

**ANALYSIS OF GROWTH CENTRE THEORY
AS A BASIS OF REGIONAL DEVELOPMENT PLANNING IN MALAWI:
THE CASE OF LIWONDE AND LUCHENZA SECONDARY CENTRES**

M.Sc. (Geography) Thesis

By

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fulfillment of the requirements for the award of Master of Science degree in Geography**

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MAY 2009

DECLARATION

I the undersigned hereby declare that this thesis is my own original work which it has not been submitted to any other institution for similar purposes. Where other people's work has been used acknowledgement have been made.

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CERTIFICATE OF APPROVAL/CERTIFICATION

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DEDICATION

To the late Justice Raitt Ngoleka Mlia (1946-1990), who until his death in a car accident, was Professor of Regional and Urban Planning at Chancellor College, University of Malawi. His Ph.D. work, 'Public Decision-Making and the Spatial Organisation of Development in Malawi', inspired me to specialise in Regional and Urban Development Planning. May his soul rest in peace.

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ABSTRACT

The Government of Malawi adopted *prima facie* growth centre strategy as a *panacea* for spatial development imbalances and as a stimulant for further regional development. Prior to the implementation of growth centre strategy however, there was need to confirm or reject the theory. The problem was lack of sufficient *posterior* evidence because no known scientific study has been undertaken to test the theory. The study therefore, analysed growth centre theory as a basis of regional development planning in Malawi, using the cases of Liwonde and Luchenza Secondary Centres, from 1976 to 2006. In order to make a scientific analysis, the theory's concepts were subdivided into propositions, of which each formed a research question.

The case study was designed to deduce academic knowledge from a theory. Data collection methods were basically observational. Methods included a survey of 500 systematically sampled household heads using face-to-face interview questionnaires; focus group discussions with five conveniently sampled participant groups; observations using growth centre checklist for primary data; and desk research for secondary data. Quantitative data analysis methods were used basically to confirm results at the $p < 0.05$ alpha level of significance. Techniques to determine statistic significance of results involved correlations, chi-square, and analysis of variance using Scientific Package for the Social Sciences (SPSS), Microsoft Excel and Moonstat software tools. Qualitative data analysis involved grounded growth centre theory analysis.

Results were analysed using both quantitative and qualitative methods. At the $p < 0.05$ alpha level, quantitative analysis of the conceived and perceived spatial development role and characteristics of Liwonde and Luchenza growth centres, was found to be statistically significant. Furthermore, respondents from both centres agreed that government should designate more growth centres. With regard to migrants and non-migrants, results were statistically significant in Liwonde and Luchenza. In terms of housing services, results revealed a significant difference improvement from tradition to semi-permanent household dwellings in both centres. Finally, grounded growth centre theory analysis showed a substantial improvement in rural-urban linkages between centres and their hinterland, allocative efficiency of health services in Liwonde and basic education services in Luchenza but allocative inefficiency of basic public education services in

Liwonde and public health services in Luchenza. Findings therefore, exhibited significant evidence that growth centre theory is a basis of regional development in Malawi.

However, given the case study approach undertaken in this study and the relatively small number of growth centres investigated, there is not yet sufficient empirical evidence to generalise the findings to unsurveyed centres in Malawi, or to develop a gravity model that could predict long-term impact of growth centre strategy on the rate of urbanisation. There is therefore, need for further research in the other growth centres.

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LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
FAO	Food and Agriculture Organisation
FDG	Focus Group Discussion
GoM	Government of Malawi
IDP	Integrated Development Planning
IRD	Integrated Rural Development
KfW	<i>Kreditanstalt für Wiederaufbau</i>
MASAF	Malawi Social Action Fund
MBC	Malawi Broadcasting Cooperation
MDG	Millennium Development Goals
NGO	Non-Governmental Organisation
NPDP	National Physical Development Plan
NSO	National Statistical Office
PHA	Planned Housing Area
PUC	Principal Urban Centre
RDI	Regional Development Institute
RGCP	Rural Growth Centre Programme
RMC	Rural Market Centre
TVM	Television Malawi
SCDP	Secondary Centres Development Programme
SIUM	Small and Intermediate Urban Centres
SME	Small and Medium Enterprises
SMUC	Small and Medium Urban Centres
SPSS	Statistical Package for the Social Sciences
UFRD	Urban Functions in Rural Development
UHA	Unplanned Housing Area
UN	United Nations
UNDP	United Nations Development Programme
UTHA	Urban Traditional Housing Area

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LIST OF KEY TERMS

- Growth Centre : A secondary centre or medium/intermediate urban centre or town with intermediate industries such as Liwonde and Luchenza in Malawi context. They ranked level 3 and 4 in the NPDP
- Growth Pole : A large or national urban centre or city with main industries such Blantyre City in Malawian context. They are ranked level 1 and 2 in the NPDP
- Regional development : Holistic process whereby the natural and physical environmental, economic, social and cultural resource of a planning region are harnessed for the betterment of people in ways that reflect the comparative advantage offered by the inherent and geographically different characteristics of the area
- Regional planning : A branch of planning that deals with the design and efficient placement of activities and infrastructure in a planning region such as a district, town or city in Malawian context
- Rural (Growth) Centre : A rural service centre such as Mbalachanda and Lobi in Malawian context. They are ranked level 5 and 6 in the NPDP

CHAPTER ONE: INTRODUCTION

This chapter links the concept of regional development planning to the statement of a problem worthy of study. It is divided as follows: background information, problem statement, justification for the study, objectives of the study, and areas of study.

1.1 Background Information

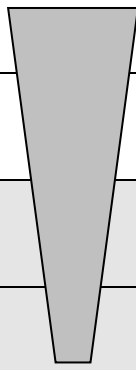
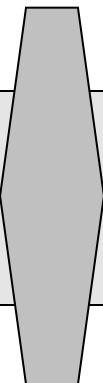
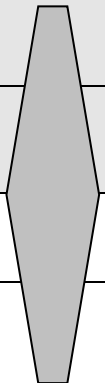
Recently, there has been the political will to pursue regional planning strategies in order to stimulate regional development. The State President, His Excellency, Dr. Bingu wa Mutharika, addressing a rally at Masintha ground in Lilongwe and Phalombe Boma, on Sunday 30 October 2005 and Tuesday 28 February 2006 respectively, reiterated the government's agenda to designate more growth centres in order to stimulate regional development across a broad range of planning regions. Speaking at Njamba Park on Sunday 25 March 2007, the President alluded to the fact that growth centres are expected to act *inter alia* as market centres for secondary order goods and services and for agro-produce from rural areas, and locations for non-farm employment for the growing rural population. Furthermore, he added that these would act as alternative destinations for potential migrants to large cities, and locations for concentrating public services, such as agriculture, health, education and transport services, for reaching a larger rural population. In addition, the provision of agricultural credit and inputs at subnational level would introduce farming innovations at the lowest level, rather than allowing them to trickle down through the hierarchy of urban centres and transportation routes, causing time and distance-delay effects (TVM and MBC).

Regional development is a holistic process whereby the natural and physical environmental, economic, social and cultural resources of a region are harnessed for the betterment of people in ways that reflect the comparative advantage offered by the inherent and geographically different characteristics of the area (RDI, 2005). The Government of Malawi (GoM) development policy states that the 'fruits of development should be spread as evenly as possible throughout all sections of the population and all parts of the country' (GoM, 1971-1980:6), and articulates spatial development policies, spatially balanced development in terms of both regional and rural-urban composition, and spatial co-ordination of development objectives (GoM, 1987-1996).

1.1.1 The Meaning and Rationale of Growth Centre Planning

Hoover and Giarratani (1999) defined a planning region as referring to a heterogeneous or subnational unit of a country, composed of a system of functionally and hierarchically interrelated settlements, with a growth centre suitable for designing and implementing spatial development plans. Malawi's six-tier hierarchy of central places consists of three categories. (Refer to Table 1-1.) Levels 1 and 2, designated as 'tertiary centres', include Blantyre, Lilongwe, Mzuzu and Zomba. Their primary function is manufacturing, except Zomba. Levels 3 and 4 are designated as 'secondary centres', with primary functions of manufacturing, agro-processing and agro-marketing. The last two levels are designated as 'rural centres' with a primary function of marketing (GoM, 1987). In the Malawi context, therefore, growth centres refer to secondary centres. The rationale of growth centre planning is to integrate rural and urban development in order to stimulate complementary relationships between tertiary and rural centres (Hoover and Giarratani, 1999).

Table 1-1 Functions of growth centres

Broad Classification		Government Functions		Private Sector Functions		
"Functional Class"	Pop. Range (1000)	Loc. Gov. status	Admin. Function	Manu-facturing	Agro-processing	Agro-marketing
National Cities (3)	>100	City Assembly	Regional HQ			
Tertiary Centres (1)	50-100	Municipality	Municipal HQ			
Intermediate Towns (8)	30-50	Town Assembly	District & Town HQ			
District Centres (28)	10-30	District Assembly	District HQ			
Rural Centres	1-10					
Village Centre	<1					

Source: GITEC, 1993

1.1.2 Malawi's Growth Centre Plan

In 1985, the GoM, with financial and technical assistance from the German Government through its government-owned development bank, *Kreditanstalt für Wiederaufbau* (KfW) initiated the Secondary Centres Development Programme (SCDP), based on growth centre theory. The aim was to promote, among other things, the development and growth of secondary centres, by providing basic infrastructure and economic facilities in the centres, a decentralised urban development pattern, the linkages and interdependence of urban centres and their hinterland, employment opportunities and the capacity of local authorities for urban management through institutional building, financial management and development administration (Matope, 1989). The pilot phase covered Karonga, Mzuzu, Kasungu, and Luchenza centres (Moyo, 2005). (See Figure 1-1.)

At the end of the pilot phase, a study was expected to be undertaken to either accept or reject growth centre theory. In 1998, however, the GoM revived and extended the strategy to strengthen the capacities and roles of Karonga, Kasungu, Dedza, Salima, Mangochi, Balaka, Liwonde and Luchenza centres, and Mzuzu city (Moyo, 2005).

1.2 Problem Statement

The GoM adopted a *prima facie* growth centre strategy as a *panacea* for spatial development imbalances, *inter alia*, rural-urban migration, income and employment inequalities, allocative inefficiency of goods and services, and stimulation of further regional development. There is, therefore, a gap between the theory, on the one hand, and the practice, on the other. Prior to the implementation of a growth centre strategy, there was need to either confirm or reject the hypothesis inherent in the theory in order to avoid these centres becoming either 'white elephants' or 'vanguards of spatial exploitation'. Nevertheless, as the growth centre strategy assumes greater importance in Malawi, the question 'Does a growth centre strategy significantly contribute to regional development in Malawi?' must be answered. The problem therefore, is the gap between the theory and practice due to lack of sufficient *posterior* evidence. It is against this background that the question was subjected to the internal logic of a case study research design guarded by absolute norms of scientific rigour based on a growth centre theory conceptual framework.

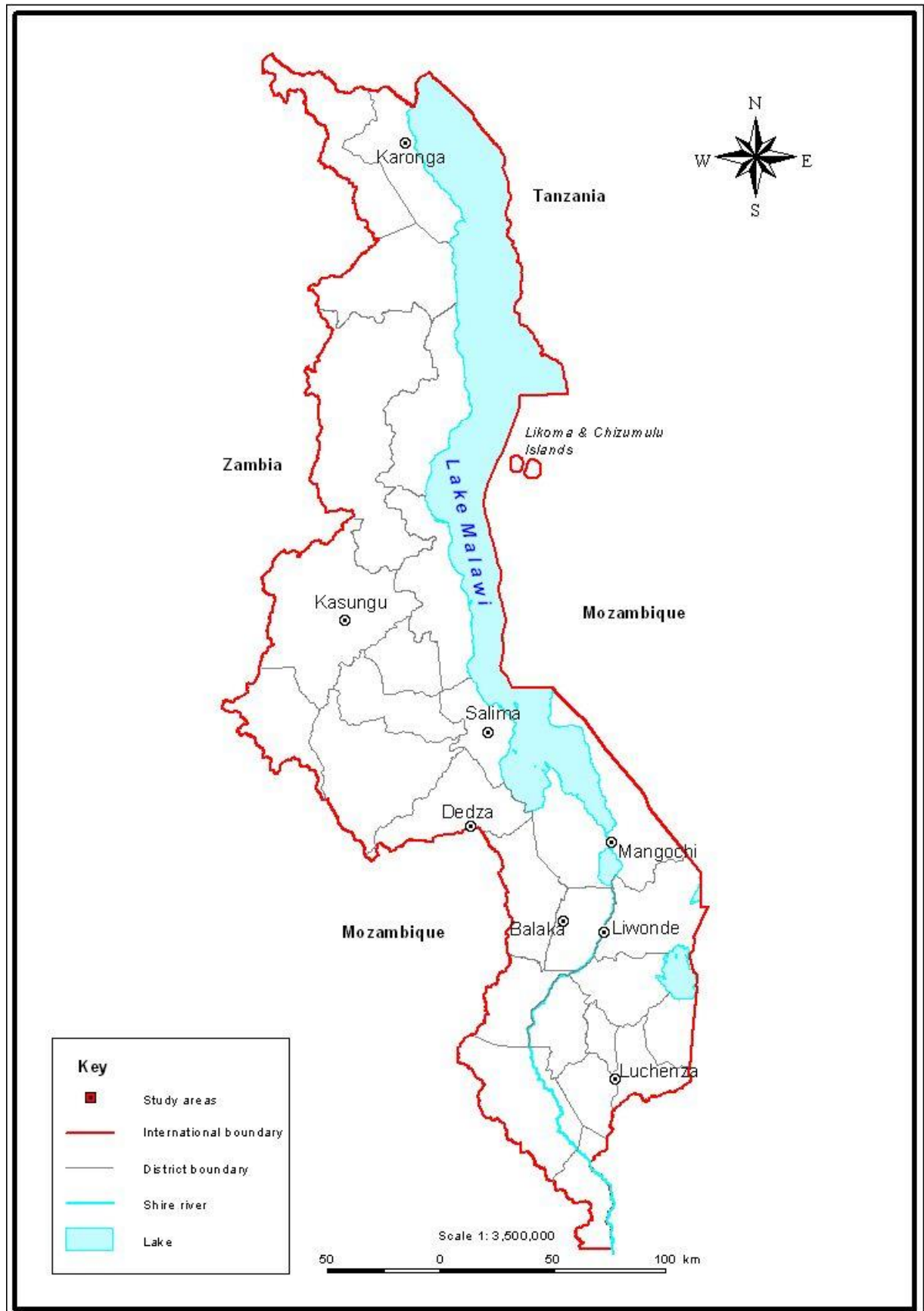


Figure 1-1 Designated Secondary Centres

1.3 Justification for the Study

A review of past research on growth centres in Malawi revealed a research gap. This is because many past studies on spatial development in Malawi focused primarily on rural service centres (Mlia and Kalua, 1989) and tertiary centres (Madziakapita, 2003; Englund, 2002; Potts, 1985). They ignored secondary centres, even though these form a linkage between rural and tertiary centres. Furthermore, past studies on growth centres (Matope, 1989; Manda and *et al.*, 2005; Moyo, 2005) did not make an in-depth assessment of the growth centres' relationships with rural areas in terms of migration, allocative efficiency of secondary order goods and services, spatial innovation diffusion, income distribution and creation of off-farm employment, to either confirm or reject the theory. Among the reasons for this gap is the view that growth centres are not clearly delimited planning regions, as they do not have a hinterland. There is also the view that they are indifferent to spatial development process.

Apart from providing data to enable the acceptance or rejection growth centre theory as a basis for regional development planning in Malawi, therefore, this study is also expected to contribute to the basic theoretical body of growth centre theory, knowledge and application in Malawi. Furthermore, the study will act as a recipe to identify theoretical gaps for further research.

Moreover, despite growth centre strategy, regional disparities still persist. For example, there is a skewed rural-urban population growth rate and size, mainly due to rural-urban migration (GoM, 1998c). In 1998, for instance, 11% of Malawi's population lived in the four major urban areas of Blantyre (4.9%), Lilongwe (4.4%), Mzuzu (0.9%) and Zomba (0.7%). The remaining 3% lived in other urban centres (GoM, 1998c). There is also skewed provision of essential services. For instance, in terms of education and health service provision, average distance to primary and secondary schools is 1.5 km in urban areas and 15 km in rural areas, and 86% of rural dwellers had difficulty accessing health services. Similarly, 81% and 28% of urban and rural households respectively, live in either permanent or semi-permanent houses (DFID, 2004). Finally, there is skewed employment, with only 6.4% of rural workers and 26.7% of urban workers employed (UN, 2001). Consequently, urban areas have almost three times higher income than rural areas (DFID, 2004).

1.4 Objectives of the Study

The main objective was to critically analyse growth centre theory as a basis for regional development in Malawi, using the cases of Liwonde and Luchenza growth centres from 1976 to 2006. Specific objectives of the study were as follows:

1. To investigate people's perception of Liwonde and Luchenza growth centres.
2. To examine the relationship between growth centres and migration.
3. To assess rural-urban linkages between growth centres and their sphere of influence.
4. To describe the relationship between growth centre strategy and allocative efficiency of education, health and housing services.

In order to make a critical analysis, the following null hypothesis was developed:

H₀: Growth centre strategy has not significantly contributed to regional development in Malawi.

In order to make a statistical synthesis, the following research questions were formulated;

1. Is there any relationship between the conceived and perceived roles of Liwonde and Luchenza growth centres that they bring about regional development?¹
2. Is there any relationship between the conceived and perceived characteristics of Liwonde and Luchenza growth centres?
3. Is there any statistically significant difference in in-migration in Liwonde and Luchenza growth centres between 1976 and 2006?
4. Is there any statistically significant difference in the number of people intending not to out-migrate and those intending to migrate out of Liwonde and Luchenza growth centres between 1976 and 2006?
5. Is there any statistically significant difference in housing services in Liwonde and Luchenza growth centres between 1976 and 2006?

¹ Conceived characteristics refer to those put forward by scholars as highlighted in Chapter Two. Perceived characteristics are those that respondents are aware of through experience.

1.5 Areas of Study

Malawi has eight designated growth centres, namely Karonga, Kasungu, Salima, Dedza, Mangochi, Balaka, Liwonde and Luchenza. Two secondary centres, Liwonde and Luchenza, were chosen as study areas in order to ensure quixotic and synchronic reliability. (Refer to Figure 1-2.) According to Kitchin and Tate (2000), quixotic reliability occurs where a single method of observation continually yields an unvarying measurement, and synchronic reliability refers to the similarity of observations within the same time period. This would be possible for Liwonde and Luchenza because both centres benefited from SCDP which applied growth centre theory and have been subjected to decentralised concentration strategy for more than 20 years.

1.5.1 Liwonde Growth Centre

Liwonde growth centre lies between 35° 10' to 35° 15' East and 15° 00' to 15° 05' South. The town is located at the boundary of Machinga and Balaka districts in the Southern Region of Malawi. (See Figure 1-2.) It is 35 km east of Balaka growth centre, 64 km south of Mangochi growth centre and 53 km north of Zomba growth pole. It has a total land area of about 34 km² (GoM, 2002).

Liwonde was created after independence as a link for rail, road and potentially water transport, and a new industrial point. It was expected that problems associated with rapid urbanisation in Blantyre, where most of the industries were located, would be alleviated. Before independence, it grew mainly because of the ferry, which permitted crossing over the Shire. The main economic activity is tourism in Liwonde National Park. The tourism industry has influenced the agglomeration of economies in hotels, rest houses, transport and artisan industries among others. Another economic attraction for Liwonde is the availability of railway transport, which has influenced the agglomeration of economies in industries such as the Malawi Fertilizer Company, ADMARC and the Tannery. The development of Liwonde was further boosted by the SCDP in 1995. Under the 1970 Town and Country Planning Act, Liwonde became a statutory planning area. It was declared a township in 1971 under the Local Government Act. The 1998 National Decentralisation Policy and Local Government Act, created Liwonde as a local government district in its own right, with powers to prepare development plans (GoM, 2002).

1.5.2 Luchenza Growth Centre

Luchenza growth centre lies between 35° 15' to 35° 30' east and 16° 00' to 16° 15' south. The town is located between Thyolo and Mulanje districts in the Southern region. (See Figure 1-2.) It is about 45 km south-east of Blantyre city, 20 km south-south-east of Thyolo, and 20 km west of Mulanje district centres. It is also 45 km by railway from Blantyre on the Limbe-Nsanje Railway Line. It has a total land area of about 13 km² (GoM, 2003).

Luchenza owes its existence and growth to the tea estate industry and the railway line constructed from 1904 to 1907. The development of freehold estate land included the construction of shops, houses and a market, which served the estate labourers. When demand for services and goods increased, the estate owners sub-divided their freehold land, leased or sold plots for commercial and residential purposes. This created the need for the Outline Town Planning Guidance Plan of 1959 and Outline Zoning Plan of 1980.

The 1982 National Physical Development Planning central place survey placed Luchenza as one of the 80 rural market centres. Such centres are the basic economic activity nodes at which rural people sell their produce and buy the goods and access services they need. The development of Luchenza was further boosted by improvement of infrastructure and service provision under the Secondary Centres Development Programme since 1985. On 1 April 1987, former Head of State, Hastings Kamuzu Banda, declared Luchenza a township. The 1998 Local Government Act created Luchenza as a local government district in its own right, with powers to prepare development plans (GoM, 1998a).

Currently, the major economic attractions for Luchenza are the railway and tourism industry. The railway station located at the centre has influenced the agglomeration of several industries including agro-processing industries: the tea and chilli factories. Railway transport has also boosted Small and Medium Entrepreneurship (SME) at the centre. The Mulanje Massif tourism industry has influenced an agglomeration of industries such as hotels, rest houses and artisans.

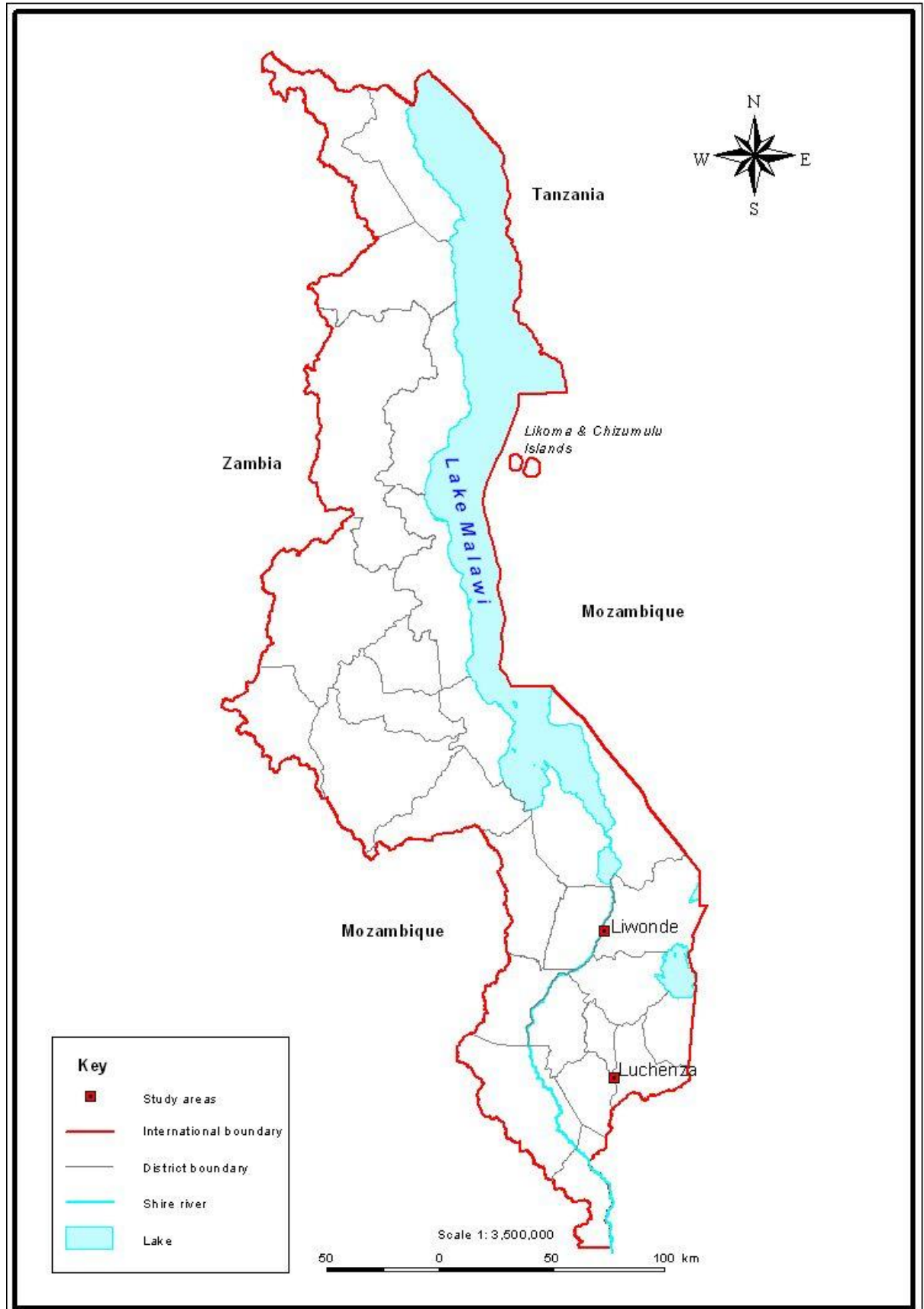


Figure 1-2 Liwonde and Luchenza Growth Centres

1.6 Chapter Summary

The Government of Malawi adopted a *prima facie* growth centre strategy as a *panacea* to regional development imbalances: rural-urban migration, innovation diffusion imbalances, income and employment inequalities, and allocative inefficiency of goods and services. There is therefore a gap between the theory on one hand, and practice on the other. Prior to the implementation of growth centre strategy, there was need to confirm or reject the hypothesis in order to avoid these centres becoming either ‘white elephants’ or ‘vanguards of spatial exploitation’. The problem was lack of sufficient *posterior* evidence.

The main objective of the study was, therefore, to analyse growth centre theory as the basis for regional development planning in Malawi, using the cases of Liwonde and Luchenza growth centres from 1976 to 2006. Specifically, the study investigated people’s perceptions of Liwonde and Luchenza growth centres, examined the relationship between urban size and migration in the study areas, assessed rural-urban linkages between growth centres and their sphere of influence, and described the relationship between growth centre strategy and allocative efficiency of education, health and housing services.

CHAPTER TWO: LITERATURE REVIEW

This chapter links growth centre theory and research methodology in order to ensure content validity (Kitchin and Tate, 2000). It is divided as follows: theoretical review, conceptual framework, and empirical review.

2.1 Theoretical Review

A critical prerequisite to link growth centre theory and research methodology is a comprehension of its theoretical body. A lot of growth centre misconceptions exist, however, in regional development planning literature and practice. For example, there is no common opinion among regional development planning scholars about growth centre theoretical framework *vis-à-vis* whether to pursue the Perrouxian and Boudevillean sense of the term or the Misraian interpretation. For instance, Pioro (1972) used both theories interchangeably. This is also evident with Mlia and Kalua (1989) who, while recognising limitations and ambiguities inherent in both theories, loosely applied the concepts to the Malawi Rural Growth Centre Programme (RGCP). Hansen (1972) and Boundeville (1974) however, conceived growth centre theory as an *ex post facto* attempt at practical operationalisation of an abstract growth pole theory by attaching a spatial dimension. In an attempt to rest the terminology debate, Misra (1972), enunciated a four-tier hierarchy of centres: growth poles at the national level, growth centres at subnational level, growth points at local level, and finally service centres at rural level. Likewise, Hermansen (1972) distinguished growth poles and growth centres as relating to the national and regional scale respectively. Helmsing (1986) concurred with Misra and Hermansen that growth poles meant national urban centres while growth centres were small and intermediate urban centres. Glasson (1974:145), however, disapproved of such an attempt as “vast confusion of terminology” and envisaged growth poles to be without a specific geographical dimension, while growth centres have a spatial dimension.

A critical semantic re-working of growth centre theory is therefore required, because “considerable semantic confusion has arisen from conceptual ambiguities in the original formulation of growth pole concept by Perroux and from efforts to apply the idea in a non-Perrouxian context” (Semple, 1972:598). It is against the background of this theoretical turmoil that this section endeavours to re-examine the theory.

Since both theories were derived from centre-periphery models of regional development, a clear specification of what was really meant by “centre” and “periphery” is critical in order to avoid conceptual contradictions. The centre-periphery model can be contextualised from a ‘territorial’ and ‘functional’ perspective. In territorial context, ‘centre’ and ‘periphery’ are envisaged as static homogeneous entities, with the former dominating the latter in a horizontal dependency relationship. This is evident in Hirschman’s (1958) distinction between a ‘developed north’ and ‘underdeveloped south’ transformed into a core and periphery respectively (Knox and Marston, 2004). Hirschman employed the terms ‘polarisation’ and ‘trickle-down’ instead of Myrdal’s (1957) ‘spread’ and ‘backwash’ effects respectively, to emphasise the top-down relationship (Stutz and Warf, 2004).

In functional context, however, although the model recognises that the centre-periphery system cannot be eliminated in space, ‘centre’ and ‘periphery’ are envisaged as dynamic heterogeneous entities with a vertical modernisation relationship. ‘Centre’, in this context, refers to the functional node or nucleus of a dynamic geographical system, as opposed to a geometric centre of a static entity. ‘Periphery’, on the other hand, refers to the hinterland of a centre of a functional system (Hoover and Giarratani, 1999).

Since growth centre theory is built on a functional regional development planning perspective, it may therefore, be described as a set of positive and normative logical propositions, which explain how regional development planning has occurred in the past, and/or should occur in the future. Its theoretical basis is the assertion that ‘growth does not appear everywhere and all at once; it appears in points or development poles, with variable intensities; it spreads along diverse channels and with varying terminal effects to the whole of the economy’ (Glasson, 1974:149); ‘having started in certain favoured locations, would continue through a process of circular and cumulative causation’ (Myrdal, 1957:44); and the favoured locations are the ‘matrix of urban centres with the potential to polarise and spread development effects’ (Friedmann, 1966:37). On the other hand, Perroux defined ‘*poles de croissance*’ (development poles), from which growth pole theory is derived, as ‘centres from which centripetal forces emanate and to which centripetal forces are attracted’ (Lynch, 2005).

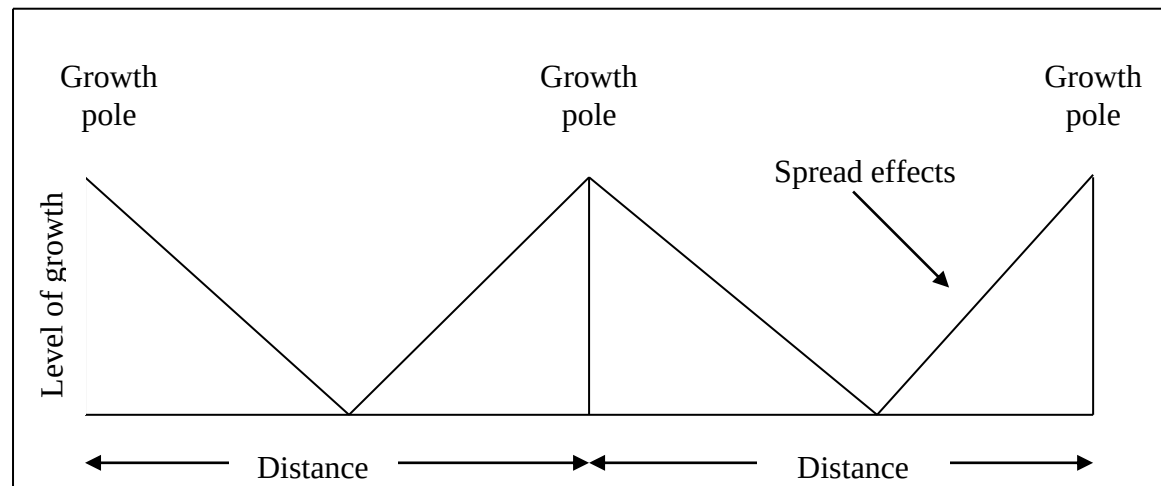
On the one hand, growth pole theory explicitly promotes concentration of economic activities in few urban centres, with its basic concepts of economic space, leading industries, polarisation and spread effects. Growth centre theory, grounded in the modernisation development school of thought (Webster, 1984), on the other hand, stipulates that spatial development could be spread to the backward regions of a developing country by decentralised concentration of infrastructure and directly productive investments at selected subnational centres with economic expansion potential (Friedmann, 1973), with its basic concepts of rural-urban linkages, hierarchy of centres and agglomeration of economies.

Ipso facto, growth pole strategy refers to the concentrated process of polarisation at national level and applies to the main urban centres, so that a pole sticks out like a peak (Lynch, 2005). On the other hand, growth centre strategy refers to the spatial decentralised concentration process of agglomeration at subnational level and applies to secondary urban centres (Kuklinski, 1975). The presence of growth centres between growth poles reduces distance and increases transmission of development waves. The absence of growth centres, therefore, means increased distance between growth poles and decreased diffusion of development waves. In this regard therefore, growth centre theory is not a *modus operandi* of growth pole theory.

The basic implication underlying growth centre policy is ‘steering a middle course’ (decentralised concentration) between concentration and dispersal. Growth centres are therefore significant, in that they promote local and secondary goals (Satterthwaite and Tacoli, 2006). From the standpoint of regional economy, centralisation is undesirable because important opportunities for regional economic growth are foregone as a result of centralization in the pole. Such opportunities include *inter alia* untapped natural resources in the periphery because of relatively little infrastructure and limited human resources (Kirkby, Bradbury and Shen, 2006). The concept is linked with regional development objectives in that it is expected that the hinterland of the growth centre would benefit from ‘spread effects’ (Baker and Pedersen, 1992) and that decentralised concentration of economic activities would trigger multiplier effects, which would lead to further development (Rubenstein, 2003).

Figures 2-1a and 2-1b illustrate the role of growth centres in the reduction of regional disparities between polarised regions. The model suggests that in order to reduce regional disparities between regions, strategically located growth centres should be designated.

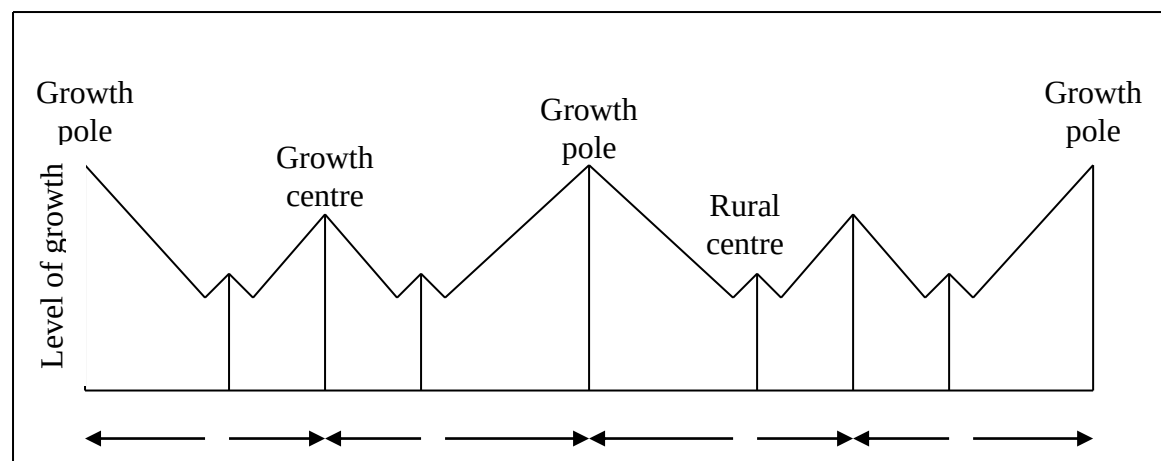
Figure 2-1a Hypothetical Curves of Development Surfaces from Growth Poles



Source: Modified from Ajaegbu (1976)

In Figure 2-1a, the absence of growth centres means increased distance between growth poles and decreased transmission of development waves.

Figure 2-1b Hypothetical Curves of an Integrated Hierarchy of Urban Centres



Source: Modified from Ajaegbu (1976)

Figure 2-1b illustrates how the presence of growth centres means reduced distance and increased transmission of development waves. This comparison is highlighted in Table 2-1, below.

Table 2-1 Comparison between Growth Pole and Growth Centre Models

No.	Characteristic	Growth Pole	Growth Centre
1	Level of planning	Macro/Meso level planning	Micro level planning
2	Planning style	Usually top-down via sectoral planning agencies	Decentralised concentration integration of multi-sectoral, rural and urban activities at local level.
3	Spatial positioning	Main national centres	Subregional centres
4	Hierarchical level	At the apex of the hierarchy of centres	At the middle of the hierarchy of centres
5	Basic sector	Urban-based manufacturing; focus: ‘propulsive’ industries, ‘footloose’ production	All sectors, depending on local endowments and conditions; emphasis on local small/medium enterprises, regionally based.
6	Urban system	Hierarchical, single dominant centre; emphasis on population size, associated with central place theory.	Horizontal composed of several centres and their hinterlands, each with own specialisations and comparative advantages.
7	Rural-urban relations	Image of diffusion process moving down the hierarchy, from urban centre to rural periphery; rural areas passive recipients of ‘trickle down’ from urban growth.	Image of complex rural-urban field of activities, growth stimuli emanating from both urban and rural areas; intensity increasing along regional inter-settlement transportation corridors.
8	Functional role	Tertiary functions predominating over the secondary and primary functions	Mixture of both tertiary and primary functions
9	Ability to promote and transmit economic development	Promote national goals	Promote secondary and local goals
10	Major policy areas	Industrial decentralisation incentives: Tax holidays, industrial estates, national transportation, trunk roads.	Agricultural diversification, agro-industry, resource-based manufacturing, urban services, manpower training, regional transportation system connecting local centers.

Source: Based on Munson (2006), Kammeier (2002), and Misra (1972)

2.2 Conceptual framework

Concepts are basic building blocks of a theory (Sarantakos, 1997). This section therefore seeks to describe growth centre concepts in order to link the theory and methodology (Kitchin and Tate, 2000). Propositions formed the content for verification in order to ensure conceptual validity of the study. Figure 2-2 illustrates the growth centre conceptual framework and links it to regional development planning.

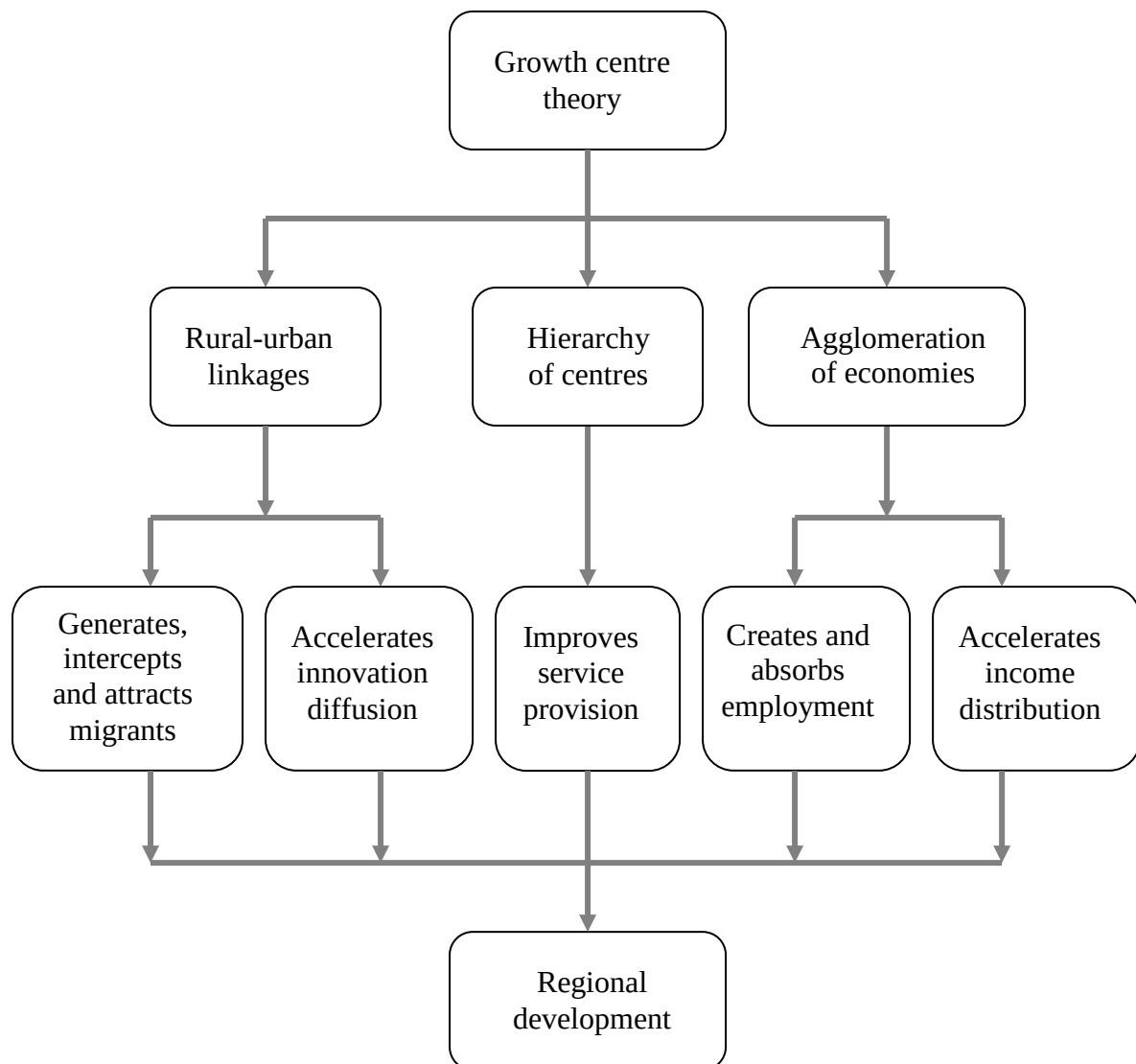


Figure 2-2 Growth Centre Conceptual Framework

Source: Based on Moseley (1974), Wanmali (1983), Satterthwaite and Tacoli (2003)

2.2.1 Rural-Urban Linkages

Rural-urban interactions are a set of relationships between rural and urban sectors and vice versa, for purposes of providing appropriate placement and economical use of available resources. Rural-urban linkages can be divided into two broad categories: ‘spatial’ interactions, which take place across space, such as flows of people, goods and services; and ‘sectoral’ interactions, including ‘rural’ activities taking place in urban centres and activities often classified as ‘urban’ (Satterthwaite and Tacoli, 2003).

Regional integration depends on vertical, horizontal and complementary linkages, between the centre (urban) and the periphery (rural). Vertical linkage implies mutual relationship. It occurs when outputs of one activity are inputs to another activity. Proximity of the two activities reduces transfer costs, and the presence of either of these activities in a region enhances the region’s attractiveness as a location for the other activity. Horizontal linkage involves the competition of activities for either markets or inputs. The locational effect is mutual repulsion. Locational effects of complementary linkage are mutual attractions, that is, an increase of one activity in a region encourages the growth of a complementary activity.

The two essential mechanisms of rural-urban interaction are spread and backwash effects. Knox and Marston (2004) defined spread effects as expansionary momentum from the centres of economic expansion to other regions, resulting in a substantial and sustained increase in demand, incomes, investment and production. Stutz and Warf (2004) defined backwash effects as the process of spatial concentration of resources in a core or centre. The former are likely to occur if there exists between the two sectors a certain degree of complementarity. The latter, on the other hand, result from the lack of new expansionary momentum in the rural area (Stutz and Warf, 2004). Backwash effects occur when activities in the rural sector become depressed as a result of competition in the urban sector.

Table 2-2 shows types of rural-urban linkages and their corresponding elements. It further highlights general urban facilities serving both hinterland and towns, such as physical facilities, agriculture, manufacturing and agro-processing.

Table 2-2 Types of Rural-Urban Linkage

Type of linkages	Elements	Urban facilities (serving both hinterland and towns themselves)	Rural Facilities, agriculture and agro-processing
Physical Linkages	• Roads • Railways • Airways • Waterways	• Intra- and intersystem connections • Railway stations, bus terminals, ports, airports	• Rural access roads from/to towns • Access to bulk transport links (air, ship, rail, road)
Economic Linkages	• Market Patterns • Flows of Raw Materials and Intermediate Goods • Production Linkages • Consumption and Shopping Patterns • Income and Capital Flows • Sectoral and Interregional Commodity Flows • “Cross Linkages”	• Agricultural and consumer goods markets, retail shops • Input delivery facilities (wholesale, storage) • Banking and investment finance facilities	• Agricultural produce markets • Agricultural cooperatives • Sales agents, import-export agents • Agricultural input delivery facilities • Agricultural machinery purchase and repair facilities • Credit outlets for agricultural and other small-scale enterprises
Population Movement Linkages	• Migration Patterns • Commuting to Work	• Passenger transport facilities	• (n.a.)
Technological Linkages	• Technology Interdependencies • Irrigation Systems • Telecom Systems	• Maintenance and repair workshops	(refer to sections 2 (economic linkages) and 6 (service delivery linkages))
Social Interaction Linkages	• Visiting Patterns • Kinship Patterns • Rites, Rituals and Religious activities • Social Group Interaction	• Community halls • Churches, mosques • Sports facilities • Cinemas • Restaurants, clubs	(no specific facilities except for catering to increasing demand from hinterland)
Service Delivery Linkages	• Energy Flows and Networks • Credit and Financial Networks • Education, Training and Extension Linkages • Health Service Delivery Systems: Professional, Commercial and Technical Service Patterns • Transport Service Systems	• Energy supply facilities (electricity, fuel depots) • Banking and investment finance facilities • Various types of schools • Hospitals, clinics • Telecommunications and postal facilities • Mass media • Accommodation facilities	• (Energy supply and facilities as specifically required for agro-processing and manufacturing) • Vocational schools and agricultural training facilities
Political, Administrative, and Organizational Linkages	• Structural Relationships • Government Budgetary Flows • Organizational Interdependencies • Authority-Approval-Supervision Patterns • Inter-jurisdictional Transaction Patterns • Informal Political Decision Chains	• Su-national authorities and agencies (administration, maintenance, planning, implementation) • Chamber of Commerce • Labour Unions • Courts • Police	• Branch offices of Ministries of Agriculture/Forestry, Health, Industries)

Source: Based on Kammeier (2002)

Related to the growth centre concept of rural-urban linkages is the proposition of innovation diffusion. Berry (1973) argued that the role played by growth centre strategy in regional development is its promotion of hierarchical spatial diffusion of innovations from large urban centres *en route* to the periphery through growth centres. The theory holds that diffusion of spatial innovations in a functional (social) distance is deterrent to the neighbourhood effect (Knox and Marston, 2004). It further states that linkages are the channels through which innovations are diffused, whereas distance acts as a barrier to diffusion. The distance over which such channels exist determines the mean field of communication. Communication fields are varied and hierarchical, and innovations diffuse from higher to lower order of communication fields. If there is a break in the hierarchy of urban centres, therefore, the process of diffusion is halted (Wanmali, 1995). Stohr (1981) argued that the process of innovation diffusion requires, among other things, increasing units of functional and territorial integration. Growth centres still rooted in rurality, but with adequate contact with urban networks and their influences, are therefore potential host centres for spatial development initiatives targeting the rural areas, where greater proportions of the population reside.

Furthermore, a population's growth centre linkage proposition is their ability to generate, intercept and attract migrants (Mosley, 1974). In terms of generating migrants, it is argued that the presence of a growth centre will encourage some peripherally located people, who would have otherwise remained unemployed or underemployed, to migrate and be brought into the labour market (Fellman, Getis and Getis, 2005). Regarding the interception of would-be migrants, it is argued that, given the inevitability of a certain amount of migration from the most depressed parts of the problem region, and given the desirability of diverting these migrants away from major cities, growth-centre strategy may intercept such migrants (Bah, *et al*, 2006). Concerning the attraction of migrants, it has been argued that the development of a problem region is held back partly due to lack of skilled and professional manpower and that, in order to attract such people from other regions, the deliberate fostering of urban attraction, by means of growth centre policy, is necessary (Baker, 2006). This school of thought is further reinforced by the concept of step migration, which argues that most migrants follow a step pattern from village through to the large urban centre and vice versa (Anderton and Yankey, 2001).

2.2.2 Hierarchy of Centres

Another concept inherent in growth centre theory is the hierarchy of urban centres. This concept is based on Christaller's (1933) Central Place Theory. It is a theory of geographical pattern and hierarchical structure of urban centres and nodal regions (Fellman, Getis and Getis, 2005). The theory argues that there is a hierarchy of central places ranging from major urban centres to village centres.

Christaller's two concepts, range of goods and services, and threshold, made him come up with seven principles, of which two, market or supply and transport, are relevant to this study (Waugh, 2000). The principle states that the centre serves one third of each of the six peripheral centres plus itself, making a total equivalent of three centres. This principle provides a framework for efficient allocation of goods and services in a planning region, in that a hierarchy system of centres avoids duplication and waste (Hypergeo, 2006).

Similarly, the transport principle states that, in a transport hierarchy, the centre serves half of each of the six peripheral centres plus itself, making a total equivalent of four centres. The principle suggests that in order to minimize transport costs in a planning region, goods and services belonging to the same range-class must be located at equal distances. High-order goods and services (with high thresholds) will be produced at the centre of the system, while low-order goods and services (with lower thresholds) will be located at the main centre and in a number of centres at the corners of the market areas of the most central place. The same procedure is then followed until all classes of goods and services are included, and the location and market area of goods with the smallest range are reached. The theory is therefore regarded as a general theory of efficient allocation of goods and services (Stutz and Warf, 2004).

Linked to the concept of hierarchy of centres is the proposition that growth centres promote allocative efficiency of goods and services (Tacoli, 2003). Since most people in developing nations depend on goods and services located in secondary centres, growth centres may help to realise the Millennium Development Goals (MDGs) and, in particular, the Malawi Growth and Development Strategy (MGDS) targets for both rural and urban residents (GoM, 2006).

2.2.3 Agglomeration of economies

The last concept explicit in growth centre theory is agglomeration of economies. Manda (2003) defined agglomeration of economies as referring to savings an individual enterprise makes by locating and operating in the same area as others, as a result of sharing specialist utilities, financial services and service industries, or serving a large market within a compact geographical area. The term ‘economies of agglomeration’ in regional development economics denotes locational benefits that firms derive from ‘clustering effects’ (Waugh, 2000). It is related to the idea of economies of scale and network effects, in that the more related services are clustered together, the lower the cost of production due to competing multiple suppliers, greater specialisation and division of labour result, as well as greater threshold. Notable regional development agglomeration economies include urbanisation (benefits derived from the agglomeration of population, e.g. bus depot and produce market), industrialisation (benefits derived from the agglomeration of industrial activities, such as suppliers and customers) and localisation (benefits derived from the agglomeration of a set of services education institutions and bookshops) economies (Rodrigue, 2007). Three economies P, Q and R, with respective locational constraints may benefit from agglomeration economies located at growth centre A (see Figure 2-3). The additional transport and distance costs may be derived from the advantages of the ‘clustering effect’.

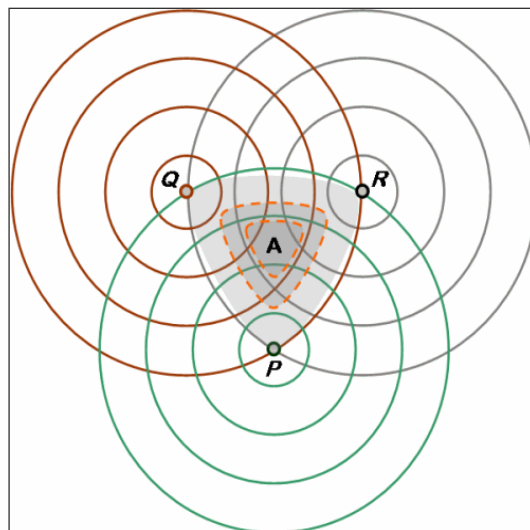


Figure 2-3 Illustration of agglomeration of economies P, Q and R on A

Source: Rodrigue (2007)

The concept is linked to the process of circular and cumulative causation and multiplier effects. When a new or expanding economic activity has been introduced in a centre of potential, it creates extra employment and raises the total purchasing power of the population. The extra population and raised purchasing power increase the demand for goods and services, thus creating even more employment. The new industry itself, as it expands, demands even more goods and services. It may also attract complementary industries, which use its products or supply it with materials. These lead to further increase in employment and further increase in goods and services (Bradford and Kent, 1977).

The ‘economies of agglomeration’ proposition of growth centre strategy is economic impact through creation of employment. Growth centres play a crucial role in the generation and absorption of non-farm employment in developing countries. Since agriculture may absorb a significant but not sufficient percentage of additional labourers, many of the unemployed labourers can be expected to migrate to the major cities and larger towns already suffering from diseconomies of scale due to their rapidly growing populations. Hence, growth centres lead to absorption of some of the surplus agricultural labour and also reduce migration to the cities and large towns.

Another ‘economies of agglomeration’ proposition of growth centre strategy is the ability to accelerate income distribution, in particular rural household income. The three main stages in the model can be summarised as follows: first, rural households earn higher incomes from the production of agricultural goods for non-local markets, and this increases their demand for consumer goods; this leads to the creation of non-farm jobs and income diversification, especially in Small and Intermediate Urban Centres (SIUC) close to agricultural production areas; this, in turn, absorbs surplus rural labour, raises demand for agricultural produce and, in so doing, boosts agricultural productivity and rural incomes (Satterthwaite and Tacoli, 2003).

2.3 Empirical review

This section reviews the empirical results of growth centre propositions: that they (1) intercept, generate and attract migrants; (2) accelerate spatial innovation diffusion; (3) improve allocative efficiency of goods and services; (4) create and absorb employment; and (5) accelerate income distribution. It also highlights the grounds for success and/or failure of the strategy in selected developing countries.

2.3.1 Interception, Generation and Attraction of Migrants

Empirical evidence shows that many governments in Asia and the Pacific adopted growth centre policies to intercept rural-urban migration, and also to attract both rural and urban populations to SIUC. Whereas the natural population growth rate during the period 1990-2000 was 1.4%, the urban population grew much faster than the rural. The difference between urban and natural population growth rates was attributed to rural-urban migration and the designation of growth centres (UN, 2001). In Ghana, the government pursued growth centre policy to facilitate a balanced spatial distribution of the population. As a result, the population residing in cities declined. Conversely, growth centres increased in both population and numbers (Owusu, 2001). In Zimbabwe, after independence in 1980, the government pursued a system of growth centres in district centres. During the 1980s and early 1990s some of the district centres grew into towns of 10,000–20,000 inhabitants (Pedersen, 1990).

In Latin America however, the strategy was objected to by the *de facto* governments on practical grounds. Practical objectives had mainly to do with problems of implementing growth centre strategy, such as a criterion for identifying an appropriate location for a growth centre, and relevance of such centres over time. Relevance problems were reflected in the growing pessimism about the dismal record of success which growth centre strategies appear to have had (Conroy, 1973).

2.3.2 Acceleration of Innovation Diffusion

Regarding spatial innovation diffusion, empirical evidence in Mali and Uganda shows that market information transformed small farmers' practices, and helped them adapt production to demand, while at the same time maximising the use of their resources

(Satterthwaite and Tacoli, 2003). Information was provided by local traders and by migrant relatives with access to growth centres. Satterthwaite (2003) found that traditional agriculture in Colombia has given way to innovative forms of production in response to growth centre dwellers' demands for fresh vegetables. Furthermore, empirical evidence from Bolivia in Latin America indicated that, through personal contacts in growth centre markets, farmers were much more impressed by seeing improved varieties of potatoes in growth centre markets within reach, than being told about them or seeing them growing (Rondinelli, 1983).

The broadest objection to spatial innovation diffusion in Colombia essentially concerned ideological grounds. In Colombia, a change of government in 1970 corresponded with a concomitant change of political economy from capitalism to socialism. Wikipedia defines capitalism as referring to the economic system in which a country's trade and industry are organized and controlled by the owners of capital, the chief elements being competition, profit, supply and demand; and socialism as the philosophical, political and economic theory that land, transport, the chief industries, natural resources, etc., should be owned and managed by the state or by public bodies, and wealth equally distributed. Growth centre strategy viewed as 'capitalist thinking', characterised by the promotion of private economic activity and absence of government policy instruments other than location of the concentrated units, was thus replaced with an alternative regional development strategy based on socialist political economy. Critics, therefore, viewed growth centre strategy to have been forced by capitalist countries to expand their economy (Conroy, 1973). Consequently, the absence of an articulated, integrated urban system obstructed the emergence of a spatially balanced pattern of economic growth. Rondinelli (1983) argued that countries with such a system cannot easily achieve geographically diffused development and hence cannot reduce regional disparities. Since the effect of innovation diffusion from growth centres to hinterlands decreases with increasing distance, a system of an integrated network of urban centres is essential to ensure wide diffusion of innovation (Fellman, Getis and Getis, 2005).

2.3.3 Efficient Service Provision

Concerning allocative efficiency of goods and services, empirical evidence from Honduras and Bolivia, in Latin America, shows that growth centres in these countries supported basic health, agricultural supply, educational, commercial and communication

services (Wanmali, 1995). Empirical evidence from the state of Puebla in South Mexico indicates that due to the greater efficiency of secondary healthcare services as a result of decentralised concentration strategies, there was a reduction in cervical cancer, increase in public works investment and regional development projects (Satterthwaite and Tacoli, 2003).

Notwithstanding these successes, there were ideological objections to growth centres in Chile. The highly centralised political and administrative systems of Chile presented a major obstacle to the successful implementation of the strategy. Even though the alternative regional development strategy embraced a ‘socialist’ approach to regional development by establishing numerous rural service centres, virtually for micro-level planning purposes, top-down development strategies were emphasised because planning remained centralised (Wilson and Pendall, 1987). Richardson and Richardson (1975) argue that growth centre strategy works best in countries where there has been administrative and political decentralisation. This is because the process of spatial decentralisation entails the decentralisation and distribution of political power and influence from national centres to subnational centres. Growth centre strategy is more likely to be given priority and preserved in democratic political structures than in authoritarian structures like those of Latin America.

Finally, there is no evidence that growth centre strategy in Latin American countries took into consideration a clearly integrated hierarchy of urban centres as demanded by the theory that ‘economic growth tends to occur in a matrix of urban centres through a network of spread and polarisation’. Latin American countries did not implement the matrix of urban centres, because they treated spatial implications as ‘suspect’, in that they were derived from densely populated, functionally integrated areas in clearly hierarchical city-size distributions, as opposed to the uniformly non-hierarchical primate city-size distribution of Latin America. The absence of such a matrix acted as a barrier to centripetal and centrifugal spatial development waves (Conroy, 1973).

2.3.4 Creation and Absorption of Employment

Regarding the creation and absorption of employment, empirical evidence from Tanzania shows that growth centres provided non-farm employment. On average, almost 25% of the economically active labour force in Tanzanian growth centres was employed in

agriculture. The other 75% were in nonagricultural employment: approximately 10% in manufacturing; 15% in construction, utilities and communication; 15% in commerce; and 32% in services. Similarly, in Ghana, growth centres like Techiman, with a population of about 20,000, were periodic markets, linking growth poles and rural centres. On a market day, for example, traders' trucks arrived from Kumasi, Tamale and Accra on the one hand, and commuters from the periphery on the other (Rondinelli, 1983). Empirical evidence from Banepa secondary centre in Nepal, however, indicated insignificant non-farm employment because people from the hinterland often lacked adequate skills and education to get jobs in the centre. It was thus suggested that job training and skill development of villagers be an integral part of growth centre strategy (Bajracharya, 1995). An objection to the agglomeration of economies emerged in Chile, essentially because of the relative scarcity of entrepreneurship capable of organizing and financing projects of the scale required for propulsive industry that would lead to employment creation (Conroy, 1973).

2.3.5 Income Distribution

Concerning income distribution, empirical evidence from Metro Naga planning region shows that growth centre strategy lessened regional income disparities (Robredo, 2003). Metro Naga is located in the province of Camarines Sur in the Bicol region—one of the Philippines' 15 administrative regions. Growth centre strategy was introduced in 1993, with Naga as a response to the widening rural-urban income disparities, among other factors. The political implications of implementing growth centre strategy to lessen spatial income disparity were themselves a barrier to utilisation of the approach in Chile. The preferential treatment accorded to selected centres was not accepted by the representatives of excluded planning regions. Attempts to allay such objections by naming a multiplicity of centres vitiated the potentiality of the strategy. Wilson and Pendall (1987) attributed the failure of the Chilean decentralised concentration to the proliferation of centres due to political interference.

2.4 Chapter Summary

This thesis adopted Hansen's (1981), and Hoover and Giarratani's (1999) definitions of a planning region as referring to a heterogeneous subnational unit of a country, composed of a system of functionally and hierarchically interrelated settlements, with a growth centre suitable for designing and implementing spatial development plans. By the same

token, it adopted Friedmann's (1966, 1972), Misra's (1972), Hermansen's (1972), Kuklinski's (1973), Ajaegbu's (1976) and Helmsing's (1986) definitions of a growth centre from a functional regional development planning perspective. Growth centre theory shall thus refer to the spatial decentralised concentration process of agglomeration at subnational level and shall apply to secondary centres.

Based on Moseley's (1974), NPDP's (1987), Wanmali's (1983), and Satterthwaite and Tacoli's (2003) conceptualisation of secondary centres, the thesis identified three major concepts explicit in the theory: rural-urban linkages, hierarchy of centres and agglomeration of economies of scale. Implicit in these concepts were the five key propositions: that growth centres generate, intercept and attract migrants; accelerate innovation diffusion; improve allocative efficiency of goods and services; create and absorb employment; and accelerate income distribution. These key propositions formed the hypothesis for testing the theory.

Prior to testing these propositions, empirical literature in developing countries was reviewed. Empirical results varied from one proposition to another and from country to country. Results revealed that growth centre strategy in Ghana led to the decline of the population residing in cities and consequently, increased population in secondary centres. With regard to allocative efficiency of goods and services, evidence from Honduras and Bolivia showed that growth centres in these countries supported basic health, agricultural supply, educational, commercial and communication services. Regarding the creation and absorption of employment, empirical evidence from Tanzania showed that growth centres provided non-farm employment. Concerning income distribution, empirical evidence from Metro Naga planning region showed that growth centre strategy had lessened regional income disparities. Proliferation of growth centres due to political, ideological, theoretical and practical objections, however, led to failure of the strategy in Chile and Colombia.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

This chapter provides the *raison d'être* for the research design and methodology. It also describes ethical considerations and limitations of the study.

3.1 Research Design

In order to obtain data to satisfy the aim of the study, a critical multiple-case study design was used. The basic aim was to advance fundamental knowledge of growth centre theory in Malawi, by either supporting or refuting the theory's prediction on the basis of empirical results. The study, concerned with the principle of empiricism, was thus subjected to an internal logic of research design guarded by scientific norms. *Ipsa facto*, the study was guided by the theoretical principle of deductivism, in that it began with a theory which guided the input and process of empirical inquiry, and formed the basis on which the results were interpreted. The theory was then followed by concepts which were subjected to empirical analysis. Implicit in the concepts were propositions that were translated into researchable questions and hypotheses. This was followed by data collection and analysis, and then results upon which the theory was confirmed. The study time dimension was longitudinal in that data collection and analysis involved retrospective construction of the history of the case in the following four time categories: (1) before 1976, (2) 1977 to 1986, (3) 1987 to 1996, and (4) 1997 to 2006.

3.1.1 Organization of the Study

Field work started with the training of two research assistants with Malawi School Certificate of Education, which was conducted from May 22–26, 2006, at Liwonde Town Assembly. This was followed by a pilot study in Balaka Town Assembly on May 24-25, 2006. The purpose of the pilot study was to train research assistants, pre-test data collection and recording instruments and determine the time to be allocated to each respondent. After evaluating the pilot study, changes such as duplication of items and questions, and coding system were incorporated and an action plan for fieldwork was drawn up with the research assistants. Data from the pilot study was processed and entered into the Scientific Package for the Social Sciences (SPSS) for pre-analysis. Data collection commenced on June 5, 2006, and November 13, 2006, in Liwonde and Luchenza respectively. In each case, the first two weeks of each month were for data collection and the last two for processing and entering data.

3.2 Data Collection Methods, Techniques and Tools

In order to increase the chance of making a creative synthesis, both quantitative and qualitative data from both primary and secondary data sources were collected through survey, desk research, key informants and Focus Group Discussions (FGD).

3.2.1 Survey

A survey was conducted to obtain quantitative data on peoples' perception of growth centres, demographic trends, service provision and household dwelling units. A systematic probability sampling method was used to obtain a representative sample for household interview questionnaire respondents and household observation units. A direct element of randomness was introduced by choosing the first household at random then every 10th household, in order to reduce bias (Montello and Sutton, 2006).

The sample frame was households in which sample units were individual household heads and household dwelling units. The study population (N) was 5000 households. N was obtained by rounding 24,543 (the 1998 total population of Liwonde and Luchenza secondary centres) to 25,000, then dividing by 5, the national mean number of people per household (GoM, 1998c). Then N was divided by 10 (sampling interval) to obtain the sample population (n). In order to avoid sampling population bias, n was further split into a ratio proportional to the study population. The 1998 census was used to estimate the proportion from which a sample fraction was calculated, as shown in Table 3-1.

Table 3-1 Household Sampling Procedure

	Liwonde	Luchenza	Total	Rounded total
1998 census	15,701	8,842	24,543	25,000
Study population (N)	3,140	1,768	4,908	5,000
Percentage proportion	64%	36%	100%	100%
Sample population (n)	320	180	500	500

A face-to-face household interview questionnaire technique was used to collect data in order to minimise response bias and non-response rate. Likert Scale, Rating Scale and a pre-coded interview questionnaire were used as tools for collecting and recording data.

Likert Scale was used as a tool to collect and record responses on peoples' perception of growth centres. The justification for use of the Likert Scale lies in the fact that it allowed the researcher to analyse qualitative data quantitatively, by converting qualitative data into numeric format. To ensure construct validity, Likert scale items were adopted and modified from the study conducted by the Vermont Planners Association in Vermont in 2005. These items were relevant to this study because it contained most of the conceived roles of growth centre.

The Rating Scale was used as a tool to collect and record responses on allocative efficiency of public services and rural-urban linkages. The justification for using a Rating Scale lies in the fact that the task of rating involved the respondents placing that which was being rated along a continuum or in one of an ordered set of categories. In addition, ratings allowed the respondents to register a degree or an amount of an item directly on a scale. To ensure construct validity, the Rating Scale items on rural-urban linkages were generated from ESCAP and UN-Habitat. Furthermore, an alternative *two-stage* scale format was used in which respondents were first asked about direction (e.g., yes or no) and then asked about intensity (very efficient, efficient, constant, inefficient, and very inefficient) in order to minimise central tendency error due to reluctance on the part of the respondents to give extreme responses, even when these exist.

The study also collected data on stock and condition of housing to assess the quality of housing services over time. A pre-coded observation checklist was used for both collecting and recording data on the types of household dwellings. The Household Questionnaire, Module G, was adopted and modified from the Malawi National Statistical Office Questionnaire for the Second Integrated Household Survey, 2004, pages 18 and 19 (see Appendix B). Structured and open-ended questionnaires, arranged according to themes, were also administered to gather qualitative data. Structured interview questions were included in order to increase the comparability of responses and ensure responses to all questions for every interviewee. It was also thought that this technique would reduce interviewer effects and biases introduced through free conversation.

3.2.2 Desk research

Desk research was conducted for the purposes of obtaining secondary data. It included official government documents and vital statistics. Unobtrusive research was cost and

time effective because most of the documents were available in the Geography and Earth Sciences Department's Map Library at Chancellor College. The Microsoft Excel programme was used to record data. This tool allowed easy analysis of the data. Despite some missing variables, data collected from the National Statistical Office was valid and reliable. Data collected over a period of 30 years provided an opportunity for longitudinal analysis.

3.2.3 Focus Group Discussions

The non-probability convenience sampling method was used to identify participants for Focus Group Discussions (FGD). FGDs were introduced to verify, build on and add depth to the results of the questionnaire survey on rural-urban linkages. Five FGDs composed of produce-market leaders were set as shown in Table 3-2. In order to reduce gender bias, the number of male and female participants was selected according to gender proportion in each produce section.

Table 3-2 Distribution of FGD participants

CENTRE	MARKET	NO. OF FGDs	COMPOSITION OF FGDs		
			MALE	FEMALE	TOTAL
Liwonde	Central	1	5	4	9
	Kamuzu Barrage	1	5	2	7
	Chidzanja	1	6	3	9
Luchenza	Central	1	5	3	8
	Chonde	1	3	3	6
Totals		5	24	15	39

Participants were presented with two log frames: rural to urban and urban to rural, on which to rank where most of the produce came from, or went, respectively. Participants were first asked to list and then rank three districts, then rank three rural centres where the mentioned produce comes from, then against each rural centre, three main products which come from the periphery of that centre.

3.3 Data Analysis Methods, Techniques and Tools

In order to ensure analytical validity, confirmatory data analysis methods were basically used to test growth centre propositions (Clarke and Cooke, 1983). This section describes data analysis methods, techniques and tools used.

Descriptive statistics: frequencies, mean, median, variance, standard deviations, kurtosis, skewedness and range, were computed to characterize respondents, responses and observations. SPSS was used as a tool for analysis. Descriptive statistics were also used to analyse demographic data. The Excel software package was used as a tool to produce population pyramids and bar graphs.

The non-parametric Spearman's Rank Order Correlation (*rho*) test was used to investigate the relationship between two continuous variables; conceived and perceived role of growth centres. This data analysis technique was appropriate because it involved ordinal data. Moonstat, Excel and SPSS software packages were used as tools. *Rho* shows the strength and direction of the relationship between two continuous variables. The *rho* value indicates the strength of the correlation. According to Neuman (2001), a *rho* of -1 is a perfect negative correlation, and a *rho* of 1 is a perfect positive correlation. A *rho* of 0 means there is no correlation. The alpha level of statistical significance was set at $p < 0.05$.

The non-parametric Pearson Chi-square (X^2) test for independence was used to determine if there was a statistically significant difference between two categorical variables: the proportion of in-migrants to non-migrants in Liwonde and Luchenza growth centres. It was also used to determine if there was a statistically significant difference in the number of people intending not to out-migrate and those intending to migrate out of Liwonde and Luchenza growth centres. This data analysis technique was appropriate because it involved categorical data. The SPSS software package was used as tool to compute data.

The alpha level of statistical significance was set at $p < 0.05$. Since a 2 by 2 table was encountered by SPSS in both outputs, the correlation value labelled 'Continuity Correlation' was used. This is Yates' Correlation for Continuity which compensates for the overestimate of chi-square value when used with 2 by 2 tables (Pallant, 2001).

Analysis of Variance (ANOVA) was used to determine if there was a statistically significant difference in housing services in the study areas between 1976 and 2006 by comparing the variance between groups with the variability within each of the groups, using SPSS. In order to conduct ANOVA, one categorical independent variable (When was the household dwelling built?) with four distinct categories (Before 1976, 1977-1986, 1987-1996, and 1997-2006), and one dependent variable (What type of construction material is the household dwelling made of?) divided into three (permanent, semi-permanent and traditional) were chosen.

The parametric Pearson product-moment correlation coefficient (r) test was conducted to determine whether there was a statistically significant difference in sources of water, lighting fuel and cooking fuel in Liwonde and Luchenza growth centres between 1976 and 2006. This data analysis technique was appropriate because it involved nominal data. SPSS was used to compute data. According to Clarke and Cooke (1983), the r value indicates the strength of the correlation. An r of -1 is a perfect negative correlation, an r of 1 is a perfect positive correlation, and an r of 0 means there is no correlation. The p value indicates whether the correlation is statistically significant. The alpha level of statistical significance was set at $p < 0.05$.

Analysis of qualitative FGD data on rural-urban linkage data involved grounded theory as a general strategy. During collection in the field, data was immediately categorised into themes and sub-themes: economic linkages, transport linkages, etc., in accordance with propositions and concepts embedded in the theory. Excel was used to compute the data into themes and sub-themes for analysis.

3.4 Ethical considerations

In order to gain entry into growth centres, for in-depth observational research, a six-month attachment to the Town Assemblies was sought. Consent was sought from the Chief Executives and respondents in both growth centres to conduct research. Respondents were informed of the purpose and criteria by which they were identified and were told that their responses were anonymous and confidential. (Refer to Appendix B.)

3.5 Limitations of the Study

Limitations were encountered during both data collection and analysis. During data collection, low basic education level compromised the quality of data from some respondents, whose information was either partially disqualified or discarded for giving irrelevant information because they were either illiterate or semi-illiterate. In Liwonde, 18% and 19% of respondents had no education or attended non-formal education respectively. In Luchenza, 14% and 18% of respondents had no education or attended non-formal education respectively. As a remedy, FGDs were set up to make up for discarded or disqualified data and to complement data collected through other methods. Quantitative data from secondary sources presented several limitations such as absence of key variables like employment data. Aggregated data in most recent official documents meant that disaggregated data for Liwonde and Luchenza was not available. The study, therefore, relied on the 1998 Population and Housing Census data.

3.6 Chapter Summary

This section summarises the research design and methodology. The basic study was academic or pure research. The aim was to advance fundamental knowledge of growth centre theory in Malawi, by either supporting or refuting the theory's prediction on the basis of empirical results. The study thus employed a case study design in which the approach was deductive, and the time dimension was from 1976 to 2006.

Data collection methods were basically observational. Methods included a survey of 500 systematically sampled household heads using face-to-face interview questionnaires, Focus Group Discussions with 5 conveniently sampled participant groups, observations using a growth centre checklist, and desk research.

Data analysis methods were basically confirmatory testing at the $p < 0.05$ alpha level of significance. Quantitative data analysis techniques to determine the statistical significance of results involved correlations; non-parametric Spearman's rank order correlation (ρ) and Parametric Pearson Product-moment correlation coefficient (r) tests; Chi-squares; and Analysis of Variance using SPSS, Excel and Moonstat software tools. Qualitative data analysis involved grounded growth centre theory analysis.

CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter presents results and discussion of findings on perception of growth centres, migration, rural urban linkages and service provision.

4.1 Characterisation of Survey Respondents

Prior to data analysis, sex composition, age composition, education and economic characteristics of survey respondents were analysed. The usefulness of this characterisation of survey respondents lies in the possibility of cross-tabulation with other variables such as migration, to determine relationships.

4.1.1 Sex and Age Composition of Respondents

Data on sex composition, analysed using masculinity proportion and sex ratio numerical techniques, formed the basic data for cross-classification with other characteristics such as migration and economic activity to determine relationships (Shryock and Siegel, 1976). Of the 320 respondents in Liwonde, 43% were males, and of the 180 respondents in Luchenza, 42% were males. The sex ratio was 75 and 73 in Liwonde and Luchenza respectively. These results could be attributed to the fact that the population census revealed the proportions to be 51% females and 49% males (GoM, 1998c). Pearson Chi-Square (X^2) test, conducted to determine whether there was a statistically significant difference in gender of respondents, found that the two distributions were not statistically significant in either Liwonde ($X^2=0.056$; $p=0.812$) or Luchenza ($X^2=0.022$; $p=0.882$). These results indicate that the sex composition of the respondents sampled was similar, implying that there was no gender bias

The usefulness of the age composition lies in its cross-classification with other demographic characteristics such as migration and marital status. These results indicate that Luchenza's population is somewhat younger than Liwonde's. Computed using the measure of central tendency and dispersion, percentage of the age points that are within one standard deviation of the mean was found to be 71% in Liwonde and 72% in Luchenza; the range was found to be 57 years in Liwonde (18-75) and 54 years in Luchenza (16-70). Furthermore, results showed that age distribution was positively skewed and peaked, 0.534 and 0.185 respectively, in Liwonde, while only slightly positively skewed at 0.429, and not peaked at 0.077, in Luchenza.

4.1.2 Educational Characteristics of Respondents

The usefulness of analysing of educational characteristics of respondents lies in its cross-classification with other characteristics, such as perception, migration, economic activity and type of dwelling, to determine relationships. This is because education is an important variable in accounting for variables relating to education such as migration and economic activity (Shryock and Siegel, 1976). Education output characteristics of respondents was analysed using non-parametric Pearson Chi-Square (X^2) test.

Descriptive results showed that 88% of respondents in Liwonde and 87% of respondents in Luchenza had attended school. Further analysis of results within sex of respondents showed that, in Liwonde, 111 of the 137 male respondents (93%) and 151 of the 183 female respondents (85%) had attended school. In Luchenza, 71 of the 76 male respondents (93%) and 85 of the 104 female respondents (82%) had attended school.

The Pearson Chi-Square (X^2) test revealed that the two distributions, in Liwonde ($X^2=4.059$; $p=0.044$) and Luchenza ($X^2= 4.231$; $p=0.040$), were statistically significantly different (refer to Tables 1 and 2 in Appendix A).

The results imply that, in both Liwonde and Luchenza, more male respondents had attended school than female respondents. These results were similar to NSO findings, which showed that, of the 64% literate population in Malawi, in urban areas 86% were literate, as compared to 61% in rural areas (GoM, 2004-05). Of the 64%, 75% were males and 50% females. This may be attributed to gender-based discrimination that favours male to female children in terms of education. The similarity implied that findings on education composition in both Liwonde and Luchenza growth centres were valid.

4.1.3 Economic Characteristics of Respondents

The usefulness of analysing economic characteristics of respondents lies in its cross-classification with other characteristics such as perception, migration, education and type of dwelling, to determine relationships.

Descriptive results showed that 69% of respondents in Liwonde and 66% of respondents in Luchenza were economically active. Analysis of results within those who were economically active showed that of the 69% in Liwonde, 36% were females and 33% males, and of the 66% in Luchenza, 34% were females and 32% males. Further analysis of results within sex of respondents, showed that in Liwonde, xx of the 137 male respondents (77%) and xx of the 183 female respondents (63%) were economically active. In Luchenza, xx of the 76 male respondents (75%) and xx of the 104 female respondents (60%) were economically active.

The Pearson Chi-Square (X^2) test revealed that, in both Liwonde ($X^2=6.318$; $p=0.012$) and Luchenza ($X^2=3.978$; $p=0.046$), the distributions were statistically significantly different (refer to Tables 3 and 4 in Appendix A). The results imply that, in both Liwonde and Luchenza, more male respondents were economically active than female respondents.

Furthermore, Spearman's rank order correlation (ρ) test determined that education and economic status of respondents were moderately correlated in both Liwonde ($\rho=0.336$; $p=0.001$) and Luchenza ($\rho=0.206$; $p=0.006$) (refer to Tables 5 and 6 in Appendix A). These results imply that more respondents who attended school were likely to be economically active than those who had not attended school. These results were similar to NSO findings which showed that literacy rate increased with increase in per capita expenditure quintiles. The similarity implied that findings on the relationship between education attainment and economic activity in both Liwonde and Luchenza growth centres were valid.

4.2 Growth Centre Perception

Most regional development planning scholars conceive that growth centres bring about spatial development. According to Chisholm (1975:159), however, 'regions do not exist as objective realities independent of the observer but are mental constructs that vary both with the person concerned and the purpose for which they want to identify regions'. This section provides results of the relationship between conceived and perceived role of growth centres that they bring about spatial development.

4.2.1 Do Growth Centres Bring about Spatial Development?

In order to answer the research question, ‘Is there any relationship between conceived and perceived role of growth centres that they bring about spatial development as measured by Likert scale using non-parametric Spearman’s rank order correlation (ρ)?’, null and alternative hypotheses were developed as follows:

H_0 : There is no relationship between conceived and perceived role of growth centres that they bring about spatial development

H_1 : There is a relationship between conceived and perceived role of growth centres that they bring about spatial development.

Figures 4-1 and 4-2 (below) reveal, at the $p < 0.05$ alpha level, a strong positive correlation between conceived and perceived role of the growth centre in Liwonde ($\rho = 0.97$; $p = 0.001$) and Luchenza ($\rho = 0.93$; $p = 0.001$). Furthermore, the coefficient of determination was found to be 94% and 86% in Liwonde and Luchenza respectively. This implied that the perceived role of Liwonde explained about 94% and of Luchenza about 86% of the conceived role. Furthermore, descriptive analysis indicated that 84% of respondents in Liwonde and 90% of respondents in Luchenza agreed that growth centres bring about development.

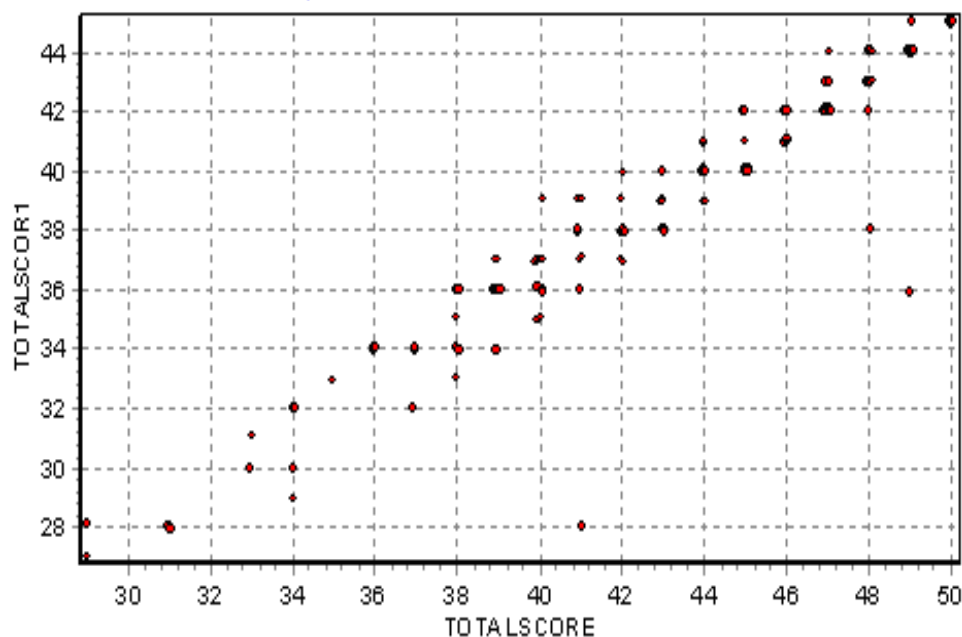


Figure 4-1 Correlation for Conceived and Perceived Development Role of Liwonde

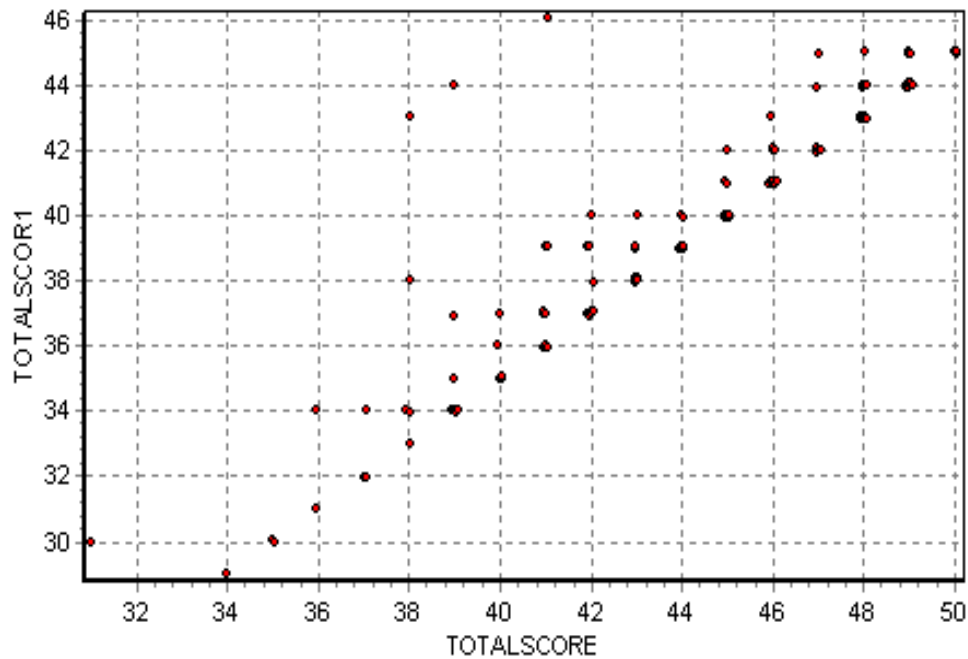


Figure 4-2 Correlation for Conceived and Perceived Development Role of Luchenza

Given these results, the study accepted the alternative hypothesis that there is a relationship between conceived and perceived role of growth centres that they bring about development in Liwonde and Luchenza. It can, therefore, be concluded that people's perceptions of growth centres in Liwonde and Luchenza are that they bring about development.

4.2.2 Do Liwonde and Luchenza Exhibit Characteristics of Growth Centres?

In order to find out peoples' perceptions of what constituted Liwonde and Luchenza secondary centres, the research question, 'Is there any relationship between conceived and perceived characteristics of growth centres in Liwonde and Luchenza as measured by Likert scale using non-parametric Spearman's rank correlation (ρ)?', null and alternative hypotheses were tested. The two hypotheses were:

- H₀: There is no relationship between conceived and perceived characteristics of growth centres in Liwonde and Luchenza.
- H₁: There is a relationship between conceived and perceived characteristics of growth centres in Liwonde and Luchenza

Descriptive results (see Tables 7 and 8 in Appendix A) indicated that 88% of respondents in both Liwonde and Luchenza agreed that these centres reflect both residential and non-residential use. Table 4-1 shows that the relationship between conceived and perceived characteristics in Liwonde ($\rho=0.969$; $p=0.001$) and Luchenza ($\rho=0.981$; $p=0.001$) was statistically significant. These results agreed with observation which showed that although most people lived in the centres, substantial numbers of people commuted from the periphery to the centre to access secondary order services and goods. These results imply that an integrated network of tertiary, secondary and main roads and an efficient transport system in growth centre planning would be an appropriate strategy to support non-residential use and avoid diseconomies of urbanisation.

	Liwonde	Luchenza
A mixture that reflects both residential and non-residential uses	.969	.981
A mixture that reflects both traditional and urban housing	.965	.979
Contain central places and focal points (railway station, bus depot)	.942	.981
Contain population densities higher than in surrounding areas	.946	.989
Designed to accommodate the town's population in the next 20 years	.926	.958
Contain public places that promote social interaction	.857	.943
Suitable for both pedestrian and vehicular travel	.906	.957
	.892	.914

Table 4-1 Correlation for Characteristics of Growth Centres

Results also revealed that about 90% of respondents agreed that both Liwonde ($\rho=0.965$; $p=0.001$) and Luchenza ($\rho=0.979$; $p=0.001$) reflected both traditional and urban dwellings (see Table 4-1, above). These results agreed with observations that, in Liwonde, 13.8% of household dwellings were permanent, 60% were semi-permanent, and 26% traditional; and in Luchenza, 10% of household dwellings were permanent, 46% were semi-permanent, and 44% traditional. The study therefore, concluded that Liwonde and Luchenza support both the traditional and urban ways of life.

Regarding the characteristic that growth centres contain central places and focal points, 91% of respondents agreed that Liwonde ($\rho=0.906$; $p=0.001$) and Luchenza ($\rho=0.957$; $p=0.001$) significantly exhibited such characteristics. Related to this characteristic, 90% and 83% of respondents in Liwonde ($\rho=0.945$; $p=0.001$) and Luchenza ($\rho=0.989$; $p=0.001$) respectively, agreed that the centres significantly support

transit use. Furthermore, 92% in Liwonde ($\rho=0.857$; $p=0.001$) and 84% in Luchenza ($\rho=0.914$; $p=0.001$) agreed that the centres were suitable for both pedestrian and non-vehicular travel (see Table 4-1, above).

Regarding the characteristic that growth centres contain population densities higher in surrounding areas, 94% of respondents in Liwonde ($\rho=0.946$; $p=0.001$) and 100% of respondents in Luchenza ($\rho=0.989$; $p=0.001$) agreed that they exhibited such characteristics. Related to this characteristic, 89% of respondents in Liwonde ($\rho=0.926$; $p=0.001$) and 81% of respondents in Luchenza ($\rho=0.958$; $p=0.001$) agreed that the centres were designed to accommodate population growth in the next 20 years. In addition to this, 81% of respondents in Liwonde ($\rho=0.857$; $p=0.001$) and 68% of respondents in Luchenza ($\rho=0.943$; $p=0.001$) agreed that the growth centres contained public places that promoted social interaction (see Table 4-1, above).

Given the above results, the study rejected the null hypothesis, thereby accepting the alternative hypothesis that there is a positive relationship between conceived and perceived characteristics of growth centres in Liwonde and Luchenza. They are well placed to support secondary order goods and services that reflect needs of both rural and urban residents.

4.2.3 Should Government Designate More Growth Centres?

Analysis of views of respondents showed that the vast majority of respondents in Liwonde (88%) and Luchenza (92%), were for the designation of more growth centres (refer to Tables 5 and 6 in Appendix A). Spearman's rank correlation (ρ) test conducted to determine the direction and strength of the relationship between governments and people's views, was found to be statistically significant in Liwonde ($\rho=0.95$; $p=0.001$) and Luchenza ($\rho=0.93$; $p=0.001$) (see Figures 4-3 and 4-4, below).

Respondents gave the following reasons, among others, for the designation of more growth centres; first, growth centres were perceived as migration 'sinks'. 'Push' factors, such as declining agricultural incomes and labour surpluses in rural areas, on one hand, exerted 'pressure' on rural residents. On the other, diseconomies of scale in large urban centres such as Blantyre left the people with limited options, preferably moving to growth

centres. In addition, the desire to move shorter distances in order to maintain closer links with ‘akumudzi’ (relatives) made them move to a nearby secondary centre.

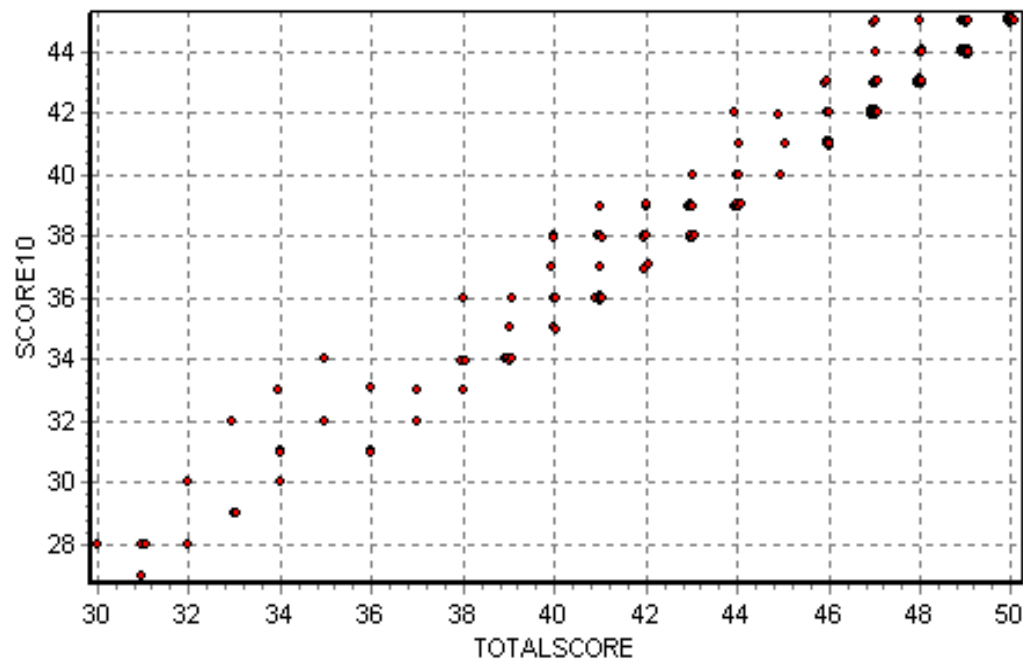


Figure 4-3 Correlation Analysis of 'Designation of Growth Centres' in Liwonde

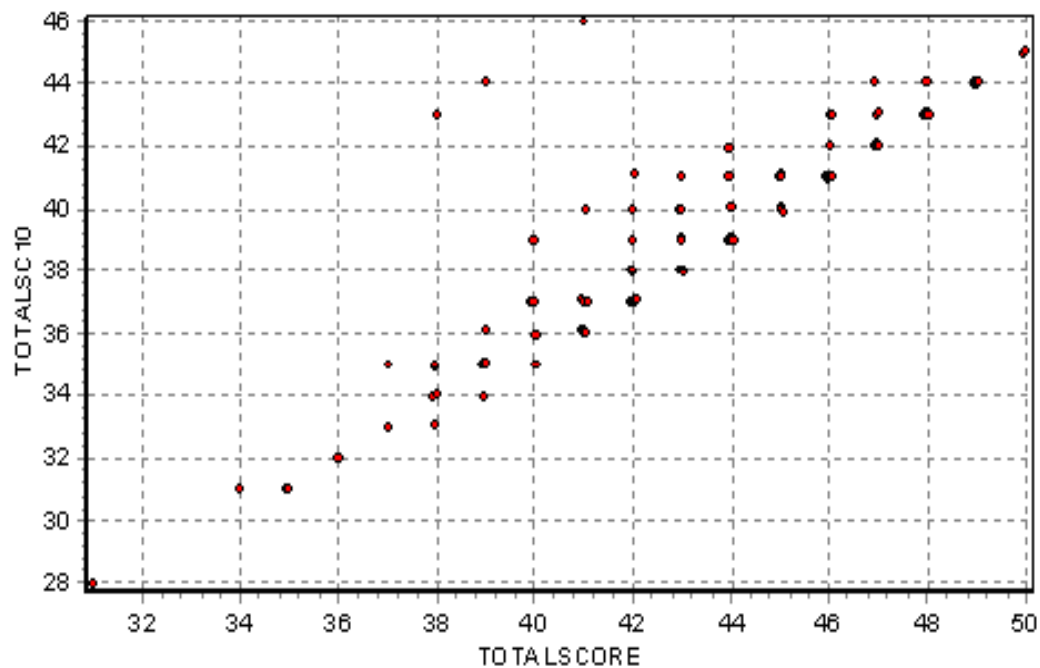


Figure 4-4 Correlation Analysis of 'Designation of Growth Centres' in Luchenza

Second, growth centres were perceived as ‘unemployment absorbers’. Urban primacy in main urban centres created ‘unemployment shock’, in that migrants needed employment for livelihood diversification and the development of non-farm occupations, which was available in growth centres. Furthermore, respondents argued that growth centres provided secondary order goods and services, often bypassed by providers, who prefer urban centres to rural centres.

Finally, respondents viewed Liwonde and Luchenza as centres of ‘pull factors’, such as innovation. They argued that growth centres had brought new ideas, products and ways of life, some of which had stimulated, among other developments, commercial agricultural production, high quality education and healthy life, in the surrounding rural areas.

Given the overwhelming relationship above, the study therefore, concluded that designation of more growth centres would be an appropriate strategy for secondary order settlements, goods and services, and employment that reflects the needs of the people.

4.3 Migration

One major proposition of growth centre strategy is the ability to attract, generate and intercept migrants. Prior to survey data analysis, unobtrusive demographic data collected from 1977, 1987, 1998 census reports, was computed into compound population pyramids according to population census (see Figures 4-5 and 4-6, below). This was done because age and sex composition are important to the nature and functioning of societies and communities, in that population pyramids are instructive starting points for population investigation (Rowland, 2003).

4.3.1 Analysis of Population Pyramids

Analysis of population pyramids was done using visual and population model analysis methods put forward by Siegel and Swanson (2004). Visual analysis depicted narrow pyramids in both centres between 1966 and 1977. (See Figures 4-5 and 4-6, below.) According to Siegel and Swanson (2004), a narrow pyramid suggests a low population growth rate due to low birth rate, or high infant and child mortality rate, or low in-migration rate. The pyramids correspond to the quasi-stable population model. The model indicates the fixed age-sex structure of a population resulting from moderately declining mortality and no migration.

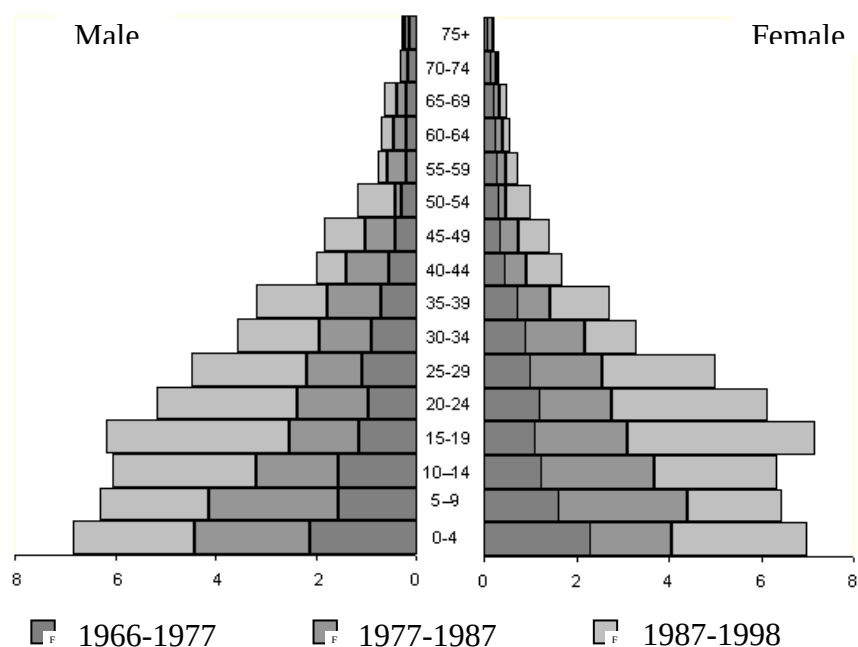


Figure 4-5 Population Pyramid for Liwonde

Source of data: GoM 1977, 1987 & 1998 National Population Census

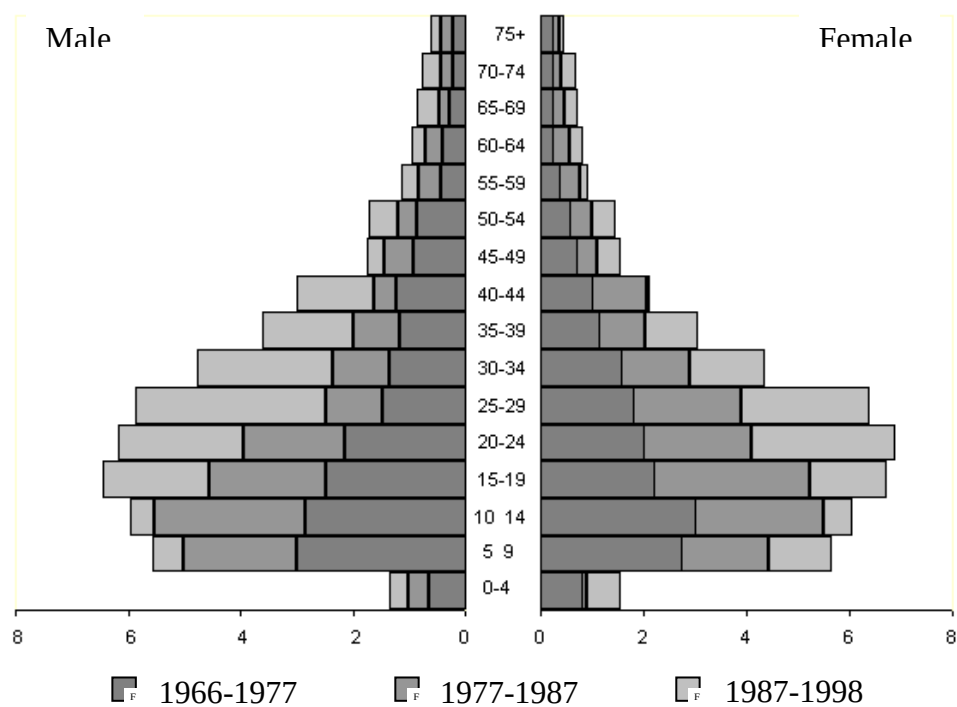


Figure 4-6 Population Pyramid for Luchenza

Source of data: GoM 1977, 1987 & 1998 National Population Census

Visual analysis also showed a broad base, rapidly narrowing from the base up, depicting triangular-shaped pyramids with concave slopes, for both Liwonde and Luchenza, between 1977 and 1986. This suggested a population with a relatively high birth rate and moderately high death rate. This resembled the stable population model. A sudden increase of population in Luchenza in the age-groups 5-9 and 10-14, however, suggested a high in-migration rate of child refugees fleeing from the civil war in Mozambique. An increase in population in the age-groups 15-19 and 20-24, could have been due to in-migration of youth from rural areas.

Furthermore, visual analysis of Liwonde and Luchenza population pyramids between 1987 and 1998 showed excessively long bars in the middle parts with an asymmetrical shape in the primary labour force ages 25-39, suggesting a heavy selectivity of in-migrants, as well as short bars in the upper parts of pyramids, suggesting either heavy out-migration of adults or short life span.

4.3.2 Attraction of Migrants

Uneven rural-urban migration has led to people concentrating in large cities, by-passing secondary centres. Such uneven spread of the urban population has overstrained resources of large cities and underdeveloped secondary centres, affecting the quality of life in urban centres of all size categories. Another justification of growth centre strategy is their ability to even out urban population distribution by attracting migrants from rural and main urban centres.

In order to answer the research question, ‘Is there any statistically significant difference in in-migration in Liwonde and Luchenza growth centres between 1976 and 2006 as analysed by non-parametric Pearson Chi-square?’ the null and alternative hypotheses were set as follows:

- H₀: There is no statistically significant difference in the number of people who had always lived in the centres and those who had in-migrated to the centres.
- H₁: There is a statistically significant difference in the number of people who had always lived in the centres and those who had in-migrated to the centres.

At the $p < 0.05$ alpha level, results were found to be statistically significant in Liwonde ($X^2 = 90.313$; $p = 0.001$) (see Tables 9 and 10 in Appendix A). Descriptive analysis showed

that almost 77% of respondents were in-migrants, of whom 10% migrated before 1976, 14% between 1977 and 1986, 21% between 1987 and 1996, and 31% between 1997 and 2006. Results were also found to be statistically significant in Luchenza ($X^2=47.022$; $p=0.001$). Descriptive analysis revealed a similar trend, where 76% of respondents were in-migrants, of whom 11% migrated before 1976, 15% between 1977 and 1986, 20% between 1987 and 1996, and 30% between 1997 and 2006. The null hypothesis was, therefore, rejected.

These results imply that both Liwonde and Luchenza growth centres significantly attracted migrants. A spatial strategy to overcome the problem of over-urbanization of the large cities on the one hand, and exploiting developmental potential of secondary centres on the other, therefore, would be an integrated and balanced urban hierarchy that emphasises complementarity among rural centres, secondary centres and large cities.

4.3.3 Place of Origin of Migrants

Data pertaining to ‘place of origin of in-migrants’ and ‘period of in-migration’ was analysed. Places of origin were categorized into five: Rural 1 (rural areas of this district; Machinga and Balaka for Liwonde; Thyolo and Mulanje for Luchenza), Rural 2 (rural areas of other districts), Urban 1 (district and town centres of that district; Balaka Town for Liwonde, and Mulanje and Thyolo district centres for Luchenza); Urban 2 (district and town centres of other districts), and Urban 3 (major urban centres).

In Liwonde, results showed that 33% of respondents were in-migrants from rural areas of Machinga and Balaka districts, 20% from rural areas of other districts, 11% from urban centres of Machinga and Balaka districts, 8% from urban areas of other districts and 5% from major urban centres. In Luchenza, a similar trend was observed: 31% of respondents were in-migrants from rural areas of Thyolo and Mulanje districts, 21% from rural areas of other districts, 11% from urban centres of Machinga and Balaka districts, 8% from urban areas of other districts and 4% from major urban centres.

A cross tabulation between ‘place of origin of in-migrants’ and ‘period of in-migration’ showed that in Liwonde, the total proportion of in-migrants from rural areas of the district has been increasing at a slightly decreasing rate (45.5% before 1976, 44.4% between 1977 and 1986, 42.2% between 1987 and 1996, and 40.4% between 1997 and 2006).

Results also revealed that the total proportion of in-migrants from rural areas of other districts has been increasing at an increased rate (24.4% before 1976 to 26.7% between 1977 and 1986). The figure remained constant at 26.5% between 1987 and 1996 but decreased slightly to 25.3% between 1997 and 2006. While the total proportion of in-migrants slightly decreased between 1987–1996 and 1997–2006, there was a slight increase from urban areas between the same periods (13.2% to 15.2% from urban areas of other districts, 10.3% to 12.1% from urban centres of other districts). In-migrants from major urban centres however, remained constant at 7% over the same period. Results showed that in-migration from districts surrounding growth centres has been increasing steadily over the past 30 years (see Figures 4-7 and 4-8, below). The rate of migration declines with the distance of the urban area from the rural area of origin. This is because of transport barriers, but also because most migrants maintain strong blood ties with their rural areas.

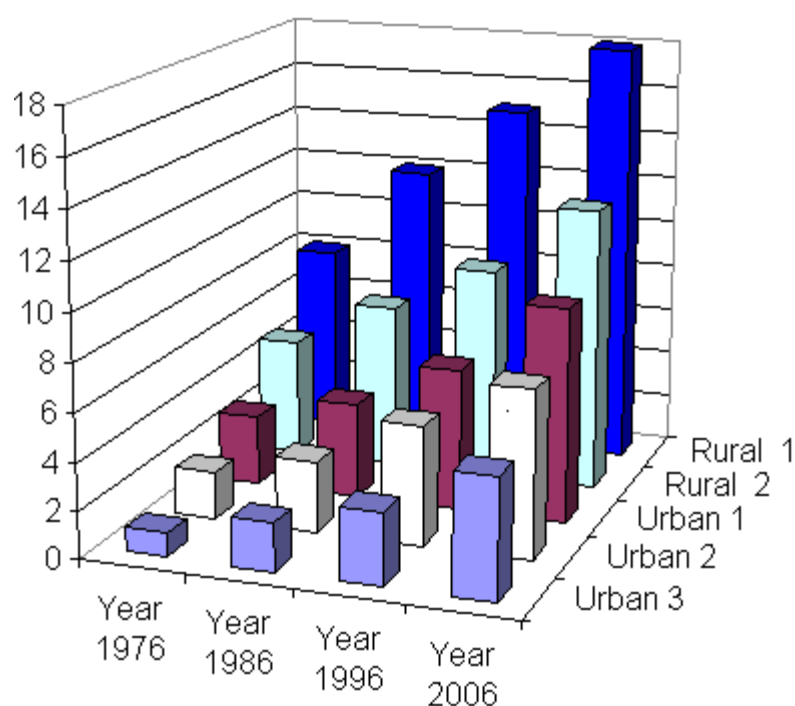


Figure 4-6 In-migration Trends for Liwonde

Key	Rural 1	Rural areas of this district
	Rural 2	Rural areas of other districts
	Urban 1	Districts and town centres of that district
	Urban 2	District and town centres of other districts
	Urban 3	Major urban centres

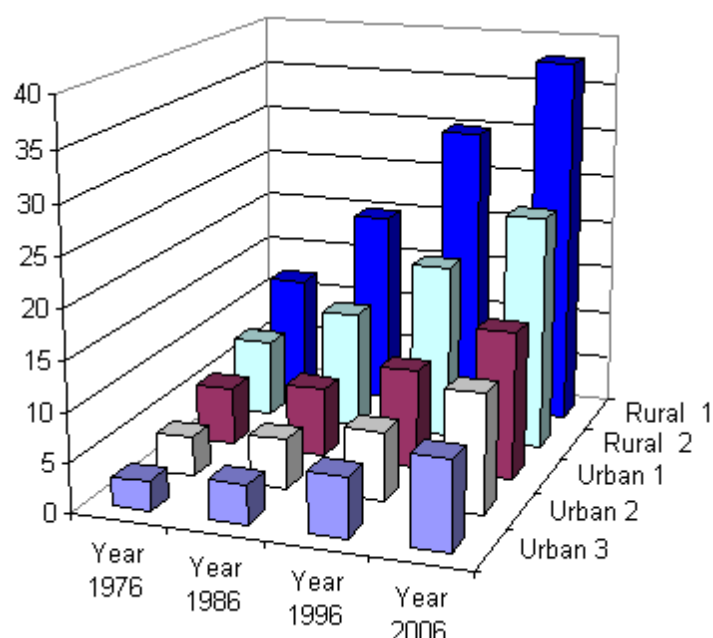


Figure 4-7 In-migration Trends for Luchenza

Key	Rural 1	Rural areas of this district
	Rural 2	Rural areas of other districts
	Urban 1	Districts and town centres of that district
	Urban 2	District and town centres of other districts
	Urban 3	Major urban centres

4.3.4 Age of In-migrants at Migration

Descriptive analysis showed in-migrants' age variations at the time of migration. Aggregate in-migration in both Liwonde (67.8%) and Luchenza (52%) was positively skewed and peaked at age groups 10-29 (see Table 4-2, below). The peak however, was highest in the age group 15-19 in both Liwonde (21.2%) and Luchenza (19.9%). These results were similar to findings by GoM (1998c) which showed an inflated population pyramid between age groups 10-29. This implies a high propensity to in-migrate to these centres at ages 10-29. Results also revealed higher child in-migration in Luchenza (9.6%) than in Liwonde (4.9%). These results were similar to findings by GoM (1998c) which showed an abrupt broadening of the population pyramid in Luchenza at age group 0-4.

Furthermore, factor analysis showed that age at migration varies with reasons to migrate. In Liwonde, 21% of the respondents aged 15-19 and in Luchenza, 15.7%, in-migrated to start a job or business. Some 16% and 19.1% aged between 0-19 in Liwonde and Luchenza respectively, in-migrated with their parents. Similarly, in Liwonde and

Luchenza, respectively, 15% and 14% aged 15-34 in-migrated to look for jobs. Finally, 14% and 19.1% aged 0-19, in Liwonde and Luchenza respectively, in-migrated to stay with relatives.

Table 4-2 Age of In-migrants at Migration

		Liwonde %	Luchenza %
Valid	0-4	4.9	9.6
	5-9	8.6	11.0
	10-14	22.0	16.2
	15-19	21.2	19.9
	20-24	14.7	18.4
	25-29	12.2	12.5
	30-34	9.0	6.6
	35-39	4.5	4.4
	40-44	1.6	1.5
	45-49	1.2	.0
	Total	100.0	100.0

The study therefore, concluded that the desire for economic gains in these centres was a major determinant for migration. Figures 4-9 and 4-10 (below) show the distribution of in-migrants by employment. The appropriate ‘unemployment absorber’ approach in growth centres would therefore be the promotion of labour-intensive employment.

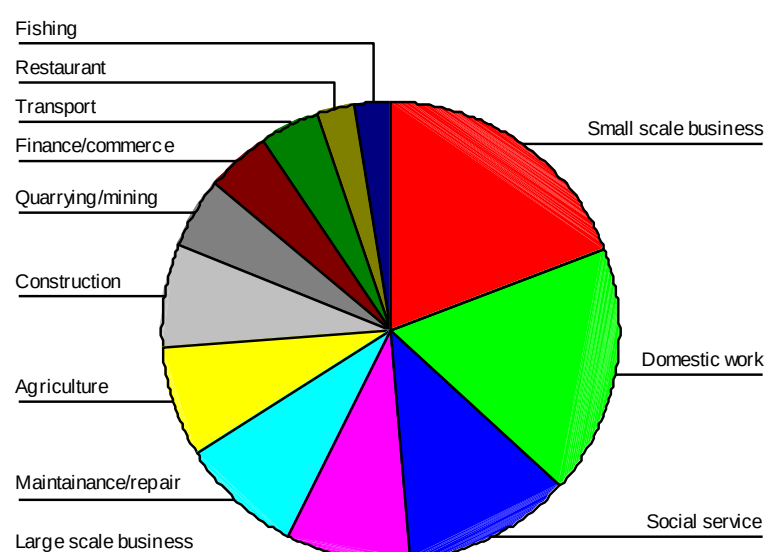


Figure 4-8 Distribution of In-migrants by Main Employment in Liwonde

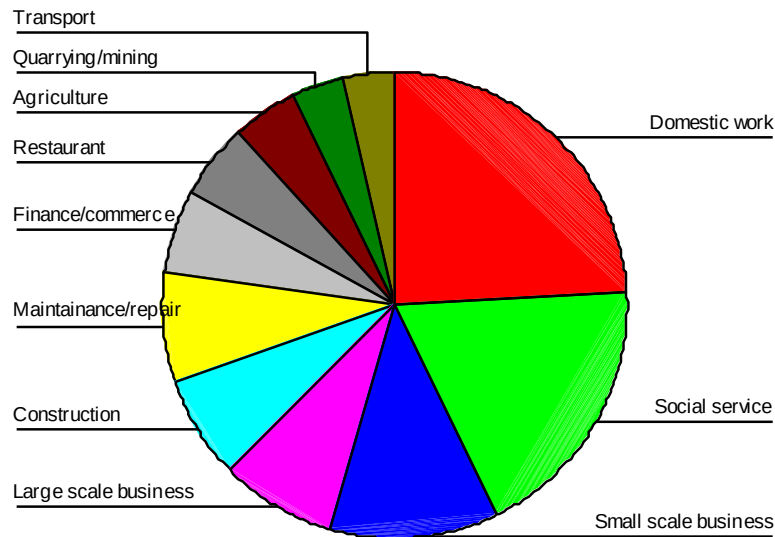


Figure 4-9 Distribution of In-migrants by Main Employment in Luchenza

4.3.5 Absorption of Migrants

Another justification of growth centre strategy as a migrant-sink or migrant-absorber is absorption of migrants who would otherwise be unproductive in rural areas or who would step-migrate to main urban centres. In order to answer the research question, ‘Is there any statistically significant difference in the number of people intending not to out-migrate from and those intending to migrate to Liwonde and Luchenza growth centres as measured by parametric Pearson Chi-square analysis?’, the following null and alternative hypotheses were tested:

- H₀: There is no statistically significant difference in the number of people intending not to out-migrate and those intending to migrate.
- H₁: There is a statistically significant difference in the number of people intending not to out-migrate and those intending to migrate.

Descriptive analysis showed that 85% of respondents who had always lived in Liwonde did not intend to out-migrate to elsewhere. Only 15% claimed that they planned to out-migrate. For those who had come from elsewhere, 75% did not intend to out-migrate while 25% intended to move out of Liwonde. Combined, a total of 79% of respondents had no intention of moving elsewhere. In Luchenza, 71% of respondents who had always

lived in Luchenza did not intend to out-migrate to elsewhere. Only 29% claimed that they intended to out-migrate. For those who had come from elsewhere, 58% did not intend to out-migrate while 42% intended to move out of Luchenza. Combined, a total of 61% of respondents had no intention of moving elsewhere.

The parametric Pearson Chi-square (X^2) test showed statistically significant results in Liwonde ($X^2=5.291$; $p=0.021$) and Luchenza, ($X^2=4.776$; $p=0.029$) (see Tables 11 and 12 in Appendix A). The alternative hypothesis was thus accepted, that there is a statistically significant difference between the number of people who are intending not to out-migrate and those intending to. The implication of these findings is that Liwonde and Luchenza growth centres have successfully absorbed migrants. Given the above evidence, an appropriate strategy to absorb would be rural-urban migrants would be the growth centre strategy.

4.4 Rural-Urban Linkages

One major proposition of growth centre strategy is based on the acceleration of rural-urban linkages. The study therefore analysed information on transport and physical linkages, and economic and market linkages, to determine if there was a significant difference.

4.4.1 Physical and Transport Linkages

In terms of transport and physical linkages, the study was interested in the interface between primary, secondary and tertiary roads and railway stations. The study compiled information on transportation linkages by name, classification, type and conditions of roads linking centres and their hinterlands. In addition, information on traffic volumes, mode of transportation and selected commodity flows was made available through various transportation studies conducted by SCDP.

In Liwonde growth centre, the Blantyre-Mangochi M3 road links the centre to Mangochi growth centre and Blantyre and Zomba growth poles, and several rural centres such as Malosa. The Liwonde-Balaka M8 road provides the major link to Balaka growth centre, and the Bakili Muluzi S131 road from Liwonde to Mangochi growth centre links up the centre to several rural centres such as Ntaja, Nsanama and Namwera. (See Table 4-3, below.) In Luchenza growth centre, the M2 Limbe-Mloza road, which passes through the

town from Blantyre to Mulanje, links Thyolo and Mulanje growth centres and Blantyre growth pole. (See Table 4-4, below.)

Table 4-3 Road Network in Liwonde Growth Centre

NAME OF ROAD	CLASSIFICATION	TYPE OF ROAD	CONDITION
M3	Main	Bitumen	Passable all year round
Ntaja/Nsanama	Secondary	Bitumen	Passable all year round
Western Bank	Undesignated	Earth	Passable in dry season only
Eastern Bank	Undesignated	Earth	Passable all year round
Market Street	Undesignated	Bitumen	Passable all year round
Chipatala	Undesignated	Bitumen	Passable all year round
Old Ferry	Undesignated	Earth	Passable in dry season only
Station	Undesignated	Bitumen	Passable all year round
Mawila	Undesignated	Earth	Passable in dry season only
Civic Offices	Undesignated	Bitumen	Passable all year round
Msamati UTHA	Undesignated	Earth	Passable all year round
Chabwera UTHA	Undesignated	Earth	Passable all year round
Mvuu camp	Undesignated	Earth	Passable in dry season only

Table 4-4 Road Network in Luchenza Growth Centre

NAME OF ROAD	CLASSIFICATION	TYPE OF ROAD	CONDITION
M2	Main	Bitumen	Passable all year round
Khonjeni	Secondary	Earth	Passable all year round
Msikawanjara	Secondary	Earth	Passable all year round
Market Streets	Tertiary	Bitumen	Passable all year round
Nkalo	Tertiary	Earth	Passable in dry season
Lolo UTHA	Undesignated	Earth	Passable all year round
Kanthawire UTHA	Undesignated	Earth	Passable all year round

Results showed that more than 70% of all roads in Liwonde, and 60% in Luchenza, were of good quality and passable all year round, having been upgraded by SCDP, MASAF and the Public Works Programme. But as physical linkages between centres and the periphery beyond the boundary, the roads provided rather poor services. Most rural areas were not easily accessible by road, and transport was difficult and expensive. People from rural areas had to walk for hours to the nearest road. After reaching the main or secondary road, they had to wait for 30 minutes or longer for a bus or lorry. Despite these challenges however, respondents were of the view that there had been a substantial improvement in transport and physical linkages. The study therefore, concluded that the growth centre strategy had linked up all the three levels of the transport delivery system: main, secondary and tertiary.

4.4.2 Transport System



Figure 4-10 Liwonde bus depot developed by SCDP

Source: Courtesy of SCDP

Roads are used by over 95% of the passengers taking trips within the centres, and to transport over 80% of agricultural commodities. Several public and private bus operators provide road transport at Liwonde and Luchenza. Figure 4-11 reflects the boom of minibuses since the mid-1990s, substantially increasing linkage between growth centres.

Hitch-hiking (*matola*) is also dominant, especially for small scale traders who mostly reside in growth centres, linking them to periodic markets, mostly in rural centres. Within the township, the main mode of transport is walking, followed by bicycles and then cars. Both centres also have railway transport complementing the road network. Results however, showed relatively declining railway services which operate between Limbe and Nacala, and also between Limbe and Makhanga, passing through Liwonde and Luchenza growth centres respectively, due to vandalism of rails, breaking of bridges, and declining amount of passengers and cargo, among other factors. Rail transport links both growth centres to their periphery and Blantyre growth pole. The bulk of export cargo includes sugar, tobacco and tea, while imports include fertilizer, salt and fuel. Internal goods are mainly agro-products, transported from rural to urban centres.

4.4.3 Economic and Market Linkages

The study conducted FGDs in five regular produce markets (three in Liwonde and two in Luchenza), to determine the origin and destination of selected commodities through major markets, to estimate the physical ‘reach’ of marketing centres for those commodities, and to identify spatial and functional linkages among producers, middlemen and buyers.

Farmers have responded to demand by increasing production, because their linkage to consumers, mediated by the growth centre, has offered important opportunities to increase production in the rural area. By giving farmers access to input and produce markets, growth centres have allowed them to specialize in productions in which they have a comparative advantage, such as bananas in Thekerani. Many rural households’ incomes include remittances from urban-based family members, which may be important for investment in agricultural production, as well as for rural consumption. Non-farm employment in growth centres is an important part of rural livelihoods. Analysis of the commodity flows indicated that markets within Liwonde and Luchenza centres, even though primarily local exchange centres serving residents of the places in which they are located, are well integrated into a network of area-wide exchange and trade. (See Tables 13 and 14 in Appendix A.)

Figures 4-12, 4-13, 4-14, and 4-15, below, clearly demonstrated that market linkages, which formed a major network of commercial interaction within and among rural areas, were strong between centres and their hinterlands. The main economic activity for people in Machinga and Balaka districts (which share boundaries with Liwonde growth centre) and Thyolo, Mulanje and Chiradzulu districts (which share boundaries with Luchenza growth centre) is farming. Some farming households in these districts depend on urban demand in these centres for part of their livelihood. Liwonde and Luchenza growth centres act as markets for agricultural produce, both because of the demand generated by their own population and, more importantly, because they often function as nodes in a wider marketing network, channelling demand from outside the region. On the other hand, rural farmers buy manufactured products from retail and wholesale shops located at the centre.



Figure 4-11 Kamuzu Barrage Market at Liwonde before Improvement by SCDP

Source: Courtesy of SCDP



Figure 4-12 Kamuzu Barrage Market at Liwonde after Improvement by SCDP
Source: Courtesy of SCDP



Figure 4-13 Luchenza Market before Improvement by SCDP
Source: Courtesy of Luchenza Town Assembly



Figure 4-14 Luchenza Market after Improvement by SCDP

Source: Courtesy of SCDP

In order to investigate forward market linkages, five FDGs were conducted (three in Liwonde and two in Luchenza). Participants were asked to list and rank three districts and three rural places in each of the districts where they buy most of the produce found at the market. Finally, they listed and ranked three main products they buy from those rural centres (see Tables 13 and 14 in Appendix A).

With regard to market linkages, results showed that Liwonde and Luchenza secondary centres performed three major market roles: as outlets for rural production, as intermediary market centres and as distribution centres for ‘imported’ goods. Regarding the role as outlets for rural production, results showed that most growth centre enterprises purchase directly from nearby hinterland households and within the town. Liwonde, for example, obtained most of its rice sold at the centre from Lake Chilwa, maize from Nsanama, Irish potatoes from Tsangano and Njolomole, tomatoes from Ulongwe and Bilira, and sweet potatoes from Chingale (see Figure 4-16). Luchenza obtained most of its bananas sold at the market from Thekerani, maize from Khonjeni and cassava from Nkalo (see Figure 4-17). In general, agricultural produce accounts for a large share of rural production channelled to the centres.

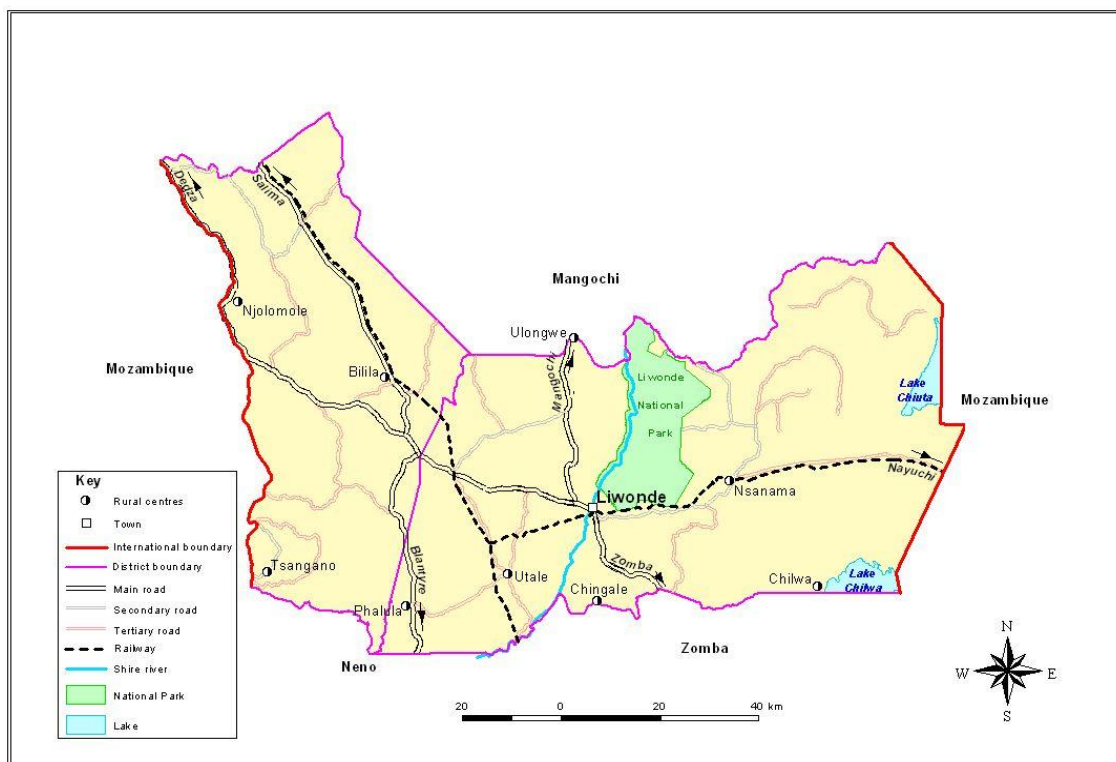


Figure 4-15 Market Linkages in Liwonde

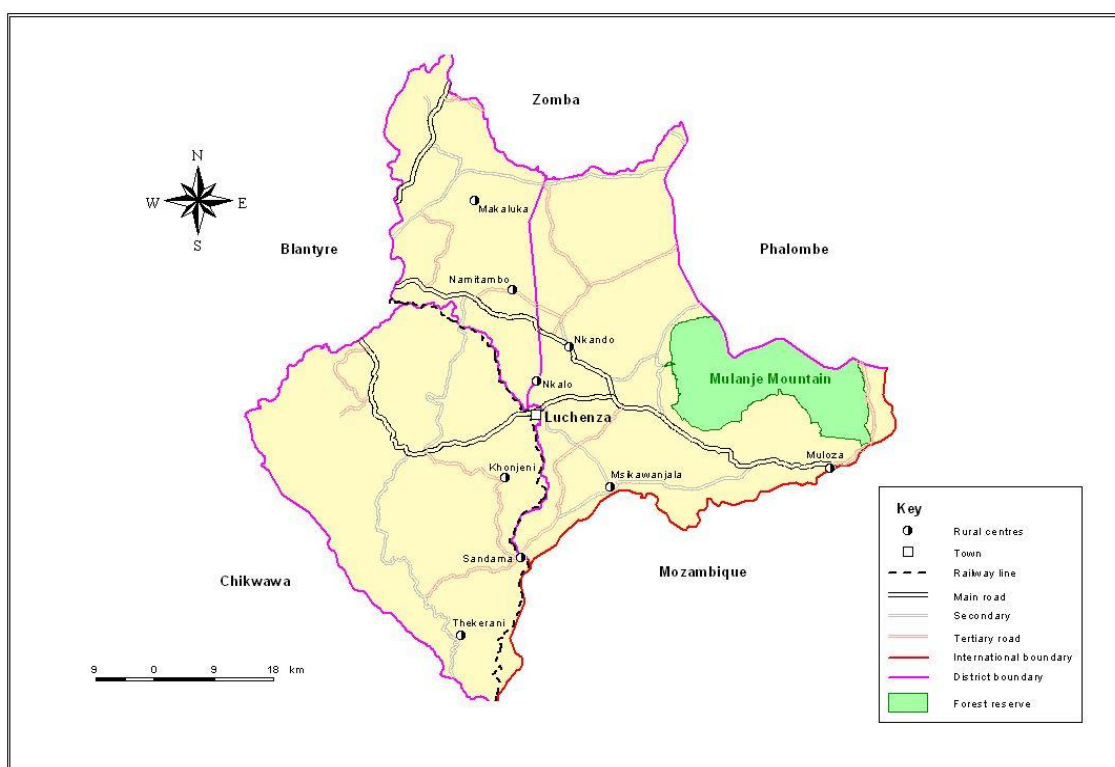


Figure 4-16 Market Linkages in Luchenza

As regards the role as intermediary market centres, results showed that these centres mediate between rural producers and urban sources of demand. These centres are too small to constitute significant final destination markets for goods produced in their periphery, hence the strategic importance of growth in enabling local producers to access distant, especially urban, markets. In Luchenza, for example, most curios were purchased by urban dwellers, such as from Blantyre and Lilongwe. Furthermore, some citrus fruits, bananas and maize from Luchenza were purchased by buyers from Blantyre. It was observed that such bulky goods could be easily and cheaply transported to main urban markets using rail transport.

Finally, results revealed that one of the key functions of Liwonde and Luchenza growth centres was to ‘import’ production and consumption goods such as salt, fertilizer and wheat flour, that would otherwise be unavailable, more expensive, or of poorer quality locally. These growth centres, Liwonde in particular, are strategically placed as receiving centres for products transported by railway transport, for example from Nacala in Mozambique.

4.5 Service Provision

The purpose of this section is to test the relevance of growth centres in the improvement of allocative efficiency of basic services. Respondents were asked to rank efficiency, ranging from 1 to 5, of basic public education and health service from 1976 to 2006. Results are shown in Figures 4-18 and 4-19, below.

4.5.1 Education Services

Reference to Figures 4-18 and 4-19, below. Respondents in Liwonde had a perception that there was a substantial increase in allocative efficiency of basic public primary schools between 1976 and 1996. Between 1997 and 2006 however, the efficiency decreased, owing to among other things, huge Teacher-Pupil Ratio (TPR), and Classroom-Pupil Ratio (CPR). TPR is an indicator of allocative efficiency as it gives an indication of the amount of work allocated to a particular teacher. CPR is a measure of allocative efficiency in that it indicates the number of pupils allocated to a particular classroom. The standard PTR and CPR are 1:50 and 1:50 respectively (GoM, 2004-05). The higher the deviation, the greater the allocative inefficiency. This may be due to either under-allocation or over-allocation. In Liwonde, PTR and CPR were at 1:79 and 1:125

respectively (see Table 4-5, below). The higher teacher-pupil ratio resulted among others, from the surge in enrolment due to the introduction of free primary education and high population growth rate and lack of trained teachers.

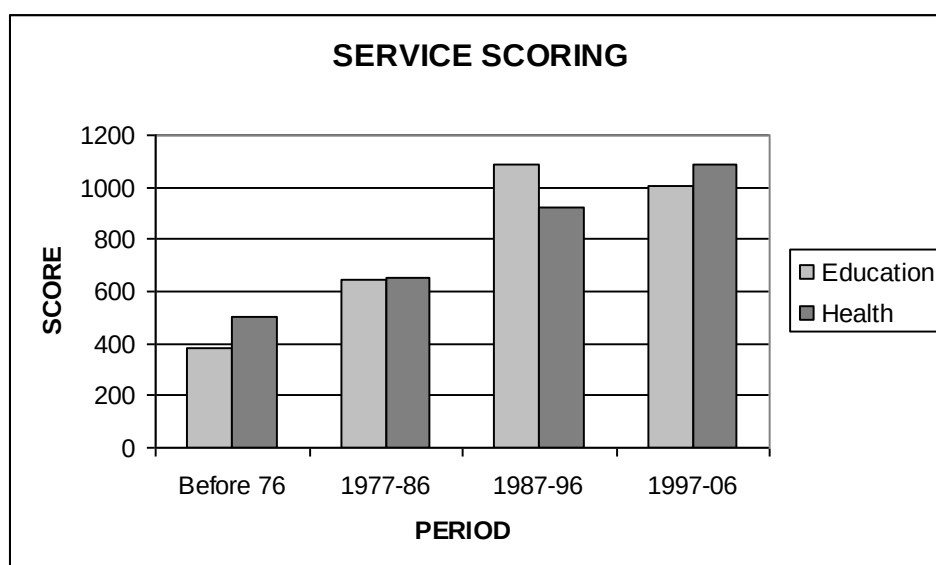


Figure 4-17 Efficiency of Basic Public Services in Liwonde

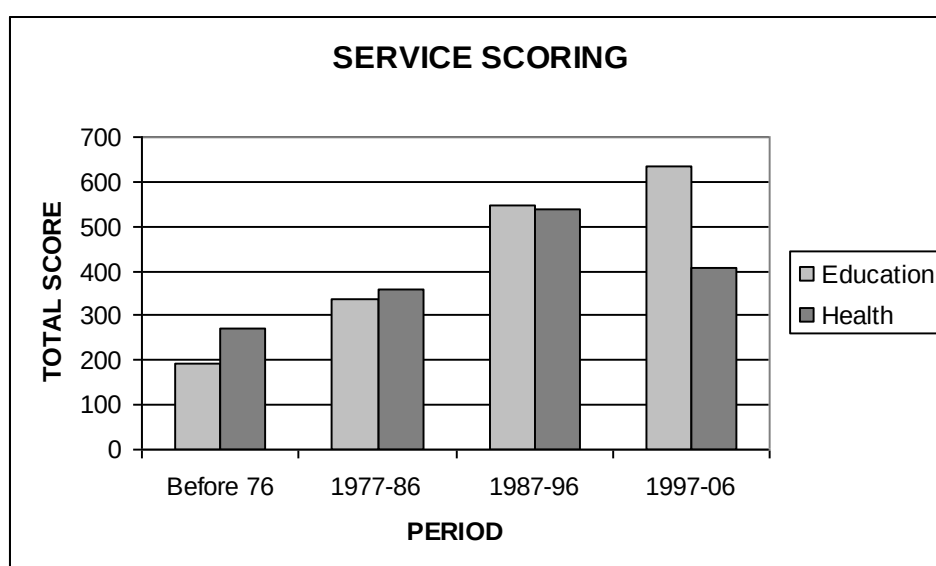


Figure 4-18 Efficiency of Basic Public Services in Luchenza

In Luchenza, TPR and CPR were at 1:60 and 1:76 respectively (see Table 4-5, below). Even though the deviation was above the normal rate, results in Luchenza indicated that respondents had the perception that there had been a substantial improvement in

allocative efficiency of basic public education between 1976 and 2006. Respondents argued that the presence of two government primary schools, Lomola and Mendulo, less than 2km outside the *de facto* township boundary, and two private schools, Enoch Junior Academy and Hacabel, helped to reduce pressure on government owned primary schools.

Table 4-5 Teacher/Classroom Pupil Ratio

INDICATOR	RECOMMENDED	MACHINGA		THYOLO	
		District	Liwonde	District	Luchenza
TPR	50	1:80	1:79	1:86	1:60
CPR	50	1:122	1:125	1:140	1:76

The study therefore, concluded that basic public education services were efficient between 1976 and 1996, but the efficiency level dropped between 1997 and 2006.

4.5.2 Health Services

Refer to Figures 4-18 and 4-19, above. Respondents in Liwonde had the perception that allocative efficiency of basic public health services between 1976 and 2006, improved. Machinga district hospital, a secondary hospital, is located at Liwonde growth centre. Hospitals in Malawi are categorised as follows: (1) tertiary hospitals at national level, located at national centres—Queen Elizabeth Central Hospital in Blantyre, Zomba General Hospital in Zomba, Kamuzu Central Hospital in Lilongwe and Mzuzu Central Hospital in Mzuzu; (2) secondary hospitals located at subnational level, such as Machinga Hospital in Liwonde; and (3) primary hospitals located in rural service centres (Prion, 1987). This accorded well with growth centre planning that requires secondary order goods and services to be allocated in secondary or subnational centres, such as Liwonde. The hospital, rehabilitated in 1996, has a total bed capacity of 230. Even though it has a bed-population ratio of 1:990, the presence of 12 health centres, 9 dispensaries and 14 health posts providing basic primary and curative health services reduces congestion at the district hospital and acts as a health link to clients, offering efficient interventions. The presence of ambulatory services linking primary, secondary and tertiary health facilities, also contributes to the efficiency of the health services.

Results in Luchenza indicated that respondents had the perception that basic public health services improved between 1976 and 1996, but dropped between 1997 and 2006.

Luchenza, though a secondary centre, has a dispensary instead of a secondary hospital. The results showed that there is under-allocation of health services to the centre and this results in allocative inefficiency, particularly when the population of the centre has grown beyond the recommended 5,000. According to government policy, a dispensary is meant to cater for a population of about 5,000 drawn within a catchment area of 5 km radius (GoM, 2003). There is, therefore, more pressure on the health service, which compromises allocative efficiency.

The study concluded that growth centre planning, which requires the hierarchical allocation of secondary goods and services in secondary centres, improved allocative efficiency of basic public health services in Liwonde. A failure to adhere to growth centre planning, on the other hand, led to allocative inefficiency of basic public health services in Luchenza.

4.5.3 Housing Services Characteristics

Results show that the majority of rich urban households in growth centres lived in semi-permanent dwellings, most of which were built between 1997 and 2006 by in-migrants. Most of these houses were located in PHAs developed by the Department of Physical Planning and Malawi Housing Cooperation. These settlements were characterized, among other things, by planned houses, good sanitary conditions, presence of essential services (power, running water, and garbage collection), and legal status as residential dwellings. Public services and infrastructure such as piped water and residential access roads were also available. Most houses were of good standard, with household facilities such as kitchen and flushing toilets. Houses were safe from the prevalence of pathogens because of the availability of basic infrastructure and services such as sewers, drains, or services to collect solid and liquid wastes and safely dispose of them.

Results also reveal that the majority of the poor urban population in growth centres lived in mainly traditional dwellings in UTHAs. Owing to the many housing problems, Liwonde and Luchenza Town assemblies, with help from Habitat for Humanity and SCDP, embarked on a project to up-grade UHAs to UTHAs. In UTHAs, the Assembly is responsible for the surveying, demarcation and allocation of plots, and the provision of essential services such as water (see Figure 4-20, below), electricity, markets and roads. The community, however, is responsible for the management of such services.



Figure 4-20 Water Pipe in Liwonde after Improvement by SCDP

Source: Courtesy of SNDP

Furthermore, results reveal that the majority of the ultra-poor urban population lived in UHAs, most of which start as illegal settlements. These settlements were characterized, among other things, by poorly constructed houses, poor sanitary conditions, lack of public services and infrastructure, such as piped water and residential access roads, and lack of legal status as residential dwellings. Most houses have the lowest level of household facilities (see Figure 4-21, below). Houses suffer from the prevalence of pathogens, because of the lack of basic infrastructure and services, such as sewers, drains or services to collect solid and liquid wastes and safely dispose of them. These pathogens are a cause of many debilitating and endemic diseases that afflict poor households.



Figure 4-21 Example of Unprotected Well Common in UHA in Both Centres

Source: Courtesy of WaterAid

In terms of the number of types of household dwellings, descriptive analysis showed that in Liwonde, 13.8% were permanent, 60% semi-permanent, and 26% traditional. In Luchenza, 10% dwellings were permanent, 46% semi-permanent, and 44% traditional. In order to answer the research question, ‘Is there any statistically significant difference in housing services in Liwonde and Luchenza centres between 1976 and 2006 as analysed using analysis of variance (ANOVA)?’ hypotheses were developed as follows:

- H₀: There is no difference in types of household dwellings over the years.
- H₁: There is a difference in types of household dwellings over the years.

Results showed a significant difference in both Liwonde (ANOVA: $F(2, 317)=8.9$, $p=0.001$) and Luchenza (ANOVA: $F(2, 177)=4.4$, $p=0.01$). Furthermore, the results of the post-hoc test (using Tukey HSD) showed that in Liwonde, the number of traditional dwellings was significantly higher than permanent ($M=3.15$; $SD=1.0$; $p=0.049$) and semi-permanent ($M=3.12$; $SD=0.95$; $p=0.01$) dwellings. In Luchenza, the number of traditional dwellings was likewise significantly higher than permanent ($M=3.11$; $SD=1.1$; $p=0.04$,

and semi-permanent ($M=3.30$; $SD=0.89$; $p=0.32$) dwellings. In both centres, however, there was no statistically significant difference between the number of semi-permanent and permanent dwellings. (See Tables 17-20 in Appendix A.)

The construction of dwelling units in these centres was mainly regarded as a basic need and source of income. A substantial demand for rental accommodation by mixed-income growth centre residents stimulated the increase of semi-permanent dwelling units. As a result, landlords invested in low-income semi-permanent shelters. The economic implication of semi-permanent dwelling units, which tend to rely more on local materials or skills and generate a lot more jobs per unit of investment, was a high locational rent. In the case of infrastructure, too, it pays off for the local economy and the urban poor when labour-intensive rather than capital-intensive construction methods are selected. An integrated approach to increasing supply of household dwelling units in growth centres would, therefore, be the promotion of semi-permanent houses.

4.5.3.1 Source of dwellings-related services

Furthermore, was conducted using SPSS as a tool to determine whether there was a statistically significant correlation between types of household dwellings and the related services.

Comparing Figures 4-20 and 4-21, observations showed that there has been a substantial improvement in sources of drinking water owing to improvement by the SCDP, in some areas. The parametric Pearson Product-moment correlation coefficient (r) test showed that type of household dwelling units and main sources of drinking water were significantly correlated in Liwonde ($r=0.644$; $p<0.001$), and Luchenza ($r=0.659$; $p<0.001$) (see Tables 21 and 22 in Appendix A). These results implied that an improvement of traditional dwellings to either semi-permanent or permanent dwellings brought an improvement in sources of drinking water.

Type of household dwelling units and lighting fuel were also significantly correlated in Liwonde ($r=0.733$; $p<0.001$) and Luchenza ($r=0.712$; $p<0.001$) (see Tables 21 and 22 in Appendix A). It was therefore deduced that an improvement of traditional dwellings to either semi-permanent or permanent dwellings brought concomitant improvement in sources of lighting fuel. Furthermore, types of household dwelling and sources of cooking

fuel were significantly correlated in both Liwonde ($r=0.318$; $p<0.001$) and Luchenza ($r=0.385$; $p<0.001$) (see Tables 21 and 22 in Appendix A).

The implication of these results is that an improvement of traditional dwellings to either semi-permanent or permanent dwellings brought a number of improvements, in sources of drinking water, lighting and cooking fuel. An appropriate way to improve the quality and quantity of housing services in growth centre planning would, therefore, be the promotion of semi-permanent housing. The benefits include social interaction between people of different economic and locational circumstances. The interaction can reduce the culture of poverty that pervades unplanned traditional housing areas. It can also provide access to quality housing-related services such as water and electricity. This implies that semi-permanent housing must offer amenities and a quality of living that is competitive with what is found elsewhere, and that offers close proximity and easy access to the employment and shopping that both urban and rural residents need. The design quality must therefore be high enough to attract and absorb migrants.

4.6 Chapter Summary

First, the study investigated the perceptions of people in Liwonde and Luchenza growth centres. At the $p<0.05$ level, quantitative results were found to be statistically significant. For example, there was a strong correlation between conceived and perceived spatial development role of Liwonde ($\rho=0.97$; $p=0.001$) and Luchenza ($\rho=0.93$; $p=0.001$) growth centres. Furthermore, there was strong correlation between conceived and perceived characteristics of Liwonde and Luchenza. Finally, people from both Liwonde ($\rho=0.95$; $p=0.001$) and Luchenza ($\rho=0.93$; $p=0.001$) agreed with the Government agenda to designate more growth centres, in order to reduce regional imbalances and stimulate regional development.

Second, the study examined the relationship between growth centres and migration. The results were found to be statistically significant in Liwonde ($X^2=90.313$; $p=0.001$) and Luchenza ($X^2=47.022$; $p=0.001$). These findings imply that Liwonde and Luchenza growth centres attracted significant numbers of migrants.

Furthermore, the study assessed rural-urban linkages between growth centres and their sphere of influence. Grounded theory analysis showed a substantial improvement in rural-

urban linkages: physical and transport, economic, market and social linkages in both centres. However, results showed a decline in railway linkages.

Finally, the study described the relationship between growth centre strategy and allocative efficiency of education, health and housing services. In terms of services, results revealed a significant difference between the number of traditional and semi-permanent household dwellings in both Liwonde (ANOVA; $F(2, 317) = 8.9, p=0.001$) and Luchenza (ANOVA; $F(2, 177) = 4.4, p=0.01$). Results also showed allocative efficiency of health services in Liwonde and basic education services in Luchenza; and allocative inefficiency of basic education services in Liwonde and public health services in Luchenza.

These findings exhibited significant evidence that growth centre theory provides a sound basis for regional development in Malawi.

CHAPTER FIVE: CONCLUSION AND STUDY IMPLICATIONS

This chapter summarises main findings and their implications. It also suggests areas for further research.

5.1 Conclusion

With regard to the perception of growth centres, the study found that there was a significant positive relationship between conceived and perceived role of Liwonde and Luchenza growth centres that they bring about spatial development. People had the view that these centres provide secondary order goods and services, both public (health care, education, government services) and private (trade, transport, personal services), to both urban and rural residents. They also provide access to markets for produce, inputs and consumer goods and to employment and investment opportunities. Furthermore, they attract temporary and permanent migrants from the rural and major urban areas. Under favourable economic conditions, these roles have the potential of regional development.

On the characteristics of growth centres, it was found that Liwonde and Luchenza centres exhibited the following major growth centre characteristics: (1) they reflected both residential and non-residential use; (2) they reflected both traditional and urban dwellings; (3) they contained central places and focal points; (4) they supported transit use; (5) they contained population densities higher than in surrounding areas, designed to accommodate population growth in the next 20 years; and (6) they contained public places that promoted social interaction. This is an indication that the two centres conformed to major characteristics of growth centre strategy.

Furthermore, it was found that there were growth centre plan interests among respondents. Most people (>85%) shared the Government's urban agenda to designate more growth centres to intercept migration to major urban centres, and to provide centres for goods, services and employment. The appropriate strategy to stimulate regional development that reflects expectations of the people would be growth centre strategy. To stimulate regional development through growth centres, however, there is need to ensure sustained growth of the growth centres themselves, as well as generating growth in both town and hinterland economies.

Regarding the proposition that growth centres attract and absorb migrants from surrounding rural areas instead of them moving to larger towns and cities, it was found that Liwonde and Luchenza had significant numbers of in-migrants. In addition, the number of people who did not intend to move out of Liwonde and Luchenza was found to be statistically significant. Moreover, results showed that, in both Liwonde and Luchenza, about one-third came from rural areas of the district, about one-fifth from rural areas of other districts, and about one-tenth from urban centres of the district. The conjecture that growth centres attract more migrants from the surrounding rural areas was therefore found to be correct.

With regard to the proposition that growth centres accelerate rural-urban linkages through a network of a well-articulated hierarchy of roads, the study found that there was a significant interlace between main, secondary and tertiary roads within Liwonde and Luchenza. Beyond Liwonde and Luchenza centres, however, the roads were of poor quality. In terms of economic linkages, results showed that there were mutual economic linkages between the centre and the periphery. Some farming households surrounding the centres depended on urban demand in these centres for part of their livelihood. Liwonde and Luchenza growth centres act as markets for agricultural produce, both because of the demand generated by their own population and, more importantly, because they often function as nodes in a wider marketing network, channelling demand from outside the region. On the other hand, rural farmers bought manufactured products from retail and wholesale shops located at the centre. Liwonde and Luchenza, therefore, played a crucial role in collecting and channelling produce from their hinterlands, and distributing goods and services to its residents and periphery. The orthodoxy of a discrete and dichotomous approach to urban development as distinct from rural development at subnational level no longer accords with reality, considering the complementary functions and flows of people, capital, goods and services, employment, information and technology between the two areas.

Finally, as regards the proposition that growth centres accelerate allocative efficiency of services by efficiently allocating secondary goods and services to secondary centres, results confirmed the proposition. In Liwonde, where a secondary order hospital was allocated to a secondary centre, results revealed that there was allocative efficiency. In Luchenza, on the other hand, results showed inefficiency in health services because the

centre was allocated only a dispensary, meant for rural centres. Analysis of education services showed that basic education was efficient in Luchenza but inefficient in Liwonde. In terms of housing services, results revealed a significant difference in types of household dwellings over the years in both Liwonde and Luchenza. Furthermore, there was a significant correlation between the type of household dwelling unit and sources of drinking water, lighting fuel and cooking fuel.

Given the empirical results above, the null hypothesis that ‘growth centre strategy does not lead to regional development in Malawi’ was therefore rejected. Growth centre strategy indeed leads to regional development in Malawi. In light of this, the study supported growth centre theory as a basis for regional development planning in Malawi. It is evident from the above discussion, however, that the application of growth centre strategy as a basis for regional development planning in Malawi is likely to be relevant where there is already a decentralised concentration of population and where it reinforces growth patterns that are already evident. An example could be where there is an emerging assembly market, agglomeration of economies, or strong transport trends, such as a growth axis caused by an improved inter-regional road system, which may encourage migration or settlement.

The study did not, however, collect data on income distribution and innovation diffusion. Thus, the growth centre proposition that it accelerates income distribution and diffusion of innovations was not analysed. The study, therefore, proposes further research on these propositions. The study, having concentrated on *de jure* boundaries of Liwonde and Luchenza secondary centres, proposes further research on rural-urban linkages between both *de jure* and *de facto* boundaries of the planning region.

5.2 Study Implications

The significance of this study is here related to policy implications in line with findings. A significant positive relationship between conceived and perceived role of growth centres, that they bring about spatial development, implies that the appropriate spatial strategy to stimulate regional development that reflects expectations of the people is to develop a well-articulated, integrated and balanced urban hierarchy. Chisholm (1975) argued that ‘regions do not exist as objective realities independent of the observer but are mental constructs that vary both with the person concerned and the purpose for which

they want to identify regions'. The policy implications include need for an integrated development plan of action to pursue growth centre planning. There will, furthermore, be a need for a multi-disciplinary study to identify potential growth areas like Liwonde and Luchenza, other than of need such as Makanjira and Mbalachanda, for the designation of growth centres.

In addition, having found that growth centres attract and absorb significant numbers of migrants, particularly to economic opportunities in urban centres, an appropriate strategy to intercept migration to large urban centres would be a relative balance between rural and urban economic opportunities through the spread of intermediate industries and the reorientation of economic activities and social investments towards raising incomes in growth centres. Spatial policy considerations may, therefore, include strengthening the capacity of growth centres to enable them to absorb excess in-migrants and to better manage urban development. This may include addressing problems of growth centre unemployment rates, pressure on growth centre infrastructure and services and the designation of more growth centres to encourage settlements and other functions in secondary centres. Here, instead of merely marketing agricultural produce, the processing of these at subnational level might offer a greater potential for adding value. Potential Small and Medium Enterprises (SME) in these centres would contribute not only towards improving the local economy by providing marketing avenues and innovations for rural products, but also towards providing additional off-farm employment opportunities for the local people.

Furthermore, having found that there is a relatively significant allocative efficiency of social and economic services in Liwonde and Luchenza, growth centres are an appropriate central place for the location of secondary order services and goods as they take a whole hierarchy of central places with the hinterland as the focus, because the Ministry of Local Government and Rural Development cannot provide all services and development programmes for all settlements 'like butter on bread', due to scarcity of resources.

Moreover, having found that growth centres located on road axes and along railways, have better rural-urban linkages, and that rural and urban areas are economically and socially interdependent, the old orthodoxy of a discrete and dichotomous approach to

urban development as distinct from rural development no longer accords with reality, considering the complementary functions and flows of people, capital, goods and services, employment, information and technology between the two areas. Policy considerations may, therefore, include the promotion of rural-urban linkages by developing and strengthening a system of economic, physical and social networks.

The study also found that there was a statistically significant difference in the number of semi-permanent dwelling units and related services in Liwonde and Luchenza centres. The results implied that an integrated approach to increasing supply of household dwelling units in growth centres would be the promotion of semi-permanent houses. The results also implied that an improvement of traditional dwellings to either semi-permanent or permanent dwellings leads to an improvement in sources of related services such as drinking water, lighting and cooking fuel. Policy considerations, therefore, would be the promotion of semi-permanent dwelling units and related services. Thus, most of the intermediate/secondary order services needed to meet regional development goals should be located in growth centres to efficiently serve their populations and the rural populations around them. This network of small, medium-sized and larger urban centres may be described as locationally efficient if it allows clusters of services, facilities and infrastructure that cannot be economically located in rural centres.

Finally, given this study's use of only two cases, there is not yet sufficient empirical evidence to generalise the findings to un-surveyed centres in Malawi. It is important to undertake further research in the other secondary centres.

5.3 Chapter and Thesis Summary

The study tested the hypothesis that growth centre strategy contributed to significant regional development in Malawi, using the cases of Liwonde and Luchenza growth centres from 1976 to 2006. The Government of Malawi adopted *prima facie* the growth centre strategy in order to stimulate regional development. There was, however, need to confirm or reject the theory prior to the implementation of the strategy.

Data collection methods were basically observational. Methods included a survey of 500 systematically sampled household heads using a face-to-face interview questionnaire, five conveniently-sampled focus groups, observations using a growth centre checklist,

key informants and desk research. Data analysis methods were basically confirmatory testing at the $p < 0.05$ alpha level of significance. Quantitative data analysis techniques included correlations, Chi-squares, and Analysis of Variance using SPSS, Excel and Moonstat software tools. Qualitative data analysis involved grounded growth centre theory.

At the $p < 0.05$ level, perception was found to be significantly correlated to conception of growth centres. Respondents from both centres shared the governments' agenda to designate more growth centres. With regard to migration, it was found that Liwonde and Luchenza had attracted and absorbed significant numbers of migrants. In terms of efficient allocative service, results showed a significant improvement of household dwellings in both centres. There was also a significant improvement in rural-urban linkages in both centres, but a decline in railway linkages. Furthermore, results showed allocative efficiency of health services in Liwonde and basic education services in Luchenza. By contrast, there was allocative inefficiency of basic public education services in Liwonde and public health services in Luchenza.

These findings exhibit significant evidence that growth centre theory forms a sound basis for regional development in Malawi. Given the case study approach undertaken in this study, and the small number of secondary centres investigated, however, there is not yet sufficient empirical evidence to generalise the findings to un-surveyed centres in Malawi. There is, therefore, need for further research in the other secondary centres.

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APPENDIX A—Statistical Outputs

Table 1 Chi-Square for Sex and Education Attainment in Liwonde

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.793 ^b	1	.029		
Continuity Correction ^a	4.059	1	.044		
Likelihood Ratio	5.027	1	.025		
Fisher's Exact Test				.035	.020
Linear-by-Linear Association	4.778	1	.029		
N of Valid Cases	320				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.27.

Table 2 Chi-Square for Sex and Education Attainment in Luchenza

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.193 ^b	1	.023		
Continuity Correction ^a	4.231	1	.040		
Likelihood Ratio	5.592	1	.018		
Fisher's Exact Test				.026	.018
Linear-by-Linear Association	5.164	1	.023		
N of Valid Cases	180				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.13.

Table 3 Chi-Square for Sex and Economic Activity in Liwonde

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.946 ^b	1	.008		
Continuity Correction ^a	6.318	1	.012		
Likelihood Ratio	7.075	1	.008		
Fisher's Exact Test				.010	.006
Linear-by-Linear Association	6.924	1	.009		
N of Valid Cases	320				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 42.81.

Table 4 Chi-Square for Sex and Economic Activity in Luchenza

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.639 ^b	1	.031		
Continuity Correction ^a	3.978	1	.046		
Likelihood Ratio	4.727	1	.030		
Fisher's Exact Test				.038	.022
Linear-by-Linear Association	4.613	1	.032		
N of Valid Cases	180				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.76.

Table 5 Spearman Correlation for Education and Economic Activity in Luchenza

			Have you ever attended school?	Economic active
Spearman's rho	Have you ever attended school?	Correlation Coefficient	1.000	.336**
		Sig. (2-tailed)	.	.000
		N	320	320
	Category of employment	Correlation Coefficient	.336**	1.000
		Sig. (2-tailed)	.000	.
		N	320	320

** . Correlation is significant at the .01 level (2-tailed).

Table 6 Spearman Correlation for Education and Economic Activity in Luchenza

			Have you ever attended school?	Economic active
Spearman's rho	Have you ever attended school?	Correlation Coefficient	1.000	.203**
		Sig. (2-tailed)	.	.006
		N	180	180
	Category of employment	Correlation Coefficient	.203**	1.000
		Sig. (2-tailed)	.006	.
		N	180	180

** . Correlation is significant at the .01 level (2-tailed).

Table 7 Descriptive Analysis of Growth Centre Perception in Liwonde in %

	What is your perception of the growth centres?	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
1	Growth centres bring about development	71.3	13.1	9.7	5.6	0.9
2	Reflect both residential and non-residential uses	72.8	15.6	8.1	3.4	0
3	Reflect both traditional villages and urban areas.	70.0	21.3	5.9	2.5	0.3
4	Contain central places and focal points (railway station, bus depot)	72.5	18.8	7.5	1.3	0
5	Contain population densities higher than in surrounding areas.	69.7	24.7	5.0	0.6	0
6	Designed to accommodate population in the coming 20 years.	64.7	23.8	7.5	3.8	0.3
7	Contain public places that promote social interaction	60.9	20	10.9	6.3	1.9
8	Suitable for both pedestrian and non-vehicular travel	71.6	20.0	7.8	0.6	0
9	Support transit use	71.9	18.4	7.8	1.9	0
10	Government should designate more growth centres	73.8	14.1	8.4	3.1	0.6

Table 8 Descriptive Analysis of Growth Centre Perception in Luchenza in %

	What is your perception of the growth centres?	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
1	Growth centres bring about development	71.7	18.3	5.6	3.9	0.6
2	Reflect both residential and non-residential uses	65.6	21.7	8.3	2.8	1.7
3	Reflect both traditional villages and urban areas.	64.4	25.6	7.2	2.2	0.6
4	Contain central places and focal points (railway station, bus depot)	71.1	19.4	6.1	2.8	0
5	Contain population densities higher than in surrounding areas.	70.0	30.0	0	0	0
6	Designed to accommodate population in the coming 20 years.	51.1	29.4	14.4	3.9	1.1
7	Contain public places that promote social interaction	41.1	27.2	17.8	13.9	0
8	Suitable for both pedestrian and non-vehicular travel	63.9	21.7	7.8	5.6	1.1
9	Support transit use	66.1	17.2	8.9	5.6	2.2
10	Government should designate more growth centres	72.2	19.4	6.1	1.7	0.6

Table 9 Chi-Square for Migration in Liwonde

	Have you always lived in this centre?
Chi-Square ^a	90.313
df	1
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 160.0.

Table 10 Chi-Square for Migration in Luchenza

	Have you always lived in this centre?
Chi-Square ^a	47.022
df	1
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 90.0.

Table 11 Intention Not to Out-migrate: Chi-Square Analysis for Liwonde

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.291 ^b	1	.021		
Continuity Correction ^a	4.610	1	.032		
Likelihood Ratio	5.742	1	.017		
Fisher's Exact Test				.022	.013
Linear-by-Linear Association	5.274	1	.022		
N of Valid Cases	320				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.52.

Table 12 Intention not to Out-migrate Chi-Square Analysis for Luchenza

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.776 ^b	1	.029		
Continuity Correction ^a	3.976	1	.046		
Likelihood Ratio	5.191	1	.023		
Fisher's Exact Test				.035	.020
Linear-by-Linear Association	4.749	1	.029		
N of Valid Cases	180				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.71.

Table 13 Functional Market Facilities at Liwonde Growth Centre

Centre/ Activity	Chinguni	Mapuloti/MHC	Town Centre			Road block	Chidzanja	Mawira Low density	Total
			Town	Central Market	Bus Station				
Wholesale	0	0	4	1	0	2	1	0	8
Retail	6	12	19	105	4	63	44	3	256
Chibuku Tavern	0	3	1	0	0	2	1	0	6
Bottle/Bar	0	0	5	0	0	3	4	1	13
Video shows	0	2	3	0	0	2	2	0	9
Butchery	0	0	0	4	0	1	1	0	6
Produce Market	0	1	1	1	0	1	1	0	5
Curio Market	0	0	0	0	0	0	1	0	1
Tea room	0	2	0	5	0	0	2	0	9
Restaurant	0	2	7	19	5	8	15	0	56
Fuel filling station	0	0	1	0	0	0	1	0	2
Bank	0	0	1	0	1	1	1	0	4

Table 14 Functional Market Facilities at Luchenza Growth Centre

Centre/ Activity	Chonde	Lolo UTHA	Town Centre			Chiromo UTHA	Kanthawire Low density	Total
			Town	Central Market	Bus Station			
Wholesale	0	0	6	1	0	0	0	7
Retail	4	15	23	65	7	4	3	106
Chibuku Tavern	1	1	2	0	0	0	0	4
Bottle/Bar	1	0	5	0	0	0	0	6
Video shows	2	1	5	2	1	1	0	9
Butchery	1	0	3	4	0	0	0	8
Produce Market	1	1	1	1	1	1	1	6
Curio Market	0	0	1	0	0	0	0	1
Tea room	3	2	0	6	3	2	0	15
Restaurant	2	0	5	7	3	1	0	18
Fuel filling station	0	0	0	0	1	0	0	2
Bank	0	0	0	0	1	0	0	1

Table 15 FGD Results in Liwonde Growth Centre

District	Rural centre	Products from the periphery		
		Rank 1	Rank 2	Rank 3
Machinga	Chilwa	Rice	Fish	Vegetables
	Nsanama	Maize	Beans	Sweet potatoes
	Chingale	Sweet potatoes	Cassava	Vegetables
Balaka	Ulongwe	Tomato	Vegatables	Goats
	Phalura	Citrus fruits	Cassava	Maize
	Utale	Cassava	Maize	Goats
Ntcheu	Tsangano	Irish potatoes	Cabbage	Onions
	Njolomole	Irish potatoes	Beans	Tomato
	Bilira	Tomato	Cabbage	Irish potatoes

Table 16 FDG Results in Luchenza Growth Centre

District	Rural centre	Products from the periphery		
		Rank 1	Rank 2	Rank 3
Thyolo	Khonjeni	Maize	Sweet potatoes	Beans
	Thekerani	Bananas	Sweet potatoes	Cassava
	Sandama	Sorghum	Maize	Beans
Mulanje	Nkando	Citrus fruits	Tomato	Vegetables
	Njete	Pigeon peas	Beans	Cassava
	Muloza	Maize	Pigeon peas	Beans
Chiradzulo	Nkalo	Cassava	Goats	Vegetables
	Chimaliro	Cassava	Tomato	Goats
	Walakani	Maize	Vegetables	Tomato

Table 17 ANOVA for Types of Household Dwellings in Liwonde

When was the dwelling built?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.761	2	6.881	8.898	.000
Within Groups	245.126	317	.773		
Total	258.887	319			

Table 18 Post-hoc test for Types of Household Dwellings in Liwonde

Dependent Variable: When was the dwelling built?

Tukey HSD

(I) Type of construction material	(J) Type of construction material	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Permanent	Semi-permanent	.03	.166	.981	-.36	.42
	Traditional	-.42*	.176	.049	-.83	.00
Semi-permanent	Permanent	-.03	.166	.981	-.42	.36
	Traditional	-.45*	.108	.000	-.70	-.19
Traditional	Permanent	.42*	.176	.049	.00	.83
	Semi-permanent	.45*	.108	.000	.19	.70

*. The mean difference is significant at the .05 level.

Table 19 ANOVA for Types of Household Dwellings in Luchenza

When was the dwelling built

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.112	2	3.056	4.356	.014
Within Groups	124.199	177	.702		
Total	130.311	179			

Table 20 Post-hoc test for types of household dwellings Luchenza

Dependent Variable: When was the dwelling built
Tukey HSD

(I) Type of construction material	(J) Type of construction material	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Permanent	Semi-permanent	-.19	.208	.626	-.68	.30
	Traditional	-.55*	.226	.040	-1.09	-.02
Semi-permanent	Permanent	.19	.208	.626	-.30	.68
	Traditional	-.36*	.143	.032	-.70	-.03
Traditional	Permanent	.55*	.226	.040	.02	1.09
	Semi-permanent	.36*	.143	.032	.03	.70

*. The mean difference is significant at the .05 level.

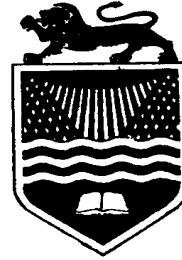
Table 21 Correlation for Household Dwellings and Related Services in Liwonde

		Type of construction material	Main source of drinking water	Main source of lighting fuel	Main source of cooking fuel
Type of construction material	Pearson Correlation	1	.644	.733	.318
	Sig. (2-tailed)	.	.000	.000	.000
	N	320	320	320	320

Table 22 Correlation for Household Dwellings and Related Services in Luchenza

		Type of construction material	Main source of drinking water	Main source of lighting fuel	Main source of cooking fuel
Type of construction material	Pearson Correlation	1	.659	.712	.385
	Sig. (2-tailed)	.	.000	.000	.000
	N	180	180	180	180

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QUESTIONNAIRE
NUMBER

UNIVERSITY OF MALAWI

GROWTH CENTRE STUDY, 2006

THIS STUDY IS BEING CONDUCTED BY JIMMY GONDWE AS A FULFILLMENT OF THE MASTER OF SCIENCE DEGREE IN GEOGRAPHY
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**GROWTH CENTRE PERCEPTION, RURAL–URBAN LINKAGES, MIGRATION, SERVICE PROVISION AND EMPLOYMENT
QUESTIONNAIRE**

MODULE B: PERCEPTION OF GROWTH CENTRES						
Question 1. In your opinion, what is your perception of the growth center? ¹ (Tick in the appropriate box)						
		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
	ITEM	5	4	3	2	1
B01	Growth centers bring about development					
B02	A mixture that reflect both residential and non-residential uses					
B03	A mixture that reflect both traditional villages and urban areas.					
B04	Contains central places and focal points (railway station, bus depot etc.)					
B05	Contains population densities higher than in surrounding areas					
B06	Designed to accommodate the town's population growth in the coming 20 years					
B07	Contains public places that promote social interaction					
B08	Suitable for both pedestrian and non-vehicular travel.					
B09	Supports transit use					
B10	Should government designate more growth centres or not?					

¹ Modified question adopted from Munson, M.J., Implementing Growth Centres in Vermont: A View from the Town, Survey on Growth Centres, Paper prepared for the Vermont Planners, 2006.

APPENDIX B—Household Questionnaire

B11	Give reasons for your answer in B12 above CONVEY THE FOLLOWING INFORMATION TO THE RESPONDENT TO BE INTERVIEWED					
TABLE OF CONTENTS						
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This year, the Department of Geography and Earth Sciences, Chancellor college, University of Malawi, has selected 320 and 180 respondents in Liwonde and Luchenza Growth Centers respectively to ask them questions about how these centres influence Regional Development in their areas. The responses to the questions are intended for testing ‘Growth Centre Theory as the basis of Regional Development Planning in Malawi’. You were selected as one of these respondents to which the questionnaire will be administered. You were not selected for any other specific reason. Simply your household was chosen using systematic sampling methods in which every 10th house after the first is chosen.

I would like to ask the questions in this form to you as head of the household or spouse of the head. I will also need to ask questions to other members of your household. These questions will take over an hour to complete. All your responses will be held in confidence. The responses, which you and the members of your household might give me, will only be used by the University of Malawi, or under its supervision. Before I start, do you have any questions or is there anything which I have said on which you would like any further clarification? May I proceed with interviewing you and members of your household?

MODULE A: RESPONDENTS AND INTERVIEW DETAILS

A01.	House hold ID		A05.	District	
A02.	Sex of house hold head		A06.	Enumeration area/centre	
A03.	Age of house hold head		A07.	Date of interview	
A04.	House hold head marital status		A08.	Date of data entry	

MODULE I: MIGRATION																				
Question 4. Since the growth centre was designated, what has been the status of migration?																				
I01		I02		I03		I04		I05		I06		I07		I08		I09		I10		
Have you always lived in this centre?		Where were you born?		Where did you live before you came here?		When did you come to stay here?		How old were you when you came here?		Why did you mainly move?		Are you intending to move?		If yes, when are you moving?		Where are you mainly intending to go?		Why are you intending to go there?		
Yes	1	This urban centre	1	This urban centre	1	Before 76	1	0-4	1	Parents moved	1	Yes	1	Quite many	1	Rural area of this urban centre	1	Parents moved	1	
No	2	Rural area of this urban centre	2	Rural area of this urban centre	2	1977 – 86	2	5-9	2	To live with relatives	2	No	2	Many	2	Other urban centre of this district	2	To live with relatives	2	
		Other urban center in this district	3	Other urban center in this district	3	97- 2006	4	15-19	4	Education	3		Satisfactory			Rural area of this district	3	Education	3	
						Don't know	5	20-24	5											
		Rural area of this district	4	Rural area of this district	4			25-29	6	Marriage	4		Few				Other urban centre in another district	4	Marriage	4
								30-34	7											
		Other urban center of another district	5	Other urban center of another district	5			35-39	8	Divorce	5		Quite few				Rural area of another district	5	Divorce	5
								40-44	9											
		Rural area of another district	6	Rural area of another district	6			45-45	10	Return from work	6						Major urban centre	6	Return from work	6
								50-54	11											
		Major urban	7	Major urban	7			55-59	12	Job transfer	7								Job	7

	centre	centre		60-64	13						transfer	
	Specify place	Specify place		65-69	14	Job seeking	8				Job seeking	8
				70-74	15	Start job/business	9				Start job/business	9
				75+	16	Looking for farm land	10				Looking for farm land	10

MODULE C: RURAL URBAN LINKAGES										
Question 2. Since the growth centre was designated, how would you assess the following elements of rural-urban linkages?										
C01	C02	C03	C04	C05	C06	C07	C08	C19	C10	
Postal communication linkages (letters)	Public transport linkages	Private Transport linkages	Physical linkages (Interlace between primary, secondary and tertiary roads and railway station)	Diffusion of agricultural technology	Production linkages	Forward economic linkages (export outlets)	Backward economic linkages (import outlets)	Market linkages for produce goods	Market linkages for consumer goods	
CODE	Greatly improved 5			Improved 4		Constant 3		Deteriorated 4		Greatly deteriorated 1
Before 1976										
1977 – 1986										
1987 – 1996										

1997 – 2006									
In each case (C01 – C10), ask respondents to describe the change.									
C01	C02	C03	C04	C05	C06	C07	C08	C09	C10

MODULE C: SERVICE PROVISION: EDUCATION									
Question 2. Since the growth centre was designated, how has been the efficiency and access of education service?									
C01	C02	C03	C04	C05	C06	C07	C08	C19	C10
Have you ever attended school?	What is the highest class	How accessible have been public primary schools	How accessible have been private primary schools	How efficient have been public primary school	How efficient have been private primary school	How accessible have been public primary schools	How accessible have been private primary schools	How efficient have been public secondary school	How efficient have been private secondary school
CODE	Greatly improved 5		Improved 4		Constant 3		Deteriorated 4		Greatly deteriorated 1
Before 1976									

1977 – 1986									
1987 – 1996									
1997 – 2006									
In each case (C01 – C10), ask respondents to describe the change.									
C01	C02	C03	C04	C05	C06	C07	C08	C09	C10

MODULE E: SERVICE PROVISION-HEALTH SERVICES									
Question 3 (b). Since the growth centre was designated, how has been the efficiency and access the health services?									
E01	E02	E03	E04	E05	E06	E07	E08	E09	E10

Do you have access to health services?		Where do/did you mainly access health services?		Specify the name.	Classify the place you mainly accessed health services.		How far is/was the place you mainly accesses health services		How long did it take you to get there?		What was the main reason for seeking health services?	How frequently do/did you seek health services?		How efficient are/were these health services?		Describe the impact of health services in your area?	
Yes	1	Central hospital	5		This urban centre	1	Very near Less than 1 km	5	Less than 30 minutes	1		Very high	5	Very high	5	Very high	5
No	2	District hospital	4		Rural area of this urban centre	2	Near 1 – 4 km	4	0.5 – 1.0 hours	2		High	4	High	4	High	4
		Health centre	3		Other urban centre in the district	3	Satisfactory 5 – 9 km	3	1 – 2 hours	3		Constant	3	Constant	3	Constant	3
		Dispensary	2		Rural area of this district	4	Far 10 – 14 km	2	2 – 3 hours	4		Low	2	Low	2	Low	2
		Mobile clinics	1		Urban centre of another district	5	Very far 15 km plus	1	3 – 4 hours	5		Very low	1	Very low	1	Very low	1
					Rural area of another district	6			4 hours plus	5							
				Major urban centre	7												
Before 1976																	
1977 – 1986																	
1987 – 1996																	
1997 – 2006																	
Give reasons for your answer E08 above																	

Give reasons for you answer E09 above
Give reasons for you answer E10 above

MODULE F: SERVICE PROVISION; HOUSING SERVICES															
Question 3 (c) Since the growth centre was designated in, how has been the provision of housing services?															
F01	F02	F03	F04	F05	F06	F07	F08	F09	F10						
Ownership of dwelling (Tick in the box)	How old is the dwelling?	Main source of lighting fuel	Main source of cooking fuel	Main source of drinking water	Types of dwelling the house hold live/d in	Type of construction material used	Outer walls made of what materials?	Roof of made of what materials?	Floor made of what material?						
Self-built	1 Do not know 99	Candles	1 Saw dust	1 Piped into dwelling	1 Single house	1 Permanent	1 Grass	1 Grass	1 Smoothed mud						
Purchased	2	Paraffin	2 Crop residue	2 Piped outside dwelling	2 Semi-detached	2 Semi-permanent	2 Mud	2 Iron sheets	2 Smooth cement						
Employer provides/d	3	Electricity	3 Firewood	3 Communal stand pipe	3 Flat	3 Traditional	3 Compacted earth	3 Clay tiles	3 Wood						
Free	4	Others (specify)	4 Charcoal	4 Communal hand pumped well	4 Room in large dwelling	4 Permanent-built of modern materials such as iron sheets and cement.	Mud bricks	4 Concrete	4 Tile						
Rented	5		Paraffin	5 Protected well	5 Servant quarters	Semi-permanent mixture of	Burnt bricks	5 Plastic sheets	5 Other (specify)						
	Gas		6 Unprotected well	6 Others (Specify)	6 Concrete		6 Others/specify	6							
	Electricity		7 Dam/river/spring	7	Wood		7								

			Others/specify	8	Others (specify)	8		permanent and traditional. Traditional -built of mud and grass	Iron sheets	8		
									Others	9		
Before 1976												
1977 – 1986												
1987 – 1996												
1997 – 2006												
F11. What are the three major problems facing the provision of housing services in this urban centre?												
F12. What should be done to solve the problems mentioned in F11 above?												

MODULE J: EMPLOYMENT AND INCOME														
Question 5. Since the growth centre was designated, how has been your employment status?														
J01	J02	J03	J04	J05	J06	J07	J08	J09	J10					
How do you earn a living?	Describe your main employment industry over the past years	Specify your primary industry activity	How much do you earn from this work per month	Specify your manufacturing industry activity	How much do you earn from this work per month	Specify your tertiary industry activity	How much do you earn from this work per month	Do you have other sources of income?	How much do you earn from this work per month					
	Primary 1	Agriculture 1	Much more 5	Construction 5	Much more 1	Small scale business 7	Much more 1		Much more 1					
	Secondary 2	Forestry 2	More 4	Maintenance/repair 6	More 2	Large scale business 8	More 2		More 2					

	Tertiary	3	Fishing	3	Constant	3	Others (specify)	99	Constant	3	Restaurant	9	Constant	3		Constant	3
			Quarrying/ mining	4	Less	2			Less	4	Transport	10	Less	4		Less	4
			Others (specify)	9 9	Much less	1			Much less	5	Financing, insurance	11	Much less	5		Much less	5
											social services	12					
											Domestic work	13					
											Others (specify)	99					
Before 1976																	
1977 – 1986																	
1987 – 1996																	
1997 – 2006																	

This is the end of the interview. Before we can go, do you have any question or comment?

THANK YOU VERY MUCH

STRICTLY CONFIDENTIAL


**QUESTIONNAIRE
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GROWTH CENTRE PERCEPTION, RURAL–URBAN LINKAGES, MIGRATION, SERVICE PROVISION AND EMPLOYMENT QUESTIONNAIRE

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CONVEY THE FOLLOWING INFORMATION TO THE RESPONDENT TO BE INTERVIEWED

This year, the Department of Geography and Earth Sciences, Chancellor college, University of Malawi, has selected 320 and 180 respondents in Liwonde and Luchenza Growth Centers respectively to ask them questions about how these centres influence Regional Development in their areas. The responses to the questions are intended for analysing ‘Growth Centre Theory as the basis of Regional Development Planning in Malawi’. You were selected as one of these respondents to which the questionnaire will be administered. You were not selected for any other specific reason. Simply your household was chosen using systematic sampling methods in which every 10th house after the first is chosen.

I would like to ask the questions in this form to you as head of the household or spouse of the head. I will also need to ask questions to other members of your household. These questions will take over an hour to complete. All your responses will be held in confidence. The responses, which you and the members of your household might give me, will only be used by the University of Malawi, or under its supervision. Before I start, do you have any questions or is there anything which I have said on which you would like any further clarification? May I proceed with interviewing you and members of your household?

MODULE A: RESPONDENTS AND INTERVIEW DETAILS

A01.	House hold ID		A05.	District	
A02.	Sex of house hold head		A06.	Enumeration area/centre	
A03.	Age of house hold head		A07.	Date of interview	
A04.	House hold head marital status		A08.	Date of data entry	

MODULE B: PERCEPTION OF GROWTH CENTRES						
In your opinion, what is your perception of the growth center? ¹ (Tick in the appropriate box)						
	ITEM	Strongly agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly disagree 1
B01	Growth centers bring about development					
B02	A mixture that reflect both residential and non-residential uses					
B03	A mixture that reflect both traditional villages and urban areas.					
B04	Contains central places and focal points (railway station, bus depot etc.)					
B05	Contains population densities higher than in surrounding areas					
B06	Designed to accommodate the town's population growth in the coming 20 years					
B07	Contains public places that promote social interaction					
B08	Suitable for both pedestrian and non-vehicular travel.					
B09	Supports transit use					
B10	Should government designate more growth centres or not?					
B11	Give reasons for your answer in B12 above					

¹ Modified question adopted from Munson, M.J., Implementing Growth Centres in Vermont: A View from the Town, Survey on Growth Centres, Paper prepared for the Vermont Planners, 2006.

MODULE C: MIGRATION																			
Since the growth centre was designated, what has been the status of migration?																			
C01		C02		C03		C04		C05		C06		C07		C08		C09		C10	
Have you always lived in this centre?		Where were you born?		Where did you live before you came here?		When did you come to stay here?		How old were you when you came here?		Why did you mainly move?		Are you intending to move?		If yes, when are you moving?		Where are you mainly intending to go?		Why are you intending to go there?	
Yes	1	This urban centre	1	This urban centre	1	Before 76	1	0-4	1	Parents moved	1	Yes	1	Quite many	1	Rural area of this urban centre	1	Parents moved	1
No	2	Rural area of this urban centre	2	Rural area of this urban centre	2	1977 – 86	2	5-9	2	To live with relatives	2	No	2	Many	2	Other urban centre of this district	2	To live with relatives	2
		Other urban center in this district	3	Other urban center in this district	3	97- 2006	4	15-19	4	Education	3			Satisfactory		Rural area of this district	3	Education	3
		Rural area of this district	4	Rural area of this district	4	Don't know	5	20-24	5										
		Other urban center of another district	5	Other urban center of another district	5			35-39	8	Divorce	5			Few		Other urban centre in another district	4	Marriage	4
		Rural area of another district	6	Rural area of another district	6			30-34	7										
		Other urban center of another district	5	Other urban center of another district	5			40-44	9					Quite few		Rural area of another district	5	Divorce	5
		Rural area of another district	6	Rural area of another district	6			45-45	10	Return from work	6					Major urban centre	6	Return from work	6
		Major urban centre	7	Major urban centre	7			50-54	11										
		Specify place		Specify place				55-59	12	Job transfer	7							Job transfer	7
								60-64	13										
								65-69	14	Job seeking	8							Job seeking	8
								70-74	15	Start job/business	9							Start job/business	9
								75+	16	Looking for farm land	10							Looking for farm land	10

MODULE D: RURAL URBAN LINKAGES										
Since the growth centre was designated, how would you assess the following elements of rural-urban linkages?										
D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	
Postal communication linkages (letters)	Public transport linkages	Private Transport linkages	Physical linkages (Interlace between primary, secondary and tertiary roads and railway station)	Diffusion of agricultural technology	Production linkages	Forward economic linkages (export outlets)	Backward economic linkages (import outlets)	Market linkages for produce goods	Market linkages for consumer goods	
CODE	Greatly improved 5		Improved 4		Constant 3		Deteriorated 4		Greatly deteriorated 1	
Before 1976										
1977 – 1986										
1987 – 1996										
1997 – 2006										
In each case (D01 – D10), ask respondents to describe the change.										
D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	

MODULE E: PROVISION OF EDUCATION SERVICE									
Since the growth centre was designated, how has been the efficiency and access of education service?									
E01	E02	E03	E04	E05	E06	E07	E08	E09	E10
Have you ever attended school?	What is the highest class	How accessible have been public primary schools	How accessible have been private primary schools	How efficient have been public primary school	How efficient have been private primary school	How accessible have been public primary schools	How accessible have been private primary schools	How efficient have been public secondary school	How efficient have been private secondary school
CODE	Greatly improved 5		Improved 4		Constant 3		Deteriorated 4		Greatly deteriorated 1
Before 1976									
1977 – 1986									
1987 – 1996									
1997 – 2006									
In each case (E01 – E10), ask respondents to describe the change.									
E01	E02	E03	E04	E05	E06	E07	E08	E09	E10

MODULE F: PROVISION HEALTH SERVICES																	
Since the growth centre was designated, how has been the efficiency and access of health services?																	
F01		F02		F03	F04		F05		F06		F07	F08		F09		F10	
Do you have access to health services?		Where do/did you mainly access health services?		Specify the name.	Classify the place you mainly accessed health services.		How far is/was the place you mainly accesses health services		How long did it take you to get there?		What was the main reason for seeking health services?	How frequently do/did you seek health services?		How efficient are/were these health services?		Describe the impact of health services in you area?	
Yes	1	Central hospital	5		This urban centre	1	Very near Less than 1 km	5	Less than 30 minutes	1		Very high	5	Very high	5	Very high	5
No	2	District hospital	4		Rural area of this urban centre	2	Near 1 – 4 km	4	0.5 – 1.0 hours	2		High	4	High	4	High	4
		Health centre	3		Other urban center in the district	3	Satisfactory 5 – 9 km	3	1 – 2 hours	3		Constant	3	Constant	3	Constant	3
		Dispensary	2		Rural area of this district	4	Far 10 – 14 km	2	2 – 3 hours	4		Low	2	Low	2	Low	2
		Mobile clinics	1		Urban centre of another district	5	Very far 15 km plus	1	3 – 4 hours	5		Very low	1	Very low	1	Very low	1
					Rural area of another district	6		4 hours plus	5								
					Major urban centre	7											
Before 1976																	
1977 – 1986																	
1987 – 1996																	
1997 – 2006																	
Give reasons for you answer F08 above																	
Give reasons for you answer F09 above																	
Give reasons for you answer F10 above																	

MODULE G: PROVISION HOUSING SERVICES																			
Since the growth centre was designated, how has been the provision of housing services?																			
G01		G02		G03		G04		G05		G06		G07		G08		G09		G10	
Ownership of dwelling (Tick in the box)		How old is the dwelling?		Main source of lighting fuel		Main source of cooking fuel		Main source of drinking water		Types of dwelling the house hold live/d in		Type of construction material used		Outer walls made of what materials?		Roof of made of what materials?		Floor made of what material?	
Self-built	1	Do not know	99	Candles	1	Saw dust	1	Piped into dwelling	1	Single house	1	Permanent	1	Grass	1	Grass	1	Smoothed mud	1
Purchased	2			Paraffin	2	Crop residue	2	Piped outside dwelling	2	Semi-detached	2	Semi-permanent	2	Mud	2	Iron sheets	2	Smooth cement	2
Employer provides/d	3			Electricity	3	Firewood	3	Communal stand pipe	3	Flat	3	Traditional	3	Compacted earth	3	Clay tiles	3	Wood	3
Free	4			Others (specify)	4	Charcoal	4	Communal hand pumped well	4	Room in large dwelling	4	Permanent-built of modern materials such as iron sheets and cement. Semi-permanent mixture of permanent and traditional. Traditional -built of mud and grass		Mud bricks	4	Concrete	4	Tile	4
Rented	5			Paraffin	5	Protected well	5	Servant quarters	5					Burnt bricks	5	Plastic sheets	5	Other (specify)	5
				Gas	6	Unprotected well	6	Others (Specify)	6					Concrete	6	Others/specify	6		
				Electricity	7	Dam/river/spring	7							Wood	7				
			Others/specify	8	Others (specify)	8							Iron sheets	8					
													Others	9					
Before 1976																			
1977 – 1986																			
1987 – 1996																			
1997 – 2006																			
G11. What are the three major problems facing the provision of housing services in this urban centre?																			
G12. What should be done to solve the problems mentioned in G11 above?																			

MODULE H: EMPLOYMENT AND INCOME																	
Since the growth centre was designated, how has been your employment status?																	
H01	H02		H03		H04		H05		H06		H07		H08		H09	H10	
How do you earn a living?	Describe your main employed industry over the past years		Specify your primary industry activity		How much do you earn from this work per month		Specify your manufacturing industry activity		How much do you earn from this work per month		Specify your tertiary industry activity		How much do you earn from this work per month		Do you have other sources of income?	How much do you earn from this work per month	
	Primary	1	Agriculture	1	Much more	5	Construction	5	Much more	1	Small scale business	7	Much more	1		Much more	1
	Secondary	2	Forestry	2	More	4	Maintenance/repair	6	More	2	Large scale business	8	More	2		More	2
	Tertiary	3	Fishing	3	Constant	3	Others (specify)	99	Constant	3	Restaurant	9	Constant	3		Constant	3
			Quarrying/mining	4	Less	2			Less	4	Transport	10	Less	4		Less	4
			Others (specify)	99	Much less	1			Much less	5	Financing, insurance	11	Much less	5		Much less	5
											social services	12					
											Domestic work	13					
											Others (specify)	99					
Before 1976																	
1977 – 1986																	
1987 – 1996																	
1997 – 2006																	

This is the end of the interview. Before we can go, do you have any question or comment?

THANK YOU VERY MUCH