POPULATION AGEING IN RURAL AND URBAN KENYA: A CASE STUDY OF LAMU, TURKANA AND NAIROBI DISTRICTS

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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To my dear wife Stella and our children: Millen, Seth and Barrack, in appreciation of their constant inspiration, prudence, encouragement, selflessness, unmatched industry and love throughout my entire study period.

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However, any errors and/or omissions in this piece of work are entirely my own.

ABSTRACT

This study broadly examines the role of demographic and spatio-temporal factors in explaining variations in the age-structure ageing prevalent in the leading and lagging ageing districts of Lamu and Turkana in Kenya. Specifically, the study investigates how the key drivers of demographic change namely fertility, mortality and migration account for those variations. It also examines the role of both spatial and temporal factors namely climate, income and natural resource-use conflicts in the distribution of the elderly. Given the mainly rural set-up of both Lamu and Turkana districts, Nairobi district as an urban area is also considered in the study for purposes of comparison.

To meet the study objectives, three hypotheses were formulated, namely: Variations in demographic factors do not influence observed ageing levels and trends; changes in spatio-temporal factors do not explain the variations in the distribution of the elderly; and, the needs and concerns of the elderly populations in the study areas are not solely borne by the communities of which they are part. Both primary and secondary data sources provided the requisite data for this study. The primary data was generated from a total sample of 300 persons aged sixty years and over across the study areas, using both respondent-driven and simple random sampling procedures. To test the study hypotheses, various statistical, demographic and spatial analysis techniques were utilized. These included descriptive and inferential statistics, spatial analysis, and demographic data analysis techniques. The data were illustrated and presented using a diversity of tools such as maps, figures, charts and tables.

This study, mainly premised on the Stable Population Model (Lotka, 1911) and the Demographic Transition Theory (Notestein, 1945), mainly found out and concluded that (a) there is an increase in the number of the elderly across the study areas; (b) the critical demographic variables explaining observed trends in Lamu and Nairobi districts are in the order of migration, fertility and mortality and those in Turkana district in the order of mortality, migration and fertility; (c) whereas insufficient food and water resources in Turkana district explain the distribution of the elderly, in Lamu and Nairobi districts, the poor environmental conditions make the elderly population more vulnerable to diseases and therefore poor health; (d) the family unit is the most preferred form of living arrangement among the elderly across the study areas in meeting their needs and concerns. The study thus recommends that there is need to develop a consistent set of population relevant policies in order to provide an assessment of the state of the elderly, living arrangements and needs in society and calls for a shift in the approaches as to the care of the elderly in our societies.

This study makes an original contribution to knowledge as it is not only a pioneering study in Kenya, but also utilizes a wide palette of data collection and analytical tools, as well as a unique conceptualization of both demographic and spatio-temporal factors as they explain the observed age structure ageing phenomenon in Kenya

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CHAPTER ONE

BACKGROUND TO THE STUDY

1.0 Introduction

Population ageing is a summary term for shifts in the age distribution of a population toward older age groups (Gavrilov, 2003). As a direct consequence of the ongoing global fertility transition and mortality decline at older ages, population ageing is expected to be among the most prominent global demographic trends of the 21st century. The ageing of population is progressing rapidly in many industrialized countries and also in the developing countries whose fertility rates are declining rapidly. This pattern is expected to continue over the next few decades, eventually affecting the entire world (HelpAge International, 1999).

Today, the ageing of the world population is without parallel in the history of humanity (UN 2002). Increases in the proportions of older persons aged 60 years and above are being accompanied by declines in the proportions of the young persons aged less than 15 years. This global phenomenon has or will affect everyone and anywhere in the world. The steady increase of older age groups in national populations, both in absolute numbers and in relation to the working-age population, has major consequences and implications in all areas of day-to-day human life, and it will continue to do so. In the economic area, population ageing affects economic growth, savings, investment and consumption, labour markets, pensions, taxation and the transfers of wealth, property and care from one generation to another. Population ageing has also continued to affect health and health care, family composition and living arrangements, housing and migration. Politically, population ageing produces a powerful voice influencing

voting patterns and representation, as seen in developed countries (UN, 2002). The need to understand how both demographic and geographical factors explain this largely global phenomenon in the Kenyan context, together with the associated effects of such a phenomenon on the affected populations forms the bedrock of the present inquiry. Despite the increasing size of the elderly population, and its implications, ageing remains largely invisible in public policies and programs in Kenya. This mainly pioneering study seeks to bring to the fore the ageing agenda in Kenya by portraying the immensity and magnitude of the crisis in order to attract the requisite attention from the various stakeholders.

The current level and pace of population ageing varies widely by geographic region and within regions as well, but virtually all nations are now experiencing growth in their numbers of elderly residents. The world population of individuals aged 60 years and over is increasing tremendously. In 1950, it was 200 million; by 1975 it had shot up by 75 percent to 350 million and increased to 600 million by 1999. By 2020 the number of elderly people worldwide will reach more than one billion with over 700 million of them in developing countries (WHO, 1998). Of the ten countries with the largest elderly populations in the world, five will be in the developing world namely China (230 million), India (142 million), Indonesia (29 million), Brazil (27 million) and Pakistan (18 million). The proportion of "oldest old" (80 years and older) in the above 60 years age group is projected to be 22 percent in Greece and Italy, 21 percent in Japan, France and Spain, and 20 percent in Germany. By 2025, the world population for the elderly will reach 1.2 billion and 2.0 billion by 2050 (WHO, 1998).

There are marked differences between regions in the number and proportion of older persons. In the more developed regions, almost one fifth of the population was aged 60 or older in the year 2000; by 2050, this proportion is expected to reach one third. In the less developed regions, only 8 per cent of the population is currently over the age of 60; however, by 2050 older persons will make up nearly 20 per cent of the population. As the pace of population ageing is much faster in developing than in developed countries, developing countries will have less time to adjust to the consequences of population ageing. Moreover, population ageing in the developing countries is taking place at much lower levels of socio-economic development than was the case in the developed countries (UN, 2002).

The ageing process in the developed countries was first detected in France in the late 18th century, then spread to Sweden and Germany, but has today become a standard feature in most of the countries (Sauvy, 1966). The process evolved gradually as a result of improved living standards for the majority of the population over a relatively long period of time after the industrial revolution. However, technological breakthroughs in the field of medicine and the development of new and effective drugs and vaccines contributed to this process much later (WHO, 1998). In France, it took 115 years (1865-1980) for the proportion of the elderly population to approximately double from 7 to 17 percent. It is projected that in China, given the declining fertility rates and mortality rates, it will take only 27 years between 2000 and 2027 for the proportion of the population aged 60 years and over to double from 10 percent to 20 percent.

Europe experienced a fertility transition from a high total fertility rate of 5 - 6 children per woman in about 1870 to a low total fertility rate of 2 children per woman in the 1970's (Coale

and Watkins eds., 1986). Currently, these rates have gone down to more than below the 2.1 fertility replacement level for moderate and low mortality countries. This has brought about the ageing of the populations. For example, Germany has 16 percent of its population at old ages of 65 years and over, about equal to children under age 15, at 16.2 percent (United Nations, 1996). Over the next quarter-century, Europe is projected to retain its title of "oldest" region in the world. Currently, elderly people represent around 20 percent of the total population now and will represent 25 percent by 2020 (United Nations, 2002). The "oldest" country by 2020 will be Japan (31 percent), followed by Italy, Greece and Switzerland (above 28 percent). Today, the countries with the highest proportion of elderly people are Greece and Italy (both 23 percent in 1998). By 2020, the proportion of population aged 60 and over is projected to reach 23 percent in North America, 17 percent in East Asia, 12 percent in Latin America and 10 percent in South Asia. Within Africa, Northern Africa is in particular undergoing a much more rapid ageing process than other sub-regions (Marcoux, A 2001).

In the developing countries, population ageing is occurring more rapidly because of rapid fertility decline and an increasing life expectancy due to medical interventions. Also of great importance is the fact that population ageing in the developing world is accompanied by persistent poverty. Over the last fifty years mortality rates in developing countries have declined dramatically hence raising the average life expectancy at birth from around 41 years in the early 1950s to almost 62 years in 1990. By 2020, it is projected to reach 70 years. However, the spiraling effects of the HIV/AIDS pandemic particularly on infants, children and young adults threatens to reverse these gains made in life expectancies in the developing world, as shown in Table 1.1.

Table 1.1: Changes in Infant and Child Mortalities of Some Developing Countries

Country	Infant Mortality per 1000 live births		Under 5 Mortality	
	1960	1999	1960	1999
Algeria	152	36	255	41
Argentina	60	19	72	22
Botswana*	118	46(39)	173	59(49)
China	150	33	225	41
Egypt	189	41	282	52
Iran	164	37	281	46
Malaysia	73	8	105	9
Mauritius	67	19	92	23
Morocco	132	45	211	53
Saudi Arabia	170	20	250	25
Seychelles	--	13	--	17
South Africa*	89	54(49)	130	69(65)
Tunisia	170	24	254	30

** HIV/AIDS pandemic has reversed the positive trend in this country. Data in parentheses from 1997.*

Source: UNICEF, 1999 and 2001

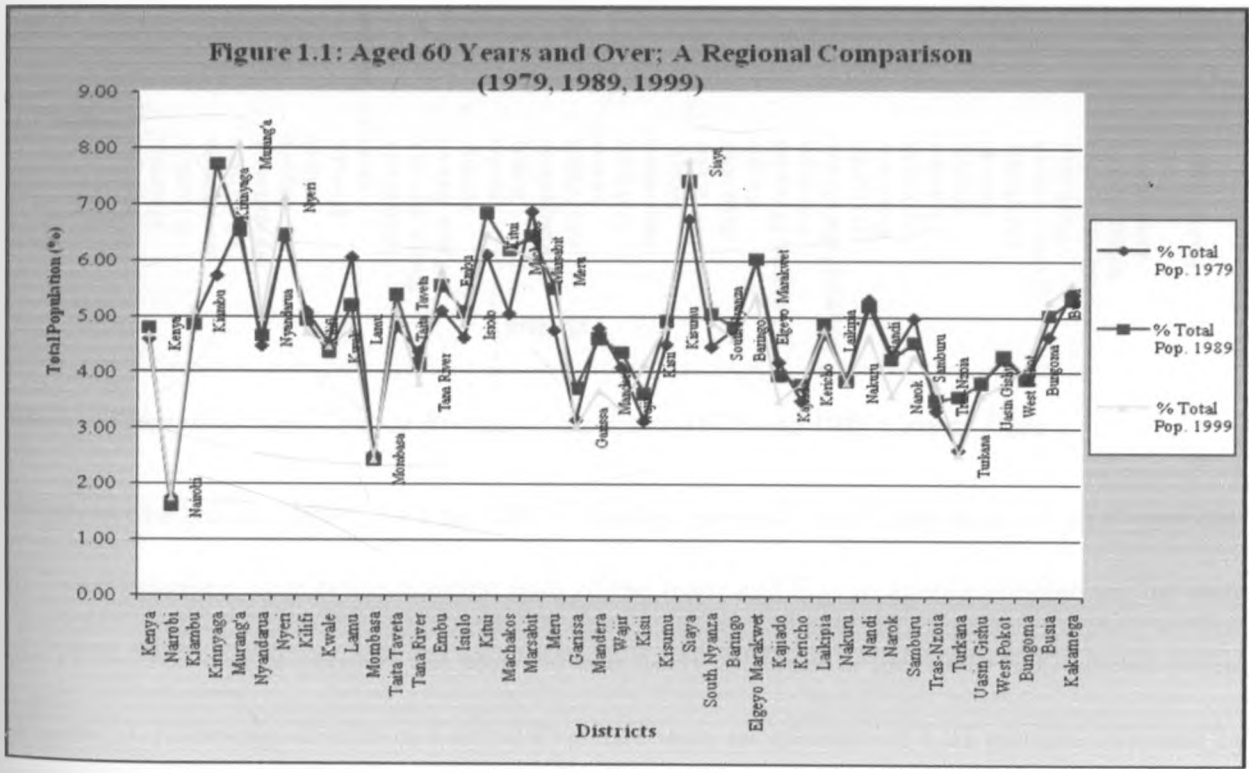
At the end of 2001, an estimated 40 million people were living with HIV/AIDS in the world. Sub-Saharan Africa, with less than 11 percent of the total world population, had more than 70 percent of all HIV-infected people (UNAIDS, 2002). As indicated in Table 1.1 above, infant mortalities in the listed countries had dropped to below 50/1000 live births in 1999 except in Botswana and South Africa where the HIV/AIDS pandemic had reversed the otherwise positive trend. In Africa, the highest life expectancies of 73 years are in Seychelles and Mauritius and the lowest life expectancies of 36 years are in Zambia, followed by Lesotho and Sierra Leone with 37 years (UNICEF, 2001). HIV/AIDS has also impacted negatively in Child mortalities in Sub-Saharan Africa with Botswana and South Africa experiencing high mortalities between 1997 and 1999. Although the HIV/AIDS pandemic is arguably lowering the life expectancy at birth, the numbers of the aged persons continue to increase in the society as the already

predominantly young population moves to higher ages in the age structure. Given the low fertility rates experienced in most areas of the world, additions to populations are becoming increasingly small. Elderly populations are increasingly finding themselves as providers and caretakers of the infected and affected young populations in society. This calls for the need to understand the socioeconomic dynamics of this population segment in society with a view to evaluating their potentials and coping mechanisms.

There are currently more than 20 developing countries in which life expectancy at birth is 72 years or above. Among these are Costa Rica (77), Cuba (76), Jamaica (75), Argentina and Sri Lanka (73), Malaysia (72) and the Republic of Korea (72) (WHO 1998). The United Nations estimated that the total elderly population in developing countries in 1995 was more than 215 million and was projected for 2025 at close to 400 million. Such numbers are certainly not insignificant. More recently, sharp falls have also occurred in birth rates in nearly all developing countries except for most of Sub-Saharan Africa. Asian countries have experienced the most rapid fertility decline so far. For example, Thailand halved its fertility in only 15 to 20 years in the period 1965-80. The total fertility rates in China declined from 5.5 in 1970 to the current 1.8 level. Respective figures for Brazil are 5.1 and 2.2 and for India 5.9 and 3.1 (WHO, 1998). Though Africa is a latecomer in the demographic transition, it will experience an increase of people aged 60 years and over, currently 38 million to 212 million by 2050 (HelpAge International, 2001). Between 1990 and 2025 the rate of increase in the number of older people in developing countries is expected to be 7 to 8 times higher in countries such as Colombia, Malaysia, Kenya, Thailand and Ghana, as compared, for example, with the United Kingdom and Sweden. These developing countries are expected to experience an increase of between 200

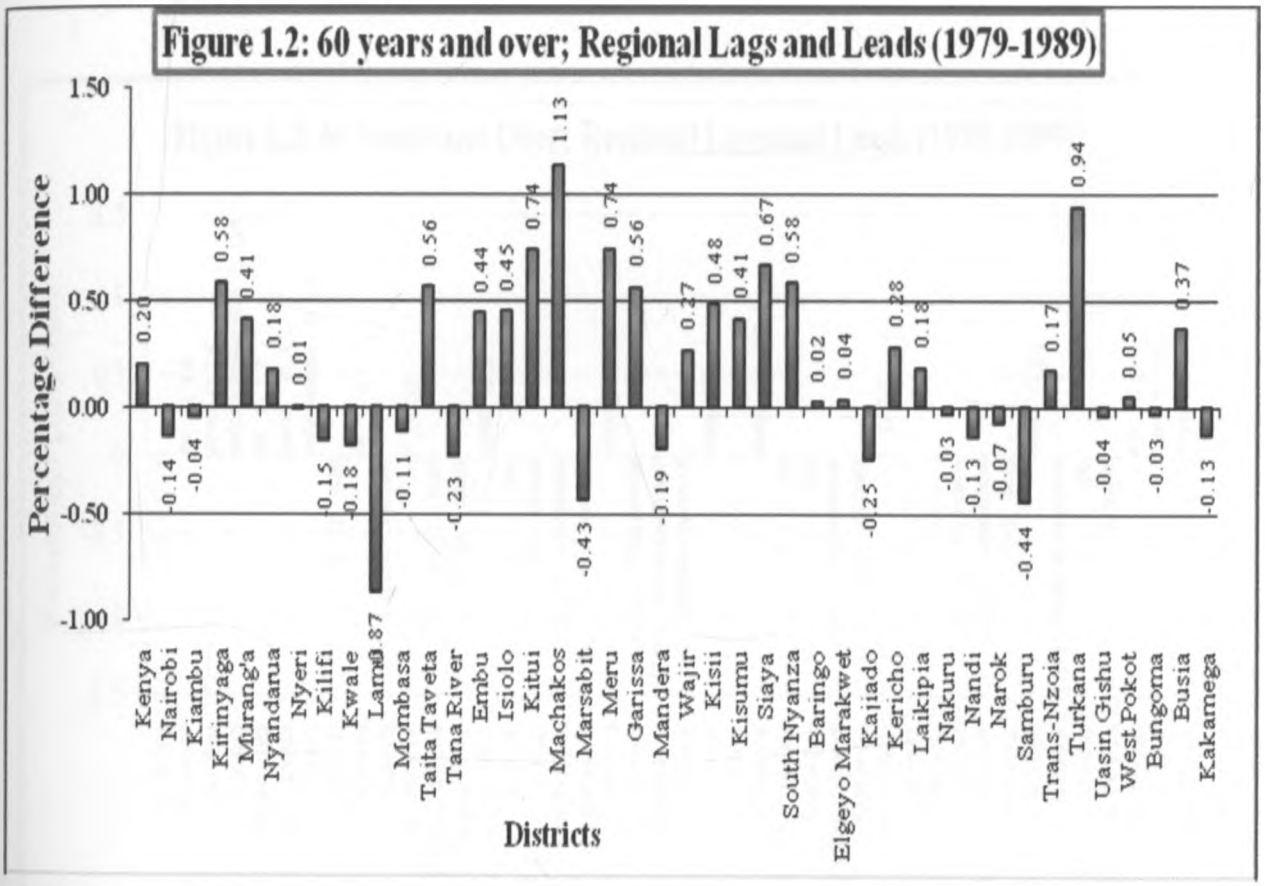
percent and 300 percent in their elderly populations over a period of only 35 years (WHO, 1998).

The 1999 population census estimates that Kenya has 1,341,810 persons aged 60 years and above constituting 4.68 percent of the total population. The absolute numbers of the aged had been oscillating between 1979 and 1999 as those aged 60 and over increased by approximately 638,184 persons. The relative gain among those aged 65 years and over and those aged 75 years and over (oldest) will be even greater with the 75 years and over doubling every 15 years. Naturally, fertility reduction or increase has a direct bearing on ageing populations. Similarly, the effects of mortality decline and migration on ageing are worth consideration. Figure 1 below depicts the variations in the population aged 60 years and over in Kenya during the 1979-1999 period.



Source: Compiled from Central Bureau of Statistics 1979, 1989 and 1999 Census Data

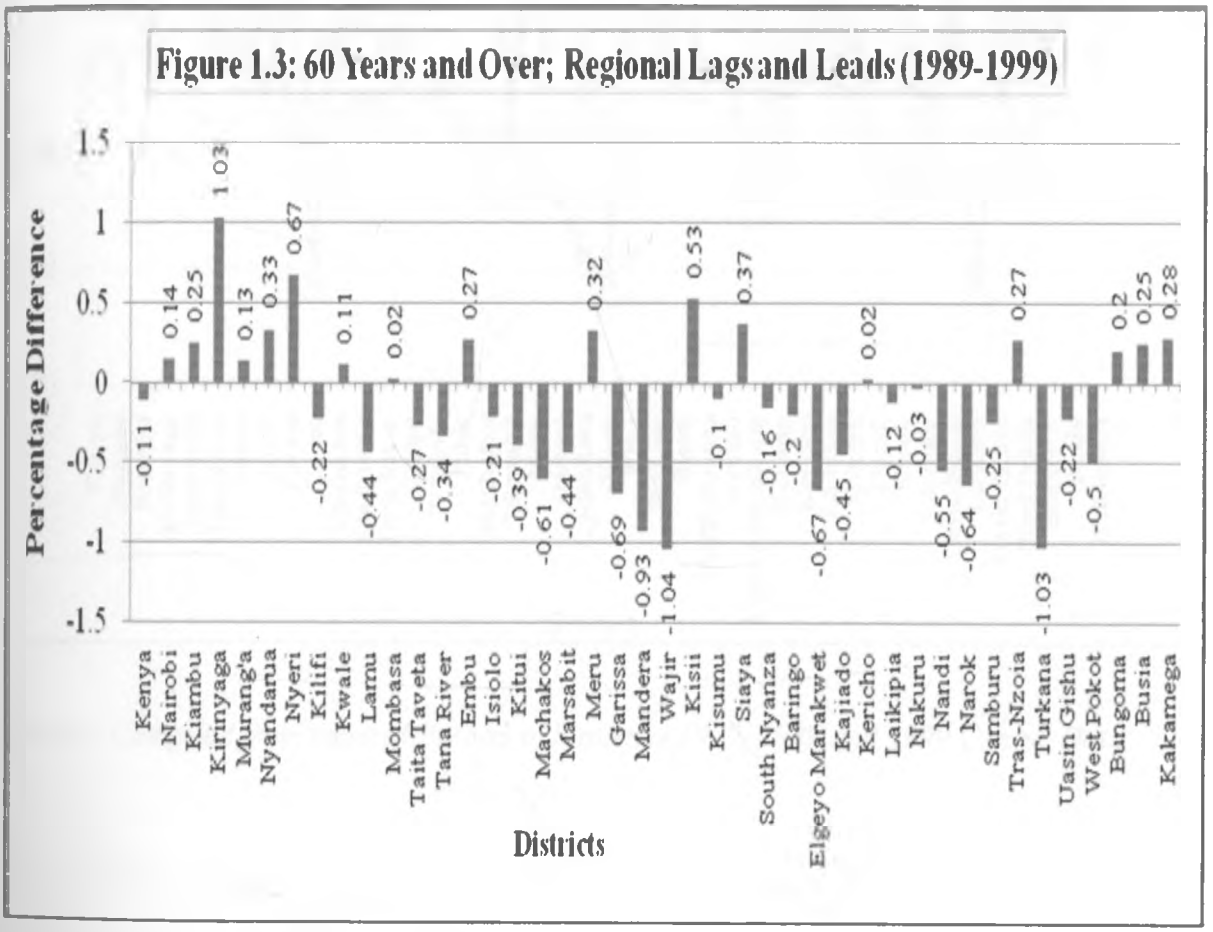
In view of the regional variations in the populations aged 60 and over, there are wide dissimilarities with some districts like Machakos and Turkana experiencing an increase in the ageing populations at 1.13 percent and 0.94 percent respectively and others namely Lamu and Samburu registering tremendously declining aged populations at - 0.87 percent and - 0.44 percent between 1979 and 1989 census years.



Source: Compiled from Central Bureau of Statistics 1979 and 1989 Census Data

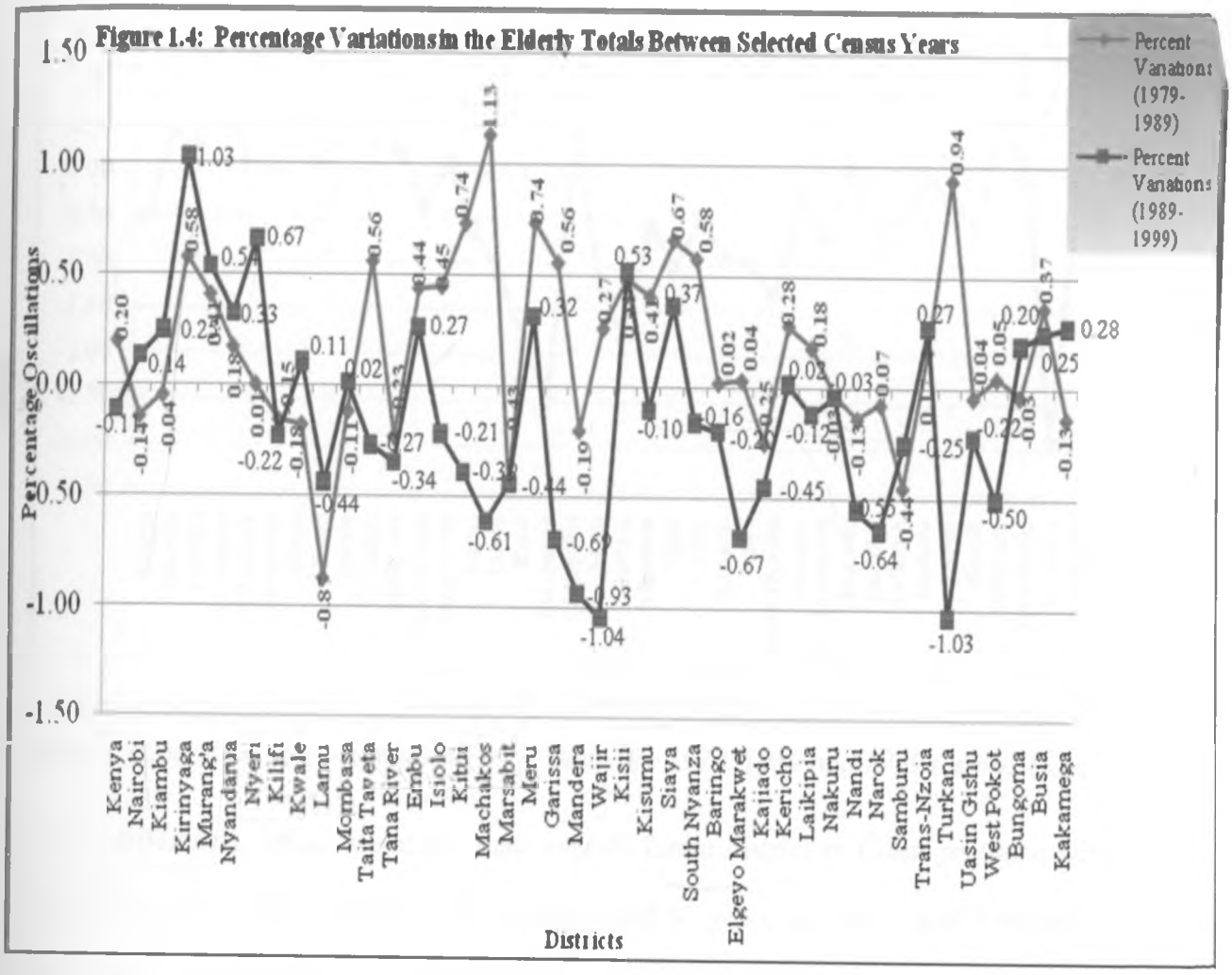
Whereas Machakos district (1.13 percent) in Eastern province and Lamu district (- 0.87 percent) in Coast province were at the extreme ends of the leads and lags in ageing populations between the 1979-1989 census periods, the scenario was fairly different in the 1989-1999 census period (Figure 3). Kirinyaga district in Central Province with an increase of 1.03 percent followed by Nyeri district in Central Province with an increase of 0.67 percent lead those with gains. At the

bottom of those districts that lost were Wajir in North Eastern province with a -1.04 percent decrease and Turkana district in Rift Valley province with a -1.03 percent decrease. These trends are indicative of the underlying processes and those often used as indicators of advancement of the demographic transition (Van de Kaa, 1987). These oscillations are portrayed in Figure 1.3.



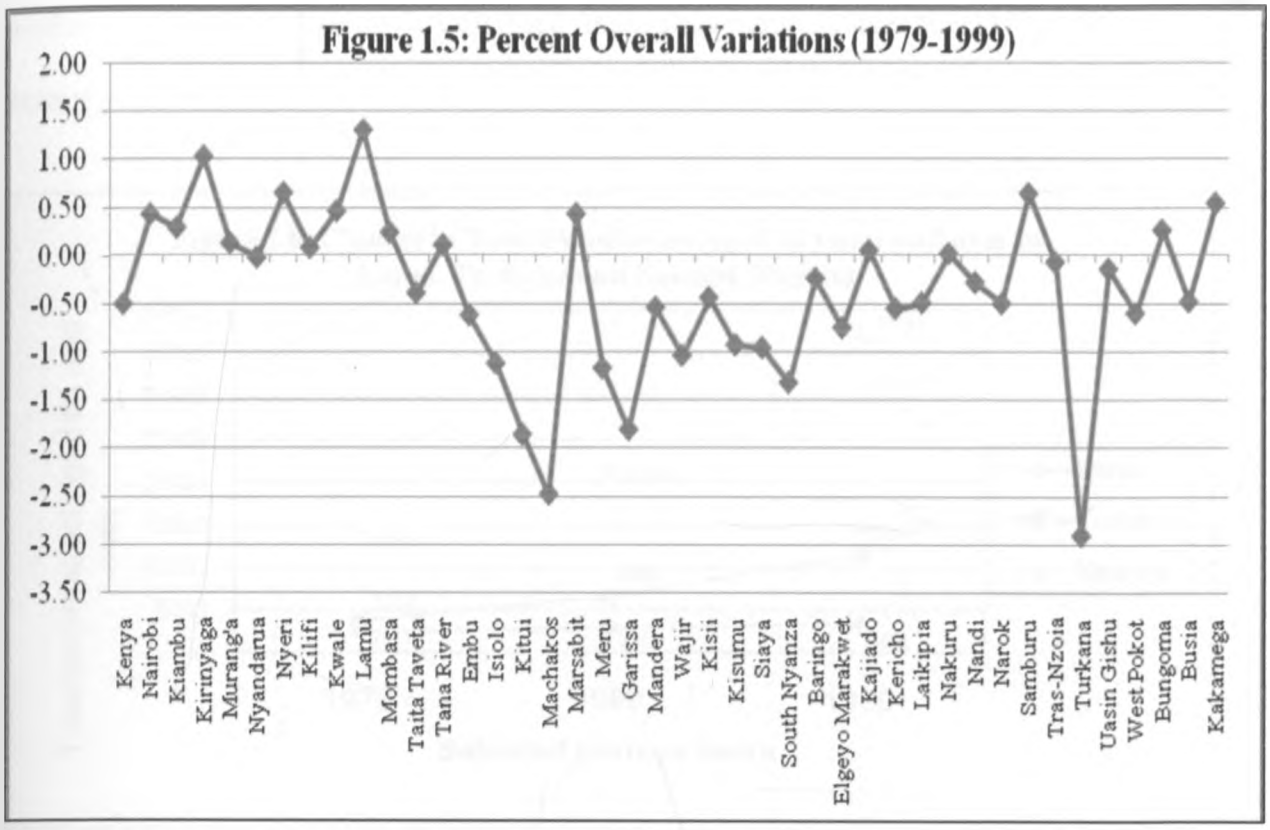
Source: Compiled from Central Bureau of Statistics 1989 and 1999 Census Data

The changes in the percentage populations aged 60 and over in Kenya between the 1979-1989 and 1989-1999 census periods still portray more dramatic differences as shown in Figure 1.4.



Source: Compiled from Central Bureau of Statistics 1979, 1989 and 1999 Census Data

The overall percentage differences in those aged 60 years and over in the 1979, 1989, and 1999 national censuses are presented in Figure 1.5.



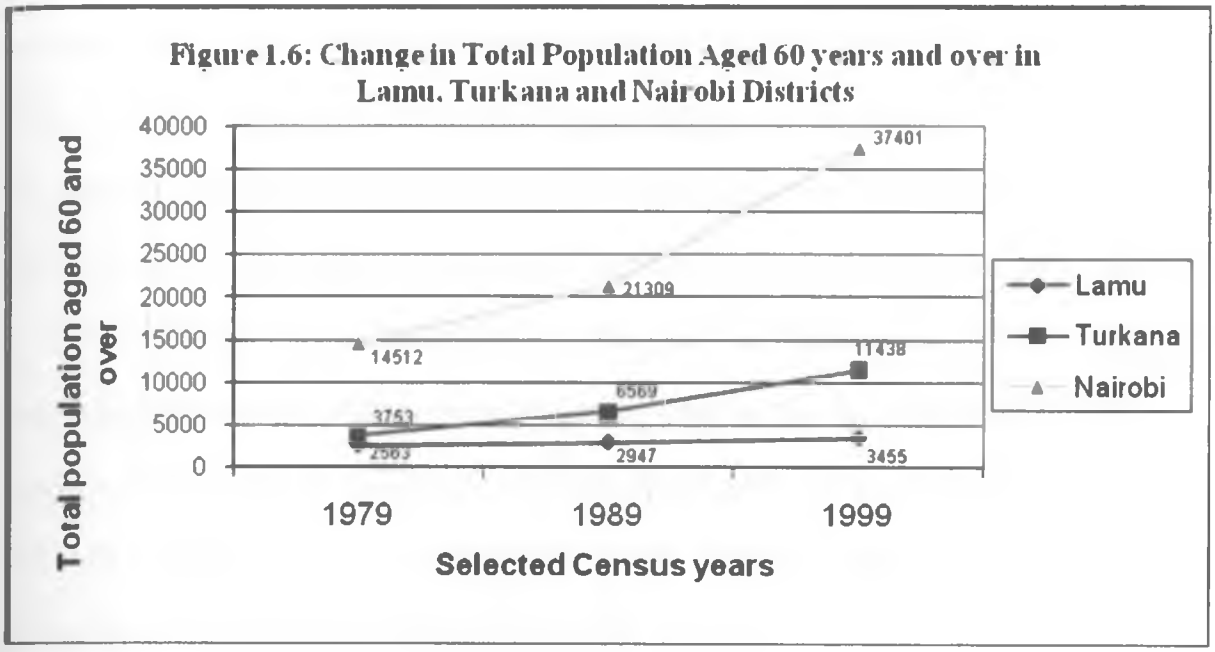
Source: Compiled from Central Bureau of Statistics 1979, 1989 and 1999 Census Data

These differences clearly point out that, overall, Lamu district in Coast province with a 1.30 percent increase leads in the number of those aged 60 years and over, and Turkana district in Rift Valley province, with a - 2.91 percent decrease leads in the opposite end of the scale.

1.1 Statement of the Research Problem

This study examines both the demographic (mainly fertility, mortality and migration) and spatial-temporal (namely lithology-related aspects, climate, water availability and migrations induced by resource conflicts) variables of population ageing, and the implications of such a phenomenon on the socio-economic life of the elderly in Lamu, Turkana and Nairobi districts in Kenya. Figure 1.6 shows how the total population of persons aged 60 years and over in Lamu,

Turkana and Nairobi districts has changed in absolute numbers over the 1979, 1989 and 1999 census years in Kenya.



Source: Compiled from Central Bureau of Statistics 1979, 1989 and 1999 Census Data

An analysis of the census figures for 1979, 1989 and 1999 of those aged 60 years and over (*Figure 1.5*) points out to Lamu district (1.30 percent) and Turkana district (-2.91 percent) as the leading and lagging ageing districts in Kenya respectively. Nairobi, with a 0.43 overall increase, and given its mainly urban base, compares well with these mainly rural extremes. The need to understand the nature (dimensions) and magnitude of the phenomenon, underlying explanatory variables, and the socio-economic implications of such trends forms the bedrock of the present inquiry. Specifically, the study seeks to examine the salient explanatory demographic and spatial-temporal variables possibly accounting for the observed ageing dynamics in the selected districts, and the socio-economic issues underlying such aged

populations, together with the existing (or non-existing) institutional ageing policy framework, and the constraints to the promotion of ways to alleviate population ageing related problems.

In Kenya, like in many other developing countries, population ageing per se has not, in the past, been deemed as critical issue of concern owing largely to the predominantly agrarian nature of the Kenyan economy, coupled with the prevailing high fertility and relatively low infant mortality rates. This situation has produced young cohorts who are bound to be a real problem in their older ages given the declining social and economic sectors. This is particularly supported with disruption of the traditional social support structure of the elderly citizens in the modern society. There is an emerging trend, in the absence of a government policy framework for aged persons, of private organizations, mostly in urban areas, setting up institutions for caring for aged persons. This trend is indicated in Table 1.2.

Table 1.2: Some Homes for Aged Persons in Kenya

No.	Home of the Aged	Where found
1	Mji wa Huruma	Nairobi – Runda Estate
2	Thogoto Home for the Aged	Kikuyu
3	Little Sisters of the Poor	Nairobi – Ruaraka
4	Cheshire Home	Nairobi – Kariobangi Estate
5	Pumwani Muslim Women Group Home for the Aged	Nairobi – Pumwani
6	Matumaini Home for the Aged	Nairobi
7	Little Sisters of the Poor	Mombasa
8	Alms House	Mombasa
9	Ahero Joot Social Services Centre	Kisumu
10	Alms House	Nakuru
11	Sisters of Tarbes	Nyeri
12	Mundika Home for the Aged	Busia
13	St. Mary's Home for the Aged	Sagana
14	Gaturi Home for the Aged	Murang'a

Source: Fieldwork data, 2006

A growing number of very aged and frail people adds its burden and exerts strong pressure on health and social budgets, among other effects. As it occurs, population ageing, both in the developed and developing countries, is characterised by features such as:

- The most rapid growth occurs in the oldest age leading to a preferential accumulation of particularly old and frail people.
- Population ageing is particularly rapid among women because of lower mortality rates among women. This means that most of the older women tend to be widows, thus living without spousal support.
- Population ageing also causes changes in living arrangements resulting in increasing number of older people living alone
- Since older persons have usually lower income and a higher proportion of them are living below the poverty line, population ageing is associated with poverty, particularly in developing countries.

In a nutshell, the thrust of this study is summarized by the following leading research questions, which essentially constitute the statement of the problem:

1. To what extent do the changing demographic (fertility, mortality and migration) variables in Lamu, Turkana and Nairobi districts account for the observed trends in the ageing populations?
2. What is the role of spatial-temporal factors (mainly lithology-related aspects such as rocks and soils, as well as climate, water availability, and conflict induced migrations) in explaining the distribution of the elderly in the study areas?

3. What are the socio-economic characteristics and needs/concerns of the elderly people in these selected areas?
4. How effective are the available coping mechanisms, social support systems and institutions in meeting the needs of the elderly in their communities and the Kenyan society in general?

This research posits that the observed oscillating, declining and/or increasing ageing population levels and trends in the selected areas are attributed to the dynamics of demographic and spatial-temporal considerations. It also examines the social, cultural and economic life of the elderly in the selected study areas. The study is intended to establish the extent of the ageing phenomenon in Kenya, and more particularly in the selected study areas.

1.2 Objectives of the Study

The overall objective of the study is to examine the effects of the selected demographic (viz. fertility, mortality and migration) and spatio-temporal factors namely lithology, climate, water availability and conflict induced migrations, on ageing population, the socio-economic issues underlying such aged populations, together with the coping mechanisms/strategies/potentials and constraints of communities.

1.2.1 Specific Objectives

(i) To determine the effect of changing demographic variables on age structure ageing

(ii) To examine the role of spatio-temporal factors in the distribution of aged populations

(iii) To evaluate the social and economic characteristics of the elderly with a view to understanding whether the needs and concerns of these populations are solely borne by the communities of which they are part or not

1.2.2 Assumptions

1. The ageing of populations is a real phenomenon in Lamu, Turkana and Nairobi districts and requires urgent understanding of its dynamics, problems and possible solutions.
2. The traditional community and/or societal responsibilities for the aged populations are fast waning thus leaving these populations vulnerable to poor health, food deficiencies and lack of care.
3. The aged populations are deemed to be a dependent lot and thus not engaged in serious productive activities in their communities.

1.3 Justification for the Study

This study is justified on several grounds. It will be noted that in Kenya, like in many other developing countries of the world, the subject of population ageing has received little attention (Kamuzora, 2001). Furthermore, few of the relevant studies conducted the world over are different in their approach(es) and scope(s). Most of the works done in western countries that are related to the present study suffer from the limitation of being somewhat irrelevant to the spatio-temporal and demographic backgrounds of developing countries. Hence, the findings, arguments and conclusions arrived at by these writers may not be representative of the circumstances in the developing countries such as Kenya. It is projected that between 1990 and 2025, Kenya, like other developing countries such as Colombia, Malaysia, Thailand and Ghana, will experience an increase of between 200 percent and 300 percent in their elderly populations over a period of only 35 years (WHO, 1998). This calls for an urgent need to study the ageing phenomenon in Kenya with a view to understanding its demographic dimensions, impact(s) on the socio-economic development, and suggest possible solutions to the related problem. Given

that the ageing phenomenon selectively affects certain segments of a given population, its ramifications on sectors such health, education, housing and agriculture are worth considering. In addition, the study is important since it is not common, at least in developing countries, for demographic ageing to be a subject of study, as most researchers prefer to study the young who constitute the bulk of the populations as opposed to the elderly.

Concern for ageing population is merely a function of the proportion of older people in a population. Where that proportion is low, for example in sub-Saharan Africa, the magnitude of related issues such as support for the elderly and healthcare is limited. When the proportion of older people starts increasing, it is important to start acting upon the related issues in a progressive fashion, lest the magnitude of the delayed tasks should become unmanageable. Highlighting demographic factors of ageing, as is the intent of this study, is not only of scientific value but also helps to influence population policy.

The creation and strengthening of a reliable database is a prerequisite for the development of national policies on healthy ageing. Policies specific to addressing the needs of the elderly are entirely lacking in Kenya. It is also crucial for raising awareness among policy- and decision-makers about the speed of population ageing and its public health consequences. This awareness is still low, particularly in developing countries. National policies on ageing should rely on the results of research aimed at cost-effective public health interventions to improve the quality of life in old age. Such results need to be widely shared among countries.

The need to contribute to new knowledge in the field of demographic ageing in terms of the specific ageing variables in Kenya, as well as the utilization of a myriad of methodological approaches in relation to the study problem is perhaps one of the justifications for this study.

The study areas namely Lamu District in Coast Province, Turkana District in Rift Valley Province and Nairobi District's Kibera division are relevant given that they exhibit discernible ageing trends over the census years; which easily leads to the need to understand the forces behind these trends, issues/concerns of the elderly, implications and possible remedial measures to address them for a sustainable society.

1.4 Scope and Limitations of the Study

1.4.1 Scope

The study examines the ageing phenomenon in the leading ageing district of Lamu and lagging ageing district of Turkana in Kenya in an attempt to explain the observed ageing trends using both demographic and spatio-temporal variables. Nairobi district is also studied for comparison purposes, although it may exhibit certain peculiarities worth consideration. The study also seeks to understand the socio-economic characteristics of the elderly populations and their related needs and concerns, as well as the policy implications of such elderly populations in Kenya. Any other aspects outside those specified and the areas of study identified lies beyond the scope of the present study.

1.4.2 Limitations

A number of possible limitations were foreseen, ranging from insufficient research funds, poor infrastructural facilities and insecurity in the study areas, to lack of cooperation from the respondents.

For the insufficient research funds, reasonable financial outlays were made available from the funding request that had been made to the Deans Committee of the University of Nairobi. This was also supplemented by personal savings.

As for infrastructural facilities, reliable means of transport was made available for the research with the kind assistance to the researcher offered by the United Nations' World Food Programme operating in Turkana District, and also from the researcher's personal transport arrangements particularly in Lamu and Nairobi Districts. Security escorts by security officers, particularly in Turkana district, was also made available at times of need. Given that insecurity in the region is a common phenomenon, the security escorts provided were not viewed by the respondents as problematic but necessary.

Creation of good rapport with the locals and use of their own people in certain assignments particularly during data collection, together with a clear statement of the purpose for which this research work was intended helped in enhancing respondent cooperation and response.

1.5 Operational Definitions of Terms and Concepts

The key terms and/or concepts used in the study are explained below:

Age – refers to the number of years of life completed by an individual i.e. an irreversible accumulation of years up to a definite time.

Aged population - refers to a state of total population including a higher proportion of old people. Age 60 and over is the worldwide reference adopted by the United Nations World Assembly on Ageing, Vienna 1983.

Ageing population – This is a concept of the transition from a population with high fertility and low life expectancy to a population with low fertility and low mortality representing broad-based age-sex and narrow-based and steep sided pyramids respectably. The term of ageing of population refers to changes in the age structure when the weight of the adults and the elderly is higher in the total population in general than the weight of the young population.

Geodemographic variables – these are mainly spatial and/or geographic and demographic (fertility, mortality and migration) factors deemed to explain ageing trends and levels in the study areas.

Intergenerational transfers - include land, other goods, wealth, entitlements and assets, which can be assigned to or inherited by members of a different generation, such as one's children.

Life Expectancy – the number of years that a person could expect to live on average, based on the mortality rates of the population in a given year. Life expectancy can change over the lifecycle. For example, at birth a person may be expected

to live for 75 years, but if they survive to 75 they may be expected to live for another 10 years.

Life Span – is the maximum number of years that a person has been known to live, currently around 115 years. This is frequently confused with life expectancy.

Senescence - is the combination of processes of deterioration which follow the period of development of an individual. That is, the decline or degeneration, as with maturation (old age condition), age, or disease stress. Senescence is universal, intrinsic, progressive, and deleterious.

Coresidence – refers to living arrangements where the elderly prefer to reside with their adult children for companionship, emotional and financial support

Positive ageing – Refers to the positive attitudes to ageing among older persons.

Stationary population – refers to theoretical models of hypothetical populations in which the same course of mortality and the same density of births is maintained for a long time.

1.6 Organization of Thesis Chapters

This study is organized in eight chapters. A summary of the contents of each of these chapters is provided as follows:

Chapter One

In this chapter, a broad background to the nature of the study problem is provided, beginning with a global context, and then narrowing down to the regional and local perspectives. The study problem is then clearly stated and the relevant study objectives provided. Furthermore,

this study is justified in terms of both the choice of the subject of study and the specific study areas selected. Definitions of terms and concepts used in this study are also provided in this chapter.

Chapter Two

This chapter basically examines the theoretical foundations of the present study problem and also provides a comprehensive review of the past works relevant to population ageing globally, regionally and locally, with specific reference to the demographic and spatial-temporal factors that explain the existence of such a phenomenon in the study areas. It also studies the socio-economic characteristics and needs and concerns of the elderly populations, together with the policy implications of ageing in the world and Kenya in particular. The reviewed literature also provides a basis for identifying the relevant research gaps this study set out to fill.

Chapter Three

In this chapter, the background information to the main study areas, namely Lamu, Turkana and Nairobi districts is provided. With the help of maps and other visual aids, the study areas are delimited and the physical, socio-economic and demographic characteristics examined in reasonable detail. These characteristics are mainly related to the ageing phenomenon in the study areas.

Chapter Four

A comprehensive research methodology, ranging from the nature of data required for the study, data sources, sample design, methods of data collection, processing, analysis and presentation of data and results is discussed in this chapter.

Chapter Five

In this chapter, a specific aspect of the study, namely the demographic factors such as fertility, mortality and migration, that are deemed to explain the prevalent ageing levels and trends in the study areas of Lamu, Turkana and Nairobi, is presented. An examination of the contribution of each of these demographic characteristics towards the ageing phenomenon is attempted. The study objective (i) on determining the effect of changing demographic variables on population ageing in Lamu, Turkana and Nairobi is analyzed here and the related interpretation(s) and discussion of the results presented.

Chapter Six

This chapter addresses the issue of the role of spatial and temporal factors in explaining the observed distribution of the elderly in the study areas of Lamu, Turkana and Nairobi districts. An analysis of the key spatial characteristics namely lithology, climate and water availability, as well as the temporal aspect of the conflict induced migrations, as they affect the distribution of the elderly populations are presented. The study objective (ii) on the spatio-temporal characteristics and the elderly is discussed and the results presented here.

Chapter Seven

This chapter examines the social and economic characteristics of the elderly in the study areas. This is in a bid to understand whether the needs and concerns of these populations are solely borne by the communities of which they are part or not. The discussions, analysis and results of objective (iii) on meeting the socio-economic needs and concerns of the elderly populations in the selected study areas are presented in this chapter.

Chapter Eight

In this chapter, a summary of the salient research findings, related conclusions based on these findings and the resultant recommendations, both to policy makers and researchers are presented.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This section reviews literature on both the empirical and theoretical bases regarding the geodemographic variables and implications of ageing from both the global and local perspectives. This review is useful in identifying the research gaps this study set out to fill and also to avoid replication of past research works in the area of demographic ageing.

2.1.1 Empirical Bases Relevant to this Research Problem

Whereas the literature on population ageing in the more developed regions of the world is enormous, the same is scanty in the developing countries as population ageing is still considered a problem of the future. Demographically, population ageing occurs when the median age of a country or region rises. According to the UN 2005 Human Development Report, this process is taking place in almost every country and region across the globe. This is constituted by a shift in the distribution of a country's population towards older ages. Thus an increase in the population's mean or median age, a decline in the fraction of the population composed of children, or a rise in the fraction of the population that is elderly are all aspects of population aging. Three demographic determinants are important in explaining the prevalent population ageing in the world.

The UN, (1999) describes old age as 'a new frontier' given that twenty years were added to the average life expectancy worldwide in the 20th century. As pioneers of this life extension, today's

elders are rewriting the scripts for late life, exploring new ways of being, becoming and doing in the advanced ages. This calls for the need for a society that adjusts its structures and functioning, as well as its policies and plans, to the needs and capabilities of all, thereby realizing the potential of all, for the benefit of all. The findings of the present study will form the basis for such action in Kenya and more particularly in the selected study areas.

The UN, (2004) notes that population ageing is a highly generalised global process and attributes this scenario to the declining world mortality rates and increased life expectancies across the world regions from 41 years in the early 1950s to 62 years in 1990. Among the countries currently classified by the United Nations as more developed (with a population of 1.2 billion in 2005), the median age of the population rose from 29.0 in 1950 to 37.3 in 2000, and is forecasted to rise to 45.5 by 2050. The corresponding figures for the world as a whole are 23.9 for 1950, 26.8 for 2000, and 37.8 for 2050. In Japan, one of the fastest ageing countries in the world, in 1950 there were 9.3 people under age 20 for every person over 65 years. By 2025, this ratio is forecasted to be 0.59 people under 20 years for every person older than 65 years. Globally, the proportion of population that is aged over 60 years is fast growing. Currently 355/580 million people aged 60 years and older live in developing countries. By 2020 the number of elderly people in the world is projected to reach more than one billion, with 70 percent living in developing countries.

Weil, (1997) seems to agree with the UN, (2004) position regarding the increased life expectancies, but focuses more on global fertility declines as the source of increasing aged persons. He argues that an increase in longevity raises the average age of the population by raising the number of years that each person is old relative to the number of years in which he is

young. A decline in fertility increases the average age of the population by changing the balance of the young to the old. Of these two forces, that's fertility and mortality, it is declining fertility that is the dominant contributor to population ageing in the world today. More specifically, it is the large decline in the total fertility rate over the last half century that is primarily responsible for the population ageing that is taking place in the world's most developed countries. Because many developing countries are going through faster fertility transitions, they will experience even faster population ageing than the currently developed countries in the future. Weil's view supports the present study as it seeks to, among other considerations, examine the demographic variables that may explain the observed ageing trends in the selected districts in Kenya.

Marcoux, (2001) notes that population ageing has become a prominent subject for studies particularly on the implications of demographic change. He argues that whereas the theme is of immediate concern in the developed countries where ageing is already well advanced with serious consequences on the economy of pension schemes, it is also gaining importance in developing countries where a number of countries are already worrying about the medium and long-term implications of the ongoing or incipient fertility decline for their age structures. This is line with the current study's view that increased aged population has implications on the socio-economic life of the elderly and society in general.

Hausa, (1983) views ageing as a macro-view of the world measured in many ways including the number or proportion of older persons, median age, aged dependency ratio and the ageing index. He has demonstrated that population ageing is primarily the product of declines in fertility, whereas the extension of life is mainly the result of declines in mortality. However, he does not mention the effect of migration nor attempt to offer an evaluation of the effect of the spatio-

temporal factors on the ageing process and the spatial distribution of the elderly. The present study is an attempt to analyse the impact of both demographic and geographical characteristics on the ageing and distribution of populations, among other considerations.

Sandra, (2003) examines the concept of successful ageing and argues that this depends on cultural variations as suggested by the Kluckhohnian theory (Klukhohn and Stodtbeck, 1961) of cultural variation. This theory suggests that congruence exists between value orientations concerned with human-nature, time, activity and relationships. That is, cultural values tend to influence attitude towards ageing in terms of engagements and participation in society. It is worth noting that in the ageing of the selected areas in Kenya, it is envisaged that there is a relationship between the value orientations that people prefer and the various understandings of successful ageing that they uphold.

Gavrilov and Heuveline, (1991) noted that the rate of population ageing may also be moderated by migration. He argues that immigration (or in-migration) usually slows down population ageing as seen in Canada and Europe because immigrants tend to be younger and have more children. On the other hand, the emigration (or out-migration) of working-age adults accelerates population ageing, as it is observed now in some Caribbean nations. Population ageing in these countries is also accelerated by the immigration of elderly retirees from other countries, and the return migration of former emigrants who are above the average population age. Some demographers expect that migration will have a more prominent role in population ageing in the future, particularly in low-fertility countries with stable or declining population size. The effects of migration on population ageing are usually stronger in smaller populations, because of higher relative proportion of migrants in such populations.

Sougareva, (1989) in her paper entitled the 'impact of population ageing on family and household structure' presented at the International Population Conference on Ageing of population in developed countries held in Prague, Czechoslovakia in 1989, views population ageing as part of a more general process of restructuring the population system. In this process, the traditional type of population reproduction is replaced by a contemporary type. She attributes ageing of European populations to mortality decline, fertility decline and changes in the family and household patterns, but does not account for the ageing patterns in the developing countries of the world. However, other than the two key drivers of demographic change, fertility and mortality, changes at family and household levels are an important consideration as they relate to ageing in the world. The present study considers the role of the family in the ageing process in the study areas.

Blank and Shea, (1994) argue that fertility trends in sub-Saharan Africa have been the subject of much discussion. In particular, three African countries, namely Botswana, Kenya and Zimbabwe have experienced declines in fertility starting in the early 1980s. They note that these declines in fertility in each country have been accompanied by substantial increases in contraceptive use. Such declines in fertility may influence the rate of ageing in the respective countries. The current study seeks to find out the role of fertility, among other demographic factors, in explaining the observed ageing trends in some parts of Kenya

Auvinen, (1989) in her paper on human life and the social environment interactions presented at the 1989 International Population Conference in Prague, argues that the need for individuals to extend their lives is inherent and that to achieve this, the human focus has been on both environmental and hereditary factors. She noted that an incorrect diet, little physical activity,

stress and pollution of the environment shortens the time nature has originally granted humans as their lifespan. She observed that in South Africa, while the white population has an average lifespan of about 70 years, the African population in the same country has only 38 years. She attributes this variation to differences in the environment and lifestyle of these populations arguing that if these conditions are optimally satisfied, populations have the potential to live up to about 100 years. In this study, spatio-temporal characteristics are deemed to influence not only the distribution of the elderly but the ageing process as well.

Adamchak, (1989) noted that the elderly are usually viewed in one of four distinct perspectives: (a) as a group of low priority; (b) as an impediment to development; (c) as victims of modernization; (d) as resources. Whereas most of these conventional views treat the elderly as a passive and a largely inconsequential entity, the current study conceptualises the role of the elderly in a way that differs significantly from the commonly adopted approaches. They are considered as necessary actors in societal development and thus playing a dynamic role in exchange relationships between generations, and therefore acting as one of the decisive forces in social affairs.

Khasiani, (1987) investigates the role of the family in meeting social and economic needs of the ageing populations in Kenya and therefore with Sougareva's assertion that changes affect family and household patterns. However, she does not address the factors accounting for the various ageing trends in a demographic and spatial-temporal context as is the case in the present study. Notably, the family unit is still viewed as a critical component in addressing issues related to the care and concerns of the elderly in the study areas.

Oucho, (1988) in his study of the effects of ageing on national development noted that while the developing countries grapple with problems of young populations, the developed societies address pertaining issues to ageing populations. He observes that the trends in the developing countries are that these countries must be prepared to handle problems on ageing populations that will manifest themselves in early 21st century. This, he argues, is as a result of partly the populations reaching the next stage of the demographic transition when both fertility and mortality will have declined appreciably and partly as a result of the ageing of the post-war "baby boom". This study posits that population ageing is a real phenomenon in the study areas and thus the need to mainstream age structure ageing in our planning and policies.

Kamuzora, (2001) in his paper entitled 'Africa's emerging population and last power asset: Ageing Inevitable but possibly far into the future, presented at the IUSSP General Conference in Brazil, argues that population ageing in Africa is inevitable but possibly not an immediate problem. He notes that unlike Europe, Africa still has to contend with a young age structure. However, even with the continuing high fertility rates in Africa, there are remarkable increases in the numbers of those aged 60 years and over. This population calls for serious planning in a bid to forestall an impending socio-economic crisis. Though not an immediate danger, the rising proportion of the elderly requires planning for.

Oranga, (1997), in his study on how communities in Kisumu and Homabay districts in Kenya perceive ageing and poverty in rural Kenya, found out that poverty is widespread among the African elderly. He also found out that rural poverty was associated with poor health and unsatisfactory access to health care. He noted the need to protect the aged members of the society from payments for health care and to include them in societal decision-making

processes. Whereas he focuses on the poverty and health issues of the elderly, he does not examine the spatial aspects of the ageing phenomenon. This study underscores the need to examine other aspects of the ageing phenomenon, mainly demographic and spatial in nature, in the Kenyan society.

Vanzo and Chan, (1999) in their article on the living arrangements of older Malaysians argue that more than two-thirds of Malaysians aged 60 years and over reside with an adult child. This coresidence is influenced by the costs, benefits and opportunities of coresidence and preferences of the seniors and their children. They note that the benefits of coresidence range from the companionship and emotional support to the fulfilment of the physical and financial needs of parents and children. The present study takes the view that coresidence is perhaps one of the coping strategies adopted by the ageing populations in the selected study areas in Kenya.

2.1.2 Theoretical Bases Relevant to this Research Problem

Many theories, though mostly evolutionary in nature, have been published to account for the process of ageing in societies. These theories put emphasis on both the genetic and biochemical causes of ageing. Evolutionary theories of ageing and longevity try to explain the remarkable differences in observed ageing rates and longevity records across different biological species through the interplay between the processes of mutation and selection (Gavrilov, 2002). Although it is not the intention of the present study to delve into such mainly evolutionary theories, a brief summary of the Theory of Programmed Death, suffices. This is in a bid to provide a general understanding of such mainly biological theories.

Theory of Programmed Death and Ageing

Weismann (1889) is credited with the origins of the theory of programmed death essentially based on genetic principles. He postulated that evolution introduced ageing to avoid the parents and their more adapted offspring competing for the same resources. His idea was that there exists a specific death-mechanism designed by natural selection to eliminate the old, and therefore worn-out, members of a population. The purpose of this programmed death of the old is to clean up the living space and to free up resources for younger generations. Whereas this theory of "programmed death" to some reasonable extent does not hold given that practically not every individual dies of old age, there is lack of real consensus as to whether the ageing process is an inescapable biological reality or a disease that can be cured, or at least postponed. Furthermore, the focus of this study is to explain the observed age- structure ageing phenomenon in Lamu, Turkana and Nairobi districts purely from a demographic and spatio-temporal standpoint.

This research is conceptually premised on the Stable Population Model, theories of the 'Demographic Transition', Demographic Regulation and the Intergenerational Wealth Flows. These theoretical foundations of the present research are discussed as follows:

The Stable Population Model and Ageing

The theory of stable population, as suggested by Alfred Lotka (1911), provides an analytical framework to understand the exact relationships between regimes of fertility and mortality on the one hand, and the age distribution of a population on the other hand. The population model assumes that if a population is closed to migration and experiences constant age specific fertility and mortality rates, irrespective of the initial age distribution, it will eventually increase in size

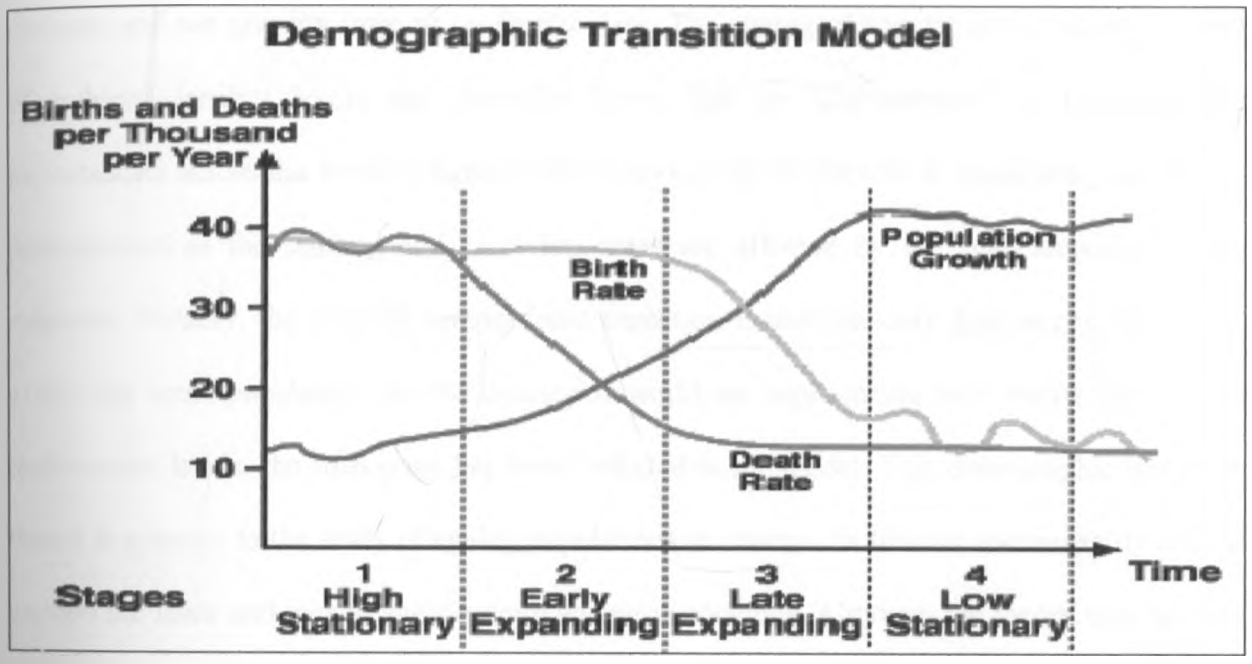
at a constant rate. Given that, in this model, the human population is closed to migration influences, it suggests that any change in age structure, and population ageing in particular, can only be caused by changes in fertility and mortality rates. This study takes the view that if everything else is held constant, a fertility decline reduces the size of the most recent birth cohorts relative to the previous birth cohorts, hence reducing the size of the youngest age groups relative to that of the older ones. The effects of changes in mortality rates on population ageing appear when mortality declines among infants, children and persons younger than the population mean age thus lowering the population mean age, hence making the population younger.

Other than fertility and mortality, as considered in the stable population model, the rate of population ageing in a given place may also be moderated by migration (Didier, 1989). The effects of migration on population ageing are usually stronger in smaller populations, because of higher relative weight (proportion) of migrants in such populations. This study seeks to establish the role of these mainly demographic factors, namely fertility, mortality and migration, in explaining the variations in the ageing phenomenon in the study areas. Although relevant to this study, stable populations do not generally exist in reality and the model fails to address other factors, such as migration and the mainly spatial considerations which would influence the ageing phenomenon in society. This study considers both the demographic and spatial factors in an attempt to explain this phenomenon.

The Demographic Transition Theory and the Reality of Population Ageing

Notestein (1945), is credited with the formulation of the Demographic Transition Theory. Accordingly, the theory portends that societies progress from a pre-modern regime of high fertility and high mortality to a post-modern regime of low fertility and low mortality, and possibly below fertility replacement levels, as illustrated in Figure 1.6.

Figure 1.6: Illustration of the Demographic Transition Model



Source: *http:geographyfieldwork.com/DemographicTransition.htm*

In the course of this transition, the age structure is subjected to different influences. According to Kirk (1996), the transition begins with the reduction of death by controlling epidemic and contagious diseases that mostly benefit infants and young children. As life expectancy at birth improves, fertility tends to remain unchanged, thereby producing large birth cohorts and an expanding proportion of children relative to adults. Other things being equal, this initial decline in mortality generates a younger population age structure.

After initial and sometimes very rapid gains in infant and child mortality have been achieved, further mortality declines increasingly benefit older ages and are eventually accompanied by fertility declines. Both changes contribute to reverse the early effect of mortality decline on the age structure. With modernization, children become more costly, cultural changes weaken the importance of children and the increasing empowerment of women to make their own reproductive decisions lead to smaller families. This change in values emphasizing on quality of children and not quantity impacts on family sizes. The ageing of populations is largely a result of reduced fertility levels and mortality levels that are characterized by increased life expectancies across the world. Migration also plays a significant role in moderating the ageing phenomenon as the sending and receiving areas are affected by the age categories of the migrants. Notably, the original demographic transition model has only four stages, but today, given that most populations in the developed world are reproducing well below the fertility replacement levels, the fifth stage has been included in the model. This demographic transition theory is relevant to the study of ageing populations as changes in fertility and mortality tend to explain the leads and lags in age structure ageing in societies. Although the theory uses fertility and mortality to explain the ageing phenomenon, it is limited in application as it does not include other explanatory factors such as migration and spatial considerations. The present study examines both demographic and spatial factors in explaining the observed ageing trends in Lamu, Turkana and Nairobi districts in Kenya.

The Demographic Regulation Theory and Population Ageing

This theory which is premised on the assertion that every society has a set of norms that guide population growth is credited to Bogue (1969). These norms are not explicit opinions about

desired population size or the optimum rate of growth. Instead, they are opinions concerning what constitutes the ideal size of completed family, or the number of surviving children a couple ought to have when it reaches the end of the reproductive period. Any society whose average numbers believe that it is good or desirable to have four or more surviving children either will grow rapidly or must face very high mortality. A society whose members agree to bear no more than two children is one that expects to suspend further growth and expects very low mortality. Family size in most of the developing countries (Kenya included), exceeds four. The actual and desired family sizes in the lagging (Turkana) and leading (Lamu) ageing districts in Kenya would, perhaps, explain the observed inherent population ageing trends in those areas. Though providing societal perspectives as to what constitutes an ideal family size and therefore, indirectly though, indicating age structure ageing, the model is limited in addressing the ageing phenomenon as it does not deal with other factors, namely demographic and spatial factors, as considered in the present study.

Intergenerational Wealth Flows Theory and Aged Populations

According to Caldwell's (1976) Intergenerational Wealth Flows Theory, there exists a direct link between family structure and fertility. The theory argues that there are only two major forms of family structure, differing principally in the direction of wealth flows among generations. Whereas in the developing world, net wealth flows are primarily upward from younger to older generations, in the developed nations, family structure is organized in terms of downward wealth flows where parents are expected to provide for children's economic well-being.

The theory proposes that fertility decisions in all societies are economically rational responses to familial wealth flows. In societies with net upward wealth flows, the economically rational

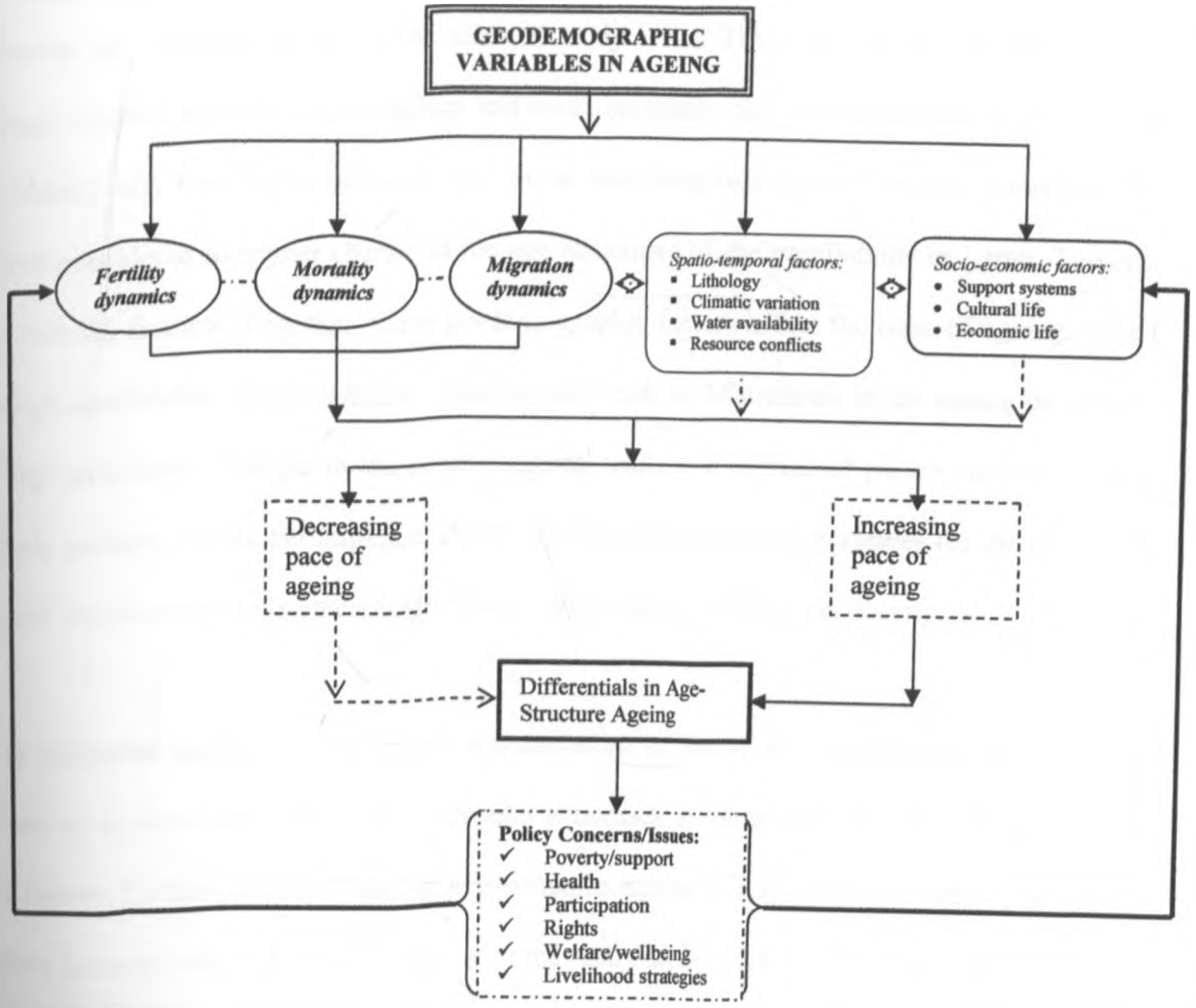
decision is to have as many surviving children as possible, because each additional child adds positively to a parent's wealth, security in old age, and social and political well-being. In societies with net downward wealth flows, the economically rational decision is to have no children or the minimum number allowed by a psychological disposition that derives pleasure from children and parenting. The worldwide transition from high to low fertility is the result of a change in family structures from upward to downward wealth flows due to the spread of new values that placed a premium on individual satisfaction and achievement (Caldwell, 1980).

According to the wealth flows theory, one of the periods in the life course for parents to receive economic benefits from their offspring is during old age. Those benefits motivate high fertility in traditional societies where adult children are expected to support their ageing parents. Using national data in Indonesia, Hugo (1997) found that high fertility was positively associated with perceptions regarding the likelihood of receiving old age support. This assertion was supported by Schellekens (1993) who, using historical data for England and Wales, found out that old age security was correlated with high fertility. This study seeks to examine whether fertility, as one of the main demographic factors, is influenced by the need for old age support and security.

Overall, this study adopts the stable population model and the demographic transition theory to inform the study as they provide the mainly demographic explanations to the observed global ageing trends. However, the other considered theoretical bases also serve to enhance the various aspects of the study such as increased life expectancies and their implications, role of migration and effects on family structure, among others. This study's conceptual model is outlined in Figure 2.1.

2.2 The Conceptual Framework

Figure 2.1: A Conceptual Model for Geodemographic Variables in Age-Structure Ageing



Source: Modified from Stable Population Model and Demographic Transition Theories

The above conceptual framework has been designed to illustrate the relationship(s) between demographic factors, namely fertility, mortality and migration, as well as spatial factors namely lithology, climatic variability, water availability and conflict induced migrations, as they influence age-structure ageing in the selected study areas. These key drivers of demographic change, coupled with the spatial factors and socio-economic characteristics such as support for the elderly and their participation in the social and economic life of society, constitute the factors considered to trigger change in the age structures of the populations in Lamu, Turkana and Nairobi districts. Together, these geodemographic factors affect the pace of ageing, either through acceleration or deceleration, which in turn leads to differentials in the ageing process of the age structures. Changes in the pace of ageing leads to a myriad of policy concerns which include poverty, health, participation, rights, welfare and livelihood strategies for the elderly in society. Such concerns also have implications on the ageing variables in society.

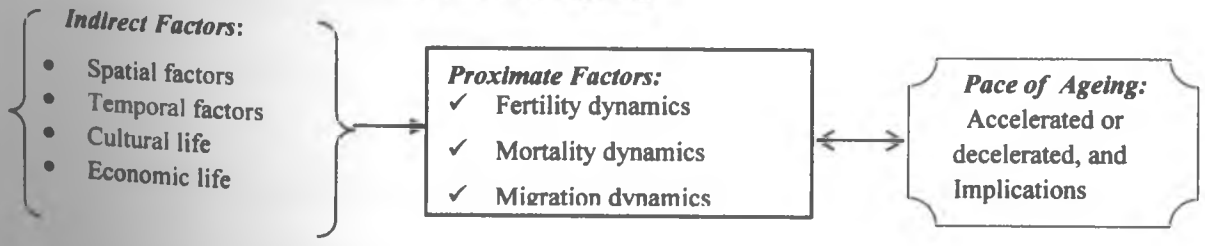
Both individual ageing, an irreversible accumulation of years, and demographic ageing, also known as age-structure ageing, are important processes in the ageing of populations globally and locally. Unlike individual ageing, age-structure ageing is a reversible process. This study mainly focuses on the age structure ageing in the study areas of Lamu, Turkana and Nairobi. An interplay of mainly demographic determinants namely fertility, mortality and migration, and partially spatio-temporal factors can easily reverse or accelerate an age-structure ageing trend in a population. High fertility rates in a population mean that the population remains younger and low mortality rates mean an increase in the life expectancy of a people. Given that youthful populations, mainly dominated by males, tend to migrate more than older populations, both the source areas and the receiving areas tend to be affected by these migrations. In the source areas, mainly female old populations tend to remain and in the receiving areas largely male youthful

populations are prevalent. These mainly demographic factors tend to compound each others' impacts in a population.

The ageing process is also a function of spatio-temporal variables mainly the physical and/or environmental factors such as, lithology-related aspects namely geology and soils, climatic variability, water availability, as well as conflict-induced migrations, and also the socio-economic considerations such support for the elderly, cultural life, and economic life of a people. These environmental factors tend to influence the mainly demographic factors and hence enhance the ageing process. Whether the geographical and demographic factors determine the ageing process singularly or compositely is debatable. These determinants help to increase or decrease the pace of ageing in populations. An increase in the pace of the ageing phenomena means an increase in the number of aged persons and an upsurge in the issues and concerns of the elderly persons. A decrease in the pace of ageing means that the population demographically becomes younger and younger. Such changes in ageing have various implications on the economic and social life of the people. This relationship is demonstrated in the operational conceptual framework below:

2.2.1 Operational Conceptual Framework

Figure 2.2: Factors for Age-Structure Ageing



Source: Compiled by Author, 2007

As indicated in the operational framework above, the largely indirect factors namely the spatial and temporal factors influence the mainly biological factors namely fertility, mortality and migration to impact on the pace of age-structure ageing in the selected study areas. The measurable indicators for each of the factors provided in the operational model above are listed as below:

Factor	**Measurement**
Spatial	Lithology-related e.g. geology, soils, climate
Temporal	Conflict-induced migrations
Cultural life	Living arrangements
Economic life	Economic activities/support systems
Fertility	Total fertility rates
Mortality	Life expectation at age 60
Migration	Net lifetime migrations

2.3 Research Hypotheses

1. **H0:** Variations in demographic factors do not influence observed ageing levels and trends in Lamu, Turkana and Nairobi districts;

2. **H0:** Changes in the spatio-temporal factors do not explain the observed variations in the distribution of the elderly in Lamu, Turkana and Nairobi districts;

3. **H0:** The needs and concerns of the elderly populations in Lamu, Turkana and Nairobi districts are not solely borne by the communities of which they are part.

From the foregoing literature review, the following research gaps, which the present study attempts to fill, emerge. These include the need to:

- Examine the demographic factors namely fertility, mortality and migration that explain the observed ageing trends in the lagging and leading ageing districts of Turkana and Lamu in Kenya,
- Study the role of the geographical and/or physical or environmental and temporal factors namely lithology-related aspects such as geology and soils, as well as climate, water availability and resource conflict induced migrations in explaining the distribution of the aged populations in the study areas, and
- Evaluate the social and economic characteristics of the elderly in the study areas
- Understand the effectiveness of the available coping mechanisms and social support systems in the affected communities and the Kenyan society in general.

CHAPTER THREE

THE STUDY AREAS

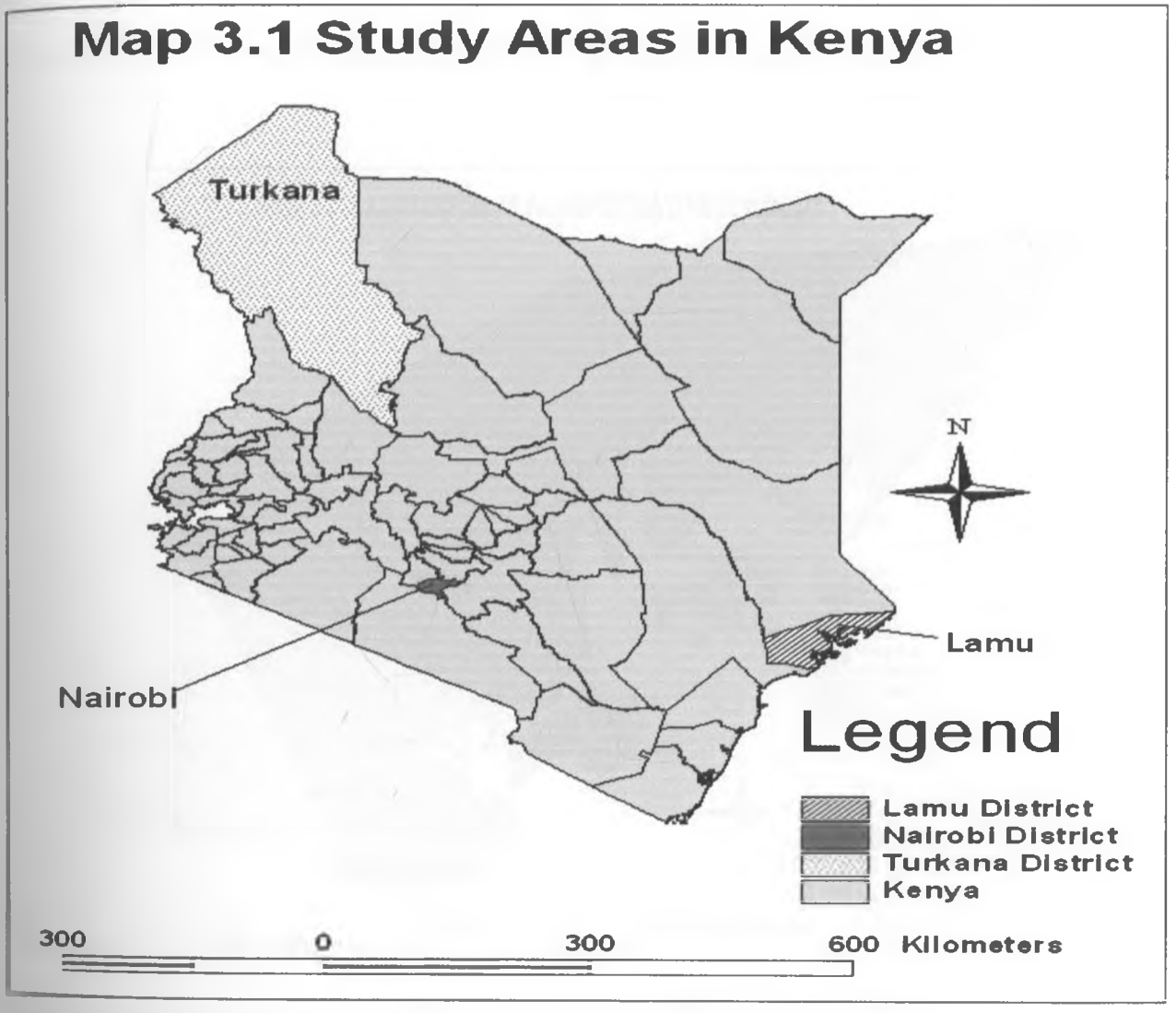
3.0. Background to the Study Areas

This chapter presents the background information of the study areas, namely Lamu district, Turkana district and Kibera Division which represents Nairobi district. This information relates to the location, physical, economic and demographic characteristics as they influence dynamics of population ageing in these areas. The study areas are treated not as isolated entities but rather under selected thematic areas so as to allow for ease of comparability. In this, information is presented starting with Lamu district, then Turkana and finally, where necessary, Nairobi district with specific focus on Kibera Division.

The three study areas namely: Lamu, Turkana and Nairobi districts have been selected for study given their unique ageing trends since the 1979 population census. Whereas Lamu district led and Turkana district lagged in ageing between 1979 and 1999, Nairobi district exhibited interesting ageing trends during the same period. Such urban aged populations in the selected areas of Kibera Division of Nairobi District were used for comparison purposes with the mainly rural populations in Lamu and Turkana districts.

3.1. The study Areas in Kenya: Location and Size

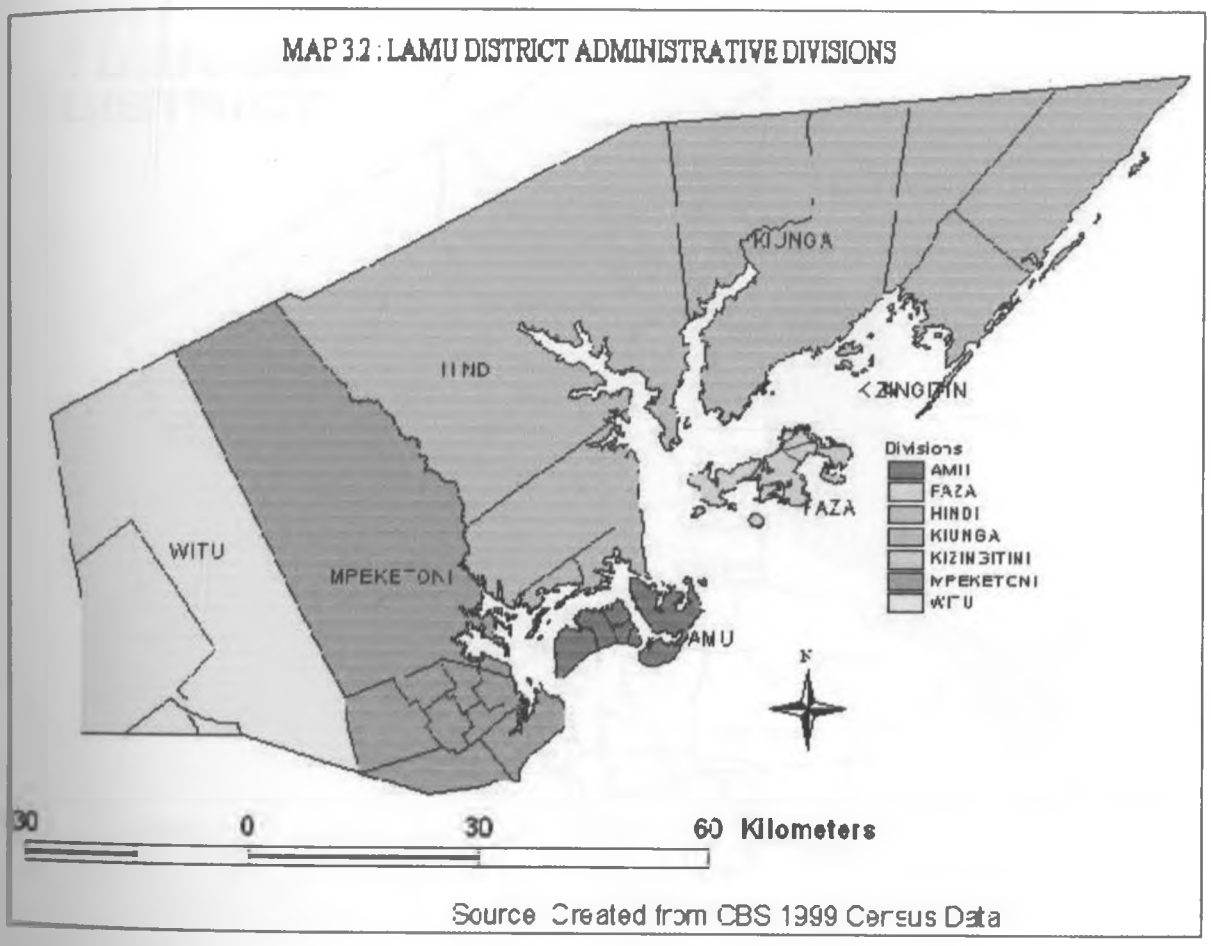
The location of the study areas in Kenya is portrayed in Map 3.1.



Source: Compiled from Survey of Kenya

Lamu district is one of the six districts constituting the Coast Province of Kenya. The district lies between latitudes 1^0 40' S and 2^0 30' S and longitudes 40^0 15' E and 41^0 38' E, and covers an area of 6,166.70 square kilometres. It is the second smallest district in Coast Province after Mombasa covering only 8.15 percent of the province, and extends to about 70 kilometres at its widest, with a coastline of about 130 kilometres long and only 5,517 square kilometres of

agricultural land. Administratively, the district is divided into seven administrative divisions namely: Kiunga (1,570.1 km^2), Hindi (1,804.9 km^2), Faza (74.8 km^2), Kizingitini (18.1 km^2), Amu (102.4 km^2), Mpeketoni (1360.70 km^2) and Witu (1235.70 km^2). About 308 km^2 of the district is covered by open waters. Map 3.2 shows the administrative divisions of Lamu district.



Turkana district lies on the 36th meridian between 10^0 30' and 5^0 30' north of the equator and covers a total of 68,387.80 square kilometres. Administratively, the district has 17 administrative Divisions namely: Central (799.6 km^2), Turkwel (5,608.5 km^2), Katilu (1,212.1 km^2), Lokori (7,040.5 km^2), Lokitaung (1,836.2 km^2), Kakuma (3,695.2 km^2), Kibish (5,684.2 km^2), Lokichoggio (7,918.7 km^2), Kaaling (8,145.2 km^2), Kainuk (1,641.9 km^2), Kalokol

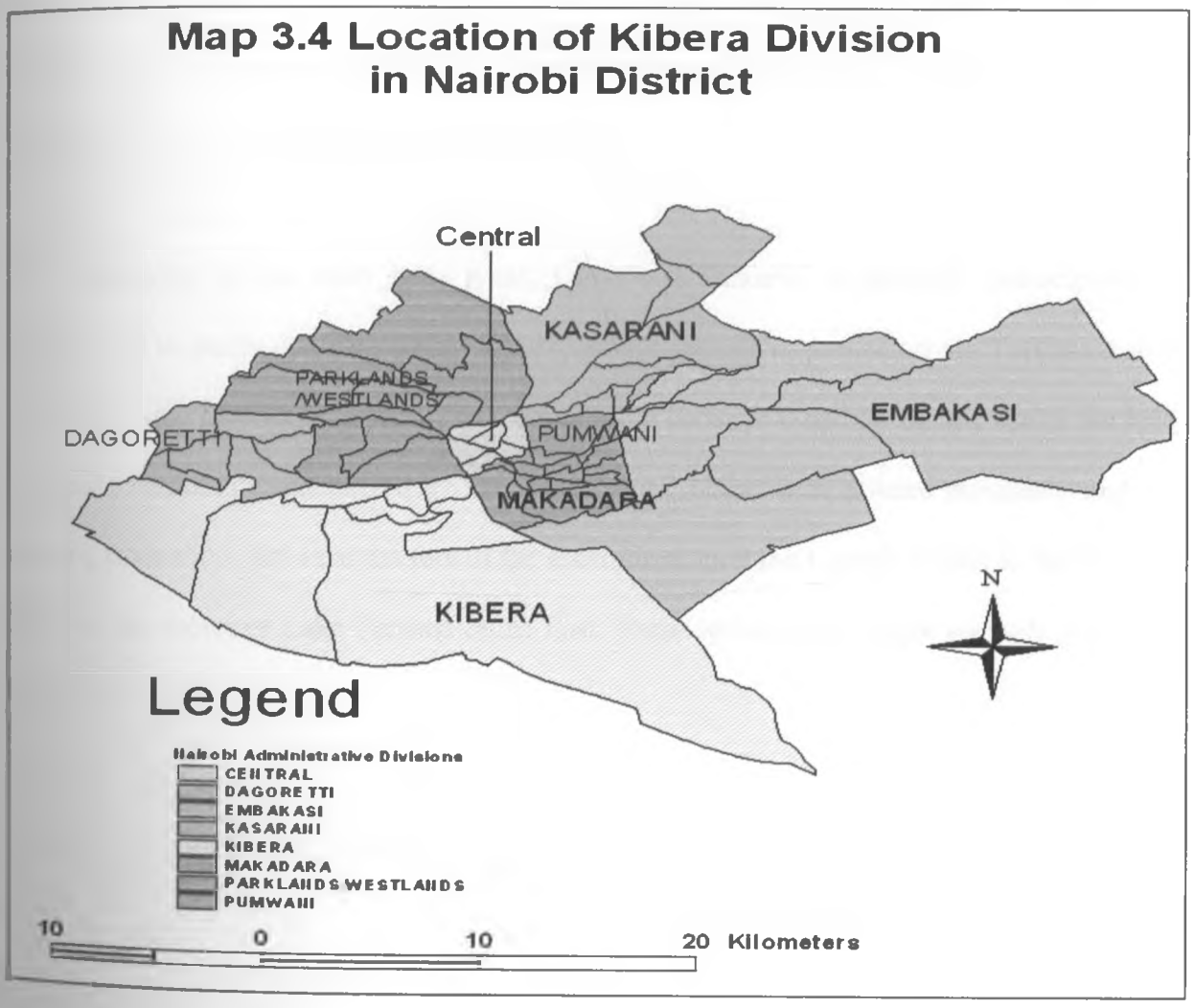
(2,132.4 km^2), Kerio (2,750.1 km^2), Lapur (2,274.5 km^2), Loima (3,475.4 km^2), Lokichar (4,504.3 km^2), Lomelo (4,222.7 km^2) and Oropoi (5,446.3 km^2). Map 3.3 depicts the administrative divisions of Turkana district.

Map 3.3: Turkana District: Administrative Divisions

Nairobi district's physical boundaries have been changing over time. The area expanded from 3.84 km^2 in 1910 to 25 km^2 in 1919. By 1948, the boundary covered an area of 83 km^2 and extended to 680 km^2 in 1968. This has remained the official size of the district. The new

boundaries include Karen, Nairobi National Park, Embakasi airport area, Dandora, Kahawa, Garden Estate, Ruaraka, Njiru and Githurai. The district has 9 administrative divisions namely: Parklands, Westlands, Dagoreti, Kasarani, Pumwani, Embakasi, Makadara, Kibera and Central division. Kibera division, with 7 locations, forms the specific study area in Nairobi. The locations, namely Kibera (17 km^2), Langata (445 km^2), Karen (27.3 km^2), Mugumoini (125.2 km^2), Nairobi West (23 km^2), Laini Saba (0.7 km2), and Sera Ngombe (1 km^2) are shown in Map 3.4.

Map 3.4 Location of Kibera Division in Nairobi District



Source: Compiled from Survey of Kenya

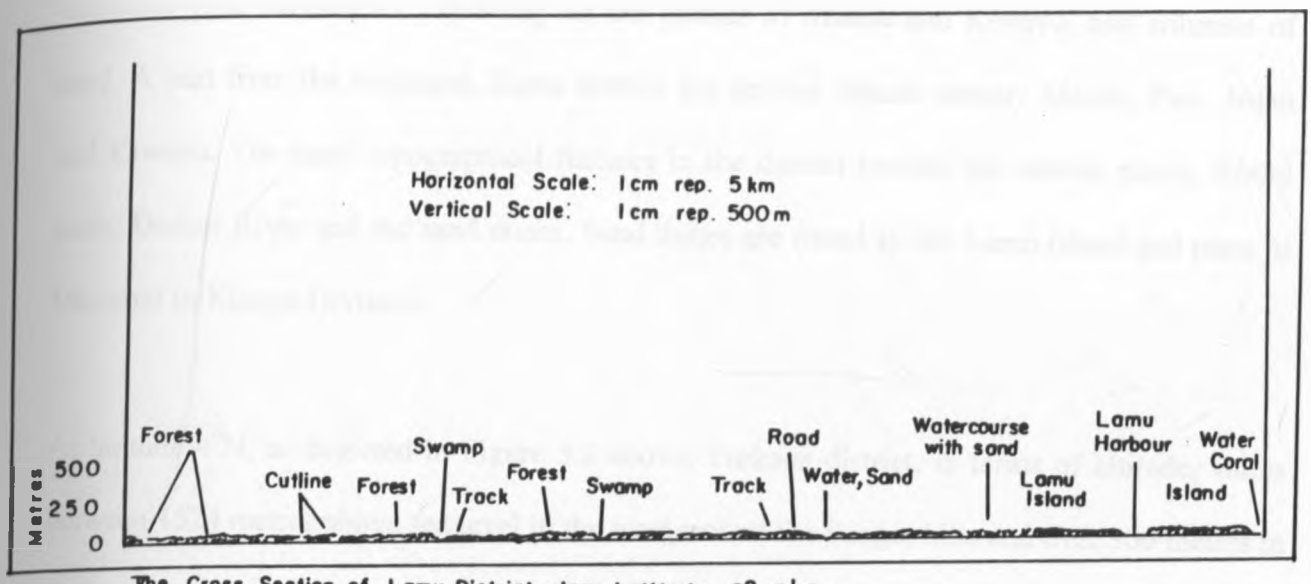
3.2. Physical Characteristics in Relation to Ageing

3.2.1. *Surface configuration*

The need to examine the surface configuration of an area arises out of the realization of the crucial role it plays in the determination, among other considerations, of the agro-climatic and agro-ecological zonations, related agricultural potentials, communication network (particularly roads), density differentials and human settlement. That certain populations would prefer to live in certain topographic areas, for various reasons, is important. Elderly populations in particular, prefer to live in areas convenient to them in terms of mild weather changes, agricultural productivity and accessibility, among other factors.

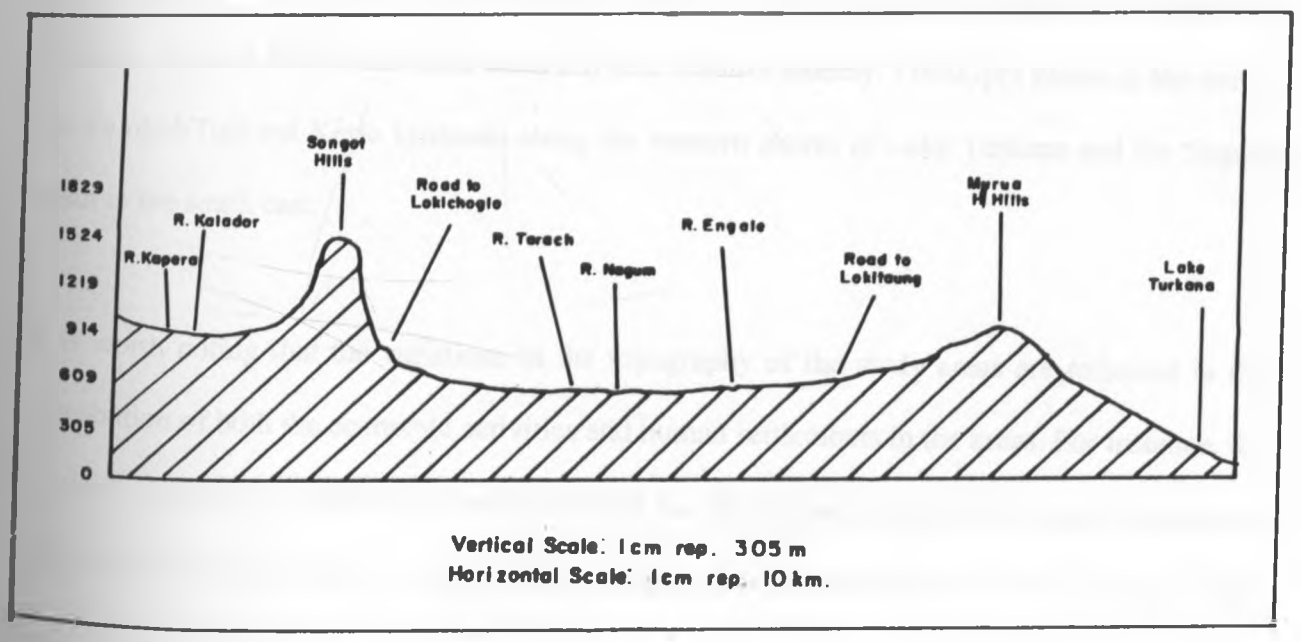
The topography of the main study areas, Lamu and Turkana, is generally characterized by nearly level to gently undulating plateaus, excepting small areas particularly in Turkana district. Whereas Lamu District is generally a flat area lying between 0 and 50 metres above sea level, Turkana District is characterized by mostly low lying plains with isolated mountains and hills ranging from about 900 m at the foot of the escarpment marking Uganda border to the West and 369m to the shores of Lake Turkana in the East. These variations in height are well depicted in Figures 3.1 and 3.2.

Figure 3.1: Simplified Topographical East-West Cross section of Lamu District



The Cross Section of Lamu District along Latitude 2° 18' S

Figure 3.2: Simplified Topographical East-West Cross section of Turkana District



Cross section along Latitude 4° N

As shown in Figure 3.1 above, Lamu district is generally low lying, and some parts of the island areas lie below sea level especially during high tides. The district is characterized by coral limestone rock formations, especially on the islands of Manda and Kiwayu, and columns of sand. A part from the mainland, Lamu district has several islands namely Manda, Pate, Ndau and Kiwayu. The main topographical features in the district include the coastal plains, inland plain, Dodori River and the sand dunes. Sand dunes are found in the Lamu island and parts of Mkokoni in Kiunga Division.

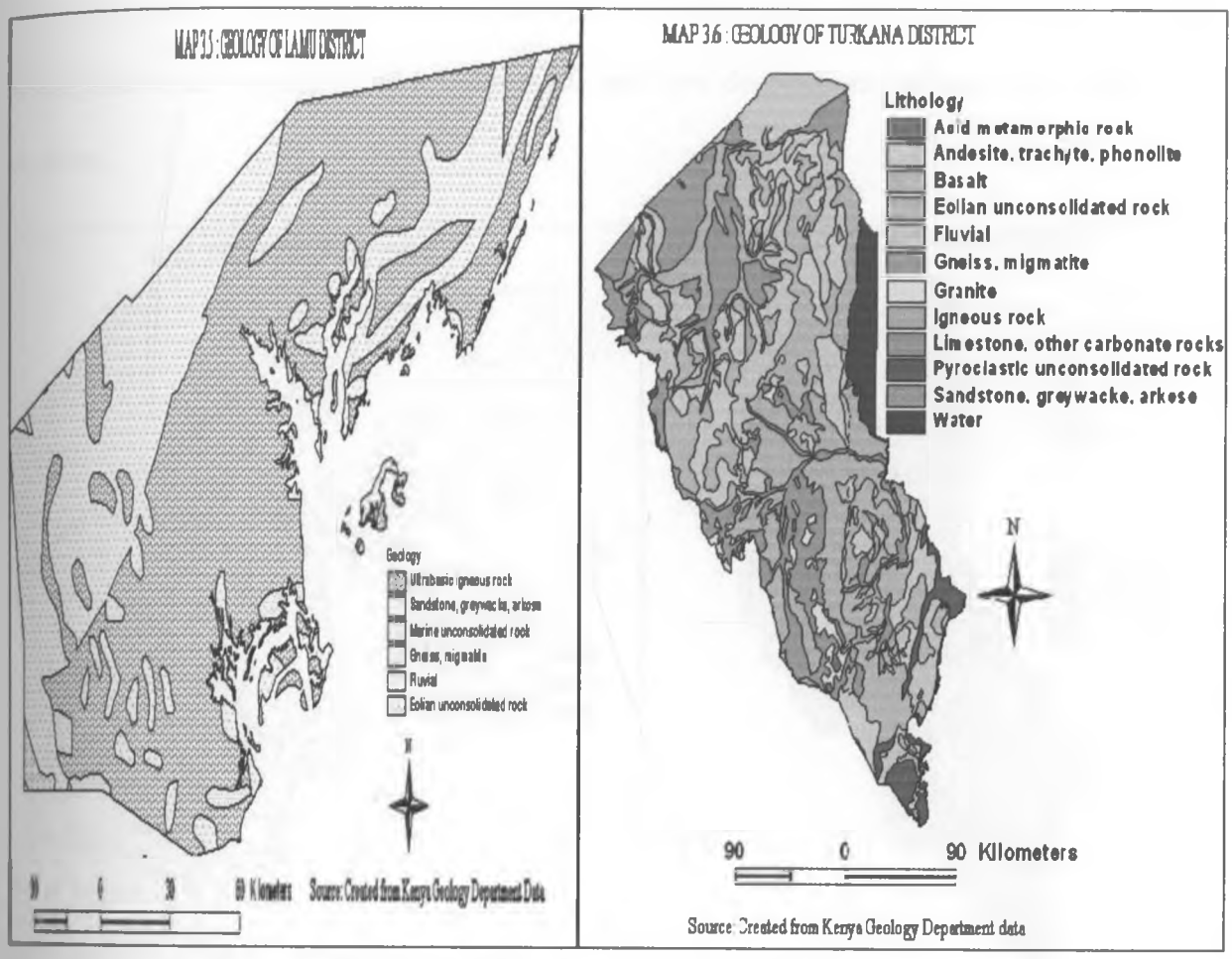
At latitude 4^0N, as depicted in Figure 3.2 above, Turkana district, in terms of altitude, varies between 1524 metres above sea level in the west around the Songot hills and over 300 metres in the east. In other areas bordering latitude 3^0N, the altitude of the mountains range between 1,500 and 1800 metres in the west reaching their peak at Loima hills, which stretches for some 65 square kilometers. Other isolated hills, such as the Ngapoi hills, are mainly found in the central area of the district, with plains around Lodwar and more particularly the Lotikippi plains in the north. In the south-east, the Suguta valley follows a tectonic trough bordering the Samburu uplands. Turkana district has three main physical features namely: Loitikippi plains in the north, the Kalokol/Turkwel Kerio lowlands along the western shores of Lake Turkana and the Suguta basin in the south east.

It is worth noting that the variations in the topography of the study areas are reflected in the distribution of both the economic activities and human settlements in the areas. For instance, for Turkana district, the western part of the district has the highest potential for human settlement and some farming owing to its altitude, among other considerations. Such relatively high

altitudes tend to experience milder temperatures and relatively more rainfall hence suited for settlement and some rain fed agriculture. Topographical gradients also tend to affect the direction of the flow of rivers and thus altering settlement patterns.

3.2.2. *Geology*

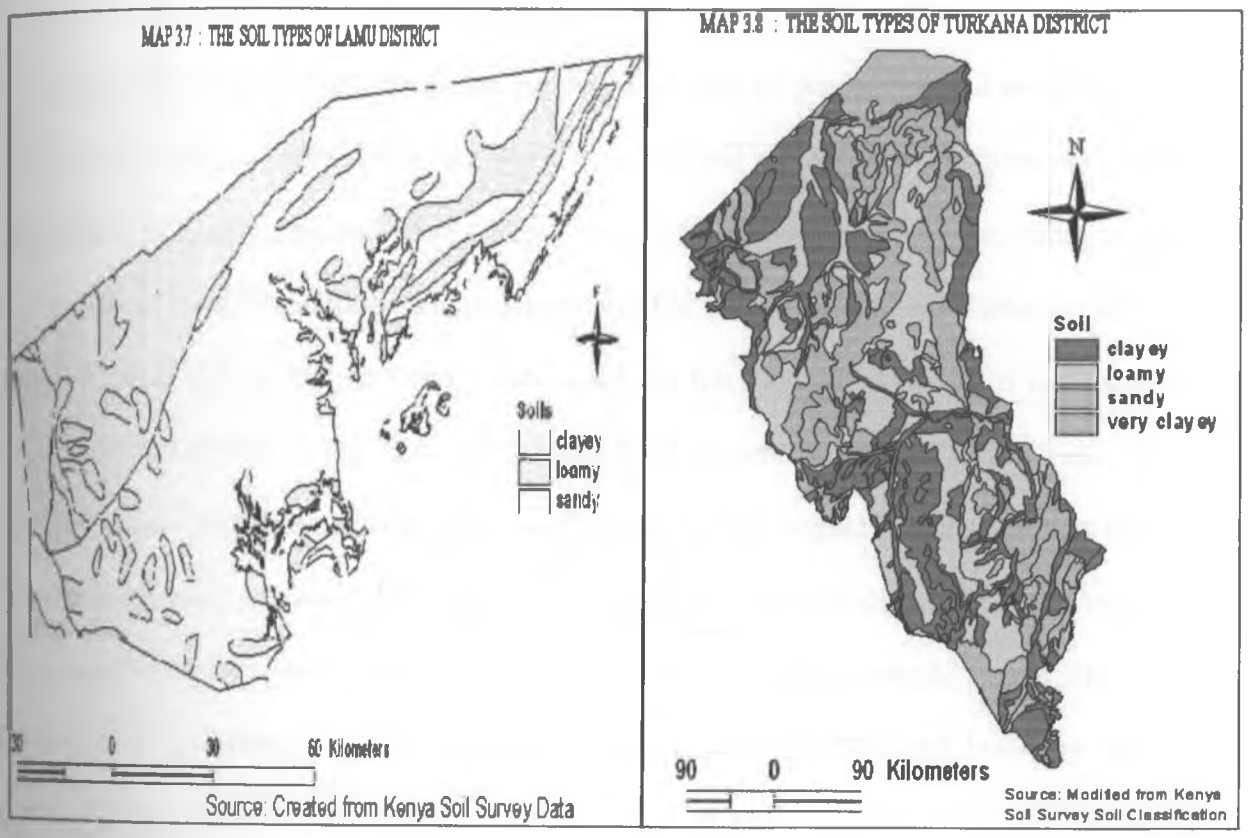
The rock structure that underlies an area is an important variable as it influences, among other factors, the characteristics of the soils formed in that area. The soils thus formed help to influence particularly the agricultural practices suitable for the areas in question, and therefore determining, among other considerations, production levels. The variability in such levels, determines, among other factors, the distribution of both the human and physical resources in the study areas. The socio-economic activities that the elderly particularly in Lamu and Turkana districts are engaged in are so much a function of the geological bases of those areas. Maps 3.5 and 3.6 depict the geological foundations of Lamu and Turkana districts.



As depicted in maps 3.5 and 3.6 above, whereas Lamu district is largely occupied by the ultra basic igneous rock and unconsolidated marine deposits, some parts of the district have scattered sandstones, gneiss, fluvial deposits and unconsolidated aeolian rock. Turkana district, on the other hand, has a third of its area covered by volcanic rocks formed from widely varying volcanic ash cinder and flow materials. The basement system outcrops are confined to the Uganda escarpment to the west of the district and to the mountains south of Lokichar and Lodwar.

3.2.3. *Soils*

Whereas in Lamu district, the best agricultural land is found to the coastal, northern and western parts, the soils in Turkana district are not well developed due to aridity and constant erosion by water and wind. Maps 3.7 and 3.8 shows the soil type descriptions of both Lamu and Turkana districts.



3.2.4. *Drainage*

The drainage network of an area plays an important role in the distribution of both the population and socio-economic activities as it tends to attract human settlement particularly to areas bordering watercourses. This guarantees water availability for domestic, industrial and other uses. Incidentally, vegetation also flourishes along such courses. In Lamu District, the few seasonal streams found in the district flow from the west towards the south-eastern part of the

district, though they do not reach the Indian Ocean. These streams have no profound impacts on the spread of the populations and their activities. However, in Turkana District, there are several rivers with major ones being the Turkwel and Kerio rivers both originating in the highlands to the south. Most rivers are seasonal in nature and, therefore, can only be relied upon during short periods in a given year. Whenever it rains, the water runs rapidly off the barren slopes and causes flash floods in the rivers and valleys and some of this water goes to replenish the available river bed aquifers. Given the existing high rates of percolation and evapo-transpiration in Turkana district, some rivers like Kerio and Turkwel which receive regular water from the highlands of Cherangani and Mount Elgon do not flow throughout the year. Noteworthy, most of the rivers empty their waters in Lake Turkana. The water level of Lake Turkana, which is fed, among other rivers, by the Omo River, tends to fluctuate in response to rainfall over the Ethiopians highlands. The Omo river supplies 80 percent of the lake inflows and the rest is from Turkwel and Kerio rivers. Other small rivers include Suguta in the south east and Tarach in the north-west. Suguta is permanent while Kerio and Turkwel dry out in their lower courses between November and March. Tarach River flows only during periodic floods. There are two major drainage patterns in Turkana district namely Lake Turkana and Lotikippi plains. The ground water sources in the district include boreholes, wells and pans that are concentrated in permanent settlements and along major roads.

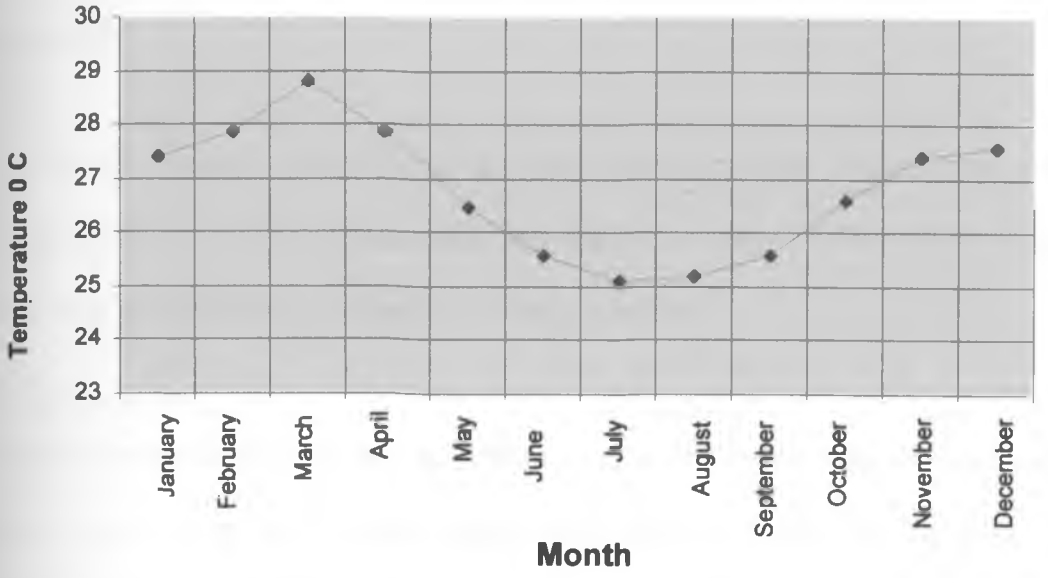
3.2.5. *Climate*

An interplay of factors such as altitude, latitude, topography, character of the prevailing winds, proximity to the sea or any sizeable water body tends to influence the climate of a given region. The vegetation cover and pressure belts are equally significant. Some of these climatic factors, as they influence the climate of the study areas, are considered here below:

(i) Temperature

Owing to its remarkably low altitude, Lamu District experiences two marked variations in temperature generally ranging between 23^{0}C and 34^{0}C throughout the district. Whereas the hottest months are from December to April, the coldest months are from May to July.

Figure 3.3: Mean Monthly Temperature (^{0}C) for Lamu District



Source: *Farm Management Handbook of Kenya, Vol. II*

As for Turkana District, there exits generally high and fairly uniform temperatures throughout the year with a daily average of about 24-38^0 C. However, given the generally high altitude to the western part of the District, the area experiences fairly cooler temperatures. The district also experiences strong winds which blow from the east to south. In the western part of the district,

people practice some small-scale farming activities and keep livestock while in the rest of the district, people can only keep livestock and practice fishing in Lake Turkana.

Generally, the high temperatures in the two study areas may not be not conducive to the elderly as this tends to render them inactive by not participating actively in the socio-economic processes of their communities. Most of the elderly choose to idle and do only what is within their reach without straining.

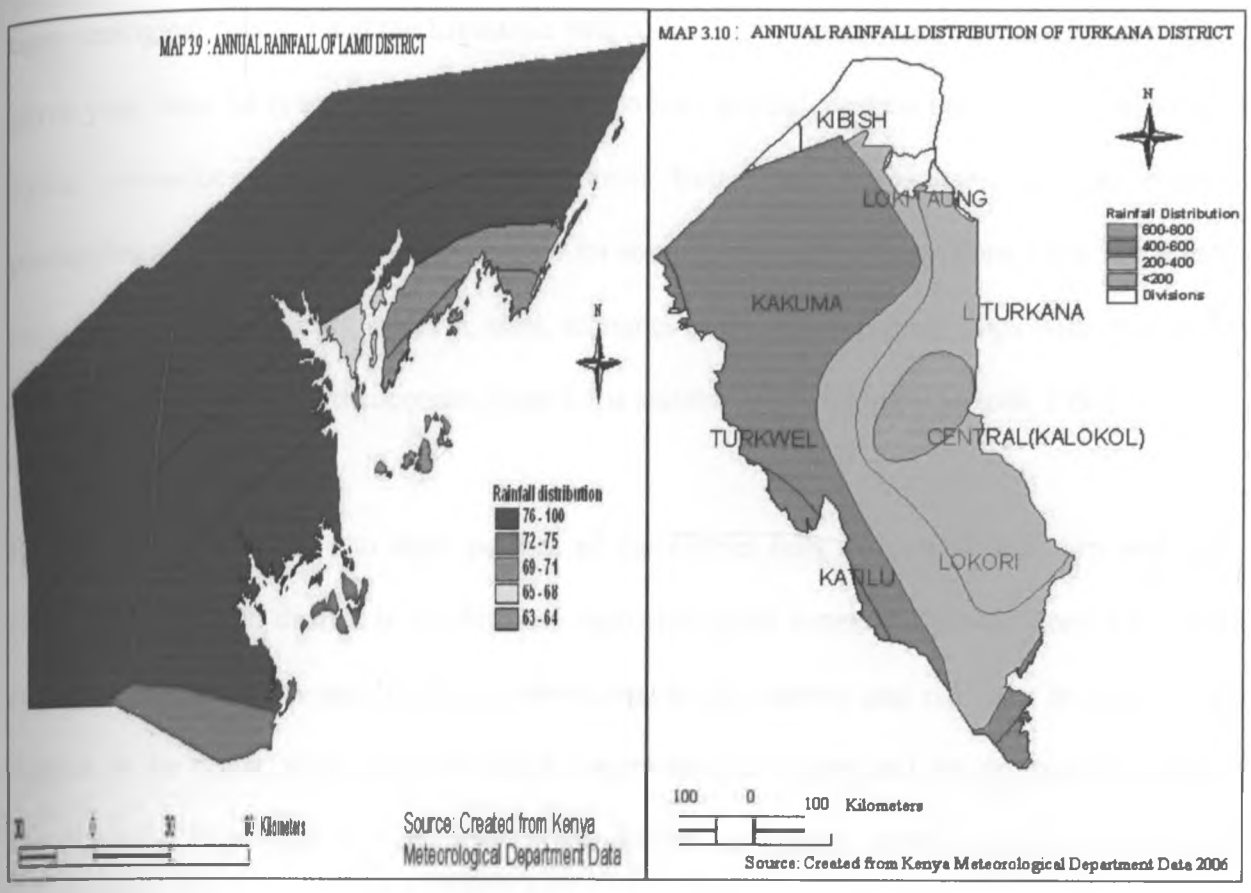
(ii) Rainfall

The rainfall amounts received in an area, reliability and effectiveness are significant considerations in the socio-economic activities of a people. This tends to influence the distribution of populations and their economic activities.

Lamu district experiences a bimodal pattern of rainfall with the long rains occurring from mid April to end of June and the short rains occurring in November and December. The highest rainfall occurs in month of May. The rain is generally unreliable and therefore inhibiting agricultural activities, among others. The months of January to March and August to October are usually hot and dry. This makes the participation, especially of the elderly, in the socio-economic life of the District, limited. In addition, the District usually experiences three rainfall zones, with the arid areas along the northern border receiving below 540 mm, the semi-arid areas covering Amu Division and the islands receiving between 550 mm and 850 mm, and the sub-humid zone covering the divisions of Witu and Mpeketoni receive between 850 mm and

1100 mm of rainfall annually. Notably, the mean annual rainfall and its reliability decreases towards the hinterland because the rainfall pattern is mainly influenced by the Indian Ocean to the south of the district. Overall, the generally low and unreliable rainfall in Lamu District hinders, to some reasonable extent, agricultural development and therefore, affecting the livelihoods of the elderly persons.

Turkana District has both arid and semi-arid characteristics, with the lowest annual average rainfall of 120mm recorded in the central plains around Lodwar and the highest annual average rainfall of about 430 mm experienced in the north-west area around Lokichoggio. Lokitaung to the north-east and Kaputir in the Turkwel valley to the south have an average rainfall of 300 mm and 280 mm respectively. The long rains usually fall between April and August and the short rains in October and November. Other than the generally low annual rainfall totals, Turkana District experiences unreliable and erratic rainfall patterns over the years. For example, Lodwar town's rainfall figures range between 19 mm and 380 mm. In addition, rain is usually accompanied by sharp thunderstorms in the late afternoons and at night (*Turkana District Development Plan, 1997-2001*).

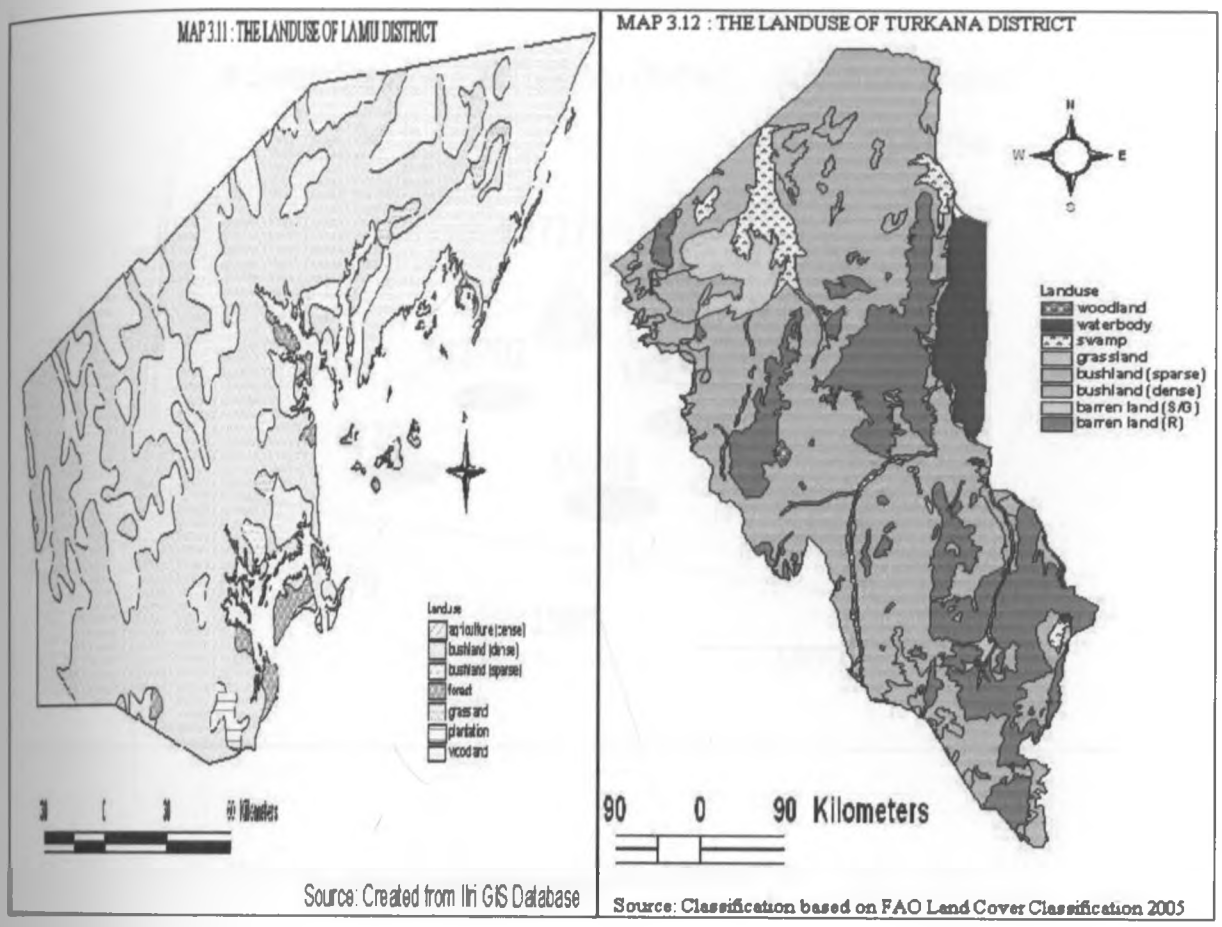


3.2.6. Agro-Ecological Zones

Agro-ecological zones are areas of potential land-use as delineated on the basis of natural (or environmental) factors such as moisture availability and temperature, among others. In Lamu district, though relief differences are small, this affects the soil water differences in the area. Rainfall decreases with distance away from the coastal strip inland. For example, the highest annual average rainfall of above 1,000 mm occurs about 5-20 kilometres inland. The district is divided into three main agro-ecological zones, namely: the Coconut-Cassava Zone (L3) which covers mostly the coastal plains, the Cashew nut-Cassava Zone (L4) which extends around

agro-ecological zone L3 and the Livestock-Millet Zone (L5) which is further inland. During any given year, zone L3 is the most suitable for crops such as sisal, cashew nuts, bixa, papaws, West Indian avocadoes, cassava, guavas, and some fruits such as bananas, lemons, oranges, pineapples and grapefruit. It is also suitable for some pasture and forage. Zone L4 in suitable for crops such as cashew nuts, cassava, sisal, mangoes and some marginal crops with poor yields potentials like bananas and coconuts. Zone L5 is suitable for ranching (Jaetzold, 1981).

For Turkana district, five to eight percent of the district falls under arid and very arid agro-climatic Zones. The district is divided into agro-ecological zones as follows: Zone VII, which covers the land at low and moderate elevations in the eastern and northern sections of the district, is the driest, while zone VI which covers the foot slopes and the dry troughs between the extension high lands and the core of the district has higher rainfall. Zone V is arid with inadequate and poorly distributed rainfall, and Zones III and IV which form about 3 percent of the district are suitable for limited rain fed crop cultivation. A few isolated areas mainly between zones 5 and 7, which constitute an area of 18,000 square kilometers (about 23 percent of the district), constitute agricultural development areas though with limited potential. Crops such as maize can be grown in this area (Jaetzold, 1981). Maps 3.11 and 3.12 below depict the variations in land use between Lamu and Turkana districts.

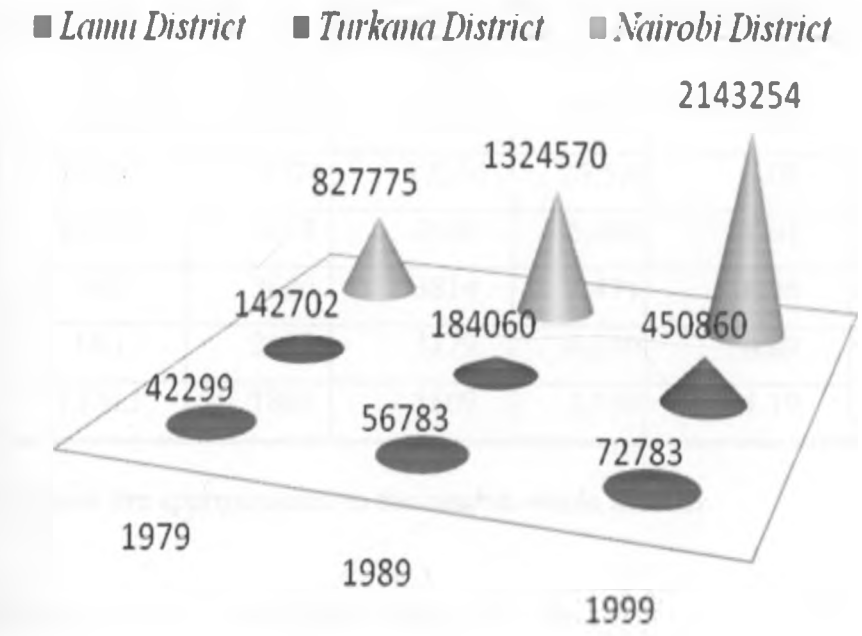


3.3. Demographic Characteristics and Ageing

3.3.1 Population Growth Levels and Trends

The changes in the total populations of Lamu and Turkana Districts and Kibera Division in Nairobi District, over the 1979, 1989 and 1999 Kenya population census years are portrayed in Figure 3.4.

Figure 3.4: Total Population Change in the Study Areas in Kenya



Source: Compiled from Kenya Population Census Reports 1979, 1989, 1999

As shown in Figure 3.4 above, the total population in Lamu district increased from 42,299 in 1979 to 72,783, an increase of 72.1 percent and in Turkana district the population changed from 142,702 in 1979 to 450,860 in 1999, a 215.9 percent increase. For Nairobi district, the population increased from 827,775 in 1979 to 2,143,254 in 1999 representing an increase of 158.9 percent. Notably, there has been tremendous growth in the total populations in the three study areas between 1979 and 1999 census years.

3.3.2 Population Distribution and Densities

Table 3.1 : 1999 Population Distribution in Lamu District

DIVISION	LAND (KM^2)	MALE	FEMALE	TOTAL	SEX RATIO	DENSITY*
Amu	102.4	8919	8391	17,310	1.06	169
Hindi	1804.9	4056	3016	7,072	1.34	4
Mpeketoni	1360.7	13274	12256	25,530	1.08	19
Witu	1235.7	3012	2968	5,980	1.01	5
Faza	74.8	3660	3814	7,474	**0.95**	100
Kizingitini	18.1	2831	3179	6,010	**0.89**	332
Kiunga	1570.1	1801	1509	3,310	1.19	2

*These density figures are approximated to the nearest whole number

Source: Compiled from Kenya Population Census 1999 data

An examination of the 1999 population distribution and sex ratio data of Lamu District shows that in all the divisions except Faza and Kizingitini (*Table 3.1*), the male populations exceed the female populations. Amu Division, in which Lamu town is located, has the highest population density of 169 persons per square kilometer and Kiunga Division, with a density of 2 persons per square kilometer has the lowest density in the district. The dominant male population in the district would be attributed to in-migration for populations in Amu, Hindi, Mpeketoni, Witu and Kiunga, and out-migration in Faza and Kizingitini. The number of persons aged 60 years and over in Lamu District increased from 2,563 in 1979, to 3,455 in 1999, an addition of 892 persons.

Table 3.2 : 1999 Population Distribution in Turkana District

DIVISION	LAND (KM^2)	MALE	FEMALE	TOTAL	SEX RATIO	DENSITY
Central	799.6	16,872	19,047	35,919	0.88	45
Kaaling	8,145.20	11,872	12,181	24,053	0.97	3
Kainuk	1,642.90	5685	6,114	11,799	0.93	7
Kakuma	3,695.20	53,395	43,719	97,114	**1.22**	26
Kalokol	2,132.40	13,627	15,108	28,735	0.90	13
Katilu	1,212.10	5,750	6,798	12,548	0.84	10
Kerio	2,750.10	7,119	8,290	15,409	0.86	6
Kibish	5,684.20	2,917	3,140	6,057	0.93	1
Lapur	2,274.50	6,819	5,961	12,780	**1.14**	6
Loima	3,475.40	16,507	17,472	33,979	0.94	10
Lokichar	4,504.30	10,315	11,476	21,791	0.89	5
Lokichoggi	7,918.70	18,343	17,844	36,187	**1.03**	5
Lokitaung	1,836.20	11,002	11,584	22,586	0.95	12
Lokori	7,040.50	8,616	9,299	17,915	0.93	3
Lomelo	4,222.70	3,032	3,055	6,087	0.99	1
Oropoi	5,446.30	8,751	9,269	18,020	0.94	3
Turkwel	5,608.50	23,926	25,955	49,881	0.92	9

Source: Compiled from Kenya Population Census 1999 Census data

Based on the sex ratios and population distribution for Turkana district and its constituent administrative divisions above, it is evident that there are more females than males in the population in the district, with an exception of Kakuma, Lapur and Lokichoggio divisions (*Table 3.2*). This situation could be explained by the fact that wherever out-migration takes place, more males tend to migrate and settle elsewhere than females. Notably, the populations of Kakuma and Lokichoggio are largely characterized by refugee populations.

The spatial population distributions and density differentials in the Turkana district portrays an existence of distinct population clusters, with population concentrating mainly around urban areas and water points. This is, perhaps, a reflection of the varying environmental potentials and

migration trends. The number of persons aged 60 years in Turkana District increased from 14,512 in 1979 to 37,401 in 1999, an addition of 22,889 persons.

Table 3.3: 1999 Population Distributions in Kibera Division of Nairobi District

LOCATION	LAND (KM^2)	MALE	FEMALE	TOTAL	SEX RATIO	DENSITY
Kibera	17	48,492	35,195	83,687	1.37	49,228
Lang'ata	44.5	9,585	6,533	16,118	1.46	362
Karen	27.3	5,651	4,113	9,764	1.37	358
Mugumoini	125.2	17,867	17,195	35,062	1.03	280
Nairobi West	23	21,035	21,497	42,532	0.97	1,849
Laini Saba	0.7	30,360	21,659	52,019	1.40	74,313
Sera Ngombe	1	26,093	21,464	47,557	1.21	47,557

Source: Compiled from Kenya Population Census 1999 Census data

Kibera Division, one of the divisions that constitute Nairobi District, is divided into 7 locations. In these, Laini Saba location has the highest population density of 74,313 persons per square kilometre and Mugumoini location, with 280 persons per square kilometre has the lowest population density. In terms of total population, Kibera location, with 83,687 people is leading and Karen location, with 9,764 is lagging.

3.3.3. Urbanization and Ageing

Given their wide range of pull factors, urban centres tend to attract populations mainly from rural areas. Such populations include the predominantly young male populations in search of better facilities, services and opportunities, among other considerations, than the old. The aged populations both from the urban and rural areas require easy access to medical and other

facilities which are readily available in urban centres. In Lamu district, the majority of the elderly populations live in urban areas as opposed to their counterparts in Turkana district who live mainly in rural areas. Lack of sufficient food, serious drought conditions and abject poverty in the lives of the elderly in Turkana district, as compared to Lamu district, perhaps explains the stark realities of the ageing phenomenon in those areas.

3.4. Agriculture and Ageing

Agriculture plays a significant role in the lives of people as it not only provides the much required food nourishment for a population but also engages the population in the production processes. This participation is particularly important for ageing people as it allows them to spend their time more actively in society.

In Lamu District, owing to the prevailing bimodal rainfall pattern, most of the major crops are grown during the long rains which occur from mid April to end of June. The short rains occur in the months of November and December, a period that is short for any meaningful agricultural undertaking. However, the drought resistant crops such as cowpeas, green grams and simsim are grown during these short rains. The various crops grown during the long rains include cashew nuts, cassava, coconuts, groundnuts, sweet potatoes, cabbage and bananas. Some of the crops and fruits grown throughout the year include sisal, mangoes, papaws, West Indian avocadoes, bixa, lemons and limes, oranges, pineapples and grapefruit (Jaetzold, 1981).

In Turkana district, only about 30 percent of the land area can be classified as moderately suitable for agriculture. This exists in areas such as Central Lotikippi plains, the upper

Loima/Punch prasit plateaux, the lowlands of Turkwel, Naketon and Kwalathe drainage, along the Lake Turkana at Tondeyang plains, the lower Kalokol and portions of the Loriu plateau. The major crops in Turkana are sorghum and maize as staple food crops and cotton as cash crop. The cultivation of these crops is mainly under irrigation schemes mainly along the Turkwel and Kerio rivers, and rain fed areas particularly to the western parts of the district. The main cropping areas are Lokori, Katilu and Turkwel Divisions, and the rest of the Divisions are mainly pastoral areas.

3.5. Tourism and Distribution of the Elderly

Tourism plays an important role not only in redistributing population in both the source and destination areas, but also in providing the much needed monetary and other benefits to enhance livelihoods. As tourism involves travel, most of those who travel vary in both gender and age. In terms of gender, males are likely to travel more than females. Mature populations, particularly those in search of new and better opportunities and the elderly who have retired from their duty engagements in life, have more likelihood of traveling to new areas. As is evident in Turkana District, there are more females in the Turkana population except in three areas namely Kakuma, Lokichoggio and Lapur Divisions, which are characterized by male populations mainly due to in-migration waves resulting from pressures in the source areas. In Lamu, except in Faza and Kizingitini Divisions, the rest of the areas have more males than females. The situation is fairly similar in Nairobi's Kibera Division where the male population is dominant in all locations except in Nairobi West Location. The prevailing ageing trends in the study areas

are, perhaps, among other considerations, a result of the migrations trend prevalent in those areas.

Other than the harvesting of the mangrove trees for a myriad of uses both domestic and otherwise, together with business engagements, tourism is perhaps the mainstay of the people of Lamu District. The district, with 72,686 people (CBS, 1999) and with its district headquarters on Lamu Island, is a World Heritage site, attracting domestic and international tourism. It has one marine park called Kiunga National Marine Reserve (KNMR) and a national reserve called Dodori.

As for Turkana District, tourism as an economic activity is not very well developed and has therefore not made a major contribution in redistributing the district's population in space. However, population distribution is a function of the available resources mainly water and food together with the existing resources in urban centres. Central Division, with a population density of 45 persons per square kilometre and Kakuma Division, with a population density of 26 persons per square kilometre, are areas of high population density in Turkana District. Incidentally, in Central Division Lodwar Town, which is the headquarter of Turkana District and Kakuma refugee camp which is in Kakuma Division, have high populations. With the creation of refugee camps in Kakuma and Lokichoggio, such centres act as central places which tend to attract populations owing to the availability of a wide range of facilities and services for the population.

In Turkana District, the main tourist attracting centres are found in the far north-west and south of the district, west of the Songot Hills, Magila ranges on the northern half of the Lotikippi

plains, north and west of Kaaling Division, on the plains between Kalokol and Kerio Rivers between Lorugum and Loima Hills in the mid section of Kerio Valley, and in the east of Kapedo in the south east tip. In terms of density and diversity, the wildlife population is insignificant. Some of the animals found in South Turkana Game Reserve include elephants, buffaloes, Zebras, fringe eared oryx, island dik-dik, leopards, cheetahs, jackals, grand gazelles, and hyenas. The central island in Lake Turkana also hosts a variety of crocodiles, fish, birds and hippos (Turkana District Development Plan, 1997-2001).

CHAPTER FOUR

RESEARCH METHODOLOGY

4.0 Introduction

This chapter examines the research methodology of the study. It focuses on various methodological aspects. These are: sampling design, data requirements in terms of nature and sources, data collection methods and processing, analysis and presentation techniques applied. The quality and quantity of data collected is important as it influences the data analysis tools utilised and the relevance of the research results. These elaborate procedures provide the guidelines on how this study was undertaken so as to avoid self-deception and minimize the probability of being inaccurate (Prewitt, 1974). It is an important precursor to the attainment of the stipulated objectives of the present study.

4.1 Research Design

4.1.1 *Sample Frame*

Hammond and McCullagh (1978) define a sampling frame as the statistical population from which a sample is selected. For this study, the sample frame consisted of all persons (both male and female) aged 60 years and over in Lamu, Turkana and Kibera Division of Nairobi district in Kenya. According to the 1999 Kenya population census, such populations totalled to 3,455 people in Lamu, 11,438 people in Turkana and 37,401 in Nairobi districts. However, during the pilot survey and data collection stage it was realized that a number of the elderly aged 60 years and over had either died or moved out of their districts in search of better care. This study,

however, utilized the 1999 Kenya Census statistical figures provided for purposes of sampling. It is from this sample frame that a total sample of three hundred aged persons was drawn. It was felt that this sample size was representative of the statistical population parameters. The envisaged insufficiency of financial and time resources available to the researcher necessitated the utilization of a sample as opposed to the study of all aged persons in Lamu, Turkana and Nairobi districts. Furthermore, it is generally acknowledged that sample coverage often permits higher levels of accuracy as opposed to full enumeration. Moser, et al (1971) notes that a sample also enables a researcher to make inferences about the population characteristics on the basis of sample analysis within the limits of statistical theory.

4.1.2 Sampling Procedure

The sampling procedures adopted for this study were varied given that there was need to sample both the study areas and the study population. These are presented below:

4.1.2.1 *Study Area Sampling*

The main study areas, namely Lamu district in Coast Province and Turkana district in Rift Valley Province, owing to their unique ageing trends exhibited during the entire 1979-1999 census period, were respectively identified for this study as the leading and lagging ageing districts in Kenya. Given that these are mainly rural based districts, Nairobi district was used as an urban district, as exemplified by Kibera Division, to provide comparison for the ageing trends witnessed in these rural districts.

In selecting the sampled areas, the study areas were first purposefully classified on the basis of regional representation as well as the existing administrative areas. In this, Turkana district, with seventeen administrative divisions was clustered as follows:

Table 4.1: Clustered Sample Areas in Turkana District

No	Cluster Name	Clustered Divisions
1	South Turkana	1. Lokichar 3. Lomelo 5. Lokori 2. Katilu 4. Kainuk
2	North Turkana	1. Oropoi 3. Lokichoggio 5. Lokitaung 2. Kakuma 4. Kaaling 6. Kibish 7. Lapur
3	West Turkana	1. Loima 2. Turkwel
4	East Turkana	1. Kerio 2. Kalokol
5	Central Turkana	1. Lodwar

From the above list of all divisions in Turkana district, again purposefully, considering that the ageing process is also a function of both spatial and economic activities such as fishing, agricultural, urban and pastoral engagements, the sampled study areas in the respective clustered areas were as follows: Lokichar and Katilu, Oropoi and Kakuma, Loima and Turkwel, Kerio and Kalokol, and Lodwar. Whereas most of the areas practice mainly pastoral activities, Katilu and Turkwel practice both agricultural and pastoral activities, Kalokol is a fishing area, and Lodwar is an urban area.

For Lamu district, all the divisions were considered in the study. Again, however, on the basis of spatial proximity to each other and economic considerations, these administrative divisions were purposefully clustered as shown in Table 4.2.

Table 4.2: Clustered Sample Areas in Lamu District

No	Cluster Name	Clustered Divisions
1	Mpeketoni/Witu	1. Mpeketoni 2. Witu
2	Hindi/Kiunga	1. Hindi 2. Kiunga
3	Matondoni/Faza	1. Matondoni 2. Faza
4	Amu	1. Amu

These economic considerations necessitated the inclusion of Kibera division in Nairobi as the main area of study owing to the fact that its population could with ease be divided into high income (Lang'ata/Karen locations) and low income (Kibera location) categories for purposes of comparability with the aged populations of the mainly rural districts of Lamu and Turkana districts.

4.1.2.2 *Study Population Sampling*

All the individuals aged 60 years and over, who constituted the unit of measurement, were eligible for inclusion in the population sample. This population, according to the 1999 Kenya population census, totalled to 3,455 in Lamu district, 11,438 in Turkana district and 37,401 in Nairobi district. Aged populations in these study areas had an equal chance of being included in

the samples that were drawn. Given that sample size does not depend at all on the size of the population (Kalton, Graham 1983), it was felt that a sample of 100 individuals aged 60 years and over, from each of the study areas, was large enough to use for estimating the parameters of the parent population. Furthermore, it is the size of the sample and not the proportion of the parent population which it represents that affects confidence limits. The larger the sample drawn, the greater is the probability that it accurately reflects the distribution from which it was taken, and as the sample size increases, confidence limits get closer to the sample mean. However, large samples may be time consuming and costly. From the various clusters, various samples were drawn as follows: Turkana district 20 samples per cluster, in Lamu district, 25 samples per cluster and in Kibera division of Nairobi district, 50 samples per cluster were drawn, with one half of the sample drawn from Kibera Location and another half from Lang'ata Location. The total sample drawn from the three study areas was 300 individuals aged 60 years and over. The drawn samples of 100 aged persons each, representing 0.9 percent for Turkana district, 2.9 percent for Lamu district, and 2.1 percent for Kibera division whose total elderly population was 4,782, permits the researcher to make conclusions about the parent populations.

For the sampling of the study population, both the Respondent- Driven Sampling and Simple Random Sampling procedures were utilized. According to Heckathorn (2005), the Respondent-Driven Sampling approach is extremely useful in studying such populations as the elderly. In this, a randomly chosen sample serves as the initial contact, which then provides names of their peers who fulfil the research criteria. The researcher approaches these persons and each person provides a fixed number of names. The researcher continues this process for as many stages as desired. Notably, the Respondent-Driven Sampling procedure produces samples that are

independent of the initial subjects from which sampling begins. All the identified peers have an equal opportunity of being included in the sample. As for random sampling, Hosking and Clark, 1986, observe that it is useful as it helps to 'average out' the effects of any extraneous factors that may be present in the sample frame. A random sample consists of units drawn from a population where every unit of the population has an equal chance of being selected.

In the various clusters identified, to draw a sample of the elderly, the administrative officers in these areas were used to recruit a handful of the elderly to serve as 'seeds' in the recruitment process. At least three could-be respondents were identified. From the three identified, simple random sampling procedures were used to select two elderly individuals to be included in the sample. Those sampled and interviewed also served to provide other recruits, and the process continued until the required sample size was obtained. This network was useful as it provided the required samples for the study. The main trait defining membership in the sample was age (at least 60 years and over) which was objectively verifiable.

4.1.3 Data Requirements

Data quality and availability is critical in any research undertaking given that the conclusions arrived at, at the end of the study and the related recommendations, largely depend on the analysis of the data collected at the initial stages. This study required data on the following aspects: demographic variables mainly fertility, mortality and migration; spatio-temporal factors such as lithology-related aspects mainly geology and soils, climatic variability, water availability and resource conflict-induced migrations, as well as the socio-economic variables such as transport and communication networks, education, health, livelihood sources and coping strategies of the aged populations in the selected study areas.

4.1.3.1 Data Sources and Collection Techniques

To meet the objects set out for this study, both primary and secondary data sources were used.

4.1.3.2 Primary Data

Primary data was obtained from the field using questionnaires, interviews, personal observations and photographic material. These data related to the peoples' views and perceptions regarding the ageing phenomenon and the elderly in their communities. Questionnaires were used to obtain both quantitative and qualitative data. The use of questionnaires facilitated personal contact with the interviewees. This ensured better communication and probing of issues not clearly understood and likely to engender confusion. By administering questionnaires, the researcher and his assistants were able to dispel the fears of respondents regarding the various issues raised as well as create an atmosphere of ease.

Both formal and informal questionnaires designed to suit particular groups of interest were used in this study

(i) Formal Interviews

Formally designed questionnaires, totalling 300, with both open-ended and closed ended questions, were used to elicit relevant data from the randomly selected persons aged 60 years and over in the selected households in the study areas. The open ended and closed ended questions in the questionnaire were meant to allow appropriate flexibilities in the responses of those interviewed as well as restrict the interviewees to the relevant research issues. It is worth

noting that these questionnaires were completed by individuals aged 60 years and over only. These questionnaires were administered by trained interviewers as face to face interviews in order to ensure the existence of high response rates from the elderly respondents, availability of explanation(s) for the clarity of questions and relevant answers, as well as the probing and cross-checking of questions and responses. Some important variables obtained by use of questionnaires include personal details, socio-cultural life of the elderly, spatio-temporal factors namely geology and soils, climatic variability, water availability and natural resource induced migrations of the elderly. Others variables included livelihood sources of the elderly as well as their coping potentials and strategies.

(ii) Informal Interviews

The informal interviews were conducted as free, open and often casual interviews with the respondents after the formal interviews. These efforts were, however, dictated by the degree of responsiveness of the various interviewees and the astute judgement of the responses given by the interviewers.

(iii) Observation

Both the direct observation of the state or condition of the elderly and the inferences of the implications of what is actually observed were used by the interviewer(s) so as to obtain a first hand and authentic picture of the research problem. However, this was also subject to biases from those observing as their observations would be based largely on personal opinions, understanding and past experience(s) in the field and subject of study. In an attempt to minimise such bias, the researcher had to treat each observation as a new experience and allow room for new ideas and/or views to shape up. The use of photographs and images was also useful in getting the required data.

4.1.3.3 Secondary Data

Secondary data was gathered from a wide palette of already published and unpublished sources such as books, annual reports, topographic sheets, study reports, journals, theses and dissertations.

The following are the secondary data sources from which the requisite data was obtained:

(i) *Population Census Reports*: - This reports provided information relating to, among others, population dynamics in Kenya and in the specific study areas (Turkana, Lamu and Kibera) in particular. Census reports for the years 1979, 1989 and 1999 were particularly useful in this study.

(ii) *Development Plans*: - This data source provided useful information relating to resource availability and planning aspects both at the national level and the district, mainly Turkana, Lamu and Nairobi district, levels during the relevant periods covered by the plans.

(iii) *Statistical Abstracts*:- These abstracts contain useful information on diverse aspects of the economy, among others.

(iv) *Other Published and Unpublished Materials*:- These include available literature in the form of books, reports, theses and dissertations, internet sources and any other publications relevant to the present study.

(v) *Maps*:- Maps on the study areas relating to administrative units, population, geology, soils, annual rainfall distribution, temperature, agro-ecological zones, road networks, vegetations, landuse, landforms and water points, among others, were generated from already existing database sources such as the following:

(a) Kenya Soil Survey (KSS) 1982 and revised in 1997 for the Kenya Soils data whose coverage shows the soil, physical and chemical properties for Kenya, the Kenya Lithology data whose coverage shows the lithology of Kenya, and the Kenya Agro-Climatic Zones data whose coverage, derived from the Exploratory Soil Survey Report No. E1 of Kenya Soil Survey of 1982, shows the principle agro-climatic zones of Kenya based on a combination of both moisture availability zones (I-IV) and temperature zones (1-9);

(b) German Technical Co-operation (GTZ) databases for the northern Kenya landforms, northern Kenya water points and the Kenya vegetation;

(c) Central Bureau of Statistics (CBS) databases for the 1979, 1989 and 1999 Kenya population census whose coverage shows the average total population numbers, population densities as well as the household and household densities done up to the sub-location levels;

(d) World Food Programme (WF) database covering the road network of Kenya excluding Western Kenya; and,

(e) Japanese International Co-operation Agency (JICA) and the National Water Master Plan, Kenya covering the Kenya River Basins (November 1991), the Kenya Rainfall Distribution (November 1999), and the Kenya Landuse showing the general landuse classes derived from the 1980 Landsat data.

4.2 Data Processing, Analysis and Presentation

The enormous amount of data collected from the field was processed, analysed and presented using a number of relevant demographic and statistical tools. The data was analysed as either qualitative or quantitative data. Data processing and analysis was mainly done with the help of computer packages mainly the Statistical Package for Social Sciences and Excel.

An elaborate use of a diversity of tools such as tables, charts, graphs, diagrams and maps were resorted to for illustration and presentation purposes. Each of these data presentation tools has unique advantages and thus enriched the output of this research. An initial summary of the field data using these tools was very useful in the preliminary investigations and conclusions of this study.

4.2.1 Qualitative Data Analysis

Qualitative data included the respondent's perceptions, subjective reasons/rationale for the coded questions and responses from open-ended questions. These were summarized, processed and compiled in the form of tables, diagrams, graphs, maps and pictures in order to provide a summary of the data and also give a quick visual impression of the various aspects treated in the study. Descriptive statistics, mainly the means, frequencies and percentages have been used. This is in a bid to help in comparing between sets of raw data, facilitate easy assimilation of the data, and present the data in a summarised form for quick and easy comprehension.

A number of scanned photographs have also been used as tools of data presentation. These plates serve as tangible sources of evidence as they portray what actually happens in the many aspects related to the study.

4.2.2 Quantitative Data Analysis

A diversity of descriptive and inferential techniques and computations have been used in order to satisfy the study objectives. The types of quantitative analyses done, in this study, are presented as follows:

(a) Demographic Data Analysis

The analysis of the indicators of demographic ageing was done using the following methods:

(1) ***Speed/Intensity of ageing***: - Given that this study considered population ageing as the ageing of the age structure, ageing was measured by the change in the proportions of persons in different age groups. Thus, the 'speed' of the process of ageing was given by the formula:

$$S(o-i) = \frac{Sqrt\,(v_{it} - v_{io})^2}{\frac{n}{k}} x100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1^{1}$$

where:

v_{it} = Proportion of population in age group i at the moment t

v_{io} = Proportion of population in age group i at the moment o

n = Number of age groups

k = Number of years from o to i

S = Measures the mean year percentage change in the average age group during the considered period

The speed and/or intensity of ageing between specific periods is given in percentage.

[1] Source: Marta Sougareva (1989) in her article 'Impact of Ageing on Family and Household Structure, presented at the International Conference on Ageing of Population in Developed Countries, Prague, Czech Republic, 1989. Vol. IX/4. pp.472.

(2) ***Population Change:*** - this is measured in absolute and relative terms as provided below:

(i) Absolute population change is given by the formula

$$A = \frac{prop(t_i) - prop(t_o)}{(t_i - t_o)} \quad \text{.....2}^2$$

(ii) Relative population change is given by the formula

$$B = \left(\frac{prop(t_i)}{prop(t_o)}^{1/(t_i - t_o)} - 1 \right) x100 \quad \text{.....3}$$

where:

A = is absolute population change (in i above)

B = Relative population change (in ii above)

Prop = proportion of population at a given time

t_i = later time or period

t_o = earlier time or period.

(3) ***Ageing Index***: - This is another indicator of the age structure also sometimes referred to as the aged-child ratio. The aged-child (elder-child ratio) ratio indicates whether or not a population is young or ageing. It is the number of people aged 60 and over per 100 youths under age 15. If the ageing index is more than 100, then the area has more elderly people than youths and vice versa. The ageing index is calculated as:

$$ECR = \frac{<60 years}{>15 years} X100 \quad \text{.....4}$$

The ratio is given as, for example, x elderly residents per 100 children in Lamu.

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[2] Source: Proceedings of International Population Conference on Ageing of Population in Developed Countries, Prague, Czechoslovakia, July 4-7, 1989. Vol. I pp. 66

As the value of elderly child ratio increases, we may say that population is ageing. The population may be termed young when the ECR is below 15 and old when the ECR is above 30.

(4) ***The Elderly Dependency Ratio (EDR):*** - This is the number of individuals of retirement ages (elderly) compared to the number of those of working ages. For convenience, this study assumed the working ages to start at age 15, although increasing proportions of individuals pursue their education beyond that age and remain, meanwhile, financially dependent, either on the state or increasingly though, on their parents. This ratio of the elderly dependent population to the economically active (working) population is also known as the old-age dependency ratio, age-dependency ratio or elderly dependency burden. The elderly (Aged) dependency ratio is given as:

$$EDR = \frac{P_{60+} + P_{0-14}}{P_{15-59}} x100 \quad \text{.....5}$$

(5) ***Measures of location***: these include a group of statistical measures of location mainly the median and mean of population. The median age is the age at which exactly half the population is older and another half is younger and it is perhaps the most widely used indicator. Because it is more sensitive to changes at the right-hand tail of the age distribution (i.e., the oldest old ages), the mean age of population might in fact be preferred to the median age to study the dynamics of population ageing. The median helps to indicate two distinctive trends in a population and these are ageing and a juvenation of a population. In ageing, the share of older persons increases and the share of children decreases in a population. Due to this, the median age increases. The juvenation is a process in which the share of children increases and the share of older persons declines and the median age decreases. Populations which have a median age below 20 may be termed as young and those with median ages above 30 years may be termed as

old. Those populations which have median ages between 20-29 years are in the intermediate age category.

(6) ***Population pyramids***: - Since population ageing refers to changes in the entire age distribution, any single indicator might appear insufficient to measure it. The age distribution of population is often very irregular, reflecting the scars of the past events (wars, depression etc.), and it cannot be described just by one number without significant loss of information. Were the age distribution to change in a very irregular fashion over the age range, for instance, much information would be lost by a single-index summary. Therefore, perhaps the most adequate approach to study population ageing is to explore the age distribution through a set of percentiles, or graphically by analyzing the population pyramids. Population pyramids are commonly used to describe both age and sex distributions of populations. Youthful populations are represented by pyramids with a broad base of young children and a narrow apex of older people, while older populations are characterized by more uniform numbers of people in the age categories.

(7) ***Fertility indicator:*** - Fertility is one of the demographic variables deemed to account for age-structure ageing in the study areas. The variations in fertility in the study areas were calculated using the Crude Birth Rates indicator that looks at the number of births (usually live births) reported in the population to the mid-year population. It is the number of live births per year per 1000 population. This is given as:

$$CBR = \frac{B}{P} xK \qquad \text{.....6}$$

where P = mid-year population

B = births in the year

K = 1000

(8) ***Mortality indicator:*** - Mortality is another important demographic variable that may explain the variability in the age structures of the study areas. The changes in mortality in the selected study areas were calculated using the Crude Death Rate indicator which is the ratio of the total registered deaths to the mid year population multiplied by a constant. This is given as

$$CDR = \frac{D}{P} xK \quad \text{.....7}$$

where D = total deaths in the population

P = mid-year population

K = 1000

(9) ***Migration indicator***: - Migration is also an integral factor in changes of age structures. Variations in the net migrations of the various study areas were

done using the balancing equation method, which is given as:

$NM = P_{(t+n)} - p_t - ({}_nB_t - {}_nD_t)$.....8

where:

$P_{(t+n)}$ = population of a locality at time $t + n$

p_t = population of the locality at time t

${}_nB_t$ = number of births occurring in the locality in the period $t + n$

${}_nD_t$ = number of deaths occurring in the locality in the period $t + n$

(10) ***Population Growth Rate***:- Calculation for the annual growth rate was based on the exponential rate of growth which follows the principle of compound interest. In this, it is assumed that the population experiences a constant rate of growth that is repeated and maintained year after year. This produces larger and larger increments given that the total population becomes larger.

The annual rate of population growth across the age categories in the study areas was calculated using the following equation:

$$r = \frac{\log(P_{t+n} / P_t)}{n \log_e} x100 \quad \text{.....9}$$

Where:

r = Annual rate of population growth

P_{t+n} = Population in current census period

P_t = Population in prior census period

n = Number of years between census i.e. P_{t+n} and P_t

e = Natural logarithm, value of approximately 2.718

(11) ***Population Doubling Time***: - The calculation of doubling time gives a quick perspective of change in different populations. This is the number of years the population takes to double itself if it continues to grow at the same rate (Pathak, 1998). The rate is given by the formula:

$$DT = \frac{70}{GR} \quad \text{.....10}$$

Where:

DT = Doubling time

70 = Constant

GR = Annual growth rates in percentage

(b) Spatial Data Analysis

To be able to address the question of what the data, the patterns in the data are, and what the data could be, the study referenced various variables used in the study to the earth's surface. The geo-spatial data were sourced from Central Bureau of Statistics (Electoral Commission

included), Kenya soil Survey, Kenya Geological Department and Ilri GIS databases. Three geo-spatial data sets were generated from the Kenya Electoral Commission spatial database which provided the most up to date information on the administrative boundaries. The resultant geo-spatial data included Kibera in Nairobi District, Turkana district, and Lamu district with a spatial resolution of sub-location. The data sets were used to generate population distribution, land use, geology, road, soils, water points, and annual rainfall distribution maps. To be able to do this, ArcView GIS was used as a platform where the geo-processing tool was used to clip for each variable required the surface representation. The resulting spatial data were then classified either using unique classification scheme (for individual measurements) or graduated classification scheme (for grouped measurements) to generate thematic maps depicting spatial conditions in the study area.

(C) Quantitative Data Analysis and Hypothesis Testing

In analyzing quantitative data, both descriptive and inferential statistical tools have been used. Descriptive statistics are used to describe the basic features of data in a study by way of summarizing and displaying data. They are also helpful in screening data in order to determine its reliability and consistency. According to Mathews (1981), descriptive statistics form the basis of virtually every quantitative data analysis. In this study, the main descriptive analytical tools used are: the arithmetic mean, frequency distributions and percentages. The arithmetic mean summarizes a data set and is calculated by dividing the sum of all the values in a data set by the number of values/observations. A frequency distribution is a table that shows how frequently each value of a variable occurs in a set of scores. Inferential statistics provide a means by which inferences are made about the population from which the sample is drawn.

These statistics are useful for testing hypotheses. The inferential statistic utilized in this study is the Pearson Correlation analysis.

(i) ***Correlation Analysis***

Correlation is a statistical technique which can show whether and how strongly pairs of variables are related (Hammond and McCullagh, 1978). Correlation is only appropriate for data in which numbers are meaningful, usually quantities of some sort. This provides precise measurements. In this study, correlation analysis seeks to determine how well the linear equation explains the relationship between various aspects in Lamu, Turkana and Nairobi districts. These aspects are as follows:

(a) demographic effects (fertility, mortality and migration) on age-sex structures

(b) Spatio-temporal characteristics of climate, natural resource induced conflicts and income on the distribution of the elderly

(c) Living together and financial support from children on caring for the elderly

The correlation measure is given by the Pearson Correlation Coefficient r as:

$$r = \sqrt{\frac{(ExplainedVariation)}{(TotalVariation)}} = \frac{(\sum X)bi}{\sum Y} \quad \text{.....11}$$

Where: $$\sum X = \frac{\sum X^2 - \left(\sum X^2 / n\right)}{n-1}$$

and: $$\sum Y = \frac{\sum Y^2 - \left(\sum Y^2 / n\right)}{n-1}$$

The main result of a correlation, called the *correlation coefficient* (or "r"), ranges from -1.0 to +1.0. The closer r is to +1 or -1, the more closely the two variables are related. If r is close to 0,

it means there is no relationship between the variables. If r is positive, it means that as one variable gets larger the other gets larger. If r is negative it means that as one gets larger, the other gets smaller. While correlation coefficients are normally reported as r = (a value between -1 and +1), squaring them makes them easier to understand. The square of the coefficient (or r square, also known as the coefficient of determination) is equal to the percent of the variation in one variable that is related to the variation in the other. The coefficient of determination (r^2) gives the percentage of the total variability of Y explained by the independent (predictor) variable(s) Xi. To ascertain the probability of obtaining results as extreme as those observed, the significance of each correlation coefficient is obtained. If the obtained significance level is small (less than 0.05), then the correlation is significant and the two variables are linearly related. If the significance level is large (0.5), the correlation is not significant and the two variables are not linearly related (*Appendices 3, 4 and 5*).

The foregoing discussion on the various methods of research forms the bedrock of the key methodological tenets of this study. In the next chapter, the study results, particularly on the relationship between demographic factors namely fertility, mortality and migration, and age-structure ageing in the study areas are presented.

CHAPTER FIVE

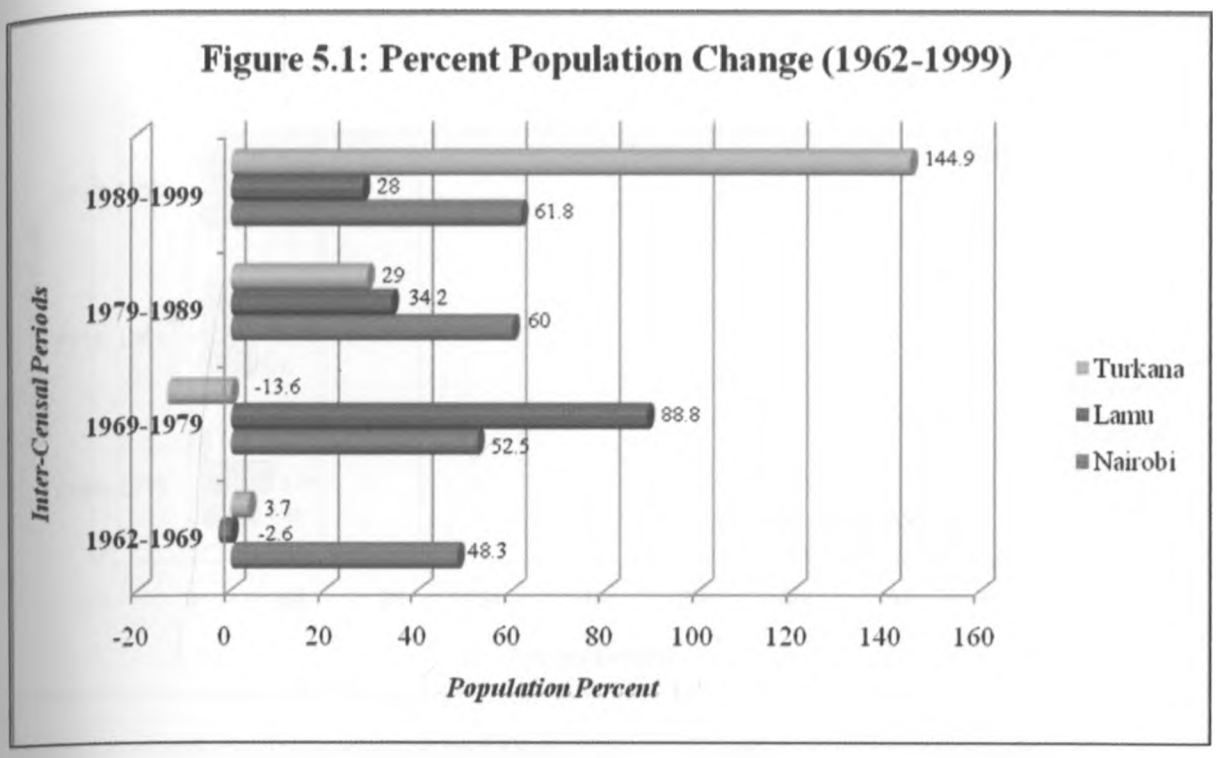
DEMOGRAPHIC DETERMINANTS AND TRAJECTORIES OF AGEING POPULATION

5.0 Introduction

This chapter examines the trajectories of population age structure ageing as well as the effect(s) of the variability of demographic factors, namely fertility, mortality and migration, on the ageing levels and trends of the populations in Lamu, Turkana and Nairobi districts of Kenya. This analysis begins with an exposition of the changing levels and trends in the growth of the total percent populations, inter-censal growth rates, as well as the elderly populations in the respective study areas and then examines each demographic variable as it contributes to the ageing phenomenon in the study areas. In addition, this chapter attempts to explain, using the salient demographic factors, the variability observed in the ageing of the age structures of Lamu as the leading and Turkana as the lagging ageing districts in Kenya. The observed ageing phenomena in these mainly rural districts are favourably compared with the characteristically urban ageing age structures of Nairobi district for the entire 1979-1999 period. In this chapter, the first hypothesis of this study which states that 'variations in demographic factors do not influence ageing levels and trends in Lamu, Turkana and Nairobi districts, is tested and results presented.

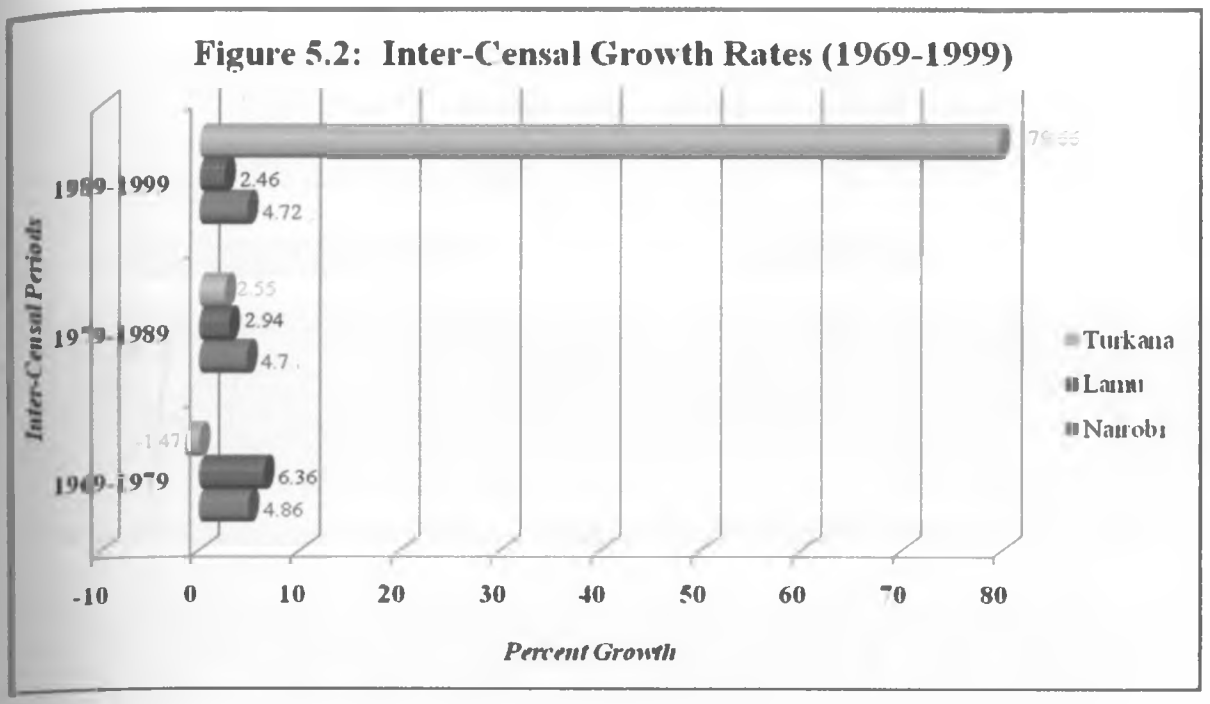
5.1 Percentage Total Population and Elderly Population Change

Figures 5.1 and 5.2 depict the variations in the total population percent and inter-censal growth rates in the study areas of Lamu, Turkana and Nairobi districts.



Source: Population Change figures estimated from 1969, 1979 and 1989 Census reports.

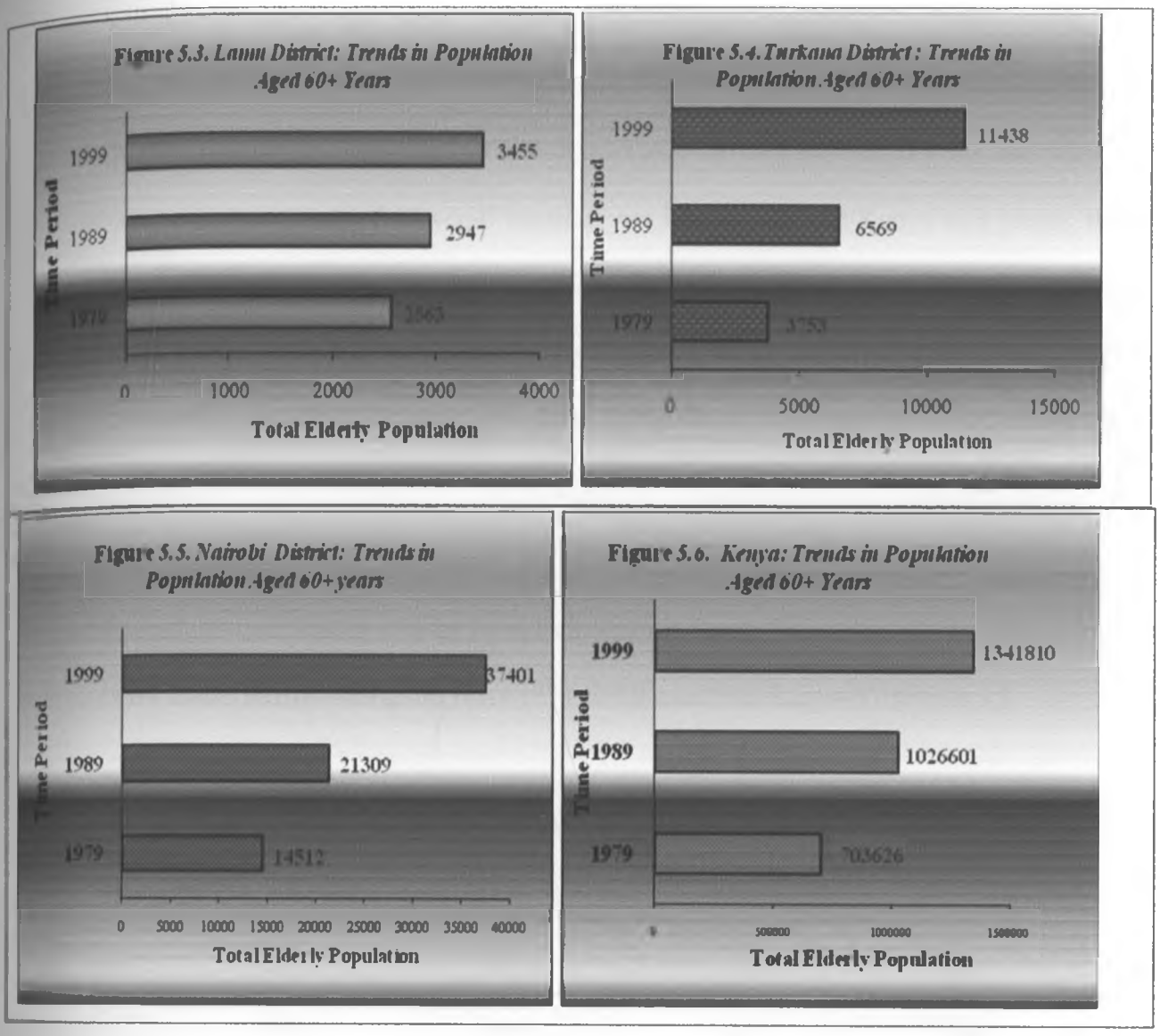
As for the total population change, Lamu district's population changed from -2.6 percent in the 1962-1969 period to 88.8 percent in the 1969-1979 period, 34.2 percent in 1979-1989 period and 28.0 percent in the 1989-1999 period. Clearly, the upsurge in the total population in the 1969-1979 period would be attributed to in-migration and settlement in the district. Turkana district's total population experienced unstable growth patterns during the entire period ranging from 3.7 percent in 1962-1969, -13.6 percent in 1969-1979, 29 percent in 1979-1989 and 144.9 percent in 1989-1999. This variability is perhaps attributed to the extremely dry conditions in the district. As for Nairobi district, the change varied from 48.3 percent in 1962-1969, 52.5 percent in 1969-1979, 60 percent in 1979-1989 and 61.8 percent in 1989-1999, reflecting a consistent upward trend in the population. This is also largely a result of in-migration.



Source: Growth rate indices estimated from 1969, 1979 and 1989 Census reports.

As depicted in Figure 5.2 above, the inter-censal growth rates varied significantly across the study areas. Lamu district started with a high rate of 6.36 percent in the 1969-1979 period, only to decline to 2.94 in the 1979-1989 period and 2.46 percent in the 1989-1999 period. Turkana district's inter-censal growth rates varied from -1.47 percent in the 1969-1979 period to 2.55 percent in the 1979-1989 period, and finally a huge 79.66 percent growth rate during the 1989-1999 period. For Nairobi district, the growth rate varied from 4.86 percent in 1969-1979 inter-censal period to 4.7 percent in the 1979-1989 period and 4.72 percent in the 1989-1999 period.

The variations in the growth of total population aged 60 years and over in the selected study areas contrast significantly, with some areas such as Nairobi district registering tremendous growth particularly between 1989 and 1999, and others like Lamu district, recording a fairly even growth. These trends are revealed in figures 5.3, 5.4, 5.5 and 5.6.



Source: Kenya Population Census and Housing Reports Vol. I, 1979, 1989 and 1999

As indicated in Figures 5.3, 5.4, 5.5 and 5.6 above, Nairobi district with a total population of 14,512 persons aged 60 years and over in 1979 increased to 21,309 in 1989 and 37,401 in 1999. This change represents slightly more than two and a half fold increase in a period of only twenty years. For Turkana district, this population segment increased from 3,753 in 1979 to 6,569 in 1989 and 11,438 in 1999, representing a more than three fold increase. Lamu district, with a total of 2,563 in 1979, 2,947 in 1989 and 3,455 in 1999 experienced a fairly even change in its

elderly population during this period. Although the elderly population in Turkana district increased fairly significantly over the 1979-1989 and 1989-1999 periods, this increase was fairly low compared to the total population. In Lamu district over the selected census years, the elderly population was high although the overall increase was insignificant. In Kenya as a whole, the elderly population increased tremendously from 703,626 in 1979 to 1,341,810 in 1999 as shown in Figure 5.6 above. These increases in the elderly population of the selected study areas, and Kenya in general, represent a segment of the total population that requires special opportunities and services given their frail nature and conditions.

The total population percentage change by age category in Lamu, Turkana and Nairobi districts, as well as the entire Kenya during the years 1979, 1989 and 1999 is shown in Table 5.1.

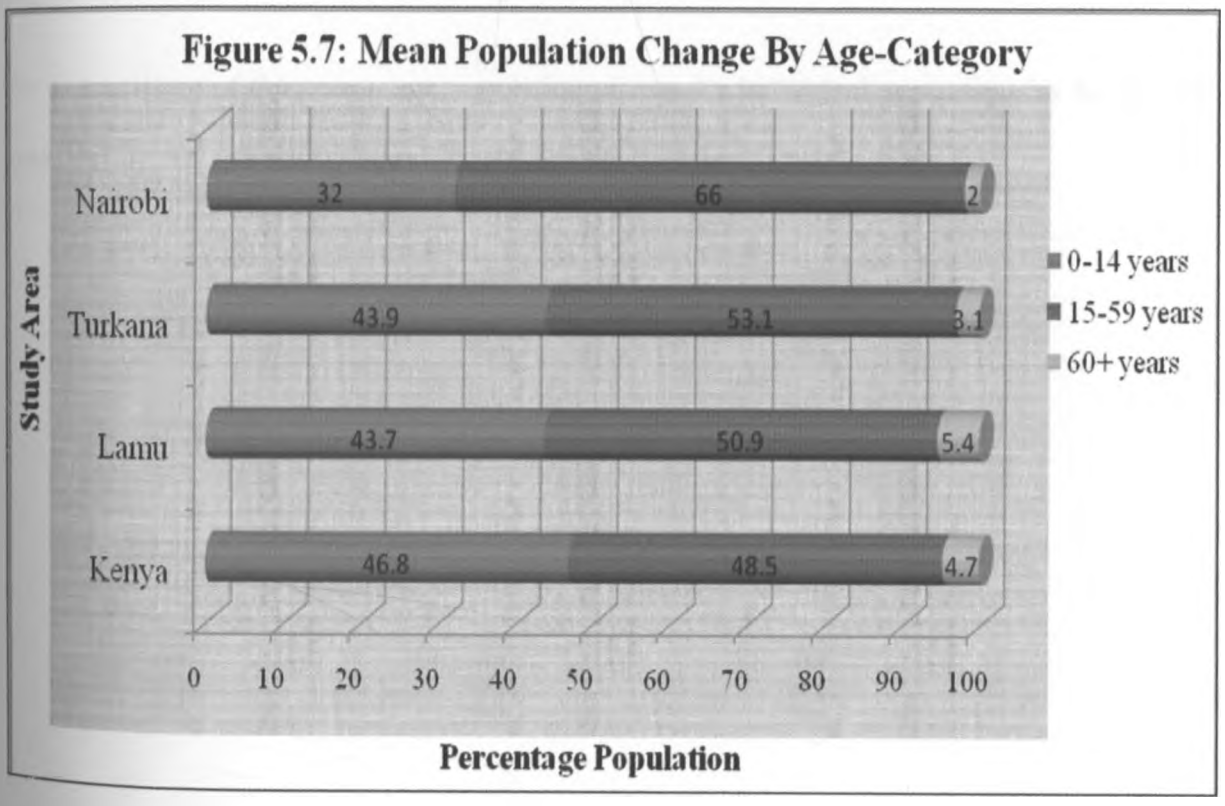
Table 5.1: Population Percentage by Age Groups by Area, 1979-1999

Year	Kenya	Lamu District	Turkana District	Nairobi District
		Aged 0-14 years		
1979	48.4	44.2	41.6	34.0
1989	47.9	44.7	45.3	30.5
1999	44.0	42.3	44.8	31.1
Mean	**46.8**	**43.7**	**43.9**	**32.0**
		Aged 15-59 years		
1979	47.0	49.8	55.7	64.2
1989	47.3	50.1	51.1	67.8
1999	51.3	52.9	52.4	67.1
Mean	**48.5**	**50.9**	**53.1**	**66.0**
		Aged 60 years and over		
1979	4.6	6.1	2.6	1.8
1989	4.8	5.2	3.6	1.7
1999	4.7	4.8	2.8	1.8
Mean	**4.7**	**5.4**	**3.1**	**2.0**

Source: Compiled from Kenya Population Census and Housing Reports Vol. I, 1979, 1989 and 1999

Overall, as indicated in Table 5.1 above, whereas Lamu district's mean population change by age category for the census years 1979-1999 varied from 43.7 percent for ages between 0-14 years, 50.9 percent for ages 15-59 and 5.4 percent for those aged 60 years and over, Turkana district had 43.9 percent population between ages 0-14 years, 53.1 percent between ages 15-59 years and only 3.1 percent for persons aged 60 years and over. Nairobi district's population, on average, also varied from 32 percent between ages 0-14 years, 66 percent between 15-59 years and 2 percent over 60 years of age. For comparison purposes, the mean population of Kenya for the 0-14 years segment also varied from 46.8 percent to 48.5 percent for the working population aged 15-59 years and 4.7 percent for the elderly population. These variations in the mean population change of the selected study areas and Kenya in general are illustrated in the Figure 5.7.

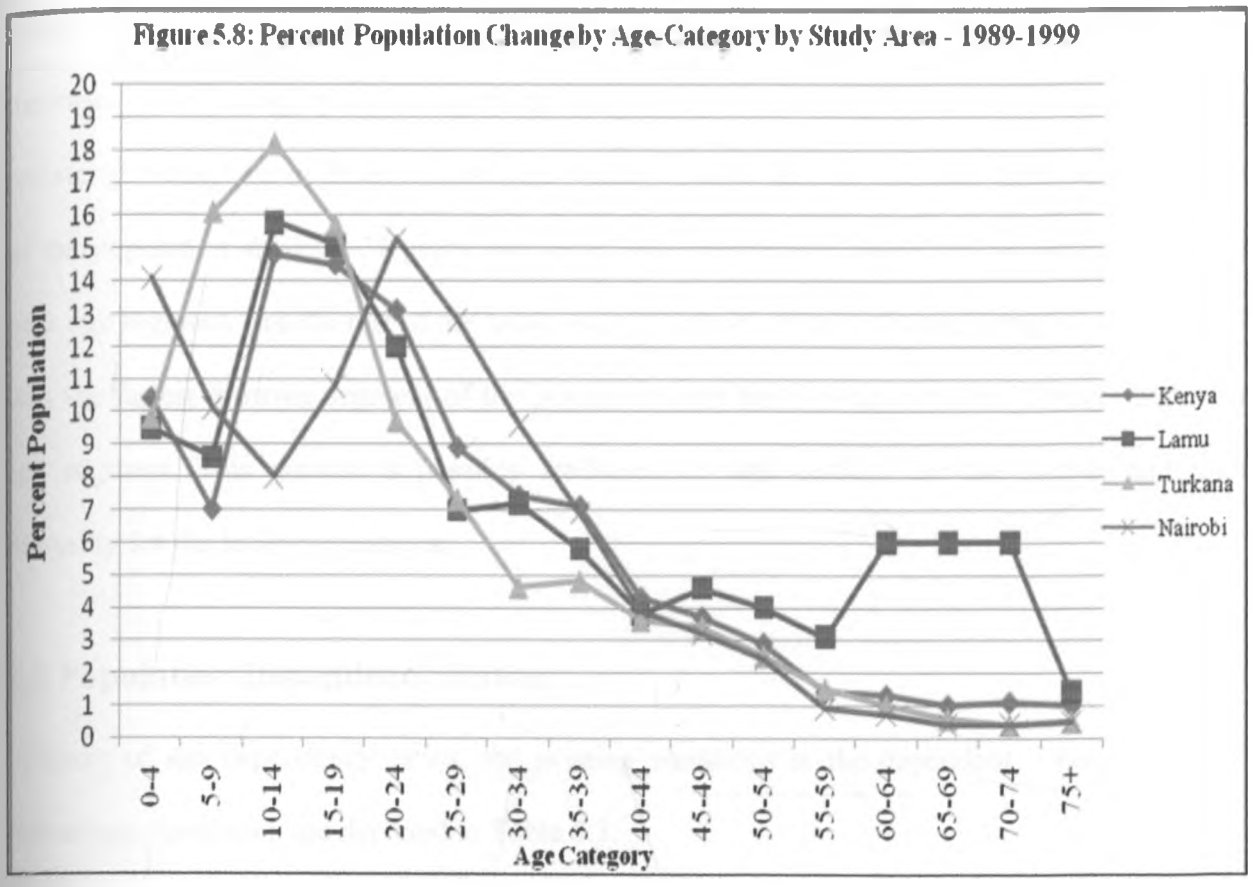
Figure 5.7: Mean Population Change By Age-Category



Source: Kenya Population Censuses 1979, 1989 and 1999

Whereas in the 0-14 years age category, Turkana district had more population than Lamu and Nairobi districts, in the 15-59 years category Nairobi district had more people followed by Turkana and Lamu districts. In the 60 years and over age category, Lamu district with 5.4 percent was leading followed by Turkana district and Nairobi district trailed. The national mean for the 0-14 age category was the highest among all the considered study areas, though the mean for the 15-59 years category trailed. However, the national mean for those aged 60 years and over was only second to that of Lamu district. As can be deciphered from table 8 above, Lamu district had more elderly persons and Nairobi district had the least in 1999. The variations in the mean population percent across the broad age segments, as shown in Figure 5.7 above, are indicative of the underlying explanatory demographic factors mainly fertility, mortality and migration.

An examination of the percentage population change by individual age categories for the study areas during the 1989-1999 inter-censal period is depicted in Figure 5.8.



Source: Kenya censuses 1989-1999

Figure 5.8 above provides information on changes in the percent population of individual age categories over time for Lamu, Turkana and Nairobi districts, as well as that of the entire country. This is valuable in determining if the population percent of the individual study areas is growing slower or faster than that of the entire country. As shown in Figure 5.8 above, progression from one age segment to another exhibits remarkable changes. In the 0-4 years age category, Nairobi district has the highest population at 14.1 percent. The rest of the areas, even as compared to the national level, have relatively small percentages. The high percentage witnessed in the 0-4 years segment drastically reduced to 8.6 percent for Lamu district, 10.1 for Nairobi district and 7 percent for Kenya in the 5-9 years category. Notably, Turkana district's population aged 5-9 years increased to 16.1 percent only to peak at 18.2 percent in the 10-14

years category. With an exception of Nairobi district which registered tremendous population increase in the category 20-24, perhaps due to in-migrations, the rest of the study areas registered reductions in their populations. Notably, Lamu district recorded tremendous growth in the population aged 55-74 years. However, this progression nosedives in the 75 years and over age segment. For the rest of the areas, except Nairobi district, the age category 10-14 years was the fastest growing segment of the population and the slowest was the 75 years and over age segment. This growth is possibly attributed to high fertility for the former and high mortality for the latter populations.

5.2 Population Dependency Ratios

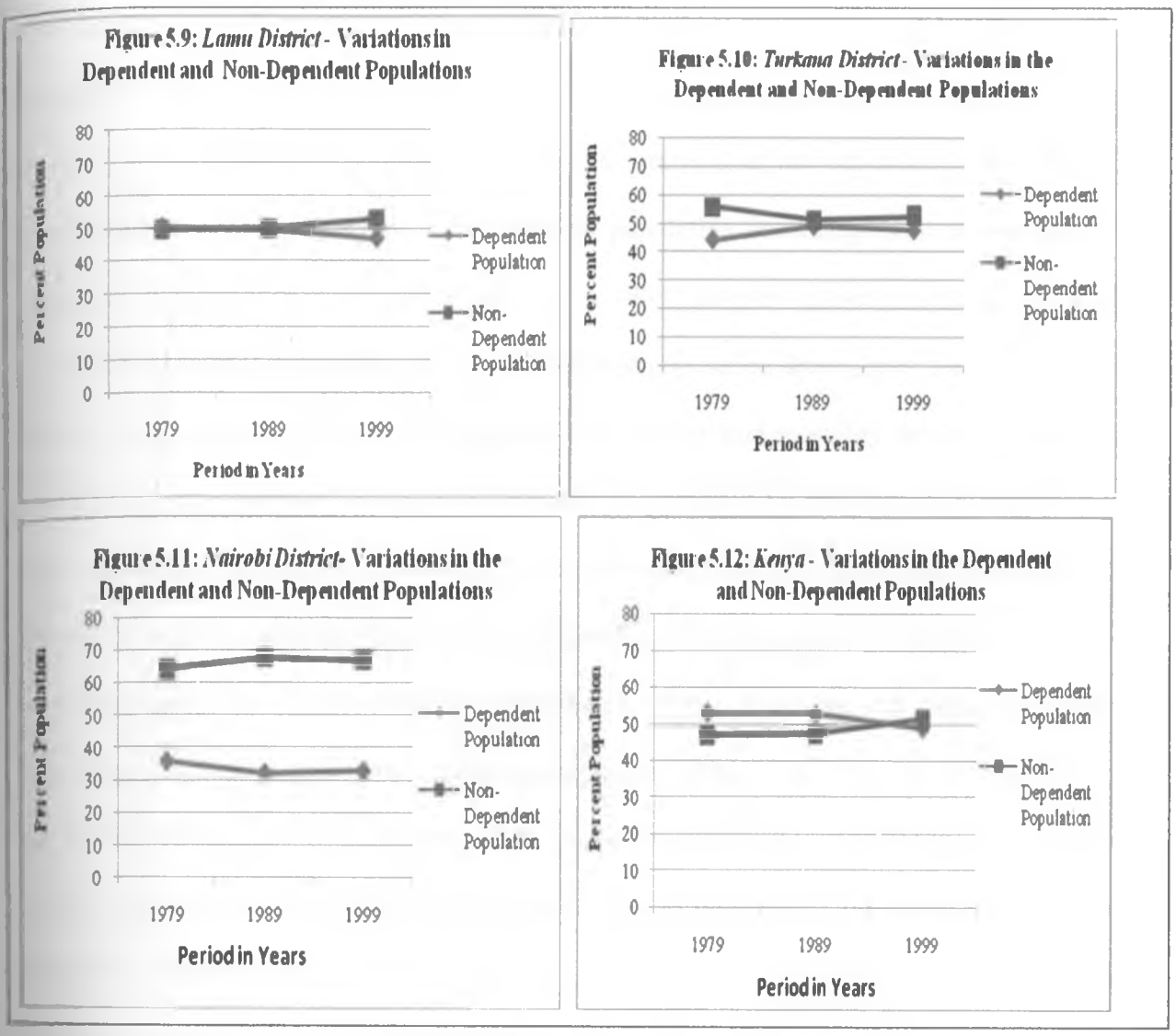
In terms of age dependency ratios, the existing variations in the dependent – non-dependent percentage population are depicted in Table 5.2.

Table 5.2: Ratios of the Dependent and Non-Dependent Populations

Area/Year	1979	1989	1999
Lamu District	50.3:49.7	49.9:50.1	47.1 : 52.9
Turkana District	44.2 : 55.8	48.9 : 51.1	47.6 : 52.4
Nairobi District	35.8 : 64.2	32.2 : 67.8	32.9 : 67.1
Kenya	53 : 47	52.7 : 47.3	48.7 : 51.3

Source: Compiled from Kenya Population Censuses 1979, 1989 and 1999

These variations in the dependent and non-dependent populations are illustrated in figures 5.9, 5.10, 5.11 and 5.12.



Source: Compiled from Kenya Population Censuses 1979, 1989 and 1999

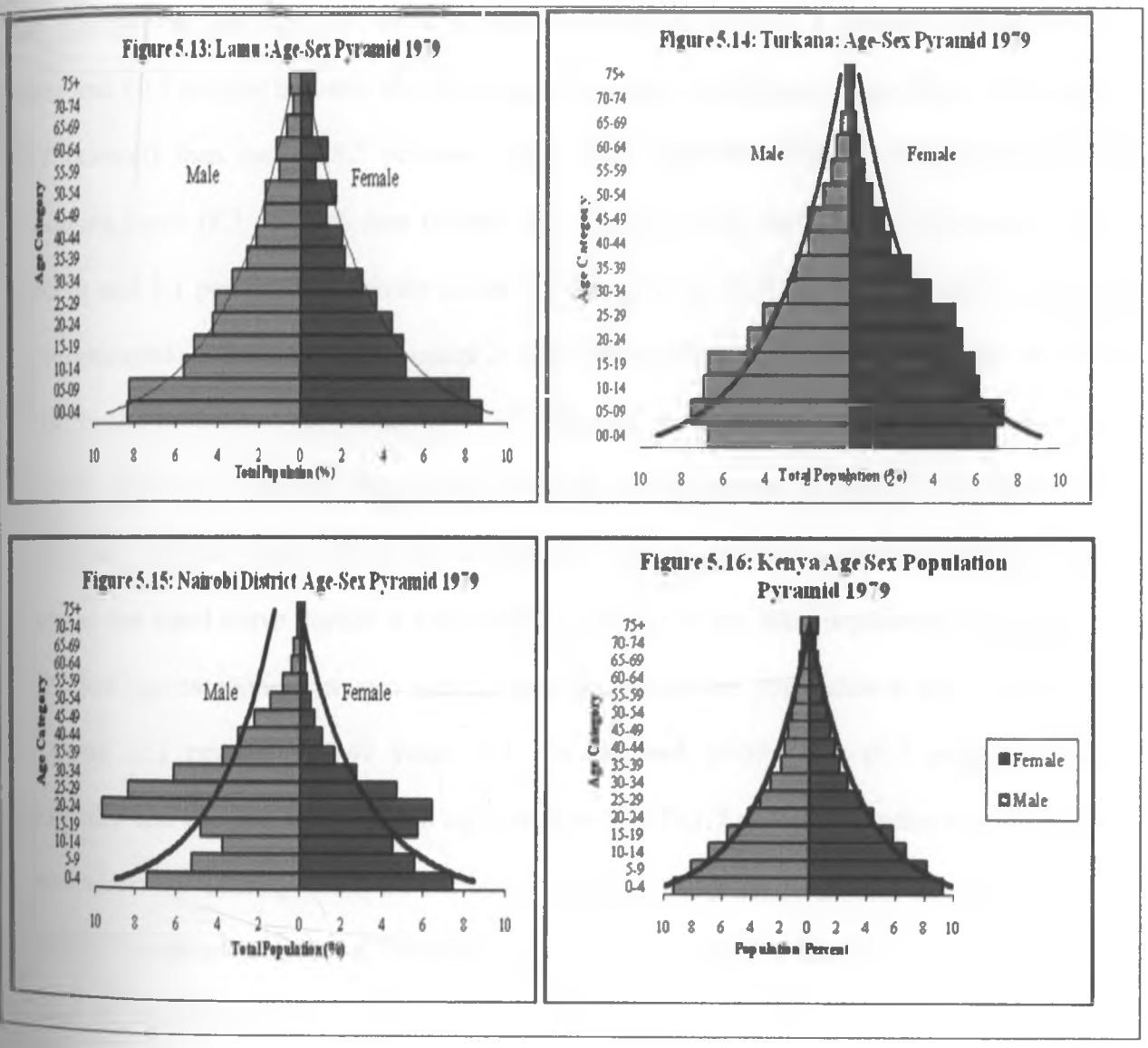
As portrayed in Figures 5.9, 5.10, 5.11 and 5.12 above, Lamu district experienced fairly similar proportions of the dependent and non-dependent populations between 1979 and 1989, but the situation has since changed with the gap between the two population proportions widening with the non-dependent population increasing to 52.9 percent at the expense of the dependent population. This indicates more growth in the populations aged 15-59 years than those aged 0-14 years and 60 years and over. In Turkana district over the same period, the dependent and

non-dependent population proportions varied significantly in 1979 (*Figure 5.10*) with the earlier population being less than the latter (44.2:55.8), but almost converged in 1989 (48.9: 51.1), though the non-dependent population was slightly more than the dependent population. This trend seems to continue with the non-dependent population becoming more and more and the dependent population becoming less and less in 1999. Nairobi district's scenario is a case of more non-dependent population than the dependent population throughout the selected census years. This has more to do with in-migration than fertility and mortality factors. Between ages 15-59 years, more people tend to move to Nairobi, propelled by inherent push factors in their places of origin, such as land shortage, scarce education and job opportunities as well as pull factors in Nairobi, such as better opportunities for their labour in the informal sector and education, among other considerations (Bilsborrow, 1998). In Kenya, the dependent and non-dependent populations exhibited interesting variations in the entire 1979-1999 period. Whereas the 1979-1989 period was characterized by more dependent than non-dependent populations (53:47), with a reducing dependent population to the ratio of 52.7:47.3, in 1999, the non-dependent population exceeded the dependent population in the ratio of 48.7: 51.3. This is perhaps an indication of the general reduced fertility rates across the country.

5.3 Population Ageing Trajectories

The trajectories of population ageing, that's, the processes of shifts in population age structures in relative growth to the proportions of higher age groups – is largely influenced by the demographic processes that determine the age composition of the population. These factors are fertility, mortality and migration. A detailed examination of the variations in the population age-

structures of Lamu, Turkana and Nairobi districts, as compared with that of the entire country, is depicted in the various age-sex pyramids for the selected periods and districts presented in the following section starting with the 1979 scenario and then 1989 and 1999 scenarios. These population pyramids were derived by expressing each age group as a proportion of the total for each sex.



Source: Kenya Population Censuses 1979, 1989 and 1999

As indicated in the Figures 5.13, 5.14, 5.15 and 5.16 above for the 1979 age-sex pyramids for the populations in Lamu, Turkana, Nairobi and Kenya, there was remarkable variability in the age categories 0-14 years, 15-59 years and 60 years and over. In the Lamu district population, 44.2 percent was constituted by those aged 0-14 years. Though dominant in the population, an examination of the individual age categories shows that the children aged 0-4 years accounted for 17.1 percent although this reduced with age progression to 16.4 percent between age 5-9 years and 10.7 percent between age10-14 years. In gender progression, there were more females (8.7 percent) than males (8.3 percent) under age 5, but this scenario changed with males becoming more (8.3 percent) than females (8.1 percent) in the age category 5-9 years and 5.6 percent and 5.1 percent respectively in the age category 10-14 years. Overall, males under age 15 represented 22.2 percent and females 21.9 percent of the total population in Lamu district in 1979. In the productive ages category of 15-59 years, the population represented 45 percent of the total population and was characterized by 26 percent males and 24 females. Generally, more males than females characterized the population in the productive ages. In figure 5.13 above, whereas the trend curve depicts a fairly uniform change in the male population throughout the individual age categories between ages 15-59 years, the female population at age categories 35-39 years (2.1 percent), 45-49 years (1.3 percent) and 55-59 years (0.7 percent) reduced drastically and the population in the age category 50-54 (1.7 percent) increased tremendously. These variations could possibly be attributed to the mortality and migration trends prevalent in the area. The elderly population aged 60 years and over in Lamu district in 1979 represented 6.1 percent of the total population and was characterized by more females (3.1 percent) than males (2.8 percent). Interestingly, this depicts a change from the trends in gender progression witnessed in the 0-14 years and 15-59 years categories. The predominance of females over

males in the elderly population is characteristic of most aged populations in the world. This is perhaps explained by the fact that women tend to live longer than males.

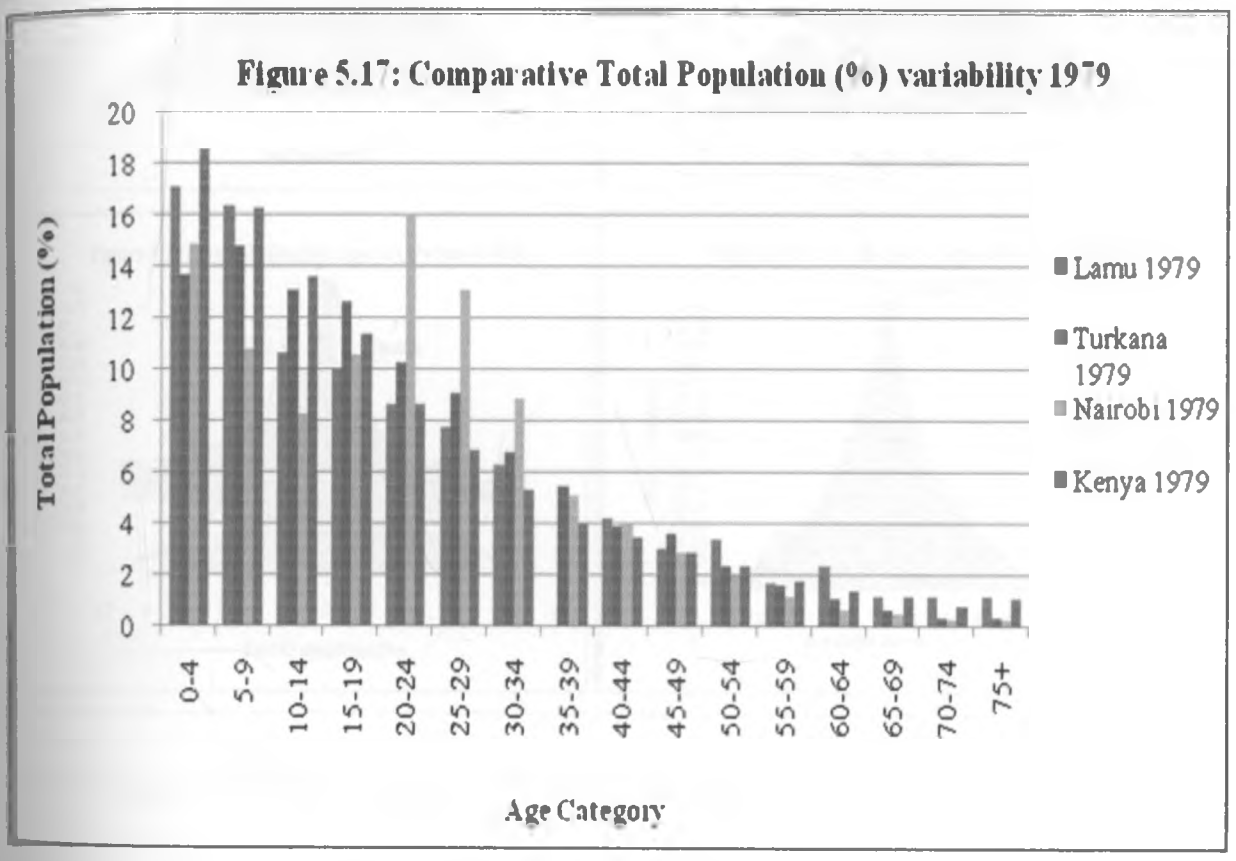
The Turkana district age-sex population pyramid (*Figure 5.14*) indicates that the 0-14 years population segment represented 41.6 percent of the total population in the district. Again, like in the case of Lamu district, this age category is dominant in the Turkana district population. Whereas the age category 0-4 years had 13.7 percent of the total population, the age category 5-9 years had 14.8 percent and 10-14 years had 13.1 percent. Noticeably, there was an increase in population in the age category 5-9 years. In terms of gender progression, males in the 0-14 age segment accounted for 21.4 percent and females 20.3 percent of the total population. Unlike the situation prevalent in Lamu district under 5 years of age, there were more males than females in the total population. The age category 15-59 years represented 55.7 percent of the total population with more females (28.1 percent) than males (27.7 percent) in the population. The total elderly population in Turkana district aged 60 years and over represented a paltry 2.6 percent of the total population in 1979, with males accounting for 1.6 percent and females 1 percent. As can be deduced, the initially dominant male population below age 15 in the ratio of 21.4:20.3 disappears in the productive years with females dominating the population in the ratio of 28.1:27.7 respectively. Again, male dominance reappeared in the elderly population aged 60+ years. However, the difference in terms of numbers between the males and females in the elderly population is not significant. As compared to the elderly population in Lamu district which accounted for 6 percent of the total population, the elderly in Turkana district accounted for only 2.6 percent of the total population.

In Nairobi district in 1979, the population under 15 years represented only 34 percent of the total population with more females (17.5 percent) than males (16.5 percent) in the children population. Although the male population being small compared to that of females in these ages, in addition, it is interesting to note that there is a drastic reduction in the male population with the age category progression as exemplified by the 0-4 years (7.4 percent), 5-9 years (5.3 percent) and 10-14 years (3.8 percent). The reduction in the female population in the same age categories is fairly gradual. Also, noteworthy is the fact that the productive population in the ages 15-59 accounted for 64.2 percent of the total population with there being more males (40.4 percent) than females (23.8 percent) in this population. Again, whereas it is true that males tend to migrate more than females, the overall increase in Nairobi of the population in the productive ages would be explained by in-migration from rural-urban migration and immigration from other areas in search of better life opportunities. An examination of the individual age categories reveals that the total population percent increased tremendously from 10.6 percent in the ages 15-19 years and peaked at the ages 20-24 years (16.1 percent) then began a gradual reduction to the upper age segments. This dominant population aged 20-24 is mainly characterized by young people in search of jobs and other opportunities in Nairobi. The elderly population aged 60 years and over in Nairobi accounted for 1.8 percent with 1 percent males and 0.8 percent females.

The entire country scenario for 1979, as depicted in Figure 5.16 above, shows that in the ages 0-14, which constituted 48.4 percent of the total population, there were more males (24.3 percent) than females (24.1 percent) in the country. In the working ages, the total population percent for 1979 was 47 percent with 22.9 percent males and 24 percent females. In the elderly ages which constituted 4.6 percent of the total population, there were more males (2.4 percent) than females

(2.2 percent). Overall, there are more children in the population in 1979 than the working ages and the elderly populations.

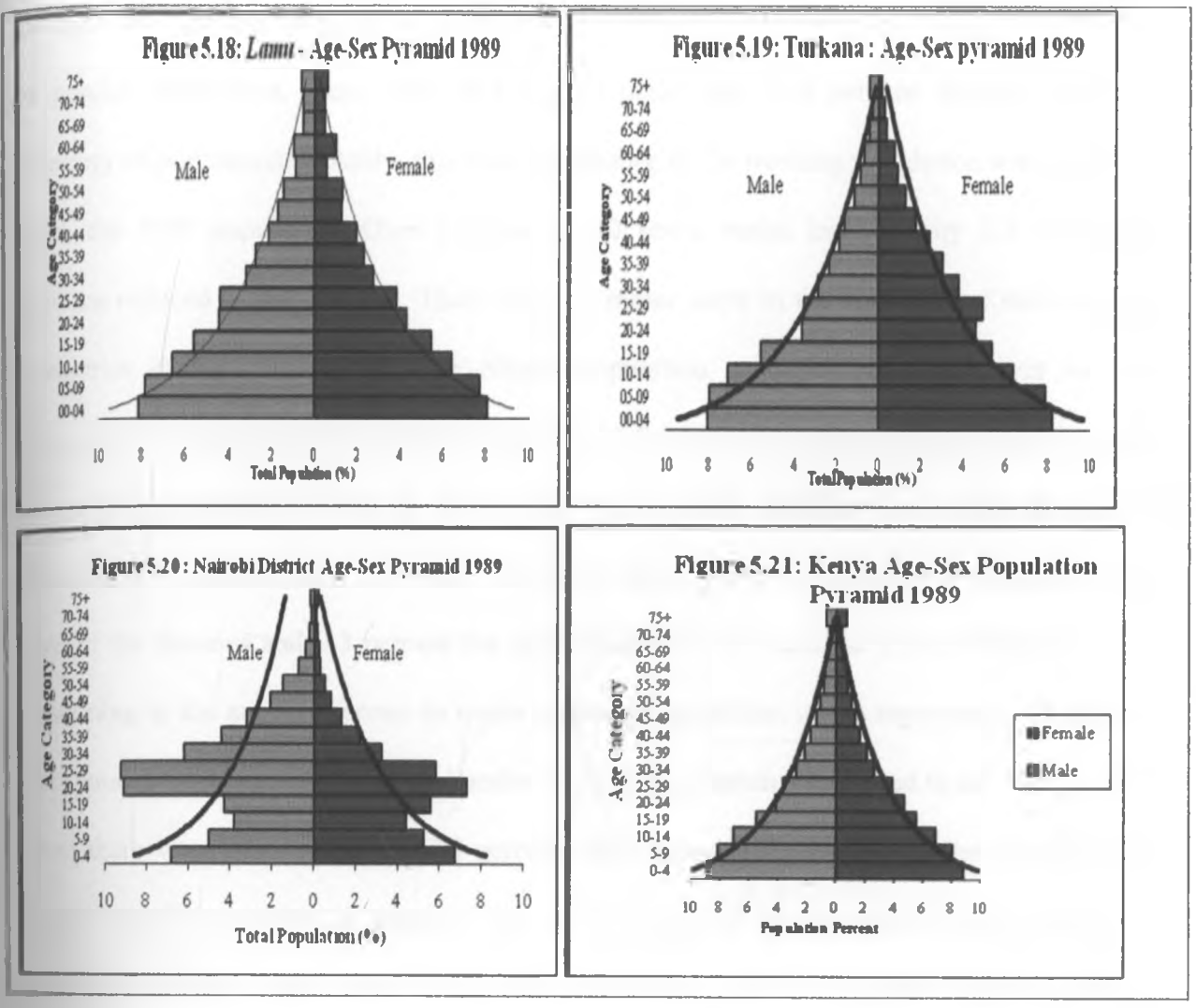
Figure 5.17 below summarizes the variability in the population age structure of Lamu, Turkana and Nairobi Districts as well as the entire country in 1979.



Source: Kenya Population Censuses 1979, 1989 and 1999

Overall, Lamu district had more elderly people (6 percent), followed by Kenya (4.5 percent), then Turkana (2.6 percent) and Nairobi (1.8 percent) in 1979.

Figures 5.18, 5.19, 5.20 and 5.21 depict the changes in the age-sex compositions of the populations in Lamu, Turkana and Nairobi districts, as well as Kenya in 1989.

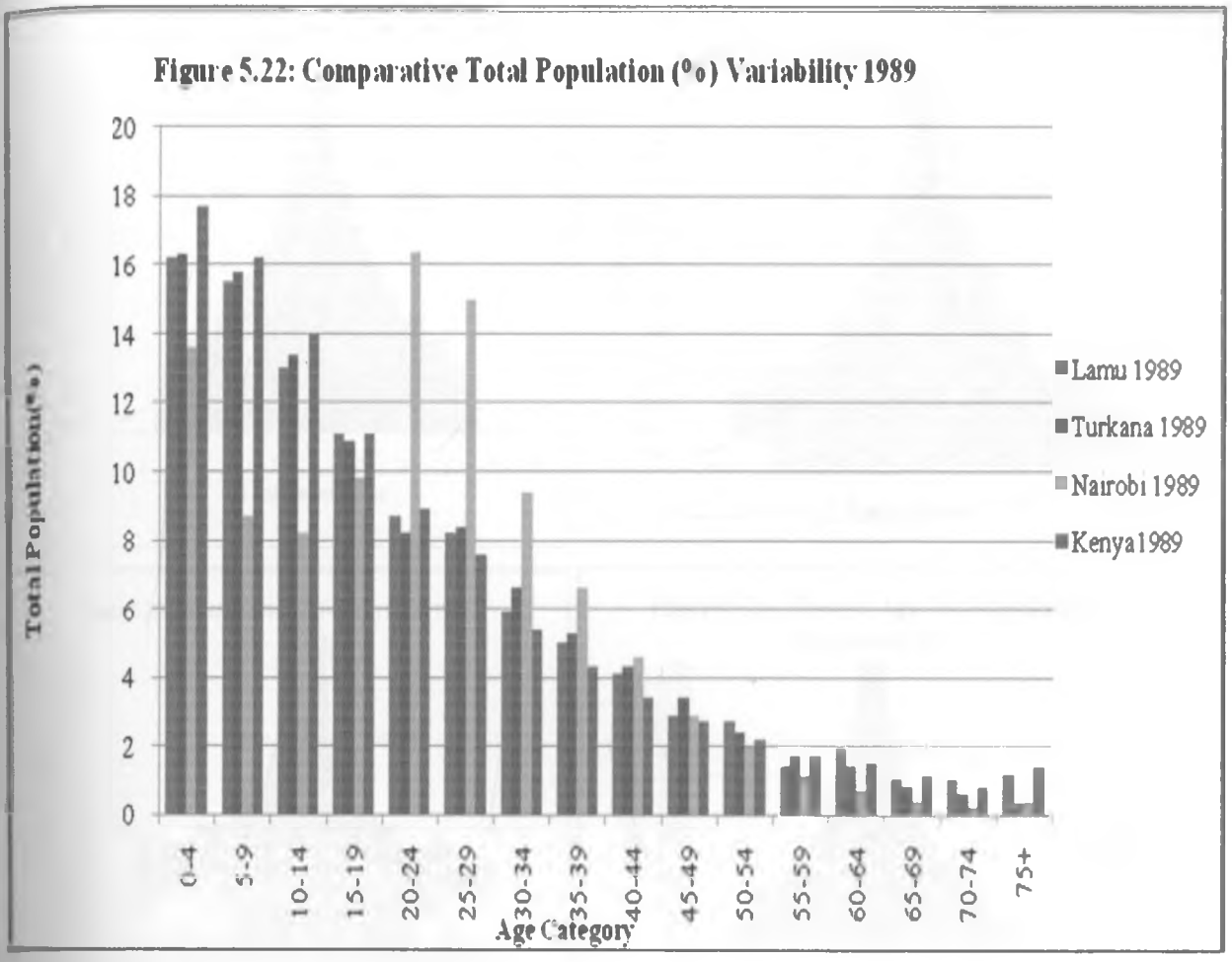


Source: Kenya Population Censuses 1979, 1989 and 1999

In 1989, the age category 0-14 years represented 44.7 percent of the total population in Lamu district with 22.7 percent males and 22 percent females. Notably, both gender, as can be seen in the trend curve (*Figure 5.18*) experienced smooth transitions from one age category to the next under age 15 years. In comparison with the 1979 situation, the total population under 15 years of age increased by 0.5 percent from 44.2 percent. Individual age categories show that age category 0-4 years constituted 16.2 percent, age 5-9 years had 15.5 percent and age-category 10-14 years had 13 percent population. The productive population aged 15-59 years totalled 50.2

percent and experienced an increase of 0.4 percent from the 1979 total of 49.8 percent. In terms of gender differences, there were 26.4 percent males and 23.8 percent females in this age category of population. Notably, this male dominance in the working population was maintained from the 1979 population. Over a period of 10 years, males increased by 0.5 percent and females reduced by 0.1 percent. There were no major leaps in the transition of individual age categories during this period. The elderly population aged 60 years and over in Lamu represented 5.1 percent of the total population with 2.5 percent males and 2.6 percent females in the elderly population. That is, there were more elderly females than males in the total population of Lamu district in 1989. However, there generally occurred a reduction of 0.5 percent for females and 0.3 percent for males from the 1979 census. This is indicative of the slackening in the ageing process. In terms of gender variability, males represented 15.6 percent and females 14.9 percent of the total under 15 years population. Compared to the 1979 situation when there were more females (17.5 percent) than males (16.5 percent) in the population, the female population under 15 years of age in 1989 reduced by 2.6 percent and males by 0.9 percent to allow for male dominance in the population. The 15-59 years category population totalled 67.8 percent with more males (40.9 percent) than females (26.9 percent) in these mainly productive ages. As compared to the 1979 population in this age cluster, the total population increased by 3.6 percent. The male population increased by 0.5 percent and females by 3.1 percent. Whereas it is true that there were more males than females in the 1989 population aged 15-59 years, females had a tremendous growth in a span of only 10 years. In considering the individual age structure progression, after a declining trend observed in the age structures below 15 years, there was an upsurge of population growth between ages 15-19 years (9.8 percent) which peaked with 16.4 percent at age category 20-24 years. However, there was a subsequent

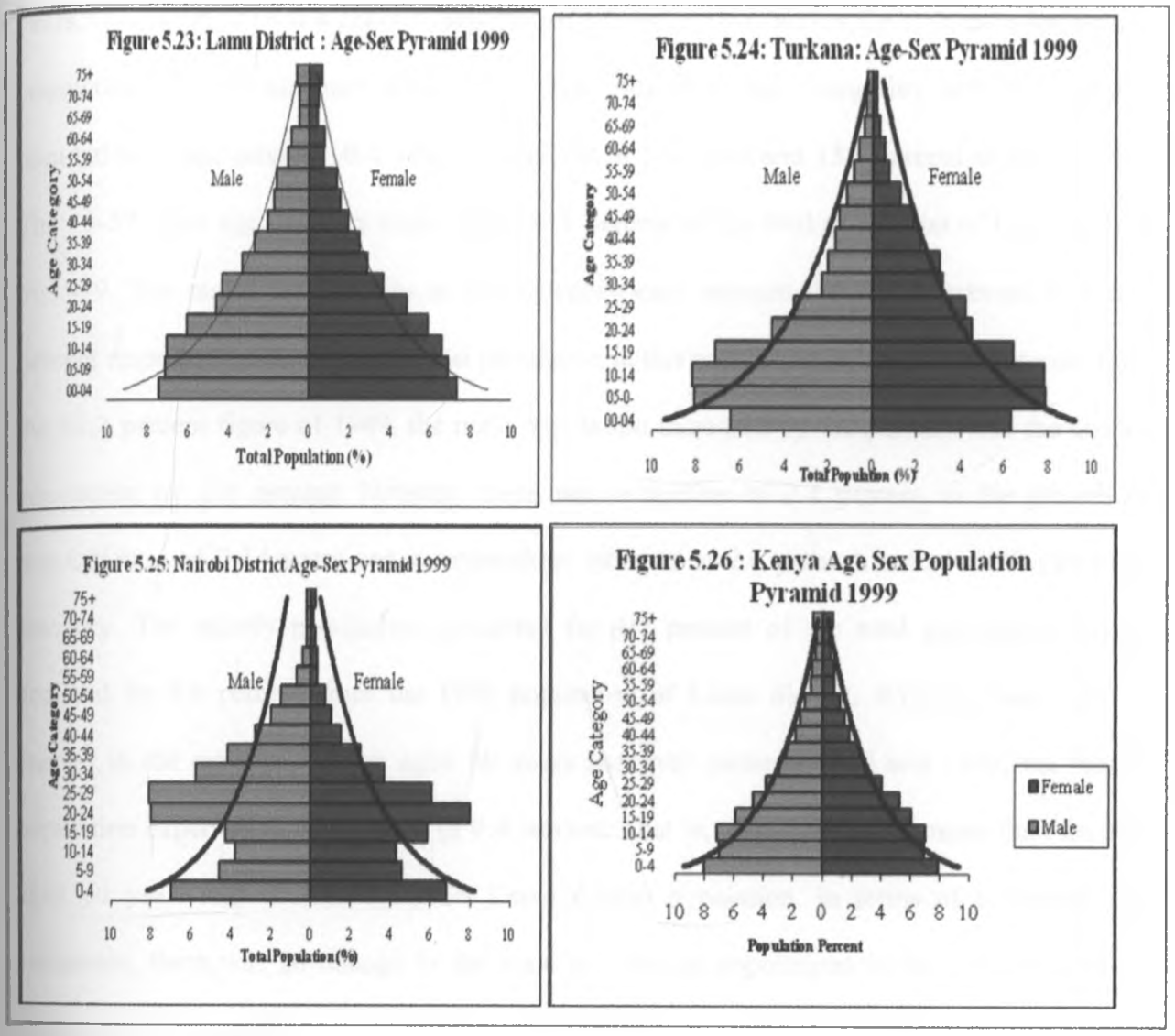
decline in the population though fairly uniform starting with the 25-59 age category and then throughout the rest of the age structures up to age 75 years and over. Interestingly, the 1979 population also exhibits a similar trend of population with a peak of population of 16.1 percent in the 20-24 years age category. Overall, there is an increase of 0.3 percent in the population between 1979 and 1989. In terms of gender progression, whereas the age bracket 15-59 years had more females (5.5 percent) than males (4.3 percent), this trend changed to having more males than females in the categories 20-24 (9.1:7.3 percent) and 25-29 (9.3:5.8 percent) respectively and also throughout the subsequent age categories. The elderly population in 1989 represented a total of only 1.7 percent and had slightly more males (0.9 percent) than females (0.8 percent). Although there occurred a reduction of 0.1 percent in the total population aged 60 years and over, male dominance was still prevalent in this elderly population. In the national scene, the 0-14 age segment population reduced slightly from the 48.4 percent figure of 1979 to 47.9 percent in 1989. However, males remained predominant in this population category. In the working population segment, there was an increase of 0.3 percent from the 1979 figure with more females (24.2 percent) than males (23.2 percent). The elderly population represented 4.8 percent of the total population with more females (2.5 percent) than males (2.3 percent). The total population variability in the study areas is illustrated in Figure 5.22.



Source: Kenya Population Censuses 1979, 1989 and 1999

As can be discerned from figure 5.22 above, Lamu district was still leading in the elderly population (5.1 percent), followed by the national total of 4.8 percent, then Turkana district (3.1 percent) and finally Nairobi district with 1.7 percent. This trend is akin to the one witnessed in the 1979 population totals of the elderly in the various study areas.

In 1999, population age structure variability of the study areas as well as that of the entire country witnessed remarkable changes. These are portrayed in Figures 5.23, 5.24, 5.25 and 5.26.



Source: Kenya Population Censuses 1979, 1989 and 1999

Trends in the 1999 population age structure of Lamu district are similar to the trends exhibited in the 1979 and 1989 populations with the transitions between age categories appearing fairly smooth and even. The 0-14 years age segment accounted for 42.3 percent of the total population in Lamu district in 1999. This represented a decline of 2.4 percent from the 1989 figure of 44.7 percent. In terms of gender progression, there were 21.5 percent males and 20.8 percent females. This male dominance trend is also discernible from the 1979 and 1989 populations under age 15

years. Overall, there was a general reduction of 1.2 percent population for both male and female populations in this category from 1989. The individual age categories had 14.7 percent population at age category 0-4 years, 14 percent at 5-9 years and 13.6 percent at 10-14 years. The 15-59 years age category represented 52.8 percent of the total population of Lamu district in 1999. The males and females in this category each accounted for 27.6 percent and 25.2 percent respectively. Whereas the total population in this category increased by 2.6 percent from the 50.2 percent figure of 1989, the male population increased by 1.2 percent and the female population by 1.4 percent. Notably, there was a decline of 2.4 percent in the growth of population aged 0-14 years and a tremendous increase of 2.6 percent in the 15-59 years age category. The elderly population accounted for 4.7 percent of the total population, having declined by 0.4 percent from the 1989 population of Lamu district. Whereas there was no change in the male population aged 60 years and over between 1989 and 1999, the female population experienced a reduction of 0.4 percent. That is, there were more males than females aged 60 years and over in the 1999 Lamu district population. In terms of individual age categories, there was no change in the male and female populations in the categories 65-69 years and 70-74 years.

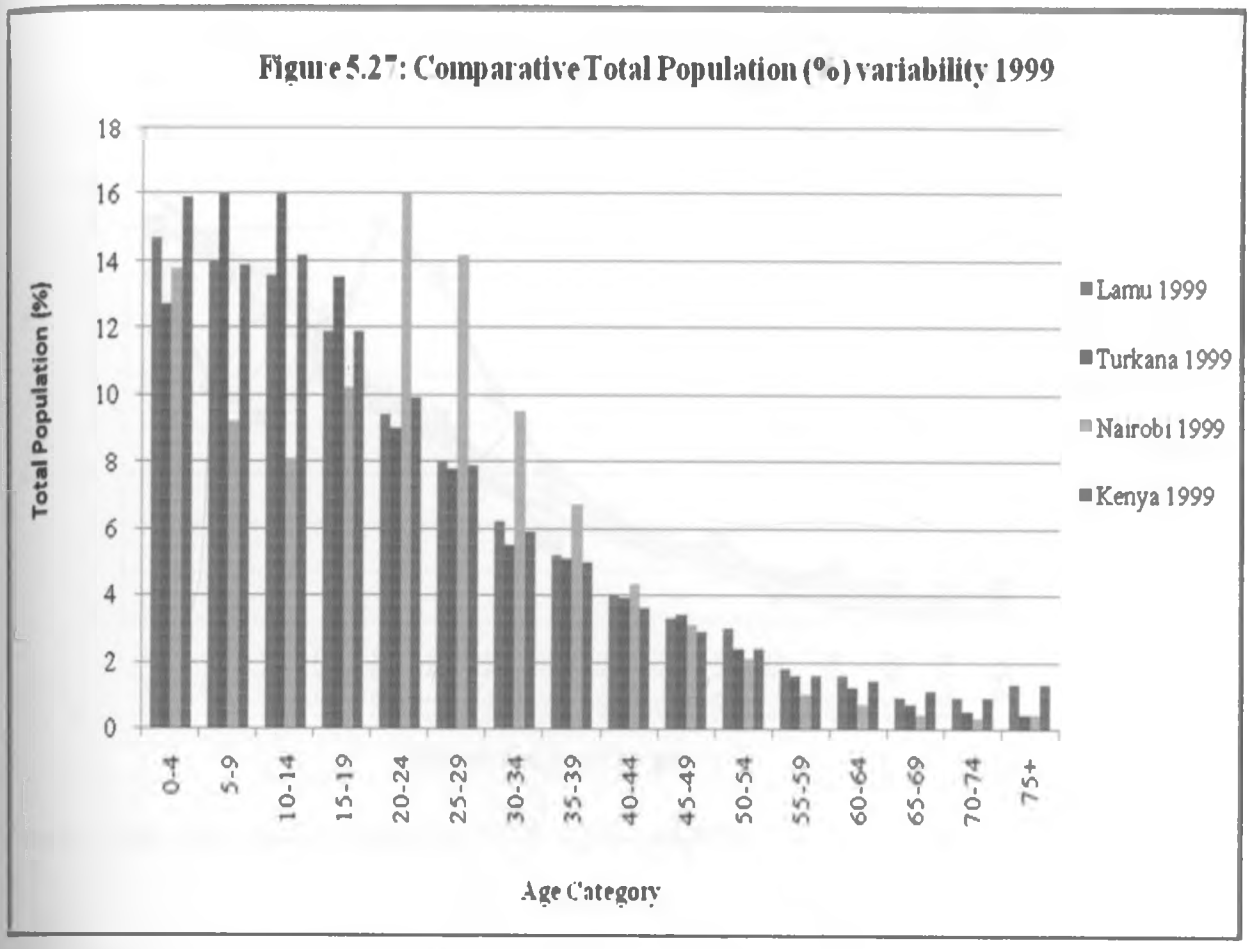
In Turkana district in 1999, the population aged 0-14 years represented 44.7 percent of the total population with 22.7 percent males and 22 percent females. In general, there was a decline of 0.8 percent in the population under 15 years of age from the 1989 figure of 45.5 percent, with males dropping by 0.4 percent and females by 0.4 percent. The individual age categories under age 15 years indicated that whereas the age category 0-4 years had 12.7 percent population, the 5-9 and 10-14 age categories remained unchanged with a 16 percent population. The 15-59 age category constituted 52.2 percent of the total population with males and females accounting for

24.7 percent and 27.5 percent respectively. In addition, this population in the productive years constituted more than one half of the total population in Turkana district, with an increase of 0.8 percent from the 1989 figure. Interestingly, whereas there was witnessed a decrease of 0.8 percent in the population aged below 15 years, there occurred a similar increase in the population aged 15-59 years. Although the male population increased by 1.5 percent and the females reduced by 0.7 percent, overall, the female population was still predominant. In comparative terms, the 15-59 years population category of 1989 was relatively smaller compared to the 1999 population in the same cluster. The elderly population of 60 years and over totalled to 2.8 percent of the total population with 1.4 percent males and 1.4 percent females. This gender balance is interesting owing to the fact that earlier age structures have shown great differences in gender numbers. Individual growth of age structures stagnated in the 60 years and over population with the same numbers moving from one age category to the next.

The total population of Nairobi district in 1999 also exhibited varied trends in the age structure categories of 0-14 years, 5-9 years and 10-14 years. In the 0-14 years category, the population represented 31.1 percent of the total population of Nairobi district with more females (15.7 percent) than males (15.4 percent). This total population portrays an increase of 0.6 percent from the 1989 figure of 30.5 percent with females increasing by 0.8 percent and males decreasing by 0.2 percent. Whereas there occurred a reduction of the total population aged 0-4 years between the 1979 and 1989 populations, there was an increase in the same population between 1989 and 1999 census. The transition from one individual age category to the next was fairly smooth with the age category 0-4 years totaling 13.8 percent, 5-9 years having 9.2 percent and 10-14 years with 8.1 percent. In terms of gender progression, the situation in Nairobi in 1999 is a kin to the 1979 situation when there were more females than males in the 0-14 years

category population. The age category 15-59 represented 67.1 percent of the total population of Nairobi in 1999 with 37.4 percent males and 29.7 percent females. There was an overall reduction of 0.7 percent in the total population of the elderly persons from the 1989 total of 67.8 percent. Notably, the male population decreased by 3.5 percent and the female population increased by 2.8 percent. The individual age categories between the ages 15-59 years exhibit interesting variability with the populations in the ages 15-19 (10.2 percent), 20-24 (16 percent) and 25-59 (14.2 percent) portraying tremendous growth. The trend witnessed in 1999 is fairly a replication of the 1989 population situation in Nairobi. The elderly population aged 60 years and over in the Nairobi population of 1999 represented a meager 1.8 percent with more females (1 percent) than males (0.8 percent). Unlike in 1989 when males were predominant in the elderly population, though insignificantly, the 1999 elderly population had more females than males.

The variability in the total population percent for Kenya in 1999 shows that the 0-14 years age category had reduced to 44 percent of the total population, with more males than females. The 15-59 population category had increased to 51.3 percent with a dominant male population. Notably, the elderly population had reduced by 0.1 percent from the 1989 population total in this category. These variations of the populations in the respective age segments for the study areas are illustrated in Figure 5.27.

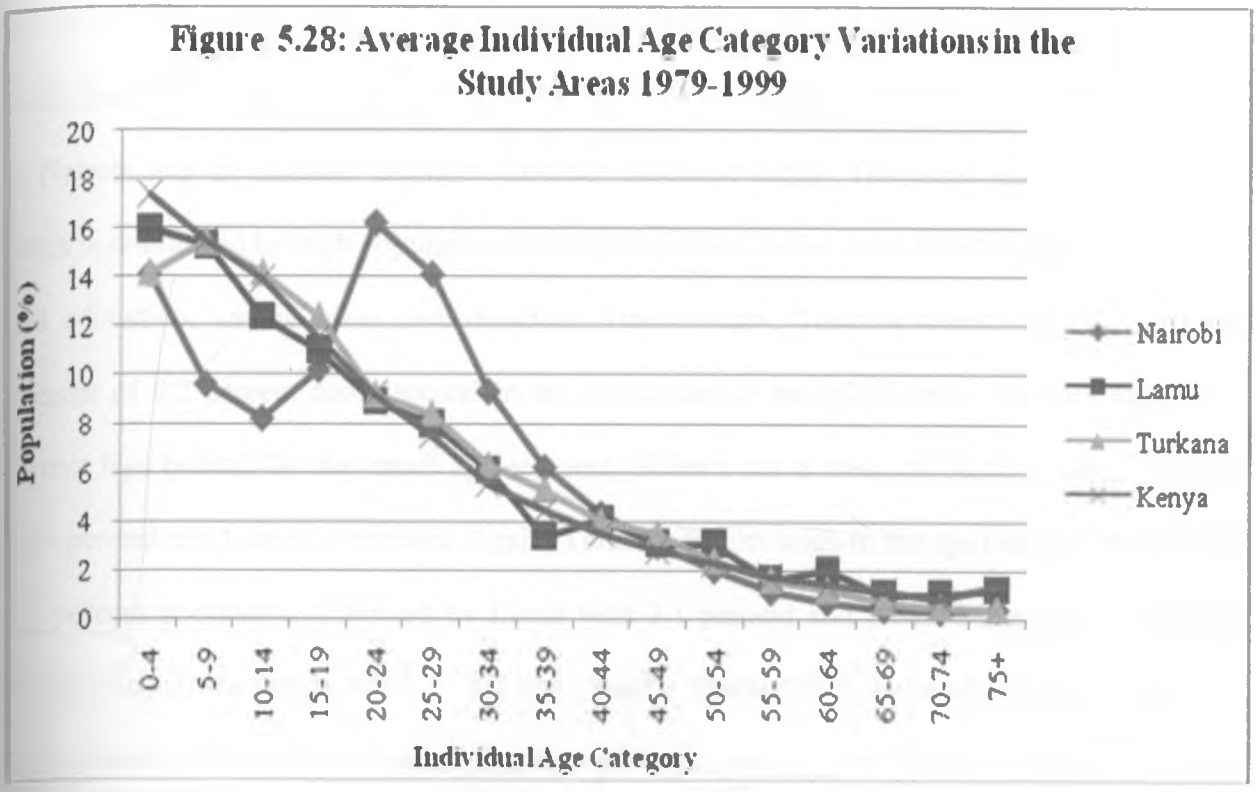


Source: Kenya Population Censuses 1979, 1989 and 1999

As indicated in Figure 5.27 above, again, Lamu district remained dominant in the total elderly population though there was a significant reduction in this population from the 1979 figure of 6 percent to the 1999 figure of 4.7 percent. The entire country's population in this segment was still second, followed by Turkana district and finally Nairobi district.

Overall, the average age category population percentage variations in the study areas during the entire 1979-1999 time period are depicted in Figure 5.28.

Figure 5.28: Average Individual Age Category Variations in the Study Areas 1979-1999



Source: Kenya Population Censuses 1979, 1989 and 1999

The variations in the individual age categories, as shown in Figure 5.28 above, indicates that between ages 0-4 years, the national average of 17.4 percent was the highest, followed by Lamu district with 16 percent, then Turkana district (14.2 percent) and Nairobi district (14.1) percent. This is indicative of high fertility rates in the respective areas. However, there occurred a remarkable decline in the population in the age segment 5-9 years in all the areas. This decline in the 5-9 age category in the case of Lamu district, is indicative of the rise in child mortality witnessed between 1969 and 1979 in the Lamu population (Kenya Population Census, 1989:8). Although Turkana district experiences low populations in the age 0-4 years (14.2 percent), this situation changes in the age category 5-9 years when the population increases to 15.5 percent, then declines to 14.2 percent in the 10-14 years category and 12.4 percent in the 15-19 years category. This is reflective of the high infant mortality rates in Turkana district. For example, in

the 1979-1989 decadal period, Turkana district experienced high infant mortality rates of 91 per 1000 live births. This is compared to the 72 per 1000 live births in Lamu, 49 per 1000 live births in Nairobi and the national average of 66 per 1000 live births. The broad age category 20-44 years is dominated by high populations in Nairobi district mainly due to in-migration for labour and education, among other considerations. Interestingly, Turkana district and the national average of 9.2 percent come second in the population in the 20-44 years category and Lamu district lags behind. In this broad age segment, Nairobi has a mean of 10.02 percent, Turkana 6.64 percent and Lamu 6.1 percent. Again, Turkana district leads in the age category 45-49 with 3.5 percent population, followed by Lamu with 3.1 percent and Nairobi lags with 3 percent. The age cluster starting from 50-75 and over years is dominated by Lamu district with a mean of 1.65 percent, followed by Turkana district with 1.13 percent and Nairobi with 0.82 percent. Whereas Lamu district has more children less than 5 years of age, Turkana district has more children between age categories 5-9, 10-14 and 15-19 years. Nairobi district leads in the population aged 20-24 years and Lamu lags in the same population. Lamu district has more elderly people starting from age category 50-54 and beyond and Nairobi district has the least of such populations.

Table 5.3 provides a summary of the population oscillations exemplified by the increases and decreases of population percentage witnessed in the age structures of the populations in the study areas of Lamu, Turkana and Nairobi districts, as well as Kenya in general.

Table 5.3: Changing Proportions of the Young and Elderly by Period and District, 1979-1999

District	Age	A=*Average absolute yearly change (%)* Periods		*Inter-period change (%)*	*B=Average relative (to <15) yearly change (%)* *Periods*	
		1979-1989	1989-1999	1979-1999	1979-1989	*1989-1999*
Lamu	<15	+0.11	-0.24	-0.03	+0.11	-0.55
	>60	-0.09	+0.04	-0.05	-1.61	-0.81
Turkana	<15	+0.39	-0.08	0.31	+0.90	-0.17
	>60	+0.05	-0.03	0.02	+1.77	-1.01
Nairobi	*<15*	-0.35	+0.06	-0.29	-1.08	+0.19
	>60	-0.01	+0.01	0.0	-0.56	+0.57
Kenya	*<15*	-0.10	-0.4	-0.5	-0.11	-0.85
	>60	+0.02	-0.01	0.01	+0.41	-0.18

Source: Researcher, 2007

In terms of the absolute average yearly percentage change in the proportions of the young population less than 15 years of age during the 1979-1999 period, as indicated in Table 5.3 above, whilst this population in Lamu and Nairobi districts decreased by -0.13 percent and -0.29 percent respectively, Turkana district gained by +0.31 percent. That is, the <15 years old populations in Lamu and Nairobi are becoming older through the decreasing population under age 15, and the population in Turkana becoming younger by the same population increasing in number. However, in the population aged 60 years and over during the 1979-1999 period, whereas Lamu district's population decreased by -0.05 percent, the same population in Turkana gained by 0.02 percent and Nairobi district's population remained unchanged. Overall, there is more ageing in the lower age categories than in the higher categories. For comparison, Kenya's

absolute and relative yearly percentage population change in the selected broad categories is provided in Table 5.3 above.

The variability in the mean speed and intensity of the ageing phenomenon in the study areas of Lamu, Turkana, Nairobi, as well as the entire country is summarized in Table 5.4.

Table 5.4: Mean Speed of Ageing

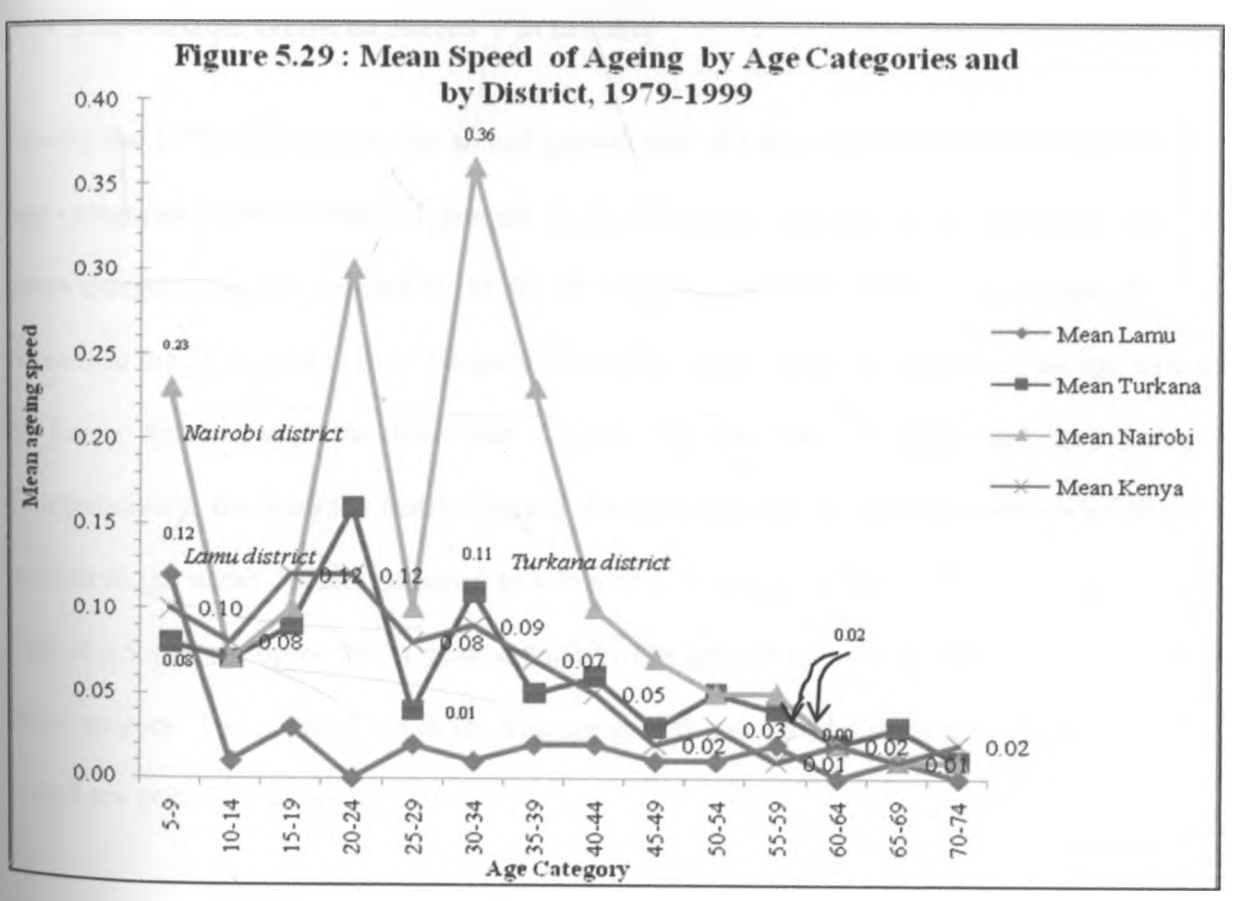
Age-Group	Lamu District	Turkana District	Nairobi District	Kenya
	Mean speed of Change	*Mean speed of Change*	*Mean speed of Change*	*Mean speed of Change*
0-4	-	-	-	-
5-9	0.12	0.08	0.23	0.10
10-14	0.01	0.07	0.07	0.08
15-19	0.03	0.09	0.10	0.12
20-24	0.00	0.16	0.30	0.12
25-29	0.02	0.04	0.10	0.08
30-34	0.01	0.11	0.36	0.09
35-39	0.02	0.05	0.23	0.07
40-44	0.02	0.06	0.10	0.05
45-49	0.01	0.03	0.07	0.02
50-54	0.01	0.05	0.05	0.03
55-59	0.02	0.04	0.05	0.01
60-64	0.00	0.02	0.02	0.02
65-69	0.01	0.03	0.01	0.01
70-74	0.00	0.01	0.01	0.02
75+	-	-	-	-

Source: Survey, 2007

Table 5.4 shows the mean speed of population age structure ageing in Lamu, Turkana and Nairobi districts as well as Kenya. It is indicated that in Lamu district, whereas the age category 5-9 years records the highest speed of change of 0.12, other age categories namely 20-24 years and 60-64 years show no change at all. The rest of the age categories reveal insignificant variations. In Turkana district, the age category 20-24 years records the highest speed of 0.16 followed by the age category 30-34 years which records a speed of 0.11. The lowest speed is

noticeable in the category 70-74 years. Nairobi's variations in the speed of ageing indicates the highest speed being in age categories 30-34 years (0.36), 20-24 years (0.30), together with the age category 5-9 years and 35-39 years both of which have a speed of 0.23. Ageing in Nairobi is lowest in the elderly populations aged 60-64 years (0.05), 65-69 years (0.01) and 70-74 years (0.01). This could, among other considerations, be attributed to returnee migrants particularly of retirees who opt to go back to their rural homes. For Kenya, ageing speed varies from 0.12 percent in the age category 15-19 years to 0.01 percent in the 55-59 years and 65-69 years categories. These variations in the speed of ageing in the study areas are well illustrated in Figure 5.29.

Figure 5.29 : Mean Speed of Ageing by Age Categories and by District, 1979-1999

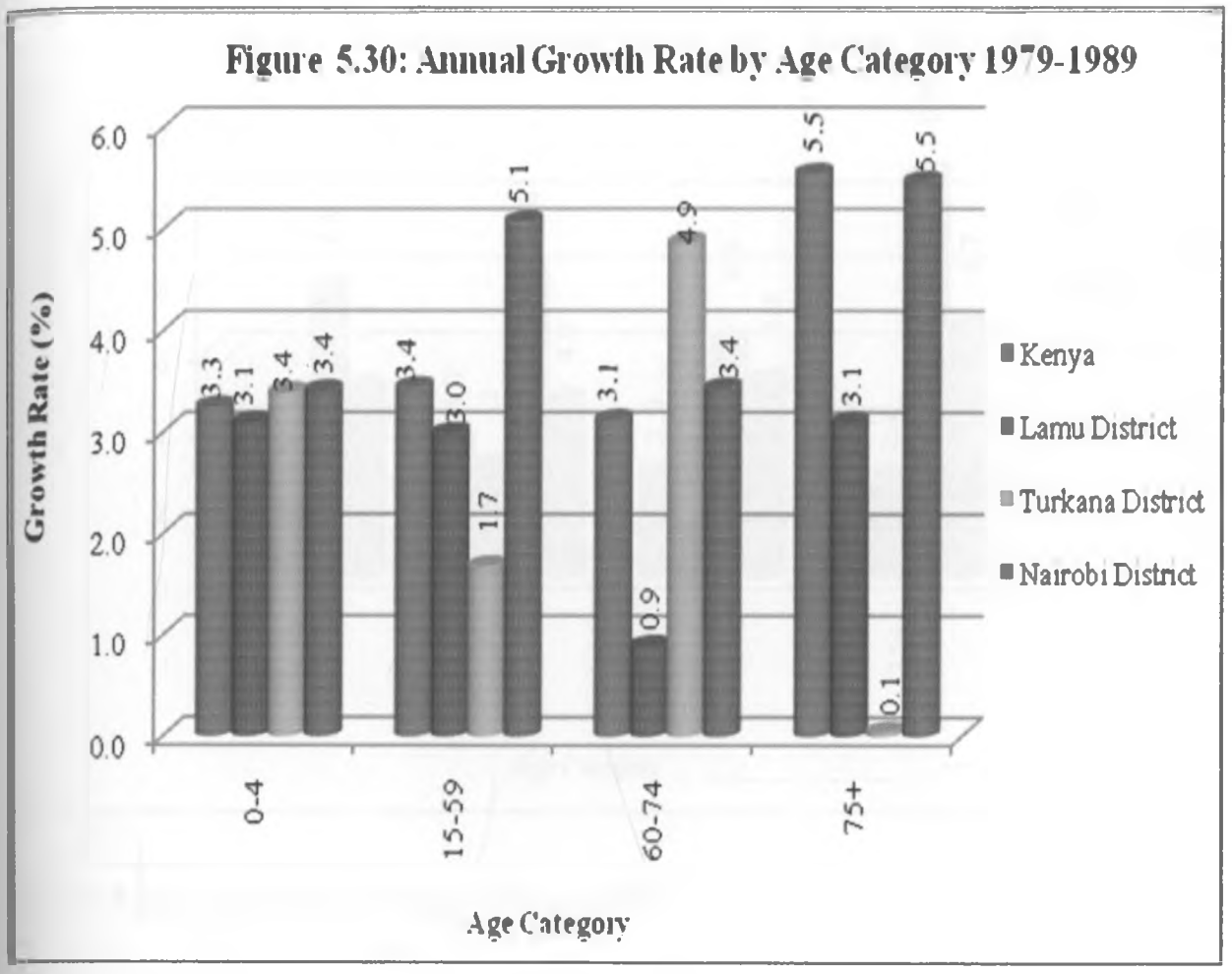


Source: Survey, 2007

As shown in Figure 5.29 above, the average yearly speed of demographic ageing for the period 1979-1999 in the study areas of Lamu, Turkana and Nairobi districts, as well as Kenya oscillates significantly over the various age categories and areas. Whereas the speed of ageing is greatest between the 00-04 and 05-09 age categories in Lamu (0.12), Turkana 20-24 years (0.16) and Nairobi 30-34 years (0.36) districts, the age category 70-74 records an insignificant speed of between 0.00 and 0.01. That is, the ageing process is fastest in the age category 5-9 years for Lamu district, 20-24 years for Turkana district and 0.36 for Nairobi district. The slowest ageing speed is realized in the age category 70-74 years for Lamu, Turkana and Nairobi districts.

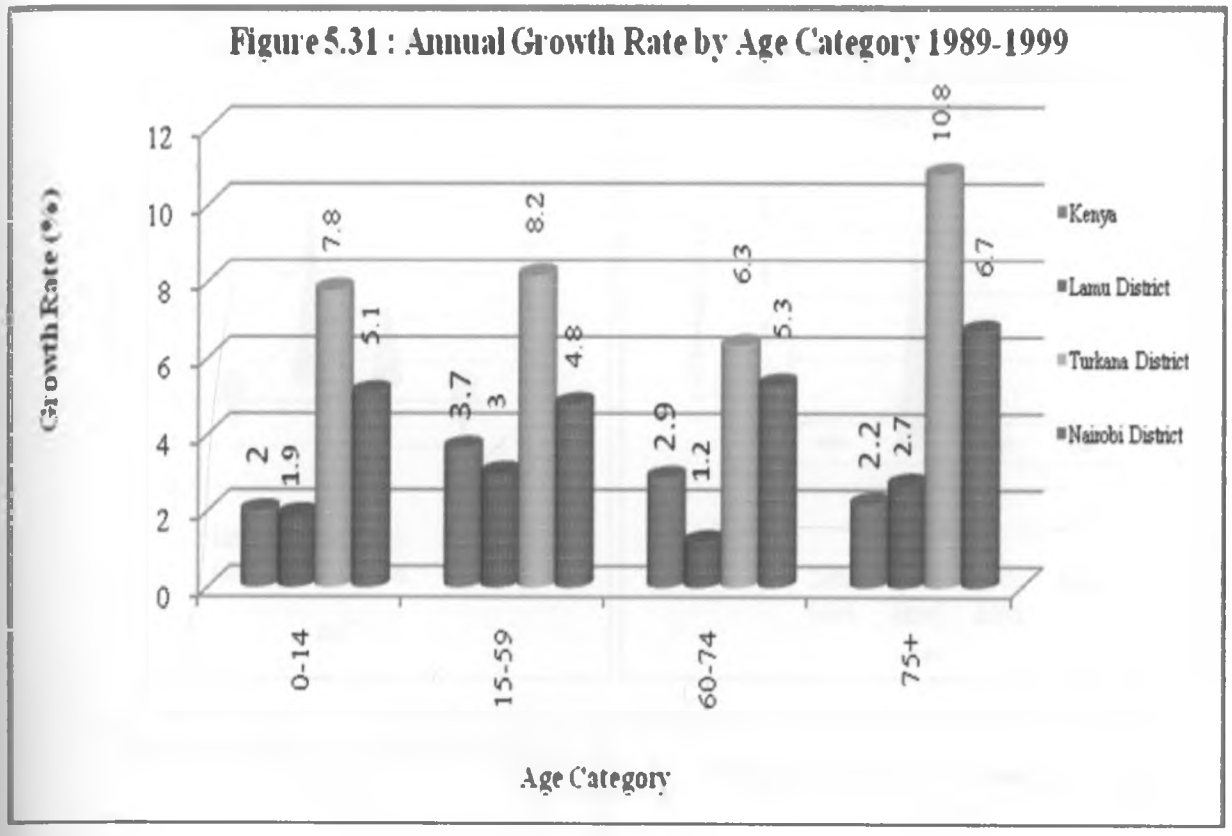
5.4 Population Growth Rates Variability

During the 1979-1989 period, the annual growth rate of Lamu district across the selected broad age categories reduced from 3.1 percent in the 0-4 years segment to 3.0 percent in the 15-59 years category and 0.9 percent in the 60-74 category, and then increased tremendously to 3.1 percent in the 75 years and over category. Thus, the fastest growing sections of the age structure of Lamu district were the less than 5 year olds and the 75 years and over category. Comparatively, for Turkana district during the same period, the growth rates varied from 3.4 percent in the under 5 years category to a low of 1.7 percent in the 15-59 years category and a high of 4.9 percent in the 60-74 years category. The growth rate was lowest in the 75 years and over category. These variations in the average growth rates of the study areas in the 1979-1989 period are portrayed in Figure 5.30.



Source: Kenya Population Censuses 1979 and 1989

For the 1989-1999 period, growth rates in the study areas exhibited remarkable variability across the study areas. These changes are depicted in Figure 5.31.



Source: Kenya Population Censuses 1989 and 1999

As indicated in Figure 5.31 above, the growth rates increased more in Turkana district than in all the other study areas. This phenomenon is followed by the scenario in Nairobi district that also registered remarkable changes in the growth rates of the selected age categories. Growth rates in Lamu district indicated that among the elderly, age 75 years and over grew faster than age category 60-74 years. In Kenya, the fastest growing segment was the 15-59 years category.

The variability in the selected broad age segments during the entire 1979-1999 period is depicted in Figures 5.32, 5.33, 5.34 and 5.35.

Figure 5.32: Growth Rate Variability in 0-14 Category 19"9-99

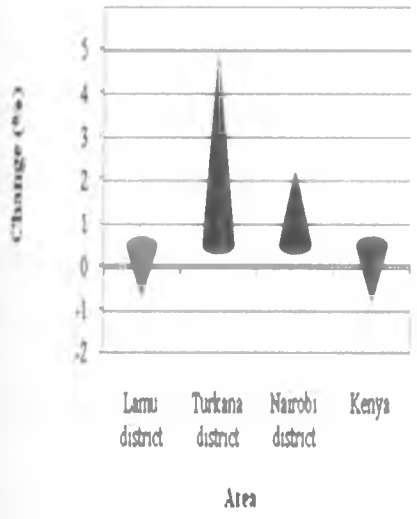


Figure 5.33: Growth Rate variability in 15-59 Category 19"9-99

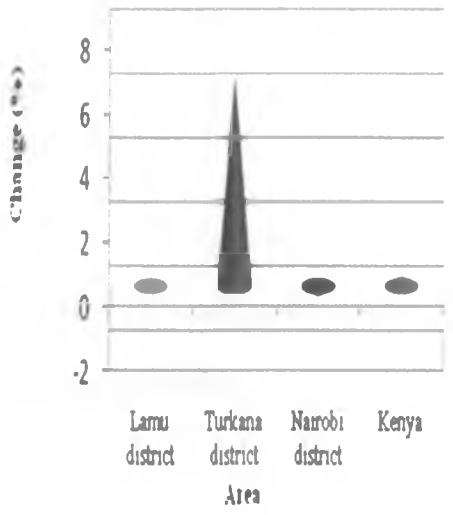


Figure 5.34: Growth Rate Variability in 60-"4 Category 19"9-99

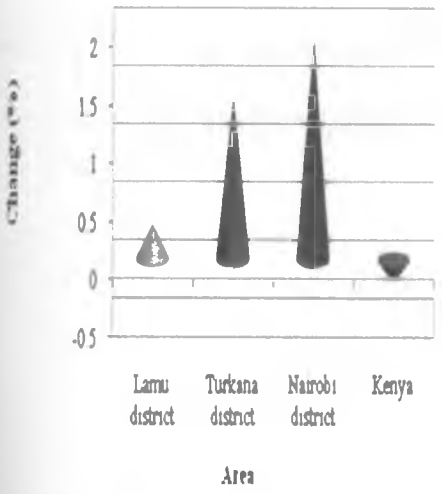
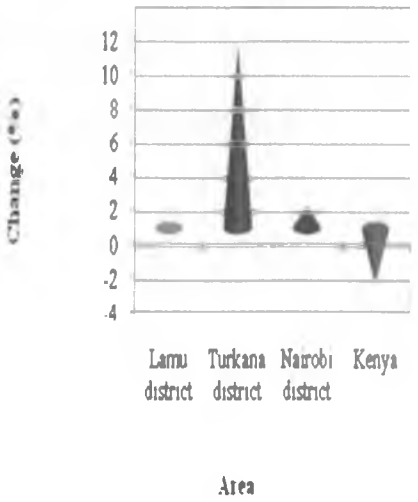


Figure 5.35: Growth Rate Variability in "5+ category 19"9-99



Source: Kenya Population Censuses 1979, 1989 and 1999

As shown in Figures 5.32, 5.33, 5.34 and 5.35, Turkana district experienced positive change in its growth rates in all the age categories. Even with this indication, the district still lagged behind in its elderly population in the country. Lamu district experienced negative growth rates in its 0-4 category during the 1979-99 period and modest positive growth rates in the rest of the categories. However, there was more growth in the 60-74 years category than in all other categories. Whereas Nairobi district experienced positive growth rates in all the age segments, Kenya experienced negative growth in the 0-5, 60-74 and 75 and over years. These changes are indicative of the underlying demographic processes in the study areas.

5.5 Doubling Rates of Population Age Categories

An examination of the cones (*Figures 5.36 and 5.37*) depicting the amount of time it would take the various population age segments to double themselves is shown below:

Figure 5.36: Population Doubling Time By Age Category 1979-1989

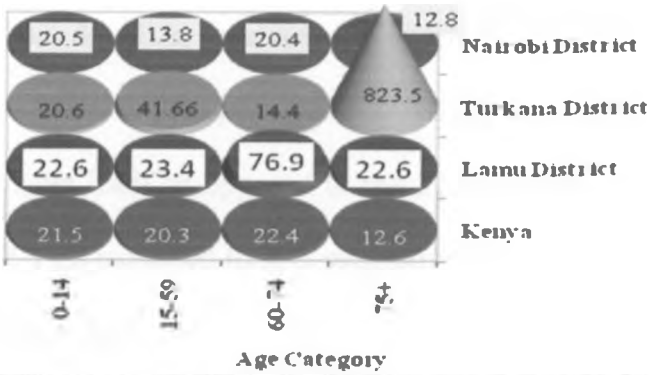
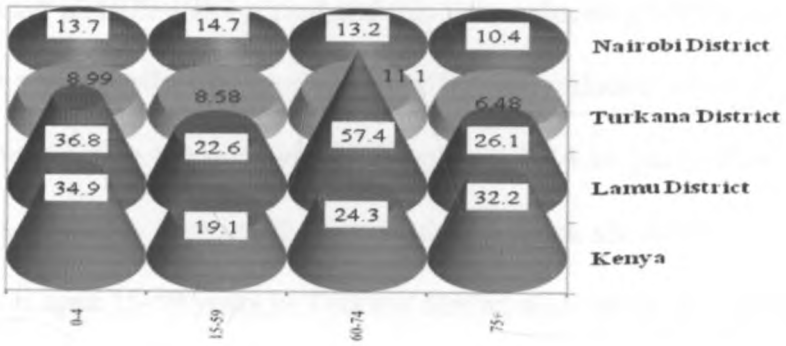


Figure 5.37: Population Doubling Time By Age Category 1989-1999



Source: Compiled from Kenya Population Censuses 1979, 1989 and 1999.

As indicated in Figures 5.36 and 5.37, the various age categories would take varied times to double in size. Whereas in the 1979-1989 period it would take the 0-14 years population category in Lamu district 22.6 years to double itself, this duration increased to 36.8 years during the 1989-1999 period. This is indicative of the reduced numbers of the population in this age category. An examination of the working population aged 15-59 years in Lamu district in the 1979-1989 period shows that it would take 23.4 years to double itself. This time slightly reduced to 22.6 years in the subsequent 1989-1999 period, reflecting an increase in this population.

Whilst it would take 76.9 years for the population in the 60-74 years category in Lamu district to double itself in the 1979-1989 period, it would take only 57.4 years in the subsequent time period. Noticeably, this doubling time reduced is reflective of the increased numbers of the elderly in the district. However, the population aged 57 years and over required more time (26.1 years) in 1999 to double itself as opposed to the 22.6 years it would take this population to double itself in 1989. This increased time is suggestive of the reduced numbers of the elderly in these higher ages of the elderly.

In comparison with the situation in Turkana district, the 0-14 years age segment required 20.6 years to double itself in 1979-1989 period and this time reduced tremendously to only 8.9 years in the 1989-1999 period, reflecting increased fertility and reduced infant mortality rates in the latter period. Compared to the situation of those aged 0-14 in Lamu district in the two time periods, this age segment in Turkana district required a much shorter time to double itself. The working population aged 15-59 years in Turkana district also varied in doubling time from 41.7 years in the 1979-1989 period to only 8.6 years in the subsequent period. This trend is also exhibited in the 60-74 years category where the doubling time reduced from 14.4 years to only 11.1 years. Interestingly, whereas it would take those aged 75 years and over remarkably long (823.5 years) to double itself in the 1979-1989 period, it would only take 6.5 years for this population category to double itself in the 1989-1999 period.

Overall, in comparing the variations of doubling time across the study areas and age structures, it is indicated that whereas Nairobi district's population would take the shortest time of 20.5 years to double itself, Lamu district's population would take 22.6 years to double. In the 60-74

years category, it would take Turkana district only 14.4 years to double itself and Lamu district 76.9 years. In the 75 years and over category, the shortest doubling time of 22.6 years would be taken by Lamu district and the longest time of 823.5 years by Turkana district population. The population doubling time phenomenon has implications particularly with regard to planning for the various services required by the various population segments. This information is summarized in Table 5.5.

Table 5.5: Acceleration or Deceleration of Doubling Time By Age Category By Area 1979-99

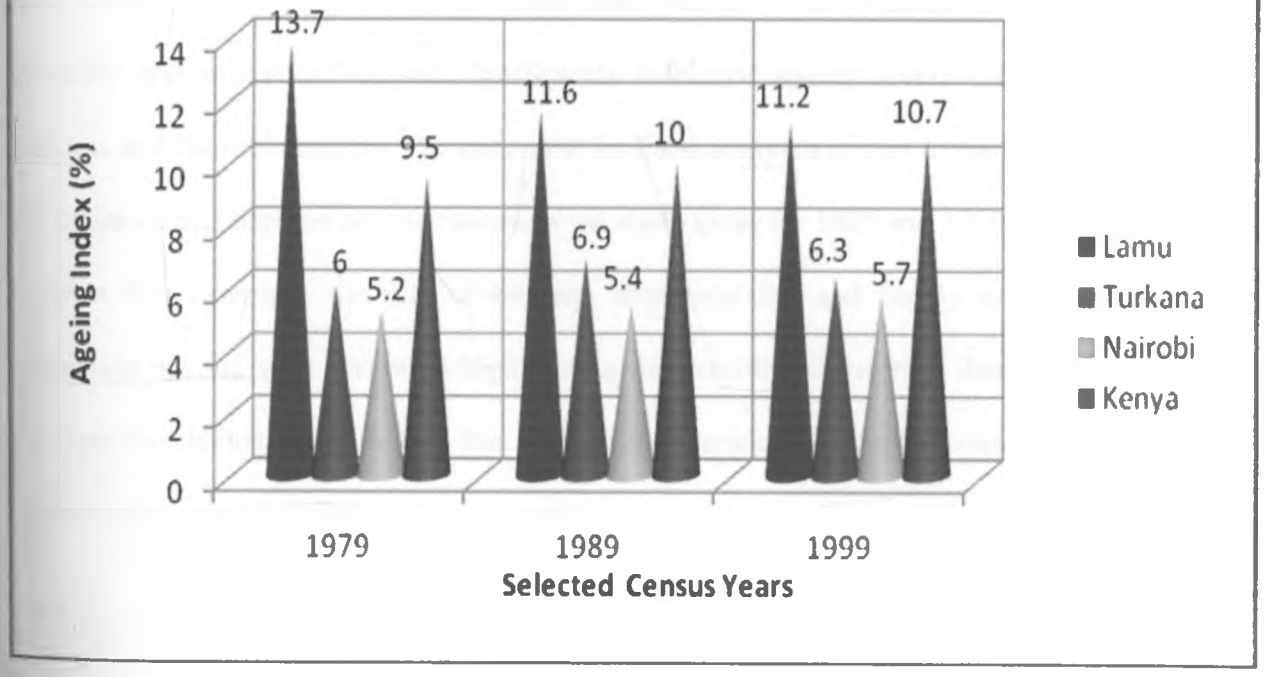
Time Period / *Area & Age Category*	*1979-1989*	*1989-1999*	*Change in time*	*Change in population*
Lamu District				
0-14 years	**22.6**	**36.8**	**Time acceleration**	Reduction in population
15-59 years	**23.4**	**22.6**	**Time deceleration**	Increase in population
60-74 years	**76.9**	**57.4**	**Time deceleration**	Increase in population
75+ years	**22.6**	**26.1**	**Time acceleration**	Reduction in population
Turkana District				
0-14 years	**20.6**	**9**	**Time deceleration**	Increase in population
15-59 years	**41.7**	**8.6**	**Time deceleration**	Increase in population
60-74 years	**14.4**	**11.1**	**Time deceleration**	Increase in population
75+ years	**823.5**	**6.5**	**Time deceleration**	Increase in population
Nairobi District				
0-14 years	**20.5**	**13.7**	**Time deceleration**	Increase in population
15-59 years	**13.8**	**14.7**	**Time acceleration**	Reduction in population
60-74 years	**20.4**	**13.2**	**Time deceleration**	Increase in population
75+ years	**12.8**	**10.4**	**Time deceleration**	Increase in population
Kenya				
0-14 years	**21.5**	**34.9**	**Time acceleration**	Reduction in population
15-59 years	**20.3**	**19.1**	**Time deceleration**	Increase in population
60-74 years	**22.4**	**24.3**	**Time acceleration**	Reduction in population
75+ years	12.6	32.2	Time acceleration	Reduction in population

Source: Kenya Population Censuses 1979, 1989 and 1999.

5.6 Population Ageing Indices

An examination of the ageing indices of the study areas shows the variations in the numbers of the aged persons in the areas of Lamu, Turkana and Nairobi districts. This variability compare well with the national ageing index variability. This unevenness in the ageing index in relation to the specified census years is depicted in Figure 5.38.

Figure 5.38 : Ageing Index Variability in the Study Areas 1979-1999



Source: Kenya Population Censuses 1979, 1989 and 1999.

As shown in Figure 5.38, the number of people aged 60 years and over per 100 youths under age 15, known as the ageing index, is less than 100 in all the three areas. This is indicative of the small numbers of aged persons in the study areas in relation to the youths in those areas. Notably, variability in the ageing index is more pronounced in Lamu District with 2.5 percent as

compared to Turkana with 0.6 percent and Nairobi with 0.5 percent. This compares well with the national ageing index variability of 1.2 percent. Put differently, Lamu district has more aged persons than Turkana and Nairobi districts, as well as Kenya as a whole.

5.7 Demographic Factors and Population Ageing

This section attempts to examine the contribution of fertility, mortality and migration in the ageing of age structures in the study areas with a view to testing, interpreting and presenting the result of the null hypothesis which states that: 'variations in demographic factors (fertility, mortality and migration) do not significantly influence ageing levels and trends in Lamu, Turkana and Nairobi districts. The data used for these analyses relates to the ageing indices, life expectancies and lifetime net-migrations of the study areas for 1989 and 1999 census years. This analysis first examines the role of fertility, then mortality and finally migration factors in population ageing, with a view to highlighting the contribution of each demographic variable. The specific demographic factors that explain the demographic trends observed in the study areas are discussed as follows:

5.7.1 *Analysis of data relating to Fertility and Demographic Ageing*

Birth rates and the age structures of any given population tend to be highly related to one another. When birth rates are high, the youth tend to comprise a high percent of the population. As a result, plans and resources must focus on meeting the educational, health, housing, and recreational needs of children. A young population also tends to produce more births since the next generation of young women enters their childbearing ages in the next decade. Resources

must continue to focus on meeting the needs of children, even when birth rates decline. Fertility transitions play a significant role in affecting population ageing. For example, a declining fertility is normally followed by a relative increase in the size of higher age groups than the younger age groups and therefore increasing the senility ratio (Jozwiak, 1989).

The changes in fertility observed in the study areas and Kenya as a whole indicate that the process of ageing is inevitable. In the 1960s and 1970s, Kenya had the highest population growth rate in the world, though the country is now on a path of fertility transition characterized by major fertility reductions more in urban areas than in rural areas. The estimated Crude Birth rates and Total Fertility rates of the selected study areas are as shown in Table 5.6.

Table 5.6: Crude Birth and Total Fertility Rates

Area	Crude Birth Rate		Total Fertility Rate		TFR Absolute Change 1979-99	TFR % change 1979-1999
	1979-89	1989-99	1979-89	1989-99	1979-99	1979-99
Kenya*	48.0	41.3	6.6	5.0	-1.6	-24.2
Nairobi	35.8	32.0	3.8	3.0	-0.8	-21.1
Lamu	44.5	36.9	6.0	4.7	-1.3	-21.7
Turkana	50.3	44.3	5.7	6.3	0.6	10.5

* Kenya's figures provided above are used for general comparison with study area figures

Source: *Central Bureau of Statistics (1999): Population Census Vol. IV Analytical Report on Fertility and Nuptiality. Nairobi. pp 36-37.*

As can be observed in Table 5.6 above, there was a general reduction both in the crude birth rates and total fertility rates across the study areas between 1979-1999 except in Turkana district where the total fertility rates increased by 0.6 percent. In terms of crude birth rates, whereas Lamu district experienced the highest reduction of 7.6, Turkana 6.0 and Nairobi the lowest reduction of 3.8. Kenya had a reduction of 6.7. In terms of absolute changes in the total fertility rates between 1979-1999, whereas there occurred reductions in the Kenya (-1.6), Nairobi (-0.8) and Lamu (-1.3) total fertility rates, there was observed an increase of 0.6 in the Turkana total fertility rate. In other words, Lamu and Nairobi district experienced transitions from high fertility rates to low fertility rates but the same was not true of Turkana district. The high total fertility rates of 1979-1989 in Kenya (6.6), Nairobi (3.8) and Lamu (6.0) reduced significantly to the low fertility rates of 5.0, 3.0 and 4.7 respectively. Turkana district's low total fertility rate of 5.7 increased to 6.3 during the same period. In other words, in Turkana district, high fertility rates are responsible for the low ageing levels and trends observed and in Lamu district, the low fertility rates explain the high ageing levels and trends.

An analysis of the relationship between fertility and population ageing is well captured in the correlations between the total fertility rates of the various populations (*Appendix 3*) in the study areas during 1979, 1989 and 1999 and the ageing indices of these areas during the same period. In this relationship, the computed Pearson correlation coefficients (r) for Lamu, Turkana and Nairobi districts are 0.962, - 0.435, and -0.980 respectively. Whereas the Lamu district correlation coefficient (r = 0.962) denotes a strong positive association between the total fertility rates and ageing index during the entire 1979-1999 period, the scenario in Turkana district (r = -0.435) reveals a weak negative relationship between these variables. In Nairobi, the coefficient

of correlation exhibits a strong but negative relationship between total fertility rates and ageing index. Put differently, whereas an increase in the total fertility rates in Lamu district presupposes a similar increase in the ageing index and vice versa, in Turkana and Nairobi district's Kibera division, an increase in the total fertility rates implies a reduction in the ageing indices. According to Kichamu, (1986), given that Lamu district tends to experience long dry spells, it becomes difficult to grow food crops and thus results to shortages in food supply that mainly affects children. The pattern exhibited in Turkana and Nairobi districts conforms to the general global patterns where declines in fertility rates lead to increases in senility ratios (Jozwiak, 1989) and vice versa. An examination of the significance levels of the correlation indices for the study areas reveals that whereas the total fertility rates for Lamu district (0.176) and Nairobi district's Kibera division (0.128) are significant and therefore linearly related, that of Turkana district (0.713) is not significant and therefore not linearly related. Thus, in the three study areas, total fertility variability is a more critical consideration in explaining the ageing of Lamu district and Nairobi district's Kibera division populations than in Turkana district.

5.7.2 *Analysis of data relating to Mortality and Demographic Ageing in the Study Areas*

The effect of mortality on the age structure depends on the age at which the mortality decline occurs. If mortality declines at all ages equally, the population will eventually age somewhat. If the decline is at the young ages, the population will quickly get younger. If the decline is at the old ages, the population will get older.

In order to highlight the effect of mortality trends on the age structures of the populations in the study areas, the actual population proportions in the respective age structures of these study

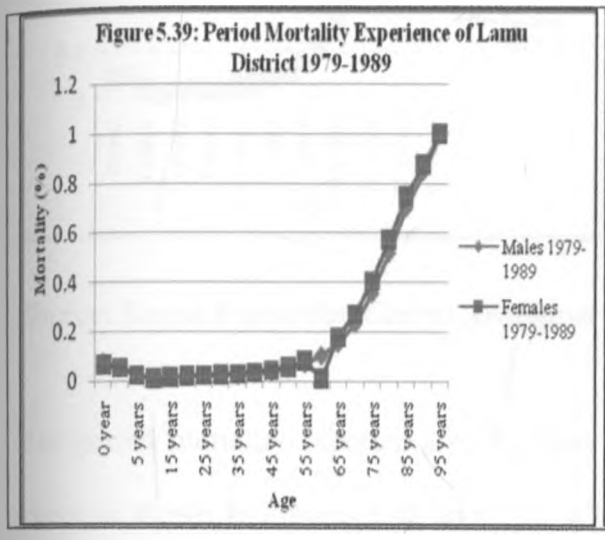
areas is compared with the stationary populations associated with Life Tables (Graziella et al., 1990). For the selected study areas of Lamu, Turkana and Nairobi districts, such comparisons for the 1989 and 1999 census periods are provided for both males and females in Table 5.7.

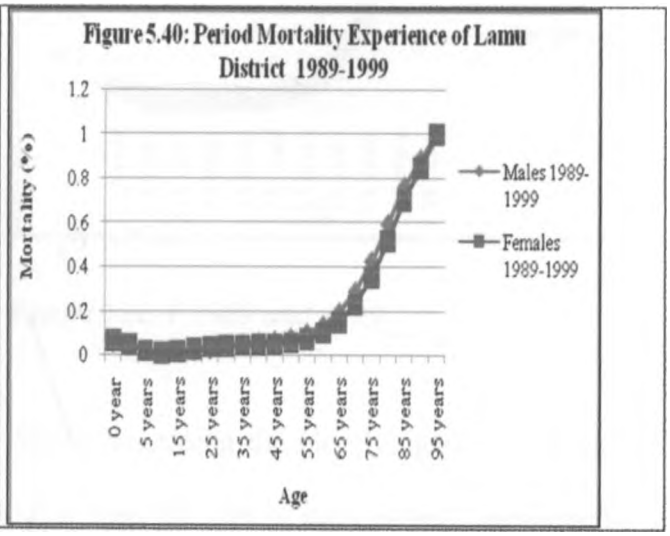
TABLE 5.7: RATIO OF POPULATION AGED 60 YEARS AND OVER IN THE ACTUAL POPULATION AND IN THE STATIONARY POPULATION CORRESPONDING TO PERIOD MORTALITY

Population	Males		Females	
	1989	1999	1989	1999
Lamu District				
Actual:				
60-74 years	2.01	1.87	1.94	1.62
75+ years	0.62	0.63	0.62	0.65
60+ years	2.64	2.49	2.56	2.27
Stationary:				
60-74 years	1.66	1.39	1.58	1.56
75+ years	0.75	0.51	0.62	0.72
60+ years	2.41	1.89	2.19	2.28
Turkana District				
Actual:				
60-74 years	1.36	1.21	1.45	1.18
75+ years	0.41	0.22	0.15	0.21
60+ years	1.77	1.43	1.61	1.39
Stationary:				
60-74 years	0.91	1.45	0.95	1.71
75+ years	0.21	0.49	0.22	0.77
60+ years	1.12	1.94	1.17	2.48
Nairobi District				
Actual:				
60-74 years	0.78	0.79	0.50	0.54
75+ years	0.17	0.21	0.19	0.22
60+ years	0.95	1.00	0.69	0.77
Stationary:				
60-74 years	2.02	1.30	2.09	1.70
75+ years	1.01	0.39	1.11	0.81
60+ years	3.03	1.69	3.19	2.51

Source: Compiled from Kenya Population Censuses 1989 and 1999 and Analytical Report Vol. V

As can be observed from Table 5.7, in the case of Lamu district, in 1989, the real population age structure (60 years and over) was older for both males and females than the stationary population corresponding to its life table. In 1999, the situation remained the same, although the real population and the stationary population became slightly younger. The influence of mortality is portrayed by the J-shaped period mortality Figures 27a and 27b below:

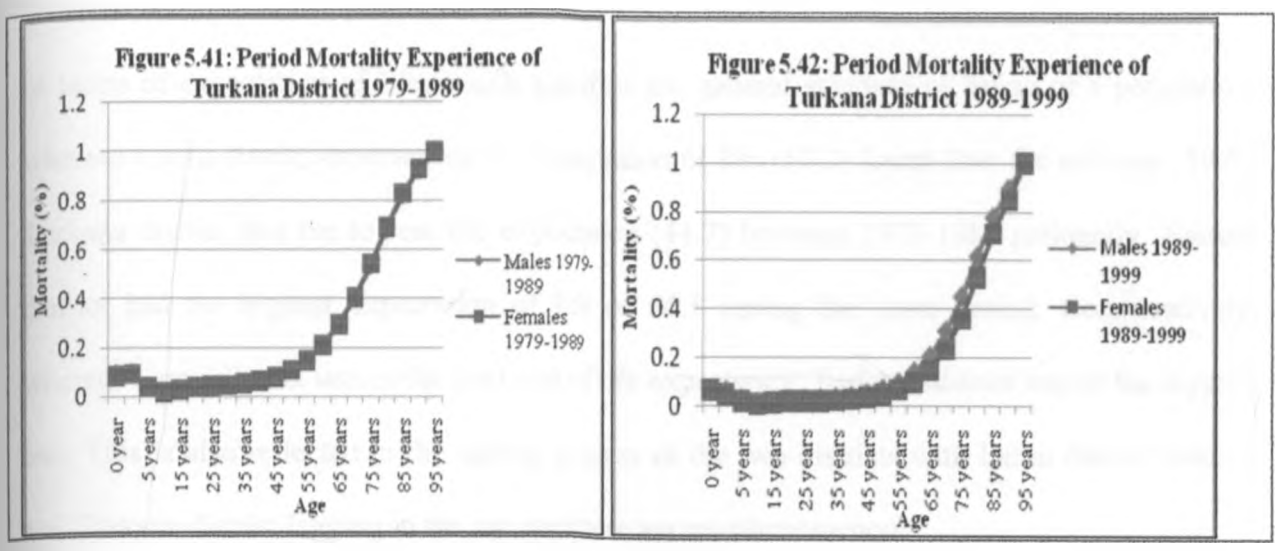




Source: Kenya Population Census Analytical Report Vol. V 1989 and 1999

Figures 5.39 and 5.40 indicate increased mortality for the elderly population in Lamu district starting from age 60. In this, the female mortality, with an exception of age 60, was higher than male mortality throughout the rest of the upper ages in 1989. However, this situation changed in 1999 with male mortality becoming dominant over the female mortality almost throughout the entire age spectrum. Increased mortality at the higher ages affects the ageing of the elderly as it reduces the numbers of the elderly in the population.

The period mortality experience of the population in Turkana district in 1989 and 1999 is depicted in Figures 5.41 and 5.42.



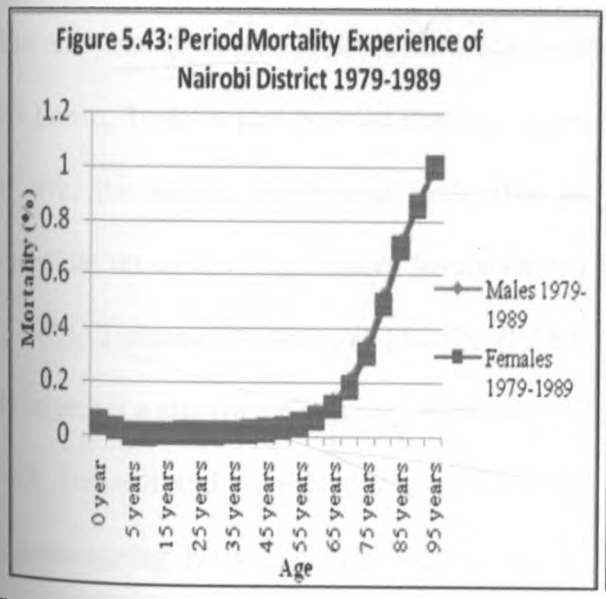
Source: Kenya Population Census Analytical Report Vol. V 1989 and 1999

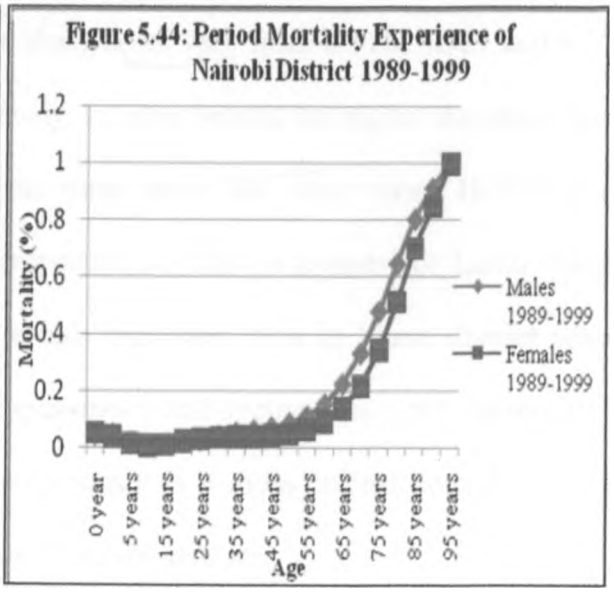
The period mortality experience of Turkana district regarding the elderly aged 60, 70 and 80 years as shown in Figures 5.41 and 5.42 is higher than the one of such elderly populations in Lamu district. For instance, at age 60 in 1999, whereas the mortality level of the elderly in Lamu district was 0.13 percent for males and 0.10 percent for females, the one of the same group in Turkana district was 0.14 percent for males and 0.10 percent for females. At age 70, the period mortality rate increased to 0.29 percent and 0.23 percent for the respective male and female populations in Lamu district, as compared to 0.31 percent for males and 0.23 percent for females in Turkana district. At age 80, the rate increased even further for both regions to reach 0.59 percent for males and 0.51 for females in Lamu district, and 0.78 percent for males and 0.71 percent for females in Turkana district. Whereas it is true to suggest that the mortality experience of a population affects the ageing of that population, it is clear that the higher mortality experience of the elderly in Turkana district explains the small numbers of the elderly

in the district. Conversely, the slightly lower mortality experience of the elderly population in Lamu district explains the relatively higher numbers of the elderly in Lamu district.

In terms of expectation of life, which signifies the general standard of living of a population, whereas Lamu district experienced an expectation of life (57.2) lower than the national (59.5), Turkana district had the lowest life expectancy (44.7) between 1979-1989 nationally. Nairobi district had the highest expectation of life of 66.1 during the same period. Comparatively, whereas Lamu district was in the lead end of life expectancy, Turkana district was in the lagging end. This is also reflected in the ageing process of the two districts with Lamu district leading and Turkana district lagging in the age structure ageing phenomenon.

The period mortality experience of Nairobi district, depicted in Figures 5.43 and 5.44, also provides a contrasting scenario to both the experiences of Lamu and Turkana districts.





Source: Kenya Population Census Analytical Report Vol. V 1989 and 1999

As shown in Figures 5.43 and 5.44, the period mortality experience of Nairobi district for both males and females at ages 60, 70 and 80 are 0.16 for males and 0.09 for females, 0.33 for males 0.22 for females, and 0.65 for males and 0.51 for females for the respective ages during the 1989-1999 intercensal period. Overall, in Nairobi district, males have a higher mortality experience than females in all considered ages. In terms of expectation of life, at age 60, 70 and 80, one expects to live for 15.6 years, 9.5 years and 5.2 years respectively in Nairobi. This compares well with the Turkana scenario of 15.6 years, 9.6 years and 5.3 years and Lamu district's 16.0 years, 9.9 years and 5.5 years for the ages considered. Notably, of the three regions, Lamu district has the highest expectation of life at 60, 70 and 80 years.

An analysis of the relationship between mortality and population ageing is presented in the correlations between the life expectancies of the various populations in the study areas during 1989 and 1999 and the ageing indices (*Appendix 3*) of these areas during the same period. In this analysis, the correlation coefficients for the study areas vary from 0.916, 0.327 and 0.328 for Lamu, Turkana and Nairobi districts respectively. In other words, the higher the expectation of life, the higher the ageing indices in all the three areas and vice versa. However, an examination of the significance levels for the respective correlation indices for Lamu district (0.262), Turkana (0.788) and Nairobi (0.787) reveals that other than in Lamu district where there exists a significant correlation between life expectancy and ageing, this is not significant in both Turkana and Nairobi districts. Thus, life expectancy is a more critical consideration as regards ageing in Lamu district than in Turkana and Nairobi districts.

5.7.3 *Analysis of data relating to Migration and Demographic Ageing in the Study Areas*

Migration is an important phenomenon both at regional and local levels as it influences the distribution of people and the diffusion of ideas, among other things (Bilsborrow, 1998).

The life-time migration levels and patterns in the study areas indicate that all areas were affected by both out-migration and in-migration of the population by varying degrees. Overall, the net effect of migration indicates that whereas Nairobi and Lamu districts gained by having more in-migrants than out-migrants during the 1979-1999 period, Turkana district was a net loser with more out-migrants than in-migrants. Table 5.8 below shows these variations in life-time net migration by district in 1979, 1989 and 1999.

Table 5.8: Lifetime Migration Levels and Trends

	In-migrants			Out-migrants			Net-migrants		
	1979	**1989**	**1999**	**1979**	**1989**	**1999**	**1979**	**1989**	**1999**
Nairobi	615,942	930,074	1,444,809	91,570	157,450	179,099	524,372	772,624	1,265,710
Lamu	13,349	17,808	20,542	8,635	11,463	13,864	4,714	6,345	6,678
Turkana	4,413	8,271	13,720	25,155	39,457	45,228	-20,742	-31,186	-31,508

Source: Kenya Population Census 1999 Vol. VI Analytical Report on Migration and Urbanization

In terms of percentage migrants, whereas the out-migrants in Nairobi in 1989 represented 30.7 percent, the in-migrants represented 72.3 percent of the total population. By age group, the life-time migrants in Nairobi district represented 27.80 percent in age category 0-14 years, 71.21

percent in age category 15-64 years and only 0.92 percent in the 65 years and over category. 0.07 percent were not stated. The scenario in Lamu district was that 23.1 percent were out-migrants and 31.8 percent were in-migrants in 1989. By age category, there were 24.62 percent in the ages 0-14, 72.75 in the category 15-64 years and 2.60 in the age category 65 years and over, with 0.03 unstated. Turkana district had 18.5 percent out-migrants and only 4.5 percent in-migrants. In these life-time migrants, 27.06 percent belonged to the age-category 0-14 years, 72.32 percent in 15-64 years and 0.56 percent in 65 and over years with 0.06 unstated.

The relationship between net-migration and the ageing indices (*Appendix 3*) of the study areas over the specified time periods also shows that variations in net-migration explain the ageing phenomenon. The computed correlation coefficients in these relationships are -1.000, -0.738, and 0.997 for the respective study areas of Lamu, Turkana and Nairobi districts. For Lamu district and Turkana districts, the strong inverse coefficients indicate that an increasing lifetime net-migration implies a reduction in ageing indices and vice versa. Notably, this negative relationship is stronger in Lamu district than in Turkana district. In Nairobi district, lifetime net migration has a strong positive influence on ageing. An examination of the significance levels of the computed correlation coefficients for the various study areas reveals that the correlation is more significant (0.006) in Lamu district than it is in Nairobi district (0.047) and Turkana district (0.471). Thus, migration as a demographic factor does influence the ageing levels and trends in all the study areas. Notably, whereas Turkana district's population is largely characterized by out-migration, Lamu and Nairobi districts' populations are characterized by in-migration.

5.8 Conclusion

Based on the foregoing results, the three demographic factors considered in this study namely fertility, mortality and migration do influence the ageing levels and trends in the respective study areas, thus rejecting the null hypothesis that variations in demographic factors do not influence ageing levels and trends in the study areas of Lamu, Turkana and Nairobi districts. From the discussion of results, it is apparent that for Lamu district, a reduction in the total fertility rates is the most important variable in explaining the observed ageing levels and trends of the population. However, mortality as exemplified by the expectation of life at age 60 also accounts for the ageing of the elderly. In Turkana district, lifetime net migration explains 54.5 percent of the age structure ageing in the district. This is closely followed by the total fertility which explains 18.9 percent and life expectancy at 60 that explains 10.7 percent. Kichamu (1986) notes that in 1979, Turkana district had one of the highest child mortalities in Rift Valley province and that comparatively, rural areas in Turkana experienced lower child mortalities than urban areas. For Nairobi district, Net migration, which accounts for 99.7 percent of the variability in ageing index is the most important consideration in explaining this variability. This results mainly from in-migration of the population in the working ages.

CHAPTER SIX

SPATIO-TEMPORAL CHARACTERISTICS AND THE DISTRIBUTION OF THE ELDERLY POPULATION

6.0 Introduction

The influence of place on health is not a new concept. As far back as 500 BC, Hippocrates described swamps as unhealthy places and sunny, breezy hillsides as healthy places[3]. The physical and environmental factors, as characterized by lithologic aspects such as geology, topography, soils, as well as climatic variability and water availability are important to the elderly as they affect the quality of life of the elderly, impact on their attitudes and behaviour as well as their physical and psychological health (Auvinen, 1989). A poor physical environment makes life more difficult for the elderly, causes more psychological stress, leads to a loss of the sense of hope and therefore causing chronic strain, and makes the elderly feel more socially isolated. In addition, poor housing conditions and hygiene, as well as noisy and crowded living environments lead to poor health of the elderly persons. Generally, the living environment of the elderly affects their physical health and self image hence their psychological well-being. Environmental characteristics, whether objective or perceived tend to impact on the quality of life of people.

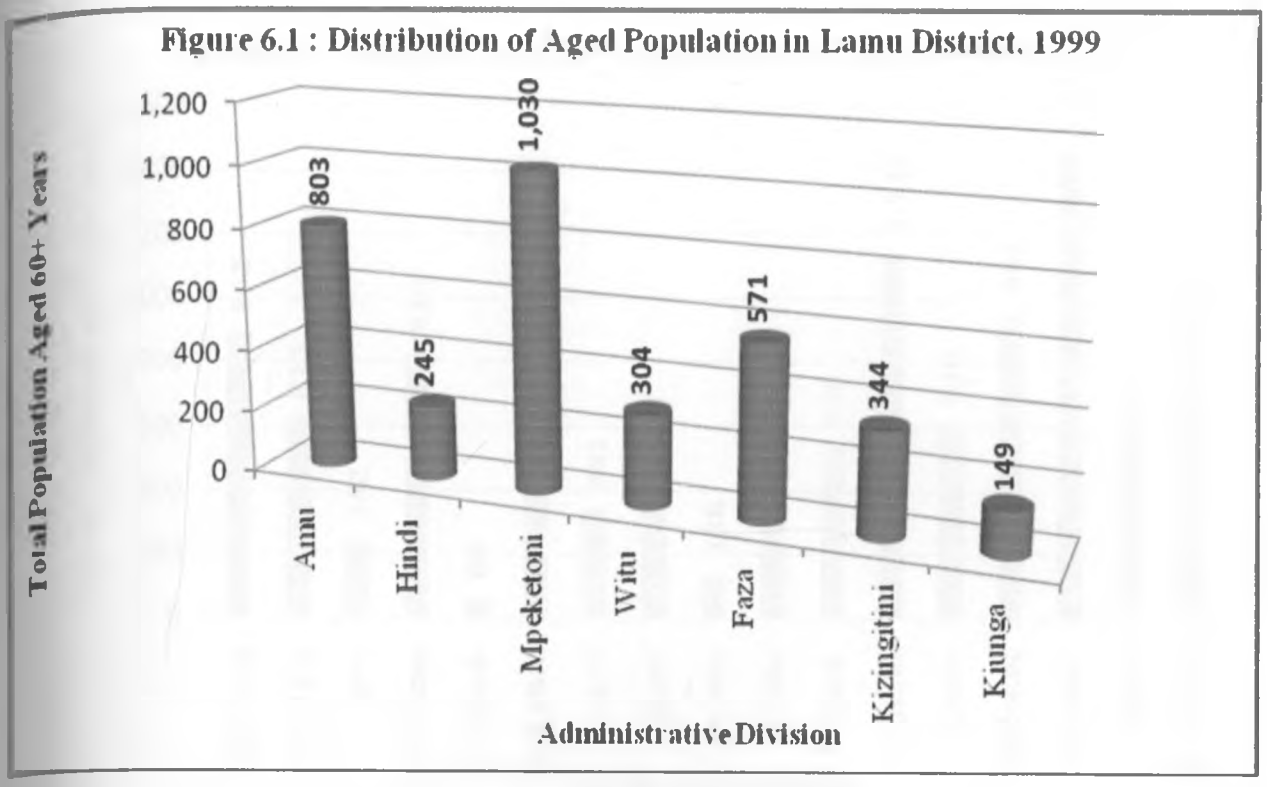
This chapter focuses on the analysis relating to the impact(s) of spatial and temporal factors on the variations in the distribution of the elderly populations, with a view to testing and presenting results of the second null hypothesis which states that: 'changes in the spatio-temporal factors do not explain the observed variations in the distribution of elderly populations in Lamu, Turkana and

[3] Hippocrates (Original text written 400 B.C.E). On Airs, Waters, and Places. In: http://classics.mit.edu/Hippocrates/airwatpl.1.1html

Nairobi districts. Spatial variations mainly in lithologically related aspects such as geology, topography, soils and vegetation, as well as climate and water availability tends to affect temporal considerations such as resource conflicts and food security or insecurity. The spatial factors considered in this section are physical in nature and are those mainly related to lithology, climate and water availability. Conflict induced migrations as a temporal factor, is also discussed herein. These factors help to explain the prevalent variability of the elderly. An analysis of the hypothesis relating to the changing spatio-temporal environment and the variations in the spatial distribution of the elderly is attempted here.

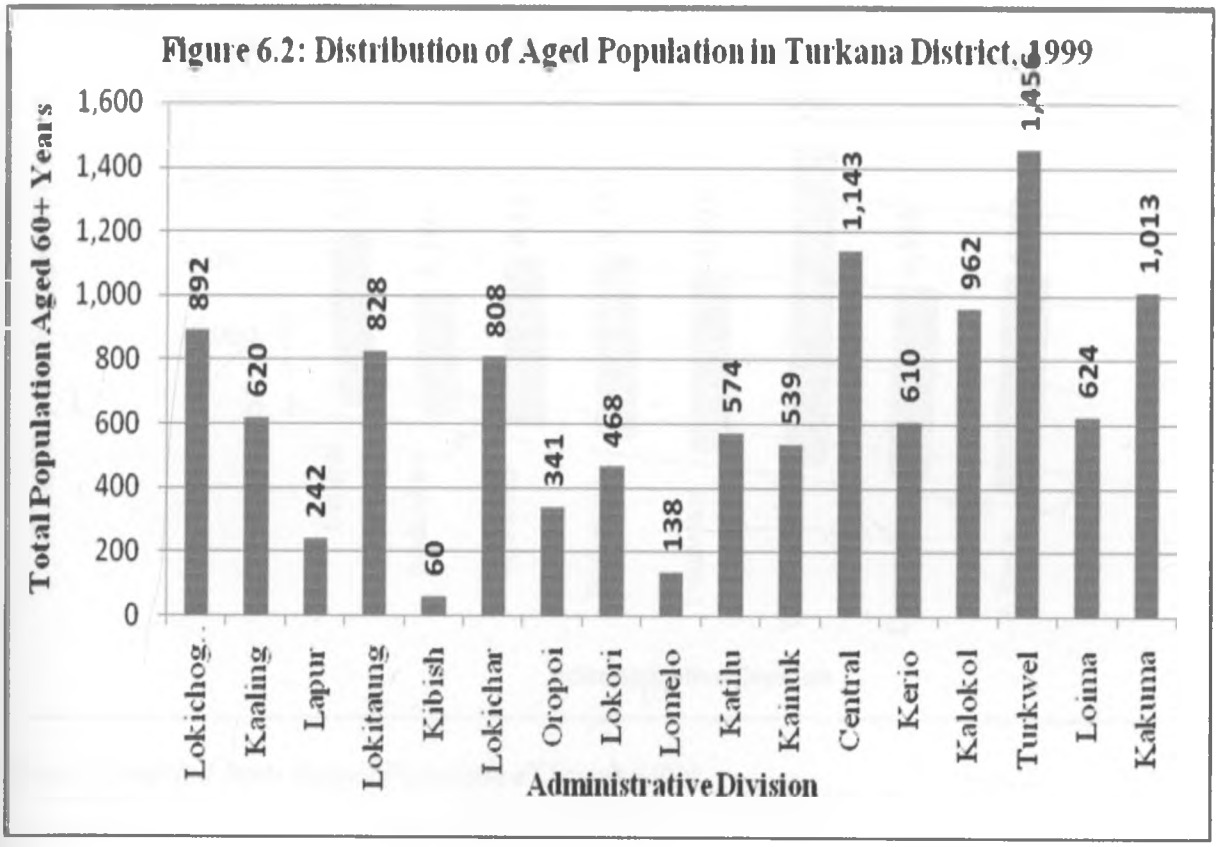
6.1 Distribution of Aged Population

In this section, a graphical presentation of the distribution of the elderly in the specific study areas is attempted with a view to indicating areas of concentration and the possible reasons that account for such distributions. Generally, variations in the numbers of the elderly across the administrative divisions in the study areas are indicative of the underlying explanatory spatial and temporal factors. These variations are presented in Figures 6.1, 6.2 and 6.3 for Lamu, Turkana and Nairobi districts respectively. Based on these elderly population variations, a number of observations are drawn.



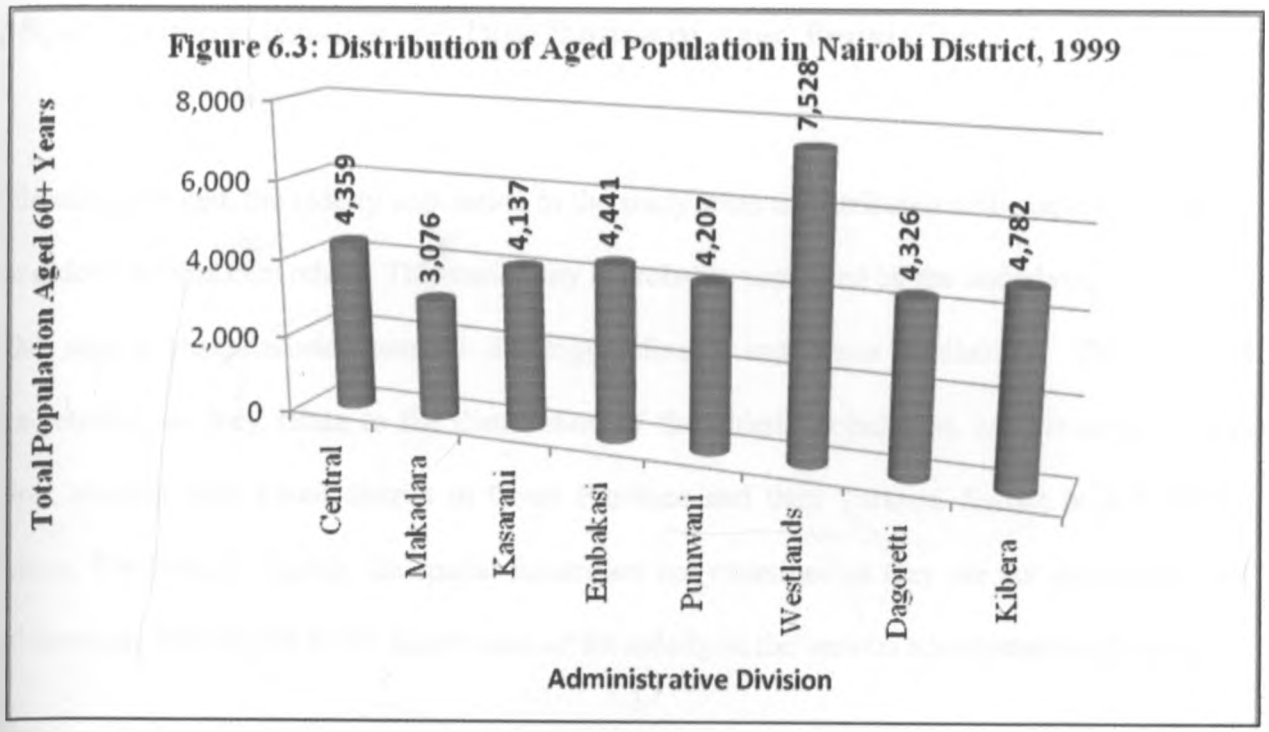
Source: Compiled from Kenya Population Census 1999

Figure 6.1 shows that in Lamu district, whereas Mpeketoni division with 1,030 elderly persons and Amu division with 803 elderly persons have the highest numbers of the elderly, Hindi division with 245 elderly persons and Kiunga division, with 149 elderly have the lowest numbers of the elderly. In terms of areal characteristics, Mpeketoni division, which occupies 1429 square kilometers, is the largest division in the district and Amu division, covering 151 square kilometers is the smallest. Amu division, in which Lamu town is situated, is mainly urban in character.



Source: Compiled from Kenya Population Census 1999

From Figure 6.2 above, it is observed that in Turkana district, the elderly populations are mostly concentrated around Turkwel (1,456 persons), Central (1,143 persons) and Kakuma (1,013 persons) divisions. The people in Turkwel division mainly practice irrigated agriculture along the Turkwel River as well as some pastoral activities. Also, Lomelo (138 persons) and Kibish (60 persons) divisions have the least number of elderly persons in Turkana district.



Source: Compiled from Kenya Population Census 1999

The distribution of the elderly in Nairobi district is shown in Figure 6.3. Whereas the Westland division, with 7,528 elderly people has the highest number of such populations, Makadara division, with 3,076 elderly persons has the lowest number of such persons. Kibera division, which is the specific area of study in Nairobi district, has 4,782 elderly people. These populations in Kibera division are spread in the mainly middle-high income area of Lang'ata and Karen as well as the low income area of Kibera.

6.2 Spatial Characteristics and Distribution of Aged Population

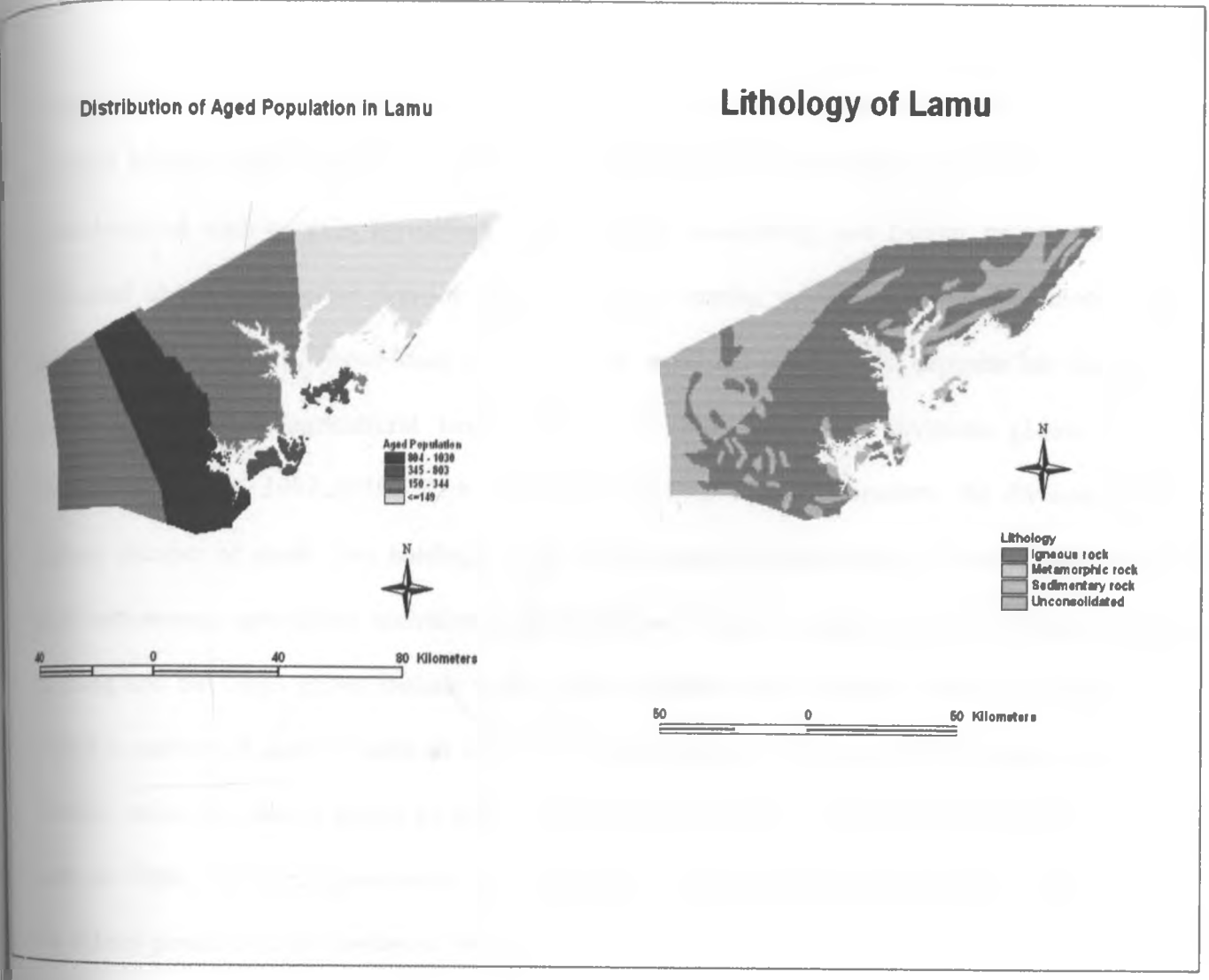
As already indicated, the elderly population in the study areas is distributed with some areas having more elderly people than others. This variability is probably explained by the underlying differences in the spatial characteristics namely lithology, climate and water availability. These spatial characteristics, as they relate to the distribution of the elderly population, are discussed in this section, starting with Lamu district in Coast Province and then Turkana district in Rift Valley Province. For Nairobi district, the spatial factors are not examined as they are not deemed critical considerations with regard to the distribution of the elderly in the various administrative divisions.

These spatial factors are examined in the subsequent sections, starting with lithology, then climate and water availability.

6.2.1 Lithology and the Distribution of Elderly

In this section, lithology encompasses aspects such as geology, topography, soils and vegetation as they influence the elderly and their distribution in the study areas. Maps 6.1 and 6.2 below juxtaposes the distribution of the aged population in Lamu district and the lithology of the district. This is in an attempt to discern any spatial relationships prevalent between the two aspects.

Map 6.1 and 6.2: Lithology and the Elderly in Lamu district



Source: Survey, 2007

As indicated in maps 6.1 and 6.2, the distribution of aged persons in Lamu district is essentially dominant in Mpeketoni division (804-1030), followed by Amu and Faza division (345-803), then Witu and Hindi divisions (150-344) and lastly Kiunga Division with less than 149 aged persons. In terms of lithology, the major rock clusters are igneous and metamorphic rocks which cut through

much of the district, as well as a few sedimentary rocks in the northern and eastern parts of Witu and Mpeketoni Divisions, and some patches of unconsolidated rock spread throughout the district.

As can be discerned, there seems to be no direct influence of the lithologic factors on the distribution of aged persons in the district. However, this distribution can be explained by a number of distinct considerations such as soils, agriculture, climate, water availability, and fishing, among others. As indicated above, Mpeketoni division has the highest number of the elderly in the district. The division, with high fertility red-loam soils in the low lands and some fluvial deposits, has the highest percentage of good agricultural land, followed by Faza and Witu divisions (*Lamu District Development Plan, 1997-2001*). With a farm area of 89.5 square kilometers, the division has the highest number of small farm holdings in the district, and given its high agricultural potential and high settlements, agricultural activities are predominant. The area supports both food and cash crop farming and the crops grown include maize, beans, cassava and cowpeas. Mpeketoni division also enjoys a number of shallow wells as well as Lake Kenyatta, the only natural fresh water lake in the district, which provides a source of water, together with rain water. Fresh water fishing, in species such as tilapia, claris and protopterus, is also prevalent. These considerations serve as attractions to the elderly populations in Mpeketoni division.

Amu and Faza divisions are also important settlement areas for the elderly populations. Other than the prevalent urban environment conducive to the elderly as it provides numerous resources in terms of food, health and other requirements, Amu division has shallow wells of the Shella sand dunes that provide fresh water supplies for the Lamu Island and Mokowe area. The division also has good agricultural potential and a high percentage of the farmers in the division grow cash rather than food

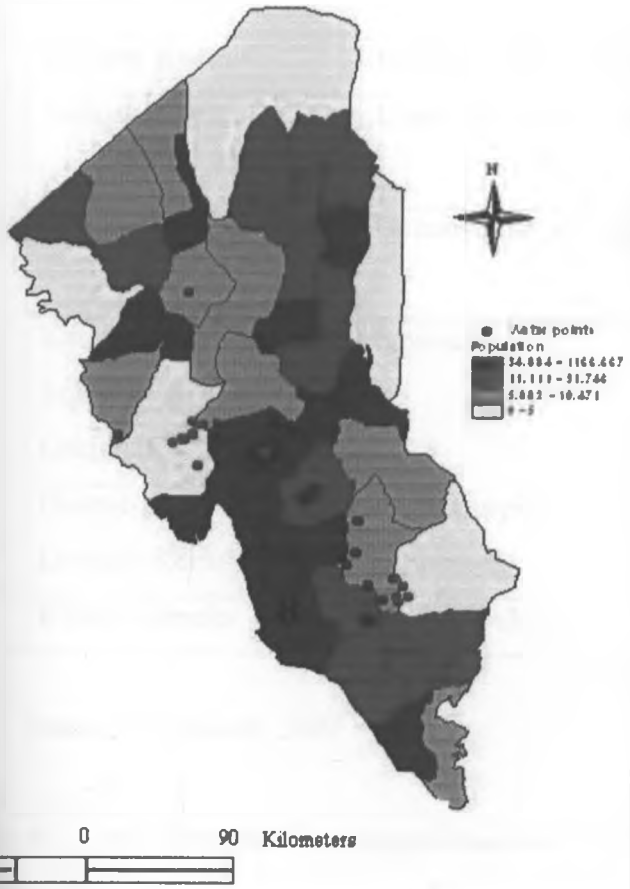
crops. These include coconut and mango plantations. Faza Division has low production levels due to its semi-arid nature. Residents here prefer fishing to farming.

The rocky soils found in the northern marginal areas of Kiunga and Witu divisions are very poor and support only scanty grassland vegetation. In Kiunga division, some aeolian soil deposits are also prevalent. Rain water, an important source of water in the district, is the only source of clean and portable water in Kiunga division. In addition, predominant banditry activities coupled with an existing wildlife menace in the division are important militating factors against the elderly populations.

The physical environment plays an important role in the lives of old people as it influences a number of variables. In their perception, 38 percent of the elderly in Lamu district feel that the physical environment has influenced their rate of growing old as they have witnessed a worsening environment in terms of reduced soil fertility and therefore decreasing harvests, increasing floods, increasing sunshine and heat intensity, new emerging diseases, and increased poverty and stress, among others. However, 62 percent of the respondents in Lamu district indicated that the physical environment has not influenced their rate of growing old. This agrees with the above finding that lithologic aspects, as shown in the lithology map of Lamu are not distinct to certain specific areas only but cut across most of Lamu district and therefore do not influence the distribution of the elderly in the district.

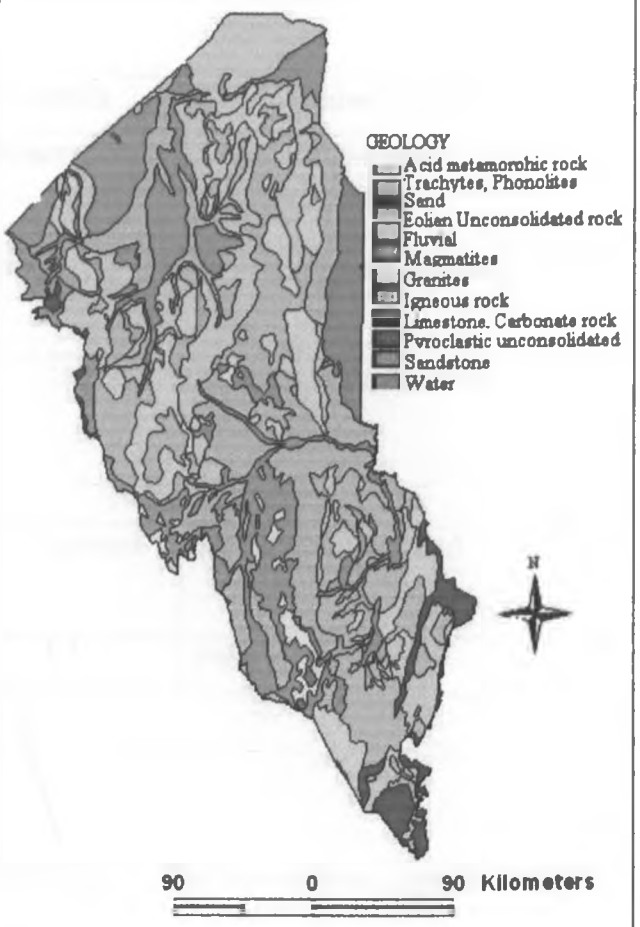
Maps 6.3 and 6.4 juxtaposes the distribution of the elderly population and the related lithologic aspects in Turkana district in Rift Valley province.

MAP 14a : DISTRIBUTION OF AGED POPULATION IN TURKANA DISTRICT



Source: Created from Kenya 1989 Census

MAP 6.4 : THE LITHOLOGY OF TURKANA DISTRICT



Source: Created from Geology Department Data

As shown in map 6.3 and 6.4 on the elderly population distribution in Turkana district above, the Turkwel and Central areas have more elderly population totals of between 1177 and 1456, followed by Kakuma and Kalokol with between 898 and 1176 elderly people. The larger part of the district composed of Kaaling, Lokitaung, Lokichoggio, Loima and Lokichar have elderly populations of between 619 and 897 persons. Another part of the district constituted by Oropoi, Katilu, Kainuk, Lokorio and Kerio have between 340 and 618 elderly people and another area made of Kibish and Lomelo have populations of between 60 and 339. These five elderly population regions, together with their lithological characteristics are shown in Table 6.1.

Table 6.1: Elderly Regions and Lithological Characteristics in Turkana District

	Elderly Region	Lithological characteristics	Predominant Activity
1	Turkwel-Central	Unconsolidated + Sedimentary	Livestock, irrigated agriculture, urban life
2	Kakuma-Kalokol	Unconsolidated + Igneous	Livestock, refugee camp, fishing
3	Kaaling-Lokitaung-Lokichoggio-Loima-Lokichar	Igneous	Pastoral, refugee camp
4	Oropoi-Katilu-Kainuk-Lokorio-Kerio	Metarmorphic + Igneous Sedimentary	Agriculture, pastoral
5	Kibish-Lomelo	Unconsolidated	Pastoral

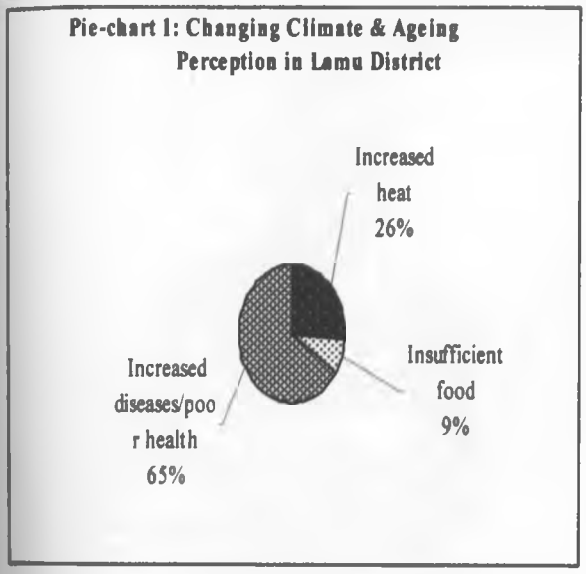
Source: Fieldwork, 2007

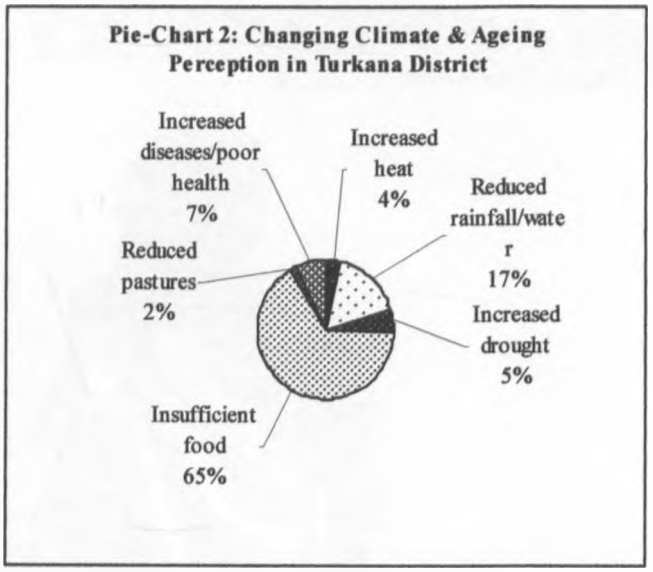
Table 6.1 above provides five categories of the elderly regions in Turkana district, together with their lithological characteristics. As indicated, most of the district consists of low-lying plains with isolated mountains and hill ranges. Turkana district is also mainly characterized by metamorphic and volcanic rocks, though in some areas sedimentary rocks are prevalent.

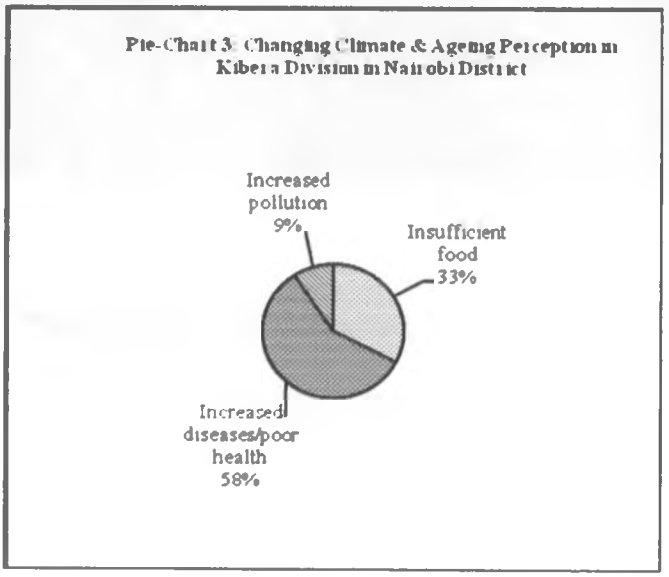
In Turkana district, the vegetation physiognomic characteristics such as woodland, bush and bushed grassland is controlled by both water availability and landscape pattern. The woodland and forest vegetation mainly occur in the riparian and riverine situations while the driest parts of the district supports the dwarf shrub grassland with fewer trees. The woody vegetation, characterized by variations in landscape gradients and gradients of rainfall, are mostly dominated by species of acacia namely: *acacia tortilis* – mostly dominant in the riparian and riverine zones, *acacia Senegal* – on the hilly and rocky sites, and *acacia reficiens* – on the non-riparian sites with fine soils.

6.2.2 Climatic Factors and the Distribution of Elderly

Climatic factors such as rainfall and temperature are critical considerations in the livelihoods of the elderly and other population categories in the study areas. Whereas at least 39.6 percent of the elderly populations in Lamu district believe that climatic characteristics tend to accelerate their rate of ageing, only 29.5 percent believe the same in Turkana district. These perceptions are indeed supported by the elderly peoples responses presented in the pie-charts below:



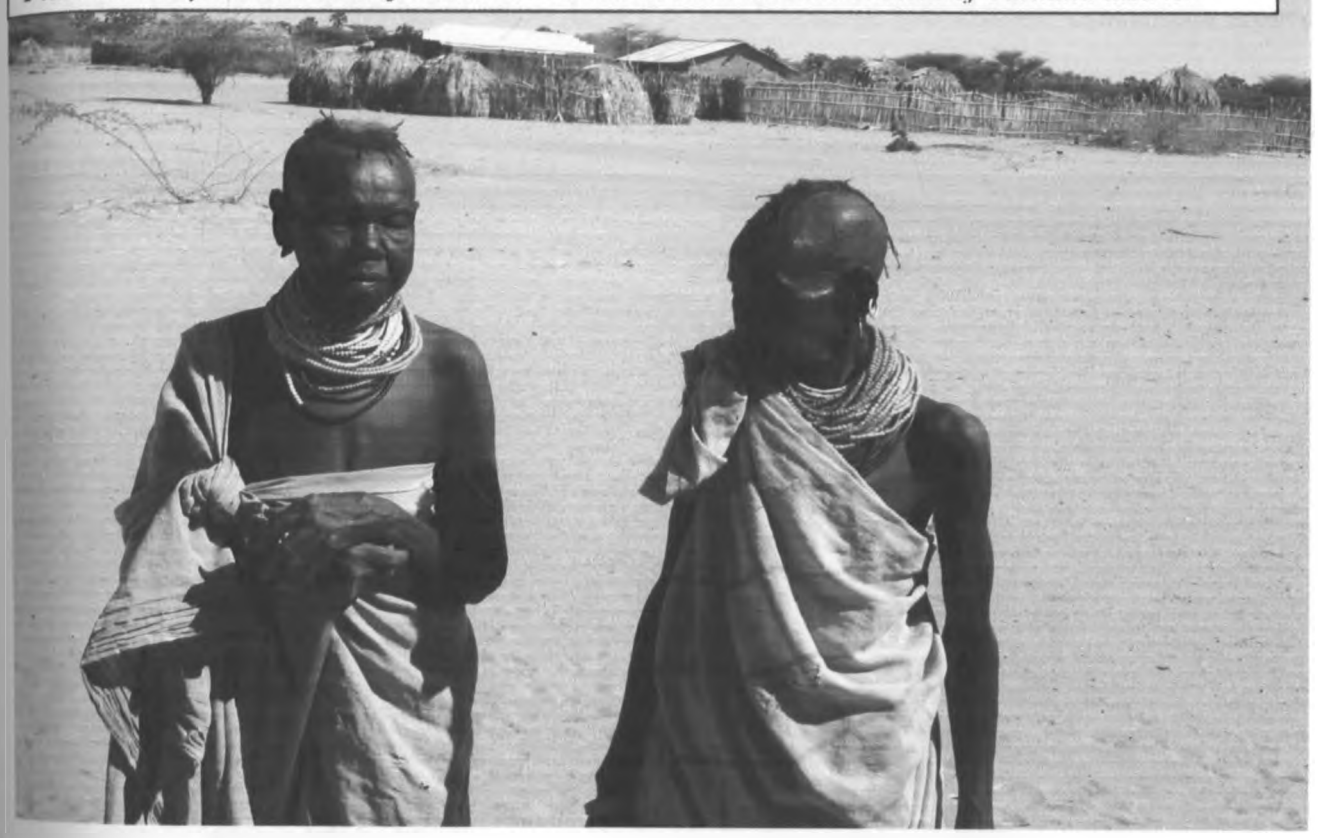




Source: Survey, 2007

As can be discerned from the above charts, changing climatic conditions, in the elderly people's view, impacts on their lives through increased diseases and therefore attendant poor health, insufficient food, increased heat, reduced rainfall, increased drought and reduced pastures. In Turkana district, insufficient food is the most critical factor as opposed to the poor health occasioned by climatic changes in Lamu and Nairobi district's Kibera Division.

Plate 6.1: Depicts two elderly women in the harsh climatic environment of Turkana district



Source: Source, 2007

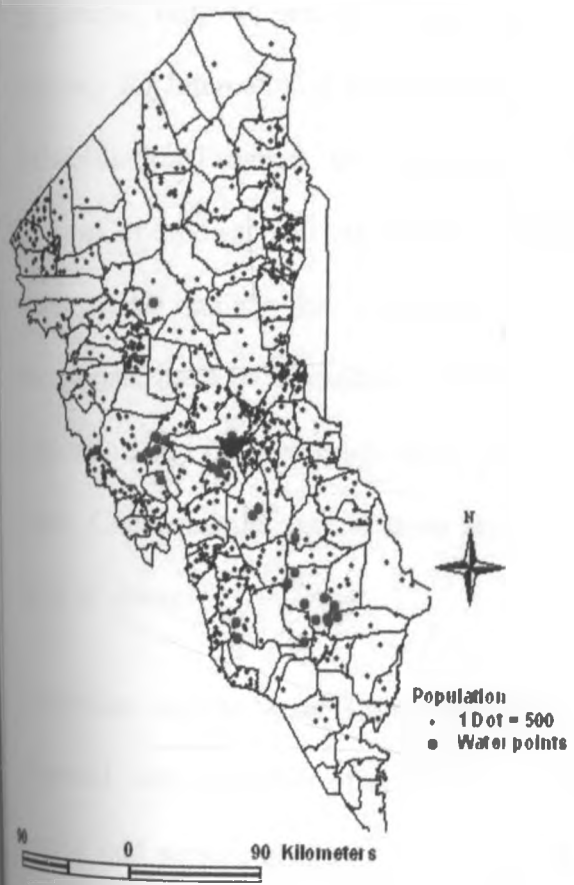
In terms of climate, Turkana district is characterized by desert conditions and a rainfall of 300 mm/year or less. This means that there exists a regular crisis of water and food shortages that escalates with drought conditions in the area. In the district, most of the villages are semi-deserted as most of the men move with their livestock to the hills in search of water and pasture. Notably, pastoralist livelihood depends on the availability of water and pasture. In this area, the elderly, given

their vulnerability owing to their frail physical and health conditions, tend to be disadvantaged as they can only depend on their family members, relatives and well wishers for their survival.

6.2.3 Availability of Water and Distribution of the Elderly

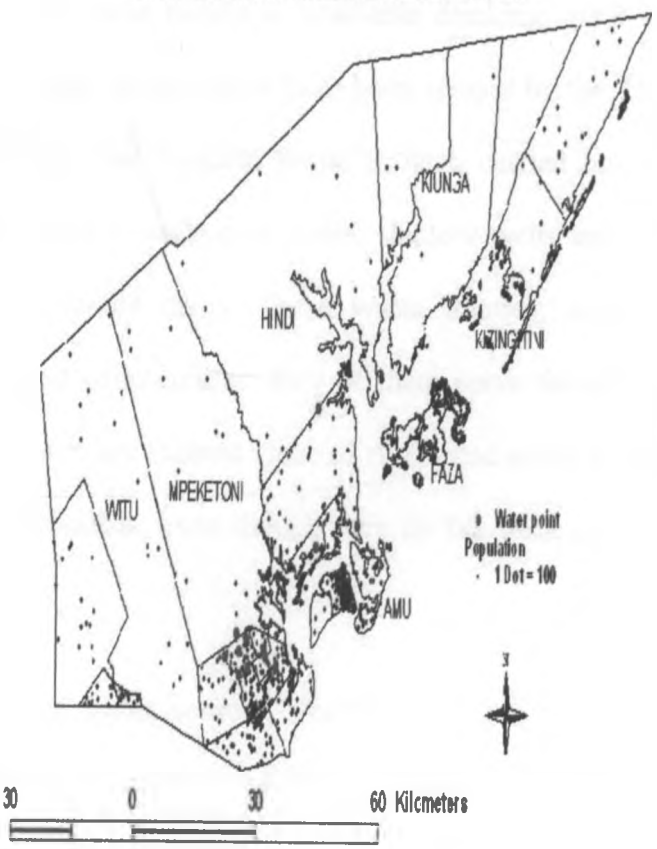
Water is essential for human survival. Population in the study areas tends to concentrate along rivers and streams and around water points. Such water points include dams, falls, rapids, springs, wells and waterholes. Maps 6.5 and 6.6 below show how the populations in two districts concentrate around water points

MAP 15: TURKANA DISTRICT POPULATION DISTRIBUTION AND WATER POINTS



Source: Created from CBS 1999 Census Data

MAP 16: LAMU DISTRICT POPULATION DISTRIBUTION AND WATER POINTS



Source: Created from CBS 1999 Census Data

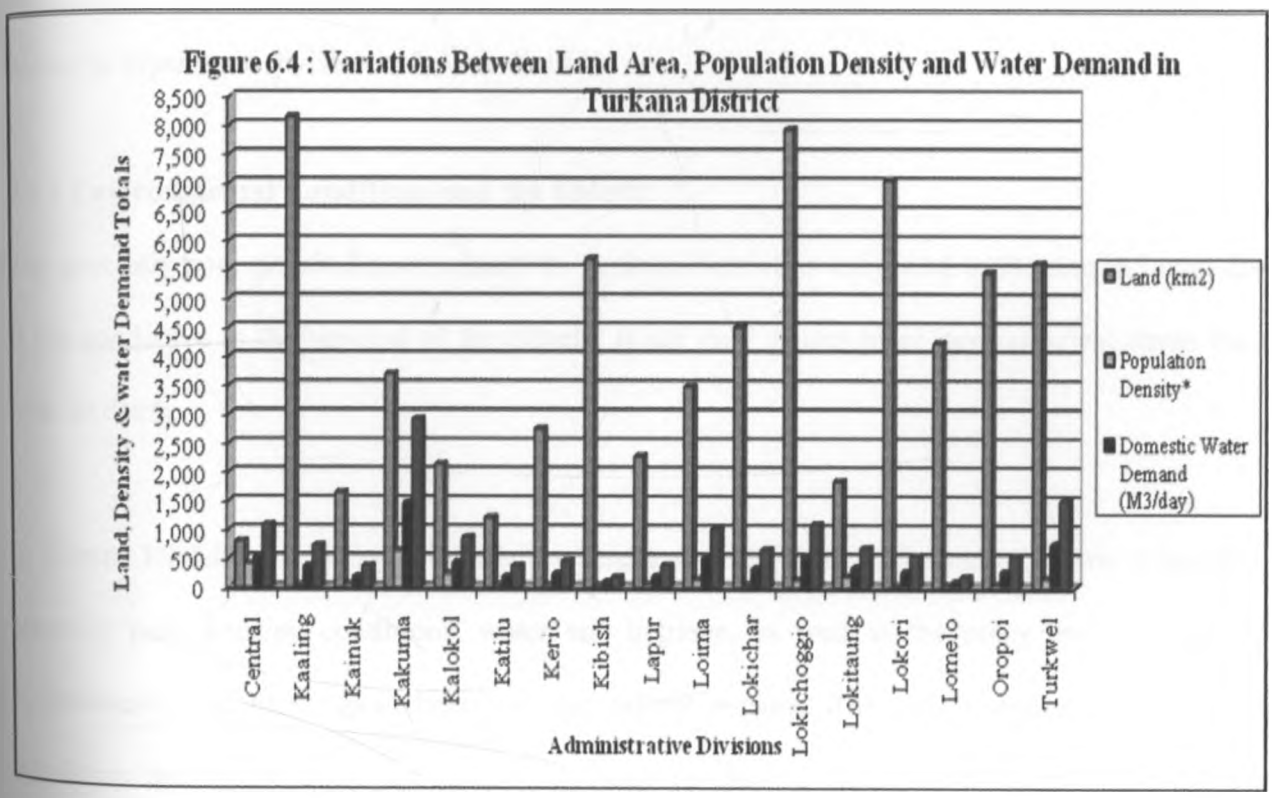
To the pastoralists in Turkana district, access to safe and affordable water is one of the main challenges in an environment characterized by inadequate fresh surface water supplies. Water acts as the main limiting factor in the socio-economic development of the dry season grazing areas of the district where livestock exploitation is the backbone of local livelihoods. The Turkana community is made up of clans with each having their own territorial grazing zones. When moving into the grazing territory of another clan, grazing and water rights have to be discussed. Turkana people have a great indigenous knowledge on natural resource management and take wise decisions on water use and grazing patterns as their livelihood depends on the availability of these resources.

In general, only 41 percent of the Turkana people have access to a reliable drinking water source (Society for International Development, 2004). Many water points have been created by the Turkana Rehabilitation Program, the European Community, the Turkana Water Project, carried out by the Diocese of Lodwar and other actors. These sources include bore holes, shallow wells and ground water dams namely the subsurface and sand storage dams. These water sources, with a few exceptions, have been created to serve the settled communities. Few of them serve the pastoralist population and in most cases these sources of water are located close to rivers and other sources of water. Consequently, few of them serve the pastoralists, even though they do fall back on them in times of stress.

Pastoralists access water from different types of water sources. Fortunately, Turkana district is endowed with a number of seasonal rivers and water courses. Although dictated by the amount of rainfall and season, shallow wells and traditional scoop holes in the river are a common source of water for the pastoralists. Water points are mostly identified through trial and error method and are located at isolated spots on the riverbeds. Water is drawn from unlined depths of up to 8m below

riverbeds. One has to keep on changing wells as the water disappears. The Turkana pastoralists extract their water from underground by scooping the top soil and sand from dry river beds to reach the water table. This method especially involves women, for whom it is their main task, as they take care of the watering of the animals.

The life of Turkana people is inevitably changing. Droughts and increasing conflicts are the basis of loss of traditional social and political structures. More people are settling in and around towns. Figure 6.4 shows the variations between land area, population density and water demand both for domestic and livestock consumption in Turkana district.



Source: Survey, 2007.

It is observed that Kakuma division, with a land area of 3,695 square kilometres and a population density of 638 persons, has the highest water demand for both domestic (1,457 cubic meters per day)

and livestock (2,913 cubic meters per day) consumption in the district, followed by Turkwel, Lokichoggio and Central divisions. Conversely, Kibish division, with an area of 5,684 square kilometres and a population density of 10 persons per square kilometre has the least demand both for domestic (91 cubic meters per day) and livestock (182 cubic meters per day) consumption. This variability in water resource demand also affects the elderly in terms of their distribution in the district.

In Lamu district, there are more watering points in Mpeketoni division, followed by Amu division (*Map 6.6*). This indicates that water availability mainly for domestic and agricultural use is higher in Mpeketoni division than in any other division. It is also noteworthy that population concentration is higher in Mpeketoni division and Amu division.

6.2.4 Environmental Conditions and the Elderly

The generally poor physical environment in Turkana district as compared to the one in Lamu district is not conducive to the survival of the elderly. It not only causes more psychological stress but also leads to death.

In Kibera Division of Nairobi District, whereas the physical environment seems tolerable, the generally poor housing conditions, water and hygiene, as well as the noisy and crowded living environments lead to the poor health of the elderly persons. The city of Nairobi has an average population density of 2600 per square kilometer (excluding the area of Nairobi National Park). Notably, in Kibera Division, whereas the high income area of Karen/Lang'ata has an average density of 300 people per square kilometer and a household size of 4.7 people, other areas of Kibera Division have a density of 49000 people per square kilometer and an average household size of 6 people. This

illustrates the magnitude of the problem facing slum dwellers with regard to their inability to obtain adequate income and access to basic services and facilities. Households in the low income Kibera have poor access to services such as safe water, sanitation and solid waste disposal and are thus exposed to the danger of ill health and disease (Mugeni, 1995).

Plate 6.2: Depicts Stagnant Water next to Residential Houses in Kibera Division

Source: Survey, 2007

The majority of the households (80 percent) in Kibera have no sanitary units such as toilets and bath rooms. This leads to people preferring to use "open air defaecation". Regular leakages from poor constructed pit latrines find their way into the nearby streams. A flurry of giant flies and rats are an every day phenomenon. Solid waste is also dumped by residents at their door steps, near available

streams, seasonal and otherwise, and about 100 meters from such stream. This produces stench and filth near houses attracting more flies and rats.

Plate 6.3: Human Faeces Leaking from a Pit Latrine in Kibera Division

Source: Survey, 2007

The high prevalence of diarrhoeal diseases in Kibera is explained by environmental hazards. The lack of sewers or other means of ensuring hygienic disposal of human wastes contributes to high incidences of disease. Overcrowding, poor housing conditions, a high density of insects and rodents, lack of garbage disposal facilities, poor personal hygiene and squatter environment are predisposing factors for gastrointestinal diseases. Water is the primary medium for disease transmission and the most common diseases in Kibera include dysentery, amoebiasis and infection by intestinal protozoa. Contact with human faeces is also dangerous as it is the principal source of pathogenic organisms of

many communicable diseases. The stagnant water and clogging of drains also provides suitable breeding grounds for mosquitoes thus increasing the incidence of malaria.

A quick comparison between the high/middle income Lang'ata area and the low income Kibera area shows that the elderly in Kibera are more vulnerable to diseases and lack of good healthcare support than their counterparts in Lang'ata. Whereas at least 46.7 percent of the elderly in Kibera suffer from some form of disease or disability, only 30.8 percent of the elderly suffer from such in Lang'ata. In addition, whereas only 29.6 percent indicated availability of healthcare support programs for the elderly in Kibera, 35.6 percent enjoyed such services in Lang'ata area. In terms of elderly support, the Lang'ata area is more endowed than the Kibera area.

6.3 Temporal Factors and Distribution of the Aged Population

In this section, the factor of conflict related migrations, which is temporal in nature, is examined as it relates to the elderly populations.

6.3.1 Conflict Induced Migrations

Owing to the harsh climatic conditions, drought and insufficient water, Lodwar town continues to attract more and more elderly people as they seek for survival. This is also accentuated by the fact that there is insecurity in most areas as a result of resource conflicts. For instance, there have always been tensions between the Turkana and other pastoralist groups about access to water and pasture and these have increased as water sources have dried up and pastures been lost. Cattle raiding has always been used as a strategy to restock herds during or after a drought. Among those interviewed 13.5 percent of the elderly in the district indicated as having been displaced from their original abodes for

various reasons. These include frequent raids (13 percent), droughts (6.5 percent), wars (2.2 percent and food shortage (2.2 percent). About 19.8 percent of the elderly indicated that violent conflicts involving communities have befallen them and these are caused by stealing of animals (21.5 percent), pasture areas (9.2 percent), water points (9.2 percent) and land disputes. Notably, prolonged drought and more cattle deaths lead to more raids.

In Turkana district, over 4,000 vulnerable households have benefited from a cash-for-work scheme where families identify activities such as tree planting, improvement of surface water points, making fishing nets, running livestock sale yards, improving irrigation systems, among others, in exchange for money. This money is mostly used to buy food. Such activities mostly lead to aggregating of population particularly along the Turkwel River, where such activities, mostly run by a non-Governmental Organization called Oxfam, are prevalent.

In Lamu district, 24 percent of the elderly indicated that for a number of reasons, they were displaced from their original homes. The reasons advanced include insecurity as a result of banditry activities mainly from the Somali shifters (26 percent), landlessness (52 percent) occasioned by factors such as search for land for cultivation, squatting and displacement during colonial times. In addition, other factors such as witchcraft (4.3 percent), robberies (4.3 percent), lack of care for the elderly (4.3 percent), and divorces/separations (8.7 percent) explain such migrations. Plate 6.4 shows how four sisters in Lamu live together as a way of overcoming lack of care for the elderly in society.

Plate 6.4: Four Sisters between the ages of 65-94 years living together in Lamu District

Source: Survey, 2007

Regarding cattle rustling and banditry activities in Lamu district, only 23 percent of the elders indicated having fallen victim to such activities, though they noted that such are not frequent these days.

6.4 Analysis of Data Relating to Spatio-temporal Factors and Distribution of the Aged Population

In this section, an attempt is made to present the results of the null hypothesis which states that changes in the spatio-temporal factors do not explain the observed variations in the distribution of elderly populations in Lamu, Turkana and Nairobi districts. Using the health of the elderly as a critical proxy

indicator for the elderly people's choice of location and/or distribution within the study areas, this variable is correlated with climate, income and natural resource conflicts involving communities. Results for each of the study areas are presented below:

For Turkana district, the computed Pearson correlation coefficients (r = - 0.062, 0.069, 0.026) for the respective spatio-temporal variables of climate, conflicts and income (*Appendix 4*) denotes weak degrees of association between them and the distribution of the elderly population, as indicated by the proxy of health. With an exception of the climatic variable which correlates negatively with the population distribution indicator, the rest of the variables namely natural resource use conflicts and income correlate positively with the distribution indicator. In other words, whereas a more favourable climate implies less uneven distribution of the elderly and vice versa, the more the natural resource use conflicts and income, the more the distribution of the elderly in Turkana district and vice versa. Given their relatively larger significance levels of 0.551, 0.509 and 0.810 respectively, the above correlations are not significant and, therefore, not linearly related. Hence there is not enough evidence to reject the null hypothesis. In other words, in Turkana district, it is safe to say that the considered spatio-temporal factors do not largely explain the observed variations in the distribution of the elderly in the district.

In Lamu district, the results show that the computed correlation coefficients (r = 0.022, - 0.111 and 0.097) for the respective variables of climate, conflicts and income reveal weak relationships with the distribution of the elderly population in the district. Other than conflicts which correlate negatively with the distribution, the variables of climate and income correlate positively with the distribution of the elderly. Put differently, more natural resource use induced conflicts in Lamu district would mean less distribution and vice versa, and more favourable climatic conditions and income would mean more

distribution of the elderly and vice versa. Again, the fairly large significance level (0.834) for the variable of climate implies that the correlation is not significant. However, the relatively small significance levels (0.274 and 0.341) for, conflicts and income respectively indicates that the correlations are significant and linear. In other words, whereas climate does not linearly influence the distribution of the elderly in Lamu district, natural resource use conflicts and income are critical considerations as far as the distribution of the elderly is concerned. Overall, there is enough evidence to reject the null hypothesis; hence the considered spatio-temporal factors do explain the observed variations in the distribution of the elderly in the district.

In Nairobi's Kibera division, the correlation coefficients computed (r = - 0.134, - 0.376 and 0.282) for climate, conflicts and income respectively, also reveal weak relationships with the distribution of the elderly in the division. Whereas more favourable climatic conditions and more conflicts mean less distribution of the elderly, more income means more distribution. In other words, income is an important consideration in the distribution of the elderly in Kibera division. However, a consideration of the significance levels of the three variables (0.199, 0.000 and 0.005) reveal that the small significance levels between climate, natural resource use conflicts, income and distribution of the elderly indicates that these relationships are significant. Thus, there is enough evidence to reject the null hypothesis and adopt the alternative hypothesis that considered spatio-temporal factors do explain the observed variations in the distribution of the elderly in the district.

6.5. Conclusion

As indicated from the foregoing sections, overall, spatio-temporal factors are important considerations in the distribution of the elderly populations in the study areas. For instance, whereas lithology has

some important role to play in the lives of the elderly as it affects the rocks, soils and vegetation, other considerations mainly climate, water availability and induced migrations resulting from environmental vulgaries such as drought, together with wars and insecurity are critical in the distribution and redistribution of the elderly. Whereas insufficient food is the most worrying concern in the lives of the elderly in Turkana district, poor health as a result of increased diseases with ageing is the most important concern of the elderly in Lamu district. It can be deduced thus that the reducing numbers of the elderly in Turkana is, among other considerations, explained by the insufficient food resources in the district. For Kibera Division, the poor environmental conditions make the elderly population more vulnerable to diseases and therefore attendant poor health.

CHAPTER SEVEN

MEETING THE SOCIO-ECONOMIC NEEDS OF THE ELDERLY

7.0 Introduction

The main objective of this chapter is to examine the social and economic characteristics of the elderly in the study areas with a view to understanding whether the needs and concerns of these populations are solely borne by the communities of which they are part or not. That is, it seeks to analyze the effectiveness or otherwise of the existing, if at all, communities' and/or institutional support systems in the study areas. In this chapter, the third hypothesis of this study which states that 'the needs and concerns of the elderly populations in Lamu, Turkana and Nairobi districts are not solely borne by the communities of which they are part' is tested and results presented. This fairly comparative section starts with the situation of the elderly in Lamu district, then Turkana district and finally Nairobi District as depicted by the situation in Kibera division.

In Lamu district, the elderly populations were interviewed from four clusters namely Amu, Hindi/Kiunga, Matondoni/Mpeketoni and Witu areas. The Amu cluster has mainly urban populations in character and the rest of the clusters have rural populations. In Turkana, such populations were drawn from five clusters namely the south, north, western, eastern and central areas. The south cluster is mainly characterized by the pastoral area around Lokichar and the agricultural area around Katilu. The north cluster, exemplified by the mainly pastoral nature of the population, is the area around Kakuma and Oropoi. Whereas in the east, the population is partly pastoral around Kerio and partly agricultural, mainly engaged in fishing activities around Kalokol, the west cluster is both agricultural and pastoral around Turkwel area. The central

cluster, mainly around Lodwar town, is fairly urban in character. In Nairobi, the elderly population is drawn from Kibera division with equal proportions coming from the Kibera and Lang'ata clusters. These clusters represent two categories of aged populations namely the low class and middle-cum-high class populations. The socio-economic engagements of the elderly populations in the various strata, as depicted by their economic activities, were deemed to affect their livelihoods and consequently their ageing patterns.

The social and economic characteristics of the elderly, in this section, are discussed under a number of sub-sections namely the demographic, social, economic, health characteristics and active ageing and vulnerability of the elderly. A section on the implications of such elderly populations is also included in this part. These are discussed in the subsequent sections.

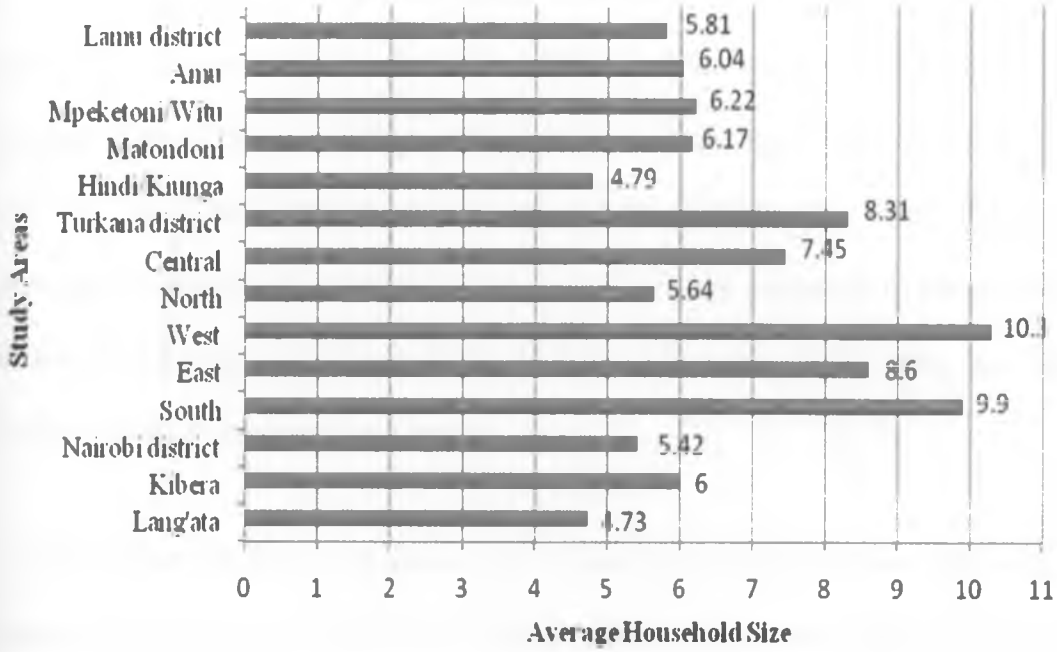
7.1 Demographic Characteristics of the Elderly

Under the demographic characteristics of the elderly in the study areas, household size and composition as well as their educational attainment are considered. These are presented as follows:

7.1.1 Household size and composition

It is generally recognized that high household sizes are a reflection of high poverty levels. In the study areas, in terms of household size, Turkana district leads with a mean of 8.3 persons followed by Lamu district with 5.8 and Nairobi with 5.4 persons. These variations, as related to their various clusters in the selected study areas, are demonstrated in Figure 7.1.

Figure 7.1 : Household Size Variations in the Study Areas



Source: Survey, 2007

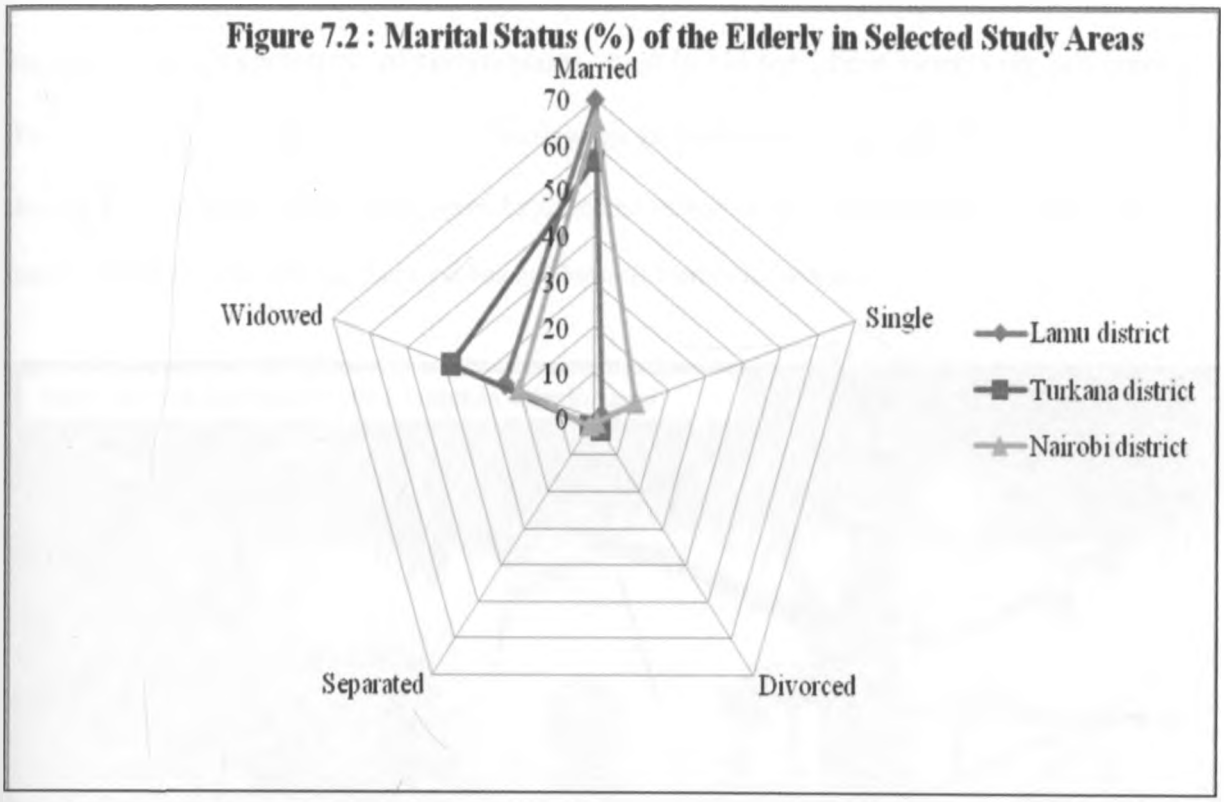
As depicted in Figure 7.1, the highest average household size in Lamu district is prevalent in the Mpeketoni/Witu area with 6.2 persons and the lowest average household size is in the Hindi/Kiunga area with 4.8 persons. Amu division, where Lamu town is situated, has an average household size of 6 persons. In Turkana district, the predominantly agricultural communities exemplified by Katilu division (9.1) in the south, Turkwel division (10.3) in the west and Kalokol division (9.2) in the east exhibit relatively high average household sizes as compared to the mainly pastoral communities such as those in Lokichar division (9.9) in the south and Kerio division (8) in the east. In addition, the mainly urban populations such as the one in Lodwar township (7.2) have relatively lower household sizes than those in the fringes such the population in Kawalathe (8.2) area. The situation in Nairobi district, as exemplified by Kibera division, reveals that the households in Lang'ata area characterized by the middle-cum-high

income brackets have lower household sizes (4.7) as compared to those in the lower income households of Kibera with an average of 6 persons. Noteworthy, household sizes are proxy indicators of the economic and social wellbeing of the various communities. In the case of Turkana district, the availability of food in the mainly agricultural areas such as along the Turkwel river where farming is practiced and the Kalokol area where fishing is prevalent, allows for higher household sizes as survival chances are enhanced. In Kibera in Nairobi, high household sizes are indications of the high poverty levels in the area as compared to the relatively low poverty levels in Lang'ata.

An examination of the composition of the elderly populations shows that in Lamu district, whereas a majority of households (71 percent) have at least one elderly person aged 60 years and over, twenty six percent of the households have two persons, two percent have three elders and one percent have four elderly persons. This situation is also true of Turkana district where seventy four percent of the households have at least one elderly person, 19.6 percent have two persons, 5.2 percent have three persons and one percent have four persons aged 60 years and over. However, in terms of gender, whereas the Lamu elderly population has more males (71 percent) than females (29 percent), the Turkana elderly population has more females (52.5 percent) than males who constitute 47.5 percent. In Nairobi, 67 percent of the households have at least one elderly member aged 60 years and over, 30 percent have two such members and only 3 percent of the households have three such members. Notably, no households have four such members. In terms of sex composition of the elderly, the Nairobi population has more males (71 percent) than females (29 percent). This situation is akin to the one prevalent in Lamu.

The elderly populations in the study areas also exhibit various trends in their marital status, as seen in Figure 7.2.

Figure 7.2 : Marital Status (%) of the Elderly in Selected Study Areas

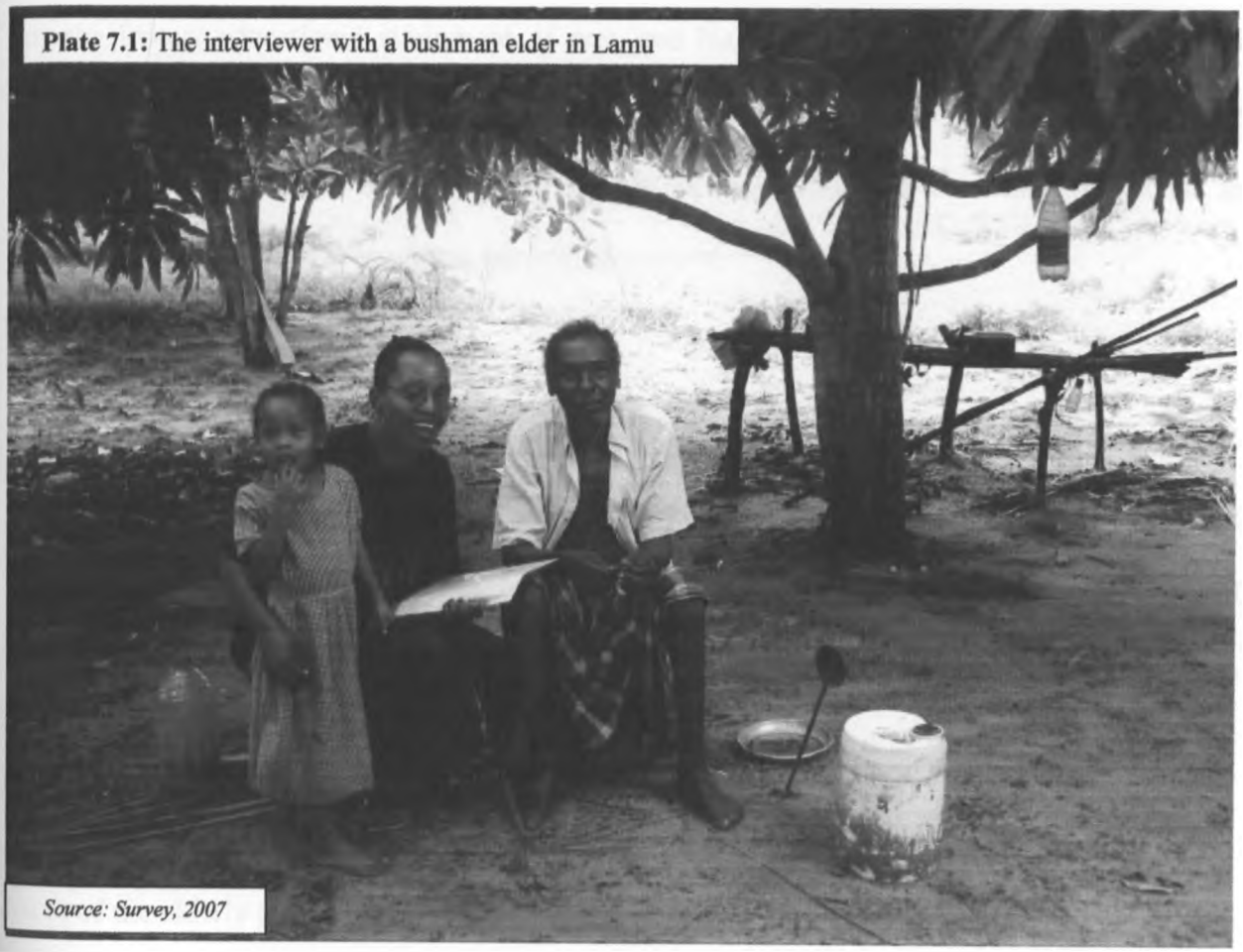


Source: Survey, 2007

As indicated in the radar figure above, whereas Lamu district has the highest percentage of the elderly (70 percent) married, Turkana district has the least percentage with only 56.6 percent, and Nairobi has 65.7 percent. Interestingly, Turkana district leads with widowed elderly populations (38.4 percent) and Nairobi district lags with only 20.2 percent widowed. A comparison of single cases in the elderly population shows that Nairobi district has more (11.1 percent) of such cases as opposed to Lamu district with 2 percent and Turkana district with none. All the areas have fairly similar percentages of divorced and separated cases of the elderly. In Lamu district, the divorced and separated elderly populations were largely women who sited barrenness as the cause of separation or divorce. These cases were predominant in the

Matondoni cluster. Notably, the large number of widowed elderly in Turkana is attributed to mortalities due to regular raids and wars, clan hostilities and hunger, among other factors. The Loss of a partner or other supporting persons mainly affected the men. Though divorce and separation are characteristic of communities, even in old age, these aspects are not common in the communities in the study areas. Marriage as an institution is still upheld in these communities, though in some cases, some elderly population opted to stay single. Those single in Lamu district were mainly bushmen who believe that God has not blessed them with wives.

Plate 7.1: The interviewer with a bushman elder in Lamu



Source: Survey, 2007

7.1.2 Educational Attainments of the Elderly

In Lamu district, majority of the elderly (72.3 percent) have no formal education, 23.8 percent have primary education and only 2 percent have secondary education. This compares well with the situation in Turkana district where 97 percent of the elderly have no formal education and only 3 percent have primary education. In Nairobi, 14 percent of the elderly have no formal education, 57 percent have primary education, 17 percent have secondary education and 12 percent have post-secondary education. In all the areas, Turkana district's elderly population has the lowest educational attainment, if any, and Nairobi district has the highest levels of education among the elderly populations aged 60 years and over. Better educational attainment also mirrors the socio-economic life of people as education is a necessary ingredient in accessing many social and economic benefits in society.

7.2 Social Life and Ageing

The social life of the elderly in the study areas is, among other considerations, determined by the non-existence of a family set up. Most of the elderly find the satisfaction of their needs and concerns in the family relationships. In the section, the social life of the elderly is examined under subjects as the actual and desired family size, living arrangements and support systems, and gender roles and differentiation among the elderly in the study areas.

7.2.1 Actual and Desired Family Size

Most of the elderly populations (94 percent) in Lamu district have children. Notably, those with more children have more wives, and those with fewer children, at least one or two, desired to have more children. About 24.7 percent of the elders in Lamu district desired to have more children and 71.1 percent did not have such a desire. Among those who needed more children,

at least 10.7 percent desired to have 2-3 children and 89.3 percent desired to have four children and over. This is perhaps an indication of the high poverty levels prevalent in such populations in Lamu district. In Turkana district, whereas 99 percent of the elders have children, 1 percent has no children of their own. This is explained by barrenness among other considerations in society. Among those with children, a large majority (63.3 percent) has between 6-9 children, 12.3 percent have between 4 and 5 children, 4 percent have between 1-3 children and 20.3 percent have more than 10 children. Even with this high fertility, most of the elderly populations in Turkana (68.8 percent) still desired to have more children and only 31.3 percent did not. Whereas 3 percent of the elderly population desired to have 2-3 children, 61.8 percent desired to have four children and above. In Nairobi district, whereas 95 percent of the elderly population have children, 5 percent have no children of their own. Among those with children, the majority (78.3 percent) has between 4-8 children, 12.3 percent have 2-3 children and 9.2 percent have more than 9 children. Even with this high fertility, most elders (58.7 percent) indicated their desire to have more children with 89.7 percent of this population desiring to have more than four children and only 10.3 percent desiring to have between 2-3 children. In all these communities, children among the elderly populations are still regarded as assets and therefore the need to have more children born.

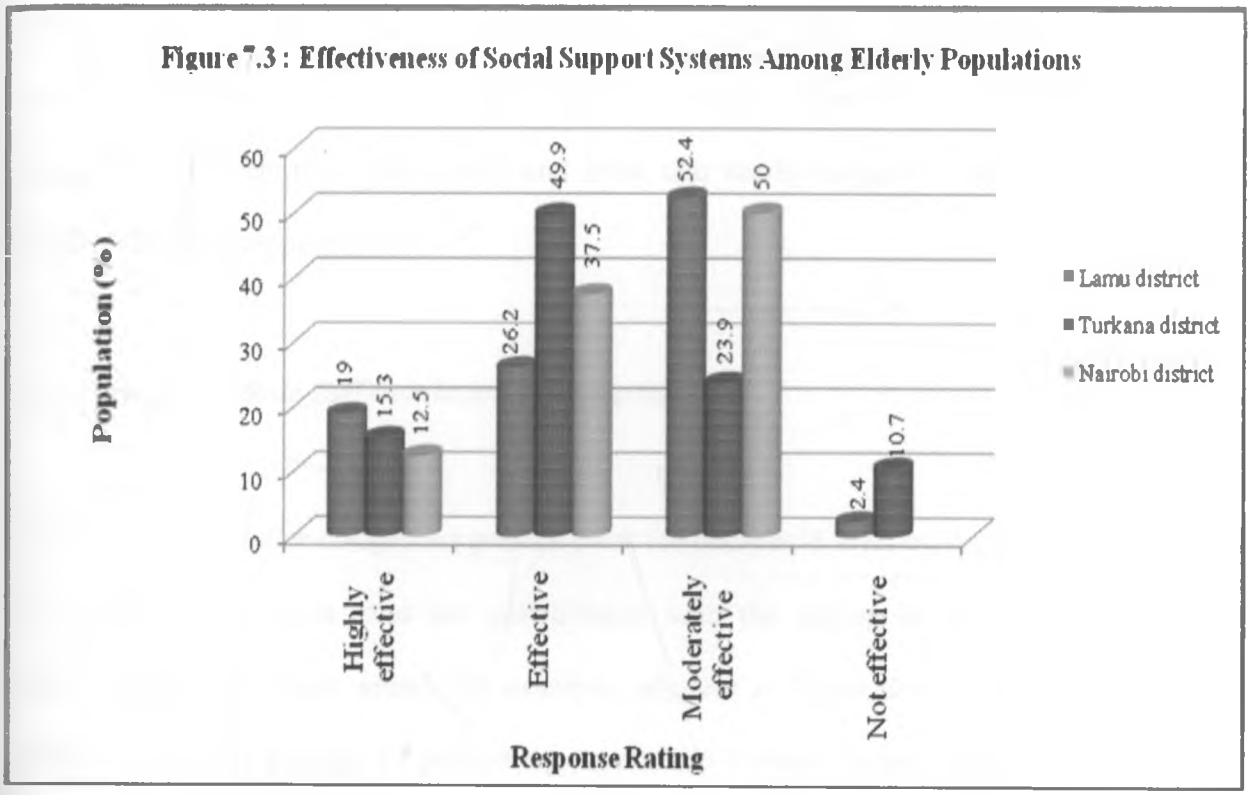
7.2.2 Living Arrangements and Support Systems

As ageing takes place, most individuals in society are unable to support themselves in meeting most of their daily needs. In Lamu district, the elderly population has challenges as some of them (14.3 percent) live alone, 58.1 percent live with their families' spouses and children, and another 27.6 percent live with their relatives such as grand children, among others. In Turkana

district, a small percentage (3.1) of the elderly population lives alone, and a large percentage (83.7) live with the family members and another 13.2 percent live with other relatives among them the grand children. In Nairobi, 15.3 percent of the elderly live alone, 68.3 percent live within the family set up and another 16.8 percent live with relatives. This living arrangement, mainly within the family set up, which still looks predominant, helps to cushion the elderly against inadequacies in the provision of their needs. Notably, in the three study areas, whereas it is easier to live alone in Lamu and Nairobi districts, the elderly in Turkana can hardly manage to live alone. This is perhaps explained by the harsh reality of life in Turkana compared to the rest of the areas. The high percentage of those living alone in Nairobi and Lamu indicates that most of these populations are still engaged in economic activities for their living. In addition, even when living within families, 73.3 percent of the elderly populations in Lamu district look after themselves and only 26.7 percent do not. For those who are not able to look after themselves, 60 percent of them have support from their children and another 40 percent get support from other relatives and well wishers. In Turkana district, 59.2 percent of the elderly look after themselves and 40.8 percent are not able to look after themselves. This compares well with the situation in Nairobi district where 84 percent of the elderly look after themselves and only 16 percent cannot. As can be seen, Turkana district leads in the population of the elderly who cannot support themselves at all, then followed by Lamu and Nairobi has the least.

An examination of the effectiveness of the family and other social support systems towards catering for the needs and concerns of the elderly populations in the various study areas shows that in Lamu district, 69.1 percent of the elderly rate such systems as effective and another 29.1 percent as not effective. In Turkana district, those who support such arrangements increase to 89.4 percent and those who do not reduce to 10.6 percent. In Nairobi district, those who support

the system are 62.2 percent and those who do not are 37.8 percent. The effectiveness of these social support systems is portrayed in Figure 7.3.



Source: Survey, 2007

As indicated in Figure 7.3, whereas in Lamu district 19 percent of the elders rate the effectiveness of the social support system highly, only 15.3 percent do as much in Turkana and 12.5 percent in Nairobi. In Lamu district a small 2.4 percent of the population rate the support system as not effective and 10.7 percent in Turkana district. On the whole, Lamu district (52.4 percent) and Turkana district (49.9 percent) regard the support system as moderately effective or effective. Overall, the mean response for all the three study areas shows that the elderly populations regard the social support systems as effective. This effectiveness is based on the family support given to the aged persons emanating from their love and concern for elderly

people, social responsibility by spouses, children, and general society for the old in most communities, together with the frailty and ailments which accompany old people seeking for the need to be attended to. The family is the source of security and support for the old as it provides the care and concern, help in domestic chores, and food requirements, among other considerations. However, the elderly need to support themselves through meaningful engagements to earn their own living and think that family support is sometimes unreliable, insufficient or no support at all.

7.2.3 Gender and Role Differentiation with Ageing

In terms of roles and/or obligations performed at the household level by the elderly populations, it is indicated that such roles are redistributed with the ageing of spouses in the various communities in the study areas. For example, whereas in Lamu district, 65.7 percent of the elders attest to this change, 57 percent support this in Turkana district and 66 percent support this in Nairobi district.

The nature of roles and /or activities performed by each group of men and women both young and old varies significantly. These roles and/ or responsibilities have conveniently been grouped under thematic areas namely : learning/schooling, farmwork and related activities, business activities, employment, domestic and/or household chores, religious duties, leisure/idling, advisory, instruction and arbitration activities and leadership/headship roles. In these areas, farmwork and related activities entails engagements such as working in farms in planting, weeding and harvesting, scaring birds and wild animals such as baboons from the shambas,

tending livestock, hunting of wild animals for food, fishing and building animal sheds. Business activities include the burning and selling of charcoal, carpentry work, sand harvesting, weaving of mats, ropes and baskets, selling of coconuts and clothes, sculpturing, dressmaking, bee-keeping, making of hides and skins and other petty business ventures. There also exists a wide palette of domestic and /or household activities namely fetching water and firewood, providing home security, conducting raids on other communities, running errands, providing for the family needs, building houses and sheds, cooking and washing, milking animals, gathering wild fruits and caring for children and the elderly at home. Leisure and idling involves activities such as forming clubs for playing and dancing, playing draughts/cards, courting, wrestling, social work, story telling, resting and relaxing, attending marriage ceremonies and other outdoor activities. Advisory activities include instructing and counseling of the young by the old on issues related to marriage and the general life, and preparing the young for transition to adulthood.

The following Tables (7.1 and 7.2) provide summaries of the changing roles of the young and the old in the various communities in the selected study areas.

Table 7.1: Role Differentiation and Variability among Young and Old Males (%)

Role / District	Learning/ Schooling	Farmwork & Related	Business activities	Job/ Employed	Domestic chores	Religious duties	Leisure & idling	Advisory/ Instruction/ Arbitration	Leader/ Head
Young Men									
Lamu district	15.5	45.2	22.6	8.9	3.6	0.6	3.6	-	-
Turkana district	-	75.8	1.2	-	23.2	-	-	-	-
Nairobi district	27.8	50.9	-	-	20.4	-	0.9	-	-
Old Men									
Lamu district	-	36.8	18.4	11.5	10.6	1.8	3.5	16.6	0.8
Turkana district	-	20.0	1.2	-	-	-	15.2	31.8	31.8
Nairobi district	-	36.6	4.8	1.0	12.5	-	1.9	26.9	16.3

Source: Survey, 2007

As indicated in Table 7.1, schooling as an activity is clearly absent among the young Turkana males and predominantly present (27.8 percent) in Nairobi with Lamu having 15.5 percent of their young male populations in school. The majority of youths (78.5 percent) in Turkana district are engaged in farm work of some sort. They are also predominant in the domestic chores but also absent in the leisure and idling category. The Lamu district male youths are engaged in farm work, business, domestic chores and also leisure activities. As for the elderly male, all participate in farm work and related activities fairly evenly, with their household leadership roles being clearly depicted. Whereas the young males in Turkana district have no leisure component in their daily undertakings, the elderly males (15.2 percent) have. On the whole, the majority of the elderly people in the three study areas play the important roles of advising the young males, instructing and teaching the young, as well as arbitrating in matters of disputes among members in their societies.

Table 7.2 depicts the differentiation in the roles of women both young and old in the study areas.

Table 7.2: Role Differentiation and Variability among Young and Old Females (%)

Role / *District*	Learning/ Schooling	Farmwork & Related	Business activities	Job/ Employed	Domestic chores	Religious duties	Leisure & idling	Advisory/ Instruction/ Arbitration	Leader/ Head
Young Women									
Lamu district	10.6	15.0	18.6	-	54.9	-	0.9	-	-
Turkana district	-	36.2	4.6	-	59.2	-	-	-	-
Nairobi district	21.2	22.	-	-	54.6	-	2.0	-	-
Old Women									
Lamu district	-	14.8	33.7	-	44.5	-	2.0	5.0	-
Turkana district	-	6.0	11.0	-	46.4	-	9.9	26.7	-
Nairobi district	-	17.0	17.0	-	52.0	-		14	-

Source: Survey, 2007

Among the young and elderly women in the study areas, Nairobi district's young women (21.2 percent) go to school and only 10.6 percent go to school in Lamu. Again in Lamu district, schooling among most young women involves learning and preparing for marriage. Whereas most of the young perform farm work and related duties, most of the elderly women do not. This trend is again reflected in the performance of domestic chores. Notably there are more elderly women in business related activities in all the study areas than young women. Elderly women are more prone to leisure and idling though their male counterparts participate more in this. Elderly women also play crucial roles as advisors, instructors and arbitrators in the society.

7.3 Economic Life and Ageing

The economic life of the elderly is reflected in their participation in their respective areas. As ageing progresses in society, those in the upper ages can only participate in certain restricted economic activities owing to their reduced energy. This is done in order to ensure that their survival is guaranteed particularly in societies where the elderly are not taken care of adequately. The elderly in the study areas engage themselves in various economic activities in order to meet their daily requirements. Table 7.3 provides a summary of such productive economic ventures across the study areas.

Table 7.3: Productive Economic Activities (%)

Source / District	Business	Farming & related	Employment	Children & grandchildren	Public assistance	Pension	Wild fruits
Lamu district	48.3	10.3	22.4	12.1	6.0	1.1	-
Turkana district	33.6	-	39.3	8.2	3.3	-	8.2
Nairobi district	50.4	11.6	8.5	9.8	1.6	7.8	-

Source: Researcher, 2007

Most of the elders are engaged in business activities, employment and farming. In addition, they also receive help from their children and grandchildren, relatives and the general public. Others get support from their pension schemes and others depend on the fruits from the wild. In terms of business engagements, the elderly practice various activities such as selling local brew, stones, sand, charcoal burning and selling, weaving, and water vendoring. They also receive economic returns from their shop businesses and other investments such as houses for rent. Farming involves slight working in the farms, farming in cash crops such as cashew nuts and

mangoes, and fishing. Employment entails casual jobs, captaining ships/canoes especially in Lamu district and working as security guards. Public assistance comes from the relatives of the elderly, well wishers and relief efforts from the government and non-governmental organizations working in the various districts. In Lamu district, the elderly mostly depend on business (48.3 percent), slight cultivation and related activities (10.3 percent), employment and the assistance from children and grand children, together with public assistance and own savings. Whereas business (33.6 percent) and employment (39.3 percent) form an important source of incomes for the elderly in Turkana district, farming and pension as sources of income are clearly not sources of income for the elderly. Other available sources of income include children (8.2 percent), help from the public (3.3 percent) and gathering of wild fruits (8.2 percent).

Plate 7.2: *An elderly mother and her daughter preparing a meal of wild fruits in Turkana District*

Source:Survey, 2007

7.4 Health and Ageing

Health and ageing are inextricably linked components. This section examines the health conditions of the elderly and their perception as to whether such conditions enhance their individual ageing process or not.

In Lamu district 62.5 percent of the elderly persons indicated that their health condition is not good. This compares well with the situation in Turkana district where 69.5 percent of the elderly have their health condition as bad and Nairobi district where 51.3 percent of the elderly indicated it as bad. The elderly persons advanced various reasons to support their perception regarding the condition of their health status. These are provided in Table 7.4.

Table 7.4: Causes of Bad Health among the Elderly (in percentage)

CAUSE OF BAD HEALTH	PERCENTAGE RESPONSE LAMU DISTRICT	PERCENTAGE RESPONSE TURKANA DISTRICT	PERCENTAGE RESPONSE NAIROBI DISTRICT
Body aches = joint pains, back pains, chest pains & general malaise	57.2	52.2	33.7
Poor Eyesight	12.7	0.9	-
Ear problems	7.8	-	-
Colds/flu/headaches/asthma/malaria	7.9	-	8.6
Constant worries/stress/high blood pressure	3.2	13.7	5.8
Insufficient food/starvation/malnourishment/weight loss	6.4	22.2	1.9
Disability/injury	1.6	1.7	-
Stroke	3.2		

Source: Researcher, 2007

The elderly persons advanced various reasons. Among these, body aches which include pains in the chest, back and joints, together with general malaise are predominant as they account for 57.2 percent of the respondents in Lamu district, 52.2 percent in Turkana district, and 33.7 percent in Nairobi district. Poor eyesight and hearing problems also characterized the elderly

populations in Lamu and Turkana districts. Insufficient food is a critical contributory factor to the poor health particularly in Turkana where it accounts for 22.2 percent of the reported cases, as opposed to 6.4 percent and 1.9 percent cases in Lamu district and Nairobi district respectively. Notably, physical disabilities among the elderly are also prevalent in Turkana and Lamu districts.

In terms of the availability and access to healthcare support programs for the elderly people, it was clearly indicated that the elderly in all the three study areas have no specific programs meant to address their peculiar health concerns. However, the available general health facilities were useful in partially meeting their needs. Overall, 81.1 percent of the elderly in Lamu district, 55.2 percent in Turkana district and 67.7 percent in Nairobi district indicated that there are no health programs in place for them in their respective areas. In addition, in their view, 60.8 in Lamu district, 77.1 percent in Turkana district and 58.8 percent felt that their pace of ageing is enhanced owing to their health problems and, therefore, a need for better health programs specifically tailored for them.

In the absence of adequate medical care for the elderly in the various study areas, the elderly have resorted to traditional medicine to meet their health needs. A wide palette of medicinal herbs used to address a diversity of health concerns is clearly in the knowledge of the elderly. Whereas in Lamu district at least (46 percent) know some plants of medicinal value, in Turkana district 78.6 percent and 52.0 percent in Nairobi district know such plants. This also indicates that more elderly people Turkana district depend on traditional medicine than those in Lamu and Nairobi districts.

7.5 Active Ageing and Vulnerability in Society

7.5.1 Participation in community activities

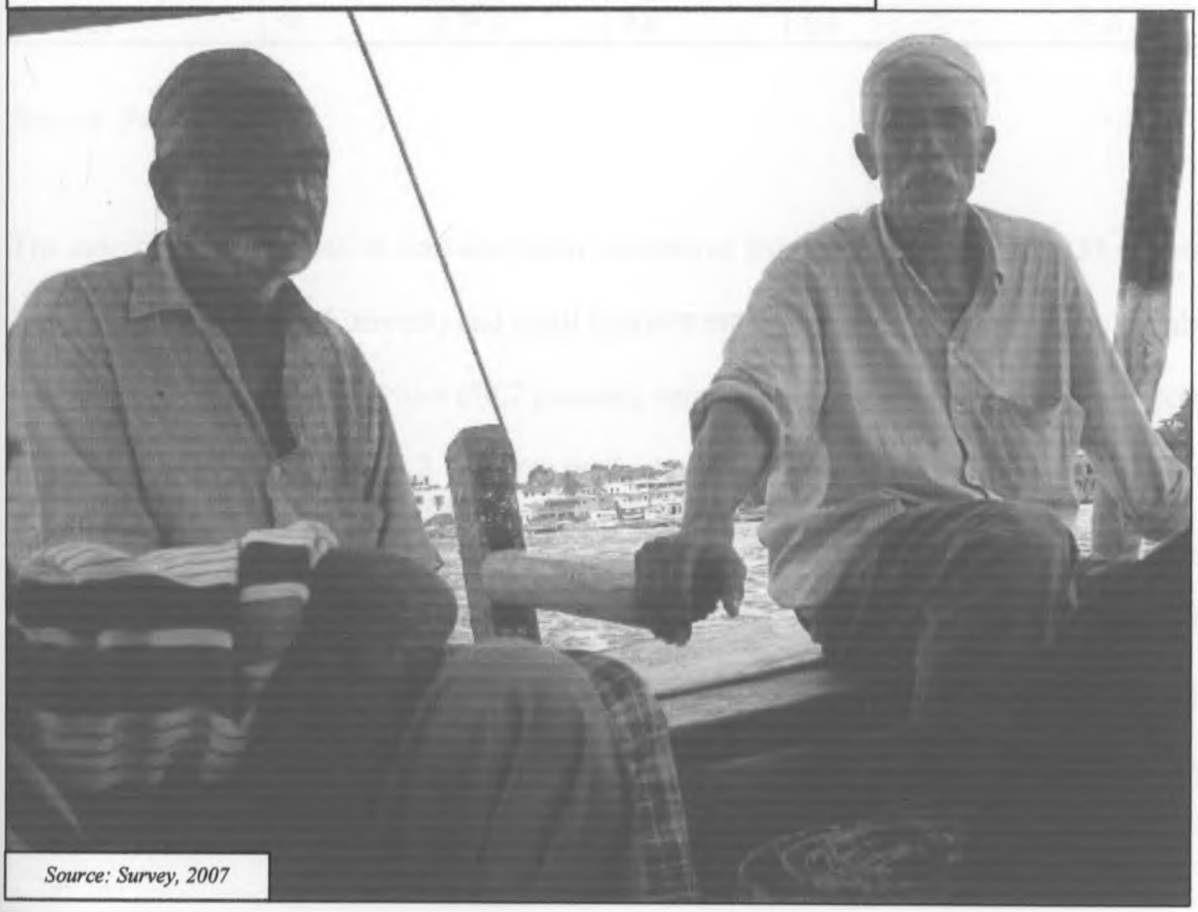
Participation in community activities, which is an indicator of active life with ageing, shows that only 36 percent of the elderly in Lamu and Turkana districts take part in cultural activities. Such activities include weddings/marriage ceremonies, which incidentally form the bulk of their participation in Lamu (52.5 percent) and Turkana district (19.4 percent), initiation/circumcision ceremonies, religious celebrations such as Idd, Maulid and Ramadhan in Lamu district as well as cleansing and/or casting away bad omen ceremonies and petitioning the supernatural/gods ceremonies in Turkana district. Other ceremonies include childbirth, funerals, harvest ceremonies, arbitration in conflicts in local courts, as well as competition activities such swimming, donkey competitions and dances in Lamu district. These elders play varied roles and these include beating drums and other related instruments, spectating, parenting, dancing, singing, overseeing, facilitation, advisory and gift presentation roles. Some of these activities are performed during specific times of the year and others run throughout the year. Those performed at specific times include religious ceremonies such as Idd and Ramadhan in Lamu district.

7.5.2 Vulnerability

As already indicated, most of the elderly persons are not engaged in economic activities that can adequately sustain their lives in the light of their aged condition in life. They rely on sources of support that essentially emanate from family set ups. Such sources are, to some extent, unreliable and sometimes non-existent. This leaves most of the elderly in precarious positions as

they fend for themselves given that most of their energies decline with ageing and debilitating age related diseases.

Plate 7.3: Elderly men actively engaged in an economic activity in Lamu



Source: Survey, 2007

In the absence of sufficient income, 89.6 percent of the elderly in Lamu district, 90.6 percent in Turkana district and 84.5 percent in Nairobi feel susceptible to growing old faster than they should. Most of the elderly indicate that their incomes are hardly sufficient to sustain them. In the light of this, some remain with no clear alternatives for their survival and others engage in activities too rigorous and demanding for their age. Such preferred alternative livelihood sources among the elderly in Lamu, Turkana and Nairobi districts include the following:

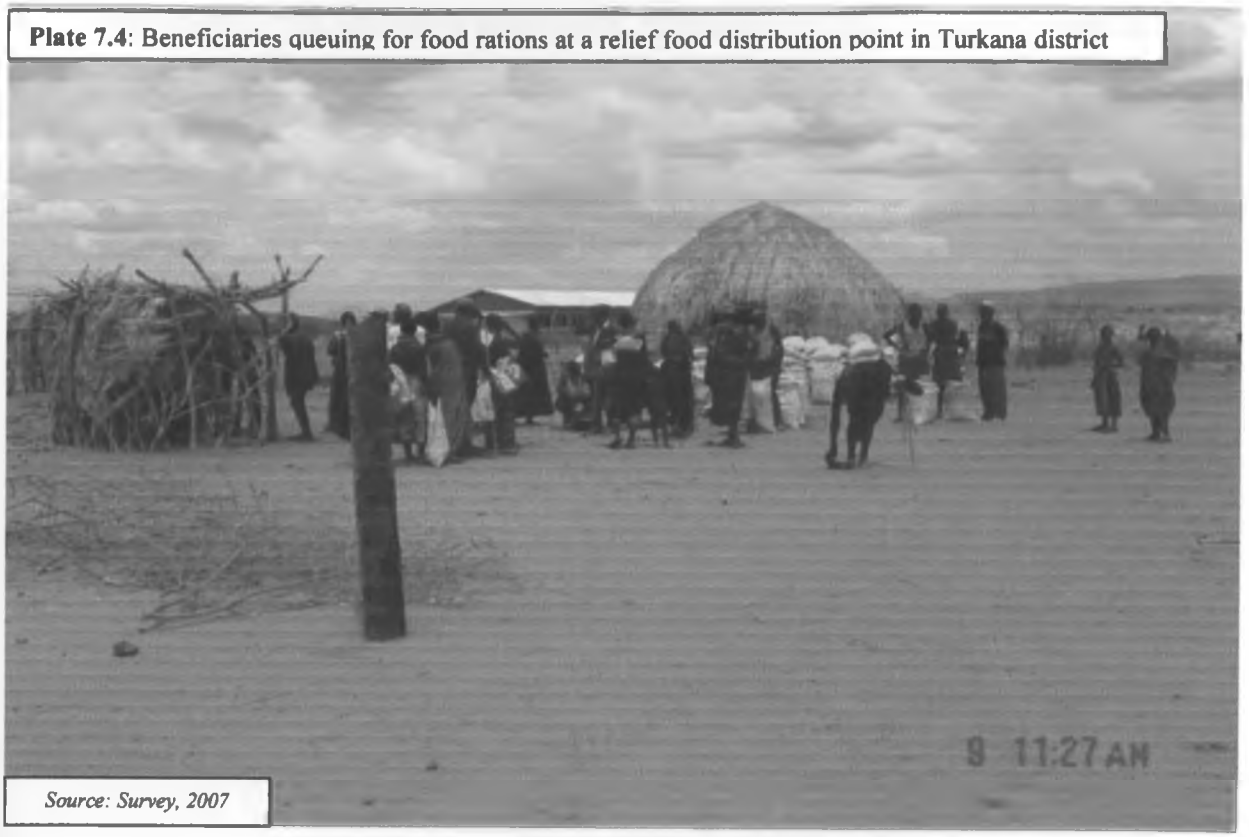
Table 7.5: Alternative Livelihood Sources among the Elderly (in percentage)

Alternative Source / *District*	Pastoralism	Irrigated agriculture	Small Business Enterprise	Industrial business e.g. Jua Kali	Relied Food
Lamu	1.0	0.0	11.5	12.5	33.0
Turkana	50.7	29.2	7.8	0.0	95.0

Source: Survey, 2007

The elderly in Lamu seem to find alternative sources of livelihood in relief food (33.0 percent), Jua Kali businesses (12.5 percent) and small business enterprises. In Turkana district, the elderly mainly practice pastoral activities (50.7 percent), rely on relief food (95.0 percent) and practice some irrigated agriculture (29.2 percent) particularly along the water courses and also small business engagements (7.8 percent). Noteworthy, the large percentage of the elderly depending on relied food both in Lamu district and Turkana district is an indication of their vulnerability as this source of livelihood is unreliable and unpredictable. Even when it is availed, the rations provided are hardly sufficient to sustain the elderly in these areas. Plate 7.4 depicts people receiving relief food from a distribution point in Turkana district.

Plate 7.4: Beneficiaries queuing for food rations at a relief food distribution point in Turkana district



Source: Survey, 2007

Whereas 90.6 percent of the elderly in Turkana can afford at least one meal a day, 60.5 percent in Lamu district can afford two meals a day. Thus it is clearly indicative that the elderly in Turkana district are more vulnerable compared to their counterparts in Lamu and Nairobi districts.

7.6 Analysis of Data Relating to Meeting the Socio-economic Needs of the Elderly in Society

In this analysis, the care of the elderly was correlated with living arrangements and support from children. These correlations (*Appendix 5*) are treated and the results interpreted and presented as per the study areas as follows:

In Turkana district, the computed correlation coefficients for the aspects of elders living together with relatives and financial support from children as they affect the care of the elderly population reveals that whereas there exists a weak but positive correlation (r = 0.318) between care of the elderly and living together, there exists a strong but negative correlation (r = - 0.525) between care and financial support from children. That is, whereas living together would ensure better care for the elderly, the care of the elderly does not necessarily benefit from the often poor financial help from children in Turkana district. The very small significance levels of 0.001 and 0.000 respectively indicate that the correlations are significant and therefore the variables are lineally correlated. In other words, the needs and concerns of the elderly populations in Turkana district are solely borne by the communities of which they are part.

The situation regarding care for the elderly population in Lamu district, as indicated by the correlation coefficients (r = 0.061 and r = - 0.262) for the respective aspects of living together and financial support from children, reveals that whereas living together would mean better care for the elderly, the often low financial support from children does not necessarily improve the care of the elderly. However, whereas the large significance level of (0.554) for the correlation between care and living together indicates that the correlation is not significant and, therefore, not linearly related, the small significance level (0.009) for care and financial support from children shows that the correlation is significant and linearly correlated. In other words, although to a small extent living together does support the care of the elderly, financial support from children, which would form a critical component in their lives, does not support care for the elderly in Lamu district because it is not available.

In Nairobi district's Kibera division, the computed Pearson correlation coefficients (0.04 and - 0.112) for the variables of living together and financial support from children reveal a fairly similar trend as that witnessed in Lamu district. Whereas living together supports the care of elderly persons positively, low financial support from children does not improve care of the elderly. Significance levels of 0.717 and 0.268 for the respective correlations of the variables of living together and financial support from children reveal that whereas living together does not significantly affect care for the elderly, financial support does. However, the unavailability of financial support from children does not help the elderly.

7.7 Conclusion

From the foregoing, the family set up plays a significant role in the lives of the elderly as they find, to a great extent, the satisfaction of their needs both social and economic in the family. Support for the elderly in the study areas is mainly sourced from family members. Overall, most of the elderly people's needs are borne by the communities of which they are part.

CHAPTER EIGHT

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

8.0. Introduction

This study set out to investigate the effect(s) of changing demographic variables namely fertility, mortality and migration on age structure ageing, examine the role of the spatio-temporal (lithology - related factors, climate, water availability and resource conflict) factors on the distribution of the elderly populations and also evaluate the social and economic characteristics of the elderly in Lamu, Turkana and Nairobi Districts with a view to understanding whether the needs and concerns of such elderly populations are entirely borne by their communities or not. This was done in order to arrive at meaningful findings and related conclusions with a view to developing plausible and relevant recommendations to policy makers and future researchers alike. In this final chapter, a comprehensive summary of the relevant research findings, emergent conclusions and the resultant recommendations is presented. In addition, specific contributions made by this study with regard to the set objectives are presented.

The objectives of the present study were as follows:

(i) To determine the effect of changing demographic variables on age structure ageing

(ii) To examine the role of spatio-temporal factors in the distribution of aged populations

(iii) To evaluate the social and economic characteristics of the elderly with a view to understanding whether the needs and concerns of these populations are solely borne by the communities of which they are part or not

8.1 Research Findings

In this section, the research findings presented emanate from the objectives this study set out to investigate, as highlighted in section 8.0 above. The key research findings on the various demographic determinants, socio-economic characteristics and spatio-temporal aspects of the ageing phenomenon are presented as follows:

8.1.1 Demographic Determinants, Socio-economic characteristics and Age-Structure Ageing

With regard to the socio-economic characteristics of the elderly and the demographic determinants of age structure ageing in the study areas, it has been established that:

- There is an increase in the number of the elderly across the study areas. However, this increase does not occur uniformly and that it not only varies with age but also with time. For example, in Lamu district, the total increase in the number of people aged 60 years and above is much higher during the 1979-1989 period than the 1989-1999 period. This is essentially due to the fact that there exists variation in fertility, mortality and migration considerations

- Lamu district experienced the highest mean percentage change in the elderly population (5.4 percent) followed by Turkana (3.1 percent) and Nairobi (2.0 percent) districts during the entire 1979-1999 period.
- The most rapid growth of population occurs in the age groups 10-14 years for the population in Turkana and Lamu districts, and 20-24 years for the population in Nairobi district. In the

older ages, the fastest growth occurs in Lamu district in the population aged 60-74 years. These variations in growth lead to a preferential existence of populations dominated by young and old populations. For example, whereas Lamu district seems to have an abundance of the elderly populations, other areas, and particularly Turkana district, has an abundance of the young population below age 15 years.

- In all the study areas, overall, the age segment 10-14 years was the fastest growing and the 75 years and over category was the slowest. This implies that a fertility dominated growth still characterizes the populations in the study areas and the mortality of the very old (75 + years) explains their slow growth. A reduction in fertility and mortality rates would certainly lead to increased elderly populations in these areas.
- The non-dependent population is becoming more and more as opposed to the dependent population in all the study areas. This is attributable to reduced fertility rates across Lamu and Nairobi areas over the 1979-1999 period, increased in-migration for Nairobi, and increased adult mortality in Turkana district.
- Overall, Lamu district dominated in the elderly population though with modest reductions from 6 percent to 5.1 percent and 4.7 percent for the 1979, 1989 and 1999 respective periods. Interestingly, Turkana district's share of the elderly increased from 2.6 percent to 3.1 percent in the 1979-1999 period. Although Turkana district still lags in the numbers of the elderly, this modest growth is indicative of the improved living conditions and therefore occasioning a reduction in adult mortality in the area.
- Despite the small numbers of aged persons, variability in the ageing indices is more pronounced in Lamu district (2.5 percent) than in Turkana district (0.6 percent) and Nairobi

(0.5 percent). In other words, Lamu district has more elderly populations than Turkana and Nairobi districts.

- With regard to the doubling time for the various population age segments in the study areas during the 1989-1999 period, the shortest time of 22.6 years and 26.1 years are required for the respective 15-59 and 75 and over years age categories in Lamu, 6.48 years for the category 75 and over years in Turkana, and 10.4 years for the 75 and over years in Nairobi. The longest doubling time of 57.4 years is required in the 60-74 years population segment of Lamu district, 11.1 years for the 60-74 years category in Turkana district, and 14.7 years for 15-59 years category in Nairobi district.
- Population ageing is particularly intense and rapid among women given their lower mortality rates than that of men. This low mortality also implies that most of the older women tend to remain widows without spousal support.
- Ageing causes changes in the living arrangements of the elderly with increasing numbers of older people living alone. Although a few elderly people still rate social support systems highly, such systems are waning fast. This is as a result of breaking societal arrangements where the elderly were traditionally taken care of by their families. Such family ties are slowly breaking up leaving the ageing susceptible to lack of care and other needs and concerns.
- Population ageing is associated with great poverty since most older persons have lower incomes and are not actively involved in the economic production processes given their elderly ages.
- An analysis of the relationship between fertility and age structure ageing in the study areas indicates that whereas the populations in Lamu and Nairobi districts experienced transitions

from high fertility to low fertility, the population in Turkana district transited from low fertility to high fertility during the entire 1979-1999 period.

- An upsurge of mortality at higher age groups tends to reduce the numbers of the elderly population in the respective age groups. Generally, whereas the population aged 60 years and over in Lamu district witnessed a modest increase in mortality rates during the 1979-1999 period, the mortality experience of the elderly in Turkana district during the same period was even higher. This explains the relatively high numbers of the elderly in Lamu district than in Turkana district. Notably, the mortality of males witnessed across the areas was higher than that of females thus accounting for the more females than males the in the elderly population in these areas.
- An analysis of the effect of migration on age structure ageing indicated that Nairobi and Lamu districts gained more in-migrants than out-migrants in the entire 1979-1999 period and Turkana district lost through out-migration during the same period. Whereas Nairobi district's gain is in the working population aged 20-24 years, Lamu district's gain is mostly in the retired adult population. Turkana district's loss is mainly in the youthful population in search of better living and working opportunities.

8.1.2 Spatio-Temporal Factors and the Distribution of the Elderly

With regard to the spatio-temporal factors and the distribution of the elderly in the study areas, the study found out that whereas lithology plays a vital role in the lives of the elderly by influencing rocks, soils and vegetation, other factors namely climate, water availability and induced migrations resulting from environmental vulgaries such as drought, together with wars and insecurity are critical in the distribution and redistribution of the elderly in both Lamu and

Turkana districts. Notably, whereas insufficient food is the most worrying concern in the lives of the elderly in Turkana district, poor health as a result of increased diseases with ageing is the most important concern of the elderly in Lamu district and Nairobi district.

8.1.3 Meeting the Needs of the Elderly

In this aspect, the family unit is still the most preferred living arrangement among the elderly as it meets their needs and concerns in all the study areas. However, in the absence of such set ups owing to socio-economic changes in society, the elderly resort to living alone or coresiding as witnessed in Nairobi and Lamu districts. Whereas support from children and other relatives is desirable among the elderly, given that it is hardly available, this is not considered useful in sustaining their livelihoods. Other elderly people engage themselves in small economic ventures that make their lives livable.

8.2 Conclusions

In the light of the foregoing research findings, a number of conclusions have been drawn. These are as follows:

- The demographic history in the study areas has already built an age-cohort structure that makes the ageing of population almost inevitable in the future. Though seemingly small, the elderly populations in both the leading and lagging districts of Lamu and Turkana, as well as other parts of Kenya have the potential to increase to worrying proportions. This calls for the need to address their needs and concerns with a view to stemming their tide now and in the future.

- Lamu district has the oldest population aged 60+ years as compared to Turkana and Nairobi district and that the variations in the increasing elderly in Lamu district and young population in Turkana and Nairobi districts require specific programs and services
- An increasing non-dependent in all the study areas indicates that the effect of the initial age structures characterized by huge bases of fertility across the areas is becoming evident in the productive population with progression from those aged under 15 years to those in the working bracket of 16-59 years This progression will also be reflected in the elderly population even with increased elderly mortality.
- The pace of ageing of population in the study areas seems to increase with time. For example, the short doubling time for the working population in Lamu district is suggestive of the underlying population potential as a result of high fertility. This will shortly progress to the upper age categories thus improving the numbers of the elderly. The short doubling period required for the 75+ years category also indicated improved adult mortality conditions across the areas. Generally, the elderly populations are increasing in all the study areas though with varying speeds and intensities.
- It is true that fertility had a greater impact on population ageing than mortality. A reduction in the total fertility rates leads to populations becoming older and an increase in the total fertility rates leads to an increase in the youthful populations. The relative importance of mortality increases with increasing age and also varies with the study areas. A relatively higher mortality is prevalent in Turkana district than Lamu and Nairobi districts. Notably, mortality is a critical consideration especially with regard to its impact on the elderly populations. This has affected particularly the old of the old populations (75 + years) as their numbers are increasingly becoming small across the areas.

- A huge pool of elderly women occasioned by variations in mortality among the male and female elderly populations creates a vulnerable group with specific needs and concerns. Formulation of policies for the old population needs to take cognizance of this important population.
- Migration tends to regulate the rate of population ageing given that young in-migrants slows down the ageing process, as in the case of Nairobi district, and older migrants accelerates this process as witnessed in Lamu district. A loss of young population through out-migration leaves behind a largely elderly population as seen in Turkana district.

- It can be deduced from the spatio-temporal factors and the distribution of the elderly that whereas the insufficient food and water resources in Turkana district may explain the distribution of the elderly, for Lamu district, and more particularly Nairobi district, Kibera Division, the poor environmental conditions make the elderly population more vulnerable to diseases and therefore attendant poor health.

8.3 Recommendations

The recommendations presented below are based on both the research findings and the related conclusions arrived at in the foregoing sections. Apparently, there is need to focus on the planning and policy issues regarding the ageing phenomenon in Kenya, and also provide recommendations for researchers and scholars alike. These are made to various groups of interest. Some of the recommendations for dealing with the planning and policy aspects are outlined below.

8.3.1 Planners and Policy Makers

Given that population ageing is now an inevitable phenomenon in Kenya, and that there is an increase in the numbers of the elderly across the country, this calls for planners and policy makers to develop a consistent set of population relevant policies. Such policies will reflect the changes in the entire social and economic conditions required to create favourable circumstances for families, the young, the middle aged and the old family members of society. This calls for a shift in the approaches as to the care of the elderly in our societies with the need for the formulation and implementation of proper policies and programs to address this emergent concern. There is therefore need to:

- Integrate the issue of age structure ageing in our development plans
- Provide a thorough and detailed assessment of the state of the elderly, living conditions, aspirations and needs with a view to understanding their concerns and potentials and providing requisite responses to such needs
- Provide alternative living arrangements for the elderly in the face of waning family support across the country
- Examine the participation of the elderly in the socio-economic life of their communities in order to improve such participations

8.3.2 Researchers and Scholars

For scholars and researchers, they will find of practical use and interest the wide range of demographic and statistical tools that have been utilized in this study. Such tools include the Respondent-Driven sampling procedures, the speed/intensity of ageing and population change

techniques, spatial data analysis techniques and simple correlation analysis techniques. These techniques provided the richness and depth of analyses done in this study.

There is need for further research on the effects of an ageing population on the socio-economic life of Kenya, as well as the causes of age structure changes in all other parts of the country.

There is a need for a detailed comparative study on the living arrangements of the elderly in Kenya and any other, preferably, developed countries with a view to learning how such countries cope with their old populations.

8.4 Contributions Made by the Study

The findings and conclusions highlighted in the foregoing sections of this work suffice as contributions by this study. However, the need to isolate the salient study contributions, with due regard to the set study objectives, both in the specified study areas and Kenya in general, is imperative. The contributions made by this study are provided in the comprehensive summary provided as follows:

Given that this is a pioneering study in Kenya, the findings, conclusions and recommendations provided herein should be considered in totality as a major contribution of this study to the general field of population geography and specifically to the understanding and knowledge of age structure ageing.

The diversity of data collection and analytical tools put together and utilized in this study that include the respondent-driven sampling, demographic, spatial, descriptive and quantitative. Although no originality is claimed in the use of such tools, their relevant application and interpretation, as well as the conclusions derived, suffice to be contributions made by this study.

The conceptual framework provided in Chapter two, section 2.2, which illustrates the relationship between demographic factors and spatio-temporal factors as they influence age-structure ageing in the selected study areas, is an important contribution of this study to the understanding of the geography of population ageing. These mainly demographic and spatial and/or environmental factors constitute the factors considered to trigger change in the age - structures of populations as they, together, affect the pace of ageing which in turn affects the ageing process of the age structures. Changes in the pace of ageing leads to a myriad of policy concerns including poverty, health, participation, rights, welfare and livelihood strategies for the elderly in society.

This study has also deployed a myriad of maps, graphs, tables, figures and other illustrations which constitute important sources of material for general reference and even further analyses.

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APPENDIX ONE

Household Questionnaire

Household/Personal Details (*where necessary, tick as appropriate*)

1. Name of Household member (*Optional*)
2. Gender (1) Male ☐ (2) Female ☐
3. Level of educational attainment (1) None ☐ (2) Primary ☐ (3) Secondary ☐
   (4) Post Secondary ☐ (5) Others (specify) _____
4. Position in the Household (1) Husband ☐ (2) Wife ☐ (3) Child ☐ (4) Others _____
5. Number of people living in the home ☐
6. Do all the members belong to one family? (1) Yes ☐ (2) No ☐
7. If no – how is the household made up? _____
8. How many people in the household are over 60 years? ☐

(***To be completed by those over 60 years***)

9. Name of Elder _____
10. Sex (1) Male ☐ (2) Female ☐
11. Date of birth _____
12. Religious affiliation _____
13. Marital status (1) Single ☐ (2) Married ☐ (3) Divorced ☐
    (4) Separated ☐ (5) Widowed ☐
14. Relationship to household head _____

Socio-Cultural / Home Life

15. Do you have children? (1) Yes ☐ (2) No ☐
16. If yes to Q15 above, how many? ☐
17. Is this the number of children you desired to have? (1) Yes ☐ (2) No ☐
18. If No to Q17 above, what number of children did you desire to have? (1) 0-1 ☐ldren (2) 2-3 children ☐ (3) 4 children and over ☐
19. With whom do you live? (1) Alone ☐ (2) My children ☐(3) My grandchildren ☐ (4) Relatives ☐ (5) Others (*specify*) _____
20. If living alone, state reason _____

_____

21. Do you look after yourself? (1) Yes ☐ (2) No ☐
22. If not, who does? _____
23. Why does he/she look after you? _____
24. Do you think such social support systems are effective? (1) Yes ☐ (2) No ☐
25. If Yes to Q24 above, how effective/reliable are such social support systems? (1) Highly effective☐ (2) Effective ☐ (3) Moderately effective ☐ (4) Not ☐ effective
26. Reason(s) for response in Q25 above _____

_____

27. Are there any historical events, such as wars, migrations etc that you have taken part in?

    (1) Yes ☐ (2) No ☐
28. If Yes to Q27 above, please state the event(s) _____

_____

29. Are your children also responsible for your financial affairs? (1) Yes☐ (2) No ☐
30. If No to Q29 above, who are? _____
31. Do you participate in any of your community's cultural festivities? (1) Yes☐ (2) No ☐
32. If Yes to Q31 above, please name event, when it occurs (occurred), and your role in it:

    (a) Event _____

    (b) Time of occurrence _____

(c) Role played_____

33. Do you know any plant(s) that has medicinal value? (1) Yes ☐ (2) No ☐

34. If Yes to Q 33 above, please specify _____

_____

35. Are societal roles and obligations redistributed with the ageing of couples in your community? (1) Yes ☐ (2) No ☐

36. If Yes to Q35 above, list some of the key roles/obligations in the table below:

	Young Men	Old Men	Young Women	Old Men
1.				
2.				
3.				
4.				
5.				

37. What happens to properties such as land as couples grow old in your community? _____

_____

38. What happens to other assets with the ageing of couples in your community? _____

_____

39. In your view, does the physical environment around you influence your rate of growing old in any way? (1) Yes ☐ (2) No ☐

40. If Yes to Q39 above, please explain how _____

_____

41. Do you believe that the time of your generation has been more problematic than any other times in the past? (1) Yes ☐ (2) No ☐

42. In Yes to Q41 above, please give reasons why _____

_____

Spatio-temporal Factors and the Distribution of the Elderly

43. In which administrative location do you live? _____

44. Have you ever been displaced from your home? (1) Yes ☐ (2) No ☐

45. If Yes to Q44 above, please state reason _____

_____

46. Are there any cattle rustling and banditry activities in your areas? (1) Yes ☐ (2) No ☐

47. If Yes to Q46 above, how frequent are such activities in your area? (1) Not frequent ☐

(2) Fairly frequent ☐ (3) Frequent ☐ (4) Very frequent ☐

48. Any violent conflicts involving communities in your area? (1) Yes ☐ (2) No ☐

49. If Yes to Q48 above, please list the possible causes of such conflicts _____

_____

50. How have such conflicts affected the:

(a) Young people? _____

(b) Elderly people? _____

51. In your opinion, have climatic conditions changed drastically from the past?

(1) Yes ☐ (2) No ☐

52. If Yes to Q51 above, how? _____

_____

53. Do you find these climatic changes making you grow old fast? (1) Yes ☐ (2) No ☐

54. If Yes to Q53 above, please explain how _____

_____

55. Are you good health? (1) Yes ☐ (2) No ☐

56. If No to Q55 above, please state reason _____

_____

57. Are there any healthcare support programs in place for the old in this area? (1) Yes ☐

(2) No ☐

58. If Yes to Q57 above, please list them _____

_____

59. In your view, have you grown old faster due to your health problems? (1) Yes ☐ (2) No ☐

Livelihood Sources and Concerns of the Elderly

60. List your sources of income? _____

61. If public assistance (a) For how long have you been receiving? _____

(b) How much is it? _____

(c) Any difficulties obtaining it regularly? (1) Yes ☐ (2) No ☐

62. If employed (a) What is your job _____

(b) Is it regular employment? (1) Yes ☐ (2) No ☐

(c) Approximately how much do you earn in Kenya shillings? ☐

63. If in retirement (a) When did you retire ☐

(b) Why did you retire? _____

(c) Approximately how much is your pension in Kenya shillings? ☐

64. If other sources of income, please specify _____

65. Is your income sufficient for your sustenance? (1) Yes ☐ (2) No ☐

66. If No to Q65 above, what alternatives do you have? _____

_____

67. In the event of not having enough income, do you feel being susceptible to growing old faster? (1) Yes ☐ (2) No ☐

68. How many meals do you have daily? (1) One ☐ (2) Two ☐ (3) Three ☐

69. Do you do your own cooking? (1) Yes ☐ (2) No ☐

70. If Yes to Q69 above, do you find this difficult? (1) Yes ☐ (2) No ☐

71. If No to Q69 above, who does? _____

72. Do you do your own food shopping? (1) Yes ☐ (2) No ☐

73. If Yes to Q72 above, do you find this difficult? (1) Yes ☐ (2) No ☐

74. If No to Q72 above, who does food shopping for you? _____

75. Do you cultivate/keep your own crops/cattle? (1) Yes ☐ (2) No ☐

76. In your opinion, are you a better skilled farmer given your age? (1) Yes ☐ (2) No ☐

77. If Yes to Q76 above, please explain _____

_____

78. If Yes to Q76 above, do you pass on these valuable skills to younger generations?

(1) Yes ☐ (2) No ☐

79. If Yes to Q76 above, please explain how? _____

_____

The Elderly Coping Mechanisms/ Strategies and Potentials

80. Do you have any alternative sources of livelihood? Yes ☐ (2) No ☐

81. If Yes to Q80 above, please specify by appropriately ticking choices given below:

(1) Pastoralism (i) Yes ☐ (ii) No ☐

(2) Irrigated agriculture (i) Yes ☐ (ii) No ☐

(3) Small scale business enterprises (i) Yes ☐ (ii) No ☐

(4) Industrial business (i) Yes ☐ (ii) No ☐

(5) Any other (*specify*) _____

82. Do you depend on relief food? (1) Yes ☐ (2) No ☐

83. Are you involved in any cultural/religious activities? (1) Yes ☐ (2) No ☐

84. If Yes to Q83 above, please specify _____

85. What are your favourite activities? _____

86. Is there anything preventing you from doing them? (1) Yes ☐ (2) No ☐

87. Are you a member of any social club? (1) Yes ☐ (2) No ☐

88. If Yes to Q87, please specify _____

89. Are you a member of any community based organization? (1) Yes ☐ (2) No ☐

90. If Yes to Q89

(i) State nature of organization

(ii) Explain your role in the organization

(iii) How do you rate your participation in the organization? (1) Not active ☐

(2) Fairly active ☐ (3) Active ☐ (4) Very active ☐

91. Are there any healthcare support programs in place for you? (1) Yes ☐ (2) No ☐

92. Approximately how far from your home is your nearest health centre? _____

93. Is there a constant supply of medicine in the health centre? (1) Yes ☐ (2) No ☐

94. Do you have any immediate needs or problems (1) Yes ☐ (2) No ☐

95. If Yes to Q94 above, please specify _____

96. What would like to see done for the aged persons in your community? _____

_____

APPENDIX TWO

Ageing Index, Life Expectancy at 60, Lifetime Net-migration and Estimated Total Fertility Rates for the Study Areas: 1969-1999

District	1969-1979				1979-1989				1989-1999			
	Ageing index	*Total Fertility Rate*	*Life expectation at age 60*[4]	*Lifetime Net-migration*	*Ageing index*	*Total Fertility Rate*	*Life expectation at age 60*	*Lifetime Net-migration*	*Ageing index*	*Total Fertility Rate*	*Life expectation at age 60*	*Lifetime Net-migration*
Lamu district	13.7	7.83	20.59	4714	11.6	6.0	16.2	6345	11.2	4.7	11.2	6678
Turkana district	6.0	5.86	8.30[5]	-20742	6.9	5.7	11.95	-31186	6.3	6.3	15.6	-31508
Nairobi district	5.2	4.88	13.47	524372	5.4	3.8	18.25	772624	5.7	3.0	15.6	1265710

Source: Kenya Population and Housing Census, Analytical Report on Fertility and Nuptiality. Vol. IV pp.36-37

[4] Source: Kizito, P.M.L. (1985). *The Estimation of Adult Mortality Differentials in Kenya Using a Life Table Technique pp 99-133.* Unpublished MSc. Thesis, University of Nairobi.

[5] This lifetime expectation at age 60 is for males only and has been used owing to lack of data for females.

APPENDIX THREE

CORRELATION COEFFICIENTS FOR DEMOGRAPHIC VARIABLES AND AGEING

		TOTAL FERTILITY RATE	LIFE EXPECTANCY AT AGE 60	LIFETIME NET-MIGRATION
Lamu District - *Ageing Index*	Correlation coefficient	**0.962**	**0.916**	**-1.000**
	Significance level	0.176	0.262	0.006
Turkana District - *Ageing Index*	Correlation coefficient	**-0.435**	**0.327**	**-0.738**
	Significance level	0.713	0.788	0.471
Nairobi District - *Ageing Index*	Correlation coefficient	**-0.980**	**0.328**	**0.997**
	Significance level	0.128	0.787	0.047

APPENDIX FOUR

CORRELATION COEFFICIENTS FOR SPATIO-TEMPORAL FACTORS AND DISTRIBUTION OF ELDERLY POPULATION

		CLIMATE	CONFLICTS	INCOME
Turkana District - *Distribution*	Correlation coefficient	**- 0.062**	**0.069**	**0.026**
	Significance level	*0.551*	*0.509*	*0.810*
Lamu District - *Distribution*	Correlation coefficient	**0.022**	**- 0.111**	**0.097**
	Significance level	*0.834*	*0.274*	*0.341*
Kibera Division - *Distribution*	Correlation coefficient	**- 0.134**	**- 0.376**	**0.282**
	Significance level	*0.199*	*0.000*	*0.005*

APPENDIX FIVE

CORRELATION COEFFICIENTS FOR MEETING THE NEEDS AND CONCERNS OF THE ELDERLY POPULATION

		Living together with	Children responsible for income
Turkana District	Correlation coefficient	**0.318**	**-0.525**
	Significance level	*0.001*	*0.000*
Lamu District	Correlation coefficient	**0.061**	**-0.262**
	Significance level	*0.554*	*0.009*
Kibera Division	Correlation coefficient	**0.040**	**-0.112**
	Significance level	*0.717*	*0.268*