

**POPULATION GROWTH AND ITS IMPACT ON THE  
PROVISION OF PRIMARY EDUCATION  
IN NYAMIRA DISTRICT**

**BY**

**JULIUS NYONG'A SEGERA**

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**THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE  
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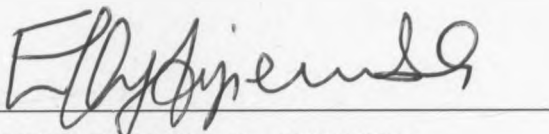
## DECLARATION

This is my original work and has never been presented for a degree in any other university.

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This thesis has been submitted for examination with my approval as the University supervisor.

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## **DEDICATION**

To my parents Segera and Keremensia, my wife Justina, my sons Collins and Merlvin, my brothers Jones, Samuel, Joseck, James, Jared, my sisters Joyce and Priscah. Finally to my friends Charles and John.

## ABSTRACT

The main objective of this study was to investigate the impact of demographic levels and trends on the provision of primary education in Nyamira district. The district under study is characterized by high population growth rate of 3.1% hence a lot of co on its social services. The research therefore aimed at examining demographic levels and trends in terms of fertility, mortality, migration, growth rates and age structure. Analysis was also made of the demands for and supply of primary education in terms of educational facilities such as the number of classrooms per school, teachers and teaching material.

The study used both primary and secondary data. The raw data was obtained through a questionnaire which was administered by the researcher himself. A sample size of 160 primary schools was taken from 360 primary schools in the District. Proportionate stratified random sampling was applied, which ensued that each unit of the working population has an equal chance of being selected. In analyzing the data both demographic and statistical techniques were applied e.g population on pyramidal peaks, population growth rate method, the use of age specific fertility rates, the total fertility rates and crude death rates, other demographic method used included the use of teacher-pupil ratio, population tables and graphs. The researcher also utilized the following statistical techniques: Descriptive statistics were useful in analyzing the enrolment rate, here tables and graphs were used. Inferential statistics was useful in explaining the relationship between population growth and educational facilities; here regression and correlation analysis were used. It is important to note that all the methods were used to test the hypotheses of the research.

The research, indicated that Nyamira has been experiencing fast population growth rates of 3.1 per cent per annum. This is as a result of rising fertility and declining mortality in

Nyamira. In addition, Nyamira population appears to be more youthful, with an increasing proportion of children aged 0-14 years due to increased births of the reproductive women in the age group 15-49 years. This has seriously affected the demand for primary education in Nyamira and the capacity of the district education board to cope with it.

Correlation and Regression analysis shows a significant relationship between enrolment and the number of teachers and classroom, which had  $R^2$  of 0.54514 and 0.47868 respectively. This shows that as the number of pupils increases the number of teachers and classrooms are likely to increase. However, the coefficient of determination explains a small variance which means that although there is a positive relationship between enrolment and education facilities; the facilities are not enough. The testing of the hypothesis showed a weak relationship between pupil enrolment and educational facilities. It was generally concluded that pupil enrolment outweighs the supply of educational facilities in Nyamira.

The major recommendation from this study is that the rapid increase in school age population should be seen as a serious problem and therefore, it is important for the government to increase family planning method in the district. It is also important to increase the age of marriage and increase the opportunity of more female in the working sector.

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# CHAPTER ONE

## 1.1 Introduction

World population growth rates vary with time and space, in which case different regions have different growth. The global population growth rate is currently 1.7 per annum (I.C.P.D Cairo 1994:24). This means that with the current rate, the yearly increment is 90 million persons worldwide. Most of the increment occurs in developing countries (about 78%), whose growth rate is 2.7 per annum. Africa has one of the highest growth rates in the world (2.8 percent per annum). This rate has remained almost constant since 1989; although there is possibility of changing given that most people are responding positively to family planning programmes consequently, fertility is bound to decline (I.C.P.D Cairo 1994:24)

Kenya, being an African country also suffers from high population growth rates. The country experiences demographic trends that are characterized by slow declining high fertility and declining mortality rates. The population census of 1969, 1979 and 1989 indicates that the population grew from 10 million in 1969 to 21 million in 1989. This indicates that there has been a 40% increment every decade. Today, Kenya's growth rate of 3.1% per annum is still high.

The above growth rate tells us that Kenya suffers from high population growth rate which shows little signs of improving. The high fertility rate of the country is also replicated in some provinces and districts. However, some of the provinces and districts have even higher growth rates. For instance, Nyanza has a fertility rate of 5.8 which is higher than that of the whole country (5.4 according to the K.D.H.S 1983). Nyamira district, the study area in Nyanza Province has a growth rate of 3.1 per annum, which is one of the highest in the country. This rate has been almost constant since 1989.

High population growth rate is therefore a phenomenon of developing countries and it needs to be checked closely. It should be noted that the above history of high fertility in the third world has been influential in shaping the youthful broad-based age pyramid (Coale 1978), therefore indicating an unbalanced age-structure between the young and adults as the young are more than the adults. In fact, it is widely known that in developing countries most of the population is in the pre-school and primary school-age cohorts. This age structure is believed to be a problem in many regions of the world.

In Kenya, 50.5% of the population is under 15 years of age (Moti 1981). The high fertility in Kenya has really affected the provision of social services like health, education, etc. in most cases, Kenya has never achieved its aims of universal education because of the high fertility rates which constrains the educational facilities leading to high drop-outs. For instance, the primary school enrolment rate is 85.7% (Development Plan 1994). The above rate is considered high, therefore, implying that the educational facilities, among other social services, are constrained. The more the constraints in education facilities, the higher the number of drop-outs. For instance, 40% of those who enroll in primary schools do not complete their primary education in Kenya (Kenya, Development Plan 1994-1996). Therefore one wonders if Kenya will ever attain its universal aim of primary educational development given the above drop-outs.

Nyamira district, the study area, has a problem of high fertility, the school-age population occupies 53.1% of the total population. The district suffers from increased pressure on its social services particularly educational facilities arising from a large number of school-age population.

Therefore it is clear that Nyamira district suffers from high fertility which needs to be checked as it is now a threat to the existing social services. The government is unable to provide schooling facilities, including school buildings, teaching materials, trained teachers, etc., for the

ever increasing number of children (Ominde 1984). It is thus hard for Kenya to realize its aim of universal primary education; more so in Nyamira because of the high increase in school-age population. It is therefore important for one to analyze the extent to which this high fertility affects the provision of primary education in the country. In this case Nyamira District was chosen as the case study.

## **1.2 Statement of the Research Problem**

The present study attempted to examine the effects of population growth rate on the provision of primary education in Nyamira. The district chosen has one of the highest natural population growth rates of 3.1 per annum (Development Plan 1994/96). The district is therefore characterized by a high and increasing young population, and hence, the study area has a lot of constraints on its social services.

The study was therefore intended to describe the underlying fertility trends, age structure, mortality and migration behaviours in the district with an aim of knowing how these trends affect primary school enrolment. The underlying causes of the changing fertility patterns are also analyzed. The two factors of particular interest to this study was the role of female education and the family in explaining the trends in fertility levels. The influence of AIDS/HIV on mortality and school drop-outs was also examined.

It was also important to analyze how this population growth rate affects educational attainment in Nyamira District. In the case of the attainment the focus was on wastage (i.e. the loss got from the number who do not finish school). The study here embarked on the drop-outs and completion rates in the district. Thus the research analyzed the adequacy of education facilities, in which case the researcher aimed at answering one crucial question of whether



Nyamira has adequate educational facilities (teachers, classrooms, textbooks, maps, charts etc).

The research also examined the pupil-teacher ratio in the district.

To complete the research, it was important for one to recommend appropriate ways of improving the situation for future planning programmes and for research priority.

### **1.3 Objectives**

The following were the objectives of the study divided into two i.e. the general and the specific objectives.

#### **1.3.1 General Objective**

To evaluate the impact of population growth rate at various space and time scales on the provision of primary education in Nyamira.

#### **1.3.2 Specific Objectives**

The specific objective of the study thus will be to:

- (a) Examine the population levels trends in Nyamira District in terms of fertility, mortality, migration and age-sex structure.
- (b) Analyze the relationship between primary school-age population versus primary school going pupils.
- (c) Relate the demand for educational facilities to the supply of such facilities. The facilities which will be analyzed include:
  - i) school buildings
  - ii) trained teachers

- iii) teaching materials (maps, textbooks, charts, etc)
  - iv) teacher-pupil ratio
- (d) To recommend appropriate policies to the government to enable future planning processes.

#### 1.4 Literature Review

A number of scholars in most cases relate the population problem in the developing countries to social services such as health, food, education and shelter. But it is too surprising to note that a few scholars have really focuses their attention on the effect of the population on education, more so most of these studies that have been carried out are either based on global, regional or some in urban areas which makes them fall short of an intensive analysis of the effect of population growth rate on the provision of primary education in a rural society.

Bernard (1969) talked of population and education on a global scale. He addressed the effect of population in developing countries where he indicated that rapid population growth rate retards social and economical development. Bernard was then not specific on which social aspect is more affected by rapid population growth rate.

Mehat et al (1970) relates the population problem with the educational decline in developing countries. His argument is relevant to this study though it is not specific to any given region. He covered a large frame hence making his argument too general when he said that education's viability is threatened by population pressure which can be realized in the unprecedented expansion of facilities at all levels and in all branches of education in developing countries. He further says that the educational budget in schools and colleges doubles with high

enrolment in developing countries. This has made it hard for most countries to cope with the ever swelling numbers of children and young people waiting to be educated.

Abela (1971) argues that there is need for planning for provision of educational institutions in order to reverse space (cited in Cantrelle 1971:383). He focused his idea on the expected school-age population size, density in different areas within a region and the expected number of classes and class size. He concludes that the growth rate of urban population is very fast and has inescapable consequences for the distribution of schools. In his argument he only bases his study in urban areas and does not talk about rural areas meaning that there is a need for a research in a rural place in order to note the problems of population growth on the distribution of schools.

Jones (1971, 1975) indicates the problem in expanding education and relates it with demographic problems. He argues that fertility decline results in educational attainment. He therefore asserts that high rates of population growth are barriers to the attainment of the goals set for quantitative and qualitative expansion of education. Jones however cites poor physical facilities, poor trained teachers and irrelevant courses as a common feature of less developed country schools. He argues that to raise educational facilities and quality means: the increasing of the cost per student. This is because of the upgrading of the pay scales for teachers; increase the proportion of teachers who are fully qualified; supply more and better teaching aids and laboratory equipments. Jones appears to be more concerned with the improvement of educational facilities and fails to explain how demographic trends relate to the provision of primary education.

Eduardo (cited in Population Basic orientation 1972:254) in his survey done in Latin America assessed the effect of demographic characteristics on educational development. In his

projection he foresaw a situation where Latin America countries, despite their effort to reduce fertility will have a problem of attaining educational development before the year 2000. Eduard's argument relates to the current survey. However, he does not outline the plans that will be used to curb the problem. Furthermore, his findings might be irrelevant to the present study area.

Chau (1972) emphasized the importance of population expansion in contributing towards increased educational costs. In a study done in Ceylon, Columbia, Tanzania and Tunisia, Chau noted that considerable efforts will have to be made in order to improve education under conditions of rapid population growth. He further argues that a slow-down in the growth rate of the young population and an increase in population of working age could diminish the economic crisis faced by many schools in developing countries and will also encourage the establishment of universal primary education.

Stamper (1973) looks at the changing age distribution as affecting both the demand for education and the capacity of a society. He argues that developing countries are characterized by high levels of fertility and infant mortality is drastically declining hence a very young age structure that is very powerful. He therefore asserts that under the above situation, the size and proportion of the population in the school age groups are increasing rapidly. He further sees a situation being chaotic in the future if proper planning will not take place. Thus he concludes that in order to maintain satisfactory standards of education the number of teachers and schools must be tripled. Stamper has explained the general problem but he has not shown how different levels of education are affected by the demographic trends. Furthermore, he is not specific to any region; he covers a wide frame of references and hence lacks comprehensive results.

Hallack (1977) and Gould (1978) talk only on the distribution of population in relation to the distribution of schools. They do not evaluate the effect of rapid population growth on education. Their argument is geared towards achieving a closer merger between school distribution which can only be realized in the equality of access to education, particularly where there is no universal enrolment in which priority should be given to satisfying the educational needs for the poor as a fundamental approach to development planning.

World Bank Educational Sector Policy Paper (1974) emphasizes the appropriate location of educational facilities which is noted as a simple but effective particularly for lower levels of education where physical proximity is a major factor for determining enrolment. This paper has not shown the relationship between demographic trends and school enrolment. Instead, it only evaluates the ways to equalize educational facilities.

Nepal (cited in Population and Planning 1981:35) noted the projected number of children at the primary level is very worrying. He therefore stated that if the estimated growth of population were to take place, it would be more difficult to fulfill the increasing needs in the field of education. Nepal's argument is similar to the current study. However, he covered a wider geographical area.

Richard and Farooq (1984) noted the size and growth of the school age population which ranges from 6–15 has been the most obvious factor determining educational requirements. They argue that the size of the school-age population actually enrolled in school is an indicator on how serious the problem of out of school drop-outs are. This means the actual population age 0-6 years determines the potential school enrollment. They argue that fertility changes either put pressure on potential educational facilities or reduces it. To them the spatial distribution of population is an important factor in determining the location, concentration and the type of

educational facility to be provided. They thus conclude that educational planners should for their part be aware of the role of education in affecting demographic changes. Thus in planning for primary education an effort should be made to ensure that enough teachers are available to accommodate an upward trend in school enrolment. This literature appears relevant to the current study but would be even more relevant if the research would have referred to a small geographical area.

Charles (1984) argues that the size of population is an important factor in determining the form of the educational system. Some societies have not been able to provide more educators for the greater numbers of children in each generation. He further argues that the three measures of educational attainment shown include; school enrolment by sex, educational attainment and literacy. He notifies us that the measures are not easy to achieve given high population growth rate. Charles concludes that in developing world erratic growth increases the educational cost. He thus argues that population size is not the major problem. The idea is the rate at which this population grows. Charles' argument is not comprehensive enough.

The above argument has the right direction on the present study in which case they have shown out the problems of providing social service facilities in an area of high population growth. However their literature focused only on developing countries in general and thus fails to discuss the problem in particular countries. Some scholars are mainly concerned with the economics of education and not population growth and its impact on education.

In Kenya the work which has been done has been concerned with making descriptions of many kinds. In most cases people have been describing the structure of education (i.e. before and after independence) so as to enable them make projections for future population trends in

order to plan for educational requirements. Several scholars have linked population processes with education facilities but their analysis have loopholes that need to be discussed.

Ominde (cited in Shielfied 1966: 288-229) noted the structure of education in Kenya and cautioned the educational planners on the continued burden of illiteracy resulting from raising birth rates which leads to many problems in achieving the universal primary education. He finally indicated that the quality of primary education is likely to fall especially in the rural areas where there is lack of enough adequate staff.

In another contribution, Ominde (1971) analyzed the expected trend in primary school population based on the then rates of population growth and educational expenditure. He noted that educational planning in Kenya cannot be based on the need to provide places, to meet demand with a rapid growth rate. Educational planners are then faced with the serious problem of decline in education. He further said that educational planning should be supported by a programme for moderation of the country's high rate of population increase because the accelerated growth rate would result in greater difficulties in providing free primary education.

In a later contribution which is more relevant to the present study but differs in scope and approach Ominde (1984) analyzed the effect of population growth on economic development. He said that rapid population growth rate results in the shortage of schools in Kenya and Africa in general. He elaborated further and gave the tremendous importance attached to education in which his major concern was on the impact of population growth on the provision of educational facilities. He foresaw the changing age distribution or the dominance of youths in the population as a hindrance to the capacity of a nation to meet the demand of educational needs. The rapid population increase creates pressure on education leading to escalation of education expenditure.

Ominde's argument is similar and can be applied in the current study but it is not specific and lacks detailed analysis.

Meck (1971) studies the enrolment rates in both primary and secondary schools in the mid 1960's and asserts that the enrolment has been growing gradually because of high proportion in the school age population. As indicated in his argument, 85% of the children who have reached school age are likely to be enrolled in the next two decades despite the government of Kenya's efforts to improve education. Meck's argument is not exploitative on the relationship between population dynamics and school facilities.

Raju (1973) looks at the problem of high population growth rate as related to a lot of wastage. She then emphasized the importance of educational planning to avoid wastage in terms of high drop-outs, repetitions and poor educational content. She further noted a general behaviour in Kenya in which the projected enrolment also exceeds the actual enrolment because of the fast rate of population growth. Raju's argument is particularly based on population growth on educational facilities and this shares some similarities to the current study but she has analyzed different areas and furthermore never gave any specific example.

Kinyanjui (1974) noted that equality of educational opportunity is an important social goal and contributes significantly to the overall process of development. He therefore indicated that the existing educational resources and opportunities should be distributed as equitably as possible to all the people in the country irrespective of where they reside. There is a desire for equitable distribution of educational facilities among the Kenyans but surprisingly the desire is not achieved more so when the equal distribution is not accompanied by the perception that an equal important change is needed in the quality and content of education to be shared.



Kinyanju's idea appears too pressing to many educators in Kenya. He continued to emphasize on the disparities seen on the provision of education in Kenya in terms of teachers distribution between urban areas and rural areas where he noted that the uneven distribution in terms of qualified teachers have a significance in terms of quality of education provided in urban and rural areas. This can be portrayed by the number of pupils who pass the certificate of primary education exams.

In a later contribution, Kinyanjui (1977) gave almost a similar argument as that of 1974 in which he discussed about the inequalities of education facilities but went further to give the causes of inequalities which he attributed to the colonial era. He therefore identified and discussed the causes of educational inequalities in the provision of education resources and opportunity at the primary school level. His argument was based on types of schools and teachers qualification in different districts and major urban centres of Nairobi, Mombasa, Kisumu and Nakuru. Kinyanjui's arguments fail to show us the contribution of the rapid population growth rate in affecting educational facilities in rural areas.

Masavivu (1981) noted that education in Nairobi is faced with problems in spite of all efforts to improve the situation. She links the problem in Nairobi as those associated with high population growth. She argued that the demand for primary education will continue to increase during the next one or two decades if the population of Nairobi will not slow down, that no more than 86% of the children aged 6-12 years in Nairobi will be enrolled in school if the situation will not change. The proportion may even decline given the problem of resource constraints in terms of space and funds. Much more would be achieved in coverage if birth rates were to be reduced and effective measures taken to curb the influx of migrants. The future growth of school enrolment ratio will therefore be determined by the government policy regarding population

increase and the means of financing primary education in large areas such as Nairobi. Her work is similar to the current problem because it deals with population growth rate and its effect on the provision of primary school education. Her study differs with the current one in terms of the scope and region.

Oucho et al. (1986) argues that planning for primary education in Kenya is hard because of the rapid influx of school-age population into primary schools. He notes that most people are caught unprepared in terms of building equipments, school places and teachers. He links the problem to the current education system (8.4.4) which he argues will not meet its objectives because of shortage of educational facilities. He concludes that pressure is exerted on the existing facilities and hence education in Kenya has ended up consuming much of the governments budget. Oucho's argument looks logical but has a bigger frame of reference and hence lacks specific detailed analysis.

Juha (1989) has analyzed the interrelationship between demographic factors and the provision of primary education in Kenya. He has noted the problem of rapid population growth and the expansion of primary education. He realized that population growth outpaces the possibilities of further expansion in primary education; that with the current economy there are insufficient resources to cater for the educational requirements of the rapidly increasing numbers of school-age children. He further identified the inequalities existing between regions in Kenya in terms of teachers and facilities. He noted that the better off centrally located areas of the country and areas in the vicinity of the large town would be able to cope with the situation because of better facilities. He concludes that to have quality and quantity education in future the country must adopt an integrated approach to the problem. Accordingly it is also important for Kenyans to mix family planning and societal factors in order to reduce fertility. His

argument appears similar to the current study. However, Juha dealt with a wide scope and made a lot of generalizations.

Nyaora, W. (1990) in his dissertation argues that the distribution of educational facilities corresponds with that of population which is uneven. He thus says that the use of educational facilities differs accordingly from one region to another depending on such factors as regional monthly household levels, population density of school age children, human perception of the concept of education and the prevailing economic activities. Nyaora has only touched on population distribution and its relationship on the educational facilities, he does not explain the impact of population growth rate on education facilities which is the essence of this study.

In the most recent comment on educational facilities in the district, it is revealed that Nyamira's educational facilities are over-utilized (district development Plan, 1994), the plan attributes the over-utilization of such facilities to population density of the area. The development plan seems to have a positive relationship to the present study, but it lacks a detailed analysis of the whole impact of population growth rate on educational facilities in the District. Further, the scope of this study differs from the one given in the development plan.

The above literature shows that scholars dwell more on the economic aspect as related to education and fail to link the problem with the demographic trends. In cases where demographic factors are mentioned, emphasis is laid on the whole country or urban areas. Few studies have been conducted in the rural areas. The current study has taken a scope and a frame of reference that is somewhat different from those (scopes and references) of other studies.

## 1.5 Theoretical and Conceptual Framework

This section attempts to provide a conceptual model for this study. The model is based on population theories formulated by the classicists and neoclassicists. Such theories include the Malthusian theory of population growth rate on resources and the neoclassicist theories of Enke (1960), Easterlin (1969, 1975, 1978, 1980), Mandishona (1987), Repetto (1987) and Sai (1988).

Economists have also tried to come up with theories which explain fertility and resources, for instance, Enke (1960) shares with Malthus a belief that there are inherent limitations on the resources that a nation or a family can marshal for its economic well being. Given these constraints, any rational family will want to limit the number of children to the number that is consistent with maintaining a reasonable standard of living in the face of these constraints (Enke, 1960). Within this framework, children can be a source of poverty if they dilute a fixed or relatively inelastic income. The neo-malthusian differs from Malthus in believing that contraception and not delayed marriage is a possible way to reconcile a family life with limited resources. Enke's theory actually relevant to the present study and can be applied because it essentially talks about high population affecting the economy, however, Enker only fails when he talks about population growth rate with the economy in a general way and he appears not specific.

Another possible theory that can apply here include Easterlin theory. Easterlin (1969, 1975, 1978, 1980) developed a micro economic theory of fertility. In this theory, Easterlin gives a number of factors involved in fertility decisions as being biological factors, differences in tastes, and in his specification he gave the relationship between the demand for children and the supply of children. Easterlin argues, then in his theory that parents face a budget constraint and children are assumed to have a price. Central to his concern is the integration of the "biological"

constraints on fertility (supply) and the choice constraint families face (demand), i.e. economy that determines the natural fertility of the population and defines the upper limit of family size.

Easterlin used these two concepts of supply and demand to explore a number of different equilibrium solutions for the individual family and for the society as it moves from the situation of excess demand to that of restricted fertility. Thus, his model is quite consistent to the current situation in terms of the demand and not very clear on the supply.

One major problem of the theory is that Easterlin does not address himself to the issue of preference. Preference in most cases incorporates socio-economic characteristics such as the origin and education. The two variables are therefore essential in determining family size. This alone makes us disqualify Easterlin from the centre of my framework. Furthermore, Easterlin does not give the influence of fertility on the educational attainment.

Educationalist also have theories which explain population and human resources. Education is one of the most persuasive factor influencing fertility control behaviour (Cochrane, 1979, 1983). Formerly, education tends to reduce the demand for children by shifting tastes in a manner unfavourable to children and decreasing the price of goods relative to children (Lindert, 1983). With regard to the relative price of children, if better education improves the income earning possibilities of women, then the alternative cost of the mother's time required in child bearing is increased while some offset to these may be available, for example through the help of other members or domestic workers, there is probably some net positive effects on the cost of children and thus a tendency towards a reduction in the demand for children. In addition, compulsory education may increase the relative cost of children by reducing the possible contribution to income.

In all countries and all areas, fertility follows changes in the demand for children by consideration of both economics and tastes. Fertility fails to fall in the earlier phases of most country's development, and falls thereafter for a straightforward reason. The relative costliness of extra children fails to rise until advanced stage in development. Therefore it appears that the fertility transition parallels the long-term pattern of children and benefits (Lindert, 1983, pp. 495-496).

Lindert therefore gives the taste for children as being the intensity of the desire to have children relative to goods which is affected negatively by education of the parents because children, and the life style associated with them are essentially an 'old' good, while education presents an image of new life style competitive with children. The theory appears relevant to the current study but cannot be applied because it does not give a detailed analysis on the impact of population on educational attainment.

The father of population theory Thomas Malthus produced his theory in the 18<sup>th</sup> century. In the theory he stated the effects of unchecked population on resources. He foresaw a situation where rapid population growth will out space resources and hence leads to disaster. Since the days of Malthus, there has been disagreement on the consequences of population growth on the society as a whole. This is partly on ideological grounds but increasingly it has been dependent on the analytical methods used in approaching the problem (Harvey 1975, McNicoll 1984).

Some scholars claim that a dense populations creates the conditions for technological developments (Boserup 1965 and 1981, Clark 1967). Accordingly an increasing population within a limited area provides incentive to replace natural resources by labour and capital, thus stimulating innovations. The scholars use the overall population density of Africa as a partial explanation to the continents underdevelopment.

On the other there are those theories which show population increase as a resource and they then indicate that population increase can be seen as a resource only if it is well trained, healthy and in productive employment, thus satisfying its basic needs such as health and education. Hence scholars argue that rapid population growth may make the resources limited and in such a situation population becomes a burden.

Malthus' theory holds water despite criticisms especially from the socialist scholars that the population growth rate will not hamper resources and development. Several scholars have however improved the Malthusian Theory.

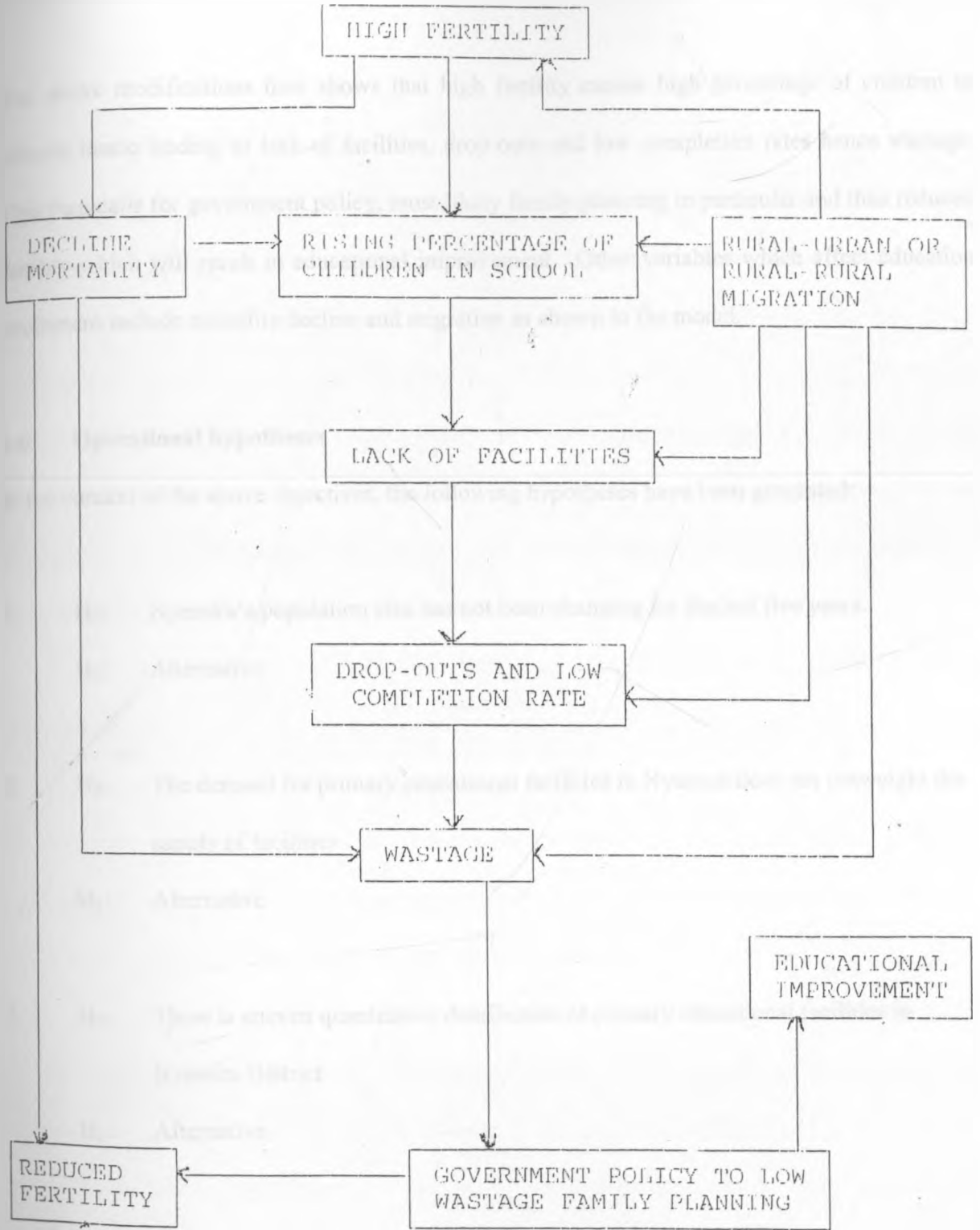
One obvious effect of the rapid population growth rate is the resulting age-structure. This affects schooling in two contradicting ways. First as the ratio of the dependants to workers increases the total savings in the economy decreases thus hampering the investment in education and in physical capital. Secondly, the number of children of school age increases rapidly requiring more investment in educational facilities. Studies on the effect of population growth on educational expenditures in developing countries verify clearly these effects.

Scholars like Jones (1975) gave a model which shows the effect of population growth rate on education. He noted that with lower fertility there is a relatively fast effect on educational system reducing wastage and drop-outs because it necessitates quality facilities and hence quality education. He goes further by saying that high fertility affects the expansion of education and hence lowers development. He argues that to raise education facilities means increasing the per student cost and this cannot be realized in high population growth. However, his model is not sufficient hence needs a small modification.

The above theories of population growth rate indicates that there is need to modify them in order to have a concrete theory which can apply in a specific place. Jones' model and Malthus theory are relevant and can be used after a few modifications. Thus the theory in our reference is that of Malthus and the model to used in this study is modified from Jones (1975). The model is shown below.



Figure 1. Operational Framework



Source: Modified from Jones 1975.

The above modifications then shows that high fertility causes high percentage of children in schools hence leading to lack of facilities, drop-outs and low completion rates hence wastage. This then calls for government policy, most likely family planning in particular and thus reduced fertility which will result in educational improvement. Other variables which affect education attainment include mortality decline and migration as shown in the model.

## 1.6 Operational hypotheses

In the context of the above objectives, the following hypotheses have been generated:

1.  $H_0$ : Nyamira's population size has not been changing for the last five years.

$H_1$ : Alternative

2.  $H_0$ : The demand for primary educational facilities in Nyamira does not outweigh the supply of facilities

$H_1$ : Alternative

3.  $H_0$ : There is uneven quantitative distribution of primary educational facilities in Nyamira District

$H_1$ : Alternative

## 1.7 Justification of the Study

The subject of the present study bears certain relationships to other studies conducted in Kenya and elsewhere. However, few scholars deal with the effect of population on particular services such as educational facilities. For instance Kinyanjui 1977, Ominde 1984 and Narman 1984 focused their analysis on the regional disparities in the point of political economy and policy without taking into account demographic aspects and socio-cultural hindrances to education.

Some of the studies have wide frames of reference. They cover wider geographic regions as compared to this study (Juha 1989, Oucho *et al.* 1986, Kinyanjui 1974). This study covers a small geographic region for purposes of detailed analysis.

Other studies (Masavivu 1981) have been conducted in the urban areas hence differing from this study.

The works of western scholars (Mehta *et al.* 1970, Jones 1975, Charles 1984) suffer from the limitation of being irrelevant to the demographic background(s) of developing countries, especially Kenya. Hence their findings and conclusions are neither representative nor conclusive of the circumstances in Kenya and Nyamira district in particular.

The study area chosen (Nyamira district) is relevant on account of the fact that it is a region of high population growth (3.1% per annum) which has put pressure on its social services especially education.

In conclusion, it is noted that though the existing literature bears resemblance to this study, other researchers' frames of reference, scopes and approaches differ with those of this study. This study addresses itself to a specified and unique geographic region and hence its justification.

## 1.8 Scope and Limitations

The focus of this study is to identify the impact of population growth on the provision of primary education in Nyamira district. The study covered 160 primary schools out of the 364 schools in the district. This coverage was almost a half of the total schools in the study area. All the schools would have been covered in the area but because of time and resource constraints, it was not possible.

Financial constraints also limited the data collection because the study covered the whole district. This means that many schools were not visited more than once for justification and clarification. This occurred because of high transport cost and in some cases the research had to walk long distances to reach some schools which was time consuming and tedious.

There was also the problem of cooperation from some heads of certain primary schools, who made it very difficult to hold interviews with the researcher. This at times necessitated visiting some schools a number of times to get the data. Some heads would not honour the appointment and hence one would bounce them severally, this indicated time consuming and resources hence it was hard to collect all the intended data.

There was also inadequate background materials that could be used for this study. In fact very little research has been conducted in connection with the title and little literature existed. Whatever has been written so far on this subject has tended to embrace a unit larger than or has also tended to involve only urban areas. Thus in most cases secondary data was missing and the one which was available lacked detailed analysis.

Data collection on AIDS/HIV proved the hardest because even the district medical officer of health (MOH) could not give the figures after even he was given the research permit. Much of the data he provided were heresy, he did not have the records to extract the actual data on AIDS/HIV in the district. Some data on fertility and mortality from the district office was lacking. The only excuse given was that Nyamira is a new district and most of records remained in Kisii district when the district was created in 1989. The data which was available dated back to 1990.

Lastly, I thus intend to limit myself to the analysis of population growth on the provision of primary education hence leaving out some factors. I find it necessary because today population growth is a root cause of many problems related to social services in many developing countries like Kenya.

Despite the above arguments it is believed that the findings of this study were enough to give a comprehensive analysis in the case study and contribute positively in solving the problems that face educational development in the district.

## **1.9 Definition of important Concepts**

Concepts have been defined according to their usage in this study.

**Primary education** - is the lowest form of formal education in Kenya and refers to classes I – VIII

**Primary school-age population** – refers to the numbers in the age-group 6 – 12 which is regarded normal for primary education.

**Pupil/class ratio** – refers to the number of pupils per class.

**Pupil/teacher ratio** – refers to the number of pupils per teacher.

**Kenya Certificate of Primary Education (K.C.P.E)** – is examination sat for by pupils at the end of class eight.

**Enrolment ratio** – is defined in the context of primary school-going in relation to school-age population enrolled in various schools.

**Drop-outs** – refers to the pupils who leave school before completing the expected terminal level. In this study it refers to a pupil who leaves primary school before completing the expected eight years education.

**Crude Birth Rate** – is a ratio of total registered births to the total population in a specified year.

It is normally expressed as;

B  
- K  
P

Where:

B is the total number of live births registered during the year

P is the mid-year population of women in the age-group between 15-49

K is a constant, normally 1000

**Age-specific fertility rate** – is the average number of births occurring to women in a given age group. It is normally expressed as:

$$\frac{b_i}{P_i} K$$

Where:

$b_i$  is the total annual registered births in the age interval

$P_i$  is the mid-year population of the women in the same age-group

$K$  is the constant, normally 100

**Total Fertility Rate** – is the mean number of births occurring to a woman who lives to the end of her reproductive life (15-49 years).

**Crude Death Rate** – is the ratio of the total registered deaths to the total population in some specified year. It is normally expressed as:

$$\frac{D}{P} K$$

Where:

$D$  is the total number of registered deaths

$P$  is the total population

$K$  is a constant

## **CHAPTER TWO**

### **THE STUDY AREA**

#### **2.1 Introduction**

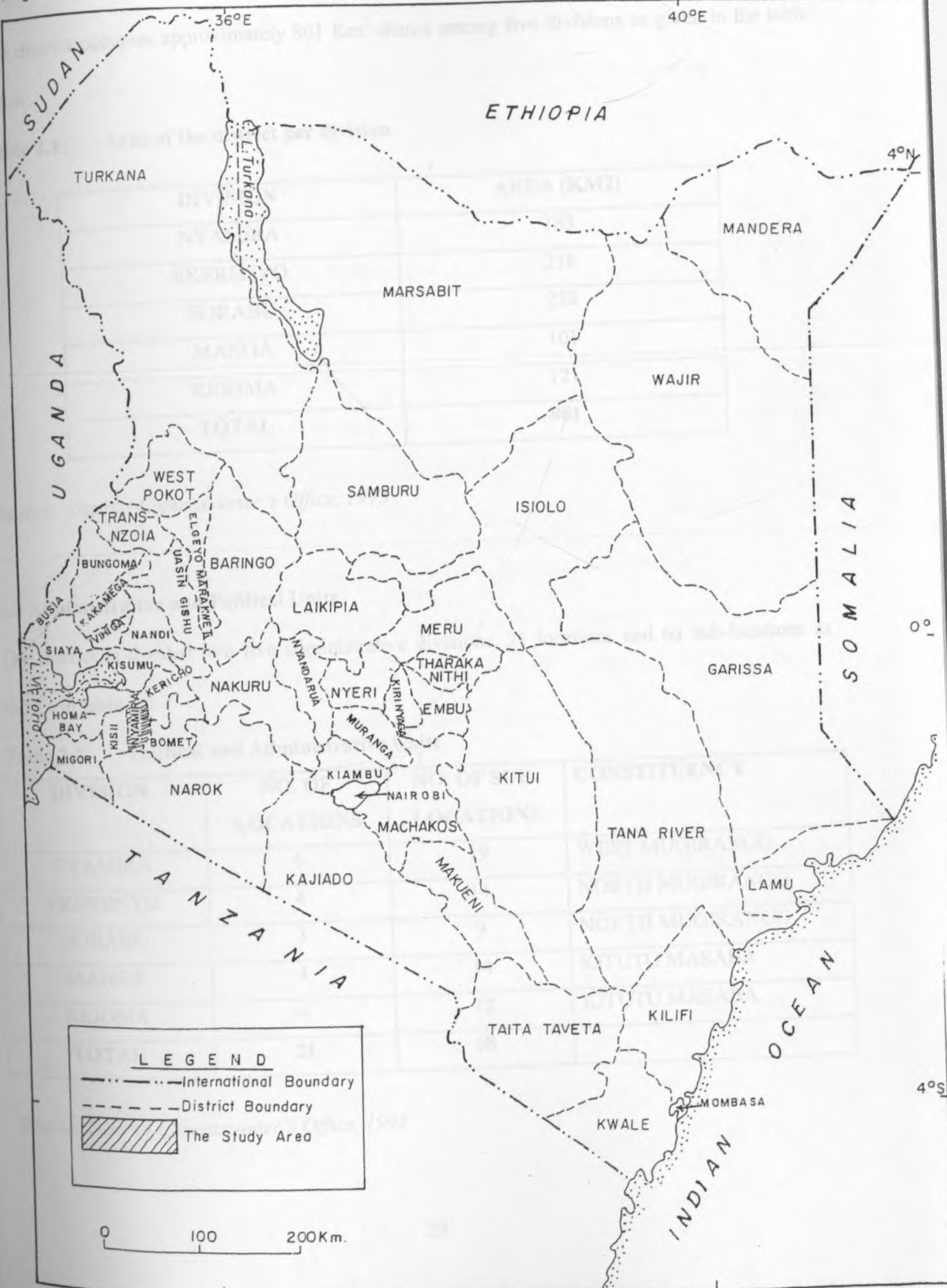
This chapter examines various relevant aspects of the study area (Nyamira District). These aspects relate to physical, economic, socio-infrastructure and population characteristics of the study area. Regions, owing to their location and physical character seem to support certain ways of life. The physical landscape and economical response exist always with man and his particular abilities, desires, caprice which together determine the level of development in a particular region (Anderson 1966, cited in Kenya Statistical Abstract 1974). An evaluation of these characteristics is essential because they (the characteristics) have a lot of influence on this study which is on. The given characteristics serve as background information which necessitates a comprehensive analysis of the research.

#### **2.2. Location and Size**

Nyamira District is one of the districts that make up Nyanza Province. It is a new district carved from Kisii District in 1989. It borders Homa Bay to the north, Narok to the south, Kericho to the east, Kisii to the west and Bomet to the south-east. The district lies between latitudes  $0^{\circ}45'$  and  $35^{\circ}00'E$  (figure 2).



Fig. 2 : LOCATION OF NYAMIRA DISTRICT



Source Survey of Kenya

The district occupies approximately 861 Km<sup>2</sup> shared among five divisions as given in the table below.

**Table 2.1: Area of the district per division**

DIVISION	AREA (KM2)
NYAMIRA	183
EKERENYO	218
BORABU	238
MANGA	101
RIGOMA	121
<b>TOTAL</b>	<b>861</b>

*Source: District Commissioner's Office, 1993*

### 2.3 Administrative and Political Units

The district is divided into five administrative divisions, 21 locations and 68 sub-locations as shown in table 2.2.

**Table 2.2: Political and Administrative Units**

DIVISION	NO. OF LOCATIONS	NO. OF SUB-LOCATIONS	CONSTITUENCY
NYAMIRA	6	19	WEST MUGIRANGO
EKERENYO	4	14	NORTH MUGIRANGO
BORABU	3	9	NORTH MUGIRANGO
MANGA	4	14	KITUTU MASABA
RIGOMA	4	12	KITUTU MASABA
<b>TOTAL</b>	<b>21</b>	<b>68</b>	

*Source: District Commissioner's Office, 1993*

The district is further sub-divided into three political constituencies, namely: North Mugirango, West Mugirango and Kitutu Masaba. The boundaries on West Mugirango coincide with the administrative boundary of Nyamira Division. Ekerenyo and Borabu Divisions form North Mugirango constituency while Manga and Rigoma are represented by Kitutu Masaba (figure 3).

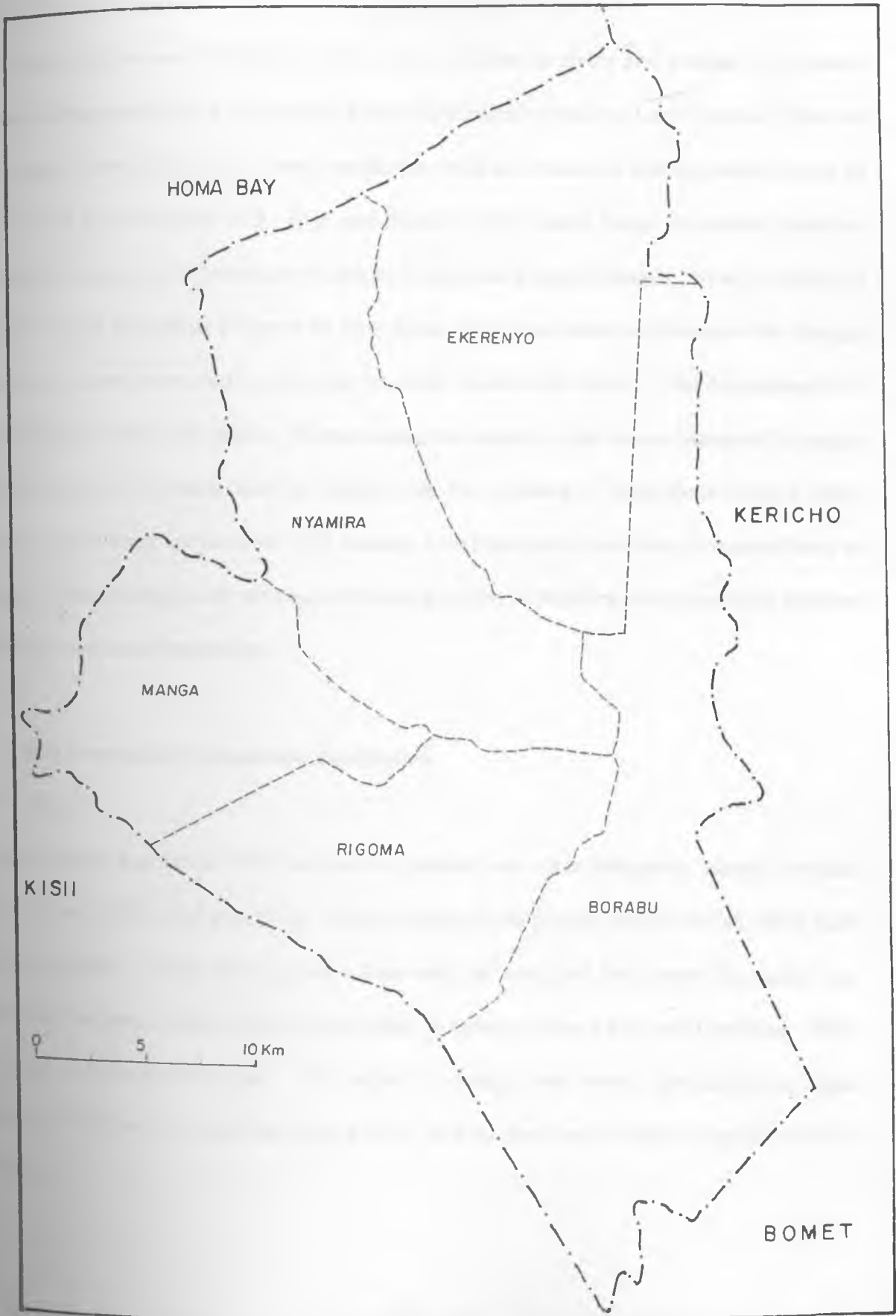
## **2.4 The impact of relief features on population distribution**

### **2.4.1 Physiography**

The district can be divided into two main topographic zones corresponding closely to altitude. The first zone covers all the areas whose altitude lies between 1500m and 1800m above sea level. This zone covers the northern parts of Nyamira and Ekerenyo divisions.

The second zone covers all the areas lying above 1800m. The area covered by this zone comprises South Nyamira, South Ekerenyo as well as Central and East Kitutu locations of Manga and Rigoma divisions respectively. The district is mostly hilly and is dissected by several ridges especially in the east with Mount Kiabonyoru, Manga Escarpment and Nyamabisimi being the most prominent features. The area therefore is characterized by the hilly terrain which in most cases makes it hard and expensive for the construction of roads because in the process of avoiding steep slopes, roads cover long meandered courses. The existing terrain also causes soil erosion which aggravate road maintenance. Due to the fact that the district has almost similar altitude the population of the district is almost evenly distributed although Nyamira division is densely populated.

Fig. 3 : NYAMIRA DISTRICT ADMINISTRATIVE BOUNDARIES



Source Adopted from O. D. P (1994-96)

## **2.4.2 Drainage system**

The district has several hill terrain which acts as sources of rivers and streams, for instance Mount Kiabonyoru acts as a source of R. Kuja which drains its water to Lake Victoria. There are other small rivers in the area of local significance (acts as a source of drinking water), many of them which are tributaries of R. Kuja and Sondu. River Sondu forms the natural boundary between the study area (Nyamira) and Kericho, Bomet and Kisumu Districts. River Sondu is the longest river in the district followed by river Kuja. There are several depressions like Sironga Valley and several other small depressions which are found in the district. These depressions form small swampy areas in the district. In most cases, the swampy areas are not occupied by people because of fear of diseases such as malaria, due to the existence of mosquitoes in such areas. However, these areas are used for brick making, a fact that will attract more people to settle in the area. Thus drainage does not pose any major problem in Nyamira which can bring about an uneven distribution of population.

## **2.5 Soil in relation to population distribution**

### **2.5.1 Soils**

Nyamira district has fertile soils that can be grouped into three categories, namely notosols (75%) vertisols (20%) and peat (5%). The soil types can be broadly known as clay, sand, loam or rich clay loam. These soils support a wide range of cash and food crops like coffee, tea, phyrethrum, bananas, maize, beans, finger millet, sorghum, cassava and sweet potatoes. They also support horticultural crops. The district is divided into various agro-ecological zones depending on the soil type and the crops grown. In total there are six agro-ecological zones in the district.

There is a Lower Highland Tea-dairy zone (LH1) which has well deep drained reddish brown friable clay which has thick humic topsoil. The soil support tea growing and rearing of cattle. The Lower Highland maize-wheat/pyrethrum zone (LH2) has deep well drained soil which range from dark red to reddish brown friable sand clays, these soils support growing of wheat, maize and pyrethrum. The Lower Middle Sugar zone (LM1) has well drained dark red friable clay which has thick humic topsoil, it has high potential for growing sugarcane. Lower Marginal Sugar Zone (LM2), has shallow reddish brown loam gravel clay soils which support the growing of soya beans, groundnuts and sugarcane. The upper middle zone (UMI) and the upper midland zone (UM2-3) have soil ranging from dark red friable clay reddish brown, coffee is mainly grown in UM2-3 while UM1 supports the growing of both tea and coffee. It is estimated that 30% of the total land is devoted to maize production and more than 60% of the land is under food and cash crop production. Thus indicating that Nyamira's land is very utilized and hence there is possibility that population density can be high. Table 2.3 shows agro-ecological zones available by division and by household. Figure 4 also shows the Agro-ecological zones in the district.

Of the total 86100 hectares of land, 81800 is suitable for agricultural and dairy farming. There are approximately 58670 small holdings with farm sizes ranging from 1.4 ha. to 2.2 ha. The average size of holdings is generally around 1.8 ha. Due to fertile soils that favour a lot of food and cash crop production, Nyamira district has a high growth rate which is 3.3% per annum. This growth rate has made the area to be densely populated in which case the density is 515 persons per Km<sup>2</sup>.

Nyamira District is therefore composed of fertile soils which are evenly distributed in the area hence giving almost a uniform distribution and density of population in the area.

**Table 2.3: Agro-ecological zone available by division and household**

Division	In '000' ha = sq Km					In hectares							
	T.A	S	F	O.R	A.L	Area in Agro-ecological zone						Area per H	
						LH1	LH2	UM1	UM2	LM1	LM2	H	P
Kitutu	43	3	-	8	32	11	-	21	-	-	-	0.6	.1
Kitutu	92	-	-	18	74	68	2	4	-	-	-	1.3	.2
onge	87	-	-	18	69	20	-	49	-	-	-	1.1	.2
rabu	238	2	2	24	212	43	-	-	-	-	-	4.6	.6
Mugirango	183	-	-	36	147	104	3	40	-	-	-	1.2	.2
Mugirango	218	3	-	44	171	60	-	92	-	-	-	2.5	.3

Source: *Farm Management Handbook of Kenya vol. 2 Part A, Western Kenya 1985*

Notes:

S is steep slopes

F is Forest, Lakes and Swamps

OR is others; roads

AL is agricultural land

LH1 is Lower Highland tea-dairy zone

LH2 is Lower Midland maize-wheat/pyrethrum

UM1 is Upper Midland coffee-tea zone

UM2 is Upper coffee zone

LM1 is Lower Midland sugar zone

LM2 is Marginal sugar zone

## 2.6 Climate in relation to population

### 2.6.1 Rainfall

The district receives high and reliable rainfall which is well distributed throughout the year. The rain is received in the long and short rain seasons. The long season starts in March to June while the short rains are received in October to December. The dry season is experienced in December and January. Most of the rainfall is received in April when over 300 mm is recorded while least precipitation is received in January and August (100 mm). On average the district receives an annual rainfall of 2000 mm (see Table 2.6).

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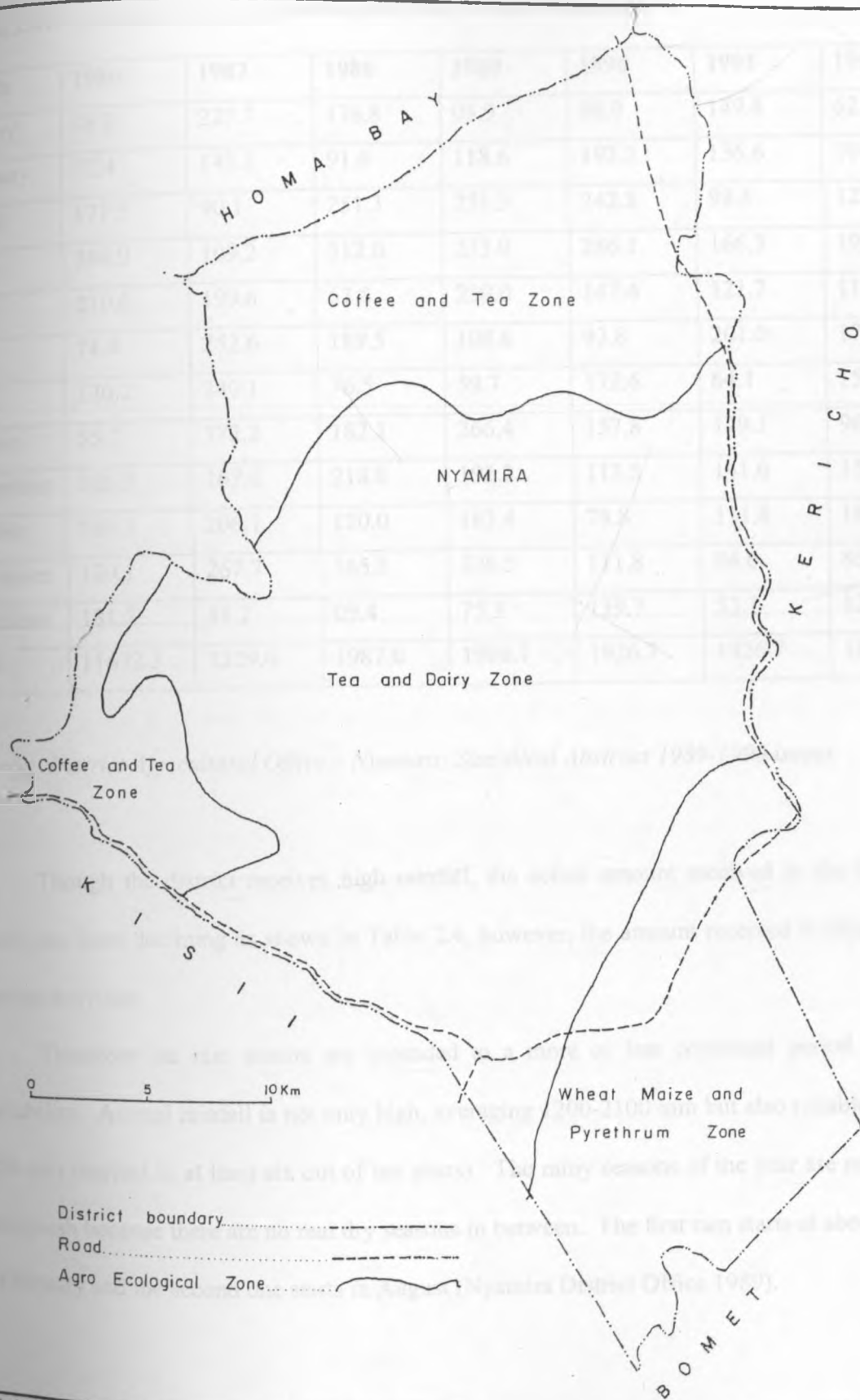


FIG. 4: NYAMIRA DISTRICT AGRO ECOLOGICAL ZONES

Source Adopted from Farm Management Vol. 11

**Table 2.4: Mean Monthly Rainfall (mm) for 1989-1992 period**

Month	1986	1987	1988	1989	1990	1991	1992
January	48.0	227.7	176.8	05.9	98.9	149.8	62.3
February	72.4	145.5	91.6	118.6	192.3	136.6	104.3
March	171.5	90.1	251.3	251.3	242.8	98.3	127.3
April	366.9	109.2	312.0	233.0	286.1	166.3	192.9
May	210.6	199.6	63.8	239.0	147.4	121.7	118.7
June	74.4	252.6	189.5	108.6	93.8	201.0	170.9
July	120.2	240.1	76.5	59.7	172.6	64.1	150.1
August	55.7	172.2	182.1	266.4	157.8	129.1	96.2
September	105.9	167.6	218.8	192.2	113.5	141.6	154.4
October	160.1	206.1	120.0	163.4	78.8	111.8	188.3
November	120.1	267.7	165.3	226.5	111.8	84.6	86.1
December	181.7	41.2	09.4	75.3	139.7	53.1	123.7
Total	11672.5	1329.0	1987.0	1986.7	1926.7	1926.7	1575.2

*Source: District Agricultural Office – Nyamira; Statistical Abstract 1989-1990 issues*

Though the district receives high rainfall, the actual amount received in the long rain season has been declining as shown in Table 2.4, however, the amount received is adequate for farming activities.

Therefore the rain season are extended to a more or less continued period of water availability. Annual rainfall is not only high, averaging 1200-2100 mm but also reliable (1100 – 1750 mm reached in at least six out of ten years). The rainy seasons of the year are not easy to distinguish because there are no real dry seasons in between. The first rain starts at about middle of February and the second one starts in August (Nyamira District Office 1989).

The high and reliable rainfall received promotes a wide range of agricultural activities which has made the district agricultural producer in the country. It also enables good health to the inhabitants who are well fed through the agricultural produce and thus favouring high fertility rates in the study area.

## 2.6.2 Temperature

The district does not experience extreme temperature variation largely due to its altitude. The minimum temperature are  $10.1^{\circ}\text{C}$  while the average daily temperatures are  $19.4^{\circ}\text{C}$ . Table 2.5 shows mean long term monthly temperatures in the district for 1985 – 1992.

The table indicates that high mean maximum temperatures recorded in 1985-1992 was  $27.1^{\circ}\text{C}$ , while the lowest was  $24.3^{\circ}\text{C}$ . The lowest mean minimum monthly temperatures recorded over the same period was  $9.7^{\circ}\text{C}$ . The variation in both mean monthly maximum temperatures was therefore minimal and ranged from  $2.2^{\circ}\text{C}$  to  $2.7^{\circ}\text{C}$  in the same period. The cool temperatures promote the growing of cash crops, like tea, coffee, pyrethrum as well as food crops like maize, beans and millet. Such temperatures, in most cases, does not favour mosquito existence, however this does not mean that they are non-existence in the district. The presence of moderate temperatures has made many people in Nyamira to have a permanent settlement in the area, the fact that has promoted less out migrations in the area. Therefore there is high population growth experienced in the area. This is because less migration promotes traditional norms and the inhabitants are only exposed to their traditions which in most cases favour high fertility.

**Table 2.5: Long Term Mean Temperatures 1985-1992**

Month	Means		
	Max ( <sup>0</sup> C)	Min ( <sup>0</sup> C)	Range ( <sup>0</sup> C)
January	27.1	10.1	17.0
February	27.1	10.1	17.0
March	26.4	10.2	16.2
April	25.6	11.9	15.7
May	25.1	11.7	13.7
June	25.0	10.6	14.4
July	24.3	9.7	14.6
August	24.8	10.6	14.2
September	25.3	10.2	15.1
October	26.6	10.4	16.2
November	25.8	10.3	15.5
December	26.6	10.4	16.2

*Source: Kenya Meteorological Dept. 1990, Sotik Tea Estate*

## **2.7 Demographic and Settlement Patterns**

### **2.7.1 Population Size**

The population of Nyamira was 248,539 in 1969 and increased to 300,756 in 1979, thus growing at a rate of 4% per year. Between 1979 and 1989, the population grew at a rate of 2.7% per annum and the population was 471,461 in 1989. The population has been growing at a rate of 3.1% since 1989 and swas 587,942 in 1997 and it is expected that it will be 656,576 persons by the year 2001.

The district had 73,927 households in 1993 and currently there are about 81,017 households. This indicates an increase of 7090 household for only two years (see chapter 4 for more details, with an average household size of 7).

## 2.7.2 Population Structure

In 1979 females were more than males and the same trend continues to prevail (table 2.6 shows sex projections). In 1979 the population of the youth 0-14 years was 53.10% and this proportion was expected to hold in the whole of 1996. 3.6% of the population comprised people aged above 59 years in 1996. This, therefore, implies that 56.7% of the population in the district comprise of dependants with a dependency ratio of 1:1.42. The dependency ratio might rise in the years to come if appropriate measures are not taken to control the population growth rate.

**Table 2.6: Sex Projections**

SEX/YEAR	1979	1993	1994	1996
FEMALE	152991	225782	232781	247437
MALE	147965	218222	172366	239152

*Source: Population Projections, 1979 census*

As regards sex ratio in the district, there were 100 females for 96 males in 1979 and the number of females is still high currently, with a sex ratio of 0.96.

Table 2.7 shows the composition for the various selected age groups.

**Table 2.7: Population of selected age groups and sex**

YEAR	1979		1994		1996	
	M	F	M	F	M	F
6-13 (PRIMARY)	49602	48658	79954	105523	110933	112166
14-17 (SECONDARY)	19033	20740	22172	31536	30763	33122
15-49 (FEMALE)	-	64687	-	98359	-	104554
LABOUR FORCE	120144		182174		193466	

*Source: Population Projections, 1979 census*

As indicated in table 2.7, the primary school going population has been increasing in the past and the same trend is expected to increase to 146,633 by the year 2001. This calls for increased primary, secondary and post-primary training institutions. Over the years primary school age population will continue to rise thereby requiring more facilities.

The expected increase in the number of women of reproductive age (15-49 years) in the 1994-1996 period created pressure on existing infrastructure and increased dependency burdens on parents and the working population.

### **2.7.3 Population Distribution and Density**

Nyamira division had the highest total population by 1979. It was followed by the Ekerenyo and Rigoma divisions respectively. By 1993, Nyamira division had about 30% of the district's total population while the least populated division (Borabu) had about 11%. Borabu division had the least population because it is a settlement area with large farms which have not been subdivided.

Table 2.8 shows the population by division in the district

**Table 2.8: Population Distribution per Division**

DIVISION	1979	1993	1994	1996
NYAMIRA	91606	135102	139291	148060
EKERENYO	74965	110560	113981	121164
BORABU	31587	46585	48029	51058
RIGOMA	52019	76645	79021	83996
MANGA	50629	74669	76983	81830
TOTAL	300956	443561	457311	486104

*Source: Population Projection, 1979 census*

The average district population density by 1979 was 349 persons per square kilometer, while in 1993 the density was 515 persons per sq. km. This is expected to be around 564 persons per sq. km by the end of 1996. Table 2.9 shows the population density per division in Nyamira.

The highest concentration of the population is in Manga and Nyamira divisions while the least concentration is in Borabu division. The current figures indicate that the population density of the two densely populated divisions increases at a rate of 47%. The same trend is expected throughout 1996.

#### **2.7.4 Migration**

Population movements do not feature very prominent in Nyamira district. The high population growth rate has mainly been due to natural increase. The rural to rural movement within the district have been to the settlement area in Borabu division. The people who bought land and have settled in the area were from Kisii and Nyamira Districts.

Occupational movement are common in the area. People migrate to other districts in the country or to urban areas in search of employment and business opportunities. Quite a number have bought property and have settled in places like Molo, Narok, Kitale, Migori and many other places in the country.

#### **2.7.5 Infant Mortality Rates**

The infant mortality rates has been declining and this is expected to continue in 1996. The decline is attributed to improved health care and immunization against the killer diseases. Before the creation of the district in 1992, Kisii district had infant deaths of about 4,573 in 1988 which declined slightly to about 4,564 in 1989. The decline in mortality rate was 71.4 to 69.6 per cent respectively. Since Nyamira was carved out of Kisii district the figures can be taken to represent Nyamira district.

The original Kisii district has a large proportion of stunted children due to low intake of nutritious food. Low nutrition levels in the district is partly due to lack of balanced diet due to ignorance among the mothers. The nutrition aspect in the district is a major concern and most mothers require education in order to encourage balanced diet.



## **2.8 Socio-economic Infrastructure**

The welfare of the people is greatly influenced by the existence, access, distribution and utilization of the socio-economic infrastructure in the district. Among the infrastructure, educational facilities are most constrained and need more emphasis.

### **2.8.1 Health Status in the District**

There are several health facilities in the district with one district hospital in Nyamira town, the hospital has a modern facility which serves the whole of Nyamira district and some parts of Kisii and Homa Bay districts. The hospital is over utilized because there are very few health centres in the district which could ease the congestion at the hospital.

A number of health facilities such as Nyamusi, Manga, Amaterio, Igena, Itambe are under utilized. This is mainly because these health centres lack essential components such as staff, water, electricity, maternity wings and essential equipments. The problem is worsened by poor roads which make the accessibility to these health facilities hard.

Most of the health facilities in the district are government owned. Nyamira district has the highest concentration of health centres where a hospital and a maternity home is found. Ekerenyo division has three health centres while Manga and Rigoma have one health centre each. Borabu division has only dispensaries with five of the being under NGOs. Table 2.10 shows the health units and agents which maintain them. Fig. 5 also shows the distribution of health facilities in the district. The Kenyan government maintains about 51% of the health facilities in the district. 29% is under the NGOs while private facilities account for 21% in the district.

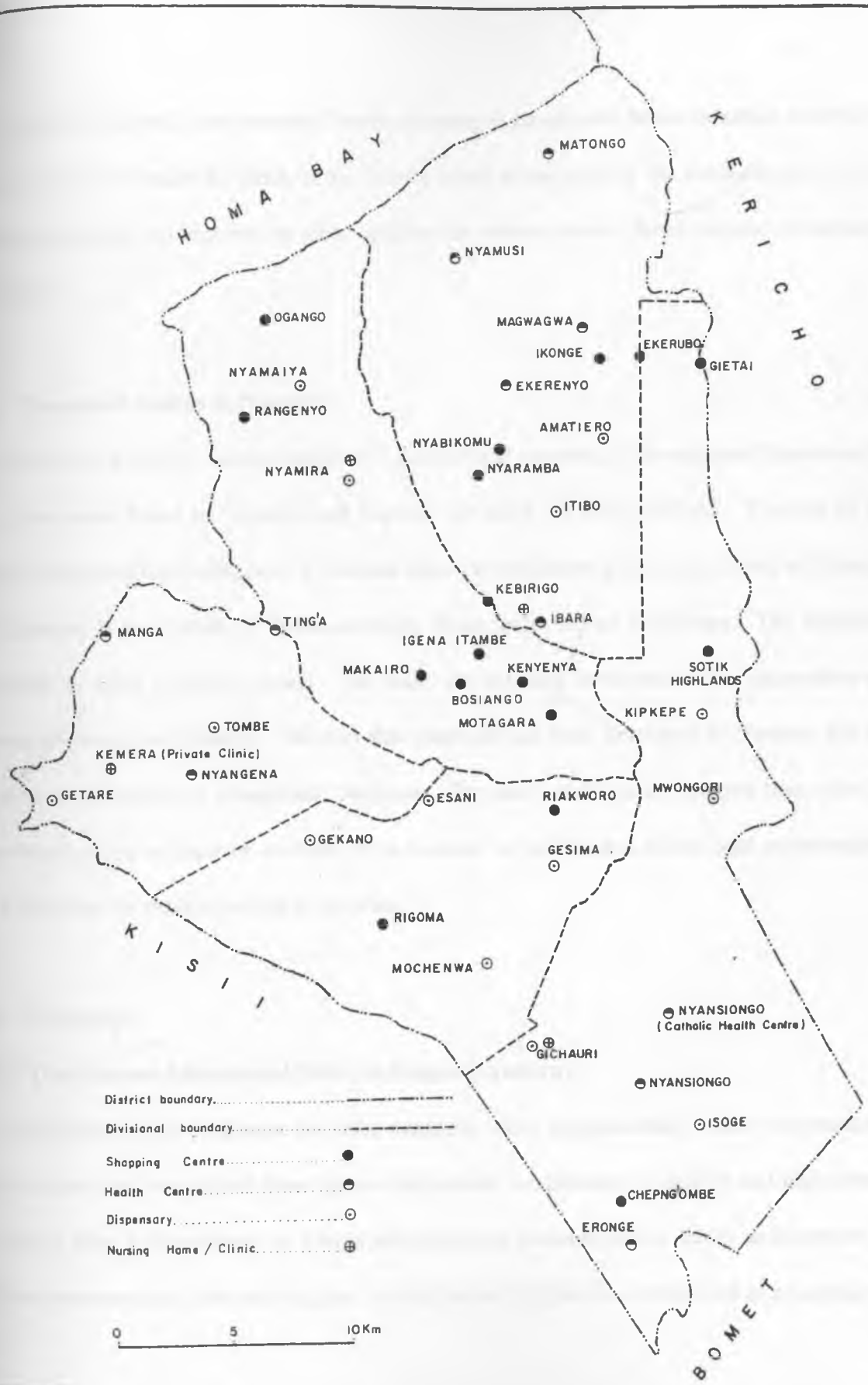
**Table 2.10: Health Facilities and Agents which maintain them**

Type of Unit	Government Maintained	Private	NGOs	Total	Bed Capacity
Hospital	1	-	1	2	250
Health Centre	5	-	1	6	10
Nursing Home	-	2	2	2	50
Dispensary	17	9	12	36	-
Total Units	24	11	14	46	310

*Source: District MOH, 1995*

In 1993 there were 6 doctors in the District serving an estimated population of about 444,560 people. This gives a doctor population ratio of 1:75,000 implying that the available doctors are not enough; this is one fact which explains why mortality is still high in the district. The health facilities in an area is important because it determines mortality levels and birth rates. In a situation of more health facilities the diseases can be treated more faster before they cause death.

Fig. 5: The Distribution of Health Facilities in Nyamira



Source Adapted from D. D. P (1994-96)

The health facilities will also promote family planning to people and hence reduction in fertility. The distribution of health facilities in the district is not adequate thus, the situation calls for the government policies to improve on these facilities in order to have a future decline of mortality and fertility.

## **2.8.2 Transport System in Nyamira**

The district has a total of approximately 473 Km of road network. It is estimated that about 58 Km of the roads found in Nyamira and Rigoma divisions are under utilized. The rest of the roads fall under normal utilization. It is noted that over utilization of the roads found in Nyamira and Ekerenyio is as a result of traffic avoiding those roads in bad conditions. The district is dominated by class C-murram roads. The roads are not well developed and in most cases are impassable during wet seasons. The fact that roads are not well developed in Nyamira has led into slow development of educational facilities. The road condition in Nyamira then calls for government policy to improve on them so as to assist in healthy and educational improvement.

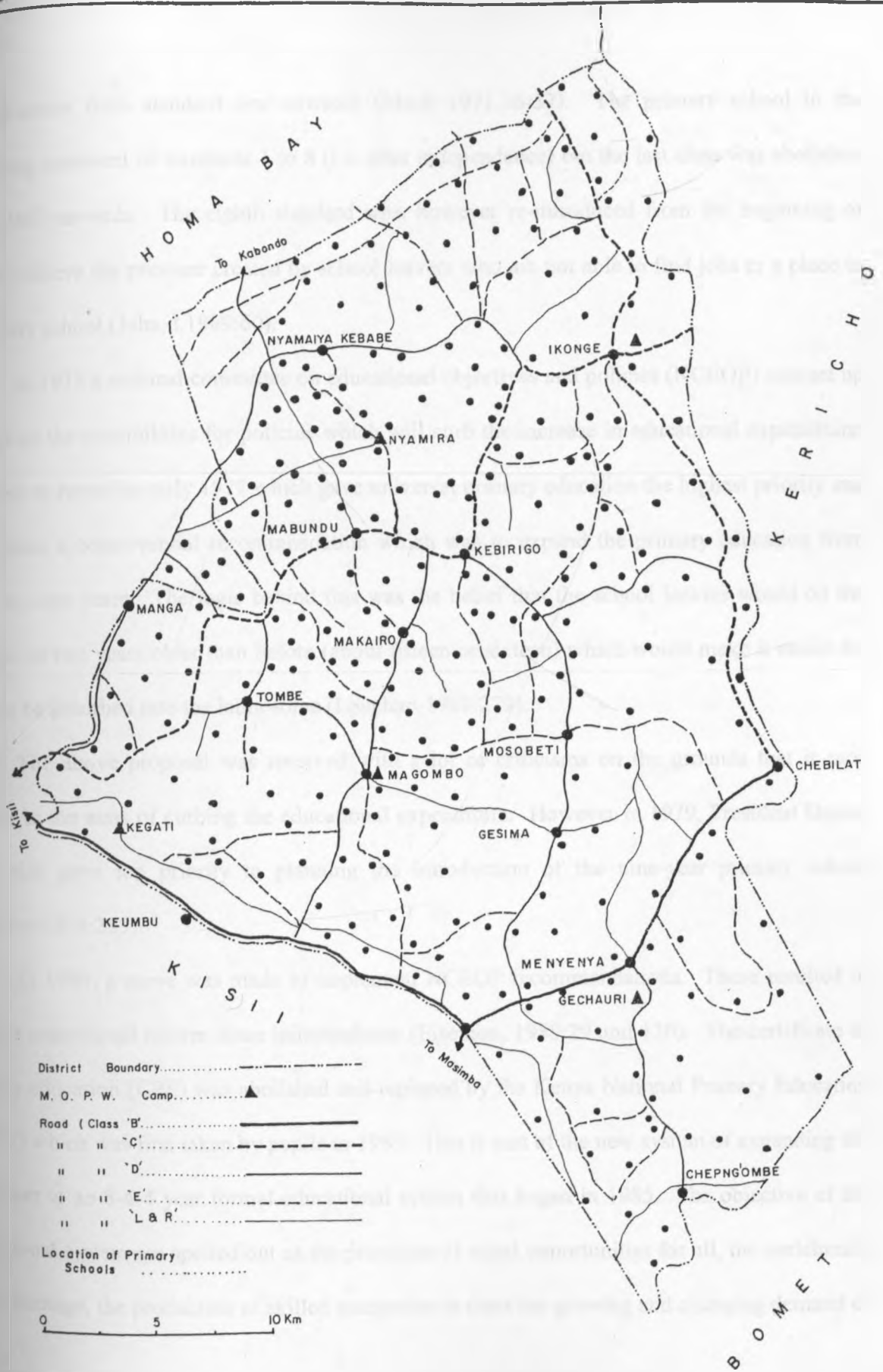
Fig. 6 indicates the roads structure in Nyamira.

## **2.8.3 Education**

### **2.8.3.1 The Current Educational Policy in Kenya (Nyamira)**

The educational policy in Kenya has been changing since independence. After independence Kenya adapted and recognized three types of education, i.e. primary, secondary and high school. The policy after independence in Kenya was meant to promote social equity and remove the divisions between race, tribe and religion. At this period English was introduced as a language

Fig. 6 : The Road Structure and Location of Primary Schools in Nyamira District



District Boundary.....  
 M. O. P. W. Camp.....▲  
 Road ( Class 'B'.....  
 " " 'C'.....  
 " " 'D'.....  
 " " 'E'.....  
 " " 'L & R'.....  
 Location of Primary Schools.....

0 5 10 Km

of instruction from standard one onwards (Meck 1971:36-37). The primary school in the beginning consisted of standards 1 to 8 (i.e. after independence) but the last class was abolished from 1967 onwards. The eighth standard was, however re-introduced from the beginning of 1985 to relieve the pressure created by school leavers who are not able to find jobs or a place in secondary school (Juha, I.1989:60).

In 1975 a national committee on educational objectives and policies (NCEOP) was set up to explore the possibilities for policies which will curb the increase in educational expenditure. It issued its report in early 1977 which gave universal primary education the highest priority and even made a controversial recommendation which was to expand the primary education from seven to nine years. The logic behind this was the belief that the school leavers would on the average be two years older than before (about fifteen or sixteen) which would make it easier for them to be absorbed into the labor force (Louchart 1981:279).

The above proposal was received with a lot of criticisms on the grounds that it runs counter to the aims of curbing the educational expenditure. However in 1979, President Daniel Arap Moi gave top priority to planning the introduction of the nine-year primary school education (Ibid:285).

In 1984, a move was made to implement NCEOP recommendations. These resulted in the first educational reform since independence (Eisemon, 1988:29 and 130). The certificate of primary education (CPE) was abolished and replaced by the Kenya National Primary Education (KNPE) which was first taken by pupils in 1985. This is part of the new system of expanding the education to an 8-4-4 year formal educational system that began in 1985. The objective of the educational system are spelled out as the provision of equal opportunities for all, the enrichment of the heritage, the production of skilled manpower to meet the growing and changing demand of

the economy. The policy, however the good objectives has been giving many Kenyans the problem of meeting the requirements to achieve the intended objectives. The system requires many facilities which many parents are not able to buy especially in Nyamira where fertility is high.

### 2.8.3.2 The Educational Facilities

When Nyamira district was created, most of the educational facilities remained in Kisii district. The existing educational facilities have been strained because they are inadequate. This has necessitated the expansion of the available facilities to cope with the increased usage in the district.

Table 2.11 shows the distribution of pre-primary schools and the pupil ratio in the district. Ekerenyo division has the highest number of these schools while Borabu division has the least. Distribution of these facilities depends on the population per division.

**Table 2.11: Pre-Primary Schools**

DIVISION	NO. OF SCHOOLS	ENROLMENT		RATIO
		BOYS	GIRLS	
NYAMIRA	91	2274	2289	1:1.09
EKERENYO	105	2573	2539	1.01:1
MANGA	55	1485	1535	1:1.09
BORABU	41	958	897	1:1.06
RIGOMA	75	1891	1906	1:1.09

*Source: District Education Office, 1993*

There are a total of 364 primary schools in Nyamira. Ekerenyo and Nyamira divisions have more than 100 primary schools each. The distribution of primary school facilities shows a similar scenario to that pre-primary schools. Other facilities such as workshops and home science laboratories are distributed in the district according to the available schools. Table 2.12 indicates the number of classroom, workshops which are completed and the ones which are not completed in the district.

Although the educational facilities are evenly distributed there are cases of inadequate physical facilities such as workshops, labs, classrooms, etc. This is reflected in Table 2.12 above which appears in terms of the number of these facilities required and those available. The inadequacy of these facilities within some schools imply over-utilization of the existing facilities. It is important to note that high population pressure on land renders future expansion of the same facilities to be impossible. Many of the classroom in the district are not permanent classroom. 40% of the total classrooms are not permanent, 60% of the classrooms are permanent but not all of them are complete. (A detailed analysis on population and educational facilities is given in Chapter 5)



**Table 2:12 Primary Schools in Nyamira District**

DIVISION	CLASSROOMS			WORKSHOP			
	NO. OF SCHOOL	NO. REQUIRED	NO. COMPLETED	%	NO. REQUIRED	NO. COMPLETED	%
Nyamira	104	1082	897	82.9	88	16	18.2
Ekerenyo	108	1891	850	44.9	109	24	22.1
Manga	46	654	557	85.2	58	19	32.8
Rigoma	64	689	568	82.4	65	25	38.5
Borabu	42	389	536	13.7	44	14	31.8
Total	364	3072	3208		364	98	

*Source: District Education Office, Nyamira 1993*

#### **2.8.4 The Pupil Teacher Ratio in the District**

The district had 4227 primary teachers by January 1996 who served a population of 123,337 (DEO Jan 1996). This means that each teacher is in charge of 32 pupil in the district. The ratio of 1:32 is not a very bad ratio in Kenya where it is recommended that each primary school teacher should serve population of 30 pupils. However, the Ministry's recommendations, it is important that the teachers workload becomes heavy when serving such a population.

## CHAPTER THREE

### METHODS OF DATA COLLECTION AND ANALYSIS

#### 3.1 Introduction

This chapter analyses various methodological aspects namely, experimental design, data requirements for the study, and data collection as well as data analysis techniques.

It is important to note that research methodology is very essential in any research undertaking because it explains how one conducts research (Prewitt 1974). Methodology also guides one against self-deception.

#### 3.2 Sampling Framework

In many studies it is very hard for a researcher to enumerate or examine the objects of the whole universe. What is required in this case is the use of a sample frame. In this study the frame consisted of all primary schools in Nyamira district. The sampling frame or population contained all the divisions of the district from which the sample was drawn.

In order to get the sample from the population there was need to apply the principle of 'randomization'. The principle helps to average out the extraneous and bias factors that are likely to be present in the working population (Clark and Hosking 1986).

A sample from all primary schools in each division in the district was drawn after considering the divisions with high proportion of schools. It was thus important to have a proportionate number which was relative to each division's total number of schools, there was a big need for applying proportionate stratified random sampling.

All primary schools in the divisions were numbered randomly and using a table of

random numbers the schools were randomly chosen. The division with more schools had more chances of being chosen so as to facilitate the element of proportions. The sample consisted of 160 schools among the 370 schools in the district. This sample covered almost half of the total number of schools in the district. Proportionate stratified random sampling is appropriate here for it ensures that each unit of the working population has an equal chance of being picked or selected. Therefore a random stratified proportionate sample frame of 160 schools was samples (on the basis of administrative units) as a representative of the universe population (See Table 3.1)

**Table 3.1: Number of Primary School sampled in each Division**

<b>Division</b>	<b>Total Number of School</b>	<b>Number Sampled</b>
Nyamira	92	40
Ekerenyo	105	45
Manga	55	24
Borabu	43	19
Rigoma	75	32
Total	370	160

*Source: Field Work Research 1996*

A pilot survey (a reconnaissance trip) was conducted in the study area by the researcher. This was meant to pre-test the methods that were used particularly the questionnaires so as to see whether they could be mis-interpreted.

The education officers who were chosen came from each division in the district. Some

officers were also chosen from the district education office who included: Deputy District Education Officer who provided information on the number of primary schools, the streams and the staff. The District Staffing Officer was also interviewed. The District Sports Officer also gave information on the extra curriculum activities in the district. In general, the education officers provided information on: the enrolment, staffing and distribution of schools in each division.

### **3.3 The nature of the data required**

There are two types of data required for this study. These are primary and secondary data. Primary data is essential as it makes one have original ideas because it is normally collected from the field directly by the researcher, hence it is called raw data. Secondary data, unlike primary data, is normally collected from published and unpublished sources i.e. from other peoples findings.

The present study thus relied on both primary and secondary data. In summary the kind of data collected included the following among others: a brief historical background on fertility, mortality and migration; population density and distribution in the district, spatial distribution of schools, the number of school age population (5-14 years) in each division: the number of pupils in each school, the average distribution of teachers, text books, maps, charts etc. The average size of each classroom in each particular school was also enumerated. The data on repeaters and dropouts was collected with an aim of identifying the problem facing each school and each individual pupil in the area. Data on the school enrolment over a time period of six years i.e. 1990-1996 in case of standard one enrolment was collected which also involved the total number of pupils in a school. The above data was required in order to obtain the intended objectives.

### **3.4 Sources of Data**

The secondary data sources used include:

#### **3.4.1 Source of demographic trends in the District**

There are three main sources of demographic trends (Births, deaths and migration) occurring within the District. Records for these events are kept by various institutions as indicated below.

- (a) **Health Institutions:** For all events taking place within the health institutions. These events are registered and the registers are then kept both in the hospital and the district registration office.
- (b) **Chief's office:** For events occurring at the sub-locational level within the district. These are registered by the Assistant Chiefs in the areas of their jurisdiction before the expiry of the six months period. An exception is made for deaths occurring under unusual circumstances where officers of the police force or health institutions do the registration.
- (c) **District Registration office:** For all events which have not been registered within six months from the date of occurrence. These events are registered by the District Registration when reported by the individuals concerned. These events are only registered by the District registrar if they occur within the District. They are normally referred to as Late Registration.

Other Demographic data sources and related data was found in the following publications among others:

- Kenya Population Census of 1969, 1979 and 1989
- Kenya Fertility Survey (KFS) 1977-88
- Population Projections for Kenya 1980-2000 (published by the government in collaboration with UNICEF)
- Kenya Demographic Health Survey (KDHS 1989, 1993)

Economic and general data was another source of data in the present study. The actual data came from the following publications, among others:

- The Development Plans
- Sessional Papers
- Statistical Abstracts and Statistical Digests
- Economic Surveys

Educational data was obtained from the Ministry of Education annual reports and other relevant publications.

It should be noted however that secondary data suffers from certain limitations. The data may be out of date. Furthermore, one needs to know the purpose for which the data was originally compiled (Harper 1977:16). Hence secondary data should be supplemented with primary data from the field.

## 3.5 Data Collection

The methods which were used in data collection were the combination of various social science techniques for data collection. These techniques are shown below.

### 3.5.1 Questionnaires

The collection of primary data was done through a designed structured interview schedules i.e. questionnaires. The questionnaires were laid out before the actual field, with an help of the supervisor. The interviews were carried out using questionnaires which were of two types:

- (i) for Primary Headmasters
- (ii) for Education Officers in the district

In total 160 Headmasters were interviewed and 10 Education Officers were interviewed. The questions which were asked focused on the adequacy of facilities such as number of classrooms, number of teachers, text books, distribution of maps and charts, the number of dropouts and repeaters, the extra-curriculum activities, etc (see appendix ii). In most cases the researcher and his assistants never encountered problems in the administering questions to the respondents, this followed the advantage that all those who were interviewed were literate and could interpret questions easily. Most of the questions were closed, making the respondents to give the answers that were within the limits. However, some questions were open ended to enable the respondents to give answers that were accurately represented by their feelings, the questions were simplified for easy interpretation. At one stage an attempt was made to make use of postal questionnaires to cut transport cost, but this failed to function satisfactory because most respondents considered

personal preliminary introduction as essential. Therefore, the questionnaires were self administered by the researcher and his assistants.

### **3.5.2 Personnel Interview**

This method was used for interviewing persons for whom the structured questionnaires were not intended. The people interviewed were mainly government officials for instance, the Health Officers, District Officers, Registration Officers from whom such data on; population dynamics i.e. fertility trends, mortality and migration trends were gathered. The method was not sufficient because those who were giving the data were not accurate because they were giving their general observation. Hence, there was need to supplement primary data with secondary data.

### **3.5.3 Secondary data**

This study also relied a lot on data from secondary sources, some of which was hard to get. These data included both unpublished and published literature. The method supplemented the primary data so as to show a clear and complete picture of the study. In particular data from official government documents such as census reports and statistical abstracts enabled the researcher to obtain data on population dynamics. Secondary data also enabled the researcher to secure the number of educational facilities in the area, their quality in terms of training available in each school, population served and the distribution of these facilities. Data on climate and land use was also collected through the use of secondary method. In most cases the data was obtained from headmaster's office, Ministry of Education, Ministry of Planning and National Development (Nairobi), Survey of Kenya (Nairobi), Nyamira District Offices (Registration



offices, District Hospital and District Commissioner's office). Other information was procured from the libraries (Nairobi) and the University of Nairobi Library.

### 3.6 Data Analysis

The following techniques were used to analyze data from the field; both demographic and statistical techniques were used.

#### 3.6.1 Demographic Techniques

The population pyramidal peaks appeared very necessary in explaining the age structure in the district, the peak was drawn to indicate the age structure of both female and male sex in various age group in the district. The population growth rate were also calculated using the formula:

$$GR = \frac{2 (p_1 - p_2)}{n (p_2 - p_1)} \times \frac{1000}{1}$$

Where:

Gr = growth rate

N = period

P<sub>2</sub> = total population of region at the end of the period

P<sub>1</sub> = total population of region at the beginning of the period

1000 = the constant 1000

The method was used to calculate the growth rate of Nyamira for the last three years.

Other demographic techniques used include: the use of age specific fertility rates, the total fertility rates and crude death rate. Age specific fertility rate was calculated using the following formula:

$$A.S.F.R = \frac{b_i K}{P1}$$

Where:

A.S.F.R.	=	Age specific fertility rate
B <sub>i</sub>	=	Total annual registered births in the age interval
P <sub>1</sub>	=	The median population of the women of the same age-group
K	=	Constant

Total fertility was also applied. The method used for computation of the total fertility employed the following formula:

$$T.F.R. = (A.S.F.R.)^5$$

Where:

T.F.R.	=	Total fertility rate
A.S.F.R.	=	Age specific fertility rate
5	=	Denotes age interval

The two methods were very important as they showed the series of levels of fertility in Nyamira district for the last five years. This in conjunction with crude birth rates justified the hypothesis that Nyamira's population has been experiencing changes for the last five years.

Crude death rates was also applied to indicate the level of mortality in the area. The method was used through the help of the following formula:

$$\text{C.D.R.} = \frac{(D)}{P} \quad K$$

Where:

C.D.R.	=	Crude death rate
D	=	Total death registered
P	=	Total population
K	=	Constant normally 100

Other methods used for analysis of population in the are included the teacher-pupil ratio, tables and graphs which described the series and trends of population. The demographic techniques in this aspect were important because they enabled the researcher to test his first hypothesis which was on population dynamics in the district.

### 3.6.2 Statistical Methods

In addition to demographic techniques statistical techniques was also used in analyzing the data. The techniques includes the application of descriptive statistics and inferential statistics.

Descriptive statistics was useful in analyzing the population dynamics and primary school enrolment. In analyzing population dynamics over years there was need for tables and bar graphs. Tables and graphs were also used in showing school enrolment in time.

Inferential statistics was very useful in analyzing the relationship between school enrolment rate and school facilities. Regression and correlation analysis were useful in explaining the relationship between population growth and education facilities (classrooms, teachers, textbooks etc) in the study area.

Regression analysis was used to determine whether there exists a relationship between school enrolment and school facilities allocated to each school. This method requires one to observe the independent variable and dependent variable, in this case population and school facilities respectively.

In order to fit the regression line, a regression model was used to get regression coefficients. The model is outlined below:

$$Y = a + b_x + e \quad \text{or} \quad Y = b_0 + b_1x_1 + e$$

Where

Y is the independent variable or predictor variable

$b_0$  is the constant

$b_1$  is the intercept

$x_1$  is the independent variable

$e$  is the error term

In order to determine the strength of the relationship, a correlation coefficient was used. The linear correlation coefficient ( $r$ ) relates the variance in the dependent ( $Y$ ) to the reduction in that variance when an independent variable ( $x$ ) is used to estimate values of  $Y$  (Johnston 1978:29).

To determine the correlation coefficient the ( $R^2$ ) was applied. Thus

$$R^2 = 1 - \frac{\sum (y_i - \hat{y})^2}{\sum (y_i - \bar{y})^2}$$

Where:

$R^2$  is the coefficient of determination between  $y$  and  $x$

$y_i - \hat{y}$  is the explained variance in  $y$  according to regression

$y_i - \bar{y}$  is the total variance in  $y$

### 3.6.3 Multiple Regression Analysis (Stepwise)

Multiple regression analysis was also used in this study; this was meant to show the relationship between enrolment and such variables as teachers, numbers of classrooms, textbooks, charts etc.

This was geared towards identifying the variable which has a significant relationship. The relationship between  $y_i$  (enrolment) and  $x_1, x_2, x_3, \dots, x_p$  was formulated as a linear model.

$$Y_i = B_0 + B_1X_1 + B_2X_2 + \dots + B_pX_p + U_i$$

Where:

$Y_i$  = the dependant variable

$B_0, B_1, \dots, B_p$  are constant referred to as the model regression coefficients (or the regression coefficients).

$X_1, \dots, X_p$  are independent (explanatory variables)

$U_i$  is random disturbance or error term

The computation of B's and  $U_i$  was easy to arrive at given that the compute facilities were available. The statistical package for social scientist (SPSS) was used to arrive at the result. For the result see

It was important to test the specification of the model used and also test whether there is any violation of the assumption.

#### **3.6.4 Analysis of Variance**

The analysis of variance was used to test the stated hypotheses. The hypotheses such as, The demand for educational facilities does not out weight the supply of such facilities was tested using the analysis of variance. The Snedecor's F-test was used. In the first case in the analysis of "F" the variance of estimate accounted for by the regression was inferred using the formula  $N-1$  where N is the sample size. The second step was to calculate for the variance unaccounted for. The F-ratio formula is shown below; the computation of F was done through the help of the SPSS compute package.

Conventional tables of F-distribution were used to establish the F-critical which helped the researcher to draw conclusions on the hypotheses.

$$F = \frac{R^2(N-2)}{1-R^2}$$

Where:

F is the statistical test

$R^2$  is the coefficient of determination

N is the sample size

OR

$$F = \frac{\text{Estimate of the variance accounted for}}{\text{Estimate of the variance unaccounted for}}$$

The student t-test was also used to test the correlation between two variables such as enrolment verses teachers and classrooms. The test was done at a given degree of freedom depending on the sample size taken and at 0.025 significance level. Also here using conventional tables of the t-distribution, t-critical was established which helped in giving conclusions. The formula employed was:

$$t = r \sqrt{\frac{(n-2)}{(1-r^2)}}$$

Where:

t is the t-test statistic

r is the coefficient of correlation

n is the sample size

r<sup>2</sup> is the coefficient of determination

### 3.7 Limitation of Research Methodology

The quality and reliability of statistical sources and analysis varies somewhat depending on the type of information and the period of time. It is often difficult to assess the qualities accurately. This is especially true in relation to population and demographic data.

There was also inadequate background materials that could be used for this study. Infact very little research as been conducted in connection with the title and little literature existed. Whatever that has been written so far on the subject has tended to embrace a unit larger than a district or has also tended to involve only urban areas. Thus in most cases secondary data was missing and the one which was available lacked detailed analysis. There was also the problem of cooperation from some heads of certain primary schools, who made it very difficult to hold interviews with the researcher. This at times necessitated visiting some schools a number of times to get the data. Some heads would not honour the appointment and hence one would bounce them severally, this indicated time consuming and resources hence it was hard to collect all intended data.



### **3.7.1 Solution to Problem Faced**

The main problem as mentioned above was time limit. Time was a problem because of the wide range of the study area. This problem was taken care of by adding another research assistant despite the extra cost that was realized.

## CHAPTER FOUR

### DEMOGRAPHIC LEVELS AND TRENDS

#### 4.0 Introduction

This chapter gives an analysis of the population growth and trends in the District. Fertility levels and trends will be analyzed as relates to school enrolment, the role of family planning in relation to fertility will also be given a special emphasis. Mortality levels are also discussed in detail; in this case the implication of HIV/AIDS on mortality and school drop-outs will be shown. Finally a close look at migration will also be enumerated in the district.

#### 4.1 Population Characteristics in the District (Population Size and Growth Rate)

In 1969 the population of Nyamira was 248,539 and it increased to 300756 in 1979, hence growing at a rate of 4% per year. However the growth rate decreased from 4% in 1979 to 2.7% in 1989 making the district realize a total population of 392,571 in 1989. The decline in the growth rate which occurred between 1979 – 1989 in the district is associated with the female education in the district and wide usage of contraceptives among many women in the area (M.O.H. Nyamira Hosptial 1996).

Since 1989 the population has been growing at a rate of 3.1% and as per the start of 1996 the growth rate was 3%. Thus in 1993 the total population of Nyamira was 443,561. In March 1996 the population of the District was about 486104. The Table 4.1 shows the population in the district between 1979 and 1996 and the rate at which it has been growing.

**Table 4.1: Population of the District from 1979-1996**

<b>Year</b>	<b>Population</b>	<b>Growth Rate (%)</b>
1979	300756	4.0
1989	392571	3.1
1993	443561	3.1
1994	457311	3.0
1996 (Feb)	486104	3.0

*Source: District Population Office 1996*

#### **4.1.1 The Population Structure**

Currently the population of Nyamira comprises the youths 0-14 years who represents 53.1% of the total population, 3.6% is the percentage of those aged 59 years and above. This shows that the total active population comprises 43.2% in the District. This shows a dependency ratio of 1:1.42 but this is expected to decline because many people in the district currently are responding to family planning programmes. The influence of family planning on fertility will be discussed later.

Nyamira district has many of its population in the years 0-14 which indicates a heavy burden on the economically active population. This poses severe strains on provisions of public services; for instance in education, employment, pressure on agricultural land, environmental hazards in the form of using marginal lands for agricultural and livestock husbandry. The pyramidal peak below shows the age and sex structure in the district. See figure 7.

In the period 1989 to 1996 January, the population in the age group 6 – 12 years rose by about 40% in only five years. This tremendous increase in the school age population has tended

to increase the absolute numbers in enrolment; in the year 1989 to 1996 January the number of pupils enrolled in the district primary school rose by 46.3% whereas enrolment ratio was 86.3%; the fact that has resulted in a lot of congestion in many of the primary schools hence resulting into lack of classrooms and the teaching materials. Such structure shown above indicates a trend where most of the population are dependants; the ratio of those aged 6-14 years in the district is 1:3. It then means that most of the population are youths aged 0-15 years meaning that the primary school enrolment is very high in the district.

#### **4.2 Fertility Levels in Nyamira**

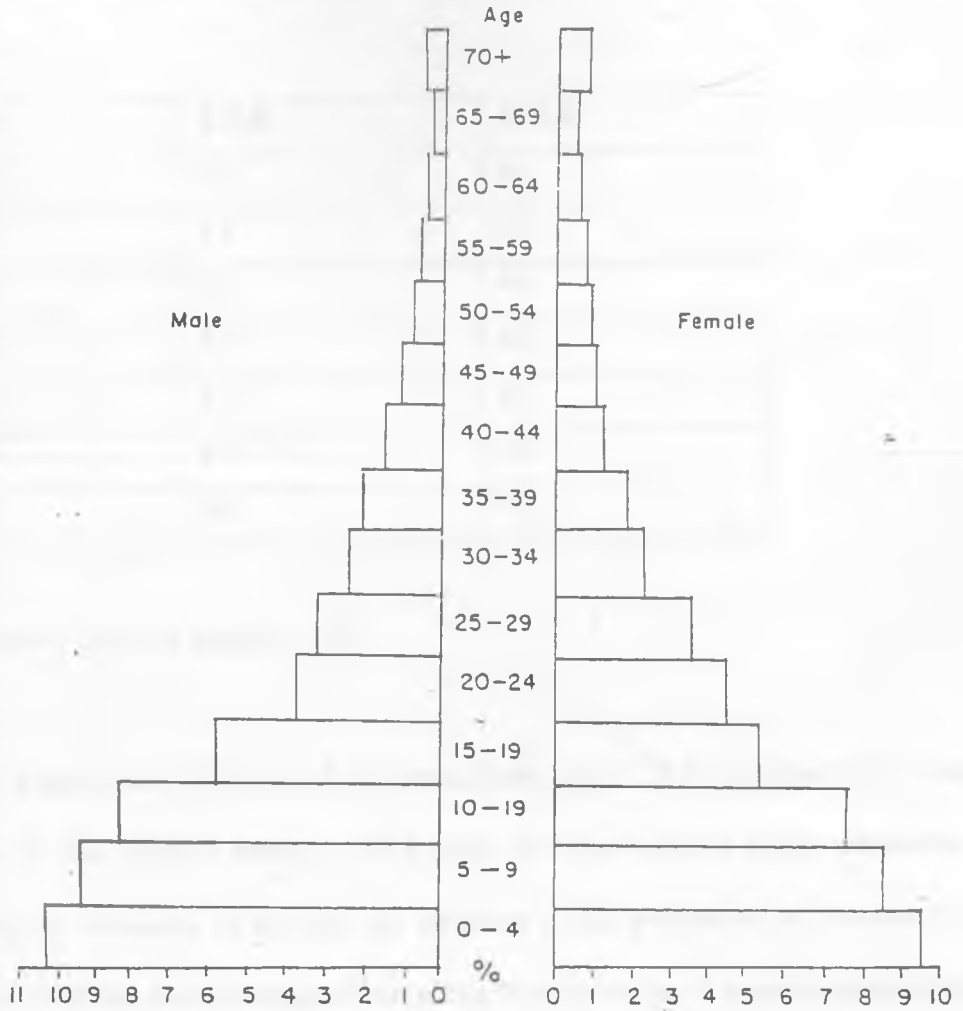
Nyamira district has one of the highest growth rate in Nyanza Province and Kenya as a whole. The rate of 3.1% is one of the highest in the country. It is even higher than that of the country which is 2.8%. The reason behind this high population growth in the District is mainly high fertility and declining mortality in the area.

The district has a total fertility rate of 5.0. This indicates that women in the area are capable of getting 5 children at the end of their reproductive period.

A significant feature in the District is that the trend seems to have been constantly rising over the last decade and there appears a small decline in the 1990s. This then explains the increasing population growth rate in the district. This rise in fertility has been connected to the overall breakdown of the traditional social structure through penetration of western values and habits to the African society (Hopkins Valentine & Revson, 1979:455-464).

Figure 7:

### Age and Sex Structure of the Nyamira's Population



Source: Computed from the District Development Plan, Nyamira 1994-1996

**Table 4.2: Total Fertility Rate (TFR) and Crude Birth Rate (C.B.R.) for Selected Years in Nyamira**

<b>Year</b>	<b>T.F.R</b>	<b>C.B.R</b>
1989	5.1	44
1990	4.9	36
1991	5.0	40
1992	5.0	42
1993	5.0	41
1994	4.9	38
1995	4.8	36

*Source: District Registry, 1995*

The total fertility rate (T.F.R) and the crude birth rate (C.B.R) together give a fairly reliable measure of the fertility levels. C.B.R. has the drawback of being vulnerable to distortions caused by variations in age and sex structure of the population as it refers to the population at risk. TFR has the advantage of being free from the effect of population structure as it measures the fertility of female population of reproductive age.

In the case of Nyamira the rising trend in fertility between 1991-1993 can be attributed to the general socio-economic development which is associated with tea, coffee, maize and pyrethrum growing in the district.

The district has got well improved health and nutrition and arising level of education. These factors together are responsible for both increased fecundity and fertility between 1991-1993. The decline shown between 1994 – 1995 is due to the fact that most women at this time had responded positively to family planning programme and at this time many of the women had

got about 9 years of education. The trend shows that fertility in the area is expected to decline more by the year 2000. The shorter the duration of breast-feeding and the marriage pattern largely explain the decrease in fertility (Bongaarts, 1987). In Nyamira the breast feeding is between (12-24) months; this is shorter than the 1989 duration of (14-18) months. Its thus important to note that although breastfeeding is being overcome by female education in the recent year. However, it is still a determinant factor of fertility decline for some women in the district.

**Table 4.3: Age Specific Fertility Rates for Selected Years in Nyamira**

Age	Year					
	1990	1991	1992	1993	1994	1995
15-19	0.0922	0.0811	0.0844	0.0797	0.0636	0.0752
20-24	0.1759	0.1875	0.1820	0.1864	0.1794	0.7111
25-29	0.2420	0.2243	0.2307	0.2237	0.2370	0.2092
30-34	0.2695	0.2879	0.2892	0.2916	0.2995	0.2609
35-39	0.1695	0.1678	0.1721	0.1688	0.1773	0.2299
40-44	0.0420	0.1357	0.0346	0.0342	0.0351	0.02914
45+	0.0085	0.0169	0.0067	0.0156	0.0069	0.02364
Total	4.449	5.0025	4.9985	5.0001	4.996	4.8

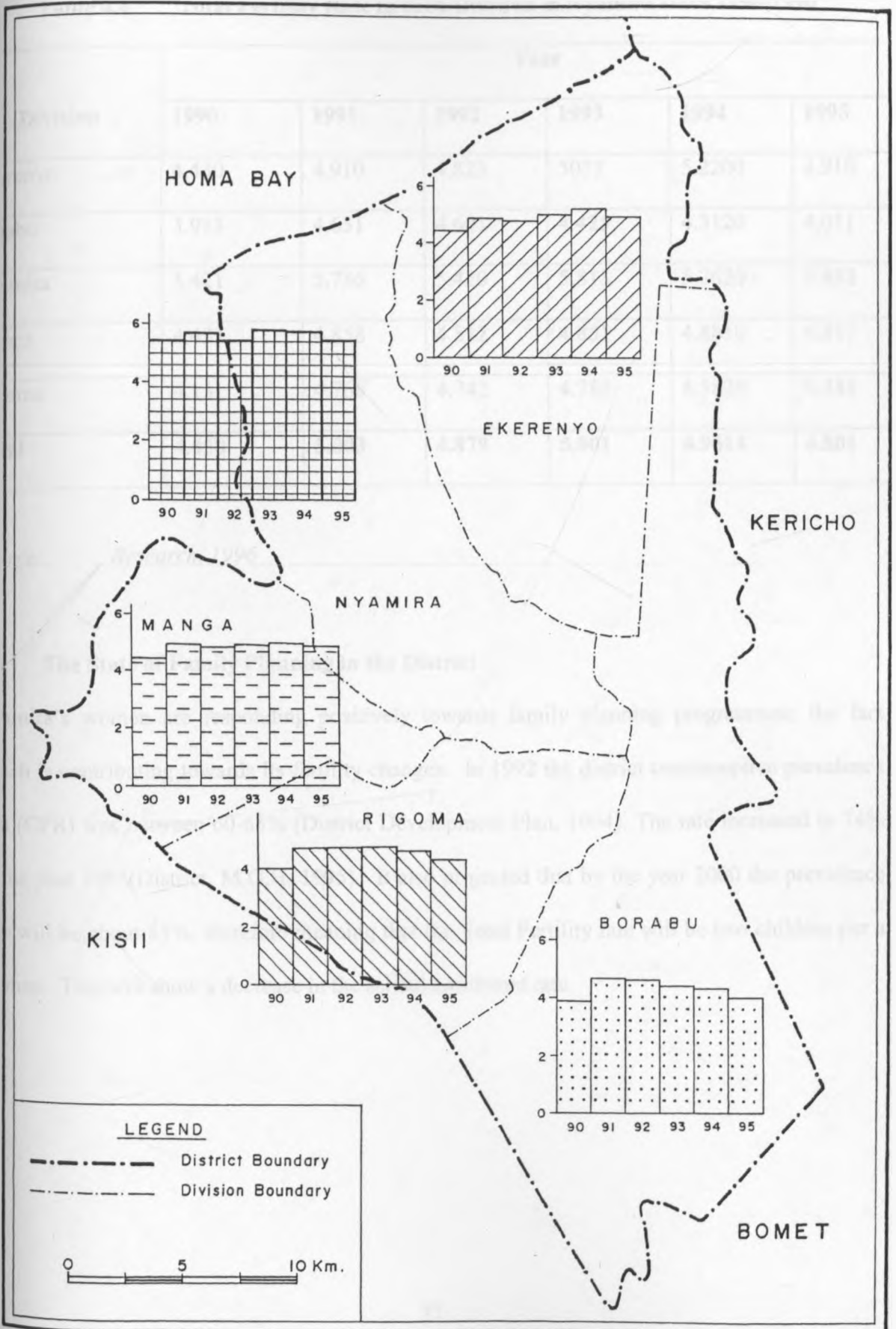
Source: District Registration Office (1996)

The age specific fertility rates shows a slow rising trend between 1990 to 1992 but indicates a decline between 1992 – 1995. This indicates a change in fertility trends in Nyamira. Generally the fertility of Nyamira women is not very high in all age groups but it is higher in the age groups 20-34 years while the lowest is in the age group 40 – 49. Thus women in Nyamira continue conceiving throughout their reproductive period. The age specific fertility rate for the years 1990-1995 is shown above in Table 4.3.

In the analysis of fertility levels of the district it is evident therefore that Nyamira's fertility has been experiencing a declining change since 1990. The reduction of fertility in the recent years is due to the fact that many people in the area are accepting family planning programmes. Divisional variation of fertility indicates that Nyamira division has been leading in fertility rates followed by Ekerenyo, Manga and Rigoma in that order. See table 4.4 and Fig 8 for the divisional variation of T.F.R for the years 1990-1995. The fertility trends per division shows that there has been fertility decline in each division. The low fertility in Borabu division is a result of high educational level in the division as compared to other divisions in Borabu over the female who have received over 9 years of education.



Fig. 9 : Total Fertility Trends In each Division In Nyamira since 1990-1995.



**Table 4.4 Total Fertility Rate in each Division in Nyamira since 1990-1996**

Division	Year					
	1990	1991	1992	1993	1994	1995
Ekerenyo	4.430	4.910	4.823	5.013	5.2200	4.910
Borabu	3.913	4.631	4.601	4.425	4.3120	4.011
Nyamira	5.421	5.786	5.420	5.813	5.7620	5.482
Manga	4.431	4.858	4.812	4.851	4.8810	4.817
Rigoma	4.131	4.768	4.742	4.782	4.5820	4.385
<b>Total</b>	<b>4.450</b>	<b>5.003</b>	<b>4.879</b>	<b>5.001</b>	<b>4.9614</b>	<b>4.801</b>

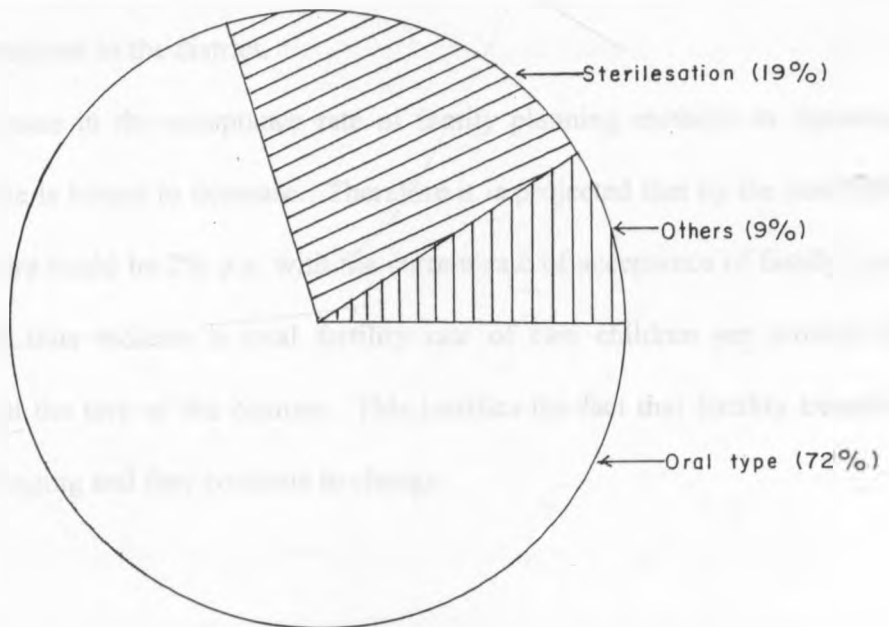
Source: *Research, 1996*

### 4.3 The State of Family Planning in the District

Nyamira's women are responding positively towards family planning programmes; the fact which is contributing towards its fertility changes. In 1992 the district contraceptive prevalence rate (CPR) was between 60-65% (District Development Plan, 1994). The rate increased to 74% in the year 1995(District, M.O.H, 1995). It also projected that by the year 2000 the prevalence rate will be about 85%, therefore meaning that the Total Fertility rate will be two children per a woman. This will show a decrease in the school enrolment rate.

The most acceptance method of planning in the district is oral type i.e. family planning tablets. The method represents over 70% of the total methods used for family planning in the district (M.O.H, Nyamira, 1995). This means that 15,000 expected births were controlled (M.O.H. Nyamira, 1995). This means that 15,000 women were completely prevented from giving birth. The method represents about 19% of the total family planning methods. Figure 9 shows the percentage of the accepted methods in the district. Although not well confirmed it is indicated that there is an increasing number of males undergoing vasectomy in the district.

**Fig 9: Percentage of the accepted family planning method in the year 1995 in Nyamira**



Data Source : District M.O.H. (Jan. 1996)

Literacy classes have contributed to raising awareness among the learners concerning family planning. By 1992 a total of 2080 people enrolled for literacy classes. Out of the 2080 enrolled learners 87% were females (Ministry of Culture and Social Services – Nyamira, 1993). The fact that many women enroll for adult classes signifies that the rate of family planning acceptance could be the increase in the coverage of outreach clinics in the district. In Nyamira contraceptives are at village levels, there are about 1400 community based distributors of contraceptives. Almost every health centre in the district is equipped with the family planning methods equipment. Finally the socio-economic improvement in the district has enabled the eradication of traditional beliefs of having many children.

However the acceptance of the family planning methods in the district is still low, the programme is undermined by the youths who are not getting this policy, there are very many girls who becomes pregnant in the district.

With the increase in the acceptance rate of family planning methods in Nyamira, the population growth rate is bound to decrease. Therefore it is projected that by the year 2000 the growth rate of Nyamira could be 2% p.a. with the current rate of acceptance of family planning methods. This will thus indicate a total fertility rate of two children per women in the reproductive period at the turn of the century. This justifies the fact that fertility trends in the district have been changing and they continue to change.

#### 4.4 Education and Fertility

Education, especially female education, seems to be the single factor that is more closely linked with decreasing fertility (Cleland and Rodriguez 1988). Education acts as an intermediate variable and works together with other variables through a variety of channels. Generally, education has a clearly inverse relationship with fertility. However, it seems that the relationship takes the form of an inverted 'U' where at the early stages of development when the general education and literacy levels are low, initially Fertility tends to increase (Cleland and Rodriguez 1988). At higher levels of socio-economic development the effects of education on fertility appears to be monotonically negative (United Nations, 1987). The reasons for the fertility decreasing effect of education are manifold; one of the most important conclusions is that education has a clear tendency to raise the woman's age at first marriage (Ohlsson, 1984: United Nations, 1987). This is mainly because of the schooling process itself and also because educated women are more likely to work than their uneducated women. It is also arguable that educated women take time to find a partner. The delay in marriage shortens the reproductive period and the educated women who marry later do not tend to make up for the lost time afterwards. Also it is very clear that education increases the possibilities of female sex to participate in the labour market. The opportunity lost in having children thus becomes higher (Rodriguez & Cleland, 1988).

Arguably education has a socio-psychological dimension because it widens the horizons of the parents resulting in a different perception of children and subsequently lower ideal family size. It is therefore true that educated parents will thus plan their family and are more likely to have the knowledge about and ability to use modern contraception. The relationship between

education and contraceptives use in the developing countries is monotonically positive in the light of the results from the World Fertility Survey (United Nations, 1987).

Education has also the tendency of promoting western values and habits which may have bearing on the fertility levels. Education is associated with shorter duration of breast-feeding with a resulting reduction in birth intervals. It has been claimed that breast-feeding hinders more pregnancies in developing countries than all modern contraceptives put together (Bongaarts, 1987). Similarly, the habit of post-partum abstinence, which has been a wide-spread tradition, is gradually being eroded, especially among the educated couples (Valentine and Revson, 1979). Also polygamous unions tend to have a lower average number of children per wife than monogamous unions, but the prevalence of polygamy is reduced by female education (Monsted & Walji, 1978).

The effect of each of the above factors may be marginal but together they can produce an observable rise in fertility which can offset the effect of increasing usage of contraception (Bongaarts, 1987). Most of these effects are however transitional and are likely to be reverted when modernization including (female) education increases. It seems most plausible that there is a threshold level in each population's educational attainment which produces a fertility decline.

#### **4.5 Education and Fertility Levels in Nyamira**

Nyamira provides no exception to the general fertility trend experienced in the whole country. Fertility levels are clearly linked with the levels of education of the mother (see Table 4.5 below).

**Table 4.5: Mean Number of Children Desired by currently married women aged 15 to 44 by Education (1994 – 1995)**

Level of Education	Number of Children
None	7.0
1-4 years	6.2
5-8 years	5.3
9 + years	4.0
All	5.2

*Source: District Registry Office, 1994  
District Education Office, 1995*

Fertility in Nyamira is notably lower among those women who have had nine or more years of education as shown in Table 4.5 above with lower levels of education. The effect is not as clear among those with primary level of education and only a few years of schooling have a tendency to increase fertility.

The increases in fertility associated with the introduction of primary education among girls in Nyamira may be explained by the improved health conditions among the women who have received some education. Basic education is likely to have an impact first within the sphere of hygiene and health care. Similarly the traditional values curtailing fertility decrease in Nyamira are affected by the process of westernization enhanced by formal education. The K.F.S. 1991 found that women under 30 years of age with one to four years of education behind them had an average breast-feeding duration of 12.8 months as compared with 14.2 months for women with no schooling at all in Kenya. This can also be replicated in Nyamira. In fact in

Nyamira the breast-feeding duration of educated women is about 12.6 as compared to uneducated duration of 14.8 (District Hospital, 1993).

Education of the mother has an impact on the attitudes towards the family and children and the perceptions of life as whole. This results in lower aspirations regarding family size of which the lower fertility levels of educated women are an expression. This is well explained in Table 4.5. A conclusion drawn from the female education in Nyamira, indicates an expansion of the sex's education in future which will reduce fertility in Nyamira. By the year 2000, Nyamira fertility is expected to stand at 1.8% to 2% p.a. given the fact that the present situation of female education will continue to improve at the same base it is growing now.

#### **4.6 Fertility and Women's Employment in Nyamira**

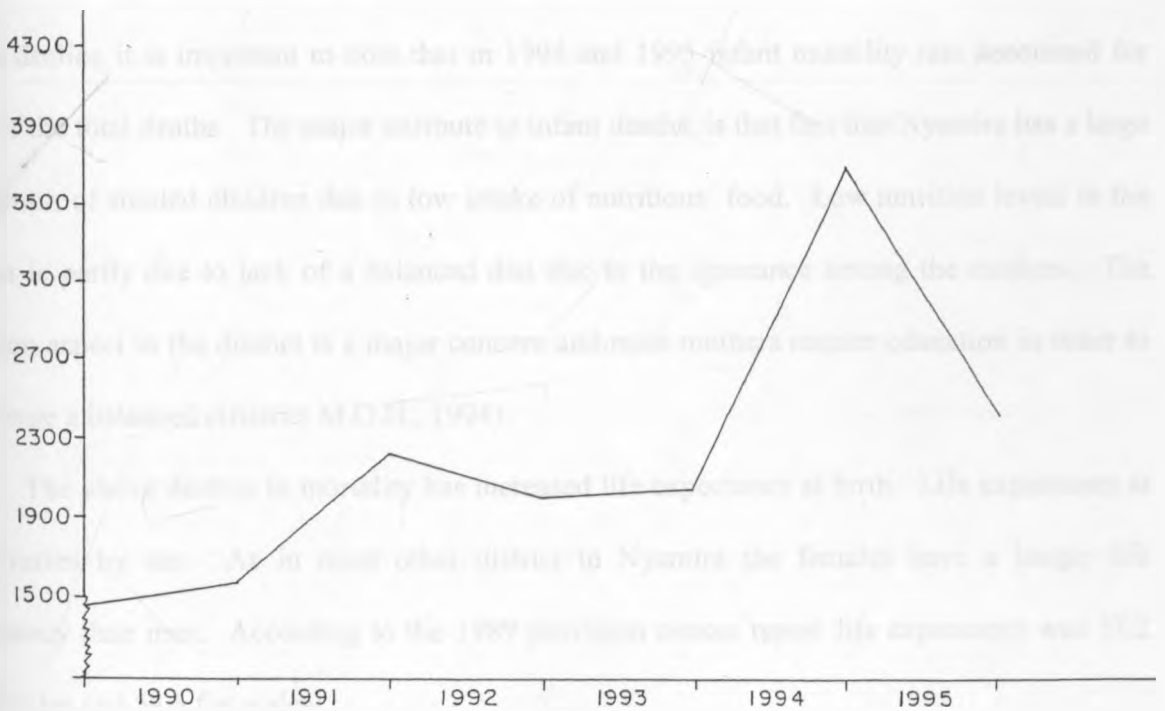
Women's employment outside the shamba for pay and profit has in the light of numerous studies shown an inverse relationship with fertility (United Nations, 1985). Paid employment in Nyamira increases the woman's possibilities for gaining esteem in her own right and reduces her dependency on the children. Currently the number of women employed in the modern sector is still very small and those employed are mainly well educated ones in the District. In general two factors that is formal employment and education in Nyamira appear closely interrelated and is very hard to separate the impact of the two factors on Nyamira's fertility level for the last 5 years.



#### 4.7 Mortality levels in the District

The decline in mortality in Nyamira as experienced over the past decades has had a major impact on the rate of population growth. The crude death rate also reflects changes in the age-structure and does not thus give a fully reliable picture of the historical development of mortality. In total the number of people who died from 1990-1995 in Nyamira District are indicated in Figure 10 below.

**Fig 10: Total deaths for a grace period of 5 years in Nyamira**



Data Source : District Registration Office.

The crude death rate for instance in the years 1993 and 1994 was 14/1,000 population and 17/1,000 population meaning that in 1994 out of 1000 people the expected death was 17 people. The above crude death rate as compared to 1979 when the crude death rate was 24 is quite low and thus shows a rapid decline between 1979 and the year 1994. The rise in the number of deaths in 1994 from 1993 (i.e 14-17) can be attributed to highland malaria which occurred in the whole of Kisii and Nyamira district.

Similarly, there has been a drop in infant mortality from 4,573 in 1988 to 4,564; the rapid decline was realized in 1993 and 1995 in which case the total infant deaths were 3268 (1993) and in 1995 was 2817. This was almost 13.8% decline. If the same decline is maintained then total infant deaths in the district will be 1915 by the year 2000 (District M.O.H. 1995). Despite the above decline it is important to note that in 1994 and 1995 infant mortality rate accounted for 26% of the total deaths. The major attribute to infant deaths, is that fact that Nyamira has a large proportion of stunted children due to low intake of nutritious food. Low nutrition levels in the district is partly due to lack of a balanced diet due to the ignorance among the mothers. The nutrition aspect in the district is a major concern and most mothers require education in order to encourage a balanced (District M.O.H., 1994).

The above decline in mortality has increased life expectancy at birth. Life expectancy at birth varies by sex. As in most other district in Nyamira the females have a longer life expectancy than men. According to the 1989 provision census report life expectancy was 57.2 for females and 54.3 for males.

Infant mortality especially post-natal mortality is a good development indicator. In the post-neonatal period deaths increases proportional to the environment facts and those which are connected with pregnancy and incidents directly after birth; therefore the post-neonatal mortality

reflects the overall nutritional and health conditions of the district. In Nyamira most of the infant mortality occur in the post-neonatal period. According to the district hospital the proportion of post-neonatal deaths of infants for the year 1992 was 38 percent (District Hospital, 1992). In 1994 the children who were dying in their first five year in Nyamira were 104 out of 1000 births; this is quite high and hence calls for proper attention. The malnutrition level in Nyamira district is 12.8% (Mott, 1996). Most of the children who are malnourished are those children who belong to school girls and the unmarried women (District Reg. Office, 1995; District Hospital, 1994).

There is no much regional difference in infant mortality in Nyamira because much of the area covered by the district has almost a uniform climatic conditions and the socio-economic conditions are similar. Divisional differential in infant mortality is caused by differences in the accessibility to health facilities and transportation. Nyamira division has the lowest infant mortality because the division has well developed health centre and it has the advantage of being near the district hospital. Borabu division follows Nyamira division. The division also enjoys a good socio-economic climate where virtually almost every settler in the area belongs to a middle class level. Other divisions particularly Ekerenyo have the highest infant mortality rate about 133 per 1000 because of the lower socio-economic development; many of the population of Ekerenyo division is virtually very poor. See Table 4.6 and Figure 11 below.

**Table 4.6: Estimates of the proportion of children dying in the first five years of life by division in Nyamira**

Division	Number dying per 1000 live births		
	Male	Female	Total
Ekerenyo	140	126	133
Borabu	82	74	78
Rigoma	138	111	124.5
Manga	121	112	116.5
Nyamira	74	62	68
Total	111	97	104

*Source: District Registry, 1994*

Studies of the determinants of mortality in Nyamira indicate that the principle determinant of mortality in recent years in Kenya has been the prevalence of malaria (Anker & Knowles, 1977: 16-26; Faruquee et al. 1980:23-27). This factor explains much of the deaths in Nyamira district . Since 1994 Nyamira has been experiencing Highland malaria which has been prevalent year-round, through 1996. Malaria alone claimed 70% of the total deaths which occurred in the district in he year 1994; although it reduced in 1995 it is said that in early 1996 it came again in a new fashion. This means that the total deaths which will occur due to malaria in 1996 could rise.

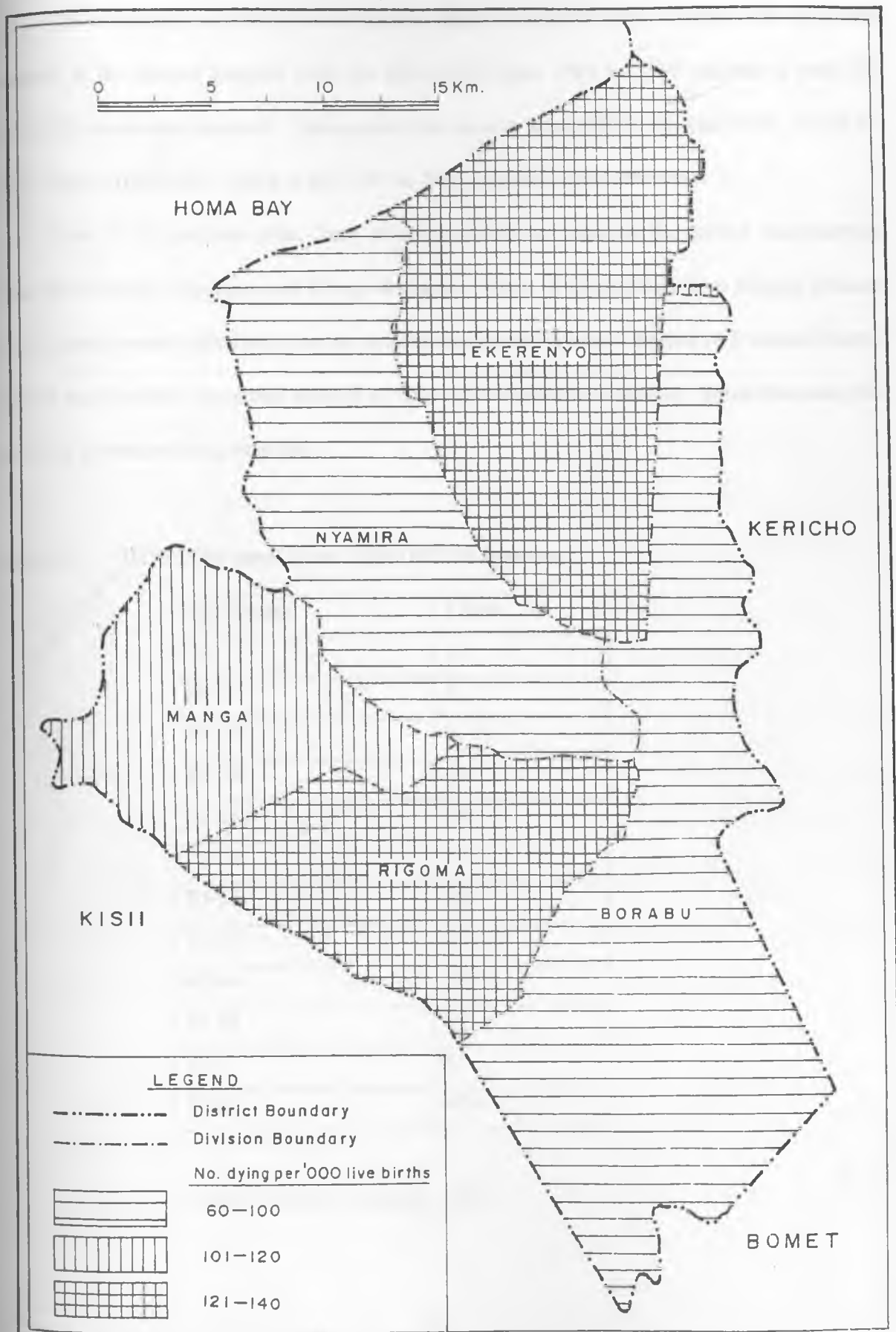
The existing data from Nyamira shows that mortality has been dropping by about 13.8% since 1992. The reduction in mortality in the areas is due to the improvement of the socio-economic development which is associated with the increase production of tea, coffee, bananas, maize, etc. The decline is also associated with educational development.

The study of mortality is crucial in this study because it contributes a lot to the drop-outs from school. Infant mortality is important because it enables one to know the number who are likely to join standard one (from here one can know the school-age population). For instance the decline in infant mortality since 1992 has marked an enrolment of 93% in 1996 an increase of 8% from 85.7% of 1990. The drop-out rate due to deaths are still low in the district. But the low mortality of the infants rises enrolment which leads to congestion in standard one, hence resulting into lack of facilities.

#### **4.8 HIV/AIDS Situation, its implication of Fertility and Mortality in Nyamira**

Acquired Deficiency Syndrome (AIDS) is the name given to the fatal clinical condition that results from long-term infection with HIV (Human Immunodeficiency Virus). Being infected with HIV does not automatically mean that a person has AIDS or is ill. It does, however mean that a person has AIDS or is ill. It does, however, mean that a person can transmit it (HIV) to someone else. HIV gradually disables an important part of the body's immune system. Its main target are cells in the blood called "T – helper cells" which HIV invades and eventually destroys. These cells normally help protect the body from attack by infection. As the immune system is progressively damaged a person becomes increasingly vulnerable to a range of infections. The average time of progression from infection with HIV to the onset of AIDS (as defined by WHO and US centre for disease control, 1987) – the incubation period – is approximately 10 years. Some people stay healthy for a much shorter period than this, but few develop AIDS within the first three years of infection. Research has shown an estimate that others may be infected with HIV for up to 20 years before the onset of serious illness.

Fig. 18: Estimates of the Proportion of Children dying in the first five years of life by Division in Nyamira per 1000 live births.



The screening for HIV/AIDS in Nyamira district started in 1989. Patients who have been screened at the district hospital with the HIV/AIDS from 1989 to 1993 indicate a total 260 HIV/AIDS cases were reported. This number has risen to about 415 in the year 1995. Table 4.7 below shows HIV/AIDS victims in the 1989 to 1993 and their age distribution.

Most of the patients come from divisions which are close to the district headquarters. These are Nyamira, Ekerenyo and Manga divisions. Many of the patients from Borabu division attend hospital outside the district as the facilities are nearer to them. Therefore Nyamira District Hospital may not have the actual number of HIV/AIDS cases in the district. Remember also that some case go minus being recorded.

**Table 4.7 HIV/AIDS cases from 1989-1993 in Nyamira**

<b>Age Group</b>	<b>Cases</b>
0-4	16
5-9	4
10-14	2
15-19	13
20-24	64
25-29	81
30-34	90
35-39	87
40-44	27
45-49	14
50+	6
<b>Total</b>	<b>404</b>

*Source: M.O.H. Nyamira, 1993*

#### 4.8.1 The Implication of HIV/AIDS on demography

Given a relatively severe AIDS epidemic (eg 25 percent of sexually active adults infected) reaching into both urban and rural areas of a country total population growth rates may decrease by only 1 percentage point (Way and Stanecki, 1993). In Nyamira the disease has only got room into about 0.2% of total sexually active adults; this therefore tells that the disease so far has not found room to alter the population growth rate. Given also the growth rate of 3.1% p.a. it appears hard for the disease to make any meaningful changes in the growth rate. This is in view of (John Kwasi A. 1994) who said that it is hard for AIDS to have a negative population growth in Africa given the current high rate of population growth (about 3 percent per year). As indicated from the previous work Nyamira's growth rate is strictly affected by the influence of family planning programme but with the current rate, in future AIDS will have a major influence on growth rate.

The fact that AIDS doesn't have an upper hand in influencing fertility or population growth rate in Nyamira district does not mean that it will not influence mortality. AIDS has the capacity to alter the pattern of age-specific mortality rate in Africa (John K.A., 1994). It is known that new HIV infections among adults are contracted in the ages of peak sexual activity – from the late teens to about 30 to 35. Thus in the absence of AIDS, the rate of mortality among these age groups is one of the lowest. Therefore AIDS can increase the mortality rates in these age groups many times over. In Nyamira although cases are not very rampant it is approximately that about 1% of the total deaths in the district is due to AIDS particularly deaths which occur to people of ages 20-39 years.

AIDS does not affect only the sexually active population. It is estimated that about 30% of the children born to women who are HIV positive will become HIV positive themselves.



Most of these children will die before reaching the age of five. AIDS in Nyamira is projected to raise death rate for children under five to a high level if prevention measures will not be adapted.

In essence the influence of HIV/AIDS and demographic changes in the district is minimal as the disease is not very much rampant in the area. There is no vital changes on population growth rate and mortality rate which is attributed to AIDS.

#### **4.9 Migration in the District**

There is no significant migration movement either from or into the district. The high population growth has mainly been due to the natural increase. The rural to rural movement within the district have been to the settlement area in Borabu division. The people who bought land and settled in the area were from Kisii and Nyamira districts.

##### **4.9.1 Rural-Rural Migration**

Rural migration is the main type of migration that the district is experiencing. A number of people have been moving from various parts of Kisii and Homa Bay to Borabu divisions which was a former White Settlement area. Major movement to Borabu occurred in 1969 when the Kenyan government in conjunction with the former settler sold land to various people who were willing to buy at that time. In 1979 the number of people who shifted from Ekerenyo, Nyamira, Rigoma and Manga division to Borabu were 2,200, 4,800, 3,234 and 2,822 respectively.

The rest of the people who shifted to Borabu in the same year came from various parts of Nyanza with the majority coming from Kisii district. By 1995 the number of migrants to Borabu had increased to 38,210 from 31,589 of 1979. Otherwise rural-rural migration has been limited in the districts like Nakuru, Kericho and Trans Nzoia. For instance it was examined that over 18,000 migrants from Nyamira are in Nakuru (Molo) and Trans Nzoia (Cherangani).

#### **4.9.2 Rural-Urban Migration**

A noticeable movement is by job seekers and business people moving from rural to urban areas in search of employment and business opportunities. Rural-urban migration is quite low although some migrations were noted taking place to Nyamira town and to Keroka urban centre. It was hard to measure the magnitude because most of the migrants were seasonal. It was noticed that the number of migrants to Nyamira town as from 1989 when the town was upgraded to a district headquarters were about 10,000. Those who had bought land settled in Nyamira and Keroka between 1989 and 1996 were 4,800 and 8,215 respectively.

The records available revealed that the rest of the population were the occupants of the area and seasonal traders. Several migrants moved towards other towns like Nairobi, Mombasa, Kisumu and Kitale. For instance the migrants from Nyamira to Nairobi since 1989 to 1995 were 16,820. However, cases of rural-urban migration is meant to pick up as many young school leavers are attracted by job opportunities and the idea of releasing tension from scarcity of land in the area.

Nyamira town being a district headquarters is expected to boost high migration rate because it now attracts business people and has job opportunities available. This will mean that

Nyamira urban centre's population is expected to grow as more people move in from rural areas in search of jobs.

The fact that migration is less in Nyamira implies that people will remain with their beliefs of getting more children and hence fertility rates may take time to change.

#### **4.9.3 The migration of the School Age Population in the District**

There are no significant migration of young age population (6-14) years in the district. However a notable migration was realized in the late 1960s and earlier 1970s to Boarabu division when most old people migrated with their families from various parts of Nyanza to the division. Between 1989 and 1996 the number of migrants aged 6-14 to the district were 235 children. This flow was mainly to Nyamira urban centre after Nyamira was pronounced the district headquarters. The migration to Nyamira town therefore explains why Nyamira township primary school is over-enrolled.

#### **4.10 Chapter Summary**

From the above observation it is noted that Nyamira's population is increasing at a place of 3% per annum. This is one of the highest in the country; due to improved health conditions and nutritional situation, mortality has declined. The decline in mortality is the major reason for increasing high population growth rate. However, evidence also show a clear rise in fertility rate. The reason for the rising fertility is connected with the modernization process. The fallen mortality itself has also an effect on fertility rise through improved fecundity of marital life. However, high fertility is being reduced by the high rate of accepting the family planning programmes in the district.

The rapid population growth rate has led to an increasing young age structure and high dependency ratio in the district. This puts severe strains on the provision of social services such as education. Fertility rate vary between different divisions according to socio-economical development, but these variations are not very large. The rise in fertility and the decline in mortality has lead into the dramatic increase of the youthful population thereby affecting the demand of primary education and the capacity of the society to supply the demand. A detailed examination of the primary school age (6-14) years versus school going population revealed that it is becoming extremely difficult for the district educational authorities to cope with the bulging numbers in this age.

## **CHAPTER FIVE**

### **THE IMPACT OF POPULATION ON THE DISTRIBUTIONAL OF EDUCATION FACILITIES**

#### **5.0 Introduction**

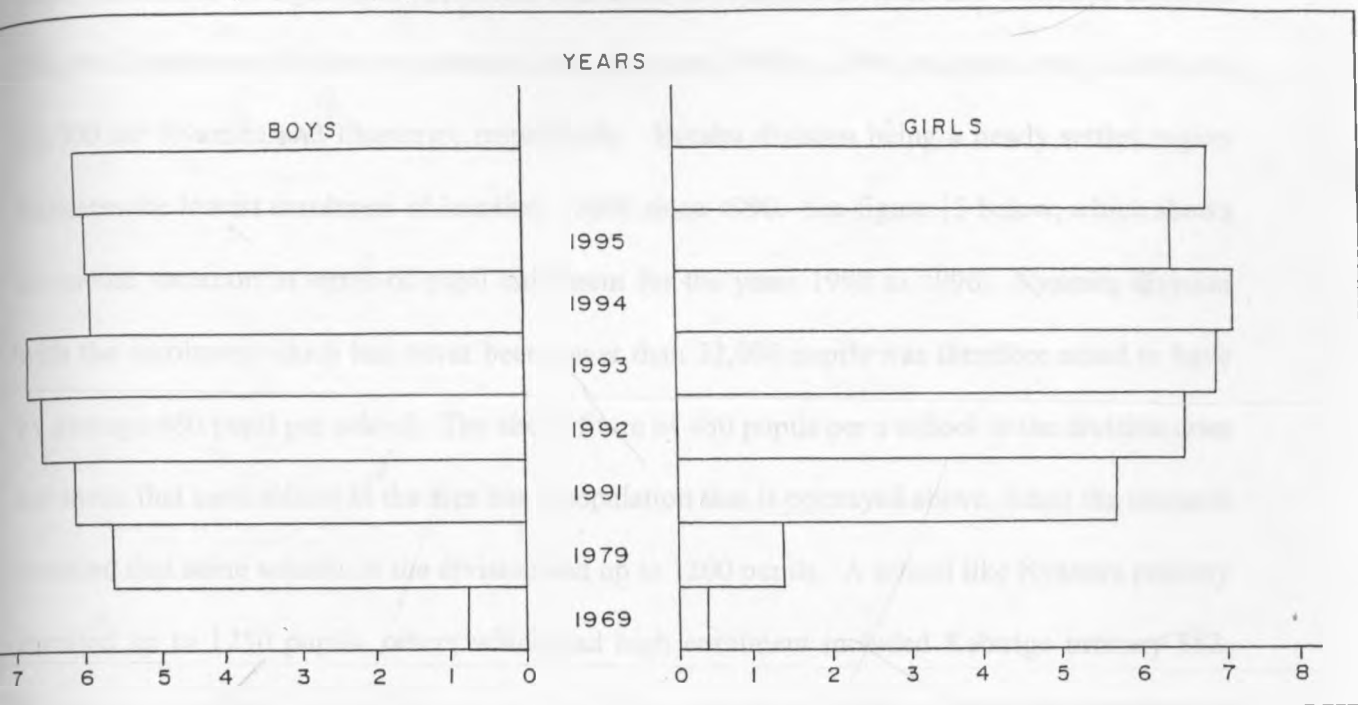
This chapter analyses population growth rate vis-à-vis the primary school enrolment and its relationship with school facilities i.e. number of classrooms, teachers, teaching materials (textbooks, maps, charts etc). Various hypothesis are tested in this section based on the relation of population growth rates and primary school facilities. The distribution of the primary educational facilities is also shown and finally the chapter gives a correlation and regression analysis together with the analysis of variance.

#### **5.1 Development of enrolment in Nyamira**

The enrolment in primary school in Nyamira has increased dramatically for both boys and girls since independence. There were significant increases in primary school enrolment in 1974 when school fees for the first four years were abolished in the whole of Kenya. The remaining fees were abolished in 1979 and a free school milk programme was launched which motivated more young people to join primary school. However, attending primary school is still far from free, the compulsory expenditures for a household include school uniform, books and contributions to the building funds. In Nyamira, school expenses rank number one for each household with children at school; the expense also take up to half of the farmers income, the largest occurs when children enter secondary school.

Nyamira district has one of the highest enrolment rates in primary school in Kenya. There were 4648 pupils enrolled in primary schools in 1969, of these 3168 boys giving a percentage of 68.2%. In 1979 the enrolment was 36776, of which 60.4% were boys. The enrolment trend increased rapidly between 1979 and 1991, thus in 1991 the enrolment was 118,056 and in 1995 it was 126,014, of these the percentage boys was 49.9 and 49.6% respectively. Thus it can be seen that at the primary level, the gender differences have been constantly decreasing with the number of girls competing to balance with that of boys. However the above figure does not take into account the high dropouts, absenteeism and repetition rate. The enrolment ratios are also high than the real proportion of the age groups due to the large scale of "over age" and "under age" pupils in the district. Figure 12 shows the enrolment of pupils in primary schools by sex and in a grace period of 27 years (1969-1996).

**Fig 12: The Development of Pupil Enrolment for 1969-1996 in Nyamira per Sex**



Source: Research Data, January 1996.

### 5.2 Distribution of Primary Educational Facilities in the District

On average Nyamira district has 372 pupils per a primary schools, however, the average distance from one primary school to another is about six kilometers. This shows that the distribution of school in the area is not satisfactory, because in a normal case where the population is evenly distributed, the average distance from one school to another is supposed to be 5 Kilometres and not 6 kilometres as in the case of Nyamira. Some schools are over enrolled where by they have a carrying capacity of 1200 pupils, while others are under enrolled with a carrying capacity of 150 pupils. But it is important to note that the ones that are under enrolled are primary boarding schools where most people cannot afford to take their children.

It is also important to note that there is Divisional variation in terms of primary school pupil enrolment. A significant enrolment was noted in Nyamira division and Ekerenyo division. The total enrolment for the two divisions for the years 1990 to 1996 has been over 32,000 and 31,000 for Nyamira and Ekerenyo, respectively. Borabu division being a newly settled region indicates the lowest enrolment of less than 11000 since 1990. See figure 13 below, which shows divisional variation in terms of pupil enrolment for the years 1990 to 1996. Nyamira division with the enrolment which has never been lower than 32,000 pupils was therefore noted to have by average 480 pupil per school. The above figure of 480 pupils per a school in the division does not mean that each school in the area has a population that is portrayed above, infact the research revealed that some schools in the division had up to 1200 pupils. A school like Nyamira primary enrolled up to 1250 pupils, others which had high enrolment included Kebirigo primary 882, Makairo primary 722 among others, the picture is just of a few cited cases. Therefore this shows that the enrolment in such school is higher than the Ministry of Education recommendation of having less than 500 pupil per primary school in any given area in Kenya.

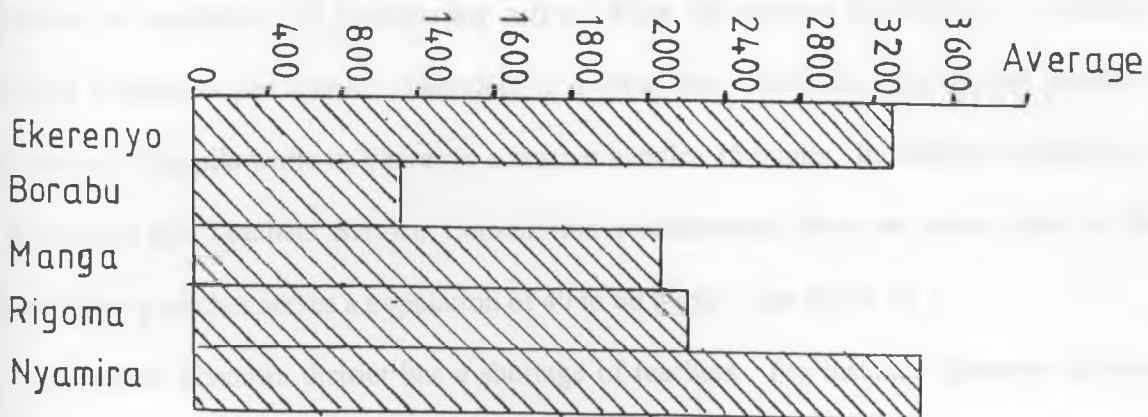
Similar variations were also noted in Ekerenyo division, in this division a number of schools were noted to have more pupils than the number recommended by the Ministry of Education. The schools which were found to be victims included: Kiabonyoru Primary School with a pupil enrolment of 742, Kebabe Primary School with an enrolment of 820 pupils and Nyamiranga Primary School with an enrolment of 692 pupils among the many schools in the division. The remaining divisions were fair although there were cases of over enrolment in Manga and Rigoma where schools had exceeded the Ministry's recommendation of 500 in Manga division had 621 and 589 pupils respectively. At least there were 10 schools in each



division where the enrolment was higher than the Ministry of Education recommendation of 500 pupils per each primary school in Kenya.

The high enrolment that was noted in various divisions is due to variations in the distribution of the primary educational facilities in the divisions. There were variations in the distribution of classrooms, teachers and teaching materials in the district. The fact of uneven distribution of educational facilities has resulted into pupils clustering in schools with enough facilities. Some schools were located far away in terms of distance from others, for instance, Kiabonyoru primary school is about 6 Km from the surrounding school. The factor of distance also explains why the school had more pupils than recommended. Other schools experience over enrolment purely because of high population growth rates associated with declining mortality in the district.

**Fig 13: Average Distribution of Pupils Enrolment in each Division in Nyamira (1990-1996) in '00' (aged 6-15 years)**



Source: Research work 1996.

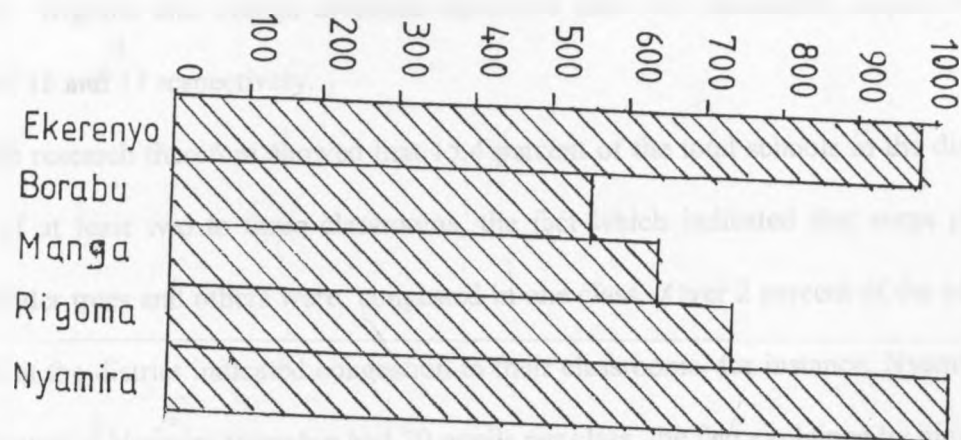
### 5.2.1 Average Distribution of Primary School Teachers

The average distribution of teachers in the district are 12 teachers per school in the district. A total of 1917 teachers were counted in a research done on 160 primary schools in the district. The number counted thus gives an average distribution of 12 teachers in each school in the district. An average of 12 teachers in a school of between 500-700 pupils is quite a small number. The distribution of teachers therefore tells us that every teacher in the district handles between 30 and 60 pupils. Handling 60 pupils is not an easy work for one teacher. In a closer examination on the distribution of teachers in the district it was discovered that some schools had about 8 teachers while others had about 11 teachers.

Divisional distribution of teachers vary as per the number of pupils enrolled in each school. Nyamira division which has a pupil enrolment of 34,989 as per 1996 has a total teaching force of 1084, Ekerenyio division had a pupil population of 33,419 and a teaching staff of 978. Borabu division is the one which is well served by the teaching staff. In Borabu an average distribution of teachers is 15 teachers per school, while the average distribution in Ekerenyio division is 9 teachers per school. Therefore it is clear that in Borabu each teacher handles a population of 20 pupils while in Ekerenyio a teacher handles 35 pupils. In Ekerenyio teachers are less than what the Teachers Service Commission recommends; there are some cases in the division where a teacher serves a population of 40 to 60 pupils. See figure 14.

In general Nyamira district has a shortage of teachers. For instance Ekerenyio division has about 8 classes going minus a teacher at any given teaching season because of the shortage of teachers. For the district to have enough teachers there is a need for the government to allocate the district with over 120 teachers.

**Fig 14: Spatial Average Distribution of Teachers per Division for the Years 1990-1996 in '00'**



Source: Research Work 1996

### 5.2.2 Average Distribution of Classrooms

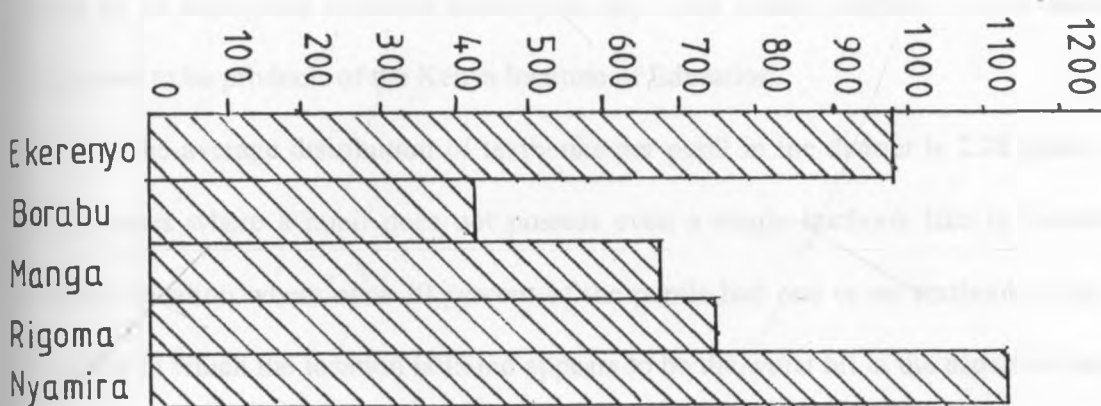
The number of classrooms in each primary school in Kenya is supposed to grow simultaneously with the number of pupils in any given region in the country. The limit is therefore controlled by the number of pupils in each primary school.

In Nyamira the average number of classroom is 11 classrooms in each primary school. This means that the average distribution of pupils per class is about 31.7 given that the average distribution of pupils in each school in the district is 372. The average distribution appears encouraging and indicates that there is no congestion. But the above figure applies to only 60 percent of the total schools in the district; meaning that 40 per cent of the schools in the district has a problem of shortage of classrooms. For instance, in Ekerenyo Division, the number of classrooms are 973 classrooms whereby they are supposed to be 1080 classrooms. This shows a

shortage of 107 classrooms, 66 percent of the schools in the division have also not completed their workshops. The neighbouring division Nyamira is also affected by the shortage of classroom. Rigoma and Manga divisions have 670 and 742 classrooms respectively with a shortage of 16 and 17 respectively.

The research therefore showed that 15.4 percent of the total schools in the district had a shortage of at least two to three classrooms, the fact which indicated that some pupils were learning under trees and others were congested in one class. Over 2 percent of the total schools examined in the district indicated congestion in their classrooms, for instance, Nyamira Primary School located in Nyamira township had 70 pupils per class, the fact explained by high migration rate into the town. Other schools also which had high numbers of students per class include Kiogutu Primary school in Manga division which had 72 pupils per class, Kiabonyoru Primary school in Ekerenyo division which had 72 pupils per class, Kiabonyoru primary school in Ekerenyo division had 68 pupils per class. The congestion in these schools is associated with high fertility rate and declining mortality. The congestion in classrooms and schools has resulted in high repetition rate, high dropouts and poor examination results in the district. Most student dropout of school because of repeating several times. Repetition in most cases make pupils have little hope in education, it also increases the age of stay in school whereby the young ones who mature very fast, especially girls seek for marriage and dropout of school. Most headmasters who were interviewed revealed that repetition alone contribute to about 2 percent of the dropout rates in the district.

Fig 15: Divisional Average Variation in the Numbers of Classroom for the Years 1992-1996 in '00'



Source: Research Work 1996

### 5.2.3 Textbooks

The essential textbooks recommended by the Ministry of Education that will go in line with the current educational system (8.4.4 system of education) are at least 8 textbooks per pupil. The recommended books includes at least one English book, Kiswahili, Maths, Science and Agriculture, G.H.C. (Geography History and Christian religious book), Music, Art and Craft, and a Business textbook. The above recommendation was made in 1986 when the current 8.4.4 system of education started in Kenya. Any 8.4.4 pupil in Kenya is therefore required to have a copy of all the books indicated above plus any other related textbook. The above books are supposed to be products of the Kenya Institute of Education.

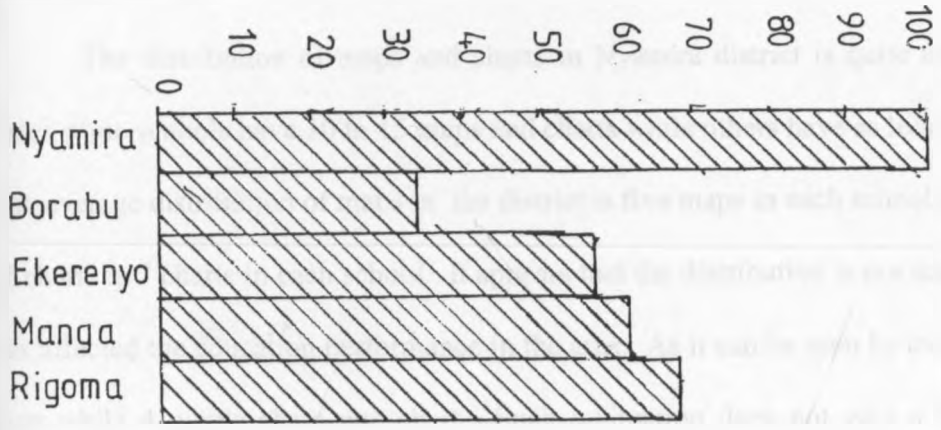
The average distribution of textbooks per pupil in the district is 2.78 books. There are some cases where a pupil does not possess even a single textbook like in North Mugirango Chache location where over 70 percent of the pupils had one or no textbook at all. Ekerenyo division in which the location is found appears to be the worst hit in the aspect of textbook. The average distribution of textbook in the division is 1.1 books per pupil. In Nyamira division the average distribution of textbooks are 1.6 textbooks per pupil. The division is followed by Rigoma division with an average distribution of 2.7 books per pupil, Nyamira 2.9 books per pupil, Manga 3.3 books per pupil, and Borabu division had an average distribution of 3.4 textbooks per pupil. This shows that the average distribution of the textbooks is 2.78 books per pupil. This average of 2.78 books in the district when compared with the Ministry of Education's recommendation of 8 textbooks per pupil is quite low. See the divisional variation of textbook for the years 1994-1995 in figure 16. The reason attributed to this low distribution of textbooks was associated with the high fertility rate in the study area.

The issue of textbooks is very crucial affecting many parents in the district. In fact 20 per cent of the pupils who drop out of school in the district are affected by the lack of textbooks. Most pupils are compelled to purchase their own textbooks and when they fail to meet the condition most of them end up being put out of school and they opt never to come back. The problem here is not that most parents are too poor to afford to the purchase of textbook for each child, but the problem is associated with high fertility. Here is the case where a headmaster of Kenyoro primary school was quoted saying:

*“Consider a case where one parent has eight children in one school and is required to buy at least seven text books for each child together with buying school uniform, exercise books, paying for building fund and many other school demands; will he be able to meet all the requirement? Therefore the aftermath of all this is, the parent tries to compel some pupil to leave school at the expense of the others.”*

The problem of textbooks is therefore associated in most cases with high population growth rate and the only solution is by reducing the population growth rate.

**Fig 16: Divisional Average Distribution of Textbooks in Nyamira for the Years 1989-1994 in '00'**



Source: Research Work 1996

**5.2.4 Maps, Charts and Other Related Facilities**

The Ministry of Education requires that each primary school should have reading charts especially wall charts having numbers or diagrams, geographical charts, health charts, etc for illustration purposes. The charts are supposed to be over 4 per a class in normal circumstances meaning that each school is supposed to have at least 16 charts. Geographical maps are the ones recommended in each primary school. The well accepted maps for use here include a map of the

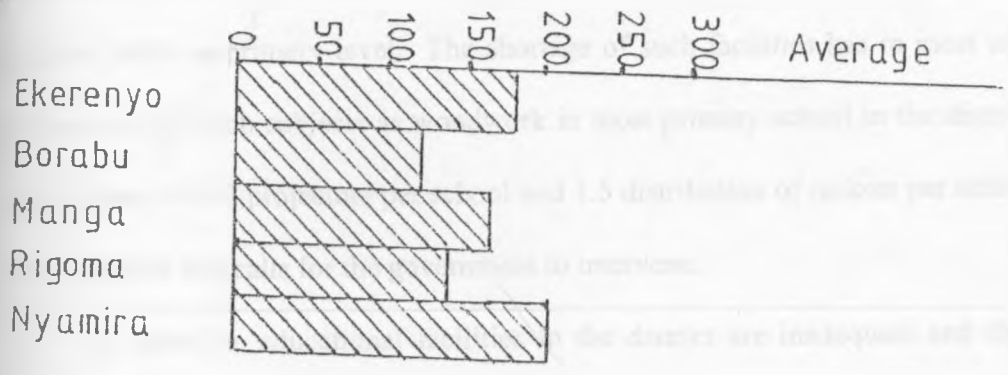


world, Africa, East Africa, Kenya and maps of various provinces and districts. Each class in each primary school is supposed to have at least 4 of each of the above named maps. These maps help pupils in locating features. These maps are supposed to be accompanied by the leading Atlas.

The distribution of maps and charts in Nyamira district is quite uneven where in most cases some schools have 10 to 15 maps and charts while others have as less as 3 maps and charts. The average distribution of maps in the district is five maps in each school while the distribution of charts is 7 charts in each school. It appears that the distribution is not adequate the fact which has affected the education performance in the area. As it can be seen by average 6 pupils share 1 map while 4 pupils share one chart. Such a situation does not give a pupil the freedom of reading through a map of his or herself.

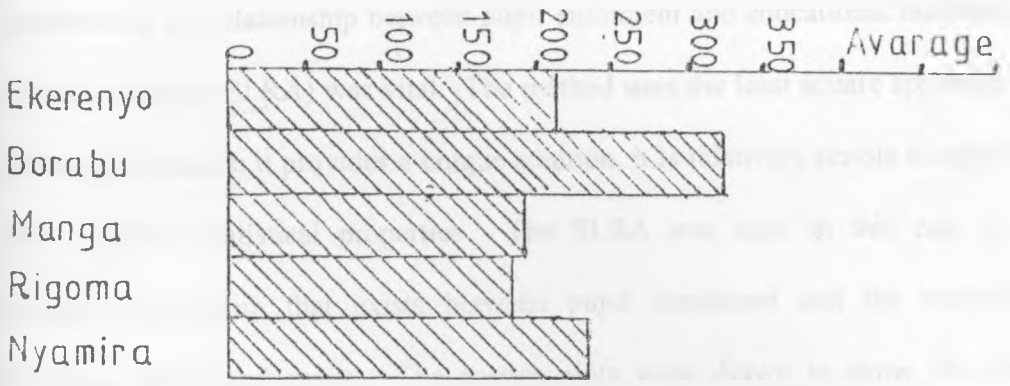
There are divisional variation in the distribution of Geographical and Reading charts. Nyamira division had high numbers of Geographical maps o 201 while Borabu division had the highest number of charts of 344. This indicates that the average distribution of maps in Nyamira is too low where about one map could be shared by 170 pupil. The rest of the divisions had a meager number of maps and charts, to the extend that 250 pupil could share one map. See figures 17 and 18 which shows the average divisional distribution of maps and charts for the years 1990-1996. In most cases those who were interviewed attributed the scarcity of maps to poverty in the area and also to high population growth rates.

**Fig 17: Spatial Average Distribution of Geographical Maps in each of the Five Divisions in the District (1989-1995)**



Source: Research work 1996.

**Fig 18: Divisional Average Distribution of Teaching Charts (1989-1993) in '00'**



Source: Research work 1996.

The distribution of other facilities such as rackets and projectors prove to be in short supply in the whole district. Over 60 percent of the schools visited in the district had no rackets and projectors. This was a horrible situation given that the current educational system advocates for practical skills at primary level. The shortage of such facilities has in most cases affected the performance in such subjects as woodwork in most primary school in the district. The average distribution of 0.63 projectors per school and 1.5 distribution of rackets per school is in fact quite low. The fact that calls for the government to intervene.

In short the educational facilities in the district are inadequate and they are unevenly distributed. Of the 160 schools interviewed, 76.4 percent did not have sufficient facilities. Many of these schools lacked teachers, textbooks, classrooms, maps and etc. Most of these schools were faced with a problem of over enrolment which was due to high fertility rate in the area and declining mortality.

### **5.3 Analysis of the Relationship Between Pupil Enrolment and Educational Facilities**

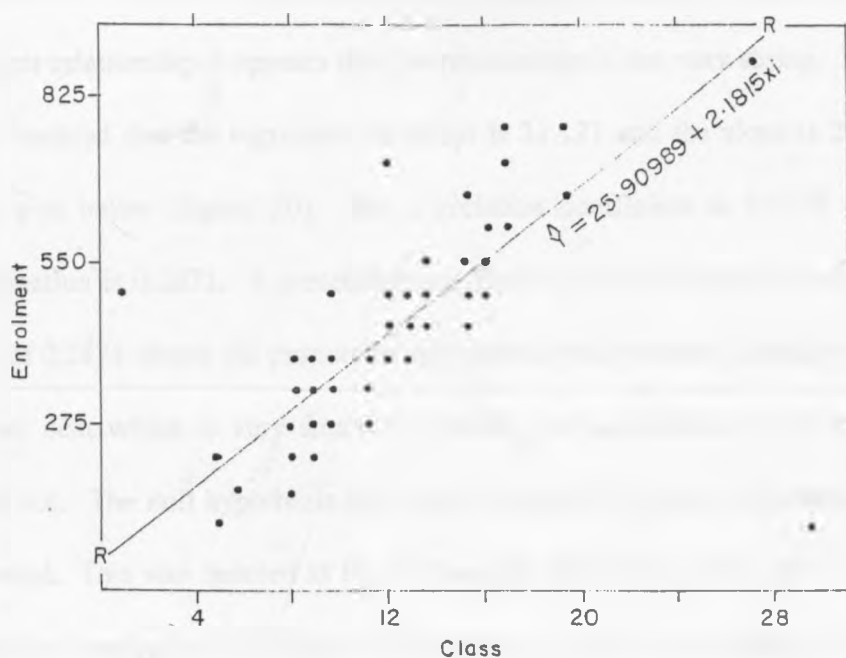
#### **5.3.1 Simple Linear Regression Analysis**

In determining the relationship between pupil enrolment and educational facilities, simple linear regression analysis (SLRA) was vital. The method uses the least square approach which has the following advantages; it provides a unique solution, it is relatively simple to apply and it possess certain desirable statistical properties. The SLRA was used in this case to establish the functional relationship that exists between pupil enrolment and the number of teachers, classrooms, charts and maps. The scatter plots were drawn to show the direction of the relationships, using the model shown below.

$$y = B_0 + Bx_1 + e_1$$

In this case the aim was to determine whether the relationship is either positive or negative. In each parameter that was regressed the correlation coefficients (R) for each was identified and each of them tested separately for the true significance. In the plot on pupil enrolment against the number of classrooms in the district the regression coefficient which came out after the analysis indicate an intercept of 25.90989 and a slope of 2.1815 as indicated on the regression line in figure 19. The correlation coefficient established was 0.7333 which showed a strong relationship between enrolment and classrooms and the coefficient of determination,  $R^2$  is 0.5377 which shows that 53.8 percent is the proportion accounted for by the regression.

Fig 19: The Relationship between School-age and the Number of Classrooms



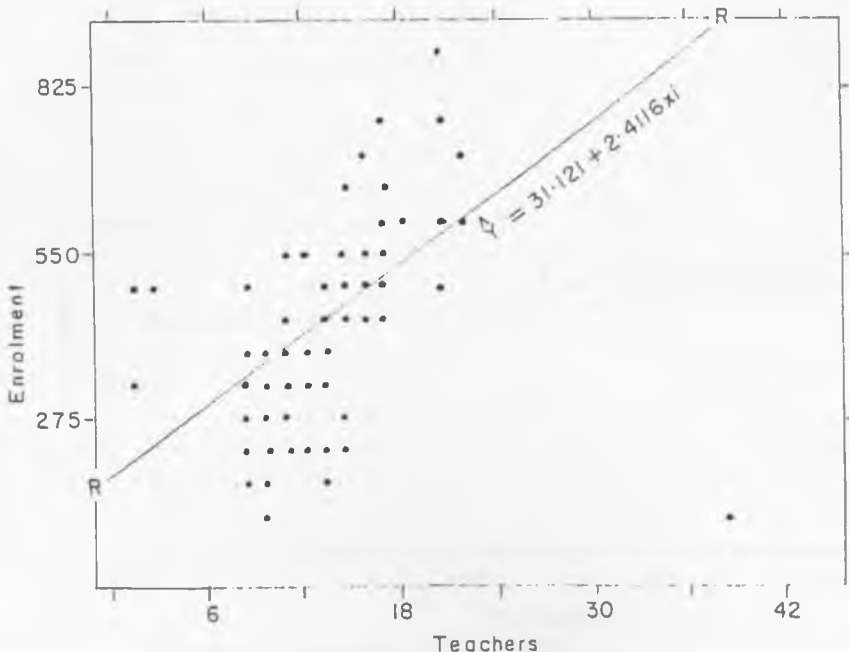
Source: Research Work 1996

In testing whether the relationship is significant, R was used as a testing tool. Therefore at 0.05 significance level the  $H_0: p > 0$  and the  $H_1: p < 0$  was tested. At a one-tailed test and at 124 degrees of freedom R-critical is 0.914 and the calculated is 0.733, which means that we reject the null hypothesis and accept the alternative hypothesis which in our case states that pupil enrolment do not grow at the same pace with the demand of classrooms in Nyamira. The number of pupil enrolment grow at higher rate than the capacity to supply the number of classroom.

### 5.3.2 Analysis of Teachers

The number of teachers in the district is not strongly correlated with enrolment. Although there is a linear relationship it appears that the relationship is not very strong. From the scatter plot it can be realized that the regression intercept is 31.121 and the slope is 2.4116 as shown in the scatter plot below (figure 20). The correlation coefficient is 0.5358 and the coefficient of determination is 0.2871. A correlation coefficient of 0.5358 shows a moderate relationship and the  $R^2$  of 0.2871 shows the proportion explained by the number of teachers on pupil enrolment is 28.7 per cent which is very small. In testing the significance of the relationship R-test was carried out. The null hypothesis that pupil enrolment does not influence the supply of teachers was tested. This was denoted as  $H_0: p > 0$  and the alternative as  $H_1: p > 0$ . At 0.05 significance on a one-tailed test and at 124 degrees of freedom, R-critical was observed to be 0.914. Given that the R-calculated is 0.5384 which is smaller than the R-critical, therefore the null hypothesis is rejected and the alternative stated that pupil enrolment influences the supply of teachers.

Fig 20: Regression Plot on School-age with Teachers

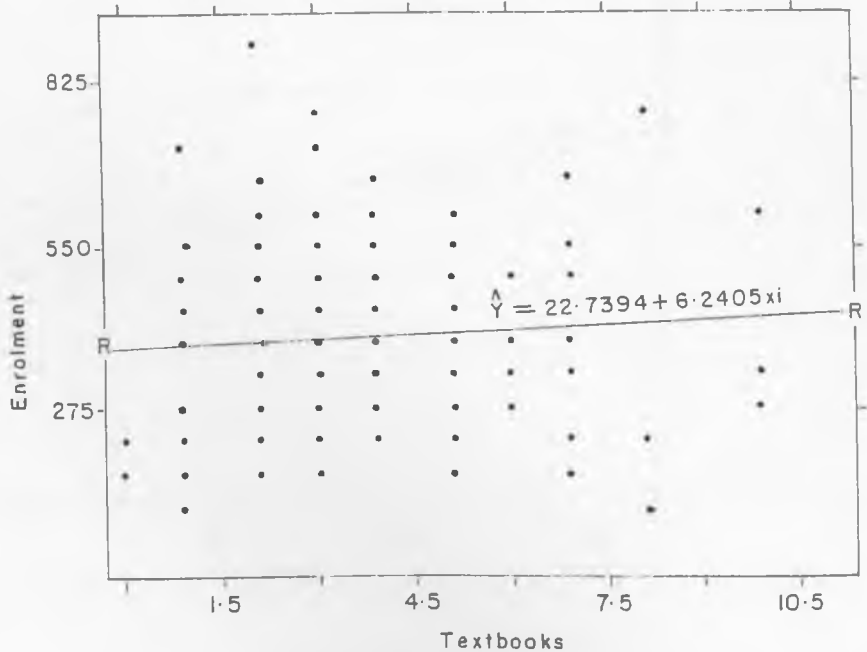


Source : Research Data 1996

### 5.3.3 Analysis of Textbooks, Maps and Charts

The above facilities are referred to as the teaching facilities. They appeared to have a limited relationship when they were regressed with the school age population. Their relationship with school-age population was weak, which means that their supply is also limited. From the scatter plots the regression coefficients were: textbooks had an intercept of 22.7394 and a gradient of 6.2405, maps had an intercept of 18.4663 and a slope of 2.1315 while charts had an intercept of 15.8571 and a gradient of 1.4170. The correlation coefficient of each of the parameters were 0.0891, 0.2832 and 0.2557 respectively. As can be seen, the calculated R shows a very weak relationship, even the coefficient of determination which is 0.0079, 0.0802 and 0.0652 respectively indicates that the proportion explained by the parameters is very meager. See figures 21, 22 and 23.

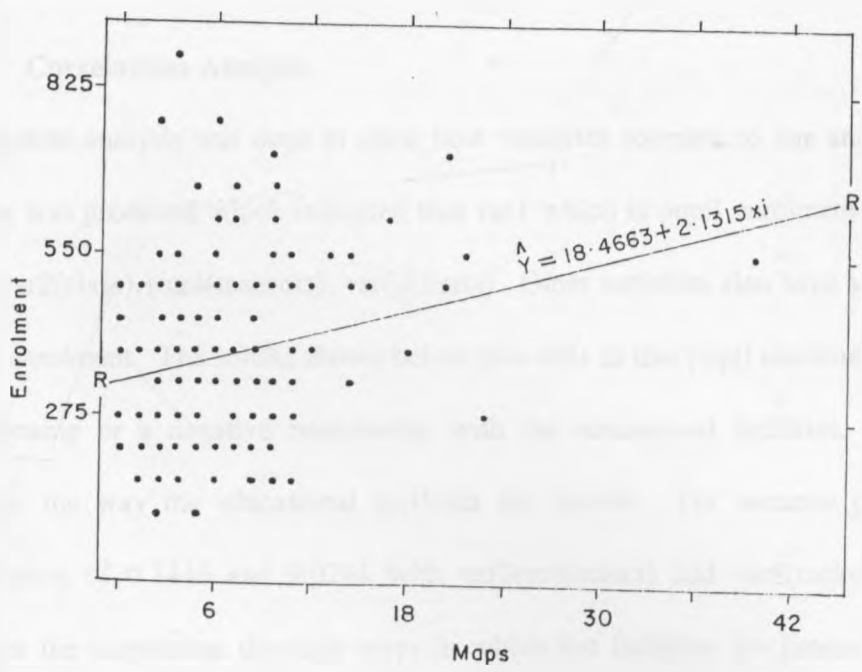
Figure 21: Regression Plot on School-age Population with Textbooks



Source : Research Data 1996

The true significance here was tested using the correlation coefficient, R. The null hypothesis tested in this case stated that the school does not out number the supply of textbooks, maps and charts in Nyamira. Using  $H_0:p>0$  and  $H_1:p<0$  the null hypothesis was tested at 0.05 significance level and 156 degrees of freedom for each parameter on a one-tailed test. The R-critical for each of the parameter was 0.914. Since the R-critical is greater than the R-calculated for each of the parameters, therefore we reject the null hypothesis and state the alternative that the school age population out number the supply of textbooks, maps and charts in Nyamira district.

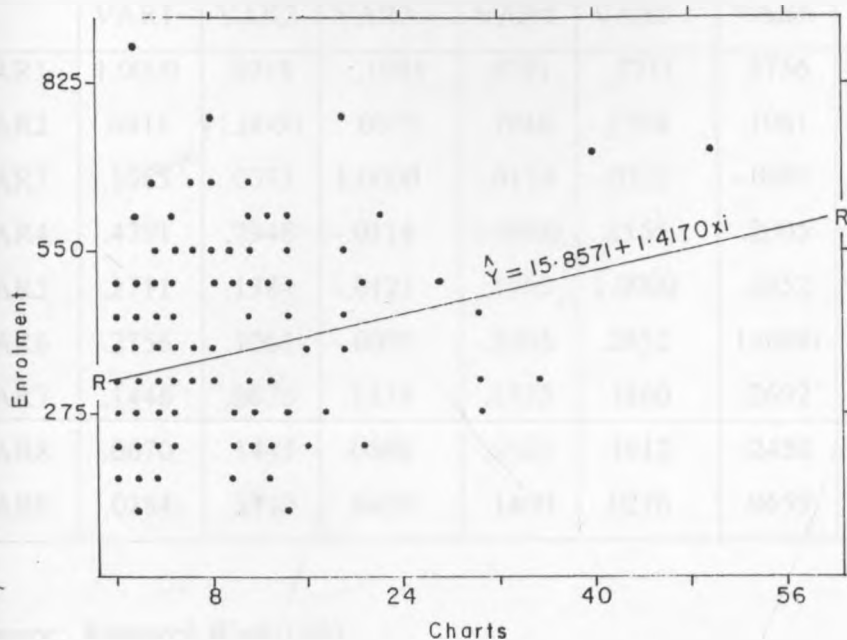
**Fig 22: Regression Plot of School-age Population with Maps**



Source: Research Data 1996



**Fig 23: Regression Plot of School-age Population with Charts**



**Source: Research work 1996.**

#### 5.4 Correlations Analysis

Correlation analysis was done to show how variables correlate to one another. The correlation matrix was produced which indicated that var1 which is pupil enrolment has strong correlation with var2(class), var4(teachers), var6(charts). Other variables also have a weak correlation with pupil enrolment. The results shown below thus tells us that pupil enrolment has either a positive relationship or a negative relationship with the educational facilities. A weak relationship implies the way the educational facilities are limited. For instance pupil enrolment has a correlation of 0.1446 and 0.0284 with var7(projectors) and var8(rackets) respectively. The smaller the correlation the high ways in which the facilities are limited. See the correlation matrix below.

**Table 5.1 Correlation Matrix**

	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6	VAR7	VAR8	VAR9
VAR1	1.0000	.6918	.1085	.4791	.2711	.2756	.1446	.0670	.0284
VAR2	.6918	1.0000	.0075	.7948	.1384	.1061	.0876	.1445	.1240
VAR3	.1085	.0075	1.0000	-.0114	-.0121	-.0095	.1534	.0080	.0429
VAR4	.4791	.7948	-.0114	1.0000	.1155	.2005	.1533	.2323	.1400
VAR5	.2711	.1384	-.0121	.1155	1.0000	.2852	.1860	.1612	.0276
VAR6	.2756	.1061	-.0095	.2005	.2852	1.0000	.2692	.2458	.0659
VAR7	.1446	.0876	.1534	.1533	.1860	.2692	1.0000	.3770	.2468
VAR8	.0670	.1445	.0080	.2323	.1612	.2458	.3770	1.0000	.1346
VAR9	.0284	.1240	.0429	.1400	.0276	.0659	.2468	.1346	1.0000

*Source: Research Work 1996*

### 5.5 Multiple Regression Analysis (Stepwise)

The method was used to establish the effect of population (pupil enrolment) on primary educational facilities. In this case stepwise regression analysis was applied, the method appeared relevant in this case because it was necessary to have a number of causal influences on the variance in a dependent variable (pupil enrolment) in this case. The aim of using this was to identify independent variables in this case educational facilities (classrooms, teachers and teaching materials); isolating in particular those which do have critical causal effects (in a statistical sense) and should be retained in an equation required either to describe the variance. To test a true significance in this matter “t” value appeared unsatisfactory. Therefore in testing the “true” significance the partial regression coefficient and its standard error were used to show a true significance of the relationship.

In this research the aim was to establish the casual effect of population growth on primary educational facilities (classroom, teachers and teaching materials). The major aim was to indicate the spatial variations in population growth in Nyamira district using the following variables var2(classroom), var3(textbooks), var4(teachers), var5(maps), var6(charts), var7(projectors) and var8(rackets). Multiple regression analysis shows that population growth rate (pupil enrolment) has causal influence on all the educational facilities but it has major relationships with the number of classrooms, teachers and charts. The above of coefficient of determination ( $R^2$ ) than other variables which therefore means that the portion that the variables explain on pupil enrolment is high as can be seen below. The analysis showed the partial correlation coefficient (R) of 0.69183, 0.7211 and 0.73833 for classrooms, charts and teachers respectively with pupil enrolment. Stepwise regression therefore indicated that the above facilities appeared to have a critical causal effect when regressed with pupil enrolment.

The analysis also indicated the coefficient of determination ( $R^2$ ) of 0.47815, 0.5198 and 0.53395 for classrooms, charts and teachers respectively with pupil enrolment. The coefficient of determination thus tells us that the portion explained by classrooms, charts, and teachers on pupil enrolment is 47.8%, 51.9% and 53.3% respectively. As it can be seen the portion that can be accounted for is an average portion, which therefore tells us that the relationship that exist between the educational facilities as was extracted by stepwise method is a moderate type of relationship.

The nature of relationship although, has a positive link it can be seen that the pupil enrolment in the district in most cases outweighs the supply of the educational facilities. Actually the coefficient of 0.48815, 0.5198 and 0.5335 for the number of classrooms, charts and teachers leaves out a variance of 52.2 percent, 48.1 percent proportion an unaccounted for. This

variation which is an unaccounted for means that the pupil enrolment grows at a rapid rate than the supply of the facilities mentioned above.

## **5.6 Analysis of Variance**

In order to establish the truth about the population growth (pupil enrolment) and their influence on school facilities and whether the influence is significant a null hypothesis; that pupil enrolment in most cases does not outweigh the demand for such facilities in Nyamira district was tested using the partial F-test. Remember similar tests were done above using the correlation coefficient (R) and the results that were tabulated indicated that pupil enrolment in most cases outweigh the supply of educational facilities. Hence the same hypothesis has been tested here to verify the findings that were seen above. The partial F-test was used in order to identify each educational facility separately in testing whether pupil enrolment does not outweigh the supply of teachers. A F-test done at a two-tailed test on 0.001 significance level at degrees of freedom of 1 and 22 indicated a F-critical of 5.42 (see results below). Since the F-computed is 48.7378 and is greater than the F-critical, it is therefore important to reject the null hypothesis and state the alternative hypothesis which indicates that pupil enrolment outweighs the supply of teachers in Nyamira district.

variation which is unaccounted for means that the pupil enrolment grows at a rapid rate than the supply of the facilities mentioned above.

## **5.6 Analysis of Variance**

In order to establish the truth about the population growth (pupil enrolment) and their influence on school facilities and whether the influence is significant a null hypothesis; that pupil enrolment in most cases does not outweigh the demand for such facilities in Nyamira district was tested using the partial F-test. Remember similar tests were done above using the correlation coefficient (R) and the results that were tabulated indicated that pupil enrolment in most cases outweigh the supply of educational facilities. Hence the same hypothesis has been tested here to verify the findings that were seen above. The partial F-test was used in order to identify each educational facility separately in testing whether pupil enrolment does not outweigh the supply of teachers. A F-test done at a two-tailed test on 0.001 significance level at degrees of freedom of 1 and 22 indicated a F-critical of 5.42 (see results below). Since the F-computed is 48.7378 and is greater than the F-critical, it is therefore important to reject the null hypothesis and state the alternative hypothesis which indicates that pupil enrolment outweighs the supply of teachers in Nyamira district.

**Table 5.2 Analysis of Variance (i)**

	<b>DF</b>	<b>Sum of Squares</b>	<b>Mean Square</b>	<b>F</b>
Regression	3	1447727.60780	482575.86927	48.73783
Residual	122	1207978.71760	9901.46490	

*Source: Research Work 1996*

Likewise similar tests were carried to test whether pupil enrolment outweighs the supply of the number of classes and charts in the district. The results indicated that F-computed for the number of classrooms was 66,72037 and 113.834 for charts. At a two-tailed test and a significance level of 0.001, and at 2 and 123 degrees of freedom for the number of classrooms; and 1 and 124 degrees of freedom for the charts, the F-critical were 7.32 and 10.83 respectively (see the results below). Since the F-calculated is greater than the F-critical the null hypothesis that pupil enrolment does not outweigh the supply of classrooms and charts can be rejected and the alternative which states that the pupil enrolment in the district outweighs the supply of such facilities be accepted.

**Table 5.3: Analysis of Variance (ii)**

	<b>DF</b>	<b>Sum of Squares</b>	<b>Mean Square</b>	<b>F</b>
Regression	2	1380921.24415	690460.62208	66.62037
Residual	123	1274785.08124	10364.08124	

*Source: Research Work 1996*

**Table 5.4: Analysis of Variance (iii)**

	<b>DF</b>	<b>Sum of Squares</b>	<b>Mean Square</b>	<b>F</b>
Regression	1	1271102.18689	1271102.18689	113.83519
Residual	124	1384604.13850	11166.16241	

*Source: Research Work 1996*

In general the tests done after stepwise multiple regression showed the rejection of the null hypothesis. Therefore one can conclude that pupil enrolment in Nyamira district outweighs the supply of educational facilities, that is the enrolment rate is high than the capacity of supplying the educational facilities. This therefore calls for the district educational board to take appropriate action to curb the problem.

## **5.7 Conclusion**

In concluding this chapter it is important to say that the educational facilities in the district are inadequate and they are unevenly distributed. Of the 160 schools interviewed, 76.4 per cent did not have sufficient facilities. Many of these schools lacked teachers, textbooks, classrooms, maps and etc. Most of these schools were faced with a problem of over enrolment which was due to high fertility rate in the area and declining mortality. Correlation and Regression analysis revealed that there is significant relationship between pupil enrolment and the educational facilities such as the number of schools, textbooks, teachers, etc. A significant relationship was observed between enrolment and the number of teachers, and classrooms where an  $R^2$  of 0.54514 and 0.47868 respectively was obtained. This shows that as the number of pupils increases the number of teachers and classrooms are likely to increase. However, the coefficient of

determination explains a small variance which means that although there is a positive relationship between enrolment and educational facilities; the facilities are not enough. Therefore one can conclude that pupil enrolment in Nyamira district outweighs the supply of educational facilities, that is the enrolment rate is high than the capacity of supplying the educational facilities.



## CHAPTER SIX

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 6.0 Summary and Conclusions

The primary objective of this concluding chapter is to summarize the major findings of the study and spell out the implications of this to planning. First, a brief summary of the findings and conclusion of the research is given. Second, a recommendation regarding primary educational planning are outlined.

This study has paid special attention to the back and forward linkages of population growth and a specific field of social services; education. The working hypotheses implied a changing demographic trend in Nyamira i.e. fertility in Nyamira has been experiencing high growth and mortality has been declining. Other hypotheses include that the distribution of education facilities is uneven and the population growth does not outweigh the supply of education facilities. The approach taken for analysis has utilized a regional perspective; both demographic processes and educational issues have a clear dimension.

Nyamira's population is increasing at a pace of 3% per annum. This is one of the highest in the country; due to improved health condition and nutritional situation, mortality has been declining. The decline in mortality is the major reason for increasing high population growth rate. However, evidence also shows a clear rise in fertility rate. The reason for the rising fertility is connected with the modernization process. The fallen mortality itself has also an effect through improved fecundity of marital life. However, high fertility as it is discussed currently is being reduced by the high rate of accepting the family planning programmes in the district.

The rapid population growth rate has led to an increasing young age structure and high dependency ratio in the district. This puts severe strains on the provision of social services such as education. Fertility rate vary between divisions according to the source of socio-economical development, but these variations are not very large.

In light of the evidence, the most important single determinant of fertility decline seems to be female education in the district. Rising levels of female education increase fertility in several ways: the age at first marriage tends to rise with increasing education; the knowledge and use of family planning programme is more widespread among educated women than among their uneducated sisters as is the knowledge of hygiene and child care. Initially, these factors may have contradicting effects on fertility levels. The major drop comes after a woman has received nine or more years of education. The norm of large family size is so universally accepted in Nyamira that abandoning this norm will require a major attitude change. However, the result of the last survey show a slight downward trend indicating that the period of fertility increase might be over and promising eventually an acceptance of small families in the district.

The trend also indicate a certain gap in the fertility expectation and the use of family planning among women in Nyamira. Use of family planning method is still effectively confined to the fairly narrow Strathmore of well-educated women. This poses a specific challenge to the family planning programme which is the oldest in Kenya but which has so far largely failed to reach the majority of women even when there ha been a potential demand.

In addition to the rise in fertility, mortality declined significantly in the period under consideration. Crude death rate and infant mortality rates declined from 13 and 109 respectively in 1989 to 9 and 82 respectively in 1995. All the natural factors have acted together to reinforce

population growth in Nyamira. However the influence of AIDS is likely to influence mortality in the future if steps are not taken to curb the spread at which it is spreading now.

Migration has not played any significant role in population growth in the district as there are no major regulations in the area, but in future with, the growing of Nyamira town it is likely to have a major role in population growth rate.

Under the demographic conditions, the population of youth has been increasing dramatically, thereby affecting the demand of primary education and the capacity of the society to supply the demand. A detailed examination of the primary school age (6-12) years versus school going population revealed that it is becoming extremely difficult for the district educational authorities to cope with the bulging numbers in this age. In the period 1989 to 1996 January, the population in the age group 6-12 years rose by about 40% in only five years. This tremendous increase in the school age population has tended to increase the absolute numbers in enrolment; in the year 1989 to 1996 January the number of pupils enrolled in the district primary school rose by 46.3% whereas enrolment ration was 86.3%; the fact that has resulted in a lot of congestion in the area in many of the primary schools hence resulting into lack of classrooms plus other teaching materials. It is therefore seen that there is need to expand on the number of classrooms in the district.

An analysis of the distribution of teachers, number of classrooms, textbooks and other facilities indicated a skewed nature of trend. Some division like Nyamira and Rigoma have more teachers than divisions like Ekerenyo and Manga.

Nyamira division had a fair distributions of teachers, textbooks and schools followed by Borabu and Rigoma, while the least in terms of distribution of facilities was Ekerenyo and Manga. This can be explained on the basis of differential socio-economic setting as portrayed in

the district. In terms of teachers grade, almost all teachers were S1, P1 and P2 holders and were fairly distributed in the district. Generally, Nyamira is fairly provided with qualified teachers. By 1996 January, 99.1% of the total number of teachers were professionally qualified and there was an overall pupil-teacher ratio of 36. But whether the same standard will continue in the prevailing circumstances of limitless increase in the school age population, faced with limited resources, is a question we cannot venture to answer at this juncture.

Correlation and Regression analysis revealed that there is significant relationship between pupil enrolment and the educational facilities such as the number of schools, textbooks, teachers, etc. A significant relationship was observed between enrolment and the number of teachers and classrooms where  $R^2$  of 0.54514 and 0.47868 respectively were obtained. This shows that as the number of pupils increases the number of teachers and classrooms are likely to increase. However, the coefficient of determination explains a small variance which means that although there is a positive relationship between enrolment and education facilities; the facilities are not enough. The testing of the hypothesis also showed a weak relationship between pupil enrolment and educational facilities.

From the analysis it is clear that Nyamira will be facing problems in educating its young and rapidly growing population. Now, the population growth rate is out spacing further expansion of primary education. In the current economic situation sufficient resources will be no longer available to devote the educational requirement of the rapidly increasing numbers of school age children. Even if the provision of education for the future is and must be one of the highest priority objectives of any district in Kenya, a balance must be found between the resource and used between and other sectors. It is clear that efforts have been made towards satisfying a yearly demand for education in Nyamira. This demand is likely to continue to

increase during the next decade. If population increase does not slow down no more than 90.3 percent of children aged 6 to 12 years in Nyamira will be enrolled in schools by the year 2000. The proportion may even decline given the concept of resource constraints and funds. Much more could be achieved in terms of coverage if birth rates were to be reduced. The future growth of school enrolment ratio will therefore be determined to a great extent by governmental policy regarding to population increase and means of financing primary education in rural areas.

## **6.1 Policy Recommendations**

The above major findings as well as others cited in the analytical chapters shows that it will be extremely difficult to provide any simple straight forward solution to this dilemma. It is this dilemma that has induced the author to hazard some worthwhile recommendations regarding population and the provision of education in Nyamira. Such recommendations will of course not determine the most acceptable policy, but could help to eliminate wasteful measures bringing onto view a greater knowledge of the realities with which policies must be formulated.

Since the present population growth is largely due to individual behaviour of the parents which is basically rational in their particular socio-economic context and; changing socio-economic condition in society generate a certain family size and in turn a certain family level. This is however, provided that the means of reaching the desired family size are available and that the knowledge of them exist. Western influence has significantly affected the traditional methods of fertility control. An effective programme promoting modern family planning services may be valuable in compensating for this.

In the meantime, it seems that the only feasible way of coping with the situation would be to adopt an integrated approach to tackling the problem complex. A family planning programme alone can not be effective in limiting the population growth without societal factors contributing to the creation of pre-conditions to lower the desired family size i.e. increasing the age at marriage, providing at least nine years of education to all women in the district and increasing the opportunity of more female in the working sector.

Primary education is a basic human right and prerequisite for socio-economic development, it is necessary for the nation to ensure that all those in their appropriate ages have access to the necessary educational facilities. This can be done through expansion of the facilities in conjunction with a suitable population programme to ensure that the demand for the facilities does not outweigh the capacity of the society to supply them. Most likely family planning programme and the education fund programme would be the most likely policy to be taken.

More school places should be available yearly to cater for the increasing school age population. Short term measures to ensure this could include: extension of the already existing schools particularly where there is ample space for expansion, in this case schools like Kerema, Ekerubo, Nyamusi, Kiogutwa, among others which appear to have space needs large expansion so as to accommodate more students.

In order to plan for primary education in a rural region like Nyamira it is also important to make long term forecasts concerning the school age population so that the required facilities in terms of land, classrooms, teachers and teaching materials can be prepared well in advance. It is therefore necessary to make projections of the population based on the prevailing demographic situation. Such projections should incorporate alternative population trends in order to allow for

variations. Plans can then be made for the required educational facilities and the cost calculated in advance to see the available means of raising the funds. New schools should be designed to cater for a minimum of four streams large classes which will hold forty to fifty pupils per class and allowance made for future expansion since it is easier to extend the facilities than start on new ones.

If Nyamira education board is to base pupil intake on divisions, there should be frequent counts of school age population in different areas within the district, so that planned expansion goes along with this and efforts made to ensure that there is a positive correlation between pupil intake and the available educational facilities.

It is also important to recognize that equal opportunity is not an easily obtainable goal, but all efforts should be made to ensure that there is a fair distribution of all the educational facilities in the public schools in the district. This will require a strong political commitment and associated policies which the government may use to influence the distribution of schools in the district.

The other options available for educational planners are few. If the quality and the coverage of education is not to be sacrificed, there are basically two possibilities of either reducing the cost per enrolled pupil or finding alternative modes of financing education in the district. The latter opinion would in the present mean, moving a larger part of the costs to the users i.e. the parents. This has the obvious disadvantage of putting additional strains on the poorer parents whose possibilities of financing their children's schooling would be curbed. From an equality point of view, the measure would not be recommendable. Furthermore the parents who are already currently forced to contribute significantly to their children's educational cost in the form of building funds, school uniforms and books need to be relieved.

It should be noted that in dealing with Nyamira primary education sector, an accurate grasp of the current conditions as well as a comprehensive knowledge of the patterns of change and the conditions responsible for the change is necessary for the adoption of effective measures. Therefore research and evaluation of policy issues may help planners allocate scarce resources more effectively.

## **6.2 Recommendations for Future Research**

The present study has dealt with the interrelationship of demographic factors and the provision of primary education in Nyamira district. It is clear that the problem is much wider and many faceted than presented here. This study therefore concentrated more on the distribution of educational facilities and no attention was paid on the curriculum and content of education. It is therefore clear that:

1. Aspects of utmost importance for educational planning, especially in the view of the relevance of the education and returns from it in relation to the labour market and employment.
2. Aspect of the relative importance of population growth in increasing educational costs. All these issues have been outside the scope of the present study and would each deserve a study of their own.



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## APPENDICES

### Appendix I

**Table 4.2 Age and Sex-Structure of the Nyamira Population (1994)**

Age Group	Male	(%)	Female	(%)
0-4	36519	21.7	45694	19.6
5-9	30607	17.8	39558	17.1
10-14	27175	15.6	34129	14.7
15-19	22172	12.9	31536	13.5
20-24	13936	8.1	21075	9.1
25-29	9335	5.4	14433	6.2
30-34	6815	4.1	10148	4.4
35-39	4896	2.8	8279	3.6
40-44	4667	2.7	7022	3.0
45-49	4141	2.4	5866	2.5
50-54	2976	1.8	4089	1.8
55-59	2434	1.4	2965	1.3
60-64	1757	1.0	2469	1.1
65-69	1561	0.9	1739	0.7
70-74	852	0.5	1241	0.5
75-79	2279	1.3	1743	0.7
80+	249	0.1	404	0.2
<b>Total</b>	<b>172366</b>	<b>100</b>	<b>232781</b>	<b>100</b>

*Source: District Registry Office, 1995*

**Table 4.3: Percentage of the accepted Family Planning Method in the Year 1995**

<b>Method</b>	<b>%</b>
Oral type (Tablets)	71
Sterilization	19
Others	9

*Sources: Research Data*

**Table 4.4: Total Deaths for a Grace Period of 5 years in Nyamira**

<b>Year</b>	<b>Number Died</b>
1990	1508
1991	2270
1992	2025
1993	2073
1994	3814
1995	2348

*Data Source: District Registration Office*

## MULTIPLE REGRESSION

Equation Number 1    Dependent Variable.. VAR1                    enrolment

### Variable(s) Entered on Step Number

1..	VAR9	facilities
2..	VAR5	maps
3..	VAR3	textbooks
4..	VAR4	teachers
5..	VAR8	rackets
6..	VAR6	charts
7..	VAR7	projectors
8..	VAR2	Class

Multiple R	.76230
R Square	.58111
Adjusted R Square	.55247
Standard Error	97.50972

### Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	8	1543253.37549	192906.67194
Residual	117	1112452.94990	9508.14487

F = 20.28857                    Signif F = .0000

Equation Number 1    Dependent Variable ..                    VARI enrolment

### Variables in the Equation



Variable	B	SE B	Beta	T Sig	T
VAR9	-22.67804	20.33368	-.06938	-1.115	.2670
VAR5	3.39371	1.69681	.12702	2.000	.0478
VAR3	6.57527	4.11651	.09708	1.597	.1129
VAR4	-7.78639	3.42338	-.23244	-2.274	.0248
VAR8	-5.55668	4.20671	-.08807	-1.321	.1891
VAR6	3.45295	1.10072	.20602	3.137	.0022
VAR7	9.80097	10.88123	.69190	901	.3696
VAR2	32.67003	3.82989	.85230	8.530	.000
(Constant)	62.74057	38.36622		1.635	.1047

Equation Number 1    Dependent Variable..    VAR1    enrolment

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T Sig	T
VAR3	.10115	.14991	.35442	1.668	.0979
VAR5	.12495	.17623	.35392	1.969	.0512
VAR7	.04911	.06970	.35162	.769	.4437
VAR8	.06211	-.08748	.34585	-.966	.3360
VAR9	-.06006	-.08808	.35341	-.973	.3326

## **Appendix ii**

### **Questionnaire**

This form which is presented to you seeks your assistance regarding your acceptance to fill in. The form will be useful in my research. The information you will give will be used only for research purposes.

#### **Personal Details**

Name .....

Age .....

Marital Status .....

Nationality .....

Sex .....

#### **Details of the School**

Name of the School .....

Location .....

Division .....

Sponsor of the school [government, mission, others (specify)]

.....

PUPIL ENROLMENT

Year in which each class was established e.g. 1 1960		Number of stream and total No. of pupils in class			Sex Ratio			Age Characteristics		Enrolment versus application in Standard Y' each			Dropouts and repeaters		
Class	Year	Class	Stream	Total	Class	M*	F*	Class	Age	Year	Applicants	No. Enroled	Class	Drop-outs	Repeaters
I													I		
II													II		
III													III		
IV													IV		
V													V		
VI													VI		
VII													VII		
VII													VIII		

## SCHOOL EQUIPMENT AND FACILITIES

Total No. of classrooms/ workshops	Average size of each classroom	Which of the following does the school have? Tick and specify No. and class			Average distribution of textbooks		Are the facilities adequate (yes or no)	Who provides the facilities
			No.	Class Using	Class	Textbook		
		Maps			I			
		Charts			II			
		Blackboards			III			
		Radio Sets			IV			
		Television			V			
		Clocks			VI			
		Adding machines			VII			
		Duplicating machines			VIII			
		Projectors						
		Sewing machines						
		Rackets						
		Jembes and Pangas						
		Any other						

## TEACHERS CHARACTERISTICS

Name of teacher	Sex	Age	Grade (e.g, P1)	Year of entry	Classes taught	No. of teachers transferred	Reasons for transfer	Replacement (yes/no) and when and which grade

Extra Curriculum Activities

Games/Sports	Level reached e.g. district level	Year	Prize(s) Won

Please answer the following questions (related to the above):

1. How many fund raising have been conducted? .....
2. When did you conduct the last one? .....
3. How much did you raise? Kshs. ....
4. What was the purpose of the fund raising?
  - (a) Construct more classes
  - (b) Buy books/stationery
  - (c) Payment of the staff
  - (d) Others (specify) .....
5. Do you plan for any other fund raising? Yes ..... No .....  
If yes, when and of what purpose .....

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