquarters.	18
4.	Mulanda	Community School	01
5.	Kalambulwa	No function	00

Source: Based on field data

Table 17: Distribution of Central Functions in Mwense District (2005)

Functions	Number of Functions	Threshold Population
Administration		
1. Police Station	01	8,518
2. Police Post	01	3,592
3. Magistrate Court	01	8,518
4. Local Court	01	1,755
Education		
1. High School (Grade I)	01	8,518
2. High School (Grade III)	02	2,903
3. Basic School	44	640
4. Community School	41	139
Health		
1. Rural Health Centre	18	3,500
2. Rural Health Post	04	3,500
3. Ambulance Service	04	3,500
Commercial		
1. Council Market	10	2,090
2. Wholesaler	03	8,518
3. Retail Shop	77	2,090
4. Market Stall	50	665
5. Liquor Store	11	2,971
6. Grinding Mill	15	1,961
Transport and Communication		
1. Post Office	01	8,518
2. Sub-Post Office	01	2,061
3. Postal Agency	01	2,061
4. Stamp Vendor	08	491
5. Bus Stop	09	2,840
Agriculture		
1. Agriculture Extension Services Camp	23	870
2. Co-operative Society	71	507

Source: Personal Survey in 2005.

5.2.2 Correlation Measure

The Spearman's correlation on the Statistical Package for the Social Sciences (SPSS) software was used to check how far a locational principle was evident in the district structure of service centers. Thus testing the research hypothesis that there was a significant correlation between centrality (the functional importance of a place based on the number and variety of goods and services provided) and population size of settlements in the study area was done.

When locating services it must be noted that they ought to be made available to the greatest number of people and accordingly it follows that settlements with sizeable populations should have a corresponding number or quality of services, whilst those places with smaller populations may be expected to exhibit an absence or reduction in number or quality of these facilities.

The Spearman's correlation coefficient was computed between centrality scores of all the identified service centers, numbering 75 in all and the population sizes of all places respectively. The correlation coefficient has been worked out to be 0.76, reported to two decimal places. It can therefore be reported that there is a statistically significant positive correlation between centrality scores and population sizes ($\rho = 0.76$, $df = 73$, $p < 0.01$). Thus those settlements with the highest centrality scores tend to be those with the highest population numbers. The opposite is also true. As indicated by $P < 0.01$, the probability of achieving this correlation by chance is less than 0.01.

Figure 12 shows a scattergram of the relationship between population sizes and centrality scores. An examination of the scattergram reveals breaks in population size groups and centrality scores, which correspond to, the functional levels of service centers identified in the district structure. The prominence of the district headquarters can also be seen as it stands out from the rest of the settlements.

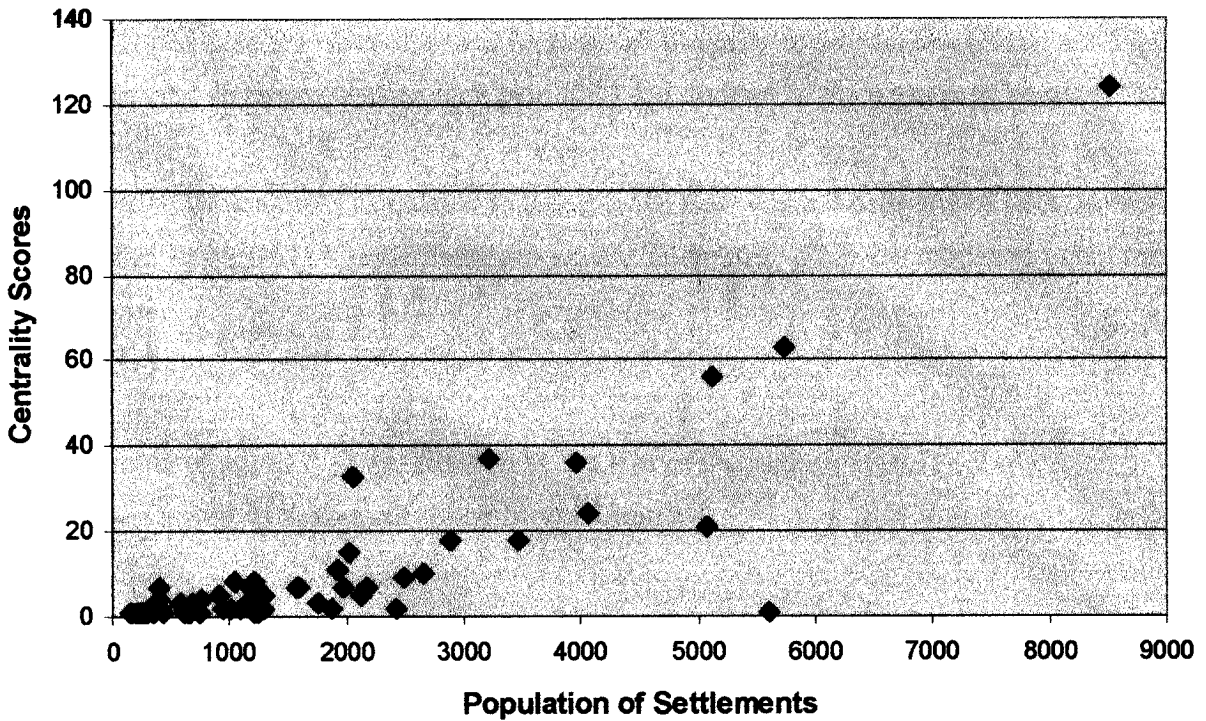


Figure 12: Scatterplot between population sizes and centrality scores

5.2.3 Distributional Pattern of Service Centres

In order to measure the distributional pattern of service centers with a view to determining tendency toward nucleation (clustering) or dispersion, in line with objective number three, the Nearest Neighbour analysis was employed. The service centers in the study area were identified; totaling 75 and each center allocated a number (Appendix D). The nearest

neighbour formula was then applied. The formula being $R_N = \frac{R_o}{R_E}$

Where R_N = the description of the distribution (the nearest neighbour Index)

R_o = mean nearest neighbour distance

R_E = randomness expected.

To find the R_o the formula $D = \frac{\sum d}{n}$ was used

where the straight – line distance between each settlement and its nearest neighbour was measured. In this case the mean distance between all the pairs of nearest neighbour was 5.44 km being the total distance between each pair 408.1 km divided by the number of points (75).

The total area of the map was calculated as being 6,718 Km² while the density of point pattern was calculated to be 0.0111 settlements per square kilometre. This was obtained using the formula $d = \frac{n}{A}$ whereby

the total number of points (75) was divided by the area of the study area (6,718 Km²). Randomness Expected (R_E) was obtained by the formula

$$R_E = \frac{1}{\sqrt{d}}$$

and this was calculated to be 4.74578998. The nearest neighbour statistic R_N value of 1.1462 was obtained.

Using the R_N value, comparison was made with the test statistic obtained as 2.4234 after substituting the formula: $\frac{R_O - R_E}{C}$

The test statistic (c) is a statistical rule that states that positive values of C denote a dispersed pattern whilst negative values of C denote a clustered pattern. Therefore for the data set used for Mwense District (Appendix D), $C = 2.4234$ tells us that the service centers in Mwense district have a dispersed distribution.

The hypothesis was tested at 0.01 level of confidence with $n = 75$, for a dispersed pattern of Nearest neighbour index R_N , (one tailed).

H_0 : The distribution of service centers in Mwense district is significantly random.

H_1 : The distribution of service centers in Mwense district is significantly dispersed.

Calculated $R_N = 1.1462$

Critical R_N at 0.01 level of significance, $n = 75$, one tailed dispersed pattern as derived from the Tables of critical values = 1.141.

R_N Calculated (1.1462) is greater than R_N Critical (1.141)

R_N Cal. (1.1462) $>$ R_N Crit. (1.141).

Since the calculated value of R_N is greater than the critical value at the chosen level of significance we reject the null hypothesis, which states that the distribution of service centers in Mwense district is significantly random.

We therefore, accept the alternative Hypothesis that the distribution of service centers in Mwense district is significantly dispersed.

Comparison of Test Statistic (c) and Hypothesis Testing.

The value of $C = 2.4234$ and the testing hypothesis R_N Calc. 1.146 $>$ R_N Critical 1.141 have both revealed that the distribution of service centers in Mwense is significantly dispersed. Negative values of C denote dispersion and the alternative hypothesis accepted affirms the dispersion of the service centers.

5.2.4 Evolution of Service Centres

A number of factors have together influenced the locational pattern of service centers existing in Mwense today and these are primarily related to matters of religion and political-historical administration. The majority of service centers are situated along the main tarred road especially at points where the road has been provided with a lay-by, a location that enables the centers to have relatively easier mobility. The rest of the centers are found in the remaining parts of the valley and on the plateau. The service centers along the main road make a linear distributional pattern as opposed to those in other areas.

Underlying the locational pattern of service centers is therefore the vital role of linear features in the form of ridge lines (the Muchinga Escarpment and Sele Hills ridge), drainage lines (Luapula and Luongo Rivers), and the main tarred road.

Other physical factors have contributed to the dispersed nature of service center distribution. Forest areas such as Mubende National Forest, Kalisa Local Forest and Luongo National Forest have prevented location of settlements in those areas. The Muchinga Escarpment, which divides the district into two parts, the valley and the plateau is also largely uninhabited as are the hilly areas such as the Mwenda Hills, north of Mwenda, and Sele Hills. There are numerous 'dambos' – water-retaining seepage zones dotted across the study area in the drainage line which have no settlements and unfortunately whose potential is largely unrealized.

Some places either originated as or gained their prominence as centers of missionary work. Examples of such centers include Mulundu, the site of Mambilima Mission established in 1905; Chipili Mission of the Anglican Church established in 1915; Kawama and Kalundu (CMML) Missions both opened in 1927; Mubende Mission of 1918 and the Roman Catholic Nsakaluba Mission at Mwense of 1946 (Snelson, 1974). It must be noted that the establishment of a network of mission stations, particularly those of CMML which incidentally were in the majority, was due not to any careful strategic planning, but to the fact that individual Brethren felt themselves called to preach the Word of God in those places (Snelson, 1974). Most of these mission centers opened up a number of schools each and some health posts thereby increasing their prominence in the local areas. These have retained their importance to date though all but one of the schools are now in government hands.

Other centers have grown to their present status due to administrative functions. Chiefs' headquarters have always been of local consequence due to their administrative duties. At about 1892, a B.S.A.C. official, Alfred Sharpe, chose a site on the Luapula River (later known as Johnston Falls, currently Mambilima Falls, just south of current Mwense Headquarters) for the administrative headquarters of what was then referred to as Luapula District (Gould, 1989). This is the present site of the center known as Mulundu, one of the only two second order settlements in the district. Its location is therefore influenced by historical factors.

Some settlements are associated with old routes. Halting places along these routes have grown to become service centers today. Mung'anga is one such example along the Mansa – Luwingu

– Kasama road. Kashiba, 10 km south of Mwense, is an old bus stop used before the main tarred road was constructed. The settlement is one of the third order centers in the district structure today and this prominence is owed in part to its role as an old overnight bus stopping place. Some newly originated and established halt places along the main road are direct results of road and means of transport in particular trucks and buses.

Other factors are also at play in this distributional pattern and they include individual initiative for selection and formation of villages; hydrographic factors such as location by the river side or wet points as seen along the Luapula and Luongo rivers. Economic factors are evident at Musonda, which has appreciable populations due to the presence of ZESCO's Hydro-electric power station at Musonda Falls. Mununshi Banana Scheme (now in private ownership) was a major contributing factor to the growth of the service center at Mununshi (Bunde-Bunde). Some settlements originated as resettlement schemes. Luminu, for instance, has grown from the location of a resettlement project for blind people.

In accordance with the government decision in the Development Plans to expand socio-economic services to the rural areas (GRZ, 1966) the post independence era has seen an increase in the functions of existing centers and a rise in the number of service centers. Places that have acquired government institutions (such as agricultural camps, schools, health centers, postal services or courts) for serving the local and surrounding population have been turned into service centers by necessarily having the service allocated to them. Most of these were located on the basis of political expediency hence they are dotted all across the district. The most prevalent of these functions are primary schools (now known as basic schools), which are widespread. The majority of the recent central places are providing lower order services as only the service centers established over long periods provide higher order services.

5.3 Identification of Locational – Functional Gaps

The identification of locational-functional gaps in the local service center system has been done using the concept of hierarchy, based on thresholds of population. The aim of the exercise is to find out the number of settlements in the district having a particular population or more but lacking the function for which they qualify with that population. According to Singh (1976, p.

178), “the logic behind the concept is that if the population threshold of a function is 300, then normally, all the settlements having that population should have that function”. Thus the population threshold has been used to propose that all settlements having higher populations than the threshold but lacking the function of that threshold should be allocated with one.

In this regard, two types of functional gaps have been identified. Firstly, that of single settlements that, alone, have the required threshold population, although they lack the facility for which they satisfy the desired threshold. The second type of gap relates to a situation where a group of settlements provides the desired threshold of population but lack the facility. This is usually the case with functions whose population requirements have high threshold levels such as health, communications and trade (Singh, 1994). A settlement from the group may then be chosen for locating the function whose threshold population is not found in one single settlement.

Thus the population threshold, determined using the Reed Muench method, has led to the identification of functional gaps as shown in Table 18 (a) to (f) below. In the Table single settlement gaps are denoted as Gap (i) while group settlement gaps are denoted as Gap (ii).

Table 18: Locational-Functional Gaps in Mwense District

(a) Administration

Function	Score	Gap(i)	Gap(ii)
1. Magistrate Court	4	Nil	Nil
2. Police Station	4	Nil	Nil
3. Police Post	4	Kashiba, Musonda, Musangu Kapala, Kapena, Lukwesa	Mwenda, Chikaya, Luminu
4. Local Court	3	Mukomansala, Musonda Musangu, Chibondo Kapala, kapena, Kasonge Mukonshi, Luminu, Kanyemba	Nil

Table 18 (Continued)

(b) Education

Function	Score	Gap (i)	Gap(ii)
1. High School (I)	4	Nil	Nil
2. High School (III)	3	Kashiba, Mulundu, Musonda, Musangu Lubunda, Kapala, Kapene, Lukwesa	Mwenda
3. Basic School	1	Kasengu, Mununshi, Kapala	Nil
4. Community School	1	Kapala, Nkomba, Chelekumbi	Nil

(c) Health Services

Function	Score	Gap (i)	Gap(ii)
1. Rural Health Centre	3	Kapala, Kapena	Nil
2. Rural Health Post	3	Kapala, Kapena	Nil
3. Ambulance Service	3	Lukwesa, Kapena Kapala, Mwense	Nil

(d) Commercial Services

Function	Score	Gap(i)	Gap (ii)
1. Wholesaler	4	Nil	
2. Liquor Store	2	Lubunda, Kapala, Kapena	Mwenda, Chikaya Munganga, Luminu
3. Council Market	2	Kanyemba, Musangu, Mulonga Chibondo, Katuta, Kawama, Kapena, Mutipula	Nil
4. Grinding Mill	2	Kanyemba, Mwenda, Mulonga Lubunda, Chibondo, Katuta Kawama, Kapena, Kapala Chipili, Mutipula, Mukonshi Luminu.	Nil
5. Market Stall	1	Kabundafyela, Kanyemba, Loto Mukomansala, Chebele, chalwe Kabila, Mutima, Munwa, Nkomba Kamani, Mupeta, Musele, Kasenda, Kaweni, Mubende Kankomba, MUSAALULA	Nil

Table 18 (Continued)

		Mununshi, Kawama, Kapena Kasonge, Lwamfwe, Mumpolokoso, Mukumbwa, Chisheta, Kanshimba Mukonshi, Luminu	
6. Retail Shops	2	Kanyemba, Mulonga, Chibondo Kawama, Kapena	Nil

(e) Agriculture

Function	Score	Gap(i)
1. Agriculture Extension Services Camp	1	Kabundafyela, Kanyemba, Mukwamansala, Chebele, Mutima, Musele, Koweni, Loto, Mulonga, Musaalula (Mweshi), Kawama Kapala, Kapena, Kasonge.
2. Co-operative Society	1	Chebele, chalwe, Kabila Chikaya, Kaoma Makasa, Mupeta, Musele, Loto, Kanomba, Musaalula (Mweshi), Kapena, Lwamfwe, Mukumbwa Mumpolokoso, Chisheta.

(f) Transport and Communication

Function	Score	Gap(i)
1. Post Office	4	Nil
2. Sub-Post Office	2	Kanyemba, Kashiba, Mulundu, Musonda, Musangu, Mulonga, Lubunda, Chibondo, Katuta, Kawama, Kapala, Kapena, Lukwesa, Mutipula
3. Postal Agency	2	Kanyemba, Kashiba, Mulundu, Musonda, Musangu, Mulonga, Lubunda, Katuta, Chibondo, Kawama, Kapala, Kapena Mutipula
4. Bus Stop	2	Katuta, Kapala, Kapena,
5. Stamp Vendor	1	Kabundafyela, Mukomansala, Nkomba, Chebele, chalwe, kabila, Mutima, Munwa, Chikaya, Kamami, Mupeta Kaoma Makasa, Musele, Mwenda Kalundu, Kasenga, Koweni, Loto,

Table 18 (Continued)

Mubende, Kankomba, Musaalula,
Mununshi, Kasonge, Lwamfwe, Chisheta
Mukumbwa, Mumpolokoso, Kanshimba
Mukonshi, Luminu (Lwanda)
Lupososhi.

Source: Based on field data

From Table 18 it can be seen that under the function of administration, there are 10 settlements, which should have local courts, and six places should be allocated with police posts. Under education, eight centres should have grade III level high schools, three should receive basic schools and four ought to have community schools. In the health sector, there are two places that require stage one rural health centers and five settlements, which should be provided with ambulance services. In the commercial sector, gaps are found at three places for liquor stores (bars), eight centres require council markets, five need retail shops, 13 centres deserve grinding mills while 25 places deserve to have market stalls. In agriculture, 14 places should have agriculture extension services camps and 15 should have co-operative societies. For transport and communication, 14 settlements should have sub-post offices or postal agencies, 31 centres deserve to have stamp vendors and three places should be allocated with a bus stop each.

CHAPTER SIX

RESEARCH FINDINGS AND DISCUSSION

6.1. Introduction

This chapter is an attempt to assess the current distribution of the six categories of services provided in relation to the population of each settlement in the study area. It is based on the premise of providing maximum benefit to the maximum number of people with a view to achieving a balanced development of the region. This is in line with the desires of the Zambian government as outlined starting with the Third National Development Plan (TNDP). One of those objectives was that of deploying investment resources so as to involve the local population fully in development and, more importantly, to ensure that the greatest possible number of people will benefit from the fruits of economic development (GRZ, 1979). This has as its ultimate aim the balancing of the need for economic efficiency with more equitable distribution of economic and social benefits. Jamal (1972) also identifies with the notion that one of the most important guidelines in the locational assignment of social services is summed up by the principle, "The greatest benefit for the greatest number."

The discussion is restricted to the distribution of facilities in relation to total population and for services under the six categories mentioned earlier. The question of accessibility of these services is also tackled as it is of vital importance. This is to satisfy the need for the efficient location of these services within easy reach of the people.

6.2. Agriculture

The major objective in this sector is to increase food production through efficient service provision in order to ensure food security at household, district and national levels as well as create jobs (ZAMSIF, 2004). This is in line with the national planning objective of increasing the purchasing power among the rural population, which can only be secured, by substantial increases in individual productivity (GRZ, 1966). Achieving this involves not only massive injections of capital in its various forms but also the acceptance by the population of technical knowledge. This leads to the important role of agricultural extension services.

6.2.1. Agricultural Extension Services

There are 23 agricultural extension services camps operating in the district located in five farming blocks. Lukwesa block has seven camps comprising Mununshi, Lukwesa, Mumpolokoso, Musangu, Mubende, Lubunda and Kankomba. All the seven, except Mubende, are found along the main tarred road though their complementary areas extend for several kilometres from the road.

Kashiba block includes seven camps namely: Mwense, located in the district headquarters, Kashiba, Katuta and Mambilima, all of which are located in association with chiefs' headquarters; and Munwa, Chibondo and Mwenda. All these are located along the main tarred road except for Katuta, Munwa and Chibondo.

The remaining three blocks are found on the plateau. Kamami block only has three camps; Mupeta, Kamani and Mutipula, which is located, near a chief's headquarters. Kalundu block consists of only two camps, Kalundu itself and Lupososhi. The last block, Mwenda, has four camps. These are Luminu, Mukonshi, Chipili and Mwenda itself. Table 19 shows the distribution of blocks and camps with their staff numbers in the district while Figure 13 shows the physical location of the camps.

Table 19: Agricultural Blocks and Camps with staffing levels in Mwense District (2005)

Block name	Number of Camps	Number of Existing Staff	Shortfall of staff	Number of farmers
Lukwesa	07	06	01	20,600
Kashiba	07	05	02	2,807
Kamani	03	02	02	1,067
Kalundu	02	02	00	3,085
Mwenda	04	04	00	7,575
TOTAL	23	19	05	35,134

Source: Ministry of Agriculture and Cooperatives, Mwense District, 2005

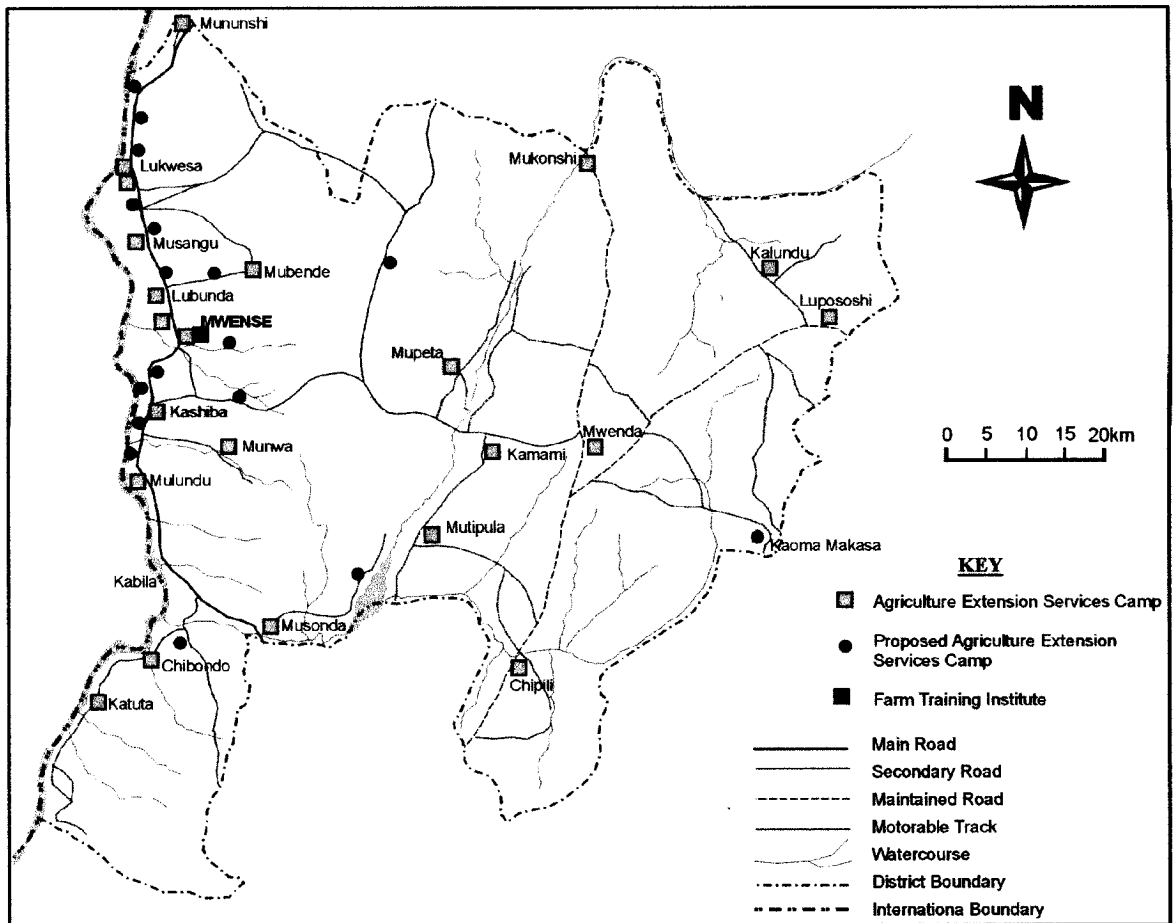


Figure 13 Location of existing and proposed agricultural camps in Mwense District

6.2.2. Locational Gaps

The population threshold (TP50) for agricultural extension services camps, as calculated using the Reed Muench Method, stands at 870, and this was awarded a score value or weightage of 1, implying its low level value in the district structure. However, this does not correspond with the general importance of agriculture in the country as a whole.

There are, as a result, 15 settlements in the district that have deserving populations but lack agricultural camps. These are listed in Table 20 in relation to their farming blocks.

Table 20: Agricultural Extension Service Camps Locational Gaps

Farming Block	Locational Gap	Number of Gaps
Lukwesa	Koweni, Loto, Mulonga, Kawama, Kapala, Kapena, Kasonge	07
Kashiba	Kabundafyela, Kanyemba, Mukomansala, Chebele, Mutima, Musaalula (Mweshi), Chisheta	07
Kalundu	Musele	01
Mwenda	Nil	00
Kamami	Nil	00
	TOTAL	15

Source: Based on field data

Following the two agricultural zones of the district, the valley and the plateau, it can be seen that while the valley has only two blocks of seven camps each, a low number of farmers and a higher population, the plateau has three blocks of about two to four camps each, a higher number of farmers but with a lower population. The number of camp officers is clearly inadequate, with five camps being without officers. This means that farmers in those camps' complementary zones are left without the extension service. Besides this, the camp officers lack transport, a lack which seriously impedes their mobility.

The camps on the plateau, for instance, are few in number because of the low population levels although distances between camps are long, ranging from 13km (between Kalundu and Lupososhi) to 32 km (between Mwenda and Chipili) all of which are located in Mwenda farming block. These are clearly beyond walking distance and therefore need the use of motorcycles – which are either non-runners or are altogether not available.

The division of blocks and camps is largely a colonial legacy as the present situation was made by the colonial administration when Mwense was not yet designated as a district of its own and was still part of Kawambwa District. Boundaries are not standardized and appear to be very abstract. Considering the absence of means of transport and the critical shortage of staff, a clear problem of planning, administration and supervision is evident. There is thus need to revise the system to suit the present conditions in light of recent population figures, and accessibility made possible by currently available means of transportation.

When the district agricultural extension system is compared to central place theory features, it shows little similarity except for the two-level hierarchy provided by a single farm training institute at the district headquarters, and a number of camps (23) dotted around the district. The district agriculture office can also be taken to be the highest order central place for extension services as it caters for the whole district and it is the only center with such higher level services as veterinary care, seed certification, research and agricultural information. Table 21 shows a proposed structure of agricultural extension services in the district.

Table 21 Proposed Structure of Agricultural camps

Block Name	Name of Camps	Proposed No	Total No
Lukwesa	Mununshi, (Kapala, Kawama Kasonge). Lukwesa, Mumpolokoso, (Kapena)	04	07
(Lubunda)	Lubunda, Mubende, Kankomba Musangu, (Koweni, Mulonga Loto)	03	07
Kashiba	Mwense, Kashiba, Munwa, Mambilima, (Chebele, Kanyemba, Kabundafyela, Mukomansala, Mutima)	05	09
(Katuta)	Musonda, Chibondo, Katuta, (Chishiba, Musaalula)	02	05
Kamani	Mupeta, Kamami (Musalango)	01	03
Mwenda	Mwenda, Luminu, Mukonshi (kaoma Makasa)	01	04
(Chipili)	Chipili, Mutipula	00	02
Kalundu	Kalundu, Lupososhi (Musele)	01	03
TOTAL	08	17	40

N.B. New blocks and camps are indicated by brackets

Source: Based on field data

The proposed structure sees the emergence of three new agricultural blocks – Lubunda, Katuta and Chipili. This is with a view to reducing distances between blocks and between camps within the blocks, thus making them more accessible for effective supervision and delivery of services.

Lukwesa block is proposed to be split into two blocks to create a new one – Lubunda. Lukwesa will remain with three of its original camps, Mununshi, Lukwesa and Mumpolokoso, but will have four new camps namely Kapala, Kawama, Kasonge and Kapena. Their populations are

5,074, 2,124, 1,879 and 5,609 respectively. These are settlements that have populations well above the threshold population for agriculture camps but have been denied the service. Deployment of the service at these places is therefore strongly recommended.

The new block, Lubunda, has four camps inherited from Lukwesa, these being Musangu, Mubende, Lubunda and Kankomba. Three new camps have been proposed on the basis of deserving populations to bring the total to seven. These new camps include Koweni (population 1,286), Mulonga (2,179) and Loto (1,204) all of which have populations well above the threshold population of 870 people.

The original Kashiba block is recommended to be split into two blocks – Kashiba and Katuta. The new Kashiba block should continue with four of its initial camps – Mwense, Kashiba, Munwa and Mambilima (Mulundu) but also have five new camps namely Chebele (1,007), Kanyemba (2,420), Kabundafyela (1,153), Mukomansala (1,752) and Mutima (1,260). All these have been chosen on the basis of population as they individually clearly satisfy the threshold population for the employment of an agriculture camp.

The proposed Katuta block has three camps inherited from Kashiba, namely Katuta, Chibondo and Musonda, which should be joined, by Chisheta (with a population of 1,293) and Musaalula (1,096), both of which have been chosen due to the fact that they satisfy the threshold population needs.

Kamani block, which initially had three camps, loses one – Matipula to Chipili block due to the close proximity to Chipili rather than to Kamani and a new camp proposed for Musalango. The proposal for a camp at Musalango is justified by the long distance from Musalango to the nearest camp at Mupeta – a distance of 32 km by the maintained road or 18 km using a motorable track. Musalango alone does not possess the required threshold of population for a camp, however, it has been chosen for locating the function as part of a group of settlements that together provide for the threshold requirement. This group of settlements is composed of Musalango, Mwafwe, Kafunga, Robeni Tobo and Mukabi.

Mwenda block is proposed to have four camps, Mwenda, Luminu, Mukonshi and a new one at Kaoma Makasa. While the first three all have deserving populations, Kaoma Makasa with 428 people does not qualify. However, together with Bunda Chunsu with 581 people the two satisfy the required threshold and the former is chosen for the location of the camp due to its remoteness from the nearest camp at Mwenda. Kaoma Makasa and Bunda Chunsu are 30 km and 20 km away from Mwenda respectively but are within 10 km of each other.

Chipili, a new block in the proposed structure, is envisaged to accommodate two camps. Both camps are already in existence – being Chipili and Mutipula. The block supervisor should be located at Chipili, which is a higher level service centre than Mutipula.

The eighth block is Kalundu with three camps namely Kalundu, Lupososhi and Musele. Musele is a new camp in the structure and has been proposed on the basis that with a population of 1, 248 people, it very well provides for the required threshold population hence deserving the allocation of a camp.

Of the respondents interviewed 65 percent said that the extension services in the present structure of agriculture camps were inadequate. This and the gaps identified indicate that indeed the existing system is not adequate for proper expansion in the agricultural sector. The new structure would, therefore, have eight blocks and a total number of 40 camps, 17 of them being a new addition to the 23 already in existence. On the basis of this, and assuming that all camps are adequately staffed and fully operational, it is expected that the resource poor rural farmers' accessibility to new farming technology and innovation would be improved leading to increased production and related improvements in peoples' incomes and livelihoods. This would, in turn, facilitate and support the development of a sustainable agricultural sector that would assure food security at both household and district level and maximize agriculture's contribution to people's incomes and well being.

6.3. Co-operative Societies

Securing increased levels of agricultural output requires re-orientation towards a monetary economy and structural changes to ensure that increased productivity does not run into supply

bottlenecks and that the increased supplies are regularly absorbed at acceptable prices. Thus adequate attention has to be paid to all aspects of marketing, since it is taken that, without full and efficient marketing services, efforts to increase agricultural production will be largely thwarted (GRZ, 1966). These needs can be met by the role of co-operative societies, which have a critical part to play in the acquisition of farming inputs, particularly seed and fertilizer, and marketing the produce. At the time of the survey, Mwense District had 74 registered co-operative societies.

Only sixteen co-operative societies benefited from the National Fertilizer Support Programme [NFSP] (where farmers contribute 50 percent of the input of costs in the first year, 75 percent in the second year and 100 percent in the third year). This means 21.6 percent of the co-operatives benefited. Of the respondents interviewed only 13 percent were members of a society leaving out 87 percent being non-members and therefore largely being unable to access inputs through the NFS programme.

6.3.1. Distribution of Co-operative Societies

Three co-operative societies are located in the first order settlement, Mwense the district headquarters, while 12 co-operative societies are found in the two second order settlements, Lukwesa and Mulundu, each having six societies. The third order settlements, seven in all, have 20 societies between them, while the fourth order settlements together have the remaining 39 co-operative societies. It is apparent that all chiefs' headquarters have at least one or more co-operative societies.

The Reed-Muench method of determining the threshold population revealed a threshold of 507, thus gaps have been identified in 15 settlements, 11 of them in the valley and the remaining four on the plateau. These are Mukumbwa, Lwamfwe, Mumpolokoso, Kapena, Loto, Kankomba, Chebele, Chalwe, Kabila, Chisheta and Mupeta and Musele. Others are MUSAALULA, Chikaya and Kaoma Makasa.

To achieve an appreciable service provision by co-operative societies it is recommended that societies be encouraged and established in these settlements since all of them have deserving

populations. Kaoma Makasa and Chisheta, being remote, have an extra reason for the deployment of a co-operative society in each of them since it is extremely difficult for farmers to acquire inputs by themselves.

Since the delivery of agricultural inputs and the collection of produce is closely linked to the transport system, there is great need for a good road network in terms of road quality and connectivity. This would help reduce on the time spent delivering inputs, avoid uncalled for wear and tear of vehicles, and reduce on fuel costs. It is thus, proposed that for the inner plateau, inputs should no longer come through Mwense and then be distributed to places on the plateau. Instead a central distribution point on the plateau should be identified so that inputs could be brought in directly from Mansa (the provincial headquarters) using the Mansa-Kawambwa road that goes via Mwenda. This would reduce on distance traveled to deliver inputs to the plateau areas and make the exercise more effective. The weighted mean centre determined for the plateau area very closely approximates to the location of Mwenda, therefore, Mwenda is denoted to be the best possible location for a distribution point (Figure 23 in Appendix E). Thus infrastructure such as storage facilities should be deployed at Mwenda. To further improve connectivity on the plateau for efficient delivery of services it is also suggested that a feeder road be constructed to link Mukonshi and Kalundu. This will involve upgrading the existing road and extending it over the distance that has no road. This would lead to the avoidance of duplication of distances. Figure 14 shows the distribution of co-operative societies in the district and the proposed road link.

It is also worth noting that co-operative societies are currently not involved in the marketing of the members' produce. However, plans for marketing are underway (Mwense District Development Coordinating Committee [MDDCC], 2003). These plans should include the creation of local sub-markets and the facilitation of sales to external markets by encouraging the membership sell their produce to primary co-operative societies, which should in turn sell to the District Co-operative Union (DCU) – for onward sale.

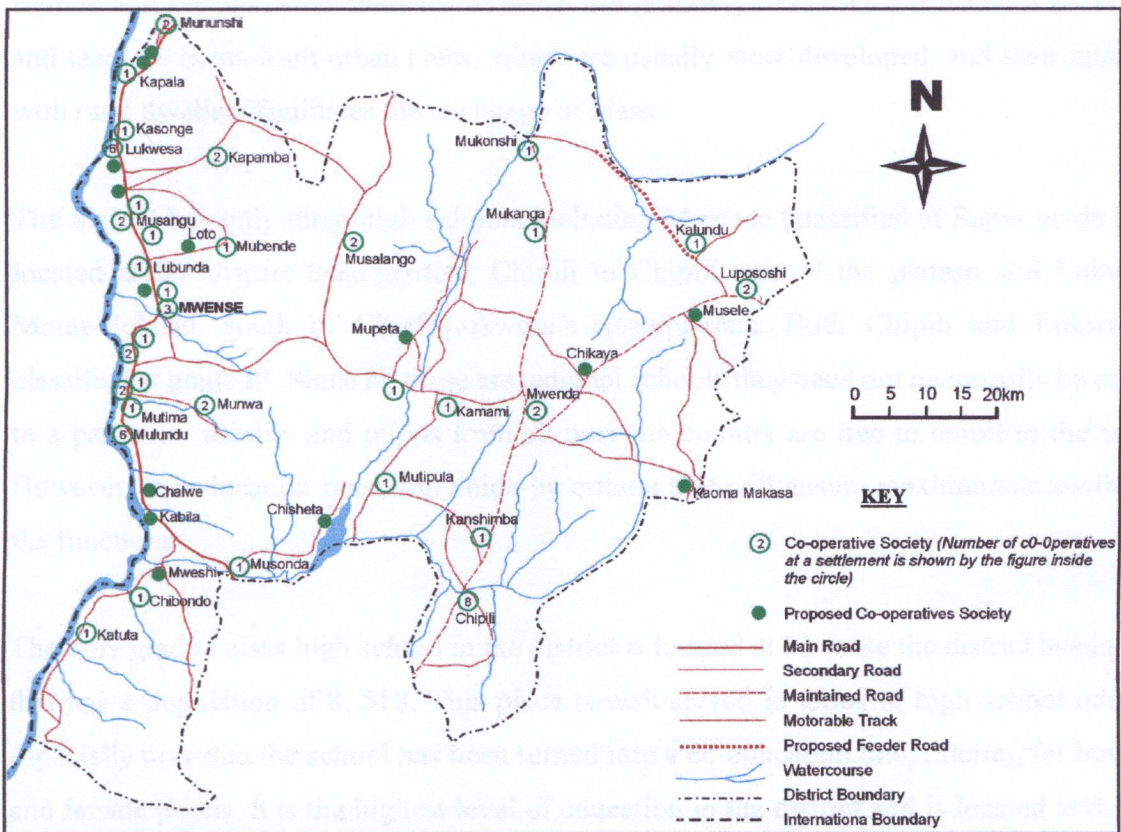


Figure 14: Existing and proposed co-operative societies in Mwense District

6.4. Educational Facilities

Educational facilities are a highly desired service and the demand for schools is ever present. There are three main types of schools in the district, high schools covering Grades Eight to Twelve; basic schools from Grade One to Nine and community schools which do not go beyond Grade Seven.

6.4.1. High Schools

High schools impart instruction to hundreds of pupils. These are mostly national schools hence part of the school population may be commuting from neighbouring communities, but part may be resident in hostels, as is the case with Mwense and Chipili high schools. Boarding pupils are drawn from all over the country. High schools are a medium through which knowledge and the modern ways of life are disseminated and they may also introduce modern modes of conduct,

fashion and various other elements of urban life (Pandey, 1973). This is because some pupils and teachers come from urban areas, which are usually more developed, and their interaction with rural dwellers facilitates the exchange of ideas.

The district has only three high schools including Mwense (classified at Super grade I level) located at the district headquarters, Chipili in Chipili area of the plateau and Lukwesa at Mumpolokoso, south of Chief Lukwesa's headquarters. Both Chipili and Lukwesa are classified at grade III. Since all these are national schools they need not necessarily be confined to a particular locality and pupils from all over the country are free to enroll in the schools. However, their location must still abide by criteria that will ensure maximum accessibility to the functions.

The only grade I class high school in the district is located at Mwense the district headquarters that has a population of 8, 518. This place is well served in terms of high school education especially now that the school has been turned into a co-education one, catering for both male and female pupils. It is the highest level of education in the district and is located at the place with the highest population total. In the local central place system of educational facilities Mwense High School presents as the highest order of educational facility providing services to the district and beyond.

The second order educational facilities are provided by Chipili and Lukwesa High Schools. Of the two only Chipili is a boarding school while Lukwesa is a day school. The threshold population for a grade III high school in the district structure is 2, 903. With a total population of 2, 061 against 2, 903, Chipili appears to be slightly over serviced. However, the location at Chipili can be justified as pointed out earlier, by the notion that enrolment is done at national level. Moreover, the location of the school in the plateau area reduces distances that pupils have to cover to access a high school. Mumpolokoso village, with only 908 people but having a class III high school is a clear case of an over serviced settlement. This is worsened by the fact that Lukwesa High School has no boarding facilities and pupils have to commute from home on a daily basis. Its location should therefore have been at a locality, which satisfied the threshold population requirement. Infact most of the pupils at the school come from Lukwesa about 3.5km to the north which has a population of 5, 741 people. Full utilization of the school

creates a disadvantage to pupils who have to travel over very long distances to get to the school.

According to the threshold population of 2, 903 many of the settlements in Mwense without this service can be identified as not qualifying for the allocation of a facility. These include all places located in the plateau region and the majority of settlements in the valley. For settlements with a good population base but having no high schools of Grade III type, a case can be made for such schools to be extended to these areas: Kashiba, Mulundu, Musonda, Musangu, Lubunda, Kapena, Kapala and Lukwesa deserve consideration for establishing grade III high schools. This suggestion is made in conformity with the premise that all settlements having populations higher than the threshold population, yet not having the function should have it.

However, in the light of funding constraints, priority should be given to four centers including Kapala, Lukwesa, Mulundu and Musonda. Musonda, which has a population of 3, 212 people and is 49 km from Mwense, deserves a high school because it has the necessary population and also due to the long distance away from any existing high school. Kapala with a population of 5, 074 and being 12.5 km away from the nearest high school at Mumpolokoso, also deserves a facility.

Both Lukwesa and Mulundu, with populations of 5, 741 and 5, 123 respectively and designated in the proposed district structure as sub-district centres, are second only to Mwense in the hierarchy. They both have stronger cases for the location of grade III high schools. It is, in this case, suggested that the high school known as Lukwesa High School but located at Mumpolokoso (of population 908) be relocated to Lukwesa and the infrastructure at Mumpolokoso be relegated to a basic school. The new location for the high school will give access to a greater number of pupils thereby fulfilling locational priorities. Furthermore, boarding facilities should be made available to cater for wider catchment areas. Settlements such as Musangu, Kapena, Kashiba and Lubunda can be placed as second priority as the existing educational structure in part caters for Kashiba and Lubunda; while Musangu and Kapena would also be taken care of in the proposed structure before each of these could get its own school. Figure 15 shows the existing and proposed structure of schools in the district.

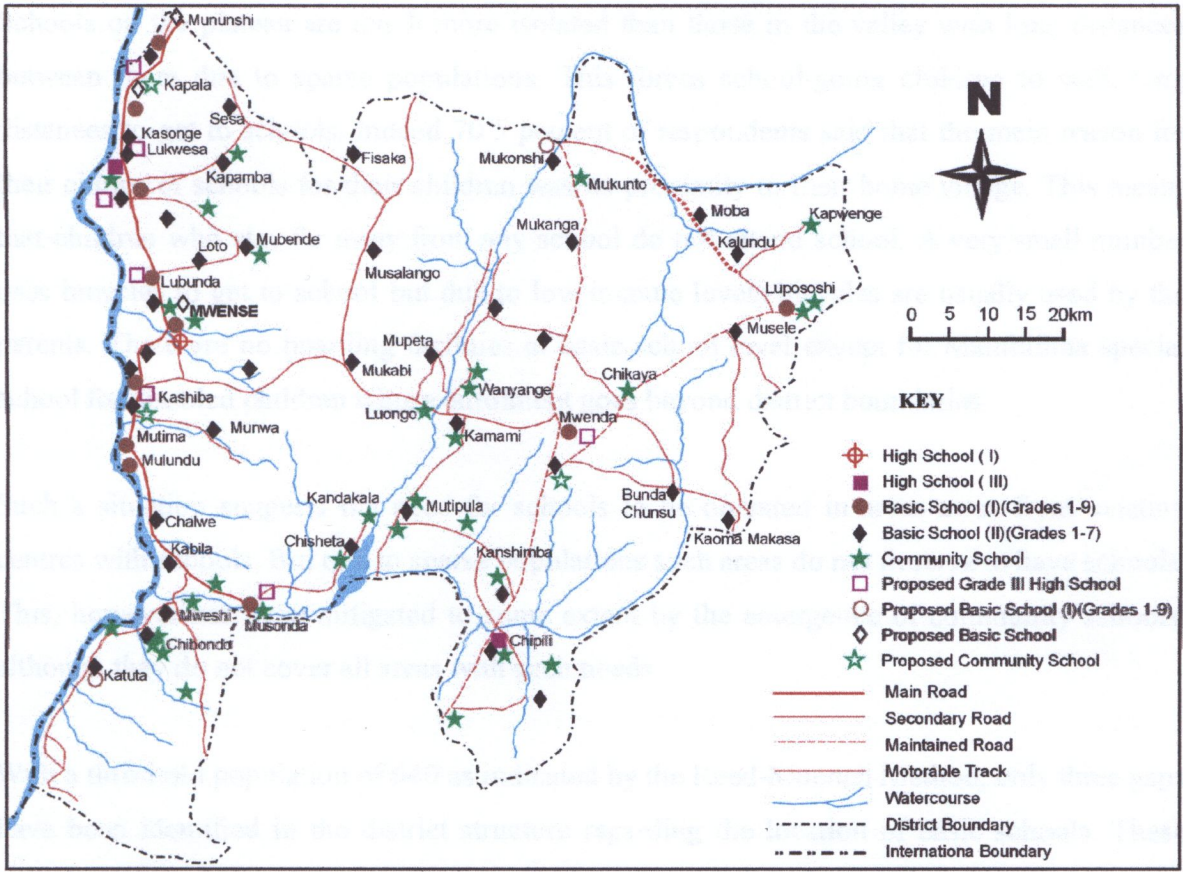


Figure 15 Distribution of educational facilities in Mwense District (2005)

At present the district has no Grade II level high school but it is envisaged that both Lukwesa and Mulundu would in future be able to reach the requirements of the grade of high school. At present grade III level schools suffice for the needs in these areas.

6.4.2. Basic Schools

There are 54 basic schools of all types in the district restricted to 53 settlements and a number of these are found in proximity to major settlements such as the district headquarters, chiefs' headquarters and centres of commercial and religious importance. Basic schools are the second most widespread service outlets in the district after co-operative societies. All centres with other government services possess a full basic school. There are many areas with low population where a basic school is the only service provider.

Schools on the plateau are much more isolated than those in the valley with long distances between them due to sparse populations. This forces school-going children to walk long distances to get to schools. Indeed 70.5 percent of respondents said that the main reason for their choice of schools for their children was its proximity to their home village. This means that children who stay far away from any school do not attend school. A very small number uses bicycles to get to school but due to low income levels bicycles are usually used by the parents. There are no boarding facilities at basic school level except for Mambilima special school for disabled children whose enrolment goes beyond district boundaries.

Such a situation suggests the need for schools to be operated in areas away from existing centres with schools. But due to sparse populations such areas do not deserve to have schools. This, however has been mitigated to some extent by the emergence of community schools, although they do not cover all areas with such needs.

With a threshold population of 640 as indicated by the Reed-Muench Method, only three gaps have been identified in the district structure regarding the location of basic schools. These include Kasengu, four kilometers north of Mwense township; Mununshi, near the boundary with a neighbouring district – Kawambwa to the north and about six kilometers from the nearest school at Mukumbwa; and Kapala two kilometers from the nearest school at Kawama.

To fulfill the locational functional gaps at basic school level it is proposed that a new school be established at Mununshi. This could be in form of upgrading Kaombe Community School to a full basic school. Such a development would reduce the long distances that children have to travel to access school at either Mukumbwa or Chinyanta in the neighbouring district – Kawambwa.

The case for locating at Kapala is even stronger than that for Mununshi. Kapala has the fourth largest population in the district at 5, 074 but lacks a basic school. Children have to travel to Kawama for studying in school but the school there cannot absorb all the children in need of this service. Kapala is also already one of the stronger service centers being particularly notable for its commercial services. It is a third order settlement in the district structure possessing a council market, five retail shops, eight market stalls and a co-operative society hence it already

has potential for the deployment of other services especially those initiated or run by government.

Kasengu has the required population threshold for a basic school but only having a community school therefore a school should be located at the settlement to fulfill the gap that exists there. Basic schools with community schools total up to 82 together. These provide the lowest order of educational facilities in the district structure after grade III high schools (in due middle order) and the only grade I high school, which makes the highest order. The district lacks educational facilities higher than this high school. A further distinction can be made of basic schools whereby eleven of them go up to grade nine level with most of these being located in stronger centres such as chiefs' headquarters, centers of major employment such as Musonda (the location of a ZESCO hydro electric power station) and mission stations.

Community schools are a relatively new arrival in the district and most of them are not very well developed suffering from organizational problems, family or clan feuds and lack of trained teachers and learning materials. There are some that are currently receiving government support and one of them at Muchinga has recently been upgraded to a basic school. Community schools play a vital role in filling up the gaps in areas with population levels that are too low to qualify for the establishment of a regular school and too remote from existing schools.

A threshold population of 139 reveals that four settlements have deserving populations but lack community schools. These are Nkomba, Mun'ganga, Chelekumbi and Kapala. Kapala has already been suggested to receive a basic school but due to its high population it can still accommodate one or more community schools, while Nkomba, Mung'anga and Chelekumbi are small or low order centers, all of which provide only one service to their inhabitants and surrounding villages and would therefore receive a boost with the allocation of community schools. It must be pointed out that community schools are not instituted primarily by government but by various community based organizations. The government can, however, sensitize the local people on the need for such schools in these areas and encourage their formation.

There exist a number of areas which, going by their threshold population, do not deserve the allocation of additional or higher educational services. But by virtue of their being very remote a case for allocating or upgrading their services is made. These include Katuta chiefdom, the greater part of the plateau and Mukonshi. Whereas Mukonshi and Katuta do have middle basic schools (grades one to seven) they lack higher-level schools to cater for grades eight to nine and beyond. This means that children are forced to stop schooling upon reaching grade seven or travel long distances on a daily basis, (an option that is neither convenient nor practical) or relocate to join family relatives staying near higher basic schools where possible or even have the entire family migrate to another village which is well served. For Katuta the nearest full basic school is at Musonda about 17 km from the pontoon bridge at Luongo River. Mwenda at 43 km distance is the nearest for Mukonshi. Thus functional gaps can be identified at these places due to their remoteness. Since they do not have deserving population thresholds they can be recognized together with surrounding settlements in a group for the allocation of the facility. Thus to provide upper basic school services to areas such as Mweshi, Bwele and Chibondo, Katuta is proposed for upgrading to a full basic school from grade one to nine. Similarly Mukonshi should as well be upgraded to cater for pupils up to grade nine. These would act as potential places for high school location in future with increases in population and the corresponding demand for school places at higher levels.

The only high school on the plateau is Chipili located in the south-eastern tip of the plateau area, thus to access it long distances have to be covered by pupils. Whilst Mwenda is centrally located, approximating to the mean centre of the plateau, it does not have the required population. However, when considered in a group of settlements, which together will provide the required population, Mwenda has a strong case for the deployment of a grade III high school. It is thus prudent that the existing full basic school be upgraded to a grade III level high school. Together with Chikaya (with a population of 612) and Munganga (with 312), Mwenda (2,014) will then be considered to have a population of 2, 938, which satisfies the minimum requirement for the deployment of a grade III high school. A high school at Mwenda would best be of boarding type so that it can cater for children coming from such far flung places as Mukonshi, Kabongo, Kalundu, Lupososhi and Kaoma Makasa among others.

6.5. Health Services Provision

The provision of adequate health services to all areas of the district is a prerequisite for the upbringing of all the people. The policy in place provides for the “provision of equity of access to quality cost effective health services as close to the family as possible” (Mwense District Development Co-ordinating Committee [MDDCC], 2003, p.40).

In 2005, the medical facilities provision on the district was; two stage II rural health centers, sixteen stage I centres and four rural health posts, totaling 22 in all. The highest level of health service provision is at second stage hence the non-availability of a medical doctor in the district. Stage II services are provided by Mwense Rural Health Centre in the township and Mambilima Rural Health Centre located at Mulundu. Since the district has no hospital it depends on the neighbouring districts such as Mansa, Luwingu and Kawambwa for third stage services, two stage II health centres and one stage one health centre which have been selected to act as referral institutions. These are Mwense, Mambilima and Chipili Health Centres. They, in turn, refer cases to their nearest neighbouring districts (Mwense District Health Management Board [MDHMB], 2005).

Mambilima Mission Rural Health Centre at Mulundu has been earmarked to be turned into a district hospital. This is because it is seen to have the best potential being the biggest, with about 50 beds. It also has facilities such as x-ray, a mortuary, a physiotherapy wing and ambulance service. None of these services are available at Mwense Rural Health Centre. Mambilima is run by the Christian Missions to Many Lands (CMML) missionaries with government support and it is located 20 km south of the district headquarters at Mwense. The centre, as does the whole district, lacks an operating theatre.

To improve the overall accessibility to medical facilities in the district and bring the local situation in line with central place principles, the facilities of Mambilima ought to be transferred to Mwense. However, such a move would be difficult because Mambilima is a mission-operated centre. The likely ways around this constraint would be for such a move to be a joint venture or for the government to completely take over the running of the health centre. Alternatively similar facilities could be deployed at Mwense Health Centre.

There is a three-tier system of higher-level medical services in the district at Mwense, Mambilima and Chipili all of which make up the local referral centres. Below this level are found 15 health centres distributed in different parts of the district. These include Chibondo, Katuta, Kawama, Kalundu, Kashiba, Lubunda and Lukwesa. Others are Luminu, Mwenda, Mubende, Mukonshi, Mupeta, Mutipula, Musangu and Musonda. The four rural health posts, Chisheta, Kapamba, Mununshi and Lupososhi, make up a third tier in health service provision. These only offers Out Patient Department (OPD) services and the beds they have are meant to facilitate for observations of seriously ill patients while making arrangements for their movement to bigger centers. This leads to the critical role played by ambulance services coupled with a good road network.

Ambulance services are available only at Chipili, Mambilima, Musangu and Katuta health centers. The allocation of an ambulance to Chipili was a result of a decision of local health managers and this was done due to the long distance between the centre and Mwense. The deployment of the service to Musangu and Mambilima was due to political expediency. The First National Development Plan (GRZ, 1966) recognizes that a major obstacle in the provision of medical care is the distance patients have to travel to get it. Thus the more numerous and widely scattered medical units become, the less patients have to travel, and for this reason it was seen best for the units of medical care of a given kind to be as small as they can be without sacrifice of efficiency, and as widely distributed as possible. Moreover, hospitals, being larger, have inevitably to be fewer and less widely spread.

In the Third National Development Plan [TNDP] (GRZ, 1979), the strategy that was adopted for health in the rural areas, called for an integrated approach to the provision of health services and other government services and to relate these to the overall rural development. The central piece of the rural health strategy during the TNDP was the establishment of rural health centres, in order to provide basic medical facilities within reasonable distance from every rural home.

On the basis of the concept of population threshold, locational-functional gaps have been identified in two places, Kapala and Kapena both of which deserve to have a health facility each because of their population numbers. Furthermore, gaps have been identified in relation to

ambulance services at Mwense, Kashiba, Lukwesa health centers and even at the two places namely Kapena and Kapala. It is evident from this that settlements devoid of any type of health facility are relatively few and are mostly found in the valley area north of Mwense. The Reed-Muench method has revealed that the average population required to justify the deployment of health centre (either stage I or II or even a health post) is 3, 500. On these grounds, we recognize that the majority of villages in Mwense may be dismissed as not qualifying for health centers or posts.

However, some settlements lacking health centers have more than 3, 500 people and therefore form an adequate basis for the provision of health facilities. These settlements are Kapala with a population of 5, 074 and Kapena with 5, 609. While on the one hand, Kapala's population indicates a strong reason for the deployment of a health facility there, on the other hand, its close proximity to Kawama Rural Health Centre only 1.7 km away may indicate that medical services could be obtained from there. Nevertheless, bearing in mind the fact that the proposed health facility at Kapala will have to cater for a large population and also because of the need to reduce walking distance, some attempt to assign a facility, at least a health post or stage I centre to the area would seem to be called for. Alternatively the Kawama facility should be expanded, upgraded and have an ambulance service extended to it.

Kapena, located between Lukwesa and Musangu, has no medical facility against its population of 5, 609. It should ideally be provided with a health centre in view of the fact that its population is larger than that of Musangu (at 4, 057). The case for Kapena is even stronger because the nearest health centre at Lukwesa is 4 km away and Musangu is 5 km further away. This should be in the spirit of making an effort directed at alleviating a situation where people need to travel long distances to obtain medical services.

A look at the settlements already provided with health services reveals 10 centres with populations in the range of 1000 to 2000. These centres are relatively more than adequately served. The total number of people is well below the threshold population. Since it appears that these settlements are over served, they need not be considered in the immediate future planning of this important service except in matters of allocating personnel, equipment and drugs.

Mention should be made of Chipili Mission health Centre that has a population of 2,061 but has been selected as one of the three local referral centres alongside Mwense and Mambilima health centers. Chipili is in a better position than both Mambilima and Mwense to serve the centers located on the plateau. Health centers including Mukonshi, Luminu, Kalundu, Lupososhi, Mwenda and Mutipula are closer to Chipili than to either Mwense or Mambilima. Nevertheless, Chipili in itself is not the best location for a referral centre meant to cater for the plateau. The facilities at Chipili should be extended to Mwenda, the mean centre of the plateau region. Due to Mwenda's central location distances and time of travel will both be minimized thereby improving accessibility in terms of referral cases. Figure 16 shows the distribution of rural health facilities in the district, both existing and proposed.

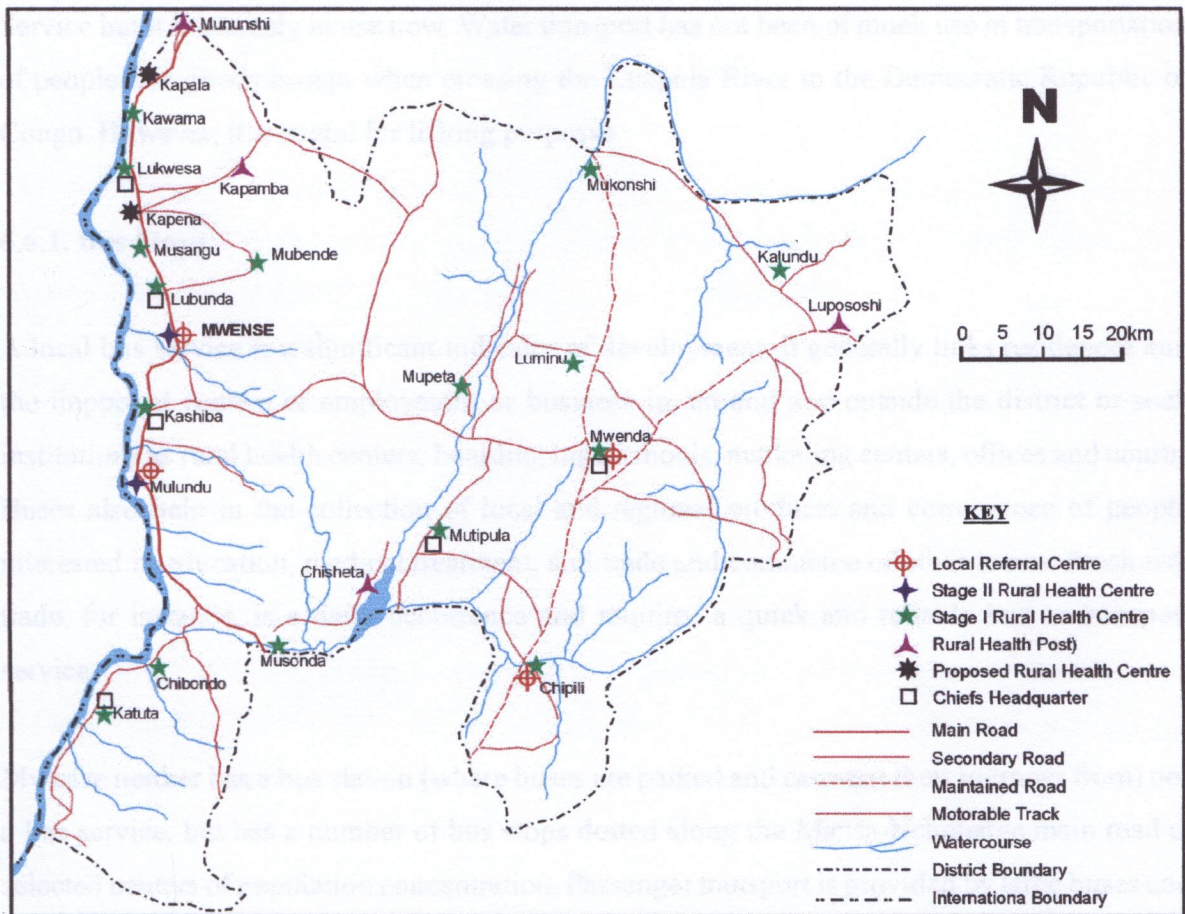


Figure 16: Health services outlets in Mwense District

6.6. Transport and Communication

Transport routes, networks and the ways used to convey goods, people and information along them are fundamental to the functioning of society (Carr, 1997). People in Mwense, like those in any other place, have come to increasingly, depend on the world outside for a variety of goods and services and for the exchange of ideas and information. Information is conveyed by many means of communication and it influences peoples' lives.

Transport is essential in linking people, resources and activities and in enabling the exchange of goods (trade) and of ideas (information). The most important form of transport in Mwense is movement by road. The district has a small aerodrome that was used by the Flying Doctor Service but it is scarcely in use now. Water transport has not been of much use in transportation of people and goods except when crossing the Luapula River to the Democratic Republic of Congo. However, it is useful for fishing purposes.

6.6.1. Bus Stops

A local bus service is a significant indicator of development. It generally links residences and the important centers of employment or business in, around and outside the district or such institutions as rural health centers, boarding high schools, marketing centers, offices and courts. Buses also help in the collection of local and regional products and conveyance of people interested in education, medical treatment, and trade and commerce of other towns. Fresh fish trade, for instance, is a daily occurrence and requires a quick and reliable bus or transport service.

Mwense neither has a bus station (where buses are parked and can start their journeys from) nor a bus service, but has a number of bus stops dotted along the Mansa-Nchelenge main road at selected centers of population concentration. Passenger transport is provided by large buses and minibuses travelling to and from Lusaka, the Copperbelt Province and Mansa on one hand and Kawambwa and Nchelenge (Kashikishi) on the other hand. This means that only the settlements located along the tarred road in the valley are catered for. However, the plateau is serviced by buses and other vehicles travelling from the Copperbelt and from or via Mansa to

Luwingu and Kasama. No buses travel along the route through the plateau to Kawambwa due to the availability of the alternative tarred road.

Along the tarred road from Mansa, bus stops, in the form of road lay-bys, are located at Musonda, Mulundu, Kashiba, Mwense, Lubunda, Mulonga, Musangu and Lukwesa. At other places buses may stop on request and at the mercy of the drivers.

Mun'ganga, on the Mansa-Luwingu road that passes through the plateau, is an old bus stop dating back to the time when the road to Mwense from Mansa passed through Mwenda, Kashiba then Mwense. This bus stop is mainly used to get to Mansa or Luwingu from the plateau. Its present location and development is as a result of historical factors.

6.6.2. Locational Gaps

The minimum number of people required to support a bus stop has been determined to be 2,840. Thus gaps have been identified at Katuta, Kapala and Kapena. These three places deserve to be allocated with bus stops to improve their accessibility.

The picture that comes out is that of a concentration of bus stops in the valley areas, obviously due to higher populations there and the presence of the tarred road, but no bus stops on the plateau except the only one at Mung'anga. This means that the majority of the people on the plateau are not served at all although they have to travel over very long distances. In view of this, a way of catering for the sparse populations should be sought. In such a case, groups of settlements are identified to satisfy the threshold population so that the service can be deployed to them. How remote the group is from existing bus stops is another factor worth considering. In this way an unnecessary duplication in the deployment of bus stops may be avoided.

There are two main routes that transverse the plateau area that need consideration; the Mansa-Kawambwa route along which settlements including Chipili, Mun'ganga, Mwenda, Luminu, Mukanga and Mukonshi are found. The other route is the Mansa-Luwingu one, which has Chipili, Mung'anga, Kapalaula (near Mwenda), Chikaya, Musele, Chipeleme (at Kalundu turn off) and Lupososhi. It is worth noting that the flow of traffic on the Luwingu road is higher

than on the Kawambwa route due to the presence of the tarred alternative route along the valley to Kawambwa.

Owing to the scattered distribution of villages on the plateau and low population levels, the threshold of 2, 840 for the provision of bus stops, would leave the plateau virtually unserved. The only existing stop is at Mun'ganga with a population of 312. This would be allowed to continue existing owing to low population levels on the plateau. Thus it is suggested that bus stops be allocated to the following locations: Chipili, Mwenda (at Kapalaula), Kalundu (at Chipeleme) and Lupososhi on the Mansa-Luwingu road; and Mwenda, Luminu, Mukanga and Mukonshi on the Mansa-Kawambwa road.

A bus stop allocated to Chipili (population 2,061) would not only serve Chipili but also the surrounding villages of Maipambe, Leo, Kapenda, Chinshinki and Kamena, all of which together will satisfy the threshold population. Moreover, Chipili has the advantage of two extra factors stemming from the economic level of the centre and its historical importance as a mission station and as a centre for education.

Mwenda is already an important service centre on the plateau being a nodal village and a chiefs' headquarters. It has the extra advantage of being centrally located as it very closely approximates to the mean centre of the plateau. Its nearest bus stop is at Mun'ganga some 8.5 km to the southwest. With its population of 2,014, Mwenda, together with surrounding settlements that it would serve, satisfies the threshold population of 2, 840 for the allocation of a bus stop. These villages include Kapalaula, Bunda Chunsu, Kaoma Makasa, Mwamba I, and Mutaba among others. However, for the Mansa-Luwingu route such a bus stop would have to be located at Kapalula, which is right along the road and is only four kilometers from the centre of Mwenda. For the Kawambwa route Mwenda itself is the best possible location for the bus stop.

Kalundu has a population of 1,917 and serves two lower order service centres, Moba (149) and Kapwenge (172) and a number of dependent villages including Mutayi, Kaputu, Shebele, Wishampanga, Nason Yambayamba, Taku Chalilembwa and Chipeleme. Taken as a group these settlements together more than adequately satisfy the required threshold population.

Kalundu itself is 7 km on the north side of the Mansa-Luwingu road and Chipeleme, located at Kalundu turn-off along the road, is the second option after Kalundu if buses cannot go up to Kalundu to pick and leave passengers.

A bus stop located at Luminu (Samson Lwanda), with a population of 1,977, would serve the lower order service centre of Kabongo (286) and other dependent villages including Katapula, Six N' gandwe, Kabange and Musasi.

Other places that have reason enough for the allocation of bus stops are Lupososhi and Mukonshi. Lupososhi, the last place on the Luwingu route would be able to serve the populations of Songwezi Kandeke, Mwila Elemu and Mboko Pondala villages in addition to its own population of 1, 038. For its part, Mukonshi, with a population of 1,214 would be able to serve the people of surrounding villages such as Chifuntwe, Jacob Mwaba, Kaba, Shimwaba and Mukonto.

Mwense, being the district headquarters, and considering its population of 8,518 people deserves a bus station, and not merely a bus stop. However, with the liberalization of Zambia's economy, there is no State transporter to take up the challenge. This would have to be done in conjunction with private transporters whereby the district makes available the infrastructure and transporters make available their buses. At the moment the number of buses passing through the district appear to be adequately serving its population found along the main tarred road. The existing and proposed bus stops are shown in Figure 17.

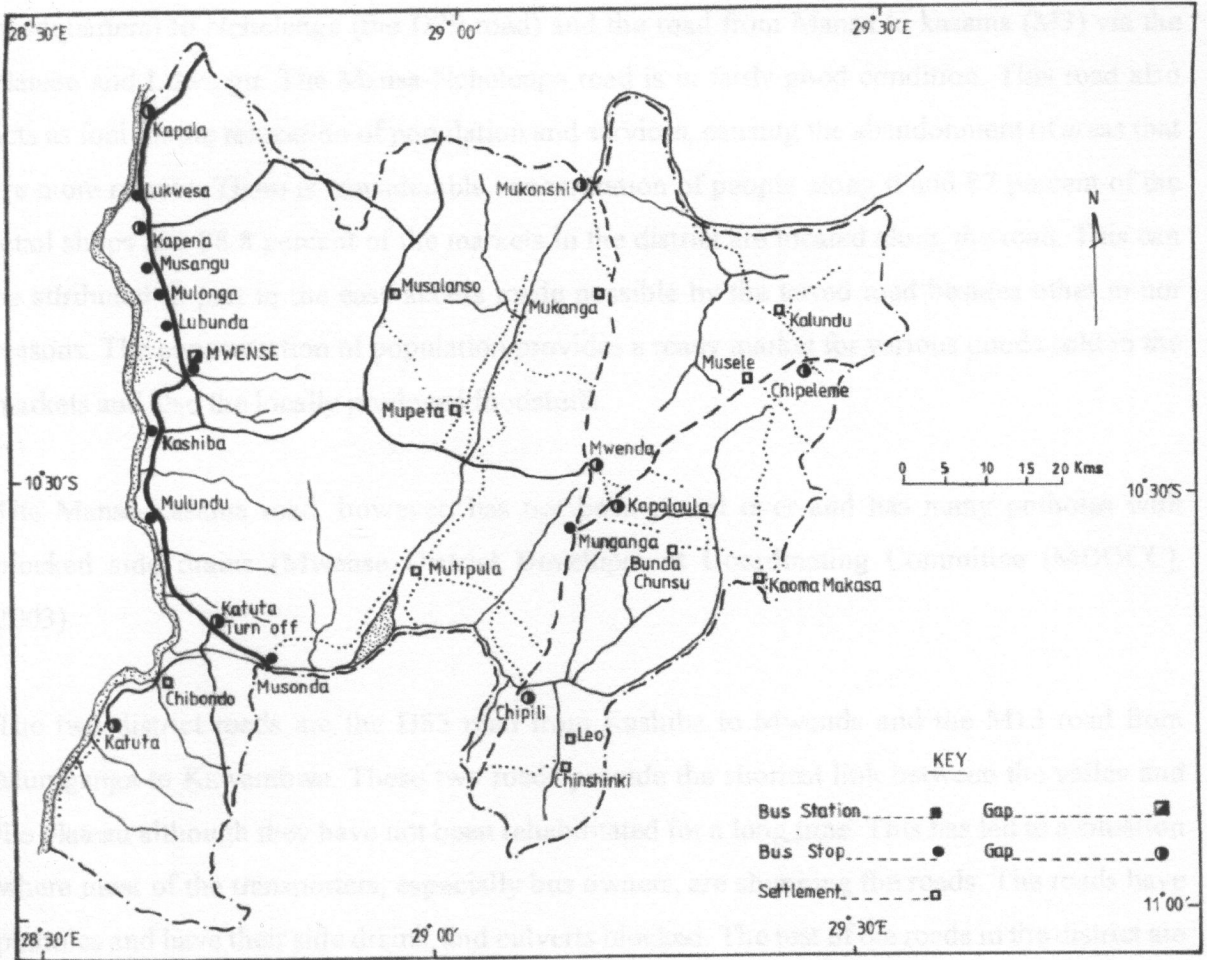


Figure 17: Existing and proposed distribution of bus stops in Mwense District

6.6.3 Roads and Road Transport

Beginning with the First National Development Plan the strategy for the transport and communication sector has been the provision of the necessary infrastructure but from the Third National Development Plan onward the programme has been geared more to rural development (GRZ, 1979). Emphasis was shifted to the development of feeder roads in order to provide the necessary infrastructure for rural development. The aim is to increase the reliability of local roads and secure an unimpeded flow of goods and services at minimum possible transport costs. This obviously calls for an efficient road network in the district.

There are three types of roads in Mwense; national, district and feeder roads. Only two of the roads in the district are national including the tarred main road from Mansa (the provincial

headquarters) to Nchelenge (the D79 road) and the road from Mansa to Kasama (M3) via the plateau and Luwingu. The Mansa-Nchelenge road is in fairly good condition. This road also acts as a focus for the relocation of population and services, causing the abandonment of areas that are more remote. There is considerable concentration of people along it and 87 percent of the retail shops and 88.8 percent of the markets in the district are located along the road. This can be attributed in part to the easy access made possible by the tarred road besides other minor reasons. The concentration of population provides a ready market for various goods sold in the markets and also the locally produced foodstuffs.

The Mansa-Kasama road, however, has not been paved over and has many potholes with blocked side drains (Mwense District Development Coordinating Committee [MDDCC], 2003).

The two district roads are the D85 road from Kashiba to Mwenda and the M13 road from Mun'ganga to Kawambwa. These two roads provide the shortest link between the valley and the plateau although they have not been rehabilitated for a long time. This has led to a situation where most of the transporters, especially bus owners, are shunning the roads. The roads have potholes and have their side drains, and culverts blocked. The rest of the roads in the district are feeder roads. Table 22 gives a summary of the road network in the district.

Some features of the central place theory deserve notice here. The district transport network is hierarchic in the sense that it consists of a few regularly used channels and many lightly used feeders or tributary channels. These segments of the transport system, like the district they serve, form an inverse distribution of size with frequency. At the top of the hierarchy is the heavily used tarred road from Mansa to Nchelenge, followed by the Mansa to Kasama road via Luwingu and the Mansa to Kawambwa route via Mwenda, whose traffic is lighter than that of the main tarred road. Next are the district feeder roads beginning with the Mwense to Mwenda (D85) road. There are numerous smaller feeder roads with very light traffic

Table 22: Mwense District Road List

Road No	Road Name	Length (km)	Condition
RD83/446	Luongo Pontoon (D81) – Kasangula-Chinondo Katuta	22.8	Fair
RD444	Mulonga (D79) - Mubende	11.4	Poor
RD445	Chipala (D81) – Koyokola – Munwa	16.7	Fair
RD727	Chindoloma (R70) – Junction D759	24.0	Poor
RD759	Kawambwa Boundary – Musalango (Mbukuta) – Mukabi (D85)	36.4	Poor
R9	Chipeteme (M3) – Kalundu Mission – Mumbwe	22.6	Poor
R70	Chindoloma (RD 727) – Kapesa-Chipunko (D79)	14.4	Poor
R71	Mununshi (Bundebunde) – Chiponga	2.6	Poor
R80	Chipowe (D85) – Mutipula – Kanshimba (M3)	37.3	Poor
U2	Kashngwa (D79) – Chindoloma (RD 727)	17.9	Poor
U4	Chipasa – Lubunda (D79)	6.0	Poor
U5	Chebele (U7) – Kaloshi	5.1	Poor
U6	Chebele – Open Air Prison	4.1	Poor
U7	Mwense – D85	5.7	
U10	Musonda (D545) – Chisheta - Kandakala	41.4	Poor
U11	Chipili Mission (M3) – Chinshinki – Mulonda (M3)	20.3	Poor
U12	Mushimba (M3) – Nyemba	12.8	Poor
U13	D85 – Mupeta	6.5	Poor
U14	Chipowe (D85) – Kasuti-Luminu (M13)	27.8	Poor
U15	Mukonshi (M13) – Chifuntwe – Mweshi	16.5	Poor
U17	Nambala (M3) – Chofwe (Lusingu District)	28.5	Fair
U18	Chofwe (Luwingu) (U17) – Chambo-Nyemba	3.5	Poor
	Total length of feeder roads	384.3 km	
D81	Junction of Mansa-Mwense Road to Kasangula Luongo Pontoon (RD83) “D” State Road	4.9	Fair

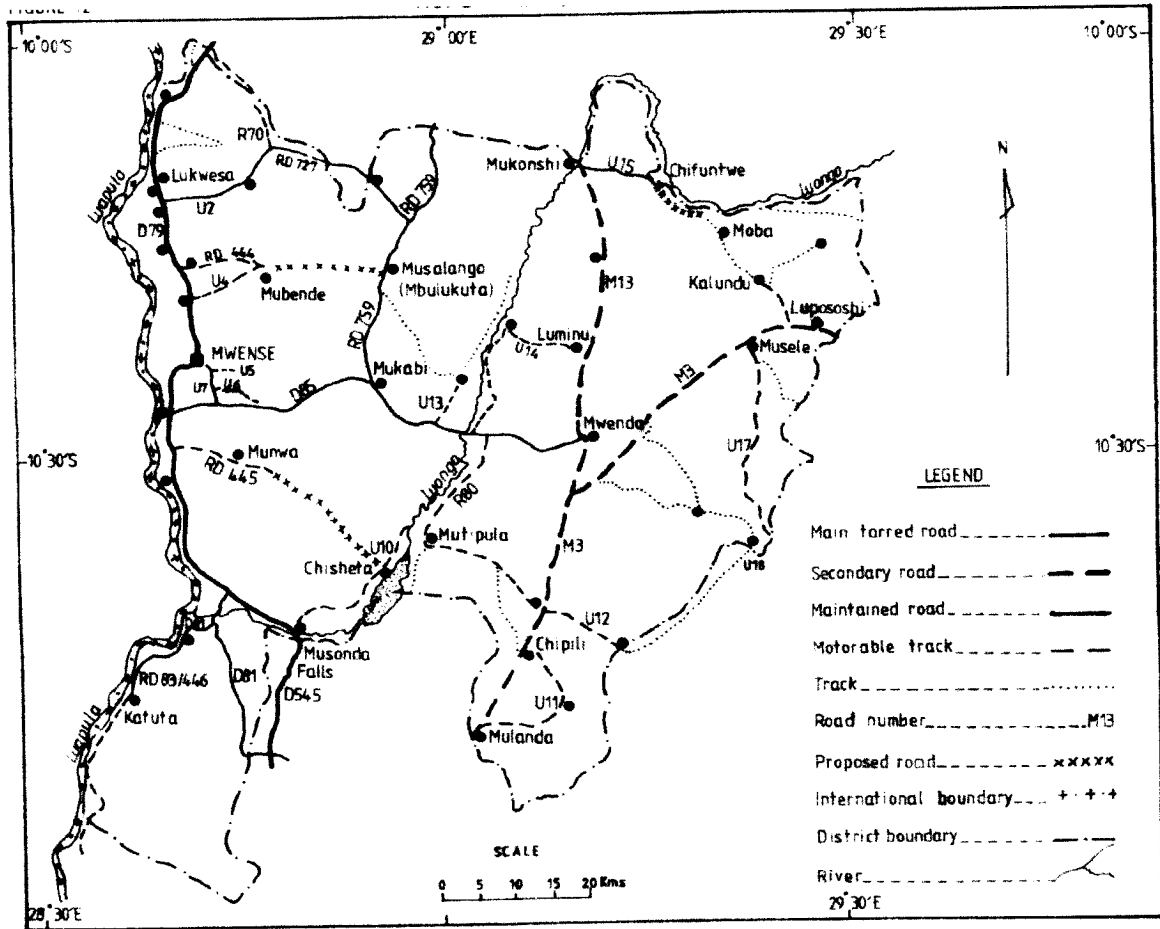
Source: Mwense District Council (MDC), 2003

The existing road network in the district is not adequate to effectively contribute to the development of the district. This arises from the fact that the roads connecting the plateau to the rest of the district are in such poor state that the plateau is almost cut off. To move from the plateau to the rest of the district, the majority of the people use bicycles with the poorer ones just walking. Of the respondents interviewed 71 percent used bicycles, while only 21 percent used vehicles and these were located in places along or close to the main tarred road. The remaining percentage either always walk or in selected areas used boats and other means of transport.

Katuta chiefdom has immense potential for timber production and cultivation of rice and other agricultural products but the area is almost always cut off during the rainy season due to high water levels in the Luongo River, which force the pontoon bridge to cease operations. This causes the area to be inaccessible. This lack of accessibility means that two basic schools, three community schools, a rural health centre with its ambulance service, an agricultural camp with its associated co-operative societies, two retail shops, a local court, a chief's headquarters and the rest of the villages are cut off from the rest of Mwense. Moreover, the pontoon on the Luongo river is not engine driven but uses human labour thus heavy laden vehicles have to be unloaded before they can be ferried across the river to lighten their weight. This adds to the inconvenience and expenses of using the Katuta-Kampemba road.

The poor state of feeder roads also works against efforts to develop the district as this hampers the delivery of agricultural inputs and products as well as service delivery in general to many of the villages, especially during the rainy season when some roads become impassable.

Public transport is only available at a very low level provided by private transporters using trucks within the district. This kind of monopoly leads to the exploitation of villagers who have no alternative, particularly in cases where they have to transport their agricultural produce. Use of bicycles entails making many repeated trips, a situation that is not efficient. The case along the main tarred road is however, much better than that on the plateau due to the high number of trucks that pass through Mwense either to Mansa or beyond or to Nchelenge and Kawambwa. This route is even serviced by buses. Figure 18 shows the road transport network of Mwense district.



Source: Mwense District Council (MDC), 2004

Figure 18: Road transport network in Mwense District

6.6.4. Telecommunications

The telephone network in the district is still very much in its infancy. Mwense has a local telephone exchange that has so far only been catering for a few customers all of them resident in the township and the government departments there. None of the service providers outside the township have access to telephone services. This means that only a small percentage of the district population enjoys the facility.

The situation is worsened by the fact that the service is prone to interruptions as lines are congested or crossing, since usually there are only two trunk lines out of the district working at a time. This is due to the system being old and the billing system, which is largely innaccurate.

There is no internet accessibility in the district while there is only one public pay phone in the district.

These shortcomings in telecommunications result into very poor communication within the district especially with the plateau. The problem is exacerbated by the poor road network and vandalism done to Zambia Telecommunications Corporation (ZAMTEL) installations.

6.6.5. Postal Services

A post office is a basic utility service. It encourages inter-communication within the district on one hand, and the outer world on the other hand. The post office facilitates the distribution of magazines, sale of books and newspapers, newsletters and is therefore a source of transmission of ideas. It also provides services such as stamp sales, delivery of letters, payments to pensioners, sending and paying of both ordinary and telegraphic money orders, express mail service, post box rentals, delivery of registered mail and parcels and the post bus transport service. By its function and character the post office initiates conditions, which may begin to bridge the gap between the unsophisticated and largely agricultural rural society on one hand, and the urban environment on the other.

In Mwense, the needs of people for postal services are less than those for other services. Figure 19 shows that five percent of respondents did not receive any mail, 68 percent received mail by hand and only 27 percent received mail by stamp vendors, postal agency or post office. This has led to the low number of postal agencies operating in the district. This indicates a lack of appreciation of the importance of such services due to low incomes – most people have monthly incomes that are less than K50, 000.00. The non-availability of the function in many parts of the district also contributes to the low usage of postal services. Of the 368 settlements in the district, 357 are without postal services of any kind. An examination of the relationship between the total population and these services indicates that a population of at least 2, 016 people is required for one postal agency or sub-post office to be established. On the basis of this, virtually all settlements in the second level functional hierarchy currently without this service need to be provided with a postal agency. These include all chiefs' headquarters namely, Mulundu, Lubunda, Katuta, Lukwesa and Mutipula. Lukwesa already has a postal

agency but it should be upgraded to a sub-post office while Mulundu should have the closed sub-post office reopened.

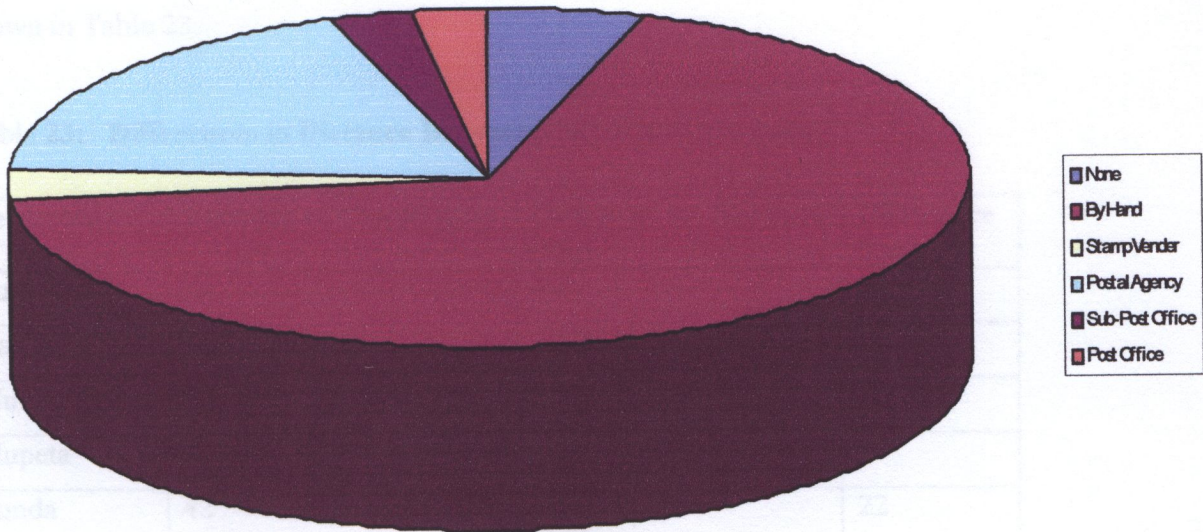


Figure 19: Pie chart showing means of receiving mail in Mwense District

Other settlements deserving a postal agency include Kanyemba, Kashiba, Musonda, Musangu, Mulonga and Chibondo. Each of these deserves a postal agency but considering the conditions of limited resources, Kanyemba may be allocated a stamp vendor instead due to its close proximity of only 4 km to Mwense where the main post office is located. Mulonga may also receive only a stamp vendor as it is very close to Lubunda. At present only the district headquarters at Mwense has a post office, which provides all the services of a post office mentioned earlier except Western Union Money Transfer and Swift Cash Money Transfer.

Chipili, with a population of 2, 061 is the only settlement with a sub-post office. This is known as a sub-post office because it has no telegraphic facilities. Its location was determined by the populations of Chipili and its surrounding villages and the good number of civil servants in the area. The distance from Mwense Post Office was also considered. Chipili sub-post office serves most of the plateau region including Mutipula, Chofwe, Luminu, Mwenda and others.

Mwenda which approximates to the weighted mean center of the plateau area and which has a population of 2, 014 people should be provided with a sub-post office due to its central location

and its local importance. Allocating a post office to Mwenda would increase accessibility to these services of places such as Mukonshi, Lupososhi, Kalundu, Bunda Chunsu, Mukanga, Luminu and Mupeta, all of which are closer to Mwenda than to Chipili or even to Mwense as shown in Table 23.

Table 23: Differences in Distance Between Chipili and Mwenda

Settlement	Distance to Chipili (km)	Distance to Mwenda (km)	Difference (km)
Lupososhi	74	40	34
Kalundu	69	42	27
Mukonshi	70	40	30
Mupeta	56	29	27
Bunda Chunsu	42	20	22
Luminu	42	12	30
Makanga	55	26	29
TOTAL	408	209	199

Source: Author's Fieldwork

Table 23 shows that the total distance from selected centers to Chipili is 408 km while that of the same centers to Mwenda is 209 km. This means a reduction of 199 km in terms of distance travelled if Mwenda would be allocated with a sub-post office. Thus Mwenda is a better location than Chipili to serve the plateau area.

Stamp vendors are agents of the post office who are licensed to sell stamps and also collect letters in their catchment areas, which they in turn convey, to the post office for onward transfer. So far, all stamp vendors in Mwense are operated by basic schools thus posting of letters in these areas is done at the concerned schools. Plateau area vendors use bicycles to collect and deliver mail from and to the post office at Mwense.

At present only 10 settlements have stamp vendors. These include Lukwesa (at Musungampashi Basic School and at Mumpolokoso), Kawama, Lwamfwe, Musalango, Mupeta, Kamami, Kashiba and Chibondo.

Settlements with populations going above 491 call for the establishment of stamp vendors. There are 31 such settlements scattered about the district occurring both on the plateau and in the valley area. Whereas all 31 places are shown as calling for the establishment of stamp vendors some places may need to be allocated with more than just one vendor since they have much higher populations. These settlements include Kabundafyela, Mukomansala, Chebele, Mutima, Kamami, Mupeta, Musele, Mwenda and Kalundu. Others are Koweni, Loto, Mubende, Mweshi, Mununshi, Kasonge, Chisheta, Mukonshi, Luminu and Lupososhi. Moreover, since these settlements, with a few exceptions, are located far from the two post offices, this makes the case for the establishment of stamp vendors in them stronger. The proposed distribution of these places is shown in Table 24.

Table 24: Proposed Allocation of Postal Services

Function	Number	Proposed Settlements
Post office	00	Nil
Sub-post Office	07	Lukwesa, Mulundu, Lubunda Katuta, Mutupula, Kashiba, Mwenda
Postal Agency	05	Musangu, Chibondo, Kawama, kapala, Kapena
Stamp Vendors (2-3)	18	Kabundafyela, Mukomansala, Chebele, Mutima, Kamami Mupeta, Musele, Kalundu, Koweni, Loto, Mubende, Mweshi, Mununshi, Kasonge, Chisheta, Mukonshi, Luminu, Lupososhi.
Stamp Vendor (only 1)	13	Kanyemba, Mulonga, Chalwe, Kabila, Munwa, Chikaya, Kaoma Makasa, kasengu, Kankomba, Musaalula, Lwamfwe, Mukumbwa

Source: Based on field data

5.7.0 Trade and Commerce

Trade plays a very important role in fostering the economic growth and development of an area. It contributes to the general well being leading to improvements in the general welfare and quality of life by way of making exchange of goods and services possible. Carr (1977) after Cho says, “trade also provides the knowledge and experience that makes development possible. In turn trade provides the capital goods that are indispensable to economic growth.” It is the way by which knowhows are disseminated and innovation transmitted.

Exchange of goods in Mwense is made possible through the vehicle of council markets, wholesale shops, retail shops and market stalls. Other facets of trade include liquor stores, grinding (hammer) mills, makeshift selling points (locally known as 'Ntemba'), street hawkers and peddlers.

5.7.1. Wholesale Trade

At the time of the survey there were only three wholesalers in the district. All three operate from the commercial area in the district headquarters and provide both wholesale and retail services. Customers come from different parts of the district including some from the neighbouring Democratic Republic of Congo. Most customers use bicycles to get to the wholesalers while some of those situated along the main tarred road use public transport. It must be noted that 'wealthier' retailers do not usually use the local wholesalers but instead prefer to travel to Mansa (the provincial headquarters) or Lusaka or even Nakonde to buy goods from Tanzania. These sources provide a wider choice of goods at cheaper prices.

With a threshold population of 8, 518 required for the establishment of a wholesale shop no occupational-functional gaps have been identified in the district structure, therefore there is no immediate need for the allocation of wholesalers.

5.7.2. Liquor Stores

There are 11 liquor stores in the district, all of which are found in the valley area and located along the main tarred road. This is with the exception of only one that is located at Chipili on the plateau. Clientele for the Chipili liquor store is generally provided by the civil servants in the area. The location of the majority of liquor stores along the main road can be explained in relation to the kind of customers required to support this service. Potential customers must have 'locally substantial' incomes to be able to sustain the business on a daily basis. Liquor stores are located in association with centers of local prominence and considerable population concentration. All these places have basic schools, council markets, retail shops, rural health centers, two of them have high schools, and three of them are chiefs' headquarters. They, as a result, have adequate cash in circulation to justify the location of liquor stores. Special notice

should be taken of Musonda which is a third order settlement but has three liquor outlets, a number more than that of the district headquarters Mwense, which only has two. Musonda is the location of the Zambia Electricity Supply Corporation (ZESCO) hydro electricity power station, thus its employees, together with government workers, provides good customers for such business. Kashiba, like Mwense, has two outlets although it is much smaller. It used to be the main bus stop in the district before the main tarred road was constructed and seems to have retained some of its former glory. However, it must be noted that some of its clients come from Mwense and are mainly made up of government officials who are able to drive there.

The rest of the places include Mulundu, Musangu and Lukwesa each of which has one store. Location along the road is also due to the fact that proprietors want to take advantage of the travellers along the route. There are bus stops at all the places where liquor stores are found.

The threshold population for liquor stores, calculated to be at 2,971, indicates that the district has three gaps regarding liquor stores at Lubunda, Kapena and Kapala. All of these have deserving population figures and therefore qualify to have the facility. It is worth noting, though, that the establishment of such services, like most of other commercial services, is not in the hands of the government but in that of private investors, thus the local government would in this case play an advisory role to the location of such facilities.

Lubunda has the highest potential considering that it has many government facilities including a basic school, a rural health centre, a local court, a council market and an agriculture extension services camp. Thus there are more government workers constituting higher purchasing power. It is also a chief's headquarters, has a vibrant basketry industry, a co-operative society and retail shops. The presence of a bus stop gives it an extra advantage coming from travelling customers who usually stop there. Kapena in spite of its higher population of 5,609 people only has a basic school and the farmers who are largely operating on a subsistence basis. Kapala has a market, retail shops, some fishing camps and market stalls. These all ensure higher cash levels than in Kapena. Thus Lubunda would be the first priority possessing the highest potential followed by Kapala and ending with Kapena.

6.7.3. Retail Shops

There are 77 retail shops in all, registered with the District Council and identified during the field survey. These are all located in only 14 service centres. The distribution of retail shops of all types is shown in Figure 14, which reveals the following features. Firstly, it can be seen that almost all but four of the shops are found in the valley area (73) and along the tarred road from Mansa to Nchelenge. Only one of these is located off the road at Katuta. The remaining four shops are scattered on the plateau at Kalundu, Mwenda, Mutipula and Chipili, with very long distances between them.

Mwense, the only first-order service centre in the district structure has 21 of the retail shops. This is indicative of the concentration of population in the area (8, 518 people) and also the purchasing capability from people in employment since many government departments and non-governmental organizations are located there. People in areas surrounding Mwense also have relatively easy access to Mwense and therefore have the shops at their disposal as well.

The two second-order service centres, Lukwesa with 13 shops and Mulundu with 11 have 24 shops between them while 28 retail shops together are located in eight third-order settlements namely Kapala, Musangu, Lubunda, Kashiba, Katuta, Musonda, Chipili and Mwenda with five, two, two six, two, five, three and two respectively. Only three fourth-order centers have shops and these include Mutipula, Kalundu and Mulonga with one, two and one respectively, bringing the total number of retail shops to four. Apart from concentrations of population along the valley road, the location of the majority of the shops in this area can be attributed to the ease of transportation that retailers enjoy as they procure supplies from external sources, and also from the custom made available by customers traveling along the road.

Those shops not located along the road are confined to chiefs' headquarters as in the cases of Mutipula, Katuta and Mwenda, all of which are centers of local prominence. The other shops are located at Chipili, which has a fairly large number of civil servants with enough purchasing power to support the three shops there, besides the local farmers in the area. Kalundu has two shops, a handful of civil servants at the rural health centre and the school but also catering for

many villages as these villages are so remote from other shops and shoppers are compelled to go to Kalundu for their shopping needs.

The required threshold population for a retail shop is 2, 090 and this reveals that gaps are present in four unserved areas in the district. These are Kanyemba, Kapena and Kawama along the main tarred road and Chibondo off the main road in Katuta's chiefdom. All these are in the valley region. Chibondo appears to have the highest potential having a basic school, three community schools, a rural health centre, an agricultural extension service camp and a co-operative society. It is followed by Kawama, which has a basic school, a rural health centre and a co-operative society. Kanyemba has a basic school and a co-operative society while Kapena only has a basic school.

The shops in these places would have to depend largely on teachers, medical personnel, and agricultural officers for their custom as these people receive regular salaries. In Kanyemba there is a flourishing business of basketry industry where people make basket furniture, reed mats, straw hats, baskets and other related products for sale. Kawama has a mission station with a number of employees together with school teachers while Kapena and Chibondo have fishing activities. All these activities together with farming give the local people some measure of purchasing power to support the allocation of retail shops in the areas.

6.7.4. Market Stalls

Market stalls are usually in the form of large tables or small shops with an open front from which goods are displayed and sold in a public place. They usually occur in association with council markets and retail shops but are also available in some places that lack council markets but have informal open-air markets or small roadside markets not recognized by the council.

These stalls are very important in the economy of the district because they sell goods that are broken down into very small quantities making them affordable to the majority of the mostly very low-income local people. Without such a provision most of the goods would be completely out of reach of many people in the villages. Market stalls can be distinguished from

the makeshift, often illegal selling points, locally known as ntemba as the market stalls are recognized by the council to which they pay market levies.

These are low-key commercial outlets and as a result the threshold population required to support them is lower than those for retail shops, for instance. The threshold population has been calculated to be 611 and this means that since there are only 50 stalls so far, many settlements are without the facility. The 50 existing stalls are distributed in places along the main tarred road as follows: Musonda has two, Mulundu has four, Kashiba has two, and Mwense possesses 19 while Musangu has four, Lukwesa has 10 and Kapala has eight.

Locational functional gaps have been identified in 31 settlements across the district. In addition, eight settlements in possession of higher order commercial services such as retail shops but lacking market stalls are deserving of market stalls and therefore should have the function deployed there. These settlements include Mwenda, Kalundu, Mulonga, Lubunda, Chibondo, Katuta, Chipili and Mutipula.

There are 31 settlements which require the deployment of market stalls and these include Kanyemba, Kabundafyela, Mukomansala, Chebele, Nkomba, Chalwe, Mutima, Kabila and Munwa all located to the south of Mwense. To the north are places that include Kasenga, Koweni, Loto, Mubende, Kankomba, Mununshi, Kawama, Kapena, Kasonge, Lwamfwe, Mumpolokoso and Mukumbwa. On the plateau settlements include Chikaya, Kamami, Mupeta, Musele, Kanshimba, Mukonshi, Luminu and Lupososhi. Others are Musaalula (Mweshi) and Chisheta.

For goods sold at these stalls, people do not need to go long distances for them since they are lower order goods which are needed on a daily basis hence the need for the market stalls to locate very close to people's homes. There is thus a need for a widespread distribution of this function in the district to be able to reach even the remotest areas as long as the threshold population requirement is satisfied.

6.7.5. Grinding Mills

Another service worthy of mention is that of grinding mills. This function is important considering the fact that the staple food of the people in the study area is 'nshima' and that both maize and cassava have to be ground into mealie meal and cassava meal respectively for daily consumption. The grinding mills available either operate on electricity or diesel engine and this has a bearing on their location. Those that are electrically operated will occur only in areas that are electrified but the diesel powered ones are not restricted in their location as they can be sited anywhere as long as diesel can be sourced. This leads to the important role that a good road network will play in making transportation of the crop (maize or cassava) and the fuel possible. At the time of the survey, there were 15 grinding mills in Mwense located in six different places. Mwense township has the highest number of seven; Mulundu, Lukwesa and Musonda all have two each, while Kashiba and Musangu both have only one each.

Hammer mills have a threshold population calculated to be 1, 961 and this means 13 places lack the function although they duly deserve to have it. These gaps are found at Kanyemba, Mulonga, Lubunda, Kawama, Kapala and Kapena, along the main tarmac road in the valley. These have the advantage of being able to accommodate both electric or fuel driven mills. The other places are Mwenda, Chibondo, Katuta, Chipili, Mutipula and Luminu, all of which are found on the plateau except Katuta and Chibondo. Of these settlements only Mwenda is electrified.

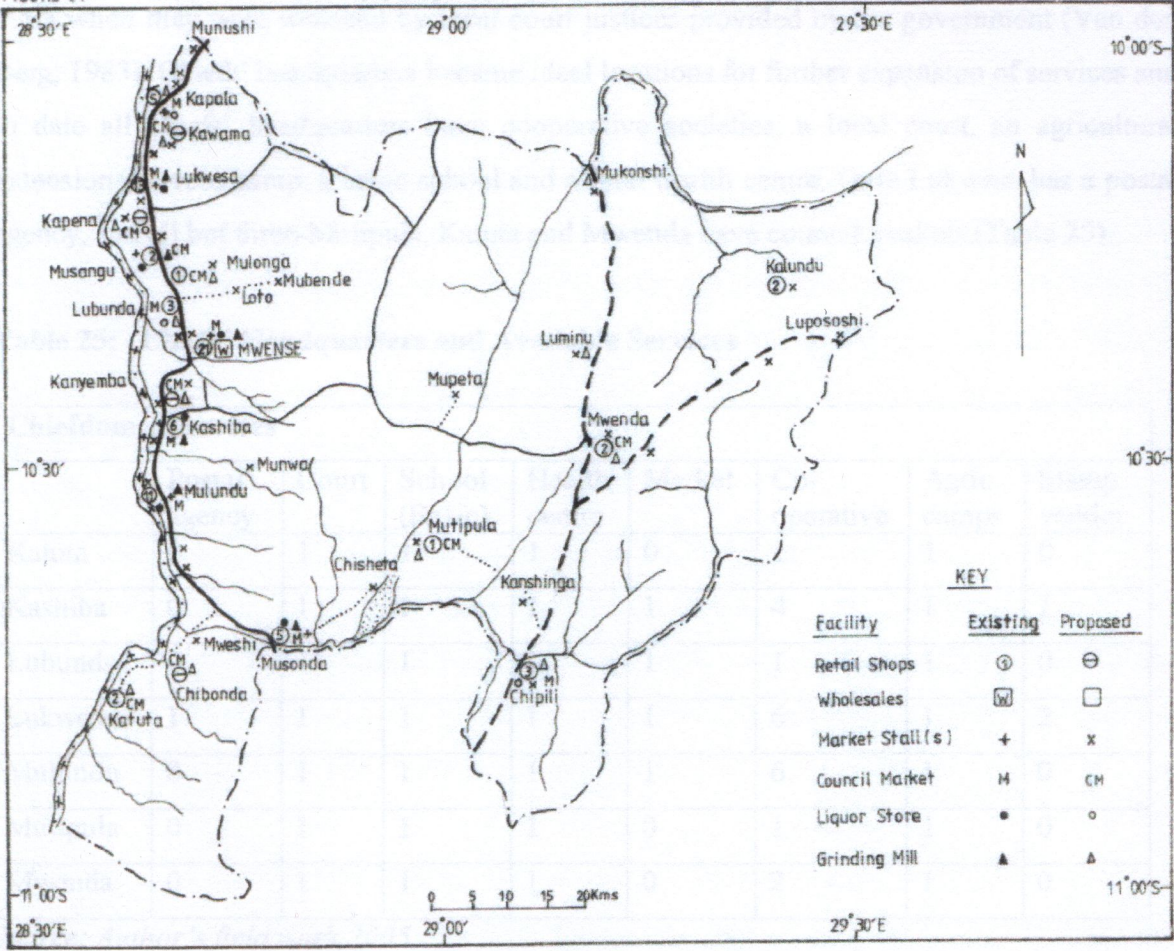


Figure 20: Distribution of commercial facilities in Mwense District

6.8. Administration

The administration of the district is largely concentrated in the township – the district headquarters or the Boma, where the offices of the District Commissioner, the Council Secretary and heads of different government departments and ministries are located. There is, nevertheless, some administration that is done in outpost areas notably the chiefs’ headquarters, local courts, police posts and village headpersons in the villages.

6.8.1. Chief’s Headquarters

There are seven chiefs in Mwense district. Chiefs used to function (and still do in certain instances) as judges settling disputes among their subjects with the help of their advisors until

1965 when they were replaced by local court justices provided by the government (Van den Berg, 1983). Chiefs' headquarters became ideal locations for further expansion of services and to date all chiefs' headquarters have cooperative societies, a local court, an agricultural extension services camp, a basic school and a rural health centre. Only Lukwesa has a postal agency, and all but three-Mutipula, Katuta and Mwenda have council markets (Table 25).

Table 25: Chiefs' Headquarters and Available Services

Chiefdom	Services							
	Postal agency	Court	School (Basic)	Health centre	Market	Co-operative	Agric camps	Stamp vendor
Katuta	0	1	1	1	0	1	1	0
Kashiba	0	1	1	1	1	4	1	1
Lubunda	0	1	1	1	1	1	1	0
Lukwesa	1	1	1	1	1	6	1	2
Mulundu	0	1	1	1	1	6	1	0
Mutipula	0	1	1	1	0	1	1	0
Mwenda	0	1	1	1	0	2	1	0

Source: Author's field work 2005

Chiefs' headquarters thus form a group of secondary order centers in the district being intermediate in size and services between the widely distributed tertiary service centers and the highest level centre at Mwense Boma. Two of these centers, Lukwesa and Mulundu possess some salient features. Mulundu has a Christian Mission in Many Lands (CMML) mission station, a special school for disabled children and a stage II rural health center- the only one in the district with a mortuary and an x-ray facility. Lukwesa is closely associated with Mumpolokoso, which has a high school, and it is the only place in the district with a postal agency. Lukwesa is also an important centre of trade.

6.8.2. Police Stations and Posts

A police station is a very important function in aiding socio-economic development because law and order must be maintained in order for meaningful provision of goods and services to be

made. With increasing population and the resulting levels of unemployment and poverty, rates of crime also increase.

Only Mwense, the district headquarters has a police station. All other settlements have no police services except Mulundu, which has a police post. With a population of at least 3, 592 people being needed for the provision of a police post, gaps have been identified at six places in the district structure. These settlements include Kapala, Lukwesa, Kapena, Musangu, Kashiba and Musonda. All these are found along the main tarred road and are located in the valley region.

This would necessarily mean that the vast plateau area would be without any police services, since no single settlement has the desired population for the allocation of a police post. In this case, a group of settlements should be used to provide the required threshold of population and “a settlement from the group may be picked up for locating the function whose threshold of population is not found in one single settlement” (Singh, 1976:181).

It is imperative therefore to identify the settlements on the plateau that will satisfy these conditions for the fulfilling of locational–functional gaps of police posts. The threshold population for police posts being 3, 592, settlements that include Mwenda, Chikaya, Bunda, Chunsu, Kaoma Makasa, Kamami, Wanyange, Nshindano, Kalundu and Luminu – together provide for more than the required population threshold. Thus a central location needs to be identified for the location of a police post.

The most economic location of a police post is at the weighted mean centre, which is found 1.2. Km north-east of Mwenda (see Appendix E). This means Mwenda can be identified as the site for a police post being this close to the calculated weighted mean centre. The weighted mean centre is important because it shows more than just an average middle point in the distribution of settlements but it also takes into consideration the population of the various settlements. Moreover, the weighted mean centre gives the shortest distance when the distances from different locations to it are measured.

6.8.3 Courts

Mwense has 15 courts in all, one magistrate court located at the Boma, eight local courts, one of them located together with the magistrate's court, and the remaining seven located at the seven chiefs' headquarters of the district. The other six are circuit courts and these are scattered with five on the plateau at Mukonshi, Kalundu, Mupeta, Kaoma Makasa and Chipili. One circuit court is located in the valley area at Musonda. This distribution of courts is illustrated in Figure 21 and Table 26, which indicate the settlements that have courts.

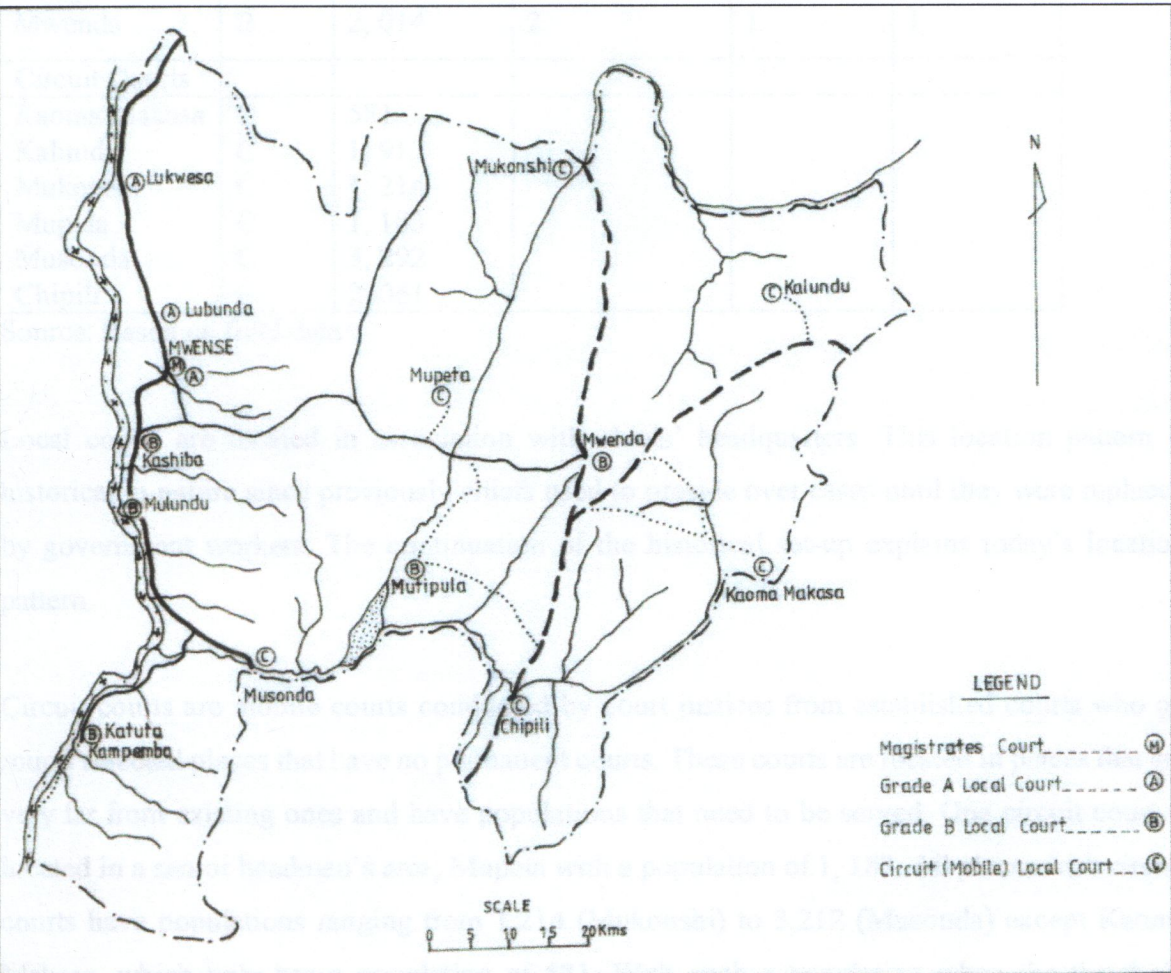


Figure 21: Distribution of existing courts in Mwense District

Table 26: Courts in Mwense District

Magistrates Court	Class	Population	Staff Establishment	Present Staff	Shortfall
Mwense	1	8, 518	1	1	0
Local Courts					
Lukwesa	A	5, 741	3	1	2
Lubunda	A	3, 464	3	1	2
Mwense	A	8, 518	3	2	1
Kashiba	B	3, 967	2	1	1
Mulundu	B	5, 123	2	1	1
Katuta	B	2, 880	2	2	0
Mutipula	B	2, 658	2	1	1
Mwenda	B	2, 014	2	1	1
Circuit Courts					
Kaoma Makasa	C	581			
Kalundu	C	1, 917			
Mukonshi	C	1, 214			
Mupeta	C	1, 183			
Musonda	C	3, 292			
Chipili	C	2, 061			

Source: Based on field data

Local courts are located in association with chiefs' headquarters. This location pattern is historical in nature since previously chiefs used to preside over cases until they were replaced by government workers. The continuation of the historical set-up explains today's location pattern.

Circuit courts are mobile courts conducted by court justices from established courts who go round selected places that have no permanent courts. These courts are located in places that are very far from existing ones and have populations that need to be served. One circuit court is located in a senior headman's area; Mupeta with a population of 1, 183. All places with circuit courts have populations ranging from 1,214 (Mukonshi) to 3,212 (Musonda) except Kaoma Makasa, which only has a population of 581. With such a population when the threshold population for local courts is at 1,755, Kaoma Makasa appears over serviced. The allocation of the court is justified by the fact that the settlement is very far from the nearest court at Mwenda. It is 37 km away from Mwenda and is clearly too remote especially that the most common means of transport available in the area are walking and use of bicycles.

The distribution of local courts in the district shows that there is more accessibility to local court services along the valley where courts are located quite close together and have manageable distances between them. On the plateau, courts have much longer distances between them. Table 27 shows distances between courts and their nearest neighbour.

Table 27: Distances Between Established Courts in Mwense

Court	Distance to District Headquarters (km)	Nearest Court	Distance to Nearest Court (km)
Mwense	-	Lubunda	08
Lukwesa	22	Lubunda	14
Lubunda	08	Mwense	08
Kashiba	10	Mwense	10
Mulundu	18	Kashiba	08
Katuta	59	Mulundu	41
Mutipula	66	Mwenda	32.5
Mwenda	65	Mutipula	32.5

Source: Author’s Fieldwork

Using the Reed Muench method, a population threshold of 1,755 was calculated as the necessary requirement for the allocation of a local court to a place. Thus functional-locational gaps have been identified at the following settlements, all of which satisfy the needed population; Mukomansala, Musonda (for upgrading), Musangu, Chibondo, Kapala, Kapena, Kasonge, Mukonshi (for upgrading), Luminu and Kanyemba.

With regard to the provision of local courts, three different situations arise. Firstly, there are three places that have populations lower than the required threshold, but have been provided with the service. This seems to present a case of being over serviced. The settlements include Mukonshi (population 1,214), Mupeta (1,183) and Kaoma Makasa (581). Whilst it is tempting to consider these settlements as being over serviced, their isolated and remote locations explain the reasons behind the provision of services. Moreover, since these places merely have circuit courts, it is acceptable that such low level services be provided to such sparsely populated areas.

The second category is that of settlements which are well served. These have deserving population totals and have been allocated the necessary service. However, striking anomalies

are evident in the grade or level of the service provided. Some settlements have high populations but their grades fall short of expectations. Mulundu with a population of 5, 123 and 18 km from Mwense is graded at B while Lubunda which is only 10 km from Mwense is graded at level A (see Table 26). Kashiba has a population of 3,967, higher than that of Lubunda, but it is also graded at level B. Musonda, with a population of 3, 212, and 46 km from Mwense, only has a circuit court. This type of allocation of the Grade A service points to the fact that certain relatively highly populated areas have been neglected in the grading of the local courts.

The third category is that of unserved places. Kapena (with a population of 5,609), Kapala, (5,074), Musangu, (4,057), Chibondo (2,486), Kanyemba (2,420), Luminu (1,977), Kasonge, (1, 879) and Mukomansala (1,752) all have threshold populations but lack the service. To fulfill the functional-locational gaps at these places there is need for local courts to be allocated to these areas.

Although at present the Ministry of Justice and Legal Affairs recognizes that concentration of population should be used as a guide for locating courts, this has not so far been applied in Mwense district. The proposed structure of allocation of courts in the district shown in Table 28 means that there should be more than just one court in a chiefdom in future. All circuit courts apart from Mukonshi, Mupeta and Kaoma Makasa should be upgraded to full courts at Grade B level, thus abandoning the traditional location to chiefs' areas and re-allocating courts due to demands presented by population numbers. Besides, there is lack of transportation necessary to facilitate the mobile courts since the judiciary department in the district does not own any means of transportation, and local court justices depend on personal bicycles and have to ride over very long distances to cover all the circuit courts. A vehicle should be made available for the existing courts and those that would be established in future as population rises and demand for judicial services increases. Figure 22 shows the proposed distribution of magistrates, local and circuit courts in Mwense District. This distribution is expected to be more effective than the present system.

Table 28: Proposed Hierarchy and Distribution of Courts

Magistrate	Class/Grade	Population	Staff Establishment
Mwense	1	8, 518	1
Local Courts			
Mwense	A	8,518	3
Lukwesa	A	5,741	3
Kapena	A	5,609	3
Mulundu	A	5,123	3
Kapala	A	5,074	3
Musangu	A	4,057	3
Kashiba	A	3,967	3
Lunuda	A	3,464	3
Musonda	A	3,212	3
Katuta	A	2,880	3
Mutipula	A	2,658	2
Chibondo	B	2,486	2
Kanyemba	B	2,420	2
Chipili	B	2,061	2
Mwenda	A	2,014	3
Luminu	B	1,977	2
Kalundu	B	1,917	2
Kasonge	B	1,879	2
Mukomansala	B	1,752	2
Circuit Courts			
Mukonshi	C	1, 214	-
Mupeta	C	1, 183	-
Kaoma Makasa	C	581	-

Source: Based on field data

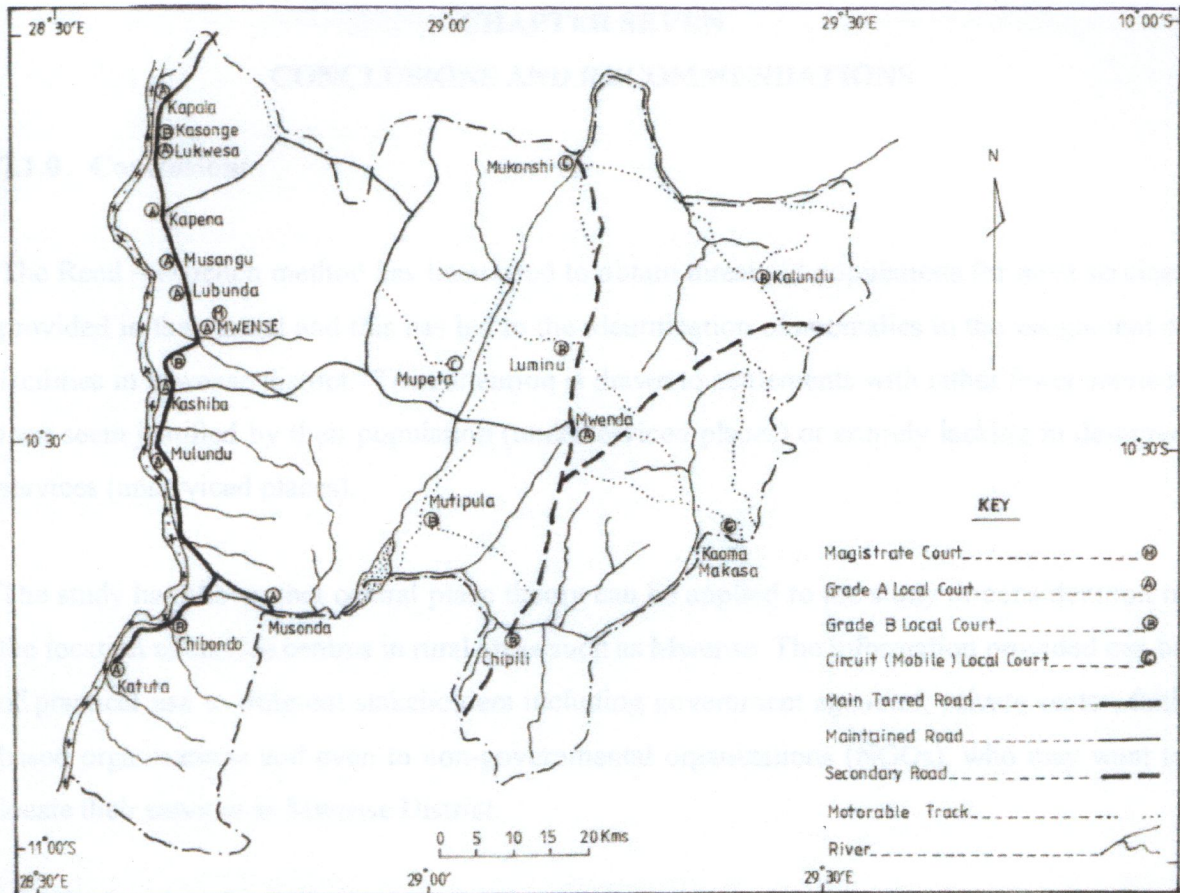


Figure 22: Proposed distribution of magistrates, local and circuit courts in Mwense District

Local and magistrates courts that have to be filled have been identified for various reasons as a number of settlements. The services related to agriculture, which has been found that 10 settlements should receive local courts, and six should be all related to all police posts. In the education sector, eight places deserve Grade II high schools, three should receive grade schools while four ought to have secondary schools. There are two gaps for rural health centers in the health sector and five gaps for ambulance services. Under recreational services, three places require liquor stores, eight should have animal markets while five need wood shops. In the same sector, 13 gaps exist for grainmills while there are 25 gaps for tobacco stalls. The agricultural sector was 14 gaps for crop extension services and 10 for cooperative societies. For transport and communication, 14 gaps have been identified for sub-post offices or postal agencies, 11 for shops, vendors and kiosks for bus stops.

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.1.0 Conclusions

The Reed – Muench method has been used to obtain threshold populations for most services provided in the district and this has led to the identification of anomalies in the assignment of facilities in Mwense district. Thus attention is drawn to settlements with either fewer services than seem justified by their population (underserviced places) or entirely lacking in deserved services (unserviced places).

The study has shown that central place theory can be applied to the study or consideration of the location of service centres in rural areas such as Mwense. The information provided can be of practical use to different stakeholders including government agencies, private sector, faith based organizations and even to non-governmental organizations (NGOs), who may want to locate their services in Mwense District.

7.1.1 Locational – Functional Gaps

Locational-functional gaps that have to be filled have been identified for various services in a number of settlements. For services related to administration, it has been found that 10 settlements should receive local courts, and six places should be allocated with police posts. In the education sector eight places deserve Grade III high schools, three should receive basic schools while four ought to have community schools. There are two gaps for rural health centers in the health sector and five gaps for ambulance services. Under commercial services, three places require liquor stores, eight should have council markets while five need retail shops. In the same sector 13 gaps exist for grinding mills whilst there are 25 gaps for market stalls. The agricultural sector sees 14 gaps for agriculture extension services camps and 15 for co-operative societies. For transport and communication, 14 gaps have been identified for sub-post offices or postal agencies, 31 for stamp vendors and three for bus stops.

The gaps depict an imbalance in the distribution of all types of services and by implication this means that the local distributive system is inadequate to properly foster development in the district. This is worsened by the poor road network, which makes accessibility very difficult.

It is evident that in many cases the prevailing spatial distribution is of historical creation emanating from both traditional and colonial structures. The new developments that have followed have not taken into consideration the changes in population ever since seriously. Moreover, the system that has evolved through the early independence years up to date has little to do with geographical determinants and in many cases can be attributed to arbitrary historical-political decisions by which certain settlements are favoured over others.

The removal of functional gaps will bring dependent villages into close proximity to service centers hence reducing distances and providing easy accessibility to various services and facilities. This way there can be improved production and peoples' welfare, as fulfilled gaps will make available necessary amenities to the remotest villager in the district. Location of services and facilities in appropriate places will not only avoid misdirecting investment efforts involved in uninformed planning in trying to improve the socio-economic development but also enable effective utilization of the scarce funding available for development projects.

7.2 Recommendations

Under the conditions of inadequacy, which have been highlighted above, all sectors are in need of improvement though some projects seem to take a higher priority. Thus general recommendations are made as follows:

7.2.1 Socio-economic development should be planned by a local team that is multisectoral with the best possible personnel being involved. Hence the acute need for immediate and adequate deployment of qualified manpower in all government departments. Coercion for politically motivated planning should not be tolerated.

7.2.2 Planners must locate socio-economic facilities on the basis of the concept of population thresholds and complementary zones. This will ensure that the right facilities are

deployed at deserving places thereby improving accessibility and efficiency of the district system.

7.2.3 Planning should be a continuous and gradual process with planners being involved in the subsequent implementation or evaluation so as to bear responsibility for the long-term results of their plans. To ensure continuity and opportunities to learn from experience there should be people who have stayed in the area of operation for a length of time.

7.3 Improving the Distributive System

For the improvement of the distributive system in Mwense, the following specific recommendations are made:

7.3.1 The road network and transport system should be improved to increase accessibility. Acceptable travel distances to services should be observed taking into account the locally available means of transportation. There are roads to be up-graded, new roads to be constructed as well as a bridge over the Luongo River to Katuta Chiefdom. Increased accessibility will benefit especially the plateau area where need for much larger catchment areas to meet population threshold has been recognized. These improvements could be funded using community development funds (CDF), directly from central government or even by non-governmental organizations (NGOs) depending on the scale of the work involved.

The road network is the backbone of the transport system in Mwense as it reaches remote areas. This is in form of feeder roads, trucks, trails and footpaths. Thus, to achieve a level of accessibility in the district that can help foster effective development, the following measures are recommended:

- Rehabilitation and maintenance of all roads to enhance efficiency;
- Upgrading (by tarring) the roads from Mansa to Kasama via the plateau and Luwingu (M3) and the Kashiba to Kawambwa via Mwenda one (D85 and M13).

This is justifiable by the need for a usable link between Luapula and Northern Provinces and between the valley and the plateau respectively;

- Construction of a bridge over the Luongo River, to replace the hand-driven pontoon bridge so as to effectively connect Katuta to the rest of the district;
- Developing new road connections to improve the overall connectivity of the network. This would further open up the plateau area especially and reduce the distances covered to reach certain places. The following are the proposed road links;
- Linking the Mukonshi to Chifuntwe U15 road to the R9 road from Kalundu Mission to Chipeleme on the Mansa-Kasama (M3) road. Such a link (via Moba) would reduce transport costs in terms of time, fuel, wear and tear as motorists having to cover Mukonshi, Musele, Kalundu, and Lupososhi would not have to get back to Mwenda to get on the M3 road but would simply use a shorter circuitous route through Moba and Kalundu;
- Link the RD445 Chipala (D81) – Koyokola-Munwa road with the U10 Musonda (D454)-Chisheta-Kandakala road. This would not only reduce the distance from Chisheta to Mwense by 15 km but it would also provide an alternative link between the valley and the plateau and
- Link the Rd 444 Mulonga (D79)-Mubende road with the RD 759 road at Musalango (Mbulukuta).

These proposed links would be helpful in the distribution of educational materials to schools, medical supplies to rural health centers, agricultural inputs such as fertilizer and seed and in enhancing other mobile services such as circuit courts and clinics.

For telecommunications it is important that the current exchange be upgraded and the district be connected to cellular mobile networks. Telephone services ought to be extended to major service centres such as Lukwesa, Mulundu, Musonda, Kashiba, Lubunda, Musangu, Chipili and Mwenda. This is especially vital for hospital referral services as a radio system for health facilities is currently lacking.

7.3.2 As a result of enormous variations in populations and incomes certain catchment areas may necessarily overlap but others are expected to be either partly or wholly empty. It is therefore, recommended that certain services be provided on a part-time or mobile basis. This can solve the problem of partially developed service centers and such a measure should be extended to services including local courts, postal facilities, health and market services. This will sort out the problem before deployment of permanent facilities can be made depending on the availability of funding.

7.3.3 Applying the growth center approach, some centers must be upgraded as a matter of priority to strengthen their relationship with their complementary areas. These include the two sub-district centers of Lukwesa and Mulundu, and the eight central village centers including Kapala, Musangu, Lubunda, Kashiba, Katuta, Musonda, Chipili and Mwenda. Upgrading should involve immediate investment to fulfil the locational-functional gaps so as to increase their ability to serve surrounding villages. The investment energy injected into these centers is expected to flow through service village centers to dependent villages with feedback processes.

When all this is done the development of the rural district will be promoted, in turn leading to the attainment of improved welfare of the people. Improvement in the socio-economic conditions of the district will make it attractive and would counter the loss of humanpower to urban areas. It will also change the negative perceptions about rural areas, thereby attracting further investment by local and potential external investors as well as by government in the local economy for further advancement of the district.

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N

Appendix A

QUESTIONNAIRE FOR THE INTERVIEW GUIDE ON ACCESSIBILITY TO SERVICES PROVIDED IN MWENSE DISTRICT ADMINISTERED TO RANDOMLY CHOSEN HOUSEHOLDS.

Serial No:.....Village:Chief.....
Date:.....

Dear Respondent,

Mr. Elie Shumba is carrying out research on your accessibility to goods and services provided in Mwense District by selected service providers. This is in partial fulfilment of the requirements for the award of the degree of Master of Science at the University of Zambia.

You are kindly requested to answer all the applicable questions to the best of your knowledge. Please be assured that the information you give will be kept secret and used for academic purposes only. Please tick the applicable response or write the answer in the blank space as the case may demand.

SECTION A: BASIC INFORMATION.

1. Sex: Male Female
2. Age:years.
3. Marital status:.....
4. Number of people in the household:.....
5. Occupation: Farmer Fisherman/woman Trader Traditional craftsman
Government worker Please
specify:.....
Other Please specify:.....
6. Main sources of income: (i) (ii).....
(iii).....
7. Education attained: Primary
Junior Secondary
Secondary
Tertiary
None
8. Period of stay in present village:.....
9. Approximate total family income per month:
a) Less than K50,000.
b) Between K50,000 and K100,000.
c) Between K100,000 and K250,000.
d) Between K250,000 and K500,000.
e) More than K500,000.

SECTION B: HEALTH.

1. When in need of medical services, which health provider outlet do you go to? Please specify the name of the applicable outlet.

- a) Rural Health Centre
- b) Rural Health Post
- c) Community Health Provider

Give reasons why.....
.....
.....

2. What mode(s) of transport do you use to get there?

- a) Walking []
- b) Bicycle []
- c) Wheelbarrow []
- d) Cart []
- d) Other (Please specify).....

3. What type of road connects your village to the health provider?

- a) Footpath []
- b) Motorable track []
- c) Regularly maintained road []
- d) Tarred road []

4. Approximately how far is it from your village to your health provider?

.....

5. Does your health provider adequately cater for all your health needs?

Yes [] No []

If not, in which areas is it lacking?

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

6. Do you face any problems in accessing health services and facilities? If so what are the problems?

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

7. What do you think would be the best solutions to the problems mentioned above?

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

8. Do you have a Neighbourhood Health Committee in your area? Yes [] No []

If so, what benefits have you found in it?

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

SECTION C: EDUCATION

1. Do you have children or dependants who are in school?

Yes [] No []

2. If so in what grades are they and which schools do they attend?

Grade							
No. of children							
School							

3. Why did you choose these particular schools?

- a) Distance (close to home) []
- b) Good teachers []
- c) Good results []
- d) Only school available []
- e) Other (Please specify).....

4. Which is the nearest school to your village?.....

5. How far is it from the village?

6. How do your children travel to school?

- a) Walking []
- b) Bicycle []
- c) Bus []
- d) Other (Specify)

7. How long does it take to travel to school using the means indicated in (6) above?

.....

8. Do you face any difficulties in accessing educational services and/or facilities for your children? If so, please specify them.

.....

9. What do you think should be done to improve or correct the situation?

.....

SECTION D: AGRICULTURE.

1. Do you belong to any Cooperative Society?

Yes [] No []

2. If so, which one?

3. Has it benefited from the National Fertiliser Support Programme? Yes [] No []

If so, please proceed to Question 5.

If not, how do you access farm inputs e.g. seed and fertilizer?

a) Buy in bulk []

b) Buy in small packages []

c) Other types of loan []

d) Programme Against Malnutrition []

e) Other (specify).....

Please proceed to Question 8.

5. Does the Cooperative Society provide the required inputs in good time?

Yes [] No []

If not, what in your opinion are the causes of these delays?

a) Administrative procedures []

b) Poor roads []

c) Lack of transporters []

d) Do not know []

e) Other (specify)

7. What could be the best way of solving this/these problems?

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

8. Where do you sell your farm produce?

.....

9. By what means do you transport your goods to the market, when you have to do so?

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

10. What do you think would be the best way of marketing your produce?

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

11. Does the Agriculture Extension Services camp in your area provide sufficiently for your needs in:

a) Advice: Yes [] No []

b) Inputs: Yes [] No []

12. If your answer(s) to (a) above is 'No' could you specify what is lacking?

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

SECTION E: TRANSPORT AND COMMUNICATION.

1. What type of road connects your village to the township?

- a) Footpath []
- b) Motorable track []
- c) Maintained road []
- d) Tarred road []

e) A combination of roads (please specify)

2. What is the most widely used transport in your village to get to the township?

- a) Walking []
- b) Bicycle []
- c) Cart []
- d) Boat []
- e) Bus []

f) Other (specify)

3. Which is the nearest bus stop to your village?

Specify the distance

4. By what means do you send and receive mail?

- a) None []
- b) By hand []
- c) Stamp Vendor []
- d) Postal Agency []
- e) Sub-Post Office []
- f) Post Office []

5. What is the distance from your village to the nearest postal services provider?

.....

6. What postal services are you in need of but are not available at the nearest postal services outlet?

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

SECTION F: TRADE AND COMMERCE.

1. Where do you go for your shopping?.....

2. How often do you go shopping there?
a) More than once a week []
b) Weekly []
c) Occasionally []

3. How do you travel to the shops?
a) Walking []
b) Bicycle []
c) Cart []
d) Bus []
e) Other (specify)

4. Why do you go there rather than any other shopping place?
a) Near to home []
b) Near to work []
c) More choice []
d) Cheaper goods []
e) Other (please specify)

5. What types of goods do you usually buy from there?
a) Groceries []
b) Clothes []
c) Food []
d) Others (please specify).....

6. What goods would you like to buy from there but are not available?
.....

7. Do you go shopping anywhere else, and if so, where?.....

8. Why do you go there?.....

9. What goods do buy from there?

10. How often do you go there?
a) Weekly []
b) More than once a month []
c) Monthly []
d) Occasionally []

11. How do you travel there?

THANK YOU FOR YOUR HELP!

Appendix B

A Data Matrix: Number of Establishments of Each Function in Service Centres of Mwenze District

ettlements	FUNCTIONS																										
	High school	Basic Sch1	Basic Sch2	Comm Sch	Health Center2	Health Center1	Health Post	Ambulance	Agric camp	Coop society	Market	Wholesaler	Retail Shop	Stall	Liquor Store	Grinding Mill	Magistrate	Local Court	Police Station	PolicePost	Chiefs HQ	Post Office	Sub-Post	Postal Agency	Bus Stop	Stamp Vendor	
Kabundafyela			1							2																	
Kashiba			1							1																	
Kashiba		1			1					4	1	6	2	2	2	1					1				1	1	
Mukomonsala			1							2																	
Nkomba										1																	
Mwenze	1	1		1	1				1	3	2	3	21	19	2	7	1	1	1	1						1	
Chebele			1																								
Chalwe			1																								
Kabila			1																								
Mutima		1								1																	
Munwa		1							1	2																	
Mukendu		1	1		1			1	1	6	1	11	4	1	2	1					1				1		
Musonda		1		2	1			1	1	1	1	5	3	3	2	1					1				1		
Bunda Chunsu			1																								
Musalango			1							2																	
Chikaya			1	1																							
Katebula										1																	
Chifuntwe																											
Kabongo			1																								
Kamami			1	1					1	1															1		
Kaoma			1																								
Makasa																		1									

Appendix C

Centrality Scores and Populations of Service Centres of Mwense District (based on 2000 Census Data).

Settlement	Population	Centrality Score	No. of Services
1. Mwense	8,518	124	18
2. Lukwesa	5,741	63	14
3. Mulundu	5,123	56	15
4. Musonda	3,212	37	12
5. Kashiba	3,967	36	13
6. Chipili	2,061	33	12
7. Musangu	4,057	24	10
8. Kapala	5,074	21	04
9. Lubunda	3,464	18	09
10. Katuta	2,880	18	09
11. Mwenda	2,014	15	07
12. Kalundu	1,917	11	06
13. Mutipula	2,658	10	08
14. Chibondo	2,486	09	06
15. Mukonshi	1,214	08	05
16. Lupososhi	1,038	08	05
17. Mupeta	1,183	07	04
18. Mubende	1,580	07	05
19. Mulonga	2,179	07	04
20. Mununshi	1,583	07	04
21. Kapamba	398	07	04
22. Luminu	1,977	07	04
23. Kawama	2,124	05	04
24. Mumpolokoso	908	05	03
25. Chisheta	1,293	05	03

26. Kamani	1184	04	04
27. Munwa	758	04	03
28. Musalango	401	04	02
29. Kabundafyela	1153	03	02
30. Mukomansala	1752	03	02
31. Kaoma Makasa	581	03	02
32. Kanshimba	681	03	03
33. Mukanga	332	02	02
34. Chulu Luongo	408	02	02
35. Kasonge	1,879	02	02
36. Musaalula (Mweshi)	1,096	02	02
37. Kankomba	950	02	02
38. Koweni	1,286	02	02
39. Kasengu	679	02	02
40. Kanyemba	2,420	02	02
41. Mutima	1,260	02	02
42. Chikaya	612	02	02
43. Mung'anga	312	02	01
44. Chebele	1,007	01	01
45. Chalwe	667	01	01
46. Kabila	753	01	01
47. Bunda Chunsu	428	01	01
48. Katebula	275	01	01
49. Chifuntwe	206	01	01
50. Kabongo	286	01	01
51. Nkomba	610	01	01
52. Musele	1,248	01	01
53. Nshindano	214	01	01
54. Wanyange	231	01	01
55. Tente	300	01	01
56. Loto	1,204	01	01

57. Bwele	286	01	01
58. Kafusha	275	01	01
59. Tangwa	347	01	01
60. Chelekumbi	292	01	01
61. Sesa	239	01	01
62. Fisaka	249	01	01
63. Kapena	5,609	01	01
64. Lwamfwe	649	01	01
65. Mukumbwa	651	01	01
66. Chinshinki	280	01	01
67. Kandakala	268	01	01
68. Kapenda	224	01	01
69. Leo	279	01	01
70. Kapwenge	172	01	01
71. Mukabi	286	01	01
72. Moba	149	01	01
73. Mukunto	159	01	01
74. Mulanda	166	01	01
75. Muchinga	429	01	01

Appendix D

Nearest Neighbour Analysis

The table below shows Service Centres, Nearest Neighbours and Distances for Mwense District.

	Settlement	Nearest Neighbour	NN Distance (Km)
1.	Kabundafyela	Kanyemba	2.5
2.	Kanyemba	Kabundafyela	2.5
3.	Kashiba	Nkomba	2.0
4.	Mukomansala	Nkomba	1.5
5.	Nkomba	Kashiba	2.0
6.	Mwense	Kanyemba	4.5
7.	Chebele	Mwense	8.5
8.	Chalwe	Kabila	4.0
9.	Kabila	Chalwe	4.0
10.	Mutima	Mulundu	2.5
11.	Mulundu	Mutima	2.5
12.	Musonda	Muchinga	5.0
13.	Bunda Chunsu	Kaoma Makasa	8.5
14.	Musalango	Mukabi	18.0
15.	Chikaya	Mwenda	8.0
16.	Katebula	Mweshi	2.0
17.	Chifuntwe	Mukunto	9.5
18.	Kabongo	Luminu	11.0
19.	Kamami	Chulu Luongo	2.4
20.	Kaoma Makasa	Bunda Chunsu	8.5
21.	Mung'anga	Mwenda	7.0
22.	Mupeta	Nshindano	4.4
23.	Musele	Kalundu	8.6
24.	Mwenda	Chikaya	8.0