

APPROVAL PAGE

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**TITLE:** *EVALUATION OF THE EFFECT OF DECENTRALIZATION ON  
EQUITY IN THE HEALTH SECTOR FINANCIAL RESOURCE  
ALLOCATION PROCESS IN ZAMBIA..*

**BY:** DR K.M MULOSHI, BSc (Hons), MBChB.

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# APPROVAL PAGE

The University of Zambia approves this dissertation of K.M. Muloshi in partial fulfilment of the requirements for the award of Master of Public Health.

## Examiners

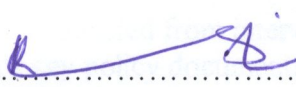
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## DECLARATION

I declare that this dissertation is the original work of Dr K.M Muloshi. It has been prepared in accordance with the guidelines for MPH dissertations of the University of Zambia. It has not been submitted for a degree at this or any other university.

Signed.....

  
Dr K.M Muloshi

Date.....

31/07/2024

## ABSTRACT

The research contained in this document was done in order to identify the factors considered in the formula used for allocating financial resources in the Zambian health sector since implementation of the decentralization policy. The identified parameters were then compared to those obtained from the international literature review such as the demographics of a population, morbidity/mortality profiles and socio-economic status of people in different geographical areas.

Data were collected from interviews with relevant informants, questionnaires and review of key policy documents and reports. Information was gathered from the Central Board of Health and from some District Health Boards. It included data on currently used variables in the formula and their justification; sources of district own revenue, actual amounts raised, factors affecting local revenue generation; socio-economic indicators and demographic profiles.

Analysis was done on the basis of assessing how (in)equitable the current formula is. Both qualitative and quantitative data were used. The former were analysed manually while the latter were analysed with computer software Excel and STATA.

Major findings include:

- The current formula does not allow for equitable distribution of financial resources. Inequities were found between provinces, with urban ones getting more funds than their rural counterparts.
- Indicators of need incorporated in the current formula were found to be inadequate. There is need to include more such as utilization of health services by age and sex and socio-economic status of people in a particular location.
- The current formula also uses some unstable and arbitrary parameters like cholera proneness and population density, respectively. Such variables need to be modified to improve equity.
- Local revenue from user fees and prepayment schemes is not considered in the formula. It was found that there are variations around the country in terms of revenue generation, with urban areas raising more funds than the rural ones. The study thus recommends that consideration be made of resources mobilized within the districts in the resource allocation formula.

This study concludes by drawing up several policy change recommendations that would enhance equity based on the findings above.



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**ACRONYMS**

|        |  |
|--------|--|
| AIDS   | Acquired Immune Deficiency Syndrome                    |
| CBoH   | Central Board of Health                                |
| CIDA   | Canadian International Development Agency              |
| CSO    | Central Statistical Office                             |
| DANIDA | Danish International Development Agency                |
| DHB    | District Health Board                                  |
| DHMT   | District Health Management Team                        |
| GDP    | Gross Domestic Product                                 |
| GNP    | Gross National Product                                 |
| HIV    | Human Immunodeficiency Virus                           |
| JICA   | Japanese International Cooperation Agency              |
| LCMS   | Living Conditions Monitoring Survey                    |
| MMD    | Movement for Multi-party Democracy                     |
| MoH    | Ministry of Health                                     |
| RAWP   | Resource Allocation Working Party                      |
| SAP    | Structural Adjustment Programme                        |
| SIDA   | Swedish International Development Agency               |
| SMR    | Standardised Mortality Ratio                           |
| UNICEF | United Nations International Children's Emergency Fund |
| UNIP   | United National Independence Party                     |
| UNZA   | University of Zambia                                   |
| USAID  | United States Agency for International Development     |
| WHO    | World Health Organization                              |



## **CHAPTER 1: INTRODUCTION, PURPOSE AND SCOPE**

### **1.1 Background**

Since all resources, including health sector resources are scarce, there is need for these resources to be distributed in a manner that will ensure equity. The health care market unlike the other economic markets, is unique because demand for health services is based on need and not on the willingness and ability to pay.

Mills (1998) argues that the allocation and distribution of health care resources is often very inequitable. Areas that are well resourced end up receiving more than those that are not. This is so especially if resources are allocated using the historical incremental approach as this method perpetuates existing inequalities. Ohene (1997) also observes that people who are actually considered the least in resource allocation decisions are those that are disadvantaged by their socio-economic status or reside in rural areas, and yet these are the ones that suffer a relatively high burden of illness and have relatively high mortality rates.

In view of the above, one way to try and improve access to health care services for everyone is by allocating resources in a manner that promotes equity by ensuring that there is equal access to basic services such as health, for equal need. In order to allocate resources efficiently, many developed and developing countries have adopted a needs-based formula as a basis for resource allocation. The first of this kind of formula was the Resource Allocation Working Party (RAWP) formula in England and it was successful in re-distributing resources from over-resourced to under-resourced areas, although it had its own shortcomings. This formula has been applied in many countries both developed and developing, but with a few modifications here and there. Some developing countries like Zimbabwe and Zambia have recently also developed a simple resource allocation formula based on population.

Most Sub-Saharan African countries, and developing countries in general have implemented health sector reforms in the last ten years, and decentralization has been seen as the overall strategy for restructuring the organization of the health sector, within these reforms. Decentralization has contributed to the implementation of reform mechanisms for the mobilization and allocation of health care resources.

Decentralization involves the transfer of power and decision making from a central authority to local levels. To promote efficiency in the provision of health care services, decentralization does encourage revenue generation at the local level through financing mechanism such as user fees, to supplement government revenue. Decentralization as part of the reform package of the health sector, combined with user fees, has been advocated by the World Bank as a way of improving efficiency in the health sector as it encourages community participation and local self-reliance (Kutzin 1995).

There are different factors that actually affect revenue generation in different areas, and evidence from the literature shows that different areas have different capacities to raise revenue. The point of concern here is how the revenue generated at local level impacts on resources allocated to these areas from central level. A resource allocation process that does not take into consideration other sources of finance that are available may have adverse impacts on equity.

The principal focus of this study, therefore, is equitable geographic allocation of health care resources from central to provincial or district level, based on a mechanism that promotes equity in access to health care services, that reflects the existing needs of the population, and that takes locally generated revenue into account.

## 1.2 Statement of Problem

The distribution of resources in many countries especially developing countries has been based on the historical incremental method where resources are allocated on the basis of the previous year's budget but only adjusted for inflation. Allocations done in this way are based on prevailing supply and demand patterns. This method generates inequities as it maintains the status quo. In order for resource allocation to be equitable, indicators of need in different geographical areas should be used since health care needs of the people may differ from one place to the other.

As many developing countries, including Zambia, have undertaken health sector reforms, decentralized the health sector and introduced cost-sharing schemes like user fees and prepayment schemes, there is a need for the resource allocation procedure to consider local revenue generated in different areas. This is because different areas would generate varying amounts of revenue and so a situation arises where some areas are able to generate more revenue than others.

The study therefore aims to assess central allocations to districts or lower levels, and to review what factors are considered in the resource allocation process in Zambia and whether they reflect the needs of the people in different geographical areas.

## 1.3 Objectives

**General objective:** To evaluate the effect of decentralization on equity in the health financial resource allocation from centre to periphery (provinces/ districts) in Zambia.

### **Specific Objectives:**

1. To determine how resources are allocated from central to local level and to evaluate which equity issues (indicators of need) are considered in this resource allocation process.



2. To evaluate the current distribution of public sector resources between provinces and health districts, and to assess whether these are allocated relative to needs.
3. To consider alternative formulae that would improve equity in resource allocation.
4. To identify available sources of locally generated revenue and to determine what factors influence these in different geographical areas.
5. To evaluate the impact of local revenue potential on resource allocation as a whole

The above are the objectives that the study intends to accomplish with a view of informing policy makers of the need to formulate policies that will ensure equity in resource allocation.

#### **1.4 Justification for the Study**

In Zambia, inequalities exist in terms of access to health services as the people that reside along the 'line of rail', mostly in urban areas, have better geographic access to health and other social services. All resources are limited or scarce, of which health sector resources are no exception since funding to the health sector in Zambia has gone down as compared to the early 1980's because the economy as a whole has gone through economic hardships. This study seeks to establish a mechanism for these scarce resources to be distributed equitably to reflect the relative needs of different areas.

With the existing inequalities in Zambia, both in terms of access to health care services and also the large income inequalities, if resources are and continue to be allocated on the basis of demand and supply with more resources going to districts along the 'line of rail', then it means that there is little or no possibility of expanding health services in the under-provided areas to improve access to health services.

A geographical resource allocation process aims to ensure that all existing resources are fairly or justly distributed between different geographical areas so that people in these different areas have equal opportunities in the utilization of health services. Therefore, in order for a resource allocation mechanism to be equitable, health care resources need to be distributed in a just way in a society.

Zambia is a country in Sub-Saharan Africa, which was among the first countries in the early 1990's to implement health sector reforms. This was because of the poor economic situation in the country and was necessitated by the situation at that time.

In Zambia, in 1991, there was a transition from a one party state to a multiparty democracy and a new party, the Movement for Multiparty Democracy (MMD), came into power. Prior to this, funding of social services was declining due to a deteriorating economy and this meant a decline in resource allocation to the health sector as well.

So the new government embarked on a substantial macroeconomic and social reform, of which health sector reforms was a component. According to Lake et.al (2000), reforming the health sector in Zambia was seen as providing a lasting solution to the many problems it faced, all of which needed immediate attention.

The key health care financing reforms such as the introduction of fees and the use of prepayment schemes have important inter-relationships with decentralization. It has been argued that these are a way of raising revenue at the lower or district level. Decentralization therefore encourages revenue generation at lower local levels through the deployment of user fees and prepayment schemes. One of the objectives of the introduction of user fees is to improve efficiency in the delivery of health services.

Existence of inequalities (both income and geographical) also means that different districts have different revenue generation capacities. Hence, there may be significant differences in the revenue generated and retained at district level, but this may not actually be taken into account in the resource allocation process of government funding.

There was need to undertake this study as it looked at the best way to distribute resources equitably by addressing all the relevant indicators of need that may be used in the resource allocation process in Zambia. The study also reviews and discusses international debates on equity in health care in order to inform policymakers on how to reduce inequities in health planning and resource allocation processes. The study also highlights major issues that policymakers should address.

### 1.5 **Organization of the Remaining chapters**

The outline of the remaining chapters of the study is as follows:

- ❖ Chapter Two provides background information on Zambia. It discusses the demographic, epidemiological, political and socio-economic profiles of the country in which the study took place.
- ❖ Chapter Three includes the literature review. Here, the definitions of all the relevant concepts in the study such as equity, need, resource allocation, decentralization, user fees and prepayment schemes, are given. A review of international debates on equity and resource allocation is also provided. This chapter ends with a conceptual framework that is drawn from the literature.
- ❖ Chapter Four gives the fieldwork methodology employed in the study. It discusses the sources and types of data collected, the type of instruments used and their validity, and also the methods of data collection.



- ❖ Chapter Five presents and discusses the findings. It also discusses alternative needs-based formulae that would try to improve equity in the resource allocation process if implemented.
- ❖ Finally, chapter six gives a summary of the key findings of the study with reference to equity in resource allocation. The chapter also gives recommendations and provides suggestions for further research.

## **2.1 Introduction**

This chapter gives some background information on Zambia's political, social and economic conditions. A brief discussion of the demographic and epidemiological profile of Zambia is also presented in this chapter. The chapter also gives an overview of the Zambian health system.

## **2.2 General Information on Zambia**

Zambia is a developing country located in southern Africa and its vegetation is mainly savannah woodlands and grasslands. It is a landlocked country that shares its boundaries with eight countries namely Namibia, Botswana, Angola, Malawi, Tanzania, Democratic Republic of Congo, Mozambique and Zimbabwe. Zambia is divided into nine provinces, which are further divided into seventy-two districts. The capital city of Zambia is Lusaka where the headquarters of most government institutions are situated.

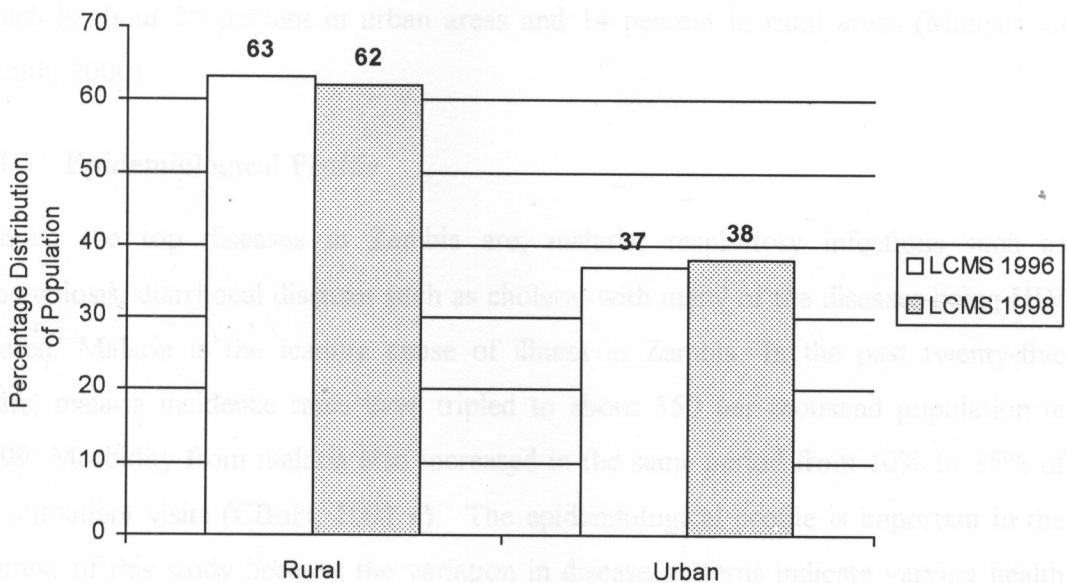
## **2.3 Demographic And Epidemiological Profile**

### **2.3.1 Demographic Profile**

The De jure population of Zambia was 7,759,167 in 1990 and was estimated to be 10.2 million in 1998 and rose to 9,885,591 as at the census date of 25<sup>th</sup> October 2000 (Central Statistical Office, Census of Population and Housing Final Report, 2003).

The average annual intercensal population growth rate for Zambia between the 1990 and 2000 censuses was 2.4 percent and this showed a decline from 3.1 percent between the 1980 and 1990 censuses. Out of the 9,885,591 people in 2000; 4,946,298 were males while 4,939,293 were females.

**Figure 2-1: Distribution of Population by Rural and Urban, 1996-1998**



Source: CSO, 1998

Figure 2.1 above shows that in Zambia, 62 percent of the population reside in rural areas while 38 percent live in urban areas (Living Conditions Monitoring Survey, 1996 and 1998). Lusaka and Copperbelt provinces are highly urbanised with 83 and 77 percent of population residing in urban areas respectively. Eastern and Western provinces are the least urbanised provinces with only 9 and 10 percent of their population living in urban areas, respectively.

The crude birth rate in Zambia decreased from 50/1000 in 1980 to 44/1000 in 1990 but then increased between 1990 and 2000 to 51.2/1000. However, the crude death rate has increased since 1980, when it was 16.7 per thousand population, to 18.3 and to 19.5 in 1999 and 2000, respectively. Life expectancy has also decreased from 46.9 years in 1990 to 45.5 years in 1996 and to as low as 37 years in the year 2000. Infant mortality rate per thousand live births also increased from 90 in 1990 to 108.9 in 1996 (CSO 2001.b). The increase in the death rate and infant mortality rates, as well as the decrease in life expectancy, can be attributed to high HIV prevalence in Zambia, which is about 29 percent in urban areas and 14 percent in rural areas (Ministry of Health, 2000).

### **2.3.2 Epidemiological Profile**

Among the top diseases in Zambia are; malaria, respiratory infections such as tuberculosis, diarrhoeal diseases such as cholera, with many of the diseases being HIV related. Malaria is the leading cause of illness in Zambia. In the past twenty-five years, malaria incidence rates have tripled to about 350 per thousand population in 1999. Morbidity from malaria also increased in the same period from 10% to 35% of all outpatient visits (CBoH, 2001 a). The epidemiological profile is important in the context of this study because the variation in disease patterns indicate varying health care needs and hence, the need for health care resources to be allocated on the basis of different health care needs of each geographical area.

## **2.4 Zambian Political, Economic and Social Background**

### **2.4.1 Political Background**

Zambia is a former British colony and was known as Northern Rhodesia before independence. It gained independence in October 1964 and has since then undergone three distinctive phases in its governance.

The first phase consisted of multi-party politics until 1971, when a one party system was established and this marked the second stage of governance. In October 1991, Zambia reverted back to multiparty democracy bringing an end to one party politics and hence, the beginning of the third phase in Zambia's governance.

In the first and second phases of Zambia's governance, social services such as education, health and many others were provided free of charge by the government but in the third phase, which started with substantial economic and social reforms that included health and education reforms, user fees were introduced. The different systems of governance did have an impact on resource allocation in all sectors of the economy, of which the health sector was no exception.

#### **2.4.2 Socio-economic Background**

Zambia is a low-income country with high and worsening poverty levels of about 73% as in 1998. Inequalities exist within urban areas and also along provincial lines, for example, provinces closer to the 'line of rail' (UNZA, Department of Economics, 1996), which runs from the Southern to the Copperbelt provinces, have better access to basic services including health care.

Distribution of income in the country is also highly skewed with an estimated Gini coefficient of 0.66. Real per capita incomes have fallen from US\$420 in 1974 to less than US\$300 in 1997 (Department of Economics, UNZA, 1996). At present GDP per capita is less than US \$1 per day.

Zambia is one of the major copper producing countries of the world and this has made the Zambian economy heavily dependent on copper export trade. About 90% of export earnings in Zambia come from copper earnings (Department of Economics, UNZA, 1996).

Zambia has, however, experienced economic decline during the period 1980 to 1991. This has been as a result of two major external shocks, the first being the rising oil prices since 1973 as oil is the country's number one import; and the other reason being the low and falling world copper prices (Masiye, 1998). Since the 1970's, both the production volume and copper prices have generally been declining, and this has led to reduced foreign exchange earnings. As a result, this has also led to increased reliance on foreign aid and debt. Therefore, Zambia's economy is also worsened by the heavy debt burden. The declining economy meant less funding of social services, as fewer resources were available to all sectors of the economy including health. Hence the financial crisis of the health sector in Zambia was a reflection of the prolonged macro-economic problems the country had been facing since the early 1980's.

In 1991, when the newly elected Movement for Multi-party Democracy (MMD) government took over power, it embarked on a vigorous Structural Adjustment Program (SAP), in order to try and redress the imbalances in the economy. The goal of the restructuring program, which was a long term one, was to reduce inflation and stabilize the economy in order to stimulate economic growth, while at the same time reducing poverty thereby improving the standard of living of the people (CSO, 1998).

The Structural Adjustment Programme included the following:

- Liberalization of foreign exchange markets
- Privatization of state-owned companies
- Liberalization of domestic and foreign trade
- Strong fiscal policy, which included government operating on a cash budget to reduce inflation
- Transformation of the civil service
- Transportation of the agriculture and transport sectors
- Health and education sector reforms, which included the introduction of user fees

As Zambia is basically a low-income country with large income inequalities but with few resources available to all the sectors including health, the resource allocation process must reflect the different needs of people in different geographical areas.

Of vital importance to this study are the health sector reforms and how they impact on resource allocation

## **2.5 The Zambian Health System**

### **2.5.1 Health Sector Reforms**

Poor health indicators and a centralised inefficient health care system were among the reasons for Zambia to initiate health sector reforms. The newly elected Movement for Multi-party Democracy (MMD) government in 1991 accelerated the reform movement, and adopted the vision 'to provide Zambians with equity of access to cost-effective, quality health care as close to the family as possible' (MOH, 1992). This was to be achieved through a combined strategy of decentralization, health financing reform and strengthening of technical service delivery and management. The health care reforms in Zambia had four major objectives and these were:

- To increase both technical and allocative efficiency in resource use
- To increase both geographical and socio-economic equity of access to health care services
- To increase resources available to the health sector
- To increase overall availability and effectiveness of health services

The overall performance of the economy in Zambia has had effects on the health sector. The health sector, like many other sectors, has experienced budget cuts due to a decrease in public expenditure. This has meant that fewer resources are available to the health sector and thus, the need for equitable resource allocation.

### **2.5.2 Provision of Services**

Both the private and public sectors provide health services in Zambia even though the government is the biggest provider. The private sector has two components namely the private for-profit and the private not-for-profit services. The private sector, in the provision of health services, in Zambia is generally very small but is being actively encouraged by the government unlike in the 1970's when private-for-profit hospitals were banned. There are now private hospitals and also private health insurance organisations.

Some people especially those that reside in urban areas, actually prefer to seek private health services, as they perceive that they derive better services from private than public institutions. But these services are in most cases very costly and so unaffordable to many Zambian people.

The private not-for-profit services refer to mission hospitals, most of which are situated in the rural areas and they provide services that are relatively cheap.

Both the private and public sectors do provide health care services but this study looks at resource allocation for the provision of public health services.

### **2.5.3 Funding for the Health Sector**

There are various sources of funding of health care services in Zambia and these include the government, companies, households, international donors, and other non-governmental organizations. But the main source of funding for the health sector is government revenue, through the Ministry of Health (MoH), although the health sector is also heavily supported by external aid through bilateral contributions.



In 1996, the District Basket Funding was introduced which refers to the ‘ co-financing of district health services by a number of donors and government’ (Lake and Musumali, 1999). The common basket is based on a set of procedures that include financial monitoring of districts and the disbursement of funds that is based on certain criteria. Currently, the contributors are the government of the Republic of Zambia (GRZ), and international donors such as DANIDA, Netherlands, SIDA, UNICEF, Ireland Aid, European Union, and USAID. Contributors in-kind include WHO, JICA and CIDA.

The Ministry of Health expenditure in 1998 accounted for 1.9 % of GDP but 11.9 % of the overall government budget (MoH, 2000). In 1999 and 2000, again it accounted for 1.9 % of GDP but rose to 13.9 % and 15 % of the total budget, respectively. In real terms though, the proportion going to the health sector has declined significantly as compared to the 1970’s and early 1980’s.

#### **2.5.4 Structure and Management of Public Health Care Services**

In 1995, the National Health Services Act (GRZ, 1995) enabled the creation of District Health Boards (DHBs) to act as the supervisors and ultimately as employers of the District Health Management Teams (DHMTs). The overall role of the DHMTs (CBoH, 2001 b), is defined as follows:

- To provide managerial and technical support to the health centres and first level referral hospitals
- To mobilize and distribute resources such as finances, supplies, equipment and human, to health centres and first level referral services.
- To monitor and evaluate health care performance in the district in terms of quality and continuity and to take corrective action where necessary
- To provide training for health post, health centre and first level referral staff

The District Health Boards were set up side by side with existing hospital boards. A Central Board of Health (CBoH) was created in order to separate the policy-making and technical functions at the national level. The National Health Services Act of 1995 stipulates the functions of the CBoH among others, as follows:

- To supervise, advise and monitor the technical performance of management boards
- To set financial objectives and framework for management boards
- To provide technical consultancy to management boards and assist non-governmental health providers
- To co-ordinate the technical capacity of management boards.

The role of the Ministry of health (MoH) was redefined as one of policy-making and regulation, and it contracts out functions related to health care delivery to the autonomous CBoH. The CBoH in turn is responsible for the coordination and supervision of the country's 72 autonomous district health boards and 24 hospital management boards (CBoH, 2001). It is also the CBoH that makes decisions on the allocation of resources to provinces and districts.

The structure of the public sector in the provision of health care services, in a descending order, is as follows:

- University Teaching Hospital (UTH)
- Central Hospitals
- General Hospitals
- District Hospitals
- Health Centres
- Health Posts

The UTH is the national hospital, which is also a teaching institution. There are only two central hospitals in Zambia and these together with UTH are autonomous and are therefore answerable directly to the CBoH. General hospitals are provincial hospitals whereas district hospitals are only found in certain districts. There are a number of health centres within the districts and health posts are generally found in rural areas and they are mainly dispensaries. In addition to the above, there are also a number of specialist hospitals offering mental, tuberculosis and children's services and operate as second level hospitals.

#### **2.5.5 Problems being faced by the Zambian Health Sector.**

There are a number of problems that the Zambian health sector is experiencing such as limited resources both financial and human, shortage of certain essential drugs, and an exodus of staff to neighbouring countries for greener pastures. This study focuses its attention on the problem of limited finances as funding to the health sector has gone down as compared to the early 1980's since the economy as a whole has been declining. This is the reason why equity in the distribution of these resources needs to be considered so that the distribution reflects the relative needs of the people in different geographical areas.

### **3.1 Introduction**

In this chapter literature is reviewed mainly on resource allocation and relevant concepts used in this study. A conceptual framework has also been developed which brings out the key issues from the literature, and this forms the basis for analysis in this study as it also provides a basis for evaluating alternative resource allocation formula within the Zambian context.

The literature review focuses on the following key issues: equity, resource allocation, decentralization, user fees and prepayment schemes; the link between decentralization and the financing mechanisms; impact of user fees/ prepayment schemes and decentralization on equity.

International approaches to resource allocation mechanisms have also been presented. This consists of experiences from both developed and developing countries. Debates on the resource allocation mechanisms have also been reviewed.

### **3.2 Equity in the Health Sector context**

A geographical resource allocation mechanism is only equitable when it facilitates the distribution of resources relative to the needs of the people.

What is meant by equity? According to Mooney (1983), in whatever way equity is defined, all the definitions contain some analysis of fairness of distribution of something or the other. In the allocation of health care resources, equity means that resources should be distributed fairly or justly in order to reflect the relative need of the people.

It is also important to note that there is a difference between equity and equality. Equality is about being equal whereas equity is about fairness. According to MacDonald (1973), equity may be defined as ‘a system of justice based on fairness’ whereas equality would be defined as ‘the condition of being equal’. Equity implies that all people be treated fairly in relation to benefiting from health care services while equality may simply imply that all people should have the same health status (Whitehead 1992, Williams 1993). Nevertheless, Whitehead (1992) as well as Culyer and Wagstaff (1993) pointed out that there are barriers to obtaining equal health and some of which are genetic, social, economic, environmental and behavioural differences among different people. They further argued that it is difficult to overcome these barriers by simply providing health care resources and hence, achieving equity in resource allocation may not automatically lead to equal health. In this case, being unequal may be deemed as being fair and equitable (Whithead 1992).

According to Whitehead (1992), equity in health care is defined as equal access to available care for equal need, equal utilization for equal need, and equal quality of care. In health care, equity is classified into two broad categories: which are equity in provision and equity in financing of health services.

**Table 3-1: A classification of equity definitions**

| <b>EQUITY</b> | <b>HEALTH CARE</b>  |   | <b>HEALTH</b>  |
|---------------|---|---|--|
|               | <b>Provision</b>  | <b>Financing</b>  |  |
| Horizontal    | <ul style="list-style-type: none"> <li>• Equal access for equal need</li> <li>• Equal expenditure for equal need</li> <li>• Equal inputs for equal need</li> <li>• Equal use or treatment for equal need</li> </ul> | <ul style="list-style-type: none"> <li>• Equal payment for equal use</li> <li>• Equal payment for equal ability to pay</li> </ul> | <ul style="list-style-type: none"> <li>• Equal health</li> </ul>                   |
| Vertical      | <ul style="list-style-type: none"> <li>• Unequal access for unequal need</li> <li>• Unequal expenditure for unequal need.</li> </ul>  | <ul style="list-style-type: none"> <li>• Unequal payment for unequal ability to pay.</li> </ul>                                   | <ul style="list-style-type: none"> <li>• Reduced inequalities in health</li> </ul> |

Source: Mooney (1987), Van Doorslaer et al (1993)

For resource allocation purposes and for the resource allocation formulae, the relevant form of equity to consider is that of provision. Therefore, this study as well focuses on equity in the delivery of health services and not equity in the financing of health services. There are two types of equity: horizontal and vertical equity. Horizontal equity refers to equal access or utilization for equal need while vertical equity refers to unequal treatment for unequal need. In this study, however, the definition of equity adopted is that of horizontal equity meaning equal inputs or resources for equal needs.

### **3.2.1 Overview of Theories of Justice as Applied to the Health Sector.**

Whenever equity is discussed in the health sector context, it is always important to consider ideological perspectives known as the theories of justice, as these tend to have an influence on the nature of a particular health system (Gilson, 1986). There are five major theories of justice and these are the libertarian theory, utilitarianism theory, maximin theory, egalitarian and Marxist theories.

According to the libertarian theory, people are entitled to whatever they have so long as they have acquired it legally. Williams (1993) pointed out that under this theory, health care is distributed on the basis of willingness to pay coupled with ability to pay. The theory also relies on market forces as a just way of allocating resources.

For the *utilitarianism theory*, it is the maximum utility or satisfaction of the greatest number of people that counts. With this theory, so long as the majority of people benefit from health services, then it is acceptable. This theory is basically related to efficiency and not necessarily equity. This study therefore cannot be based on this theory since equity is the main issue.

With the *maximin theory*, the maximum benefit should go to the least advantaged in society thereby giving priority to the poor when distributing social services such as health care.

*Egalitarianism* takes what is known as the strictest definition as it advocates for 'equal net welfare for all individuals' (Gillon, 1986). Within the health sector context, this theory maintains that everybody in society should derive equal health.

Finally, the *Marxist theory* recognizes the fact that people have different needs, which may not be identical with one's ability to pay. It is therefore of the view that needs of the people should be taken into account when determining the distribution of services.

As a result, the distribution of health care resources, according to this theory, should be based on need rather than on the ability to pay (Wagstaff and Van Doorslaer, 1993).

Looking at the above theories of justice, it is not likely that a country may adopt any one single ideology in relation to health care services but may have a mix of bits of these ideological perspectives. McIntyre et.al (1997) noted that countries might actually have a combination of the ideological perspectives in their health policies and plans. They went on to say that the mix of these perspectives may vary over time and may be influenced by changes in government, as was the case in South Africa where during the apartheid era, libertarianism was common but the present government encourages egalitarianism.

Going by the egalitarian theory, it would be preferable that all individuals in society derive equal health but as has already been mentioned, there are barriers to obtaining equal health that are difficult to overcome through the provision of health care resources alone. The Marxist perspective is very realistic as it brings out the importance of needs in the distribution of health care resources. The distribution of health care resources on the basis of need is the prime concern of this study. The egalitarian theory may however be applicable within the context of this study in the sense that all individuals in society should have the right to access health services when in need within the public sector context.

### 3.2.2 Need for Health Care

It has been noted above that the two types of equity, which are horizontal and vertical equity, imply equal or unequal inputs / treatment for equal or unequal need, respectively. What does need then mean? Need in the health care context has been defined in different ways since different people have perceived it differently. Just like the concept of equity, there is no single definition of need.

The first perception is that of need as ill-health. Cuyler and Wagstaff (1991) noted that many analysts argue that people with a similar health status have equal needs and those with a different health status have unequal needs. Others such as Gillon (1986) and Williams (1962) have argued that people who are more ill than others actually have a greater need for health care than those who have better health. But this definition of need for health care is not really well founded, as there are some health services such as family planning and many others, which are mainly preventive interventions that are sought by people who are not really sick. McIntyre (1997 b) noted that being ill is not a pre-requisite for seeking health care because health services may also be 'needed' by people who are 'healthy'. The other weakness with this definition of need for health care is that some health problems cannot be offset completely by health services but may also require other interventions such as environmental services. An example of this would be diseases that are caused by air pollution and water pollution. This brings us to the conclusion that the perception of need as ill health is inadequate to define the need for health care services.

The second way that the need for health care has been defined is that of need as the capacity to benefit. This is because people live in different locations and so they may have varying capacities to actually benefit from the consumption of health care services. According to Cuyler and Wagstaff (1993), need as the capacity to benefit from health care services has two implications. The first issue is that the expected marginal productivity of health care of a marginal need must be positive. If not, then health care cannot be needed.



Therefore in order for a need to exist, there ought to be an expected capacity to benefit from the consumption of resources (Normand 1991). The second issue is that even if the marginal product is positive, it may be a necessary but not sufficient condition for a need to exist, as there may be another less costly or more productive technology that yields greater outputs (Cuyler 1989). Capacity to benefit from the consumption of health services is a better definition of need than the existence of ill health as people may need health care but not be ill at all as in the case with preventive interventions. In the same way, people may also be ill but not need health care especially if they know that there is no effective treatment.

The other definition of need for health care is that of expenditure to exhaust capacity to benefit. Cuyler and Wagstaff (1993) came up with another definition of need as they thought that the available definitions of need were not adequate, and so their definition of need was 'the minimum resources required to exhaust an individual's capacity to benefit from health care'. If need is defined in this way, it means that it will vary from one individual to the other as resources are variable.

In resource allocation, if resources are distributed according to need, then the distribution of health care resources will vary depending on need and especially on how the concept of 'need' is defined.

### **3.3 Resource Allocation**

*Resource Allocation* refers to the process of distributing health care resources, particularly financial resources from a central or regional level to more peripheral or local levels. According to the Resource Allocation Working Party report (DHSS, 1976), resource allocation is concerned with the distribution of financial resources, which are ultimately used for the provision of real health care resources. McIntyre et. al (1997), pointed out that the fundamental aim of a geographical resource allocation formula is to make certain that all readily available resources are distributed equitably or fairly among all the health districts in different geographical areas.

It has been argued that there is need for a health care formula in resource allocation because in many countries, the public health care budgets of different regions have been and are being based on the previous year's allocations that are only adjusted for inflation of the current year. These patterns are time and again inequitable because they are determined by the historical supply of services and not based on the needs of the population (Doherty and van den Heever; 1997).

Mays and Bevan (1987) therefore argued that this historical incremental method, as a way of budgeting, is a weak method for allocating resources to different geographical areas because of its reliance on variables that reflect the supply of health services. Allocation of health care resources in this way would always be based on what is already there and not on the basis of equity considerations.

### **3.3.1 International experiences of Needs-based Formulae**

There have been a number of initiatives internationally to address geographical health care resource allocation disparities. In several countries, including England, New Zealand, Australia and Canada, a concern that equity should become the guiding principle for the geographical re-distribution of resources has led to the development of what are known as the needs- based formulae. These formulae use proxy measures of health care need to weight the population figures of regions in order to provide an estimate of the relative need for health care services across the country. These include variations in demographic structure and health status of populations residing in different regions (Doherty and Van den Heever; 1997). The objective of geographical resource allocation therefore, is to promote equity.

According to McIntyre et.al (1997), a needs-based formula is one method used widely to guide the resource allocation process and decisions. A needs-based formula is thus a formula for allocating financial resources adjusted for the relative needs of the population in terms of age, sex, and other factors that reflect need for health care services.

Such a resource allocation formula can promote equity in the distribution of health care resources between districts, and this means that areas with equal need receive equal health care resources. A number of different formulae have been developed and some of these are discussed below.

### **3.3.2 England**

England was the first country to derive a resource allocation formula known as the Resource Allocation Working Party (RAWP) formula. The RAWP formula was designed as a “method of securing, as soon as practicable, a pattern of distribution responsive objectively, equitably and efficiently to relative need” (DHSS, 1976). The RAWP report (DHSS, 1976), also defined the criteria of need as consisting of the size of the population weighted for demographic make-up, morbidity, cost of providing care in different areas, health care use across administrative boundaries, medical education and capital investment.

Population make-up in terms of age and gender was found to be very important, as people do not have equal needs for health care. Women may have different needs from men, whereas children and the elderly may be heavy users of health care facilities. Therefore, the patterns of morbidity may be different between the sexes at different ages. This is why the RAWP formula took into account the age/sex make-up of the population in addition to its size. But also, populations of the same size and make-up may display diverse morbidity characteristics even when differences due to age and sex have been taken into consideration. This was the reason why data on morbidity was also considered, and standardized mortality ratios (SMRs) were used to reflect this. RAWP also took account of differences in the costs of providing care, as these are also variable. There may be different costs in different areas in the provision of health care services

RAWP also accounted for cross-boundary movements to make sure that allocations were based on the total populations served by a particular service and not just the people residing within a certain administrative boundary.

The criteria of need should therefore consider patient flows across boundaries because unplanned patient flows could also be a measure of geographical disparity in health care provision. People in one administrative boundary may opt to seek health care services from another due to a number of reasons.

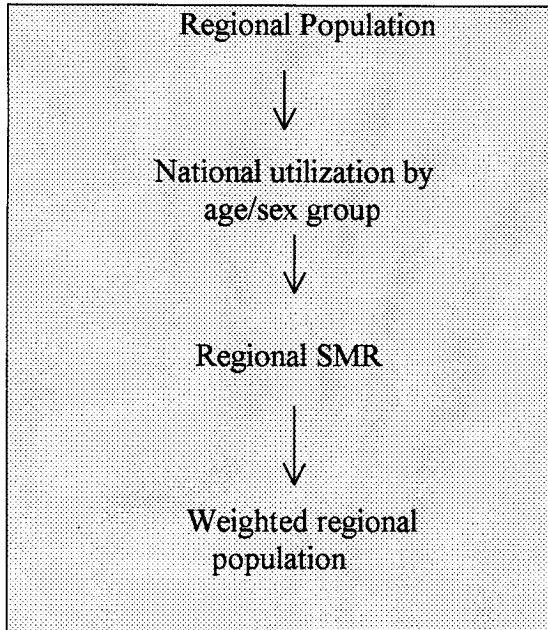
First and foremost, if the health sector facility in the other area is conveniently located near them, in terms of distance, then they will definitely go to the nearest one regardless of whether it lies outside their administrative boundary or not. Another reason may be that if the quality of health care services were better in another area, then this would lead to cross-boundary flows. Mays and Bevan (1987) observed that RAWP recognised the fact that the historic imbalance of service availability was too great for widespread boundary flows to be gotten rid of except in the long term. So in cases where patient flows were prominent, populations used for revenue allocations needed to be adjusted in order to take account of this movement, also bearing in mind the different costs of care involved in different areas. RAWP therefore, opted to take existing patient flows into account when calculating revenue targets so that regions and areas would be funded on basis of population served.

In summary, the indicators of need, therefore, identified by RAWP were the size of the population in each region and this was the primary indicator of need; population was weighted by national utilization of the respective services by each age/ sex group in order to account for gender and age composition of each geographical regions' population; mortality data in form of SMRs, as a proxy for inter-regional differences in morbidity (See Table 3.2).

Later on, regional populations were also weighted by a measure of social deprivation as SMRs were criticized as not adequately accounting for regional variations in the need for health care services arising from differences in socio-economic conditions. Differences in socio-economic status are very important especially in developing countries, where they are very significant, because they influence the level and type of health need of the people in society.

For example, poor people may tend to suffer from ill health more than the rich and also diseases may also vary depending on socio-economic status.

**Table 3-2: Summary of RAWP**



Source: McIntyre (1994)

As already discussed, further adjustments were made for cross boundary flows of patients and in areas with teaching hospitals, the costs of health care provision in certain areas, and the additional costs of teaching and research were included (Lake et. al, 2001).

This RAWP formula was successful in guiding the distribution of health care resources in England. Resources were gradually shifted away from those regions that were relatively ‘over-resourced’, that is, in terms of their need for health services, to those regions that were relatively ‘under-resourced’. According to McIntyre et. al (1997), those areas that were over-resourced, above the target figure, had their resources reduced gradually each consecutive year with a maximum cut of two and a half percent each year. Similarly, the under-resourced areas had their share of resources slowly increased each year with a maximum of five percent each year (DHSS 1976).

### 3.3.3 Other Country Experiences of the Needs-Based Formulae.

The RAWP formula has been the foundation of the experiences in other countries as these have generally built on the initial work done by the RAWP (Lake et.al, 2001), but with slight variations here and there. The basic principles and structure of the RAWP formula have been applied in both developing and developed countries as a result of the success of this formula in guiding the re-distribution of health care resources in England.

The table below shows different countries and the variations of the needs-based formulae adopted.

**Table 3-2: Examples of other countries using or considering using the needs-based formulae**

| Country   | Type of Needs-based Formula   |
|-----------|---|
| Australia | A variant of the RAWP formula was adopted by the state of New South Wales in the late 1980's, but with an adjustment for utilization of private sector services and more recently, adjustments have been made to reflect greater health needs of certain population groups  |
| Canada    | Experience was slightly different with provincial ministries of health being responsible for determining the method to be used in the allocation of funds for health care, although in many cases it has remained based on historical budgets. Canada, nevertheless, also has recognised the need for a weighted capitation formula and one suggestion is that programme budgets in Ontario be allocated on the basis of age, sex and an index of relative need, with some allowance of for the costs care in sparsely populated areas. The index is based on standardised mortality rates by sex, for people under the age of sixty-five. There is already limited use of needs-based formula in Quebec, which allocates funds for its home care programme based on relative need. |
| Country   | Type of Needs-based Formula   |
| Portugal  | Based its formula on RAWP but has employed it only for the allocation of funding to primary care services. Income is used in the formula as an indicator of socio-economic status.  |
| India     | An index of need was investigated by researchers, for health resources for the different states in order to replace the current per capita allocations. The main determinants of need in this index are mortality-related indicators.   |
| Zambia    | Due to scarcity of accurate data, a simple per capita formula is used.  |

Source: Doherty and Van den Heever (1997), Lake et.al (2001), Birch et.al (1996)

According to Doherty and Van den Heever (1997), needs-based formulae try to identify a combination of factors that make a fair or just estimation of need. Allocation of funds based on the simplest formulae are done on a per capita basis (an example from the above table is Zambia which is a developing country), while more complex formulae bring in more factors such as age and sex, morbidity and socio-economic status. In developed countries, where data and the necessary skills are readily available, complex formulae have been widely used. Nevertheless, recommendations have been made that a needs-based formula even of the simplest kind should be applied in developing countries (Bevan, 1991).

In South Africa, another developing country, an approach known as the South African Health Resource Allocation formula (SAHRA) was proposed in the early 1990's (Bourne et.al 1990, McIntyre et.al 1991). The difference between this formula and RAWP is that the former only covered both preventive and curative health services. For curative care, the three elements that formula included were: regional populations by age and sex; national age and sex-adjusted utilization of hospital services (per capita bed days) taken from the US estimates as there were none for South Africa; and the inverse proportion of regionally-weighted life expectancy. The formula for preventive care, made use of the concept of Potential Years of Life Lost (PYLL) to reflect need due to preventable cases (Lake et.al, 2001).

In South Africa, also a case study was done on resource allocation to regions and districts in the Eastern Cape Province. According to Makan et.al (1997), a research team investigated the implications of using a needs-based resource allocation formula that weighted the district populations to reflect their demographic composition, differential levels of ill-health using mortality as a proxy measure between districts, and also accounted for differential access to private sector since the objective was to ensure equitable access to the public sector services (Makan et.al 1997).

A further adjustment was made to the formula to take account of local government own revenue so that the provincial health department allocates less of its budget to districts containing a local government that can generate significant revenue for primary health care services (Ibid).

The analysis in the Eastern Cape actually indicated that there were significant inequalities in the current distribution of district level health expenditure with one region substantially over-resourced relative to the health needs of the population in that region, while another region was under-resourced.

Experience has therefore shown that even though there are problems in obtaining accurate data for all the proxy measures of need, emphasis should at least be put on trying to achieve equity in expenditure per capita.

Some of the indicators of need that have been applied in other countries and which may be relevant to Zambia, within the context of this study might include; population size, demographic composition of the population, morbidity or mortality rates as well as indicators of socio-economic status like poverty rates or per capita income.

#### **3.3.4 Shortcomings of the RAWP Needs-Based Formula**

In addition to the indicators of need used in the RAWP formula, other countries have included a range of other indicators, for example, some countries have based resource allocation decisions on the size of the regional population dependent on public sector services, and accounted for differential population densities among geographical area. There has also been some debate about whether SMRs should be used in the formula or not, but this is discussed in detail later in this section.

The RAWP formula did not take into consideration the private sector, as it probably was not significant in England at the time.



However, this has been seen as necessary especially in countries with a large private sector and therefore, it has been argued that it is necessary to base resource allocation decisions on the proportion of the regional population dependent on public sector services (McIntyre 1994). In Zambia, though, this may not be significant as the private sector is very small in comparison to the public sector as most people do in reality rely on public health care services.

The other issue not considered under RAWP were the variations of population density between different geographical areas. Nevertheless, in countries like Zambia, where rural areas have low population density as compared to urban areas where population densities are high, this is relevant. According to McIntyre (1994), there is a need to compensate those areas with low population densities for the comparatively higher cost of providing services, which are accessible to the people. However, it should be noted that even if there is a need for this compensation, it is also important to consider urbanisation especially in the context of developing countries, as there is rapid urbanization in these countries. The RAWP formula overlooked urbanization, as this may also not have been relevant to England at that time. Urban areas in most countries have more resources than rural areas and this may mean allocating resources away from urban areas to rural areas. But in future, more resources may actually be needed in urban areas when population grows due to rapid urbanization. Therefore, as McIntyre (1994) suggested, when adopting a needs-based formula, a longer perception of population should be considered in order to prevent services from being downscaled in the urban areas only to be reinstated later.

Another issue is that of cross-boundary flows. There have been international debates (as discussed earlier on) as to whether these should be considered in the allocation of resources to each geographical area. The main reasons for cross-boundary flows are convenience due to location and in an attempt to seek better services as a result of comparatively inadequate provision of health services in some areas.

Under RAWP in cases where patient flows were prominent, populations used for revenue allocations were adjusted to take account of this movement. Estimation of cross border flows and compensations of the areas that served people from other areas were then made after two years. But it has been argued by different researchers that the process of estimating the cross-boundary flows should actually be eliminated deliberately so as to encourage regional autonomy (Mays and Bevan 1987). This means that not taking into account cross-boundary flows would eliminate inequities in accessing health care, which would just be perpetuated if considered, especially at district level where vital basic health care services are provided to the people. These basic services must be accessible to local residents and they should not go to another district to seek them. Hence, as McIntyre et.al (1997) also argued, at district level cross boundary flows are not relevant as these may exacerbate inequities in accessing basic health care.

There has also been debate on what measure of relative need to include in the resource allocation formula based on whether indicators of morbidity or mortality are sufficient, or whether there's a need for additional measures of socio-economic deprivation required (Lake et.al 2001). "The adequacy of RAWP's stand on social deprivation has been the subject of extensive debate, most of it criticizing the lack of a 'social deprivation weight' in sub- regional RAWP which would take account of the effect of adverse social conditions over and above those which are visible in mortality" (Mays and Bevan 1987). Many of the critics have been of the view that SMRs are an incomplete indicator of need, as they do not recognise urban poverty, crowding and other effects of social deprivation (Ibid). As a result, there are two main arguments for social deprivation with regards to SMRs. The first argument is that in socially deprived areas, the ratio of mortality to morbidity may be different than in non-socially deprived areas. The second argument is that the relationship between morbidity and the need for health care resources differs depending on the socio-economic and environmental conditions of an area (Ibid). SMR's are themselves also

a weak measure of mortality as they mainly reflect the relative mortality at older ages of an area compared with the national average.

A number of deprivation indices in the United Kingdom and other countries have been used to reflect the importance of socio-economic deprivation to strengthen planning and resource allocation procedures. In the UK, the most well known of these, is the Jarman Underprivileged Area (UPA8) index which was derived as a measure of predicted GP (General Practitioner) workload. This approach was also adapted for use in Sweden. Other indices usually used in studies of deprivation and morbidity or mortality are the Townsend Index of material deprivation, and also the Scottish deprivation Score which was developed by Carstairs and Morris (Lake et.al, 2001)

In South Africa, McIntyre et. al (2000) recently also proposed a deprivation index for resource allocation in the health sector which incorporated a wide range of socio-economic and demographic variables, including housing type, education levels, access to a telephone, access to electricity, water source and sanitation facilities (Lake et. al, 2001).

### **3.2.1 Limitations of Needs-Based Formulae in General**

The major objective of all needs-based formulae is to equitably distribute resources geographically entirely based on need. But the problem comes in when measuring need. On the other hand, there is no single indicator of need and therefore several indicators must be used and combined into a single formula (Doherty and Van den Heever; 1997). The selection of the indicators to be used in the formula may be influenced by lobby groups (Doherty and Van den Heever; 1997) and so this must be done in a clear manner so that the goal of equity may be achieved.

Needs-based formulae also entail redistribution of resources from over-resourced to under-resourced areas but this may face some opposition from people and political leaders in the over-resourced areas. McIntyre et.al (1997) noted that the opposition could be lessened if all the stakeholders were involved in the process of decision-making, which identifies priority needs and how to meet these needs in the provision of services.

### **3.4 Decentralization**

*Decentralization* is the transfer of authority and functions as well as decision-making from a central body to a lower or local body, usually from higher to lower levels of government. Mills (1990) defines decentralization as “the transfer of authority, or dispersal of power, in public planning, management and decision-making from the national levels to sub-national levels, or more generally from higher to lower levels of government”. There are four types of decentralization according to Brijlal et.al (1998), and these are deconcentration, devolution, delegation and privatisation. The central government retains significant authority and responsibility in policy-making, regulation, coordination and monitoring.

*Deconcentration* involves the transfer of some administrative authority to local offices and examples of these are the District Health Management Teams (DHMTs) as in the Zambian case. In Zambia, the DHMTs are accountable to a central authority for example the Central Board of Health (CBoH). Deconcentration is aimed at strengthening district level management bodies.

*Devolution* is the transfer of functions from central government to lower levels of territorial administration such as provinces or local government in which case the lower levels of government are given a considerable level of decision-making authority and they are politically accountable to the local electorate.

In the case of *delegation*, it is the transfer of functions with managerial responsibility from central government to autonomous organizations.

And lastly, *privatisation* involves the transfer of functions and all decision-making powers from government to non-government organizations.

In most of these types of decentralization, the government retains a regulatory role so as to ensure accountability and to monitor the activities that are undertaken by the decentralized units.

The four different types of decentralization are linked to specific objectives but objectives of decentralization in general, among others, are:

- To encourage community participation and local self-reliance
- To promote accountability of the government to the people
- To improve efficiency in provision of health care services
- To promote national unity through local democracy.
- To reduce congestion at the centre.

It has been argued that decentralization is one way of encouraging efficiency at local level as it transfers decision-making power from central to local level and encourages revenue generation at local levels. This revenue generated is then used to improve the quality of health care services. It is also used to strengthen performance of public facilities, and to address resource shortages and inefficiencies of the centralized system through local resource mobilization and cost containment (WHO, 1995).

According to Brijlal et.al (1998), it is argued that local decision-making power and financial sustainability will be enhanced if a greater proportion of expenditure is funded from local sources and that this financing mechanism will promote accountability to the community.

Therefore, decentralization and increased local financing are usually closely associated health sector initiatives.

According to Brijlal et.al (1998), there are three main categories of local generation mechanisms and these are local government revenue, user fees, and prepayment schemes also known as community financing. User fees, and prepayment schemes are two of the different financing mechanisms for health care services that this study focuses on, as local government is only relevant to the devolution type of decentralization, but the one in Zambia is that of deconcentration.

### **3.4.1 Financial or Fiscal Decentralization**

Financial decentralization refers to the decentralization of financial management of the cost-sharing revenue in the health sector. It is the transfer of revenue generation, management, control and expenditure tasks to lower levels of government and it is a focal point of decentralization (Zhang and Zou, 1997). Financial decentralization with regards to cost sharing refers to the transfer of responsibilities for decision-making on the collection and expenditure of revenues to the district (WHO, 1995). In Zambia there may be autonomy in the collection of revenues but not complete autonomy in the expenditure because district budgets have to be approved at central level. In essence what prevails in Zambia is not complete but partial financial decentralization.

It is argued that that decentralization of fee collection, management and retention of a certain percentage is meant to improve efficiency and hence, the quality of services as accountability is promoted to local governance structures and to the community, and it increases community participation. It should be noted, however, that for decentralization to be effective, it is actually necessary to develop accounting, managerial and information systems skills in the health sector at all levels including the lower levels (McParke 1993; Kutzin 1995).

This means that even the local personnel should be trained in planning, resource allocation, managerial, accounting and in all the relevant skills in order for revenue generation and management to be successful.

### **3.4.2 User fees**

User fees are charges levied at the point of consumption for the use of publicly provided health services. They have become a widely used method of health care financing for the health sector especially in countries with a decentralized system where they are a common source of revenue for the health sector. Therefore, they may also improve the quality of health services being delivered to the people (Gilson & Mills: 1995). Revenue generated can therefore be used in the purchasing of inputs such as drugs, equipment and other necessary inputs.

However, if health services do not improve then people will not be willing to pay for these services even if they have the ability to pay. For example, according to a study in Cameroon, while utilization fell in facilities with no fees and no quality improvement, it rose where fees were introduced with quality improvements (Gilson & Mills; 1995). Cassels (1995) also argued that people would not accept poor quality services uncritically just because they are there. Hence, many services would be under-utilized if the quality was not good and revenue raised from these services would not be enough. Most studies for example, (Hanson and McParke 1993, McParke, Hanson, and Mills 1992) have found that the extent to which drugs are available in a health facility has an important positive impact on the demand of ~~services~~ in that facility.

Fees lead to a greater efficiency in the health sector than when services are provided free of charge because they also deter unnecessary utilization of health care services.

### **3.4.3 Prepayment schemes**

Prepayment schemes are also known as community financing or risk sharing when they take the form of a community based prepayment scheme where households or adults pay a fixed sum annually or they make an in-kind contribution. In-kind payment for health services refers to non-cash contributions of goods or services such as labour. The benefits are then defined for those that contribute to the fund and the objective is to protect those covered from the fund from unaffordable health care costs at the time of illness.

A prepayment scheme is also a financing mechanism that may involve co-payment at the point of service. Scheme members pay a fixed premium for a certain period, usually annually, or they actually pay in kind. In Zambia, the premiums are paid every month, “ at the time of its introduction, at the University Teaching Hospital, the initial premium was set at K500 per month for an adult and K50 for a child between 5 and 16 years old” (Lake et. al; 2000).

### **3.4.4 User fees, prepayment schemes and their impact on Equity**

User fees and prepayment initiatives can have adverse accessibility and affordability effects on the poor (Mills and Gilson, 1988; McIntyre 1997). Also, according to Gilson and Russell (1995), fees have been known to dissuade the poor from using services more than the rich. In this way, potentially beneficial effects of user fees in terms of equity are not realized.

User fees actually have two effects: they generate revenue from those patients who appreciate the value of paying for quality health care services, as well as the fact that they divert patients that cannot pay for health care services. According to Kutzin (1995), studies in many countries including Bangladesh, Ghana, Lesotho, Peru, Swaziland, Zaire, United Kingdom and United States of America, have shown that poorer people are more likely to be put off by price increases than richer persons.



User fees try to mitigate this by putting in place exemption mechanisms in order to ensure equity. According to Gilson & Mills (1995), “user fees have some potential to be progressive if they are biased in favour of the low income/more vulnerable through a sliding scale or exemption mechanism”. It is argued that when user fees are charged and the focus is on efficiency, the revenue collected can be used to expand coverage and improve equity, which can in turn benefit the poor (Litvack et.al, 1998).

It has been argued that community prepaid schemes have more equity advantages than user fees. The pre-payments are usually a flat fee across all income categories and because the poor tend to be sick more frequently, they have the potential of benefiting more than the rich, from the scheme (Korte et.al, 1992; Shaw and Griffin, 1995). The other advantage is that prepayment schemes can limit the fluctuations in seasonal or irregular incomes on people’s ability to access health care (Shaw and Griffin, 1995).

Pre-payment schemes have, however been criticised on the basis that they fail to address the problem of vertical equity as they charge a flat rate. It means that people with different abilities to pay, still pay the same contribution.

### **3.4.5 Exemption Mechanisms**

Exemption refers to the waiver of cost-sharing requirements for a patient on the grounds of poverty, age, disease or condition. For example in Zambia, exemptions apply to children between the ages of zero to six, the elderly aged sixty-five and above, and to people who cannot afford to pay for health services as they have no means and these people are identified by the Public Welfare Assistance Scheme (PWAS), (GRZ, 2000).

According to Kutzin (1995), introduction of fees would reduce inequity by obliging better off persons to pay and the funds made available could be targeted to services for the poor, who could be charged lower fees or be fully exempted from payment.

However, this is not achieved when people that are actually exempted do not qualify to be exempted. The goal of user fees of promoting equity through exemption of children, the elderly and those that do not have the ability to pay is also affected with decentralization as these exemptions targeting the poor often miss the intended beneficiaries because some decentralized centres decide whom to exempt. For instance in Zimbabwe, “decentralized screening procedures, in which revenue clerks decide whom to exempt, have been criticized” (Gilson et.al: 1995). According to Choongo and Milimo (1995), a similar thing happened in Zambia when health districts were given complete autonomy in determining exemption criteria with the result that the Ministry of Health introduced a standard list of patients and health conditions to be exempted from any charges. Some exemptions have targeted people in steady employment such as civil servants, at the expense of the rural poor, as was the case in Mali and Ghana (Weaver, Handou and Mohammed, 1990). Another issue is that of the stigma on the part of the patients. For example, in Costa Rica and Thailand, exemptions were associated with the stigma of receiving inferior services or with lower economic status in society. Most people therefore felt discouraged to apply for exemptions (Abel-Smith and Creese, 1989 in Gilson et.al 1995; McParke 1992).

In summary, the problems associated with exemptions are; firstly on the targeting of the beneficiaries, then there is usually lack of administrative capacity to manage the exemptions and also the stigma of exemption. This causes the eligible candidates not to take advantage of the services.

#### **3.4.6 Link between Decentralization, User fees and Prepayment schemes.**

In decentralized units, user fees are a major source of funding. User fees are charged in these units, plus other cost-sharing measures, such as prepayment schemes in order to raise revenues by mobilizing additional funds for the health sector at local level.

According to Mills et.al (1990), decentralization may have a beneficial impact on health financing in that it can encourage revenue generation at local level particularly if there is significant community participation. Funding from local resources fosters local decision-making and financial sustainability.

It is argued that fee retention, which is a policy of decentralization as a way of improving efficiency, will just worsen existing inequalities between different geographical areas, as some areas are able to raise more resources than others. Papua New Guinea (PNG) is one country where existing inequalities between provinces were perpetuated and even heightened due to decentralization's policy of fee retention. The literature shows that decentralization in PNG not only perpetuated previous inequalities in resource allocation but actually widened them such that the more economically advantaged provinces benefited from increases in expenditure per capita compared to the real expenditure cuts suffered by more disadvantaged ones (Mills and Gilson, 1995).

In Zambia also, for example in 1992, provincial populations ranged from 5.6 percent in North-Western province to 18.4 in the Copperbelt. Lusaka province constantly received the greatest share of resources over the 1991-1993 period, with about 47.6 percent in 1992 going to the capital (Lake et.al 2000).

The above experience shows that decentralization combined with local revenue generation through user fees and prepayment schemes could worsen differences in resource availability between different areas if there is revenue retention. Fee retention may generate inequities especially in cases where central resources are distributed equally between areas or more are given to those areas that generate more income or revenue than others. Wealthier districts will be able to spend more on health care and, therefore, exacerbating existing inequalities between regions.

According to Brijlal et.al (1998), if locally generated revenue is to be used for financing of health services, revenue generation differentials between geographical areas and different facilities must be taken into account when determining transfers of tax revenue and allocations from central government especially in decentralized units. This is because in decentralized units, health expenditure is dependent on the ability of the local authority to generate income.

### **3.4.7 Revenue generation potential of user fees and prepayment schemes and factors influencing it in different areas.**

It has been noted above that different geographical areas do have different capacities to generate income. Some areas generate more revenue than others. As a result, it is imperative to also look at the factors that influence revenue generation in different geographical areas. Available literature shows that there are a number of factors that actually influence the level of revenue generation in different geographical areas. These are, among others, the socio-economic status of the people, the age and gender composition of the population, morbidity profile, the perceived quality of health services provided, management and financial capacity of staff as well as the level of accountability (Gilson & Mills, 1995; Brijlal et. al, 1998; Russell & Gilson, 1995).

The socio-economic status of the people is important because it determines the ability of the people to pay for health care services. In a place with people of a low socio-economic status, less revenue would be realized because if more people are poor, then it also means that more will be exempted from paying user fees. It is also actually the poor people that tend to be more ill on average than the rich.

This definitely means that districts with a high socio-economic status of the people are able to raise more resources from user fees and prepayment schemes. "Fee retention at local level just exacerbates existing inequalities, the better off districts with more facilities and a high proportion of the population able to pay will be winners while the losers are the poor districts with few health institutions and a high proportion of the population unable to pay" (Gilson and Mills; 1995).

According to Bennett and Ngalande-Banda (1994), on a national average, user fees have contributed a small percentage of about 5 % of operating revenues for publicly provided health services in developing countries. This has been due to several reasons, which include poor quality of services as well as poor administration of user fee schemes.

“ For user fees to contribute to the improved operation of health services, appropriate management skills and financial institutions must be in place. Fee retention will not automatically lead to an improvement in quality. Conditions for success in the collection and use of fee revenues in peripheral health facilities include having staff trained in basic financial management, the availability of reliable banking arrangements for the investment of funds, development and use of simple audit procedures, and the establishment of locally accountable committees to oversee the use of revenue” (Brijlal et.al 1998).

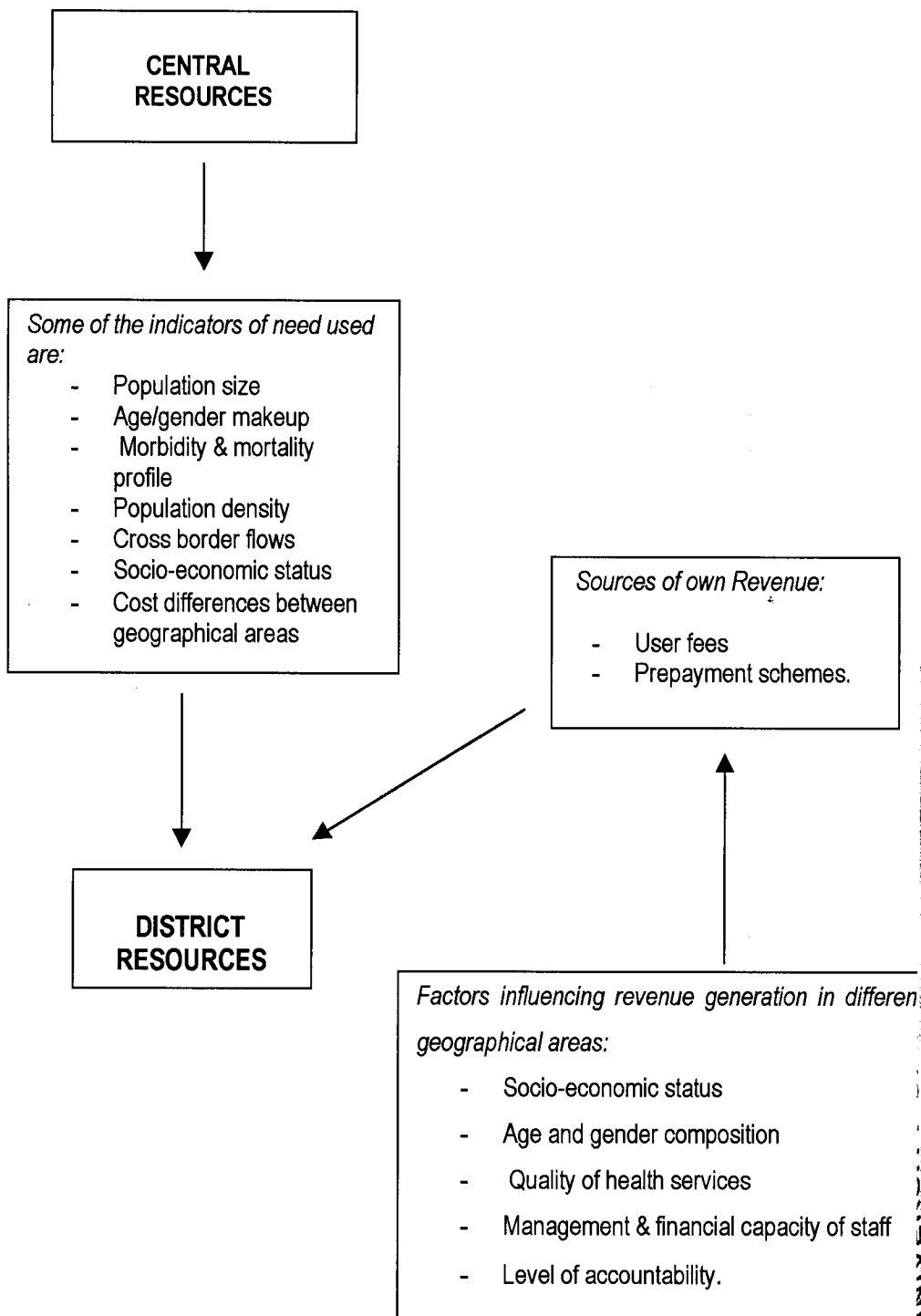
User fee schemes may therefore be poorly administered due to lack of accountability, poor management or simply lack of capacity. As a result, this would lead to user fees contributing a small percentage to total revenue. In addition, retention of fee revenue at local level must be accompanied by the development of management expertise in order to make sure that there is proper control and utilization of these resources. Russell and Gilson (1995) argued that the lack of skills to manage fees has been one of the many problems encountered in developing countries.

The age and gender composition of the people in an area may play an important role in determining the factors that influence or affect revenue generation in different geographical areas. This is because mechanisms have been put in place to exempt those who cannot pay for the services and in the example cited above of the Zambian case where exemptions apply to children under the age of six, the elderly aged sixty-five and above. This means that if there are more elderly people, these do not pay anything.

Age composition should be considered together with the morbidity profile because if in a certain area there are diseases, which mostly affect children, then no resources will be realized out of treating these patients as they are exempted from paying the fees. Populations in different areas may display different morbidity characteristics.

### **3.5 Conceptual Framework**

In order to guide this study, a conceptual framework was developed from the international literature review and is summarized in the figure below:

**Figure 3-1: Conceptual Framework**

The conceptual framework brings to light the following areas of concern:

1. Central Allocations

- Mechanisms used for central allocations to districts
- Indicators of need that are used and their relevance
- Any consideration for own revenue generated when allocating resources from central level?

2. Districts' own revenue

- Sources of revenue generation that are available at district level
- Factors that influence revenue generation in different geographical areas

From the conceptual framework, the important indicators of need that may be used in a needs-based formula are population size adjusted for the demographic profile, health indicators such as the morbidity or mortality profile, population density and also indicators of socio-economic status.

Socio-economic indicators are important because people's level and type of need are influenced by their socio-economic status in society. Diseases may also vary from one place to the other, depending on socio-economic status. Also, the types of diseases found in each province would have an impact on the health needs of the people in that area. Hence, the need for morbidity data but a more accurate measure is that of mortality because morbidity data only reflects morbidity at health services and not total morbidity (Carr-Hill 1989). Another important indicator is the cost differences between geographical areas in the provision of services.



In summary, the factors identified from the literature as influencing revenue generation in different geographical areas are socio-economic status of the people, age and gender composition of the population, the quality of health services, management and financial capacity of staff, and also the level of accountability of staff to higher authorities.

### **4.1 Introduction**

This chapter outlines the fieldwork methodology that was used in this study. The sources and types of data collected are discussed and examined. A detailed discussion on what specific data was collected, from what source, is also presented in this chapter. The chapter also discusses the data collection technique employed, as well as the method of data analysis used in this study.

### **4.2 Methods and sources of data**

The objective of data collection was to obtain data covering a wide range of issues concerning the resource allocation formula and the impact of decentralization. Information that was collected for the study included both primary and secondary data.

Data collection methods involved both record reviews and the use of structured interviewer questionnaires. Data collection consisted of a review of key policy documents, evaluation reports, and other secondary information such as household survey reports, as well as interviews and discussions with key informants like policymakers and other informed and accessible people in positions of authority.

The study reviewed the current actual allocations and distribution of resources from the central level and information was collected on the structure of the formula that is currently being used. So, at central level, data was collected from the Central Board of Health (CBoH) as well as the Ministry of Health (MoH). This information included total allocations from central to districts, that is, the actual allocations versus the allocation guidelines, indicators used and rationale behind using them.

Information on the actual allocations from the central level to the districts for the year 2000 came from a published audited report by the finance unit of the CBoH. At district level, some faxes were sent to a number of districts on the actual allocations with the aim of collaborating with the figures obtained centrally. The districts also gave the same figures as those from CBoH. The extent to which this information is reliable and valid is questionable, as the districts may have just used the information from the report from the CBoH instead of looking at their own records. Information was also obtained on user fee and prepayment scheme revenue for all the seventy-two districts in Zambia and this information also came from a CBoH financial report and the same assessment on data quality applies as that of the allocations. Statistics on disease epidemiology came from the 2000 annual health statistical bulletin published by the Central Board of Health.

Data on the indicators used and the rationale behind using them came from interview data and also from a draft report on the needs-based resource allocation in the Zambian health sector by a number of researchers including those from the Central Board of Health. It should be noted that interview data might sometimes be subjective depending on who is being interviewed and what their opinions may be. That is why in this study, most of the information from the interview was backed up and verified from document review. All in all, the methods that were used involved interviewing of key stakeholders in resource allocation and also document review of different publications such as the handbooks for District Health Management Teams and the National Health Strategic Plan for the years 2001-2005.

At central level, information collected also included recent data on indicators of need, demographic patterns such as population size and composition in each district, socio-economic indicators; income indicators, income inequality, poverty levels and data on mortality rates.

This information was collected from the Central Statistical Office (CSO) in Lusaka and it came from the publications of the Central Statistical Office which included the final report for the 2000 census of population and housing count, the 1996 and 1998 Living Conditions Monitoring Surveys, also from a published report on selected socio-economic indicators for the year 2000. The methods used to collect this data involved mainly reviewing of different documents and publications.

At district level information was collected from the District Health Management Teams (DHMTs), and it included information on actual allocations from central level that was collected in order to validate the CBoH / MoH data as centrally collected data, in most cases are often incorrect. In districts, data was also collected on the potential and actual sources of revenue generation, and on the actual resources generated, and on the problems encountered in the revenue generation exercise. Information on the factors that actually influence revenue generation in different geographical areas was also collected. The methods used at district level were interviews and as already been discussed above, interview data may not always be objective.

The data collection techniques that were employed for the extraction of information from each source are summarized in the table below

**Table 4-1: Summary of data collected and methods used.**

| Objective   | Data Source | Data Collected   | How data was collected   |
|---|-------------|--|--|
| To determine resource allocation from central to local level (districts) & evaluate current distribution of resources | MoH<br>CBoH | Total allocations from central to districts<br><br>Revenue generated in different districts<br><br>Actual allocation Vs allocation guidelines<br><br>Indicators used and rationale behind them | Interviews with key informants such as the Director planning, budget specialist etc<br><br>Document reviews: Policy documents on Resource Allocation, evaluation reports, Strategic Framework paper. |

|  |                    |   |  |
|--|--------------------|---|--|
| To identify indicators of need for alternative formulae  | CSO                | Population size by age and gender of each district, population density of each province<br><br>Infant mortality rate, poverty and unemployment rates as well as per capita household income in different provinces. | Document reviews: Publication reviews, Census Report, Living Conditions Monitoring surveys (LCMS) and data sets. |
| <b>Objective</b>   | <b>Data Source</b> | <b>Data Collected</b>   | <b>How data was collected</b>  |
| <p>To identify available sources of locally generated revenue</p> <p>To determine what factors influence revenue generation in different geographical areas</p> <p>Impact of local revenue potential on resource allocation as a whole</p> | DHMT               | <p>Allocations from central to Districts</p> <p>Revenue generation-sources, problems, potential,</p> <p>General impression about decentralization</p>   | <p>Interviews with Director, Manager, Accountant, etc</p> <p>Document reviews</p>                                |

In summary, data were gathered from questionnaires, interviews with key informants, review of key policy documents and reports. Data were collected from the central level coordinating body known the Central Board of Health (CBoH), and from District Health Management Teams (DHMTs) in different districts. This data included information on the factors currently being used in the resource allocation formula and their justification, actual allocations from CBoH, sources of own revenue in the different districts as well as the amount raised, revenue generation potential and also the factors affecting revenue generation in the different areas.

Copies of interview schedules that were used at central level as well as the district level can be found in appendix C.

### **4.3 Data Analysis**

Analysis of data was done on the basis of assessing how equitable the current formula is. Both qualitative and quantitative data were used. Qualitative data that was collected from policy makers and other key stakeholders in resource allocation, was analysed manually while quantitative data such as actual allocations, revenue generated was analysed using excel spreadsheet and statistical computer software known as STATA. STATA was also used to do different types of analyses using the Zambian 1998 Living Conditions Monitoring Survey (LCMS) data set.

### **4.4 Weighting of the Population to Reflect relative Need**

When using a needs-based formula to distribute resources on the basis of need, the crude populations in different geographical areas need to be weighted in order that they may reflect the relative need for health care services. In section 5.4 of this study where the analysis and discussion of alternative formulae is carried out in order to achieve a better health care resource allocation formula, the population has been weighted for the age/sex utilization of health services, mortality rates, poverty rate and population density. To adjust the populations to reflect these indicators of need, the different rates were divided by the smallest rate, for example, all mortality rates were divided by the smallest mortality rate, in order to normalise or standardize them. This meant that the province with the lowest rate had the lowest normalized rate of 1.0. The normalized rates for each province were then multiplied by the crude populations of the given provinces in order to get the weighted populations. To get the equity target budget allocations for each province, the weighted populations were then multiplied by the equity per capita allocation, which is the national average per capita, based on the actual allocations of the year 2000.

The age / sex utilization rates were calculated using information from the Living Conditions Monitoring Survey of 1998 (for the formula used, see appendix D). These rates were then normalized as described above.

Lastly, in section 5.3, alternative resource allocation formulae are analysed to see

Population density was dealt with in two ways. Firstly, in the analysis of the current resource allocation formula 10% was added and subtracted to the equity target allocations for the low and high-density areas, respectively. Then secondly, when alternative formulae were assessed, the study applied different weights to different low-density levels to see the effect on the allocations.

## 5.2 The resource allocation process in Zambia

### 5

## CHAPTER 5: ANALYSIS AND DISCUSSION OF RESULTS

### 5.1 Introduction

This chapter presents the findings of the study. It discusses the geographical resource allocation process and tries to identify the inequities that may arise as a result of the way that resources are distributed. The conceptual framework developed in section 3.5, provides a framework for analysing the resource allocation criteria in Zambia.

Section 5.2 presents the resource allocation criteria in the health sector in Zambia with all the variables and weights that are used.

In section 5.3, the analysis involves a critical examination of the current resource allocation procedure in terms of the different variables and weightings used. This involves an evaluation of actual budget allocations in terms of what these allocations would have been if the current formula were fully applied and also in terms of equity target allocations.

Section 5.4 tries to analyse what impact accounting for own revenue would have on resource allocation.



Lastly, in section 5.5, alternative resource allocation formulae are analysed to see what impact they have on resource allocation. This section gives a detailed critical evaluation of alternative resource allocation formulae from international experiences that may be applicable within the **Zambian** context and whether these would improve equity in the distribution of financial resources.

## **5.2 The resource allocation process in Zambia**

In Zambia, the criteria for resource allocation have evolved since 1995, as presented in the Table 5.1 below.



**Table 5-1: Criteria for District Funding.**

| Year | Applied to type of funds   | Criteria  |
|------|--|---|
| 1993 | DANIDA and other donor funds   | \$0.54pc in rural districts; \$0.27pc in urban areas since DANIDA was also providing drug kits to urban areas   |
| 1994 | GRZ grant funding  | <p>District population multiplied by the agreed per capita allocation, with the following weights;</p> <p>+/- 10% dependent on population density (+10% for low density)</p> <p>-20% in districts with a second or third level referral facility adjustment for existing infrastructure</p> <p>For first level referral facilities within the district grants;</p> <p>Per bed-day subsidy specified for official beds and cots.</p> <p>Mission first level referral hospital (1LR) beds funded at 50% of the GRZ rate</p> |
| 1995 | GRZ grants and donor funds passing through the 'district basket funding' | <p>As in 1994, but with addition of the following:</p> <p>+/-5% according to index of fuel prices (as proxy for cost differentials)</p> <p>+5% in districts prone to cholera or dysentery</p> <p>+5% in districts without a bank and /or a service station (as a proxy for underdevelopment)</p>  |
| 1996 | All district grant funding   | As in 1995 except that the cots received 150% of the bed-day subsidy because of exemptions of under five children from cost sharing.  |
| 1997 | All district grant funding   | <p>Same as in 1995 apart from the following:</p> <p>Mission 1LR beds funded at 75% of GRZ rate following signing of the 1996 memo of understanding</p> <p>20% deduction for the presence of a larger hospital dropped in order for districts to directly contract with such facilities for provision of 1LR services, otherwise such districts would be double-funded for these services.</p>   |

Source: Lake et al (2000)

The criteria above in Table 5.1 can also be written in statistical terms. The current actual formula used for the allocation of financial health resources in Zambia is below.

**Equation 5-1: Formula used in the current resource allocation process**

$$WA = (CP * pcA) * (\sum W_i X_j)$$

Where:

WA = weighted district allocation

CP = crude district population

pcA = initial per capita allocation

$W_i$  = weights

$X_j$  = variables used to weight population for need

With the inclusion of the adjustment for the presence of a referral hospital, the formula becomes as follows:

**Equation 5-2: Adjusted resource allocation formula**

$$WA = [(CP * pcA) * (\sum W_i X_j)] + W_H H$$

Where:

$W_H$  = the weight attached to the adjustment

H = presence of the referral hospital

The various variables and weights that are used in the Zambian resource allocation formula are given in Table 5.2 below:

**Table 5-2: Variables and weights used in the Zambian resource allocation formula**

| Variable or criterion (X)   | Weight | Type        | Values                                   |              |
|---|--------|-------------|--|--------------|
| Cholera proneness (C)   | 0.05   | Binary      | Prone<br>Not prone                       | 1<br>0       |
| Fuel price (FP)   | 0.05   | Categorical | Low<br>Medium<br>High                    | 1<br>0<br>-1 |
| Variable or criterion (X)   | Weight | Type        | Values                                   |              |
| Presence of a Bank (B)  | 0.05   | Binary      | Present<br>Not present                   | 0<br>1       |
| Population Density (PD)   | 0.10   | Categorical | Low<br>Medium<br>High                    | 1<br>0<br>-1 |
| Presence of 2 <sup>nd</sup> or 3 <sup>rd</sup> level hospital (H) | 0.20   | Binary      | Hospital in district<br>No such hospital | -1<br>0      |

Source: Lake et al (2001)

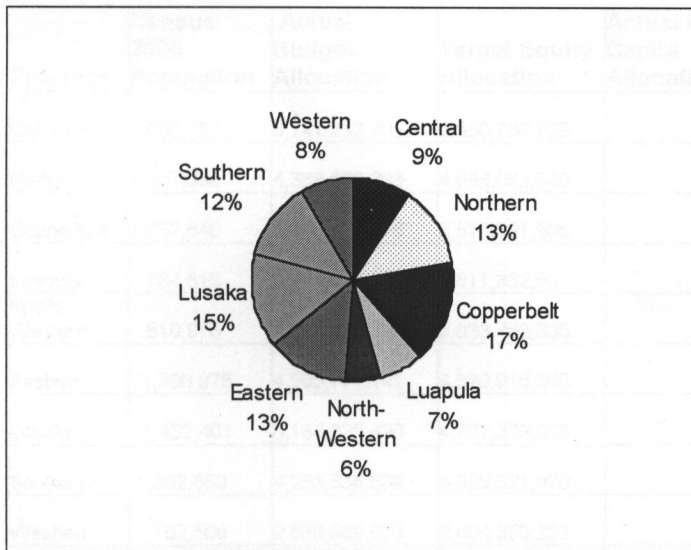
### 5.3 Analysis of the current resource allocation criteria

This section of the study involves a critical analysis of the current system of resource allocation and the impact of different components of the formula on the actual allocations if the formula were fully applied. The total budget allocations to each province for the year 2000 are presented to show exactly how much each province received. Target equity allocations have also been calculated and are compared to the actual allocations in order to identify any inequities in the current distribution of financial resources. The variables and their weights and the impact on the allocations are each also discussed.

Figure 5.1 below shows the actual total allocations (both government and donor grants), in percentage form, to the different provinces in the year 2000.

The services included in these allocations are for first level referral facilities, that is why those districts with higher-level hospitals face a 20% deduction in order to avoid double-funding for first level referral care. Second and third level referral facilities are funded directly.

**Figure 5-1: Percentage allocation per province in 2000**



The information in Figure 5.1 shows that the provinces with the least grants were North-Western and Luapula with percentage shares of 6% and 7%, respectively. The total resources to these provinces were K4,348,044,442, representing about 13% of the total allocations. This was the approximate percentage of resources that went to each of the Eastern, Northern and Southern provinces. The greatest share of resources went to the copperbelt and Lusaka provinces, which accounted for 17% and 15% of the total grants, respectively.

### 5.3.1 The impact of population on resource allocation

The population size of an area is the primary determinant of the need for health services. Therefore, any simple resource allocation formula takes account of population size as the chief determinant of resources allocated to different geographical areas.

Table 5.3 provides information on the actual distribution of financial resources vis-à-vis the target budget allocations based on population size. It also compares provinces' allocation with the national average to determine the extent of inequities in the current disbursement of funds.

**Table 5-3: Current Versus Equity Budget Allocations in Kwacha (2000)**

| Province      | Census 2000 Population | Actual Budget Allocation | Target Equity Allocation | Actual Per Capita Allocation | Equity Per Capita Allocation | Difference in Actual & Equity Target Per Capita Allocation |
|---------------|------------------------|--------------------------|--------------------------|------------------------------|------------------------------|--|
| Central       | 1,006,767              | 3,241,232,405            | 3,350,730,729            | 3,219                        | 3,328                        | -109   |
| Northern      | 1,407,088              | 4,386,669,233            | 4,683,082,580            | 3,118                        | 3,328                        | -211   |
| Copperbelt    | 1,657,646              | 5,475,399,016            | 5,516,991,906            | 3,303                        | 3,328                        | -25  |
| Luapula       | 784,615                | 2,444,824,113            | 2,611,362,501            | 3,116                        | 3,328                        | -212   |
| North-Western | 610,975                | 1,903,220,329            | 2,033,452,335            | 3,115                        | 3,328                        | -213   |
| Eastern       | 1,300,975              | 4,505,771,141            | 4,329,916,366            | 3,463                        | 3,328                        | 135  |
| Lusaka        | 1,432,401              | 5,184,825,430            | 4,767,329,528            | 3,620                        | 3,328                        | 291  |
| Southern      | 1,302,659              | 4,253,838,689            | 4,335,521,070            | 3,266                        | 3,328                        | -63  |
| Western       | 782,509                | 2,836,959,953            | 2,604,353,293            | 3,625                        | 3,328                        | 297  |
| <b>Zambia</b> | <b>10,285,635</b>      | <b>34,232,740,309</b>    | <b>34,232,740,309</b>    | <b>3,328</b>                 | <b>3,328</b>                 | <b>-</b>   |

Key to Table:

(-) = Below national average

(+) = Above national average

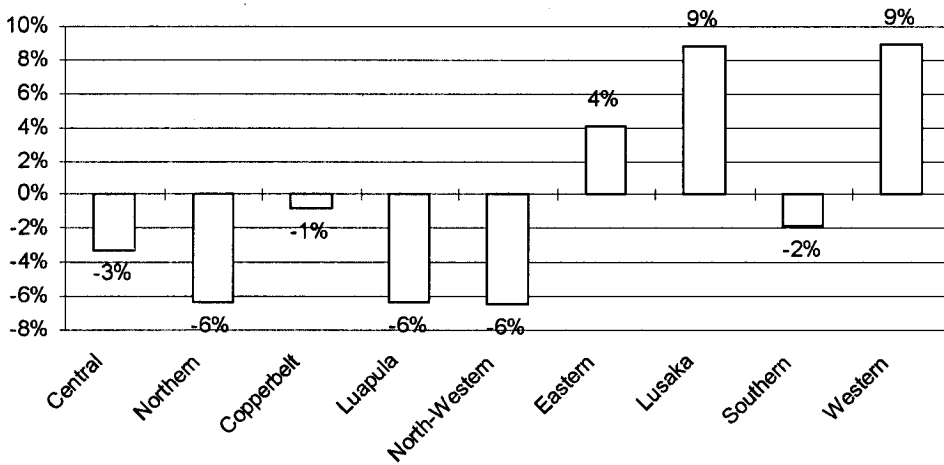
The above information tells us that when allocations are expressed in per capita terms, only three provinces namely Lusaka, Eastern and Western, lie above the national average, which is the equity target per capita allocation, of K3, 328. The Western province has the highest per capita allocation of 3,625 Zambian Kwacha (K). The other six provinces are below average of which the lowest is the North-Western province with a per capita allocation of only K3, 115.

In fact North-western, Luapula, and Northern are the three provinces that seem to be under-resourced as they have the largest difference between the actual and equity

target per capita allocations, below the average, of -213, -212 and 211, respectively. The Copperbelt and Southern provinces are the only two provinces whose actual budget allocations are close to their target ones with differences between the two budgets of -25 and -63, respectively.

Table 5.3 is summarized in Figure 5.2, which brings to light the provincial budget allocation inequities, by using un-weighted population. It shows the percentage by which provinces are under or over-funded or the percentage from the equity target. The equity target is based on the national average and is represented by zero on the graph.

**Figure 5-2: Difference between Actual and Target Budget Allocation as % of Target Budget Allocation (2000)**



From the graph above, Lusaka and western provinces are the most over-resourced provinces as they have the highest percentage of 9% each, above the equity target allocation. Similarly, the most under-resourced provinces are Northern, Luapula and North-Western with allocations of 6% below the national average. Altogether, the inter-provincial resource differences range from 9% above the equity target to 6% below.

The above discussion shows how important it is to analyze the distribution of resources relative to the population (per capita) as this gives more information on how resources have been distributed, as population size is the primary indicator of need. An area may be seen to be over-resourced and yet the distribution may be in relation to population size, which may be huge and therefore have increased need for health services.

All of the above analysis has been done on an inter-provincial basis. It is important to also look at the intra-provincial distribution of resources and see what variations and inequities exist within the provinces. The table below presents information on the distribution of resources within the province or between districts in the same province. Two provinces are chosen here, one rural which is North-Western and we saw earlier on that this province is relatively under-resourced, and the other one is the Copperbelt province that is mostly urban. Information on the other districts can be found in Appendix E.

**Table 5-4: Evaluating inter-district equity position for 2000 using un-weighted Population**

| Copperbelt Province |                       | North-Western Province |                       |
|---------------------|-----------------------|------------------------|-----------------------|
| District            | % Over / Under-Funded | District               | % Over / Under-Funded |
| Chililabombwe       | -27%                  | Chavuma                | -10%                  |
| Chingola            | 5%                    | Kabompo                | -6%                   |
| Kalulushi           | 7%                    | Kasempa                | 1%                    |
| Kitwe               | 0%                    | Mufumbwe               | -28%                  |
| Luanshya            | -4%                   | Mwinilunga             | 1%                    |
| Lufwanyama          | 0%                    | Solwezi                | -14%                  |
| Mpongwe             | -10%                  | Zambezi                | 12%                   |
| Mufulira            | 17%                   | -                      | -                     |
| Masaiti             | 12%                   | -                      | -                     |
| Ndola Urban         | -7%                   | -                      | -                     |
| <b>Copperbelt</b>   | <b>-1%</b>            | <b>North-Western</b>   | <b>- 6%</b>           |

The above information shows that the variation between districts in the same province is much greater than that between the provinces. Inter-district analysis gives a better picture of the differences in resources than the provincial level analysis, since in the latter the inequities within the province cancel out because those districts that are comparatively under and over-resourced tend to balance. But the inter-district analysis shows exactly the differences in resource allocations between the districts. For instance, in the Copperbelt province, inter-district resource differences range from 17% above to 27% below the target allocations but the province as a whole is only -1 % below the equity target allocation.

In the Copperbelt province, four districts are above the target, while four others are below. There are only two districts, Kitwe and Lufwanyama that have the same actual allocations as the target ones. In the North-Western province, Mufumbwe district has the lowest budget allocation of 28% below the target whereas Zambezi district has the largest amount of 12% above the equity target allocation.

### **5.3.2 The effect of accounting for cholera on resource allocation**

In the Zambian resource allocation formula, districts that are prone to cholera have an extra weight and they are given 5% more funding of the initial allocation. These extra resources are to be used for preventive activities that are intended to avoid outbreaks and also in the case of outbreaks, extra resources assist in the treatment of the victims.

The extent to which cholera proneness is the best indicator of differential morbidity is questionable. From international literature we gather that the indicator used as proxy measure of morbidity are the SMRs (Standardised Mortality Ratios). Cholera proneness may not be a good indicator of differential morbidity because other areas that may not be prone to cholera may have other specific diseases that may be just as fatal and costly to treat as cholera. Disease patterns vary between different areas or provinces and so there is a need for an overall and standardised measure of mortality.



Table 5.5 shows the suspected and confirmed cholera cases for the years 1999 and 2000, as well as how the target allocations would change according to if 1999 or 2000 data was used. It also indicates that overall, cholera cases reduced from 1.3 to 0.7 cases per 1,000 population in 1999 and 2000, respectively. However, Luapula and Eastern Provinces recorded increases in cases per thousand population in 2000 whereas Lusaka province experienced a drastic decline to 1.7 in 2000 from 4.8 in 1999. It can be seen that the figures fluctuate from one year to the other and therefore cholera proneness is not a stable indicator of need.

The information below shows how unstable proneness to cholera is, as an indicator of need, as it illustrates how the target allocations would change depending on the cholera incidences, which rise and fall, from time to time.

The other problem with this indicator is that how cholera proneness is measured, is a bit arbitrary. This is so because given the information in Table 5.5, all the provinces do have some incidence of cholera, which means that they are all likely to be affected by this disease. What level of incidence defines proneness to cholera?

**Table 5-5: Target Allocations when weighted for Cholera Cases for 1999 and 2000**

| Province            | Actual Budget Allocation (2000) | Target Equity Allocation (2000) based only on population size | Cholera Cases (Per 1,000 population) |            | Weighted Target Allocations for cholera |                       |
|---------------------|---------------------------------|---|--------------------------------------|------------|---|-----------------------|
|                     |                                 |   | 1999                                 | 2000       | 1999                                    | 2000                  |
| Central             | 3,241,232,405                   | 3,350,730,729   | 1.0                                  | 0.1        | 3,436,716,218                           | 3,294,391,764         |
| Northern            | 4,386,669,233                   | 4,683,082,580   | 0.8                                  | 0.3        | 4,574,531,904                           | 4,604,341,540         |
| Copperbelt          | 5,475,399,016                   | 5,516,991,906   | 1.2                                  | 0.3        | 5,658,567,366                           | 5,424,229,569         |
| Luapula             | 2,444,824,113                   | 2,611,362,501   | 1.2                                  | 2.3        | 2,678,374,535                           | 2,695,827,986         |
| North-Western       | 1,903,220,329                   | 2,033,452,335   | 0                                    | 0.5        | 1,986,318,290                           | 1,999,262,002         |
| Eastern             | 4,505,771,141                   | 4,329,916,366   | 0.4                                  | 1.1        | 4,229,551,843                           | 4,469,969,111         |
| Lusaka              | 5,184,825,430                   | 4,767,329,528   | 4.8                                  | 1.7        | 4,889,667,368                           | 4,921,530,563         |
| Southern            | 4,253,838,689                   | 4,335,521,070   | 0.6                                  | 0.1        | 4,235,026,633                           | 4,262,623,905         |
| Western             | 2,836,959,953                   | 2,604,353,293   | 0.2                                  | 0.1        | 2,543,986,151                           | 2,560,563,869         |
| <b>Total Zambia</b> | <b>34,232,740,309</b>           | <b>34,232,740,309</b>   | <b>1.3</b>                           | <b>0.7</b> | <b>34,232,740,309</b>                   | <b>34,232,740,309</b> |

The study therefore assumes that an area is prone to cholera if its incidence is 1.0 cases and above per thousand population. In this case, using 1999 data, the provinces identified as being prone to cholera are Central, Copperbelt, Luapula and Lusaka whereas with 2000 data these would be Luapula, Eastern and Lusaka.

The target allocations, based on the 2000 actual allocations, decrease or increase when the cholera incidences are taken into account. This clearly shows that this indicator is not reliable as it is not a steady one.

### 5.3.3 The effect of using absence of bank as proxy for underdevelopment

The current Zambian formula uses the absence of a bank in some areas as representing the underdevelopment of that area. Most of the districts that do not have banking facilities are in fact in remote rural areas and are underdeveloped.

Eastern province has been chosen at random in order to show the distribution of resources within the province or between districts while taking account of the fact that some areas are more underdeveloped than others. Areas that do not have banks receive 5% more of the initial funding than those where banks exist.

**Table 5-6: Actual and Target Allocations with reference to underdeveloped areas**

| Eastern Province | Actual Budget Allocation (K) | Actual Per Capita Allocation (K) | Target equity alloc. based on population size | Bank (Present =1 Absent=0) | Weighted Target Equity Allocation (Population + Bank) (+ 5% If Bank =0) | Target Equity Per Capita Allocation (+5% for bank=0) |
|------------------|------------------------------|----------------------------------|---|----------------------------|---|--|
| Chadiza          | 289,960,882                  | 3,519                            | 274,244,400                                   | 0                          | 296,494,323   | 3,695  |
| Chama            | 238,680,436                  | 3,154                            | 251,895,479                                   | 0                          | 272,332,194   | 3,311  |
| Chipata          | 1,205,195,490                | 3,328                            | 1,205,254,216                                 | 1                          | 1,240,989,119   | 3,328  |
| Katete           | 600,874,273                  | 3,292                            | 607,391,439                                   | 1                          | 625,400,149   | 3,328  |
| Lundazi          | 781,855,083                  | 3,303                            | 787,893,512                                   | 1                          | 811,253,976   | 3,328  |
| Mambwe           | 257,011,742                  | 4,948                            | 172,880,475                                   | 0                          | 186,906,567   | 5,195  |
| Nyimba           | 266,617,980                  | 3,976                            | 223,156,396                                   | 0                          | 241,261,460   | 4,175  |
| Petauke          | 865,575,255                  | 3,569                            | 807,200,450                                   | 1                          | 831,133,352   | 3,328  |
| <b>Eastern</b>   | <b>4,505,771,141</b>         | <b>3,480</b>                     | <b>4,329,916,366</b>                          | <b>-</b>                   | <b>4,505,771,141</b>  | <b>-</b>   |

It can be seen from Table 5.6 that in the Eastern province, there are four districts that lack banking facilities. According to the formula, these areas deserve extra funding, as they are underdeveloped. This is because it may be more costly to provide health services in such areas due to factors like poor road infrastructure and many others related to being underdeveloped. The information in the above table indicates that the four, except for one district in which banks are absent, have per capita allocation higher than the rest. This goes according to what the formula stipulates. The exception applies to Chama district, which despite not having a bank has the lowest per capita allocation in the province.

#### **5.3.4 Accounting for Population Density**

Taking into account the population density is vital especially for a country like Zambia where there are large variations in population densities in different geographical areas. The Zambian resource allocation formula recognizes this fact and so considers population density in the distribution of resources. Areas where population density is low receive more funding because it is relatively more costly to provide health care services to a scattered population than in areas where there are more people per square kilometre. According to the formula, areas with a low density receive 10% more funding while those that are highly density receive 10% less of the initial per capita allocation that is multiplied by the crude population of an area.. Ten percent more funding to sparsely populated areas may in fact not be enough to cover all costs that come with providing services to such areas. Why not 25% or even 50% more resources to such areas?

The problem with the way this indicator is applied is that there are varying levels of 'low density'. It is not specified how many kilometres per square density make up low, medium or high density. From the information given in Table 5:8, this study classifies Northern, North-Western, Western and Central provinces as having low densities, and those provinces with high densities are Copperbelt and Lusaka. Luapula, Eastern and Southern provinces can be categorized as medium density areas.

Table 5.7 gives the population densities for the different provinces as in the year 2000, as well as the actual different budget allocations. It also compares the current funding with the equity target allocations.

**Table 5-7: Population Densities and Allocations, by Province**

|                     | Actual Budget         | Population       | Density  | Target Equity Alloc.<br>(+/-10% for low/high)<br>Population + density |
|---------------------|-----------------------|------------------|----------|---|
| Province            | Allocation (K)        | Density (sq. Km) | Level    |   |
| Central             | 3,241,232,405         | 10.7             | Low      | 3,660,278,026   |
| Northern            | 4,386,669,233         | 8.5              | Low      | 5,115,715,242   |
| Copperbelt          | 5,475,399,016         | 50.5             | High     | 4,930,905,929   |
| Luapula             | 2,444,824,113         | 15.3             | Medium   | 2,593,277,693   |
| North-Western       | 1,903,220,329         | 4.6              | Low      | 2,221,306,784   |
| Eastern             | 4,505,771,141         | 18.9             | Medium   | 4,299,929,834   |
| Lusaka              | 5,184,825,430         | 63.5             | High     | 4,260,882,349   |
| Southern            | 4,253,838,689         | 14.2             | Medium   | 4,305,495,722   |
| Western             | 2,836,959,953         | 6.1              | Low      | 2,844,948,730   |
| <b>Total Zambia</b> | <b>34,232,740,309</b> | <b>13.1</b>      | <b>-</b> | <b>34,232,740,309</b>   |

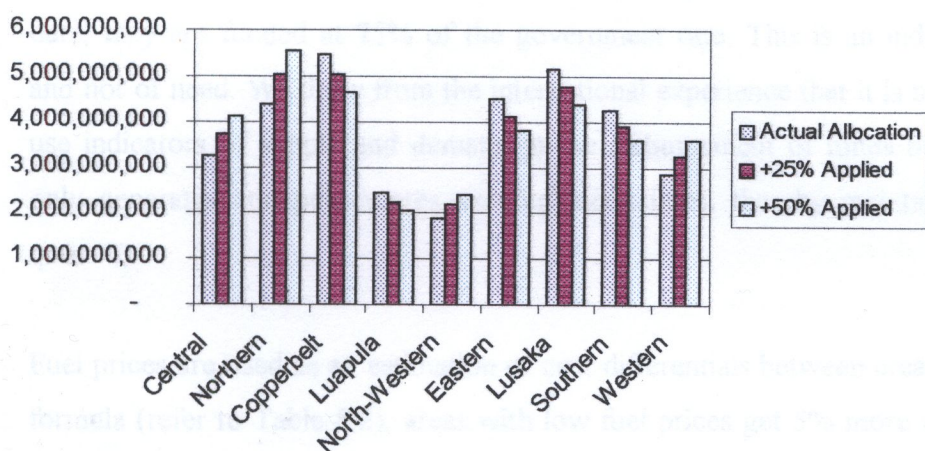
Table 5.7 shows that the provinces with the lowest population densities are Northern, Western and North-Western with densities of 8.5, 6.1 and 4.6 per square kilometre, respectively. Only two provinces are well above the national average of 13.1/km<sup>2</sup> and these are Lusaka and Copperbelt. In fact their population densities are extremely high thus pushing the average national density upwards. Even though Lusaka and the Copperbelt provinces have the highest densities, they also have the highest budget allocations. Despite the North-Western province having the lowest density, it also has the lowest budget allocation of all the three provinces.

It can also be seen that going by the equity target allocations, most of the provinces including Copperbelt, Lusaka and Eastern would receive less funding than the actual allocations. On the other hand, Central, Northern, North-Western, Luapula, Southern and Western provinces would receive more financial resources than the actual funding.

### 5.3.4.1 Effect of applying different weights to low-density areas.

This section involves a sensitivity analysis of applying different weights for funding to low-density areas in order to see what impact these have on the budget allocations. The provinces with low densities are Northern, North-Western, Western and Central provinces. Figure 5.3 shows the results of the sensitivity analysis graphically.

**Figure 5-3: Comparison of Allocations when different weights are used for Low Density**



The results of the sensitivity analysis show that when more resources are apportioned to the low-density areas, say 25% or 50%, comparatively less resources go to the high density areas which are Lusaka and Copperbelt provinces. The idea here is that the 10% extra given to sparsely populated areas may not be adequate in the provision of health services in these areas given the fact that it is very expensive to provide these services in an area where people are scattered than where people live close together.

### **5.3.5 Other indicators of need used in the resource allocation formula**

The other indicators of need that are used in the current resource allocation in Zambia and need commenting on are the use of hospital beds and also the use of fuel price as a proxy for price differentials.

In the resource allocation process, district grants for first level referral facilities (1LR); that is, official beds and cots are given per-day subsidies. Then the mission beds for 1LR in 1995 were funded at 50% of the government rate but since 1997 to date, they are funded at 75% of the government rate. This is an indicator of supply and not of need. We draw from the international experience that it is not acceptable to use indicators of supply and demand in the disbursement of funds because their use only generates and perpetuates existing inequalities, thereby maintaining the status quo.

Fuel prices are used as an estimation of cost differentials between areas. In the current formula (refer to Table 5.2), areas with low fuel prices get 5% more while those with high fuel prices get less funding. But in Zambia rural areas are the ones that have high fuel prices due to transportation costs and you find that in most urban places the fuel prices are much lower than in the rural remote areas. Therefore, if areas with high prices get less funding then it means that the rural areas get less funding while the urban ones get more since the prices of fuel there are cheaper, and this just exacerbates the existing inequalities. A better indicator for the cost differentials would be population density if applied in a proper way as has been discussed in the previous section.

### **5.3.6 Summary of the key issues regarding the current formula**

The above analysis of the criteria used in the Zambian health sector resource allocation process brings out a few issues of concern. Firstly, it is clear that the formula makes use of some arbitrary measures, for example, +5% for areas with no banks or + / -10% for low and high-density areas, respectively.

These percentages are a bit subjective because it is not clear how they are arrived at. Secondly, is the use of indicators such as cholera proneness which is not stable as incidence fluctuates from one year to the other. It should also be noted that the formula uses hospital beds, which are an indicator of supply.

#### **5.4 Analysing the impact on resource allocation of accounting for own revenue**

This component of the study tries to analyse the impact on resource allocation if revenue generated in different geographical areas were incorporated in the resource allocation formula.

It has been argued that different geographical areas have different abilities to generate their own income and so some areas would generate more revenue than others. Therefore, it has been recommended that where locally generated revenue is used for financing of health services, the revenue generation differentials between geographical areas would have to be taken into account when determining allocations from central government to decentralized units. If this were not considered then it would mean that the better off districts would be able to spend more on health care, than the poorer districts, as they would still receive large grants from central level. This would in turn lead to the worsening of existing inequalities between regions or geographical areas.

##### **5.4.1 Types of local revenue generation activities**

In all the districts where interviews were conducted, it was found that the main sources of local income were user fees and prepayment schemes. There was one exception however, in Ndola district which is the second biggest town in the copperbelt province, it was found that their only source of local revenue was through charging user fees at health facilities. The use of prepayment schemes in this district had been done away with some time ago as they faced high administration costs and it was found to be time consuming where keeping records was concerned.

Table 5.8 below presents information on how much income each province was able to generate mainly from user fees and prepayment schemes in the year 2000. Data on the revenue generated separately from user fees and from prepayment schemes was not readily available and so the study considers the total local revenue generated from the two methods of health care financing.

**Table 5-8: Local Revenue generated in 2000, by province**

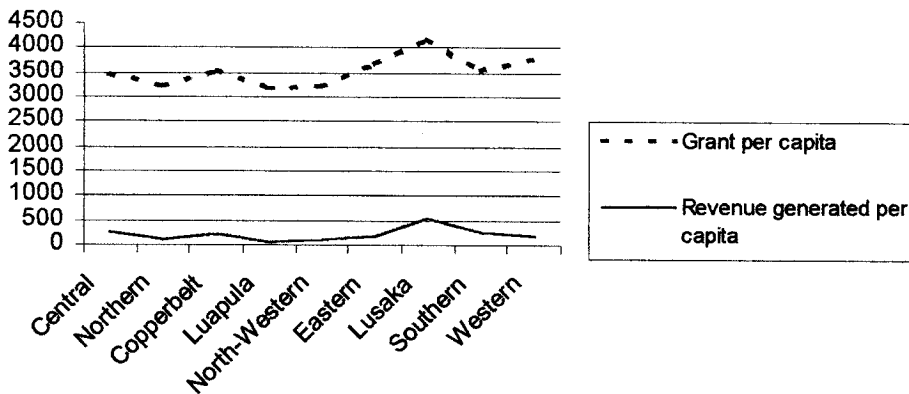
| Name of Province | Revenue generated in 2000 (K) | Total Population | Revenue generated per capita | Own revenue as percentage of Grant (%) |
|------------------|-------------------------------|------------------|------------------------------|--|
| Central          | 236,979,308                   | 1,006,767        | 235                          | 7.3                                    |
| Northern         | 132,905,108                   | 1,407,088        | 94                           | 3.0                                    |
| Copperbelt       | 344,457,799                   | 1,657,646        | 208                          | 6.3                                    |
| Luapula          | 38,254,898                    | 784,615          | 49                           | 1.6                                    |
| North-Western    | 46,595,910                    | 610,975          | 76                           | 2.4                                    |
| Eastern          | 224,786,723                   | 1,300,975        | 173                          | 5.0                                    |
| Lusaka           | 767,468,733                   | 1,432,401        | 536                          | 14.8                                   |
| Southern         | 339,258,926                   | 1,302,659        | 260                          | 8.0                                    |
| Western          | 112,156,836                   | 782,509          | 143                          | 4.0                                    |

Lusaka province generated the highest income followed by the Copperbelt and Southern provinces. The lowest income was realized in Luapula province and was only 1.6% of the total grant from central level. Table 5.14 also shows that there is widespread variation around the whole country in terms of income generated. Some provinces generated more than twice the amount realized in other provinces. For example, Lusaka's revenue was almost four times that of the Western province.

Figure 5.4 illustrates this variation graphically and it compares revenue generated per capita with grant from central level per capita.



**Figure 5-4: Comparison of Grant per capita and Revenue generated per capita**



It can be seen from the above graph that provinces like Lusaka and Copperbelt that were able to generate the highest proportion of income, also received more grant allocations per capita than the other provinces. On the other hand, Luapula and North-Western provinces had both the lowest grant per capita and revenue generated per capita.

If local revenue were taken into account in the resource allocation formula, the grant per capita line in Figure 5.4 would go in the opposite direction to the current one. Essentially, it would be lower for Copperbelt and Lusaka to compensate for higher own revenue, and it would be higher for North-Western and Northern provinces to compensate for low local revenue.

#### **5.4.2 Factors influencing revenue generation in different geographical areas.**

The previous section clearly highlights the fact that different geographical areas have different capacities to generate their own income and hence, the need to incorporate own revenue generation potential of different areas, in the resource allocation procedure. This section therefore discusses those factors that influence revenue generation in different geographical areas.

#### 5.4.2.1 The Socio-economic status of the population in different geographical areas.

The socio-economic status of the people is one of the major factors that influence local revenue generation as it determines the ability to pay for health care services of the population in a specific area. Provinces with a high socio-economic status of the people would raise more income from user fees and prepayment schemes. Also, with the exemption mechanism in place, it means that in provinces in which the majority of the population have a low socio-economic status, many people would be exempted from paying user fees. Therefore, less revenue would be generated in these provinces. This issue also came out strongly in the interviews conducted. Many district officials expressed their concern over the issue of exempting those that cannot afford to pay for health services. They said that records from the welfare department to guide them on whom to exempt are not available and so it was difficult to tell which people genuinely cannot afford to pay user fees.

Indicators of socio-economic status may include poverty rates, per capita household income, unemployment rates and many others. Table 5.9 presents some of the indicators that may depict the socio-economic status of a given population.

**Table 5-9: Indicators of socio-economic status and revenue generated in 2000, by province**

| Name of Province | Total revenue generated in 2000 (K) | Revenue generated per capita (K) | Per Capita HHD Income (K) | Poverty Rate (%) |
|------------------|-------------------------------------|----------------------------------|---------------------------|------------------|
| Central          | 236,979,308                         | 235                              | 43,685                    | 77               |
| Northern         | 132,905,108                         | 94                               | 24,101                    | 81               |
| Copperbelt       | 344,457,799                         | 208                              | 60,247                    | 65               |
| Luapula          | 38,254,898                          | 49                               | 25,053                    | 82               |
| North-Western    | 46,595,910                          | 76                               | 27,723                    | 77               |
| Eastern          | 224,786,723                         | 173                              | 32,957                    | 79               |
| Lusaka           | 767,468,733                         | 536                              | 90,618                    | 53               |
| Southern         | 339,258,926                         | 260                              | 38,424                    | 75               |
| Western          | 112,156,836                         | 143                              | 18,949                    | 89               |

Looking at the information in Table 5.9, there seems to be a link between the indicators of socio-economic status and revenue generated. Lusaka province has the highest per capita household income of K90, 618 with the lowest poverty rate of 53% and the highest revenue generated per capita of K536. Western province has the lowest per capita household income with an extremely high poverty rate of 89% and per capita own revenue of only K143. In all, most of the urban provinces like Lusaka, Copperbelt, Central and Southern provinces generated the highest revenue per capita. The rural provinces mainly Luapula and western provinces generated very few resources probably because their poverty rates are very high and so many people cannot afford to pay user fees. Many people in rural areas pay in kind and it is not much revenue that can be realized from such things.

The socio-economic status of the people in a geographical area is therefore, the most important factor in determining how much revenue would be generated in that particular area.

#### **5.4.2.2 Quality of Health Care Services**

Data from the interviews conducted showed that the quality of health services being offered at the health centres was one of the factors cited as affecting revenue potential of the districts. Officials identified shortage of essential drugs as being the major problem in the majority of public clinics. As a result, patients tend to shun these public clinics in preference for private clinics where they end up paying higher fees. Hence, poor quality of health services provided can adversely affect the revenue generation potential of districts.

#### **5.4.2.3 Political Factors**

It was found that there were also political factors influencing the level of revenue generation in the sense that user fees can only be pegged as the political officials determine, such that the fees charged are very low. In most cases local councillors oppose any increases in the fees because they fear losing their popularity among the people and hence, losing out on votes.

This information is contrary to what is written in the handbook for guidelines for health centre staff and communities, that the health centre staff and community representatives set the fees.<sup>1</sup>

#### **5.4.2.4 Disease Outbreaks**

Outbreaks of different diseases like cholera, dysentery and many others across the country were another factor that came out in the interviews as affecting the revenue generation potential of different areas. It was found that these tend to adversely affect collection of fee revenue as a result of the exemptions that apply to these epidemics.

#### **5.4.2.5 Inadequate capacity and skills**

It was identified in the literature that the management & financial capacity of staff is one of the factors influencing revenue generation in different geographical areas (Brijlal et.al 1998).

Officials at central level indicated that capacity had been developed since decentralization through seminars and workshops. They also noted that there are written guidelines in the handbooks to help districts plan, budget and manage their own resources. However, at district level, officials felt that the workshops were very brief and that their staff needed more training to equip them with adequate skills to help them effectively manage their resources. But unfortunately, there is no funding allocated for this. The other issue of concern that was related to the above was the fact that most people that were trained initially have left and that new people come in from time to time. There is a need for additional funds for re-training of staff since capacity building needs to be an ongoing exercise.

### **5.5 Analysis and discussion of alternative formulae: Towards a better health care resource allocation formula**

This part of the study discusses and analyses alternative resource allocation formulae with the inclusion of variables from international experiences that may be relevant to the Zambian situation.

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<sup>1</sup> CBoH (1999); *Designing and Operating Cost Sharing Schemes for Health Care*.

The discussion also looks at how these would improve equity in the distribution of financial resources. There are a number of indicators of need that have been identified from international literature and also from the interviews conducted, and these are contained in the conceptual framework in section 3.5. The indicators include:

- Population size
- Demographic composition of the population
- Socio-economic status
- Morbidity pattern
- Cross border flows
- Cost differences between geographical areas.

#### **5.5.1 Demographic composition of the population**

The Zambian resource allocation formula considers population size as the primary indicator of need, which is then adjusted for all the different variables used in the formula that have been discussed in section 5.2. However, the formula does not take into consideration the age/sex composition of the population. This also came out very strongly in the interviews, as it was perceived as one factor that can improve equity in the distribution of health care resources and consequently health care services. The consideration of the age / sex composition of a population in a geographic area is an important indicator of need for health services because people do not have equal needs for health care. Women may have different needs from men, and children may use health care facilities more than adults. Hence, the elderly women of childbearing age and of course children may be in need of more health services than other segments of the population. Patterns of morbidity may be different between the sexes at different ages. This means that utilization rates of health services between men and women, as well as between the different age groups will vary, and so adjusting the population of each geographical area for its demographic profile would ensure more equitable distribution of resources in the Zambian health sector.

Table 5.10 shows the standardized national different utilization rates for five-year age and sex groups. These were calculated using data from the Living Conditions Monitoring Survey (1998) data set. See Appendix D for the formula. The utilization rates were standardized by dividing them by the smallest rate, which is 1.01.

**Table 5-10: National Utilization rates by Sex and Age**

| Age group | Utilization rates |      | Standardized Utilization Rates |      |
|-----------|-------------------|------|--------------------------------|------|
|           | Female            | Male | Female                         | Male |
| 0 - 4     | 2.10              | 2.07 | 2.08                           | 2.05 |
| 5 - 9     | 1.27              | 2.14 | 1.26                           | 2.12 |
| 10 -14    | 1.01              | 2.15 | 1.00                           | 2.13 |
| 15 -19    | 1.18              | 2.07 | 1.17                           | 2.05 |
| 20 -24    | 1.57              | 1.88 | 1.56                           | 1.87 |
| 25 -29    | 1.70              | 2.07 | 1.69                           | 2.05 |
| 30 -34    | 1.70              | 2.07 | 1.69                           | 2.05 |
| 35 -39    | 1.70              | 2.07 | 1.69                           | 2.05 |
| 40 -44    | 2.25              | 1.78 | 2.22                           | 1.76 |
| 45 -49    | 1.70              | 2.07 | 1.69                           | 2.05 |
| 50+       | 2.10              | 2.07 | 2.08                           | 2.05 |

The national utilization rates show that for males utilization of health services is highest in the 10 – 14 age group, which has an utilization rate of 2.13. The lowest utilization levels occur in the 40 – 44 age group. However for the women, the scenario is different. Highest utilization for females is in the 40 – 44 age group and the lowest is in the 10 –14 age group.

In the 0 – 4 age/sex group, utilization is more for the females than the males. Female utilization rates then start to decrease steadily until in 15 – 19 age group and then start to increase again in the early twenties until mid forties and these age groups consists of women of childbearing age. For males, utilization rates are increasing right from 0 years until about 15 years and then decrease in the early twenties, rising again in the mid twenties until the early forties when they decrease but increases in the mid forties.

Surely adjusting the populations in the different provinces to these changes in the utilization of health services would have an impact on total population and would therefore enhance equity in the distribution of financial resources.

Table 5.10 therefore shows the impact of adjusting the populations of different geographical areas for the age and sex utilization of health service differences.

For some provinces, weighting the population for age and sex decreases the relative weighted population size while for others the weighted population share increases. For example, after population was weighted, the copperbelt province's share decreased by over 200,000 people. Similarly, Northern province's population after being weighted increased by over 500,000. The adjustments in relative population size reflect the health care need in different geographical areas.

Table 5.11 also shows how budget allocations change when the population is weighted for its demographic composition. Resources would be reallocated to areas with more health needs than the others.

**Table 5-11: Comparison of Crude and Age/ Sex weighted Populations**

| Province      | Crude Population  | Population Weighted for Utilization | Ratio of Age/Sex weighted population to crude | Actual Budget Allocations | Target Allocations for Age/sex weighted Populations |
|---------------|-------------------|-------------------------------------|---|---------------------------|---|
| Central       | 1,006,767.0       | 786,912                             | 0.78  | 3,241,232,405             | 2,619,006,172                                       |
| Northern      | 1,407,088         | 1,955,220                           | 1.39  | 4,386,669,233             | 6,507,381,715                                       |
| Copperbelt    | 1,657,646         | 1,439,615                           | 0.87  | 5,475,399,016             | 4,791,338,242                                       |
| Luapula       | 784,615           | 1,022,121                           | 1.30  | 2,444,824,113             | 3,401,832,347                                       |
| North-Western | 610,975           | 636,736                             | 1.04  | 1,903,220,329             | 2,119,189,175                                       |
| Eastern       | 1,300,975         | 1,355,828                           | 1.04  | 4,505,771,141             | 4,512,479,458                                       |
| Lusaka        | 1,432,401         | 1,119,597                           | 0.78  | 5,184,825,430             | 3,726,251,516                                       |
| Southern      | 1,302,659         | 1,018,187                           | 0.78  | 4,253,838,689             | 3,388,740,355                                       |
| Western       | 782,509           | 951,419                             | 1.22  | 2,836,959,953             | 3,166,521,329                                       |
| <b>Total</b>  | <b>10,285,635</b> | <b>10,285,635</b>                   | <b>1</b>                                      | <b>34,232,740,309</b>     | <b>34,232,740,309</b>                               |

### 5.5.2 Indicators of socio-economic status

The need for health care services by the people is greatly influenced by their socio-economic status in society. For example, poor people may have a higher burden of ill-health than the well off in society, hence their increased need for health care relative to the rich, as they tend to be sick more often than the rich. Types of diseases may also vary depending on one's socio-economic status. Per capita household income, poverty and unemployment rates may be some of the indicators that may be used in Zambia to reflect the socio-economic status of the population. We therefore look at each one of them and then see which one may be the best indicator of socio-economic status to use.

Table 5.12 below shows the poverty rates of the different provinces in Zambia, which varies considerably from one province to the other. The poverty rate reflects the total number of people living below the poverty line. In Zambia, households with monthly adult equivalent expenditure of less than K44, 771 are considered poor.

**Table 5-12: Poverty rate by Province**

| <b>Name of Province</b> | <b>Poverty Rate (%)</b> |
|-------------------------|-------------------------|
| Central                 | 77                      |
| Northern                | 81                      |
| Copperbelt              | 65                      |
| Luapula                 | 82                      |
| North-Western           | 77                      |
| Eastern                 | 79                      |
| Lusaka                  | 53                      |
| Southern                | 75                      |
| Western                 | 89                      |
| <b>National Average</b> | <b>73</b>               |

Source: CSO, Living Conditions Monitoring Survey, 1998.

It is evident that the poorest province is western with a very high poverty rate of 89% followed by the Luapula province whose poverty rate is 82%.

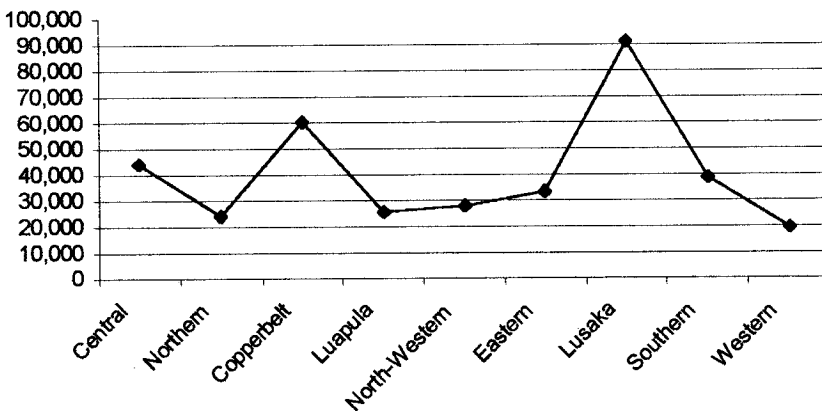


Lusaka province seems to have the lowest poverty rate of 53 %. Only two provinces Lusaka and Copperbelt are actually below the national average rate. All the others are above the average rate of 73%. The above analysis shows that on the whole, people in Zambia are very poor.

Despite the poverty rate being high in Zambia, the distribution of income in the country is also highly skewed with an estimated Gini-- coefficient of 0.66. Figure 5.5 below shows the distribution of per capita household income for the nine provinces in Zambia.

Per capita household income is highest in Lusaka province, where the capital city of Zambia is situated, followed by the copperbelt province. This may be explained by the fact that most people in these two provinces are in formal employment and therefore receive a steady income every month.

**Figure 5-5: Per Capita Household Income by Province**

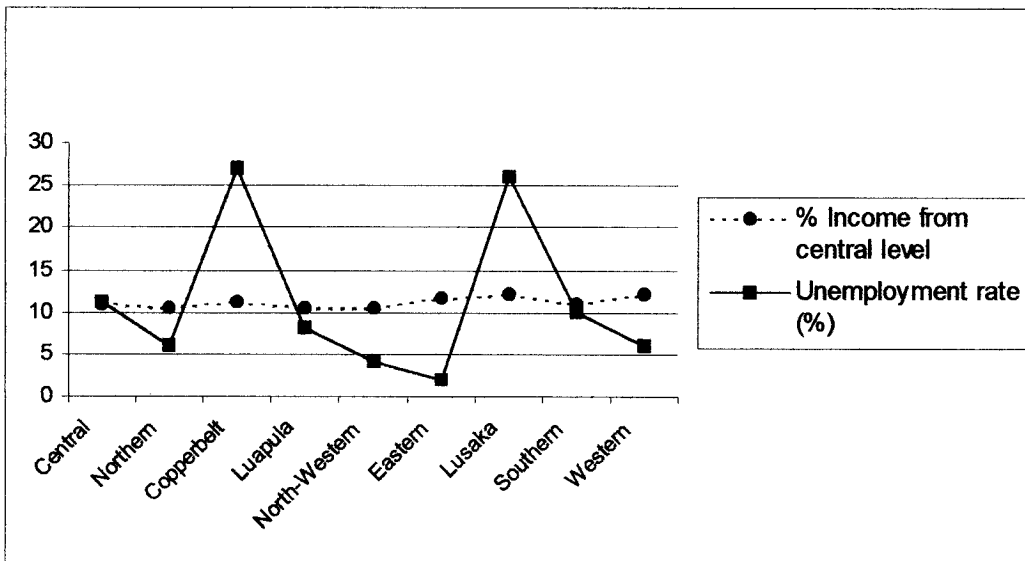


Western province has the lowest per capita household income and lies far below the national average of K44, 771. There is a huge difference of K71, 669 between the highest and lowest per capita income, and this indicates just how skewed income distribution is in Zambia.

Lusaka province has the highest per capita income and also the lowest poverty rate. Similarly, the western province has the lowest per capita income with the highest poverty rate. This shows that there is negative relationship between poverty and per capita household income. The lower the per capita household income is, the higher the poverty rate.

In Figure 5.6 below, the unemployment rate of each province is plotted against the percentage budget share of each province from the central level.<sup>2</sup> When unemployment rates are used the scenario is different. Copperbelt and Lusaka seem to have the highest rate of unemployment even though we saw earlier on that these two provinces have the highest per capita household income and lowest poverty rates. This may be so due to high variation of household income within the province. The lowest unemployment rate is found in the Eastern province where only 2% of the total population are not employed. Looking at the graph below, it however seems like there is little variation in allocation per capita from the central level.

**Figure 5-6: Unemployment rate and percentage income from central level**



The analysis of different socio-economic indicators shows the variations in the socio-economic status of the people. These are important and if incorporated in the formula

<sup>2</sup> Unemployment rate refers to the number of unemployed persons expressed as a percentage of the labour force or economically active population. Employment refers to both non-agricultural and agricultural activities including small and large-scale farming.

for resource allocation, may lead to great improvement in equity in the distribution of resources.

Looking at the above analysis, there seems to be a negative relationship between poverty rates and per capita household income. The higher the poverty rate, the lower the income per capita and vice versa. This is the expected relationship between these two variables. Any one of these two indicators may be a good reflection of the socio-economic status. However, using unemployment rates may be a bit deceiving since the areas with the highest unemployment rates are actually the ones that have the highest per capita incomes. One may expect these areas to have the lowest per capita incomes. This may not be so because a number of people are actually engaged in the informal sector.

Between poverty rates and per capita household income, a better indicator to incorporate in the formula would be the poverty rates because this represents all the people living under the poverty line. Unlike the income per capita which may be high or low depending on the extremes and so may not be a true reflection of the socio-economic status of all the people in an area. The study therefore suggests that poverty rates of each area be used to reflect the socio-economic status of the people in a particular area.

### **5.5.3 Indicators of Health Status**

It is important to note that even when the age/sex make-up of the population has been taken into account, populations of the same size and make-up may exhibit different morbidity characteristics. The current resource allocation formula takes into account the predominance of cholera in different areas. However, it should be noted that there are certain districts that are not prone to cholera but to other specific diseases that are just as costly, or even more costly than cholera. Disease patterns vary between provinces and thus the types of diseases found in each province would have an impact on the health needs of the people in that area. Many district officials interviewed were of the view that since different districts have different disease patterns, it would be better if the cost of each disease found in a specific area were considered in the allocation formula.

Table 5.13 below shows the main causes of morbidity in Zambia by province.

Malaria is the leading cause of all diagnoses in all age groups (CBoH, 2001 c).

**Table 5-13: Some of the top diseases per 1,000 population in 2000, by province**

| Province      | Disease (Incidence per 1,000 Population) |                        |                  |                   |            |                 |            |
|---------------|--|------------------------|------------------|-------------------|------------|-----------------|------------|
|               | Malaria                                  | Respiratory Infections | HIV / AIDS cases | Tuberculosis (TB) | Cholera    | Suspected Polio | Measles    |
| Central       | 373                                      | 139                    | 3.1              | 7.9               | 0.1        | 18              | 4.3        |
| Copperbelt    | 306                                      | 156                    | 3.2              | 14.1              | 0.3        | 19              | 2.0        |
| Eastern       | 273                                      | 81                     | 2.1              | 2.0               | 1.1        | 3               | 1.3        |
| Luapula       | 346                                      | 96                     | 1.0              | 5.2               | 2.3        | 11              | 0.6        |
| Lusaka        | 254                                      | 136                    | 4.0              | 13.4              | 1.7        | 9               | 2.5        |
| Northern      | 228                                      | 81                     | 1.2              | 1.8               | 0.3        | 19              | 4.1        |
| North Western | 485                                      | 157                    | 2.5              | 5.9               | 0.5        | 4               | 0.6        |
| Southern      | 335                                      | 114                    | 2.4              | 6.2               | 0.1        | 13              | 7.8        |
| Western       | 440                                      | 122                    | 3.4              | 6.5               | 0.1        | 12              | 1.4        |
| <b>Zambia</b> | <b>316</b>                               | <b>120</b>             | <b>2.6</b>       | <b>7.6</b>        | <b>0.7</b> | <b>-</b>        | <b>3.0</b> |

Source: The 2000 Annual Statistical Bulletin (CBoH, 2001 a)

North Western and Western provinces had the highest incidence of malaria. In fact, North Western province recorded twice as much malaria incidence as that recorded in Lusaka province in 2000. The Northern province had the lowest malaria incidence of 228 cases per 1,000 population. Respiratory infections were most prevalent in the North-Western and Copperbelt provinces. Lusaka province recorded the highest incidence of HIV/ AIDS of 4.0 followed by Western province with an incidence of 3.4. Copperbelt and Lusaka Provinces had the highest number of suspected and confirmed TB cases reported. As for cholera, the province with the highest incidence of 2.3 cases per 1,000 population in 2000 was Luapula, followed by Lusaka with an incidence of 1.7 cases per 1,000 population. For measles, Southern province recorded a remarkably high incidence of 7.8. In all, Southern, Central and Northern provinces recorded the highest incidences in 2000. The measles incidence is an indicator that measures the number of new cases of measles amongst under 5 per 1,000 children. Northern and Copperbelt provinces recorded the highest cases of suspected polio.

The analysis above of the main causes of morbidity in the different provinces shows that different areas have different patterns of morbidity. Taking into consideration the different diseases that are prominent in different areas and the costs that come with them may be a bit cumbersome. Morbidity data would be the most precise measure for this but it is not a reflection of total morbidity but only morbidity seen at health facilities. In this case, it would be better to use the mortality rates, as these would be a more accurate and standardized measure of the burden of illness of each area. Incorporating mortality rates of each particular area would therefore be a step further in achieving a better and more equitable health care resource allocation formula

According to the Living Conditions Monitoring Survey (1998), Copperbelt province has the highest crude mortality rate of 41.3 per thousand population while the province with the lowest mortality rate is North-Western with 17.7. It is strange however, that mortality rates are highest in areas with low poverty rates which are mainly urban and the other way round for rural areas. For example, highest mortality of 41.3 per thousand population is in the Copperbelt province, which has a relatively low poverty rate 65, and lowest mortality of 17.7 occurring in North-Western province where the poverty rate of 77 percent and this is quite high. This may be an indication that reporting of mortality in urban areas is better than in rural areas and therefore, mortality data in this case, may not be accurate. This in turn means that in Zambia, at this stage, it would be better to leave this indicator out until a time when accurate data becomes available.

#### **5.5.4 Other Indicators of Need**

The other indicators of need that are important and are worth considering are firstly, the consideration of the different costs involved in the delivery of health services in different geographical areas.

For example, most urban areas are densely populated and so it would be cheaper to provide health services in these areas than in most rural areas where population density is very low. The current formula does however incorporate population density as one of the variables that determine the distribution of resources. However, the way that density is included is arbitrary because 10% extra is given to low-density areas while 10% is deducted from areas with a high density. But there are varying levels of 'low density'. The study therefore suggests that different weights, although also a bit arbitrary but with differing weights, should be given to these densities as is shown in Table 5.14. Areas with a very low density of below 15 kilometre square may have a weight of +50% meaning that they receive 50% extra funding while those areas with moderately low density of less than thirty but above fifteen may receive 25% extra funding. The 10% extra funding in the current formula is not adequate for effective provision of health services in these low-density areas. Under this criterion, provinces would be classified as shown in Table 5.14.

**Table 5-14: Applying different weights to different population densities**

| Province            | Population Density (sq. Km) | Density Level  | Weight   |
|---------------------|-----------------------------|----------------|----------|
| Central             | 10.7                        | Very Low       | 0.50     |
| Northern            | 8.5                         | Very Low       | 0.50     |
| Copperbelt          | 50.5                        | High           | 0.00     |
| Luapula             | 15.3                        | Moderately Low | 0.25     |
| North-Western       | 4.6                         | Very Low       | 0.50     |
| Eastern             | 18.9                        | Moderately Low | 0.25     |
| Lusaka              | 63.5                        | High           | 0.00     |
| Southern            | 14.2                        | Moderately Low | 0.25     |
| Western             | 6.1                         | Very Low       | 0.50     |
| <b>Total Zambia</b> | <b>13.1</b>                 | <b>-</b>       | <b>-</b> |

Secondly, the other indicator of need that is important to consider, involves the issue of cross border flows. RAWP argued that there are patient flows across boundaries to seek health services in another geographical area and that unplanned patient flows could also be a measure of geographical disparity in health care provision.

Therefore, RAWP included this in their allocation formula so that areas that serve patients from another area are compensated. However it should be noted that the main reason why people may cross boundaries might be the fact that they perceive the quality of services to be better on the other side than in their own area. But this study, and as different researchers have pointed out, takes the stance that estimating cross boundaries, especially between districts should not be encouraged so that areas may in turn become self-reliant, and try to improve their services so that local residents need not to go to other districts to seek these basic services. Equity is enhanced when these basic services are accessible to local residents. The main problem with estimating cross border flows is that health care supply would increase further demand. This means that if more resources are allocated to areas, mostly urban, serving people from other areas, it means that fewer resources would be allocated to rural areas. People from these areas would therefore, continue staying away from their local health services. This system of distributing resources would thus exacerbate the existing disparities in health services. Perhaps at provincial level these cross border flows may be considered because people may move from one province to another in order to seek special health services that are not available in their areas.

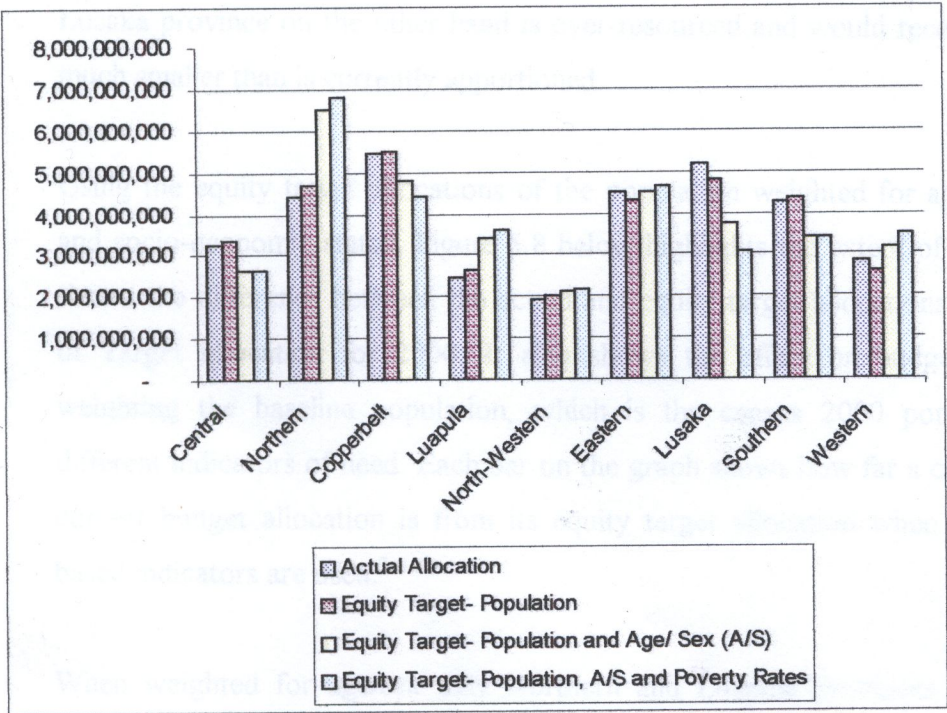
#### **5.5.5 Summary of Alternative Formulae and impact on Budget Allocations**

This section summarises the indicators of need that would lead to equitable distribution of resources and these are population size, which is the principal indicator of need. Population is then weighted for the age/sex utilization of health services, mortality rates of different areas, population densities and poverty rates used as proxy for socio-economic status.

When the population is weighted for the different indicators of need, even the budget allocations based on such weighted populations reflect the needs of the people in different areas and so may be equitable.

Figure 5.7 shows the effect on budget allocations of weighting the population for the various indicators of need.

**Figure 5-7: Effect of weighting the Population (Census 2000) for different Indicators of need on Budget Allocations**



The figure above shows how the allocations vary when the population is weighted for different indicators of need. The ideal formula would be the one that would incorporate all these indicators of need, but one that would at least include weight the population for the age/sex utilization and poverty rates for socio-economic status would promote equity in distribution of resources. Density and mortality rates are left out because of arbitrariness and inaccurate information, respectively. It seems like there is under-reporting in rural areas of mortality rates. Therefore poverty is a much more important indicator of need that would also reflect different morbidity and the need for reliance on public sector services. Using weighted population, the highest equity target budget allocation has to go to the Northern province, which is relatively under-resourced as the actual allocations show.



Lusaka province on the other hand is over-resourced and would receive an allocation much smaller than is currently apportioned.

Using the equity target allocations of the population weighted for age/sex utilization and socio-economic status, Figure 5.8 below highlights the extent of inequalities as it shows the difference between the actual and equity target allocations as a percentage of Target allocation for 2000. It also shows the effect on budget allocations of weighting the baseline population, which is the census 2000 population, for the different indicators of need. Each bar on the graph shows how far a certain province's current budget allocation is from its equity target allocation when different needs-based indicators are used.<sup>3</sup>

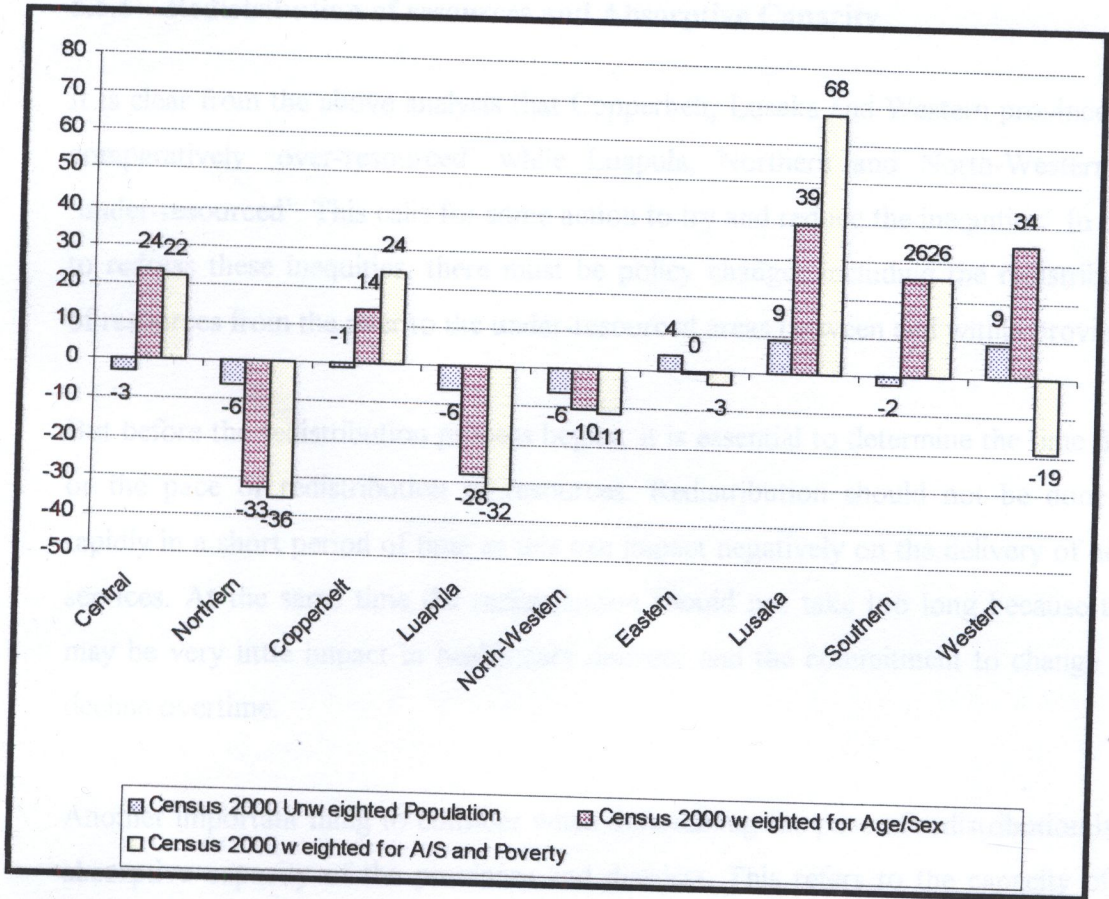
When weighted for age/sex only Northern and Luapula provinces seem to be the worst off whilst Lusaka and Western are better off.

Using a needs-based formula that takes into account all the above indicators of need, that is, population weighted for age/sex and socio-economic status (poverty rate), means that the Eastern province would now be close to its target allocation, while the Northern and Luapula provinces would be made worse off than the actual allocation as they receive lower budget allocations. At the same time Lusaka and Copperbelt provinces appear to be better off as more resources would be allocated to them.

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<sup>3</sup> The equity target allocation for each province is based on the average weighted per capita allocation for that province and is represented by zero (0) on the graph.

**Figure 5-8: Allocations according to different needs-based Indicators.**



Before weighting the population, Copperbelt and Southern provinces are fairly close to their equity target budget allocation levels. Nevertheless, Lusaka and Western provinces are significantly above their equity target allocations whereas Northern, Luapula and North-Western are well below their targets.

But after weighting the population for different indicators of need, age / sex utilization and poverty rates, Lusaka province is still significantly above its target allocation while the Copperbelt province is also still well above its target allocation. The Northern province is the lowest below the target equity allocation.

### 5.5.6 Redistribution of resources and Absorptive Capacity

It is clear from the above analysis that Copperbelt, Lusaka and Western provinces are comparatively 'over-resourced' while Luapula, Northern and North-Western are 'under-resourced'. This calls for some action to try and reduce the inequities. In order to redress these inequities, there must be policy changes including the redistribution of resources from the over to the under-resourced areas between and within provinces.

But before the redistribution process begins, it is essential to determine the time frame or the pace of redistribution of resources. Redistribution should not be done too rapidly in a short period of time as this can impact negatively on the delivery of health services. At the same time the redistribution should not take too long because there may be very little impact in health care delivery and the commitment to change may decline overtime.

Another important thing to consider when determining the pace of redistribution is the absorptive capacity of the provinces and districts. This refers to the capacity of the over-resourced areas to absorb budgetary cuts and also the capacity of the under-resourced areas to absorb budgetary increases.<sup>4</sup> The five dimensions of capacity include:

- The action environment whose political factors and macroeconomic policies affect the tasks to be performed;
- The public sector institution context that affects the intended tasks with its rules and regulations;
- Task Networks that involve inter-linkages with other organisations or institutions carrying out a similar task;
- Organisation of institutions in terms of their structure, hierarchy and management also has an impact on capacity;
- Human Resources capacity that includes the training, skills management and motivation of staff.

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<sup>4</sup> Capacity has been defined by Hildebrand and Grindle (1994) as "the ability to perform appropriate tasks effectively, efficiently and sustainably".

In the early years of the redistribution process, it is thus important to build capacity especially in human resources (HR) such as in management, planning and budgeting skills, so that the process may be well handled and successful. Also another important aspect of capacity is task networking, for example knowing how to work with other departments and organizations so that you can employ staff quickly, purchase equipment and so on.

### 5.5.7 Modelling the Pace of Redistribution

A needs-based formula is the basis for equitable distribution of resources as it gives equity target allocations therefore identifying inequities. But in order to move the allocations either downwards or upwards to their equity targets, it has been mentioned above that a redistribution process must be determined. Therefore this section of the study models the pace of redistribution of budget allocations (based on the 2000 budget allocations) from the central level to provinces and districts in order to achieve the equity target levels.

Table 5.15 below, gives the actual and target budget allocations of each province, and shows the annual percentage budgetary change (either a cut or increase) for each province to achieve equity within the time periods considered which are from 1 to 20 years and the various time frame settings are 1,5,10,15, and 20 years.

**Table 5-15: The Pace of Redistribution Model.**

| Province      | Budget Allocations (2000) |                    | Total Redistribution; Average annual % change |           |            |            |            |
|---------------|---------------------------|--------------------|---|-----------|------------|------------|------------|
|               | Actual                    | Equity Target      | (1 year)                                      | (5 years) | (10 years) | (15 years) | (20 years) |
| Central       | 3241232405                | 3338847116         | 3.0   | 0.6       | 0.3        | 0.2        | 0.1        |
| Northern      | 4386669233                | 6436295379         | 46.7  | 8.0       | 3.9        | 2.6        | 1.9        |
| Copperbelt    | 5475399016                | 4407683905         | -19.5   | -4.2      | -2.1       | -1.4       | -1.1       |
| Luapula       | 2444824113                | 2927912597         | 19.8  | 3.7       | 1.8        | 1.2        | 0.9        |
| North-Western | 1903220329                | 2166802189         | 13.8  | 2.6       | 1.3        | 0.9        | 0.7        |
| Eastern       | 4505771141                | 4488609298         | -0.4  | -0.1      | 0.0        | 0.0        | 0.0        |
| Lusaka        | 5184825430                | 3113388617         | -40.0   | -9.7      | -5.0       | -3.3       | -2.5       |
| Southern      | 4253838689                | 3833422296         | -9.9  | -2.1      | -1.0       | -0.7       | -0.5       |
| Western       | 2836959953                | 3519778913         | 24.1  | 4.4       | 2.2        | 1.4        | 1.1        |
| <b>Total</b>  | <b>34232740309</b>        | <b>34232740309</b> | -   | -         | -          | -          | -          |

#### **5.5.7.1 One-Year Redistribution**

From the information in the above table if this option were implemented, then there would be major budgetary changes, both in terms of cuts and increases, in order to try to attain equity within the shortest period of one year. This means that allocations to Lusaka, Copperbelt and Southern provinces will decrease significantly by 40%, 19.5% and 9.9%, respectively. In a similar way, Northern, Western and Luapula provinces would receive huge increases in their allocations of 46.7%, 24.1% and 19.8%. Significant budgetary changes can have adverse effects on health care delivery especially when capacity is not yet fully developed to absorb these budgetary changes. Hence, this may not be the best option for the redistribution of resources.

#### **5.5.7.2 Five-Year Redistribution**

In this option, the period for redistribution of resources is a bit longer and so it is more practicable than the one-year period. This allows for more time for the relevant adjustments. The other factor is that the annual percentage changes in the budget are now less than in the first option above. For example Lusaka, Copperbelt and Southern provinces would now only receive annual budget cuts of 9.7%, 4.2% and 2.1%, respectively while Northern, Western and Luapula provinces' budgets would increase by 8%, 4.4% and 3.7%, per annum respectively.

#### **5.5.7.3 Ten, Fifteen to Twenty-Year Redistribution**

Looking at the ten, fifteen to twenty-year options, it is evident that the longer the period is, the smaller the annual change in the budgetary allocations. For example, the annual budgetary cuts for Lusaka province for the ten, fifteen to twenty-year options are 5%, 3.3%, 2.5%, respectively and the budgetary increases for the Northern province would be only 3.9%, 2.6 %and 1.9% respectively. The annual percentage changes are smallest in the twenty-year option. Eastern province in these three options needs almost no budgetary changes, as it would have attained equity.

## **6.1 Introduction**

This is the final chapter of the study that gives a summary of the major research findings. These findings are summarized with regards to the objectives of the study given in the first chapter in order to evaluate whether the study has achieved what it set out to do.

Section 6.2 therefore gives a summary of the key findings in relation to the research objectives. In section 6.3, the recommendations of the study are discussed while section 6.4 gives suggestions for further research related to this study.

## **6.2 Summary of Key Findings in relation to the research objectives**

The key findings of the study are summarized in the context of the following research objectives:

- Evaluation of the indicators of need considered in the resource allocation process in Zambia
- Determining the current distribution of resources and issues of equity
- Assessment of alternative needs-based formulae to improve equity in resource allocation
- Identification of available sources of local revenue and factors that influence revenue generation in different geographical areas
- Evaluating impact of local revenue potential on resource allocation as a whole

### **6.2.1 Evaluation of indicators of need considered in the resource allocation process**

This evaluation shows that there are a number of indicators currently used in the health care resource allocation in Zambia and these are analysed one by one. The study found the use of certain indicators a bit ambiguous. For example, the way that population density is introduced in the formula is somewhat arbitrary. This is because there are differing levels of 'low population density' but the formula assigns the same weight to all low-density areas. It is a well-known fact that the provision of health services to low density areas is very costly but even more costly to very low-density areas where the population is very scattered.

Another indicator of need that has been found to be unstable and partial is the use of cholera proneness as a proxy for differential morbidity. Firstly, analysis has shown that this indicator is very unstable because the level of incidence changes significantly from year to year as indicated by cholera cases per thousand population data of 1999 and 2000. Secondly, analysis has indicated that there are various leading diseases in Zambia of which cholera is only one of them. It has been noted that different areas may have different disease patterns that need to be taken into account as well. Therefore, cholera proneness is not sufficient to represent total morbidity

Analysis has also shown that the use of hospital beds is unacceptable by international standards as this is an indicator of supply and not of need. Indicators of supply maintain the status quo and perpetuate inequities. The study also finds the use of fuel prices for cost differentials a bit questionable and suggests the use of population density if properly applied.

The criteria for the disbursement of funds need to be objective.

### **6.2.2 Current distribution of resources and issues of equity**

The current resource allocation formula does not allow equitable distribution of resources as it was found that some provinces are over funded while others are under funded compared to their equity target allocations. Urban provinces seem to get more funding than the rural provinces.

Analysis of the current distribution of funds using the information for 2000 highlights the inequalities that exist between and within provinces.

It was also found that the actual budget allocations differ from the ones if the formula were fully applied.

### **6.2.3 Assessment of alternative resource allocation formula**

It was found that the indicators of need incorporated in the formula were not adequate and so there is a need to include different and possibly more indicators of need that reflect the relative needs of the people in different geographical areas. The study therefore also involves an assessment of different needs-based formulae in order to try and improve equity in resource allocation.

This analysis suggests the inclusion of indicators of need that are currently not in the resource allocation formula. The study in this respect, discusses indicators of need such as weighting the population for the demographic composition of the population in terms of age and sex. This is because the utilization of health services varies from one age group to another.

The other issue examined is the need for an indicator of socio-economic status. Different socio-economic groups may have differing needs for health care services with the poorest of the poor having the greatest burden of disease. In view of this, the analysis involves three indicators of socio-economic status, which are unemployment rates, poverty rates and household income per capita.



Based on this evaluation, it is suggested that the poverty rates of each area be used in the resource allocation formula to reflect the socio-economic status of the people in that particular area. This would enable more equitable distribution of resources if taken into account since health care need is greatly influenced by people's status in society. The analysis shows also that the areas with the highest poverty rates of 89 % and 82 % are North-Western and Luapula provinces respectively, which are the ones that received the least budget allocations.

Analysis also includes coming up with an appropriate indicator for health status that is impartial as opposed to the use of cholera proneness, which has been found to be both unstable and unfair to other areas that are prone to other diseases. In order to improve equity, the study suggests the use of overall mortality rates of different areas in order to capture total morbidity. However, mortality data is poor and reflects under-reporting especially in rural areas, so possibly this indicator should be left out until more accurate data becomes readily available.

Population density is also analysed but with different weights for low and very low density. The study assigns weights of 0.5 and 0.25 extra funding for very low and low-density areas, respectively unlike the 0.1 weighting in the current formula, which is both inadequate and is equal for both low and very low densely populated areas. But the study found limitations on the use of density too because of arbitrary weights. This should be left out as well until cost-differential is properly estimated.

All in all, the analysis highlights inequities as a result of using the different needs-based formulae and these are represented as the distance from the equity target allocations. Therefore, this analysis ends up with a model for the redistribution of resources from the over-funded to the under-funded areas, over different time periods.

#### **6.2.4 Identification of available sources of local revenue and factors influencing revenue generation in different areas**

Since the study also looks at local revenue generated from cost-sharing schemes that supplements the budget allocations from the central level, this part of the analysis involved the identification of the sources of local revenue in the different geographical areas.

The sources of local revenue are the cost-sharing schemes, which are the user fees that are charged at the point of consumption of health care services, and prepayment schemes, which involve community, based schemes where a fixed annual in-kind contribution is made.

We learn from international experience that different areas do have different capacities to generate revenue. Analysis of Zambian data shows significant variation in the revenue-raising capacity of provinces and districts with the urban areas generating much more income than the rural provinces. This has been identified as a source of inequities.

Evaluation of local revenue generated in the year 2000 shows that areas like Lusaka and the copperbelt provinces received the highest budget allocations despite the fact that these are the areas that were able to raise the highest revenue from cost-sharing schemes. This is one factor that can lead to the widening of existing inequities because the status quo is maintained. Therefore, this is the reason why local revenue needs to be incorporated in the formula.

Factors that influence revenue generation have been highlighted and some of these include the quality of health care services being delivered to the people, the socio-economic status of the people in that area, political factors and exemptions of certain diseases from the payment of user fees.

#### **6.2.5 Impact of local revenue potential on resource allocation as a whole**

Decentralization has meant the transfer of financial management of the cost-sharing revenue to the local level. All powers of decision-making involving the collection and expenditure of revenues are transferred to the district. This means that districts have to be equipped with the necessary skills to carry out these major functions.

Analysis in this regard indicates that at the district level, more training is needed from time to time to improve on the management and financial capacity of staff. This is because new people come in and go often and these new staff have to go through some kind of training too but it was found that no funding has been set aside for such training. This is actually one of the major factors that influence the revenue generation potential in different geographical areas.

As indicated in the previous section, because of the introduction of user fees as a result of decentralization of the health sector, there is a need to account for this local revenue in the resource allocation process in order to reduce inequities. This is because of the different abilities to raise revenue that exist in different geographical areas.

### 6.3 Recommendations

The following recommendations are given, based on the research findings of the study:

- ❖ The study recommends that first and foremost, the inequities in the current formula should be addressed especially indicators such as the use of hospital beds, fuel prices, proneness to cholera and proper application of population density in the current formula. The study then suggests the use of a needs-based formula that includes indicators such as population, poverty rates and weighting the population for its sex/age profile. Then later on as data improves, total mortality and population density need to be included in the formula.
- ❖ A recommendation is also made that resources should be directed to the improvement of health services especially in areas with high poverty levels since analysis has shown that these areas are currently under-resourced. Reallocation of resources however, should be based on the model developed by the study and a minimum of a five- year period is recommended to allow for the building of necessary capacity in order for the provinces / districts to be able to absorb the budgetary changes.

- ❖ Training of staff should be an ongoing exercise to ensure effective planning, management and expenditure of the revenue generated locally and to carry out all the relevant tasks. Thus, a recommendation is made in this regard, namely that funds be set aside specifically for capacity-building of staff and refresher training from time to time.
- ❖ Factors affecting revenue generation in different areas must be addressed in order to increase local revenue generating potential since this money supplements central government revenue and can be used to improve the health infrastructure at local level such as purchasing items like furniture, various fittings, and to improve on communication and transport facilities.
- ❖ There is also a need to take account of local revenue generation potential in the resource allocation formula, so that areas with more own revenue may not receive higher than is equitable budget allocations from central level. However, it should be noted that it is necessary that a certain amount or percent remain unaccounted in the resource allocation formula to act as an incentive to the districts to raise more revenue. The study therefore recommends that the resource allocation procedure should take note of local revenue but also allow for retention of a certain percentage of revenue for motivation purposes.

This study concludes by pointing out the fact that equity can be realized in the distribution of resources in the health sector in Zambia only through a better resource allocation formula that reflects the need for health care services of the people in different geographical areas. An equitable needs-based formula must be accompanied by a number of policy changes that have been suggested.

#### **6.4 Further Research**

The following are the suggestions for further research:

- ❖ This study concentrated on the distribution of financial resources only between different geographical areas. There is need for a study to be carried out in Zambia that evaluates the distribution of non-financial resources too like human resources, health care facilities and many others.

- ❖ There is need to undertake a study on the costs of providing services in different areas with different population densities and also the need to improve reporting of data.
- ❖ This study looked at mainly inter-provincial equity, although there are a few analyses on intra-provincial equity. A recommendation is made in this regard that future studies may have a more detailed analysis on inter-district equity and the extent of inequalities at this level.
- ❖ There is also need for a detailed study looking at the scope of local generation in Zambia and the sustainability of the cost sharing schemes in order to increase the revenue generating potential at local level.

## **7 APPENDIX A: Useful Principles for a Need-based Formula**

- Estimate relative need for health services within each geographical area based on:
  - Population size (single indicator of need
  - adjusted for usage of public sector
  - services)
  - Demographic composition of population (Need to adjust for age, gender as this has an effect on relative need for health services)
  - Morbidity/ mortality profile
  - Socio-economic status of population
- Indicators of supply, demand, and utilization should not be used as indicators of need. If utilization regional health service utilization were used as proxy for need, areas with already relatively good supply of services would be allocated more resources.
- Estimate resource targets by allocating financial health care resources between areas in proportion to their adjusted populations
- In determining targets, other sources of finance within each area should be taken into account
- Monitor changes in population distribution between geographic areas and estimate proportional distribution of resources in the longer term
- Recalculate resource targets on a regular basis refining the formula to include more indicators of need as more accurate data become available.

Source: Health Economics Unit: University of South Africa (2001)

## 8 **APPENDIX B: Principles of a successful formula**

### **Some principles of a successful formula:**

- Policy objectives of a formula must be made clear and explicit before it is developed
- The policy objectives of a formula must be consistent with other policies in general, and with service priorities in particular
- A formula should have the following characteristics:
  - Simple and clear. This means that it should not be too sensitive to changes in data and assumptions
  - Makes use of indicators that are well and frequently recorded. It avoids indicators which reflect the existing supply of services
  - It takes account of demography, utilization of the private sector, health status, cross boundary flows, the cost of teaching and research, and the special cost of service delivery in different areas.

Source: Doherty J, and A. van den Heever (1997)

## 9 **APPENDIX C: RESEARCH INSTRUMENTS.**

### **Interview Schedule for MoH / CBoH**

- 1) What is your position in the Ministry / CBoH?
- 2) What factors are considered in making decisions concerning allocations to districts?
- 3) On what basis are resources allocated from central to different districts? What are the indicators used in the resource allocation formula?

- 4) What is the rationale behind using these indicators?
- 5) Are district budgets considered in allocation decisions?
- 6) Are the final allocations the same as the budgets?
- 7) Is local revenue generation taken into account in allocation decisions?
- 8) What can be done to improve equity?
- 9) Are there any guidelines on how resource allocations to different districts should be made? If so what are they?
- 10) What are the actual allocations like versus the allocation guidelines?
- 11) Do districts have capacity to plan, budget and manage resources?
- 12) If not, what is being done to ensure this?
- 13) What is the level of decentralization of authority to the districts? Is there any kind of central level involvement? If so, how?
- 14) Are there any monitoring mechanisms put in place?

#### **Interview schedule for DHMTs**

- 1) What is your position in the DHMT?
- 2) What are the sources of revenue for the provision of health care services in this district?
- 3) What are the actual allocations of resources from the CBoH and how often are these made?
- 4) What is the relationship between The DHMT and CBoH?
- 5) What is the potential of revenue generation from locally generated resources in this district?
- 6) What are the factors that influence revenue generation in this district?
- 7) What are the current policies on user fees and prepayment schemes at district level and what are the obstacles to successful implementation of fees and prepayment schemes?
- 8) What is the criterion for implementing of user fees and who sets the fee?



- 9) Is the district team equipped with adequate capacity and skills to effectively formulate guidelines on fees, and to manage the resources?
- 10) Are there any measures that are taken to ensure financial management capacity in the health units?
- 11) Are there any mechanisms to ensure accountability of resources generated at the clinics?
- 12) Since one of the objectives of decentralization is to promote community participation, were there any consultations with or explanation to the community regarding the introduction and implementation of fees and the need for cost- sharing?
- 13) What are your general impressions about decentralization?
- 14) What is the extent of decentralization of the DHMT in terms of decision-making and other functions?
- 15) How is revenue generated used to improve the quality of overall health care services in the whole district?

#### **10 APPENDIX D: Formula for Calculating utilization rates**

$$\text{Utilization rate} = (P_s \div TP) \times 365/14 \text{ days}$$

Where,

$P_s$  = Number of people that used service

TP = Total number of People

365 refers to the number of days in a year which is divided by 14 days as the household survey (Living Conditions Monitoring Survey) gives the total number of people that reported illness / injury in the 2 weeks preceding the survey.

The utilization rates were calculated for each age/sex group applying the above formula.

**11 APPENDIX E: Evaluating inter-district equity position for 2000 using un-weighted population**

| DISTRICT<br>&<br>PROVINCE | CENSUS<br>2000<br>POPULATION | ACTUAL<br>BUDGET<br>ALLOCATION<br>(K) | TARGET EQUITY<br>ALLOCATION | ACTUAL PER<br>CAPITA<br>ALLOCATION | EQUITY PER<br>CAPITA<br>ALLOCATION | PERCENTAGE<br>OVER<br>OR<br>UNDERFUNDED |
|---------------------------|------------------------------|---------------------------------------|-----------------------------|------------------------------------|------------------------------------|---|
| Chibombo                  | 242,380                      | 671,691,481                           | 806,691,235                 | 2771                               | 3328                               | -17%                                    |
| Kabwe<br>Urban            | 178,341                      | 608,436,057                           | 593,556,075                 | 3412                               | 3328                               | 3%                                      |
| Kapiri<br>Mposhi          | 191,604                      | 480,718,943                           | 637,698,108                 | 2509                               | 3328                               | -25%                                    |
| Mkushi                    | 109,546                      | 296,886,340                           | 364,591,955                 | 2710                               | 3328                               | -19%                                    |
| Mumbwa                    | 154,165                      | 681,536,463                           | 513,093,300                 | 4421                               | 3328                               | 33%                                     |
| Serenje                   | 130,731                      | 501,963,121                           | 435,100,057                 | 3840                               | 3328                               | 15%                                     |
| <b>Central</b>            | <b>1,006,767</b>             | <b>3,241,232,405</b>                  | <b>3,350,730,729</b>        | <b>3219</b>                        | <b>3328</b>                        | <b>-3%</b>                              |
| Chilubi                   | 59,473                       | 207,381,069                           | 197,938,558                 | 3487                               | 3328                               | 5%                                      |
| Chinsali                  | 129,406                      | 410,857,040                           | 430,690,180                 | 3175                               | 3328                               | -5%                                     |
| Isoka                     | 100,990                      | 367,601,952                           | 336,115,801                 | 3640                               | 3328                               | 9%                                      |
| Kaputa                    | 86,608                       | 254,741,839                           | 288,249,503                 | 2941                               | 3328                               | -12%                                    |
| Kasama                    | 179,936                      | 478,668,993                           | 598,864,568                 | 2660                               | 3328                               | -20%                                    |
| Luwingu                   | 83,369                       | 322,515,127                           | 277,469,434                 | 3869                               | 3328                               | 16%                                     |
| Mbala                     | 161,532                      | 546,852,843                           | 537,612,214                 | 3385                               | 3328                               | 2%                                      |
| Mpika                     | 145,315                      | 593,117,581                           | 483,638,653                 | 4082                               | 3328                               | 23%                                     |
| Mporokoso                 | 98,376                       | 388,577,021                           | 327,415,863                 | 3950                               | 3328                               | 19%                                     |
| Mpulungu                  | 66,332                       | 239,060,577                           | 220,766,742                 | 3604                               | 3328                               | 8%                                      |
| Mungwi                    | 142,202                      | 361,830,725                           | 473,277,939                 | 2544                               | 3328                               | -24%                                    |
| Nakonde                   | 153,549                      | 215,464,466                           | 511,043,124                 | 1403                               | 3328                               | -58%                                    |
| <b>Northern</b>           | <b>1,407,088</b>             | <b>4,386,669,233</b>                  | <b>4,683,082,580</b>        | <b>3118</b>                        | <b>3328</b>                        | <b>-6%</b>                              |
| Chililabombwe             | 84,866                       | 204,917,248                           | 282,451,763                 | 2415                               | 3328                               | -27%                                    |
| Chingola                  | 177,445                      | 621,432,485                           | 590,574,000                 | 3502                               | 3328                               | 5%                                      |
| Kalulushi                 | 72,765                       | 257,978,403                           | 242,177,109                 | 3545                               | 3328                               | 7%                                      |
| Kitwe                     | 388,646                      | 1,288,384,090                         | 1,293,495,014               | 3315                               | 3328                               | 0%                                      |
| Luanshya                  | 155979                       | 496,274,813                           | 519,130,671                 | 3182                               | 3328                               | -4%                                     |
| Lufwanyama                | 65804                        | 218,985,447                           | 219,009,448                 | 3328                               | 3328                               | 0%                                      |
| Mpongwe                   | 67972                        | 203,410,608                           | 226,225,005                 | 2993                               | 3328                               | -10%                                    |
| Mufulira                  | 152664                       | 595,222,939                           | 508,097,659                 | 3899                               | 3328                               | 17%                                     |
| Masaiti                   | 97712                        | 364,417,359                           | 325,205,932                 | 3730                               | 3328                               | 12%                                     |

|                                |                               |                       |                                 |                          |                          |                           |
|--------------------------------|-------------------------------|-----------------------|---------------------------------|--------------------------|--------------------------|---------------------------|
| Ndola Urban                    | 393793                        | 1,224,375,624         | 1,310,625,305                   | 3109                     | 3328                     | -7%                       |
| <b>Copperbelt</b>              | <b>1,657,646</b>              | <b>5,475,399,016</b>  | <b>5,516,991,906</b>            | <b>3303</b>              | <b>3328</b>              | <b>-1%</b>                |
| Chiengwe                       | 82,887                        | 230,095,803           | 275,865,238                     | 2776                     | 3328                     | -17%                      |
| Kawambwa                       | 103,760                       | 399,675,523           | 345,334,939                     | 3852                     | 3328                     | 16%                       |
| Mansa                          | 182,507                       | 606,948,233           | 607,421,393                     | 3326                     | 3328                     | 0%                        |
| <b>DISTRICT &amp; PROVINCE</b> | <b>CENSUS 2000 POPULATION</b> | <b>ACTUAL BUDGET</b>  | <b>TARGET EQUITY ALLOCATION</b> | <b>ACTUAL PER CAPITA</b> | <b>EQUITY PER CAPITA</b> | <b>PERCENTAGE OVER OR</b> |
|                                |                               | <b>ALLOCATION (K)</b> |                                 | <b>ALLOCATION</b>        | <b>ALLOCATION</b>        | <b>UNDERFUNDED</b>        |
| Milenge                        | 27,265                        | 82,499,293            | 90,743,611                      | 3026                     | 3328                     | -9%                       |
| Mwense                         | 107,668                       | 342,265,018           | 358,341,579                     | 3179                     | 3328                     | -4%                       |
| Nchelenge                      | 113,665                       | 277,042,320           | 378,300,846                     | 2437                     | 3328                     | -27%                      |
| Samfya                         | 166,863                       | 506,297,923           | 555,354,895                     | 3034                     | 3328                     | -9%                       |
| <b>Luapula</b>                 | <b>784,615</b>                | <b>2,444,824,113</b>  | <b>2,611,362,501</b>            | <b>3116</b>              | <b>3328</b>              | <b>-6%</b>                |
| Chavuma                        | 33,046                        | 98,691,992            | 109,983,986                     | 2987                     | 3328                     | -10%                      |
| Kabompo                        | 75,663                        | 237,093,633           | 251,822,258                     | 3134                     | 3328                     | -6%                       |
| Kasempa                        | 55,894                        | 188,452,268           | 186,026,899                     | 3372                     | 3328                     | 1%                        |
| Mufumbwe                       | 43,862                        | 104,706,209           | 145,981,892                     | 2387                     | 3328                     | -28%                      |
| Mwinilunga                     | 131,515                       | 441,415,058           | 437,709,373                     | 3356                     | 3328                     | 1%                        |
| Solwezi                        | 204,301                       | 584,024,978           | 679,956,374                     | 2859                     | 3328                     | -14%                      |
| Zambezi                        | 66,694                        | 248,836,191           | 221,971,554                     | 3731                     | 3328                     | 12%                       |
| <b>North-Western</b>           | <b>610,975</b>                | <b>1,903,220,329</b>  | <b>2,033,452,335</b>            | <b>3115</b>              | <b>3328</b>              | <b>-6%</b>                |
| Chadiza                        | 82,400                        | 289,960,882           | 274,244,400                     | 3519                     | 3328                     | 6%                        |
| Chama                          | 75,685                        | 238,680,436           | 251,895,479                     | 3154                     | 3328                     | -5%                       |
| Chipata                        | 362,133                       | 1,205,195,490         | 1,205,254,216                   | 3328                     | 3328                     | 0%                        |
| Katete                         | 182,498                       | 600,874,273           | 607,391,439                     | 3292                     | 3328                     | -1%                       |
| Lundazi                        | 236,732                       | 781,855,083           | 787,893,512                     | 3303                     | 3328                     | -1%                       |
| Mambwe                         | 51,944                        | 257,011,742           | 172,880,475                     | 4948                     | 3328                     | 49%                       |
| Nyimba                         | 67,050                        | 266,617,980           | 223,156,396                     | 3976                     | 3328                     | 19%                       |
| Petauke                        | 242,533                       | 865,575,255           | 807,200,450                     | 3569                     | 3328                     | 7%                        |
| <b>Eastern</b>                 | <b>1,300,975</b>              | <b>4,505,771,141</b>  | <b>4,329,916,366</b>            | <b>3463</b>              | <b>3328</b>              | <b>4%</b>                 |
| Chongwe                        | 144,736                       | 454,376,458           | 481,711,620                     | 3139                     | 3328                     | -6%                       |
| Kafue                          | 162,262                       | 505,427,847           | 540,041,807                     | 3115                     | 3328                     | -6%                       |
| Luangwa                        | 21,990                        | 98,580,616            | 73,187,310                      | 4483                     | 3328                     | 35%                       |
| Lusaka Urban                   | 1,103,413                     | 4,126,440,509         | 3,672,388,791                   | 3740                     | 3328                     | 12%                       |
| <b>Lusaka</b>                  | <b>1,432,401</b>              | <b>5,184,825,430</b>  | <b>4,767,329,528</b>            | <b>3620</b>              | <b>3328</b>              | <b>9%</b>                 |
| Choma                          | 203,305                       | 695,646,344           | 676,641,478                     | 3422                     | 3328                     | 3%                        |
| Gwembe                         | 33,391                        | 199,278,567           | 111,132,218                     | 5968                     | 3328                     | 79%                       |
| Itezhi-tezhi                   | 46,357                        | 149,633,145           | 154,285,773                     | 3228                     | 3328                     | -3%                       |
| Kalomo                         | 167,446                       | 653,256,591           | 557,295,241                     | 3901                     | 3328                     | 17%                       |
| Livingstone                    | 158,148                       | 286,026,941           | 526,349,556                     | 1809                     | 3328                     | -46%                      |
| Kazungula                      | 66,140                        | 325,562,725           | 220,127,726                     | 4922                     | 3328                     | 48%                       |
| Mazabuka                       | 240,116                       | 692,160,049           | 799,156,170                     | 2883                     | 3328                     | -13%                      |
| Monze                          | 165,741                       | 508,037,586           | 551,620,645                     | 3065                     | 3328                     | -8%                       |
| Namwala                        | 82,708                        | 300,922,477           | 275,269,489                     | 3638                     | 3328                     | 9%                        |
| Siavonga                       | 58,932                        | 115,120,949           | 196,137,997                     | 1953                     | 3328                     | -41%                      |
| Sinazongwe                     | 80,375                        | 328,193,315           | 267,504,778                     | 4083                     | 3328                     | 23%                       |
| <b>Southern</b>                | <b>1,302,659</b>              | <b>4,253,838,689</b>  | <b>4,335,521,070</b>            | <b>3266</b>              | <b>3328</b>              | <b>-2%</b>                |
| Kalabo                         | 120,861                       | 477,149,967           | 402,250,637                     | 3948                     | 3328                     | 19%                       |
| Kaoma                          | 160,950                       | 492,744,681           | 535,675,197                     | 3061                     | 3328                     | -8%                       |
| Lukulu                         | 62,438                        | 239,399,238           | 207,806,697                     | 3834                     | 3328                     | 15%                       |
| Mongu                          | 166,609                       | 627,331,803           | 554,509,530                     | 3765                     | 3328                     | 13%                       |
| Senanga                        | 110,634                       | 438,835,523           | 368,213,046                     | 3967                     | 3328                     | 19%                       |
| Sesheke                        | 78,664                        | 259,352,740           | 261,810,212                     | 3297                     | 3328                     | -1%                       |

|                      |            |                |                |      |      |     |
|----------------------|------------|----------------|----------------|------|------|-----|
| Shang'omb            | 82,353     | 302,146,001    | 274,087,974    | 3669 | 3328 | 10% |
| Western              | 782,509    | 2,836,959,953  | 2,604,353,293  | 3625 | 3328 | 9%  |
| Grand Total (Zambia) | 10,285,635 | 34,232,740,309 | 34,232,740,309 | 3328 | 3328 | 0%  |

## 12 APPENDIX F: Pace of Redistribution Model

| Province      | Actual Allocation<br>2000 | Equity Target<br>2000 | Difference between<br>actual and target<br>allocation | Total redistribution<br>(1 year) | Annual real change<br>in allocation<br>(5 year redistribution) | Annual % change<br>(5 years) |
|---------------|---------------------------|-----------------------|---|----------------------------------|--|------------------------------|
| Central       | 3241232405                | 3338847116            | 97614711.1  | 3.011654176                      | 19522942.22  | 0.59520                      |
| Northern      | 4386669233                | 6436295379            | 2049626146  | 46.72397295                      | 409925229.2  | 7.9692825                    |
| Copperbelt    | 5475399016                | 4407683905            | -1067715111   | -19.50022469                     | -213543022.2   | -4.2455571                   |
| Luapula       | 2444824113                | 2927912597            | 483088483.5   | 19.75964164                      | 96617696.7   | 3.672148                     |
| North-Western | 1903220329                | 2166802189            | 263581859.7   | 13.84925622                      | 52716371.95  | 2.6280411                    |
| Eastern       | 4505771141                | 4488609298            | -17161843.04  | -0.380885813                     | -3432368.608   | -0.0762934                   |
| Lusaka        | 5184825430                | 3113388617            | -2071436813   | -39.95191046                     | -414287362.7   | -9.6974864                   |
| Southern      | 4253838689                | 3833422296            | -420416392.8  | -9.883223685                     | -84083278.57   | -2.0597677                   |
| Western       | 2836959953                | 3519778913            | 682818960   | 24.06868519                      | 136563792  | 4.4076776                    |
| Total         | 34232740309               | 34232740309           | -   | -                                | -  | -                            |

### Continued: Pace of Redistribution Model

| Province      | Annual real change<br>in expenditure<br>(10 year<br>redistribution) | Annual % change<br>(10 years) | Annual real change<br>in expenditure<br>(15 year<br>redistribution) | Annual % change<br>(15 years) | Annual real change<br>in expenditure<br>(20 year<br>redistribution) | Annual % change<br>(20 years) |
|---------------|---|-------------------------------|---|-------------------------------|---|-------------------------------|
| Central       | 9761471.11  | 0.29716008                    | 6507647.406   | 0.198008733                   | 4880735.555   | 0.1484698                     |
| Northern      | 204962614.6   | 3.908268477                   | 136641743.1   | 2.588828832                   | 102481307.3   | 1.9354052                     |
| Copperbelt    | -106771511.1  | -2.145800886                  | -71181007.39  | -1.435699403                  | -53385755.54  | -1.0787186                    |
| Luapula       | 48308848.35   | 1.819520805                   | 32205898.9  | 1.209364799                   | 24154424.18   | 0.9056593                     |
| North-Western | 26358185.97   | 1.305498924                   | 17572123.98   | 0.868449824                   | 13179092.99   | 0.6506328                     |
| Eastern       | -1716184.304  | -0.038154023                  | -1144122.869  | -0.025437633                  | -858092.152   | -0.0190788                    |
| Lusaka        | -207143681.3  | -4.972365314                  | -138095787.6  | -3.343007103                  | -103571840.7  | -2.5178812                    |
| Southern      | -42041639.28  | -1.035242513                  | -28027759.52  | -0.691357995                  | -21020819.64  | -0.5189678                    |
| Western       | 68281896  | 2.180075204                   | 45521264  | 1.448153186                   | 34140948  | 1.0841605                     |
| Total         | -   | -                             | -   | -                             | -   | -                             |

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