APPROVAL

THIS DISSERTATION BY MR. JOHN KANGWA IS APPROVED AS FULFILLING THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN GEOGRAPHY BY THE UNIVERSITY OF ZAMBIA.

NAME	SIGNATURE
.....	.....
External Examiner	
Prof. R.Y. Singh	22/03/2004
.....	.....
Supervisor and Internal Examiner	
Dr. G.P.A. Banda	22/03/04
.....	.....
Internal Examiner	
Prof. J.N. Zulu	22/03/04
.....	.....
Dissertation Chairperson	

The Impacts of Fragmented Settlement Patterns on Provision of Infrastructure and Services in Lusaka

John Kangwa

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

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Geography Department
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Dedication

To my family

("*..at Independence Lusaka was primarily a city of 'servants', civil, domestic and otherwise.*" Leonardus M. van den Berg, 1984)

Abstract

Like many other cities that were established during the British colonial period, Lusaka was created to reflect the town planning ideas of the late 19th century in Europe. The ideas propagated by the 'Garden City Movement' played an important role in the design ethic applied to Lusaka. This resulted in a city that fostered the ideals of suburban living for the white minority while ignoring the living conditions of the African majority.

While insisting on a "generous, gracious city" for the small, white community, the planners of colonial Lusaka had difficulties finding a suitable site for the growing African population. The European areas were provided with all the modern amenities necessary for urban living while the African areas had little in the way of infrastructure and services. Independence in 1964 halted the racial segregation but replaced it with a physical and social segregation based upon income levels.

As a result mainly of colonial planning policies, Lusaka is now characterized by a physically and socially fragmented urban structure in which a majority of residents do not enjoy equitable access to infrastructure and services.

This study investigates levels of access to infrastructure and services in a sample of residential areas and arrives at an index of accessibility showing the different levels of access across the study area. The methodology of the study consisted of a field study of 100 respondents drawn from eight residential areas covering the high, medium and low cost areas and a literature study of the relevant source material on the issues of housing and infrastructure access both in Lusaka and Third World cities in general.

The research findings broadly confirm what was suspected that the low and medium cost areas, which were originally African housing areas, suffer more from deficiencies in access to infrastructure and services in comparison to the high cost areas. However, they also point out the fact that a certain amount of consolidation has taken place, particularly with respect to the permanence of shelter among the low cost residents. The research concludes with the view that there is still much to be done to improve accessibility to infrastructure and services for the low cost majority who continue by and large to carry on a seemingly rural way of life in a city, which is increasingly adopting an urban mode of existence.

Acknowledgements

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Approval

This dissertation by John Kangwa is approved as fulfilling part of the requirements for the award of the degree of Master of Science (Geography).

Examiners

Signed.....**Date**.....

Signed.....**Date**.....

Signed.....**Date**.....

Declaration

I, John Kangwa, declare that this dissertation is a result of my own archival and field research. It has never been presented for a degree at this or any other University. All published work or material from other sources which have been incorporated have been specifically acknowledged and adequate reference thereby given.

Signed.....J. Kangwa.....

Date.....19/03/2004.....

Abbreviations

BSA	British South Africa Company
CBD	Central Business District
CBU	Copperbelt University
CLNC_DST	Distance to Nearest Clinic
CLNC_TYP	Type of Clinic attended
COOK_EN	Cooking Energy used
CSO	Central Statistical Office
DIST_WAT	Distance to Water Source
DPU	Development Planning Unit
DRC	Democratic Republic of the Congo
EDUC	Education level attained
EMP_STAT	Employment
FNDP	First national Development Plan
Govt.	Government
GRZ	Government of the Republic of Zambia
H/holds	Households
HLTH_PRO	Health Provider
JNY_TIME	Journey Time to work
LIGHT_EN	Lighting Energy used
LITES_WK	Street Lighting status

MLGH	Ministry of Local Government Housing
MMD	Movement for Multi-Party Democracy
NAZ	National Archives of Zambia
NHA	National Housing Authority
NHP	National Housing Policy
NO_RMS	Number of Rooms
PUSH	Project Urban Self-Help
RD_TYPE	Road Type
RES_AREA	Residential Area
ROOF_MAT	Roofing Material
SAN_TYPE	Toilet type
SCH_TYPE	Type of School
SHOP_DST	Distance to Shops or Market
SNDP	Second National Development Plan
SPOT	Satellite Pour L'Observation de la Terre
SPSS	Statistical Package for the Social Sciences
STRT_LTS	Street Lighting
TNDP	Third National Development Plan
TRSPT	Transport
UNIP	United National Independence Party
UNZA	University of Zambia
WALL_MAT	Wall Construction Material
WAT_AV	Water availability

WAT_SRC	Water Source
WC	Water Closet
WK_PLACE	Work Place
WST_DISP	Waste Disposal
ZGA	Zambia Geographical Association

Operational Definitions of Key Terms

Central Business District (CBD)
Commercial part of a city or town-usually central or core area.

Garden City Movement
Movement started as a result of ideology of urban planning propagated by Ebenezer Howard (1902) in his book 'Garden Cities of Tomorrow'. Also refers to the adoption and implementation of "Garden City" concepts in totality.

Garden City Thinking
Refers to the application of parts only of Howard's ideology.

High Cost Area
Residential area where plot sizes are equivalent to or larger than 30m by 45m.

Histogenesis
Refers to the historical origins of a settlement.

Infrastructure and Services
In this context infrastructure refers to elements in the built environment including houses and other buildings (and the materials that make them up such as roofing and walling material), roads, drains, sewers, street lighting, electricity transmission lines etc., while services include health and education facilities provided for the benefit of residents in a particular locality.

Informal Housing Area
Residential area not legally constituted as such before occupation by its residents. Formal housing area has the opposite meaning.

Low Cost Area
Residential area where plot sizes are equivalent to or larger than 12m by 27m but smaller than the medium cost specification.

Medium Cost Areas
Residential area where plot sizes are equivalent to or larger than 18m by 30m but smaller than the high cost specification.

Morphogenesis
Origins or history behind current structure or form of a settlement.

Natural areas
Geographical units or entities in a city within which a population with broadly similar characteristics resides.

Settlement Pattern
Spatial relationship of settlements.

Site-and-Service Areas
Areas where serviced plots have been made available to the public including a building materials loan and technical assistance for self-help house building.

Socio-spatial or Residential Differentiation
The sifting out of city populations according to social and economic criteria into distinctive neighbourhoods

Squatter
One who occupies land illegally. Squatter area or township should be construed accordingly.

Urban/Spatial Fragmentation
The formation of a city or town from incomplete or different parts that are not easy to understand or are not the same or similar all through.

Upgraded Areas
Refers to squatter townships where the settlement pattern has been regularised by the addition of roads and other infrastructure

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Chapter One

Introduction

1.1 Growth and Development of Cities

The growth and development of cities has, historically, been influenced by many factors. From very early times man has demonstrated a desire for places of assembly for defensive or religious purposes and a need to overcome the physical obstacle of distance in human interaction. The clustering of populations in communities is a basic human need brought about by man's need to cooperate in order to survive (Goodall, 1972).

The earliest cities appeared between 6000 and 5000 BC. By 3000 BC there were in existence what may be termed as true cities, which declined until Greco-Roman times when city existence developed further. From 600 BC to 400 AD, towns and cities became more numerous and the degree of urbanisation became greater. The Dark Ages, from AD 400 to about AD 1000 witnessed the collapse of cities in Europe until the development of trade and mediaeval towns after 1000 AD led to urban centres gaining in significance. The appearance of genuine urbanisation came with the industrial revolution when the development of industry led to the growth of urban areas (Kingsley, 1959).

The rise and growth of colonial cities followed in the wake of the industrial revolution as settler colonies developed in search of raw materials to fuel the European industrial machine. Home (1997:9), refers to the fact that a policy of deliberate urbanisation underpinned the British model of colonial town planning. This policy had its mediaeval origins in the granting of charters by the British crown and earlier, with the colonies of the Roman occupation. He states that the British government consistently applied this

policy to its overseas plantations and colonies ensuring that they became "centres for trade and defence, and a civilising influence".

1.2 Urbanisation and the need for Infrastructure and Services

During the Industrial Revolution, the issue of housing conditions for unskilled workers and the attendant infrastructure gained in prominence. Housing densities were generally high and overcrowding was commonplace. There was no provision for sewerage, no piped water and no refuse collection. In these conditions diseases such as typhoid fever and tuberculosis were rife and epidemics took a heavy toll. A cholera epidemic in London in 1849 resulted in 14,000 deaths (Daniel and Hopkinson, 1993). In Liverpool during the period 1839-1844, the average age at death was only 17 and more than half the children born did not reach the age of five (Daniel and Hopkinson, 1993). The development of urban infrastructure systems in the United Kingdom was therefore greatly influenced by the spread of diseases and death brought about by the insanitary housing conditions of the period. This led to the enactment of legislation, which stipulated minimum conditions to be adhered to in the provision of housing and infrastructure (Guy, Graham and Marvin, 1997).

1.3 The Industrial Revolution and the 'Garden City' Movement

These conditions gave birth to what came to be known as the 'Garden City' Movement. A number of employers saw the creation of new settlements as a solution to the problem of poor housing conditions for the working classes (Daniel and Hopkinson, 1993). In 1902, Ebenezer Howard published 'Garden Cities of Tomorrow' in which he argued for the

creation of 'healthy cities' of not more than 30,000 persons supported by the intervening agricultural land. These ideas were put into practice through the formation in 1901 of the Garden City Association, which preceded the Town and Country Planning Association.

Thus, when the colonial administration of Northern Rhodesia decided to erect a new capital for the territory, they engaged a planning consultant from this background. Professor Adshead was in the vanguard of the 'Garden City Movement' and was himself a past President of the Royal Town Planning Institute, which succeeded the Town and Country Planning Association. The planning standards he applied to Lusaka derived from the ideas propagated by the 'Garden City Movement'. However, Lusaka as it stands today is not only a product of these influences, but also of the political process of change from colonial rule to self-government.

1.4 Statement of the Problem

The fragmented settlement patterns that can be observed in Lusaka are a result of colonial planning standards and rural-urban migration patterns before and after independence. These influences have played a large part in determining Lusaka's present urban morphology and have given rise to a city characterised by social and spatial differentiation which has resulted in variations in access to infrastructure and services. Inadequate provision of infrastructure and services frequently determines the quality of life of many urban residents and is at the centre of many of the problems facing urban areas in developing countries. In Zambia, prevalent usage of pit latrines, inadequate water supply systems, and poor drainage and waste disposal systems have led to frequent

outbreaks of cholera over recent years threatening the life and health of many poor urban residents. Poorly maintained or non-existent road networks cause some low cost residential areas to become inaccessible, and the absence of street lighting frequently contributes to high levels of crime in these areas.

With respect to medical, educational and other social facilities, there is a wide choice depending upon level of income. Those who have the means often buy themselves out of the system, thereby reducing their dependence upon facilities that are provided for everyone. The result is a social and spatial polarisation in which many less fortunate urban residents do not have their social needs catered for. They are therefore at risk from use of unsafe drinking water, insanitary environments, crowded living conditions and health and social services that cannot fully meet their needs and aspirations for integration into the urban way of life.

1.5 Purpose of the Study

This study examines the current state of infrastructure and services in Lusaka and specifically addresses the differences in access to infrastructure and services between the high, medium and low cost residential areas.

The study seeks to:

- Determine the prevailing land use and settlement patterns in the study area and how these have evolved,
- Determine levels of access to infrastructure and services in a sample of residential areas, and

- Identify current impacts of fragmentation on the city's urban landscape and the implications for the delivery of infrastructure and services.

1.5.1 Hypotheses

To achieve the above objectives, the study intends to test the following hypotheses:

- Garden city thinking in the planning for Lusaka has produced a spatially fragmented urban form that does not cater for the needs of all residents in a uniform manner.
- Fragmentation in the use of urban spaces has resulted in differential access to infrastructure and services in the study area.

1.6 Significance and Relevance of the Study

This study is significant because

- The population of Lusaka has grown over the years without a corresponding rise in the provision of infrastructure and services. It is important for the future growth prospects of the city to present a situation analysis of current conditions in order to gain an understanding of what has gone on before.
- The year in which the study has been carried out marks the end of the period covered in the master plan of the city (1978-2000). It is of relevance to examine what has been achieved by the planning strategies of the past so as to learn lessons for the future.

1.7 Scope and Limitations of the Study

The City of Lusaka includes within its boundaries, a number of suburban and smallholding enclaves where the population density is lower than in the closely built-up

areas. For purposes of defining the study area, the population of Lusaka has been taken to include all settlements falling within the boundaries shown in Fig. 1.1 (page 8). However, in mapping accessibility to infrastructure and services (Fig. 6.13, page 107), it has not been possible to include all outlying areas due to the difficulty of accurately ascertaining their boundaries and also because of the dispersed nature of these settlements. In addition, the sampling process did not include the formal low cost areas of Chilenje and Matero. This was not by design but was due purely to the randomness of the process by which the selected townships were included in the survey.

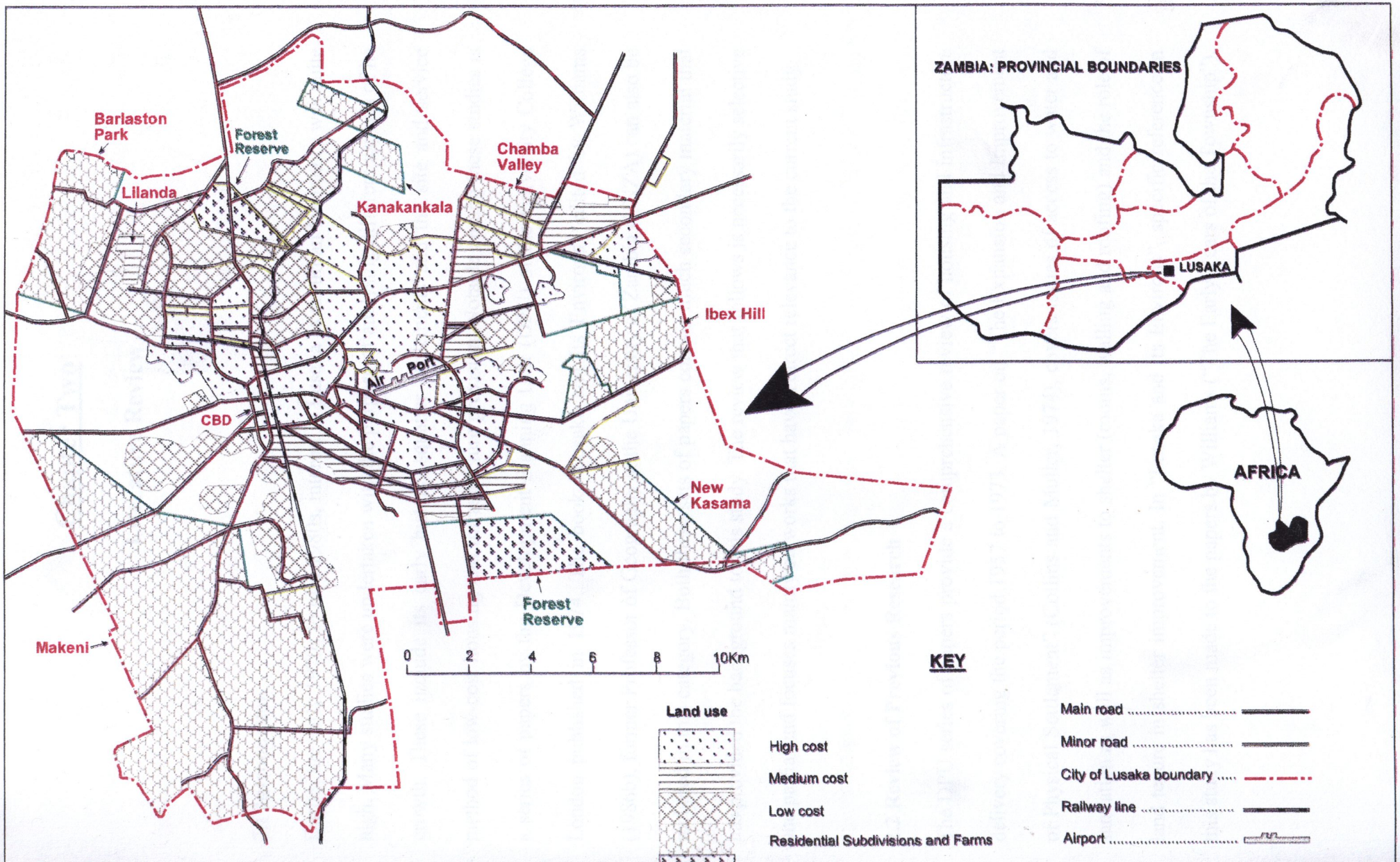
The categorisation of residential areas into high, medium and low cost is a convenient device for dividing up the study area and has been adopted from existing planning practice in the Lusaka City Council. The division is based on planning guidelines for minimum plot sizes in each category. Additionally, most parts of Lusaka have come to be characterised over the years with residents of a particular social status. Within the context of this research, it is recognised that these divisions are not hard and fast because of the mixed nature of some of the residential developments that have taken place over the years.

1.8 Structure of the Study

Chapter One introduces the subject of city growth and infrastructure and the research problem. Chapter Two is a literature review covering previous work related to the study area as well as the research problem. Chapter Three provides a theoretical framework that lays the foundation for the field study. Chapter Four presents the methodology adopted for the study. Chapter Five is a treatment of the history of settlement development and

growth at Lusaka. Chapter Six presents the research findings from the sample survey and results of the hypothesis tests while Chapter Seven presents a discussion and analysis of the research findings. Chapter Eight presents the conclusions and recommendations.

FIG. 1.1 STUDY AREA – LAND USE AND SETTLEMENT PATTERNS



Chapter Two

Literature Review

2.1 Introduction

During the early 1970s to mid 1980s, interest in Lusaka as an urban laboratory was quite high. Many studies were undertaken with the purpose of analysing different aspects of its growth. These include its early history, squatter settlements and the site and service method of low-cost housing and infrastructure provision. Notable among these studies is a series of papers by the Development Planning Unit (DPU) of the University College London published in 1974. The book "Lusaka and Its Environs" edited by Williams (1986b), former Professor of Geography at the University of Zambia (UNZA) can also be included in this category. Both these sets of papers contain much secondary material that has provided the background to this study. The review that follows is necessarily selective and partial and focuses mainly on works that have a direct relevance to the current study.

2.2 Review of Previous Research

The DPU series of papers provide a comprehensive review of housing and infrastructure delivery covering the period 1957 to 1973. A paper on "The Expansion and Improvement of Physical Settlement" (Collins and Muller, 1974), covers issues of access to water and sanitation as well as improvements to shelter (rooms, walling and roofing) and the role of land tenure in shelter improvement. In "Lusaka and its Environs", specific reference in this study has been made to the papers by Williams ("The Early Years of the Township"),

Collins ("Lusaka: The Historical Development of a Planned Capital, 1931-1970"), Wood with Banda and Mundende ("The Population of Lusaka"), Rakodi ("Housing in Lusaka: Policies and Progress"), Henkel ("The Spatial Structure of the Retail Sector of Lusaka outside the CBD"), Cheatle ("Water Supply, Sewerage and Drainage"), Blankhart ("Urban Transport in Lusaka"), and Kajoba ("Land Tenure as a Development Constraint in Lusaka"). Other research on the issue of housing in Lusaka includes works by Modise (1970), Rothman (1972), the Department of Town and Country Planning (1972), Knauder (1982) and Khonje (1983).

Modise (1970), discusses home-ownership and housing within the conceptual framework of social stratification. This paper deals with the main characteristics of urban housing in Zambia and the effect of social status on access to housing in Lusaka, in particular. Modise (1970), has analysed the extent of, and attitudes to, home-ownership among Africans in Lusaka in the seventies. His research focuses on a sub-population of the African residents of the city earning the equivalent of five hundred British pounds per month. Modise argues that ever since the creation of Zambian towns, urban housing policies and practices have been characterised by stratification. He states that the provision and allocation of houses was always based upon criteria such as income, profession, type of employer, and social standing. He goes on to conclude that this practice resulted, as in other parts of the world where it is found, in better housing for the higher income groups and poorer housing for those in the lower income bracket.

Khonje (1983), has written on the acceptability of urban low-cost housing in Zambia.

This work focuses on the difference in attitudes to their type of accommodation, between consumers of formal, low cost housing and those living in site and service and squatter areas. Sample surveys were conducted in Libala Stage II and Nyumba Yanga (conventional/formal housing), Chawama and Kalingalinga (non-conventional/site and service), and Bauleni and Misisi (squatter). He concludes that consumers of non-conventional housing exhibited higher levels of satisfaction with their type of accommodation than did consumers of conventional housing. The reasons for this difference are postulated to lie in the flexibility with which non-conventional housing can be altered to suit the home-owners tastes and needs at any particular point in time. The infrastructure and services Khonje surveyed include shelter, sanitation, roads and street lighting. This work includes an analysis of the housing policies and strategies employed by the Zambian government in the post independence period. A review of this material is included in the discussion on the "Evolution and Growth of Settlement at Lusaka" in Chapter Five.

Knauder (1982), has undertaken an assessment of the post independence housing policy of 1968. This work looks at the degree of integration and segregation, and social interaction across income groups, and attitudes towards social integration and equality between residents in the low-density areas and those in the high-density areas of Lusaka.

Rothman (1972), has written on urban development in the colonial period up to the attainment of independence. This work traces the origins of the practice of providing housing tied to employment. He states that it grew out of the system of providing

accommodation for African servants at the rear of European employers' residences. As the servants were allowed to build their huts for themselves, they invariably built them from local materials based on traditional village types. This practice was extended on a larger scale to compounds on farms and contractor's premises and led to the growth of squatter compounds after independence when the farm owners and contracting companies left the country.

A report prepared by the Department of Town and Country Planning (Ministry of Local Government) on 'Low Cost Residential Development in Lusaka' (Government of the 'Republic of Zambia (GRZ)', 1972), provides an assessment of low cost housing development before and after independence in 1964. This paper defines the origins and characteristics of low cost housing in Lusaka from the time it was officially recognised as the capital of Northern Rhodesia to post-independence policies regarding squatter upgrading and aided self-help housing.

In view of the large amount of research that has already been done on Lusaka and the problems of its urban growth and development, the question can be posed as to the contribution that this current study brings to the subject. The answer to this question lies in the application of factorial ecology techniques in the analysis of social-spatial differentiation. It is notable that among the research papers reviewed above, none of the authors have attempted a factorial ecology of Lusaka to explain its socio-spatial or residential differentiation. The only work that approaches this subject is that by Modise (1970). However, his work is limited by the fact that he deals only with the issue of

housing amongst a specific sub-population of the city. Furthermore, he does not subject his data to the theory of social area analysis using the techniques of factorial ecology.

Knauder (1982), has provided a descriptive analysis of the elements of residential differentiation in Lusaka. Although extensive lists of figures collected during her field surveys back her work, the data set has not been subjected to the techniques of factor analysis either. The point of departure for this study, therefore, lies in the application of factor analysis techniques to derive the major dimensions of differentiation in access to infrastructure and services and thereby to compute an index of differentiation or accessibility between the different classes of urban dwellers in Lusaka.

2.3 Urban Fragmentation as a Research Problem

The analysis of areal differentiation is a basic task of geographical analysis that provides an overall descriptive synthesis, which can be shown to have fundamental value in its own right (Knox, 1995). Socio-spatial differentiation has been said to occur when "city populations get sifted out according to race and social class to produce distinctive neighbourhoods" (Knox, 1995:1). Engels (1969), described this phenomenon when he wrote about the segregation of social classes in the city of Manchester. Sirjamaki (1964:201), refers to the ecological organisation of cities into local areas, which are geographically termed as "natural areas" within which the city populations reside. These natural areas constitute physical and geographical entities that are distinct in their boundaries and composition. As social group habitats, these areas result from the segregation of populations in areas of urban residence. Other writers have shown that

urban space is a product of a series of transformations including social, cultural, political and economic ones (King, 1976; Soja, 1980; Peil, 1984). In reference to Third World cities, Balbo (1993), Balbo and Navez-Bouchanine (1995), and Larbi (1996), have described this aspect of the internal organisation of cities as the fragmentation of urban space. Balbo (1993), argues that the cities of the Third World exhibit distinct spatial patterns that need to be recognised as the fragmentation of urban space. This "fragmented character of their spatial organisation" is expressed in the drawing together of "planned districts, illegal settlements and slums in a continuously discontinuous pattern that is impossible to handle with the conceptual and operational tools of traditional city planning" (Balbo, 1993:23).

Larbi (1996), in presenting a case for urban fragmentation in Accra argues that the failure of spatial planning in that city has led to fragmentation of the urban environment. He states that the planning system has failed to take a strategic view of the urban land development process. Instead, planning decisions are taken re-actively rather than pro-actively. As a consequence the measures taken often translate into physical development in the form of uncontrollable urban sprawl. This tends to have a negative effect on economic activities, which are often poorly located, unrelated and uncoordinated. The result of this is inadequate physical and social infrastructure, and many social, economic, political and cultural tensions. Boakye-Yiadom Jr. (1997), comments that no discussion of Accra's infrastructure seems to avoid the terms "deterioration" or "disgrace". He states that the reasons for this lie, on the one hand, on the economic decline the city has undergone, while a second reason has to do with the physical dimensions of the city's

growth. He also states that ordinances framed for purposes of fostering a sensible growth pattern have not been enforced for several decades, and spontaneous developments have characterised the sprawl in many parts of the city. As a result overcrowding has increased in existing residential areas, and is particularly severe in unserviced and unplanned slum areas.

In a study of urban land use in the Saudi Arabian City of Madina, Abdulaal (1990), discusses the effects of uncontrolled land subdivision on a city's urban morphology. His findings indicate that fragmentation in Madina has been caused primarily by the irregular subdivision of land parcels. Instead of proceeding in an orderly manner taking in all land in its pathway, subdivision activity "leaps ahead to distant tracts, passing over nearby ones depending upon land owners estimates of the saleability of the subdivided land" (Abdulaal, 1990:726). Balbo (1993:24), has also referred to this phenomenon when he says that urbanisation in Third World cities "takes place in leaps and bounds."

Larbi (1996), goes on to postulate that there are social, economic and environmental costs attached to this wide divergence in urban morphology in Third World cities. He argues that spatial planning should aim at "balancing the allocation of resources between groups, establishing a symmetry between space and economy and between social costs, economic costs and benefits and providing a healthy and sustainable urban environment" (Larbi, 1996:214). However, many Third World cities such as Lusaka have not been able to achieve this balance. They continue to exhibit a lack of balance in access to resources

between groups of urban dwellers as well as differences in the standards and quality of housing and infrastructure.

Balbo (1993), states that urban fragmentation occurs on three different levels. These relate to differences in settlement patterns, in levels of access to infrastructure and services, and in levels of tenure security. These three areas of difference are discussed further in sections 2.3.1, 2.3.2 and 2.3.3.

2.3.1 Differences in Settlement Patterns

A settlement form or pattern, relates to the way in which land and buildings can be used together to create nucleated or dispersed settlements (Daniel and Hopkinson, 1993). Balbo (1993:26), has shown that different settlement patterns dominate the urban environment of most Third world cities. These patterns include what he calls the 'modern centre', the historic city, the planned districts, the various types of illegal settlements and slum areas all of which "exhibit distinct features and within these areas private, collective and public spaces have different meanings and therefore give rise to different ways of using the city".

On a continental scale, O'Connor (1983), has proposed a typology of cities in Africa. He states that African cities can be differentiated into six categories: indigenous, Islamic, colonial, European, dual and hybrid. The last of these categories is "reserved for those cities which combine indigenous and alien elements in roughly equal proportions, but in which they are to a large extent integrated, rather than merely juxtaposed" (O'Connor,

1983:40). He further states that while it may be true that at the time of independence most of the cities of tropical Africa could appropriately have been fitted into one of the above categories, this is no longer the case. The urbanising processes that have taken place in most African cities over the past [*thirty*] years have meant that most of them can now be regarded as hybrid cities.

O'Connor (1983), lists Harare, Bulawayo, Lusaka and Nairobi as 'European' cities set up primarily for a European core of settlers with little regard for any pre-existing settlements. At the same time indigenous cities are cast as those pre-colonial settlements established mainly as African centres of political power and administration. The best examples of these are found among the Yoruba peoples of south-western Nigeria (O'Connor, 1983).

Lusaka has no history of pre-colonial indigenous settlement on such a scale. However, Martin (1975), has studied the use of residential spaces in Lusaka's informal housing areas and concludes that the resulting morphology is a reflection of traditional practices. O'Connor (1983), makes a similar observation concerning informal areas in colonial settler cities such as Lusaka, Harare and Nairobi, stating that forms of social organisation within these areas have more in common with the rural areas of Africa than the elite sections of the city. According to Martin (1975), the architecture and building materials that have long been used in Lusaka's informal areas are indicators of indigenous building practices. If Lusaka is to be understood as a hybrid city, it is in the sense that it now combines elements of the European city that it was originally planned to be and

indigenous elements expressed in the traditional morphologies evident in the city's informal or unplanned housing areas.

Kay (1967), has suggested that fragmentation was a colonial imposition upon Lusaka. He notes that the European planners of Lusaka subdivided the residential areas into three sub zones that were brought about by the size of the plots and the value placed upon such plots. This imposition of different fragments was meant to cater for the separate development of different classes along the terms proposed by Adshead, who had earlier argued that the natives of Lusaka did not deserve to be treated in the same manner as the European settlers. The settlement patterns that are discernible in Lusaka, therefore, include the planned sections of the city and those that grew up spontaneously. Since independence, however, the efforts to upgrade some of the spontaneous settlements have yielded results by way of transforming their original character so that they now resemble, to some degree, the pattern of housing that can be seen in the conventional areas.

Nevertheless, significant differences are still discernible between the medium and low cost, conventional areas and the spontaneous and unplanned areas, particularly in relation to the standard of building materials and architecture.

2.3.2 Differences in Services and Infrastructure Levels

The second evidence of fragmentation put forward by Balbo (1993), is represented by differences in services and infrastructure levels and access to them. O'Connor (1983), supports this view when he states that access to basic services such as clean water,

sewerage and refuse disposal continue to pose insurmountable challenges for the majority of residents in African cities. Devas (1993), adds the view that patterns of land development [in African cities] are very often determined by the provision of urban infrastructure. Kay (1967), has noted that the planning for Lusaka provided for first class accommodation on the Ridgeway which "would be easy to sewer and [*was*] well suited to the requirements of a residential area" (Adshead, 1931 quoted by Kay, 1967). By contrast, African housing was located "on the lower and flatter land near the railway" (Kay, 1967:115), which was "known from the start to be expensive to service" (Collins, 1986:98). Knauder (1982:13), puts the whole situation in perspective in the following terms:

> "The layout and design of all major urban settlements followed the colonial pattern of racial segregation. The layouts for African housing areas were monotonous and unimaginative; few or no roads were tarred. The African housing areas were poorly provided with the essential community facilities such as primary schools and health centres.
>
> The Asian community, largely made up of businessmen and traders, was also segregated from the European and African communities. They had their separate social, educational and health facilities, but they too were of a much lower standard than those for the Europeans" .

Another factor that hinders the provision of infrastructure and services is the higher cost involved in the maintenance of services and facilities when settlements are widely spread out. Abdulaal (1990), found that the existing, spread out pattern of subdivisions in Madina, impaired public service systems, and made them costly to provide and maintain. Turok (1994), echoes this view on the nature of spatial fragmentation in South African cities. He expresses the view that the imbalance in political power in apartheid South Africa led to the allocation of 'salubrious' public goods to white areas because they were perceived as permanent residential areas. Black townships were deprived of the most basic services because they were regarded as temporary areas. Thus, in the South African case, the origins of fragmentation lie in the legacy of social control mechanisms exercised under apartheid. However, the evidences are, by and large, similar. They include "increased costs of public services in the form of high capital costs, expensive operating costs for maintaining services such as refuse collection and public transport over dispersed settlements, and wider social inequalities fostered by spatial separation of races" (Turok, 1994:251). Smith (1992), comments that the doctrine of apartheid as legislated racial separation was inextricably bound up with urbanization, but it soon became clear that imposing such rigid constraints on urbanization was inconsistent with economic efficiency and personal liberty.

In as far as transport provision is concerned, most African cities in which urban growth has resulted from European initiatives have grown in the context of the availability of motor transport for the European residents. The resulting layout of cities has therefore not favoured the lower income residents who could not afford their own means of

transport (O'Connor, 1983). Davies (1969:10), says that at a very early stage in Lusaka's development, the Europeans had achieved "exceptional mobility based upon a private motor car for virtually every family", while the Africans "relied largely on bicycles or their own feet".

Sections 2.3.2.1, 2.3.2.2, and 2.3.2.3 present a review of data collected by Collins and Muller (1974), which provides an early look at the situation of Lusaka residents in regard to access to shelter, water, and sanitation between 1957 and 1973. Collins and Muller (1974), differentiated the levels of accessibility in terms of three thresholds, namely; above upper threshold, between thresholds and below lower threshold. In keeping with their definition of the thresholds, this study has re-interpreted these to be nearly equivalent to the residential categories of high cost, medium cost and low cost which are adopted in this study to differentiate between the residential areas.

2.3.2.1 Shelter Elements

For walling material the percentage of residents with concrete blocks or burnt brick walling (Appendix B, Fig. B7, page 148) in the low cost category remained quite low only rising to 10% in 1969 and dropping slightly to about 8% in 1973. Medium cost residents rose up to 20% by 1963 and stayed at around 15% between 1969 and 1973. High cost residents with this type of accommodation showed a sustained level of just under 20%, which dropped at the change of government in 1963 to just above 10% between 1969 and 1973.

Mud block walling (Appendix B, Fig. B8, page 148) was much in evidence in the low cost category rising from just above 5% between 1957 and 1963 to about 33% in 1973. There was a consistent decline in use of this building material in both medium and high cost categories from about 24% in 1957 to 15% by 1973. Residents using any other form of walling (Appendix B, Fig. B9, page 148) were quite few. The low cost category showed a decline from 5% in 1957 to 2% in 1973. The other two categories showed similar signs of decline in this respect.

For roofing material in the low cost category, there was a significant rise in the use of asbestos, corrugated iron or tiles (Appendix B, Fig. B10, page 149) in the period under review. The graphed data shows a rise from about 3% in 1957 to about 26% in 1973. For the medium and high cost categories these figures stayed between 10% and 20%. Additionally, between 10% and 25% of this category was using good thatch (Appendix B, Fig. B11, page 149) while the use of this type of roofing rose from under 5% to over 25 % in the low cost category over the same period. The use of poor thatch (Appendix B, Fig. B12, page 149) was almost exclusively limited to the lower cost category but even here this type of material recorded a drastic drop in usage from about 9% in 1957 to about 1% by 1973 while the medium and high cost categories recorded figures in the range between zero and 2%.

2.3.2.2 Water Supply

According to Collins and Muller (1974), the percentage of high cost residents with a private tap remained fairly constant between 1957 and 1963 at around 20% (Appendix B,

Fig. B1, page 146). After 1963 this proportion fell to below 10% while that for residents in the medium cost category rose from zero in 1957 to just above 10% between 1969 and 1973. Low cost residents had no private taps before 1963 since many of them lived in 'unauthorised' areas without piped water. After this date, the percentage rose to a conservative 4% by 1973. The changes between 1963 and 1973 can in part be attributed to the independence movement which resulted in more Africans moving to the urban areas, while some expatriates left the country, thus paving the way for the rise of a new cadre of Africans with access to these services.

Shared water sources (Appendix B, Fig. B2, page 146) show a progressive decline among the medium and high cost groups between 1957 and 1973 whereas a rise in the use of such sources is recorded in the lower income group from a low of 5% in 1957 to just above 15% in 1973. Shared taps were installed in all municipal housing areas and 'officially recognised' employers' compounds. In addition, very few residents in the medium and high cost group did not have a piped water supply in the years between 1957 and 1973. The figures consistently stayed below 5% for both categories in the whole period. For the low-income group the proportions show a dramatic rise after 1963 from 10% to just over 25% in 1973.

2.3.2.3 Sanitation

Between 1963 and 1973 less than 2% of low cost residents had access to flushing toilets (Appendix B, Fig. B4, page 147) while the proportion in the medium cost category rose from zero in 1957 to about 12% in 1973. For the high cost category, the proportion

remained above 17% between 1957 and 1963 after which it dropped to just above 10%. With regard to the use of pit latrines or shared waterborne facilities (Appendix B, Fig. B5, page 147), the low cost category showed significant improvement after 1963 rising to just under 20% by 1973 from about 3% between 1957 and 1963. For this type of facility the medium cost category stayed between 15% and 25% while high cost residents showed an improvement in the quality of their facilities as the level of those with this type of facility dropped from about 27% in 1957 to 15% in 1973.

High cost residents showed the lowest use of other forms of sanitation at below 5% for all the years surveyed (Appendix B, Fig. B6, page 147). Medium cost residents also showed a significant drop from 15% in 1957 to zero in 1973 while low cost residents showed a significant rise from 15% in 1957 dropping slightly to about 11% in 1963 and then rising sharply to 20% by 1973.

These data indicate the general nature of infrastructure provision in Lusaka over the period 1957 to 1973 covering the final years of the Federation of Rhodesia and Nyasaland and the first decade of independence. They also give some general pointers at the way in which the city provided different levels of physical comfort for its inhabitants. Low cost residents (mainly Africans) had the poorest access to urban services particularly in the years before independence. This was a time when they shared the most basic and poor facilities provided by the colonial authorities or those which they provided for themselves. Rothman (1972), has indicated that though Africans were allowed to build their own huts on their employers compounds, no services were provided and their huts

were quite often patterned after the rural types that they were familiar with. Modise (1970), has argued that the provision of housing and services was based upon criteria that included social standing.

A resident of Lusaka in 1951 sums up the colonial attitude to provision of infrastructure and services for Africans. James Mlenga Bwalya wrote a letter to the Central African Post of 18th October, 1951 in which he stated the following:

> "Chinika suburb *(an African compound)* formerly known as New African Village comprises some 2,000 huts in which over 6,000 Africans are unhygienically accommodated at a monthly rental of 10 Shillings per head. There are 8 to 10 unmarried persons in each hut paying 10 Shillings each. They say there are 6 wells in this suburb, but actually only one well serves the 6,000 Africans. Sanitation is very poor indeed. There are a number of bucket latrines, which are carelessly looked after. The Lusaka Management Board officials in order to hide their cruelty from the government and general public have deceitfully built a few latrines near Mumbwa Road so that people passing along the road will think everything is the same inside".

2.3.3 Differences in Tenure Conditions

The third evidence of fragmentation is the wide variety of tenure conditions in Third World cities. Balbo (1993), says that the land tenure systems and in particular the

different degrees of security guaranteed by each one are the determinants of urban morphology in the Third World.

The studies on Lusaka, undertaken by Van den Berg (1984), and Kajoba (1986), deal with aspects of this problem. Kajoba (1986), says that the utilisation of urban space in Lusaka (as in the rest of Zambia) was intended to serve the interests of the colonial settlers and administrators. The result of this attitude was "the systematic imposition of racist policies in residential patterns" which led to the "establishment of separate residential areas" (Kajoba, 1986:309) for all races. Consequently, systems of tenure were evolved with the intention of protecting mainly the European landowners.

Kajoba (1986), further states that before the squatter upgrading programme started, the Lusaka City Council faced problems related to the provision of water, transportation and sewage disposal in settlements considered 'illegal' and especially in those where land was privately owned. Schlyter and Schlyter (1979), express the same view in their study of George Compound, where, although pressure was exerted on the council to provide a water supply, the local authority could not, because of legal complications related to the land ownership. On the contrary, planned housing areas were supplied with roads, water, drainage, garbage disposal and electricity.

At independence in 1964, the most secure form of tenure was on state land mainly along the line of rail. The growth of informal housing areas and the recognition of these areas as an alternative to the urban housing crisis led to the creation of 'Statutory Housing and

Improvement Areas'. Van den Berg (1984), comments that the Housing (Statutory and Improvement Areas) Act of 1974 was passed to facilitate the World Bank sponsored squatter upgrading programme. This Act empowered the government to declare an area occupied by "squatters" an "Improvement Area" and land required for cheap, serviced plots a "Statutory Area". The difference in terms of tenure was a direct lease from the state in the latter and an occupancy certificate in the former.

Mulimbwa (1980), quotes a Ministry of Local Government and Housing Circular (No. 76/66 of 7/11/66) as stating that ordinary council housing estates or other fully serviced areas were to be classified as "Statutory Housing Areas" while upgraded areas or partially serviced areas were referred to as "Improvement Areas". Mulimbwa, however, notes that some uncertainty prevailed over the definition of fully serviced and partially serviced areas. Due to this uncertainty, councils were not willing to issue certificates of title in site and service areas whether fully serviced or not. Instead occupants in these areas together with those in squatter areas were issued occupancy certificates. The terms or covenants in the lease offered in Statutory Housing Areas are more favourable than the covenants in occupancy certificates offered in Improvement Areas (Mulimbwa, 1980).

Another example of differences in tenure security leading to fragmentation of urban spaces relates to the situation that obtained in pre-independence Southern Rhodesia (Zimbabwe).

Prior to independence, land ownership in Salisbury (Harare) was controlled by provisions of the Land Apportionment Acts of 1930 and 1941 and their amendments and later, from

1969, by the Land Tenure Act. A freehold property market determined access to land for whites and also controlled the land use structure and the socially differentiated residential patterns. Africans on the other hand, were subjected to an allocation process in a controlled public land ownership system. The effect of this system was a socially and physically fragmented urban space in which security of tenure was guaranteed for the white minority while the black majority had what little security was offered or felt necessary by the state machinery (Davies, 1992).

These examples serve to illustrate that fragmentation of urban space has been imposed by the legacy of colonial racial separation, and the attendant segregation in the provision of urban goods and services as well as the irregular application of land tenure systems that favoured the settler populations while ignoring the needs of the indigenous town dwellers.

2.4 Master Planning and the City of the Third World

According to Ratcliffe (1981), planning is essentially a process that evolves a method for doing something. He states that planning includes economic, physical and social aspects. Economic planning is usually politically motivated and decides the distribution of resources to geographical regions, public and private sectors, industry and social groups while physical planning determines patterns of land use, provision and distribution of facilities and promotes effective growth patterns. Social planning is concerned with the organisation of resources to combat social problems such as poverty, discrimination or

deprivation and usually determines the nature of economic and physical planning.

In reference to town planning, Ratcliffe (1981), states that this embodies two main concepts. These are normative and behavioural. Normative planning is concerned with "what ought to be" while behavioural planning is concerned with "what is and why". From these concepts planning can be conceived of at two levels. These are blueprint planning and process planning.

Blueprint planning follows a comprehensive approach and is predominantly physical in character. It produces solutions based on land use maps, zoning, density controls, building regulations and planning standards. As such it usually acts through the medium of "master plans". These require a rigorous established administrative structure with goals and objectives articulated by political representatives. It is usually subject to political decision making processes, plan preparation, implementation and review and amendment.

Process planning on the other hand is a continuous task, which incorporates social and economic aspects within the physical planning framework. It constantly reviews plan performance making adjustments as needed to reduce delays to a minimum and therefore preserves policy relevance in the prevailing circumstances.

In a democratic society, the functions of planning include the practical and technical implementation of people's wishes within a legal framework, permitting the manipulation of the various urban components such as transport, power, housing and employment so as

to ensure the greatest benefit to all. Securing a sensible and acceptable blend of conservation and exploitation of land as a background to human activity can be conceived as a further aim of planning in a democratic society. This involves the aspect of community participation by establishing community needs and desires, formulating them for comprehension and discussion, preparing policies for adoption, regulating the degree and proportion of public and private investment, guiding the provision of public services, initiating action and continually examining the effect of adopted policy, making adjustments where necessary (Ratcliffe, 1981).

According to Balbo (1993), master planning as an urban development strategy aims at achieving a homogeneous spatial structure by constructing a well-defined, controllable urban space. Its primary goals are order, integration, balance and unity of urban space. These goals are founded in the links between master planning and engineering and architecture. Master planning is seldom concerned about financial resources but requires good administrative and technical resources. Further, it is predicated on plan preparation and implementation on the basis of medium to long-term forecasts (Devas, 1993).

Balbo (1993:24), has further stated that whereas "master planning has been instrumental in shaping the order of the Western city", the city of the Third World, by contrast, "is made up of parts which do not make up a homogeneous whole". Commenting on Accra, Larbi (1996), says that Ghana's colonial administrators adopted an urban development strategy that was commonly practised throughout the British Empire. European residential areas were physically separated from the African settlements. Health and

building regulations were enforced only in European areas. "Master Planning" in the first physical development plan for Accra prepared in 1944 aimed at "providing water, markets, slaughter house facilities, lighting, sanitation and streets for the city" (Larbi, 1996:199). This was followed in 1958 by a comprehensive plan providing a total framework for the development of the city. This plan "had all the features of a master plan in terms of detail, site specificity and inflexibility" (Larbi, 1996:199). However, most of the plan proposals were never implemented. Urban development has consequently continued to spread beyond the city boundaries in an uncontrolled manner.

In many African countries, the financial resources to carry through major programs of urban development are lacking. Administrative and technical capacity, where available, is insufficient and lacks motivation due to poor remuneration. In addition, governments very often lack the political will to commit huge resources to long-term projects because of an insufficiently developed democratic framework.

Devas (1993), has outlined the weaknesses of master planning and given reasons why in spite of these weaknesses, master planning continues to be the dominant approach to urban planning in many developing countries. The shortcomings of the master planning approach are listed among the following:

- Concern with the preparation of a plan document rather than with achieving any effect on the ground,

- The attempt to be comprehensive, covering all possible aspects, rather than focusing on key issues,
- The dominance of spatial and land use issues compared to social, economic or environmental issues,
- The negative view of urban growth, leading to an objective of limiting urban growth regardless of whether that is either appropriate or achievable,
- The separation of the plan making process from decision making processes about budgets, infrastructure development and service provision,
- The absence of any effective mechanism for controlling land development, whether because of legislative weakness, bureaucratic failures, corruption or simply the absence of an adequate mechanism of relating the plan to the development control system, and
- The production of a detailed, rigid zoning plan which is unrelated to the forces (economic, social, political) which really shape the city and which is too inflexible to be adjusted in the light of the realities of the situation (Devas, 1993:72-73).

The reasons he gives for the dominance of master planning in spite of its weaknesses are:

- The professional training and ideology of planners,
- The vested interest of professional planners, firms of consultant planners, both local and international, administrators who administer the development control process; public works engineers and finance directors who programme the infrastructure development, and

- The preparation of plan documents serves the interests of politicians and donor agencies without these plans necessarily having to be implemented (Devas, 1993:74).

In 1978, Doxiadis and Associates, an international town planning consultancy presented a master plan of the city of Lusaka by which city growth was meant to be guided for a period of thirty years up to the year 2000. Schlyter and Schlyter (1979), have observed that the ideology underlying the plan proposals had more to do with European and American cities than with the history and reality of Lusaka. Blankhart (1986), comments that the plan proposed an extensive system of freeways and expressways that assumed private car ownership while little attention was devoted to the needs of other types of road users. At the time the Schlyters were writing, it was clear to them that the plan would never be implemented. To this day, only the zoning plan is used as a guide in making zoning decisions, while the rest of the plan has never been implemented.[1]

In a review of the Lusaka master plan, Vagele (1987), states that the plan envisaged an urban structure based on the following policies and strategies:

- Desegregation of residential areas based on ethnic and political considerations and promoting integrated development,
- Mixed income-group housing in all new residential developments,

[1] Personal communication, Lusaka City Council Town Planning Section, August 1999.

- Infilling of existing low-density developed areas,
- A massive programme of low-cost site and service schemes,
- Arresting the urban sprawl and disorderly growth and
- A gradual decentralisation of working areas in order to reduce the journey to work.

But he goes on to say that the plan had outlived its usefulness and had become obsolete, redundant and ineffective. He lists the following as the causes:

- The plan had not been reviewed, revised and refined as required by the Town and Country Planning Act at intervals of five years from the time it was prepared,
- The plan period was too long (30 years) making it difficult to project realistically the social, economic, physical and management variables on the basis of tacit assumptions,
- The plan was based on population data of 1961 and 1963 and a demographic analysis done in 1968. The population database was therefore redundant,
- The economic, social and physical data collected by conducting base-line studies during the plan preparation period (1968-1970) had become obsolete and irrelevant,
- Though the plan was prepared during the years 1968-1970, it was not adopted by the council until 1976, and not approved by the Minister until 1978. During this

period, many of the plan elements had undergone drastic changes even before the process of implementation had commenced,

- The plan was too ambitious and unrealistic. Funds available for the plan's implementation were grossly inadequate; not even 25-30% of the financial outlay envisaged was made available, and
- The realisation of the plan was seriously constrained by lack of qualified and experienced technical and management staff (Vagele, 1987:19).

From the foregoing discussion, it can be stated that master planning does not work as a development strategy in Third World cities because it is based upon assumptions about the state and democratic institutions, public welfare, financial and technical resources that work for western cities, but not for those of the Third World (Balbo, 1993). From the evidence on Madina, Accra and Lusaka, it can be concluded that although master planning has been employed, legislative weaknesses, bureaucratic failures, and the absence of adequate mechanisms of relating the plan to the development control system have all contributed to a failure to produce a well-ordered, controllable urban space. From Ratcliffe's observation on the functions of planning in a democratic society, planning for Lusaka was at first predicated on the needs of a white, car-owning elite and did not take into account the needs of the wider African population. Post independence planning has since been constrained by bureaucratic failures, a lack of adequate financial and technical capacity and an insufficiently developed public participation system lacking in the ability to reflect the needs of the people planned for.

Chapter Three

Theoretical Framework

3.1 Introduction

This chapter presents a review of urban growth theory by looking at the concentric, the sector and the multiple-nuclei theories of urban growth. All the theories emanate from a common source, which is the urban research undertaken at the University of Chicago in the late 1930s and early 1940s. The three theories and the models developed from them represent, in a general way, the growth patterns taken by most cities. It is, however, contended that these models are largely descriptive, and do not provide satisfactory explanations for the internal structure that most cities take. To do that, it is necessary to look beyond the residential mosaic to the many different variables that interact to contribute to the internal structuring of cities (Daniel and Hopkinson, 1989). African cities, in particular, have differences in their make up that relate to their traditional and social-religious origins which cannot be explained entirely by these theories (Mabogunje, 1968).

3.2 Urban Growth Theory

Studies of urban growth are based upon the theoretical models developed by Burgess, 1925 (concentric zones), Hoyt, 1939 (sectors) and Harris and Ullman, 1945 (multiple-nuclei). The three models represent a means of classifying different city growth patterns.

3.2.1 The Concentric Theory

The concentric theory is based upon a study of the urban morphology of the city of Chicago in the United States. Burgess (1925), who developed the theory, argued that a large city tends to expand outwards along a broad front with each zone growing by gradual colonisation of the next outer zone. This leads to the development of a number of concentric zones that give inland cities an annular structure and coastal cities a semi-annular structure. Burgess's zones were envisaged as travelling outwards to include:

a) A central area or central business district (CBD);

b) A zone of transition and perhaps of 'urban blight' with congested slums and unstable populations often supporting minor commercial enterprises and light industries , which have invaded the area from the CBD;

c) A zone of workers dwellings, factories and apartment buildings where land values may be declining;

d) A better-class, suburban residential belt, with more substantial, newer houses, occupied by relatively stable families;

e) A commuters zone, 30 to 60 minutes travelling time from the city's nucleus and consisting of well-separated, well-to-do, mainly detached houses in a semi-rural setting. This zone may also incorporate old villages not yet completely attached to the city, and dormitory towns where land values are lower than the CBD but are rising and there is space for new, horizontally spread factories (Hudson, 1977).

3.2.2 The Sector Theory

Homer Hoyt (1939), who developed this theory regarded the main elements of urban growth as being based upon the outward growth of sectors (or wedges) rather than rings. Hoyt recognised the existence of a central area in the form of a CBD and of different classes of residential areas and visualised growth as beginning near the CBD and spreading outwards in broadening wedges. He considered new developments as gradually coming to reproduce the character of earlier developments in the same sector. His arguments were supported by the varying rents charged in different parts of large cities, which he observed changing outwards, and not laterally in concentric zones, but axially in wedges, one wedge, perhaps because it occupied more attractive terrain than another, having higher average rents than the adjacent one. He also identified a sector devoted to wholesaling and light manufacture, much of the latter carried out in small workshops or on upper floors and in the rear portions of commercial premises (Hudson, 1977).

3.2.3 The Multiple-Nuclei Theory

Harris and Ullman (1945), developed the multiple-nuclei theory. Both of them agreed that cities may show elements of concentric zoning and sectors of change, but argued that most large cities also contain a number of subsidiary centres whose separate outward growth complicates the growth of a city from a central nucleus. This theory applies to cities that, in expansion, have engulfed a number of villages and small towns each of which, continue to act as minor nodes within the agglomeration (Hudson, 1977).

3.3 Urban Growth Theory and African Cities

The urban growth theories detailed above provide general principles by which cities can be analysed. Burgess has been quoted as stating that although no one city that he studied exemplified the concentric zone model, all approximated "in greater or lesser degree to this ideal construction" (Daniel and Hopkinson, 1993).

It can be said from this statement, that the different models present a basis upon which further analysis can be undertaken and that the models do not present, in each case, a rigid yardstick against which to measure every city. It is also true to say that cities are cultural, historical and social creations and since the models are tied to a specific historical and cultural context, they cannot be assumed to apply universally to all situations (Daniel and Hopkinson, 1993).

Mabogunje (1968), presents a number of criticisms of each of the three theories of urban growth. He states that Burgess' theory implies that growth takes place along broad successive zones whereas the more observable tendency is for growth to take place along radial lines cutting across the zones. He also argues against the generality of the theory and its assumption of zonal homogeneity.

In considering the sector theory, Mabogunje (1968), states that Hoyt introduces into Burgess' theory, two new elements. These are (a) the effects of land pricing or rent, and (b) the influence of the major transport routes on the pattern of urban growth.

He argues that land values (rent) tend to rise more along the main transport routes and

that therefore, growth along these routes will tend to consist of similar types of land use. He, however, finds the sector theory unrealistic in its wholesale application to Nigerian cities in that it assumes a *laissez-faire* economic system in which people and businesses compete for land and the highest bidder wins. The evidence in Nigerian cities suggests the deliberate allocation of particular areas of the city to certain uses. He also argues that the technology of modern transport, as it improves, tends to generate functional differentiation and specialization of areas, but that, this is far from being pervasive in many African cities.

In the multiple-nuclei theory, Mabogunje sees a warning not to assume the existence of a single urban nucleus as suggested by the other two theories. In this analysis, Mabogunje (1968), in fact, attempts to destroy the idealized construct of those theories by calling attention to the greater complexity of city growth. He asserts that where the theories of Burgess and Hoyt assume that urban growth involves no more that an expansion of land use regions outwards *ad infinitum,* they fail to appreciate that urban growth is the result of autonomous and often external influences whose effect on the city, in many cases, causes the creation of new centres of activity (Mabogunje,1968:179).

O' Connor (1983), has analysed the physical form of African cities against this background of urban growth theory based upon cities of the developed west. He argues that the greatest differences in form lie between the pre-colonial cities, and those of 'European' origin. From West Africa, the differences between the Yoruba cities of southern Nigeria and the Hausa cities of northern Nigeria provide models of pre-colonial

urban development set against the colonial European creations of Nairobi, Lusaka, and Harare.

Yoruba cities are centred upon the king's palace and adjacent markets that serves as social centres. Palaces differ between cities, but generally have a range of administrative buildings and extensive grounds. The residential quarters surrounding these tend to have comparable densities of settlement, while building styles and materials, once similar throughout, are beginning to change. Improved houses are to be found scattered everywhere and space has been created to incorporate post offices and banks, with schools and hospitals on the periphery. Hausa cities also have clearly defined central areas, bounding walls and buildings of fairly uniform character in between. These, however, have a triple focus in that, in addition to the Emir's palace and market place, there is a Grand Mosque. This is usually an imposing building rising above the skyline. Once again, the city is divided into residential quarters, which are further subdivided into compounds. Minor markets and smaller mosques are spread throughout and craft industries abound, so that for many residents the dwelling is also the workplace. However, colonial additions are much more physically separate here, than in Yoruba cities.

In the colonial and European cities, functional and residential sectors are sharply differentiated and clearly subdivided within themselves. Administrative, commercial and industrial zones are clearly distinguished, while separate residential areas originally catered for racial differences. A further sharp division is recognised between officially

planned development and spontaneous settlements that have sprung up since independence. The contrasting residential areas constitute distinct sub-systems with some high-class suburbs functioning like their European counterparts while other sections are more comparable to those of African rural areas. With an increase in the number of those earning their living in the low-income areas, these cities are increasingly becoming dual or hybrid in character.

In trying to understand pre- and post-colonial African cities using the theoretical tools developed by Burgess, Hoyt and Harris and Ullman, it appears that the multiple-nuclei and sector theories come closest to defining the growth patterns of African cities. Hybrid cities combine both alien and indigenous elements while dual cities continue to exhibit elements of both. From the examples of Nigerian pre-colonial urban development, hybrid cities may be taken to include Yoruba cities with modern additions, while Hausa cities can be typecast as dual cities. Cities such as Lusaka, Harare, and Nairobi, have taken on a hybrid nature because spontaneous settlements have added an indigenous element based on the building styles and materials employed in them. In addition, these cities exhibit elements of both sectoral development (brought about by the colonial imposition of separate sectors to cater (initially) for different races and functional activities, but which are now regulated by income levels and the operation of the property market) and multiple-nuclei in the creation of separate centres of gravity, to cater for differences in the composition and needs of the urban population.

3.4 Urban Infrastructure and Services

Urban infrastructure and services constitute an important asset to urban living. The relatively higher living standards and greater economic opportunities they bring about are frequently characterised as a 'pull factor' for people to move from rural to urban areas (O'Connor, 1983; Lean and Goodall, 1983; Gilbert and Gugler, 1992). Choguill (1996), divides infrastructure into two components. One is physical infrastructure, which includes water supply, sanitation facilities, drainage, urban roads, solid waste disposal facilities and land management. The second category is social infrastructure including educational and health care facilities. Balbo (1993), refers to infrastructure and services to describe physical and social facilities. Since it does not appear that there is much to differentiate between the two definitions, this study adopts the use of the terms infrastructure and services to describe physical and social facilities.

3.5 The Analysis of Socio-Spatial Differentiation

The analysis of differentiation in social patterns in cities forms the basis of a general area of study known as factorial ecology. Factorial ecology applies the techniques of principal components analysis and factor analysis to the geographical study of areal patterns in cities to derive the major dimensions of differentiation (Abu-Lughod, 1969; Taylor, 1977; Knox, 1995). The technique combines social, economic, demographic and housing characteristics with the object of establishing what common patterns exist in the data. They do this by identifying groups of variables with similar patterns of variation and then express these in terms of new or hybrid variables called factors or components. Each of these new variables accounts for small amounts of the variance of the input data which

can be mapped or used as inputs for further statistical analysis (Knox, 1995:45). According to Abu-Lughod (1969:202), most studies of urban socio-spatial differentiation using this technique identify one major dimension, which discriminates among the sub-areas within the city. This dimension relates to the socio-economic rank of residents and relates occupation, education, rent, income, housing quality and density of dwelling unit occupancy. She further states that the socio-economic factor frequently accounts for the largest proportion of the variance in the correlation matrix. An explanation of the way in which factorial ecology has been applied in this study to arrive at the elements of differentiation in the population sample whose characteristics have been studied is included in Chapter Four (Methodology).

Chapter Four

Methodology

4.1 Introduction

A review of the methodology is given in the following pages. This review covers the collection of primary and secondary data and the weaknesses and strengths of the latter. The sampling procedure is discussed with regard to the choice of study areas and respondents and the problems encountered in the sampling survey. The procedure followed for the quantitative analysis and the hypothesis testing are also reviewed.

4.2 Primary Data

The collection of the primary data for the research was organised by way of a structured sample questionnaire. The questionnaire aimed at gathering data from a stratified random sample of 100 Lusaka residents. These were chosen so as to proportionally represent the high, medium and low cost areas of Lusaka. The decision to limit the sample size to 100 respondents was partly based on the fact that there were more respondents in the low cost areas in comparison with the medium and high cost areas. Administrating the questionnaire survey in the low-cost areas required the interviewer to interpret the questions into the local language at the time of administration. The answers were also given in the local language and the interviewer then translated the information given by the respondent back into the language of the questionnaire. This took at least 45 minutes to one hour per questionnaire. Secondly, the houses in most of the informal areas of Lusaka cannot be located by numbered sequential order. To find the houses selected by the random number methods employed took up more time in the informal areas than was

the case in the conventional areas. Thirdly, in areas such as Kabulonga with very large plots, the houses selected were fewer but the distances covered much greater. A larger sample would have been more costly in terms of the time taken to accomplish the task.

The choice of the questionnaire survey for this exercise was based on the understanding that this method would yield the best results in terms of the data required with respect to access to infrastructure and services. Frequency data of the type collected on access to shelter elements, water and sanitation, electricity, education and health services, transport and shopping facilities are easier to collect on the basis of questionnaire type answers.

4.3 Secondary Data

Secondary data were collected from the following sources:

4.3.1 The University of Zambia and Copperbelt University Libraries

The University of Zambia Library has a large collection of historical documents, government reports and rare or out of print books, theses and research reports covering the pre- and post-independence periods of Lusaka's growth. Most of the data on the historical aspects of Lusaka's growth was gathered from various documents in this collection. The Copperbelt University Library provided the author with material on the more theoretical aspects of city growth.

4.3.2 The National Archives

These archives contain a much more complete record of papers from the early years of the colonial administration. The records accessed included census records, files

containing correspondence between officials of the colonial administration, district record books and newspapers.

4.3.3 The City of Lusaka Town Planning Section

The Town Planning Section of the Lusaka City Council provided information on the planning framework for the city and the categorisation of the residential areas on the basis of plot sizes. In addition, maps of the layout of the different medium and low-cost areas were accessed for purposes of selecting the households to participate in the questionnaire survey.

4.3.4 The Department of Town and Country Planning (Ministry of Local Government and Housing)

The Department keeps a small library of research papers and documents. Two of the more significant documents accessed from this source were the papers by Vagele (1987), on the shortcomings of the Lusaka Master Plan as well as the report entitled 'Low Cost Residential Development in Lusaka' (Zambia, 1972).

4.3.5 The Central Statistical Office (CSO)

The CSO provided data from the 1990 Census on the population of Lusaka broken down according to residential townships. This information provided the basis for deciding the allocation of sample sizes to each residential category.

4.3.6 The Survey Department (Ministry of Lands) and Department of Surveying (UNZA)

The Survey Department provided cadastral maps of the formal high cost areas showing the individually numbered plots from which the participating houses were chosen. In addition a street map of Lusaka was obtained for the purpose of identifying the city's street names while a 1:50,000 sheet showing the whole city was useful for identifying the different areas. The University of Zambia Department of Surveying provided a satellite image of Lusaka acquired by the French SPOT satellite system dated 1992. This was then transferred to tracing paper and reduced by photocopy means to A4 size and then processed by way of 'Freehand' cartographic software to the set of maps reproduced to illustrate both the Index of Accessibility and the Land Use and Settlement patterns.

4.4 Strengths and Weaknesses of the Secondary Data Collected

The census data for each township were broken down according to standard enumeration areas (SEA). Another list obtained from the CSO gave the final accepted figures for the enumeration. This data was found to have a number of contradictions in that the lists of figures as separately enumerated did not add up to the final figure that was officially accepted. In such cases the figure accepted was that from the individually enumerated areas. The other weakness in the use of census data in this work lies in the fact that the boundaries between medium and low cost areas cannot be defined with absolute certainty. Some of the more recent housing areas contain elements of both medium and low cost as well as medium and high cost housing, and in such cases it proved difficult to categorise an area with any measure of certainty.

Further, the maps obtained from the City Council showed development at a particular point in time and did not include developments that might have taken place after the maps were prepared. One other area of general weakness in the data is the fact that the data was derived from disparate sources. Much of the historical data was recorded at different times and with variable levels of accuracy. Some of it may have been correct at the time of recording but as it would have been practically impossible for the colonial officials to know everything that was going on all over the country, this information cannot be said to be absolutely correct.

The abundance of information on the growth and development of Lusaka is a great strength because it made it possible in many respects to verify information by cross-referencing.

4.5 Sampling Procedure

4.5.1 Sampling Frame

As indicated above, a list of residential areas and their respective populations was obtained from the Central Statistical Office. This provided the sampling frame upon which the sample survey was based. The population data provided the basis for deciding the proportionate sample sizes for each residential category.

4.5.2 Allocation of Townships to Residential Categories

The study area was divided into the three categories upon which the residential differentiation of the city is based (high cost, medium cost and low cost). These divisions are based upon plot sizes that are categorised as follows: high cost (30m by 45m),

medium cost (18m by 30m) and low cost (12m by 24m). Using this as a general guide, townships were allocated to these categories and study communities were chosen from these lists using random numbers.

4.5.3 Choice of Study Areas

The areas chosen are shown below and the sample size allocated in each category is shown in Table 4.1. Time and financial constraints dictated the choice of eight study areas.

High Cost	**Medium Cost**	**Low Cost**
Kabulonga	Chelston	Bauleni
Northmead	Chilenje South	Mandevu/Marrapodi
		Kalingalinga
		New Kanyama

Table 4.1 Stratified Random Samples based on the population of Lusaka

Sample No.	Category	Population	Sample Size
1	High Cost	209,678	16
2	Medium Cost	211,721	17
3	Low Cost	865,698	67
Total		1,287,097	100

Source: CSO, 1990.

4.5.4 Allocation of Proportionate Samples to each Township

The population data included the number of households in each township. This information was used to decide the proportion of the sample for each category that could

be allocated to the township. Table 4.2 shows the sample proportions allocated to each township on the basis of the number of households in each one.

Table 4.2 Survey Areas with Sample Sizes Allocated

Survey Area	Low Cost		Medium Cost		High Cost		Total	
	H/holds	Sample	H/holds	Sample	H/holds	Sample	H/holds	Sample
ni	938	6	-	-	-	-	938	6
galinga	1526	10	-	-	-	-	1526	10
ipodi/Mandevu	5048	33	-	-	-	-	5048	33
Kanyama	2738	18	-	-	-	-	2738	18
ton	-	-	2389	9	-	-	2389	9
nje South	-	-	2302	8	-	-	2302	8
longa	-	-	-	-	1715	9	1715	9
mead	-	-	-	-	1241	7	1241	7
	10250	67	4691	17	2956	16	17897	100

Source: CSO, 1990.

4.5.5 Choice of Respondents

Choosing the sample respondents in the high cost areas was achieved in the following manner. Using the Lusaka Street Map, an alphabetical list of streets each for Kabulonga and Northmead was prepared and each was assigned numbers in descending order. Using random numbers, two streets were chosen from each. The sample was then divided equally between the two streets. Counting from the corner house on a chosen street every third house was included in the sample. In the event that the chosen respondent refused to take part in the survey the next house in line was substituted and counting resumed from the next house after a participating house. For the other townships maps available at the Lusaka City Council provided block numbers and respective house numbers. From each

list of block and house numbers, a random sample was chosen to fill the required sample size for each township.

4.6 Problems Encountered

Some problems were encountered in all three residential categories. Due to the higher education levels in the high and medium cost areas (secondary school level was the minimum), respondents were asked to fill in the questionnaire in their own time. In most cases respondents indicated their willingness to do this. However, collecting the completed questionnaires proved difficult in some cases. Four or five visits were necessary before some questionnaires could be retrieved. This proved costly both in time, energy and money spent particularly in areas such as Kabulonga where plot sizes are quite large. In the low cost areas, the questionnaires were filled in on the spot with the researcher asking the questions and filling in the answers. Eleven questionnaires were not returned and were substituted. Two respondents (one in New Kanyama and one in Kabulonga) would not participate in spite of the purpose of the research being explained to them. In general most respondents were happy to take part once the purpose of the research was made clear to them. Due to the large plot sizes in Kabulonga, covering the area took more time than an area such as Northmead. In the low cost areas, the major problem was the absence of a logical numbering system for the houses. More time was therefore spent trying to locate the selected houses thus reducing the number of respondents that could be contacted in a day.

4.7 Data Processing and Analysis

In order to process and analyse the data, the following steps were undertaken:

1. Summarise questionnaire responses for each residential area on all measured variables.

2. Summarise frequency distributions for each of the infrastructure and services measured according to residential categories.

3. Create contingency tables for manual chi square computation.

4. Enter summarised frequency data in SPSS program for statistical analysis and to check manual computation

Values of Chi square and Fisher's Exact Test have been computed for the hypothesis testing using the statistical tools in the SPSS package (Appendix D and A, pages 156 and 131). Charts have been drawn using the Microsoft Graph 97 program. In addition the SPSS package has been used to undertake a factor analysis of the data (Appendix C, page 150). Using this technique, an index of accessibility has been computed based on the major dimension in the data. The index value computed in this way gives an individual score for each respondent as a measure of their level of access to infrastructure and services. This value is the sum of the products of the factor score coefficients (Appendix C, page 150) and the variable score for each individual or case included in the analysis on each of the recorded variables. The index is in the form of an inverse scale with the lowest values indicating the highest level of access. The reasons for this are based on the structure of the input data. The answers to the variables measured were

structured in such a way that the first answer in each case has a low code value (1) compared to the final answer (which may be a 4 or 5 depending on the number of appropriate responses). As a result respondents for whom the majority of answers had low code values have lower index values. Data display is in the form of frequency graphs and maps. The frequency distribution graphs have bars each showing the frequency of occurrence for high, medium and low cost on each of the variables measured. Where there is no measurement (a 'zero' value) the shading is shown on the floor (X-axis) of the graph. The order in which the bars appear is determined by the data input indicated on the legend.

4.7.1 Factor Analysis Procedure

1. From the questionnaire responses, 33 variables were entered in the data matrix in SPSS for each of the 100 respondents. Out of this initial set of variables, 24 were chosen for the factor analysis. These relate directly to the issue of accessibility to infrastructure and services.
2. From this data the SPSS program computed a 24 by 24 correlation matrix.
3. This was followed by the computation of a set of initial statistics showing the variable communalities, factor eigenvalues, percentage of variance and cumulative percentage of variance and an initial factor matrix (24 by 2).
4. This was followed by the computation of a rotated factor matrix (24 by 2). The rotation applied in this case was the varimax rotation, which is the most common in such cases.

5. The rotated factor matrix was followed by the computation of a factor score coefficient matrix (24 by 2). The factor score coefficients are input into an equation of the form :

$$F_{jk} = \sum_{i=1}^{n} l_{ik} Z_{ij}$$

Where F_{jk} is the score of respondent j on factor k

i is one of m original variables

l_{ik} is the loading of factor k on variable i

and Z_{ij} is the original observation for variable i on respondent j.

(After Smith, 1975: 320)

4.7.2 Factor Selection

The sizes of the eigenvalues give an idea of the explanatory 'power' of each factor. The larger the eigenvalue the greater is the explanatory power of the associated factor. The eigenvalues are therefore used to determine which factors are important for the analysis.

Normally factors with eigenvalues ≥ 1 are regarded as important. The 'break of slope' technique is also used to decide which of the factors are important. In this case the

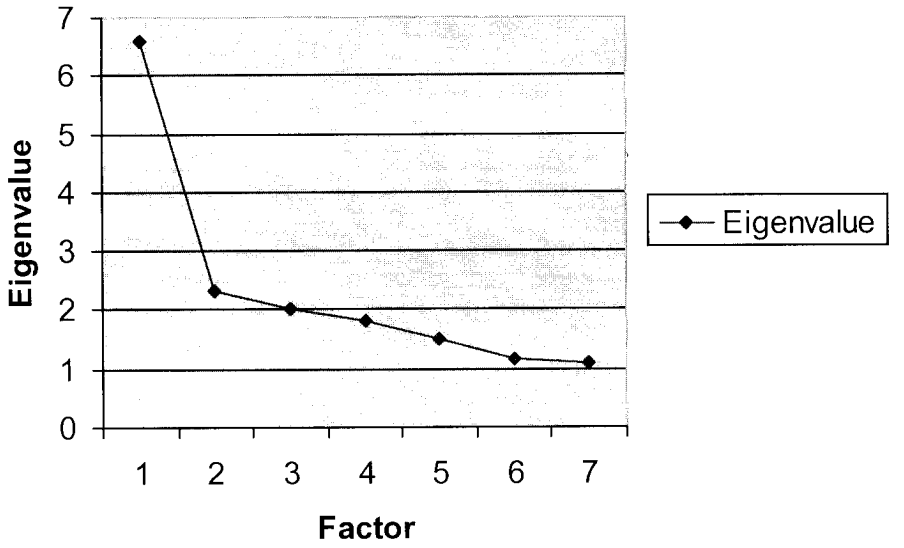


Fig. 4.1 Scree diagram showing 'Break of Slope' for factor selection

eigenvalues from the initial statistics have been plotted against each of the factors. The resulting graph takes an elbow shape (Fig. 4.1). The elbow bend signifies the last important factor. From Fig. 4.1, factor 1 and factor 2 are the important factors and these have been extracted for this analysis.

4.8 Hypothesis Testing

The second research objective was to determine whether there is a difference in access to infrastructure and services among the Lusaka residents sampled. The sampling exercise obtained information in the form of frequencies of occurrence for each of the variables

measured. The null hypothesis tested in each case postulates that there is no significant difference in access to the infrastructure and services under consideration. The Chi-Square Test and Fisher's Exact Test have been performed on the appropriate datasets to determine whether to accept or reject the null hypothesis. The results of the hypothesis testing are included in Appendix A. These results have been condensed from the SPSS output in Appendix D (page 156). The Chi Square test was chosen because it is restricted to nominal (frequency) data where the data are frequencies of occurrence of individuals in mutually exclusive categories. The SPSS software automatically applies Fisher's Exact Test where the data restrictions applicable to the Chi Square test (not more than one-fifth of the expected frequencies should be less than 5, and none of the expected frequencies should be less than 1) invalidate the application of the Chi Square test.

The SPSS output (Appendix D, page156) displays results for the Chi-Square Test (indicated as 'Pearson'), a Continuity Correction, Likelihood Ratio and Mantel – Haenszel test for linear association. Fisher's Exact Test (One-Tail and Two-Tail probabilities) is included only in those cases where one or more cells have expected frequencies less than 5. The results relevant to this research report are the Pearson (Chi-Square) and Fisher's Exact Test (Two-Tail probability).

Chapter Five

Evolution and Growth of Settlement at Lusaka

5.1 Introduction

This chapter reviews secondary data obtained from various sources on Lusaka tracing the early history of settlement at Lusaka and the growth of the planned settlement and the unplanned settlements that form such an integral part of the city's urban landscape. The chapter underlines the development and growth of squatter settlements after independence by providing three case studies. It also provides a look at the post independence provision of housing and how policy has changed over the years. Much of the literature cited was sourced from the "Special Collection" of the University of Zambia Library as well as the records held by the National Archives of Zambia (NAZ).

5.2 Geographical Location and Population of Lusaka

Lusaka is located within the Lusaka Province of Zambia (Fig. 1.1, page 8) at latitude 15° 22' South and longitude 28° 15' East. In terms of relief, it is situated on the Central African Plateau at an elevation of about 1300m. Relief variation within Lusaka itself is limited. The highest part of the city is the Woodlands area (about 1310m) and the lowest is in the vicinity of the International Airport (about 1150m) (Williams, 1983:11).

The 1990 Census (CSO, 1990), estimated the population of Lusaka at 800,000. The population has been growing at a rate of just over 5% and was expected to rise to about

1.3 million in the year 2000. Out of this population 67% live in the low cost areas while the high and medium cost areas account for 16% and 17% of the population respectively.

5.3 Early Settlement at Lusaka

In 1906 the construction of Cecil Rhodes' Cape to Cairo railway reached Broken Hill but work was suspended for about twelve months due to economic difficulties. As a result, many of the employees on the railway construction took up farms and settled down, some of them selecting the Lusaka area (Sampson, 1959). The Northern Copper Company, which had taken out exploration leases for large tracts of land around the Lusaka area failed to find any minerals. Subsequently, the company sold off much of its land for farming. In addition, the mine at Broken Hill was going through a period of technical difficulties and was forced to lay off some of its staff (Davies, 1969; Williams, 1986). This led to the growth of a small, predominantly Boer farming community around the Lusaka siding (Kay, 1967; Davies, 1969). Railway construction resumed in 1907 and traffic and trade to the south increased. The following year (1908) saw the construction of the first building at the Lusaka siding (Kay, 1967; Williams, 1983).

The first industries to be established in Lusaka were a lime quarry and kiln and a brick factory in 1911 (Sampson, 1959; Williams, 1983). Nine stand holders including three grain mills, two primary schools, several general stores and a hotel were in residence by 1912 (Davies, 1969). With these developments, an administrative framework became necessary and the BSA Company, which had administrative oversight of the territory created a Village Management Board in 1913 (Kay, 1967).

Table 5.1. European Residents – Chilanga Sub-District

Year	Men	Women	Children	Total	Numerical Increase	Percentage Increase
1908	35	7	17	59	-	-
1909	53	17	26	96	37	61
1910	65	19	44	128	32	75

Source: Chilanga Sub-District Annual General Report for year ending 31st March 1911 (NAZ File A5/2/10)

5.4 Demographic Profile

According to colonial records (NAZ File A5/2/10), Lusaka was located within the Chilanga sub-district of the Loangwa (sic) District. Table 5.1 shows the numbers of resident Europeans in the Chilanga sub-district. There is no specific record of Lusaka Township residents at this time. Records were kept for the sub-district at the headquarters at Chilanga until the Village Management Board was created in 1913. However, the table serves to show that there was a steady increase in the numbers of settlers entering the district at this time with a view to permanent settlement. The table shows a 61% increase in the number of permanent settlers entering the district during the 1908-1909 period and a 75% increase for the years 1909-1910. A review of the occupations engaged in by the European settlers is given in Table 5.3. The figures show an increase of 21 farmers and 5 traders over the period 1909-1911. This represents an increase on the figures for 1909, of 45% in the number of farmers taking up residence in the district and a 38% increase in the number of traders over the same period. The figure for missionaries includes two (2) schoolmistresses. The report also notes the occupations of adult Europeans who were

"not domiciled" (non-residents or transients) in 1908 and these include one (1) prospector, two (2) transport riders and two (2) railway labourers (NAZ File A5/2/1).

Information available in the Chilanga District Notebook (NAZ File A5/2/10) regarding the African population gives figures for the whole of the Loangwa (sic) District. The Notebook contains names of village occupants listed under their respective village headmen. The lists are presumably for (hut) tax purposes.

A report prepared in 1926 for the Colonial Office in London by the Northern Rhodesia Governor J.C. Maxwell states that by this time the European population in the whole of Northern Rhodesia had risen to 5,581 (NAZ File RC/1115). This figure is reported to show an increase of 1,400 Europeans since 1st April 1924 when the BSA Company handed over the territory to the Crown. The same report estimates the number of Africans to be 1,199,163 as compared with 979,704 in 1921. The number of Asians is given as 70 with 756 immigrants coming in, of whom 591 were British. The report also gives a breakdown of estimated population statistics for 1927 (Table 5.2). Figures for Lusaka in subsequent years show a steady rise in both European and African populations. Wood (1986) reports that, by 1928, the population of Lusaka had risen to 2,433 growing by an annual growth rate of 15% to 19,000 persons by 1946. The town experienced its most rapid growth after the Second World War, growing by 19% per annum between 1946 and 1951. This doubled the population in five years to 45,000.

Table 5.2 Estimated Population Statistics for Northern Rhodesia – 31 December 1927

Town	European	Native
Livingstone	1350	6000
Kalomo	70	400
Choma	125	800
Pemba	18	100
Monze	27	200
Mazabuka	80	400
Lusaka	282	1596
Chisamba	99	3000
Bwana Mkubwa	450	1500
Broken Hill	1433	12000
Ndola	130	1000
Roan Antelope Mine	203	2000
Nchanga Mine	209	1200
Totals	4476	30196

Source: NAZ File RC/1081

Table 5.3 Occupations of European Residents – Chilanga Sub-District

ear	Officials	Farmers	Traders	Missionaries	Railway Employees	Trades men	Black smiths
09*	1	17	3	1	7	6	Nil
11♦	1	38	8	3	7	No record	2

Source: Chilanga Sub-District Annual General Report (NAZ Files A5/2/1* & A5/2/10♦)

Archival records list a total of eleven stores in the Chilanga Sub-district by 1911. Of these, Lusaka had two general stores run by Benjamin Glasser, a Russian Jew and another run by E.Kollenberg, a German Jew. During the same year, five new stores opened up while four closed down and thirteen Hawkers Licences were issued. Ten new land grants were taken up while two land applications were received and were still pending at the time the report was made. Out of the thirty eight farmers indicated for 1911, twenty four are listed as farming within the Chilanga sub-district. Crops grown for the year 1911 including respective acreages are given in Table 5.4 (NAZ File A5/2/10).

It is evident from the figures presented above that a need was growing for a commercial service centre where local farmers could sell their produce (see Table 5.4) and in turn obtain the necessary inputs and provisions. The imposition of the Federation of Rhodesia and Nyasaland on the region in 1953 led to the removal of some administrative functions to Salisbury (Harare now) leading to a decline in population as some civil servants relocated to the south. However, the passing of the African Housing Ordinance in 1948 meant that Africans working in towns could now bring their families to live with them. This helped to stem the decline in the rate of population growth in Lusaka. Nevertheless, the growth rate continued to fall in the 1950s reaching an average of 13% between 1951

and 1956 and 6% between 1956 and 1963. By 1963, the population had grown to 123,000. Between 1963 and 1969, the growth rate picked up to 13% annually producing an increment of 140,000 persons. This more than doubled the population to 262,000. After 1969, the growth rate fell again to 9.9% until 1974. From 1974 to 1980 the population growth rate recorded was the lowest ever. It fell to 4.1% per annum. This fall is attributed to a decline in government employment as a result of the drop in copper earnings compounded by the 'oil shock' of the 1970s (Wood, 1986). Wood (1986), explains that much of the census data available for Lusaka up to 1969 is partial and therefore prevents a completely accurate assessment of demographic change over the early years. Through most of the colonial period, however, little attention was paid to the African population while detailed demographic data was collected on the European population. As a result any conclusions drawn from these data sets must be treated as "indicative rather than precise" (Wood, 1986:164). The first full census of Africans took place in 1963 and this gives a figure of 109,300 (Table 5.6) while the first comprehensive census of both African and European residents took place in 1969. This census gave the totals in Table 5.7 (Wood, 1986).

Table 5.4 Crops grown with respective acreages for the year 1911

Crop	Acres
Wheat	70
Vegetables	46
Cotton	194
Tobacco	96
Fruit (plus 1680 trees planted)	19
Forage	18
Mealies	1291
Natural Fodder	31

Source: Chilanga Sub-District Annual General Report for year ending 31 March 1911

Table 5.5 Census Data for Lusaka

Year	Africans in employment	European	Asian	Coloured
1921	-	243	-	-
1931	1,961	470	1	1
1946	7,763	1,254	165	23
1951	14,756	4,656	365	83
1956	22,444	9,488	1,077	193
1961	24,942	11,810	1,700	340

Source: Wood, 1986

Table 5.6 Distribution of African Population in Lusaka – 1963 Census

Lusaka	Males	Females	Total	
Municipal African Townships				
Balovale, Chibolya and Chinika	3030	2330	5360	(5359
Chilenje	5680	4580	10260	(10265
Kabwata/Kamwala	4400	3370	7770	(7752
Matero	14630	12300	26930	(28446
			50230	
Unauthorised Compounds				
Antonio	340	250	590	(585
Kalingalinga	1620	1410	3030	(3033
Kanyama	1630	1330	2960	(2961
Mandevu	1110	960	2070	(2115
Marrapodi	1330	1230	2560	(2558
Mtengo	110	90	200	(205
			11410	
Private Compounds				
John Howard's	510	440	950	(1413
Military Camp	1040	660	1700	
Police Camp	540	410	950	
Hospital/Prison	1100	600	1700	
Quarries and Contractors (south of Lusaka)	2860	2310	5170	(5303
Others	210	140	350	(498
			10820	
Non –African Residential & Commercial Area				
Municipality	6910	4700	11610	
Roma and Kabulonga	1420	1070	2490	(2488
			14100	
Peri-Urban Areas				
South (excl. Kanyama and Quarries)	1080	830	1910	(1652
Bothas Rust (North west)	2110	1730	3840	(3792
North East (excl. Kalingalinga)	3630	2970	6600	(6610
Lilayi Police Depot	860	400	1260	(1307
			13610	
Total Lusaka Urban Area			**100260**	(109300

Source: 1963 Census of Africans in Northern Rhodesia – National Archives of Zambia.
Note: The figures in brackets denote a later correction of the earlier figures upon further examination of the census forms. The total for the figures marked * is given as (22958).

Table 5.7 1969 Census figures

African	European	Asian	Coloured	Total
173,831	7,674	2,643	747	184,895

Source: Wood, 1986

5.5 Growth of Settlement at Lusaka

When the Village Management Board was inaugurated in 1913, the township was laid out on a simple grid pattern (Kay, 1967; Davies, 1969; Williams, 1983). Five years after this, a number of farmers in the vicinity started subdividing and selling off parts of their land for residential smallholdings. Williams (1986a), and Collins (1969), record that 'suburban' developments began taking place on farmland on the outskirts of Lusaka. Rothman (1972), states that a decline in business in the 1920s forced quarry owners and farmers to rent sections of their land to Africans. This came about because tariffs imposed by middlemen and the railway on agricultural and industrial products (mainly lime) from the Lusaka area made these goods double in price in the Belgian Congo (DRC now) while South African and Southern Rhodesian goods were cheaper. The amount of land that was rented out to Africans was in the range of 3-acre plots. Land owners usually delegated the responsibility of rent collection to a "capitao" or supervisor who might be able to collect about one half to three quarters of the rental amount levied (Rothman, 1972). Collins further records that there is no evidence that these townships were "influenced by any particular theory of town planning" (Collins, 1969:4).

In 1929, the colonial administration decided to move the headquarters of the territory from Livingstone to a more central location "in light of the mining development taking place on the Copperbelt" (Williams, 1983:24). Expert assistance was deemed necessary for such an undertaking and Professor Adshead of London University, together with the Engineer Sir Alexander Binnie were commissioned to carry out a study and report on a feasible site (Bradley, 1935; Williams, 1983; Collins, 1969).

5.6 Planning for a new Capital

The terms of reference for the creation of the new capital required the experts "to select a place centrally situated with ready access to all parts of the country which was also conveniently close to the areas of mining development" (Kay, 1967:112). The capital city, however, was not to be dominated by the mining companies, and was to be on sufficiently high ground to ensure a pleasant climate. In addition, the brief required provision to be made for 5,000 Europeans, 1,000 African Police and other African residents, mainly domestic servants and their families. The experts' recommendation was accepted in 1931 and in that same year a decision was made to build a new capital city on the recommended site (Kay, 1967; Davies, 1969).

5.6.1 The Adshead Plan

Adshead's proposal was based on the ideas of the "Garden City Movement". Influenced by the planning philosophy of this movement, he proposed a "generous, gracious city", the beauty of which, would "depend to an enormous extent upon planting", and he commented that "the width of streets, the sizes of open spaces and the distance between

the points of interest may seem to be too great...but...it is wise to err on the side of being too widely spaced, rather than to have the buildings conveniently near with a possibility of being overcrowded in the future" (Adshead, 1931 quoted in Collins, 1969:5-6). The plan recommended the general location of the main land uses and included details concerning the width and layout of streets and the general character and appearance of the city. However, the plan was ambiguous concerning the role of the 'Old Town' and made "no attempt to fit the land uses and street patterns of the existing settlements into the overall design" (Collins, 1986:98).

5.6.2 The Bowling Plan

After Adshead's recommendations were accepted by the government in 1931, P.J. Bowling (a Town Planning Engineer) worked out the details of the plan and produced his own report and plan two years later in 1933 (Collins, 1969; Williams, 1983) Van den Berg (1984) notes several differences between the two plans:

- Bowling incorporated the old town in his design while Adshead had not, and made provision for a European residential zone, west of the old town and
- Bowling avoided all private farmland while Adshead had included two farms one east and another south of the Ridgeway area.

Bowling further proposed that the European residential zone be subdivided into three sub-zones. The sub-zones were to be effected by the plot sizes in each area and their subsequent values. A third class area with relatively small plots was never implemented. The Bowling Plan also contained a list of 'character zones' which stated the principal

purpose of each zone along with the building types allowed in that zone by special consent and the types specifically prohibited (Collins, 1969). According to Van den Berg (1984), Bowling's plan emphasised a strict separation of African and European residential areas by the creation of a buffer zone between the two. This was comprised of a large shopping centre, office areas, a hospital, cemetery, police camp, army barracks and trade school. This was followed up by the creation of another African residential area close to the industrial area.

5.7 Statutory Arrangements

In the period between 1929 and 1933, a number of ordinances related to town planning came into being. These were the Town Planning Ordinance and the Townships Ordinance of 1929 and the Public Health Ordinance of 1930. The Town Planning Ordinance provided for the appointment of a Town Planning Board with powers "to prepare (or have prepared) a town plan for any town referred to it by the Governor" (Collins, 1969:9). Such a plan, according to Collins (1969), would "specify a whole range of standards affecting the efficient functioning of a town and the board would have legal authority to enforce these standards" (Collins, 1969:10). However, the plan for Lusaka was not referred to the Board and it was discovered in 1936 that in fact the plan for the new capital was illegal in terms of the Town Planning Ordinance (Collins, 1969).

As a consequence of this, 'non-statutory development plans' were introduced for Lusaka. The Government was in effect forced to rely upon the fact that it owned the majority of the land and could therefore insert appropriate clauses in the leases "to control the

zoning, siting, conformity and construction of buildings" (Collins, 1969:10). However, these plans had one great disadvantage. They were too easily amended. This led to individual proposals being considered and approved without making reference to the effect upon the general planning of the town. In reference to this, Williams (1983:28), states that it soon became clear that Lusaka "was developing in a piece-meal and loosely structured way". Once again it was decided to go back to the drawing board. Planning consultants were called in to advise Government and the Lusaka Management Board. This resulted in the first Statutory Development Plan for Lusaka, which was adopted in 1952.

The aim of this plan was:

- To weld together the present scattered development into a town with an urban character,
- To physically link together the old town and the administrative area with a new town centre,
- To provide industrial areas to the north west of the town and downwind from the residential areas, and
- Clearly delineate the extent of urban development necessary to provide a reasonable choice of living accommodation for the estimated future population of the town (Williams, 1983: Collins, 1969).

The town-planning scheme for 1952 did not succeed in its primary objective of bringing together the administrative and commercial parts of the city. Instead major construction works were carried out on Cairo Road to improve the drainage system. This made

possible the construction of modern shop and office blocks on the east side of the road and effectively established the old town as the main commercial centre of Lusaka (Williams, 1983). The only aspect of the 1952 scheme that succeeded was the shifting of the railway platform and station to the eastern side of the line (Collins, 1969).

5.8 The 1958 Lusaka Town Planning Varying Scheme

In 1958, a Lusaka Town Planning Varying Scheme was approved when the Municipal Council of Lusaka became the Planning Authority. A new Town Planning Ordinance (1962) followed under which all modifications would have to be approved by a statutory process. This plan and Ordinance were in force at the time of Independence in 1964 (Collins, 1986).

In spite of the intentions of the 1952 scheme, urban sprawl continued with the peri-urban development of Kabulonga and Twin Palm, Roma and Chelston as townships each with its own Management Board. Other areas developed around the same time were Barlaston Park, Buckley's Township, Foxdale, Chamba Valley and Makeni.

5.9 Bowling's Legacy

The city's development pattern with reference to the Bowling Plan is explained in terms of the separation or lack of integration between the high cost areas, which were primarily meant for Europeans, and other categories of residential areas. The plan was based on a mobile or car owning European population so that proximity to shopping or recreational

facilities was not a high priority. The stabilisation of labour supply brought about by the industrialisation of Lusaka led to a growth in the number of Africans living in Lusaka. With the post-independence relaxation of rural-urban migration controls, the number of unauthorised settlements grew becoming a major feature of the city's urban landscape. Due to the growth of these settlements on freehold land, the provision of services and infrastructure was for a long time constrained until the legal ownership of the land was settled by operation of law or compulsory acquisition.

5.10 Origins of Squatter Settlement

A number of factors have been identified as being responsible for the growth of squatter settlements in Lusaka. Seymour (1976), cites political and economic factors while Williams (1986), confirms that "the *(Lusaka)* township depended very much upon African labour" and that from the beginning the African population was much greater than that of the Europeans.

Colonial policy encouraged Africans to find work so that they could pay the taxes imposed on them by the colonial government. This also served to provide a ready supply of labour for the mines and European homes and farms and led to high rates of migration to the urban areas (Simons, 1979; Seymour, 1976). Early industrial activity in the form of lime burning was quickly followed by brickmaking and cement manufacture (Rothman, 1972). Rothman (1972:20), states that when Marrapodi was granted land for his lime making business "he was free to make any housing arrangements for his workers". This set the precedent for other industrialists and led to the creation of what Rothman calls a

"dual compound" system whereby brickmakers, for instance, would set up one housing area at a raw material extraction site and another at the finished product site. These housing areas remained completely autonomous (Rothman, 1972). African domestic servants and farmworkers were housed in huts on their employers' plots.

Rothman (1972), also mentions the fact that about 1922 low farm wages and increasing commercialization of African agriculture made farm labour less attractive and caused a reduction in the availability of African labour. This led farm owners to enter into agreements with farm labourers to provide services at specific times such as planting and harvest times. In return the labourers were granted plots of land on which they could build their own one room huts of mud under grass thatch. They were allowed to grow much of their own food requirements on their plots but were not provided with any services. The plots apportioned in this way were often marginal lands in terms of soil fertility and could always be reclaimed if need arose (Rothman, 1972).

Seymour (1976), states that before 1963, squatting was generally not tolerated. But as stated above, some landowners accepted rent paying tenants in settlements that were 'unauthorised' in the technical sense but were not squatter settlements since they occurred on private land. The next section presents three case studies that illustrate the origin and growth of squatter settlements in Lusaka.

5.10.1 Case Study I - Chawama

The settlement now known as Chawama was originally a private farm registered under the BSA Company's apportionment of land in the Lusaka area. Successive railway companies owned the land until 1941 when title was granted to an Afrikaner farmer who had settled in the area in 1915 (Boswell, 1975; Kajoba, 1986). This piece of land was subdivided into four equal strips and apportioned between the two sons and two daughters of the original owner, J.D. Nel. Chawama developed upon the first three of these subdivisions (Boswell, 1975).

In 1948, part of this farm was leased to John Howard's construction company for quarrying. John Howard used the land for ten years providing living space for the labour force on the property. When construction work slowed down, the company laid off their labour force. The huts were left and formed the nucleus of subsequent African settlements unrelated to employment. Boswell (1975), identifies a second source of settlement in the Chawama area. In 1952, before Nel died, his African farm supervisor or capitao, Robert, retired and was allowed to settle on a piece of fallow land used for grazing or quarrying. Other farm labourers joined Robert and they remained on the land after Nel's death in 1954. When John Howard's construction company ceased operating, one of Nel's sons wanted to demolish the compound. He was instead persuaded to allow a capitao to collect rent on behalf of the family. Boswell (1975), is of the opinion that a similar arrangement covered Robert's compound as well.

From 1959, the Lusaka Management Board tried to contain the growth of unauthorised areas of African settlement. Robert's compound being situated outside the town boundaries meant that it was effectively inviolate and new residents moved in to squat under the capitao's authority (Boswell, 1975). The settlement grew rapidly in the period before Zambia's independence and was named as New Roberts (Boswell, 1975).

By 1965, Boswell (1975), reports that the compound had expanded evenly on all sides until it reached a clearly defined 400 metre square within which considerable infilling occurred subsequently.

5.10.2 Case Study II - Marrapodi

Williams (1983), states that G.B. Marrapodi was one of the early landowners in Lusaka setting up the first lime working industry in the area. Marrapodi was granted farms to the north of the town. Many new migrants to Lusaka found the area a convenient place to settle, in some cases joining already established relatives there. Marrapodi's workers and squatters paid minimal rents and erected their own grass-thatched houses around the area. Little control was exercised over who lived there or of their living conditions (Jules-Rosette, 1981). Rothman (1972), reports that many Africans preferred these areas to town-run compounds because they could maintain a feeling of privacy and usually had sources of firewood and water nearby. Efforts to transfer the land to the township board began in 1950 but were only completed after 1964 when Marrapodi's wife sold the land to the Lusaka City Council marking the transition from marginal area to part of the city proper (Jules-Rosette, 1981).

After independence the government was not keen to antagonise the residents of these previously 'unauthorised areas' and embarked upon a scheme to legalise their status. Marrapodi became the first target for a 'site and service scheme' in which the residents leased plots of land from the council upon which they could build proper houses for themselves (Jules-Rosette, 1981).

5.10.3 Case Study III - George Compound

George compound developed on another private farm on the outskirts of Lusaka adjacent to Marrapodi's properties. The farm covered an area of approximately 1200 hectares and was originally owned by Dr. Alexander Scott. The farm was divided into three major subdivisions each of which was further subdivided. George compound developed on an area overlapping three of these subsequent subdivisions (Zambia, 1973).

The original development in the area consisted of farmhouses, some traditional villages and farm workers' houses (Zambia, 1973; Schlyter and Schlyter, 1979). It is assumed that the owners may have allowed local people to settle in the area for a small rental or they may have allowed retired workers to remain in their houses. The main growth of the area took place after independence around the nucleus of farm workers houses. This followed the large-scale movement of people from the rural areas. It would also appear that the owners of the land left the country just before or soon after independence, leaving the entire area unsupervised (Schlyter and Schlyter, 1979).

In 1971 following the extension of the Lusaka City boundary, George was incorporated into the City of Lusaka and the responsibility for the provision of communal facilities was imposed on the Lusaka City Council (Zambia, 1973; Schlyter and Schlyter, 1979). However, official policy prior to the issuance of the Second National Development Plan regarded all unauthorised areas as temporary. The view was that the residents would be resettled in official low cost housing areas or site and service schemes provided with permanent utilities and services (Zambia, 1973). Schlyter and Schlyter (1979), comment that the implementation of the Interim Housing Policy of 1970 did not even result in the expected levels of either low cost housing or serviced plots. The passing of the 1974 Housing (Statutory and Improvement Areas) Act made the squatter areas legal and ushered in the period of squatter upgrading under the auspices of the World Bank.

5.11 The Provision of Infrastructure and Services in colonial Lusaka

The history of the provision of infrastructure and services in Lusaka is rooted in the city's colonial past. One of the principal reasons for the choice of the Ridgeway area as the site for the new capital development was its suitability as a residential area that could be provided with sewerage by gravitation (Collins, 1969). On the other hand, it was decided to locate African townships in an area that had already been declared unsuitable for European occupation. It can, therefore, be concluded that while it was important to provide the European population with all the facilities necessary for an urban lifestyle, this was not applied to the African population.

The reasons for this are founded upon Adshead's observation, which entrenched racial segregation in planning the city and providing basic services for the residents. Adshead is quoted by Gann (1963:259), as saying that "it would be a mistake to treat the Africans as if they were Europeans...and it would be foolish to offer them those bodily comforts which they have never known and which generations and generations of habit have made necessary to the white man". On the basis of this argument, the planning officers responsible for implementing the proposals took it for granted that spatial separation of the races "was desirable and necessary in order to cater for the needs of each race" (Kay, 1967:114). Devas (1993), notes that the colonial founders of cities such as Lusaka were concerned primarily with their own interests while those of the native populations were generally ignored.

The provision of urban infrastructure was thus conditioned upon the premise that the city was a habitation for the European settlers, while the natives were only temporary residents there. The Employment of Natives Ordinance (1945), stated that "Where it is stipulated that the servant shall reside on the premises of the employer, he shall not be entitled to keep his wife and children on such premises unless the employer shall have consented thereto..." The view that Africans were temporary residents in urban areas is further strengthened by Turok (1994), who argues that the apartheid system in South Africa allocated better infrastructure to the white residential areas because they were 'permanent' as opposed to the black townships, which were regarded as 'temporary'.

5.12 Labour laws and Housing for Africans

The policy of circulatory labour migration and that of labour stabilisation that followed it played an important role in the quantity and quality of services provided for the African population in Lusaka. Wood with Banda and Mundende (1986), records that the African population of Lusaka grew from 1,961 in 1931 to 173,831 in 1963 (see Table 5.8 below). The period between 1931 and 1956 saw the largest increase in the number of Africans living in Lusaka with a growth rate for the period of 15.5%. This can be attributed to the passing in 1948, of the Urban African Housing Ordinance, which laid down regulations for the housing of African employees. Prior to this, a commission of inquiry had been set up in 1943 to look into the issue of African housing in urban areas.

Table 5.8 Growth of African population - Lusaka

Year	No.	% of Total Population	Growth Rate	
			Period	%
1921	-	-	-	-
1931	1,961	80.6	-	-
1946	17,467	92.4	1931-1946	15.7
1951	40,579	88.8	1946-1951	18.4
1956	72,943	87.1	1951-1956	12.4
1961	93,533	87.1	1956-1961	5.1
1963	109,300	-	1961-1963	8.1
1969	173,831	94.0	1963-1969	8.0

Source: Wood with Banda and Mundende (1986)

Of the houses surveyed by the commission, 90% consisted of one room only while 57% of the men living in them were married. The one-roomed dwellings were of a variety of materials from pole and mud huts to burnt brick and concrete houses, but the commission felt that all fell short of the minimum standards for decency and hygiene when occupied by married people. The report further stressed the 'unhygienic and squalid' conditions of settlements outside the official areas, which constituted a menace to the public health (Kay, 1967).

The enactment of the Urban African Housing Ordinance (1948), was meant to deal with some of these problems. The Ordinance required every person employing an African to provide accommodation for such an employee and where needed, to accommodate the employee's wife. It further stipulated that every local authority was to establish one or more African housing areas and provide suitable accommodation for the housing of every African employed within its boundaries.

However, the living conditions for the majority of Africans were still far below the minimum European standard. From Table 5.9 only 1.2% of Europeans (in 1956) had one-roomed accommodation while the number of Africans (in 1960) with one-roomed accommodation was 23.8%. More significantly perhaps, less than 1% of the African population had accommodation with five rooms or more while a fairly significant 36.5% of Europeans had this type of accommodation. These figures are all the more significant when it is considered that the average family size for Europeans was much lower than that of Africans. In terms of standards, all the African dwellings constructed at Matero

Table 5.9 Percentage distributions of households by number of rooms

Number of Rooms	Percentage of households	
	European (1956)	African (1960)
1	1.2	23.8
2	3.2	31.3
3	11.7	40.5
4	24.4	3.8
5	36.5	0.6
6	15.0	-
7	4.4	-
8 or more	3.6	-
Total	100	100

Source: Kay, 1967; Federal CSO, 1960

(1951) and 80% of those at Chilenje (1950) were permanent structures. Only 20% of all dwellings in the other municipal townships were permanent structures (see Table 5.11). In the private and unauthorised settlements about two-thirds of the houses were of a temporary nature (Kay, 1967). The services provided give a further indication of the condition of African housing in this period. Communal water supplies and pit latrines were almost without exception, the norm. A report based on a visit to Lusaka, Livingstone, Broken Hill (Kabwe) and the Copperbelt towns by F.W. Jameson of the National Housing and Planning Commission, Union of South Africa, in 1945 stated that: "communal latrines have been adopted almost exclusively to serve the needs of the [African] locations. Most of the latrines inspected were badly designed and in a foul condition. The ground in the precincts of the latrines was invariably littered with human

excreta. There was no provision for children and evacuation takes place on the ground close to the domicile". Only 1% of the houses and 1% of the African population had electric lighting at this time (Federal CSO, 1960; Kay, 1967).

Table 5.10 Room occupancy of African houses in Lusaka 1960

No. of persons per room	% of dwellings
Less than 1	6
1.0-1.9	40
2.0-2.9	30
3.0-3.9	14
4.0-4.9	5
5 or more	5
Total	100

Source: Federal CSO, 1960

Table 5.11 Number of African families in Lusaka by type of dwelling

Dwelling Type	%
Brick and concrete under Asbestos	32.8
Brick and concrete under Iron	29.2
Other permanent and Prefabricated buildings	2.7
Brick under grass	22.9
Pole and dagga under grass	9.3
Other temporary structures	3.1
Total	100

Source: Federal CSO, 1960

5.13 Housing policy after Independence

After independence, the new Republican government tried to redress the rural-urban imbalance created during the colonial era and thus employed policies that were aimed at creating better social and economic conditions in both urban and rural areas (Khonje, 1983). Among these, were policies to pursue the provision of housing and infrastructure. In its early stages, the UNIP government of Kenneth Kaunda initiated a development plan system, which involved the preparation of five-year plans covering the social, economic and physical development of the country. A total of four development plans were initiated covering the periods 1966 up to 1970, 1972 to 1976, 1979 to 1983 and 1989 to 1993. The strategies employed in its efforts to find solutions to the housing problems of its citizens are contained in these plans and other short-term plan documents that were devised as circumstances dictated. The main components of the housing strategies employed are indicated in Table 5.12 below.

Table 5.12 Zambian government housing strategies since Independence

Plan Document	Plan Period	Objectives	Achievements/Shortfalls
First Transitional Development Plan	1964-1966	• Provision of more new housing. • Improvement of conventional housing.	• Provided only 5,000 new houses for a target population of 9,000
First Official Housing Programme	1966-1972	• Self-help schemes for lower-income groups and self-employed. • Proposal to build 30% of houses on self-help basis on serviced plots in site and service areas. • Subsidization of serviced plots by government grants to local authorities covering 50% capital cost of services. • Provision of building material loans to participants.	
First National Development Plan	1972-1976	• Provide more and better housing. • Meet projected housing requirement of 14,000 dwelling units per annum over plan period. • Achieve recommended increase in proportion of serviced plots to 75%. • Provide two thirds of serviced plots to lower standard with grouped rather than individual services.	• Available capital was only sufficient to meet cost of 6,800 conventional units per annum over plan period.
Second National Development Plan	1979-1983	• Emphasis on home-ownership through self-reliance. • Proposed that all new homes built by public sector be for sale. • Proposal to transfer publicly owned houses to private ownership through NHA Home ownership program.	• Completed gradual policy shifts from conventional to self-help housing
Third National Development Plan	1989-1993	• Emphasis on improvement of existing self-help housing leading to squatter upgrading. • Focus on redistribution of resources by allocating more to needs of low-income groups.	• Consolidated shift to self-help housing strategy.

Source: Khonje, 1983

The housing policies implemented during this period of Zambia's history indicate a gradual policy shift from providing complete (conventional) low-cost housing to aided self-help schemes and squatter upgrading. This came to be regarded as the most viable route to housing access for the low-income majority of the Zambian population. This shift was in recognition of the fact that the unauthorized areas represented social and economic capital that could not simply be brushed aside (Kasongo and Tipple, 1990; Rakodi, 1989).

Knauder (1982), has however, criticized the policy of squatter upgrading arguing that even though the site and service programmes were a welcome innovation, the amount of investment that was actually targeted at the poor could not bring about fundamental changes in the lives of the squatter populations. She cites the fact that in 1974 total housing expenditure was approximately K43 million of which only about K6 million was spent on squatter upgrading under the SNDP. Rakodi (1986), explains that substantial funding was allocated towards the development of high cost housing for the expansion of the civil service in the first two plan periods. Table 5.13 below shows that between the end of the FNDP and the start of the TNDP, the number of traditional and squatter units rose from 59.4% to 65% while upgraded units dropped from 20.4% to 10.3% and sites and services dwellings rose only marginally from 2.6% to 3.8%. These figures indicate that the programmes for low cost housing provision were not having a highly significant impact on the poorer sections of the housing market.

Table 5.13 Housing Stock at the end of 1987

Type Of Dwelling	Number Of Dwellings	1978 %	Number Of Dwellings	1987 %
Unconventional				
Traditional and squatter units	819,300	59.4	903,500	65.0
Upgraded squatter units	80,800	20.4	143,170	10.3
Sites and Services	36,000	2.6	52,820	3.8
Conventional				
Servants Quarters	20,700	1.5	23,630	1.7
Low-cost houses	175,800	12.7	208,500	15.0
Medium cost houses	46,400	3.4	37,530	2.7
High cost houses	-	-	20,850	1.5
Total	1,379,000	100.0	1,390,000	100.0

Source: National Housing Authority

5.14 The National Housing Policy of 1996

In 1996, the Minister for Local Government and Housing launched the National Housing Policy (MLGH, 1996), which was drawn up after a nation-wide participatory process spearheaded by representatives from both the private and public sectors. The consultative process included provincial workshops conducted in all the nine provinces. These culminated in a National Conference on Housing in March 1995. The NHP recognizes the pressure exerted on infrastructure and social services country-wide by rapid population growth, which is compounded in the case of urban areas by the continued migration from rural to urban areas. The NHP notes that:

- Only 31% of total housing stock were of a formal and approved nature in 1990, the remaining 69% being informal and poorly serviced or not serviced at all,
- Approximately 36% of households are supplied with water, while 38% use wells or boreholes and about 26% use rivers or streams,
- About 17% of households use flush toilets, while 54% use pit latrines and about 29% have no toilet facilities at all, and
- The current housing backlog stands at approximately 846,000 units to clear which would require a building rate of 110,000 units over ten years.

The policy goal of the NHP is to provide adequate, affordable housing for all income groups in Zambia. To achieve this goal, the NHP puts across the following major objectives:

- An allocation of a minimum of 15% of the national annual budget to housing to support a sustainable housing development programme,
- Making serviced land available for housing development and streamlining the land allocation process,
- Streamlining of building standards, regulations and other controls so that they accord with the capabilities, needs and aspirations of the various sections of the population,
- Encouraging the production and use of local and affordable building materials,
- Assisting the poor to acquire decent shelter through alleviation of their affordability problems,

- Fostering housing areas that are functional, healthy, aesthetically pleasant and environmentally friendly, and
- The preparation of a national housing implementation strategy.

However, the formal documentation of the housing policy merely confirms previously undocumented reforms, which for the most part had already begun to be implemented under the Enabling Shelter Strategy of the early 1990's (Mashamba, 1997; Schlyter, 1998).

The discussion in this chapter highlights the process of urban growth and development in Lusaka. The chapter has attempted to trace the historical origins of the settlement in order to provide the context in which the city's fragmented settlements have developed. The chapter has shown that fragmentation in Lusaka essentially derives from the planning experiments based on the "Garden City" concepts of Professor Adshead, as formally implemented by Bowling. The growth of squatter settlements is set against this background of a planned European settlement. The chapter further explores the changes in housing policy after independence and the effect these have had on the provision of adequate shelter and infrastructure and services for the majority of Lusaka residents. Although implemented religiously, the policies of squatter upgrading have failed to achieve the intended goals of providing equitable access to services in a uniform manner across the city.

In considering the main issues that have contributed to the fragmentation in Lusaka's settlement pattern, the following points merit consideration in so far as they relate to the planning systems that were adopted for the city:

- The suburban developments that took place on farms around Lusaka in the early years led to the rise of separate township management boards in Kabulonga, Twin Palm, Roma, Chelston, Barlaston Park, Buckleys, Makeni, Foxdale and Chamba Valley and entrenched urban sprawl in the city's growth pattern,
- The development of the dual compound system by brick makers and contractors and the renting of portions of farm land for African occupation led to the growth and proliferation of squatter settlements after independence,
- The inability to integrate existing development in the "Old Town" at the time of planning the new capital, created a city with an eccentric Central Business District, which is far removed from the city's geographical centre of gravity,
- The strict separation of land uses between the African and European areas by the integration of a buffer zone made up of army barracks, police camp, hospital, cemetery, office areas and trade school further entrenched the physical separation of residential areas, and
- The introduction of non-statutory development plans led to the consideration of individual town planning modifications without taking account of the overall planning effects on the town.

Chapter Six

Presentation of Findings

6.1 Introduction

The focus of this research was to collect data on a sample of residents in the study area and evaluate their level of access to a range of services and infrastructure in relation to their residential environment. This chapter presents the results obtained from a questionnaire survey of 100 respondents chosen using a stratified random sampling methodology. This part of the research seeks to test the second hypothesis, which is that "Fragmentation in the use of urban spaces has resulted in differential access to infrastructure and services in the study area".

6.2 Wall Construction Material

In the three residential categories sampled, the use of concrete blocks as wall construction material accounts for at least 75% of the houses surveyed (Fig 6.1). Burnt brick construction represents a small percentage of the total number of houses at 25% in the high cost area and 6% in the medium cost category. In the low cost category, mud brick construction also represents a small percentage at only 12%. The category 'Other' (Table 6.1) represents construction consisting of a mixed set of materials (including mud blocks, concrete blocks and iron sheets).

The test for significance (Table A1, Appendix A) on the data obtained shows that there is no significant difference in the type of wall construction material between the sampled

high and low cost areas (Fisher's probability, p = 0.47) and between the sampled medium and low cost areas (Fisher's probability, p = 0.44).

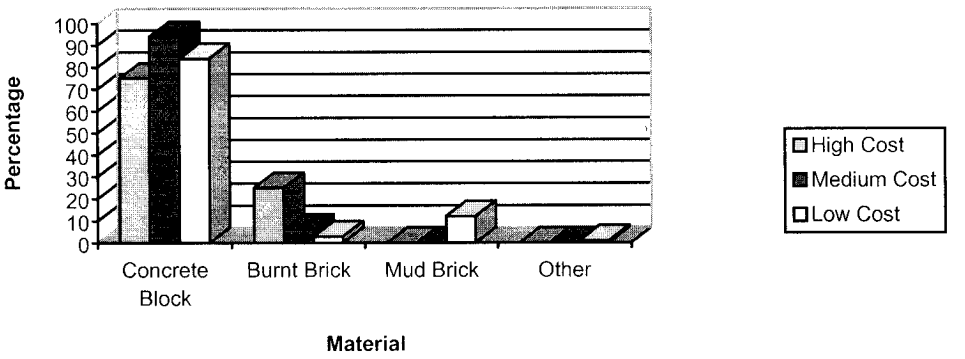


Fig. 6.1 Frequency distribution graph for wall construction material

6.3 Roof Construction Material

In the medium cost category, asbestos sheets are the most widely used roofing materials (Fig. 6.2). In the high cost category, tile roofs represent 37% of the roofing material while corrugated iron sheets are more widely used in the low cost category (49%). A small percentage of houses in the low cost category are roofed with 'Other' roofing material (8%). This is a combination of asbestos and corrugated iron or one of these two combined with plastic or other temporary covering material.

The tests for significance (Table A2) show that there is no significant difference in access to roofing material between the sampled high and low cost areas (χ^2 = 1.91). The significant difference occurring between the sampled medium and low cost areas (χ^2 = 17.61) is explained by the exclusive usage of asbestos roofing in the medium cost

category whereas both asbestos and corrugated iron sheets are used in the low cost category.

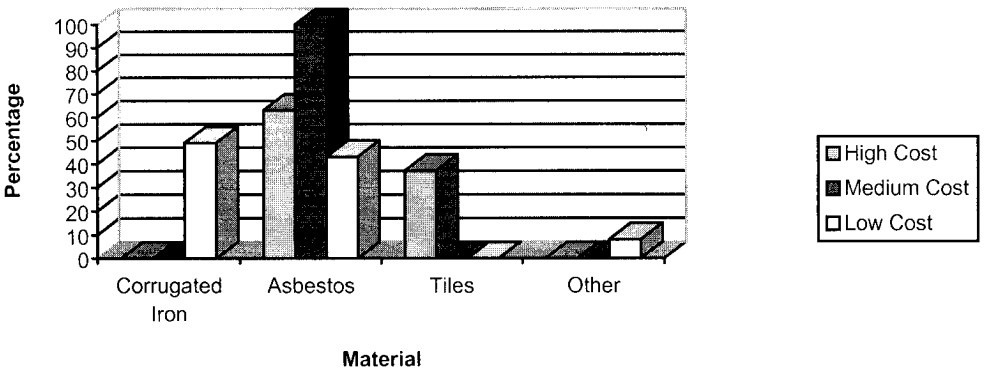


Fig. 6.2 Frequency distribution graph for roofing material

6.4 Access to Water Supply

In the high and medium cost categories, more than 75% of residents have in-house water connections (Fig. 6.3). The use of outside taps, communal taps and neighbours' taps is a characteristic feature of houses in the low cost category. Access to private boreholes is limited to the high cost category (19%). The section of the questionnaire on water supplies included an assessment of the distance to the nearest source and the availability of water. This revealed that the distance to water sources in the low cost category varied with 22.4% indicating a distance under 50m, 11.9% indicating distances between 50m to 200m, and 23.9% indicating distances averaging more than 200m. With regard to the availability of water, 40.3% reported that water was available all the time, 37.3% had water a few hours each day (0700hrs. to 1100hrs. and/or 1400hrs. to 1600hrs. or 1600hrs. to 1800hrs. and/or during night hours) and 22.4% had water every other day.

The tests for significance (Appendix A, Table A3) show that there is a significant difference in access to water sources between the sampled high and low cost areas (Fisher's probability, p = 0.00) and between the sampled medium and low cost areas (Fisher's probability, p = 0.00).

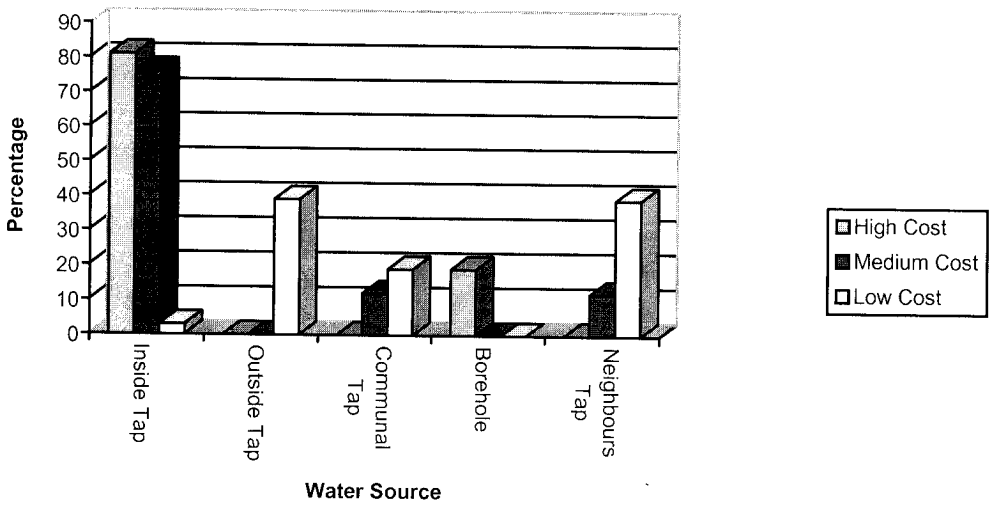


Fig. 6.3 Frequency distribution graph for water sources

6.5 Access to Sanitation

The respondents in the high and medium cost categories all indicated that they had access to flushing toilets while only 7% of low cost residents used this type of sanitation (Fig. 6.4). Ninety percent (90%) of the low cost category used pit latrines while three percent had no toilets of their own.

The tests for significance (Appendix A, Table A4) show that there is a significant difference in access to sanitation between the sampled high and low cost areas (Fisher's

probability, p = 0.00) and between the sampled medium and low cost areas (Fisher's probability, p = 0.00).

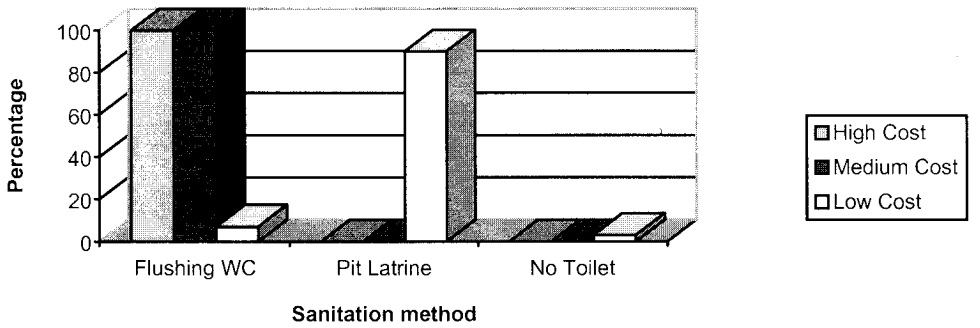


Fig. 6.4 Frequency distribution graph of sanitation methods

6.6 Access to Waste Disposal Facilities

In the high and medium cost categories, more than 80% of respondents reported the use of rubbish pits for waste disposal (Fig. 6.5). A small percentage (12%) of the high cost respondents indicated that they had arrangements with private entrepreneurs to collect the rubbish and dispose of it. The low cost respondents reporting use of "Other" methods included loading the rubbish in sacks and using their own means to dispose of the rubbish away from the residential area. Other respondents in this category used designated concrete bins. Some were in the process of being provided in areas such as Mandevu/Marrapodi at the time of the survey. Some surface dumping was observed in the medium cost areas surveyed while no respondents in the high cost areas indicated that they dumped their rubbish in this way. No respondents indicated that the council collected their rubbish.

The tests for significance (Appendix A, Table A5) show that there is a significant difference in waste disposal methods between the sampled high and low cost areas (χ^2 = 10.11) and between the sampled medium and low cost areas (χ^2 = 10.98).

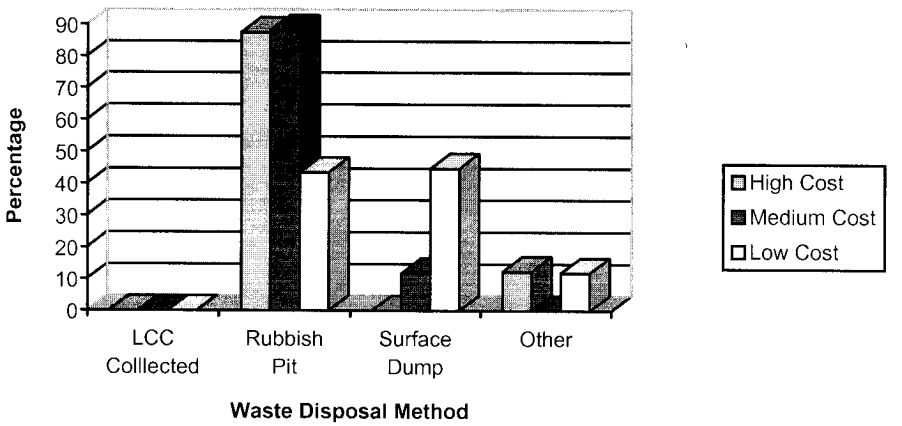


Fig. 6.5 Frequency distribution graph for waste disposal methods

6.7 Access to Lighting Energy

In both high and medium cost areas, electricity was used for lighting in all the houses sampled (Fig. 6.6). In the low cost areas only 41.8% of homes used electricity for lighting while the rest used either candles or paraffin lamps or both of these lighting energies.

The tests for significance (Appendix A, Table A6) show that there is a significant difference in access to lighting energy between the sampled high and low cost areas (χ^2 = 17.57) and between the sampled medium and low cost areas (χ^2 = 18.47).

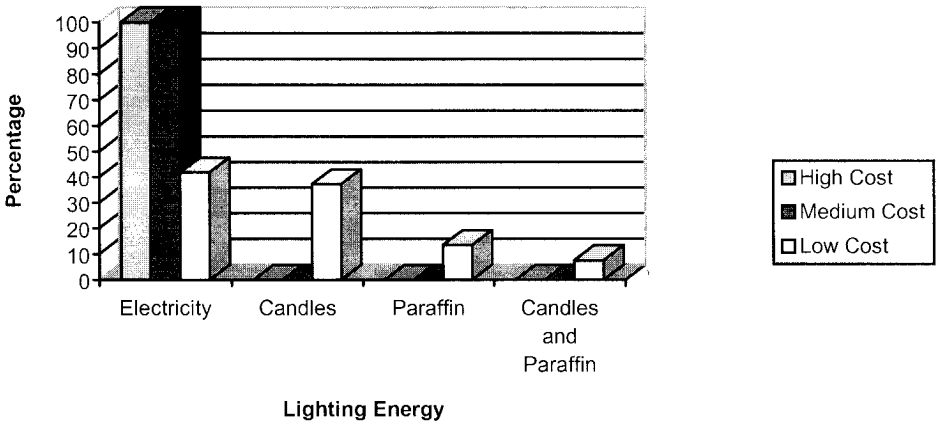


Fig.6.6 Frequency distribution graph for access to lighting energy

6.8 Access to Cooking Energy

Just as for lighting energy, electricity was exclusively used as cooking energy in all the houses sampled in both high and medium cost areas (Fig. 6.7). In the low cost areas, only 38.8% used electricity for cooking while the rest (61.2%) used charcoal or both wood and charcoal.

The tests for significance (Appendix A, Table A7) show that there is a significant difference in access to cooking energy between the sampled high and low cost areas (χ^2 = 19.35) and between the sampled medium and low cost areas (χ^2 = 20.32).

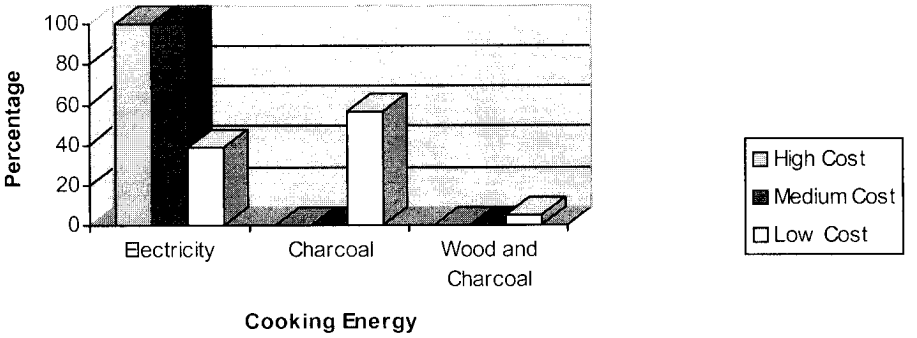


Fig. 6.7 Frequency distribution graph for access to cooking energy

6.9 Access to Road Infrastructure

In the high cost category, all the respondents sampled reported that they had tarred road access to their homes (Fig. 6.8). In the medium cost areas, only 32% of respondents reported tarred roads and in the low cost category, only 12% of respondents had tarred road access. Gravel roads provided access for 62.1% of the medium cost respondents while 76% of low cost respondents reported dirt roads and 7.5% had no road access.

The tests for significance (Appendix A, Table A8) show that there is a significant difference in access to roads infrastructure between the sampled high and low cost areas (Fisher's probability, $p = 0.00$). There is no significant difference in access to roads infrastructure between the sampled medium and low cost areas (Fisher's probability, $p = 0.13$).

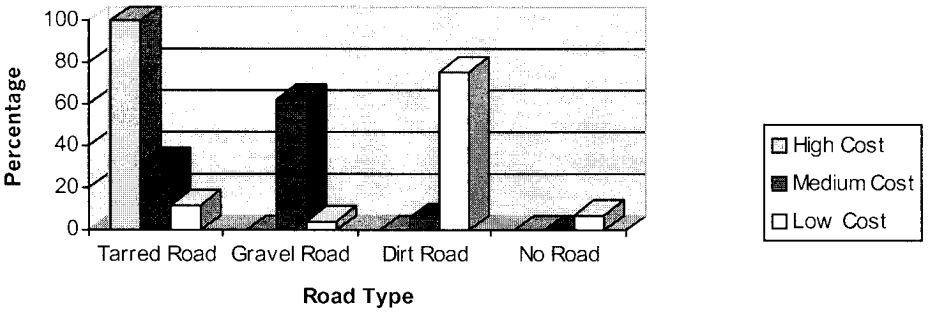


Fig. 6.8 Frequency distribution graph for access to road infrastructure

6.10 Access to Education Services

Among the high cost respondents surveyed, 43.7% had children going to private schools while 18.7% used government schools (Fig. 6.9). The category under 'other' education services (37.5%) includes those respondents with children going to government and private schools, nursery schools, colleges and university. In the medium cost category, 23.5% had no school going children while 17.6% used 'other' education services. Government and private school attendance in this category comprised 35.3% and 23.5% of the sample respectively.

In the low cost category 52.2% of the respondents reported the use of government schools while 32.8% either did not have school going children or their children did not go to school for a variety of reasons. The use of private schools in the low cost category was very low (4.5%) as was the percentage of those using 'other' education services (10.4%). In both medium and low cost categories, use of 'other' education services excluded University attendance.

The tests for significance (Appendix A, Table A9) show that there is a significant difference in access to education services between the sampled high and low cost areas ($\chi^2 = 17.51$). There is no significant difference in access to education services between the sampled medium and low cost areas (Fisher's probability, $p = 0.04$).

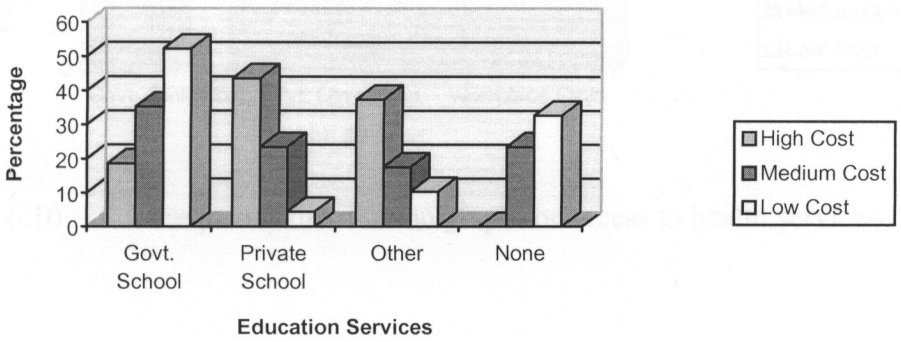


Fig.6.9 Frequency distribution graph for access to education services

6.11 Access to Health Services

The majority of low cost respondents (95.5%) had access mainly to government health facilities (Fig. 6.10). Only 3% used private health services and 1.5% used workplace services. Those in the high cost category were split equally between use of government and private facilities (50% in each case). In the medium cost category, 88.1% used government services while 11.8% used private services.

The tests for significance (Appendix A, Table A10) show that there is a significant difference in access to health services between the sampled high and low cost areas ($\chi^2 =$

23.28). There is no significant difference in access to health services between the sampled medium and low cost areas (Fisher's probability, p = 0.265).

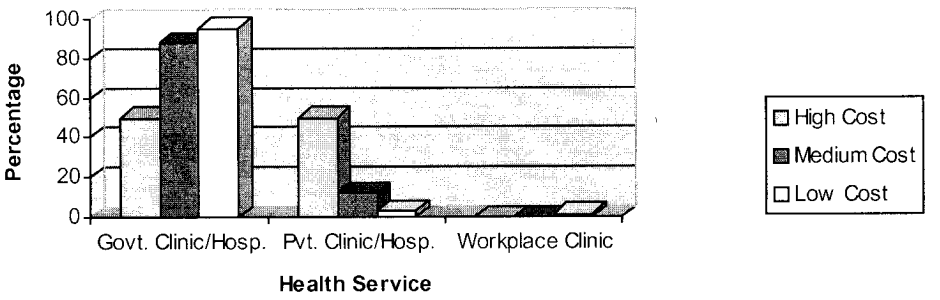


Fig.6.10 Frequency distribution graph for access to health services

6.12 Access to Shopping Facilities

This section assessed convenience of access to shopping facilities as well as the type of facilities available to the different categories of respondents. The question was aimed at determining how far respondents needed to travel in order for them to obtain the goods they required on a regular basis.

In the high cost areas, 68.7% of the respondents lived more than 200m away from a shopping centre or market while 25% lived at distances ranging between 100m and 200m away from a shopping center or market (Fig. 6.11). Only 6.2% of the sample lived within 100m of such facilities. Among medium cost respondents, 38% lived more than 200m away from the nearest shopping center or market, 31% were between 100m and 200m away, 17.6% were between 50m and 100m away and 13.4% lived within 50m of a shopping facility. In the low cost category 35.8% were at distances of more than 200m,

32.8% were between 100m and 200m away, 23.9% were between 50m and 100m away and 7.5% were within 50m.

The tests for significance (Appendix A, Table A11) show that there is no significant difference in access to shops and markets between the sampled high and low cost areas (χ^2 = 5.74) and no significant difference in access to shops and markets between the sampled medium and low cost areas (χ^2 = 0.17).

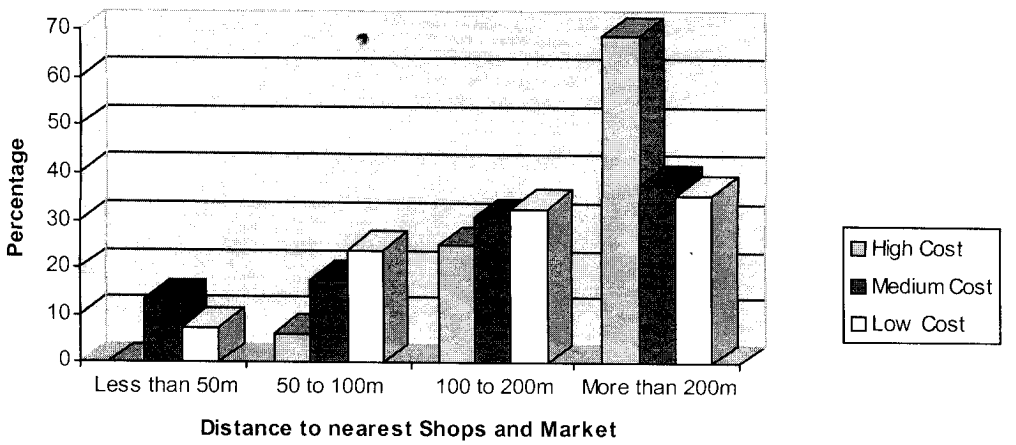


Fig. 6.11 Frequency distribution graph for access to shops and markets

6.13 Access to Transportation

The question on the use of transport services was targeted at employed respondents who use some form of transportation to get to their workplace. The use of motor transport (cars and minibuses) was highest in the high cost areas (56.2%) and lowest in the low cost areas (7.5%) (Fig. 6.12). The low cost areas also showed a significantly higher percentage (92.5%) that resort to walking as a regular means of getting around. There was

a complete absence of bicycle use and none of the respondents reported the use of taxis as a regular form of transport.

The tests for significance (Appendix A, Table A12) show that there is a significant difference in access to transportation between the sampled high and low cost areas (Fisher's probability, p = 0.00) as well as between the sampled medium and low cost areas (Fisher's probability, p = 0.00).

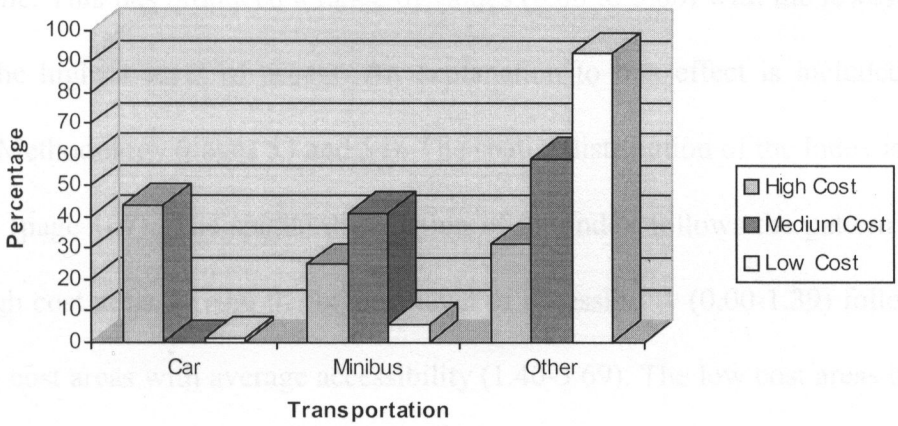


Fig. 6.12 Frequency distribution graph for access to transportation

6.14 The Index of Accessibility

In this study, factor analysis has been used to identify the group of variables that have a similar pattern of variation (Appendix C, page 150). The principle behind the use of this technique is to derive the factor that expresses most of the dimensionality in the data to compute an index value that relates each respondent's access to infrastructure and services on a common scale. This information has been mapped to show the spatial

distribution of the index across the city (Fig. 6.13, page 107). The two factors extracted in this analysis have high loadings as shown in Table 6.1. Factor I relates socio-economic, housing and energy access data into an "Urban Status" dimension, while Factor II relates mainly to street lighting and can therefore be referred to as a 'Street Lighting' factor. Factor I is strongly and positively associated with economic activity, residence in neighbourhoods with good roads, sanitation and electricity. This factor was subsequently used to compute an "Index of Accessibility" which measures the level of access to infrastructure and services for each respondent based on the input variables collected from each one. This has produced a range of values (0.00 to 5.00) with the lowest values indicating the highest level of access. An explanation to this effect is included in the Chapter on Methodology (pages 53 and 54). The spatial distribution of the Index is shown in Fig. 6.13 (page 107). The spatial distribution of the index follows the pattern of land use with high cost areas having the highest level of accessibility (0.00-1.39) followed by the medium cost areas with average accessibility (1.40-3.69). The low cost areas have the lowest accessibility (3.70-5.00). For purposes of classification, the industrial area is included in the high cost accessibility category because it is generally well served with the necessary roads, drainage, water, sanitation, and energy infrastructure.

In Table 6.1 and in Appendix C (page 150) (Initial and Final Statistics), the Eigenvalues indicate the amount of variance accounted for by the factor. The percentage of variance and the cumulative percentage of variance are expressive of the relative importance of the factors. The communalities (page 153) indicate the total variance in any variable that is accounted for by the factors.

Table 6.1 Results of Factor Analysis

(A) Explanatory power of the factors

Factor	Eigenvalue	% Variance explained	Cumulative %
I	6.0	25.2	25.2
II	1.9	7.8	33.1

(B) Factor structure

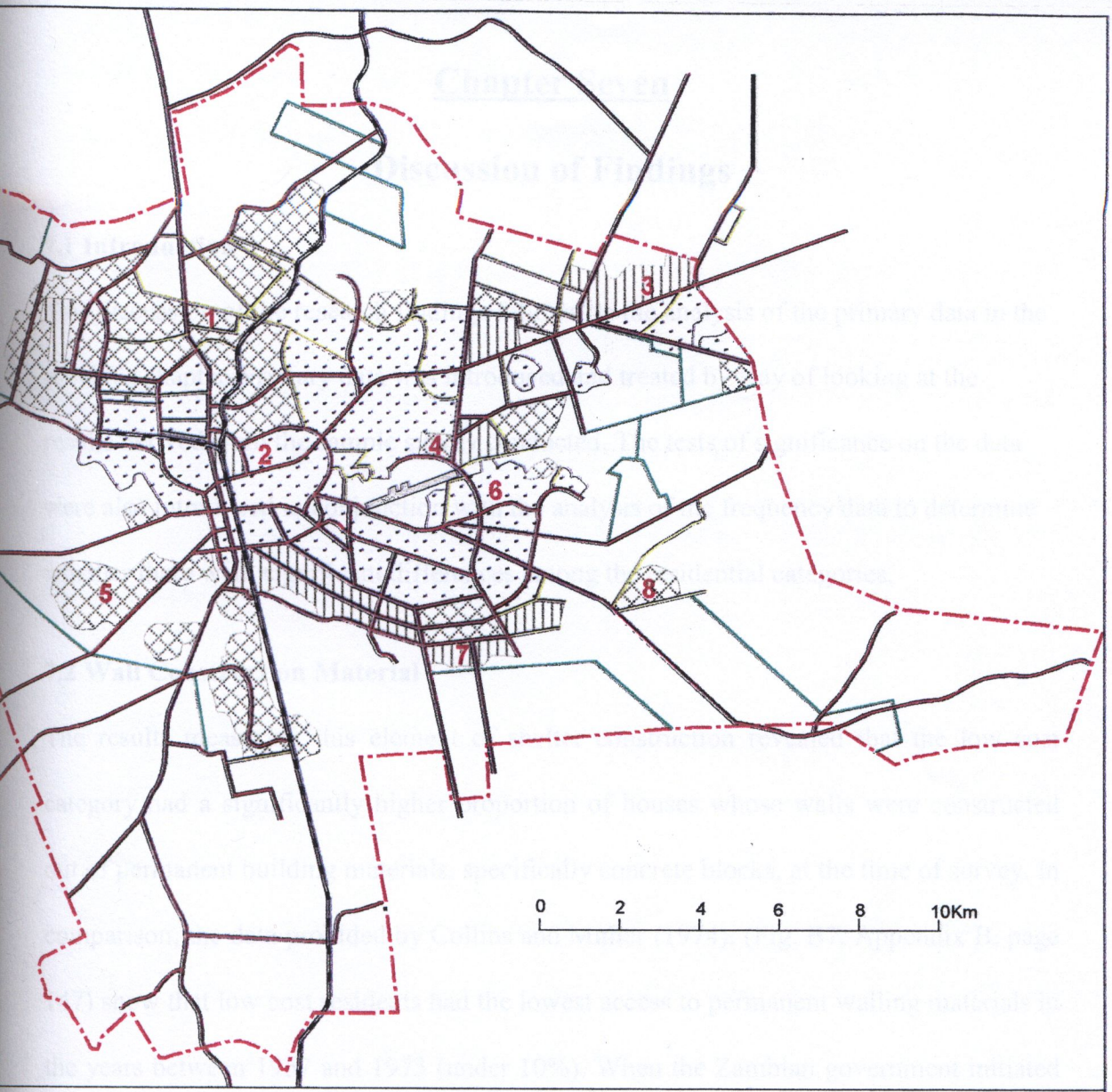
Factor	Loadings	
I. 'Urban status'	Residential area	0.874
	Journey time	0.775
	Sanitation	0.749
	Transport	0.739
	Roads	0.727
	Workplace	0.645
	Cooking energy	0.592
	Employment	0.564
	Lighting energy	0.521
II 'Street Lighting'	Street lighting infrastructure	0.821
	Active street lights	-0.806

The band of values from 0.00-1.39 contains 12 respondents while the next band from 1.40-3.69 contains 35 respondents. The final band from 3.70-5.00 contains 53 respondents. The middle band consists of four high cost respondents, all the 17 medium cost respondents and 14 low cost respondents. The factor used to compute the index emphasizes such aspects as employment, workplace, journey time to work and transportation. An unemployed respondent living in a high cost area will score poorly on

these aspects and this will affect their placing on the index. This explains why four of the high cost respondents are in the middle accessibility band. On the other hand, low cost respondents with the requisite 'Urban Status' characteristics scored better than others in their category and have therefore moved up to the middle accessibility band.

In general, the index provides a basis for deciding the level of accessibility for individuals on a common scale. On the basis of this computation, data derived from any residential area in Lusaka can be subjected to this test to determine the level of access to infrastructure and services for any Lusaka resident.

.13 ACCESSIBILITY TO INFRASTRUCTURE AND SERVICES - LUSAKA 1999



KEY

Study areas

1. Marrapodi
2. Northmead
3. Chelston
4. Kalingalinga
5. Kanyama
6. Kabulonga
7. Chilenje South
8. Bauleni

Map symbols

Main road .....
Minor road .....
Railway line .....
Airport .....
City of Lusaka boundary .....
Cadastral boundary .....

Accessibility Index

3.70 - 5.00
1.40 - 3.69
0.00 - 1.39

Source of Base Map : 1992 Spot Satellite Image, Surveying Department, UNZA

Chapter Seven

Discussion of Findings

7.1 Introduction

This discussion of the research findings follows on the analysis of the primary data in the previous chapter. Primary data was introduced and treated by way of looking at the results derived from the sample survey conducted. The tests of significance on the data were also introduced in conjunction with the analysis of the frequency data to determine whether there were significant differences among the residential categories.

7.2 Wall Construction Material

The results measuring this element of shelter construction revealed that the low cost category had a significantly higher proportion of houses whose walls were constructed out of permanent building materials, specifically concrete blocks, at the time of survey. In comparison, the data provided by Collins and Muller (1974), (Fig. B7, Appendix B, page 147) show that low cost residents had the lowest access to permanent walling materials in the years between 1957 and 1973 (under 10%). When the Zambian government initiated the first official housing programme in 1966, emphasis was placed on administering self-help schemes for the lower income groups and the self-employed. This was effected by the subsidization of serviced plots and the provision of building materials loans to participants (Khonje, 1983). Kasongo and Tipple (1990) have commented that the housing policies implemented after independence indicate a gradual shift from providing complete (conventional) low-cost housing to aided self-help schemes and squatter

upgrading. This shift was in recognition of the fact that the unauthorised areas represented social and economic capital that could not simply be brushed aside.

The Housing (Statutory and Improvement Areas) Act of 1974 provided the legal framework to bring illegal and squatter settlements into the regulatory ambit of the local authorities. By providing this means of legalising security of tenure for these settlements, the government laid the foundation for individual plot holders to invest their savings in more permanent forms of shelter as opposed to the mud-brick structures of the pre-independence era and the immediate post-independence period.

7.3 Roof Construction Material

The sample survey indicated that asbestos sheets are the most commonly used roofing material in the medium cost areas. The reasons for this lie in the standardization of accommodation for Africans influenced by the enactment of the 1948 African Housing Ordinance. Both of the sampled townships of Chelston and Chilenje South were built after the colonial administration accepted that African housing needed improvement both in the quality and quantity of housing provided. These areas represent the earliest attempt to provide reasonably permanent and durable housing for Africans.

Data presented by Collins and Muller (1974), indicate that roofing material in the low cost areas improved consistently in relation to the use of good thatch, asbestos, corrugated iron and tiles between 1957 to 1973 (Appendix B, Fig. B10 and B11, page 149). They however, recorded a steady decline in relation to the use of poor thatch or

other temporary material (Fig. B12). The findings from this survey also indicate a low percentage of temporary roofing material (Table 5.2 and Fig. 5.2). This result, as is the case for walling material, confirms that there has been a gradual improvement in the quality of roofing material and is in keeping with the post independence changes brought about by the housing policies pursued by the Zambian government.

7.4 Water Supply

The research findings on water supply indicate significant differences in access to water supply among the sampled communities. This finding negates those to do with the elements of shelter. Water supply and sanitation services are by their nature networked services that are normally supplied on a city wide rather than spasmodic basis. Balbo (1993), has argued that this constitutes a significant difference between Third World cities and those of the west because western cities are cities of networks, where primary infrastructure services all parts of the city in a uniform manner. Abdulaal (1990), and Turok (1994), also state that the provision of infrastructure among dispersed settlements accounts for higher capital, operating and maintenance costs.

In the survey, it was found that though pipe-borne water was available in Chelston, Marrapodi/Mandevu and Kalingalinga, the availability of water in these areas had to be assessed against a background of low water pressure as well as the distance travelled to get to the water source. The Marrapodi/Mandevu area was one of the earliest squatter upgrading projects. In this area, the upgrading scheme included the provision of individually metered standpipes for each plot. Rakodi (1986), indicates that the Aided-

Self Help Housing scheme provided planning standards that stipulated plot sizes of 12m by 27m, which would be provided with water-borne sanitation and individual water supply.

At the time of the survey, it was observed that only sections of piping remain where the meters used to be, and many parts of the township had no running water. Some residents explained that the meters were removed due to non-payment of water bills by the residents. It was also discovered that parts of the pipe network have been vandalised or stolen. Fetching water in these townships takes up a large part of each day's activities as Schlyter and Schlyter (1979:64), have shown. In relation to Rakodi's comment above, the sewer network in Marrapodi/Mandevu is quite evident from the manholes that can clearly be observed in many parts of the township but it has since ceased to be operational.

Figure B1 (Appendix B, page 146) shows that no low cost residents had private taps between 1957 and 1963. Between 1963 and 1973 fewer than 5% of low cost residents had private taps while between 5% to just above 15% had shared taps (Fig. B2, page 146). The percentage of low cost residents without piped water supplies fluctuated between 10% and 25% over the same period (Fig. B3, page 146).

In comparison with the data from this survey, there has been a significant rise in access to a piped water source for low cost residents but this has to be weighed against the factors enumerated above. O'Connor (1983), comments that the availability of water supplies influences the location of all types of towns around the world but this is only one

dimension of the problem. The distribution of available supplies to individual households poses a much larger challenge in African cities leading many households to use highly polluted sources or make long journeys to the nearest source of clean water.

7.5 Sanitation

The provision of sanitary services follows on the provision of water supply. Once again this is a service that benefits from economies of scale over wide areas. Lusaka, from its inception, has suffered an insufficiency of sanitary services. It is nearly 70 years since the founding of the capital at Lusaka and yet large parts of the city continue to suffer the indignity of using pit latrines. This sanitation system prompted the Assistant Magistrate for Lusaka to write to the Secretary for Native Affairs in 1948 that..."the latrine system now in force can only be described as an offence and a scandal. Many natives do not use them at all. It will be necessary to provide adequate latrine accommodation adequate to the population of the [town] compound and to the demands of decency and privacy" (NAZ File LGH1/6/5).

The differences observed in access to sanitation systems have contributed significantly to the spread of water-borne infections such as cholera particularly in the rainy season. Appendix E (page 168) carries two newspaper clippings on the cholera outbreak that hit Lusaka during the last rainy season. Both reports are indicative of the general situation during this time of the year in Lusaka's low cost areas. For the areas to the south and west of the city, the problem is compounded by their low lying situation and the poor state of drainage in the area.

Data compiled by Collins and Muller (1974) (Appendix B, Fig. B4, page 147) show that fewer than three percent of low cost residents had access to flushing toilets while those with pit latrines or shared waterborne facilities ranged from about 3% between 1957 to 1963 increasing to just under 20% by 1973 (Fig. B5, page 147). In this survey, the percentage using pit latrines is very significant at 90%.

O'Connor (1983) makes the comment that the provision of sewerage services is one area where 'Western' technology clearly has advantages over indigenous systems, which may be adequate for rural living standards but are totally unsuited to the higher densities of urban life. Schlyter and Schlyter (1979), state that the issue of excreta disposal is a private one, but the problem has communal dimensions and needs to be viewed as such. Cheatle (1986), has stated that Lusaka's sewage system has lagged behind the development of the water system and in spite of recent extensions, has tended to get overloaded. However, large parts of the urban area do not have water-borne sewerage and are dependent upon septic tanks, or where there are no individual water supplies, on pit latrines.

7.6 Waste Disposal

Inadequate waste disposal arrangements constitute a health hazard and contribute to the stench in many parts of Africa's cities (O'Connor, 1983). In Ghana's capital Accra, less than half of the city's solid waste is collected and disposed off properly (Boakye-Yiadom Jr., 1997). Schlyter and Schlyter (1979), found that there were no garbage collection

facilities at the time of their survey of George compound in 1976 and parts of the township looked very untidy due to the growing use of plastic packaging.

The results of this research indicate a significant difference in disposal methods, which can be explained by the fact that there is no surface dumping in the high cost areas and very little in the medium cost areas, whereas surface dumping accounts for almost half of all rubbish disposed of in the low cost areas. The fact that no surface dumping was surveyed in the high cost areas is not necessarily an indication that none takes place. It is only that medium and high cost respondents are more careful with the way they treat domestic waste. A difference in literacy levels (all high and medium cost respondents had a minimum of secondary education) and a much higher consciousness of the effects of environmental degradation among medium and high cost respondents accounts largely for the difference in attitudes to environmental cleanliness. An example of this was found along Lufubu Road in Kalundu. Residents in this area have posted notices discouraging the disposal of sugar cane stalks along the road because Kalundu is surrounded, on the eastern edge, by a dambo area used for growing sugar cane, which is sold to passersby in the area. The people who buy and eat the sugar cane are mainly low cost residents from either Ng'ombe (to the north) or Kalingalinga (to the south) who walk through the area to and from their workplaces in the Kalundu/Roma area. The residents' attitudes to environmental cleanliness also reflect the value placed upon the properties and the residential area concerned.

The absence of a centrally controlled garbage collection service in Lusaka once again reflects the nature of the differences explored by Balbo (1993), in his comparison of Third World and western cities. The collection, disposal and treatment of solid waste is a vital environmental consideration in urban areas, whose neglect poses a danger to the health of urban communities especially in areas where population densities are high.

7.7 Access to Energy for Lighting and Cooking

The provision of electricity, like water and sewerage, depend upon networked systems for efficient coverage of large city areas. From the report by Schlyter and Schlyter (1979), little significant change has taken place in terms of access to electricity in the low cost areas. At the time of their survey of George compound in 1977, the Schlyters found that there were about 30 electricity users of whom the majority were commercial consumers with only a small number of private homes connected to the power grid.

A report of the Northern Rhodesia Housing Board (1958), on the supply of electricity to African housing areas (NAZ File TP 133/1-LGH1/6/15) refers to the need to supply power to the municipal suburbs of Chinika, Kamwala, Kabwata, Chilenje and Matero. Power was to be supplied for purposes of street lighting and to council buildings and African housing. The main reason for providing street lighting was to facilitate the maintenance of law and order and permit people to move about at night with a measure of security. The street lighting proposed would consist of 100-watt lamps in simple reflector fittings equipped with stone guards. The lights would be mounted on overhead transmission poles used to carry the supply lines and lighting would be limited to five and

a half hours per night. The council buildings indicated in the report include offices, beer gardens, welfare and community centres, clinics, stores and sundry. Other service buildings comprising police, schools, churches, missions etc., would also be serviced. For African housing the report indicates that power supply would be controlled by automatic circuit breakers, which would cut off power when overloading occurred. There was to be no individual metering due to the cost of installing and reading them but a monthly fixed charge would be levied to cover the estimated cost. The number of points wired per house ranged from 2 points for a one-bedroom house to 5 points for a four-bedroom house. The loads proposed were intended to facilitate use of basic electrical appliances such as a radio and pressing iron.

The intention of the colonial authorities was to provide the most basic access to electric power for the African residents of Lusaka's municipal housing areas at the least cost possible, but at the same time to make it easier for them to manage these areas in a manner that suited their convenience.

From the results of this research, electricity was used as lighting and cooking energy in both medium and high cost homes in the sample. The electricity grid network covers all the medium and high cost areas and all homes are connected to the grid. By contrast, in the low cost areas, the electricity supply network covers public facilities such as clinics, police, and private commercial enterprises such as groceries, bars and small-scale workshops. Where power is extended to individual homes, the owners are required to pay an initial connection charge and provide their own meter box.

7.8 Access to Road Infrastructure

The quality of tarred roads in the high cost areas was better in Kabulonga where most roads had been resurfaced recently. In Northmead only a few of the main distributor roads, had been resurfaced. In the medium and low cost areas, most tarred roads were observed to be in very poor condition. Entire sections were eroded and deep gullies and potholes had developed in many areas. In some cases only a small strip of tar in the middle of the carriageway gave an indication of the fact that the road had been tarred when first constructed. The reasons for the differences observed lie in the fact that the high cost areas are given more priority partly because of the international nature of Lusaka's population, while the medium and low cost areas are given relatively little priority.

7.9 Access to Education

In the medium and low cost categories the use of government schools was much higher than in the high cost category accounting for 87.5% of school attendance. This can partly be explained by the fact that there was at least a primary school in each of the areas surveyed. However, not all respondents sent their children to the schools in their area.

Respondents who indicated that they sent their children to other schools explained that their reasons for doing so were based on the fact that schools in the medium and high cost areas provided a better standard of education and therefore produced better pupils in the primary and secondary leaving examinations than schools in the low cost areas. Some

respondents cited the use of local languages as a teaching medium at primary levels in the low cost areas as a reason for sending their children to schools outside their own area so that they can be taught in English. It should also be noted that the location of secondary schools in particular, favours the high cost areas much more than the medium and low cost areas.

The absence of any difference in access to education facilities between the medium and low cost categories can be explained by the fact that most government schools at basic education level are located within these two residential categories.

Table 7.1 below shows school attendance by type of school attended for the whole of Zambia in 1998. The table indicates that government was the major provider of education accounting for 93% of all school attendance at the time of survey. Private sector participation was higher at post-secondary level contributing 33% of college level education and 33% of University or higher-level education.

Table 7.1 School attendances by Type of School – All Zambia

	Government	**Mission/Religious**	**Industrial**	**Private**	**Other**	**Total**
All Zambia	93	3	0.4	3	0.3	100
Primary	95	2	0.4	2	0.3	100
Secondary	91	6	0.3	2	-	100
College	59	7	3	30	2	100
University & above	64	3	-	33	-	100

Source: CSO, 1998

7.10 Access to Health Services

In the low cost category, the use of government health facilities is much higher. This explains the significant difference in access to health services between the sampled high and low cost areas while the significantly higher proportion of medium cost respondents using government health services explains the lack of any significant difference between the medium and low cost areas. There are probably more users of health services provided in the workplace in the medium and high cost category, but none were recorded in the survey.

7.11 Access to Shopping Facilities

In general, high cost respondents were farther away from established shops and markets than respondents in the other two categories. Shop centres in the high cost residential areas were established at the time Lusaka was planned. Since then very few changes have taken place to alter this state of affairs.

Henkel (1986) recognises four shop centres in the high cost areas which were planned in the post war period to supply the European population with basic goods and services. These centres are located at Woodlands, Longacres, Northmead and Chelston. Henkel further indicates that shops in Lusaka, up to the Second World War, were confined to the CBD and the "second class" trading area at Luburma to the southeast. This was in keeping with Adshead's capital plan for Lusaka of 1931. The post-war town planning schemes of 1952 and 1958 indicated intentions to develop further shopping areas outside

of these two principal centres. Apart from the four indicated above, extra centres were to be developed at Kalingalinga, Roma, Matero and on the Great North Road near Mandevu.

Since Henkel (1986), wrote his paper, shop centres have developed to various levels of serviceability in each of these areas. Henkel, however, noted that shop density in the low cost settlements was much higher than in the medium and high cost areas. He says that this is a reflection of the much poorer nature of the shops in as far as stock and start-up capital are concerned and observes that there were about 370 inhabitants per shop in the squatter settlements of George, Chawama, Chaisa and Chipata. In the high cost areas this relationship was estimated at well over 1000. This observation fits the data derived from this research, which showed on average that high cost respondents were farther away from a shopping facility than their counterparts in the medium and low cost areas. Henkel notes though that these figures must be seen against the background of a far lower purchasing power among the low-income groups. Although Henkel's research refers to a much earlier period, the decade since the MMD came to power (1991) has seen a phenomenal growth in informal trading both at established market centres and in the lower-income residential areas where there has been a proliferation in the numbers of grocery shops and small stalls or kiosks, the latter built from all kinds of temporary material and selling all kinds of goods mostly from the home owners plots.

Schlyter and Schlyter (1979), confirm the existence of groceries and teacarts (kiosks) in George in 1969. The teacarts in their reincarnation in the low cost areas are now popularly referred to as "Tuntemba", which term means 'kiosk' or 'booth'.

7.12 Access to Transportation

Blankhart (1986), has stated that the location of individuals and organisations is closely interrelated to the transport network. It is movement that knits social areas and functional zones in a city into an integrated whole. O'Connor (1983), has argued that most urban growth resulting from European initiatives has taken place in the context of the availability of motor transport and that this has been a factor in the sprawling nature of cities such as Lusaka and Harare.

The colonial legacy left to these cities in so far as transportation is concerned arises from the combination of African income levels and European ideas on the separation of home and workplace. O'Connor (1983) further argues that the most effective way of reducing transport problems is not more investment in improved transport systems but the location of homes, workplaces, shops and schools in a manner that reduces essential movements to a minimum. From this premise, O'Connor (1983) welcomes the proliferation of local shops and the growth of small-scale employment centres within spontaneous settlements as a viable alternative to the rigidity of colonial zoning patterns.

Blankhart (1986) has differentiated the transport streams in Lusaka on the basis of the different land uses which consist of the CBD, administrative area, industrial areas, residential areas and institutional/recreational uses. She states that employment in Lusaka is concentrated in the first three areas and as the journey from home to place of work is the most important for most inhabitants, peak hour traffic streams concentrate on the transport corridors from the residential areas to the main employment centres. She

criticizes the Doxiadis Plan as do Schlyter and Schlyter (1979), for proposing a network of freeways and expressways that assume a car owning population while giving little attention to the needs of public transportation, cyclists and pedestrians.

The results from this research showed that the use of motor transport was higher in the high cost areas as is to be expected. The low cost areas revealed a higher proportion of respondents whose only means of getting around is walking. Blankhart (1986) confirmed this finding in her paper stating that the unfavourable spatial pattern of Lusaka's low cost areas affected this group most significantly as they had to make the longer journeys to places of work by means of public transport, cycling or walking.

The differences observed in this research can be partly explained by the fact that 66% of the sample was unemployed and confirms O'Connor's assertion regarding low income levels for many African city dwellers. Since the beginning of Zambia's Structural Adjustment Programme (SAP) in the late 1980s and the privatisation of the country's public sector, large numbers of formerly employed Lusaka residents have found themselves without jobs and these include many living in the low cost areas. This has reduced the amount of disposable income for most people, so that they have to make a choice between paying for the use of public transport and reserving the little cash available for food related needs.

7.13 Impacts of Fragmentation

The current impacts of fragmentation on the city's urban landscape and their implications for service delivery can be summarized as follows:

- The city continues to exhibit distinct residential zones brought about by the racial discrimination of the colonial period. There is very little integration between different categories of housing. This has resulted in physical as well as social segregation.
- Both sector and multiple-nuclei development can be observed in the differences between separate residential areas, industrial and commercial sectors. The development of commercial service nodes at different points in the city and along major road routes confirms that both theories of urban growth are at work.
- Access to water and sanitation services is differentiated on the basis of residential area. Pipe networks serve individual homes in the medium and high cost areas while low cost areas are served by communal services and other non-conventional methods such as hand-dug wells (for water). Inadequate water and sanitation services have impacted adversely upon the poorer sections of the city leading to seasonal outbreaks of water-borne diseases such as cholera.
- The differences in quality of road networks serving the high cost areas against those serving the medium and low cost areas means that the latter are often inaccessible making it more costly for residents in these areas to get to work and other activities.
- The provision of high class shopping centres in the high cost areas and low class market centres in the medium and low cost areas reflects further the social

segregation and requires medium and low cost residents to make more expensive journeys to look for goods and services in the high class shopping centres.

- The absence of a coordinated street lighting network is a hidden cost upon city residents in that it abets the levels of crime and makes it unsafe for residents to be out of doors at night. It also has an effect upon the rate of road accidents particularly at night.
- The absence of a city-wide waste collection and disposal service increases the problems of environmental sanitation and affects the quality of the city's urban landscape.

From the foregoing analysis, the most significant differences occur between the high and low cost areas. This result points to the fact that the former European residential areas are better off in terms of access to the basic infrastructure and services. While this is true, it must, however, be balanced by the fact that the sampled low cost areas are well provided for in terms of access to primary education facilities and clinics. This is a result of the deliberate policies of the UNIP government, which sought to redress the imbalance in health and education facilities after independence.

Since 1991 when the MMD government came to power, changes implemented in the management of the health and education sectors require residents to pay for services. Residents of low cost areas using government clinics are expected to buy a "scheme" which is a form of health insurance and to pay a "user fee" for each school going child.

However, most low cost respondents when confronted with the issue of access to medical facilities complained that though they pay for the scheme they still have to buy their own medicine. This makes medical care more expensive even though the services themselves are within easy reach. On the other hand some high cost respondents used health services that were farther than six kilometres from their residence. This is a sign of their relatively higher level of control over factors such as health and the education of their children.

Health, education and shopping facilities are areas, which have been affected by the liberalization policies of the MMD government. All three areas were strictly controlled under the command economy of the UNIP government. Health and education facilities were provided free of charge while shopping facilities were provided under the umbrella of state controlled parastatal organizations. As a result there was little room for innovative private provision in these areas. The liberalization of the economy has led to a growth in the number of shopping centres, grocery stores, markets, private schools and clinics thus improving access to these facilities for all residents. However, the quality of goods and the range of services available to the population is determined by the ability to pay for them. In the case of shopping centres poorer residents who live far away from the better shopping centres tend to pay more for their goods and services and are therefore at a distinct disadvantage.

7.14 Effect on Land Use and Settlement Patterns

Within the present city boundaries, land use and settlement patterns reflect both the influences of 'Garden City Thinking' and the post independence changes associated with

the increased urbanization of Africans. Garden city concepts were largely responsible for the formal planning associated with the new capital development along the Ridgeway. Coupled with this was the planning and development of formal African housing areas in Chilenje, Matero, Kamwala, Kabwata, Chunga and Lilanda. The post independence period saw a growth in the number and sizes of informal settlements. Many of the leading ones grew from small beginnings as contractors' and employers' compounds (namely, John Howard, John Laing, Chawama, Misisi, Chibolya) to become major settlements on the city's urban landscape. In a bid to improve the living conditions in these settlements, the UNIP government passed the Housing (Statutory and Improvement Areas) Act, 1974 which ushered in the era of squatter upgrading under the auspices of the World Bank.

At present, the major patterns discernible in Lusaka's urban morphology include the aforementioned formal and informal areas (see Fig 1.1, page 8). To these can be added the residential subdivisions in the Makeni and Buckley areas, Barlaston Park, Chamba Valley, Ibex Hill and New Kasama. In addition, the city boundaries include two areas of Forest Reserve one to the north, the other to the south both of which are now earmarked for some residential development.

Some changes have occurred in land use mainly in the area east of the CBD. This area has undergone land use changes in the form of conversion to business use from mainly residential use. It is possible to anticipate that this whole area will eventually become part of the CBD as space within the CBD becomes more expensive and as businesses seek cheaper and more accessible sites within close proximity of the CBD.

Chapter Eight

Conclusion and Recommendations

8.1 Conclusion

This study examined the relationship between fragmented settlement patterns and the provision of infrastructure and services in Lusaka. The study focused upon determining the origins of the fragmented settlement pattern, which has become a defining feature of many post colonial African cities and sought to identify the current impacts of fragmentation on the city's urban landscape and implications for service delivery.

The influence of garden city thinking in the planning for Lusaka in its early years has been examined by reviewing the historical data on the origins of the city. The historical record shows that Lusaka was a European creation whose creators replicated the living conditions of 19th century Europe in the colonial context. Under these conditions, Africans were only permitted to come and live in the cities if they were employed. As such, no real need existed to look after their interests in a more permanent and organized way.

The coming of independence in 1964 changed the urban landscape as Zambians replaced many white colonial officials. This process in turn led to the gradual takeover of residential areas that were formerly reserved for whites only. Some white farmers abandoned their farms or left them in the hands of local caretakers. Without the control systems that had prevailed before independence, workers compounds grew to cater for

the influx from rural areas and eventually became large squatter townships without proper services and infrastructure.

A study of accessibility to various infrastructure and services across the different categories of residential areas in Lusaka shows that there are significant differences when we consider access to health, education and roads infrastructure between the high and low cost areas. However, access to these services is similar when considering the medium and low cost areas. Access to lighting and cooking energy, water supply, sanitation and transportation are also significantly different across all categories while shelter construction materials and shopping facilities are broadly similar across all the categories.

This latter conclusion indicates that access to networked facilities (electricity, water supply, sanitation and roads) shows the more significant differences between the three categories. This broadly agrees with the supposition that while western cities are cities of networks where primary infrastructure runs through different parts of the city servicing all of them under essentially similar conditions, African cities with their fragmented spatial organization tend to draw together planned districts, illegal settlements and slums in a discontinuous pattern that is difficult to handle with the conceptual and operational tools of traditional city planning. The latter is responsible for the order and integration observed in western cities but the application of these tools in the African context has, by and large, proved difficult. This is because the application of planning principles is predicated upon assumptions about the state, public welfare and technical resources that work for western cities and not for those of the Third World.

The major failure in Lusaka's urban development relates to the planning processes that have been employed over the years. Although the original intention was to create a 'garden city', this has proven to be a myth in that subsequent developments have negated the philosophy upon which the city was based. Urban sprawl and a disorderly growth pattern characterize much of Lusaka at present. Post independence attempts to develop a cohesive structure have been thwarted by inadequate financial and technical resources and the bureaucratic machinery of the government.

8.2 Recommendations

Against this failure to implement a planning system that caters for the city in a uniform manner, the city of Lusaka is faced with continuing to deal with its urban problems in a piecemeal fashion. In order to redress the problems of its colonial legacy, the city needs to consider the following recommendations:

8.2.1 Planning

- Planning must take account of the needs of the people being planned for. The Lusaka Master Plan laid emphasis on achieving an overall effect, while ignoring the realities of Lusaka's urban development. A planning system must be implemented that effectively accounts for existing development while seeking to achieve improvements in the way that services are delivered.

- Planning for the city must be complete, comprehensive and inclusive. The city authorities should carry out an assessment of socio-economic and environmental

conditions so as to obtain up to date information on the conditions in Lusaka. This would provide the baseline data for future planning activities.

- Residents Development Committees exist in many of the informal areas of Lusaka. The Lusaka planning authority should constitute Neighbourhood Planning Committees in all of the residential areas of Lusaka to work with the professional/technical staff of the Council and the various NGOs and donor agencies involved in development work particularly among poor peri-urban communities.

8.2.2 Infrastructure and Services

- The low cost areas need major improvements in roads infrastructure, provision of street lighting and waste disposal facilities. These services can only be provided if the users are able to pay for them. The Council should implement a community tax system that is specifically aimed at financing improvements in infrastructure and service delivery and ensure that these funds, when collected are directed to these areas of urban improvement. The ability to pay for these services as well as the willingness to do so among Lusaka residents needs to be measured by way of a study that targets this area so that a tax system is designed which is affordable and is supported by the majority of residents.

- To achieve improvements in water supply, detailed studies of water needs and usage need to be undertaken. Such surveys can provide the data necessary to determine the type of water system suited to particular communities. Different alternatives such as

kiosk vending systems and communal standpipes can be developed on the basis of an understanding of the communities needs. However, this is only possible if it is done in consultation with the communities concerned.

- To improve sanitation, the use of pour-flush latrines should be encouraged. Pour flush latrines are suitable where water has to be carried to the latrine from a standpipe, well, or other water sources. The latrine is constructed in the same manner as an ordinary pit latrine except that the floor slab is fitted with a water seal pan, which is cleared by pouring water down the pan after use. This type of latrine overcomes the problems of flies and smell by incorporating a water seal in the defecating hole.

- Community-based initiatives such as the Project Urban Self-Help (PUSH) programme, which has been implemented in many areas of Lusaka, can achieve commendable results in community infrastructure provision and improvement. This programme has achieved improvements in roads and drainage systems using local labour on a food-for-work basis. Such programmes achieve positive results because they give the local people a sense of ownership of the improvements achieved and should continue to be supported by the city authorities.

- The ability to connect to electric power by many poorer residents of Lusaka is still very low even though many low cost areas have power lines. This is because of the high connection cost and subsequent bill payments. A lower, initial connection cost and a monthly tariff, which is tailored to specific usage, can be implemented based on

a number of allotted units and a circuit breaker system that cuts off power when it is overloaded. Without a significant decrease in the connection charges and the monthly payments, access to electricity will continue to be difficult for many in the low cost areas and will therefore continue to impair their quality of life.

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APPENDICES

Appendix A

Hypothesis Testing

Table A.1 Statistical tests for wall construction material

	High and Low Cost	Medium and Low Cost
Significance Level (Sig.)	0.01	0.01
Degrees of Freedom	-	-
Critical Value (χ^2_α)	-	-
Calculated Value (χ^2_{calc})	-	-
Fisher's Probability (Pr_{calc})	0.47	0.44
Result	Pr_{calc} > Sig., Accept Ho	Pr_{calc} > Sig., Accept Ho

Conclusion:

1. There is no significant difference in type of wall construction material between the sampled high cost and low cost areas.
2. There is no significant difference in type of wall construction material between the sampled medium cost and low cost areas.

Table A.2 Statistical tests for roof construction material

	High and Low Cost	Medium and Low
Significance Level (Sig.)	0.01	0.01
Degrees of Freedom	1	1
Critical Value (χ^2_α)	6.64	6.64
Calculated Value (χ^2_{calc})	1.91	17.61
Fisher's Probability (Pr_{calc})	-	-
Result	$\chi^2_{calc} < \chi^2_\alpha$, Accept Ho	$\chi^2_{calc} > \chi^2_\alpha$, Reject Ho

Conclusion:

1. There is no significant difference in type of roof construction material between the sampled high cost and low cost areas.
2. There is a significant difference in type of roof construction material between the sampled medium cost and low cost areas.

Table A.3 Statistical tests for water sources

	High and Low Cost	Medium and Low Cost
Significance Level (Sig.)	0.01	0.01
Degrees of Freedom	-	-
Critical Value (χ^2_{α})	-	-
Calculated Value (χ^2_{calc})	-	-
Fisher's Probability (Pr_{calc})	0.00	0.00
Result	Pr_{calc} < Sig., Reject Ho	Pr_{calc} < Sig., Reject Ho

Conclusion:

1. There is a significant difference in access to water supplies between the sampled high cost and low cost areas.
2. There is a significant difference in access to water supplies between the sampled medium cost and low cost areas.

Table A.4 Statistical tests for sanitation methods

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	-	-
Critical Value (χ^2_{α})	-	-
Calculated Value (χ^2_{calc})	-	-
Fisher's Probability (Pr_{calc})	0.00	0.00
Result	Pr_{calc} < Sig., Reject Ho	Pr_{calc} < Sig., Reject Ho

Conclusion:

1. There is a significant difference in sanitation facilities between the sampled high cost and low cost areas.
2. There is a significant difference in sanitation facilities between the sampled medium cost and low cost areas.

Table A.5 Statistical tests for waste disposal methods

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	1	1
Critical Value (χ^2_{α})	6.64	6.64
Calculated Value (χ^2_{calc})	10.11	10.98
Fisher's Probability (Pr_{calc})	-	-
Result	$\chi^2_{calc} > \chi^2_{\alpha}$, Reject Ho	$\chi^2_{calc} > \chi^2_{\alpha}$, Reject Ho

Conclusion:

1. There is a significant difference in waste disposal methods between the sampled high cost and low cost areas.
2. There is a significant difference in waste disposal methods between the sampled medium cost and low cost areas.

Table A.6 Statistical tests for access to lighting energy

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	1	1
Critical Value (χ^2_{α})	6.64	6.64
Calculated Value (χ^2_{calc})	17.57	18.47
Fisher's Probability (Pr_{calc})	-	-
Result	$\chi^2_{calc} > \chi^2_{\alpha}$, Reject Ho	$\chi^2_{calc} > \chi^2_{\alpha}$, Reject Ho

Conclusion:

1. There is a significant difference in access to lighting energy between the sampled high cost and low cost areas.
2. There is a significant difference in access to lighting energy between the sampled medium cost and low cost areas.

Table A.7 Statistical tests for access to cooking energy

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	1	1
Critical Value (χ^2_α)	6.64	6.64
Calculated Value (χ^2_{calc})	19.35	20.32
Fisher's Probability (Pr_{calc})	-	-
Result	$\chi^2_{calc} > \chi^2_\alpha$, Reject Ho	$\chi^2_{calc} > \chi^2_\alpha$, Reject Ho

Conclusion:

1. There is a significant difference in access to energy for cooking between the sampled high cost and low cost areas.
2. There is a significant difference in access to energy for cooking between the sampled medium cost and low cost areas.

Table A.8 Statistical tests for access to roads infrastructure

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	-	-
Critical Value (χ^2_α)	-	-
Calculated Value (χ^2_{calc})	-	-
Fisher's Probability (Pr_{calc})	0.00	0.13
Result	$Pr_{calc} <$ Sig., Reject Ho	$Pr_{calc} >$ Sig., Accept Ho

Conclusion:

1. There is a significant difference in roads infrastructure between the sampled high cost and low cost areas.
2. There is no significant difference in roads infrastructure between the sampled medium cost and low cost areas.

Street Lighting

The data on street lighting has not been subjected to a test of significance. All the respondents contacted indicated that their residential areas had no street lighting except for Kalingalinga and part of Chelston where the infrastructure is in place but the lights do not work.

Table A.9 Statistical tests for access to education services

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	1	-
Critical Value (χ^2_{α})	6.64	-
Calculated Value (χ^2_{calc})	17.51	-
Fisher's Probability (Pr_{calc})	-	0.04
Result	$\chi^2_{calc} > \chi^2_{\alpha}$, Reject Ho	$Pr_{calc} >$ Sig., Accept Ho

Conclusion:

1. There is a significant difference in access to education services between the sampled high cost and low cost areas.
2. There is no significant difference in access to education services between the sampled medium cost and low cost areas.

e A.10 Statistical tests for access to health services

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	-	-
Critical Value (χ^2_α)	-	-
Calculated Value (χ^2_{calc})	-	-
Fisher's Probability (Pr_{calc})	0.00	0.26
Result	Pr_{calc} < Sig., Reject Ho	Pr_{calc} > Sig., Accept Ho

nclusion:

There is a significant difference in access to health services between the sampled high cost and low cost areas.

There is no significant difference in access to health services between the sampled medium cost and low cost areas.

ble A.11 Statistical tests for access to shops and markets

	High and Low Cost	Medium and Low Cost
Significance Level	0.01	0.01
Degrees of Freedom	1	1
Critical Value (χ^2_α)	6.64	6.64
Calculated Value (χ^2_{calc})	5.74	0.17
Fisher's Probability (Pr_{calc})	-	-
Result	$\chi^2_{calc} < \chi^2_\alpha$, Accept Ho	$\chi^2_{calc} < \chi^2_\alpha$, Accept Ho

onclusion:

. There is no significant difference in access to shops and markets between the sampled high cost and low cost areas.

. There is no significant difference in access to shops and markets between the sampled medium cost and low cost areas.

Table A.12 Statistical tests for access to transportation

	High and Low Cost	Medium and Low
Significance Level	0.01	0.01
Degrees of Freedom	-	-
Critical Value (χ^2_α)	-	-
Calculated Value (χ^2_{calc})	-	-
Fisher's Probability (Pr_{calc})	0.00	0.00
Result	Pr_{calc} < Sig. , Reject Ho	Pr_{calc} < Sig., Reject Ho

Conclusion:

1. There is a significant difference in access to transportation between the sampled high cost and low cost areas.
2. There is a significant difference in access to transportation between the sampled medium cost and low cost areas.

Appendix B Data adapted from Collins and Muller (1974) showing comparative access for a selection of Infrastructure and Services, Lusaka 1957 to 1973.

Collins and Muller (1974) differentiated the levels of accessibility in terms of three thresholds, viz., above upper threshold, between thresholds and below lower threshold. In keeping with their definition of the thresholds, this study has re-interpreted these to be roughly the equivalent of the residential categories of high cost, medium cost and low cost adopted in this study.

Water Supply

Fig. B1 Percentage of Residents with a private tap

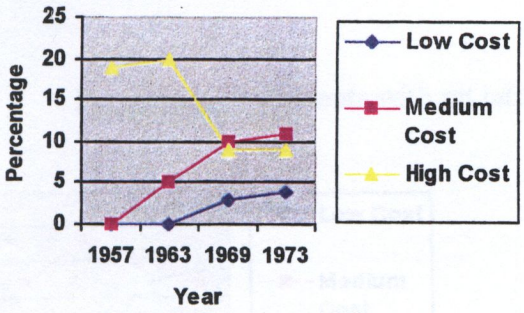


Fig. B2 Percentage of Residents with a shared tap

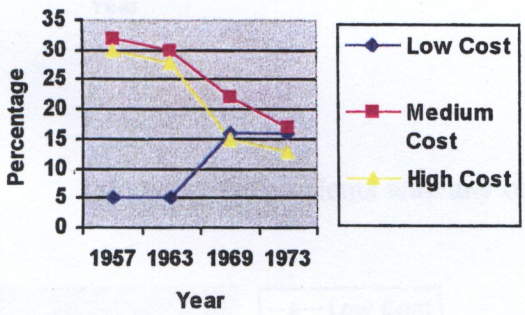
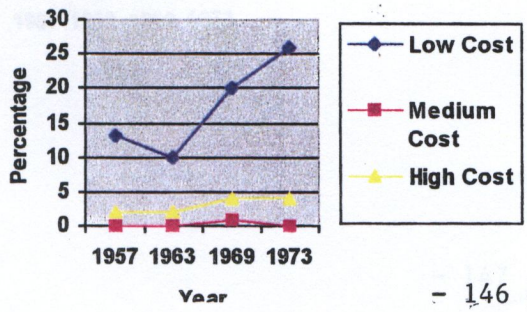


Fig. B3 Percentage of Residents without a piped water supply



Sanitation

Fig. B4 Percentage of Residents with a flushing WC

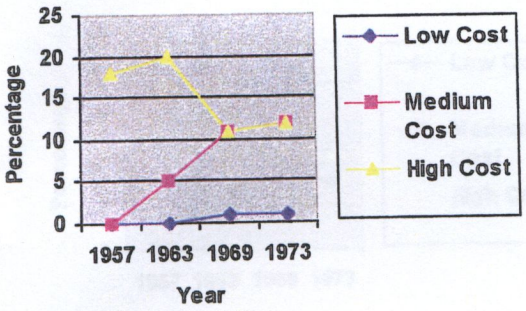


Fig. B5 Percentage of residents with pit latrines or shared waterborne facility

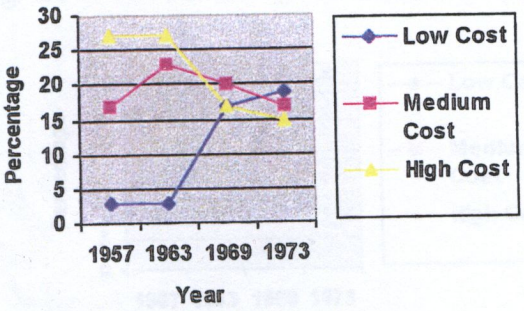
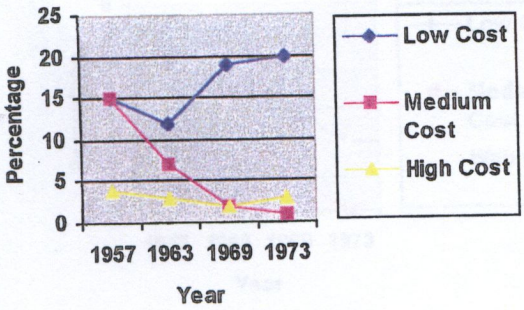


Fig. B6 Percentage of residents with any other form of sanitation



Walling Material

Fig. B7 Percentage of residents with concrete block/burnt brick walling

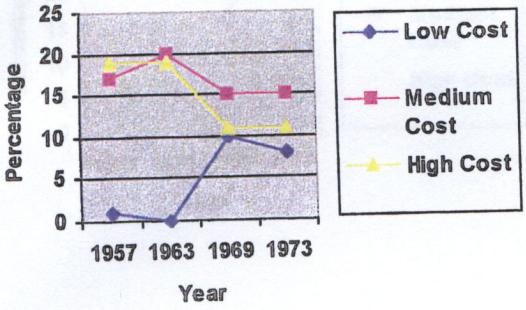


Fig. B8 Percentage of residents with mud block walling

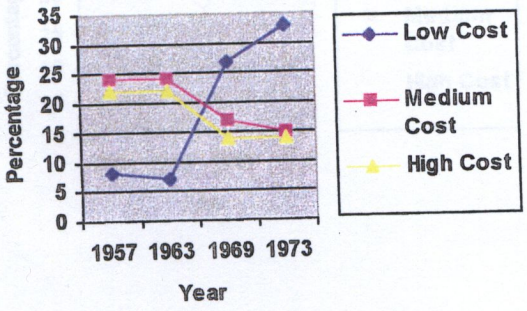
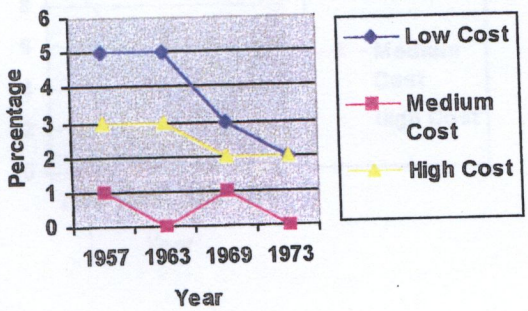


Fig. B9 Percentage of residents with any other form of walling



Roofing

Fig. B10 Percentage of residents with asbestos/corrugated iron or tile roofing

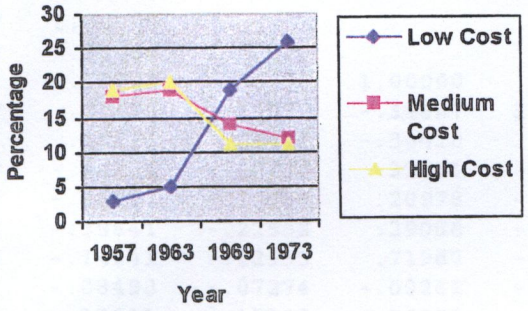


Fig. B11 Percentage of residents with good thatch

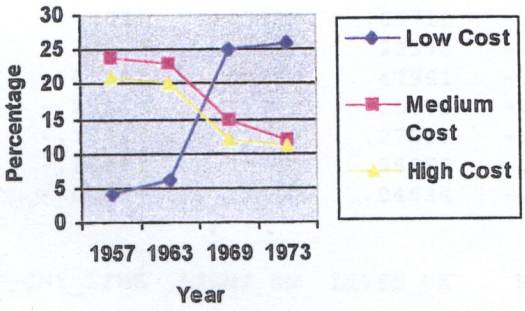
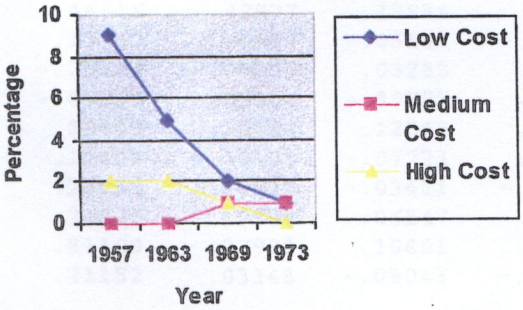


Fig. B12 Residents with poor thatch or other temporary material



PPENDIX C

- - - - - - - - - - - - F A C T O R A N A L Y S I S - - - - - - - - - - -

alysis number 1 Listwise deletion of cases with missing values

rrelation Matrix:

	CLNC_DST	CLNC_TYP	COOK_EN	DIST_WAT	EDUC	EMP_STAT	HLTH_PRO
NC_DST	1.00000						
NC_TYP	.35466	1.00000					
OK_EN	-.19823	-.23270	1.00000				
ST_WAT	.20498	.16977	-.34887	1.00000			
UC	.19273	.26470	-.30420	.00582	1.00000		
P_STAT	-.24552	-.00780	.32661	-.26068	-.26080	1.00000	
TH_PRO	-.36057	-.30389	.20978	-.10552	-.01715	.10025	1.00000
Y_TIME	-.38841	-.22582	.29086	-.20497	-.31277	.62768	.21266
GHT_EN	-.14241	-.22995	.71967	-.18967	-.29582	.27228	.12489
TES_WK	-.08498	-.07274	-.00261	-.09171	.12494	.04516	.07722
_RMS	.14911	.13335	.02280	.13674	-.06271	.22161	-.19940
_TYPE	-.36346	-.26935	.43727	-.24238	-.40915	.30545	.21209
S_AREA	-.51912	-.35447	.41533	-.32656	-.44934	.42465	.39558
OF_MAT	.22750	.24669	-.39092	.23408	.35070	-.24077	.05905
N_TYPE	-.35464	-.21996	.55073	-.26332	-.39653	.40184	.25975
H_TYPE	-.02102	-.04605	.32113	-.14649	-.04186	.07026	.22895
OP_DST	.13743	.16750	-.04256	-.06537	.04132	-.16265	-.13103
RT_LTS	.12825	.09003	.05715	.12702	-.10691	.01065	-.03431
SPT	-.32961	-.36690	.29378	-.20035	-.31217	.56761	.18765
LL_MAT	-.03661	-.09160	.47961	-.12951	-.25086	.13353	.07431
T_AV	-.15349	-.11681	.00678	-.37452	-.10292	.14702	.14427
T_SRC	-.17219	-.19049	.27518	-.68554	-.09695	.25345	.14622
_PLACE	-.14863	-.22350	.26857	-.19838	-.31025	.48161	.11478
T_DISP	-.02814	-.03040	.04634	-.15360	-.06484	.16789	-.03142

	JNY_TIME	LIGHT_EN	LITES_WK	NO_RMS	RD_TYPE	RES_AREA	ROOF_MAT
Y_TIME	1.00000						
GHT_EN	.30872	1.00000					
TES_WK	.12629	.02509	1.00000				
_RMS	.01509	.05798	-.16389	1.00000			
_TYPE	.44333	.41925	-.28181	.07779	1.00000		
S_AREA	.62968	.41042	.12982	-.12134	.73010	1.00000	
OF_MAT	-.26625	-.31452	.14709	.04957	-.46816	-.41932	1.00000
N_TYPE	.46516	.42577	.12884	-.16343	.57848	.74550	-.35536
H_TYPE	.13447	.20950	-.05441	-.24807	.17317	.14430	-.15091
OP_DST	-.25784	-.00329	.03283	.00341	-.08271	-.25854	.27433
RT_LTS	-.09755	.03364	-.80795	.11917	.30605	-.04910	-.15109
SPT	.89409	.30764	.12062	.03840	.41938	.56373	-.24634
LL_MAT	.12408	.32101	-.07723	.15991	.18179	.13619	-.16784
T_AV	.28155	-.02939	-.03411	-.13418	.30650	.40153	-.18678
T_SRC	.24520	.19384	-.06547	-.15979	.36034	.44199	-.16352
_PLACE	.81109	.27988	.10801	.03767	.37651	.47614	-.19561
T_DISP	.21152	.03348	-.08043	-.09884	.22635	.28926	-.20430

	SAN_TYPE	SCH_TYPE	SHOP_DST	STRT_LTS	TRSPT	WALL_MAT	WAT_AV
_TYPE	1.00000						
_TYPE	.24334	1.00000					
P_DST	-.16434	-.07706	1.00000				
T_LTS	-.00759	.07736	.02709	1.00000			
PT	.45173	.11532	-.22311	-.06275	1.00000		
L_MAT	.26722	.12426	.04394	.09559	.12636	1.00000	
_AV	.24361	.03831	-.09257	-.01642	.22398	-.17300	1.00000
_SRC	.38369	.19084	-.06648	.02701	.23019	.01348	.58070
PLACE	.42508	.12101	-.16246	-.10837	.79655	.16229	.18892
_DISP	.18947	.02695	-.08135	.13027	.14847	.01196	.23899

	WAT_SRC	WK_PLACE	WST_DISP
_SRC	1.00000		
PLACE	.18516	1.00000	
_DISP	.23715	.12952	1.00000

raction 1 for analysis 1, Principal Axis Factoring (PAF)

ial Statistics:

able	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
_DST	.48468	*	1	6.59595	27.5	27.5
_TYP	.44903	*	2	2.33255	9.7	37.2
_EN	.70874	*	3	2.01658	8.4	45.6
_WAT	.61650	*	4	1.80471	7.5	53.1
	.41317	*	5	1.49117	6.2	59.3
STAT	.55249	*	6	1.16630	4.9	64.2
_PRO	.41920	*	7	1.09044	4.5	68.7
TIME	.89438	*	8	.95069	4.0	72.7
T_EN	.58220	*	9	.88480	3.7	76.4
S_WK	.75166	*	10	.80535	3.4	79.7
MS	.35964	*	11	.71884	3.0	82.7
YPE	.75217	*	12	.69254	2.9	85.6
AREA	.86589	*	13	.55769	2.3	87.9
_MAT	.47513	*	14	.53542	2.2	90.2
TYPE	.70262	*	15	.46421	1.9	92.1
TYPE	.25142	*	16	.41664	1.7	93.8
_DST	.30493	*	17	.35742	1.5	95.3
_LTS	.71493	*	18	.25788	1.1	96.4
T	.85425	*	19	.20504	.9	97.3
_MAT	.33685	*	20	.19140	.8	98.1
AV	.48062	*	21	.17757	.7	98.8
SRC	.68008	*	22	.12516	.5	99.3
LACE	.74983	*	23	.09629	.4	99.7
DISP	.21200	*	24	.06535	.3	100.0

extracted 2 factors. 9 iterations required.

actor Matrix:

	Factor 1	Factor 2
LNC_DST	-.46292	.14163
LNC_TYP	-.39375	.08488
OK_EN	.59147	.18999
IST_WAT	-.41199	.07298
UC	-.46383	-.18427
P_STAT	.56448	-.04954
TH_PRO	.31323	-.11445
Y_TIME	.77582	-.23114
GHT_EN	.52053	.14759
TES_WK	.03671	-.80612
_RMS	-.05777	.17203
_TYPE	.72554	.36603
S_AREA	.87457	-.06674
OF_MAT	-.48655	-.24264
_TYPE	.74894	.00727
_TYPE	.24532	.08641
OP_DST	-.23110	.04736
RT_LTS	.00829	.82072
SPT	.74053	-.21037
LL_MAT	.26185	.19881
T_AV	.35753	-.05248
T_SRC	.47547	.02292
_PLACE	.64578	-.18798
T_DISP	.24995	.08917

nal Statistics:

riable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
NC_DST	.23435	*	1	6.05128	25.2	25.2
NC_TYP	.16224	*	2	1.88384	7.8	33.1
OK_EN	.38593	*				
ST_WAT	.17507	*				
JC	.24910	*				
P_STAT	.32110	*				
TH_PRO	.11121	*				
_TIME	.65532	*				
HT_EN	.29274	*				
ES_WK	.65118	*				
RMS	.03293	*				
TYPE	.66039	*				
AREA	.76933	*				
F_MAT	.29561	*				
TYPE	.56096	*				
TYPE	.06765	*				
P_DST	.05565	*				
T_LTS	.67366	*				
PT	.59265	*				
L_MAT	.10809	*				
AV	.13058	*				
SRC	.22660	*				
PLACE	.45236	*				
DISP	.07043	*				

tor Matrix:

	Factor 1	Factor 2
C_DST	-.46292	.14163
C_TYP	-.39375	.08488
K_EN	.59147	.18999
T_WAT	-.41199	.07298
C	-.46383	-.18427
_STAT	.56448	-.04954
H_PRO	.31323	-.11445
_TIME	.77582	-.23114
HT_EN	.52053	.14759
ES_WK	.03671	-.80612
RMS	-.05777	.17203
TYPE	.72554	.36603
_AREA	.87457	-.06674
F_MAT	-.48655	-.24264
_TYPE	.74894	.00727
_TYPE	.24532	.08641
P_DST	-.23110	.04736
T_LTS	.00829	.82072
PT	.74053	-.21037
L_MAT	.26185	.19881
_AV	.35753	-.05248
_SRC	.47547	.02292
PLACE	.64578	-.18798
_DISP	.24995	.08917

al Statistics:

iable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C_DST	.23435	*	1	6.05128	25.2	25.2
C_TYP	.16224	*	2	1.88384	7.8	33.1
K_EN	.38593	*				
T_WAT	.17507	*				
C	.24910	*				
_STAT	.32110	*				
H_PRO	.11121	*				
_TIME	.65532	*				
HT_EN	.29274	*				
ES_WK	.65118	*				
RMS	.03293	*				
TYPE	.66039	*				
_AREA	.76933	*				
F_MAT	.29561	*				
_TYPE	.56096	*				
_TYPE	.06765	*				
P_DST	.05565	*				
T_LTS	.67366	*				
PT	.59265	*				
L_MAT	.10809	*				
_AV	.13058	*				
_SRC	.22660	*				
PLACE	.45236	*				
_DISP	.07043	*				

ARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.
ARIMAX converged in 3 iterations.

otated Factor Matrix:

	Factor 1	Factor 2
LNC_DST	-.46225	.14379
LNC_TYP	-.39334	.08672
OOK_EN	.59235	.18722
ST_WAT	-.41165	.07491
UC	-.46469	-.18210
P_STAT	.56425	-.05218
TH_PRO	.31269	-.11591
Y_TIME	.77473	-.23477
GHT_EN	.52122	.14515
TES_WK	.03294	-.80628
_RMS	-.05696	.17230
_TYPE	.72724	.36264
S_AREA	.87425	-.07083
OF_MAT	-.48768	-.24036
N_TYPE	.74896	.00376
H_TYPE	.24572	.08526
OP_DST	-.23088	.04844
RT_LTS	.01213	.82068
SPT	.73954	-.21383
LL_MAT	.26277	.19758
_AV	.35728	-.05415
_SRC	.47558	.02069
PLACE	.64489	-.19100
_DISP	.25036	.08800

tor Transformation Matrix:

	Factor 1	Factor 2
tor 1	.99999	-.00468
tor 2	.00468	.99999

tor Score Coefficient Matrix:

	Factor 1	Factor 2
C_DST	.01945	.03139
C_TYP	-.06080	.01192
K_EN	.14463	.08471
_WAT	-.05540	-.02238
	-.00466	-.05911
STAT	.04139	.03204
_PRO	-.01542	-.04749
TIME	.23664	-.17267
T_EN	.00760	.06676
S_WK	-.08112	-.34104
MS	-.00852	.00664
YPE	.07098	.22456
AREA	.39517	-.08423
_MAT	-.05234	-.03812
TYPE	.09655	.01569
TYPE	.02821	.00224
_DST	.01734	-.01973
_LTS	-.03466	.41848
T	.12036	-.11253
_MAT	.02018	.05061
AV	-.00191	.00271
SRC	.04111	-.05643

K_PLACE	.00464	-.00853
ST_DISP	-.01376	.01524

ovariance Matrix for Estimated Regression Factor Scores:

	Factor 1	Factor 2
actor 1	.93938	
actor 2	-.00699	.83569

ENDIX D - STATISTICAL TESTING

PARISON BETWEEN HIGH AND LOW COST AREAS

l Construction Material

	Count / Exp Val	Concrete 1.00	Other 2.00	Row Total
n Cost	1.00	12 13.1	4 2.9	16 19.3%
Cost	2.00	56 54.9	11 12.1	67 80.7%
	Column Total	68 81.9%	15 18.1%	83 100.0%

Chi-Square	Value	DF	Significance
rson	.64248	1	.42281
tinuity Correction	.19358	1	.65995
elihood Ratio	.60254	1	.43761
tel-Haenszel test for linear association	.63474	1	.42562
her's Exact Test:			
One-Tail			.31658
Two-Tail			.47370

imum Expected Frequency - 2.892
ls with Expected Frequency < 5 - 1 OF 4 (25.0%)
ber of Missing Observations: 0

Construction Material

	Count / Exp Val	Asbestos 1.00	Other 2.00	Row Total
Cost	1.00	10 7.5	6 8.5	16 19.3%
Cost	2.00	29 31.5	38 35.5	67 80.7%
	Column Total	39 47.0%	44 53.0%	83 100.0%

Chi-Square	Value	DF	Significance
rson	1.91470	1	.16644
tinuity Correction	1.22095	1	.26917
elihood Ratio	1.92192	1	.16565
tel-Haenszel test for linear association	1.89163	1	.16902

imum Expected Frequency - 7.518
ber of Missing Observations: 0

er Supply

	Count / Exp Val	Inside tap	Other	Row Total
		1.00	2.00	
h Cost	1.00	13 2.9	3 13.1	16 19.3%
Cost	2.00	2 12.1	65 54.9	67 80.7%
	Column Total	15 18.1%	68 81.9%	83 100.0%

Chi-Square	Value	DF	Significance
rson	53.43269	1	.00000
tinuity Correction	48.27747	1	.00000
elihood Ratio	45.00463	1	.00000
tel-Haenszel test for linear association	52.78892	1	.00000
ner's Exact Test:			
One-Tail			.00000
Two-Tail			.00000

imum Expected Frequency - 2.892
ls with Expected Frequency < 5 - 1 OF 4 (25.0%)
ber of Missing Observations: 0

itation

	Count / Exp Val	Flush WC	Other	Row Total
		1.00	2.00	
n Cost	1.00	16 4.0	0 12.0	16 19.3%
Cost	2.00	5 17.0	62 50.0	67 80.7%
	Column Total	21 25.3%	62 74.7%	83 100.0%

Chi-Square	Value	DF	Significance
rson	58.51883	1	.00000
tinuity Correction	53.72502	1	.00000
elihood Ratio	58.32317	1	.00000
tel-Haenszel test for linear association	57.81379	1	.00000
her's Exact Test:			
One-Tail			.00000
Two-Tail			.00000

imum Expected Frequency - 4.048
ls with Expected Frequency < 5 - 1 OF 4 (25.0%)
ber of Missing Observations: 0

e Disposal

Count / Exp Val	Rubbish Pit 1.00	Other 2.00	Row Total
Cost 1.00	14 8.3	2 7.7	16 19.3%
Cost 2.00	29 34.7	38 32.3	67 80.7%
Column Total	43 51.8%	40 48.2%	83 100.0%

Chi-Square	Value	DF	Significance
on	10.11373	1	.00147
nuity Correction	8.42029	1	.00371
ihood Ratio	11.22822	1	.00081
l-Haenszel test for linear association	9.99188	1	.00157

um Expected Frequency - 7.711
r of Missing Observations: 0

ing Energy

Count / Exp Val	Electri-city 1.00	Other 2.00	Row Total
Cost 1.00	16 8.5	0 7.5	16 19.3%
ost 2.00	28 35.5	39 31.5	67 80.7%
Column Total	44 53.0%	39 47.0%	83 100.0%

Chi-Square	Value	DF	Significance
on	17.56852	1	.00003
uity Correction	15.30939	1	.00009
hood Ratio	23.69349	1	.00000
-Haenszel test for linear association	17.35685	1	.00003

m Expected Frequency - 7.518
of Missing Observations: 0

oking Energy

	Count / Exp Val	Electri-city 1.00	Other 2.00	Row Total
gh Cost	1.00	16 8.1	0 7.9	16 19.3%
w Cost	2.00	26 33.9	41 33.1	67 80.7%
	Column Total	42 50.6%	41 49.4%	83 100.0%

Chi-Square	Value	DF	Significance
rson	19.34897	1	.00001
tinuity Correction	16.97829	1	.00004
elihood Ratio	25.55550	1	.00000
tel-Haenszel test for linear association	19.11585	1	.00001

imum Expected Frequency - 7.904
ber of Missing Observations: 0

ds Infrastructure

	Count / Exp Val	Tarred Road 1.00	Other 2.00	Row Total
n Cost	1.00	16 4.6	0 11.4	16 19.3%
Cost	2.00	8 19.4	59 47.6	67 80.7%
	Column Total	24 28.9%	59 71.1%	83 100.0%

Chi-Square	Value	DF	Significance
rson	48.72637	1	.00000
inuity Correction	44.53633	1	.00000
lihood Ratio	50.82321	1	.00000
el-Haenszel test for linear association	48.13930	1	.00000
er's Exact Test:			
ne-Tail			.00000
wo-Tail			.00000

mum Expected Frequency - 4.627
s with Expected Frequency < 5 - 1 OF 4 (25.0%)
er of Missing Observations: 0

alth Services

Count / Exp Val	Govt. 1.00	Other 2.00	Row Total
gh Cost 1.00	8 13.9	8 2.1	16 19.3%
w Cost 2.00	64 58.1	3 8.9	67 80.7%
Column Total	72 86.7%	11 13.3%	83 100.0%

Chi-Square	Value	DF	Significance
arson	23.28079	1	.00000
ntinuity Correction	19.48952	1	.00001
kelihood Ratio	18.25311	1	.00002
ntel-Haenszel test for linear association	23.00030	1	.00000
sher's Exact Test:			
One-Tail			.00004
Two-Tail			.00004

nimum Expected Frequency - 2.120
lls with Expected Frequency < 5 - 1 OF 4 (25.0%)
mber of Missing Observations: 0

pps and Markets

Count / Exp Val	Under 200m 1.00	Over 200m 2.00	Row Total
gh Cost 1.00	5 9.3	11 6.7	16 19.3%
w Cost 2.00	43 38.7	24 28.3	67 80.7%
Column Total	48 57.8%	35 42.2%	83 100.0%

Chi-Square	Value	DF	Significance
arson	5.74280	1	.01656
ntinuity Correction	4.47188	1	.03446
kelihood Ratio	5.72410	1	.01673
ntel-Haenszel test for linear association	5.67361	1	.01722

nimum Expected Frequency - 6.747
mber of Missing Observations: 0

ansportation

Count / Exp Val	Motor 1.00	Other 2.00	Row Total
gh Cost 1.00	11 3.1	5 12.9	16 19.3%
v Cost 2.00	5 12.9	62 54.1	67 80.7%
Column Total	16 19.3%	67 80.7%	83 100.0%

Chi-Square	Value	DF	Significance
arson	31.17592	1	.00000
ntinuity Correction	27.36180	1	.00000
elihood Ratio	25.93136	1	.00000
ntel-Haenszel test for linear association	30.80031	1	.00000
sher's Exact Test:			
One-Tail			.00000
Two-Tail			.00000

inimum Expected Frequency - 3.084
ells with Expected Frequency < 5 - 1 OF 4 (25.0%)
mber of Missing Observations: 0

ocation Facilities

Count / Exp Val	Govt. 1.00	Other 2.00	Row Total
rh Cost 1.00	3 10.0	13 6.0	16 26.2%
y Cost 2.00	35 28.0	10 17.0	45 73.8%
Column Total	38 62.3%	23 37.7%	61 100.0%

Chi-Square	Value	DF	Significance
rson	17.50910	1	.00003
tinuity Correction	15.08620	1	.00010
elihood Ratio	17.72129	1	.00003
tel-Haenszel test for linear association	17.22206	1	.00003

imum Expected Frequency - 6.033
mber of Missing Observations: 0

PARISON BETWEEN MEDIUM AND LOW COST AREAS

Construction Material

	Count / Exp Val	Concrete 1.00	Other 2.00	Row Total
um Cost	1.00	16 14.6	1 2.4	17 20.2%
Cost	2.00	56 57.4	11 9.6	67 79.8%
	Column Total	72 85.7%	12 14.3%	84 100.0%

Chi-Square	Value	DF	Significance
rson	1.22915	1	.26757
tinuity Correction	.51932	1	.47113
elihood Ratio	1.45740	1	.22734
tel-Haenszel test for linear association	1.21452	1	.27044
her's Exact Test:			
One-Tail			.24641
Two-Tail			.44419

imum Expected Frequency - 2.429
ls with Expected Frequency < 5 - 1 OF 4 (25.0%)
ber of Missing Observations: 0

Construction Material

	Count / Exp Val	Asbestos 1.00	Other 2.00	Row Total
um Cost	1.00	17 9.3	0 7.7	17 20.2%
Cost	2.00	29 36.7	38 30.3	67 79.8%
	Column Total	46 54.8%	38 45.2%	84 100.0%

Chi-Square	Value	DF	Significance
rson	17.60675	1	.00003
tinuity Correction	15.39175	1	.00009
elihood Ratio	24.01656	1	.00000
tel-Haenszel test for linear association	17.39714	1	.00003

imum Expected Frequency - 7.690
ber of Missing Observations: 0

r Supply

Count / Exp Val	Inside tap 1.00	Other 2.00	Row Total
um Cost 1.00	13 3.0	4 14.0	17 20.2%
Cost 2.00	2 12.0	65 55.0	67 79.8%
Column Total	15 17.9%	69 82.1%	84 100.0%

Chi-Square	Value	DF	Significance
son	49.91903	1	.00000
inuity Correction	45.03493	1	.00000
lihood Ratio	42.29293	1	.00000
el-Haenszel test for linear association	49.32475	1	.00000
er's Exact Test:			
ne-Tail			.00000
wo-Tail			.00000

mum Expected Frequency - 3.036
s with Expected Frequency < 5 - 1 OF 4 (25.0%)
er of Missing Observations: 0

tation

Count / Exp Val	Flush WC 1.00	Other 2.00	Row Total
um Cost 1.00	17 4.5	0 12.5	17 20.2%
Cost 2.00	5 17.5	62 49.5	67 79.8%
Column Total	22 26.2%	62 73.8%	84 100.0%

Chi-Square	Value	DF	Significance
son	60.06513	1	.00000
inuity Correction	55.37353	1	.00000
lihood Ratio	61.03692	1	.00000
el-Haenszel test for linear association	59.35007	1	.00000
er's Exact Test:			
ne-Tail			.00000
wo-Tail			.00000

mum Expected Frequency - 4.452
s with Expected Frequency < 5 - 1 OF 4 (25.0%)
er of Missing Observations: 0

te Disposal

	Count / Exp Val	Rubbish Pit 1.00	Other 2.00	Row Total
ium Cost	1.00	15 8.9	2 8.1	17 20.2%
Cost	2.00	29 35.1	38 31.9	67 79.8%
	Column Total	44 52.4%	40 47.6%	84 100.0%

Chi-Square	Value	DF	Significance
rson	10.98456	1	.00092
tinuity Correction	9.25633	1	.00235
elihood Ratio	12.27391	1	.00046
tel-Haenszel test for linear association	10.85380	1	.00099

imum Expected Frequency - 8.095
ber of Missing Observations: 0

hting Energy

	Count / Exp Val	Electri-city 1.00	Other 2.00	Row Total
ium Cost	1.00	17 9.1	0 7.9	17 20.2%
Cost	2.00	28 35.9	39 31.1	67 79.8%
	Column Total	45 53.6%	39 46.4%	84 100.0%

Chi-Square	Value	DF	Significance
rson	18.47164	1	.00002
tinuity Correction	16.20547	1	.00006
elihood Ratio	24.95224	1	.00000
tel-Haenszel test for linear association	18.25174	1	.00002

imum Expected Frequency - 7.893
ber of Missing Observations: 0

ooking Energy

Count / Exp Val	Electri-city 1.00	Other 2.00	Row Total
edium Cost 1.00	17 8.7	0 8.3	17 20.2%
ow Cost 2.00	26 34.3	41 32.7	67 79.8%
Column Total	43 51.2%	41 48.8%	84 100.0%

Chi-Square	Value	DF	Significance
arson	20.32211	1	.00001
ntinuity Correction	17.94675	1	.00002
kelihood Ratio	26.90622	1	.00000
ntel-Haenszel test for linear association	20.08018	1	.00001

nimum Expected Frequency - 8.298
mber of Missing Observations: 0

ads Infrastructure

Count / Exp Val	Tarred Road 1.00	Other 2.00	Row Total
ium Cost 1.00	5 2.6	12 14.4	17 20.2%
Cost 2.00	8 10.4	59 56.6	67 79.8%
Column Total	13 15.5%	71 84.5%	84 100.0%

Chi-Square	Value	DF	Significance
rson	3.16417	1	.07527
tinuity Correction	1.96949	1	.16050
elihood Ratio	2.78255	1	.09530
tel-Haenszel test for linear association	3.12650	1	.07703
ner's Exact Test:			
One-Tail			.08520
Two-Tail			.12574

imum Expected Frequency - 2.631
ls with Expected Frequency < 5 - 1 OF 4 (25.0%)
ber of Missing Observations: 0

Health Services

Count / Exp Val	Govt. 1.00	Other 2.00	Row Total
Medium Cost 1.00	15 16.0	2 1.0	17 20.2%
Low Cost 2.00	64 63.0	3 4.0	67 79.8%
Column Total	79 94.0%	5 6.0%	84 100.0%

Chi-Square	Value	DF	Significance
Pearson	1.28622	1	.25675
Continuity Correction	.31385	1	.57533
Likelihood Ratio	1.09482	1	.29541
Mantel-Haenszel test for linear association	1.27091	1	.25960
Fisher's Exact Test:			
One-Tail			.26510
Two-Tail			.26510

Minimum Expected Frequency - 1.012
Cells with Expected Frequency < 5 - 2 OF 4 (50.0%)
Number of Missing Observations: 0

Jobs and Markets

Count / Exp Val	Under 200m 1.00	Over 200m 2.00	Row Total
Medium Cost 1.00	10 10.7	7 6.3	17 20.2%
Low Cost 2.00	43 42.3	24 24.7	67 79.8%
Column Total	53 63.1%	31 36.9%	84 100.0%

Chi-Square	Value	DF	Significance
Pearson	.16702	1	.68277
Continuity Correction	.01620	1	.89871
Likelihood Ratio	.16525	1	.68437
Mantel-Haenszel test for linear association	.16504	1	.68456

Minimum Expected Frequency - 6.274
Number of Missing Observations: 0

ansportation

Count / Exp Val	Motor 1.00	Other 2.00	Row Total
dium Cost 1.00	7 2.4	10 14.6	17 20.2%
w Cost 2.00	5 9.6	62 57.4	67 79.8%
Column Total	12 14.3%	72 85.7%	84 100.0%

Chi-Square	Value	DF	Significance
arson	12.58648	1	.00039
ntinuity Correction	9.98376	1	.00158
kelihood Ratio	10.29496	1	.00133
ntel-Haenszel test for linear association	12.43664	1	.00042
sher's Exact Test:			
One-Tail			.00184
Two-Tail			.00184

nimum Expected Frequency - 2.429
lls with Expected Frequency < 5 - 1 OF 4 (25.0%)
mber of Missing Observations: 0

ucation Facilities

Count / Exp Val	Govt. 1.00	Other 2.00	Row Total
dium Cost 1.00	6 9.2	7 3.8	13 22.4%
w Cost 2.00	35 31.8	10 13.2	45 77.6%
Column Total	41 70.7%	17 29.3%	58 100.0%

Chi-Square	Value	DF	Significance
arson	4.86836	1	.02735
ntinuity Correction	3.46169	1	.06281
kelihood Ratio	4.55084	1	.03290
ntel-Haenszel test for linear association	4.78442	1	.02872
sher's Exact Test:			
One-Tail			.03433
Two-Tail			.03992

nimum Expected Frequency - 3.810
lls with Expected Frequency < 5 - 1 OF 4 (25.0%)
mber of Missing Observations: 0

Kanyama floods may wo
cholera situation - doc

NGELA CHISHIMBA
AKA Urban District
th management team
ctor Rose Kumwenda
said Cholera cases
deaths in Lusaka are
to increase rapidly
use of the floods in
yama compound.
Kumwenda said more
were coming from
ma compound and that
leath was recorded on
esday.
e are almost on a
u, the cholera cases are
r increasing nor
asing," Dr Kumwenda
said Lusaka district
ecorded 32 patients in
rds in various clinics.
Kumwenda said 12
sions had been
ed in the last 24 hours.
said the number of
deaths had now
d eight, with six
ed at the University
ng Hospital (UTH)
o at the clinics.
Kumwenda said most
cholera cases at UTH
of malnourished
n whose conditions
changed to cholera
e their immune
had already been
ned.
speaking in an
ew, Central Board of
(CBoH) spokesman
hirwa also expressed
about the floods in
na which led to many
f cholera.
hirwa said apart from
the situation in the
was normalising.
said Luapula and
n provinces were
few cases, while the
belt, Kabwe and
ibo had no new cases.
ad two cases.
hirwa, however said
y area of worry was
gu were there was an
f refugees leaving, a
ossibility of an
t of the disease.
to take preventive
s, we have sent the
am in Mpulungu to
area in case the
breaks out," Dr
said.
while, Honda
Limited, and
in Kanyama
nd have drained off
the area which was
gged due to
e rains, reports
N PHIRI.
n and men worked
with tools ranging
s and shovels while
Zambia used water
nd sucked the water
turday morning.
Zambia marketing
Patrick Bowa said
ise would go for six
d hoped the plan
duce the water.
wnship had most of
ses sub-merged in

shifted to drier areas to seek temporally accommodation.

Residents, who were led by area councillor, Mr Alick Jere gave help by opening drainage to get rid of the water.

Mr Jere commended Honda Zambia's action saying residents had suffered a lot.

And Mr Bowa said Lusaka City council and Honda Zambia had signed an agreement that the firm should repair some of the equipment at the council and that the payment be made in installments.

Mr Bowa also said his firm had purchased portable fire fighting engines from Japan and hoped that councils in the country would buy them to help fight fires in future.

He said the equipment was very useful in large estates like the Nakambala Sugar Estates and that the initiative by his firm was the only way to help Zambians fight the fire which had engulfed many buildings in the country.

Zambia Daily Mail 03/04/2000, Page

30 cholera cases recorded in Lusaka

By Times Reporter

AT least 30 new cases of cholera have been recorded in Lusaka as the disease claims 12 lives in Kawambwa in Luapula Province.

Central Board of Health (CBoH) spokesman Ben Chirwa said in an interview yesterday that affected areas in Lusaka included Chipata and Kanyama townships each with nine cases.

Chawama has the highest number with 12.

Floods and pit-latrines contributed to the outbreak of the disease.

He said although the number of cholera cases had stabilised in some areas, a lot had to be done especially in Lusaka and Nchelenge.

Nchelenge had now recorded 19 cases, eight deaths while three lives have been lost in Chingola in the last one week.

Dr Chirwa said the situation was stable in Kaputa, Chiyenge, Mwense and Mansa. Mufulira and Chingola had each reported one case while the situation in other parts of the Copperbelt was in control.

And Deputy Minister in charge of Vendors Desk at State House Josiah Chishala confirmed the death toll in Luapula Province and said there could be more deaths than the reported numbers.

Mr Chishala said other cases have gone unreported in most parts of his area because of its remoteness to the central place.

Times of Zambia 21/03/2000, Page 1.

UM...SUNDAY FORUM....SUNDAY FORUM....

elstone resident cries for water

like to air my views and concerns over on of water in one part of Chelstone in

his area and the water situation is terrible ast. We have water trickle on our taps very e morning and before long it is gone. m the neighbouring Kamanga township early as five in the morning just to draw s liquid of life.

lar interest is part of Chelstone. The area n the left side of Palm Drive. The houses a are dry. When you go further towards ad it is a sorry sight. Households have eservoirs for water. There is little or no ter at all.

dvertisement like "Your health is in your your hands with running water" by the Health, how does the advert convince the ash hands with running water when there e?

lly, admire what the Japanese govern- ge township and other areas have done. These areas had similar water problems like Chelstone. But to date that problem has been solved once and for all.

CONCERNED CHELSTONE RESIDENT
Lusaka

ndày Times 16/07/2000,
Page 7.

Boy (6) drowns in flooded Lusaka compound

By JACQUELINE MWANKOTAMI

THE recent heavy rains have had a toll in Kanyama compound where a six-year old boy drowned behind his parents' waterlogged backyard last Friday.

Evans [illegible] parents who thought their son had gone to play with friends in the neighbourhood, became worried in the afternoon when the boy did not show up.

A search was instituted but when it proved fruitless around 19:00 hours the matter was reported to Kanyama Police station.

MMD Mwanawasa Ward chairman Rimmon Makusa who had been helping to look for Evans, said the boy was only found around 07:00 hours the following day.

Mr Makusa said the boy's body was found floating in a pool that had been formed by the floods about 15 metres from his parents' home.

Mr Makusa said Kanyama residents have had to put up with the problems caused by heavy rains in the city.

"The area is full of water and soon you will hear of cholera outbreaks," Mr Makusa warned.

Zambia Daily Mail
21/03/2000, Page 1.

Appendix F

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NATURAL SCIENCES

DEPARTMENT OF GEOGRAPHY

MSc.(GEOG) RESEARCH PROJECT

TITLE: "Impacts of fragmented settlements on provision of services and infrastructure in Lusaka".

Dear Respondent,

This research is an attempt to investigate the level of access of Lusaka residents to various services and infrastructure. It is assumed that a large measure of the differentiation in access to services and infrastructure is due to the fragmented nature of the urban environment of the study area.

This has been identified as a product of the city's colonial planning history. This legacy together with other more recent causes has contributed to the form and functioning of the city in ways that directly affect the level of access of Lusaka residents to various services and infrastructure.

Kindly assist the researcher by completing the questionnaire as fully as possible. All responses will be treated with strict confidentiality. Your assistance is greatly appreciated.

Yours Sincerely,

J.Kangwa
Post Graduate Student
Department Of Geography

QUESTIONNAIRE

SECTION A. *No.....*

PERSONAL DATA

1. Please state your age.....

2. Gender

a) Male
b) Female

3. Marital status

a) Single
b) Married
c) Separated
d) Divorced
e) Widowed

4. Education

a) Primary
b) Secondary
c) Post Secondary
d) None

5. Occupational status

a) Employed
b) Unemployed
c) Self-employed

SECTION B.

RESIDENTIAL DATA

6. Area of residence.....

7. How long have you lived in this area?

.....Years

8. What type of house do you live in?

a) Detached house
b) Semi-detached house
c) Terraced house/Flat in a block of flats

9. What is the plot number and street name where your house/block of flats is located?

Plot number.....

Street name.....

10. Are you the owner of the house/flat you live in? Yes/No

11. If Yes, what type of lease do you hold for the land on which the house/block of flats is built?

a) 99 year lease
b) 14 year lease
c) 30 year Occupancy certificate
d) Common leasehold scheme
e) Other, please specify.....

12. How many people live in this house permanently?

a) Number of adults.....

b) Number of children.....

13. How many rooms are there excluding kitchen and living room?

.....

14. What material are the walls of the house made from?

a) Concrete blocks
b) Burnt bricks
c) Mud blocks/bricks
d) Other material, please specify.....

15. What is the roofing material?

a) Corrugated iron
b) Asbestos cement
c) Tiles
d) Other material, please specify.....

SECTION C.

WATER AND SANITATION

16. Where do you get your water from?

a) Piped water inside the house
b) Piped water outside the house
c) Borehole
d) Well
e) Stream/River

17. If you get your water from a source that is not within your plot, please estimate the distance to the water source.

a) Less than 50m
b) 50-100m
c) 100-200m
d) More than 200m

18. Is water available from your water source

a) all the time
b) a few hours only (state the period) .....
c) on alternate days
d) once a week
e) every second week
f) Other, please specify.....?

20. Do you pay for the water?

a) Yes
b) No
c) Not sure

If Yes, go to question 21, if No go to question 22

21. How much do you pay per month for water?

.....

22. If you do not pay for the water please give the reasons why?

.....

.....

24. What type of toilet do you use?

a) Flush toilet
b) Pit latrine
c) Other, please specify.....

SECTION D.

ENERGY SUPPLY

27. What kind of energy do you use for lighting your home at night?

a) Electricity
b) Candles
c) Paraffin lamp(s)
d) Gas lamp(s)
e) Other, please specify.....

28. What kind of energy do you use for cooking?

a) Electricity
b) Charcoal
c) Wood
d) Gas
e) Other, please specify.....

SECTION E.

ROADS AND STREET LIGHTING

30. Does your plot face onto a road? Yes/No

31. If Yes, what type of road is it?

a) Tarred road
b) Gravel road
c) Dirt road

32. Are there street lights on the road? Yes/No

33. If Yes, do they work at night? Yes /No /Sometimes

SECTION F.

DOMESTIC WASTE DISPOSAL

35. How do you dispose of domestic/household garbage?

a) Collected by council refuse truck
b) Throw into rubbish pit
c) Surface dump
e) Other method, please specify.....

NOTE:
If you are employed or self-employed, please answer section G. If you are unemployed please skip this section and go on to Section H.

SECTION G.

TRANSPORTATION

36. Which part of Lusaka is your workplace located in?

a) Town Centre
b) Ridgeway area
c) Heavy Industrial area
d) Light Industrial area
e) Other, please specify.....

37. How do you get to your workplace?

a) Car

b) Taxi
c) Minibus
d) Bicycle
e) Walk
f) Employer provides transport

38. How long does an average journey to work take?

a) Under 10 minutes
b) 10 - 20 minutes
c) 20 – 30 minutes
d) 30 - 40 minutes
e) 40 - 60 minutes
f) More than 60 minutes

SECTION H.

SHOPPING FACILITIES

46. What is the distance to youR nearest shopping centre or market?

a) Less than 50m
b) 50-100m
a) 100m-200m
b) More than 200m

NOTE:
If you have school-going children, please answer Section I. If not, please skip this section and go on to Section J.

SECTION I.

EDUCATION FACILITIES

50. If you have school-going children, what kind of school(s) do they attend?

a) Government school(s)
b) Private school(s)
c) Other, please specify.....

54. What is the distance between your home and the school(s) your children attend?

a) Less than 1Km

b) 1-2 Km
c) 3-5 Km
d) More than 6 Km

55. How do your children get to school?

a) Car
b) Taxi
c) Minibus
d) Bicycle
e) Walk

SECTION J.

HEALTH FACILITIES

56. What is the distance between your home and the nearest health centre that you attend?

a) Less than 1 Km
b) 1-2 Km
c) 3-5 Km
d) More than 6 Km

57. What type of health centre is it?

a) Government clinic/hospital
b) Private clinic/hospital
c) Clinic at your place of work
d) Other, please specify.....

58. Who attends to you when you go there?

a) Doctor
b) Clinical Officer
c) Nurse
d) Other health provider, please specify.....

END OF QUESTIONNAIRE

THANK YOU FOR YOUR CO-OPERATION!