



LUSAKA CITY COUNCIL

LUSAKA CITY STATE OF ENVIRONMENT OUTLOOK REPORT



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LUSAKA CITY STATE OF ENVIRONMENT OUTLOOK REPORT

A report by Lusaka City Council and Environmental Council of Zambia

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FOREWORD

The Lusaka City State of Environment (SoE) Outlook report has been produced in order to facilitate planning of the city of Lusaka. There has been growing global concern and awareness on environmental issues since the first United Nations Conference on the Environment held in Stockholm in 1972. The focus over the years has been on sustainable development as a process of change in which the exploitation of natural resources, direction of investments, orientation of technological development and institutional change are made consistent with both the current and future potential to meet human needs.



In Zambia, sustainable use of natural resources has become a cornerstone for economic development. In this regard, Government has established legal and institutional frameworks to guide environmental management in the country by enacting regulations, plans and programmes. These include; the National Conservation Strategy (NCS) of 1985, National Environmental Action Plan (NEAP) of 1994 and Environmental Protection and Pollution Control Act (EPPCA) of 1990 which led to the subsequent establishment of the Environmental Council of Zambia (ECZ). The NEAP was then piloted through the Environmental Support Programme (ESP), which was aimed at supporting public, private and community based approaches to environmental and natural resources management.

In order to achieve an integrated approach to the use and management of natural resources, Government has developed a National Policy on Environment (NPE). The main purpose of the policy is to ensure that socio-economic development will be achieved effectively without damaging the integrity of the environment or its resources.

Further, Government policy on Decentralization is aimed at enhancing institutional and human resource capacity at all levels of government. The policy aims to empower local authorities and local communities by devolving decision-making authority, functions and resources from the centre to the lowest level with matching resources in order to improve efficiency and effectiveness in the delivery of services.

In addition to this, the Fifth National Development Plan (FNDP), 2006-2011 is a guide to the country's development efforts over the medium and long-term period. The FNDP is an important vehicle towards the realization of the Vision 2030 in which Government has articulated long-term development objectives and identified a number of development goals. The FNDP has acknowledged the weak management capacity at provincial, district and sub-district levels and suggests the need for capacity building at these levels. Improved environmental management at the local level will enhance the participation of those whose livelihoods are dependent upon the sustainable management of renewable natural resources.





Government recognises that achieving sustainable development in Zambia requires access to data and information so that those involved in decision making can reach the level of knowledge and understanding needed for successful programme planning and service delivery.

For this reason, the country has been engaged in periodic production of SoE Outlook reports in order to provide for an assessment of the environment so as to raise awareness and understanding of environmental trends, their causes and consequences among stakeholders.

In line with this, the country has gone a step further beyond regular production of national environment outlook reports to district SoE Outlook reporting to facilitate the measurement of progress made towards sustainable development.

The Lusaka City SoE Outlook Report is therefore important in strengthening management and monitoring of environmental issues at city level and is expected to have a significant impact on effectiveness and service delivery in Lusaka City.

Government is optimistic that through the environmental assessment and reporting process, there will be increasing responsibility for environmental planning and management at all levels.

Honourable Michael Kaingu, M.P.

MINISTER

TOURISM, ENVIRONMENT AND NATURAL RESOURCES





PREFACE

The Lusaka City State of Environment (SoE) Outlook report is a product of a stakeholder participatory process. The report has been prepared by a Technical Working Group comprising key Government departments and service providers in the city with support from United Nations Human Settlements Programme (UN-Habitat) and United Nations Environment Programme (UNEP).



Production of the report has been undertaken as part of the Sustainable Cities Programme (SCP), a global programme aimed at promoting urban environmental planning and management. The overall objective of SCP is to support and strengthen local authorities and their partners in the public and private sectors to plan, and manage their city environment in a sustainable manner. Such growth is bound to have a major influence on the urban environment in Africa, and there are already challenges facing policymakers. The SCP has warned that environmental degradation threatens economic efficiency in the use of scarce development resources and social equity in the distribution of development benefits and costs.

The report will therefore, increase knowledge about the interaction between society and the environment so as to bring about the needed changes for urban planning and management. It focuses mainly on assessing the pressures the environment is facing and analyses actions aimed at enhancing environmental management at district level. It goes a step further to propose policy options for addressing environmental challenges. Some of the key issues covered in the report include; provision of basic services such as education, health and housing, illegal settlements, transportation, land degradation, waste management, water and sanitation, energy, air pollution and governance.

The challenge is for various stakeholders in the district to utilise the report for planning and decision making at all levels. We must therefore use this document as a tool in the management of the environment and to consider an integrated approach in the sustainable development of the district. We recognise limitations in availability of data in the district. It remains our challenge to strengthen data collection, analysis and monitoring activities in the district such that subsequent environment outlook reports will have improved data.

I wish to take this opportunity to thank members of the Technical Working Group for their commitment throughout this process. I am further indebted to Environmental Council of Zambia (ECZ), UN-Habitat and UNEP for their technical and financial support during the preparation of this report.

Stephen Chilatu
LUSAKA MAYOR





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ACKNOWLEDGMENTS

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LCC wishes to acknowledge the guidance and technical and financial support of the United Nations Environment Programme (UNEP) and UN-Habitat for preparation of the report. We further wish to thank the many institutions and individuals that made specific contributions to the information contained in this report.

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ACRONYMS AND ABBREVIATIONS

AQUATIS	Urban and Peri-Urban Water Supply and Sanitation Database
CBD	Central Business District
CO	Carbon monoxide
CSO	Central Statistical Office
DPSIR	Driving Force Pressure State Impact response (DPSIR)
ECZ	Environmental Council of Zambia
GDP	Gross Domestic Product
IDP	Integrated Development Plan
IEA	Integrated Environmental Assessment and Reporting
LCC	Lusaka City Council
LSWC	Lusaka Water and Sewerage Company
LWMP	Lusaka Waste Management Project
LWMU	Lusaka Waste Management Unit
NO _x	Nitrogen Oxides
NWASCO	National Water and Sanitation Council
PM	Particulate Matters
SADC	Southern Africa Development Community
SoE	State of Environment
SO _x	Sulphur Oxides
SWMS	Solid Waste Management System
TWG	Technical Working Group
UNEP	United Nations Environment Programme
UN-Habitat	United Nations Human Settlements Programme
WHO	World Health Organization
WMU	Waste Management Unit
HDI	Human Development Index
PI	Poverty Index





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EXECUTIVE SUMMARY

The Lusaka City State of Environment (SoE) Outlook (LEO) Report is aimed at raising awareness levels on the nature and background of environmental challenges facing the city and attempts to show the linkages between society and the environment. The report covers four themes namely; (i) Socio-economic issues, (ii) Land and Built Environment, (iii) Energy and Atmosphere and (iv) Water and Sanitation. It also includes a chapter on scenarios and policy options for future action. Summaries of the chapter are given as follows:

Socio-economic issues

The city faces a number of challenges in this sector including rapid population growth, transportation, migration, health, HIV/AIDS, education, employment and governance issues. The population of Lusaka is estimated to be about 1.3 million and the city is growing rapidly. The highest population is concentrated in the peri-urban areas. The population of Lusaka, like the rest of the country is predominantly young. Up to 70 per cent of the population is below the age of 30 (CSO, 2000)

The growth of the city in part is attributed to a high immigration from other parts of the country. Up to 24 per cent of the population comprises persons born outside Lusaka. The most likely drivers for immigration into Lusaka remain higher economic prospects, opportunities for higher education and higher wage employment. (CSO, 1996)

The poverty level has been steadily increasing

over the last two to three decades mainly due to the high levels of population growth, which are not matched by economic growth. The majority of the total estimated city population reside in informal settlements. Due to the decline in the availability of formal wage employment, majority of residents of Lusaka work mainly in the informal sector. The literacy rate in Lusaka Province is higher than the country's average at 95.5 per cent. The population of Lusaka is growing and is putting pressure on basic services such as education, health and housing. This population growth demands improvements in provision of basic services.

Land/Built Environment

The history and experience in city planning combined with increased demand for services from the population growth and mushrooming of informal settlements, has led to the degradation of infrastructure and increased demand for land in the city.

During the last few decades, development of the City has been conducted using outdated development guidelines. An approved master plan was completed in 1975 and came into force in 1978. In 2000, the Integrated Development Plan (IDP) was prepared for the City but has not been approved. Informal land delivery is the most commonly used land delivery system accounting for not less than 60 per cent of all new developments in the city of Lusaka. The Local Authority has recorded a rise in the number of complaints involving land allocation and ownership. Illegal quarrying is common in the city and this has led to land degradation. The land has lost potential utility through this reduction in ecosystem diversity and these areas are prone to flooding in the rainy season. The abandoned quarries become breeding





grounds for mosquitoes and bacteria.

The National Housing Policy of the Republic of Zambia set guidelines to sustain an effective and efficient housing development programme. These include making serviced land available for housing development and streamlining the land allocation system. The current land management situation in the city needs attention and will worsen if no corrective measures are put in place. There is need to build capacity of the local authority by providing adequate resources to monitor land delivery and use.

Energy and Atmosphere

Energy is fuel for growth in any social and economic development. Sources for industrial energy include coal, wood, diesel and electricity while domestic sources for heating, cooking and lighting is largely provided by charcoal and electricity.

In the last five years, the cost of transport fuels has risen by 60 per cent. Studies have shown that over the last ten years (1994-2004), there has been over 100 per cent increase in demand for electricity. During the period 2004/2005, the major sector for electricity consumption in the city was the domestic sector. Out of over 200,000 households, 54 per cent used charcoal, 44 per cent use electricity and other households use kerosene and firewood.

Anthropogenic activities both combustion and non combustion are the main sources of air pollution in the city. Stationary combustion sources of air pollution in Lusaka mainly come from coal, wood and diesel fired boilers. Domestic fuels such as charcoal and other wood fuels also produce pollutants. Other sources

include tyre burning which is rampant in illegal quarries and open air burning of waste. Mobile sources are largely from the internal combustion engines (petrol and diesel).

Non combustion sources of air pollution include dust from quarrying and emissions from use of solvents, paints and sprays. There is no documented data on pollution from these sources. Emissions from sewerage works, abattoirs, incomplete incineration of Health Care Waste and livestock production within the City have been another source of air pollution.

Two thirds of vehicle population in Lusaka use petrol. The SADC target of phasing out leaded fuel by 31st December 2005 has not been met and the majority of the vehicles are still using leaded fuel.

Average temperatures for both maximum and minimum temperatures over Lusaka city have increased by approximately 1°C over the last 30 years. Warmer climates are also exacerbating the spread of diseases such as Malaria and other vector borne diseases.

The current scenario does not provide much avenue for economic development of the city and improvement of people's livelihood. Most of the people not supplied with electricity dwell in peri-urban areas where provision of this energy source is difficult. In addition, the majority of the people are not able to meet capital costs of acquiring the service. Charcoal trading provides employment to many people and is a good source of income. The large market of charcoal provided by those not supplied with electricity encourages the trade.

Water and Sanitation

Lusaka city relies on both surface and ground water





as its source of water. The quantity of water supplied by Lusaka Water and Sewerage Company (LWSC) is between 200 000m³ to 220 000m³ per day. The increasing population and economic activities in the city have increased demand for water supply. In 1993, the total water supplied to Lusaka by LWSC was approximately 210 000m³ per day. The company was still supplying the same quantity of water by 2005.

Water supply is inadequate due to a number of reasons which include; the increasing number of unplanned new developments in the city, leakages and pipe bursts within the water distribution system and old infrastructure. LWSC estimates that 56 per cent of the water produced is unaccounted for and probably lost through such means as leakages in distribution. Water supply particularly to peri-urban areas in Lusaka is insufficient in comparison to the population in these areas. The geology of Lusaka comprises an ancient basement complex overlain by limestone and dolomite. Its porous and soluble characteristic renders it susceptible to pollution.

Currently, the service provider is unable to provide adequate water and sanitation services in the city. The scenario does not provide a meaningful avenue for development as the gap between demand and supply of water and sanitation services is wide and will continue to increase if necessary interventions are not put in place.

Urban growth has resulted in increased amounts of waste. The main waste streams in the city include domestic, commercial, industrial and hazardous. Limited financial capacity and human resource are some of the reasons contributing to the failure by the local authority to fulfill its

obligations in waste management. The problem is exacerbated by inadequate infrastructure and recycling facilities. Households are the main generators of waste, contributing about 80 per cent of the total amount generated.

In 2003, Lusaka City Council (LCC) produced a Strategic Plan for Municipal Solid Waste Management (MSWM) for the City. Through this plan, two new waste management systems were developed to serve the conventional and peri-urban areas. To support the new waste management system, the LCC elaborated the Municipal Waste Management By-Law.

Although LCC has developed a strategic plan for MSWM, implementation depends on Local Authority's ability to raise finances. Revenue generation is however low. In addition, capacity among the Local Authority Agents (Franchise Contractors) is still limited both in terms of equipment and technical expertise.

Scenarios and Policy Options

Scenario analysis was conducted to consider a long range future in light of uncertainties and to examine the requirements for a transition to sustainability. Scenarios are indispensable tools for environmental management that focus on long term interactions between development and environment. They have been built for each thematic issue and in general, the provision of basic services in the city does not match the growing population. There is need to build the capacity of the local authority and relevant service providers to improve urban planning and management. The chapter proposes actions that can be undertaken for all the themes discussed in the report. Most of the actions supplement proposed actions identified in the IDP for Lusaka City



I INTRODUCTION

Since the first United Nations Conference on the Environment held in Stockholm in 1972, there has been growing awareness of environmental issues. The United Nations Conference on Environment and Development (UNCED) held in Rio in June 1992 acknowledged the need for countries to strike a balance between the economic and social demands on the world's ecosystems and the need to conserve natural resources on which economic and social systems depend. The UNCED also highlighted gaps in our understanding of the earth's ecological processes that were hindering our ability to attain sustainable development.

Sustainable Development is defined as 'development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs'. (WCED; 1987, 43)

Sustainable development is therefore, a process of change in which the exploitation of natural resources, direction of investments, orientation of technological development and institutional change are made consistent with both the current and future potential to meet human needs.

In 1985, African environment ministers met in Cairo, Egypt to lay the foundation for the African Ministerial Conference on the Environment (AMCEN), the supreme continental forum responsible for articulating authoritative perspectives on environment in Africa. During the 9th session of AMCEN held in Kampala in July

2002, inadequate information and data were recognized as a major constraint to strategic environmental management planning and implementation of programmes in Africa.

There are a number of initiatives at global and regional levels aimed at addressing challenges identified by AMCEN. Among these, is the implementation of a capacity building strategy for Integrated Environmental Assessment (IEA) and reporting at global and regional levels by the United Nations Environment Programme (UNEP). At sub-regional level, the Southern African Research and Documentation Centre-India Musokotwane Environment Resource Centre for Southern Africa (SARDC-IMERCSA) has been guiding environmental reporting.

Recognizing that management and communication of environmental information is fundamental to sustainable development, the country has adopted a process of IEA and reporting to provide information for decision making at various levels. At national level, State of Environment (SoE) reporting has continued with two reports produced in 1994 and 2000. Traditional SoE reports gave a good description of the state of environment at the time of writing the report. Previous SoE reports have been useful in pointing out environmental trends and conditions. However, SoE reporting has now evolved and demands linking environment to development as a basis of sustainable development. The new approach in SoE reporting is IEA defined as a process of producing and communicating policy-relevant information on key interactions between the natural environment and society.



The country has gone a step further to conduct environmental reporting at district level. In line with this, the Lusaka City State of Environment (SoE) Outlook report has been produced to increase knowledge about the interaction between society and the environment so as to bring about the needed changes for urban planning and management.

The Process of Preparing the Lusaka City State of Environment Outlook Report

The process of preparing this report started with establishing a Technical Working Group (TWG) whose representation was drawn from key stakeholder institutions which included; Government, private sector and civil society. As this process involved institutions that have traditionally not been participating in SoE outlook and reporting activities, a training workshop on IEA was conducted. Specifically, the methodology involved:

- ❖ Identification and composition of the district TWG.
- ❖ Identification of environmental issues and themes.
- ❖ Development of indicators and identification of information sources.
- ❖ Data collection and analysis.

This report is an environmental assessment of Lusaka City and answers the following questions:

- ❖ What is happening to the environment in the district?
- ❖ Why is it happening?
- ❖ What can be done and what is the district doing about it?
- ❖ What will happen if we do not act now?

The TWG identified critical issues affecting the city and four thematic areas were agreed upon for the report based on these issues. These are; Socio-Economic issues, Atmosphere, Energy, Land, Water and Sanitation.

Further, training in development of environmental indicators for the city was conducted, after which, a set of indicators was developed. Sub-Committees were formed based on themes and institutional mandate. Members of the TWG were then tasked with the responsibility of collecting data and compilation of the report. Recognising that different frameworks are used in environmental statistics, the Driving Force Pressure State Impact Response (DPSIR) framework was used for indicator development as well as data analysis. Several meetings to review the draft report were held before the report could be adopted.

Technical guidance was provided by ECZ and the LCC took a leading role in preparation of the report. It is therefore, hoped that this report will be useful to planning the growth and development by all players in the economy of the city. The process of producing the report was therefore, participatory with the involvement of major stakeholders involved in city planning and management.

One of the limitations in producing this report was inadequacies in information availability at city level as much of the information is generated mainly at provincial and national levels. This therefore presented challenges in information collection and analysis for the city.

In view of the multi-sectoral nature of the environment, integrated environmental assessment brings together information and



2

BACKGROUND



Lusaka is located in central Zambia on the central African plateau, 1300m above sea level. The city occupies a watershed area. The Ngwerere and Chalimbana streams drain most of the Northeast of the city into the Chongwe River, a tributary of the Zambezi River. Other sectors of the city are drained to the Kafue River by the Chunga stream in the Northwest and a series of small streams to the south of the city. The Inter Tropical Convergence Zone movements largely influence the annual weather pattern across Lusaka and the rest of the country. It has an average annual rainfall of 803mm. The temperatures are moderate with

average maximum temperature measuring 31.2°C in October and an average lowest temperature of 9.6°C in July. (Williams; 1984,6). Savannah grasslands cover certain parts of the city.

The city was designed for a population of 500,000 people. It has a vital role in national development and is a centre for social and economic progress besides being the nation's administrative capital. The choice of Lusaka to become the capital did not follow what is usually regarded as the traditional development pattern. The town's main attribute was its central location and healthy climate. Professor S.D. Adshead, a Town and Country



Planning Professor of the University of London, was commissioned to recommend a site for a new capital. In 1931, Adshead recommended Lusaka due to its central location and good communication with the mining centres.

In his plan, Professor Adshead seemed to have been influenced by Ebenezer Howard's 'Garden City' concept of 1902. Basic to the plan was the assumption that the new capital was to be 'generous and spacious in style'. He planned for a European population of 500, 000 though at that time Lusaka had only 470 Europeans. The city was to be an administrative centre and not an industrial town.

The first Lusaka City Development Plan was issued in 1956 and subsequently amended in 1965. In 1968, a new Lusaka City Development Plan was compiled and finally approved after ten years in 1978. Although Section 18 of the Town and Country Planning Act (TCPA) provides for the statutory review of the plan every fifth year, this has not been done. Therefore, it has been difficult for the city planning department to move in pace with the constantly changing trends. In addition, the necessary budgetary allocations could not be made and the plan was poorly implemented.

In the year 2000, a new Lusaka IDP was completed, but is yet to be approved by the Ministry of Local Government and Housing (MLGH). The challenges for the city therefore include; city planning, competing land uses, land delivery, access and governance issues.

The performance of Lusaka in service delivery has been constrained by a lack of financial and administrative autonomy. Councillors are elected every five years to run the affairs of the city through the LCC on behalf of the residents of the city. Like all councillors in Zambia, the Councillors are part time officials. Full time employees of the council headed by a Town Clerk assist them with the daily management of the affairs of the city.

The Councillors, however, approve all development projects for the city. LCC therefore, serves as the planning authority. Although LCC is a corporate body and is expected to manage the affairs of the city independently; it merely operates as an agent of the Central Government and does not enjoy financial autonomy.

The weak financial position has contributed to their inability to deliver the services they were designated to provide. Government has acknowledged the failure of the current financing arrangements for Local Authorities. The Decentralization Policy of, 2002 commits the Government to improving the local authorities' financial resources so as to reduce their dependence on Central Government and provides a legal framework that could promote autonomy in decision-making at the local level.



3

SOCIO-ECONOMIC ISSUES

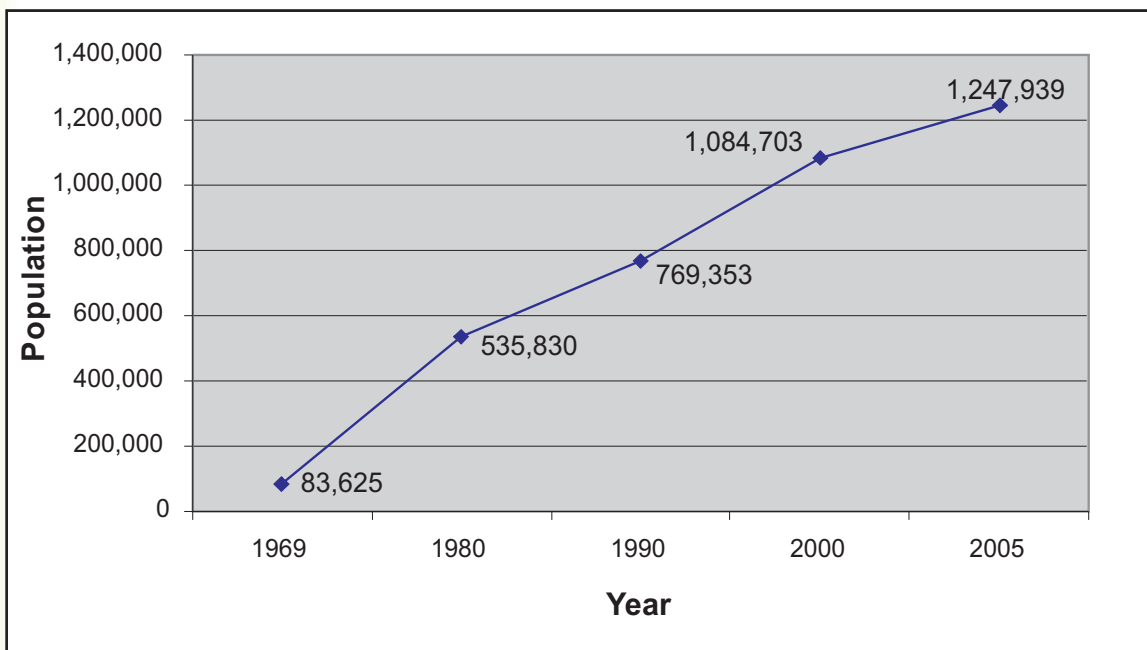
Development is measured in many ways. This chapter provides economic measurements which are easily usable especially to inform policy and other high level interventions. This is the basis on which the Socio-economic chapter for the Lusaka SoE Outlook report has been written, that is, to provide aggregate measures of selected socio-economic variables, which could then serve as a basis for short to long term planning for the city and the economic development thereof.

The linkage between the environment and the economy and how economic development affects the environment has long been established. The environment or ecosystems to be more precise, provides the materials and

services upon which life depends. As development sometimes tends to negatively affect the environment, there is need to manage the economic development processes in such a way as to ensure the natural resources on which the economy is built are not exploited beyond the level where they can still recover. There is a need to strike a balance between human socioeconomic activities and environmental conservation.

Poverty is a factor in as far as the state of the environment is concerned in that the higher the poverty levels the higher the dependency on natural resources. Addressing poverty reduces pressure on the environment and likewise the quality of life for the less privileged members of society. It goes without saying that environmental

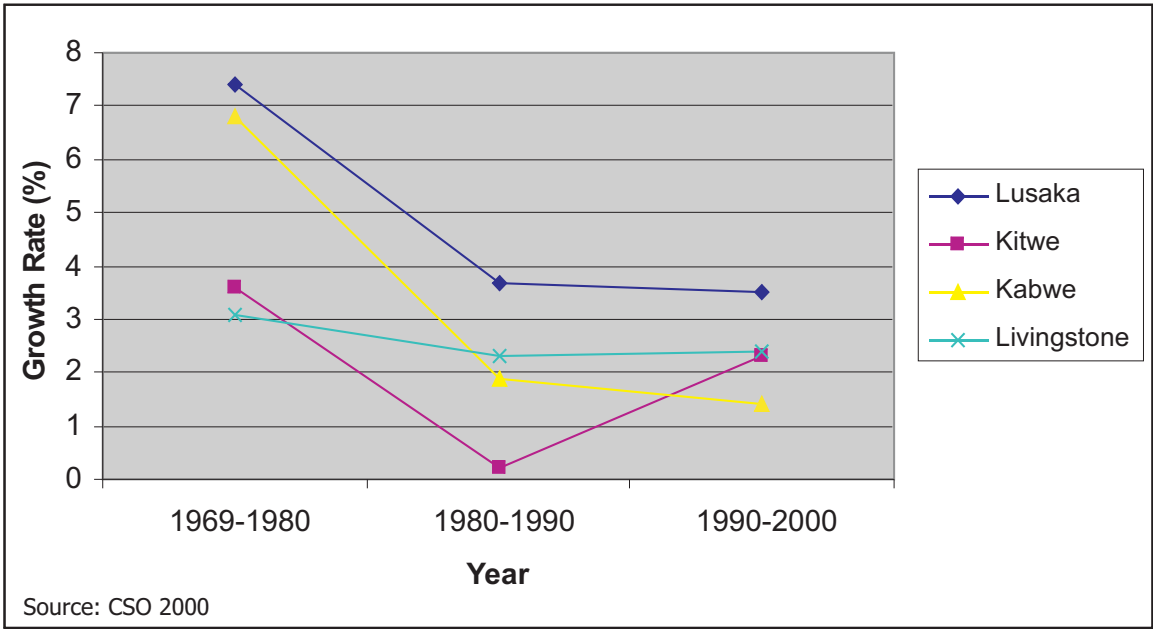
Figure 3.1 Showing Population Trends for Lusaka 1969 -2005



Source: CSO Living Conditions Surveys



Figure 3.2: Population Growth Rates for Zambia's Major Towns and Cities

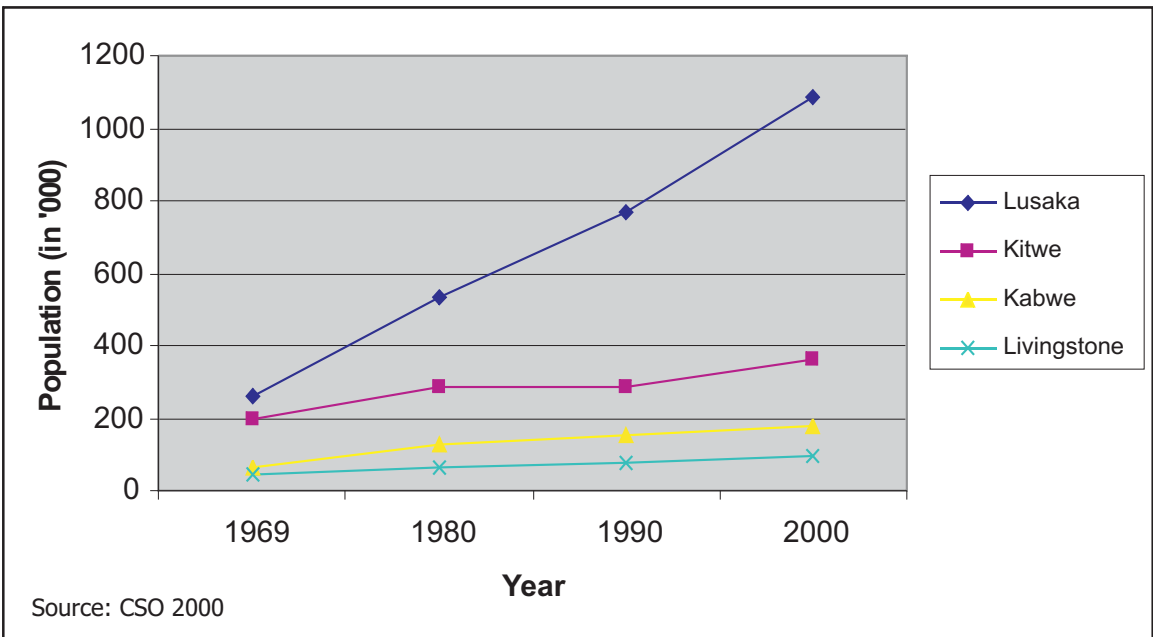


problems are closely associated with where the poor live and conversely where the poor live, there is clearly higher environmental degradation than where the well-off live. An example is quarrying and associated environmental hazards of diseases such as

Malaria and diarrhoeal diseases such as Cholera. Further, where there is higher poverty, there tends to be limited or no mechanisms for proper waste disposal and management, water supply and sanitation services.

The substantial urban development challenges for

Figure 3.3: Population trends for Zambia's Major Towns and Cities



Lusaka and other cities in Zambia emanate from increasing poverty levels and more specifically, social, political and economic problems and processes. The city faces a number of challenges in this sector including rapid population growth, transportation, migration, health, HIV/AIDS, education, unemployment, increasing inequality between the rich and poor and males and females.

This chapter covers population, transport, communication, industry, health and education. These variables are considered both as major drivers and pressures for the state of the environment in the City. Further, the chapter provides means through which the drivers and pressures are addressed or ought to be addressed (responses and options) for sustainable development.

3.1 Population

The population of Lusaka in 2005 was estimated to be about 1.3 million and the city is growing rapidly. Lusaka has steadily developed into a vibrant metropolis with a population increase of about 3.7 per cent per annum. About 10 per cent of the total area is occupied by informal settlements (compounds or peri-urban areas), and majority of the people live in these areas.

As can be observed from Figure 3.1, the population of Lusaka from 1969, has been growing and projections are that it will continue to grow, albeit, at a slightly reduced rate. In 2005, Lusaka had a population of 1 247 939. This indicates an increase of 478 586 from its 1990 figure of 769 353 representing an annual growth rate of 3.2 per cent as compared to 3.7 per cent recorded for the previous decade. The

growth rate for the city is still higher than that of other parts of the country as shown in Figure 3.2. The population density has also increased from 729 in 1969 to 3013 persons per sq. km in 2000. (CSO, 2000). In terms of the trends, the population of Lusaka has continued to grow more rapidly than any other city in the country as shown in Figure 3.2. With regard to the age structure, Lusaka, like the rest of the country is predominantly young. Up to 70 per cent of the population is below the age of 30. Gender desegregated data shows that 49 per cent are males and 51 per cent are females. There are slightly more females than males in their teens and in the twenty to thirty years age categories (CSO 2000). Figure 3.4 provides the population pyramid.

The implications of the young population are those of high demand for employment and pressure on social and other basic services among them health, education, transport, housing as well as recreational facilities.

The other feature of Lusaka's population that has a bearing on the environment in the City is its distribution. As can be observed from Figure 3.5, the highest population is concentrated in the peri-urban areas. The high population density in the peri-urban areas means limited access to among other services water and sanitation, waste management and health facilities. The average density of population is 150 per ha, but varies significantly from 5 persons per ha in the high cost areas to almost 1,450 persons in the informal settlements. (LCC 2006).

3.2 Migration

The growth of the city in part is attributed to a high immigration from other parts of the country. These



Figure 3.4: Population Pyramid for Lusaka City in the year 2000

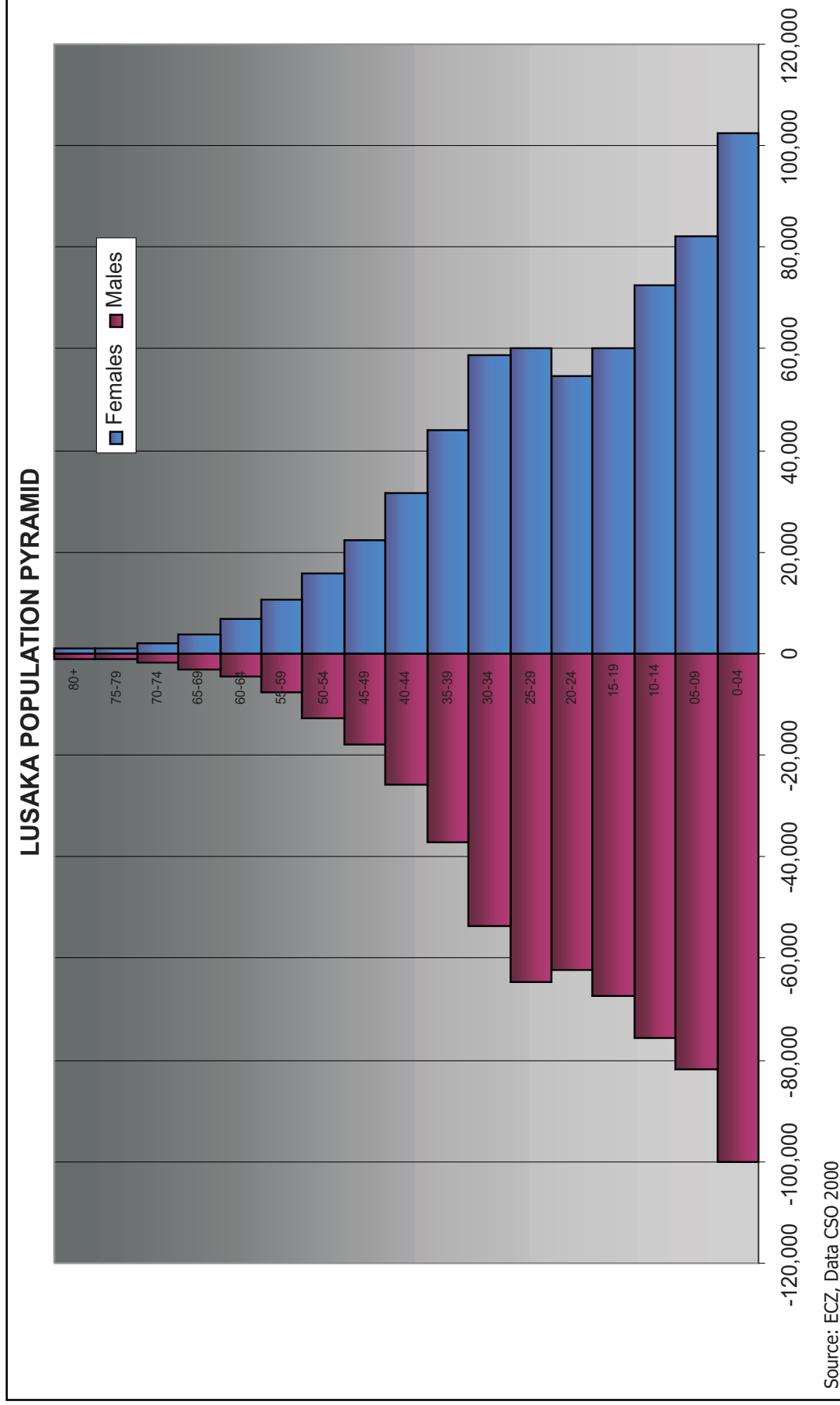
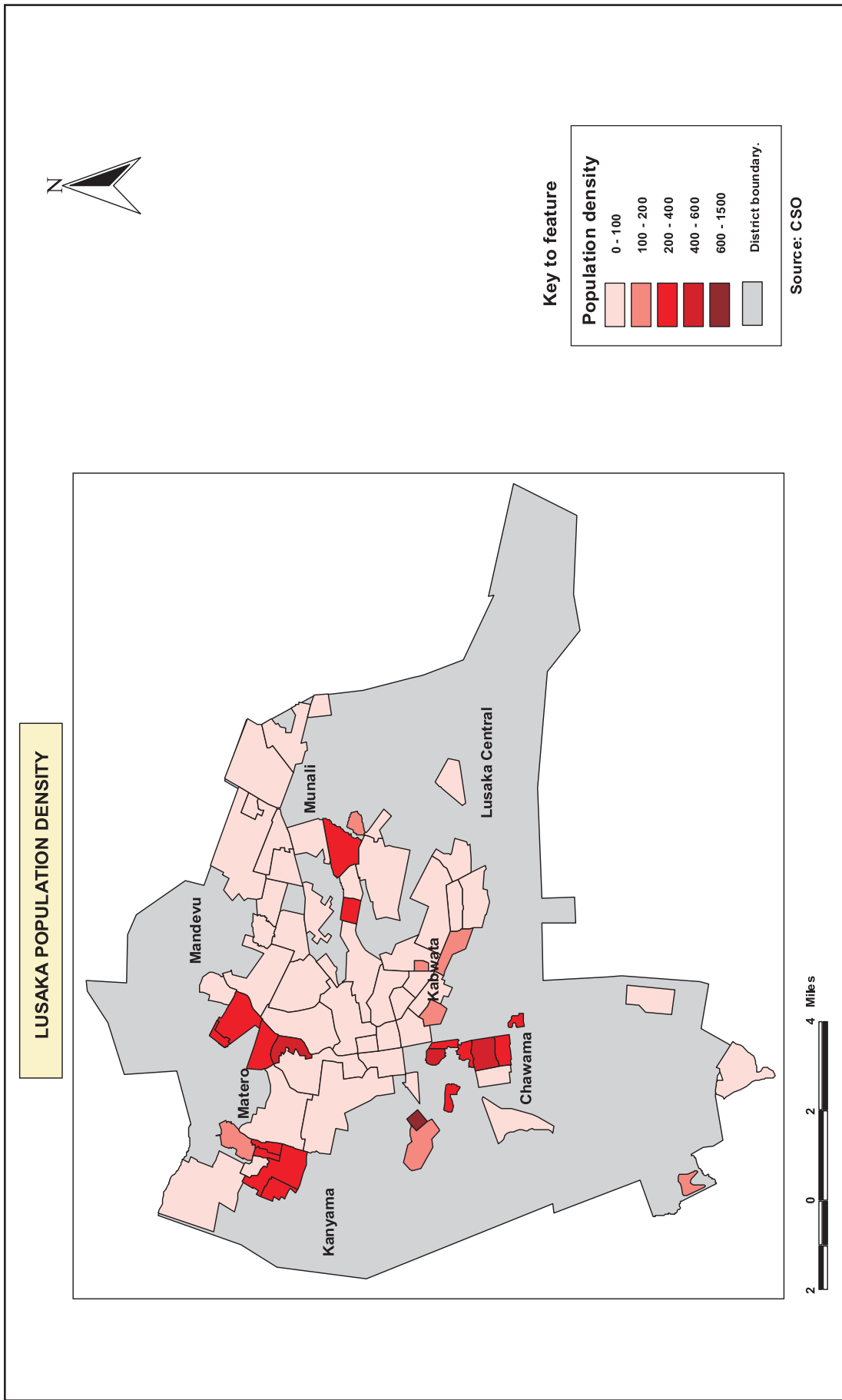


Figure 3.5: Lusaka City Population Density



include Copperbelt, Eastern and Southern Provinces. Up to 24 per cent of the population comprises persons born outside Lusaka. About 42 per cent of the population comprises persons who have migrated to Lusaka whereas those that have migrated out represent 17.5 per cent of the population. Projections are that the immigration into Lusaka will continue, but at a slackened rate (CSO 1996).

The most likely drivers for immigration into Lusaka remain higher economic prospects, opportunities for higher education and higher wage employment. Further, the higher population in Lusaka serves as a market for goods and services which cannot be sustained elsewhere in the country. In practice, this assumption has shown not to always hold true, as high levels of unemployment and poverty are

current realities in the City. The overall trend is that the migration rate is on a decline due to reduced overall economic prospects in urban districts. Further, the current economic reform programme, which puts emphasis on agriculture, as a major economic sector could be a factor in reducing migration into urban centres, Lusaka inclusive.

The other factor to consider about the population of Lusaka is that the city has a substantially higher day-time population. This is partly due to its proximity to other urban centres among them the Copperbelt towns, Chongwe, Kafue and Mumbwa. There are persons living in other towns but work in Lusaka especially Kafue Town 50Km to the South. The other group comprises persons who travel to Lusaka to either sell produce or buy goods for sale in other parts of the country.

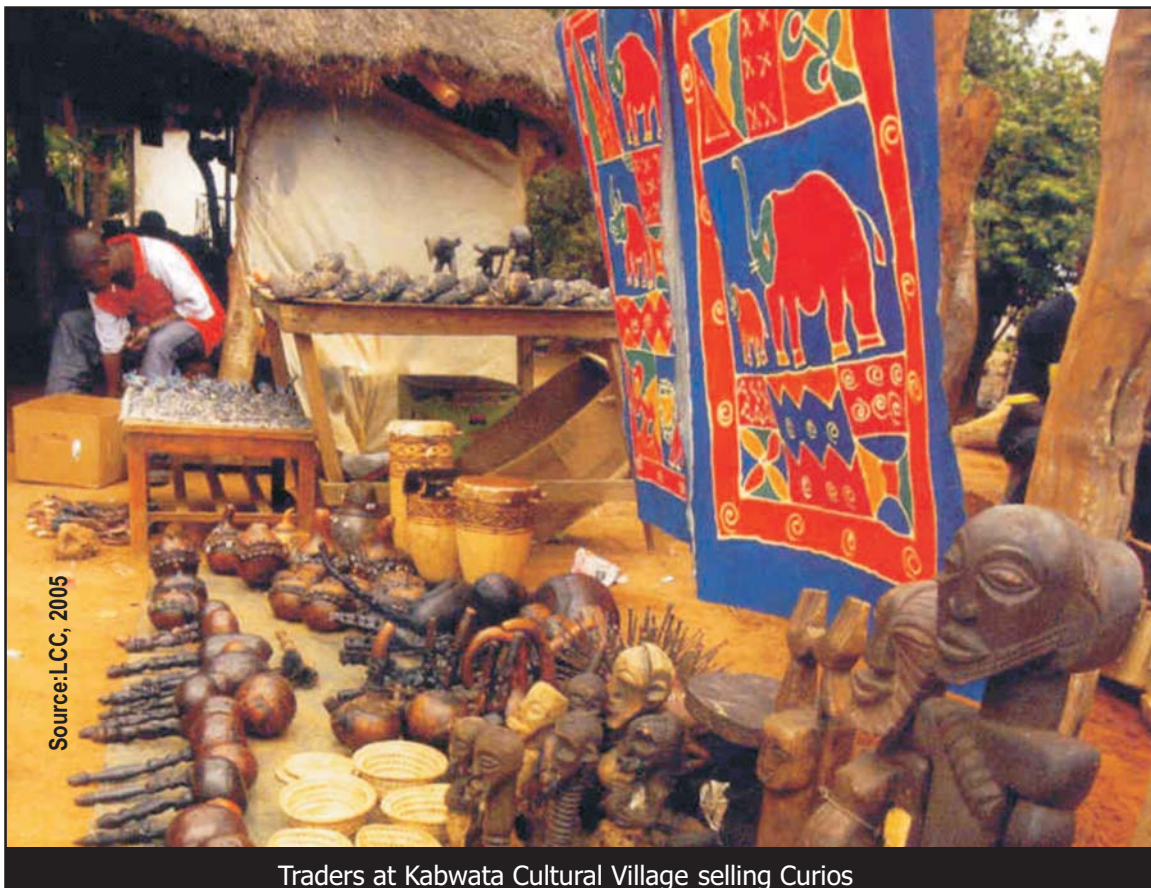
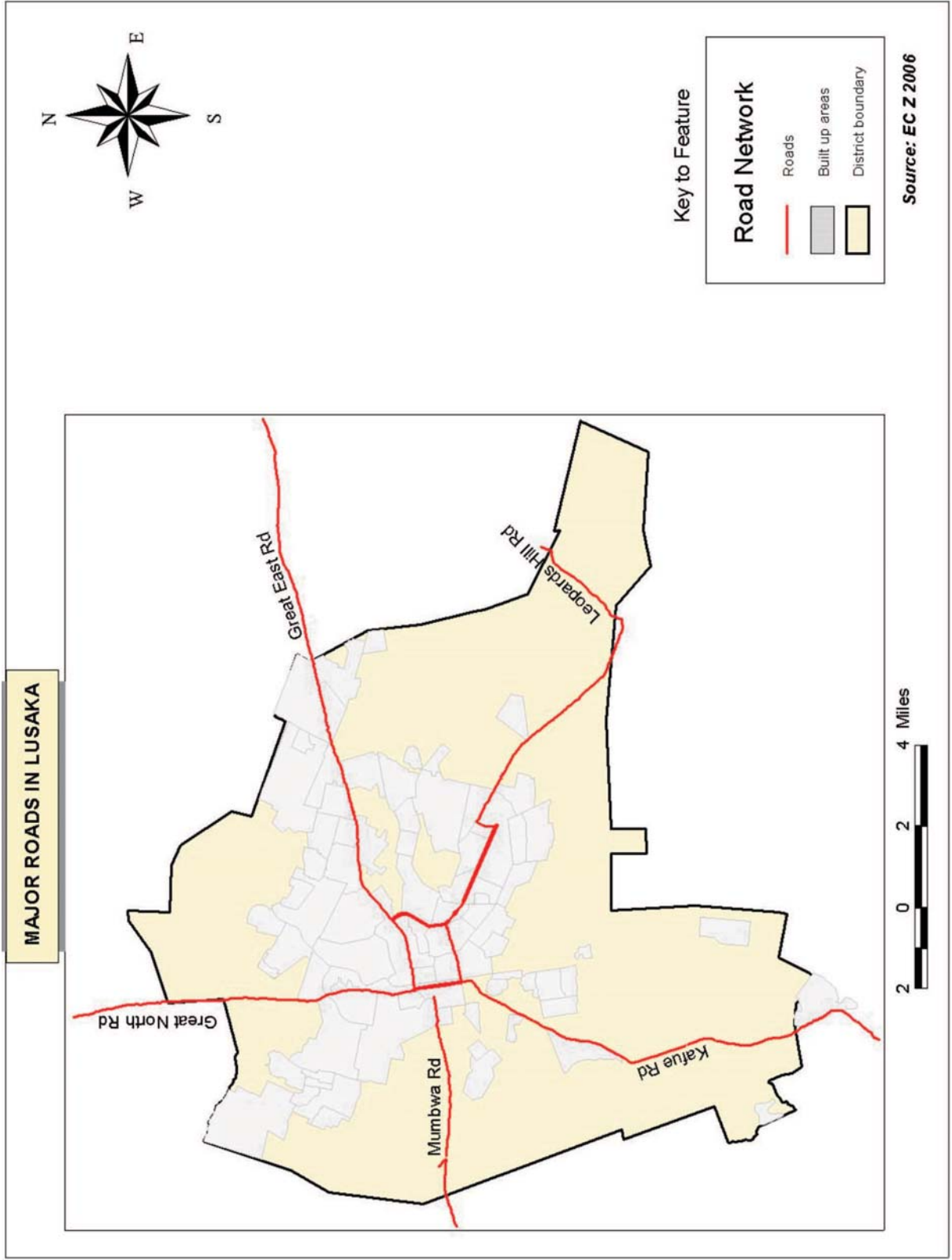
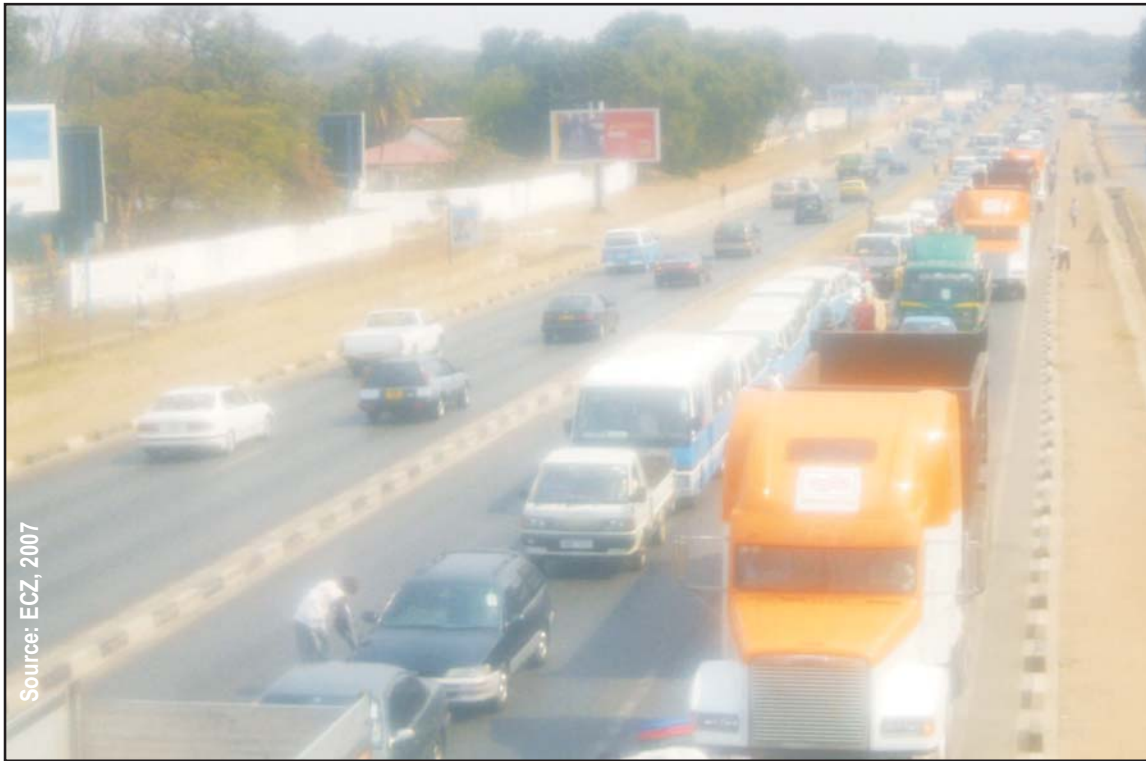


Figure 3.6: Map showing road network in Lusaka



Traffic in Lusaka City



3.3 Transportation

The geographical, commercial and governance centrality of Lusaka's position has made the city a major destination and meeting place. As a result, Lusaka has a superior transport system compared to other urban centres around the country.

Commuter buses service mostly to commercial, industrial and residential areas are the main public transport system. Besides the commuter bus system there exists a fairly developed taxi system. Lusaka is also an important destination for national long distance road travel. There are also a number of buses that service international routes among them Zimbabwe, South Africa, Malawi, Botswana, Congo and Tanzania.

The other means of transport found in the city is rail. Railway Systems of Zambia offers passenger and goods trains, although most of the rail traffic is transitory. The railway network through Lusaka goes to the Copperbelt and Southern Provinces towns, Democratic Republic of Congo and Tanzania and subsequently Zimbabwe and South Africa.

Lusaka is also a key point on trunk air routes. The Lusaka International Airport located 22.5Km east of Lusaka handles both Local and International flights. Among the notable international carriers include British Airways, Ethiopian Airways, South African Airways, Kenya and Zambian Airways.

Lusaka has a developed intra-city road network, which connects the residential, industrial and active agricultural areas to the CBD. Further,



Lusaka is connected to four major trunk roads; the Great North, Kafue, Great East and Mumbwa Roads. The Great North Road forms the backbone of the network, serving both local and transitory movements. The Great East Road and Mumbwa Road to the west of the city centre, together with the Great North Road form the intersection of national transportation axes within Lusaka.

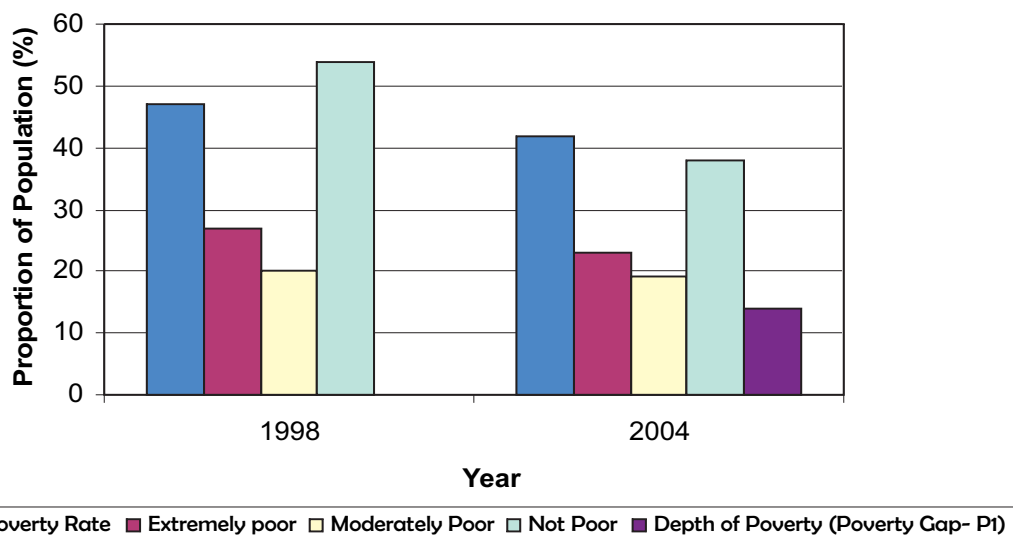
Lusaka has witnessed an increase in the number of motor vehicles. This development has however, not been matched by an expansion of the road network and as a result, congestion and traffic jams are becoming a common feature on most roads, particularly on the eastern part of the CBD during peak times.

In addition, it can be concluded that the vehicles are contributing to air pollution in the city. However, the absence of regulations in the country to adequately address air pollution for

mobile sources and the non-implementation of the SADC declaration for the phase out of leaded fuel are among the factors that further compound the problem of air pollution in the city.

As a response to the transport challenges in Lusaka, the Ministries of Local Government and Housing, and Communications and Transport in conjunction with LCC have implemented projects aimed at improving the road network. Through this, twelve access roads connecting the city centre and peri-urban areas were improved. Ten main roads within the city were developed. The Great East Road was rehabilitated into a dual carriageway up close to CBD. This has helped to reduce road traffic congestions and accidents. This therefore, means that Lusaka City's capacity to maintain its roads was strengthened (JICA, 2005). Construction of the roads in the city as in other parts of the country has been done in accordance with Environment Impact Assessment (EIA) Regulations. This has minimized potential environmental impacts in the city.

Figure 3.7: Poverty levels for Lusaka urban for 1998 and 2004



Source: CSO Living Conditions Survey, 2004



Figure 3.8: Monthly Real Income per Capita (ZMK) for Zambia’s Provinces

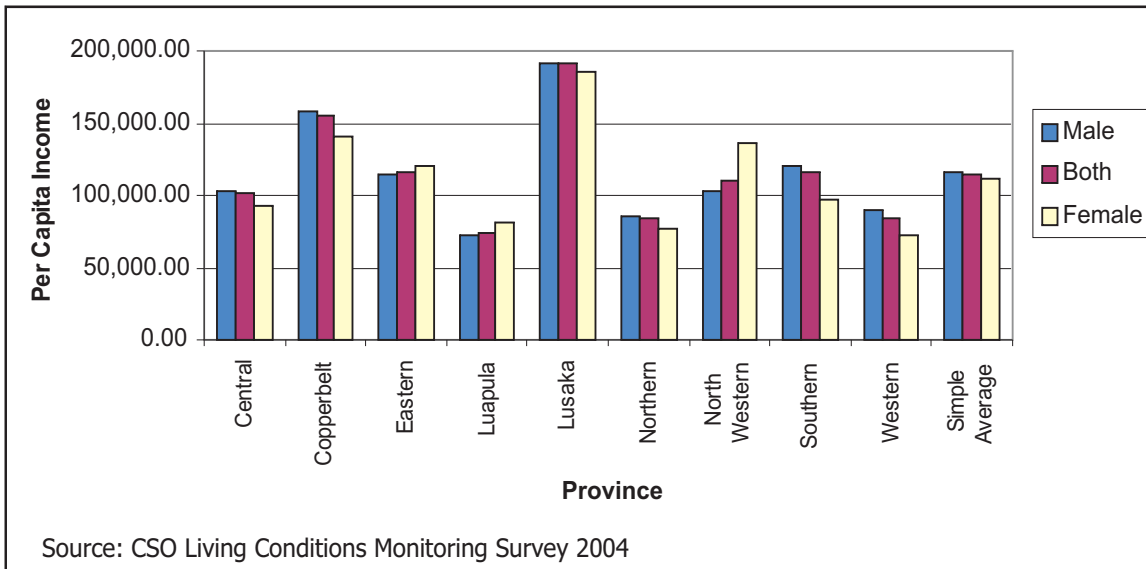
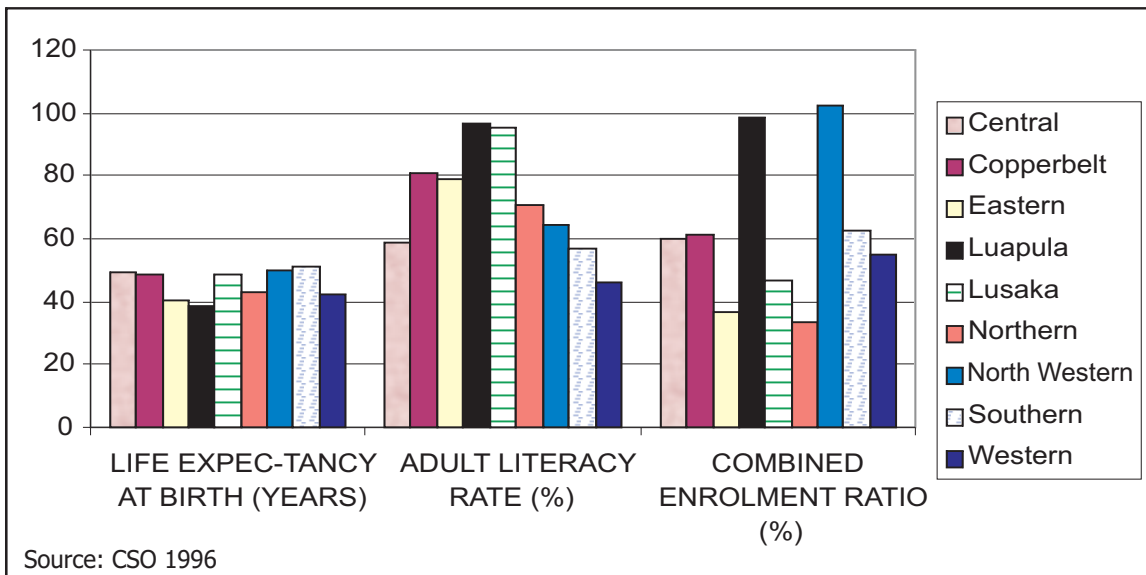


Figure 3.9: Comparative HDI indicators for Zambia’s Provinces



For the future, the LCC plans to construct ring roads among major road networks to reduce traffic congestion.

Surveys conducted at some of the formal parking areas provided in the city revealed that there is insufficient provision made for off-street parking in the City. The on street parking bays are also insufficient to cater for the current

demand. The City needs more formal parking areas, especially in the CBD.

In the past, no provision was made for either pedestrian walkways, or bicycle lanes, in the planning of road systems in Lusaka despite statistics indicating that more than 50 per cent of the population in Lusaka walk, as a primary means of transport. Therefore, the need for adequate



pedestrian facilities is necessary and should be incorporated in future road planning.

3.4 Telecommunications

There are currently, various telecommunication service providers in the city. Among them are three cellular phone service providers namely Zambia Telecommunications Company (Zamtel), MTN and Celtel. Besides provision of cellular services Zamtel is a multi-telecommunication service provider dealing also in fixed-line telephone, Internet services and leased lines. Other internet service providers, besides Zamtel include ZAMNET Communication Systems, Coppernet Solutions, Microlink Technologies and UUNET.

In terms of Internet service provision, the City

has a number of Internet Cafes besides private and corporate Internet connectivity. Other telecommunication services available in Lusaka include the snail mail provided by ZAMPOST, which company also has a courier service. There are other notable companies in the courier service among them DHL, FEDEX and Mercury.

3.5 Poverty

Poverty is one of the biggest challenges facing Lusaka and the country. The poverty level has been steadily increasing over the last two to three decades mainly due to the high levels of population growth, which are not matched by economic growth. Other causes of poverty would include the social exclusion of the vast majority.

At the personal level, poverty is more as a result of



not having means of production or inability to secure decent wage employment. Decent employment here is understood to mean a job that pays a wage above the poverty datum line, that is to say, one that enables one to meet basic requirements of shelter, food, clothing, heating and lighting energy and costs of social services such as education and healthcare.

As far as the poverty situation in Lusaka is concerned, the situation has improved as shown in Figure 3.7. Whereas the proportion of the population classified not poor in 1998 was 54 per cent, the proportion reduced to 38 per cent in 2004. The proportion of the population in extreme poverty reduced by about 15 per cent. Other poverty measures such as moderately poor and extremely proportions remained largely unchanged and slightly reduced respectively. (CSO 2000)

Poverty in the city of Lusaka like elsewhere is complex due to both personal and societal factors. Lack of access to wage employment in the formal sector seems to be a major cause of poverty.

The majority of the people who live in Lusaka are employed by the informal sector. The poorest seem to be concentrated in the unplanned settlements, which do not have public services such as water, sanitation and proper waste management. Poor service provision coupled with poor environmental practices in these areas contributes to various forms of pollution and incidences of diseases such as Cholera. In addition, the economic activities people engage in such as illegal quarrying further contributes to land degradation.

The poor are not likely to command high wages when they take up wage employment despite the comparatively higher per capita income for Lusaka when compared to other provinces of the country, as shown in Figure 3.8. In terms of self employment the persons in peri-urban areas tend to venture into activities characterized by low capital input and low returns.

Zambia's Human Development Index (HDI) has been rising steadily since 1994 much sharper between 2000 and 2004 from 0.451 to 0.462 respectively. The HDI for Lusaka Province increased from 0.445 to 0.513 in 2000 and 2004 respectively. (UNDP, 2007)

Figures 3.8 and 3.9 show that Lusaka Province (which comprises mainly of Lusaka City) is better than most other Provinces in the country in terms of life expectancy, literacy and income levels. However, with regard to combined enrolment ratio Lusaka is below the national average. The conclusion that can be reached from the discussion on poverty is that poverty levels in Lusaka City are high.

The link between poverty and the environment notes that generally the urban poor are affected by sub-standard housing and poor environmental services, while the rural poor lack the ability to derive livelihoods from more productively and sustainable natural resources. This is true for Lusaka as evidenced by poor housing structures, roads and service provision in most peri-urban areas of the city. The incidence of water borne diseases such as Cholera in these areas is common due to poor water supply and sanitation facilities.

The high poverty level creates pressure on environment as people resort to different coping strategies by engaging in activities such as illegal



3.10: Distribution of Health Centres in Lusaka

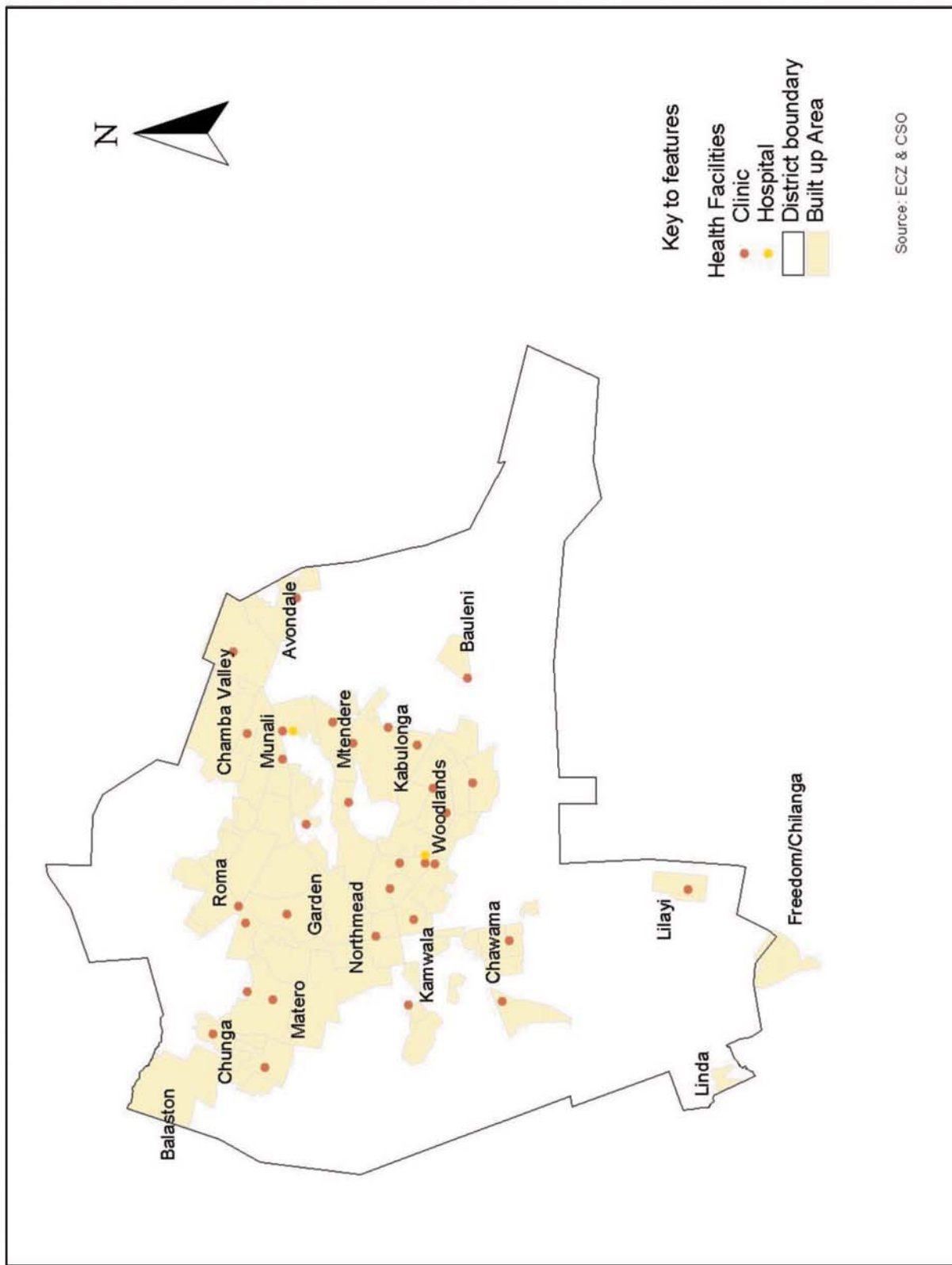
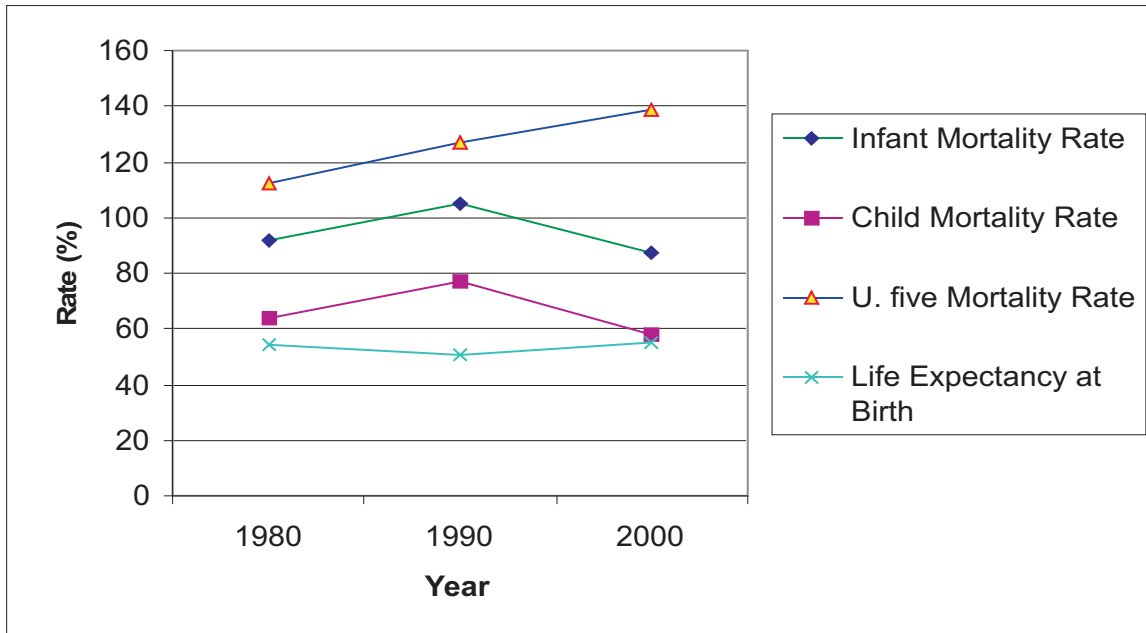


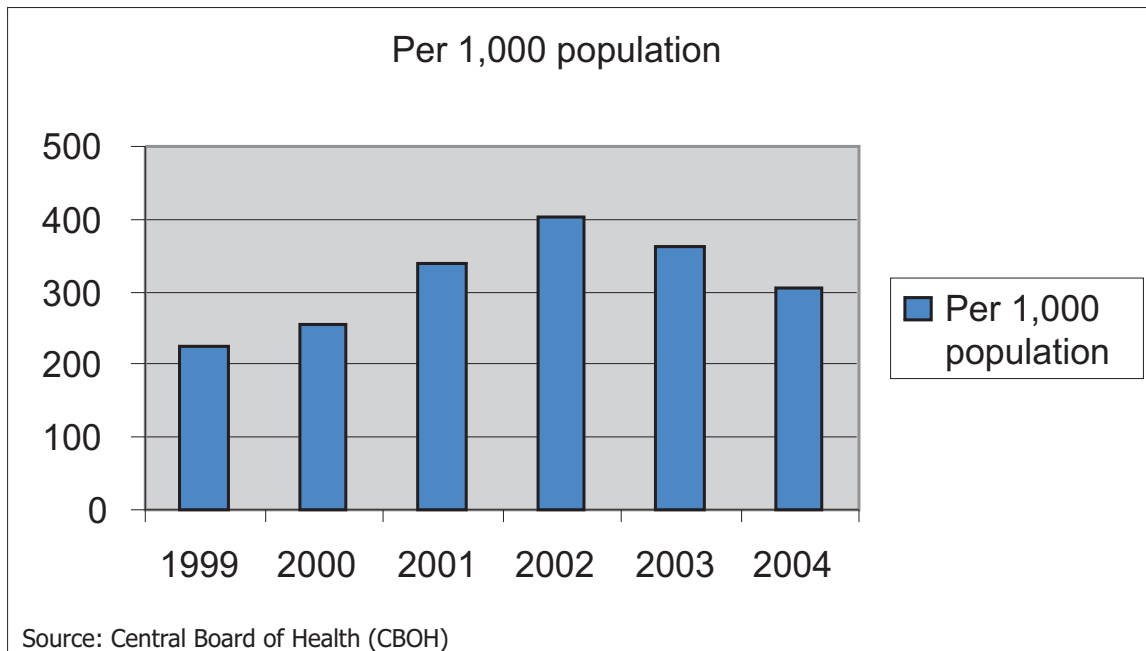
Figure 3.11: Infant, child mortality, under-five mortality & life expectancy rates at birth for Lusaka Urban 1980, 1990 and 2000



Source CSO 2000

Note: Chongwe and Kafue were combined at the time of 1980 and 1990 Censuses undertaking

Figure 3.12: Incidence of Malaria in Lusaka Per 1000 population



Source: Central Board of Health (CBOH)

small scale quarrying, garages, car washes and street vending. The impact of these activities on the environment includes land degradation, generation and indiscriminate dumping of

waste and outbreak of diseases such as Cholera and diarrhoea.



3.6 Economic Development

Lusaka provides among other services, administrative functions to Zambia as a whole.

It also plays a significant role in the country's manufacturing. Though the economy of the city is more diversified than that of the country, it is quite weak, as most of the sectors are underdeveloped. The basic manufacturing activities, such as food processing and beverages, textiles and leather goods for example dominate the manufacturing activities.

The construction sector, on the other hand, has mirrored the performance of the overall economy. This can be attributed to the rehabilitation of major roads and the construction of new housing estates and conference facilities in the city (GRZ 2002).

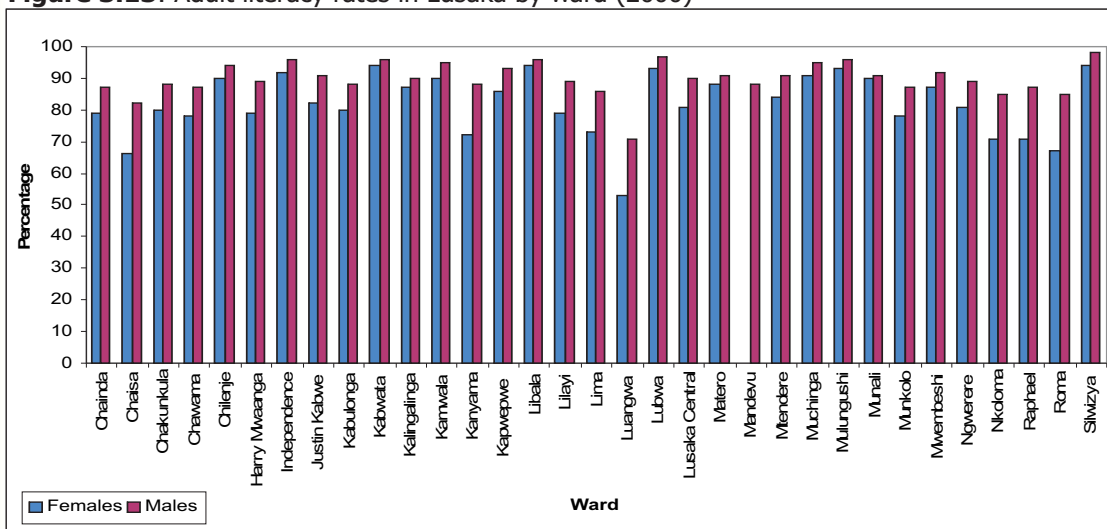
The economy of the City of Lusaka only provides formal employment to a small proportion of its labour force. The IDP which meant to address the key economic challenges for Lusaka, for example, put the number of people in formal

employment in Lusaka at 120 233 or 35 per cent of the labour force (LCC 2000). The majority (65 per cent) of the city's labour force, therefore, earns its livelihood from informal economic activities, which predominantly consist of unregistered and unregulated small-scale non-agricultural economic activities ranging from petty trading to metal fabrication and wood processing. The bulk of the informal economic activities are, however, essentially in trading.

It is generally accepted that there can be no poverty reduction without growth in the economy. Unfortunately the economy of Lusaka has not been measured as a stand alone. Major economic measurements of Growth Domestic Product (GDP), inflation and Foreign Direct Investment (FDI) are available at national level. As such, it has proved difficult to measure the performance of the economy in Lusaka. The economy of Zambia has grown over the last five years. It follows then that Lusaka has equally seen growth.

The dominance of a strong public sector presence in the city is likely to continue into the foreseeable

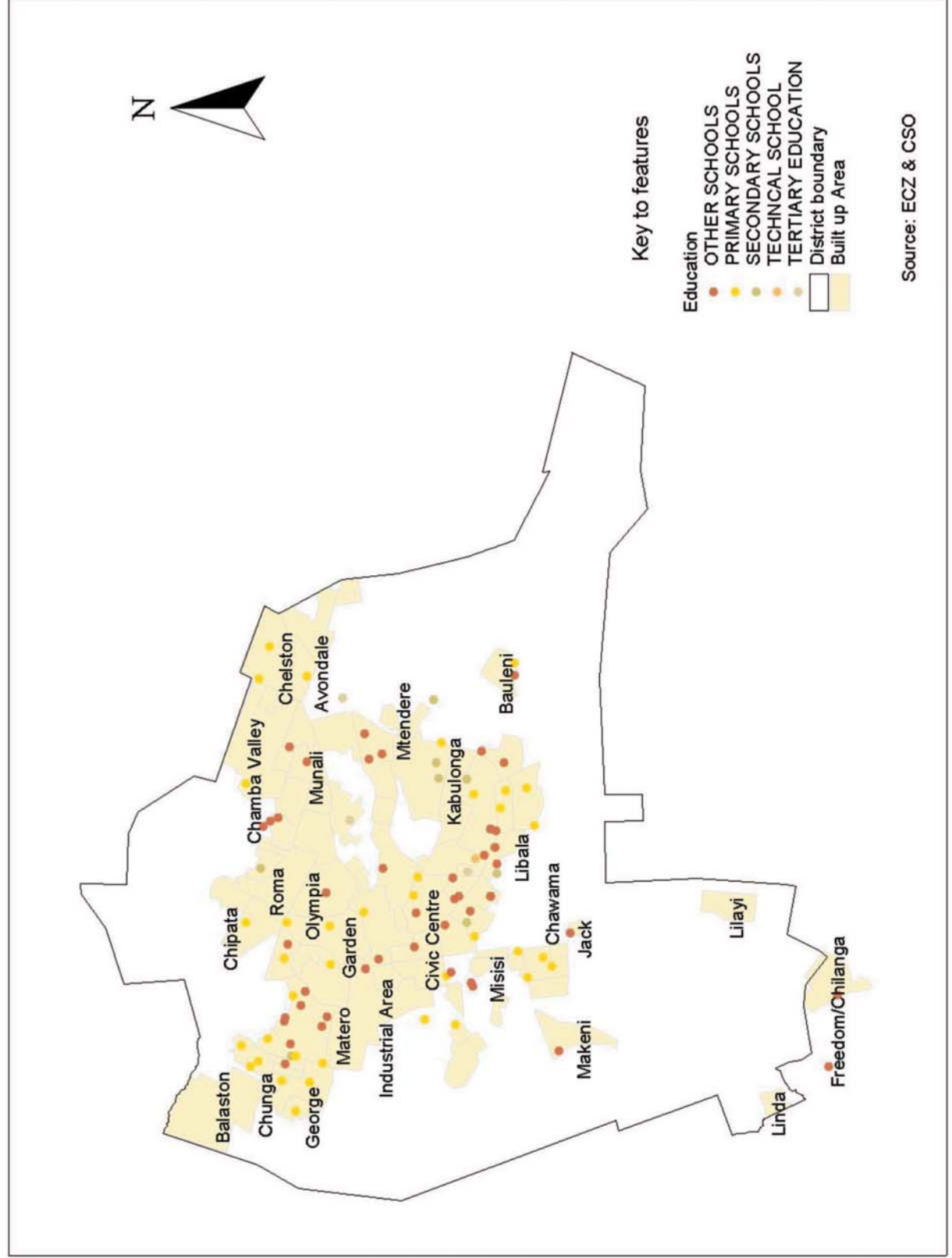
Figure 3.13: Adult literacy rates in Lusaka by ward (2000)



Source: CSO 2000



Figure 3.14: Education Centres in Lusaka



future. However, Government sector dominance is expected to steadily decline over the long term as the remainder of the economy gains in relative importance and as the sector declines due to cutbacks brought about through the economic reform programmes and other downsizing measures.

The private sector represents a livelihood for a major portion of the local population and its importance should therefore not be underestimated.

3.7 Health

Health is a key sector in the economic standing of the city. Productivity is severely hampered when disease prevalence is high. There are a number of challenges in health provision in the city among them; access to health facilities and incidences of some diseases whose occurrence is driven by the state of the environment.

Provision of water and sanitation, for one, is such that many households in the peri-urban areas on the whole lack access to safe drinking water and sanitation and as a result have a higher incidence of water borne diseases. Furthermore, the peri-urban areas have no mechanism to manage domestic waste thus leading to pollution.

In Lusaka, more than 1 000 000 residents have access to a health centre within 1.5km and less than 200 000 have to travel more than 1.5km to access a health facility. However, in some areas such as those suburbs located to the extreme south of the municipal area, for example, Freedom, Chilanga and Linda have to travel more than 4kms to access health facilities.

(CBoH, 2002) Figure 1.10 below distribution of health centres in Lusaka.

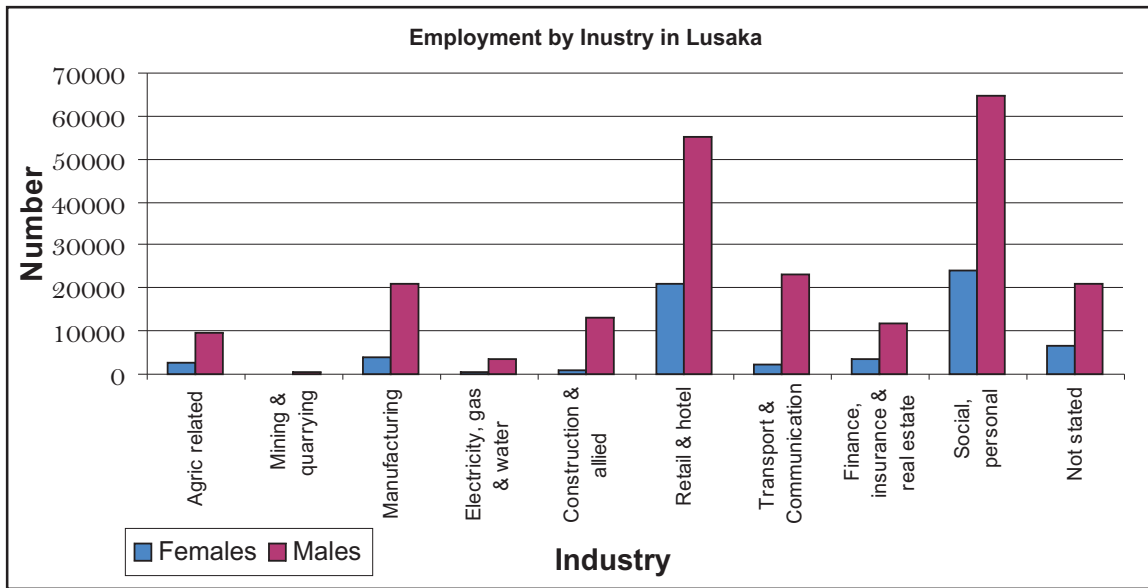
3.7.1 Infant, Child and Under Five Mortality rates

A National Population Policy developed in 1984 targeted the reduction of infant mortality from 97 deaths per 1 000 live births in 1980 to 65 per 1 000 live births by the year 2000 and to 50 by the year 2015.

According to the Zambia Demographic and Health Survey (ZDHS) of 2001-2002, Zambia's level of under-five mortality was 168 deaths per 1,000 live births during the five-year period before the 2001-2002 ZDHS, indicating that around 1 in 6 Zambian children born during the period died before their fifth birthday. A number of demographic factors are strongly associated with the survival chances of young children. These factors include sex of the child, age of the mother at birth, birth order, length of the preceding birth interval, and the size of the child at birth. In general, female children have a lower mortality risk than males. The under-five mortality risk for males is more than 10 per cent greater than that for females (CSO, 2003).

There are variations in childhood mortality indicators by background characteristics. Early childhood mortality is lower in urban areas such as Lusaka than in rural areas. For Lusaka Province, Infant, child and under five mortality rates were 70, 72 and 137 deaths per 1 000 births respectively. This therefore, indicates that the city was still below the infant mortality target of 65 deaths by 1 000 births for 2000. (CSO, 2004)



Figure 3.15: Chart Showing Employment by Industry in Lusaka in 2000

Source: CSO, 2000

3.7.2 Incidence of diseases

There are a number of environmentally related diseases. These diseases include Malaria, Diarrhoea, HIV/AIDS, TB, and Cholera. Malaria is the most frequently reported disease at health centres and is reported to be the greatest contributor to high rates of morbidity/sickness in all the districts. Figure 3.12., shows that the incidences of malaria increased from 1999 to 2002 and decreased in 2003. This can be attributed to increased malaria control programmes such as In-door Residue Spraying and use of mosquito nets. In 2003, 29.4 per cent of the population in Lusaka, were reported to have been using mosquito nets (CSO 2005).

3.7.3 HIV/AIDS

Lusaka has recorded an increase in the number of HIV positive persons from 123 414 of which 56per cent were females in 2000 to a high of 126, 988 in 2002, of which females still constituted 56per cent of those infected (CSO, 2005). The projected infection rate has since

began to reduce, albeit at a slow rate. The projected infection rate for 2006 was 121 396, representing a reduction of 4per cent from the 2002 figure. Principally, HIV/AIDS threatens the city's capacity building efforts because the most infected are those in the most productive proportion of the population (15 to 49 age group).

3.8 Education

The literacy rate in Lusaka Province is higher than the country's average at 95.5 per cent but the enrolment ratio is one of the lowest in the country at 47 per cent (CSO, 1996). As can be observed from figure 3.13, the literacy rate for males is generally higher than that for females. This could be attributed to poverty amongst the population, forcing children to sell on the streets as a way of raising income for the family.

The 7 to 18 year age group represents children of school going age and this group comprises approximately 450 000 individuals, about a third of the city's population. A further 250 000 residents



make up the under 7 age group, which will soon be entering the education system. The conclusion that can be reached is that there is a massive demand, in terms of numbers of potential pupils, in need of an education in Lusaka.

Of youths between the ages 10 to 19, 18 per cent cannot read or write and 80 per cent of these are females. Furthermore, school attendance is lower for girls than boys, as more girls drop out of secondary schools.

3.9 Employment

Lusaka offers a wide range of economic activities offering employment to various occupational groups. Almost half of the people of Zambia in the manufacturing industry are employed in Lusaka with a figure of 29 012 out of the total 70 560.

However, there are currently approximately 120 233 people in formal employment in Lusaka. This represents 9.02 per cent of the total population, or 16.85 per cent of the economically active (aged 15 to 65 years) population of Lusaka City. In other words, the unemployment rate is about 83 per cent (LCC, 2000).

Out of 223 828 jobs available in Lusaka, only 65 585 were females representing a percentage of 29. This gap between males and females as far as employment is concerned may be difficult to explain. One conclusion could be due to the fact that there are more skilled males than females. The unemployment rate in Lusaka City is increasing, 13.7 per cent in 1990 to 27.0 per cent in 2000 (CSO, 2004). As a result the bulk of the

residents of Lusaka work mainly in the informal sector. The unemployment rate for females is higher than that for males represented by 30.0 per cent and 24 per cent, respectively. Those without any practical skills generally engage in piecework and small-scale trading activities.

In general, women and young people are involved in trading at markets within these settlements and in the main city markets. Semi-skilled and skilled men with practical skills such as carpentry and metal fabrication, on the other hand, earn a living by making household items such as furniture and other usable things for sale

A few young men and women also engage in anti-social means of earning livelihoods, ranging from stealing, selling drugs and prostitution. (CSO, 2000).

3.10 Governance in Lusaka

LCC is made up of seven constituencies and 33 wards. Each of the 7 constituencies is represented by a Member of Parliament who by virtue of being in Lusaka is also a Councillor. Each of the 33 wards is represented by Ward Councillors. Councillors have a term of office of 5 years. At ward level, the community organise themselves into Ward Development Committees which are made up of representatives from Zone Committees. All this line of leadership is democratically elected as people's representatives. The Council is led by a Mayor who is elected from amongst the Ward Councillors and is a ceremonial Mayor as opposed to executive Mayor. The weak financial position of LCC has contributed to their inability to deliver the services they were designated to provide. The Government has acknowledged the failure of the current



Decentralization Policy of 2002 commits the government to improving the local authorities' financial resources so as to reduce their dependence on Central Government and provides a legal framework that could promote autonomy in decision-making at the local level. The performance of Lusaka in service delivery has thus been constrained by a lack of financial and administrative autonomy.

The city has witnessed an increase in the number of media institutions. Private radio stations currently in operation in the city include; Radio Phoenix, Q-FM, 5 FM, Radio Yatsani, Hone FM and Radio Christian Voice. Three private Television stations are also in operation. These are Muvi-TV, Mobi-TV and TBN. The impact of this development is increased dissemination of information to the general public. The media has provided opportunities for increased advocacy on pertinent issues particularly for civil society and communities in general thereby, increasing people's participation in governance of the city. In conclusion, limited formal employment opportunities, high HIV prevalence rates and the marginal female participation in the formal economy are some of the major challenges facing the city. High HIV/AIDS prevalence rates increase pressure on the social infrastructure, especially on the number of orphans and vulnerable children.

Overall, prospects for development of the city are improving. For example, the development of the service industry is more pronounced in Lusaka than is the case in the rest of Zambia. Addressing poverty, high HIV/AIDS prevalence and immigration rates are some of the necessary measures from which the environment could benefit.

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4

LAND/BUILT ENVIRONMENT

Land is a principle necessity to human livelihood. It is an important resource of necessity for human, animal and plant life and should be managed sustainably for the benefit of both the present and future generations. From economics point of view, land is one of the three factors of production, others being capital and labour. Rapid population growth in Lusaka and competing uses has led to increased pressure on land. For instance there is an increase in the conversion of agricultural land to residential use.

Currently 70 per cent of the population in Lusaka live in peri-urban areas occupying about 30 per cent of the land. In Table 4.1, the actual built up areas in informal settlements cover about 10.49 per cent while the total land area covered by all informal settlements is about 30 per cent. Overcrowding, spontaneous construction and lack of financial resources have made it difficult to provide services such as proper roads, street lighting, sanitation and drainage systems in peri-urban areas. This problem is compounded by the inadequate capacity of the Local Authority to provide these services. In most cases, these areas are either squatter settlements or are settlements that have unregistered households and as such, little or no revenue is raised from them. On the other hand, provision and maintenance of services to low density areas is costly as services are provided to few households but covering large areas.

The Local Authority has constantly found it difficult to provide adequate-serviced land for

Table 4.1: Summary of the different land use types and the total area they occupy in Lusaka City

LAND USE	AREA HA	PER CENTAGE
Administration	142.03	0.34
Airport	215.17	0.51
Cemetery	247.51	0.58
Central Business District	250.78	0.59
Cultivation & Plantation	3 979.34	9.40
Industrial	772.59	1.82
Informal Settlement	4 442.32	10.49
Institutional	624.87	1.48
Proposed Housing Project	1 455.17	3.44
Residential	4 818.43	11.38
Small Holdings	4 226.42	9.98
Sport & Recreation	396.37	0.94
Unutilized Land	20 765.74	49.05
Total	42 336.74	100.00

Source: Lusaka Integrated Development Plan; LCC, 2000

residential, industrial, commercial and community development due to lack of financial resources. In most cases, development takes place before services are provided. The general land use categories include:

- Residential (High density, Medium, Low density)
- Business (CBD, Satellite business centers)
- Administration
- Recreational
- Institutional
- Agricultural
- Forestry
- Industrial

It is worth mentioning that the land use types presented in the Table 4.1 are as contained in the IDP for Lusaka City. However the categories listed therein are not in full



conformity with description standards applying in the Town and Country Planning Act Cap 283 of the Laws of Zambia, the table illustrates land uses as commonly understood. In addition the IDP has not been approved by the Minister of Local Government and Housing due to a number of factors, among them, the failure to implement the proposed extension of the city boundary.

Lusaka Land Use Map (Figure 4.1) indicates that most of the unplanned settlements are located towards the north, north-west and south of the CBD, whereas most of the formal residential development occurs to the east of the CBD. Much of the current physical development of Lusaka portrays a colonial legacy whose planning was based on racial segregation. The white settlers occupied higher and well drained land in the East while indigenous Zambians were settled in areas such as Matero, Kabwata and Chilenje with chronic drainage problems due to the geophysical characteristics of the land.

During the last few decades, development of the City was carried out using well intended but outdated development guidelines. The approved Development plan by Doxiadis was completed in 1975 and came into force in 1978. The plan is supposed to be reviewed after every five years, however, it has not been updated since.

Originally, the principal planners of Lusaka never intended it to be a large city. It was planned for a European population of 500 000 though at that time Lusaka had only 470 Europeans. The city was to be an administrative centre and not an industrial town. Its initial total area was only 2.6 km². It

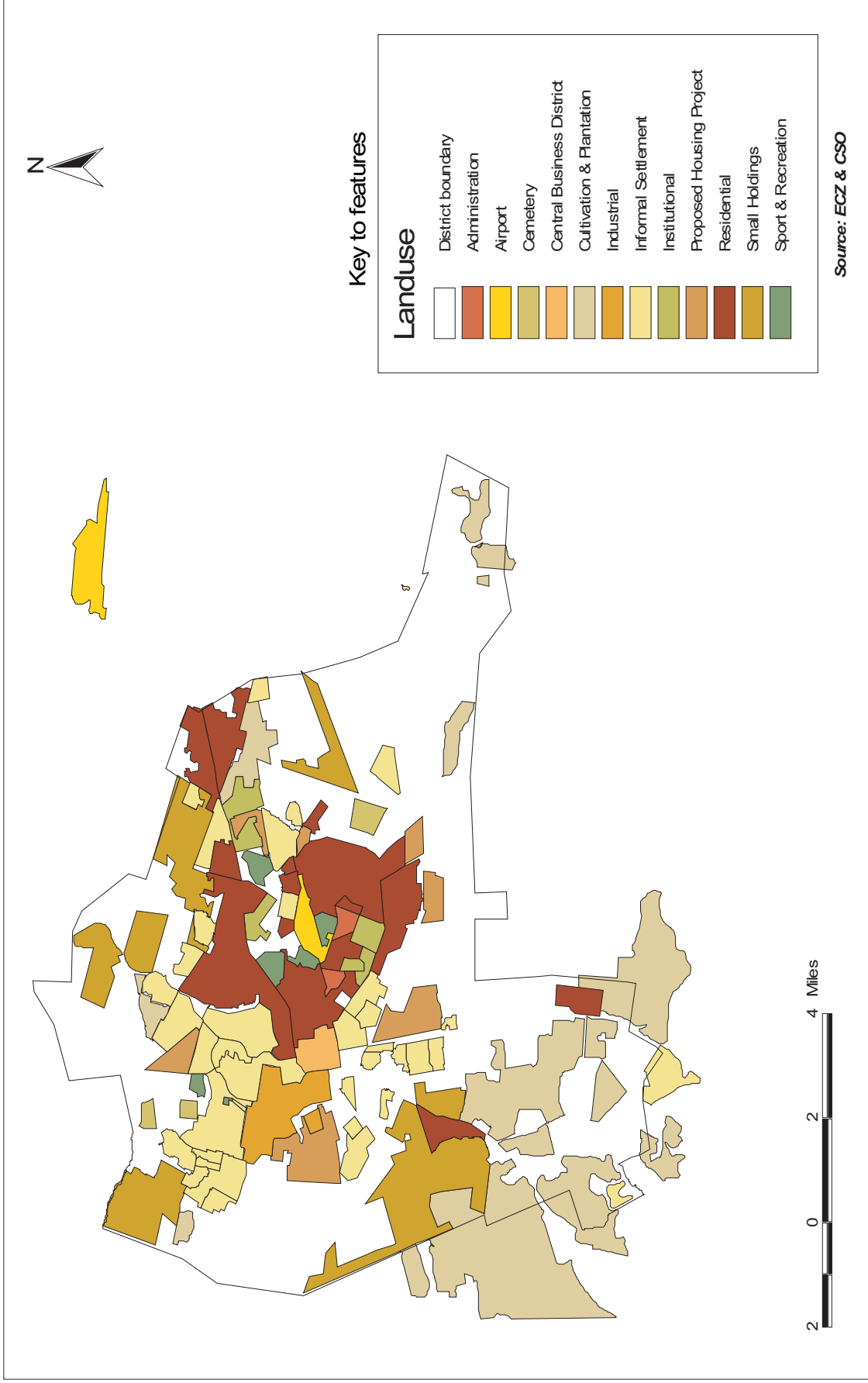
was, however, increased to 18 km² in 1931, then 36 km², and 139 km² and 360 km² in 1961, 1969 and 1970 respectively (Collins 1969; Pasteur 1979). The IDP prepared in 2000 proposed extension of the city boundary to bring the Lusaka International Airport, which is currently in the neighbouring Chongwe District and additional land around the city within its boundaries. Inadequate land within the city boundary has constrained re-development of most peri-urban areas.

The main causes of "shortages" of land for development in the city are;

1. Lack of serviced land; poor supply of serviced land against the ever-increasing demand for the same.
2. Speculation on land; Land owners hold on to land for a long time without developing it.
3. Complex procedures in land allocation and poor record keeping.
4. Inadequate human resource; Institutions dealing with issues of planning and land alienation generally have inadequate capacity to carry out their work effectively.
5. Slow pace for issuance of security of land tenure; poor information and cumbersome procedures for transferring titles make the costs of developing land unnecessarily high.
6. Failure to implement the Doxiadis Development Plan: the planning system had been rigid and static, seldom based on realistic appraisals of an area's economic potential or likely growth.
7. Illegal Settlements; There are various factors that lead to illegal settlements among them; lack of civic education,



Figure 4.1: Map showing land use types in Lusaka City



4.1 Land Delivery

Land delivery practice refers to the system used in making land available for development. There are two major practices namely: formal and informal. Formal land delivery is where the Planning Authority plans available land and applications are invited from the members of the public. Usually applicants compete with other applicants in order to assess the most suitable candidate. In areas where the Council has jurisdiction, offers are made by the Council, while the other areas outside the Council jurisdiction are offered by the Commissioner of Lands. In the latter, the Local Authority only makes recommendations to the Commissioner of Lands. Beneficiaries of these plots are expected to submit their applications for planning permission to the Planning Authority in accordance with the provisions of Town and Country Planning Act, CAP 283 of the Laws of Zambia. This is to ensure that only acceptable and orderly development takes place. This method of land delivery has been blamed for numerous and unnecessarily long procedures and high costs which mostly favour the rich. Transparency in issuing of plots has also been questioned and the system is prone to corrupt practices. It has been observed that records of illegally created plots have found their way to the land register, and official titles issued. This is usually done by illegally subdividing land that was reserved for public use such as play-parks, schools, markets, sites for health institutions etc.

The other formal method of land delivery is through institutions that construct houses which they in turn sell or rent to individuals and

organizations. Such institutions include the National Housing Authority and several private organizations, such as, Meanwood Properties and Lilayi Housing Project.

Even where the plots have been formally created and offered basic services such as water, sewerage infrastructure, roads and drainages have not been provided by the Planning Authority. This makes it very difficult to monitor and enforce best planning practices. In essence the resulting development may end up as that of an unplanned settlement.

Informal land delivery is the most commonly used land delivery system accounting for not less than 60 per cent of all new developments in the City of Lusaka. Poor land delivery practices by the formal sector has among other reasons, led to residents assuming powers to illegally demarcate and allocate land. They do this with little or no assistance from qualified personnel to plan and implement on the ground. The result is haphazard development. The plots sizes are uneven whereas the structures they build range in size, quality and materials used in construction. (LCC 2006)

Some of the impacts of informal land allocation include;

1. The developers carry out construction work with no security of tenure, thereby risking losing their investments if the Council was to demolish the structure, or indeed if the land lord obtained a court order to evict the illegal squatters.
2. There is no order in the alignment of plots and structures making it difficult to provide basic services to such places.



3. Construction takes place without the plans having been scrutinized by the Planning Authority and as a result, no inspections to ensure compliance with planning and material standards, hence the quality of the structures are usually substandard.
4. The developments are not captured in a land register hence no land taxes can be collected from the developers. The burden of providing services is not shared by these 'free riders' of the city. Most importantly these settlements which account for a larger share of construction works in the city are a haven of many negative environmental problems ranging from soil erosion to diseases such as Malaria, Cholera, Dysentery etc. Upgrading such settlements once they are recognized by the government is a very costly venture.

4.2 Land Disputes

The distribution of land is a sensitive matter in Zambia. The City of Lusaka Planning Authority has reported a rise in the number of complaints that are put before the courts, involving allocation and ownership. Most land disputes are dealt with by institutions such as the Lands Tribunal, Town and Country Planning Tribunal, Magistrates Courts and the High Court.

4.3 Land Tenure

In Zambia, Land is held by the President for and on behalf of the people. Land holding or tenure is under the leasehold system for 99 years renewable. Such lease can be obtained directly from the state or through Local Authorities for land held on head lease by such planning authorities. However, land tenure in improvement areas is held under occupancy license system for a period of 30 years renewable. Both the Certificate of Title and Occupancy License could be used as collateral and provide some certainty which could be used as basis for further investment in the property. It is unknown how many informal property owners have obtained a License or Title Deed in Lusaka but the stakeholders indicate that a rough estimate might be less than 50 per cent. (LCC, 2006)

Lack of secure tenure and formal registration is an impediment to development for the following reasons:

- It discourages the owners from investing (whether they live there themselves or rent it out to others) and prohibits the use of property as collateral;
- It increases the risk that the property maybe lost;
- It makes it more difficult for service providers (including LCC) to enter into contractual agreement with the tenant or owners.

Table 4.2: Types of Land Tenure

No	DOCUMENT	TYPE	DURATION	INSTITUTION
1	Title Deed	Confers Title to land (for surveyed land)	99 year	Local Authority Ministry of Lands
2	Land Record	Card Stop- gap document	10 years	Local Authority
3	Occupancy Licence	Licence giving occupier the right to occupy the piece of land in question	30 years	Local Authority
4	Title Deed	Stop-gap document for unsurveyed land	14 years	Ministry of Lands



- It makes it difficult to tax property owners.
- Lack of secure tenure discourages property owners in informal settlements to invest further due to high risk of losing their investment.

4.4 Urban Agriculture

Urban agriculture has been an important part of city life in Lusaka. However the importance of agriculture has waned over the years as agricultural land gave way to residential development. There has, however, been an increase of informal agricultural activities within residential areas and road reserves in form of maize cultivation, vegetable gardens and even poultry rearing. It must be mentioned that the Local Authority in accordance with the Public Health Act regards this type of agriculture as a nuisance. The rationale was that such crop production created a "health hazard" because of the breeding of vermin and mosquitoes resulting in the possible spread of disease such as Malaria or that such crops reduced aesthetic values of the area, and provided cover for thieves. Cultivation of such crops has also been linked to clogging of drainage systems.

Despite the negative esteem in which urban agriculture is viewed, other parts of the world are promoting such use of urban land from the point of view that the practice contributes to urban food security, nutrition and creation of employment.

As Lusaka is a built up urban area and more and more agricultural productive land is taken up for urban purposes, there is little scope for long-

term growth in this sector.

4.5 Residential Land Use

The National Housing Policy of the Republic of Zambia set guidelines to sustain an effective and efficient housing development programme. These include making serviced land available for housing development and streamlining the land allocation system. However, in Lusaka, political influence has played a role in land allocation and urban services. Provision of services is not proportional to the rate at which land is being allocated.

The post-independence land tenure system was inherited from the colonial government and consisted of a cumbersome bureaucratic system of freehold and later long leasehold requirements, tied to overall city development and the presence of required physical infrastructure. Despite policy to regulate housing development, the growth of unauthorized squatter settlements around the city continued. Development controls both in informal and formal areas have not been very effective. The number of informal settlements which have been recognized in Lusaka is at 30, with around 70 per cent people living in such informal settlements. This means that the absolute majority, or more than two thirds of the total estimated city population, reside in these informal settlements.

Informal settlements are poorly serviced except for the few upgraded ones. Even there, such services are minimal. The proliferation of many pit-latrines within limited space poses a danger of contamination of the ground water aquifer. Wells are sunk mostly near pit latrines compounding health risks.



4.6 Industrial/Commercial Land Use

Lusaka was established as an administrative centre, hence the activities are generally around administration and the service industry. Manufacturing activities have generally been underdeveloped. However, the closure of a number of mines on the Copperbelt in the early 1990s and declining economic activities, resulted in a number of business activities and light industries relocating to Lusaka. This resulted in increased industrial activities located predominantly in the western direction of the city. However, service provision in this area has not been commensurate with the developments therein resulting in increased instances of industrial effluent being discharged within the properties in septic tanks and soak-aways.

The major commercial activities in Lusaka are concentrated along three major streets in the CBD, i.e. Cairo, Chachacha, and Freedom way, and Kamwala Trading Area. However traffic congestion, lack of parking space and limited

expansion space has resulted into business enterprises relocating to residential areas. This has resulted in a remarkable change of land use character in residential areas around the CBD from general residential to business use such as office use and other activities in the service industry.

Initial efforts to relocate the CBD to Ridgeway area were hampered by demand for compensations for relocation. Merging of the existing CBD and Ridgeway has also been hampered by the railway line which is a major physical barrier. Nevertheless there has been an increased number of satellite business centres in various settlements with medium sided shopping centres among them Manda Hill, Arcades, Crossroads, and Downtown.

4.7 Quarrying

One form of pressures exerted on land in Lusaka is in form of small scale quarrying. Increase in illegal quarrying can be attributed to increase in construction activities in the city, which



Source: Chikoti, P, 2006

Quarrying along Lusaka-Kafue Road



phenomenon is as a result of rapid population growth.

The availability of usable material sought after by these small scale miners such as rock outcrop, laterite and flat stones has perpetuated this activity. The geology of Lusaka is such that these materials are close to the earth's surface and readily available. The soils of Lusaka city as described below can be broadly grouped under three major categories based on general characteristics. These soils include, the shallow Leptosols extending from Bauleni compound to Balastone through Lusaka city centre, Phaeozems extending southwest wards from Chawama to Makeni and an association of Lixisols and Leptosols in the Northeast. The Leptosols are found around the city centre and extend to Kanyama and Bauleni areas. This is a soil type predominantly mined by small scale miners, and has most of the quarries in the city.

Figure 4.3 shows some of the areas where quarrying activities are taking place in the city some of which include; Kalingalinga, Chawama and Chilenje. The huge deposits of limestone, dolomite, granite and gneis and sand are mainly used in the construction industry. They are used as raw material for cement production, building blocks and as aggregates for building and road construction. This informal small scale mining sector is now vibrant with self employed or marginalized groups who are mostly women.

Uncontrolled quarrying in the city has led to land degradation in some parts of the city. As a result of degradation it is expensive to restore and utilize such land. There is rampant soil

erosion and the areas are prone to flooding in the rainy season. Quarries become breeding grounds for mosquitoes and other bacteria. Malaria occurrence figures obtained for the Lusaka District Health Management Team (LUDHMT) with further analysis showed that the most affected areas are near quarry areas. (Nankamba, 2003). In addition, quarrying and blasting can cause air pollution through dust. Most stone crushers are susceptible to diseases such as Silicosis.

Uncontrolled quarrying in the city will therefore, diminish the percentage of land that can be used for future development. It is therefore, necessary to know the rate at which the quarries are being opened or closed.

It can be observed from this chapter that there are a number of factors among them income generating activities and provision of basic services such as health care, education and housing all of which require management structures and supportive mechanisms to prevent and/or minimize environmental degradation.

4.8 Other Land use Activities

The Local Authority has been faced with a challenge of providing adequate burial grounds. Currently, Leopards Hill and Chingwere graveyards are the two official burial sites for the city. The two sites are almost full, and the Local Authority has been struggling to secure alternative burial sites from the neighbouring Local Authorities. Nevertheless, LCC has partnered with the private sector to set up a fee paying cemetery. On the other hand, there are a number of illegal burial grounds dotted around the city especially in the outskirts. There is also an increasing trend of establishing private family graves



Figure 4.2: Housing types in peri-urban areas of Lusaka City

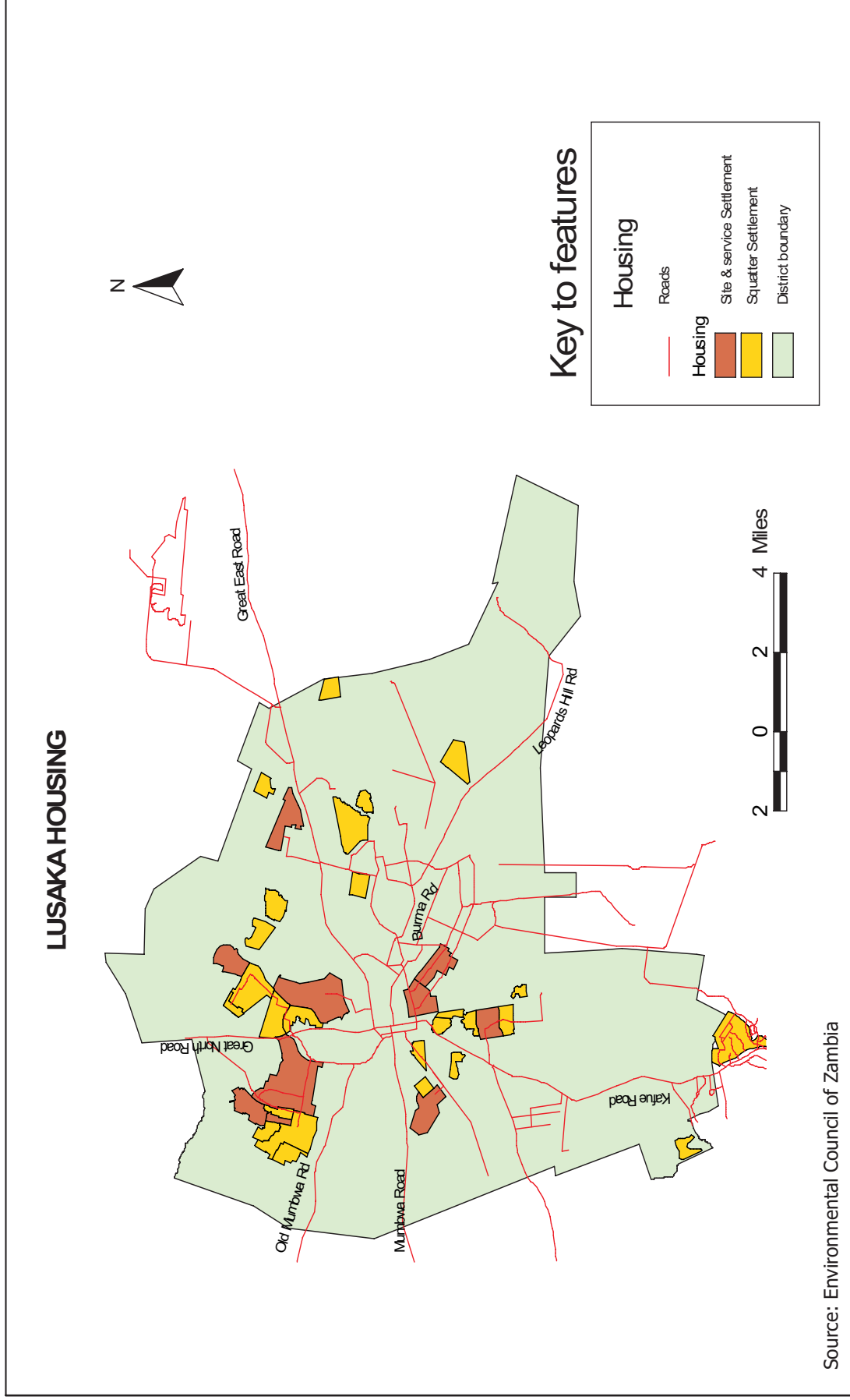
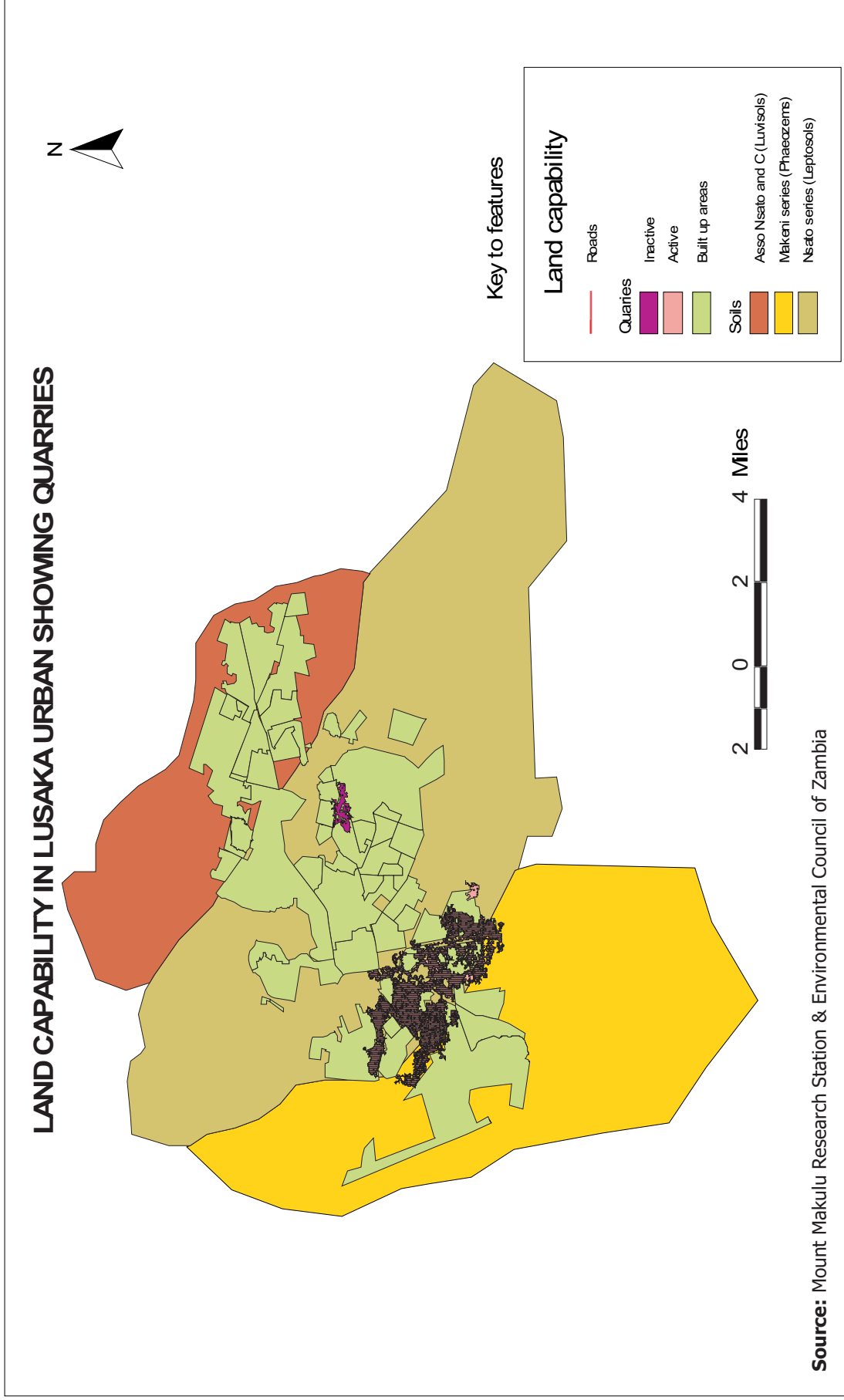


Figure 4.3: Map showing land capability and area covered by quarries in Lusaka city



especially on small holdings.

Lusaka has a generous scattering of trees, though with few public green spaces. The forest reserves in the vicinity of the city contribute significantly to the natural environment. The majority of recreational facilities consist of private open spaces, such as Lusaka Turf and Polo Club and the Agricultural Show grounds, Chainama Hills Golf Club, the Lusaka Club and Central Sports Club and Municipals Clubs and the Lusaka Golf Club. In addition to the above, there is a number of stadia dotted in conventional areas of the City. The most important is the Independence Stadium on the outskirts of the city. There are plans to upgrade the main stadia in the City before the soccer World Cup in South Africa in the year 2010.

Generally, however, Lusaka lacks adequately maintained open spaces, roads, and sidewalks. A number of open spaces have been invaded by the influx of people and these areas are used for residential development. However, the Council has come up with a policy to facilitate the adoption of open spaces by the private sector under leasehold conditions. Play parks have been adopted for soft landscaping purposes and development of children's play parks and areas for passive and active recreation.

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5

ATMOSPHERE AND ENERGY

Human activity plays a role in the evolution of the atmosphere primarily through its contribution to air pollution. For Lusaka City, air pollution is not as serious an issue as is the case in mining cities such as those on the Copperbelt. However, the recent upswing in the number of vehicles is contributing to an increase in mobile sources of air pollution. In general, air pollution in Lusaka is localized. The recent increase in cement manufacturing plants in the city presents a challenge as it will have a subsequent increase in localized air pollution.

The major source of energy consumed in Lusaka is Charcoal which is generated in peripheral areas such as Chongwe. These unsustainable energy generation activities are of serious concern due to the high deforestation rates recorded.

5.1 Energy

Energy is fuel for growth in any social and economic development. Elementary studies have shown a direct relationship between the national

GDP and the total energy consumption in a given country. Population growth and increase in industrial, transportation and other economic activities in a given country results in a corresponding increase in the demand for energy resource requirements. This is the case especially in cities due to rural-urban migration associated with industrialization. Recent studies have shown that Lusaka has a similar experience. (World Bank, 1995)

Sources for industrial energy include coal, wood, diesel and electricity while domestic sources for heating, cooking and lighting is largely provided by charcoal and electricity.

In the last five years, the cost of transport fuels in Zambia has risen by 60 per cent whilst that of a 90kg bag by volume of charcoal has risen by almost 90 per cent (Ministry of Energy, 2004). Electricity tariffs were hiked by 10 per cent in May 2005 (ZESCO, 2005)

It is evident that electricity as a source of energy is

Table 5.1: Land cover change in the eastern portion of the Chongwe study area between 1989 and 1998 based on satellite imagery analysis

Land cover type	Area in sq. km		Change	
	1989	1998	9-year	Annual (per cent)
Bare/cleared land	119	280	161	15.03
Open scrubland/grassland	721	1452	731	11.27
Dense scrubland/low forest re-growth	0	582	582	
Munga woodland	1022	216	-806	-8.76
Escarpment/hill miombo woodland	1436	1267	-169	-1.31
Plateau miombo woodland	2681	2182	-499	-2.07
All types	5979	5979		

Source: Chidumayo, 1999.

cheaper than charcoal. Additionally, electricity is cleaner, efficient, and convenient.

5.1.1 Demand for Charcoal

Charcoal supply to Lusaka originates mainly from Chongwe District. Out of over 200,000 households, 54 per cent use charcoal, 44 per cent use electricity and other households use kerosene and firewood. (Ministry of Energy, 2004).

During the period 1988-1989 it was found that Chongwe supplied about 23 per cent of the charcoal transported into Lusaka city.

A study conducted for the district to determine land cover change using an analysis of satellite images for the years 1989 and 1998 indicated that the forest had decreased at a rate of 3.2 per cent per annum with the highest rate of change of 8.8 per cent occurring in Munga woodland (Table 5.1). The rate of annual cover change in plateau Miombo woodland that is usually cleared for both charcoal and crop production, was about 2.1 per cent. Low re-growth woodland, grassland and cultivated land increased by 19.5 per cent per annum. (Chidumayo, 1999)

On the other hand, the charcoal trading industry has provided employment to many people. It has been estimated that about 8 million bags of charcoal are used every year (Chidumayo, 1999). With the cost at K21 000/50kg by volume gives a turnover of about K200 billion for Lusaka City alone. Controlled trade in charcoal can therefore, provide valuable revenue for the Local Authority.

The use of petrol and diesel generators also

produces atmospheric emissions. In Lusaka City, the data on the use of the generators is not well documented.

5.1.2 Demand for electricity

ZESCO is the bulk electricity supplier/distributor of electricity in Lusaka. Its power is sourced from the Kariba North Bank and the Kafue Gorge hydroelectric power stations and is transmitted at 330 kV to Leopards Hill intake substation, located approximately 60 km south of Lusaka. At Leopards Hill the voltage is stepped down to 132 kV and transmitted to Roma and Coventry substations.

ZESCO is responsible for the distribution of electricity to various substations in the Greater Lusaka area, at 88 kV, 33 kV, 11 kV, and 3.3 kV, where energy sources can be utilized most economically and to meet the needs of consumers at 400/231 Volts.

Studies have shown that over the last ten years (1994-2004), there has been over 100 per cent increase in demand for electricity. (ZESCO, 2005), Figure 5.3.

Wards with low access to electricity have a higher concentration of peri-urban areas such as Kanyama and Chawama. This therefore means that the residents are using other alternative sources of energy such as charcoal for domestic use.

As can be observed, energy is critical to the development of the city. It is required to run the entire city's activities and support systems of all sectors including industry, commerce, health, education and utility support services.



Box 5.1: A comparison between Charcoal and Electricity usage in Garden Compound

A comparison was made between charcoal and electricity as sources of energy in Garden Compound by ZESCO Ltd Marketing Department in April 2006. The study investigated the cost of using charcoal and electricity for a family of 8 to 10 members over a period of one month. Tables 5.1A and 5.2B show the results of the study for charcoal and electricity usage respectively.

Table 5.1A: Cost of Charcoal Use in Lusaka Garden Compound

Energy Source	Quantity	Cost	Rate of Consumption	Monthly Bill (in ZMK)
Charcoal	90kg	K40 000.00	90kg bag lasts for one and half weeks for a family of 8-10 members during the peak period (cold season)	Therefore, per month it costs one house of 10 people on charcoal
	75kg	K23 000.00	Lasts for one week for the same number of family members as above	
	50kg	K21 000.00	Lasts for about 5-6 days	
	25kg	K19 000.00	Lasts for 4 days	Mostly bought bag K133 000
	10kg	K15 000.00	Lasts for two days	
Matches	A packet of 10 boxes	K9 000.00	One month	K9 000.00
Candles	A packet of six	K1 800.00	One week	K7 200.00
Kerosene	750mls	K1 500.00	Three days	K15 000.00
Total				K154 200.00

Table 5.1B: Costs of using Electricity

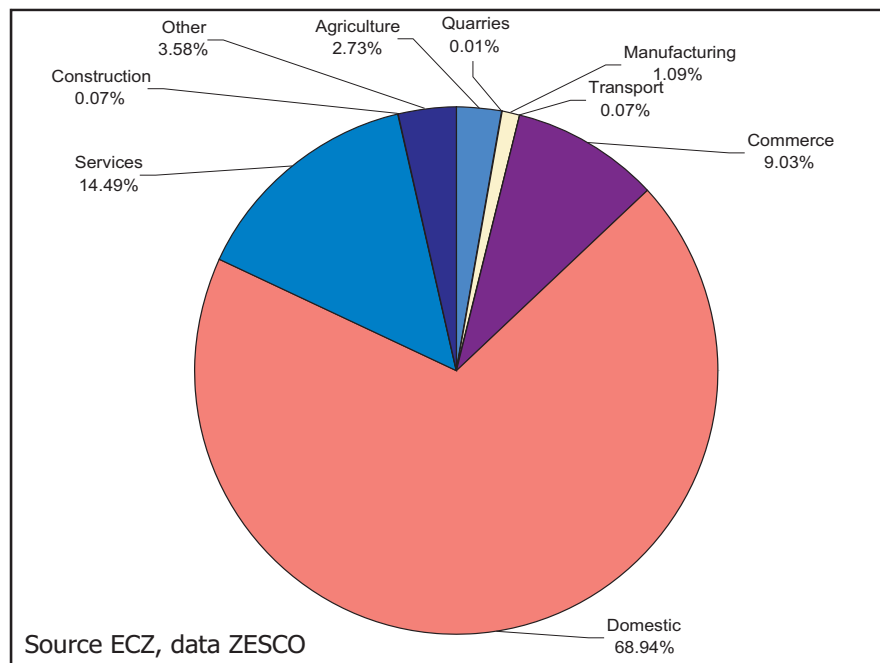
300 Unit R1	700 Units R2	800 Units R3
(K)	(K)	K
300 units x K70.00 = 21 000.00	300 units x K70.00 = 21 000.00	300 units x K70.00 = 21 000.00
Fixed charge 5 845.00	400 units x K100.00= 40 000.00	400 units x K70.00 = 40 000.00
Sub-total (i) 26 845.00	Fixed charge 5 845.00	100 units x K163.00 = 16 300.00
Excise duty 5per cent 1, 342.25	Sub-total (i) 66 845.00	Fixed charge 5 845.00
Sub-total 28 187.25	Excise duty 5per cent 3, 342.25	Sub-total (i) 82 211.00
VAT 15per cent 4, 932.76	Sub-total 70 187.25	Excise duty 5per cent 4, 157.25
	VAT 15per cent 12, 282.76	Sub-total 87 302.25
Grand total 33 120.01	Grand total 82 470.01	VAT 15per cent 15, 277.89
		Grand total 102 580.14

(Source: ZESCO Marketing Department; 2006)

The tabulation included VAT, excise duty and other electricity charges R1, 2 and 3 are varying tariffs that are determined by the level of consumption. R stands for Residential (Qualify R1, R2, R3 in terms of high, medium or low).



Figure 5.1: Retail Consumption of Electric Energy by Sector 2004/05



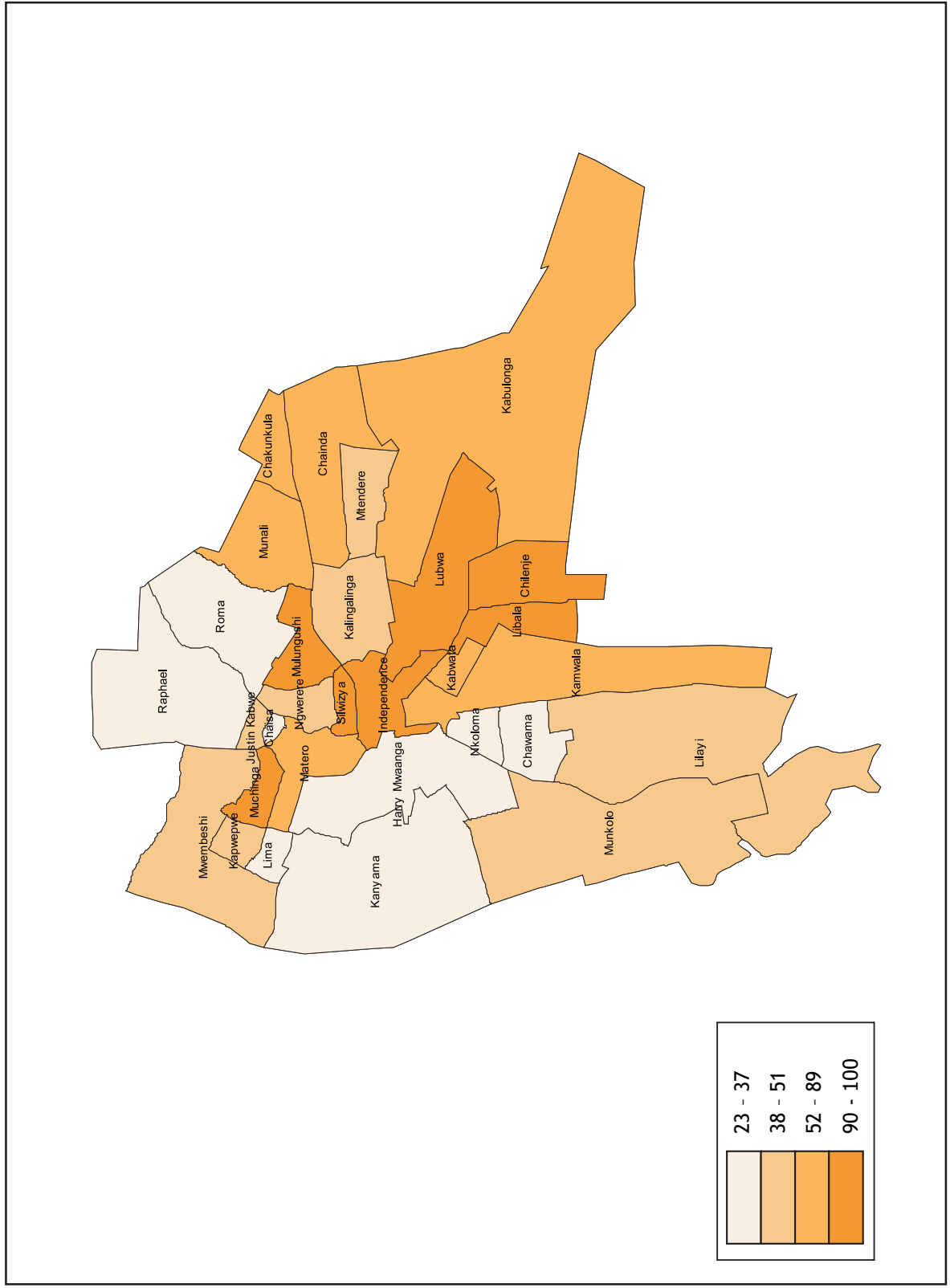
For Lusaka, for the period 2004/2005, the major sector for electricity consumption was the domestic as shown in Figure 5.1. Other sectors of significance were service and commerce.

Table 5.2: Traffic growth for the period 1995 to 1999

	Average Annual Growth Rate
Alick Nkata Road	9.0
Cairo Road	2.3
Chumbulu Road	9.6
Church Road	2.4
Common Wealth Road	14.3
Great East Road	6.5
Great North Road	-3.2
Independence Avenue (at Railway Line)	2.8
Independence Avenue (East of High Court)	3.0
Kafue Road	1.2
Katima Mulilo Road	0.9
Mutambe Road	3.0
Mwali Road	7.4
Average	4.5

Source: Chidumayo, 1999.

Figure 5.2: Map showing the distribution of households with access to electricity in Lusaka by Ward



5.2 Ambient Air Pollution

Air pollutants, which are gaseous emissions or aerosols discharged into the atmosphere in concentrations are harmful and threaten the well-being of living organisms (human, plant and animal). They disrupt the orderly functioning of the environment. Certain concentrations of air pollutants are also harmful to materials and buildings causing corrosion.

Anthropogenic activities both combustion and non combustion are main sources of air pollution in the city.

Stationary combustion sources of air pollution in Lusaka mainly come from coal, wood and diesel fired boilers which produce Carbon Monoxide (CO), Nitrogen Oxides (NO_x), Sulphur Oxides (SO_x) and Particulate Matters (PM). Domestic fuels such as charcoal and other wood fuels also produce similar pollutants. Other sources include

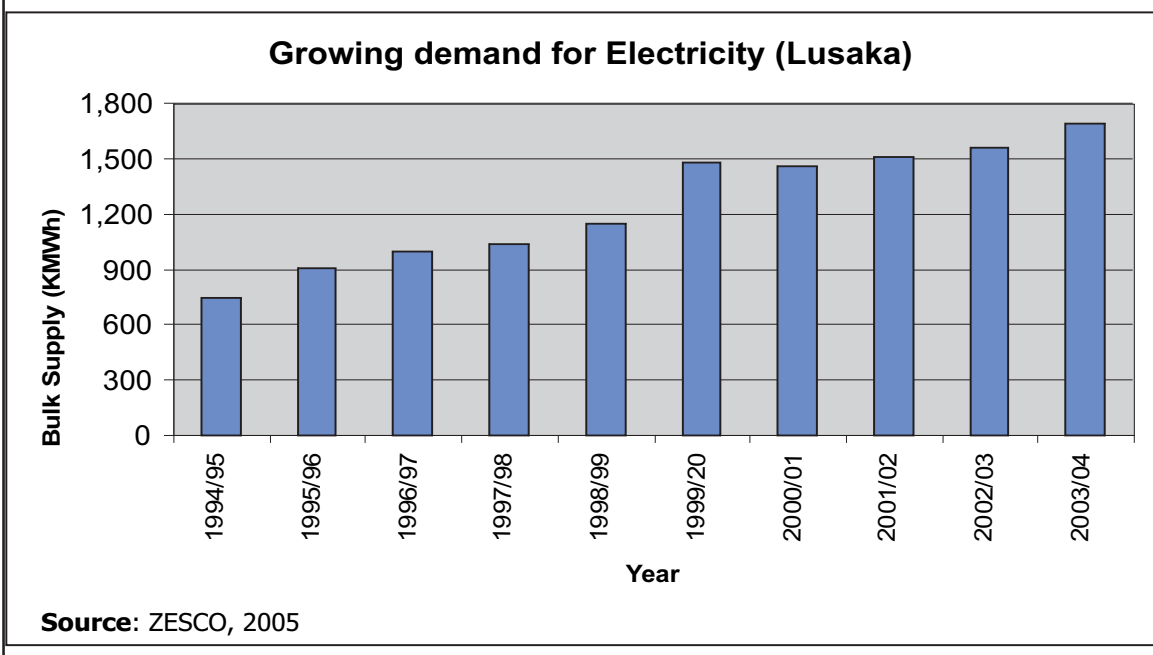
tyre burning which is rampant in illegal quarries and open air burning of waste. Mobile sources are largely from the internal combustion engines (petrol and diesel) which produce varying amounts of CO, Hydrocarbons (HCs), NO_x, SO_x, PM and Lead.

There has been an increase in traffic in Lusaka as shown by Table 5.2.

Two thirds of the vehicles in Lusaka estimated at 100 000 use petrol (RTC, 2005). The SADC target of phasing out leaded fuel by 31st December 2005 has not been met and the majority of the vehicles are still using leaded fuel. This produces more CO, NO_x, HCs, Lead, PM, SO_x and Benzopyrene. Production of these pollutants is largely determined by engine efficiency and most of the vehicles in Lusaka are second hand.

Motor vehicles are also known to cause noise pollution. Non combustion sources of air pollution

Figure 5.3: Growing demand for Electricity in Lusaka from 1994 to 2004



include dust from quarrying and emissions from use of solvents, paints and sprays. There is no documented data for Lusaka City on pollution from these sources. Emissions from sewerage works, abattoirs, incomplete incineration of Health Care Waste and livestock production within the City have been another source of air pollution. These pose a greater challenge as they produce a category of unintentionally produced Persistent Organic Pollutants (POPs) known as Polychlorinated dibenzo-p-dioxins (PCDDs) and the related furans (PCDFs).

Although there is no documented data on clinical impacts of air pollution on human health, it has been observed that there is a high incidence of respiratory diseases in localities of high air pollution. The absence of regulations in the country to adequately address air pollution for

mobile sources and the non-implementation of the SADC declaration for the phase out of leaded fuel has further compounded the problem of air pollution in the city.

5.3 Indoor Air Pollution

It is estimated that 54 per cent of Lusaka City households use Charcoal and other wood fuel as a source of energy. Their combustion produce CO_x, PM, HCs; NO_x and SO_x. Prolonged exposure causes Bronchitis, Asthma, Lung Cancer and heart diseases. However, CO has a quicker effect on human life as it can cause suffocation. Women are more vulnerable as they are the primary users of household fuels for cooking and lighting. In addition, tobacco smoking also contributes to indoor air pollution and contains many substances amongst them are nicotine, arsenic, formaldehyde

Figure 5.4: Lusaka annual Maximum and Minimum temperatures over the last 30 years

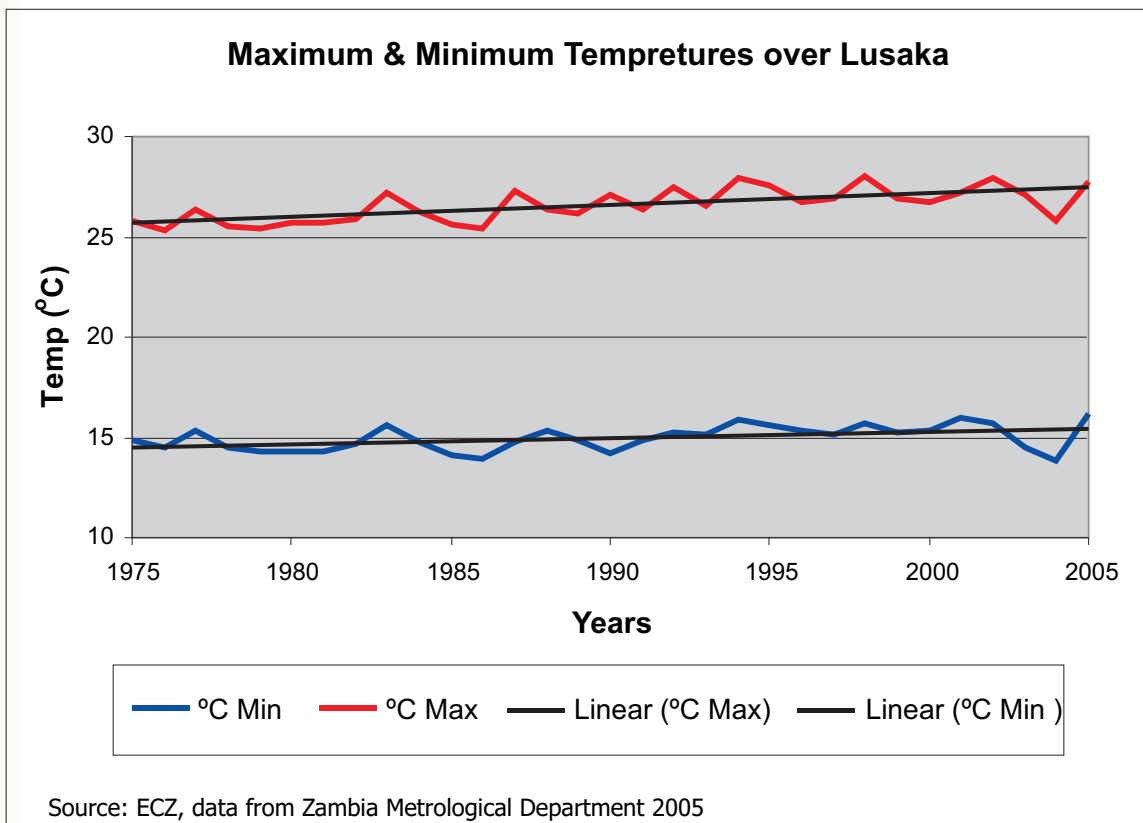
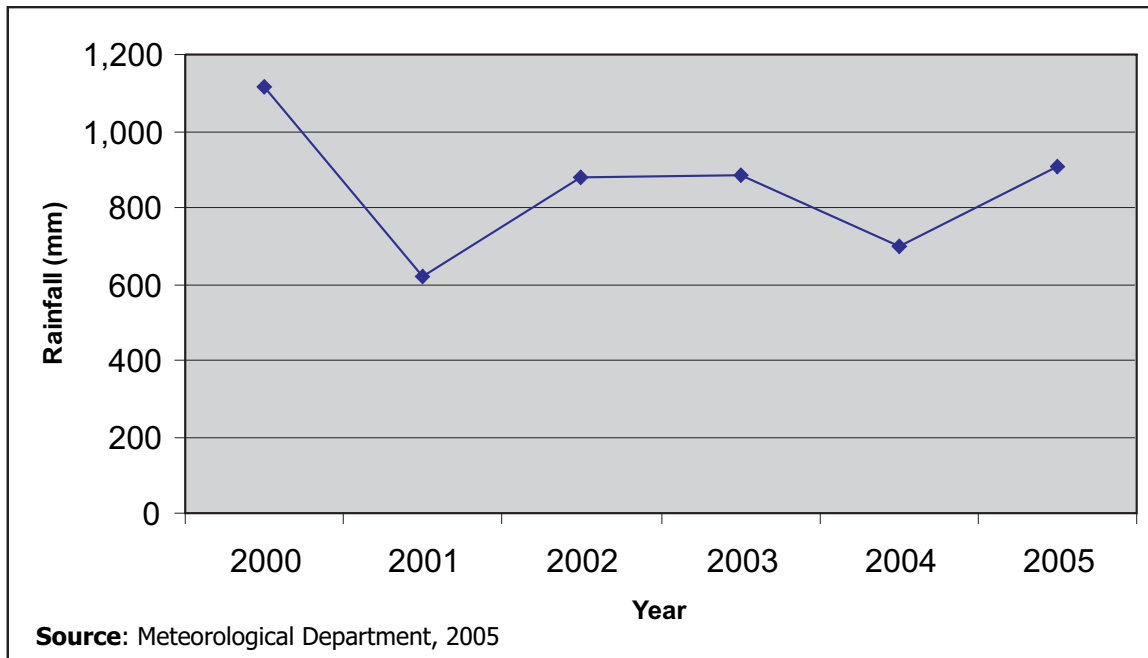


Figure 5.5: Lusaka Province Annual Rainfall for the period 2000 to 2005

(HCHO) and Polycyclic Aromatic Hydrocarbons (PAH). Other known indoor pollutants come from synthetic chemicals used in household products such as ammonia and other organic solvents.

The exact figures of people who smoke in Lusaka are not available. A general observation is that most public transport and offices do not allow smoking, thereby reducing exposure to passive smoking in these places.

In industry, the effects from prolonged exposure greatly reduce productivity in addition to the health effects.

5.4 Climate Change

Due to the transboundary nature of air pollution, global warming has had its effects on the City in form of drought, disease and floods. Gaseous emissions from industries, vehicles, wood fuel and open air burning produce SO_x , CO_x and other aerosols which trap heat thereby causing an

atmospheric blanket over the earth. In addition, Ozone Depleting Substances (ODS) such as Chlorofluorocarbons (CFCs) are still used as propellants and coolants.

Forests absorb carbon dioxide from the atmosphere, so this capacity is reduced with the cutting down of mainly the Miombo woodlands for charcoal burning to supply urban consumers. Burning of these wood fuels provides green house gases such as Carbon Dioxide (CO_2), nitrogen oxide (N_2O), Carbon Monoxide (CO) and Methane (CH_4).

Data from the Zambia Meteorological Department (2005) indicates that average temperatures for both maximum and minimum temperatures over Lusaka city have increased by approximately $1^\circ C$ over the last 30 years (Fig 5.4). Warmer climates are also exacerbating the spread of diseases such as Malaria and other vector borne diseases by providing a conducive breeding environment. The period 2000 to 2005 shows a reduction in the amount of rainfall received in Lusaka Province.



This picture is similar to other parts of the country resulting in decreased agricultural production. The consequences of this development are increase in food prices and a reduction in general food security. This has contributed to increasing poverty levels and other associated social ills.

5.5 Responses:

Improved conversions in the end-use devices and minimizing use of traditional resources such as firewood is key to reducing air pollution. Structural shifts away from traditional energy end-use patterns and energy carriers to more efficient and sustainable modern technologies should be promoted.

Some of the responses to the challenges affecting the Lusaka City's atmosphere and energy use include, but are not limited to:

- Development of regulation for mobile sources.
- Promote the use of energy efficient appliances and machinery in industry
- Construct eco-friendly buildings with less energy requirements.
- Adoption of cleaner technologies (CDMs) such as use of alternative sources of energy like bio-diesel, ethanol and solar;
- Formulate and implement government policy on phasing out leaded petrol;
- Promote tree planting in Lusaka and peripheral areas;
- Promote use of public transport and car pooling especially in institutions through increased taxes on fuel and parking levies;
- Carry out effective sensitization and public awareness programmes on the effects of air pollution.

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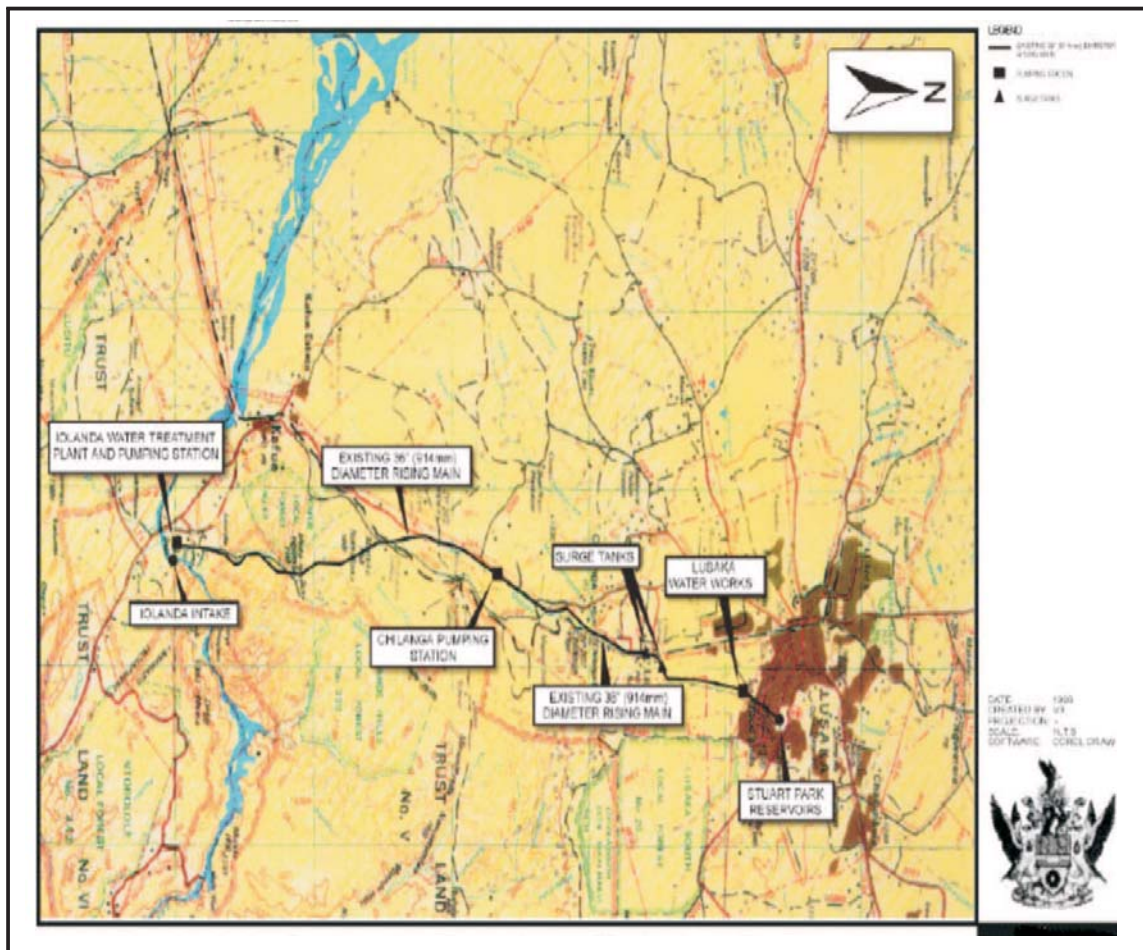
6

WATER AND SANITATION

Lusaka city relies on both surface and ground water as its source of water. The Lusaka Water and Sewerage Company (LWSC) is the main service provider for water supply, sewerage and on-site sanitation in the city. LWSC is an autonomous company, which is mandated to supply domestic, commercial and industrial water to the city of Lusaka. It is also mandated with the function of collecting, transporting, treating and disposing of the effluents generated by water users (Sichilombe, 2007). There are two water supply systems in the City of Lusaka; the network system and the satellite

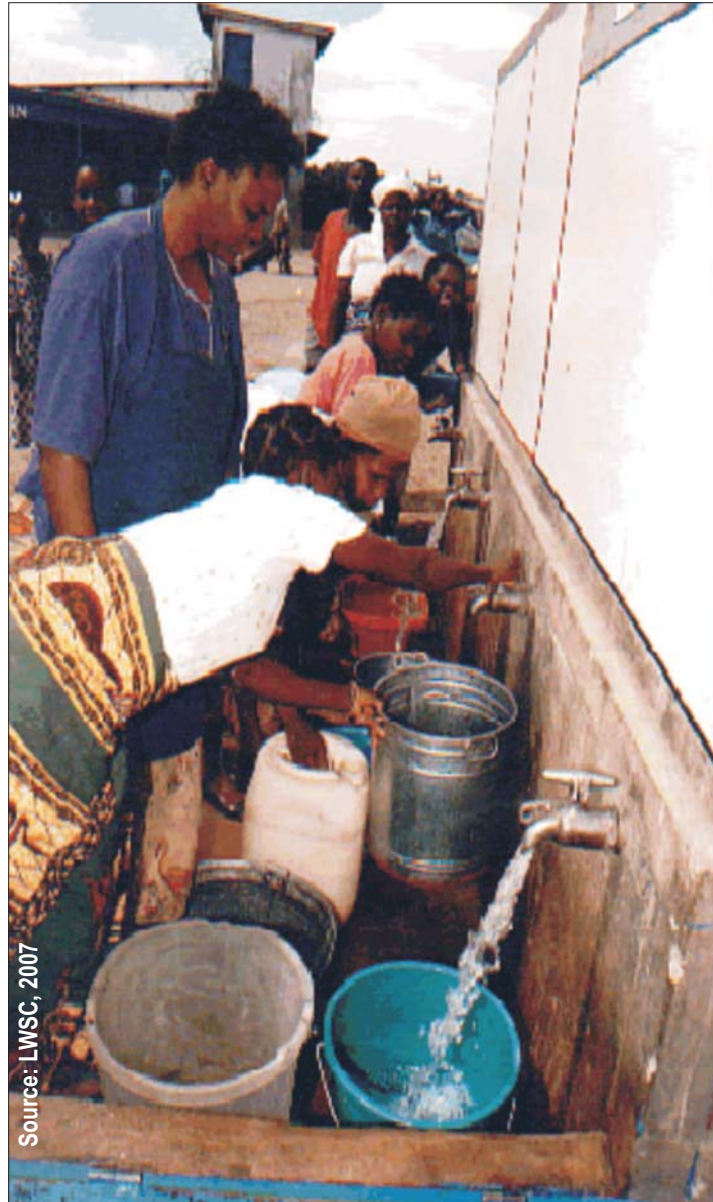
system. LWSC manages the network system as shown in Figure 6.1. Surface water is collected from Kafue River and connected to the distribution network in the city through the water treatment plant (the rapid filtration method), booster pumping stations and the main reservoirs. Groundwater also supplies the network from 72 boreholes. The satellite system, which is comprised of boreholes, elevated tanks and public tap stands, is independently introduced to mainly peri urban areas (Sichilombe, 2007).

Figure 6.1: Kafue River Bulk Supply to Lusaka



The quantity of water supplied by LWSC is between 200 000m³ to 220 000m³ per day of which approximately 80 000m³ per day is supplied from private boreholes and shallow wells. The increasing population and economic activities in the city have put increasing demand for water supply.

The estimated average daily demand for the year 2000 was 287 825m³ per day. This is approximately 80 000m³ per day in excess of the current supply, as metered by LWSC. This would suggest that approximately 80 000m³ per day is obtained from private boreholes, and hand dug wells. In 1993, the total water supplied to Lusaka, by LWSC was approximately 210 000m³ per day. The company was still supplying the same quantity of water by 2005. From the above, it is clear that, water demand in Lusaka has increased owing to various pressures among them, the population growth. However, water supply is inadequate due to a number of reasons which



Source: LWSC, 2007

A Water Kiosk in George Compound

Table 6.1: Estimated water demands and required productions for Lusaka (m³/ day)

	1995	1997	2000	2005
Net demand	108, 597	185, 797	270, 327	300, 000
Population based	71 194	144 961	220 113	-
Industrial & commercial institutions	30 000	32 000	34 000	-
Government Institutions	7 403	8 946	16 214	-
@200/ltr/prop/day				
Un Accounted for Water Rate(per cent of production)	40	40	30	60
Un accounted for Water	72 398	104 511	115 854	
Production	180 096	--	--	210 000

Source: Adapted from LCC; An Environmental Profile of the Greater Lusaka Area; 1997, 22



include; the increasing number of planned and unplanned new developments in the city, leakages, illegal connections and pipe bursts within the water distribution system and old infrastructure. LWSC estimates that 56 per cent of the water produced is unaccounted for and probably lost through such means as leakages in distribution (UN-Habitat 2004). It is estimated that by 2008, water demand for Lusaka will be 400 000m³ per day

Access to water in Lusaka City is determined by a number of factors such as the cost, infrastructure and demand. In peri-urban areas, most households use hand dug, hand pump wells or communal taps for their water sources. Low density areas such as Woodlands and Kabulonga use piped water supply. The capacity of the LWSC to supply water to the city is inadequate in comparison to the rapid developments taking place.

6.1 Access to Safe Drinking Water



Source: (NWASCO, 2006)



Figure 6.2: Borehole Distribution in Lusaka City

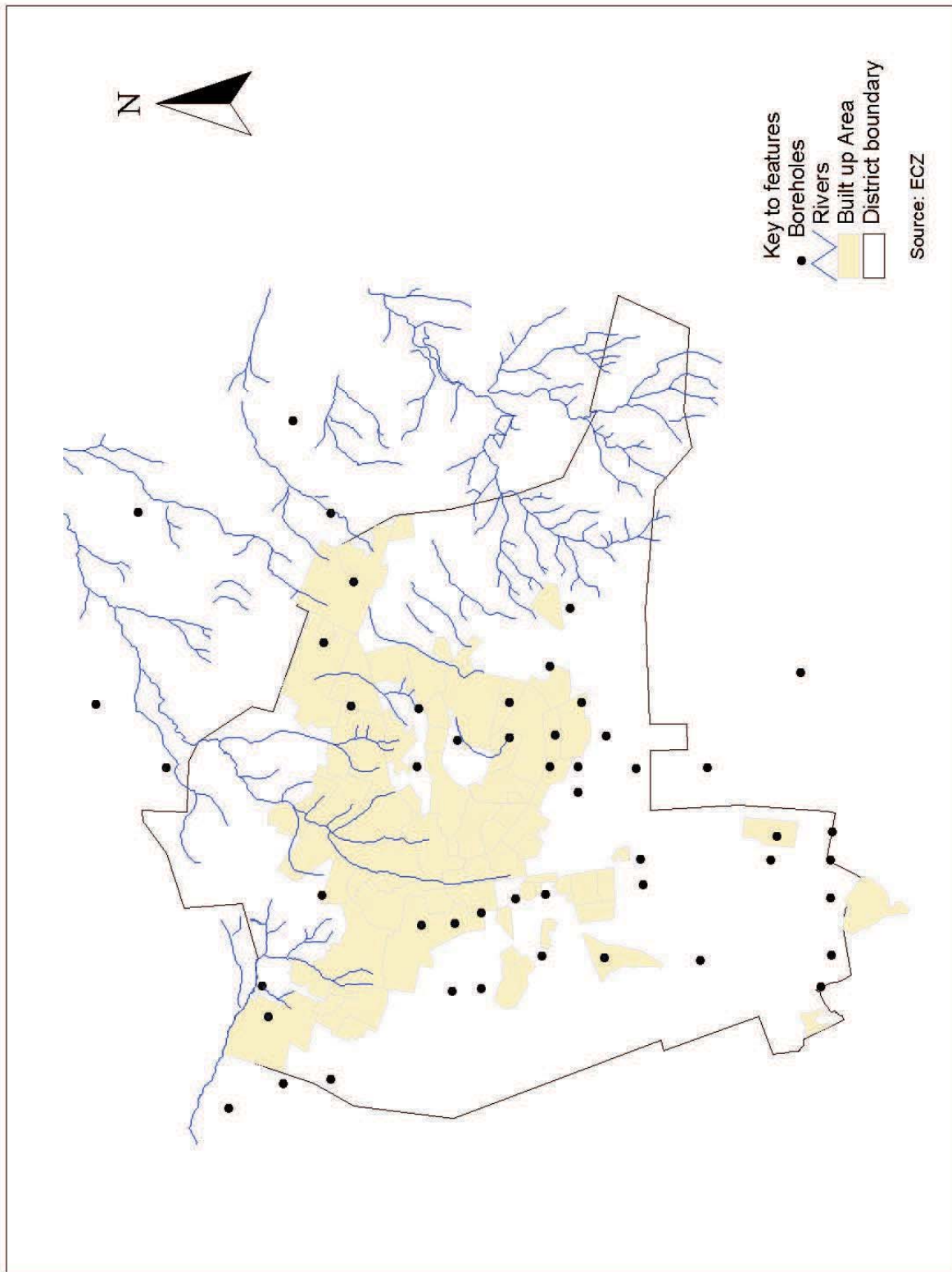


Figure 6.3: Percentage of Households with access to safe drinking water in Lusaka City

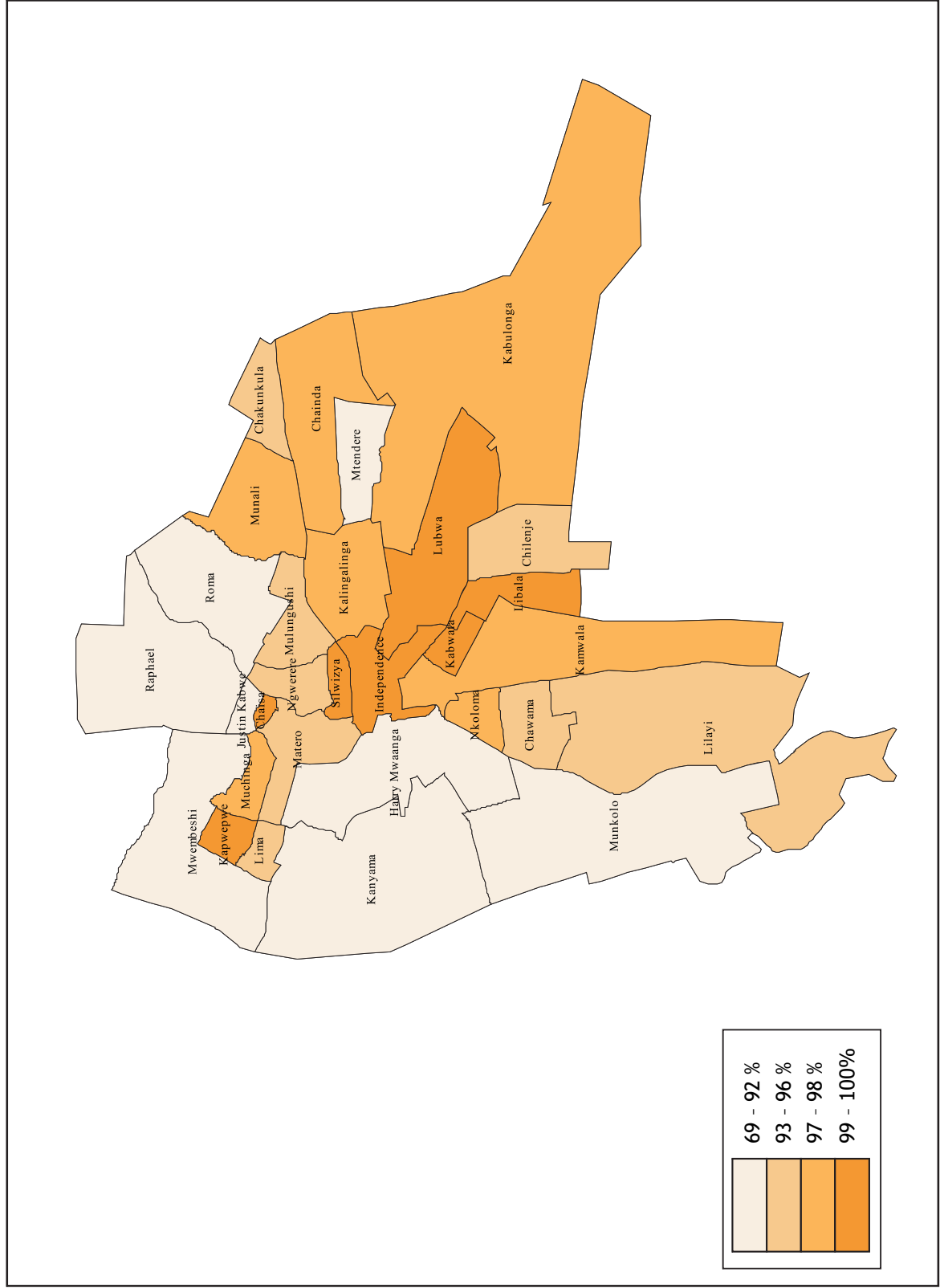


Figure 6.3 shows areas with access to safe drinking water in the city. Most peri-urban areas have limited access to safe drinking water. Box 6.1 further illustrates this matter.

The parameters for access regarding individual/domestic/household connections have been set in the "Guidelines on Required Minimum Service Level" (NWASCO, 2000) and the "Guidelines on Annual Reporting" (NWASCO, 2002).

The average household size has been investigated in many areas and an average of

**Population served by a communal tap
= No. of taps x 33 persons**

5.5 people per household has been agreed upon.

Communal taps are installations where access is restricted to a defined user group, which shares the cost, but not open to the public. Communal taps serve a limited number of people because user groups tend to face difficulties making members pay especially if the connection is metered. Experience shows

**Population served by individual connections
= No. of individual connections x 5.5 persons**

that user groups in average comprise of 6 households (within a range of 4 up to 15).

(Source: NWASCO, Aquatis, 2006)

From the statistics above and analysis conducted, it is clear that water supply particularly to peri-urban areas in Lusaka is insufficient in comparison to the population in these areas. The most commonly identified water problems in peri-urban areas are:

- Erratic water supply.

- Poor water quality.
- Long distances between dwellings and the water points.

Of these problems, water quality and water supply were considered as the main problems faced by people in the peri-urban areas.

6.2 Ground Water

Lusaka is built over a karstic dolomite aquifer. Ground water accounts for almost 61 per cent of the total water supply within Lusaka. The water sources of the LWSC system consist of approximately 58 per cent groundwater sources equivalent to 130 000 m³/d. The water sources of others such as satellite systems and private boreholes is groundwater with a supply of approximately 80 000 m³/d. (Sichilombe, 2007)

Groundwater is becoming a more accessible and comparatively cheap source of water for drinking, agriculture and industry in Zambia than surface water. In Lusaka, increased rates of urbanisation have caused large numbers of people who cannot readily obtain water supply services to exploit any other available sources of groundwater supply, thereby exerting enormous pressure on the Lusaka aquifer through construction of private boreholes or hand-dug wells. (Nkuwa, 2006)

The geology of Lusaka comprises an ancient basement complex overlain by limestone and dolomite. Its porous and soluble characteristic renders it susceptible to pollution. The water table in Lusaka is generally close to the surface. The shallow wells which are used for water supply in peri-urban areas and other areas not supplied by the water distribution system are vulnerable to pollution. Ground water pollution, may continue as long as the existing sewerage system remains



in its present condition and on-site disposal facilities (such as pit latrines), are not designed and constructed to minimum standards. Consequently, contamination in the city aquifer appears to be increasing and waterborne diseases have increased. These outbreaks have led to an increase in costs for health-care services posing a special burden, particularly for those members of society that are poor and loss of productive time due to illnesses that could otherwise have been avoided. (Nkuwa, 2006)

6.3 Access to Sanitation

In Lusaka there are three major types of sanitation services; water borne sewer system of LWSC, septic tanks and pit latrines. The coverage of the water borne sewer system is about 30 per cent of the LWSC water supplied

area as shown in Figure 6.4. Waste water is collected to two conventional treatment plants and the five non-conventional plants in the form of waste stabilisation ponds.

The areas that are currently serviced with pipe-borne system include Rhodes Park, Northmead, Kamwala, Matero, Libala, Chilenje, Kaunda Square and Nyumba Yanga. LWSC has two conventional treatment plants (Manchichi and Chunga) and four oxidation ponds located in Chelstone, Kaunda Square, Garden, Matero and Ngwerere. The company also has seven pumping stations in the following areas; Kabwata, Kamwala, Chelstone, Mass Media, Lumumba Road and Woodlands.

It should be stated that actual flows in the LWSC sewer system are not well known. It is obvious that the historical records of sewer flows to the



Source: NWASCO, 2006

Residents queuing for water



treatment facilities is not reliable and can not be used to determine flows in the sewer system because there are obstructions in the sewers and diversions for irrigation which reduces or eliminate flows which would otherwise reach the treatment facilities. (Sichilombe,2007). LWSC has generally experienced sewer blockages in its network. In general, the sewage treatment plants are old and not proportional to the increase in population. These plants are not properly maintained.

Sanitation Services in Peri-urban Areas

Lusaka City has 37 peri-urban areas. The Draft Strategy for Peri-urban Water Supply and Sanitation in Zambia defines peri-urban areas as:

"...informal or formal settlements, within the area of jurisdiction of a local authority, with high population density and high-density low-cost housing having inadequate or lacking basic services such as water supply, sewerage, roads, storm water drainage and solid waste disposal." 12 per cent of the population in peri-urban areas have no access to sanitation facilities and 4 per cent in low cost areas. The most commonly used sanitation facilities in peri-urban areas are; pit latrines, kavela (the use of plastic bags or shakeshake Chibuku packs etc by people without a sanitation facility to defecate and throw or bury indiscriminately) and sewerage system. In the low cost areas, the sewer system, pit latrines and communal septic tanks are commonly used. (NWASCO, 2005).



Source: NWASCO, AQUATTIS, 2005

A Pit Latrine in a Peri Urban Area



The major sanitation problems faced in peri-urban areas are;

- Blocked sewers.
- Insufficient water supply to flush the toilets.
- Toilets smell and attract vermins.
- In areas of high water table, pit latrines

frequently collapse.

- Cross contamination from pit latrines to shallow wells

It is also clear that peri-urban areas have insufficient access to sanitary means of excreta disposal. For example, Roma Ward which covers

BOX 6.1: THE PROBLEM OF WATER SUPPLY AND SANITATION IN PERI-URBAN AREAS OF LUSAKA “A CASE OF JONH LAING”

Description of the existing water supply situation

Lusaka Water and Sewerage Company (LWSC) is the licensed service provider supplying water to parts of the area. Only the original part of John Laing is covered by a network, which is in poor state of repair and serves only a very small proportion of residents. Only few taps are functional. These were originally communal taps, which are located in someone's yard and have been taken over by the owner of the plot. They are seen as private connections now. Many taps have been removed, as pressure is very low. Residents with a connection are selling water to their neighbours. The supply of LWSC is considered as intermittent but regular. However, the greater part of the area is not covered by the network. Residents fetch water in other compounds surrounding the area or at one of the five private hand pumps or draw water from shallow yard wells. Generally they have to pay ZMK 100 per 20 l container. The water quality is considered to be fair except at the wells. There are also resellers using wheelbarrows for carrying water to the houses. The water quality at the wells is considered to be poor. Only few households treat the water used for drinking and cooking through boiling and adding herbs. According to the residents, congestion is a big problem at the taps. Citation: “People get up at 04:00 hrs and return at 10:00 hrs”. The major problem as far as water supply is concerned is that the available water is not enough. Residents would like to have the network extended (more public taps) and to establish a Water Trust Board to manage water supply affairs.

Description of the existing sanitation situation

Most of the residents use pit latrines which are in a poor condition (in total No. 2 891). About 10 houses are connected to individual septic tanks. According to the household sample around 21 per cent of the residents do not have any sanitation facility. People without a sanitation facility mainly use plastic bags or shakeshake Chibuku packs (local beer in tetra packs) to defecate and just throw it anywhere. Some people without a toilet release themselves in houses which are still under construction or use other people's toilets. Sharing toilets between neighbours is not common in the area. Latrines are usually constructed by the householders and local masons. Latrines are generally shallow and fill up quickly. Residents are convinced that the water from the wells is polluted by nearby pit latrines.

According to the residents, reasons for not having a latrine are lack of space in the yard, lack of proper construction materials and soil is rocky and it is therefore difficult to dig. People complain that it is very difficult to find the right construction materials for latrine and to dig proper pits because of the rocky soil. There are no public or communal toilets found within the area. Pit emptying is not carried out. Quick filling up of the pits and pollution of the wells are major problems they have as far as sanitation is concerned.

Description of the existing solid waste situation

Solid waste is not considered as a problem by the residents. Residents dump their solid waste in open pits which were left over from former quarrying activities or burn or simply bury the waste in the yard.

What do residents consider to be the main (public) health risks related to water, water supply, sanitation, drainage and solid waste in this area?

Poor water supply, poor sanitation

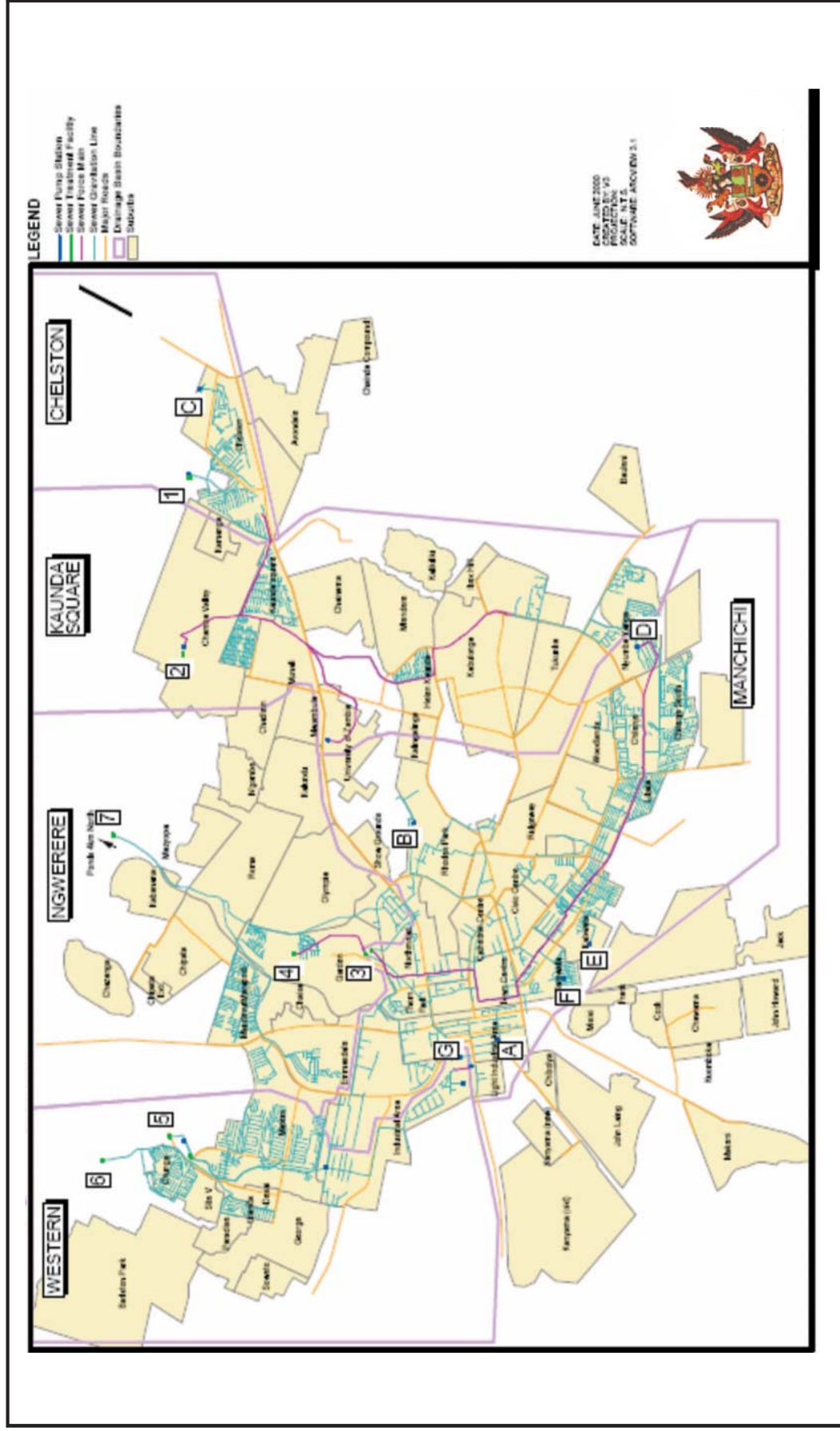
What do the residents consider to be the main problems they face?

Poor water supply, poor sanitation, lack of health centres/ clinics, lack of schools

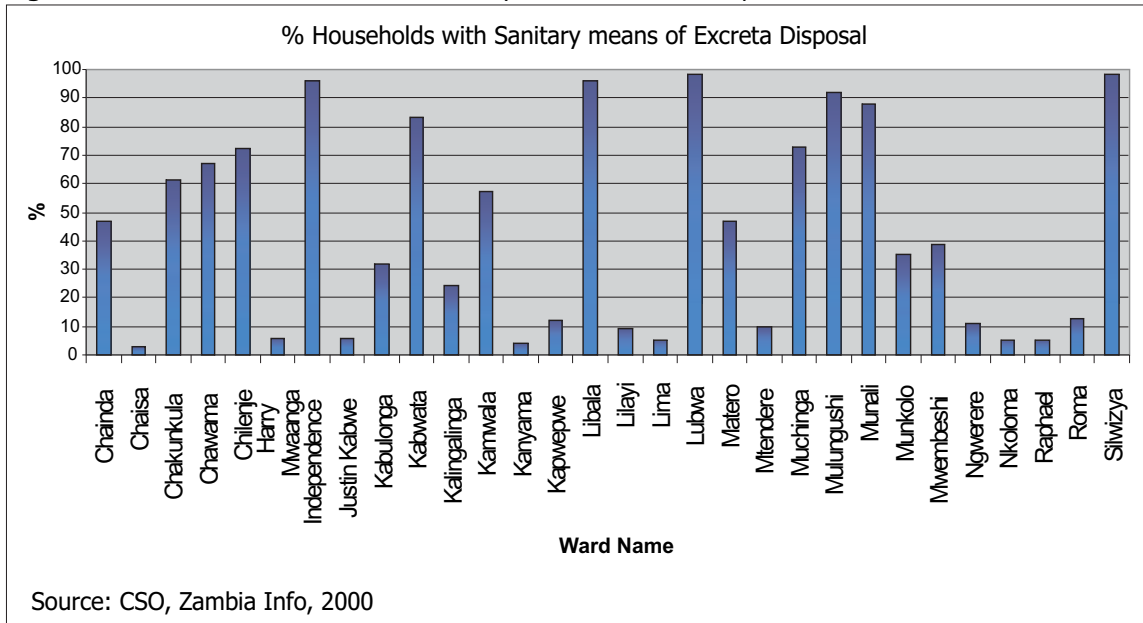
Source: Nwasco, AQUATIS, 2005



Figure 6.4 Lusaka Sewer Reticulation



Source: LCC 2007

Figure 6.5: Households with access to sanitary means of excreta disposal

areas such as Ngombe only has 12.8 per cent of household with access to sanitary means of excreta disposal where as Silwizya Ward has 98.2 per cent (Figure 6.5).

6.4 WASTE MANAGEMENT

Waste management is a challenge for Lusaka City. The main waste streams in the city include Domestic, Commercial, Industrial and Hazardous waste. Urban growth has resulted in increased amounts of waste. Limited financial capacity and inadequate trained human resource has made it difficult for the local authority to fulfill its obligations concerning waste management. The problem is exacerbated by inadequate infrastructure especially for non-municipal waste and lack of recycling facilities. Waste generated from all sectors of the city's economy are currently not adequately managed.

Waste management in general is organised within the broader framework of the EPPCA No. 12 of 1990 Cap 204 of the Laws of Zambia and

specifically Part VI of the Act. The EPPCA provides for the sound management of waste to ensure protection of the environment and human life. Under the EPPCA, the Waste Management Regulations of 1993 Statutory Instrument (SI) No. 71 and the Hazardous Waste Management Regulations (SI No. 125 of 2001) provides for specific procedures and practices for waste generation, storage, transportation and final disposal.

The EPPCA and its subsequent regulations SI No. 71 and SI No. 125 empowers ECZ to monitor industry and commerce in waste management, including Hazardous Waste. Under these regulations the following activities are undertaken to ensure an environmentally sound waste management practice in the country:-

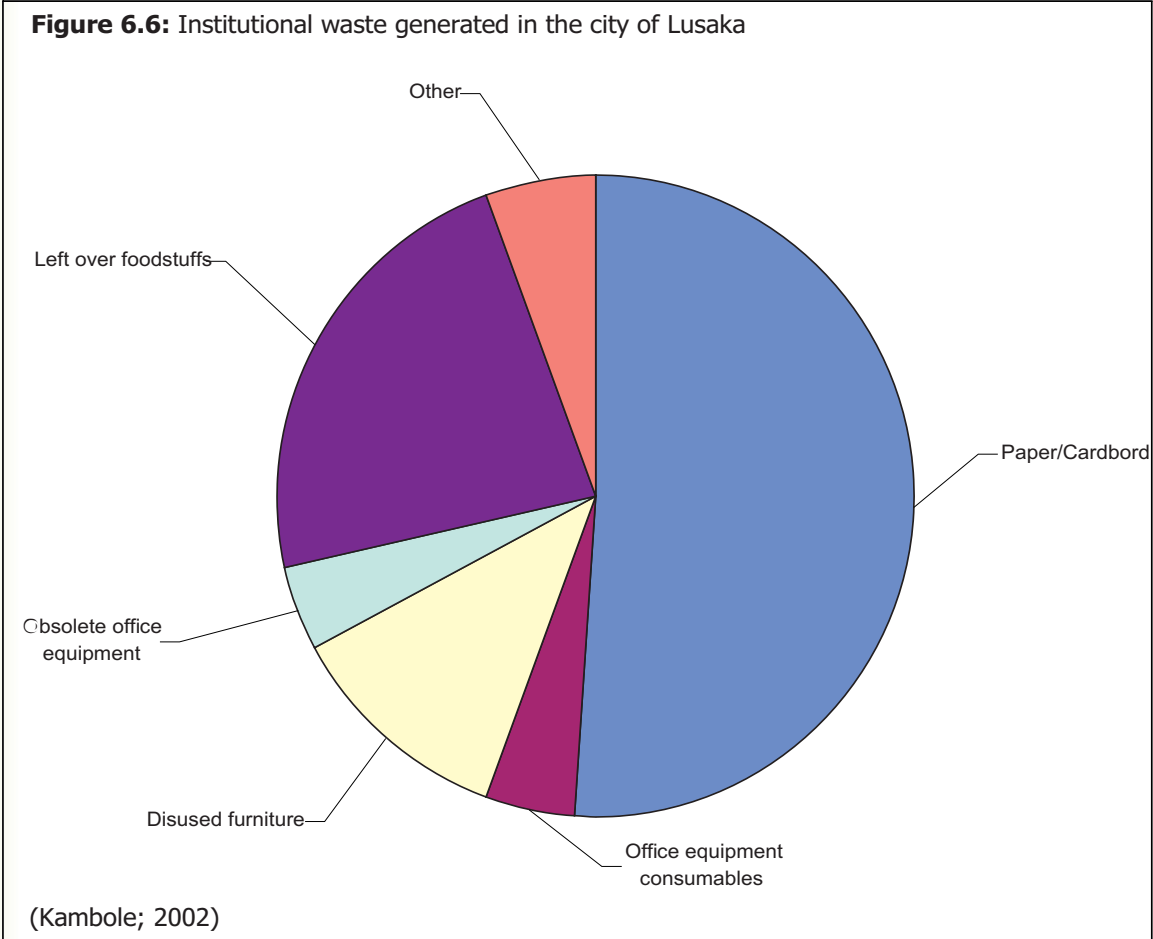
1. Licensing of Waste Generators and Transporters/Managers;
2. Compliance monitoring/patrols;
3. Attending to public complaints and emergencies;

Historically for the City of Lusaka, the LCC delivered solid waste management services directly financed through normal municipal financing channels such as government grants and property rentals on Council owned properties or property rates. From middle 1980s to early 1990s, financing of Municipal Waste Management Services through these traditional means was no longer attainable. This was attributed mainly to declining national economy which saw a significant decline in government grants to local authorities Lusaka inclusive. The situation was exacerbated by the sale of the Council owned Housing Stock which was one of the major sources of income for local authorities in form of rentals. Consequently, delivery of waste management services crumbled and was limited to sporadic

collections at public trading places (Markets) or in emergency response during the disease outbreaks, mainly Cholera. In other parts of the city, the private sector came in to fill the void left by the council by providing waste collection services to those who can afford to pay directly.

Waste Generation

There has been an increase in the amount of waste generated in the city. In 2006, the total waste generation was estimated at 242 803mt. Households are the main generators of waste, contributing about 75 per cent of the total amount of waste generated. Peri-urban areas are the main sources of all waste fractions except paper and cardboard. (LCC,2007). A high number of people are involved in trade/business for various



goods which coupled with general households; generate large amounts of solid waste.

The non-residential areas (industry and commerce) are the main generators of waste paper and cardboard with this sector contributing about 41 per cent of the total amount generated.

According to the Institutional Waste Survey for the City conducted in 2002, it was estimated that institutions in the city generate a minimum of 439.3 tons of waste per month, of which paper and cardboard constituted about 268 tons per month and 123 tons per month were leftover food stuffs. In addition, garden waste and PET bottles, cans, tins, plastics, tetra packs, etc contributed approximately 26.3 tons of waste per month. (Kambole 2002)

From Figure 6.6, it can be observed that most of

the waste generated in the city is recyclable. However, the city faces a major challenging of disposal of plastic waste.

Waste collection and disposal

In 2006, the total amount of waste generated in the city was estimated to be 242 803mt of which only 63 577mt was collected representing 26 per cent of the total amount of waste generated. It must be noted that some of the waste is disposed of in un-designated places, burnt, buried in the back yard or recycled. Generally, there is no separation of the various types of waste.

Based on the Polluter Pays Principle, all waste generators, residents, commercial entities and institutions, shall pay for the collection and disposal of the waste they generate. However, based on the affordability principle, the decision has been made to keep these fees below 1.5per



Illegal dumping of waste is common in the city



Box 6.2: Health Care Waste in Lusaka**Health care waste**

Health Care Waste HCW is one stream that is becoming one of the major concerns in the area of waste management. In 2000, Lusaka had 34 medical institutions run by government and 161 privately run institutions (Mutale; 2000, 1). Given the rising number private clinics, the amount of waste generated from this sector is exceptionally high. Despite this situation, there are currently no adequate facilities for treatment and disposal of HCW. As the amount of waste generated in these institutions increases, so does its pollution, and/or pollution potential.

Most hospitals and clinics in the city do not have incinerators as expected by the Ministry of Health. They either pack all their sharp wastes into sealed boxes or transport them to the University Teaching Hospital (UTH) for incineration which is not able to deal with the large quantity of waste. Other wastes are normally buried in back yard pits. Common cases are that hazardous waste and ordinary waste are combined.

Health care institutions must therefore, reduce the quantities of Hazardous Waste being generated by separating the waste at source. There are various pieces of legislation associated with waste management currently in place in Zambia. These include;

Hazardous Waste Regulation Statutory Instruments (SI) I No 125 of 2001, Public Health Act of 1978, Local Government Act of 1991 and National Health Services Act of 1995. However, lack of enforcement and awareness are the major problems for the state of HCW management. Particularly, there are currently draft guidelines have been developed to regulate the management of HCW.

cent of the disposable family income. As a result the fees had to be differentiated for different areas within Lusaka. In the peri-urban areas, or townships, where 70per cent of Lusaka's population lives, fee levels were set at a maximum of ZMK5,000 (USD1.20) per household per month. However at such fee level, financial sustainability is impossible to achieve and in view of the principle of full cost recovery fees in the more affluent areas had to be set at a tenfold of this amount. The higher fees in the more affluent areas is partly used to cover losses encountered in the peri-urban areas cross-subsidisation to ensure full cost recovery.

By design the involvement of the private sector should not lead to an increase of the financial obligations of the LCC, which would have been

the case with Traditional Contracts, LCC concluded Franchise Contracts with the private sector for waste collection in conventional areas. Under the contracts the Franchise Contractors pay an annual franchise fee and disposal fees which are set at levels that allow for cross-subsidisation. In return the Franchise contractors have been given the obligation to collect waste and the right to collect waste collection fees directly from waste generators.

Due to low ability and willingness to pay for waste collection in peri-urban areas, the private sector has little, or no, interest in providing waste collection services in the peri-urban areas. Having recognised this, the LCC provides waste collection services to the peri-urban areas through its Waste Management Unit (WMU) in partnership with community based enterprises.





Source: ECZ, 2005

Waste disposal facility in peri-urban area

Peri-Urban Waste Collection

Waste collection in the peri-urban areas has been split between the LCC-WMU and the communities. The communities are responsible for primary waste collection as well as fee collection while the LCC-WMU is responsible for secondary waste collection. The communities cover the full cost of primary and fee collection as well as the operational costs of secondary waste collection. On the other hand waste collected from peri-urban areas does not attract a disposal fee. Primary waste collection is carried out with wheel burrows, pushcarts and tricycles while for secondary waste collection hooklift trucks, skiplift trucks and tractor trailers are used depending on waste amounts and distance to the disposal site. Intermediate storage depends on the means for secondary collection and includes containers and bins.

To facilitate primary collection, community members formed Community Based Organisations (CBOs) which operated on a voluntary basis. However, this was not sustainable due to the high turnover of membership and low commitment of the CBOs. Therefore, Community Based Enterprises (CBEs) were formed and continue to be used and these operate on a business model. This has improved on the sustainability of primary collection in the peri-urban areas.

In peri-urban areas, services are provided in only half of the settlements and coverage in these settlements is around 20 per cent on average. Payment for secondary waste collection is, since the introduction of payment in advance, significantly higher and in several peri-urban areas payment went up from less than 5 per cent



to close to 100 per cent of the operational costs (due to the prepayment system). This is not yet the case in all peri-urban areas mainly due to grace periods given, to allow CBEs to accumulate some capital before payments start.

Waste Collection in Conventional Areas

Conventional areas are areas which are properly planned as opposed to peri-urban areas which are unplanned. In conventional areas, the principle of full cost recovery was adopted without additional financial obligation on the part of the council. Therefore a Franchise Contract system was adopted due to willingness and ability to pay in these areas.

In order to facilitate the franchise system; the City of Lusaka has been divided into 12 Waste Management Districts (WMDs). The districts are of different size to enable both smaller and larger companies to participate in the provision of waste collection services. Although geographically located within the respective WMDs, the peri-urban areas have been excluded from the franchise system and do therefore organisationally not form part of the WMDs. For each WMD a Franchise Contractor was selected through a staged tender process. The 12 WMDs are:

- A. Barlestone, Matero, Lilanda
- B. Emmasdale
- C. Chudleigh, Kalundu, Olympia Park, Olympia Extension, Roma
- D. Kamwala Commercial Area, Central Business District, Thorn Park, Villa Elizabetha
- E. Longacres, Northmead, Rhodes Park
- F. Chamba Valley, Chelstone, Chudleigh

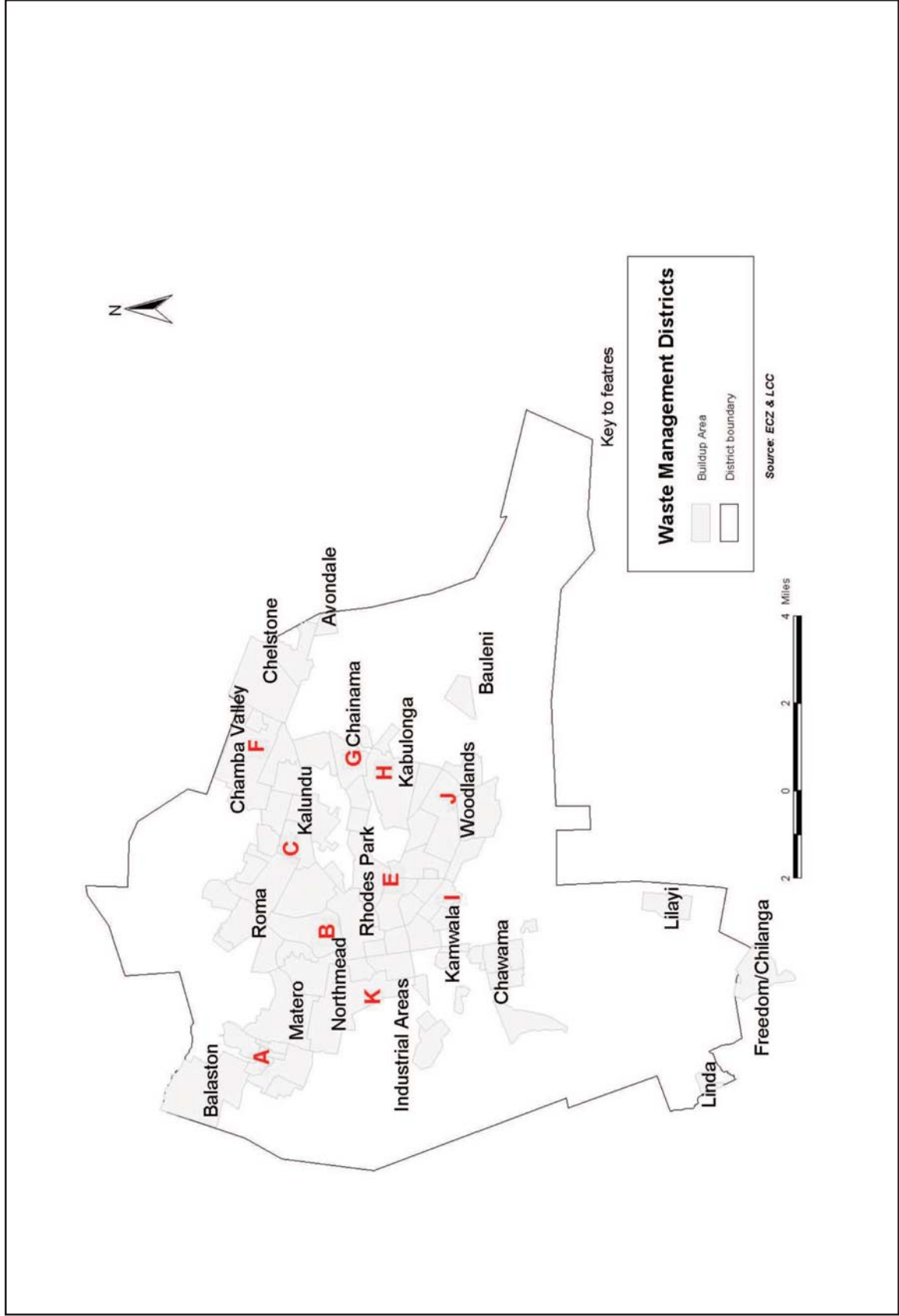
- G. Avondale, Chainama, NRDC
- H. Handsworth, Ibex Hill, Kabulonga, Sunningdale, Helen Kaunda
- I. Arakan, Kabwata, Kamwala, Libala, Madras, Ridgeway, UTH, Chilenje
- J. Nyumba Yangam, State House, Woodlands, Woodlands Extension.
- K. Industrial areas (Light and Heavy)
- L. Barclay, Lilayi, Maken

In order to maintain capacity in the WMU, one WMD was reserved for the WMU. This WMD includes the CBD and reserving it for the WMU adds to the likelihood to reach financial sustainability since the WMU charges commercial fees in this WMD and part of the revenues generated can contribute to the service provision in peri-urban areas. Further income for the Unit comes from tipping fees at the Landfill. On the basis of their contract, the Franchise Contractors are obliged to dispose the collected waste at the LCC Landfill and pay the applicable disposal fee. Any increase in disposal fees may be passed on to the waste generators. In addition to the disposal fees, each franchise contractor has to pay an annual franchise fee.

As part of operations to remove historical waste, 25 per cent of the waste generated in Lusaka is now collected and transported to the disposal site. Average monthly expenditures for WMU operations went up from ZMK75 million in 2004 to ZMK200 million in 2006. Consequently, the contributions from the LCC budget and the Lusaka Waste Management Project (LWMP) towards these expenditures reduced, from more than 90 per cent in 2004, 65 per cent in 2005 and 58 per cent in early 2006. Revenue collection was 25 per cent, 45 per cent and 55 per cent in 2004, 2005 and 2006 respectively.



Figure 6.7: Designated Waste Management Districts in Lusaka





If the above trends continue, fee collection will be close to 100per cent in 2009 and in the same year grant contributions for operations can be stopped. Operations can be fully sustained by income and a small contribution from the LCC general budget from 2008 onwards. This however is not yet full cost recovery since capital costs have not yet been taken into account.

RESPONSES

In 2003, LCC produced a Strategic Plan for Municipal Solid Waste Management for the City. Through this plan, two new waste management systems were developed to serve the conventional and peri-urban areas. These are; the franchise contractor system for conventional areas and community based

enterprises for peri-urban areas. To support the new waste management system, the LCC elaborated the Municipal Waste Management By-Law. Under this law, all waste generators in the city have to register with their respective waste management companies, utilize their services and pay the corresponding fee.

In the peri-urban areas, waste collection is conducted using different waste collection systems. In most areas, waste is collected through large (15m³) containers picked up for emptying by the WMU of the LCC. In addition, LCC has been encouraging the formation of Waste Management Committees to be responsible for the day to day management of the waste system in that area.

In Lusaka, the Chunga site is the only licensed and



designated site for waste disposal. LCC constructed a modern landfill for waste disposal for the city which caters for both hazardous and non hazardous waste.

Additionally, ECZ developed a National Solid Waste Management Strategy (NSWMS) that proposes approaches to addressing the problem of poor solid waste management. The strategy also includes such wastes as oils and sewer sludge which may not necessarily be solid. Government has adopted the 'Make Zambia Clean and Healthy Campaign' Programme aimed at affording an opportunity for all citizens of the country to participate, whether in their homes, communities, churches, workplaces or elsewhere in meaningful activities that will impact positively on their lives and contribute to the restoring a level of cleanliness and environmental good health in Zambia. This programme is expected to regain and institutionalise a culture of cleanliness and national well being.

In conclusion, it can be stated that the achievement of a clean and quality environment that would promote economic, social and cultural development requires concerted efforts from the government, the general public and the private sector.

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7

SCENARIOS

Scenario analysis offers a way to consider long range future in light of uncertainties and to examine the requirements for a transition to sustainability. Scenarios are possible sets of future events which unlike projections of trends in human affairs, maybe legitimate over the short term but not as time horizons, expand over months and years to decades and generations. They are indispensable tools for environmental management that focus on large-scale, long term interactions between development and the environment.

The integration of scientific knowledge helps scenario development, as a tool for 'peeping' into the future, to look more closely into what type of development and environmental strategies are risky and how they can be avoided, as well as into which ones are plausible and need to be reinforced (UNEP, 2006)

In this chapter, possible development scenarios are discussed within the context of Lusaka City according to the thematic areas which are Socio economics, Land, Atmosphere, Energy, Water and Sanitation. The base year is 2000 and the time horizon is 2000 to 2030 in line with the Vision 2030 for the country. The population growth was based on CSO projections for the year 2000 of which the population of Lusaka was 1,084,703 and the annual growth rate was 3.2per cent.

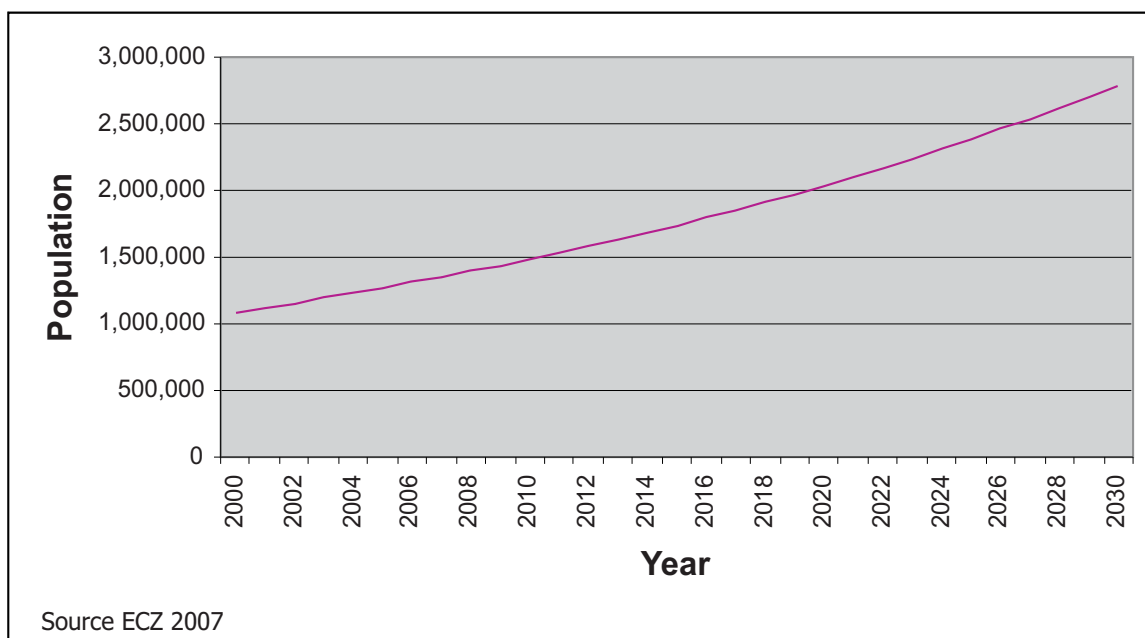
7.1 SOCIO ECONOMICS

The city faces a number of challenges in this sector including rapid population growth, transportation, migration, health, HIV/AIDS, education, employment and governance issues.

Policy Question:

What are the economic development and basic social services required to improve people's livelihood in Lusaka?

Figure 7.1: Population Projection for Lusaka City (2000 to 2030)



Business As Usual Scenario

The population of Lusaka in 2000 was 1 084 703 and the city has been growing rapidly with a population increase of about 3.2 per cent per annum. As at 2000, 70 per cent of the population was below the age of 30. Gender desegregated data showed that 49 per cent were males and 51 per cent were females. Based on this annual growth rate, the population of Lusaka was extrapolated. By 2015, the population of Lusaka will be about 1.7 million and 2.8 million in 2030. An increase in population will result in increased demand for education, health and other social services.

The geographical, commercial and governance centrality of Lusaka's position has made the city a major destination and meeting place. Lusaka has witnessed an increase in the number of motor vehicles. This development has however, not been matched by an expansion of the road network and as a result, congestion and traffic

jams are a common feature on most roads, especially in the CBD during peak times. The problem of traffic congestion will continue for as long as necessary measures are not put in place to address this problem.

The economy of the City of Lusaka only provides formal employment to a small proportion of its labour force. In 2000, the city had 120 233 which represented 35 per cent of the labour force in formal employment. This means that the majority of the labour force earned its livelihood from informal economic activities. The unemployment rate in Lusaka City increased from 13.7 per cent in 1990 to 27 per cent in 2000. The unemployment rate for females is higher than that for males represented by 30 per cent and 24 per cent, respectively.

In Lusaka, more than 1 000 000 residents have access to a health centre within 1.5km and less than 200 000 have to travel more than 1.5km to access a health facility. This means that the



majority of the population have access to healthcare facilities. A number of measures have been put in place to reduce incidences of diseases such as Malaria and HIV/AIDS. This can be attributed to increased malaria control programmes such as In-door Residue Spraying and use of mosquito nets. For HIV/AIDS, increased awareness activities and provision of drugs such as ARVs has helped reduce HIV infections.

This scenario raises implications on the environment which if not addressed will result in poor service delivery. It is clear also that the demand for services cannot be met by the service providers in the city. There is need therefore to consider policy options as proposed in Investment and Policy Reform Scenarios.

Investment Scenario

Improving people's access to basic social services

To address some of the identified transportation problems in the city, there is need for LCC to construct ring roads in order to reduce traffic congestion in the city particularly in the CBD. The construction of Kasangula Road which links Great North and Great East Roads has brought benefits to the city.

Public transportation (minibuses) has contributed to traffic congestion in the city. To address this problem, designing of new routes for public transportation needs to be done to enable people travel directly from one part of the city to another without passing through the CBD. In addition, reintroduction of the railway system as was the case with the Nyanji passenger commuter train



which operated from Chilenje to Matero is another strategy. Development of new buildings in the city should include provisions for car parks to address the problem of parking space in the city. LCC should introduce parking meters in the CBD, satellite centres and administrative areas to regulate use of parking space and generate revenue which can be used for further development of the city. Private sector investment in the development of Parkades in the city should be promoted.

Provision of health services in the city should include upgrading of health centres to equip them with such facilities as laboratory, maternity wards, mortuaries and qualified personnel so as to decongest the University Teaching Hospital. Programmes aimed at reducing incidences of diseases such as Malaria and HIV/AIDS should be continued. However, the challenge for the city is sustainability of these prevention and control measures which are mainly dependent on support from co-operating partners.

To improve provision of housing in the city, a Densification Policy should be adopted which could result in construction of high-rise flats. Additional land should be sought to encourage housing developments. LCC should promote standards in housing development by adopting a policy of encouraging institutional housing development. This will address the current practice of self help housing construction which often disregards construction standards. In addition to this, LCC should service areas earmarked for development prior to land allocation. Existing unplanned settlements should be upgraded and provided with basic services such as roads, water and sanitation.

Decentralization of provision of basic services such as water, electricity and other services will be required. Collection of district and city specific data and reporting mechanisms if improved will ensure activities at the said levels are measured against defined targets.

Policy Reform Scenario

Promoting economic development in Lusaka City

This scenario will combine policy proposals given in the Investment Scenario with policies on promotion of economic development for the city.

Since about 65 per cent of the city's local economy is in the informal sector, LCC's challenge is to capture this sector into its formal system of raising revenue which can then be used for other developments. There will be need to encourage private sector involvement in the economic development of the city through programmes such as urban renewal which can be self financing. In this regard, LCC should secure alternative land where people disturbed through the urban renewal programmes will be re-settled. There must be a deliberate policy to identify economic development zones in the city.

Poverty reduction programmes should be continued. These include construction of modern markets to accommodate the informal sector which are predominantly in the trading business. Microfinancing programmes to support community and small scale entrepreneurs should be encouraged.

The status in Business as Usual Scenario is not desirable, and measures need to be put in place to prevent and/or control impacts on the environment. Implementation of the proposed



policy measures discussed in Investment and Policy Reform Scenarios will result in improved provision of basic services, livelihood and the economy of the city. The preferable scenario is Policy Reform where all the provisions of Business as Usual Scenario are taken into consideration with the addition of economic development aspects.

7.2 LAND

In discussing land in Lusaka city, issues of land availability, allocation and monitoring of land uses for various developments were considered.

Policy Question:

“Is there a need to address land delivery mechanisms in order to meet various developmental needs, and enhance monitoring activities on land use?”

Business as Usual Scenario

Lusaka is the most populated city yet it occupies one of the smallest districts in the country. Lack of expansion space, poor mechanisms of making land available and capacity to monitor and control development coupled with rapid population growth has subjected the city to environmental problems. The population growth and increased demand for shelter in the city has led to the growth of unauthorised informal settlements around the city. The majority of the city population reside in informal settlements.

LCC is responsible for preparation of land use plans where as the Ministry of Lands allocates land. Both institutions have experienced a lot of pressure to meet the demand for land especially for residential purposes in the wake of diminishing institutional housing stock. In addition, the lengthy procedures for acquisition

of land have contributed to the growth of illegal settlements. Not all available land that is being developed is adequately serviced.

To address some of these challenges, government developed the National Housing Policy. However, provision of resources has been low and this has affected implementation of the policy. There has been a noted loss of fertile agricultural land due to expansion of physical developments as more and more land is being converted from agricultural use to other uses especially residential. In addition, there is noted expansion of developments on areas that were once reserved as water recharge areas.

The prevailing economy has added its toll on land as some residents have taken to informal economic activities such as illegal small scale quarrying which have left tracts of undeveloped land scarred with excavations rendering land derelict, difficult and expensive to develop. The said excavations are also an environmental hazard as they serve as breeding ground for mosquitoes and increase the incidences of Malaria. They are also a physical danger to humans.

The current situation is bad and will worsen if no corrective measures are put in place.

Policy Reform Scenario

Strengthen land delivery mechanisms required for various development needs

Lusaka needs to streamline land delivery mechanisms for various developments by making more land available and fairly alienated to developers. This mechanism will respond to the escalating demand for land that has led to illegal land allocation and development. Lack of space for expansion of the city needs to be rigorously pursued as proposed in the yet to be approved



Lusaka IDP as it is evident that Lusaka will continue to expand. In order to expand, LCC will need to acquire land from neighbouring districts in order to extend the district boundaries.

There will be need to improve the capacity of the Local Authority by providing adequate resources to enable the institution develop strategies to monitor land delivery to deserving applicants, monitor land use and improve services to areas already being developed. In addition, LCC should strive to service land that is newly opened up for development.

As can be observed, implementation of measures discussed in the Policy Reform Scenario will result in improved land delivery and management in the city.

7.3 ATMOSPHERE AND ENERGY

Provision of energy for domestic and industrial development is a pertinent issue for this sector. In door and ambient air pollution were other issues considered.

Policy Question

Are clean and sustainable sources of energy required to meet the city's energy demand in support of economic development and for improving people's livelihood?

Business As usual Scenario

Energy is fuel for growth in any social and economic development. Sources for industrial energy include coal, wood, diesel and electricity while domestic sources for heating, cooking and lighting is largely provided by charcoal and electricity. Out of over 200,000 households in Lusaka, 54 per cent use charcoal, 44 per cent use

electricity and the rest use kerosene and firewood.

Notwithstanding the fact that agriculture as one of the causes of deforestation is expanding in areas around Lusaka, use of charcoal in Lusaka is considered to be one of the main causes of deforestation in Chongwe district and other adjacent areas. In Chongwe district, bare land increased from 119 sq. km in 1989 to 280 sq. km in 1998. Assessment of current land cover would probably reveal that much more land is now left bare than it was in 1998. Whereas in 1998, charcoal was obtained in areas that are about 50 to 100 km away from Lusaka, charcoal is now mostly obtained in areas beyond 200km.

Charcoal trading provides employment to many people. It gives a turnover of about K200 billion for Lusaka City alone. With this scenario, Lusaka will continue to provide a large market for charcoal thereby encouraging deforestation at source.

Electricity is a cheaper source of energy than charcoal. About 68 per cent of electricity consumption is domestic. However, electricity is supplied to a significantly small population of the city. Most people living in peri-urban areas have no electricity thereby affecting their quality of life.

Levels of ambient and indoor air pollution are not known. However, the large proportion of people using charcoal and wood fuel does encourage ambient and indoor air pollution and consequently respiratory and heart diseases. Two thirds of the vehicles in Lusaka estimated at 100 000 use petrol. The SADC target of phasing out leaded fuel by 31st December 2005 was not met due to lack of frameworks to implement the agreement.

The effect of climate change has been felt over the city in form of drought, disease and floods. Average



maximum and minimum temperatures over Lusaka have increased by approximately 1°C over the last 30 years. The rise in temperatures may be providing conditions that contribute to the increase in disease incidences such as Malaria. Whereas Lusaka received rainfall in excess of 1000mm before 2000, the rainfall was consistently below 1 000mm from 2001 to 2005.

Policy Reform Scenario

Reducing dependence on woodfuel to ensure sustainable provision of affordable, reliable modern energy services to households as a means to raising productivity and standards of living

Increasing access to efficient modern energy services for the majority of the population will lead to the improvement of the standard of living of the people living in Lusaka. There will be need to promote appropriate alternatives to woodfuel and reduce its consumption by encouraging the use of other renewable sources of energy, alternative fuels for household use and wherever possible, encouraging people to grow energy crops. Supply of electricity to peri-urban areas where the majority of the people reside will need to be improved in order to reduce dependence on charcoal and subsequently, reduce pressure on forests in the neighbouring districts.

Monitoring of air quality in the city should be embarked on by relevant authorities in order to establish levels of ambient and in door air pollution. The government policy to phase out leaded fuel in line with the SADC declaration requires implementation so as to protect the environment.

The Business as Usual Scenario does not provide much avenue for economic development of the

city and improvement of people's livelihood. However, the path may be considered based on the following justification. Most of the people not supplied with electricity dwell in peri-urban areas where provision of this energy source is difficult due to tenure problems to most of the properties. In addition, the majority of the people are not able to meet the capital contribution towards the provision of the service. Charcoal trading provides employment to many people and is a good source of income. The large market of charcoal provided by those not supplied with electricity encourages the trade. Evidently, it is recommended to consider the impacts of Business as usual Scenario and implement measures proposed in the Policy Reform Scenario.

7.4 WATER AND SANITATION

The growth and expansion of Lusaka city demands provision of adequate water and sanitation services to meet this demand.

Policy Question:

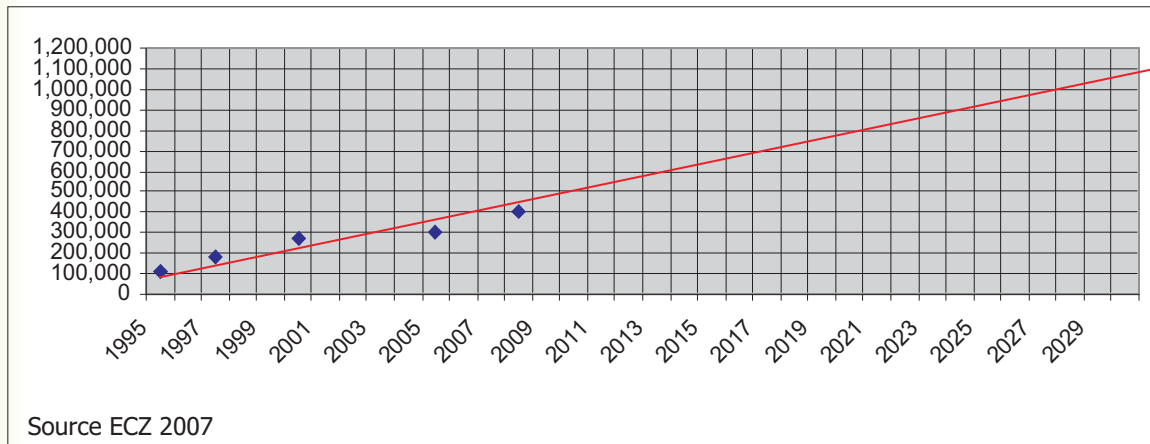
Is people's access to safe drinking water and sanitation sustainable?

Business as Usual Scenario

Lusaka city relies on both surface and ground water as its source of water. The Lusaka Water and Sewerage Company (LWSC) is the main service provider for water supply and sewerage sanitation in the city.

In the current situation, Lusaka already has a water supply deficit. The estimated average daily demand for the year 2000 was 287 825m³ per day, approximately 80 000m³ per day in excess of supply, as metered by LWSC. In 1993, the total



Figure 7.2: Water Demand Projection in Cubic Meters (2000 to 2030)

water supplied to Lusaka by LWSC was approximately 210 000m³ per day. The company was still supplying the same quantity of water by 2005. LWSC estimates that 56 per cent of the water produced is unaccounted for and probably lost through such means as leakages in distribution. It is estimated that by 2008, water demand for Lusaka will be 400 000m³ per day.

The water demand is expected to increase due to the increase in population and economic activities such as industrial development. Following the trend in the estimated demand for water from 1995 to 2008, the water demand for the subsequent years up to 2030 were extrapolated. From the extrapolation, it shows that by the year 2015, the water demand will be about 600 000 m³ per day and 1 000 000 m³ per day in 2030. At the current supply, the water supply deficit will be about 400 000 m³ per day in 2015 and 800 000 m³ per day in 2030.

The water supply deficit is partially compensated by drilling boreholes on private properties and in some of the peri-urban areas, people use shallow wells as sources of water. If the status quo remains as it is, there may be more private boreholes and many people using water from

shallow wells to compensate the water supply deficit.

Water supply is through a network system fed from Kafue River and some boreholes (72) and stand alone boreholes on private properties. In peri-urban areas a satellite system of boreholes and elevated tanks supply stand pipes and water Kiosks. In areas of limited supply, shallow wells are effected.

In Lusaka, there are three major types of sanitation services; water borne sewer system of LWSC, septic tanks and pit latrines. The coverage of the water borne sewer is about 30 per cent of the LWSC water supplied areas. The actual flows in the LWSC sewer system are not well known. Historical records of sewer flows to the treatment facilities is not reliable and can not be used to determine flows in the sewer system because there are obstructions in the sewers and diversions for irrigation which reduces or eliminate flows which would otherwise reach the treatment facilities. There has been not much expansion of the sewer system which was initially designed for fewer people than is the case with the increasing population of the city. 70 per cent of the population live in peri-urban areas.



Based on the average households of 5.5 persons per household, approximately 19 400 households in peri-urban areas have no access to sanitation facilities. At 12 per cent, the number of households without access to sanitation facilities may reach 26 500 in 2015 and 42 600 in 2030.

Currently, in order to meet the demand for water, significant quantities of ground water is being extracted from boreholes. However, the increasing demand for land in the city has resulted in developments in strategic recharge areas of the aquifer. Whilst outbreaks of diseases such as Cholera have been a recurrent problem in the city, there has been no detailed study attempting to link the outbreaks to groundwater quality. Although morbidity and mortality figures highlight the magnitude of the problem, a perspective of annual expenditures to treat these diseases will undoubtedly show the problem from another viewpoint.

In this scenario, the service provider is unable to provide adequate water and sanitation services in the city. The scenario does not provide a meaningful avenue for development as the gap between demand and supply of water and sanitation services is wide and may continue to increase if necessary interventions are not put in place. There is ardent need to address this situation.

Investment Scenario

Refurbishment and expansion of the existing water reticulation and sewer networks and treatment facilities.

Recognising some of the challenges facing LWSC such as the growing population and expanding city, inadequate water production, high unaccounted for water and run down water

infrastructure, measures need to be put in place to mitigate the impact of these challenges.

This can be addressed by increasing water production from Kafue River and increasing ground water production by strategically sinking more boreholes. The water reticulation network requires expansion in order to meet the demand for these services. LWSC will need to invest in new treatment plants for both water and sewer systems to improve service delivery. Other initiatives will include control and protection of existing boreholes, implementation of the Kafue Bulk water supply project and resolving problems with regards to unaccounted for water. Rehabilitation and expansion of the sewer system to increase the number of household connected to the network will need to be undertaken.

In view of the fact that majority of the city population reside in peri-urban areas, there will be need to improve water and sanitation service delivery to these areas. Private sector participation in this sector should be encouraged as a way of increasing investment.

Further, efforts to protect the aquifer should start with prohibiting any potentially contaminating development within each borehole's capture zone. If deterioration of water quality continues, there will be a progressive cost for water treatment and in the long term, groundwater in the city may become unfit for human consumption even with expensive treatment. The result is that new sources of water supply away from the current sources will need to be identified.

Given this scenario, a critical element in the assessment, protection and management of groundwater resources should involve



identification of contamination sources. There is a need to formulate adequate community-based sensitization and educational awareness campaign programmes on, for instance, pathways of pathogens into water supply sources and what methods, at household level, may be used to treat and safeguard the water. In addition, implementation of measures discussed in the Investment Scenario will result in improved water supply and sanitation in the city.

7.5 WASTE MANAGEMENT

The critical issues for this sector are waste generation, collection and disposal, institutional and infrastructural capacity for the management of waste in the city.

Policy Question

What are the issues surrounding ensuring sustainable waste management for the city of Lusaka?

Business as Usual Scenario

Waste management is administered on two levels. Municipal Solid Waste Management is a responsibility of the Local Authority as mandated under the Local Government Act regulated by ECZ. Hazardous Waste Generators are directly regulated by ECZ with a possibility of delegation of such functions to the Local Authority under the EPPCA.

Since 2003, LCC has been implementing the Lusaka Waste Management Project whose overall development objective is to establish sustainable and poverty oriented Municipal Solid Waste Management (MSWM) system. The immediate objectives have been achieved with the exception of financial sustainability. Total expenditures for the operation of the WMU,

including waste collection and disposal for 2006 were K1.5 billion whilst income was K0.9 billion. Comparisons of waste amounts collected by the WMU and the Franchise Contractors, showed that the WMU collects slightly more waste than the Franchise Contractors together.

In terms of waste disposal, the old disposal site at Chunga has been decommissioned and the Engineered Sanitary Landfill was commissioned in March 2007 and is fully operational. The entire landfill site is designed to have five disposal cells, but only one cell has been constructed and is expected to last about five years.

Furthermore, Lusaka has no clearly established Hazardous Waste disposal mechanisms and facilities. Health Care Waste is generally disposed off through incinerators located at various clinics. However these also are not up to standard in terms of emissions and require upgrading.

Although Lusaka has developed a Strategic Plan for SWM, implementation depends on the Local Authority's ability to raise needed financing through improved SWM service delivery and partnerships with the private sector. As mentioned above, revenue generation is still low. Furthermore, the private sector and LCC need to establish the required customer base to make their operations financially viable. There is a significant risk that city dwellers choose not to use SWM services, especially if they consider it too expensive. Significant public awareness and education campaigns have been conducted to sensitize the citizens of Lusaka on the benefits of the improved waste management system. The adoption of the by-laws has contributed to reducing the risk and the public awareness campaigns conducted also has had a positive effect.



Investment Scenario

Developing infrastructure and human resource capacity in waste management

From the Business as Usual Scenario, it is evident that under the Lusaka Waste Management Project, basic operating infrastructure has been provided for LCC as well as human resource development through training of WMU staff. However, capacity among the Local Authority Agents (Franchise Contractors) is still very limited both in terms of equipment and technical expertise.

Out of the 12 Waste Management Districts, Franchise Contractors collect waste from 11 with an exception of peri-urban areas. This entails that they cover a significant area in the city in delivering waste management services (the entire conversional/planned area except the CBD). This therefore, means that the success of the entire waste management system in the city is highly dependant on the successful performance of these contractors. It is therefore recommended in this scenario that technical capacity both in terms of equipment and staff be built among franchise contractors and the private sector in general.

On the other hand, disposal facilities for other categories of Hazardous Waste are inexistence and it is not uncommon to find Hazardous Waste in the municipal waste stream. This does not only pose dangers to the environment, but also to waste handlers as well. Hazardous Waste disposal facilities may be developed as centralised facilities accessible not only to Lusaka, but to other towns and may be operated through a consortium of municipalities. Mechanisms will need to be put in place to

upgrade the Chunga Engineered Sanitary Landfill from a Municipal Landfill to include Hazardous Waste Landfill disposal Cells.

LCC and ECZ need to enforce improved waste disposal practices that will minimise the extent of illegal waste disposal, which continues to pollute the environment and potentially lead to insufficient income from disposal fees to maintain operations. The reality is that these entities have very limited resources and therefore this is a risk.

From the financial prognosis of the existing frame conditions, after the first landfill cell is full, LCC may not be able to raise the funds for construction of a second landfill cell because the WMU may not have sufficient reserves for cell construction. Therefore, alternative possibilities to generate funds for landfill expansion through the sale of carbon emission reductions or indeed seed Money from Central Government or Cooperating Partners will be required.

As can be observed, matters of sustainability of the entire waste management system will need to be given extra attention. The Lusaka waste management system is designed to be a closed loop self financing waste management system. However, experience during these past few years indicate that sustainability will take longer than originally envisaged. Mechanisms for ensuring full cost recovery need to be strengthened.

Reference:

1. UNEP. (2006). Africa Environment Outlook 2: Our Environment, Our Wealth. Division of Early Warning and Assessment (DEWA), Nairobi.





OPTIONS FOR ACTION

This chapter presents a summary of policy options identified from the issues discussed in the thematic and scenarios chapters of this report. The options demand stakeholder participation in the development of the city. These include Government Ministries and Departments, private sector, civil society, academic and research institutions as well as communities.

8.1 Socio-Economics

The following proposed actions have been identified:

1. LCC with support from Central Government should construct ring roads in the city so as to reduce traffic congestion.
2. LCC in collaboration with relevant agencies should design new routes for public transportation to enable people travel directly from one part of the city to another without passing through the CBD.
3. Development of new buildings in the city should include provisions for car parks to address the problem of parking space in the city.
4. Development of the social services such as housing, education and health sectors to cope with the increasing population should be embarked on. This can be achieved by providing incentives for the private sector to invest in these services.
5. Adoption of cleaner technologies for industries should be encouraged. To achieve this, regulators such as ECZ should ensure that industries comply with all standards.
6. Strategies of capturing revenue e.g. through collection of taxes from informal sector should be developed so as to strengthen their contribution to the economy.
7. Youth empowerment programmes should be introduced and implemented to address the concerns of the growing youthful population.
8. Decentralization Policy should be implemented to among other interventions introduce district and city specific data collection and reporting mechanisms to ensure activities at the said levels are measured against defined targets.
9. Implementation of deliberate measures in all sectors to mainstream gender and ensure equal participation of males and females;
10. Institutional capacity and co-ordination for environmental management should be undertaken to strengthen the capacity of the Local Authority to effectively monitor and enforce relevant legislation.
11. The Population Policy in addition to other economic interventions that encourage investment in rural areas should be implemented in order to promote growth in other parts of the country and reduce the migration to Lusaka.



8.2 Energy and Atmosphere

The following actions are proposed:

1. Develop and implement programmes that promote increased community participation in energy conservation and management programmes such as the use of energy efficient appliances, alternative energy sources such as solar.
2. Promote cleaner industrial technologies in order to shift from use of traditional energy end-use patterns and energy carriers to more efficient modern and cleaner technologies.
3. Develop and implement regulations for mobile sources of air pollution.
4. Promote the use of alternative fuels such as bio-diesel and ethanol as part of Government policy to phase out unleaded fuel.
5. Review and harmonize transport policies to ensure efficient management of emissions from motor vehicles.

8.3 Land/Built Environment

Policy reform should focus on:

1. Developing and implementing a Land Policy that provides equal access to land for all groups in society.
2. Reviewing and implementing a new integrated planning and budgeting system that is supportive of the National Decentralization Policy.
3. Strengthening the regulatory mechanisms for implementing urban development and environmental policy such as the Town and Country Planning Act, Public Health Act, Land

Act, EPPCA and all relevant acts related to provision of utility services.

4. Strengthening Local Authority's structures such as the District Development Coordinating Committee (DDCC) which provides a suitable forum for development input from key actors at district level.
5. Developing a land information system for the city.
6. Encouraging land use planning and management.

8.4 Water and Sanitation

For this sector, there is need to:

1. Improve institutional capacity of the Local Authority to effectively manage waste in the city.
2. Ensure private sector access to affordable financing to invest in waste collection equipment.
3. Strengthen knowledge transfer between WMU Staff and Franchise contractors as well as curricular development for specific formal training in waste management
4. Facilitation of establishment of waste recovery and recycling facilities to reduce waste at the disposal site and ensure value addition to waste through material recovery.
5. Strengthening the enforcement of both the EPPCA and By-Laws
6. Installation of parallel 36 Inch transmission main from Kafue River intake in Kafue district to Lusaka to meet the water demand in the city.
7. Strengthen municipal financing mechanisms to Wards to ensure cost recovery of services is delivered to the





- peri urban areas and other public surroundings.
8. Strengthen polluter responsibility regulations in conjunction with relevant institutions such as Ministry of Commerce, Trade and Industry e.g. for packaging waste through introduction of relevant environmental taxes
 9. Expansion of the sewer network and rehabilitation of the sewerage treatment plant.
 10. Develop and maintain ground and surface water assessment programmes in the city.
 11. Develop and implement a supportive legal framework to regulate and harmonize management of water and sanitation in the city.
 12. Regulate the current indiscriminate sinking of boreholes in the city.



9

ANNEXES

1. **Annex 1:** Comparison of water supply and the population that can be served in peri-urban areas of Lusaka City.
2. **Annex 2:** Issues and Indicators for the Lusaka City State of Environment Outlook Report
3. **Annex 3:** Technical Working Group members



Annex 1: Comparison of water supply and the population that can be served in peri-urban areas of Lusaka City

Name	Population	Water supply service level	Sanitation service level	Population that can be serviced by existing water supply facilities
Ng'ombe	64 928	Individual connections, public outlets	Water borne flush toilets connected to septic tanks, VIPs and Pit latrines	13 800
Garden	64 397	Individual connections, Water kiosks, public outlets	Water borne flush toilets connected to sewer system, Pit latrines	50 852
Chaisa	32 512	Individual connections, Water kiosks	Water borne flush toilets connected to septic tanks, Pit latrines	70 530
Mandevu/Marapodi	53 434	Individual connections	Water borne flush toilets connected to sewer system, Pit latrines	6 270
Chipata	84 979	Individual connections, Water kiosks	Water borne flush toilets connected to septic tanks, VIPs and Pit latrines	90 104
Chibolya	31 498	Individual connections, Water kiosks, public outlets	Water borne flush toilets connected to septic tanks, VIPs and Pit latrines	49 277
Misisi	30 045	Individual connections, public outlets	VIPs and Pit Latrines	24 720
Chawama/Kuku/John Howard	67 901	Individual connections, public outlets	Water borne flush toilets connected to septic tanks, and Pit latrines	7 458
John Laing	81 634	Individual connections	Water borne flush toilets connected to septic tanks, Improved pit latrines, Pit latrines	44
Jack	12 966	Individual connections, Water Kiosks	VIPs and pit latrines	37 424
Kanyama	198 696	Individual connections, Water Kiosks	Water borne flush toilets connected to septic tanks, Improved pit latrines, Pit latrines	246 405
Kabanana	23 525	Individual connections	Water borne flush toilets connected to septic tanks, Improved pit latrines, Pit latrines	3 944
Chazanga	37 524	Individual connections, Water Kiosks	Pit latrines	30 638

Freedom	10 232	Individual connections, public outlets	Pit latrines	3 054
Linda	18 868	Individual connections, public outlets	Improved Pit latrines	
Chunga	21 299	Individual connections, public outlets	Water borne flush toilets connected to sewer system, Pit latrines	8 382
George	179 012	Individual connections, Water Kiosks	Water borne flush toilets connected to septic tanks, Pit latrines	698 965
Kaliliki	21 165	Individual connections, public outlets	Improved Pit latrines and pit latrines	858
Bauleni	26 142	Individual connections, public outlets	Water borne flush toilets connected to septic tanks, Pit latrines	4 720
Mtendere	59 121	Individual connections	Water borne flush toilets connected to septic tanks, Pit latrines	4 400
Kalingalinga	45 640	Individual connections, public outlets	Water borne flush toilets connected to septic tanks, Pit latrines	56 082
Chainda	21 796	Individual connections, public outlets	Water borne flush toilets connected to septic tanks, Pit latrines	36 098
Kamanga	13 169	Individual connections, public outlets	Water borne flush toilets connected to septic tanks, Improved pit latrines	23 316
Low cost areas served				
Matero	68 448	Individual connections	Water borne flush toilets connected to sewer system via aqua privies, septic tanks and pit latrines	14,839
Chilenje	11 856	Individual connections	Water borne flush toilets connected to an aqua privy then the sewer system, pit latrines	7,040
Kamwala	725	Individual connections	Water borne flush toilets connected to sewer system via aqua privies, septic tanks and pit latrines	314
Kaunda Square	30 866	Individual connections	Water borne flush toilets connected to the sewer system, pit latrines	
Libala	12 742	Individual connections	Water borne flush toilets connected to soakaways and septic tanks	8 882
Messengers	542	Individual connections	Pour flush toilets connected to septic tanks	192
Low cost areas not served				
Independence/Lusaka North forest/ SOS	2 923	Residents fetch water from public and communal taps in the Habitat Housing units and use traditional pit latrines		

Source: Adapted from AQUATIS; the Urban and Peri-Urban Water Supply and Sanitation Database, 2

Annex 2: Issues and Indicators for the Lusaka City State of Environment Outlook Report

The following themes were adopted for the LEO:

1. Water and Sanitation
2. Land/Built Environment
3. Atmosphere
4. Socio-Economic
5. Energy
6. Cross-Cutting Issues (e.g. Gender, HIV/AIDS, Governance)

1. Water and Sanitation

- Water pollution (Surface and ground water quality)
- Access to safe drinking water
- Sanitation
- Conservation of water resources
- Water demand and supply
- Sustainable Solid and Liquid Waste Management
- Indiscriminate sinking of boreholes
- Water and sanitation master plans
- Coordination and co-operation between stakeholder institutions

2. Land Issues/ Built Environment

- Land degradation
- Soil Fertility
- Quarrying
- Pollution
- Tenure
- Urban agriculture
- Illegal land allocation
- Land use planning and management
- Access to basic social services (electricity, transport, schools hospitals etc)?
- Inappropriate land use (by category e.g. rearing animals in a residential area, industrial, (small scale quarrying)
- Infrastructure development e.g. Road Network etc
- Settlement upgrading
- Encroachment of development on social infrastructure
 - Illegal
 - Institutionalized
- Community participation in development
- Institutional capacity
- National Peri-urban upgrading policy



3. Socio-Economic Issues

- Poverty
- Health (Mortality, Morbidity etc)
- Education
- Formal/Informal employment
- Levels of Foreign Direct Investment (FDI)
- Production and consumption patterns
- Commerce and Trade
- Underdeveloped commerce
- Industry
- Housing
- Food security (food basket)

4. Atmosphere Issues

- Air pollution
 - In-door
 - Out-door
- Climate change and variability
- Incidence of air pollution related diseases

5. Energy

- Access by category
- Energy cost
- Demand and supply issues
- Pollution issues
- Sector development vis-à-vis infrastructure development
- Energy Security (Blending of Ethanol with Gasoline and production of Bio-diesel)
- Sustainable Renewable Energy utilization
- Deforestation
- Energy Security (Blending of Ethanol with Gasoline and production of Bio-diesel)
- High demand of electricity

6. Cross-Cutting Issues

- Technology
- Information and awareness
- Private sector participation
- Resource management and benefit sharing
- Donor support, technical cooperation
- Networking among stakeholder institutions
- Review/ repeal of inappropriate laws
- Pooling of resources for urban environmental management



INDICATORS

Theme	Issue	Indicators
Energy	<ul style="list-style-type: none"> ▪ Demand and Supply 	<ul style="list-style-type: none"> ▪ Total Energy requirement ▪ Extent and dependency on Fuel Wood ▪ Availability of energy resources ▪ % Electricity available, % Charcoal/fuel wood available, % coal available ▪ % of house households using fuel wood ▪ Area forests cleared ▪ Changes Rainfall Pattern ▪ Erosion ▪ Electrification Programmes ▪ Re-forestation ▪ Diversification programmes (e.g. use of solar energy) ▪ Incidences of Acute Respiratory illnesses
Atmosphere	<ul style="list-style-type: none"> ▪ Air Pollution 	<ul style="list-style-type: none"> ▪ Industrial development ▪ Emission of Nitrous and Sulphur Oxides from Industrial Sources ▪ Fossil fuel combustion (biomass burning, transport, charcoal) ▪ Incidences of Acute Respiratory illnesses ▪ Changes in Air Quality ▪ Legislation and enforcement of air quality ▪ Extent of adoption of cleaner production
Land	<ul style="list-style-type: none"> ▪ Land Quality ▪ Degradation/quarrying ▪ Soil fertility ▪ Deforestation ▪ Land tenure ▪ Urban Agriculture ▪ Servicing of land ▪ Land use 	<ul style="list-style-type: none"> ▪ Land area covered by quarrying (Km²) ▪ Land area degazetted/ deforested (Km²) ▪ % proportion of soils degraded by pesticides ▪ % of people with formal ownership documents ▪ % of agric land (formal and informal) ▪ Length of roads in km (tarred/gravel) ▪ % of households with access to piped water and water borne toilets ▪ % of households with access to electricity ▪ % of land covered by built up areas ▪ % of residential (formal/informal) ▪ % of commercial ▪ % of industrial ▪ % of areas of recreation ▪ % of administration use
Built Environment	<ul style="list-style-type: none"> ▪ Land use ▪ Settlement Upgrading ▪ Institutional Capacity 	<ul style="list-style-type: none"> ▪ %of built up areas ▪ % of residential (formal/ informal) ▪ % of commercial ▪ % of industrial ▪ % of areas of recreation ▪ % of administration use ▪ Area of land under upgraded informal settlements (Km²) ▪ Identify stakeholder institutions (narrative)



Socio Economic	<ul style="list-style-type: none"> ▪ Poverty ▪ Economy ▪ Health ▪ Population ▪ Education ▪ Employment ▪ Access to safe drinking water ▪ Access to sanitation ▪ Conservation ▪ Water pollution ▪ Waste management ▪ Indiscriminate sinking of boreholes ▪ Types of sanitation ▪ Waste treatment ▪ Water supply cost effective management ▪ Indiscriminate sinking of boreholes ▪ Types of sanitation ▪ Waste treatment ▪ Water supply cost effective management ▪ Lack of coordination among stakeholders/providers 	<ul style="list-style-type: none"> ▪ Poverty rate (% of population living under poverty datum line) ▪ Self assessed poverty ▪ Poverty gap index ▪ Economic development ▪ Mortality rate ▪ Disease patterns ▪ Access to health facilities (by gender) ▪ Maternal mortality rate ▪ Morbidity ▪ Growth rate ▪ Population density ▪ Population structure ▪ Migration ▪ Access (by gender) primary ▪ Access (by gender) secondary ▪ Literacy (by gender) ▪ Formal sector (by gender) ▪ Informal sector (by gender) ▪ Employment creation schemes ▪ % of population with access to safe drinking water ▪ Access to water (litres per capita) ▪ % urban population with access to on site/off site water ▪ % rural population with access to on site/off site water ▪ % of population with access to sanitation ▪ Rate of change in water consumption for each use type ▪ Ratio of crop production to annual water volumes available ▪ Amount of agrochemicals used ▪ Salinity of ground water ▪ COD and BOD ▪ Amount of waste generated ▪ % of refuse collected ▪ Level of community participation ▪ Level entrepreneurship ▪ Local Authority involvement ▪ Private sector involvement ▪ Numbers of receptacles by zone ▪ Number of boreholes per settlement ▪ Number of water borne toilets and pit latrines (including VIP) ▪ Amount of raw sewer discharged ▪ Age and carrying capacity of sewerage infrastructure ▪ Level capitalization and cost recovery ▪ % or amount of unaccounted for water ▪ Number of boreholes per settlement ▪ Number of water borne toilets and pit latrines (including VIP) ▪ Poverty rate (% of population living under poverty datum line) ▪ Self assessed poverty ▪ Poverty gap index ▪ Economic development ▪ Mortality rate
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		<ul style="list-style-type: none"> ▪ Access to health facilities (by gender) ▪ Maternal mortality rate ▪ Morbidity ▪ Growth rate ▪ Population density ▪ Population structure ▪ Migration ▪ Access (by gender) primary
Land	<ul style="list-style-type: none"> ▪ Land Quality ▪ Degradation/quarrying ▪ Soil fertility ▪ Deforestation ▪ Land tenure ▪ Urban Agriculture ▪ Servicing of land ▪ Land use 	<ul style="list-style-type: none"> ▪ Land area covered by quarrying (Km²) ▪ Land area degazetted/ deforested (Km²) ▪ % proportion of soils degraded by pesticides ▪ % of people with formal ownership documents ▪ % of agric land (formal and informal) ▪ Length of roads in km (tarred/gravel) ▪ % of households with access to piped water and water borne toilets ▪ % of households with access to electricity ▪ % of land covered by built up areas ▪ % of residential (formal/informal) ▪ % of commercial ▪ % of industrial ▪ % of areas of recreation ▪ % of administration use
Built Environment	<ul style="list-style-type: none"> ▪ Land use ▪ Settlement Upgrading ▪ Institutional Capacity 	<ul style="list-style-type: none"> ▪ %of built up areas ▪ % of residential (formal/ informal) ▪ % of commercial ▪ % of industrial ▪ % of areas of recreation ▪ % of administration use ▪ Area of land under upgraded informal settlements (Km²) ▪ Identify stakeholder institutions (narrative)



Annex 3: Technical Working Group Members

Land/Built Environment/

- | | |
|-------------------------------|---|
| 1. Mr. Joseph Mukupa | Lusaka City Council (LCC) |
| 2. Ms. Meembo N. Changula | MLGH, Department of Physical Planning & Housing |
| 3. Ms. Andiseya P. Lengalenga | Lusaka Province Planning Office |
| 4. Ms. Anna Mwitwa | Ministry of Lands |
| 5. Mr. Peter Mwanza | Department of Survey |
| 6. Mr. Joseph Zulu | LCC |
| 7. Ms. Theresa Bowa | ECZ |

Atmosphere/Energy

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|------------------------|-------------------------------|
| 1. Ms. Pizye Nakamba | APINA |
| 2. Ms. Flaviour Chanda | ZESCO Ltd |
| 3. Mr. Allan Dauchi | MTENR |
| 4. Mr. Gift Sikaundi | ECZ |
| 5. Mr. Nickie Phiri | Zambia Telecommunications Ltd |
| 6. Mr. Julius P. Daka | ECZ |

Socio-Economics

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|-----------------------------|--|
| 1. Mr. Modesto Banda | CSO |
| 2. Mr. Henry Munsanje | CSO |
| 3. Ms. Cecilia M. Banda | Department of Social Welfare |
| 4. Mr. Matongo Mundia | Zambia Alliance of Women |
| 5. Mr. Kangwa Chama | UN-Habitat |
| 6. Mr. Justin Mukosa | ECZ |
| 7. Mr. Christian Fundafunda | Zambia Association of Manufacturers |
| 8. Ms. Mirriam Mumba | ECZ |
| 9. Ms. Florence Ngala | Lusaka District Health Management Team |

Water and Sanitation

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|------------------------|--------|
| 1. Mr. Henry Mtine | LWSC |
| 2. Mr. Michael Kabungo | LCC |
| 3. Ms. Irene G. Lungu | ECZ |
| 4. Mr. Paul Banda | NWASCO |

Scenarios and Options for Actions

- | | |
|------------------------|-----|
| 1. Mr. Julius P. Daka | ECZ |
| 2. Ms. Irene G. Lungu | ECZ |
| 3. Mr. Gift Sikaundi | ECZ |
| 4. Mr. Michael Kabungo | LCC |
| 5. Mr. Joseph Zulu | LCC |









LUSAKA CITY STATE OF ENVIRONMENT OUTLOOK REPORT

The Lusaka City State of Environment (SoE) Outlook report has been prepared by a Technical Working Group comprising Environmental Council of Zambia (ECZ), Lusaka City Council (LCC), key Government departments and service providers in the City.

The report is aimed at raising awareness levels on the nature and background of environmental challenges facing the City. It covers four themes namely; Socio-economic issues, Land, Energy, Atmosphere and Water and Sanitation. Some of the key issues covered in the report include; provision of basic services such as education, health and housing, illegal settlements, transportation, land degradation, waste management, water and sanitation, energy and governance.

The Lusaka SoE report will therefore, increase knowledge about the interaction between society and the environment so as to bring about the needed changes for urban planning and management. It focuses mainly on assessing the pressures the environment is facing and analyses actions aimed at enhancing environmental management at district level. It goes a step further to propose policy options for addressing the identified environmental issues.

The challenge is for various stakeholders in the district to utilise the report for planning and decision making at all levels. The report should be used as a tool in the management of the environment and an integrated approach in the sustainable development of the district.



Lusaka City Council



Republic of Zambia



Environmental Council of Zambia