LAND SETTLEMENT PROGRAMME AND POPULATION REDISTRIBUTION IN KENYA:

THE CASE OF NYANDARUA DISTRICT.

BY

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This project is submitted in fulfilment of a postgraduate diploma in population studies of the University of Nairobi.

POPULATION STUDIES AND RESEARCH INSTITUTE
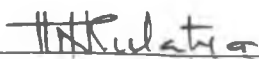
UNIVERSITY OF NAIROBI

DECEMBER, 1995

DECLARATION

This project is my own original work and to the best of my
knowledge has not been submitted for a degree/diploma in other
university

Signature: _____

MULATYA, NZOMO

This project has been submitted for examination with our approval
as the University supervisors.

Signature: _____

PROFESSOR, JOHN O. OUCHO

Signature: _____

ANNE KHASAKHALA

DEDICATION

This work is dedicated to my parents, my wife Florence Kithumbi and my sons, Mulatya and Mulyungi.

ACKNOWLEDGEMENT

ABSTRACT

The purpose of this study is to examine the contribution of land settlement programme on the spatial population redistribution in the rural areas of Kenya, particularly it s contribution to the spatial population distribution in Nyandarua district, Central Province, with regard to the overall success of this programme as a population policy measure aimed at correcting the spatial maldistribution of population in the rural areas.

The land under settlement programme in Nyandarua district was formerly held as large scale European owned mixed farms and since 1962 has gradually turned over to Kenya African farmers on Small Agricultural settlement holdings (plots).

Nyandarua district today has a total of 52 settlement schemes with 23654 agricultural settlement plots covering an area of 510,170 acres. The district has sufficiently good land soils and rainfall to allow for cash crop agriculture. It is also well serviced with transportation, marketing, medical and educational facilities.

Land settlement programme has exhausted all the land available for settlement purposes in Nyandarua district. The district is now entirely a settlement district.

There is a strong positive correlation between the increment in the number of settlement scheme plots and the population density over the years since 1962 in Nyandarua district. This means that with the exhaustion of land for settlement programme in Nyandarua district, population density is going to be determined by other factors other than land settlement programme such as the rate of fertility, infant and child mortality and the sub-division of the existing settlement scheme plots for sale to people from other districts in Kenya.

Nyandarua district depicts an even spatial population distribution per the current administrative divisions as indicated by the index of population concentration of 2.95% for the district's 1995 estimated population size. This index however is bound to increase, hence increasing the degree of unevenness unless subdivision of the existing settlement scheme plots in the high potential areas is discouraged.

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KEY

-- DISTRICT BOUNDARY

--.--. INTERNATIONAL BOUNDARY

CALE 1:5,000,000

0   100   200 KM

For Names of the Districts See Appendix iv on page 47

MAP 2 SETTLEMENT SCHEMES OF NYANDARUA DISTRICT

KEY
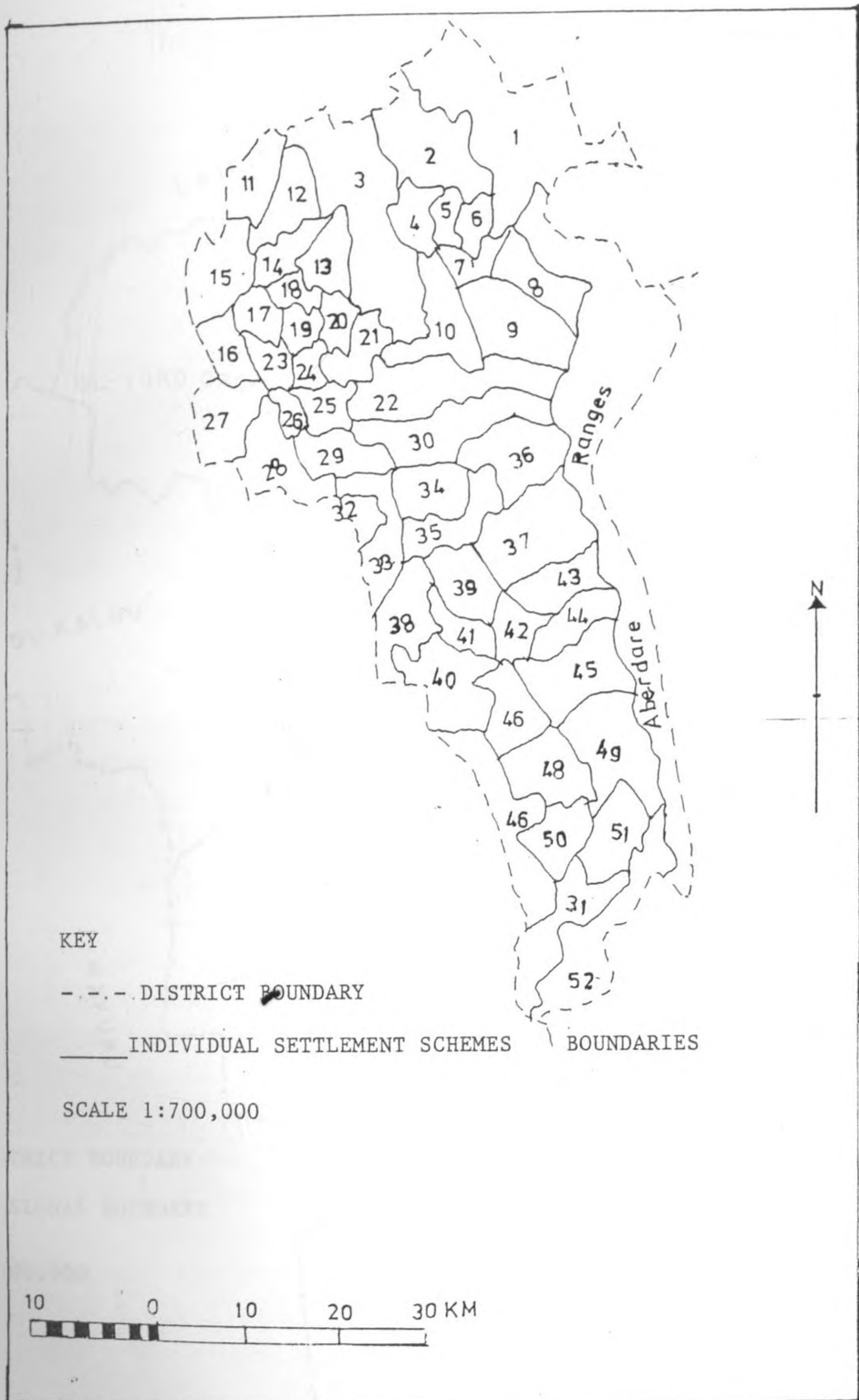
-.-.-. DISTRICT BOUNDARY

_____ INDIVIDUAL SETTLEMENT SCHEMES \ BOUNDARIES

SCALE 1:700,000
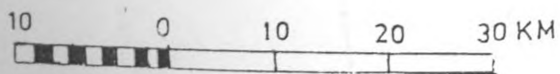
For Names of Settlement Schemes see Appendix v on page 48-49

(xiii)

MAP 3   NYANDARUA DISTRICT ADMINISTRATIVE BOUNDARIES

LAIKIPIA

LAIKIPIA

OL-JORO OROK

NDARAGWA

OL-KALOU

N

KIPIPIRI

NYERI

NAKURU

EY
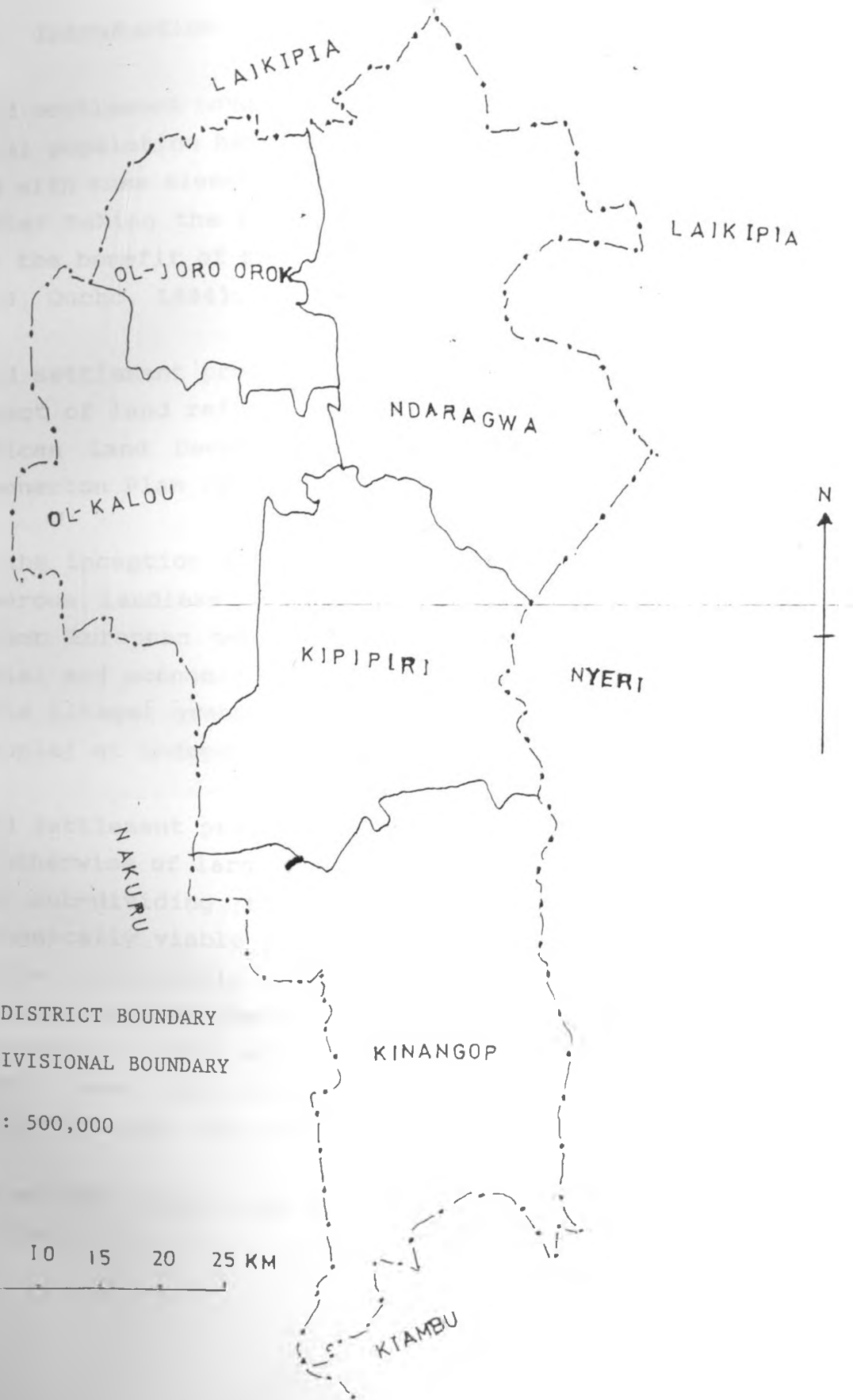
.—.—. DISTRICT BOUNDARY

_____ DIVISIONAL BOUNDARY

CALE 1: 500,000

KINANGOP

5   10   15   20   25 KM

KIAMBU

CHAPTER ONE

1.1 Introduction

Land settlement involves those land development programmes in which rural population have some options to move or to remain where they are with some elements of planning and control and land reform, the latter taking the form of the redistribution of property in land for the benefit of small farmers and agricultural workers (Gosling 1979, Oucho, 1984).

Land settlement programme in Kenya is largely a post independence aspect of land reform reminiscing earlier reforms inherent in the African Land Development Organization (ALDEV) as well as the Swynnerton Plan (Oucho, 1984).

At the inception of land settlement the policy was to settle the numerous landless and unemployed people in the country in the former European owned farms and thereby satisfy the political, social and economic aspirations of the people. This was meant to avoid illegal grabbing of land by force by the landless wananchi (people) at independence.

Land settlement programme involves the acquisition through buying or otherwise of large parcels of land and then planning, surveying and sub-dividing these large parcels of land into smaller economically viable agricultural settlement plots. These smaller economically viable agricultural settlement plots are allocated to the landless and unemployed Kenyans. The policy of land settlement programme is that 80% of the allottees to the settlement scheme plots comes from the province where the settlement scheme is located whereas the rest 20% comes from all parts of the Republic.

The current objectives of land settlement programme in Kenya is as follows:

1.   To settle landless Kenyans

2.   To plan, survey and demarcate large parcels of land into smaller economically viable units.

3.   To provide basic infrastructure necessary for human settlement such as water, roads, schools, health and community centres among other social amenities.

4.   To initiate both social and economic developments of otherwise unutilized land.

5.   To facilitate issuance of individual title deeds.

6.   To facilitate creation of employment in the rural areas and by so doing check rural-urban migration.

Land settlement programme in Kenya is implemented by the government through the Department of Land Adjudication and settlement. However, in Lamu district, the Federal Republic of Germany through German Technical Assistance (GTZ-German Assisted Settlement programme - GASP),has been assisting this department in initiating infrastructural development in the settlement schemes. Since the inception of land settlement programme in 1961, 911043 agricultural hectares of land in 23 districts have been brought under settlement in 318 settlement schemes in Kenya.

The main concern of this study is to examine the contribution of land settlement programme on the spatial distribution of population in Nyandarua district.   Studies undertaken on the spatial population redistribution recognizes land settlement programme as one of the most important policy measure that can influence the spatial population redistribution in the rural areas thus solving the problem of the spatial maldistribution of population in those areas (Gosling 1979, Oucho, 1984 Tola, 1994).

A study in this area is therefore necessary for the formulation of a more comprehensive population policy which incorporate all the

APPENDIX III

Computation of index of population concentration to determine the degree of uneveness of population distribution in Nyandarua District by the current administrative divisions in 1995.

Admin. Division	Land area in square Kms	Total Population 1995	Proportion of total land area sq km (ai)	Proportion of population (Pi)	Difference (Pi-ai)
Kinangop	932	121223	0.2642	0.2903	0.0261
Olkalou	713	83968	0.2021	0.2011	-0.000010
Ndaragwa	672	83059	0.1905	0.1989	0.00084
Kipipiri	713	75767	0.2021	0.1814	-0.0207
Oljoroorok	340	53637	0.0964	0.1284	0.032
Total	3528	417654	0.9553	1.0001	0.0589

Using formula :

Index of population concentration $= 1/2 \sum_{i=I}^{n} |p_i - a_i)| \, k$

When n, is the total number of administrative divisions (areas), i, the rank of the particular administrative division arranged in order of population sizes

P_i, is the uncumulated percentages of population per the current administrative divisions in Nyandarua district.

a_i, is the uncumulated percentage of the current areas of the current administrative divisions in Nyandarua District.

k , is a constant number equal to 1,000 or 10,000. This index is simply the sum the positive differences between the two percentage distributions P_i and a_i divided by half (1/2)

$1/2 |(0.0589)| \times 100$

= 2.95 per cent

This percentage was the proportion of the population that would have to be redistributed in inorder to attain a completely uniform distribution of persons over the current administrative divisions in Nyandarua District.

The district had a total number of 52 settlement schemes with 23,654 Agricultural settlement plots covering an area of approximately 510,170 acres by 31st December 1995. (See map 2 on page xii)

The population size and density in Nyandarua district has experienced an accelerated growth since 1962. In 1962, the total population of the district was 100,700 people with population density of 29 persons per square kilometre. This population size and density in Nyandarua district was by the end of 1995 estimated to be 436488 with a population density of 124 persons per square kilometre at an exponential population growth rate of 3.9% per annum between 1979 to 1989.

Nyandarua district is located in a part of Kenya where the structure has been very much influenced by the activities associated with the formation of the great African Rift Valley.

The altitude in the district varies from approximately 3,999 metres above sea level on the Aberdare Ranges to the south of the district to about 1828 metres above sea level to the west on the floor of the Rift Valley. It occupies an area west of Aberdare ranges where land drops in a series of fault escarpments westwards to the floor of the Rift Valley around Naivasha. It consists mainly of Kinangop plateau and Ol Kalou salient, both which are parts of the Rift Valley situated in the rain shadow of the Aberdare Range.

The general direction of rivers is mainly to the south and north of the district. The Aberdare ranges are drained by the Malewa river which flows into lake Naivasha in the south of the district and has a number of swift running streams that form its tributaries. Ewaso Narok and pesi are other major rivers flowing towards Laikipia district in the north of Nyandarua district. Lake Olbolossat is the only large water mass in the district covering an area of 4 square kilometres.

Geology and drainage patterns has influenced soil formation in the district with dominant soils having been developed from the tertiary basic igneous rocks and the volcanic ashes. The dominant soils on plateaus and elevated structural plains especially in the Kinangop area vary from perfect to imperfect drained deep to moderately deep and are dark greyish brown. The highest parts of the district on the Aberdare mountains contains soils of moderate to high fertility and are too cold for cultivation of some crops. On slightly lower altitudes in the district, soils are humid and of high fertility suitable for agricultural and livestock production.

Nyandarua district enjoys an annual rainfall of between 750 and 1500 milimetres (mm) which falls in March-May and August-November. Temperatures averages at 24°C and are slightly modified by Aberdare ranges. June to August are the district's coldest months.

Nyandarua district is predominantly a mixed farming district with small scale farming in the settlement scheme plots increasingly supplementing the large scale farms that characterised its former "scheduled area" status. The upper highlands zones in the district are suitable for growing wheat, barley and pyrethrum and for rearing sheep, whereas, the lower highland zones are suitable for growing maize, beans, peas, horticultural crops and vegetables and for rearing livestock. There has been too many sub-divisions of land in most high potential areas in the district and this has to be discouraged to enable the district realize its agricultural potential.

Administratively, Nyandarua district is sub divided into five administrative divisions with 21 locations and 62 sub locations. In terms of the area, Kinangop division has the largest area followed by Ndaragwa, Ol kalou, Kipipiri and Oljoro orok divisions in that order.(see map 3   on page xiii).

In terms of the population sizes and density Kinangop division leads followed by Oljoro Orok, Olkalou, Kipipiri and Ndaragwa divisions.

Kinangop division has the highest number of schemes followed by Olkalou, Ndaragwa, Kipipiri and Oljoro orok. Kipipiri has the highest number of settlement scheme plots followed by Kinangop Oljoro orok, Olkaou and lastly Ndaragwa divisions in that order.

Land settlement programme in Nyandarua district started in October 1962 in Kipipiri division followed by Kinangop in December in the same year, Ol kalou in May 1963, Oljoro orok in September, 1963 and finally Ndaragwa divisions in April 1964.

1.3 Statement of the Problem.

In 1961 land settlement programme was launched in Kenya with the creation of land development and settlement board to implement this programme. The powers and functions of this board was later transferred to the Department of settlement which was created in 1962 as a government department to help administer the settlement programme administratively and technically on behalf of the settlement fund Trustees(S.F.T). Since the inception of land settlement programme in Kenya in 1961, attempts to establish the extent to which this programme has contributed to the spatial population redistribution in Kenya has been generalized background information on the rate of net-migration, and the increases in population density in the settlement districts in the country (Migot, 1984, Oucho, 1984). While such information is useful with regard to providing necessary background information it however, falls short of subjecting the spatial population redistributive aspect of land settlement programme to serious scrutiny.

Kenya like many sub-saharan African countries has experienced an uneven spatial population distribution and has adopted land settlement programme as a population policy measure to help correct the unevenness of the spatial population distribution in her rural areas.

This study attempts to analyse the relationship between the increment in the number of settlement scheme plots and the population density in Nyandarua district in addition to determining the degree of imbalances (unevenness) in the spatial distribution of population in the district. Such an analysis is definitely absent in the earlier studies on the spatial population distribution. Most of these studies placed more emphasis on population density as a measure of the spatial population distribution.

Nyandarua district, the study area, is very unique in central province as indicated by its having the highest number of settlement schemes, low population size and density, even spatial population distribution of population per the current administrative divisions and finally being located entirely in the former "scheduled area" and the largest district in the province. The unique characteristic of Nyandarua district already mentioned, prompted this study.

1.4 Objectives of the Study

The main objective of this study is to analyse the impact of land settlement programme on the spatial population distribution in Nyandarua district and demonstrate the effectiveness of this programme in eliminating the spatial population maldistribution in the rural areas of Kenya.

The specific objectives of this study include the following:

1. To describe the distribution of land settlement schemes per the current administrative divisions in Nyandarua district in selected years from 1962 to 1994.

2. To show the population size and density in Nyandarua district in selected years from 1962 to 1994.

3. To examine the relationship between the land settlement programme and population size and density in Nyandarua district in selected years from 1962 to 1994.

4. To provide policy makers with appropriate recommendations based on the findings of this study.

1.5 Justificaiton of the Study

Kenya is one of the countries in sub-saharan Africa which experiences spatial population maldistribution in her rural areas. Half of the rural population in Kenya lives on 6% of the land area or one third (1/3) of the high and medium potential land at very high densities. Moreover, most of the density increases in Kenya tends to take place in those areas that are already the most crowded.

In 1961, land settlement programme was launched in Kenya with explicit socio-economic objectives and implicit socio-demographic issues which were intended to influence migration and papulation distribution in the country.   This has resulted into socio-demographic information on settlement schemes being sketchy and incomplete. Moreover, studies on the demographic implications of land settlement programme in Kenya remains incomplete.

Land settlement programme has been chosen for this study because it is the most direct and deliberate effort at spatial population redistribution in the rural areas. It is therefore important that this programme be given much emphasis like the other Kenya government's population policy measures (such as family planning) aimed at reducing the rate of population growth in order to ensure an even spatial population distribution in the rural areas in the country. Besides, this will enable Kenya government to realize a more comprehensive population policy incorporating all the three components of population change namely, fertility mortality and migration.

Nyandarua district, the study area is entirely a land settlement district and exhibit an even spatial population distribution unlike the other districts in central province. An examination of the contribution of land settlement programme on the spatial population distribution in this district, is therefore expected to provide information of great use for the formulation of future policies and implementation of land settlement programme as a Kenya government population policy measure to correct the unevenness in the spatial distribution of population in the rural areas.

1.6   Scope and limitation of the Study

The main concern of this study was to establish the extent to which the increment in the number of settlement scheme plots is related to the population density and how the availability of settlement scheme plots in different parts in Nyandarua district has affected the spatial population distribution in the district.

Analysis has been made from the available records on the increment in the number of settlement scheme plots in view of the changing population size and density since 1962.

The most important shortcoming of this study is that it assumes the whole of Nyandarua district as having arable land. This assumption was made in order to facilitate the conversion of the population density into physiological density which is a more refined index suitable for indicating meaningful population - land relationship of enumeration units (area). This study considers only the initial land settlement plots and omits the plots resulting from the sub-divisions of the original settlement scheme plots in its analysis. The limit of time and funds have restricted further inquiry to determine the number of resultant plots from the sub-division of the original settlement scheme plots besides other relevant information concerning this study. Despite these limitations, attempts have been made to derive meaningful analysis in this study.

CHAPTER TWO

2.1 Literature Review

Land settlement schemes have been a common rural economic development programmes in the developing countries over the past four decades. Many studies have been undertaken on land settlement programme with a view to evaluating the overall contribution of this programme to National Development. Most of the studies have paid much attention to the political and socio economic contribution of land settlement programme than its socio-demographic contribution.

According to Van Arkadie Mission on land settlement in Kenya (1966) Land settlement programme was started to solve land shortage problems caused by the displacement of the already scattered African Population in the Kenya highlands as a result of European settlement in those areas. This mission also stated that in 1961 land settlement programme was launched in kenya following the full indications of the attainment of independence from the British rule by opening up the former "scheduled areas" for African settlement. This was further boosted by the launching of the million Acre settlement programme in 1962 to transfer one million acres of former white settlers' mixed farming farms to African small holders.

National Development Plan (1966 - 1970) stated that prior to the launching of the million acre settlement programme in 1962 to orderly transfer Ex-European owned mixed farming large scale farms to African small holders, the colonial government had since 1938 been organising settlement schemes in the non-scheduled areas (African reserves) in the nine districts of Kilifi, Nandi, Nakuru, Machakos, South Nyanza, Kericho, Embu, Baringo and Kwale. This plan also stated that political and economic considerations dictated that this massive land transfer through settlement programme be

confined initially to the former white settlers' mixed farming areas which largely bordered on those sections of the former African areas where the pressure of population and livestock on the land was greatest.

Chambers (1969) argued on the same lines as the National Development plan (1966 - 1970) by stating that, land settlement programme was designed by the government of Kenya to provide individual agricultural settlement plots on small scale basis to African settlers on the Ex-European large scale farms, thus removing the then prevailing political discontent by satisfying the desire of landless Kenyans for their own pieces of land.

Dillon (1970) and Odingo (1971b), while recognising the political contribution of land settlement programme in Kenya, stated that this programme besides, providing land for the large numbers of landless and unemployed people, it also contributed to increased intensity of land use hence helping to meet the-fast-rising need for food as population expands rapidly.

National Development Plan (1974 -1978), stated that there was an uneven spatial population distribution in the rural areas of Kenya, with about half (1/2) of the population living on 6% of the land area or one third (1/3) of the high and medium potential land. It also stated that most of the density increases tend to take place in those areas that are already the most crowded.

Bernard et al (1979), Ominde (1982) and Henin et al (1987) argued in the same lines with this National development plan and added that over two third (2/3) of the rural population of kenya is concentrated in about one tenth (1/10) of the land areas consisting of Central, Nyanza, Western parts of Eastern province (Embu and Meru) parts of the Rift Valley province (Kericho, Nandi, Trans-Nzoia and Uasin Gishu) and the coastal belt.

Gosling (1979), stated that land settlement programme was being adopted by almost all the sub-saharan African countries as one of the population redistribution policies to correct the spatial maldistribution of population in the rural areas. This according to him, had been necessitated by the increasing attention which was being given to the distribution of population within nations in the developing countries than in the past when these countries focused almost exclusively on overall population number and growth and on policies to control fertility. Other scholars who have argued on the same lines as Gosling include Abumere (1981) Mabogunje (1981), Oberai (1988), Makinwa (1992) and Nabila (1992).

Oucho (1984) stated that land settlement involves those land development programmes in which the population have had the option to move or remain intact with some elements of planning and control, and land reform, the latter taking the form of the redistribution of property in land for the benefit of small farmers and agricultural workers . This according to him is exemplified by the transfer of land from white settlers to the African population leading to considerable population redistribution in the country. He further stated that at inception settlement schemes in Kenya were percieved as economic entities in which socio-demographic issues were but implicit in their development hence socio-demographic information on settlement schemes remain sketchy and incomplete. This hinders the formulation of a more comprehensive population policy which according to Oucho (1984), should incorporate all the three components of population change, namely, fertility implemented through (family planning) , mortality (already declining) and migration (rural - urban and rural-rural) the latter, of which land settlement programme is an expression.

In terms of population density in the settlement schemes, Oucho (1984) stated that despite changes in area and negative growth in some settlement schemes, population density has generally increased in the settlement schemes. According to him lack of relevant data hinders the application of the physiological density which is a more refined index suitable for use in settlement schemes unlike population density which is too crude to indicate meaningful population land relationship of enumeration units (Area).

According to the Nyandarua district development plan (1994 – 1996), the district is one of the most productive districts in the country in terms of agricultural and livestock activities in the settlement schemes with unlimited size of the arable land. This characteristics of Nyandarua district therefore made it ideal for the analysis of the contribution of land settlement programme on the spatial population distribution in the district using more refined indices for measuring population distribution namely, physiological density and the index of population concentration.

2.2. Operational Hypotheses.

This study attempts to test the following hypotheses: That,

1. The increment in the number of land settlement scheme plots is related to the increase in the size of the population /physiological density in Nyandarua district from 1962 to 1994.

2. There is a relationship between the number of settlement scheme plots and population/physiological density per the current administrative divisions in Nyandarua district.

3. There is an even spatial population distribution per the current administrative divisions in Nyandarua district.

2.3 Definition of Concepts.

1.Land Settlement Programme: It involves those land development programmes in which the rural population have some option to move or remain where they are. It also involves controlled movement and settlement of population. It is different from the land Resettlement programme which involves forced movement of rural population for security or development purposes.

2. Physiological Density: This refers to the population per area of arable land. It is measured by population per square kilometre of Arable land. This index of measurement takes into account the environmental conditions of an area.

3. Population Density: It is an index showing the relation between a population and the area in which it lives. It is obtained by dividing the total population by the area of the territory (district) and is generally expressed as the number of persons per square kilometre, mile or acre.

4. Scheduled Areas: These are the areas which were exclusively reserved for white settlement in Kenya mostly in the Kenya highlands.

5. Spatial Population
    Distribution: It is also referred to as the
                                    Geographical distribution of
                                    population. It deals with the way in
                                    which the population is distributed
                                    through space over the territory or
                                    administrative areas (divisions) in
                                    a district or a country.

6. Spatial Population
    Re-Distribuiton: It refers to the reorientation or
                                    alteration of the distribution of
                                    population through space over the
                                    territory or administrative areas.
                                    It involves the transfer of
                                    population from highly densely
                                    settled areas to sparsely settled
                                    areas.

7. Settlement Fund
    Trustees (S.F.T.):   It is a distinct body created by an
                                    Act of parliament, corporate, with
                                    legal entity, with perpetual
                                    succession, common seal and its
                                    corporated name may sue and be sued
                                    and may purchase, hold, manage and
                                    dispose off property and may also
                                    enter into any contract in this
                                    regard. It is in the department of
                                    settlement in the Ministry of Lands
                                    and settlement which technically and
                                    administratively administers
                                    settlement programme on its behalf.

CHAPTER THREE

3.0 Sources of Data and Methodology

3.1 Sources of Data

This study utilized secondary sources of data. The data for this study was categorized into two, namely data on land settlement programme and data on population size and density in the study area from 1962 to 1995.

The data on land settlement programme and the administrative boundaries of the study area was obtained from the annual reports of the department of land adjudication and settlement and the department of survey, boundaries section, both in the Ministry of Lands and settlement. This data was supplemented with the information obtained from the National and Nyandarua district development plans of 1974-1978, 1989-1993 and 1994-1996 prepared by the Ministry of Planning and National Development.

The data on population size and density in the study area, was obtained from the population census reports for Kenya Volume I of 1962, 1969, 1979 and 1989 published by the Central Bureau of Statistics, Ministry of Planning and National Development.

For the period beyond 1989, population size and density was projected using the exponential extrapolation method based on 3.9% per annum rate of population growth as estimated in 1989 Kenya Population Census.

Since census are decennial, gaps between them were filled using simple exponential interpolation and extrapolation methods.

3.2 Methodology

This part of the chapter briefly outlines the methods that have been used in organizing and analysing data in this study. Different types of absolute numbers have been used to describe data in this study.

3.2.1 Tabulations

The different types of absolute numbers used in this study have been tabulated in order to give an orderly pattern of numerical data representing the increment in the number of settlement scheme plots and increasing population/physiological density in selected years in the study area since 1962. This method of data analysis facilitates a better understanding of the relationships between the variables of this study.

3.2.2 Projections

The mathematical method of population projection was used in analysing the data on population size and density in this study.

This method involves the application of some mathematical formula directly to the total population to derive projections of total population. This study adopted the exponential growth model which is presented as follows:

$$Pt = P_o \, e^{rn}$$

Where   Pt, is the estimated population
            Pe, is the initial population
            e, is the base of the natural system of logarithms
            n, is the number of years or time interval

The exponential growth model was used because, its assumption that population growth is continuous is more reasonable than the assumption that population growth is periodic as with the case of geometric growth model or the assumption that a constant absolute monthly or annual population growth as with the case of Arithmetic growth model (Kpedekpo 1982). Moreover, the exponential growth model can be used to estimate population over a long period of time than geometric and the Arithmetic growth models which are useful in estimating population over a short period of time, for example one year period. This is so because the exact dates at which censuses were taken is relevant to the calculation of the estimated population in both Arithmetic and Geometric growth models than in the exponential growth model.

The exponential growth model therefore describes better the nature of population growth in the study area. This method was also used to estimate the rate of population growth (r) from 1962 to 1969 for the study area. This was done using the following formula:

$$r = \frac{1}{n} \quad Log\ e\frac{P_t}{P_o}$$

where   r, is the rate of growth
          n, is the time interval or number of years
          e, is the base of the natural logarithms
          Pt, is the estimated population
          Po, is the initial population

After obtaining the rate of population growth (r) using the exponential growth model, exponential interpolation method was used to obtain the population sizes for the selected years from 1989 to 1995. Exponential interpolation and extrapolation methods used the following formula to obtain the estimated population:

$$P_t = P_o \, e^{rn}$$

Where P_t is the estimated population

P_o, is the initial population

e , is the base of the natural logarithms

r , is the rate of population growth

n , is the number of years or time interval between two census periods

Exponential interpolation and extrapolation methods assumes that the population growth rate is constant and does not change.

3.2.3   Correlation Analysis

This study adopted the correlation method of data analysis because our interest was not to predict the value of a dependent variable (Y) that is likely to be associated with an independent variable (X) done by using the simple linear regression analysis, but was to evaluate the extent to which the increment in the number of settlement scheme plots is associated with the population density in the study area. The analysis was done by calculating the value of coefficient correlation 'r' which is used to determine the nature of association existing whether direct or inverse between the independent variable (X), that is the increment in the number of settlement scheme plots and dependent variable (Y) representing the size of population/physiological density in selected years from 1962 to 1994 in the study area.

To obtain the value of the coefficient correlation 'r' the following formula was used in this study:

$$r = \frac{N\Sigma XY - \Sigma X\Sigma Y}{\sqrt{[\{(N\Sigma X^2) - (\Sigma X)^2\}.\{(N\Sigma Y^2 - (\Sigma Y)^2\}]}}$$

Where:

X, is the independent variable (number of settlement scheme plots

Y, is the dependent variable (size of the population density)

N, is the number of occurences or observation (total number of selected years).

The value of coefficient correlation (r) ranges from -1.00 to +1.00. When the value of coefficient correlation is -1.00 or +1.00, it indicates a perfect negative (inverse) and positive (direct) relationship between the independent variable (X) and the dependent variable (Y) respectively.

Whereas, a value equal to zero indicates a complete absence of correlation between the two variables X and Y. Coefficient correlation (r) measures the degree of association between the variables and gives an investigator one summary index on the nature of relationship existing whether inverse or direct.

Most of the hypothesized relationships in this study have been analysed using the correlation analysis and on its basis certain important conclusions have been made.

3.2.4   Index of population concentration.

This method of data analysis was adopted in this study in order to determine the degree of unevenness of population distribution in Nyandarua district by the current administrative divisions in 1995. To obtain the index of population concentration, the following equation was used in this study:

$$\text{Index of concentration} = 1/2 \sum_{i=1}^{n} |(P_i - a_i)| K$$

Where:

n,   is the total number of administrative divisions (areas)

i,   is the rank of the particular administrative division (area) arranged in order of population sizes.

Pi, is the uncumulated percentages of population size per the current administrative divisions of Nyandarua district.

ai, is the uncumulated percentages of the size of the areas per the current administrative divisions in Nyandarua district

k,   is a constant number equal to 1,000 or 10,000.
     Index of population concentration is simply the sum of the positive differences between the two percentage distributions P_i and a_i divided by half (1/2). This index can be interpreted as the proportion of the population that would have to be redistributed in order to attain a completely uniform distribution of persons over the current administrative divisions in Nyandarua district. This index involves less computation, unlike the concentration ratio index, but both gives almost identical results (kpedekpo, 1982).

The results from the calculation of the index of population concentration was used to test the operational hypothesis in this study which states that there is an even spatial population distribution per the current administrative divisions in Nyandarua district.

NOTE: The following assumptions were taken into consideration in this study.

1.   That the levels of mortality and fertility are constant in the projections for the population sizes and density from 1962 to 1995.

2.   That, the increment in the number of settlement scheme plots and population sizes and density in selected years from 1962 to 1994 is continuous in the study area.

3.   That the whole land in the study area is arable. This assumption was made in order to facilitate the calculation of the physiological density which is a more refined index than the population density which is too crude to indicate a meaningful population-land relationship of enumeration units (area). (Oucho, 1984).

4.   Finally, that the spatial population distribution by administrative divisions represents census enumeration of population by geographic sub-divisions. This assumption was made in order to facilitate the calculation of the index of population concentration to determine the proportion of the population that would have to be redistributed in order to attain a completely uniform distribution of persons over the current administrative divisions in Nyandarua district.

CHAPTER FOUR

4.1 Findings and Discussions.

The study has selected land settlement programme and its relationship to the spatial distribution of population in Nyandarua district. The analysis of this relationship forms the first part of this chapter and will include the use of descriptive and inferential methods of data analysis.

The second part of this chapter deals with analysis of the degree of uneveness in the spatial population distribution in Nyandarua district, the study area using the index of population concentration method of data analysis.

Table 1.1. Total area, population size and physiological density for Nyandarua district in selected years from 1962 to 1995.

Year	Area in Sq Km	Total Population	Physiological Density
1962	3528	100700	29
1963	"	109196	31
1964	"	118409	34
1965	"	128399	36
1967	"	150980	43
1968	"	163718	46
1981	"	250218	71
1982	"	259131	73
1984	"	277920	79
1993	"	403736	114
1994	"	419793	119
1995	"	436488	124

Source: Population census reports for Kenya, 1962, 1969, 1979 and
           1989, Central Bureau of statistics, Nairobi, Kenya.

As the above table shows, the population size and physiological
density has been increasing over the years since 1962 in Nyandarua
district mainly as a result of in-migration of population from
other areas into the district's settlement land formerly held by
white settlers.

The size of population and physiological density in Nyandarua has
increased for more than four times since 1962. Population size has
increased from 100700 people in 1962 to estimated 438488 people in
1995, whereas the physiological density has increased from 29
persons per square kilometre in 1962 to estimated 124 persons per
square kilometre in 1995 (see above table 1.1 on page 24).

There has been a tremendous increase in the number of settlement
schemes and settlement scheme plots since the inception of land
settlement programme in Nyandarua district in 1962.   As table (1.2
on page 26) shows, the number of settlement scheme plots in the
district has increased from 5 to 52 settlement schemes and 3060 to
23654
settlement scheme plots in 1962 and 1994 respectively .

Table 1.2.   The number of settlement schemes plots for selected years in Nyandarua district from 1994.

Year	Number of Settlement Schemes	Number of Settlement Schemes Plots.
1962	5	3060
1963	21	8038
1964	27	9315
1965	35	11323
1967	38	12053
1968	39	12191
1981	41	14382
1982	48	21501
1984	49	22369
1993	51	23314
1994	52	23654

Source: Department of Land Adjudication and settlement, Ministry of Lands and settlement, Nairobi.

Year	Number of Settlement Scheme Plots	Population/Physiological Density
1962	3060	29
1963	8038	31
1964	9315	34
1965	11323	36
1967	12053	43
1968	12191	46
1981	14382	71
1982	21501	73
1984	22369	79
1993	23314	114
1994	23654	119

Source: Department of land Adjustment and settlement, Ministry of
           land settlement , Nairobi; population census reports for
           Kenya volume I, 1962,1969,1979 and 1989.

As the above table shows Nyandarua district has experienced an
increment of both the number of settlement scheme plots and the
population/physiological density since 1962. The increased in-
migration into the district settlement land formerly held by the
white settlers as a result of land settlement programme which
started in 1962 has led to an increasing population /physiological
density over the years (see table 1.4 on page 28). The
population/physiological density has now increased from 29 persons
per square kilometre in 1962 when the number of settlement scheme
plots were 3060 to 119 persons per square kilometre in 1994 with
the district having a total of 23654 settlement scheme plots.This
shows that as the number of settlement scheme plots increases so
does the size of the population /physiological density in Nyandarua
district.

Land settlement programme has exhausted all the available land for
settlement activities in Nyandarua district.The future
population/physiological density increase will therefore be
influenced by other factors such as the continued sub-division of
the initial settlement scheme plots for sale to people from other
districts and the rate of fertility and infant and child mortality
among other factors in the district.

Table 1.5 Total number of settlement scheme plots,
population/physiological density and the commencement of settlement
programme by administrative divisions in Nyandarua district in
1995.

Division	Number of Settlement Scheme plots	Population/ Physiological Density	Commencement of Settlmenmt Programme
Kinangop	5349	130	December, 1962
Kipipiri	5577	106	October, 1962
Olkalou	4930	118	May, 1963
Oljoro orok	4931	158	September, 1963
Ndaragwa	2817	124	April, 1964

Source: Department of Land Adjudication and settlement, Ministry
           of Lands and settlement, Nairobi.

Land settlement programme started first in kipipiri division in
October 1962 and later to Kinangop in December 1962 followed by,
Olkalou in May 1963, Oljoro orok in September 1963 and finally,
April 1964 in Ndaragwa divisions (see table 1.5 on page 29).

Although land settlement programme started earlier in Kipipiri division which has also the highest number of settlement scheme plots, Oljoro orok division has the highest population/physiological density despite being third in the number of settlement scheme plots among the five current administrative divisions in Nyandarua district (see table 1.5 on page 29). This therefore means that the size of the population /physiological density per the current administrative divisions in Nyandarua district is not only determined by the number of settlement scheme plots but also by the time and frequency of initiation of settlement schemes, and the area of each administrative division in the district (see table 1.6 on page 31).

Table 1.6 The distribution of settlement schemes by years for the current administrative division in Nyandarua district.

Division	Total Number of settlement Schemes	Number of settlement schemes by years										
		1962	1963	1964	1965	1967	1968	1981	1982	1984	1993	1994
Kinangop	13	2	8	0	0	1	0	1	0	0	1	0
Kipipiri	8	3	2	1	0	0	0	1	1	0	0	0
Oljor orok	7	0	1	0	3	1	0	0	1	0	1	0
Ndaragwa	9	0	0	2	3	1	0	0	2	1	0	0
Olkalou	15	0	5	3	2	0	1	0	3	0	0	1

The simple linear correlation analysis (see appendix II on page 44-45) reveals that there is a strong correlation between the increment in the number of settlement scheme plots and the population/physiological density from 1962 to 1994 in Nyandarua district. The value of the correlation coefficient is + 0.9112 indicating a very strong association between the two variables. The increase in the number of settlement scheme plots is therefore directly accompanied by the increase in the size of the population/physiological density in Nyandarua district. This means that with the exhaustion of the land available for land settlement activities, the future increment in the size of the population /physiological density as earlier stated, will be influenced by other factors such as the sub-division of the initial settlement scheme plots for sale to people from other districts and the levels and trends of infant and child mortality among other socio-demographic factors in Nyandarua district.

The degree of unevenness in the spatial population distribution in Nyandarua district has been analysed by using the index of population concentration method (see appendix III on page 46-47). The calculated index of population concentration of 0.0295 or 2.95 per cent indicates that this is the proportion of the population that would have to be redistributed in order to attain a completely uniform distribution of persons over all the five administrative divisions in Nyandarua district. This percentage is equivalent to a total of 12,321 persons. Since this figure is too small, it therefore indicates that there is an even spatial population distribution among the five administrative divisions of Nyandarua district.

The current increase in the rate of sub-division of the initial settlement scheme plots for sale to people from other districts may however, increase this degree of unevenness in the spatial distribution of population among the administrative divisions in Nyandarua district in the future. There is therefore a need to

institute a land policy to discourage the sub-division of the initial settlement scheme plots for sale to other people outside Nyandarua district. This will ensure the sustainability of the current spatial population distribution among the administrative divisions in Nyandarua district in addition to enhancing agricultural productivity in the area.

CHAPTER FIVE

5.1 Summary and Conclusion

The main objective of this study was to investigate the impact of land settlement programme on the spatial population distribution in Nyandarua district with a view to demonstrating the effectiveness of this programme in eliminating the spatial population malditribution in the rural areas of Kenya. This study examined the nature of relationship existing whether direct or inverse between the increment in the number of settlement scheme plots and population/physiological density in selected years in Nyandarua district. It also examined the degree of the uneveness in the spatial population distribution in Nyandarua district with a view to determining the nature of spatial population distribution in the district by the current administrative divisions.

Secondary sources of data were utilized in this study. These sources included, Kenya Population Census Reports, National and Nyandarua district development plans and the annual reports of the Departments of Land Adjudication and Settlement.

The data for this study was analysed by use of descriptive, inferential and mathematical methods of data analysis. The descriptive methods of data analysis in this study involved the tabulation of different types of absolute numbers in order to give an orderly pattern of numerical data representing the increment of settlement schemes, and settlement schemes plots in relation to increasing population/physiological density in selected years in Nyandarua district since 1962.

The mathematical methods of data analysis used in this study included the projection method and the index of population concentration analysis. The projection method was used on analysing the data on population size and physiological density in this

study. The method involves the application of some mathematical formula directly to the total population to derive projections of the size of the total population.

This method of projection adopted the exponential growth model because its assumption that population growth is continuous is more reasonable unlike the assumptions made by Geometric and Arithmetic growth models.

The analysis of the index of population concentration was another mathematical method used in this study. This method was used to determine the degree of uneveness of population distribution in Nyandarua district by the current administrative divisions. The resultant index in this analysis indicates the proportion of the population that would have to redistributed in order to attain a completely uniform distribution of persons over the current administrative divisions in Nyandarua district.

The simple linear correlation analysis was the inferential method used in this study to analyse the nature of relationship existing whether direct or inverse between the increment in the number of settlement scheme plots and the size of the population/physiological density in selected years from 1962 to 1994 in Nyandarua district.

The analysis was done by calculating the value of the coefficient of correlation (r) which is used to determine the nature of association existing whether direct or inverse between the independent variable (x) and dependent variable (y).

Land settlement programme in Kenya was initiated in order to provide land to Africans by settling them back in the Kenya highlands where they had been displaced by the Europeans when they (Europeans) settled in those areas during the colonial period. (Van Arkadie Mission, 1966, Odingo 1971b). Prior to the commencement of

land settlement programme in Kenya in 1961, the African areas (non scheduled areas) were experiencing high population densities due to the confinement of population in one area, the so called the Native Reserves (National Development - plan 1966 - 1970).

The Kenya highlands or "white highlands", the area occupied by the white settlers had sparse population. Hence the massive land transfer through the land settlement was initally confined to the former white settler's mixed farming areas, Nyandarua district being no exception, which largely bordered on those sections of the former African areas, ('Native Reserves') where the pressure of population and livestock on the land was greatest (National Development plan 1966- 1970).

Chambers, (1969), argued that land settlement programme was designed by the Kenya government to remove the political discontent by providing land on small scale basis to African settlers on the Ex-European large scale mixed farms thus satisfying the desire of landless Kenyans for their own pieces of land.

According to Dillon (1970) and Odingo (1971b) land settlement programme has contributed to the increased intensity of land use hence helping to some extent to meet the fast rising need for food as population expands rapidly in Kenya. Most of the land settlement districts in Kenya such as Nyandarua, Uashin Gishu, Trans-nzoia, Nakuru to mention but a few now serves as the National Food granneries in the country.

Kenya like many sub-saharan African countries has been experiencing uneven spatial population distribution in her rural areas (Benard et al 1979, Ominde , 1982) She is also one of the sub-saharan African countries which has adopted land settlement programme as one of the population redistribution policies to correct the spatial malditribution of population in her rural areas. Land settlement programme involves those land development programme in

which the population have had the option to move or remain intact with some elements of planning and control, and land reform, the latter taking the form of the redistribution of property in land for the benefit of small scale farmers and agricultural workers as demonstrated by the transfer of land from white settlers to the African population in Kenya.

Land transfer from the former white settlers to African small scale farmers through land settlement programme led to the considerable population redistribution and an increase in population/physiological densities in the settlement scheme areas in Kenya (Oucho, 1984).

According to Oucho (1984), a more comprehensive population policy should incorporate all the components of population change namely, fertility, mortality and migration (rural- urban and rural- rural) the latter being implemented through land settlement programme in Kenya.

In Conclusion therefore it can be said that, land settlement programme has been a major influencing factor on the spatial population distribution in Nyandarua district. This is explained by the fact that in 1962 when land settlement programme started in the district, there were 3060 settlement scheme plots at the end of the year and a total of 10070 people with a population/physiological density of 29 persons per square kilometre. But by the end of 1995 there were a total of 23654 settlement scheme plots and an estimated population of 436488 people with a population/physiological density of 124 persons per square kilometre. Moreover, the calculated coefficient correlation value of + 0.9112 indicates a very strong direct association between the increment in the number of settlement scheme plots and the size of the physiological/population density in Nyandarua district.

Nyandarua district which is purely a land settlement district

enjoys an even spatial population distribution by its administrative divisions among the six districts in central province. The calculated index of population concentration of 2.98 per cent indicates that the proportion of the population that would have to be redistributed in order to attain a completely uniform population distribution over the five administrative divisions in the district was too small. This value therefore indicates that there is an even spatial population distribution by the five administrative divisions in Nyandarua district.

The future spatial population distribution in Nyandarua district will now be influenced by the rate and the concentration of sub-division of the initial settlement scheme plots per the current administrative divisions among others factors since land settlement programme has already exhausted all the available land for settlement activities in the district. To ensure the sustainability of the current spatial population distribution by the administrative divisions in Nyandarua district, a land policy should be initiated to discourage the sub-division of the initial settlement scheme plots for sale.

5.2. Policy and Research Recommendations

5.2.1   Policy Recommendations.

1.   The planning of settlement schemes in Kenya should have provision for the future population growth in those schemes in order to ensure the retention of settler's children in the schemes.

2.   Land settlement programme in Kenya should be incorporated in the National population policy programme and accorded the same attention as the fertility, and mortality control programmes.

3. The government of Kenya through the Ministry of Lands and
    settlement should woo donor agencies interested in land
    settlement programme for example Food and Agriculture
    Organization (FAO). This will help to supplement
    infrastructural and socio-economic development work done by
    GTZ - German Assisted Settlement Programme in Lamu district
    resulting not only on the raising income of the settlers, but
    also in the reduction of loan defaulters and abadonment of
    settlement plots.

4. The Ministry of lands and settlement should implement the
    proposals of the sessional paper number 4 of 1984 concerning
    settlement programmes by devising ways of incorporating
    population oriented activities in all their training
    programmes. This will facilitate the assesment of the effects
    of settlements on population growth, migration and the impact
    of the newly settled population on the environment.[1]

5. A land policy should be instituted to discourage the
    subdivision of settlement scheme plots for sale to people from
    other districts. This will ensure a uniform population
    distribution in the settlement scheme areas in Nyandarua
    district and other land settlement areas in Kenya in addition
    to enhancing productivity in those areas.

6. Family planning activities should be encouraged in land
    settlement scheme areas in order to avoid creating a state of
    landlessness due to rapid population growth in the settlement
    schemes hence defeating its major initial objective of
    settling the landless people on the economically viable units
    of land.

[1] Population policy guidelines, sessional paper No. 4 of 1984,
    p. 27

5.2.2 Research Recommendations

1. Scholars should undertake Research to investigate the effects
    of land settlement programmes on attracting and retaining of
    population in the settlement schemes. This will help to
    provide data on the relationships between migration and rural
    settlement programmes.

2. Research should be undertaken on the socio-demographic
    implications of land settlement programme in Kenya. This will
    provide scholars, planners and policy makers with the socio-
    demographic data on settlement schemes in Kenya which is
    currently sketchy and incomplete

APPENDIX 1

Computation of population Growth rate for Nyandarua district from 1962 to 1969 – Using the exponential growth formula:

$$r = 1/n \; \log e \; \frac{(P_t)}{(P_o)}$$

Where: $\frac{P_t}{P_o}$ represent a ratio figure for the total population.

p_t, is the population at time two

p_o is the population at time one

n, is the number of years between time one and time two.

r, is the rate of population growth whose value is found by reference to a table of logarithms.

1962   Population P_o was 100700
1969   Population P_t was 176928

$$r = 1/7 \; \log_e \; \frac{(176928)}{(100700)}$$

$$r = 1/7 \; \log_e \quad 0.5635$$

$$r = \log_e \quad \frac{0.5635}{7} \quad = 0.0805$$

$$= 0.0805 \times 100 \quad = 8.05$$

r= 8.1 %   per annum

Therefore the exponential rate of population growth from 1962 to 1969 in Nyandarua district was 8.1% Per annum.

Using this exponential rate of population growth, we obtained the intercensual total population for Nyandarua district by use of the formula:

$Pt = P_o e^{rn}$

Example I
1963 pt of Nyandarua district

$= 100700\ e^{0.081} \times 1$
$= 109196$

Example II

1964 Pt of Nyandarua District

$= 100700\ e\ 0.081 \times 2$
$= 118,409$

    1965 = 128,299
    1967 = 150,980
    1968 = 163,718
    1981 = 250,218
    1982 = 259,131
    1984 = 277,920
    *1993 = 403,736
    *1994 = 419,793
    *1995 = 436,488

* NOTE: The 1989 census report indicated an exponential growth rate
of 4.04% per annum for Nyandarua District from 1979 to 1989. But
our calculation shows that it was 3.9% Per annum as shown below :
1979 Population (P_o) was 233302
1989 Population (P_t) was 345420

r= 1/10 log. $\underline{(345420)}$
           (233302)

r = $\underline{0.392}$
     10

r = 0.0392 x 100

r =‘3.9% Per annum.

APPENDIX II

Computation of the value of linear correction coefficient (r) to test the nature of relationship between the independent variable (x - the increment in the number of settlement scheme plots) and the dependent variable (y - the increment in the size of population /physiological density) in Nyandarua district in selected years from 1962 to 1994.

X	Y	X²	Y²	XY
3060	29	936300	841	88740
8038	31	64609444	961	249178
9315	34	86769225	1156	316710
11323	36	128210329	1296	407628
12053	43	145274809	1849	518279
12191	46	148620481	2116	560786
14382	71	206841924	5041	1021122
21501	73	462293001	5329	1569573
22369	79	500372161	6241	1767151
23314	114	543542596	12996	2657796
23654	119	559511716	14161	2814826
ΣX 161200	ΣY 675	ΣX² 2855409286	ΣY² 51987	ΣXY 11971789

Using the correlation equation , i.e

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{[(N\Sigma x^2) - (\Sigma x)^2] \bullet [(N\Sigma y^2) - (\Sigma y)^2]}}$$

Where X, is the independent variable, Y, is the Dependent variable

$N = 11$, Number of observations (in selected years)

$\Sigma X = 161,200$ $\Sigma Y = $ 675

$\Sigma X^2 = 2,855,409,286$ ΣY^2 51987

$\Sigma XY = 11971789$

After substituting the following values in the equation above, we get the value of the correlation coefficient to be $+0.9112$

This means that there is a strong direct association between the increment in the number of settlement scheme plots and the size of the population/physiological density (Y) in selected years from 1962 to 1994 in Nyandarua District.

APPENDIX IV

NAMES OF THE DISTRICTS IN KENYA (Note: Locations are shown in Map
1 on page xi)

1.	Turkana	25.	Nakuru
2.	Marsabit	26.	Nyandarua
3.	Wajir	27.	Laikipia
4.	Mandera	28.	Meru
5.	West Pokot	29.	Isiolo
6.	Samburu	30.	Garissa
7.	Baringo	31.	Tharaka-Nithi
8.	Elgeyo Marakwet	32.	Embu
9.	Uasin Gishu	33.	Kirinyaga
10.	Trans-Nzoia	34.	Muranga
11.	Bungoma	35.	Kiambu
12.	Busia	36.	Nairobi
13.	Kakamega	37.	Machakos
14.	Siaya	38.	Kajiado
15.	Vihiga	39.	Makueni
16.	Nandi	40.	Kitui
17.	Kisumu	41.	Taita Taveta
18.	Kericho	42.	Tana River
19.	Bomet	43.	Kilifi
20.	Nyamira	44.	Kwale
21.	Kisii	45.	Nyeri
22.	Homa Bay	46.	Lamu
23.	Migori	47.	Mombasa
24.	Narok		

APPENDIX V

NAMES OF SETTLEMENT SCHEMES IN NYANDARUA DISTRICT (Note: Locations are shown in Map 2 on page xii)

Scheme Number	Scheme Registration Number	Scheme Name
1	522	Mbuyu-Nyandarua
2	200	Karagoini
3	207	Oljoro orok salient
4	320	Olbolossat
5	221	Kanyagia
6	222	Ndaragwa
7	223	Simbara
8	225	Pesi
9	224	Shamata
10	321	Muruai
11	202	Silibwet
12	203	Oljoro orok west
13	211	Lesirko
14	205	Oraimutia
15	204	Sabuyo
16	208	Melaugini
17	209	Matindiri
18	210	Nyairoko
19	213	Passenga
20	215	Ol kalou west
21	216	Ol kalou central
22	323	Kirima
23	212	Upper Gilgil
24	214	Silanga
25	218	Ol kalou south
26	217	Gilgil west
27	219	Ngorika
28	331	Mawingo Salient

29	232	Mawingo
30	335	Ol kalou salient
31	260	South Kinangop
32	330	Kaimbaga extension
33	321	Muruai
34	228	Malewa
35	229	Kipipiri
36	227	Wanjohi
37	427	Geta
38	230	Turasha Ridge
39	327	Ndemi
40	233	Ol Aragwai
41	231	Mumui
42	251	Mkungi
43	424	Mikaro
44	252	Nandarasi
45	254	Kitiri
46	253	Kahuru
47	258	Karati
48	255	Muruaki
49	256	Tulanga
50	257	Githioro
51	259	Njambini
52	261	Mutonyora

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