

**POLICY IMPLICATIONS OF LAND SUBDIVISION IN SETTLEMENT AREAS:
A CASE STUDY OF LUMAKANDA SETTLEMENT SCHEME**

**BY
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2003

DECLARATION

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

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This thesis has been submitted for examination with our approval as the Principal
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DEDICATION

This Thesis is dedicated to my late Mum Agnes, my wife Emily and daughters Shirlyne, Beryl, and my Uncle Gerishom Yosi.

I thank all of them for their encouragement, support, and kindness and love for all the two years of my study. They all had something special to offer.

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ABSTRACT

The significance of land is that it constitutes the most important economic, cultural and political issues in Kenya today. It was true when Kenya became a colony dominated by European settlers. It remained true through the Mau Mau war and the transition to independence, both of which revolved around competing demands for land. And it has remained true since the 1980's to-date, in a country where the educated, the rich and poor alike consider land as the single most important form of personal wealth and is deeply entrenched with its distribution and use.

Subdivision of land into small un-viable holdings is a serious problem limiting the agricultural productivity of land in the Settlement Schemes (formerly called the white highlands). This study considers the problem of land subdivision in Lumakanda settlement scheme in Lugari District. Lumakanda Settlement Scheme was part of the former white highlands that is now experiencing rapid population growth currently standing at 4.1% p.a. With good rainfall that is abundant and generally reliable, coupled with agro-ecological conditions, the area is considered a zone of high agricultural potential. The predominant crop is the subsistence staple, maize, which is planted once a year.

Access to factors of production and technological constraints were mentioned as important factors affecting farmers in Lumakanda Settlement scheme. The declining land sizes, lack of capital and access to credit, and lack of appropriate farming technology has substantially limited production on sub-divided former European farms. The study revealed that the household structure and the need for alternative sources of income were the main factors influencing more subdivisions of land. The rapid population growth has had tremendous impact on the settlements economy and ecology. The high immigration has not only changed land ownership pattern, but also the mode of production. Hunger for land has led to both legal and illegal subdivision of land regardless of its productive capacity. This change in land-use signifies a tremendous intensification of land in the

study area. This calls for better land tenure and farming techniques, research and technological innovation in Lumakanda Settlement Scheme.

Land subdivisions have led to un-viable land units and over-intensification of production leading to environmental degradation. Subdivision of land was found to be an evolution of the individual tenure. It emanates out of natural evolution of land. It is spontaneous out of family subdivisions of land through successive generations and in-migration.

Agriculture is dependent on land, which is the critical primary input. Production has been affected by three main factors namely:

- Equity in land distribution which is mainly political and has encouraged land subdivision
- There is the issue of efficiency in production, and
- Changed structures of production arising from the declining land holdings.

Acquisition of factors of production to enhance production leaves most farmers vulnerable to manipulation leading to sale of land. Also most farms were found to be unable to expand scale operations and therefore handicapped, thereby increasing problems of viability particularly in terms of absorbing risks

All these problems call for an out side intervention in the form of land reform. Land reform will lead to equity and efficiency in management and production. This can be in form of land consolidation through formation of either common family homesteads or having shares and non-erection of physical boundaries, thus freeing more land for agriculture. This will promote use of mechanization and enhance the economies of scale thus increased production.

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LIST OF ABBREVIATIONS

AFC	Agriculture Finance Co-operative
ASAL	Arid and Semi Arid Areas
CAB	Central Agricultural Board
CAP	Chapter
CBK	Co-operative Bank of Kenya
CBK	Co-operative Bank of Kenya
CBS	Central Bureau of Statistics
CKRC	Constitution of Kenya Review Commission
DCO	District Co-operative Officer
DFRD	District Focus for Rural Development
DDP	District Development Plan
DDC	District Development Committee
DFO	District Forestry Officer
DAO	District Agricultural Officer
DWE	District Water Engineer
EU	European Union
FY	Financial year
FCS	Farmers co-operative Society
GDP	Gross Domestic Product
GIS	Geographic Information System
GM	Gross Margin
GMR	Guaranteed Minimum Return
GoK	Government of Kenya
HDI	Human Development Index
IEA	Institute of Economic Affairs
IFAD	International Fund For Agricultural Development
ILO	International Labour Organisation
JICA	Japan International Co-operation Agency
KLA	Kenya Land Alliance
KFA	Kenya Farmers Association
KEPHI	Kenya Plant health Inspectorate
KSC	Kenya Seed Company
KRDS	Kenya Rural Development Strategy
KCC	Kenya Co-operative Creameries
LCB	Land Control Board
LU	Livestock Unit
MARD	Ministry of Agriculture and Rural Development
MNR	Ministry of Natural Resources
MCSS	Ministry of Culture and Social Services
MFP	Ministry of Finance and Planning
NDP	National Development Plan
NPC	Nominal Protection Coefficient

NFI	Net Farm Income
NGO	Non Governmental Organisation
NEP II	National Extension Programme II
NCPB	National Cereals and Produce Board
PRSP	Poverty Reduction Strategy Paper
PRA	Participatory Rural Appraisal
PSC	Project Steering Committee
RIM	Registry Index map
UN	United Nations
UNCHS	United Nations Center for Human Settlement
UM	Upper Midlands
UNDP	United Nation Development Programme
US	United States
WMS	Welfare Monitoring Survey

CHAPTER ONE

1.0 Introduction

The rural economy provides the backbone for Kenya's development efforts. About 80 percent of the Kenyan population lives in the rural areas. In Lugari District, 90 percent are engaged in agriculture being the key enterprise of the rural economy, which has experienced a steep decline in the last decade. The lives of the rural people are of hard work, drudgery and without any basic amenities. They are trapped in a vicious circle of low income, ill health, low nutrition, low productivity and low wages. Most of their time is spent in search of basic needs and other essential commodities to support the family living. The declining performance of the rural economy mirrors the poor performance of the overall economy, whose growth declined from 5.2 percent in 1987 to -0.3 percent in the year 2000. The rural sector also exhibited declining agricultural productivity and production, which dropped from an annual growth of 6.8 percent in 1977 to -2.4 percent in 2000. Increasing food deficits and environmental degradation have also been witnessed. The decline has led also to increased incidence of rural poverty from 48 percent in 1992 to 53 percent in 1997 and to 56 percent in 2000. More than 87 percent of all poor households live in the rural areas (Republic of Kenya, 2000).

Deterioration of the rural economy calls for a critical evaluation of past rural development efforts and the need for alternative shared vision and strategy for inclusive rural development. The (2001) Poverty Reduction Strategy Paper (PRSP) identified the agricultural sector as being crucial in alleviating poverty in Kenya (Republic of Kenya, 2001). The report of the draft Constitution of Kenya Review Commission (2002): the Peoples Choice gives an added dimension - one of continued sense of injustice - to the land issue. The report points out how post-independence developments have failed to address the deprivation of many; while new forms of land accumulation, even hoarding by some, and land impoverishment for others have been created and refined. Many who are landless feel that access to land is their only hope, while many who have land cannot make a living from it, because plots are too small, or the rewards of farming too low (Nation 2002). Land,

ethnicity, identity and way of life, has been closely intertwined. For some the land issue breeds despair, for others anger, ethnic tension, and sometimes violence and other unresolved issues.

Kenya has a choice of both increasing agricultural production and exporting the surplus, or continuing with the status quo, which will lead to decline in production and increased imports. The other problem facing the agricultural sector is the shrinking land sizes among smallholder farmers, which comprises 80 percent of agricultural GDP. However, the GDP hides the fact that many of these small-scale farms do not provide the farmers with sufficient means to live on and hence many rely on off-farm activities. The farms are uneconomic and are unable to adapt to new technologies optimally. Lastly most farmers would rather not be farmers but the lack of alternative employment opportunities keeps many in agriculture. Population increase without a commensurate industrial growth to absorb the demand for economic security in the study area has meant that agricultural land use practices have intensified and have become the single most important source of natural resource degradation. Apart from the direct loss of biodiversity and critical catchment ecosystems, it has also accelerated the loss of fertile land, forest plantations, pollution and destruction of water sources in the study area.

1.1.0 Background to Settlement Schemes

Land ownership had been the main center of contention and the driving force behind native political movements in Kenya since the early 1920s. Beginning with the Young Kikuyu Association and continuing on with every subsequent political group. The dominant demand had always been for the return of the "stolen lands", an area of about 7.5 million acres of agricultural land reserved for the exclusive ownership of Europeans (Pagett, 1968). Comprising about one-fifth of the most arable mixed farming land in Kenya, the highlands had been leased to European farmer settlers (for 999 years) by the colonial Government. Here they had achieved a high standard of agricultural productivity that produced a substantial share of the colony's economy. Once Kenya's freedom struggle became clear; however, the continued existence of this privileged sanctuary could no longer be tolerated.

According to Richard Pagget (1968) and Odingo (1967), the indigenous African communities who laid claim to this land had been compelled to live in the "Native Reserves". Farming practices in these "native reserves" were primarily of subsistence nature and the colonial Government, prior to introduction of the Swynnerton plan in 1955, had made no serious effort to improve the level of reserve agriculture over the fifty years of British rule. Living standards in the reserves were low and increased population pressure threatened to drive them even lower. Under these conditions, the claimant tribes demanded access to the highlands farming area and an end to the dual economy. Legal restrictions on non-European ownership of this land in the White highlands were subsequently abolished in 1960; this alone did little to alleviate the social, political and economic problems arising from the juxtaposition of the prosperous highlands and the overcrowded peasant farming areas. Hence, by the late 1960s, the Government had resettled over 30,000 African families from the former tribal reserves to the more than a million acres of the best farming land in Kenya, previously cultivated by large-scale European farmers. The majority of them depended on traditional, subsistence agriculture for their existence. Here they were expected to participate fully in a modern "cash economy". The purpose was to transform majority of these people who were characterised by poverty, illiteracy and low levels of civic involvement into effective participants in nation building efforts (Pagett, 1968, pp 1).

Although settlement has important social and political ramifications, the attention was focussed on the economic feasibility of the program. This was understandable in view of the vital role the land involved played in pre-settlement in Kenya and the uncertain consequence of a fundamental change from large-scale to small-scale farming methods. In 1963, before the start of large-scale land transfers into African hands, the area previously restricted to European ownership had produced 78 percent of the gross value of marketed agricultural output and an even higher proportion of agricultural exports; it accounted for about 42 percent of total employment in the country (Ibid.). In addition, the Kenya Government had borrowed heavily to finance the settlement program; over 16 million pounds of interest bearing debt while financing the existing schemes. From this point of view it was essential that settlement program prove an economic success for the settlers to repay their loans, thus reducing capital available for other development needs in other parts of the country.

According to Winston and Lipscomb (1972) and Pagett (1968), a spiral debate over the economic consequences of settlement began with the inception of the program and, if any, it continues with greater intensity today. Some observers questioned the wisdom of the Government's heavy investment in settlement at that time, and even attempted to show through the use of cost-benefit analysis, that the money could have been more productively invested in alternative development programs. However this argument was ignored at the time based on the historical reality of the political situation at that time and accepted settlement as an integral part of the development process in Kenya. Richard Pagett (1968) evaluated the relationship of social and political aspect of settlement with the economic progress reported by individual settlement schemes. The original study project was designed to test the hypothesis that when given comparable inputs of land, water, technology, communications facilities, development loans and administrative assistance and advice, a settlement scheme would be more successful (economically), provided there was a more structured and manifestation of the local leadership. That is, local socio-political leadership, reflected in the organisation of the local community, would be an independent variable, which should correlate positively with the economic productivity of the settlement schemes. However it was not possible to test this hypothesis adequately. His conclusions were that before settlement a more intensive research must be undertaken.

Although the million-acre settlement scheme succeeded the immediate period after resettlement could not be sustained further. It is now argued that it achieved its political objective of allocating land to Africans thus allowing peaceful coexistence of European and African leading to a more stable political system (Leo, 1984). The objective of employment creation and income generation was not achieved, as most peasant farmers no longer can generate enough incomes from their farming activities. This problem cuts across all the farming communities in all the million acre schemes.

Lugari settlement scheme started as part of the million-acre settlement scheme in 1963 in Lugari District and now occupies two administrative locations namely Lumakanda and Mautuma. The scheme covers a total area of 142.9 km² of land. The economic potential for

farming activities in the scheme is high due to fertile soils and high rainfall. The scheme was earmarked for maize, beans, sunflower, sisal, and coffee cultivation and dairy products.

1.1.2 Problem Statement

Land is the only resource that God gave man for his livelihood. It is the source of his wealth and strength. As a direct benefit, control of land brings economic power, which in most cases is often the basis of social and political power. The question we should be asking ourselves is why did the white settler's zone Kenya's highlands for their exclusive use? Why had we to shed blood for these areas? In looking for answers to the above questions one settles to one major reason that of "economic power". One then remains wondering why we are destroying these vital areas which are our only source of livelihood.

Agriculture is the mainstay of the people of Kenya. Rural areas account for over 80 % of human population in Kenya. In Lugari District 90% of the households depend on agriculture and this trend will prevail in the short to medium term. This population derives their livelihoods from land, mainly through crop and livestock production, fishing, forestry, and exploitation of other natural resources. However the rural areas continue to be characterized by limited employment opportunities, low incomes, poor social and economic infrastructure, and high incidences of poverty (Kenya. Republic of, 2002).

The 1997 Welfare Monitoring Survey Report indicated that 87% of poor households are in rural areas. 65 % of rural population has no access to safe drinking water compared to 26 % in urban areas. The survey further indicates that women are more vulnerable to poverty than men and 69 % of active female population work as subsistence farmers who are among the poorest in the country. The report on poverty in Lugari (2000) indicated that 124,689 persons or 57.27 % are living below poverty line. The causes of poverty in the district include declining agricultural landholdings and fertility, poor state of the roads ravaged by soil erosion, poor marketing systems, high cost of farm inputs, and low prices of farm produce among others.

Human settlements are not new or unique phenomenon in either developed or developing countries. To a certain extent human societies have continually moved to and settled in various places. The reasons for such movements and settlements have been numerous and varied - under the force of numbers, in search of new territories, in response to political conflicts and instability and so on. As a case in point, the Americans were settled spontaneously and so was Australia. The colonizers who moved to and settled in the countries of Africa and Asia also largely became spontaneous settlers (UNCHS, 1986).

Although, the aims of settlement schemes in Kenya were much more than just facilitation of rapid and orderly transfer of land from European to African ownership, inspired by social and political rather than economic motives, settlement was nevertheless expected to bring opportunities for substantial progress in all the areas to those participating in the program. The value of total production was to be almost doubled through the introduction of labour-intensive farming techniques to the highlands. The assumption behind this expectation was that the large-scale farmers, preferring to avoid the problems connected with a large labour force, had concentrated on labour-extensive enterprises, i.e. cattle, sheep, and wheat. By transferring people out of the reserves, the available labour force would be substantially increased, allowing for the introduction of more labour-intensive cash crops. The more intense land use would more than have offset the lower technical efficiency of the new settlers (Pagett, 1968).

Also to curb the incidences of rural-urban migration in search of better employment and livelihood, meant accepting Settlement as an integral part of the development process and realization of its success to Kenya's future was not be ignored (Mbithi et al, 1975). Indeed, land subdivision of former large-scale farms of white highlands brings about land use changes and the emergence of new farming systems. The subdivisions have been taking place in Lumakanda Settlement Scheme in Lugari District over the last 40 years. Little information was available for the new settlers on how to run crop and livestock production on their holdings. As resource use intensifies due to increased population pressure, these key areas are undergoing growing over-use and misuse due to increasing changes in land use. Consequently, it has had adverse human impact in terms of rising rural poverty. According to

1997 Welfare Monitoring Survey (WMS), the districts incidence of poverty currently stands at 57 percent compared to 56 percent of the national.

When Lumakanda settlement scheme was opened for settlement in 1963, the projected income for each farmer was £25 - £70 per annum (Goldsack et al, 1966).

Table 1.1: Atypical Land Budget for a Household with Average Farm Size 25 Acres.

Activity	Amount of Land in Acres
Homestead	0.25
Subsistence	2.00
Maize	2.00
Passion fruit	0.50
Grazing	20.25
Total	25

Source: Goldsack and Nottidge, 1966

Table 1.2: Projected Income at the Year of iMaturity, 1963/64

Source	Units	Price/Unit	Total in Kshs.
5 Dairy cows	120 lbs.	2.50	1500
Cull Cow	1		300
One Calf	1		30
Yearling	1		150
2 Acres (maize)	16 Bags	29	464
Passion fruit	40 lbs.	15	600
		Total	3,044

Source: Goldsack and Nottidge, 1966

Table 1.3: Total Expenditure per Year

Activity	No. of units	Price/unit	Amount (Kshs)
Livestock units	6	70	420
Livestock units	2	35	70
Maize cultivation	2acres	35	286
Ley /undersown	1	60	60
Land loan			420
Development loan			412
		Total	1688

Source: Goldsack and Nottidge, 1966

Net income per year of maturity- $3044 - 1688 = 1376$ (£68.16 s od).

As noted from the typical model household budget in table 1.2 and table 1.3, all family income was to be generated from the farming economy. The basis of settlement planning was

that each farmer should have sufficient means to permit him, when his plot was fully developed, to produce his family's subsistence food requirements together with a given cash income after meeting his farming expenses and loan repayment obligations. This was to be a cash surplus (Pagett, 1968), however the situation in the study area has drastically changed over the years due to several factors including high population pressure from 3,000 in 1966 to 42,000 in 1999, shrinking farm holdings from 8-10 ha in 1964 to 4.1 ha in 1990 to 2.1 ha in 1999, (Kenya Republic of, 1964, 2002 and Bruce & Migot-Adhola, 1993), poor marketing of farm produce, poor performance of the economy and high farm inputs.

Table 1.4: Population, Density and Average Farm Sizes from 1969-1999

Year	1969	1979	1988	1999
Population (,000)	1	14.6	24.5	42.8
Density (per sq. km.	19	123	166	369
Average farm size (ha)	8-10	7-8	4.1	2.1

Source: CBS, Herufi house 1969, 1979, 1989 & 1999 population census

Several ex post evaluations of the state-imposed tenure conversion program in the country have observed that individualisation has led to land concentration, increased marginalization and landlessness as people in positions of economic and political power take advantage of the less powerful (Brokensha and Glazer 1973, Coldham 1978, Njeru 1978, Achola Pala 1980, Haugerud 1983, Okoth- Ogendo 1986). A major problem inherent in such ex-post assessment is that they tend to proceed from an overly idealised perception of traditional institutions and practices. In addition, they tend to confound influences on the observed inequality that may result from factors quite separate from those specific to land tenure.

So far, quantitative studies of the relationship between land tenure and agricultural productivity focusing on questions of share cropping, wage rates, interlinked markets for land, labour and capital, and their influences on incomes have been undertaken mainly in Asia (Hayami). Two studies by Tegemeo Institute (1998) reveal that in rural Kenya today, agriculture is no longer the main source of income. The study says that most of the household income in all zones they carried research comes from off-farm sources. 50% of Kenya's rural farming households are involved in off-farm income-earning activities, and at least 36

percent have one salary earner living away from the farm (Argwings-Kodhek, 1998). This also clearly demonstrates the sorry state of the agriculture sector gone wrong where rural folk spend all their energies and time. Again these are the roles agricultural policy; research and extension can play to promote investment in agricultural intensification among households.

Therefore, if acceptable levels of poverty reduction are to be attained, the agriculture and rural development sector will have to register high growth rates. This will require improved land administration systems to ensure better land use, effective natural resources management and environmental conservation, improved crop and livestock husbandry and raising crop output per unit area. Thus for a regional development strategy to be meaningful it should focus on tenure of agriculture lands, as the relative performance of the agricultural sector sets pace for the development of non-agricultural activities which will be concentrated in urban centres. This study by identifying land subdivision as the problem affecting the agriculture sector is therefore envisaged to give pointers to the types of linkages that might evolve in other places and help identify policies to bring about symbiotic development in rural and urban areas. This study will also add to the existing body of knowledge about the performance of the agricultural sector in the study area, particularly about linkage with other sectors in a spatial context. It will also serve as a point of departure for further studies that could be carried out in the broader research area of improved agricultural production.

1.1.3 RESEARCH QUESTIONS

The study seeks to answer the following research questions:

- 1 What factors have contributed to Land subdivision in the study area?
 How land subdivision has affected agricultural production in the study area?
- 3 What are the alternative policy measures that would lead to improved agricultural production in the study area?

1.1.4 RESEARCH OBJECTIVES

- 1 To identify the major factors that have contributed to land subdivision in the study area.
- 2 To examine how land subdivision has affected agricultural production in the study area.
- 3 To suggest alternative policy measures that could lead to improved land use and agricultural production in the study area.

1.1.5 Assumptions of the Study

- 1 The Population growth and in-migration in Lumakanda will continue to increase at very high rates.
- 2 The rate and scale of subdivision of land in the study area would continue if unchecked.
- 3 The effect on agricultural production will continue to worsen if remedial measures are not put in place
- 4 There is need for change in land use to achieve sustainability.

1.1.6 Justification of the Study

Lumakanda Settlement scheme was chosen because it presents a unique position in Lugari District. Also as compared to other 11 schemes it borders the great Uganda road and therefore more attractive to prospective land buyers and settlers. It also has historical significance to the people of Lumakanda.

The new headquarters has also put more pressure on the available agricultural land, as more land is being converted from agriculture to commercial land uses. All that land along the tarmac around Mwamba and Munyuki Sub-locations is changing to commercial. The major land use conversion type is residential to commercial.

Poverty

It is estimated that by 1997, close to 50% (13 million) of Kenya's population lived below the poverty line. In the Human Development Report (1988) Kenya is ranked as number 137 out of the 147 countries with the Human Development Index (HDI) value below 0.459. The country is currently ranked 17 among the poorest countries in Africa and the 180th among the 210 poorest countries in the world. Unemployment figures are on the rise with approximately 25% of the estimated 15 million labour force unemployed and another 25% underemployed.

This situation is worrying with increasing numbers living below the poverty line. Most Kenyans were certainly better off at independence in 1963 than they are now, raising the question of the efficacy of efforts by the government to combat poverty and increase employment. Another worrying dimension of poverty in Kenya is its distribution as it varies across the various administrative regions and districts as well as between the rural and urban areas. Thus 47% and 29% of those living below the poverty line are in the rural and urban areas, respectively.

Poverty also afflicts the remote and semi arid areas of the country as well as the high and medium potential areas. Indeed the highest concentrations of the poor are to be found in the high and medium potential areas of the country of which the study area falls. There are also major gender disparities in the incidence and intensity of poverty, with poverty being more acute among Kenyan women than among men. Available evidence indicates that women and children in both the rural and urban areas are more vulnerable to poverty than men. Reasons for this variations include gender insensitive policies, outright gender discrimination in job opportunities, persistence of outdated cultural attitudes and practices that are inimical to women's interests as well as archaic legislation, which disfavours women.

Significantly, four-fifths of the population is located in the rural areas, the bulk of it being dependent on agriculture and agro-based industry.

1.1.7 Significance of the Study

This research endeavours to examine the impact of land subdivisions on agricultural production. At the time of settlement, there were high expectations in terms of farm productivity and improved living standards. With high population increase and rapid subdivision of land; there is emerging a negative effect that is posing serious challenges to the policy makers and the people of Lumakanda Settlement Scheme in the long run. It also calls for the policy makers to reconsider long term implications of the use of resettlement schemes to national development.

Secondly majority of people in the study area are engaged in farm labour and production hence it is only logical that this sectors performance comes with improved earnings, thus, improving the living standards.

A turn around of the sector's performance is therefore needed to restore high and sustained agricultural growth and reverse the deteriorating rural poverty by increasing rural incomes and employment (MOALD 1997).

1.1.8 Scope of the Study

The study covered the whole of Lumakanda and Mautuma locations, which was the original Lumakanda Settlement scheme. The study specifically looked at two levels of analysis: the factors contributing to land subdivisions and how these conversions have affected agricultural production. The agricultural farm and other competing factors formed the basis of analysis. The issue of enterprise choice, production, markets and profitability vis-avis .he farm holding size were considered. High value cash crops e.g. maize, coffee, sunflower and horticultural crops and farmers attitudes towards them were also considered. Finally the issue of policy change within the sector was also examined. All the four sub-locations of the scheme were covered.

1.1.9 Organization of the Thesis

Chapter one is on introduction and research methodology. It provides an insight into the problem of the research. It also provides the methodological approach to the research design and analysis.

Chapter two provides a detailed literature review on agriculture and the settlement schemes and their contribution in development of rural areas, employment creation and poverty alleviation. It also looks at the performance of past sector development policies and six models of agriculture, gaps and theoretical framework.

Chapter three gives a detailed background information to the study area as the former white highlands, history of settlement in Lumakanda scheme, conditions of settlement, population and household characteristics, land uses and the physical setting of the Lumakanda Settlement Scheme.

Chapter four concentrates on the analysis of factors that are contributing to land subdivision in the study area.

Chapter five focuses on how these factors contributing to land subdivision affect agricultural production in the study area.

Chapter six looks at the policy implications, strategies and research recommendations arising out of the study for replication and use in new and other settlement schemes in Kenya.

Chapter seven gives a summary of research findings, conclusion and areas of further research in the study area.

1.2.0 METHODOLOGY

1.2.1 Introduction

This study is based on data obtained from fieldwork including standard questionnaires, focussed group discussions and interviews, measurement, photo and map interpretations and literature review. The data collected was analysed using simple statistical techniques, and presented in form of maps, tables, charts, graphs and the text.

a) Secondary Data

Collection of secondary data involved reviewing relevant literature on agriculture development and rural development, land planning and administration, resettlement schemes and the various statutes governing land use. Both quantitative and qualitative data was obtained. The most comprehensive sources of secondary data reviewed were the National Development Plans, 1966-1970 to the current 2002-2008, the various Agriculture sector policy guidelines, Sessional Papers i.e. Sessional Paper No. 10 of 1965 on African Socialism and its Application to planning, Sessional Paper No. 4 of 1981 on National food policy, sessional paper NO. 1 of 1986 on Economic Management for Renewed Growth and the Poverty Reduction Strategy Paper just to mention a few. The first Sessional Paper set the framework for planning priorities in Kenya, while Sessional Paper of 1981 set the government policy on agriculture and food production and the 1986 paper set the basis upon which the structural adjustments were implemented.

Other government publications that were reviewed are the Kericho conference of 1966 on Employment, Education and Rural Development, the Ndegwa report on Government Expenditure and Revenue, 1966 report on Socio-economic Performance of settlement Schemes by Ministry of Agriculture and the various publications by the Ministry of Lands and Settlement. Also in order to understand the factors behind the creation of the settlement schemes, reference was made to published researches by M.P.K. Sorrenson (1968) and Haberson and R.S. Odingo 1967 on Land Settlement in the Kenya Highlands. The various Statutes i.e. the Physical Planning Act, Agriculture and the Environment Acts among others

were reviewed. Other included: University libraries, UNEP/FAO/UNHCHS libraries, District Development Plans, Various land use acts and policies, thematic maps and NGO's.

Both published and unpublished works were used including land regulation and control policies such as zoning ordinances, subdivision regulations and various planning legislation. The advantages of secondary data are threefold:

- First, it enables one to get access to inaccessible literature.
- Secondly, it allows for longitudinal analysis and,
- Lastly it allows the researcher to unlimited range and access of information,

b) Primary Data

This method was applied through administration of questionnaires, observations, scheduled/focused group interviews, physical measurements, and photography. One principal researcher and four research assistants carried the survey.

1.2.2 Field Survey

(i) Reconnaissance Survey

A reconnaissance survey was undertaken in the study area. This was used as a familiarisation tour of Lumakanda and Mautuma Locations. The survey enabled the researcher to assess the feasibility of the proposed questionnaire, its suitability and estimated time required for administering it. It also helped the researcher with first hand knowledge of the geographical, economic and sociological environment of the study area.

(i) Main Survey

The survey consisted of asking questions to a representative population sample of the true Population of households. A total of 70 standard household questionnaires, 20 focussed group discussions including Key Government departments were administered. The households were

selected based on random sampling using the numbers from the Registry Index Maps (RIM) sheets. The design of the questionnaires was deliberate to meet the objectives of the study. The household structured questionnaires, focussed group interviews and photography, observations, existing maps and the physical measurements strengthened the field survey. Also the first generation settlers including the key informants such as one Paramount and 2 retired Chiefs were interviewed.

During the research, ordinal scale was applied in various cases: first was the question of gender and time spend on the farm, respondents age so as to differentiate between older and young settlers and how long they have lived in the settlement scheme. Secondly there was a question of how much land was owned. This helped to rank the land sizes and get the frequencies. The third situation involved cases of farm production in order to determine viability.

1.2.3 Research Design

The design of the research was based on the already existing structure of Lumakanda Settlement Scheme. Four sub-locations of the entire older location were covered. Random sampling method was used to select the households based on RIM. The RIM shows all plots numbers both for original parcels and those subdivided.

a) Structure of Lumakanda Settlement Scheme

Primary data collection techniques were designed to suit the existing layout of the study area. The scheme was divided into blocks, which are now headed by a Village headman, who accompanied the research assistants in identification of the plots and even introduction of the researcher thus avoiding suspicion. The boundaries of the blocks/villages are based on roads/access roads, rivers, and railway and on time of settlement. The research set to interview a total of 70 households, 20-focussed group discussions and Government Departments

b) Sampling Techniques

Sampling methods are broadly classified into probability samples and non- probability samples. The distinguishing characteristic of a probability sample is that every individual must have a known probability of being included in the sample. If probabilities are unknown, it is possible to make legitimate use of statistical inference. In non-probability samples, the probability of selection is not known. It was the probability sampling that was utilised during data collection. There are four types of probability sampling method namely: systematic, stratified random, cluster and multi-stage sampling. These techniques are not mutually exclusive as they can be combined.

b) Sampling Method

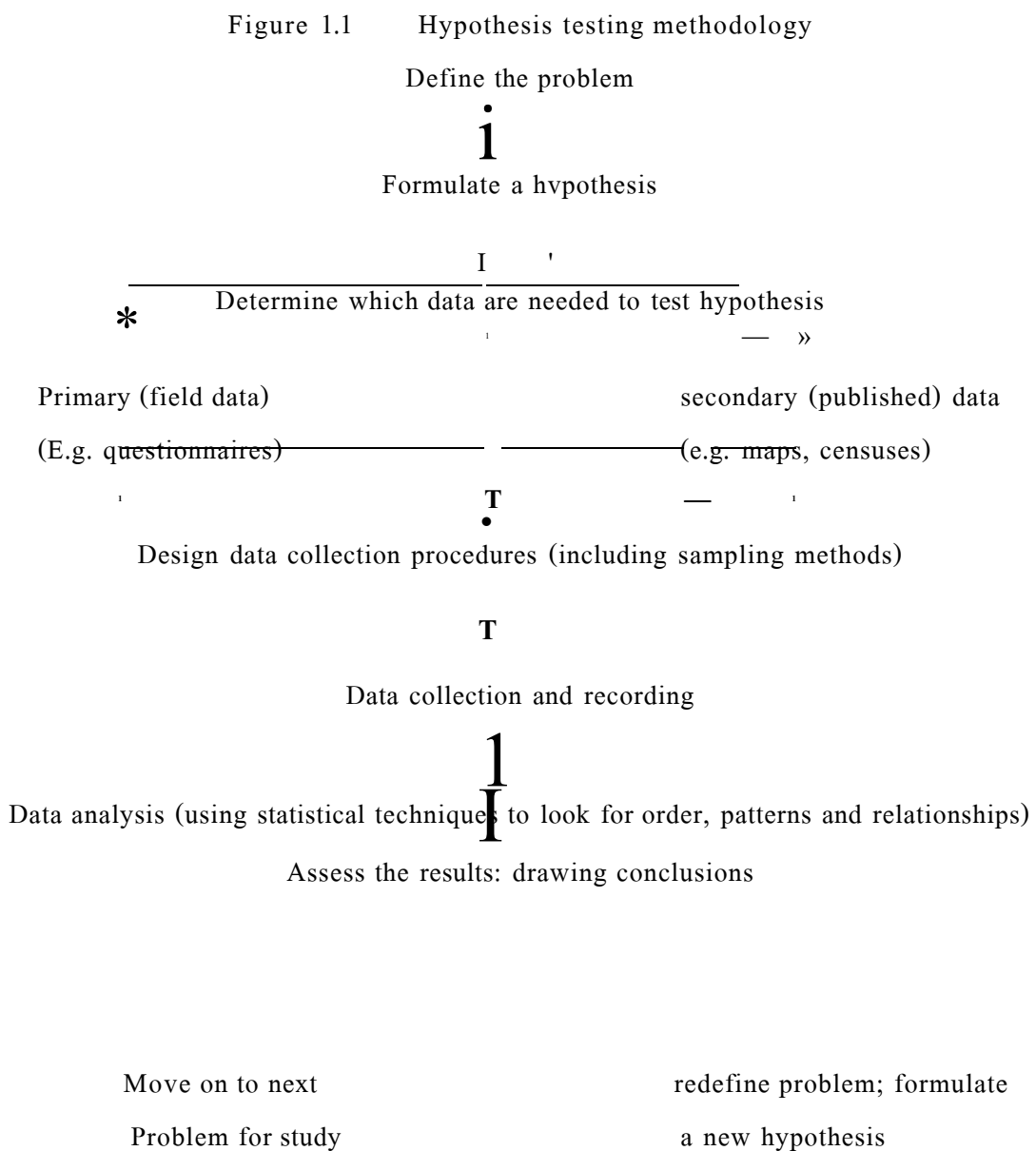
For the farm level investigation, a sample size of 70 household heads was used. There are a total of 8,700 households in the study area (CBS 1999). The choice of the sample was based on the principle of randomness using the Relative Index Maps (RIM), which implies that each farmer in the four sub-locations had an equal probability of being selected. The sample size was arrived at according to the method of determining the minimum sample size needed to get a satisfactory degree of accuracy for a specific task; which is achieved by reversing the formula of calculating the standard error (SE) at 95 percent confidence level. According to the Lugari District Development Plan (2002-2008), the parent population has a normal distribution where the accepted minimum sample size is 30 (David Waugh, 2000, p. 159, 524).

1.2.4 Data Analysis

Both quantitative and qualitative data were analysed. Qualitative methods provided the in-depth explanation while the quantitative methods supplemented them. The main task of data reduction was coding. Coding for computer analysis generally consisted of assigning a code number to each answer category so that answers may be stored in a computer. Most of the data was postcoded into groups and thus the analysis was at group level. Outputs such as frequency tables, graphs and cross tabulations were used for data presentation and for measures of

associations. The frequency distributions of the data were also used to determine the basic distributional characteristics of each of the variables used in the analysis. Thus information on the distribution, variability and central tendencies of the variables helped to provide necessary information required for detailed analysis of the results. Several statistical instruments were then employed in quantitative data analysis.

Figure 1.1 below shows a summary of the data analysis process of the study.



1.2.5 Analytical Framework

Table1.5: The Impact of Land Subdivision on Agricultural Production in Lumakanda Scheme

Research Objectives	Questions	Types of data	Techniques for analysis	Expected results
1. To identify factors contributing to land subdivision in Lumakanda scheme	<ul style="list-style-type: none"> • What are the causes of land subdivision? • Are they socio-cultural, Economic, Political or, geographic? • What are the indicators of land subdivision? • Which land uses are growing the fastest? • Where are the agricultural/forest lands conversion concentrated? • Is there enough land to accommodate urban growth in the Lumakanda town center? • Time taken to transact land • How much does it cost • Are there title deeds to this lands? • What role does the Agricultural officer, Physical planner play in the transaction of the land? • What is the role of the land 	<ul style="list-style-type: none"> • List of subdivisions and No. of plots • Average land sizes • Relief/weather patterns • Agro-ecological zones • Landscape • Proximity to markets and infrastructural services. • communication • Densities and data on land conversions to urban uses • Population trends • Level of land transactions per month • No. of surveyors, planners in the area • Cultural issues • Expenditure patterns • Incomes levels • Educational levels 	<ul style="list-style-type: none"> • Literature review on past trends • Photography • Tabulation and percentages • maps 	<ul style="list-style-type: none"> • Audit of land use patterns in Lumakanda scheme

<p>2. To examine how land subdivision affects on agricultural productivity in the study area</p>	<p>control board?</p> <p>What are the yields per acre of subdivided land compared to the original yields?</p> <p>Is there soil erosion? If yes what are the causes of soil erosion?</p> <p>Are the soils fertile? What were the yields per/acre at the time of settlement compared to the present/</p> <p>How is the performance of the major enterprise choice?</p> <p>How often do they use farm inputs and how expensive are they?</p> <p>Are cooperatives effective in assisting and marketing of the farm produce?</p> <p>Where do they obtain fuel-wood now and before.</p> <p>What is the cropping patterns on the farm?</p> <p>What are the gross margins of the major crops grown?</p> <p>How often to extension officers visit the farmers. Do they have farm layouts</p> <p>How is the accessibility of subdivided farms, homestead</p>	<p>Yields per acre</p> <p>Level of preparation of terraces, fanyajuu, fanya chini and incidences of gullies on access roads</p> <p>Drainage</p> <p>Level Agro-forestry, Forestation and deforestation patterns</p> <p>Profit margins of major crops</p> <p>Prices of farm inputs</p> <p>Estimated cost per acre per enterprise choice</p> <p>No. and type of active cooperatives</p> <p>Methods of disposal of farm produce</p> <p>No. of nearest marketing centres e.g. CPBs</p> <p>Accessibility and distribution of market centres</p> <p>No. of visits by extensions agents</p> <p>No of conflicts arising from various resource use.</p> <p>Sub-division guidelines</p> <p>Implementing authority on</p>	<ul style="list-style-type: none"> • Line graphs in • Gross margin analysis • Tabulation and percentages • Pie charts • Maps • Photographs • Historical review of trends of productivity • Matrices and descriptive statistics 	<p>improved enterprise choice and profit making</p> <p>Improved agricultural productivity</p> <p>Improved earnings agriculture farming and hence living standards in the study area</p>
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	<p>siting in relation to the neighbours?</p> <ul style="list-style-type: none"> • What are the planning regulations applicable in this area • Are there conflicts on farm boundaries and resource use? • How are planning regulations enforced? • Who enforces the regulations? • What is the level of awareness 	<p>development control</p> <ul style="list-style-type: none"> • Land control board guidelines • Current use plan for study area • Review of various acts: Land Control Act, Registered Land Act, Physical Land Act, Local Government Act, Forest Act and the Agriculture Act. 		
<p>3.To suggest alternative policy measures that would lead to improved productivity in the study area</p>	<ul style="list-style-type: none"> • What is the current agricultural policy entail for rural areas? • What are we getting from the current statute i.e. agriculture act Cap 318, Forest act, land control act Cap 302, physical Planning act Cap 286, water act on agricultural land use development and control • What s the future of agriculture and fuel-wood harvesting? • What are the communities views on current land planning issues, 	<ul style="list-style-type: none"> • Application of the acts • No. and awareness creation • Number of institutions involved in land management • Functional relationship • Community suggestions and recommendations 		<ul style="list-style-type: none"> • Better planning alternatives • Better protection of environment for future generations <p>Improved agricultural productivity in the study area</p>

1.2.7 Research Methodology Limitations

Among the difficulties experienced were as follows:

- First there were cases where the real household head was not available for the interview. In this case any member of the family who looked knowledgeable was interviewed. In cases where there was no assistance, the immediate neighbouring household was chosen.
- Secondly, the area was extensive as such a lot of time was taken moving from one homestead to another. In this case the researchers could manage to administer only four questionnaires per day.
- Third, the area is cosmopolitan; as such there was some problems in the interpretation from English to vernacular.
- Fourthly, the real household income could not be ascertained, as there were conflicting statements and no records to refer to. So we relied on the respondents perceptions
- . Most of Government offices in Lugari had no records. The only records available date to 2000. Reasons given were that the district was new and that all records were to be found in Kakamega District. However, efforts were made to conduct the Settlement, Agriculture and Physical Planning Offices in Kakamega District, including the District Information and Documentation Centre (DIDC).

1.2.8 Conclusions

Because of the nature of the data collected from the field survey, the researcher categorised it so as to facilitate analysis. Several categories were achieved hence cross tabulation was the only most appropriate technique that was employed for investigation of the relationship between groups. The chi-square method was also employed to identify the differences between the actual values and the expected results. The optimum size of the family farm is the size of the stable family farm, in other words the size of the family farm which enables a stable livelihood by farming income and of which the productivity is high. In

addition possible level of livelihood is estimated by the total income of the household and also by the farming income only.

1.2.9 Definition of Terms

- 1 Land Tenure in this study is defined as the perceived right by the possessor of a land parcel to manage and use the parcel, dispose of its produce and engage in transactions, including temporary or permanent transfers with no hindrance or interference from any person or corporate entity.
- 2 Production is the amount of farm produce per unit arising out of the maximization of labour, land, capital and management in a given time frame and subject to the agro-ecological zone of the area (Clay, 1978)
- 3 The optimum size of the family farm is the size of the stable family farm, in other words the size of the family farm which enables a stable livelihood by farming income and of which the productivity is high. In addition possible level of livelihood is estimated by the total income of the household and also by the farming income only.
- 4 Sustainability is the ability of a system to maintain productivity in spite of exploitation by man or intensive stress of large and unpredictable disturbances such as droughts or floods. When a natural system is looked at in terms of human use, a fourth system emerges. This is equitability. Equitability refers to the distribution of resources among the human beneficiaries (Ibid.).
- 5 Land fragmentation/sub-division- refer to the process whereby agricultural land is sub-divided into smaller land
- 6 Change of user- refers to the process of converting an existing use of parcel of land to another.
- 7 Sub-division plan- is a plan approved by recognised authority under physical planning act cap 286 of laws of Kenya.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1.0 An overview of agricultural policies

It has been argued that agricultural and other macro economic policies pursued until the mid 1980s were biased and had to a large extent constrained the expansion of the sector. These were mainly pricing and the marketing policies of major agricultural commodities which discouraged competition and efficiency in the sector through extensive government intervention (World Bank 1991, 1994). The sector also suffered both explicit and implicit taxation mainly through unfavourable macroeconomic policies especially overvalued exchange rates. The Nominal Protection Coefficient (NPC) for this period, were less than one showing that producer prices were less than the world market price (Sharpley, 1984). The government investment pattern also gave more incentives to the industrial and commercial sectors relative to agriculture, making it less attractive to investors. These were in the form of protecting domestic industries against imports through a variety of tariffs and quantitative restrictions.

In the sixties, immediately after independence, the government was primarily concerned with Africanisation of land ownership to ensure participation of Africans in food production and income generation. The strategy for the development of agriculture as outlined in the Sessional Paper Number 10 of 1965 was to revolutionize agriculture by developing unused and underused land through land consolidation, extension services, and training as well as the introduction of modern methods of farming and marketing. Agricultural policies were therefore founded on equitable income distribution, employment and self-sufficiency.

Agriculture experienced rapid growth in the first decade after independence (4.7% Pa.), and employment in the sector grew mainly due to the rapid expansion in the area under agriculture, and provision of production services and inputs to farmers. The subdivision of the former large farms to small-scale farmers also led to increased monetisation of the small-scale agriculture and with it increased employment opportunities.

Subsequent development plans and other policy documents have enunciated policies for the development of the sector and its contribution to employment. The 1970/74 Development Plan emphasized more labour intensive production technology and the promotion of small-scale rural industries. The next development plan of 1974/78 focussed more on equity and employment generation. The Sessional Paper No.4 of 1975 on Economic Prospects and policies sought to shift the economy to labour-intensive agricultural production and basic rural infrastructure.

The 1979/83 Development Plan laid emphasis on employment expansion and enhancement of productivity to increase the incomes of the poor. The plan outlined several policies required to raise agricultural production and employment. These included:

- Review of land policies to encourage more intensive cultivation
- The establishment of land commission to review policies to ensure equitable access to land and more intensive development of all areas
- Establishment of a Programme of arid and semi arid land development in order to achieve optimal land use patterns in these areas and reduce the risk of environmental degradation.
- The encouragement of crops and technologies with a high employment potential

The Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth, emphasized agricultural prosperity as the major means of ensuring growth of the rural areas by stimulating growth of off-farm rural activities and employment. The paper stressed the promotion of rural development, employment creation and agricultural expansion. Given the size of the sector in the economy, its growth was expected to remain key to stimulating rapid growth and the attainment of higher incomes for the majority of the country's population in the rural areas, which would lead to increased demand for consumer goods in the local market. Agricultural growth would lead to increased demand for localized processing and marketing of agricultural commodities. These developments would further provide opportunities for the development of rural entrepreneurs and the creation of new jobs at satisfactory incomes in the rural areas.

Specifically, among the goals and strategies set for agriculture by the sessional paper were:

- Generate farm family incomes that grow by 5% a year over the next 15 years.
- Absorb new farm workers at the rate of over 3% a year with rising productivity
- Stimulate growth in productive off-farm activities in the rural areas to enable off-farm jobs grow at 3.5% to 5% a year.

The sessional paper proposed three broad strategies in achieving the goals stipulated for agriculture, namely:

- Encouraging the adoption of more intensive methods of production by farmers, using the marketing and pricing policies and institutions, as well as the extension services.
- Research into new varieties to generate new and high yielding varieties.
- Diversification of the production pattern in favour of higher value crops which also has the potential to generate more employment per hectare than the other crops and activities.

The 1989/93 Development Plan had as its policy thrust the achievement of internal self-sufficiency in major food, maintaining adequate levels of strategic reserves and generating additional supplies for export. This was expected to contribute to the attainment of the objective of employment, income generation, rural urban balance, food security and overall growth among others.

During the 1994/96 Development Plan period, the main thrust was on the adoption and strengthening of policies and Programmes for sustainable agriculture and rural development. The issues were geared towards sustainable food production and food security; increased private sector participation, improved farm production, and farming systems as well as agricultural land resource planning. The plan also recognized the need for increased investment in improved rural roads, as well as technological support to farmers.

The policy Framework Paper for 1996, had the aim of accelerating agricultural growth, increase in smallholder productivity and expansion of employment. The objective was to pursued under a liberalized system where the private sector plays a key role in production, marketing and processing. The 1997/2002 Development Plan had its policy thrust as increased resource allocation to the sector, and more efficient use of such resources through improved management in the sector.

The performance of the agricultural sector in the 1960s and 1970s reflects the success of the policies in this period. In the period from 1980s to present the sector has faced crisis due to scarcity of funds and fluctuations in international prices, which have affected its performance.

In addition to the policies outlined in the development plans, the government has **undertaken** special Programmes aimed at enhancing the employment generation potential of the rural and urban areas. This include:

- The land resettlement and reform
 - The rural works programme
 - The rural access roads programmes
 - The district focus for rural development
- Poverty reduction strategy paper (PRSP) for the period 2001-2004

2.2.0 Past Policies on Resettlement Programme in Kenya

2.2.1 The African (subservient) Economy

To ensure absolute administrative and ideological control over the indigenous majority the colonial ruling class engineered the establishment of ethnic enclaves variously known as "native reserves" areas or lands into which indigenous people were shunted. The native reserve policy was directed at a number of objectives. The first was to prevent acquisition prime native land by settlers through dubious forms of private agreements, treaties or concessions with chiefs and traditional elders as had indeed happened elsewhere in colonial Africa. The second was to facilitate simpler and more efficient control and administration of natives by colonial government. It would no longer be necessary to spread resources over vast areas of land occupied by migratory or semi-sedentary

populations. These would now be administered in ethnically defined and exclusive boundaries under their own or modified form of native authorities the third was that close to protect European settlements in contiguous areas of the territory from invasion .the fourth and perhaps most important objective of the native reserves was that it made labour recruitment easier for the hoards of agents charged with securing its continuous supply for Europeans farms. To ensure that labour would indeed be available, elaborate legal and administrative infrastructure was quickly put in place for the purpose. These included crude taxation measures, coercion and aggressive recruitment in areas settled by indigenous inhabitants. As early as 1919. a circular issued by the colonial administration made it clear that the primary duty of colonial administration was to secure labour for European farms, not to promote development in the African areas.

2.2.2 The Effects of Subservience

The native reserves and similar policies had important impacts on African land relations; several of which are worth enumerating here. First they led to severe destabilization of social and production relations in the African areas; these being founded as they were on community access to and control of land. An important factor in that destabilization was the fact that the settler economy survived essentially by depriving its indigenous counterpart of its most valuable human capital - its able - bodied men and women. That in turn substantially weakened overall social and political authority in these areas (Zwanenberg, R. N., 1939).

Second, by confining communities to specific enclaves and denying them opportunities for technological adaptation, or market adjustments, colonial land and administrative policies led inevitably to serious land deterioration in the African areas. This was compounded by official neglect and even hostility to indigenous agriculture as a viable economic enterprise and systematic exclusion of African produce from official marketing channels (Ibid.).

With increased population pressure and consequent food demand, the traditional equilibrium between land availability and patterns of its use, which was usually maintained through territorial expansion and shifting cultivation, was no longer possible. That also tended to intensify competition for land resources among ethnicity's, clans and lineage's leading to disputes and social fracture.

Third, in absence of a clear framework for the evolution of African relations, no organized regime of indigenous property law was able to emerge. Indeed customary law was not only relegated to the sphere of foreign law, which in any litigation would need specific proof. It was systematically discredited in legislative enactment's and judicial proceedings throughout the colonial period (Okoth-Ogendo, 2000).

The perceived inability of customary law to meet the challenges of contemporary agriculture is, to a large extent, a function of that disposition. Finally the massive displacement of indigenous populations as a result of the establishment of colonial economic and political structures was to become a critical question in the post-independence political settlement. Indeed that factor alone defines the land question in Kenya, including the study area as the last colonial question that must be resolved.

2.2.3 Colonial Responses

Some attempts were made by the colonial authorities to address the above issues. These were, however, undertaken in a policy context, which addressed the African agrarian systems. Three important interventions were consequently made with these perspectives in mind. The first involved Programmes designed to decongest the African areas through resettlement on vacant "Crown" or reserved land, and reconditioning of degraded land. **To** plan and finance these procedures, a Development and Reconstruction Authority (**DARA**) was set up in the mid 1940s assisted by an African Land Utilization and Settlement Board (ALUS), later renamed the African Land Development Board (**ALDEV**). For a wide variety of reasons, these Programmes never succeeded. Some of these included the inherent unsuitability of the land ear-marked for resettlement, the

coercive manner in which the reconditioning schemes were administered, and general cultural aversions to the dislocation of families, clans and lineage's in the process of resettlement.

The failure of land development and resettlement schemes as well as increased political activity and violence fuelled by land pressure in the African areas led, inevitably, to the search for new interventions. One of these involved strategies designed to improve production structures and infrastructure through the provision of limited extension services and new, if rather simple, technologies. These strategies however were essentially experimental, being targeted only to the so-called "better farmers" chosen for their loyalty to the colonial government, and some ability to absorb the costs of those interventions. These were the target groups, which were also permitted to engage in cash crop farming on a limited scale.

The most comprehensive interventions, however, came in the mid 1950s in the form of reform of African land tenure. This particular intervention started in 1954 when the colonial government published a white paper on the intensification of "African Agriculture" through, *inter alia*, individualization of land tenure. The "Swynnerton Plan" as the intervention came to be known, was based on the assumption that African land tenure systems were, by virtue of their community orientation, inherently incapable of facilitating the development of modern agriculture. The solution, it was argued, lay in the conversion of those systems to individualized tenure arrangements. This is the origin of the tenure reform in the trust land areas. In the study area this Programme remains central to agricultural development strategies in Kenya today.

What emerges in the argument above is that the land question in Kenya was for over a century shaped by economic, political, social and legal parameters. These, in turn, point to the essential elements which colonialism stamped on that question.

First, since the economy was depended on land, issues about tenure, access, distribution and regulation of use were always at the center of that question. Second, control of that

economy emerged, over time, as an important basis of administrative and political power. The land question was in that sense an important political issue throughout Kenya's history.

2.2.4 The Independence Settlement

It was expected that the transfer of power from colonial authorities to indigenous elites would lead to fundamental restructuring of that legacy. This however did not fully materialize. Instead what happened was a general, re-entrenchment, hence, continuity of colonial land policies, laws and administrative infrastructure. Explanations for this lies primarily in the conduct of the decolonization process itself and opportunity which it accorded the new power elite's to gain access to the European economy (Wassermann, G., 1973).

As early as the 1950's, colonial authorities had realized that the most optimum protection for white settlers was the incorporation of the emerging politically active African elite into the principles of colonial agriculture. This is the reason, for example, why Swynnerton's blueprint was dubbed a plan for the intensification of African Agriculture. It also explains the many development schemes accompanied by extensive organization of produce marketing that were instituted in the African areas. A new Agriculture Ordinance promulgated in 1955 set the legal framework for these incorporation projects by stipulating that access to government assistance and subsidies would henceforth be based, not on racial categories, but on levels of income obtained from agriculture. The colonial authorities were convinced that once firmly induced into the settler economy, the African elites would be prepared to defend it after independence.

With that strategy in place, colonial authorities proceeded to negotiate a power transfer arrangement based on the principle that the settler economy would be dismantled or otherwise destabilized. The final outcome of that negotiation was an independence settlement plan that provided limited scope for land redistribution by removing racial barriers to land ownership in the settler areas, while at the same time confirming and

safeguarding property rights acquired during the colonial period. The one aspect of the plan consisted of land resettlement schemes designed as much to take the lid off pressure for land redistribution exerted by the landless and squatter, as to introduce the African elite directly into the settler economy. This was the primary rationale for the Million Acre, "Yeoman", and "Z" schemes of the early 1960's and the squatter, Haraka and similar Programmes towards the end of the decade. These soon gave way to more organized market-driven redistribution mechanisms supported by Land and Agricultural Bank (later merged with a revamped Agricultural Finance Corporation) and Agricultural Development Corporation. Entry by elites into and consolidation of interest in the settler economy after independence through the above Programmes and private purchase ensured not only that they now had sufficient stake in it to be able to protect and defend it, but also that the machinery of the state would continue to be used to support development in that sector. The effect of this is that the bulk of state resources allocated to the agricultural sector continued to flow to that economy (Okoth-Ogendo, 1978).

A number of developments in the last forty years have brought the land question in Lumakanda settlement scheme into much sharper focus than it was in 1963. The first of this is rapid population growth, particularly in the small farm sector, formerly known as the trust land areas.

An important effect of this has been severe land pressure and fragmentation of holdings in many areas of the country. These areas include most of Western and Central Kenya, and the eastern slopes of Mount Kenya. The second is the persistent spread of HIV /AIDS pandemic throughout the country and its impact on land use and productivity in the rural areas including the study area. The third is the general deterioration of production and productivity in all areas particularly in the large farm sector. Quite clearly many Kenyan landowners do not appear to have developed a professional calling for farming.

The fourth is the systematic breakdown in land administration and land delivery Procedures, the top-down over concentration and over -centralization of management and ^ministration of land and inadequate participation by communities in the governance

and management of land and natural resources. The fifth is the multiplicity of legal **regimes** that relate to land. The sixth is gross disparities in land ownership and gender discrimination in succession, transfer of land and the exclusion of women in land decision making process.

2.3.0 Origins of European Settlement in the White Highlands of Kenya

Lumakanda and Mautuma settlement schemes are a part of the so called "White-Highlands" based in the former North Nyanza District, the areas where white settlers had their estates

According to S.H. Ominde (1968), the movement of population in Kenya was an aspect of the modern exchange economy. Chronologically it synchronized with the beginnings of the non-African activities in the building of the modern rail communications and subsequent resource development that followed. In no other field has this effect been more fundamental than in the organization of Agriculture in the former "white Highlands" of Kenya.

Before 1901 little alienation of land had taken place. It was the completion of the rail link with the lakes and the desire to generate revenue that stimulated the move to press forward with the offer of land to potential European and South-African settlers (Ominde, 1968). The first land regulation of East Africa protectorate which had been published in 1897 and on which the limited alienation of land had taken place were replaced by the Crown Lands Ordinance of 1902 (Morgan, 1963).

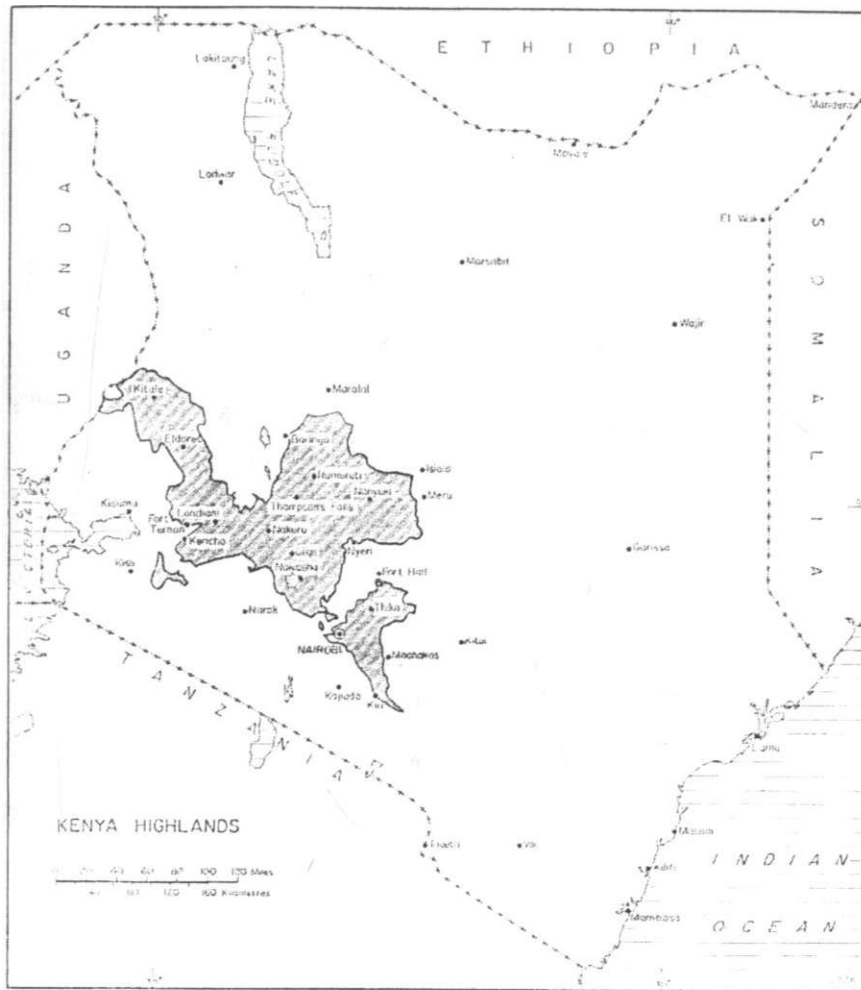
Granting of freeholds or ninety-nine year leases encouraged the intending settlers and some of these were later converted to 999-year leases. At an early stage it was decided that the Highlands area between Kiu and Fort Ternan should be exclusively reserved for Europeans. The move to exclude all others but Europeans from acquiring land in the area was further written into the Crown Land Ordinance of 1915 which replaced 1902 ordinance. In this Ordinance a covenant was inserted which explicitly excluded non

Europeans from acquiring land, from managing any of this leased land in the area. A distinction was made between the "White Highlands and the areas already settled by Africans and from which land grants and leases were excluded. But this did not prevent the acquisition of land by Europeans in areas that were considered African.

Whereas the first land Ordinance allowed settlement along the railway, with the extension of settlement after 1914-1918 War, the ex-soldiers settlement scheme and the Crown Land Ordinance of 1921 had the effect of extending settlement well away from the railway line. Between 1902 and 1922 rapid alienation had taken place extending the areas affected by European settlement well beyond the limits of Kiu and fort Ternan. It is during this period that settlement reached Uasin-Gishu and Trans-Nzoia by 1926. The new Uasin-Gishu Railway from Nakuru to Turbo (Turbo is within the study area) was commenced at the end of 1921. A branch was also extended from Soy Road to Kitale to develop the Uasin-Gishu and Trans-Nzoia areas. The Turbo to Tororo Railway was extended to tap the Kavirondo reserve (Winston C. L. and Lipscomb J. F. 1972). The alienation of land was virtually complete in what later to designated "White Highlands". The evolution of the boundary of this land unit was given public recognition by Wyn Harris Commission in 1939. After the commission the boundaries of Highlands demarcated for persons of European origin were given legal effect by the seventh schedule of the Crown Lands Ordinance under authority of Kenya (Highlands) Order in Council 1939 (Morgan 1963 pp., 142).

Whereas the above development could be seen as a move to separate areas of European farming from African land units, the effect of fragmenting this area between Nyanza, Rift Valley, Central and Southern provinces. The bulk of the "Scheduled Areas" so defined came within the boundaries of the Rift and Central Provinces. Within this areas there was unity approach to land tenure but varied agricultural and pastoral activities in response to the ecology of the land (ominde, 1968).

Map 2.1: The Position of the White Highlands in Kenya



Source: Ominde, 1968

With the achievement of political independence and in response to a growing problem of population pressure on land, a decision was made on the eve of independence in 1963, to divide up and parcel out the estates of the former European farming areas and break them **up** into small units, ranging from 2 to 40 hectares, depending on the ecological conditions. Since independence, various types of resettlement schemes have been employed to accommodate landless families, and the initial resettlement-Programme results are shown in table 2.1 below.

Table 2.1: Resettlement Programme in Kenya Highlands 1970/71

province	Hectarage			Plots		
	High-density schemes	Low density schemes	Total settled	High-density	Low-density	Total allocated
Eastern	13,345	.	13,345	769	.	769
Central	153,312	26,655	179,967	13,311	1,414	14,725
R/v alley	103,538	19,656	123,184	6,151	1,129	7,280
Nyanza	18,733	17,695	36,428	1,769	1,934	3,703
Western	67,716	8,542	76,258	6,940	505	7,445
Total	356,644	72,548	429,192	28,940	4,982	33,922

Source: Statistical Abstract 1981.

There has, therefore, been a massive land-transfer Programme since 1963, and, in various ways, the problems of rural spontaneous settlements in Kenya have been associated with this transfer. In other words, the existence of spontaneous settlements in Kenya has been largely associated with planned settlements. There have been four phases of such settlements namely:

In the late 1970s and early 1980s, these were developed around co-operative societies. "Landless" people formed co-operatives and land buying companies and bought up large farms, which have subsequently been divided into individually owned small farms.

2.4.0 The Legal Framework and Agricultural Production

The need for environmental management has been viewed as a constraint in attempts to achieve rapid economic growth by most developing countries. This has led to economic growth being achieved at the cost of the environment, which has resulted in irreparable environmental damage. Today most countries are faced with the threat of desertification, de-forestation and depopulation, as a result of immense environmental degradation. The eventual result is the loss of animals and plant species, change in rain patterns and

disappearance of rain forests to name a few. Thus, in seeking to achieve economic **development**, these countries are indirectly contributing towards eventual **underdevelopment** as the quality of life and that of the entire environment is ignored (Wanjala, 2000).

private property in land has had far-reaching implications for the people of Lumakanda **Settlement** Scheme, in terms of its productive use, soil conservation, and in the general **management** of the environment. Not surprisingly, therefore, laws have been enacted that **are** designed to regulate the rights and powers over land which are conferred upon **landowners**. Kenya's land use legislation is multi-faceted in nature. The main targets of the **existing** laws are:

- Land exploitation;
- Land control;
- Land planning.

These targets are expressed in the Agriculture Act Cap 318, the Land control Act Cap 302, and the Physical Planning Act Cap 286. The Agriculture Act is designed to provide and maintain stable agricultural production, and to provide for conservation of the soil and its fertility. It is also designed to stimulate the development of agricultural land in accordance with accepted practices of good land management and good husbandry. The Land Control Act is basically concerned with the regulation of the land market. It makes provisions for controlling transactions in agricultural land. The Physical Planning Act is mainly concerned with the physical planning of land. It makes provisions for the use and development of land. Development is defined by the Act to mean "the making of any material change in the use or density of any building or land". In all these Acts, there are provisions that are aimed at soil conservation. The most important of these are to be found in the Agriculture Act. These are in four parts, viz.:

- Part IV (S 48-62) which confers on the minister concerned powers to make rules and orders for conservation of the soil and preservation of its fertility. The particular matters to be addressed by the minister are enumerated in the sections (especially section 48)

- Part VI (S 75-81), which empowers the minister, in consultation with the Central Agricultural Board, to prepare general schemes for land preservation and land development.
- Part XII (s.184), which empowers the minister, on the advice of The Central Agricultural Board, to make general rules for the preservation, utilization and development of agricultural land, for example, may require occupiers to farm their land in accordance with rules of good husbandry.
- Part XIII (s. 85), which empowers the minister to take penal action in cases of breaches of the law. He may, if satisfied that there has been persistent contravention, and with the consent of the Central Management board (where the occupier is the owner of the land):
 - a) direct that, as from a specific date, the occupier shall give up his occupation of part or the whole land, and let it to a tenant approved by the Central Agricultural Board;
 - b) agree with the owner and all other persons having an interest in the land, for the purchase of it, and thereafter purchase the land accordingly; or
 - c) Acquire the land or any part of it compulsorily.

The Land Control Act makes provision for controlling transactions in agricultural land including subdivisions. Land Control Boards are established under section 5 of the Act for the purpose of controlling such transactions. Under section 6, each of the following transactions is void for all purposes, unless the Board for the land control area in which the land is situated has given its consent:

- the sale, transfer, lease, mortgage, exchange, partition or other disposal of or dealing with any agricultural land which is situated within a land control area;
- the division of any such agricultural land into two or more parcels to be held under separate titles;
- The issue, sale, transfer, mortgage or any other disposal of or dealing with any share in a private company or co-operative society which for the time being owns agricultural land situated within a land control area.

In deciding whether to grant or refuse consent in respect of a controlled transactions, a land control board is required to have regard to the effect which grant or refusal of

consent is likely to have on the economic development of the land concerned, or on **the maintenance** or improvement of standards of good husbandry within **the** land control **area**. Consent ought generally to be refused where the person to whom **the** land is **disposed** of is not likely to farm the land well.

The Physical Planning Act does not have provisions, which squarely deal with soil conservation as the ones discussed above. It establishes interim Planning Authorities to which land development plans must be submitted by prospective developers for approval. Apart from the main Acts so far examined, there are other laws which, though not directly concerned with agriculture and soil conservation, deal with environmental concerns which could have a direct impact on agricultural production.

There is a clear link between soil, water and forest conservation. Poor cultivation practices can lead to soil erosion and the consequent drying up of important wetlands, while the key conservation of water is the protection of forest catchment areas and aggressive soil conservation Programme. It is because of this interface between soil, water and forest conservation that mention of other laws dealing with these areas is considered worthwhile. First we have the Water Act Cap 372 of the laws of Kenya, which makes provision for the conservation, control, apportionment and use of water resources of Kenya and for purposes incidental thereto. The Forest Act, Cap 385, makes provision for the establishment, control and regulation of central forests, and forest areas.

These laws establish regimes, which are important and affect the general land use policy. These legal instruments embody Kenya's conservation policies, insofar as they bear normative prescriptions for the protection of soil fertility. Whether they are adequate expression of policy is another matter. There is evidence that these laws have not been effective in the attainment of the environmental goals stated in Kenya's land use policy. For the many years they have been in operation, unabated destruction of arable land has continued. There have been calls and undertakings on the part of the government for the establishment of a land use commission (Wanjala, 2000).

There are many reasons that have been given as to why soil conservation has not been successful even in the presence of land use laws and regulations. It is my argument that an effective land use policy can only be realized if there is a just and equitable land tenure policy. It is further argued that Kenya's land tenure has been one of the major causes for degradation of the soil. The existing situation combines traditional (customary) tenure, colonial land tenure laws and recent practices in a complex pattern that makes it difficult to operate a land policy (Ibid.).

Traditional concepts of land ownership and acquisition have been criticized as encouraging harmful or abusive use of land, such as when temporary ownership results in short-term exploitation of the land, and the farmer has little or no incentive to invest in the land and improve it on a long-term basis. Sometimes it has been said that religious restrictions, beliefs or taboos prevent rational development and use of land (Okoth-Ogendo, 2002).

The above criticisms have been used as arguments for individual land ownership systems backed up by what is termed as "security of Tenure". Whatever may be the merits of the private ownership of land, this system of tenure is also inimical to effective agricultural production policies. The individual proprietor has wide powers of use, abuse and disposition. These powers are subject only to the eminent and regulatory powers of the state. There is a clear de-emphasis on regulation and over-emphasis on protection of the property rights. Soil conservation gives way to the sanctity of private property. No wonder then that the state has only half-heartedly sought to limit the powers of landowners, in the interests of soil conservation and productivity. The functionaries in whom are vested powers to make rules, aimed at the preservation of the soil, have rarely exercised those powers. Indeed, environmental litigation within this context is almost non-existent in Kenya (Okoth-Ogendo, 2002). This has allowed private proprietors to regard their lands in a manner that reminds one of those days when men were fond of saying; "this is my castle and I can do what I want with and within it".

Individualization of tenure has also transformed land into a commodity to be bought and sold like any other on the market, in conformity with free enterprise economics. The resultant panellation of land for private dominion inevitably leads to inequitable distribution of land. The consequence is that we have large tracts of land concentrated in the hands of few people, while the majority are either landless or have inadequate land. The land use laws and policies so far highlighted are not a reflection of the socio-economic and political realities of Lumakanda Settlement Scheme or the country at large. However the majority of people live from hand to mouth on their small pieces of land in the study area. Their lives are depended on these lands. This has led to over-exploitation, and pressure upon the natural resources in the Lumakanda Scheme.

What has increasingly been perceived by the authorities as increasing population pressure on our arable land is really the fact that most of the people have access only to very few areas of land while a few people have access to large tracts. It is of course true that the rate of Kenya's population growth is crucial factor in the overall development strategy for the country, but it is also true that in terms of land use matters, the question of population is inextricably tied to the manner in which people hold land. It is regrettable that the rural areas, which our policy makers yearn to develop agriculturally, are caught up in this inequitable web of land ownership (Ibid.).

Another feature of private land ownership is that it leads to under-utilization or non-utilization. Because people own more than they need at any given time, a lot of land lies fallow for years (in cases of absentee landlords) and this is common in the study area. Under-utilization can and does lead to soil erosion. This is due to the fact that general environmental conditions may require the active interventions of man so as to prevent the escape of large layers of soil through rivers into lakes and the sea. Absentee landlordism does not encourage frequent human intervention. The Government has tacitly acknowledged the dangers posed by our land tenure to the conservation of the soil. In the Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth, it stated that:

" The sanctity of private land ownership will be respected in Kenya. But it can only operate if private property is used in socially responsible and productive ways. Two misuses of land must be prevented:

- (i) the subdivision of small farms and
- (ii) idle and under-utilized large holdings".

The paper, however, does not make any concrete propositions on how to achieve this. The conclusion flowing from this discussion is that tenure is a central issue in questions of soil conservation, and any land use policies must aim at the long-term goal of productive efficiency and distributive justice.

2.5.0 Theoretical Importance of Agriculture in Development

2.5.1 Introduction

The responsibilities of the government in the service of sustainable social welfare in the interest of the public has always sought to employ the tool of planning to meet its objectives. In Kenya, these objectives were espoused in Sessional Paper No. 10 of 1965, "African Socialism and its Application to Planning" as reduction of poverty and inequality, reduction of ignorance, and elimination of diseases. To help realize the stipulated objectives, planning has been based on the utilitarian principle of the greatest good for the greatest majority under the guidance of a centralized benevolent state.

A centralized benevolent state employed top down planning to rise to challenges of development through various dimensions of allocative planning. These dimensions of allocative planning are economic, financial, social, environmental and spatial planning among others. It has been argued by J. Friedman (1987) that allocative planning is associated with the static forces of maintaining the status quo rather than introducing the dynamics of system change and transformation. The aforementioned systems dynamics correspond to innovative and radical planning which is seen to be responsive to the different changing circumstances of people within nation and states. The role of different actors to foster agricultural development thereby increasing sustainable social welfare is

viewed against this linear perspective of forms of planning and systems dynamics within which actions take place. This action emanates from theoretical development on the role of agriculture in national development from a historical economic perspective.

2.5.2 Agricultural Development in Historical Perspective

In both periods of development economics of 1950's, 1960s and after 1970's, agriculture was assigned a passive role in the economic growth models of the time. Many development economists in the 1950's and 1960's did not view agriculture as an important contribution to economic growth. Development was equated with structural transformation of the economy that is with the decline in agriculture's relative share of the national product and of the labour force. This is exemplified in modern times by the relative decline of the contribution of agriculture to the national product of this country. However, the share of the agricultural sector is still large. The role of development economists in the past and present has been that of facilitating the transformation by discovering ways to transfer resources, especially labour from traditional agriculture to industry, the presumed engine of growth. During this period, only the settler White community practiced commercial agriculture while the African population provided labour and was involved in subsistence production. Different scholars have developed varying viewpoints to support the meager contribution of agriculture to development.

The first to present his argument on the insignificant contribution of agriculture to economic development was W. Arthur Lewis. In his article *Economic Development with Unlimited Supplies and Labour* (1954), he presented a general model of expansion in the economy with two sectors. These were a modern capitalist exchange sector and an indigenous non-capitalist sector, which was dominated by subsistence farming. Lewis' model focussed on how the transfer of labour from the subsistence sector to the capitalist sector facilitated capitalist expansion through re-investments of profits. The supply curve of labour was seen as infinitely elastic at the ruling wage rate (Meir, 1876; 158). In the model expansion in the capitalist sector continued until earnings in the two sectors were equal, at which point actual sector model was no longer relevant. Growth then proceeded

as in the neoclassical growth model. The argument to down play the role of agriculture was further reinforced by empirical observations from the development economists, that agriculture's share of the economy will inevitably decline during the course of development for two reasons.

Firstly, income elasticity of demand for unprocessed food is less than unity and declines with higher incomes. The demand for raw agricultural products grows more slowly than consumption. Secondly, increasing labour productivity in agriculture meant that the same farm output could be produced with fewer incomes, implying a transfer of labour to other sectors of the economy. The above caused the lack of interest to invest in agriculture in the short run in many developing countries. It can be argued that the technological situation prevailing in the countries where these ideas originated were quite different with many of the developing countries where the ideas were meant to contribute to policy.

Proceeding in the same spirit above, Paul Prebisen and Hans Singer, (1949), independently formulated the thesis that there is a secular tendency for the terms of trade against countries that export primary products and imports manufactured products (Eicher and Schultz 1984; 95). They concluded that the scope for growth through agricultural and other primary exports was very limited. In South America, the Economic Commission therefore advocated for import substitution of manufactured rather than support for agricultural exports; import substitution was also encouraged in Africa during the colonial and post independence periods for different reasons thereby down playing the contribution of the agricultural sector in national development.

According to Albert Hirschman (1958), the concept of linkages was applied as a tool of investigating how during the course of development investment in one type of economic activity induced subsequent investments in other income generating activities, further he stipulated that backward linkages lead to new investments in input supplying facilities and forward linkages to investment input using facilities (Hirschman, 1977; 22). He argued that government investment should be concentrated in activities where the linkage effects were greatest since this would maximize industries related to it. It was asserted that agriculture stands convicted on the account of its lack of direct stimulus to the setting

up of new activities through linkage effects. This argument therefore downplays the agriculture sector and underscores the superiority of the manufacturing sector.

The second view about the role of agriculture in development focussed on the interdependence relations between agriculture and industry. It was argued by Jolgenson (1961), growth in non-farm employment depended on the rate of growth of the agricultural surplus. Similar analysis by Ranis and Fei (1961, 1963, 1964) and Enke (1962) indicated that food shortages could choke off growth in the non-farm sector making its labour supply less than infinitely elastic. Non-farm employment is significant in the early stages through its input and output relations with the agriculture sector. They came to a conclusion that in order to avoid falling into a low level equilibrium trap in the early stages of development, a country probably required making some net investments in agriculture to accelerate the growth of the agriculture surplus.

Concern by the state regarding farming systems level of prices and their influence on production and productivity is therefore very significant. The relation between agriculture health and industry however has tended to be ignored in many developing countries leading to very little linkage between urban led industrial development and agricultural production. Moreover, urbanization has tended to be driven by informal sector and service related economic activities, which don't create a big market to stimulate greater production. The economic situation between the two is that of low powered capitalism or low equilibrium trap as aforementioned. However, Johnson and Mellon (1961) have argued that far from playing a passive role in development, agriculture could make five important contributions of third world economies; provide labour, capital, foreign exchange, food to agricultural industrial sector, and market for domestically produced industrial goods. The nature of interrelationships between agriculture and industry at different stages of development were important implications for types of agricultural and industrialization strategies that would most likely succeed in developing countries. Third world development strategies in agriculture have for a long time been distorted by the above views leading to little counter about utilization of productive land.

2.5.3 Models of Agricultural Development

Throughout history, countries have applied different models of agricultural production to ensure sufficient food production and accumulation of surplus. This has tended to be dictated by the peculiar circumstances of these countries with such abundance and scarcity of certain factor endowments. Several models have therefor been discovered and applied in various countries to increase agricultural production, productivity and ensure effective and efficient utilization of land. These models are the frontier models, the conservation model, the urban industrial input model, diffusion model, high pay off input model, induced innovations model and technical innovation model.

a) Frontier Model

In developed and developing countries, history has accurate records that expansion of the area cultivated or grazed has represented the dominant source of increase in agricultural production. For instance, the opening up of new lands such as North and South America, Australia and New Zealand, and Africa etc. Under conditions of rapid population growth, the limits to the frontier model were quickly realized. Indeed this confirmed to the Malthusian population trap, where the needs of increased population growing at a geometric rate while subsistence grew at an arithmetic rate outstripped the capacity of the land to produce more. This model was applied to Kenya during the colonial period and in the immediate post independent era. In the post independent era, the frontier model applied to the creation of settlement schemes and the clearing of forestland for human settlement. However, the above model, cannot apply in many areas except in those areas where new technique can correct certain areas into farmlands. In Kenya, some of the semi-arid lands that are arable can still be used if the government is committed to assisting the communities with irrigation facilities.

b) The Conservative Model

The conservative model of agricultural development evolved from advances in crop and livestock husbandry associated with the English agricultural revolution and the notions of soil exhaustion suggested by the early German chemists and soil scientists. This was reinforced by the application of the concept of diminishing returns to labour and capital developed by the English Classical School of economics.

The model emphasized the evolution of a sequence of increasingly complex land and labour intensive cropping systems, the production and use of organic manures. Labour intensive capital formation in the form of drainage, irrigation and other physical facilities to more effectively utilize land and water resources. Crop rotation farming systems replaced the open three field systems in which arable land was allocated between permanent cropland and semi-permanent pasture. Using this model, growth rates of agricultural production were 1 % Per annum for over long periods of time. The model also explains the situation in the settlement schemes characterized by the exhaustion of soil, soil erosion and the issue of diminishing returns due to greater population pressure on the land resource. The conservation element is therefore lost here, and the danger of land degradation has become a reality. Use of organic manures may not even lead to increases in production and productivity that can adequately meet the demands of the increasing population. The model therefore cannot be really applied although conservation aspect is highly significant even in the present times.

c) The Urban Industrial Impact Model

The urban industrial impact model was formulated in Germany by J.H. Von Thunen to explain geographic variations in the intensity of farming systems and the productivity of labour in industrializing society. The rationale for this model was developed in terms of a core effective input and product markets in areas of rapid-urban-industrial development. Industrial development stimulated agricultural development by expanding the demand for

farm products, supplying the required industrial inputs needed to improve agricultural productivity and drawing away surplus labour from agriculture.

In Kenya, this appears to have been the situation in the late colonial period and the immediate post independence. Secondary towns like Nakuru and Eldoret grew rapidly due to such linkages to the farming sector. In the more recent past, urbanization in Kenya has been mainly driven by demographic pressure as opposed to industrialization. These are therefore a great setback to the application of this model, though it really emphasizes the relationship between the farm and the non-farm sectors in the course of development. Policy implications of the urban industrial impact model appear to be most relevant for less developed regions or lagging regions of the more growing less developing countries. Agricultural development of this model may be inappropriate in countries like Kenya, where growth of urban is as a result of population pressures in rural areas migrating in search of employment growth in urban areas. The urban places themselves on the other hand have little industrial growth nor are they linked to the regional agricultural production besides being characterized by informal and service sector led growth. However deliberate planning based on this model could hold the answer for sustainable development in developing countries.

d) The Diffusion Model

The diffusion of better husbandry practices was a major source of productivity growth in the pre-modern societies. The diffusion of crops and animals from the new world to the old, potatoes, maize, cassava, rubber and from the old world to the new, sugar, wheat and domestic livestock was an improvement by-product of the voyages of discovery and trade from the 15th to the 19th century. The approach rests on the empirical observation of substantial differences in land and labour productivity among farmers and regions. This brings in the requirement of relative resource scarcity as compared to the absolute scarcity emphasized in the conservation model.

Further contributions to the effective diffusion of known technology were provided by rural sociologist research on the diffusion process. Models were developed emphasizing

the relationship between diffusion rates and the personality characteristics and educational accomplishments of the farmers. The model was not very effective and tended to suffer from the following;

- The ideas could not trickle down as was envisaged
- Traditional farming systems were rotational as dictated by the circumstances and not national as portrayed by the modernization proponents (risk averters).
- Only the better off benefited from the experiments of the diffusion model,

Inspire of the above weaknesses, the model brought in some insights that could be applied for increased agricultural production which emphasized the scientific method of farming.

e) **High Pay- off Input Model**

The inadequacy of policies based on the conservation, urban industrial impact and diffusion model led in the 1960s, to a new perspective. The key to transformation of traditional agricultural sector like those dominant in Sub-Saharan Africa into a productive source of economic growth was investment designed to make modern high pay-off inputs available to farmers in poor countries. Peasants in traditional agricultural systems like Lumakanda Settlement Scheme were viewed as rational, efficient resource allocations as directed by the environment.

Schultz (1984), in his book, *Transforming Traditional Agriculture* insisted that peasants in traditional societies remained poor, because in most poor countries, there were only limited technical, and economic opportunities which they could respond to. New high pay-off inputs model was categorised according to three issues:

- 0 The capacity of private and public sector research institutions to produce new technical knowledge. In Kenya, these are KARI and ILRI.

The capacity of farmers to acquire new knowledge and use new inputs effectively. The model is popular due to research studies showing high rates of return to public investments in research. New high yielding varieties, rice, wheat which were responsive to fertilisers and chemical use have greatly contributed to agricultural

outputs. Major areas that have benefited from these sort of model have been found mainly in South East Asia and most of the Asian continent. The green revolution is a clear point to the success of this model. In Kenya, research findings from agriculture research stations have rarely been used at the local level due to the collapse of extension services and illegal allocation of ADC farms. High pay-off input model has therefore not been applied inspite of the availability of research findings that provide high yielding varieties.

f) Induced Innovations Model

The high pay-off model remains incomplete as a theory of agricultural development. The mechanisms by which resources are alienated among education, research and other public and private sector economic activities were not fully incorporated into the model. It does not explain how economic conditions induce the development and adoption of an efficient set of technologies for a particular society, nor does it attempt to specify the processes by which input and price relationship induce investments in research in a direction consistent with a nations particular resource endowments.

The aforementioned limitations led to the efforts by Yujiro Hayami to develop a model of agricultural development in which technical change is treated as endogenous to the development process rather than an exogenous factor operating independently of other factors. The induced innovation model has been grouped into two main sub-parts; technical innovation and institutional innovation.

The levels achieved in each productivity grouping by farmers in most advanced countries can be viewed as arranged along a productivity frontier. This frontier reflects the level of technical progress achieved by most advanced countries in each resource endowment criteria. However, these productivity levels are not immediately available to farmers in most **low** productivity countries in sub-Sahara Africa. They can only be made available by undertaking investment in the agricultural research capacity needed to develop technologies appropriate to the country's natural and institutional environments and investments in the

physical and institutional infrastructure needed to realise the new production potential opened by technological advances.

There is indeed clear historical evidence that technology has been developed to facilitate the substitution of relatively abundant (cheap) factors for relatively scarce (expensive) factors of production. The constraints imposed on agricultural development by an inelastic supply of land have in economies such as Japan, Taiwan been offset by development of high yielding crop varieties designed to facilitate the substitution of fertiliser for land. Constraints imposed by inelastic supply of labour, in countries such as USA, Canada, Australia, have been offset by technical advances leading to the substitution of animal and mechanical power for manpower.

On the institutional innovation arena, a developing country which fails to evolve a capacity for technical and institutional innovation in agriculture consistent with its resources and culture endowments suffer two major constraints on its development of productive agriculture.

- i) it is unable to take advantage of advances in biological and chemical technologies suited to labour intensive agricultural systems
- ii) The mechanical technologies it does import from more developed countries will be productive only under conditions of large-scale agriculture organisation.

This will contribute to the emergence of a bimodal rather than uni-modal organisational structure or strategy for agricultural development.

The lag in shifting from a natural resource based to a science-based system of agriculture continues to be a source of national differences in land and labour productivity. Lags in the development and application of knowledge are also important sources of regional productivity differences within countries and rates of technical change are an important sources of the widening disparities in the rate of growth of total agricultural output in labour and land productivity and in incomes and wage rates. Innovations that have been developed in Japan and Taiwan are appropriate for increasing high densely populated places of Western Province in Kenya where land parcels are becoming smaller and smaller. This

would also require appropriate institutional innovations that are consistent with the cultural endowments and resources of the people.

2.6.0 Theoretical Framework

The existing cultural base, which comprises the stock of knowledge, traditions, economic prosperity, etc., is the basis for change in any society (Allen 1971: 259). Adoption of new techniques in traditional societies is lower, because of low technological culture. It is hard to adopt new technology, either due to general cultural inertia of the society (such as limited stock of knowledge, lack of security leading to fear of the new, etc.), and/or the new technique clashes with the existing traditions or values (Ibid. 274). For any technology to be adopted, the need and demand factors have to be met. When there is need, the cultural base has to provide a solution to the need. This means that the existing scientific knowledge should provide technological options to change the situation.

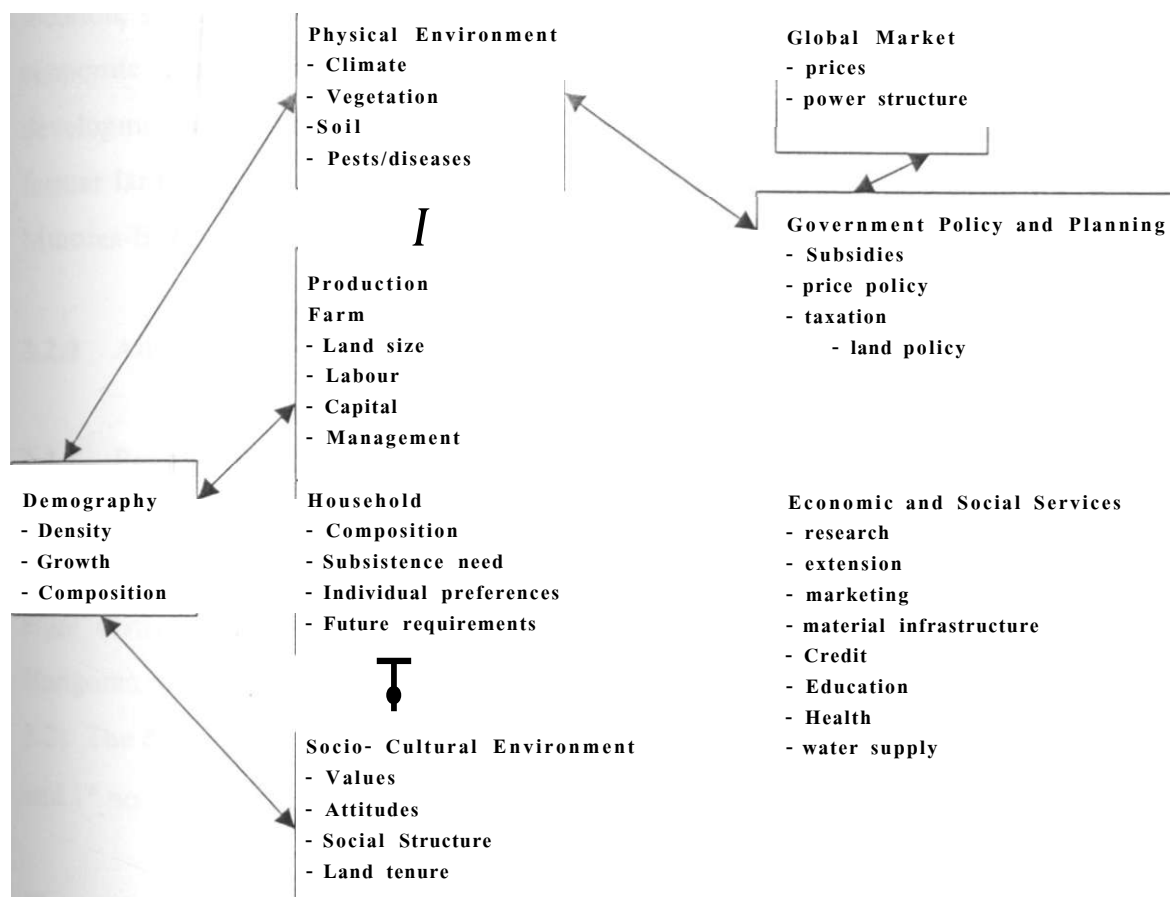
In many farming communities in the study area, the need factor exists, but the cultural base is too weak to meet the demand (the farmers are too weak to transform the need potential into action). In such areas, the cultural base has to be developed to a self-sustaining level or threshold through an information transfer on what is possible to farmers, a better education and training, and an improvement of the standard of living, a better security system, a change in the land tenure system, and similar policies. The aim should be transform the farming systems to a "take-off-threshold". As in an aeroplane, take-off results after attaining sufficient speed on the runway. Many farms in the rural areas have not attained this technological take-off-stage because of technological immobility or inertia.

From the foregoing literature review, the effect of human activities on man's natural surrounding should be investigated. The essential questions in regard to measures to be taken are protection and restoration of the balance of nature. Deforestation, soil erosion, exhaustion of natural resources and energy, one-sided use of agricultural land are all Phenomena that are certain to have dramatic consequences in the long-run. The problem

is however, that short-term prevention of the damaging consequences of human activity seems to lead to strategies, which are liable to give poor economic yields. Good **development** models should include: -

- Maximum economic growth
- **Fair** distribution of existing and potential prosperity, and
- Minimization of the damaging effects of nature

Figure 2.1: **Factors Affecting Agricultural Production**



Source: Adopted and modified from UN. 1983. ESCAP: Guidelines for Rural Centre Planning.

CHAPTER THREE

3.0 BACKGROUND OF THE STUDY AREA

3.1.0 Introduction

This chapter gives the detailed background description of the study area in terms of its location, size, administrative units, population distribution, structure and density, socio-economic factors and main physiographic and natural conditions critical to the development of the area. Lugari District is a relatively new district. Information from the former larger Kakamega district (which was split into 3 namely Kakamega, Vihiga and Mumias-Butere) were used.

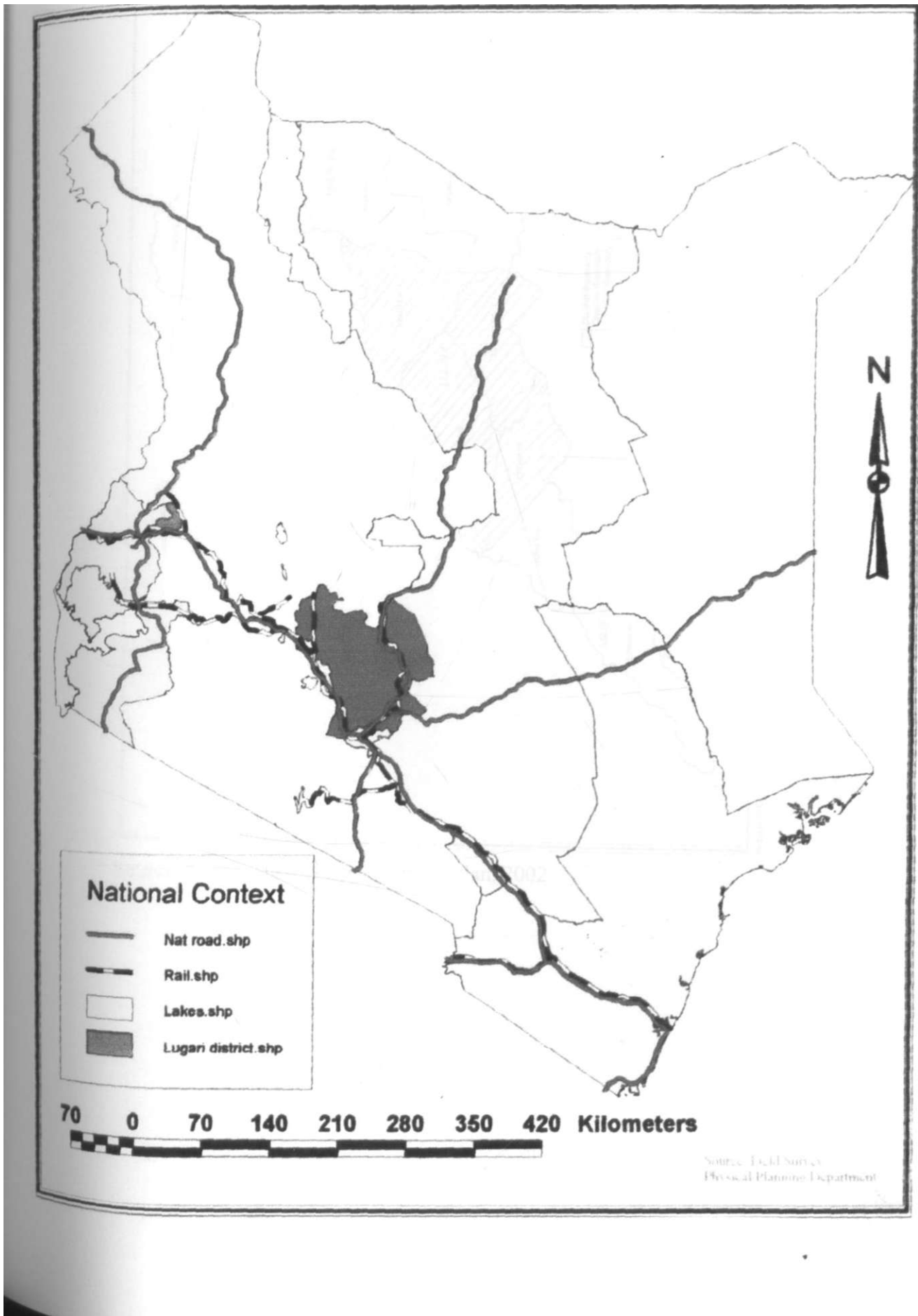
3.2.0 Administrative Units

3.2.1 Position and Size

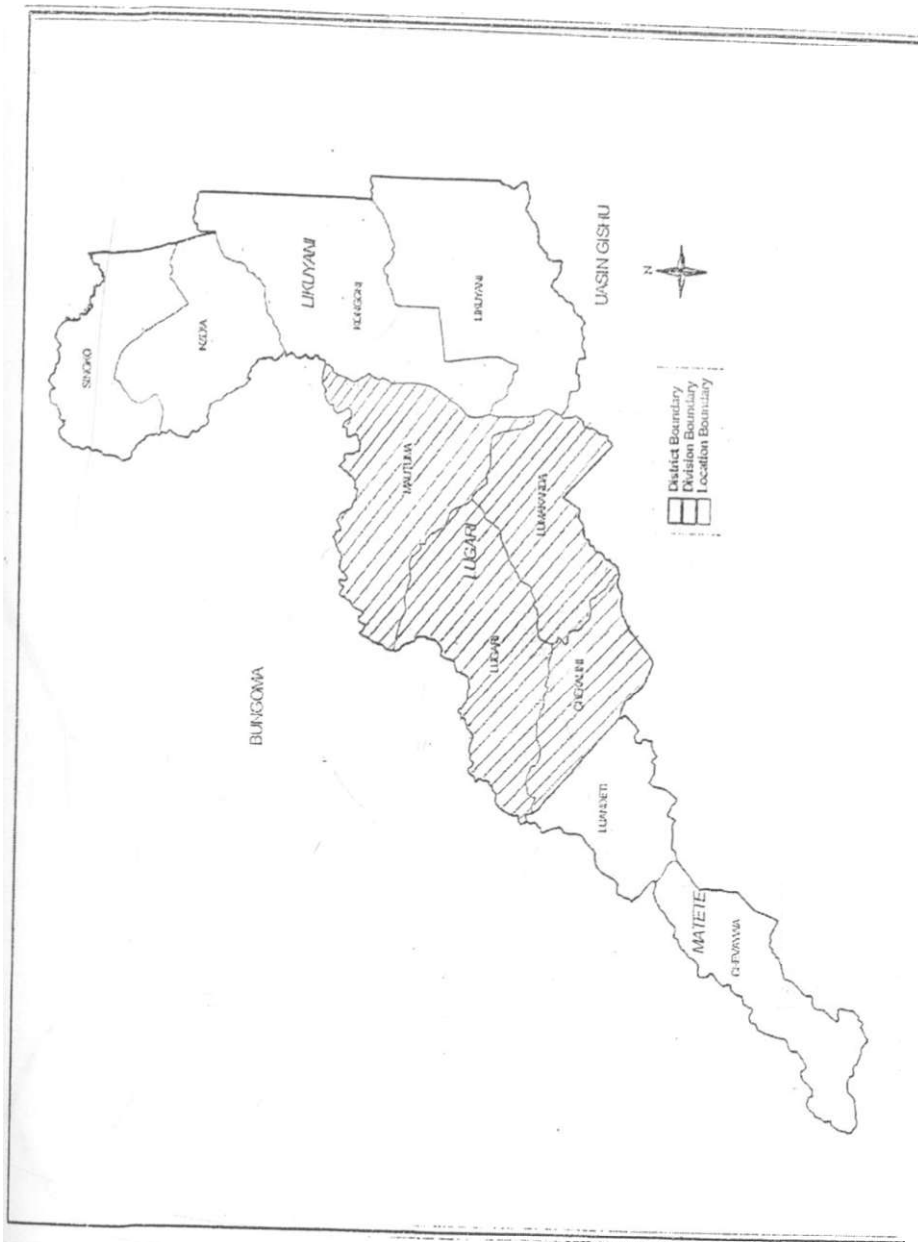
Lugari District was carved out of the larger Kakamega District in 1998. It is one of the eight districts in Western Province. It borders Kakamega and Nandi to the South, Bungoma to the west, Uasin Gishu to the East and Trans- Nzoia to the North (see map 3.2). The district lies between longitude 34° 28' and 35° east and between latitudes 0, 25' and 1° north of the Equator. The district occupies an area of 670.2 km².

The study area covers the entire Lumakanda and Mautuma Locations. The later was carved out of Lumakanda Location in 1996. The locations are within Lugari division of Lugari District as shown by Map 3.2 and map 3.3 respectively. The study area borders Lasin Gishu District in the South, and Bungoma District in the North. It has 4 Sub-locations namely Munyuki, Mwamba, Mautuma and Mbagara. It covers an area of 131.4-[^] (CBS, Lugari: 2003).

Map 3-1 Lugari District in National Context.



Map 3.2: Administrative Boundaries of Lugari District



Source: Lugari District Development Plan, 2002

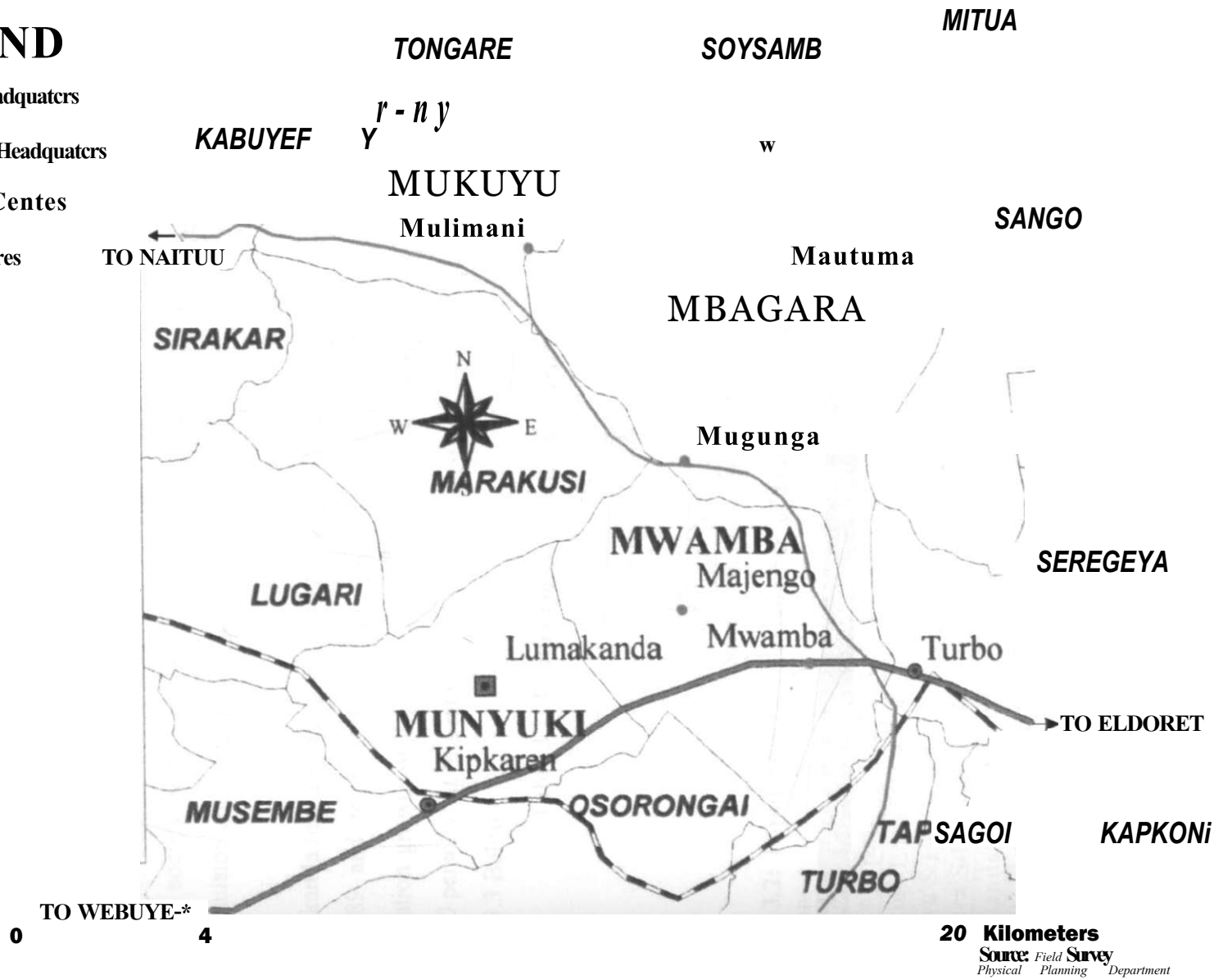
LEGEND

District Headquarters

Divisional Headquarters

Market Centres

Rural Centres



3.3.0 Population Size and Growth

Social and cultural systems contribute significantly to the process of development. They are dynamic human functional components and they tend to portray the underlying problems and opportunities for development.

The population of Lumakanda Settlement Scheme is predominantly cosmopolitan with the Luhya's forming the majority representing 91.4 percent (see figure 3.2 below). The other ethnic groups include the Kikuyu, Luo, and Kisii accounting for 8.8 percent of the total population. The existing socio-cultural systems in the study area demonstrate a mixed society with different cultural values. We have for example the Bukusu circumcision culture that is unique from all other cultures.

Lumakanda had a population of 3,000 people in 1969, 14,600 in 1979, rising to 24,500 in 1989 and to 42,800 in 1999. This recorded a growth rate of 4.1%. Assuming population growth of 4.1%, the projected population of the study area by 2015 will be 80,160 persons. At this rate the population of the study area is likely to have doubled (see table 3.3 Below).

Table 3.1: Population Composition by tribe

Tribe	Percent
Luhya	91.4
Kikuyu	4.3
Luo	1.4
Others	1.4

Source: field survey, 2003

Table 3.2: Population by Sex, Number of Households, Area and Density by Sub-locations

Location	Male	female	total	households	Area Km ²	density
-district pop.	105,273	110,647	215,920	41,809	670.2	322
Mautuma Loc.	9,534	10,037	19,571	3,560	83.6	234
Mukuyu S/L	4,115	4,423	8,538	1,562	22.9	373
Mbagara S/L	5,419	5,614	11,033	1,998	60.7	182
Lumakanda Loc.	11,478	11,783	23,261	4,650	59.3	392
Mwamba S/L	5,835	6040	11,875	2,414	33.2	358
Jiliinyuki s/L	5,643	5,743	11386	2,236	26.1	436

Source: Population and Housing Census, CBS, 1999

table 3.3: Population, Density and Average Farm Sizes from 1969-1999 for Lumakanda/ Mautuma Settlement Scheme.

	1969	1979	1989	1999	mmm	2009	2015
Population (,000)	19	14.6	24.5	42.8	48.14	63.35	80.16
Density (km²)	19	102	171	299	jj 6	443	559
Average farm size (ha)	10-Aug	8-Jul	4.1	2.1	1.8	1.4	1.1

Source: Computed from Population and Housing Census, CBS, 1969, 1979, 1989, 1999

Table 3.4: Age Structure Distribution

	Frequency	Percent	Cumulative Percent
0-4	17	3.4	16.6
5-9	32	6.5	40.7
10-14	39	7.9	48.6
15-19	36	7.3	55.9
20-24	48	9.7	65.6
25-29	48	9.7	75.3
30-34	38	7.7	83.0
35-39	38	7.7	90.7
40-44	46	9.3	100.0
45-49	28	5.7	22.3
50-54	14	2.8	25.1
5-559	8	13.2	26.7
over 60	36	7.3	34.2
Total	494	100.0	

Source: field survey, 2003

The study area had average land sizes of 10 ha at the time of resettlement. This has reduced over the years to 8 ha in 1979, 4.1 ha in 1989, to 2.1 ha in 1999. This is projected to 1.0 ha in 2015 considering the same trend.

LEGEND	
<i>U</i>	District Headquarters
<i>M</i>	Divisional Headquarters
•	Market Centres
•	Rural Centres
—	Road Class A
—	Road Class C
	Road Class D
	Rural Access Road
— -	Railway Line
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Source: Field Survey 2003

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LEGEND

- District Headquarters
- Divisional Headquarters
- Market Centres
- Rural Centres

Road Class A

Road Class C

Road Class D

Rural Access Road

— Railway Line

L J Study Areas

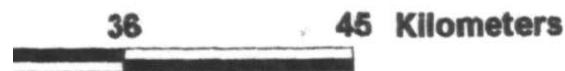
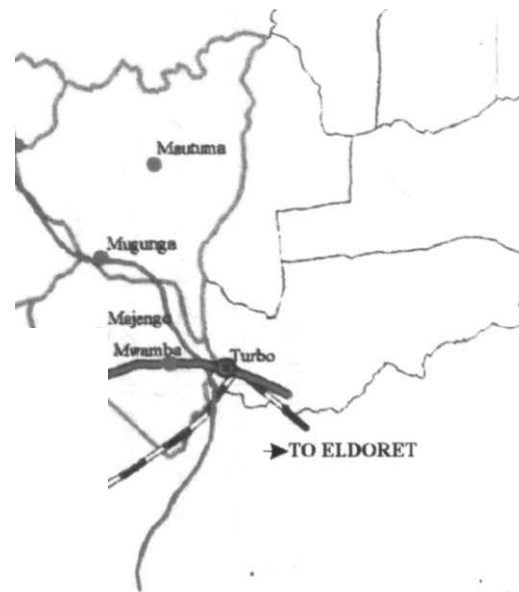
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The study showed that 52.2% representing male and 47.8% representing women sex distribution. 48.6% of the population are below the age of 14 years whereas the active economical population represent 42.1%. The total number of households was found to be 8,700 and the average household size was 8 persons per homestead. The literacy levels were 40% had primary, 42% secondary education. The nearest distance to school was found to be less than 2 Km.

3.3.1 iMigration

In the study area, the issue of migration is associated with the Kenya Government policy of selling land to people. From 1963, the area has been a net reception of migrants. Most of the migrants were from the adjoining districts in Western province, particularly Vihiga, Kakamega, and a fewer migrants from other parts of the country such as Central and Nyanza Provinces (see table 3.2 above).

3.4.0 Lumakanda Settlement Scheme (1963-2003)

3.4.1 History of the Study Area

The Original name of Lumakanda Settlement Scheme was called "Cheptindin Scheme". It was established under the Settlement Fund Trustees, a body corporate of Section 176 of the Agricultural Ordinance 1955, Cap 318. After Kenya became independent in 1963, these areas were split up and sold to African farmers. Lugari District comprised 11 Settlement schemes that comprised of 40,551 hectares on which about 6,000 families were settled (Kenya, Republic of 1989). The average farm sizes in these schemes were relatively large. Population densities were relatively low less than 249 persons per square kilometer.

The first team of African settlers was between 1963-64, just after Kenya had attained independence. The first scheme to be settled was Lugari settlement near the railway station in 1962/63, where land sizes were between 20-25 acres. It was followed by

Chekalini and Lumakanda/Mautuma settlement schemes in 1963/64. Here the land sizes were between 15-20 acres while those whose land had wetlands, hills, and rocks or **bordered** a stream had more acreage, as large as 30 acres. There were also special plots. **According** to Mzee Hebron Kamau Mugo (76yrs) of Mwamba village, himself a former Mau Mau fighter was resettled in this scheme.

According to Mzee Ayub Muhonja and Barnabas Maneno, both Village elders of Mwamba Sublocation, the name Lugari emanated from among one African worker called Mr. "Lukale". However the European settler Mr. Sergeant David called him "Lugari", hence the name of the District now. The settlement schemes were going by names such as Block A, B, C, and D. These blocks later combined to form Sublocations and Locations. The original European settlers were Mr. David Sergeant in Mautuma, Francis (Franka) in Lugari Station, David Kaiser in Chekalini, John Morrison Law and Newton in Munyuki, Beam and Resinus in Mwamba and Turbo areas respectively.

Franka currently houses Lugari Police Station while the former residence of Newton is the current St. Luke's Lumakanda High School (formerly Newton Primary School). Morrison Law's house is the current office of Lugari District Headquarters at Lumakanda whereas current Turbo Police Station was originally the European settler's Courts.

According to Mzee Muhanji whose father worked as a cook to Ms Resinus, she planted maize, oranges, lemons, apples, sunflower and sisal plantations. Her land is the current Turbo Urban Centre including Mwamba and Turbo Girls Secondary School. Mr. Newton's land is the Current Majengo, Part of Munyuki areas and all that land to the west and north of Lumakanda High School, whereas Morrison Law is the whole of Munyuki sublocation including the current District headquarters. David Sergeant occupied the whole of Mbagara Sub-location, a lot of which was under the forest plantations. These include Mugunga, Panpaper, Mautuma Parish, Mautuma Secondary School and the Catholic Parish. Also settling in Mautuma to the north was Mr. Mctecker who occupied Mlimani (current District Hospital) down to Ivona areas bordering Nzoia River and Naitiri Settlement Scheme in Bungoma District. The forest plantations have been cleared

and settled. Now we have Raburu scheme, Mudavadi scheme and Panper schemes where inhabitants were allocated 2 acres each. Initially it was meant to resettle the squatters who were living in those forests.

3.4.2 Housing

The elders confirmed that before the coming of the Europeans, the land was communally owned and they were staying in fenced villages. The houses were of round shape, mud walled and grass-thatched huts using the local materials and cow-dung to reinforce the wall. They had only one door and with no windows. They were called "Itiro". "Itiro" means round hut house. The beddings were of cow skin while the bed was made of dry banana leaves and was called "Yangongo". Inside the Itiro, at the top was the "Inungu". This was a private sleeping place for the "oldman". It also served as a security hideout incases of an enemy.

3.4.2 Acquisition of Settlement Plot

According to Mzee Maneno, who migrated from Vihiga (1963), there were advertisements by the government through the Chiefs urging people to go and settle in Lugari Schemes. For one to qualify you: -

- Must have been married
- Must have been of good health
- Must have had no land or less than an acre
- Must plant maize, and
- Must not sub-divide the land

Those who qualified were given free transport to the schemes. Allocations of the plot were through random picking of a number from a "debe". The maximum land allocated was 15 acres, but those whose lands had wetlands, hills, stones, had more acreage, as these were not counted. The settlers were required to cultivate 3 acres, which was done for them by the government for 3 consecutive years. They were also provided with

fertiliz^{er}' seeds, building materials, jembes, pangas, Shoka, nails that were included in their loan agreement.

They were advised to have one homestead, which however, failed because of family disputes, drunkenness and noise. They were taught at the Farmers training center (FTC) for one week on farm and cattle care. It was only after FTC training that one qualified to be given the 2 grade cattle, mostly of Friesian type. No keeping of a bull was allowed. They were also advised to form cooperatives so that they could market their farm produce **through** them. No one was allowed to sale farm produce outside the cooperative societies as is happening today. The loan repayment was through KCC or KFA in Eldoret town.

3.4.3 The Conditions of the Loan Agreement

The Settlement Fund Trustees, a corporate body established under Section 176 of agricultural ordinance 1955, Cap 318 were responsible for the scheme. They were offering a loan of up to Kshs. 2,000 to assist with the purchase of one cow (Kshs. 500), one heifer (Kshs. 400), one heifer calf (Kshs. 100), Housing and fencing (Kshs. 100), cultivation, seed etc. (Kshs. 500) and the establishment of sisal (Kshs. 400). This was under loan No. 026252/10/-/A of the Ministry of Lands and settlement between late 1963 and 1964 (Kenya, Republic of, 1963).

The loan was offered under the following terms (Ministry of Lands Letter dated 25th, January, 1964).

" The loan repayment shall be calculated on 4 units of Kshs. 500/- taken up and each loan unit of Kshs. 500/- shall be repayable within a period of 10 years by 20 equal and consecutive half-yearly installments of Kshs. 35; all installments shall include interest at six and half per centum per annum. Interest for any broken period in excess of the initial 6 months shall be payable with the first installment. The first of such installments will become due on each of 31st December and 30th June during the period of repayment. In the event of non-payment on the due date of any one or more of the above installments and of such non-payment continuing for a period of 30 days, then the entire balance of the loan and outstanding interest shall become immediately payable and the Trustees may there-upon take possession of the moveable assets referred to in condition No. (I) hereof and without recourse to a court of law, may dispose of such assets as they may think

fit, and after meeting all costs involved credit the proceeds thereof against the capital sum and interest outstanding"

3 44 Terms and Conditions of Cheptindini Smallholder (Scheme No. 26)

The title was freehold, subject to the following conditions: -

- 1 (a) the land shall only be used for agricultural purposes
- (b) the land shall not be subdivided, changed, let, leased or transferred without the prior consent in writing of the Central Land Board (CLB)
- (c) The allottee shall within twelve months of the date upon which he takes possession of the land, to the satisfaction of the CLB:
 - (i) cultivate atleast one acre of arable land'
 - (ii) erect a dwelling house of suitable materials, and
 - (iii) erect a fence of suitable materials or plant a hedge around the perimeter of the land
- (d) Upon any breach of these conditions, the land shall become liable to forfeiture to the CLB but such forfeiture shall not be enforceable by re-entry, suit or otherwise unless a notice shall have been served on the proprietor of the land.

there is reserved to the CLB during the period from the date hereof to the date of execution of transfer of the land:

- (a) the right to enter upon the land for the purpose of constructing laying, erecting, inspecting, repairing and maintaining pipelines , canals, rams, reservoirs, cattle-troughs, pump-houses, boreholes, dams, wells and other structures or installations necessary for the efficient supply of water to the land and all other pieces of land in the estate of which this piece of land forms part'
- (b) The right to provide such ways of access as may be necessary for and incidental, to such matters as aforesaid, and the access there to and to rivers by persons and cattle from adjoining and neighbouring pieces of land. Provided that the CLB shall have regard, where possible to the

interest of the allottee in deciding the position or alignment of any such rights.

- 3 the transfer to the allottee shall include:-
- (a) the grant to the allottee and his successors in title of such easement over adjoining or neighbouring pieces of land as shall at the date of transfer have been provided in accordance with the last preceding clause and are necessary for the proper enjoyment of the land hereby allotted, and
 - (b) The reservation in favour of the CLB and its successors in title the owner or owners of the remainder of the state of which the land hereby allotted as shall at the date of transfer have been provided as aforesaid and are necessary for the proper enjoyment of the remainder of the said estate or any part thereof.

4 it is expressly declared and agreed that all plant equipment and works installed , laid or constructed by or on behalf of the CLB on the land hereby allotted shall be and remain the property of the CLB and its successors,

5 for the parcel of land:

The settlement charge: shillings two thousands three hundred (Shs. 2,300)

Fees, etc - conveyance fee Shs. 20.00

Registration fee Shs. 20.0

Stamp duty Kshs. 60.0

Total Shs. 100.0

3.5.0 Physiographic and Natural Conditions

3.5.1 Rainfall and Temperature

General climate and rainfall pattern of Lugari is of equatorial type. The mean annual rainfall is 1188mm (Turbo Forest Station, 2003). Two periods of rain can be distinguished: the first long rains of March to July and the short rains of September to October (Kenya, Republic of, 2002). The long rains average 1200mm while the short average 1000mm. There is no real gap between the two rainfall peaks.

The temperature does not vary much throughout the year due to proximity to equator. The mean annual temperature is 25 ° C and it ranges between 22 °C- 28 °C. The dry season extends from December to February.

The diurnal rainfall pattern is of the tropical inland type that is most pronounced during the second part of the rainy season, with maximum rainfall in the afternoons. Percentages of monthly rainfall falling per hour of the day for each month are available at Eldoret Meteorological Station about 30 km south east of the study area.

Table 3.5: iMonthly Rainfall and Temperature Data for Lumakanda

Month	Rain (mm)	Half PET (mm)	Temp (dc)
Jan	99.3	95.8	18.0
Feb	77.4	90.1	18.1
Mar	54.7	116.4	18.7
Apr	102.7	94.6	19.4
May	146.2	74.9	18.4
Jun	126.8	68.6	16.9
Jul	175.6	75.9	16.7
Aug	236.0	69.7	16.6
Sep	100.4	73.1	16.9
Oct	80.4	85.2	17.8
Nov	47.3	88.8	17.6
Dec	28.6	95.1	17.2
Total	1275.4		

(Data based on Turbo Forest Estate 1994-1999, data.)

The median rainfall intensity is 30-40 mm/h. About 25 percent of total rainfall is falling in showers of 15-30 minutes. About 35 percent are falling in showers with higher intensities and 40 percent with lower intensities (Eldoret Met. 2003). These data are important for assessing the amount of runoff and erosion and for the amount of water available to plants in the study area.

3.5.2 Geology and Soils

Two main formations can be recognized (Map 3.4). These are:

- Tertiary lower Uasin Gishu phonolites, lava series;
- * Pre-cambrium Basement System rocks, consisting of:

- a) banded quartz- feldspar gneiss's
- b) gneissose flow-foliated granites or granodiorites (Sanders, 1963)

The gneiss's (a) and granodiorites (b) are situated in, some kilometers wide, broad zones, **which** are NNW-SSE, oriented. The Basement System rocks are often referred to as forming pre-Miocene erosion levels (Scott et al., 1971). In Miocene times (25 million years BC) these deeply weathered rocks were covered by, first, a thin layer of volcanic tuff, and then by the Ca. 60 meters thick phonolitic Uasin Gishu lavas. The lavas form the very gently Westward dipping Uasin Gishu plateau, of which the main phonolitic rock outcrops are often encountered at steep borders of the plateau and in the incised river valley of the Kipsangui river.

The Basement System rocks form the substratum of the river valley slopes, around the border of the plateau, and of a small area of the plateau in the northern part. Granodiorite outcrops can be seen at the big "koppies" of Soysambu in the north, and gneiss's in some "koppies" and steep slopes in the southwestern part, near Lumakanda.

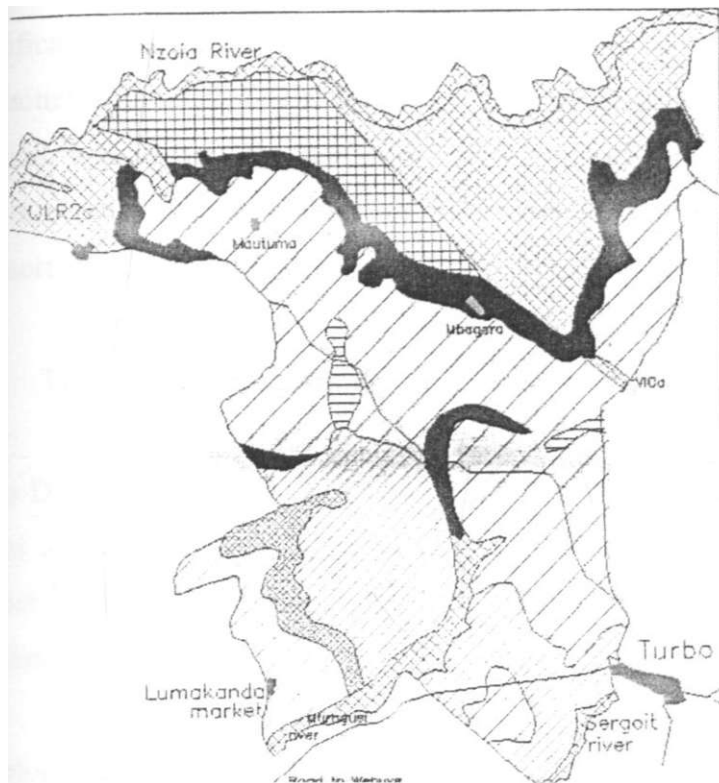
The various rock types are of importance with regard to the fertility and the grain-size distribution of the soils. According to Andriessse and van der Pouw (1985) the phonolites are intermediate rocks, which means they contain more than 54 % SiO_2 . They consist of a blue-black fine-grained groundmass with large porphyritic crystals. The metamorphic basement rocks are medium to coarse grained, and consist of acid rocks, with ca. 70 % SiO_2 .

The different weathering products of these rocks cause at least part of the major differences between soils in the area. The soils on the phonolites (plateau) have higher pH, higher cation exchange capacity and higher fertility. Soils on the basement system rocks (mainly the valley slopes) have a lower clay content and a higher sand content than the soils on the plateau, which may be enhanced by sorting, caused by erosion and selective deposition on the valley slopes. In bottomlands and small valleys, soils developed on infill from phonolites are encountered. Generally these are fertile, but

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poorly drained and very heavy-textured soils. In the larger valleys, there are some alluvial soils (Frenkel and van Dongen, 1990)

Map 3.6: Physiographic Soil Map of Lumakanda Scheme



MAP LEGEND:

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Source: Rene Dongen & Joris Frenkel, 1990

3.5.3 Agro-ecological Zones

According to Sombroek et al. (1982) and Jaetzold and Schmidt (1982) the purpose of an agro-climatic or agro-ecological zone map is to provide a tool for assessing which areas are climatically suitable for various land use alternatives, with particular emphasis on the suitability for crops or crop varieties. The difference between agro-climatic maps and agro-ecological maps is that in the latter, site conditions other than climate (particularly soil moisture storage) have been incorporated. Sombroek et al. (1982) classified the Moisture availability zones for their agro-climatological zone-map by ratio r/E_o (rainfall/potential evapotranspiration) during the growing season. The ratio for this period

is about 0.7, so the area lies in the sub-humid zone. The soil moisture regime of the soil is udic, and the probability of $r < 2/3EO$ in the growing season is less than 5 Percent.

Jaetzold and Schmidt based their main agro-ecological zones on the probability of meeting the temperature and water requirements of the main leading crops. In their classification, the area is lying in the transition zone between the semi-humid and semi-arid zones. The ratio r/EO is 0.4 to 0.5. They situated the area in the UM4 zone (upper midland, transitional), the sunflower-maize or upper sisal-zone. The growing period in this zone (with 60 % reliability) is 115 days or more for the long rains and 115 or less for the short rains.

3.6.0 The Urbanization Trends

In the District, there are very few towns with over 2000 people. With the upgrading of Lugari to a district status in 1998 and the elevation of Lumakanda market center to the District headquarters has boosted its status. The town is mainly inhabited by Government Officers, who number about 400.

The plots are now fetching Kshs. 200,000 for a quarter an acre, compared to Kshs. 50,000 in 1999. The price was aggravated by the installation of the electricity in June 2002 and piped water. According to the Lugari County Council, the total urban population as per December 2002 was 16,000 people. There are only two urban Centres Lumakanda and Lugari. However these figures are actually inclusive of the rural population as it is difficult to demarcate the urban and rural boundaries.

During the field survey, an attempt was made to identify the level and standards of infrastructure and services provided in these centres. It was evident that majority lacked basic facilities which render them weak in performing there desired functions. The level and standards of development of existing centres were found to be very low. What would be required now and in future is to promote development for efficient delivery of services in the study area.

There are no services in the Center like a mortuary, entertainment, road infrastructure etc. most of the services like banking, lodging and recreational are found at Turbo, Kipkaren River, Eldoret and Webuye, all along the great Uganda road. Most government officers commute from these towns or from their homes. Turbo and Kipkaren fall on the administrative borders of Uasin Gishu and Lugari Districts. There have been reported conflicts in revenue collection between Wareng and Lugari County Councils. The disputes arise because of boundaries. There are those who argue the boundaries were following the railway line, the tarmac road and others say it follows the Kipkaren River. The wrangling among the local leadership over the central location of the district headquarters has undermined investment in Lumakanda Center. Some are proposing it to be moved to Panpaper between Mlimani and Mugunga and there are those who want it to remain at Lumakanda.

Plate 3.1: Mugunga Market Centre.



Source: Field Survey, 2003

3.7.0 Land Use

3.7.1 Original Habitat and Agriculture of the Study area

plate 3.2: Sunflower Plantation in the study area



Source: Field Survey, 2003

The elders could remember that during the 1970s and the early 1980s, one acre of land could produce as much as 30kg. The fertilizers commonly used were 'Chapa Ndege', phosphate for planting and sulphate ammonia for top dressing. Samples of soil were always taken before the recommended fertilizer was issued. The seed came only from Kitale called 'Kitale 2'.

One bag of maize (90kg) cost Kshs. 160. To them this could pay school fees the whole year. Milk cost 30 cents per litre and they could get one full bucket of milk from one cow. They had also access to Guaranteed Minimum Return (GMR) loan in the 1960s where they were given fertilizer and seed. Around 1968, the AFC provided them with materials for a minimum of 5 acres.

3.7.2 Existing Land use Patterns

The district is 90% predominantly agriculture. The average farm size (small-scale is 2.1 ha. Whereas average farm sizes (large-scale) are 5ha. The main food crops produced include: maize, beans, sweet potatoes and sorghum. The main cash crops produced include coffee, sunflower, sugarcane, bananas, passion, and tomatoes. The production of sunflower has gone down due to low prices offered to farmers whereas only few farms have coffee as cash crop. All the agricultural cooperative societies have collapsed making marketing of farm produce very poor especially for maize, milk and coffee. The high dependence on maize as a cash crop has continued despite the prices having been poor due to liberalization of the market.

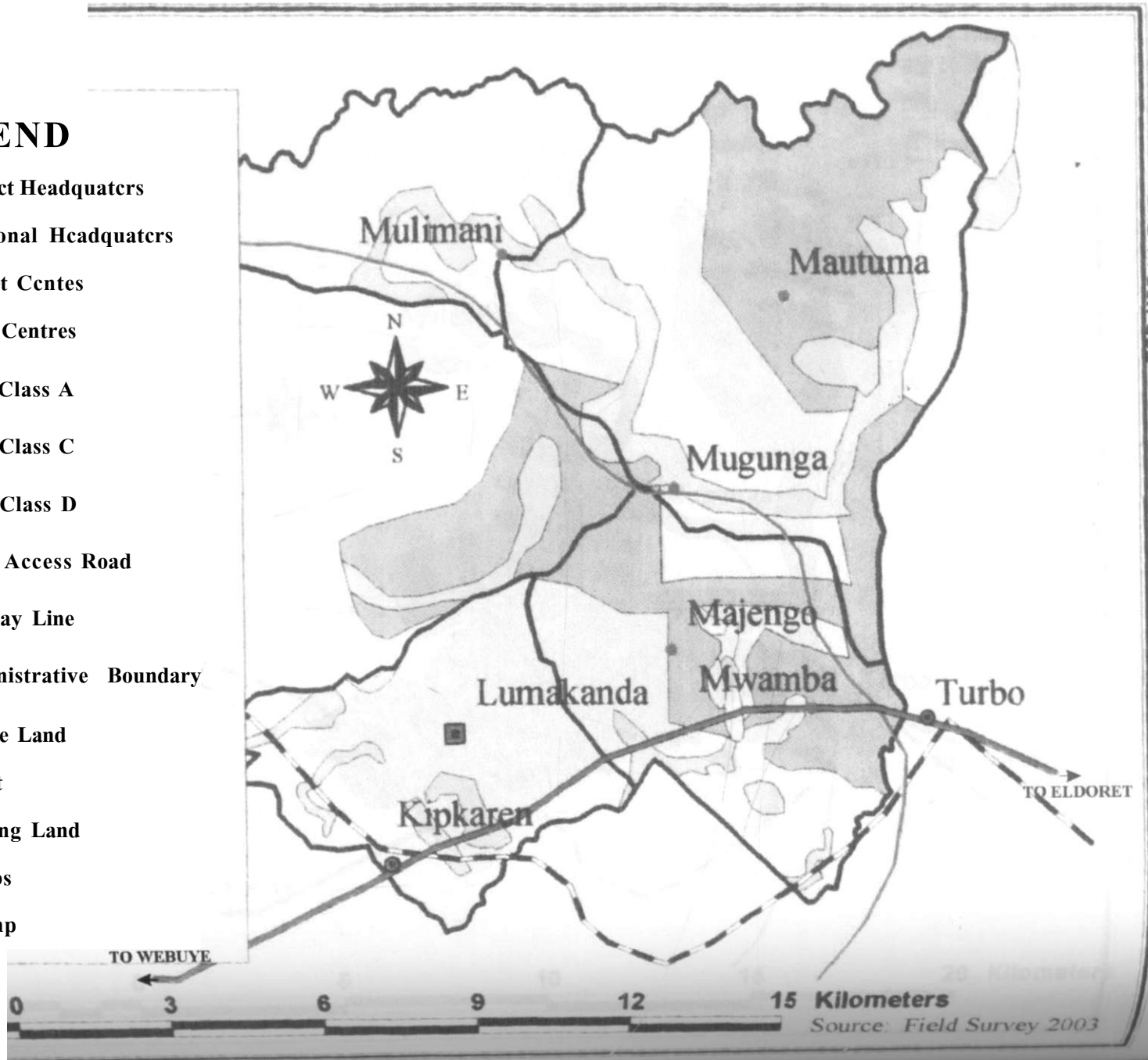
The total acreage under food crops in the district is 32,390 ha while total acreage under cash crops is 2,220 ha. It is estimated that the population working in agriculture is 54,307 in the district leaving over 200,000 not classified. Equally total numbers working in the livestock sector are 34,400. The population of fish farmers is estimated to be only 253, the number of fish ponds is 279 and the main species of fish catch are *Oreochromis niloticus*, *Clarias (omena)* and *Tilapia*. The percentage of people engaged in forest activities is estimated at 3 percent and the size of Gazetted forests is 83.9-km square. The main forest products are pulpwood, fuel wood, poles timber and grass

The legend for the land use map consists of map units with an agricultural value. The map shows the following units (map 3.7):

- Arable land (mainly maize intercropped with beans; some sorghum, millet, sunflower , sweet potatoes and cereals and some meadows)
- Forest: All the forest mapped here was production forest for wood, paper or leather tanning. In some parts the forested areas were being used as extensive grazing areas.
- Shrubs: The shrub vegetation mainly existed on steep slopes, where no intensive land use would be possible. The shrub vegetation was sometimes used for extensive grazing

LEGEND

- Di strict Headquarters
- Divisional Headquarters
- Market Centes
- Rural Centres
- Road Class A
- Road Class C
- Road Class D
- Rural Access Road
- — Railway Line
- Administrative Boundary
- Arable Land
- Forest
- Grazing Land
- Shrubs
- Swamp



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LEGEND

District Headquarters

Divisional Headquarters

Market Centes

Rural Centres

Road Class \

Road Class C

Road Class D

Rural Access Road ** >

Railway Line

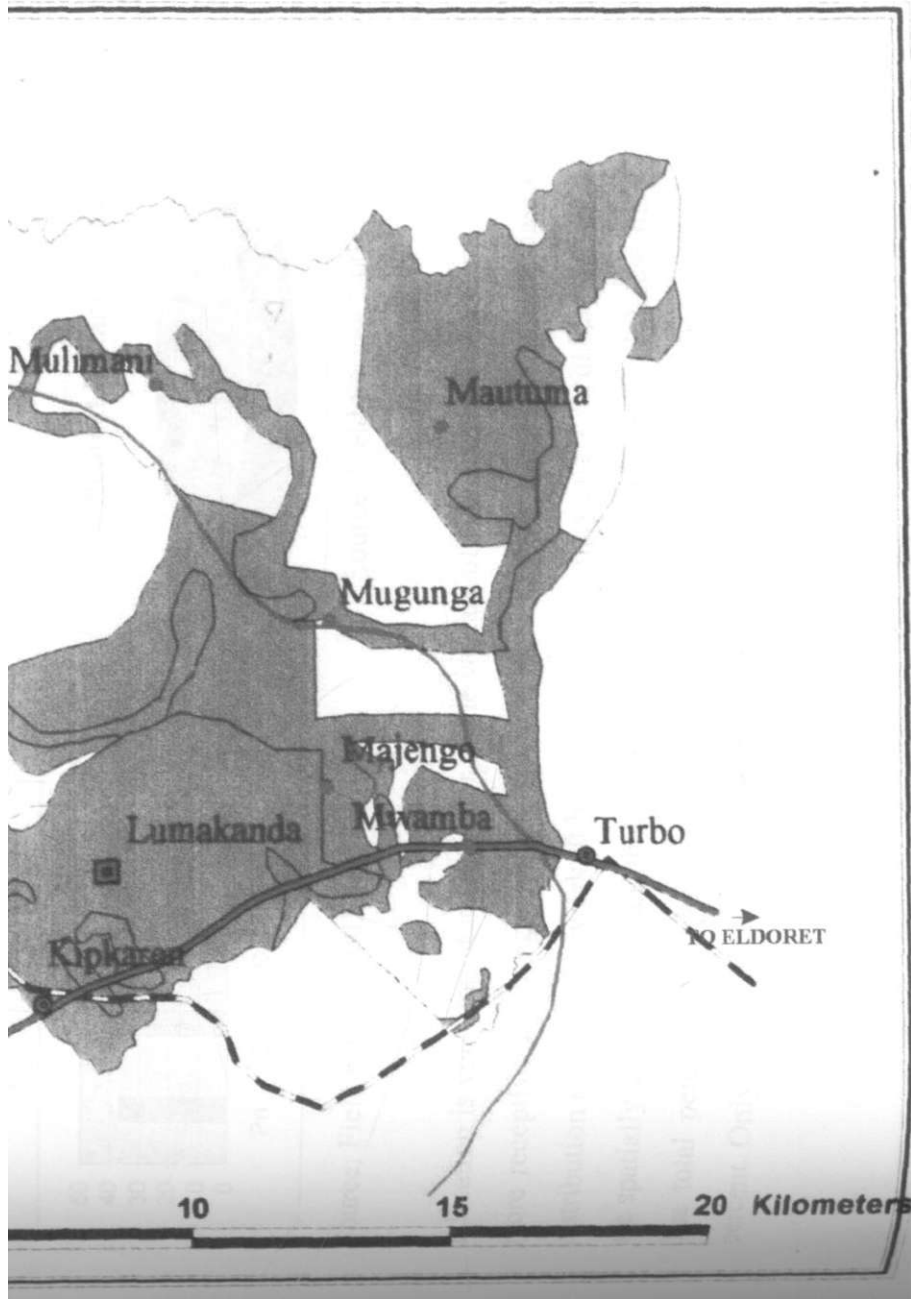
Swamp

Land Less Than 2 Ha.

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TO WE BIT

Source: Field Survey 2003



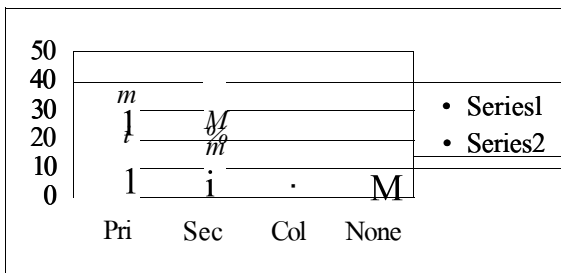
Pasture: The pasture described here was sometimes in use for intensive grazing, but in most cases it was extensive grazing land.

- **Swamps:** Some parts of the bottomlands are swampy and do not have any agricultural use.

Map 3.7 shows the land use of the study area before 1997. After 1997, the forested areas were harvested and the land given to the landless. Map 3.8 above shows the existing land use in the study area. All that forestland in Mugunga, Majengo, Mulimani and CPU has been allocated. CPU was initially earmarked to be the new district headquarters. The new landless were to benefit from 5 acres each but this was reduced to 2 acres of land due to many applicants, corruption and political interference. Some plots were allocated to more than one person, which again led to more subdivision of the plots to less than 2 acres in the affected areas.

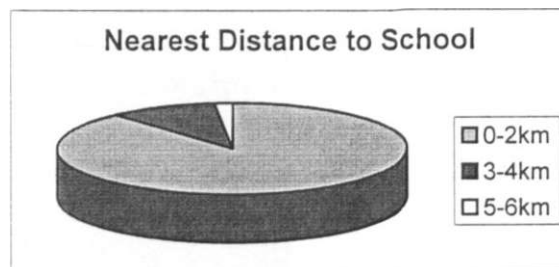
3.8.0 Education

Figure 3.1: Education Levels



Source: Field survey, 2003

Figure 3.2: Distance to School



Source: Field Survey, 2003

Education is very important indicator of the welfare of a community. A literate society is more receptive to change than an illiterate one. From the study, the area has a good distribution of school network. It has a total of 21 primary and 7 secondary schools. They are spatially distributed such that nearest distance to a primary school is less than 2km. The total percentage of population who have attained primary and above is over 70 Percent. Only 10 percent have no formal education.

The major problem has to do with absorption of form four and college dropouts. There are no youth polytechnics and other tertiary schools in the study area. Unemployment is very high.

3.9.0 Infrastructure and Services

3.9.1 Roads

The study area has good road network though apart from the Uganda road class 104A; the rest are in poor conditions. Total tarmacked roads measure 6km whereas the rest measure 514km. Lumakanda district headquarters has no sound road network. The Railway line passes through Turbo and Kipkaren connecting them to the two National Cereals and Produce Boards in the area.

Plate 3.3: The state of the bridges in the study area



Source: Field survey, 2003

Almost all the bridges are impassable during the rains and do not allow for free movement. There is no drainage system as the residents have either blocked them or have

diverted the rainwater's to the access roads, thus increasing erosion of the roads and development of gullies (see Plate 3.3 above).The vehicles operating on these roads are all un-road worthy and without insurance and road license.

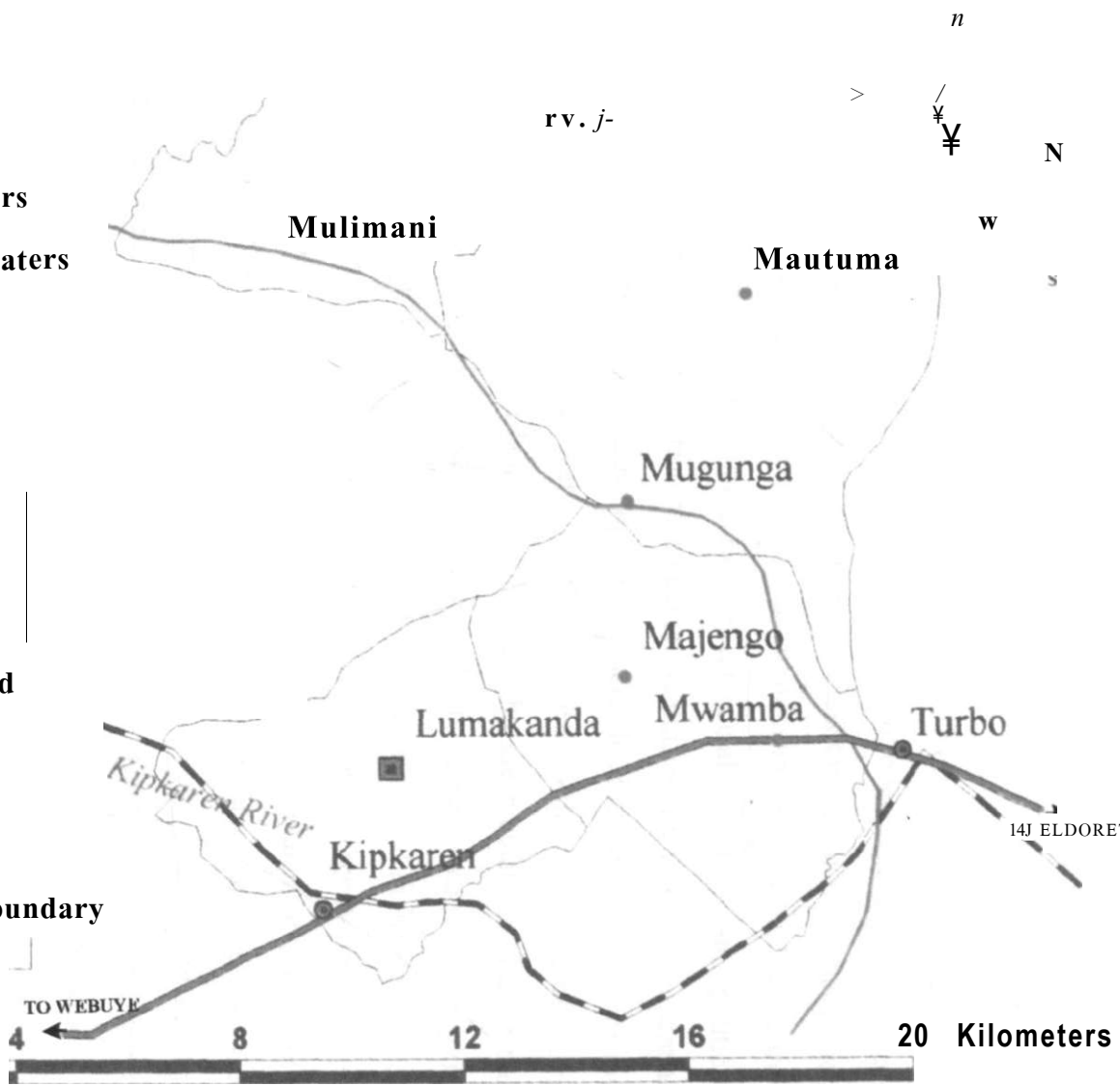
The potentials exist from the great North road and the railway line that are passing through the study area and have not been fully tapped.

3.9.2 Communication

On communication, the area is well served by the mobile phones Safaricom and Kencell Communications. Apart from the district headquarters at Lumakanda, virtually the whole district has no automated exchanges. There were a total of 122 applicants for the landline dating back to 1998 that have not been served to-date. However the results of the survey showed that 94% have access to radio, 40% have access to landline, 34.3% have rental box and 2% have access to mobile phone.

LEGEND

- District Headquarters
- Divisional Headquarters
- Market Centres
- Rural Centres
- Road Class A
- Road Class C
- Road Class D
- Rural Access Road
- Railway Line
- River
- Administrative Boundary



Source Field Survey 2003

4

0

4

8

12

16

20

Kilometers

CHAPTER FOUR:

4.0 FACTORS CONTRIBUTING TO LAND SUBDIVISION

4.1 Background

Land in Kenya, means different things to different people. Farmers look at land as their source of livelihood and also as property to be owned or controlled. The elite's in society take land as a marketable commodity to generate windfalls through market speculation mechanisms. As a nation, the public, politicians and administrators view land as an area defining a sovereign entity whose boundaries reflect social - cultural and political identity, and strategies for the control of endemic wealth, military and commercial interests and international relations. Development agencies look at land as a source for the provision of goods and services for the people's welfare and prosperity. Conservationists technically define land as a formation by the mutual working of the living and non-living entity (Benhnke and Scoon 1992). These perceptions roughly translate into the different and often competing types of interest in land in the study area. No single definition nationally can adequately reflect these divergent perceptions. However, commonality in them indirectly suggest that land may be taken to collectively refer to " an area of earth's surface whose characteristics embrace attributes of the biosphere, the atmosphere, the lithosphere and the results of past and present human activity; and the extent to which these attributes exert a significant influence on present and future uses of land by man", more so as applied in Lumakanda Settlement Scheme.

These different perceptions translate into varied interests in land, which in turn translate to interest groups who then influence the policy on land in the country. Natural interest groups with the control of political and economic power determine the shape of the land policy. As a result, land policy in Kenya has evolved much like a game of survival for the fittest among these groups. The Sultan of Zanzibar for instance expropriated the 10-mile Coastal strip to serve Arab Commercial interests but which left the Africans landless. The colonial government reserved prime land throughout the country for British Syndicates Settlers while confining Africans to the Marginal reserves. Later, African political

agitation brought their elite's and some peasants/landless into the White Highlands through settlement schemes. After independence, the African elite's took over the powerful roles of the Sultan and Settlers. The groups have lost out in this game include peasant farmers, urban poor, landless and squatters.

Land and its cover is currently the most important base from which the people of Lumakanda generate goods and services. Their economy is primarily agro-based and is based on historical origins of the White Highlands. 90 percent of all the households derive their livelihood from land cover. To them, land is the medium for livelihood to an extent that it determines the levels of economic prosperity (or poverty), the fulfillment of social and welfare obligations; and also confers social status and political power. The sustenance of the livelihood of such a high population over such limited land implies high demands for access to land: making land ownership a fundamental issue in the socio-political and economic landscape of the country.

4.2.0 The Impact of Colonial Policies

The colonial settler economy had developed by under-developing the African peasant economy, by drawing land and labour resources from African reserves. Due to population increase the reserves had by 1940s grown overcrowded and insecure. The reserve system had introduced the notion of territorial fixity into indigenous tenure institutions with grave consequences for African agriculture and tenure arrangements (Mweseli, 2000).

The results were, first massive landlessness particularly in western and Central Kenya, which were within the white highland. Secondly, there was stagnation in peasant agricultural production since land use patterns and technologies were not transformed to adjust to limited land availability. And lastly, population pressure on available land and the traditional land use techniques and patterns led to rapid land deterioration due to fragmentation, overstocking and soil erosion. The respite in terms of political security was therefore short-lived. New dangers were posed to colonial hegemony. More Permanent solutions to political instability and African problems were required. These

were found in the idea of co-option. Certain policy decisions were therefore made and pursued (Ibid.).

Certain sections of the colonial administration became convinced that the economic conditions in the reserves were important factors in the continued African agitation and unrest. The problem was conceived in terms of population pressure, inferior land and inadequate technology for which resettlement, de-stocking, soil conservation and better farming methods offered the solution. In pursuit of the perceived solution these measures were resorted to: resettlement in "empty spaces" in the reserves, campaigns to encourage soil conservation, and introduction of new farming techniques, and cash-crop production in the native areas (Mweseli, 2000).

Agronomists however argued that the basic problem was neither over-population nor the need for better farming methods but the indigenous tenure arrangements. Certain characteristics of African tenure systems were identified as major constraints to agricultural development. These were, first, the communal nature of land control causing uncertainty in decision making. Individual control would enhance proper decision making in land use and encourage initiative, it was argued. Secondly, the ambiguity of rights of use, which often led to conflicts and disputes, was seen as a restraint. Individualization would confer exclusive rights over parcels of land and thereby remove conflicts. Thirdly, the indigenous systems of inheritance which often led to fragmentation of holdings into sub-economic units was said to retard profitable agricultural production (Swynnerton, 1955). The removal of these was a *sine qua non* for African agricultural development.

The various policy strands coalesced and were synthesized into a comprehensive policy document by the then Deputy Director of Agriculture, R.J.M. Swynnerton in 1955. The Swynnerton plan proposed the creation of a landed African gentry that would participate soundly in intensive and large-scale agriculture. "Modernizing" African peasant agriculture would not only boost the colonial economy but also solve the problems of Political instability and unrest. It stated succinctly as follows: " in the long term the

greatest gain from participation of the African community in running its own agricultural industries will be politically contented and stable community" (Y. Ghai and MacAuslan, 1967). As Ghai and MacAuslan (1967) point out, the aim was to create a stable and, it was hoped, conservative African middle class that would provide bulwark against nationalism and the radical policies were thought to go with it.

Colonial policy responses to the general disarray precipitated by land policies in African peasant agricultural production were three fold, namely: first, allowing Africans to grow cash crops; secondly, instituting a campaign of land preservation and conservation and resettling part of the reserve population; and thirdly, tenure reform. There were two primary objectives behind these policy responses: the one political, and the other economic. The economic objective was to draw African peasant productive resources into the capitalist production processes so as to complement settler agricultural production.

Both the policy responses and the objectives behind them are reflected in the Swynnerton Plan, which laid down the mechanics for the creation of a prosperous and contented African middle class. Under paragraph 12, the Plan recommended that African farmers be provided with, in the first instance, economic size holdings. This was to be secured through either consolidation of fragmented holdings or the enclosure of communal lands. Secondly, they were to be granted security of tenure over their land to safeguard their labour and moneys invested in development. This was to be achieved through individualization of title and the creation of private property rights in tribal land. The general assumption was that individual proprietorship in and of itself will generate industry and enterprise. Thirdly, they were to be given technical assistance to develop this land on sound lines. Fourthly, provision would be extended for high priced cash crops with long term sustainable demand. Fifthly, marketing facilities to provide secure and profitable outlets for crop and stock produce were to be put in place. And finally, easy access to sources of agricultural credit would be granted. Paragraph 13 noted that tenure reform through the conferment of an indefeasible title would, firstly, encourage the farmer to invest his labour and profits in the development of his farm and, secondly,

enable the farmer to use his land as security for financial credits necessary for the development of his land.

Paragraph 14 noted two undesirable consequences of the process of tenure reform, namely, first, agricultural indebtedness through mortgaging land to secure credits, and, secondly, the evolution of a thriving land market leading to social differentiation within the peasantry into landed and landless class. The Plan however stated that this was a "normal step in the evolution of a country.

These policies were subsequently adopted by the colonial government through Sessional papers (Legislative Council Debates). These recommend first the removal of the boundaries created through the reserve policy; secondly; the creation of a uniform land tenure system and the progressive replacement of customary land law; thirdly, the conversion of 999 year leases held by Europeans into freeholds. This was to prevent future nationalization without compensation. Leases were government property.

This papers were approved by the Legislative Council in 1960 (legal notice number 589 of 1960). Their implementation was effected through the Kenya land Order in Council (legal notice number 631 and conversion of lease rules, legal notice number 632 of 1960), which made provision for, first, the conversion of leaseholds into freeholds (G. Wassermann, 1971), and, secondly, the acquisition of land in the Highlands by Africans through purchase on willing buyer, willing seller basis.

The position of nationalists at the first Lancaster House Conference was that claims of land ownership and property rights in the White Highlands were in dispute and had been in dispute since the establishment of White Highlands in Kenya. This position was progressively undermined and the nationalist leaders were steamrolled into granting enormous constitutional and economic concessions to European settlers in exchange for a speedy transfer of political power.

Recognition of colonial land titles became the bedrock of transfer of political power. The nationalists accepted not only the sanctity of private property but also the validity of colonial expropriations. The independence constitution immortalized this negotiated position by declaring that there would be no state expropriation without due process.

It was also agreed at the Lancaster Conference that African accession to the White Highlands would be through purchase of land either under willing buyer, willing seller schemes or through purchase by the post-colonial state for resettlement and re-distribution. This latter Programme would be through a loan granted to the state by the United Kingdom, the Colonial Development Corporation, West Germany and the world Bank (Wanjala, 2000).

The schemes also provided the emergent petty-bourgeois element with the opportunity to accede to and entrench themselves in large-scale capitalist agricultural production. In any case, as Professor Okoth-Ogendo opines, since land had to be paid for, the majority of the people who were actually settled were not the dispossessed people who had provided the political impetus for land re-distribution.

It is clear from the historical processes that by the end of the 1960s a distinct social category with vested interests in the continuity of colonial property and political processes had emerged. This accounts for the remarkable lack of transformation of colonial land policies and property law regime after independence.

4.3.0 Land Tenure Systems

The concept of land tenure is derived from the Latin word *tenere*, which means to hold. Tenure defines the method by which individuals or groups acquire, hold, transfer or transmit property rights in land. Formal rules of land tenure define ownership characteristics, that is, the nature and content of property rights which society will allow individuals or groups to hold over land, and the conditions under which those rights are to be held (Wanjala, 2000).

The Kenyan government has not only retained individual tenure; it has periodically restated its resolve to accelerate the process of adjudication, consolidation and registration. This is well articulated in the 1974-78 Development Plan, which stated that:

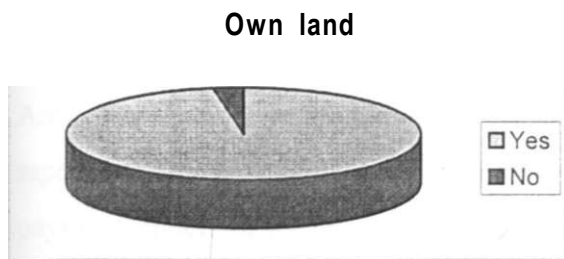
" The need to increase production and create employment in the agricultural sector requires that land be used much more intensively. The Government will encourage this in several ways. The land adjudication and registration Programme to be continued on a large scale will encourage farmers to develop their land and help establish an active land market" (Kenya, Republic of 1974).

This policy was premised on the argument similar to the one advanced by the colonial authorities to the effect that sound agricultural development is depended upon individual tenure. But individualization of tenure through registration has not only led to a destruction of communal tenure; it has also led to unmitigated landlessness in the study area.

The distinctive and dominant characteristics of the land use of the Lumakanda Settlement Scheme is the historical background of exclusive European settlement policy and the dramatic socio-economic changes and heterogeneity following independence in 1963. Post -independence farm sizes were determined as an average of 15-20 ha per farm, based on the agro-ecological quality of the land and the basic requirements of the average African household of small-scale farmers. Following further in-migration and the resultant land purchase deals by individual migrants and Government settlements schemes, a large part of the Lumakanda Settlement Scheme forest plantations have been transferred, subdivided and settled under small holder private schemes. At present, the study shows that the minimum average farm size has been reduced far below five acres, in fact to as small as half an acre. There is great land diversity in the study area.

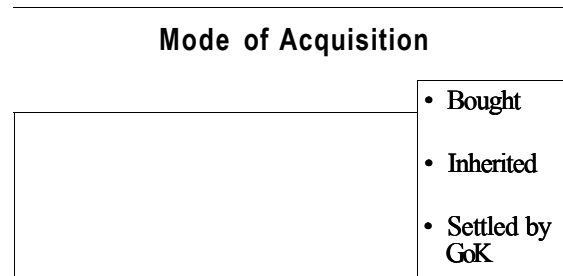
In the study area the survey revealed that 97 percent of the respondents own land. While acquisition through allocation by the government was expected to be predominant in Lumakanda Settlement Scheme, only 14.3 percent of the respondents were allocated by the government; 60 percent bought land, whereas, 25.6 acquired land through inheritance.

Figure 4.2: Ownership of Land



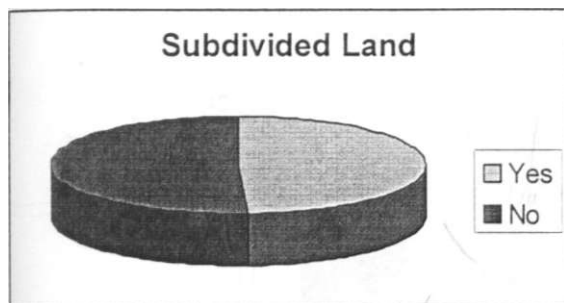
Source: field survey, 2003

Figure 4.3: Mode of Acquisition of Land



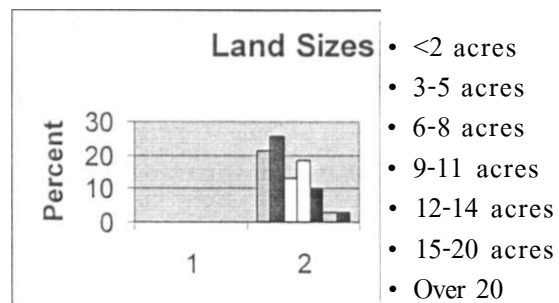
Source: field survey, 2003

Figure 4.4: Subdivided Land



Source: field Survey 2003

4.5: Land Sizes



Source: field Survey 2003

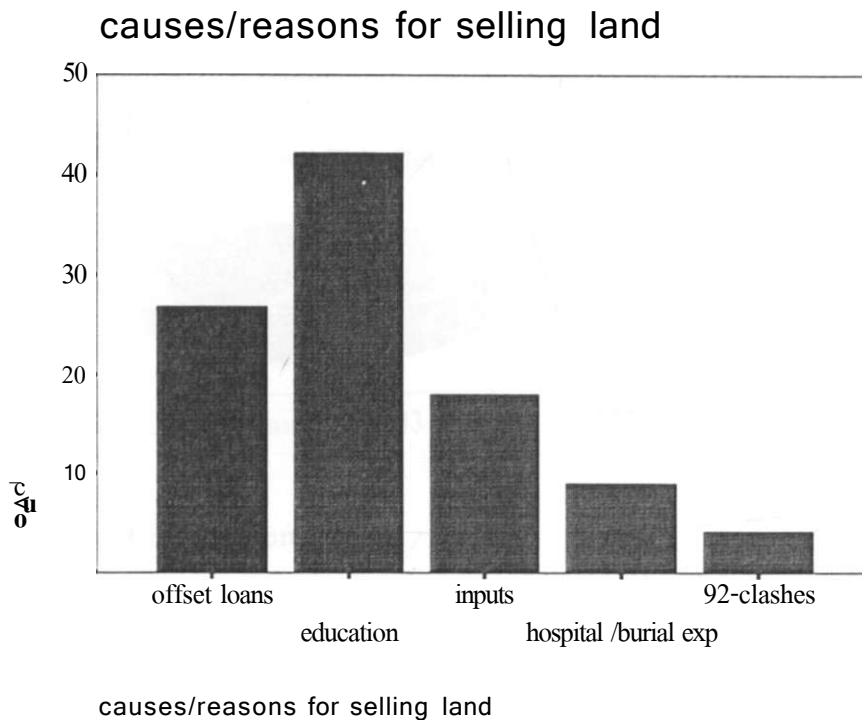
This indicates that many transactions had taken place since the initial allocation as shown by the figures above.

As expected from the study, farm and parcel sizes have generally been shrinking overtime. Young farmers often acquire subdivided parcels either through inheritance or purchase. This is especially true for Lumakanda, where great disparity exists between the holdings of original settlers and people who have since acquired land. There is clearly continued subdivision of land in the scheme as the number having had subdivision account for 48 percent. Of the respondents, 55.7% have title deeds whereas 44.3% have no title deeds. 21.4% have less than 2 acres of land, whereas the majority have between 3-5 acres of land. 9-11 acres represent 28.6% followed by 12-14 acres representing

10.0%. The average size of land was found to be an average of 5.0 acres, which is equivalent to 2.5ha. This compares very well with the district average acreage of 2.1 ha.

4.3.1 Causes for Sale of Land

Almost half of the respondents have had subdivision of land for various reasons. They represent 48.6%. Major reasons given for selling of land included: Selling due to payment of school fees accounted for 42% for all the households, followed by offsetting of loans at 28% and purchase of farm inputs representing 20% see figure 4.6 below.



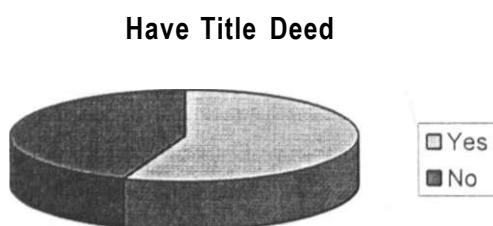
Source: field survey, 2003

The problem of landlessness is reflected by the number of cases that have come up in courts regarding the question of ownership in the study area. According to the area chiefs, the issues that has kept coming up is whether registration of an individual under the Registered Land Act extinguishes the customary rights of access that other people may have regarding the land. The situation has been that people who lived on a given piece of

land as family or clan within the context of customary law suddenly find themselves threatened with eviction by the registered proprietor. The High Court in Eldoret has at times ruled that registration extinguishes customary rights to land and vests in the registered proprietor absolute and indefeasible title. This they have ruled is the import of sections 27 and 28 of the Registered Land Act.

What the policy makers did not realize at the outset was that for rural people without any entrepreneurial skills or experience in credit management, the mortgage institutions, mostly Agricultural Finance Corporation (AFC), would increasingly serve as an instrument of disinheriting the peasantry.

Figure 4.7: % owning title deed



Source: Field survey, 2003

4.3.2 Land Use Competition

A recurrent result of changing patterns of land use and ineffective regulations is the increasing scope of land use competition and conflicts in and around the study area. Urban expansion in Lumakanda (due it housing the district headquarters) is increasingly encroaching upon prime arable land. The study found out that there is no coordinated planning of space and direction of settlement expansion among the urban and rural areas and among various categories of landowners.

Conflicts over land rights between squatters and rightful landowners are growing. Land use conflicts were found to increase between the agricultural and forest sector as well as agricultural and the mining sector. Non-agricultural land users in and around Lumakanda

settlement scheme attributed these conflicts to the conflicting macro-economic development objectives and growing demand.

Conflicts also emerge as rural service and residential land encroaches onto agricultural land. These are caused by increased population pressure and the in-migration of land buyers.

Inadequate land use policies and the lack of coordination exacerbate the subdivision due to competing uses. This has allowed loopholes in the subdivision process due to various interest groups leading to increased conflicts in land allocation and subdivision in the study area.

Table 4.1: Subdivision of land in Lumakanda Scheme (1990-2002)

	90	91	92	93	94	95	96	97	98	99	00	01	02	Total
Mwamba	22	17	16	19	19	29	31	50	64	34	76	97	101	575
Munyuki	9	9	16	22	36	34	19	22	46	47	66	157	67	550
Mukuyu	6	5	11	11	19	14	26	44	43	36	44	106	97	462
Mbagara	6	9	6	14	9	96	81	77	36	76	98	146	167	821
Total	43	40	49	66	83	173	157	193	189	193	284	506	432	2408

Source: Physical Planning Department, Kakamega, 2003

Table 4.1 above, shows land subdivisions for Mwamba, Mukuyu, Mbagara and Munyuki sub-locations. There were a total of 2408 number of subdivision between the 1990 and 2002. The year 1995 marked the biggest percentage increase of 108 %. The high values for Mbagara can be explained to the sudden subdivision of Mugunga and turbo forest plantations that were later given to squatters between 1996 and 1997.

Also all the forest around CPU was subdivided and given to squatters. Other explanations were attributed to the elevation of Lumakanda as the headquarters of the new Lugari District in 1996. The plot prices shot from Kshs. 50,000 in 1995 to 200,000 in 2003 for a 50 feet by 100 feet plot. The installation of electricity at the headquarters has also

contributed to more people converting plots to commercial land uses. The 1992 tribal clashes also saw some Nandis sell or exchange their land for fear. The resettlement

plate 4.2: Beacons for subdivided plots in Lumakanda



Source: field survey, 2003

Programme for squatters started in 1995, but were actually settled between 1997-1999 in Mbagara and Mukuyu sub-locations around Mugunga and Mulimani areas. Each was allocated 2 acres each.

There is also the problem of subdivision of land through inheritance upon intestacy or gift. The law of Succession Act has elaborate provisions as to what happens to a deceased's estate (land and other property) through intestate devolution. Section 3 of the Act defines "agricultural land" as meaning land used for agricultural purposes which is not within a municipality or township or a market, but does not include land registered under the provisions of any written law. To the extent therefore that land is registered under any written law, the provisions of the Land Control Act concerning subdivision of land are ousted if such subdivision is through inheritance under the law of Succession.

Generally the property sizes (3-5acres) do not allow any farming system viable within a minimum size of property for sub-division, unlike the early government schemes. The field study indicate that the current land use patterns and holding units are not able to meet subsistence and social needs of the people as well as enhance sustainable resource management.

Also the subdivisions are not based on any carefully determined carrying capacity, it is primarily based on willing buyer willing seller basis and equity among off-springs in case of inheritance. This means individual parcels are as small as 2 or less acres but on the average 5 acres, a unit, which is below the carrying capacity of 1 Tropical Livestock Unit (TLU) of about 12ha/TLU. An average family will certainly require far more than 1 TLU to survive (Benhnke and Scoons 1992). There is need to establish viable minimum plot size for each particular area to guide subdivision especially for agricultural lands based on the existing agro-ecological zones.

4.3.3 Land Distribution Approaches

The land distribution started in earnest in 1961 with the beginning of the land transfer Programme. This was a government led but a market based approach. This distribution Programme delivered substantial land to numerous landless (Migot-Adhola, 1994).

The process included normal sale in the open market in which existing large farm units were transferred to new African owners; this was done under special conditions of evaluation and finance. Land was also acquired by the state for certain strategic purposes (Ibid.).

The land distribution policy in Lumakanda was structured around a conventional administrative sequence, through orderly steps managed by the Government. These included land acquisition, beneficiary selection, and land tenure provisions on the schemes; the settlement and scheme planning support systems; land use and farming

models; post settlement support services and financing the land distribution Programme (Ibid.)-

The Key policy concern in the study area today, is the degree to which the policy was transparent, fair and effective implementation. The consistency with the wider aspiration of catering for the landless as, these people still exists today. The public debate in the Lumakanda Settlement Scheme concerning the newly settled areas suggests that the programme has not been transparent.

Hence the land settlement Programme has to some extent become distorted as a result of the distribution imbalances. The study revealed that the elite, through state managed security apparatus have contributed to the current conflicts and land sizes of average two acres per household in the new schemes.

The system is further complicated by the top-down planning for settlements dominated by government led committees. Stakeholders were not involved in the planning. They have been rigidly implemented by offering settlers fixed choices at the scheme level. The models are physical land use and settlement plans, which set fixed number of hectares to be allocated to each farmer based upon rain-fed farming concepts

4.4.0 Socio-economic Factors

4.4.1 Cultural Aspects

Information concerning Knowledge, perception, attitudes, intentions and adoption was collected during the field interviews. These are cultural aspects, which have a bearing on the way people react to situations of change and in particular to adaptation in a new environment. These are also the aspects, which determine how people react to interventions influencing their way of life.

4.4.2 Knowledge

Knowledge of farming and the physical environment is acquired predominantly through experience, from relatives, extension agents and neighbours. As mentioned above, the extension service was not very effective in the study area.

The type of knowledge, which is mostly acquired, is on crops and livestock husbandry. This is knowledge within the realm of modern methods of farming. In the realm of indigenous knowledge farmers know traditional methods of farming, and plants and trees of medicinal value. However, most of them have grown up in other places with other cultural and ecological backgrounds, and they cannot exploit the full potential of Lumakanda Settlement Scheme. Also, a feel for the environment and the respect for its value is stronger in an area where one has grown up than in an area where one went to settle in order to make the livelihood.

4.4.3 Attitudes and Perception

Perception of people of their own situation is a critical point in the implementation of change, as things they like cannot be changed and only things they don't like about their situation are accessible to change. It is particularly important for the researchers and the development agents to adjust their perceptions of what is possible to the perceptions of the people on what is wanted. The study tried to establish how people of Lumakanda see their current situation, what they expect from the future and which improvements in their situation they would welcome.

A shift in the perception of the individual migration process was noted between the resettlement and the early 1990s. The major pull factor then was the availability of abundant and productive land in the schemes. Whereas the main push factor of the migrants from their original homes was the land scarcity. In 1992 more push factors were mentioned than previously. This was attributed to the tribal clashes of 1992, where people sold their land.

among the neighbouring communities. Political insecurity was a contributory factor in the subsequent subdivisions of land in the Lumakanda Settlement Scheme.

4.4.5 Population Pressure on Land

The current population of Lumakanda Scheme was projected to 48,140 people in 2003 and is expected to double by the year 2015 to 80,163 people. With the current growth rate of 4.1 percent, the population is steadily increasing as permanent immigration (and natural growth) steadily out pace temporary or seasonal emigration rates. This has set in motion the classic spiral of degradation whereby increasing population leads to expanded agriculture land through settlement in former forest plantations and diversification of income.

Plate 4.3: Mining of land for brick making in Lumakanda



Source: field survey, 2003.

Plate 4.3 above shows the effects of increased population pressure on land in the study area. After mining of land for brick making the land is never leveled. This is another source of loss of agriculture land and forest depletion.

Life in the study area is found to be good by the majority, but there are many problems (water, security, and unemployment). Positive aspects are the cosmopolitan way of life easing clan conflicts and ownership of land. This seems to indicate that many people moved due to (land/family) conflicts from their areas of origin. Therefore, the majority find life in the new settlement better, especially in terms of personal freedom. Most settlers have hope for their future in the Lumakanda Settlement Scheme if the problems of water, security and high costs of farm inputs are solved.

During the periods of settlements from 1963, the main general problems mentioned were water, schools, health facilities, transport/communication, income opportunities, wildlife and security. The main problems related to farming were no cash crop, destruction by wildlife and income. Advantages were fertile soils and plenty of land for farming and grazing.

Today, however the majority are now faced with the problem of shrinking land sizes due to subdivision or sale. They are also faced with problems of environmental degradation, and soil erosion.

4.4.4 1992-Land Clashes

The 1992 land and tribal clashes, inhibited permanent wounds in the people of Lumakanda and its neighbours. Lumakanda borders the Uasin Gishu district and areas between Turbo and Kipkaren, which were seriously affected during the tribal clashes. The Luhya and the Nandi have been good neighbours for a long time. In the past conflicts could only occur during the circumcision periods and it was common for Nandis to steel cattle from the Luhya's.

The tribal clashes forced the Nandis to abandon or sale their land to join their tribesmen. This in effect accelerated sale and subdivision of land especially along the common borders. This was also exacerbated by the 1992 elections that created tension and mistrust

The search for new agricultural land combined with the need for fuel wood has resulted in an increasing rate of de-vegetation; stimulating soil erosion and lowering the dry-season water table, which in turn has degraded existing agricultural lands. This coupled with reduced fallow periods and nutrient availability and declining yields force farmers to clear new lands and the spiral begins again.

4.4.6 The Mortgage Institution and Access to Credit

One of the arguments in favour of individualization of tenure was that it would enable the registered proprietor to offer his title to financial institutions in return for credit. Registration confers "security of tenure" upon the proprietor which in turn assures the lenders (banks, finance houses, building societies, etc) of the possibility of realizing their security upon default. This has completely failed in the study area but only succeeded during the 1970/80s. Part of the reasons given for selling of land are for: offsetting the loans, purchase of farm inputs, payment of education and payment of hospital and burial expenses.

What has happened over the years in Lumakanda is that most of those who registered through the processes already mentioned above have encumbered their titles in the form of mortgages and charges without fully appreciating the implications. These people had no other means of raising capital apart from offering their land as security. The purposes to which they put the loan money so obtained may not be consonant with the original intention of the policy makers (i.e. credit for agricultural development). The result in the study area has been that those who were registered found themselves dispossessed of their land due to default in the repayment of the loan. The remedy mostly resorted to by the respective mortgagees and chargees in such situations have been the exercise of their statutory power of sale. Apart from the loss of land through the institution of mortgage, there have been cases of the dispossession of people of their land through court processes resulting from contractual obligations. This has been another catalyst for land subdivision in the study area.

The problems referred to in the foregoing analysis have been so numerous in the study area and frequent in occurrence that no farmer has been willing to take a loan using his title deed as collateral. The actions of the AFC, Land Control Board and the Administration has instilled fear into the would be beneficiaries. Proceeds from farm produce and sale of land have always been resolved using the heavy hand of the Land Control Board there by robbing them of their only source of livelihood.

4.5.0 Institutional and Legal Framework

The strong vertical institutional arrangements for land administration deny effective coordination and prevent a strategic approach to the land issues in the study area. These include specific Programmes such as land distribution and components parts of land administration such as allocation of state land.

The institutional framework for land allocation within the public sector includes different types of land: statutory allocations, (Forests); state lands, communal lands and settlement areas.

The study showed these different land areas are managed by different state institutions. These institutions allocate land in different ways and according to different rules. This gives rise to lack of consistency and resultant conflicts. Transactions affecting agricultural land are registered by Land Control Act. The Act provides for Divisional Land Control Boards at District levels; Provincial Land Control Board and Central Land Control Appeals Board.

Amidst all these problems so far mentioned from the study area, it emerged that, there appears to be no nexus between the institutions, which are in one way or another concerned with land subdivision and registration. These institutions are those that are concerned with:

- 1) Land control;
- 2) Land planning;
- 3) Land adjudication and consolidation;
- 4) Land surveying;
- 5) Agricultural and extension services

6) Local County Council etc.

All these institutions plus many others have a role to play in the keeping and maintenance of a smoothly functioning land administration and registration system. Yet they are heavily departmentalized such that there is little co-ordination and rationalization of their activities. There is also others as the Provincial administration and the Private practitioners who have also taken opportunity of this lax in coordination. This casual approach to land administration is partly due to the numerous legal regimes under which they are established and the diverse nature of the administrative machinery through which they operate. It is common practice in the study area that a land transaction which requires consent from the Land Control Board takes a long time before it is registered because the relevant land control board has not yet granted consent. Similarly some District Commissioners hijack the powers of the LCB and give consent to transactions unilaterally.

Also as pointed out, some registration laws, establish offices of land registrars and confer upon them a lot of discretionary power affecting the process of registration with very minimal intervention from other departments; e.g. the Departments of Survey and Planning. There is definitely a need for closer coordination in the activities of these administrative agencies.

The sources of statutory land use planning and regulations are poorly coordinated. They are often in conflict and originate from a multiplicity of sources in the study area. Numerous authorities with scattered responsibilities implement these regulations. The authorities have conflicting powers located in both central and local government institutions.

Implementation powers were found to be located in multiple structures including the Chiefs, Divisional and District Land boards. These structures entail a shallow and irregular degree of representation and consultation of local interest through local councilors and chiefs.

Further more the expectation that land use regulations entails consultative process between government officials and local representatives is not backed by any legal force. In Lumakanda, most land use regulations are prescribed by the central government with little regard to reality and actual use practices.

4.5.1 Lack of Effective Enforcement

The prescriptive approach to regulation has rendered monitoring and enforcement ineffective and selective. Most regulations and planning requirements are ignored. In fact according to the area Chiefs, most land and natural resource use regulations cannot be enforced. This is because they are neither legitimate nor socially grounded enough to master local compliance.

4.5.2 Land use Regulations

The principles of land use regulations and planning are not homegrown. Post colonial era technocrats formulated them in a top-down manner without consultation with most land users. This has particularly affected most farmers in the settlement scheme as the land use regulatory framework is not comprehensive and needs review to accommodate the aspirations of most landowners.

4.5.3 Land administration

The process and approach of land administration is well spread from the Divisional level in the study area. The lack of transparent, the lack of institutional transparent in allocating land (as witnessed in Mudavadi and Raburu schemes case), where elite's and favoured individuals are allocated land. This has lead to inability to determine allocation according to principles of equity, social and economic development. This has been a particular charge leveled at the way land is allocated in the forest areas in the study area.

4.5.4 Administrative capacity

Lack of administrative capacity has led to delays in such matters as land allocations, transfers, disposals, and subdivision applications, planning applications and land acquisition. These have fuelled attempts to pass regulations to corrupt proper procedures in the study area.

4 5.6 General Land Use Policy

Land use policy relates to a system of laws, rules, regulations and practices that govern the rights of landowners together with the appropriate guidelines to ensure optimum utilization of available land in both rural and urban areas. This is expected to provide security of tenure to encourage owners to invest in and develop their land. Any land use policy should be geared towards the management of existing land and management for optimum utilization on a sustainable basis.

There is no overall and/or general legislative framework that protects the environment and ensures proper management of natural resources. There is also currently no comprehensive land use policy. Large number of separate statutes regulates Land use and land ownership in this country. There are well over fifty (50) statutes that directly deal with land, land use and land ownership and many others that make constant reference to land.

The government has tried to make land laws that are acceptable to the majority of its citizens and that relate to the multiplicity of cultures, lifestyles and other historical conditions existing in different regions of the country, as exemplified by the Registered Land Act (Cap. 300), the Registration of Titles Act, the Trust Land Act.

Below are the main categories of statutes touching on land matters, as provided for in the constitution:

- Statutes that enable persons to acquire land;
- Statutes that make specific provisions regarding use of land;
- Statutes that exercise overriding powers over any person's right to land.

The constitution state that "Every person in Kenya is entitled to the protection of the privacy of his home and other property..." (Sec.70).

4 5.7 Statutes Giving Ownership of Land to Persons

There are three statutes giving ownership of land to persons:

i) The Government Lands Act (Cap.280)

Under this Act the president, through the Commissioner of Lands, allocates any unalienated land to any person he so wishes. Such land once allocated is held as a grant from the Government on payment of such rents to the Government as the Government announces from time to time.

The Government retains the powers to call back the land any time for its use. Among land allocated in this manner is agricultural land, mainly in settlement schemes, and also town plots within local authorities.

ii) Registered Land Act (Cap. 300)

Under this Act any person may acquire absolute ownership to any land once he has been registered as the absolute owner. On registration such a person acquires freehold interests on the land. A subsequent buyer of the same land acquires same rights as enjoyed by the previous owner. Over 90% of Land in Lugari are now owned on freehold basis (under this Act).

iii) Trust Land Act (Cap.285)

Any land that is not registered under any Act of parliament falls under the ownership of local authorities as Trust Land. In these Trust Lands a person may acquire leasehold interests for a specific number of years subject to renewals. The Local Authority retains powers to repossess such land for their own use should the need arise. Such Trust Lands are very few, but has been used By Lugari County Council to subdivide all land that was

available haphazardly. The plot allottees have not so far started developing the plots instead they resale them for cash.

4.5.8 Land use Statutes

There are about fourteen Statutes that directly make specific provisions regarding use of land. However, only those pertinent to the focus of the present study are highlighted.

j) The Agriculture Act (cap.318)

This Act defines Agriculture land as "all land that is not within township". In effect this means all land is agriculture land which is not declared to be any other type of land. This Act contains provisions for soil conservation, protection of catchment areas and control of land breaking or clearing.

ii) Crop Production and Livestock Act (Cap.321)

This Act regulates the quantity of land that could be utilized for food crops or livestock; what types of crops to be grown in which areas; urging agricultural land owners to cease growing a particular type of crop in their area; encouraging the correct type of crops to be grown in the right areas; reducing livestock numbers to a level appropriate for the area, all in order to give the farmer maximum returns, while safeguarding environmental conservation.

Hi) Water Act (Cap. 372)

This law serves to ensure that certain water catchment areas are protected and that such areas are declared as water catchment areas. It protects water intended for domestic use from pollution.

.) Physical Planning Act (Cap 286).

This Act applies land-planning regulations to all interim areas and any other area. Where these regulations apply, no person shall carry out any development in the interim planning area except with the consent of the Local Authority

) Land Control Act (cap.302)

This Act reinforces the provisions of the Constitution as a compulsory acquisition and consequently gives unquestionable powers to the government to acquire any person's land for public utility such as schools, hospitals, roads, etc. where such compulsory acquisition of land is made, the law requires that "prompt" and full compensation be paid to the owner. However, the law does not provide for the involvement of the owners in determining the level and mode of compensation.

Looking at the various legal instruments above, it is apparent that their relevance to land use and particularly in the settlement schemes is limited in one way or another.

First, the general legislative scheme tends to provide sectorial regimes of law for the regulation of a particular activity, or for the exploitation or utilization of one particular resource. This tends to make inter-sectoral resources utilization and planning difficult.

Second, most of the legal instruments merely provide a framework for making of legitimate decisions. They are generally short on normative content, and a framework of compulsion and obligation to take action is lacking.

Through the discussion of these land statutes it was also observed that the provisions on Protection, preservation, conservation, management and proper utilization of land are scattered into various statutes. Their implementation falls under different ministries/departments and there have always occurred some conflicts of interests

between ministries/departments while implementing some of the statutes. Below are brief illustrations of the conflicts that arise in the study area:

- Forestry, water catchment protection, and environment vs. settlement and agricultural expansion and productivity.
- Land carrying capacities, land degradation vs. pressure on land, and access by local people
- Conflicts with natural reserves, subdivision of forest plantations vs. supply of fuelwood energy and supply of pulp wood to Panpaper Mills Webuye
- Livestock grazing areas vs. arable land agriculture land
- Arable agriculture land vs. urbanization and growth of town centres

4.5.9 Legislation

The other problem affecting the people of Lumakanda is loss of land through either ignorance of the law or the failure of the legislation. Indeed the majority of the respondents quoted lack of awareness, knowledge, capital and poverty as the problems they are facing on their farms.

The government enacted a law called the Magistrates' Jurisdiction Amendment Act in 1981. This was, as its name suggests, an amendment to the Magistrates Courts Act (Act No. 17 of 1967). This new law effected three main things:

- It divested the Magistrates' Courts in Kenya of jurisdiction to hear and determine certain land disputes
- It vested such jurisdiction in newly constituted *quasi courts* called the "Panels of Elders".
- It specified the kind of land disputes that the panel of elders would deal with, viz.;
 - 1) the beneficial ownership of land;
 - 2) the division of or the determination of boundaries of land, including land held in common;
 - 3) a claim to occupy or work on land;
 - 4) trespass to land.

It is not clear from official sources what the government intended to achieve through this enactment. What is clear, however is that coming at the time it did. (The Act was hurriedly passed by Parliament at a time when there were many land disputes in courts of law. At that time there were several cases of default by farmers in payment of loan in the study area). This Act is one of the government's responses to the problem of landlessness as amplified by disputes between registered proprietors and other unregistered claimants. That being the case, the authorities may have wanted to remove the element of expensive litigation, which for most people was a hindrance to the attainments of justice. The panels of elders were located in rural areas as for the case of the study area, Lumakanda. The government must have felt that the panels of elders were best suited to find lasting solutions to the disputes since they would be knowledgeable in the nature and origin of a particular dispute; this would also make them arbiters.

This law failed to solve the problems which ordinary courts were faced with in the first place. Lumakanda is a cosmopolitan area with several ethnic tribes from various backgrounds. Hence the issue of elders does not arise since they lack coherent understanding for different ethnic composition in the study area.

The Land Control Act Cap 302, which is mainly concerned with agricultural land transactions has also some weaknesses including the provision of Land Control boards which approve subdivisions without considering the economic viability of the plots. They also lack expertise on land transactions and administration

4.6 Legal Context to Impose Land Use Change

In this paragraph several Sections of the Agriculture Act are quoted in original language. These are, among others, potentially powerful provisions within which preferred changes can be effected. Under Section 48 (1) of the Agriculture Act, " Whenever the Minister considers it necessary or expedient to do so for purposes of the conservation of the adverse effects of soil erosion, any land, he may, with the concurrence of the Central Agricultural Board (CAB) make rules for any or all of the following matters;

-) prohibiting , regulating or controlling-
- (i) the breaking or clearing of land for the purpose of cultivation;
 - (ji) the grazing or watering of livestock;
 - (iii) the firing, clearing or destruction of vegetation including stubble;
 - for the protection of land against storms, winds, rolling stones, floods or land slips
 - for the preservation of soil ridges, on the slopes or in valleys;
 - for preventing the formation of gullies;
 - for the protection of the land against erosion or the deposit thereon of sands, stones or gravel;
 - for maintenance of water in a body of water within the meaning of the Water Act;
- b) requiring, regulating or controlling-
- (i) the afforestation or re-afforestation of land
 - (ii) the protection of slopes, catchment areas or where rules made under paragraph (a) are in force;
 - (iii) the drainage of land, including the construction, maintenance or repair of artificial or natural drains, gullies, banks, terraces and diversion ditches"

Under Section 64 (1) of the Agriculture Act.

"The Minister may make orders (in this Act referred to as land development orders) requiring the execution in respect of any agricultural land by owners or the occupiers thereof of development Programmes to be carried out at such rate and to be completed within such periods as may be specified in the orders". Under Section 64 (3) 'development Programme' means "the adoption of such system of management or farming practice or other system in relation to the land in question (including the execution of such work and placing of such things in, on or over the land from time to time) as the CAB may consider necessary for the proper development of the land for agricultural purposes".

Section 73 of the Agriculture Act empowers the Minister to enforce compliance with development orders. " Any person who contravenes or fails to comply with the terms of a land development order shall be guilty of an offence and liable to a fine not exceeding two thousand shillings or in default of payment to imprisonment for one month, and in case of continuing offence to a fine not exceeding one hundred shillings for every day of which the offence continues"

Section 184 of the Agriculture Act empowers the Minister to make rules "for the preservation, utilization and development of agricultural land. Such rules can require:

- a) owners (whether or not also occupiers) to manage their land in accordance with rules of good estate management;
- b) provide for requiring occupiers to farm their land in accordance with rules of good husbandry;
- c) provide for regulating, controlling or prohibiting the cultivation of land or the keeping of stock or any particular kind of stock therein;
- d) Provide for regulating the kind of crops which may be grown;

Under Section 185 "where the Minister is satisfied that an occupier of agricultural land has persistently contravened any rules made under Section 184, and certifies accordingly, then, with the consent of the Central Agricultural Board-

- la) Where the occupier is not the owner of the land, the Minister shall have the power of the land by order to terminate his interest in the land or any part thereof specified in the order
- (b) where the occupier is the owner of the land, the Minister shall have power either-
 - (i) by order to direct... the occupier shall give up his occupation of the land;
 - W) agree with the owner and all other persons having an interest therein for the purchase thereof and thereafter to purchase the land accordingly; or
 - (iii) To acquire the land or any part of the land compulsorily".

Under Section 188, "where the land is acquired compulsorily under this part, it shall be acquired in accordance with the Land Acquisition Act".

Section 186(1) gives the power to the Minister to acquire unoccupied land, where "land is not in the actual occupation and management of the owner or his manager or tenant of his or is not being utilized for agriculture purposes; and the land is not reasonably capable of being profitably farmed without the addition thereto of other land; and

It is in the interest of proper development of the land for agricultural purposes that it should be added to and farmed with particular adjacent agricultural land;

The owner of such adjacent land is willing to acquire it".

CHAPTER FIVE

5.1.0 THE EFFECT OF LAND SUBDIVISION ON AGRICULTURAL PRODUCTION

5.1.0 Introduction

The causes of unsustainable agricultural practices leading to low production were found to be poor marketing and price policies, land tenure system, retrogressive credit systems and discriminative extension messages, livestock movement and environmental degradation. As the people increase we need to produce more food to feed them, which in turn needs more land to grow crops. More people also need more trees for fuel wood and houses.

In the study area, factors contributing to land subdivision and having impact on agricultural production were generally classified into seven categories, namely:

1. Population pressure
2. Geographic,
3. Economic,
4. Socio-cultural,
5. Political,
6. Institutional and legal framework, and
7. External/global.

5.1.1 The Impact of Population Pressure on Agricultural Production

The above factors were all found to emanate from the activities of the increasing population pressure in the Lumakanda Settlement Scheme. The growth pressures that accompany population increases and economic expansion inevitably have resulted in the selling of land to meet basic needs or conversion of agricultural land to more urbanized uses. In addition to population increase, job growth and land use policy are other factors

that have influenced development pressure leading to the current 'crisis' in the study area.

In Chinese, "crisis" is spelled in two characteristics signifying "danger" and "opportunity". Indeed every crisis presents opportunities, and the present crisis facing Lumakanda Scheme is no exception

The study revealed that the study area was one of the fastest growing areas in Lugari District with a population growth rate of 4.1%. The population increased from 3,000 people in 1969, to 42,000 in 1999 and projected to 48,140 people in 2003 and 80,160 in 2015. The land holdings declined from 8-10 ha in 1969 to current 2.1 ha in 2003. Currently, population density per km² is 336 and is projected to 560 persons per Km² in 2015. This high growth rate is projected to continue for years to come with the Growth of Lumakanda District Headquarters.

The population increase has impacted on agriculture in terms of declining land holdings and farm sizes, resulting in loss of agricultural land and low production. Subdivision was found to reduce parcel sizes, thus reducing the amount of contiguous land available for agriculture. Commodity crops such as maize, coffee and sugar are particularly vulnerable to fragmentation. Some require contiguous blocks of land for farmers to achieve the economies of scale necessary to hold down per unit production costs as will be seen from the gross margin analysis. The study also revealed that this type of fragmentation was impacting on water availability through destruction of wetlands and forests.

Subdivision was also found to drive up land values including the agricultural land. By 1995, one acre of land was going for Kshs. 50,000, now the same fetches Kshs. 200,000 to 300,000 around Lumakanda center and along the Uganda road tarmac. In the interior areas of Mukuyu and Mbagara, the prices of land increased from Kshs. 40,000 to between Kshs. 120,000 to 160,000. This represents an increase of between 300% to 500% within a period of seven years.

Development in Lumakanda has caused certain conflicts with the environment. Pressure on land resource due to population growth coupled with the introduction of exotic production technologies is causing erosion of traditional conservation strategies. Commercialization of production has also encouraged unsustainable use of land resources. With increasing western influence, resource exploitation strategies have put survival first. Thus, development and environment have been treated in isolation in the study area.

In order to achieve sustainable management of land resources, the land use policy must provide a system of laws, rules, regulations and practices that govern the rights and obligations of landowners together with appropriate guidelines on optimal utilization of available land. There are good reasons for land use planning. First, it is needed to identify changes required in land use practices, which will increase productivity and opportunities. Second, it is used to decide where the changes should be; and third, to avoid misuse of land resources.

Some of the issues that require attention include: harmonizing land utilization types within the study area; allocating land for use according to suitability; reducing land use conflicts; harmonizing land use technologies according to their appropriateness; and encouraging and educating the public to support safe and sustainable land utilization.

5.1.2 The Impact of Socio-Cultural Factors on Agricultural Production

Land ownership and scarcity has emerged as a serious problem limiting agricultural productivity in Lumakanda Settlement Scheme, especially of the small farm holders.

The cultural relationship between man and land need to be underscored, as the Luhya's who form the majority in the area are known to maintain a strong kinship network which extends throughout and beyond the study area. The study found out that these kinsmen provide information for potential land availability for purchase or settlement, and often give substantial material assistance to those coming from their original home areas.

With the impact of the colonial and the increasing pressure on land, Lumakanda Scheme has changed tremendously over the years. We now see the emergence of a process of socio-economic stratification related to education and employment, yet as the people of Lumakanda change, kinship, land, and the sense of community belonging stretching far beyond the frontiers of Lumakanda and even Lugari district were identified as fundamental values or moral foundations which have played a very important role in determining the kind of economic choices while adapting to the new emerging farming systems in Lumakanda.

The average land base available per household for agriculture has been sharply reduced over the years from 8-10 ha, to less than 2.5 ha largely as a result of natural population increase and the on-going sub-division of fathers' limited land resources amongst sons wanting to establish homesteads of their own - where households were once self-sufficient in providing for their subsistence needs from their own agricultural production. It is now frequently the case that households are able to fulfil only a fraction of their subsistence (or income) requirements from their own lands (utilizing prevailing agricultural production practices), although domestic agricultural production still provides the primary means of support for most of the Lumakanda small farm population. Its central role as a source of livelihood is threatened by the continued decline in the level of land resources available to individual farm households. How the households respond to the challenge of a dwindling land base is crucial, not only for their own economic prosperity but also in the way their decisions affect the direction and outcome of national development policies in Kenya. At the same time, many of these economic decisions have far reaching social and political implications at all levels from the household, through the local community

5.1.3 How Much Land is Enough? - the Notion of Land Scarcity

According to the Western Province Regional Physical Development Plan (1970), land sufficiency at a subsistence standard, a household of six needs 1.5ha for subsistence in Kakamega District (which included Lugari then), and land sufficiency at a subsistence

plus Kshs. 2000 (1970 rate) per standard, one needed 3.5ha of land (Kenya, Republic of, 1970, p 1-14). Applying this logic to Lumakanda Settlement Scheme which has 132.9 Km² or 13,290 ha, with current 8,700 and projected 13,360 households in 2015, the land statistics of Lumakanda are as shown in table 5.1 below.

Table 5.1: Projected Land Sufficiency at a Subsistence standard (2003-2015).

Hectares Arable land	Hectares needed for subsistence	Hectares per household (2003)	Hectares per household (2015)	Excess no. of households (2015)	Additional hectares required (2015)
13.290	1.5	1.53	0.99	4,500	6,750

Source: calculation based on figures of Kenya, Republic of, 1970.

Table 5.1 above shows that currently, subsistence land sufficiency hectares per household in Lumakanda stand at 1.53 ha, which compares well with the 1.5ha given by the Western Physical Regional Development Plan of 1970. However when this is projected to 2015, the number of households will be 13,360 with corresponding land subsistence land sufficiency hectares per household of 0.99ha, which will be far much less than the recommended land sufficiency at a subsistence level of 1.5 ha. There will be 4,500 excess number of households, meaning that there will be required a total of 6,750 hectares for subsistence in Lugari district come 2015.

The study showed that Lumakanda has more buyers than those inheriting from their fathers. 60% of the respondents bought land compared to 25.7% who inherited and 14.3% who were settled by the government. This shows that there is more of in-migration in the study area. One characteristic of those who have purchased land is that they have done so with incomes earned from long-term employment. It was also noted that since 1963, those purchasing land come mainly, though not exclusively, from the ranks of the white-collar workers.

One of the factors, which account for some of the greatest differences in the size of land holdings acquired through sub-division and inheritance is variation in family size and structure over successive generations.

The subdivisions of household land can be seen as representing one point along a development path that is common to most households in the study area. However, subdivision will have occurred only among those households having atleast twenty years in this development cycle. What this means in terms of the distribution of holding sizes is that the holdings are generally much smaller than those of older households that have not yet been through the process of sub-division. This is most clearly seen when households of the same lineage or sub-clan are compared.

5.2 The Impact of Geographic Factors on Agricultural Production

The natural environment is composed of at least five different factors namely:

- **Climate,**
- **Geology,**
- **Geomorphology,**
- **Soils, and**
- **Vegetation**

Together and in relation to each other these factors constitute the conditions under which the land is used (Waugh, 2000). For this part of the research, the literature review, maps and photographs were studied including the field examination and observation.

5.2.1 Soils and Geology

A good indication of geomorphology and the soils of the study area are given in the reconnaissance soil map of the Lake Basin Development Authority (scale 1: 250,000) by Andriese and Van der Pouw (1985). The information about geology was broadened by examining the geological maps of the area (Gibson, 1954, and Sandres, 1963), and the Ministry of Water Lugari geology maps (2003).

According to Andriese and Van Pouw (1985) and the Soil Survey of Kenya (SSK), the various rock types are of importance with regard to fertility and the grain size distribution of the soils. The area has good fertile soils containing more than SiO₂, a higher pH, higher cation exchange capacity and higher fertility.

The only major problem found in this area were the problems of soil erosion and degradation and destruction of the wetlands. These resources interact to provide essential services such as the recycling of wastes and materials, formation of soils, moderation of climate and the water cycle, and the maintenance of the productive capacity of the ecosystem.

Rising human requirements and activities found them placing increasing demand on the agricultural land, hence contributing to low productivity arising from poor agricultural practices in the study area. Intensification of agriculture was found to contribute to the depletion of soil nutrients and soil erosion due to poor farming practices and judicious use of agro-chemicals.

According to David Waugh (2000), Soil is one of the most important life support systems. The process of soil formation takes several years, however in the study area, it was found not being protected and was lost through erosion and degradation. The degradation is brought about by increasing human activities including poor agricultural practices, livestock keeping, increasing of human settlements as well as high chemical processes and floods. The effects of soil erosion are soil loss, siltation and sedimentation.

Cultivation of marginal lands often lead to soil erosion and was found to be rampant in the study area. Soil conservation practices such as tree planting, construction of gabions, blockage of terraces have been destroyed. This has impacted on agricultural production where the average farm produce has declined. According to the area Agricultural Office, the expected maize production in the area is 24 bags per acre, but despite use of fertilizer, the study showed that, most farmers get an average of 9-10 bags per acre, while that of beans was 1 bag per acre, an evident explanation of loss of fertility through soil loss and water retention availability.

5.2.2 Agro-ecological Zone

The purpose of agro-ecological zone map is to provide a tool for assessing which areas are climatically suitable for various land use alternatives, with particular emphasis on the suitability for crop varieties. According to the classification by the Farm Management Handbook (1982) and the Range Management Book of the Ministry of Agriculture and Livestock development, the study area falls in one agro-ecological zone, 'Upper Mid-land' (UM4). UM4 is classified as a sunflower-maize zone, with a long to very long cropping season. Its rains start from February/March, and the 2nd rains in August/September. The farm management handbook (1982) shows the area can support 1.2 ha/LU on natural pasture, down to 0.2ha/LU feeding on nappier. The study showed that the maize and beans farming accounted for 85%. On average there is 2 animals and over 10 birds per household. This implies that one needs at least a minimum of 2.5 ha for 2 cattle keeping only, which is more than the average farm size of 2.5 ha in the study area.

The analysis of rainfall and temperature figures for the period 1968 to 1976 at the Turbo forest station and those provided for 1994-2003 show a marked change in temperature and changed planting season in the study area. In 1968-76, the temperatures ranged between 17.2°C to 19.4°C while the 1994-2003 temperature figures range from 23.9°C to 28.9°C. this represents a change of between 6°C to 9°C.

At the time of settlement, the area was classified as temperature zones 5 (cool temperature) and 4 (warm temperature) according to Sombroek et al (1982), and Jaetzold and Schmidt (1982). However according to the District Development Plan (2002-2008), the area can be said to have shifted from cool to warm/slightly hot temperature zone. This has an impact both on the crops grown and the type of livestock kept.

Comparing the rainfall figures for 1968-76 and 1994-2003 in table 5.2 below, there is an extended dry spell to April. This means that the planting season has changed from February/March to late March/April. These data are important for assessing the amount

of run-off and erosion and for the amount available to plants. It has also a bearing on pest control and productivity

Table 5.2: Rainfall and Temperature figures for 1968-76 and 1994-2003 periods

Months	Rainfall (mm)		Temperature (°C)	
	1968-76	194-2003	1968-76	1994-2003
Jan	99.9	39	18.0	28.9
Feb	77.4	42	18.1	27.9
Mar	54.7	78	18.7	27.4
April	102.7	157	19.4	25.8
May	146.2	166	18.4	25.3
June	126.8	142	16.9	23.9
July	175.6	155	16.7	24.3
Aug	236.0	225	16.6	25.2
Sept	100.4	134	16.9	26.6
Oct	80.4	82	17.6	27.3
Nov	47.3	59	17.8	27.3
Dec	28.6	52	17.2	26.4

Source: Schmidt et al, 1982, Kenya, Republic of, (2002)

5.2.3 Forest and Vegetative Cover

Forest cover is known to conserve biological diversity, water, and soil, and are a major habitat for wildlife. They supply forest products and have been the leading source of revenue collection for Lugari county council through sale of pulpwood to Panpaper Mills Webuye, and other forests products.

According to the survey over 90% of people in the area use firewood. They also depend on forest for building and fencing materials. Most farmers interviewed confirmed that the main source of firewood was the forest plantations. Of those interviewed, 45.7% used to get firewood from the forest, 47.1% purchased (which again originated from the

forest), and 15.7% from on-farm. The field survey also showed that 75.7% rely on firewood whereas 21% use kerosene.

According to the District Forest (2002) Annual report, there were three forest plantations in Lugari District, namely: Turbo, Nzoia and Lugari. They were mainly for industrial plantations. They accounted for 8394 ha. In 2002 Financial year the District earned a total of Kshs. 6,190,410 from the forest products. To day there is hardly any forest in place.

Plate 5.1 below shows what used to be Mugunga Forest, but has now been cleared and allocated to squatters. All the forests in Mautuma and Mugunga were cleared and settled for intensive agriculture farming. There are problems of water availability and poor farming practices that encourage cases of soil erosion as shown in plate 5.2 below

Plate 5.1: What remained of Mugunga forest in Mautuma Location

Plate 5.2: Ox-plough as one of the farming practices in Lumakanda



Source: field survey 2003

The destruction of forests in the study area is threatening ecological functions. These functions were found to include prevention of soil erosion, protection of water catchments and conservation of valuable gene pools of fauna and flora. This has negative effect on agriculture production in terms of upsetting the carbon dioxide balance in the atmosphere, which results in adverse climatic changes such as global warming. The total effect of all these is loss of biodiversity and productive potential of the land leading to low production levels in the study area.

5.3.0 The Impact of Economic Factors on Agricultural Productivity

5.3.1 The Economic Problem

The twin issues of land tenure and land use have been mired in what can be referred to as the "economic problem" in the Lumakanda Scheme. This has been occasioned by the contradictory inherent in the concept of private land and the doctrine of state regulation,

which is derived from the principle of sovereignty over natural resources. The government has tried to regulate the transfer of privately owned land through the instrumentality of the Land Control Board Act (cap 302, laws of Kenya). Although the reasons for this legal regulation are not clearly articulated in the law, the assumption is that such control is in the public interest. The use of land as collateral through the mortgage and credit institutions has contributed to low agricultural production through either sale of land or loss. This has also attracted the regulatory hand of the state through some circulars, which directed the provincial administration not to allow the sale of what is referred to as family land by public auction. This has discouraged banks and other financial institution's from lending against the security of land ownership, there by rendering the very basis upon which land tenure was individualized useless in the study area.

5.4.0 The Effects of Marketing and Pricing Policy Issues

Efficient marketing systems and enterprise choice including, types of crops grown, timeliness of payment to farmers, effects of delay and uncertainty and grain marketing were found to be the main problems contributing to low production in the study area.

5.4.1 Gross Margin Analysis

Gross margin (GM) analysis was used to ascertain the land viability and economies of scale of the various crops grown in the study area. This was limited to the size of the land and the major crops grown in the area namely: maize, coffee, beans and cabbages, for an average of five farmers chosen at random.

Gross margin is the difference between gross output and the total variable costs from a given piece of land. Gross margin facilitates the conduct of a meaningful analysis of past performance and provides the relevant profitability indicators for planning.

Gross margin assists in drawing up of performance indicators, that are helpful in making of management decisions.

Table 5.3: District Crop Statistics (3 years period - 1998 - 2000)

<i>Crop</i>	1998		1999		2000	
	Area (Ha)	Tons/Ha	Area (Ha)	Tons/Ha	Area (Ha)	Tons/Ha
Maize	29800	4.5	29700	4.4	30000	4
Beans	24050	0.6	24400	0.6	24200	0.5
Banana	445	12	450	12	460	12
Sugarcane	1500	60	1200	60	900	70
Coffee	945	J	970	J	990	3
Sunflower	1250	1.1	1050	0.9	850	0.9
Tomatoes	180	15	155	15	160	15
Kales	620	8	520	7	550	10
S/potatoes	650	10	565	10	600	10
Cassava	280	5.5	2340	5	200	4
L/veg.	950	12	820	12	840	12

Source: District Agriculture Office Lugari, 2003

According to 2002 Ministry of Agriculture Lugari District annual report, the main food crops grown in order of importance are maize, beans, sweet potatoes, sorghum, finger and cassava. The present yield of beans produced is 0.6 tons/ha while maize is 4.5 tons/ha against a possible yield of 0.9 tons/ha and 6.0 tons/ha respectively. The table 5.3 above shows that they are operating below recommended yields and that the production of major crops has been declining

b) **Gross Margin Analysis for main food crops grown in Lumakanda**

Table 5.4 below shows many farmers in Lumakanda settlement practice the maize inter-crop farming. The ideal profit margin for maize and beans: at 24 bags and 2 bags per acre for 12 months as recommended by the local farm management handbook is Kshs. 15,050.

The average gross margin analysis for five farmers from the study area chosen at random is $Kshs. 550 + 4,550 - 3,700 + 7,800 - 3,700 = 5500/5 = Kshs. 1,100$ per acre. This translates to $Kshs.92$ per month per acre. This clearly shows farmers are unable to pay for their labour and management from their farms, a case of poor enterprise choice. This was attributed to lack of record keeping by the farmers, lack of knowledge and awareness creation and extension. The locals attributed it to the traditional maize-growing syndrome, as the main meal is "Ugali". To break even, this means farmers in Lumakanda must have at least own a minimum 10 acres of land.

Table 5.4: Maize/Beans inter-crop (UM4)

Levels of production	Ideal farm	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5
Yield/acre (90kg bags)	24	12	16	9	18	9
Price per bag (Kshs)	1000	1000	1000	1000	1000	1000
Gross Output (Kshs)	24,000	12,000	16,000	9,000	18,000	9,000
Beans						
Yield/acre (90bags)	2	1	1	0.5	1.5	0.5
Price/bag (Kshs)	2500	ft	-	¶	ii	
Output (Kshs)	5000	2500	2500	1250	3750	1250
Variable Costs						
Land prep.tion/acre	1500	1500	1500	1500	1500	1500
Maize seeds 10kg	1330	1330	1330	1330	1330	1330
Fertilizer DAP	1500	1500	1500	1500	1500	1500
CAN bag	1000	1000	1000	1000	1000	1000
Labour @ 100/MD						
Planting	1000	1000	1000	1000	1000	1000
Weeding/fert. Appli.	2000	2000	2000	2000	2000	2000
Bean seed 4kg @ 30	120	120	120	120	120	120
Harvesting	1500	1500	1500	1500	1500	1500
Shelling/dusting	2000	2000	2000	2000	2000	2000
Transport costs	2,000	2000	2000	2000	2000	2000
Total output	29,000	14,500	18,500	10,250	21,750	10,250
Total Variable Costs	13,950	13,950	13,950	13,950	13,950	13,950
Gross Margin	15,050	550	4,550	-3,700	7,800	-3,700

Source Field Survey, 2003

It was also an indication that most farmers depend on other off-farm activities for their survival. Kshs. 92 per month per household of average 8 persons explains the high poverty levels of 57% from the Welfare Monitoring Survey (1997). It is also far below the projected income for each farmer of £25-£70 per annum at the time of settlement in the scheme in 1963 (Goldsack et al, 1966). This also accounts for the low productivity in the study area.

The gross margin analysis for horticultural crops (cabbages, carrots, and onions etc) were found to give gross margin of over Kshs. 50,000 on average. Implying that the future direction of farmers in the study area should shift to horticulture farming, which also does well on small farm holdings.

Also the gross margin analysis for dairy cattle keeping was found to be viable on zero grazing unit. The average projected profit margin was found to be Kshs. 25,000. However, there is a serious problem of marketing in the area, and most farmers sell their milk through hawking on bicycles. This was found to be unhygienic and the market does not guarantee for maximum profits. The KCC and other Dairy cooperatives have all collapsed in the area.

Table 5.5: DAIRY (Zero Grazing) Ayrshire breed Mzee Lubia farm Mwamba Sublocation

Assumptions

- Zero grazing unit establishment cost not included
- Farmer has 1 acre under napier
- Lactation period - 240 days
- Calving interval - 508 days
- Age at first calving - 24 months
- Production life - 7 years
- Milk yield (15kg/day) - 3600kg/lactation period

0.7 calf/year - 7000

NB/ All the manure produced is used in the Napier farm (complimentary relationship of enterprises).

Outputs

Milk yields @ 15/- per kg + 3600x15	54,000
Sale of heifer	7,000
Gross Output	61.000

Variable Costs

Fertilizer CAN @ 1000/- per 50kg bag	2,000
Labour @ 100/- per M/D	
-Weeding/fertilizer application	1,500
Monthly labour @ 1200/- for 12 months	14,400
Concentrates 12 bags @ 850/- per bag	10,200
Minerals 20kg @ 150/- per bag	3,000
Vet service and drugs	5,000
Total variable costs (Kshs)	36,100
Gross margin/cow/year (Kshs)	24,900

Source: field Survey, 2003

5.4.2 Efficient iMarketing systems

The key to increasing food production is the motivation of farmers. If farmers feel well rewarded for their labour, management and the use of their land and other inputs, they will try to better the economic situation for themselves and their families. Access to basic services, school fees, paraffin, and clothing, industrial goods and processed food products come through the sale of their production. In the study area agricultural land sales and conversions were for meeting basic needs, education, burial and purchase of farm inputs.

Farmer's income in Lumakanda depends on efficient marketing system. Due to poor marketing and inefficiency of the National Cereal and Produce Board (NCPB), farmers have been selling their produce to middlemen at throwaway prices. This in turn has not

realized the economies of scale leading to inadequate application of farm inputs. Thus the failure of the agriculture and livestock industry to attain satisfactory growth rates in the past two decades may be partially due to the poor performance of the marketing system.

An efficient marketing system must be freely and readily accessible to all farmers in the study area. Prices must be free to adjust to changing consumer incomes, preferences and available market supplies. This price discovery process would guide producers in the use of their productive resources by rewarding them for the most efficient production of the desired output.

An efficient marketing system simultaneously guides the profitable use of productive resources while maximizing consumer satisfaction with the existing economic, social, political, cultural and institutional constraints. As such it stimulates production in the commercial sector and motivates production in the non-monetary sector to participate in order to increase their standards of living (Kenya, republic of, 1989).

a) **Timeliness of Payment to farmers**

In the study area it was also found, that timeliness in the payment to farmers continues to be an area of concern. This problem is in some cases closely intertwined with the inefficiencies of marketing parastatals (NCPB) and failure of cooperatives. Currently all cereal cooperatives are dormant and hence farmers have resorted to selling their produce to middlemen through "hawking". For the NCPB, the problem has been due to lack of finance or from inefficient management. These have resulted in farmers selling their produce at throwaway prices. This in effect, affect the "plough back" capital in farming leading to poor production outputs in Lumakanda settlement scheme.

b) Effects of Delay and Uncertainty

Another problem contributing to low productivity in the study area is the effects of delay and uncertainty. This has the effect of reducing the effective producer prices and therefore the profitability of production in the study area. The main effect of a payment delay is to postpone expenditure on consumption and investment goods. In addition, it may have an effect on the composition of the farmer's consumption and investment expenditure and may also change the ratio of his consumption to investment expenditures, thereby leading to greater or less investment. The impact of payment delays and uncertainty is a function of the structure of production.

5.4.3 Agriculture and Livestock Inputs

Access to farm input was another factor that contributed to land subdivision in the study area and had implications on overall farm productivity. Successful intensification requires adequate and timely supplies of key inputs (fertilizers, improved seeds, animal feeds and agricultural machinery, and supporting services (credit, research, extension, and marketing), required to finance these inputs.

The central objectives of the Government's agriculture and livestock inputs policy is to ensure that adequate inputs are made available at the lowest price possible at the farm-gate and at the right time. -Input use plays a central role in the intensification of production and is the heart of agricultural growth strategy. As noted in the Sessional Paper NO. 1 of 1986, dramatic increases in agricultural yields are central to Kenya's development strategy. The success of the strategy hinges on whether the farmers can be induced to apply improved practices. To make this happen, farmers in the study area must have ready access to inputs.

Most farmers in Lumakanda Scheme have had access to uncertified seeds, poor quality fertilizers that are often very expensive to them. For the 10kg bag seed costs Kshs. 1,330, while fertilizer costs Kshs. 1,500. The majority cannot afford the use of farm machinery

and instead have resorted to use of ox-plough. Indeed, the study revealed 71.4% of the respondents use ox-plough compared to 24% who use the tractor. 84.3% were found to apply fertilizer whereas 14 % applied organic manure. The study found that majority of farmers were suspicious about the validity of most inputs as most have been found to be fake. There are two court cases from Turbo wholesalers to attest to this. However, most farmers have no skills to ascertain whether the inputs are fake or not. Mechanization was only concentrated on large farms.

Credit use in Lumakanda has been abused by the extension agents, the AFC officials and the provincial administration who helped farmers in misappropriation of the loans, through inflated loan interests, input supply and sale of land to offset the loan. It led to reduction in the production capacity instead of improving it. Of the respondents, 67% have in lifetime got access to credit through KFA, NCPB or through their cooperatives. Inflated repayment bills and cheating by farmers of their actual hectareage also led to failure of the credit scheme in Lumakanda scheme. The credit scheme game has been administered like that of "cat and mouse". The proper utilization of agricultural credit requires that the borrower utilize the funds in a proper production system within his capacity to implement with assistance of supporting services. This was not the case for Lumakanda Settlement Scheme.

5.4.4 Seed Quality

Research findings show that over 90% of the respondents are not aware whether the seeds they were using were certified, expired or from licensed dealers. According to the Kenya Plant Health Inspectorate (KEPHIS) in Kitale, a government Institution that offers regulatory services to ensure quality and health of agricultural inputs and produce; under Seeds and Varieties Act Cap 326 of laws of Kenya, there are 40 registered seed companies in Kenya. The companies are required to appoint agents and stockists with knowledge, ability and facilities to maintain quality and viability of seeds supplied for sale. Also the developed variety is tested to determine its agro-ecological value in national performance trials before being released for commercialization. It is these

registered companies, agents and stockists who collude and repackage uncertified seeds and sell them to unsuspecting farmers.

Most farmers admitted that once they see the Kenya Seed Company Label, they assume the seed is of right quality.

Records from KEPHIS indicate that there are a total of 88 court cases from year 2000 to-date in contravention of Cap 326 for determination. Charges range from expired seeds, tempering with seed containers, lack of seed sellers license, uncertified seeds, repackaging illegally, failure to indicate seed lots, hawking to violation and processing of fake and uncertified seeds. The total value of the fake and uncertified seeds officially detected is in excess of Kshs. 35 million. KEPHIS public awareness campaign on seed quality include:

- Verification of seeds before planting
- Bridging the knowledge gap on roles of quality of seeds through public awareness of seed quality
- Training of seed stockists, farmers, seed companies, extension officers and the provincial administration

So far have they covered a total of 1,825 in 45 districts in Kenya. According to Local police station reports, Cases of uncertified. Seeds have been reported in Turbo, Kipkaren and Lugari centres, mainly from stockists. Cases of production of fake packaging bags have also been reported in the Districts.

There are several Legislation to protect the industry from collapse including the plant protection Act (Cap 324), the Agricultural Produce Act Cap 319 which calls for plant material inspection to ensure compliance. Efforts by KEPHIS and the agricultural Ministry to stem these practices have been hampered by the courts. Others include:

- The law-prohibiting sale of fake or uncertified seed has not been deterrent. It was recently reviewed and now provides for a maximum of Kshs. 20,000 fine or six month imprisonment or both, which is too lenient. So far the highest fine has been

Kshs. 12,500 and other culprits have been let free on account that they didn't know it was an offence to sale uncertified seeds

- Use of fake documents in the export and sale of uncertified seeds has been observed and may hurt Kenya's reputation as source of quality seeds
- Many farmers continue to purchase cheap seeds in open package from dubious dealers. It therefore becomes very difficult to verify complaints of poor produce. Therefore KEPHIS and the Agriculture Ministry advises farmers to purchase seeds in sealed containers from authorized and licensed stockists. They should also retain the containers and receipts issued after purchasing of the seeds until harvest for investigation when poor performance is detected.

5.4.5 The Impact of the Cooperative Movement

Until June 2002, the district had registered 25 societies. 5 are coffee, 16 multipurpose, 1 dairy and 3 saccos. Of this Lumakanda FCS remained a semi-dormant society and has its buildings located at the District headquarters being rented out (see table 5.6 below). About less than 50 percent of all cooperatives are dormant in the district.

Milk marketing continued to be a big challenge. Soy and Sergoit tried to market milk in Teso District but the costs were found to be too high to be sustained.

Table5.6: Number of Cooperatives in Lugari District

Activity	Active	Semi-dormant	Dormant	Total
Coffee				
Multipurpose			12	16
Dairy				
Sacco				
Total	11		13	25

- Source. District Cooperative Officer, Lugari, 2003

They had to revert to KCC, which has a problem of low and delayed payments. According to statistics from the District cooperatives Officers report (2003), the intake

was 29,419 kgs, of which members earned a total of Kshs. 454, 090 per annum. This is below capacity, however, the research showed that in Lumakanda settlement Scheme there is no existing Dairy Cooperative and 100 percent of dairy farmers sell their dairy through "hawking" to the various market centres. One of the areas is the district headquarters, Majengo center, panpaper and Mulimani.

Total coffee sales went up by 77 percent and 48 percent respectively for both Cherry and Mbuni. Total sales were 190,561 kgs earning a total of Kshs. 1,430,373. In Lumakanda Settlement, the study found that out of the 70 respondents, only 12 percent had coffee stems in their farms. Out of this, they have left them unattended and others are cutting them or inter-cropping them with maize. Mbuni prices continued to be low. Overall, the coffee sector continued to face problems in the district such as

- Poor coffee
- Delayed and low payments for all coffee deliveries
- Lack of credit facilities
- The sacco incurred reduced income due to delayed remittance.
- High prices of farm inputs and,
- Poor quality coffee.

5.4.6 Credit Policy Framework

The government objective on credit is to ensure that most farmers have access to incentives such as prices and efficient marketing system that can lead to higher outputs. Inefficient operations of the institutions involved in the administration of credit notably Agricultural Finance Corporation (AFC) and the cooperative Bank of Kenya (CBK) are the problem area. This has led the discontinuation of the Guaranteed Minimum Return (GMR) credit facility in 1978. In 1988 the GMR scheme was replaced by the New Seasonal Credit Scheme (NSCS) which subsequently ran into even more serious problems (Kenya, Republic of, 1987).

Looking at the history of both GMR and NSCS schemes, low loan repayment has been a major contributory factor to the unsatisfactory performance. The major causes of low loan repayment rate in Lumakanda Scheme include the following:

- a) adverse weather conditions resulting in low outputs;
- b) lack of awareness of the credit implications and obligations amongst the borrowers leading to non-commitment to loan servicing
- c) outright cheating by borrowing,
 - concerning land ownership,
 - by marketing produce through broad parties
 - exaggerating the acreage during loan application, and
 - By misuse or diversion of funds to non-agricultural activities.
- d) Inadequate follow-up arising from shortage of manpower and physical facilities.
- e) Purchase of produce by middlemen.

Multiplication of the existing funding sources and lending criteria has led to confusion, duplication and inefficiency in the part of lenders and borrowers alike. All the above factors have impacted negatively in the agricultural productivity of the study area.

5.5.0 The Effects of Lack of Farm Records/Business Plan

The study also found out that all the respondents did not keep farm record book and only used memory to remember. A farm record book or more importantly a farm business plan is essential in guiding the farmer in choosing the enterprise choice that maximizes the prevailing conditions

5.5.1 Size of Farm

The size of a farm and agricultural production has been one of the most heated and vital issues in Kenyan agriculture. It really has been the basic problem since independence to today and has continued to be the basic problem of Kenya's agricultural policy.

According to the Lugari District Agriculture annual report (2001) and (2002), farming has been considered as the activity of cultivating and living; viewed only from that standpoint of producing food. Hardly has anyone regarded farming as a business for earning a profit. This was attributed to the historical nature of the settlement scheme and the cultural background of the settlers, who had been used to practicing subsistence farming and the insufficient regulations in place.

Maxfesca (1846-1917)- professor of Komaba Agricultural School-Japan was quoted as saying:

"The Japanese peasant is a proprietor of his business and at the same time a labourer in his business. The proprietor endeavours to continue farming because he does not know any other way of making a living. The labourer does not quit his boss despite the very low wage because the labourer himself is the boss making his own living. The income which could be deemed to be the wage earned by the peasant and his family corresponds to one half of the wage which would have to be paid should the peasant hire other labourers and let them cultivate"(Ogura, 1979, pp28).

What clearly emerges from the study area is that for the case of large-scale farms, the owners are engaged extensively in farm management. The medium scale farmers are engaged in farm management and also are engaged in one part of the farming labour necessary for their farms. Whereas the small-scale farmers are engaged in farm management and also in the farming labour together with their family members, depending on only a small amount of hired labour, if necessary. Also because most of the farmers own their plots and that they are not renting for a fee, the idea of maximizing profits from their little farms is lacking. It is only those who hire land that think of profit making.

5.5.2 Optimum Size of the Farm and the Viable Family Farm

In general, the enlargement of a business diminishes the cost of the business, but it is considered that there is a certain limit on diminishing cost and therefore there is a certain

point of minimum cost. The size of business corresponding to the point of minimum cost should be the optimum size of business. As far as farming is concerned, however the production factor especially the land supply is limited by various conditions that are difficult to control not only by the individual farmer but even by the nation. Although there are constraints on the production factors, there is greater difficulty in dealing with the optimum size of the farm.

The idea of optimum size of farm in the study area has two aspects: one is the size sufficient to satisfy the need of familial consumption's i.e. the size of farming sufficient for livelihood. Another is the size sufficient to fully employ family labour. These two aspects can allow those concerned to link policy to the family farm particularly the small-scale family farms. As the general living standards of people in Lumakanda rise, agricultural policy should be aimed at lightening the heavy farming labour inputs requirement and improving the low level of consumption of the farm household. Agricultural policy should be aimed at securing food supply necessary for the household and the nation. At the same time agricultural policy in the study area should be aimed at stabilizing and improving farming and the family farm economy in order to maintain an agricultural population. Currently most farmers in the study area do not view farming as the only way of making a living but supplementary. This laissez faire attitude is having long term impact on agriculture through declining productivity. 90% of farmers preferred salaried employment than working on their farms. Especially' all the youths interviewed had a general dislike for agriculture farming.

5.6.0 Land Tenure, Agricultural Production and Soil Conservation

Problems of land tenure, agricultural production and soil conservation was found to be inter-linked in Lumakanda Settlement Scheme. What was found to be lacking was an effective policy to take account of all the three facets within a socio-economic context of the study area. Kenya's legal provisions are designed to control the use of land and soil and are generally oriented towards use. These laws were not only found to be sectoral in approach but they were juridically incomplete, as they do not account of the linkages

between the three areas. There is a definite need to harmonize policy and legislation, in matters of individual ownership of land and the rights of use, control of land use, exercise of the states powers of eminent domain in the Lumakanda Scheme, if any meaningful development is to take place. Enforcement of all the statutes were found to be lacking "teeth to bite" as such simple measures of controlling floodwaters, terraces are now a major problem. Inter-boundary conflicts arising out of planting of trees especially eucalyptus species along the common boundary is common in the study area. This tree species have an impact on productivity of crops and water retention in the soils. Another problem arising out of tenure is the sighting of homesteads relative to the neighbours, which raises the question of compatibility amongst land uses. Problems of poultry and cattle conflicts were found to be common especially as it relates to destruction of crops and grazing.

The other problem that has implication on agricultural production and marketing is the issue of access. The existing infrastructure and services are in horrible states including bridges (see plate 3.3 on page 78). The subdivision of land either through inheritance or purchase has not been taking care of access roads to new plots. Only paths exist, allowing only movement of people on foot or on a bicycle, a vehicle can hardly pass. Another conflict, which has implication on human health, was the siting of water wells and the pit latrines on common boundaries. Pit latrines were found sited at extreme end corner of the farm.

These also can't be solved because of lack of farm plan that is enforceable relative to the neighbour's plan. This problem has led to increase of water related diseases in the study area. Statistics available at the local District Hospital indicate that apart from Malaria, the second is water borne related diseases that account for 28% in the District.

All these facets hinge on reducing agricultural production in Lumakanda Settlement Scheme. Several laws exist but these laws assume a sectoral approach, i.e. laws deal with particular sectors of the economy or particular aspects of the use of land. However, a sectoral approach is not adequate for the planning of land use, productivity and

conservation. Instead the various sectors and the laws relating to them should be viewed within the framework of land use planning and development in order to ensure the harmonious allocation and development of land and soils for agriculture, forestry, recreation and urban development; land use planning based on agreed soils policy with a sustained long-term view point are essential for improved productivity in the study area.

Currently these laws are used sectorally and without coordination. There exists over 50 legislation's concerning use of land. All apply to the same farmer but have so many players with different vested interests and negative impact on agricultural production. Coordination and comprehensive land use policy with a strong "referee" is what is needed to enhance agricultural production in the study area

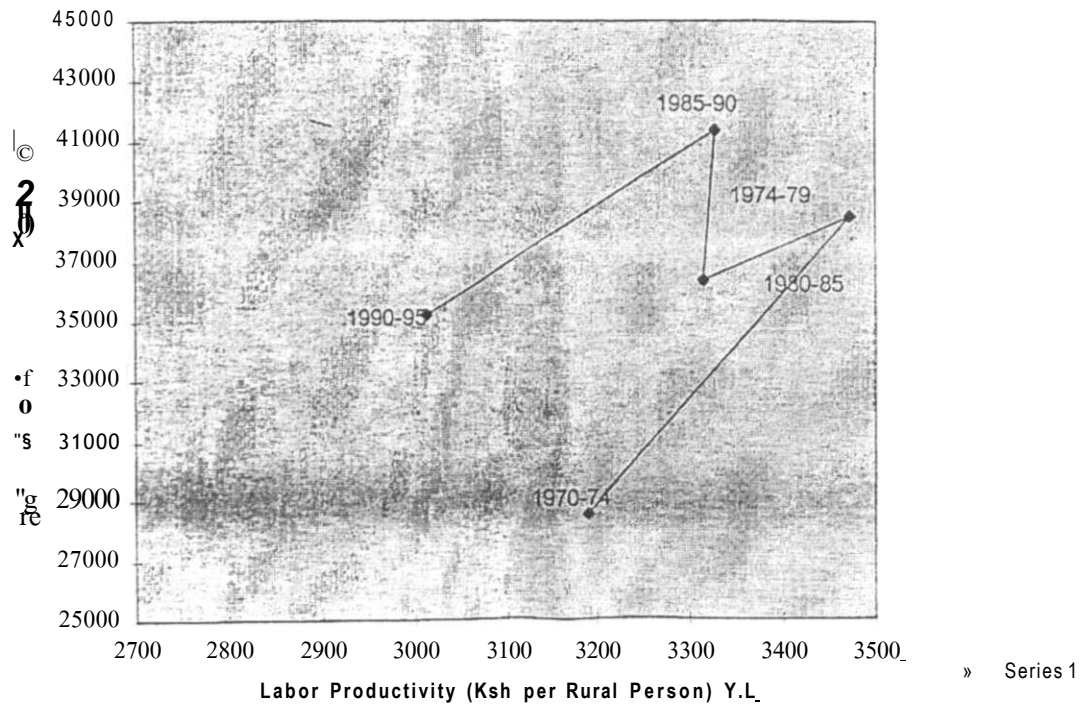
5.7.0 Political Factors as they Impact on Agricultural Production

No discussion of the land problem in Lumakanda can fail to link it to the political problem. Land in this country according to Smokin Wanjala (2000) was destined to be a political issue. In large measure, it provided the basis for the struggle for independence. The national Government, which emerged from the liberation struggle, began to use land as a legitimization reason by promising to settle, and in some instances, actually settling people in large populations.

This has not been an exception in Lumakanda as it belongs to the former "white Highlands". As recent as 1996/97, over 8,300 ha of forest plantations have been turned into settlement areas. The land owning ethic has now become a mania whereby everyone dreams of owning land. The political propaganda has always played on this blaze to the extent that when the governments hold on power was popularly threatened in 1991 through agitation for political reform; others started land clashes in 1991, which affected agricultural production in the study area. This encouraged hostility between the neighbouring Nandis' and Luhya's around Turbo and Kipkaren areas. Most people still have not gained confidence to return to their farms as evidenced by absentee landlords in the study area.

5.8.0 Factors Influencing Land and Labour Productivity in the Study area

Figure 5.1: Land and Labour Productivity for Lumakanda Scheme



Source: Field Survey, 2003 & IEA, 2002.

The lack of high value horticultural crops in the study area has led to low land and labour productivity. The study area's contribution to the general economic growth has also declined following the decline in the value of the agricultural production. A higher proportion of the families thus are likely to be more food insecure than they were in the 1990s (see figure 5.1 above). They have less job opportunities resulting in less family incomes.

5.8.1 Limited Technical Progress

The agricultural research has remained stagnant over the years. No new crop varieties marching the current soil characteristics have been introduced. The partial productivity analysis depicts a very volatile and fragile agricultural system in the study area, where

productivity gains in a few years can be eroded almost immediately. This underscores the need for high quality agricultural research systems to generate continuous improvements in farm technology over time in the study area.

The decline in land and labour productivity corresponds to the time when market reform policies were implemented. The partial- step-go nature of the market liberalization and poor sequencing of the liberalization policies during the 1990 has mitigated some of the potential benefits of reform to producers in the study area. The policies were also poorly timed (Nyangito, 1998). For example, fertilizer prices were liberalized in 1990 when maize and sugar prices and marketing continued to be regulated by the government until 1994. This squeezed profits and thus reduced producer incentives to use productivity-enhancing inputs.

The Extension delivery to farmers in the study area has been poor and most farmers have not been aware of the improved technologies. Poor maize prices and mismanagement has also led to subsequent fall in the labour and land productivity in the study area.

CHAPTER SIX

6.0 POLICY IMPLICATIONS

6.1.0 Introduction

Land remains the primary resource base for all human activities in Lumakanda scheme. The present land use practices have disregarded land potentials, carrying capacities, and limitations of land resources as well as their diversity and distribution. The existing land use policies and practices such as poor cultivation techniques, sub-divisions of lands, settlements and related activities, sedentary farming and livestock management have been promoted with little regard to the impacts on the environment. Their impacts are now being seen in terms of widespread land degradation, land use conflicts, unsustainable use of resources, loss of biodiversity, soil erosion and increased incidences of poverty in the Lumakanda settlement scheme.

The land tenure system and cultural norms relating to land ownership coupled with a fast growing population have led to the uneconomical subdivision of land in the area. The subdivisions in turn led to unsuitable management practices. The result is a reduction in the carrying capacity and degradation of the environment, thereby contributing to low agricultural productivity.

The factors influencing sub-division of land and intensive agricultural activities have been brought about by the need to a cash economy, changing habits and lifestyles, economic expectations, the demand of a rapidly increasing population, and many other modernization forces. The impacts of these factors on the agricultural production are low yield, and reduction of arable agricultural land production.

The rapid changes from subsistence to a cash economy have also had a major impact on agricultural productivity. Apathy due to uncertainties associated with land ownership and conflicts were also found to contribute to soil degradation, while intensive cultivation of land often led to erosion. These are further compounded by climate and choice of

enterprise farming, mostly maize, and cultural traditions, soil conservation practices, such as planting of trees, construction of gabions, terraces etc.

The availability of infrastructure and its efficient operation are major determinants to the costs of production, quality and timelessness of response to product and service demands. These were found to be poorly developed in the interior of the study area, especially markets have been found to be on the frontiers of the district boundaries.

6.2.0 Strategies for Development of Lumakanda Settlement Scheme

Any strategy of rural development has a strong implicit or explicit ideology orientation. A strategy would either be based on the principle of reciprocity or collective control or market orientation. An ideally formulated workable and consistent rural development plan would have many facets and be "optimally balanced". Optimal balance implies that different goals and targets, in addition to being feasible and mutually supportive, should be achievable with minimum input of effort and resources, ensuring efficiency and economy of resource use.

One way is through land consolidation - consolidating land units and redistributing them in units of economical sizes. This happened in Kiambu in 1955/56. It addresses the case of dispersal of land units. Another way is through individuals giving up land and finding alternative sources of livelihoods. This implies consolidation through expropriations of land or formation of group farms. This happened in England in 1500 AD it also happened in Kenya by the colonialist in the white highlands including the study area this brings efficiency through increased production by increasing economies of scale. I.e. benefits over and above the costs of inputs. It also brings efficiency in use of labour inputs and capital and enables use of mechanization to increase production

6.2.1 Farm Level Planning Recommendations

The world is changing very fast and we now are talking of liberalized markets, European Union (EU), International Monetary Fund (IMF) and World Bank (WB) conditions and formation of AGO A, COMES A etc. In the study area, marketing was found to have been inadequately addressed and more so when it comes to market information collection, analysis and dissemination. Thus, this was found to be a big shortfall because whatever farmers do has to start with the market besides self-sufficiency. Some but just a few questions that will have to be addressed before advising the farmers to go into production include:

- For whom is the farmer producing?
- When should the farmer produce?
- What will the farmer get for his produce?
- How much is the investment cost?

Quality produce and correct market information will assist the farmer to fetch maximum returns. The policy should be to move from subsistence to commercial agriculture. As the land size continue to decrease with population increase, commercialization of agricultural production with good returns is the only way to address the issue of productivity and poverty reduction in the study area. The farmers must be empowered in order to make rational economic decisions. The government role should remain that of facilitating farmers on:

- guiding farmers on commercial oriented farming
- assisting farmers in filling the production gap
- guiding farmers on enterprise choice based on available resources and agro-ecological zones
- Coming up with a workable Farm Specific Action Plan (FSAP) and Farm Business Plan (FBP) framework.

The Ministry should go a step further and get the global market prices as well and work backwards in order to give the farmer correct market information. Of course quality of

any produce is crucial to fetch maximum returns. In the study area farmers were found to be thirsty for knowledge; mainly on marketing and maximizing profits not forgetting food security.

6.2.2 The Farm as an Economic Unit of Production

The farm should be considered and organized as an economic unit formed with the purpose of producing livestock and crops. For this purpose, the production factors land and capital such as tools, buildings, machines and inputs like seeds, fertilizer, chemicals as well as labour are combined as farm resources to achieve the desired production results.

In this case farms should be characterized by:

- The type of enterprise i.e. crops grown, livestock, etc
- The ownership of the farm
- The farm resources, their quality and quantity see table 6.1 below

Further more small farms tend to have more labour in relation to large farms, thus should favour intensive crops in the study area. Apart from resource suitability, production will also very much depend on the proximity and accessibility of markets for the produce.

Table 6.1: Resources, Quality and quantity

Resources	Quantity	Quality
1. Land	Hectarage	Soil type, slope, carrying capacity etc
2. Labour	Persons	Training, capability etc
3. Capital	Buildings, machinery, seeds, fertilizer etc	

6.2.3 Gross Margin

The gross margin should be used as selection criteria for farm enterprises. The selection of particular farm enterprises should be greatly facilitated by drawing up enterprise budgets. This has been found useful by the International Fund for agricultural

Development (IFAD) in one of its projects in Kenya, The National Agriculture and Livestock Extension Programme (NALEP) which covers a few districts in Kenya including Lugari District.

These budgets should be based on technical possibilities of producing crops in a given agro-ecological zone. They should be assessed in economic terms by attaching current prices to the yields achieved and inputs used.

A suitable measure for economic assessment of an enterprise is the gross margin. It is calculated by deducting the value of the inputs from the output produced.

Enterprise budgets refer to a certain area of land usually one hectare and to a certain period of time.

For the case of Lumakanda which produces maize for one year period, enterprise budgets should be drawn up for a period of 12 months. The output is determined by the value of marketable and non-marketable produce. The cost of inputs included in a gross margin calculation are grouped into three categories:

- Variable costs by those inputs which are directly linked with the establishment of the enterprise. These are particular planting materials, fertilizer, chemicals or hired machinery and labour.
- Second types of costs are variable costs of the utilization of a fixed capital asset. These may be fuel costs for a tractor for ploughing the land etc.
- Thirdly, the fixed annual costs from a capital asset, which is entirely allocable to a particular enterprise, are included as a cost item. This may be for example depreciation and interest to a maize store to be allocated to the maize enterprise etc.

The calculation of a gross margin for an annual crop is summarized in table 6.2 below. Gross margins can also determine the competitiveness of farm enterprises with respect to other production factors such as labour, space requirements in buildings it and other fixed assets (IFAD, 2003).

Table 6.2: Principals of Gross Margin Calculations for an Enterprise Choice

Costs	Kshs. Per Hectare
Total output = Value of marketable output + Value of non-marketable output	
"Cost of variable inputs	
Variable cost of using fixed capital assets	
Fixed costs of allocable capital assets	
Gross Margin	

Source: IFAD, Nairobi, Gigiri, 2003

6.2.4 Farm Level Planning

1. The Farm Specific Action Plan (FSAP)-the 'Nurse Model'

At the farm level planning, the study recommends the preparation of a Farm Specific Action Plan (FSAP) to guide development and investment. Using the optimal production levels of various crops/enterprises as benchmarks i.e. using existing production data expressed both in yield/ha and the gross margins analysis, there should be identified production gaps by comparing the optimal with the farmers production levels. These gaps would then provide the entry point for interventions. Causes of the production gap should be identified with the farmer assisted by the Frontline Extension Workers (FEW). The FEW should present to the farmer a menu of extension packages from which the farmers can choose/demand intervention he/she could implement in order to close the identified production gaps. The demanded interventions are the opportunities for farm development.

The FEW are expected to indicate the contribution he/she can make towards implementation of the intervention and also indicate the "doctor" who should go to the farmer for expert advice on the same intervention-opportunity. This is the preliminary Farm Specific Action Plan (FSAP). It should include a farm sketch map indicating the existing situation and future development, showing the homestead orientation, and various land uses drawn by the FEW for further discussions with the respective technical officers. When the Subject Matter Specialists and the Physical Planner address all the demanded interventions, this will certify it as a farm specific action plan. This will be

important for future planning and implementation. Apart from being a tool for monitoring and evaluation, it will also be important for impact assessment and for guiding new settlements orientation planning in the neighborhood areas. The following are examples of what can be addressed in the plan: subdivisions, agro-forestry, animal production, crop production, crop protection, farm management, siting of homesteads, home economics, horticulture, irrigation and drainage, marketing, mechanization, range management, run-off control, small ruminants and soil and water management.

Although the Farm Specific Action Plan should form an important tool in extension, it should put emphasis on the technical possibilities of production, compatibility and conflict resolution in the neighbourhood. The individual farmers will be expected to implement the FSAP, which aims at addressing his/her chosen priorities.

Community mobilization and participation using known participatory methodology e.g. Participatory Rural Appraisals (PRA's), or gender analysis for opportunity and problem identification should form part of the FSAP. Experiences, observations, learning from farmers and interaction should form the problem identification process and synthesis.

Community action plans (CAP) should be produced in which farmers' opportunities and problems are identified and solutions proposed. The CAP should identify various activities for promoting the development in the area. The emphasis should be placed on the environment, health, poverty, roads, research and empowerment of the marginalized groups.

The government through relevant ministries should create demand for opportunities, advertise them through the promotion of opportunities posters. They should emphasize the following items- clear objectives and purpose of the activities, basic requirements, costs, and estimated benefit of the activity, services offered and discussed with the farmers.

2. Farm Business Plan (FBP)

Although the farm specific action plan will be an important tool in extension, it puts emphasis on the technical possibilities of production. The study further recommends the preparation of Farm Business Plan (FBP) to guide the farmer on the viability of the enterprise choice.

Individual farmers should be encouraged to have Farm Business Plan (FBP) as a part of the FSAP. The FBP is farm enterprise reflecting the financial plan of production and the resource flow for the farm over a specified time period. This will encourage farmers from subsistence to commercialize farming. It will also show and assist the farmer in choosing of a viable enterprise choice to meet his objectives and desired social life. FBP's should be based on simple benefit-cost analysis presented in the form of farm enterprise gross margin and farm income that a farmer can comprehend and work with. The purpose of infusing the concept into farming should be to encourage farmers to analyze the financial impact of enterprise selection using gross margin analysis and the opportunity costs of their resources (land, labour and capital) by calculating the returns to the resources. The farmer being a logical being, need informed whether it will be economically worthwhile for him to be motivated to invest his resources in a viable enterprise. Profit maximization may not be a primary objective of small-scale farmer and making of profit may be only one of the many objectives. It is nevertheless essential for sustainability and survival of their livelihood that they make a profit and not a loss. In seeking to understand which sort of financial results the farmer is working towards, he/she will want to produce commodities for known and reliable markets and employ measures that will lead to economies of scale in production and marketing (e.g. purchasing inputs and selling outputs through cooperatives). Simple models for preparation of FBPs suitable for different farming situations should be developed for particular areas. The FBPs are Wended to encourage the farmers to adopt a market-oriented production that would boost farm incomes, reduce poverty and improve living standards. This will also boost up the opacity amongst farmers in the study area.

The planning of farm is recommended for the study area. It should begin with:

- The design of farm plan or the redesign of an existing farm development plan (if it exists).
- The most suitable enterprise out of an often large number of potential enterprises which could be included in the farm plan
- Potential to produce stable yields
- Incidences of particular diseases
- Security of market outlets, and
- Stability of prices.

Depending on the farmer's objectives and constraints, they should be weighed. A risk conscious farmer can attach more importance to stability of yields and prices while a profit minded one will thrive for maximum monetary returns, accepting the chance of failing at times.

Table 6.3 represents enterprise choice and combination and the agreed scale of each enterprise. This represents total farm gross margin, net farm income, and returns to various farm resources for a model farm of 3 acres.

Table 6.3: Framework of Farm Business Plan

Enterprise	Maize	Beans	Coffee	Poultry	Cabbages	Dairy	Total GM
Acreage/Unit	1	1	1	1	1	1	
GM/Acre/Unit	1000	25000	30000	20,000	18000	20000	
Scale of Farm Enterprise	1	0.5	0.25	0.25	0.25	0.25	
Enterprise GM	1000	12500	7500	5000	4500	5000	35500
Less Fixed Cost							10000
Less other operational overhead costs							2000
Net Farm income							23500

Source: field survey, 2003

6.3.0 Research Recommendations

This study makes recommendations that the Lumakanda Settlement Scheme requires to be envisioned from the perspective of achieving a balance and harmony between man and his habitat and the contribution of agriculture to social and economic development and poverty alleviation enhancement.

In pursuant to this vision therefore, this study recommends the setting of specific objectives in order to achieve the aspirations of the above broad goal.namely:

- The formation of land reform programme to address both short, medium and long-term problems and strategies as out above. This will include the harmonization of the various land statutes; address the institutional arrangements and implementation farm specific plans.
- The institutionalization of mechanisms designed to induce landowners to put their land to productive use.
- Periodic consolidation of holdings and re-organization of settlements as a method of controlling sub-economic parcelation of agriculture land.

Rural development according to the World Bank is a strategy or process designed to improve the economic and social life of a specific group of people - the rural farmers. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural areas (WB, 1974). Emphasis should be in increasing production, raising productivity, increasing employment and mobilizing what land, labour and capital re available in the study area. It should also be noted that development involves values quality of life issues and people should participate in activities and be involved in decision-making, what Chenery et all (1974) calls "growth with justice" or "redistribution with growth". Therefore the implementation of the above strategies and objectives will lead the reduction of poverty in the study area.

6.3.1 Land Tenure Policy

Land tenure policy refers to the conditions under which access to land is obtained and its use managed. The system of land tenure therefore greatly influences agricultural production. The prevailing structure of land tenure in the study area has a negative bearing on the economic development for several reasons. First, it has a major influence on the welfare of the farm family. Secondly, land titling has produced limited benefits and has resulted in unforeseen costs in the study area. It has lessened land disputes and improved conservation practices to some extent. However the study shows that it has not had the desired effects on improved access to credit, land development and reduction of subdivision in Lumakanda scheme. Overall, it has increased interfamily disputes and weakened women's access to land.

Soil is one of the most important life support systems. The process of soil formation takes many years. However, if not protected as is the case in the study area can irretrievably be lost in a short period of time. It is therefore recommended that through sound soil conservation and agricultural processes, that this vital resource should be safeguarded from loss and degradation. Soil degradation is the decline in soil quality. Degradation was found to be due to mismanagement by various human activities including agriculture, livestock keeping, human settlements and chemical processes. Also natural disasters such as floods has contributed significantly to soil degradation through erosion and loss of soil nutrients, chemicals and fertilizers.

Land use policy in the study area should therefore seek to harmonize the effects of these complexities on existing tenorial system to enhance agricultural production. The policy should also recognize the risk potential for instability associated with landlessness and security of tenure. The extension of urban centres to agricultural land should be evaluated and addressed adequately before they are effected.

The Government should re-examine land registration Programme in the study area. Identify specific problems, streamline and improve the process and therefore: -

- Estimate costs and benefits fully and study whether individual tenure is equally applicable and beneficial in the schemes
- Reform and simplify cumbersome bureaucratic procedures and make adjudication of the process more accessible to farmers
- Broaden farmers understanding of the process, and
- Develop measures to minimize undesirable consequences of the process

6.3.2 Agricultural Land Policy

The formulation of prudent agricultural policies is very much linked to land use and management policies. An exploration of the problem of land ownership activities and organization is necessary precedent to a meaningful focus on agricultural production in the study area. A viable agricultural land policy should therefore desirably aim at removing the bottlenecks in the existing land tenure arrangements and relations that impede access to and uninterrupted use of land resources. There is also a problem of informal subdivision of agricultural land into small uneconomic units contrary to the existing laws and policies. The subdivision of agricultural land into uneconomical viable units should be stopped due to its negative effects on the environment and food production in the study area. Under the Land Control Act, all transactions in agricultural land must receive the consent of the land Control Board, and all applications for subdivision of agricultural land vetted by local agricultural committee before being taken to the board for consent. This currently is not working in the study area. A viable land use policy should establish criteria to prevent land from being subdivided to such an extent that production is impaired or damage to the environment becomes inevitable. Some of the critical issues that should be considered under subdivision include: -

- The resulting units must be able to support a family of average size in the area depending on the existing agro-ecological zone, availability of technology and average management skills.
- The areas that are currently forested and are providing watershed should not be subdivided, cleared or farmed. The growing demand for water, firewood, charcoal and timber requires the protection of such areas.

- Areas which are ecologically unique, provide habitat for the preservation of unique species and should not be subdivided for cropping
- Some crops or animal enterprises economically do well in large units due to limitation of available production technology locally and consequently economies of scale. Therefore before subdivision is authorized, the economies of cropping change should be determined considering the available production technology.

6.3.3 Institutional Frameworks

Major institutional problems in the study area are the multiplicity of agencies; Ministries and departments dealing with land related issues. There is lack of coordination among these agencies coupled with lack of personnel and financial resources. There have been also conflicts arising from administrative and political directives that land owners require consent from members of their family or community who have no registered interest in the land. This problem is inherent in the application of the land control Act. Given the changing economic circumstances, the relevance of the Act needs to be reviewed.

The issue of squatters is thorny and politically explosive. There has been the problem of identifying landless and genuine squatters from in-genuine ones in the study area. There is also scarcity of land to accommodate the landless people given the increasing population. With this kind of situation, it is not therefore possible for every landless to get land and the majority of people will have to accept the reality and settle in urban centres or settled elsewhere. What is required is the political will to act. The Government has to come to grips with these management and institutional problems because they institute an important stumbling block in the effective implementation of land use policies, more so in the study area.

In order to address these institutional issues, the Government should establish: - a focal institution namely national Land Control Board or national Land Commission as proposed by the Njonjo Land Commission and the Draft Constitutional Review

Commission of Kenya (2000), as an extra-ministerial statutory trust with executive powers to administer and manage all land in the country.

6.3.4 Land Use Planning for Settlement

The Government in consultation with stakeholders should develop more flexible, participatory and diversified approaches to land use planning and settlement models for specific areas based on the agro-ecological zones. These should be considered as technical inputs and communities should be encouraged to develop their own models and approaches. Below are some recommendations concerning land use for the study area.

- (i) The concept and process of land use planning should shift from the top-down approach to integrative approach to promote optimal and sustainable land use across the board.**
- (ii) The process of distribution should be used as an opportunity to promote equitable access to land.**
- (iii) Facilitate process of sub-division and allow market forces to regulate it.**
- (iv) Set minimum farm size suitable for various agro-ecological regions as a criteria for subdivision**
- (v) Impose land tax on large private landholders to encourage leasing parts of the farm or subdivision for sale**
- (vi) Land use planning should be flexible and be based on multiplicity of models in order to enable it respond to the market and environmental circumstances.**
- (vii) Conversion of prime land from agrarian food production uses to other non-crop and non-agricultural uses should be discouraged**
- (viii) Policies should promote optimal use of arable lands for food security, domestic and export market.**

CHAPTER SEVEN

7.0 SUMMARY FINDINGS AND CONCLUSIONS

7.1.0 Summary Findings

The field survey of Lumakanda Settlement Scheme has found out that land as a resource has undergone unprecedented levels of fragmentation. The causes for land subdivisions have been as a result of inadequate economic security. The local community whose Luhya's form a majority have been found to have a cultural affinity for land. This has led to the over-subdivision of the land by the landowners towards their sons through inheritance practices and selling in order to meet other socio-economic needs.

Agriculture is dependent on land, which is the critical primary input. Production has been affected by three factors namely:

- Equity in land distribution which is mainly political and has encouraged land subdivision and fragmentation in the study area.
- There was also the issue of efficiency in production and ,
- A changed structure of production arising from the declining land holdings and household sizes.

Land subdivision has also led to unviable land units and over-intensification of production leading to environmental degradation. Subdivision of land in the study area is an evolution of individual tenure- i.e. an evolution of agricultural land holdings. It emanates out of natural evolution of land. It is spontaneous out of family subdivisions of land through successive generations.

Another problem was the lack of farm organization/structures. Most farms were unable to expand scale operations and therefore handicapped in competition, increasing problems of viability particularly in terms of absorption of risks.

The other problem was the acquisition of factors of production i.e. capital, farm inputs and access to collateral using title deeds which, contributed to sale of land after failing to honour the loan agreement leading to subdivision of land in the study area. Also the acquisition of resources to enhance production made farmers more vulnerable to manipulation from the land speculators thus leading to sale of land.

population density and the nature of distributions of land have been wanting in Lumakanda settlement scheme. The distribution of land regardless of density tended to be skewed towards politically correct individuals. This has led to a situation whereby some people are having less or more land, which they are not able to put into good productive use.

Population growth has been and remains an important drive in land relations in the study area. Growth rates, until recently continued to rise, as have total fertility. Family sizes, therefore, remain fairly large, implying constant demand for land resources; the basic means of livelihood in these areas. This phenomenon, acting on a fixed quantity of land available to each farming household, has led to a number of important developments. These include constant sub-division of land parcels irrespective of any rules governing the maintenance of minimum sizes, increased land pressure, and radical transformation of land rights systems in order to accommodate increased demand for land in the study area.

Another problem, which is common, is the lack of scheme specific settlement plan, through the formal plan preparation process, which takes into account the specific conditions in the administrative structure of the local level. This has led to haphazard scheme development and encroachment of wetlands and pasturelands in the study area. Sensitive eco-systems such as catchments areas, forests and river basins require a special propriety and management. This is because of their fragility and exceptional value in the Maintenance of the ecosystem stability and vitality.

Tenure of land based resources, as opposed to that of land itself, was found to be another Problem. These resources include water, forests, minerals and other natural resources.

The issue of tenure arises from the fact that in colonial settlement schemes these resources were carefully appropriated to the state, hence access to them was only possible through a complicated system of licenses. Today these resources have been badly mismanaged through subdivisions and sale of riparian reserves to the detriment of the environment.

There is also the issue of time lag between farmers' time of expenditure and return. This forces farmers to wait for a whole time lag between planting and harvesting. In between this period and with lack of alternative sources of income, most farmers when faced with a problem of whichever kind have always resorted to sale of land as a first remedy. This has also contributed immensely to land subdivision in the study area.

It has also been found that Lumakanda being the new headquarters of Lugari District, has been experiencing problems of unplanned urbanization. This has arisen from the immense influence of its proximity to the great Uganda road, electricity and piped water supply, and also due to competing land uses between residential, commercial and agriculture land. The former is found to have good returns compared to agriculture farming. The effects of these have resulted in the proliferation of residential areas with inadequate service provision and increased land subdivisions, especially those in the neighbourhood of the town center.

The study has also revealed that the inadequacy of service provision is a problem in both dispersed and nucleated settlements. This problem was attributed to both the limited planning and guidance from the local authority, physical planning in terms of service provision and to misappropriation of the limited resource base by the local community, the central government and the local authority.

The study found out that the forest and water catchments of the former forest plantations areas that have been supplying Panpaper Mills in Webuye, have been encroached upon by human settlements due to high population growth and land speculation. The field survey equally found that this encroachment has been caused by political patronage.

Other problems that contributed to sale of land there by accelerating subdivision of land included:

- **Payment of school fees;**
- **Farms having turned into non profit making;**
- **Debts and AFC loan repayment;**
- **More crowded neighbour hood as a result of subdivisions;**
- **To attain personal basic needs;**
- **Payment of hospital bills, deaths and burials;**
- **Un-employment, lack of stable income poverty;**
- **Harsh economic times, climate and 1992 tribal clashes;**
- **High incidences of diseases and Aids pandemic**
- **payment of dowry and for construction of decent shelter; and**

The study has equally found out that apart from the above findings, there are opportunities in Lumakanda Settlement Schemes that require to be exploited further. The available land base and existing market centers and there proximity to towns like Eldoret, Webuye and Kakamega and the existing railway road network are fundamental resources that require to be adequately planned by application of appropriate land-use planning frameworks, the favourable climatic conditions notwithstanding.

The following are the basic issues, which emerged from the analysis of Lumakanda Scheme that, have in one way or another led to the current subdivision scenario: they can be classified into the following policies:

- **Land policy**
- **Technology policy**
- **Employment policy**
- **Agriculture education, research and extension policy**
- **Rural institutions policy, and**
- **Linkages with the rest of the economy.**

Finally the principal input to agriculture is land, and happens to be inelastic supply. If the population increases, the producing units decline, making them unviable. Land cannot be produced unlike other inputs. Land is related to principal of supply of land as an input in production, and even size of farm, constrain the farm from size of producing unit, because land will define the optimal production unit.

In agriculture the rate of diminishing returns tend to begin much earlier than in other industries. This is due to agriculture being dependent on land. The volume of agriculture produced is dependent on size of land. Therefore it diminishes especially as land declines leading to increased costs of production. All these call for an outside intervention in form of land reform. Land reform will lead to efficiency in production.

Dornor (1972) questioned the appropriateness of customary tenure systems for agriculture, which is capitalizing and adopting new technologies to increase productivity. Harrison (1987) argued that because customary tenure systems are deeply embedded in cultural and political systems and generally offer members of particular social groups overlapping multiple rights of land use, they tend to exclude non-members of the group from transactions in land. Thus they distort factor markets and undermine full integration of rural economies into national and international markets. In addition, because they permit partible inheritance, customary tenure practices contribute to land subdivision and encourage incessant and uneconomically wasteful litigation.

To remedy these problems, development specialists have favoured intervention Programmes of land reform aimed at changing the rules governing access to land and introducing new institutions of land administration (Bruce and Migot-Adhola, 1994).

7.2.0 Conclusion

An understanding of the cultural background of farmers is important for designing appropriate techniques adapted to their situation. Despite the settlers being given access to land in Lumakanda Settlement Scheme for economic prosperity from earnings from their farms, the situation facing the smallholders has not improved. Lack of diversified sources of income limits the adoption of new technologies. The farmers are resistant to changes because of low security, which leads to low innovativeness. Such farmers require strong basic support (especially in the acquisition of factors of production). Education and training may not provide the necessary boost. Education enables the farmer to know the techniques available, but does not provide the means to implement them. One may have spoons and forks, but without food they are only toys. In the Lumakanda situation, with high dependence on off-farm income, education would only benefit, if it opens the ways for the farmer to diversify his income: They need to be assured of their situation and that the needs of their families are well catered for. Thus, it is important to identify the different circumstances of different farmers and to define their specific development needs. Otherwise, faced with economic hardships leading to poverty, poor access to factors of production and other social obligations including HIV/AIDS, land subdivision is inevitable in the study area.

In this context, we should also identify the different decision making structures in the rural areas. Some resources within households are jointly owned or managed, and one person cannot be the spokesman or even the only contact person of the household or households (Simlane, 1984). There is need to identify, how socio-cultural arrangement of the households can influence decision making, to discover "nested spheres" on farm development. It is also important to identify the types of decisions that are made at each level, in order to understand possible limitations to adoption of technologies.

This study therefore proposes that for controlled and increased agricultural production, there should be in line with the land Control Act, Cap302, the Agriculture Act Cap 318 and the Physical Planning Act Cap 286, provide for Farm Specific Action Plan (FSAP)

based on which, a farm business plan (FBP) can be formulated for increased agricultural production in the Settlement Schemes. This is essential especially with the declining land sizes as they will open up the farmer to competitive farming, enabling him/her to have control over enterprise choice, that enables him/her realize economies of scale irrespective of the farm holding, as subdivision of land in the study area is inevitable.

7.3.0 Areas for Further Research

For reasons of economies of scale in agricultural productivity in the settlement schemes, land reform is proposed in form of coming up with regulations to guide land subdivisions and choice of enterprise type in the study area. These guidelines should take cognisance of agro-ecological zones and the economic viability of the sizes of land. This regulations should assist the land control board in arriving at the minimum viable land sizes for various enterprises in the study area.

The land reform is urgent now like never before because income inequalities and unemployment in the study area has worsened; rapid population growth threatens to worsen the inequalities.

Another area that needs further research is the link between successive generations and land. This will continue in the study area and is also threatening to worsen in ten years to come. The stigma associated with land should be played down. This can only be done through further research to integrate traditional customs with the current realities in the study area.

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Appendix I

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

THESIS: THE IMPACT OF LAND SUBDIVISION ON
 AGRICULTURAL PRODUCTION: A CASE STUDY OF LUGARI DIVISION

HOUSEHOLD QUESTIONNAIRE
(To be answered by the household head)

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

1. Interviewer	Name of site/area
Respondent (Optional)_	Sub-location
2. Household Head	
a) Male	b) Female c) Child
3. Marital Status	
a) Single	b) Married c) separated/Divorced d) widowed
4. <u>How many persons live in your household? Total Number</u> _____ <u>persons</u>	
Household member	age Sex Education level Relationship to h/h head to Live with h/h head alive

4. If children are in school, where do they go to school? (Specify the distance _____ km)
5. Place of origin
- 6 family ethic group
7. Type of main housing (*Tick one that you are seeing*)
- (a) Permanent structure (stone or brick walling, SCI or tiled roof)
 - (b) Semi - permanent structure (plastered mud walling, mabati roofing)
 - (c) Mud walled with Mabati roof
 - (d) Mud walled grass thatched
 - (e) Sewage disposal (pit latrine)

^ what do you own among the following

Radio

TV

Landline

Mobile (safari/kencell)

E[^]mail

Postal box

Computer

Vedeo machine

9. What cultural values would like to transmit to your children?.

10. Group(s)

Who lives here, works here or uses resources in this area?.

11. Climate and Ecological Zone

Rainfall (mm/yr.)_____elevation (m)_

Temperature extremes_____minimum_____maximum.

Seasons (*i. e.* number and timing of planting seasons per year)

12. Natural Hazards/Problems

Droughts_____floods_____windstorms.

Landslides_____mudslides_

Extremes of temperature (explain)

Fires_____severe erosion_____other.

13. Local Terrain

Sketch (on separate sheet) the local terrain and note the major variations in slope and the locations of rivers, streams, lakes, ponds, springs, swamps, seasonally flooded areas, gullies and severely eroded or degraded lands.

14. Soils

a) list the major soil types in the area

b) Sketch the location (distribution) of these soil types on a separate sheet.

14. Vegetation and Land Use

a) tick the major classes of vegetation and land use listed below

Land Cover

Land Use

1. Forest

1. Conservation reserves

2. Open grassland

2. Croplands

3. Perennial crops

3. Gardens

4. Annual crops

4. Homesteads

5. Bear soil

5. Public markets and meeting places

6. grazing areas

b) On separate sheet, sketch the distribution of these land-cover/land-use types in the local landscape.

c) List some of the most common crops in the area;

15. Settlements

a) Describe below and sketch on a separate sheet the type(s) of settlement pattern, plus the roads, paths and waterways and their role in the larger landscape.

b) Note the locations of waterpoints and crossings for people and animals and fill in the names these places on your sketch from 8a.

c) Compare any striking relationships between water, slope, vegetation type, land use and settlements

d) 16. Land Issues

a) Do you own land? a) Yes b) No

b) If yes, what is the nature of ownership? (Tick)

i) freehold

ii) leasehold

iii) trust

iv) other(specify)

c) What is the size of your land (ha)?_

d) How did you acquire this land? i) Bought ii) inherited iii) granted by government

iv) other (specify)

e) Do you have title deed to your land? Yes/No

f) Have you subdivided your land? Yes/No

g) If yes, what was/is the original size of land and plot number (ha)?_

h) How many sub-divisions have been carried out on the original farm?_

What is the minimum acreage of the sub-divided land now (ha)?

i) Whose name is the title of land?

- k) Are women/ladies/daughters also considered in communal/family land distribution Yes/No
- i) If No, why?.
- j) What are the causes/reasons for selling of land?
- k) Of the land you own, what proportion is apportioned for:
 - i) Residential_____ha
 - ii) Farming_____ha
 - iii) Livestock_____ha
 - iv) Agro forestry/Forestry_____ha
 - v) Others (specify)_____ha

17. Production or Resource-Management Problems

a) What crops do you on your farm?

Crop type	Area covered in acres	Yield in Kgs/year(2002)	Quantity consumed in H/h/day	Quantity sold	Price per Kg
Cash crops					
Food crops					

- b) Where do you sell your produce? Give names
- c) What do you think are the major resource management and production problems in the area? Associated with what types of land use and in which places? Cause? Effect?

Problem _____ land use

d) Do you own any of the following implements? (Tick)

- (i) Ox - cart/Oxen
- (ii) Wheel barrow
- (iii) Others (specify)

e) Which animals do you keep (put down the number)

Animal _____ Number

- (i) Cattle_
- (ii) Sheep_
- (iii) Goats_
- (iv) Poultry_
- (v) Others (specify)_

0 What crops do you grow? (Tick)

- (i) Maize
- (ii) Coffee
- (iii) Sunflower
- (iv) Sorghum/millet
- (v) Beans
- (vi) Others (specify)

g) Do you carry out the following on the farm? (Tick)

- (i) Apply furrows
- (ii) Use organic manure
- (iii) Apply commercial fertilizer
- (iv) Apply pesticides
- (v) make terraces
- (vi) Plant certified seeds
- (vii) Use tractor to plough
- (viii) Use oxen power to plough
- (ix) Others (specify)

- h) Of the above, which is the major crop grown? And what acreage? Crop _____ ha
- i) In a good year, do you produce enough food for your family? Yes/No
- j) If yes, do you sell surplus produce? _____ Where?_
- k) What can you say is the average yield from your farm per year? _____ Bags
- l) Do you often get professional advice from Agricultural Officers? Yes/No
- l) What are the main problems encountered on your farm (List in order of importance)

- m) What are the possible causes of the problems?
- n) What are the possible solutions to these problems?

18. A forestation and Water Resources

- a) Have you planted trees in your farm? Yes/No
- b) For what use are the trees?
- c) Who uses these trees?
- d) Where do you obtain tree seedlings?
- e) Where do you obtain/get firewood?
- f) What problems do you have in obtaining firewood?
- g) How can the problem of firewood be solved?
- h) How far is the nearest water source _____ (Km)?
- i) Indicate source(s) of water (tick)
 - (1) Roof catchment
 - (2) Piped
 - (3) Well
 - (4) River
 - (5) Spring
 - (6) Others (specify)

19. Education, Health and Health Facilities

- a) How far is your nearest Primary school? _____ (Km)
- b) What human diseases are most common in your village?
- c) Which are the major common diseases affecting your children?
- d) How far is the nearest health center _____ (KM)?

20. Development

- a) List in order of importance the five most severe development problems facing your village
- b) What do you think could be done to resolve these problems?
- d) Please list institutions present in your village and some of their activities

Appendix II

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

THESIS: THE IMPACT OF LAND SUBDIVISION ON
AGRICULTURAL PRODUCTION: A CASE STUDY OF LUGARI DIVISION

Lugari county council land information

(To be answered by the household head)

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

A: PARTICULARS OF RESPONDENT

1. Name of Respondent _____ (optional)
2. Position of Respondent (e.g. clerk, DO, etc)
3. How long have you worked in the District

B. INFORMATION ON LAND

1. What is the area of Lugari county council _____ ha
2. How much government land was there in 1990 _____ ha
3. How much government land is there today _____ ha
4. How is government land allocated to individuals?
5. Who are members of the plot allocation committee
6. Besides the district allocation committee, is there any other body charged with the allocation of government land?
7. What role do you play as far as land is concerned in the district?
8. Any problems encountered in allocation/subdivision of land in the district?
9. What future do you see for this district as far as land is concerned?
10. What do you consider to be the solution
11. what other problems do you experience as a council in the district
12. What are your future plan for the district in the next 5 or 10 years plus?
- 11 What is your major source of income in the district?
14. What other opportunities do you have?
15. Do you have any projects? If yes name them_

Appendix III

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

THESIS: THE IMPACT OF LAND SUBDIVISION ON
 AGRICULTURAL PRODUCTION: A CASE STUDY OF LUGARI DIVISION
 GROUP/FOCUSSED GROUP INTERVIEWS

(To be answered by the household head)

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

1. Introduction

1.1. Site name

1.2. Site description (landforms, land use, vegetation, settlement, proximity to roads, streams, markets, landmarks).

1.3. Group name or description

1.4. If formal group: purpose, history, total number of members, type of people who are members

Purpose

History

1.5. Where did the group members originate

Elder generation

If they or their parents came from somewhere outside the area:

Where was it?

What was it like?

Land

Climate

Land use

Settlements

When and why did they live and move to this place?

2. Livelihoods and land use

2.1 ask about the types of land use and production systems practiced locally. E.g. these systems may focus on commercial crops; dairying; mixed farming with crops and livestock or subsistence farming.

Land-use/production systems

2.2 what do people do to make a living? List specific occupations and activities of men, women and children, both paid and unpaid.

2.3. Do some people work for wages? Do they earn wages locally or outside the area? Where? For whom?

Type of job who: number and type of people where
(men, women, children?)

2.4. What kinds of production systems are the members involved in?

3.0. Land-use History and the changing Conditions of Natural Resources

3.1. What was the area like when the eldest members of the group were young, or when they first settled there?

Land_

Water_

Soil_

Vegetation_

Wildlife_____.

Land use_

Local economy_

Erosion features/conditions

(Sketch this remembered landscape on paper, note time period, include features such as forests, grasslands, croplands, water resources, roads and settlements).

3.2. What major changes in land use have taken place? List these, ask and when they took place and note them on the sketches.

Original land use change where when

3.3. What are the major changes in the condition of natural resources?

Resource change: degradation/improvement where when

Note the locations of these changes on sketch maps

3.4. What measures have people taken to stop degradation of resources or to improve the condition of soil, water, natural vegetation or wildlife?

Resource Problem control or improvement practice

Ask the group to describe these practices.

3.5. Have government or outside organizations introduced any special conservation practices? Which practices? When? What were the results? How did people feel about these practices?

Ask the group to describe these practices.

3.5. Have government or outside organizations introduced any special conservation practices? Which practices? When? What were the results? How did people feel about these practices?

Practice organization where when results
 • _____Crop and

Livestock production

4.1. What crops are grown? Ask people to name the crops and compile a list. Ask which are for home use, for sale or both and note these on the list. Also get rough estimate of how many members, among those present, grow each of those crops

Crop variety sale who grows (works on) it who owns it where
Home use group/number group/number

(Men/women/children)

(Men/women/children)

4.2. Which crops are grown together or in regular basis? List these and note whether they are combined at the same time or follow/

Crop combination	who grows it	where
	Group/member	
	(Men/women/children?)	

4.3. Do most people have one field for cropping, or more? If more, why? What size are most people cropped fields?

4.4. Follow up with sketches of a few people's landholdings or land used, including outlying plots. Choose people representative of different groups, such as rich/poor, men-/women-headed households etc. sketch the cropping system on individual plots as well as the locations and types of plot within the landscape. For those same households, note on the sketches which places are controlled, used and maintained by men, women and children respectively.

4.5. Do people clear forest, bush fallow for cultivation? If so do they clear the land? How do people prepare land that has already been cleared? Hoe, plough? If ploughs are used, are they drawn by oxen? How many use tractors

<i>Clearing methods</i>	<i>tillage methods</i>	<i>animal used</i>
-------------------------	------------------------	--------------------

4.6. Do people crop the same field permanently? How many crops per year? If not permanent, how many years before they change, and why? What happens to the fallow? When do they come back to original cropland again, and why? How much variation is there?

4.7. Gather enough information about different kinds of activity to draw a rough cropping calendar. Who does the work? Who helps? When? Who decides when?

Activity	who works/decides	where	when
----------	-------------------	-------	------

With crop productions and sketches of grazing lands are also useful. E.g., what kinds of livestock do people have? Why?_

5.0. Land subdivisions

5.1. What are the main causes of land subdivision in this area?

1. economic factors: _

2. social factors: _

3. cultural factors: _

4. physical/environmental: _

6.0. Problems associated with the land-use system

6.1 what are the major problems in household production?

Appendix III

UNIVERSITY OF NAIROBI

DEPARTMENT OF URR^N AND REC.IONAL PLANNING

Forest officer

(To be answered by the officer in charge)

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

I) General information

- | | |
|------------------|------------------|
| a) District | b) Date Visited, |
| c) Recorder. | d) Station. |
| e) Station Size. | Ha |

i. Statistics

- | | | | |
|-----------------------|------|------------------|------------------|
| a) Indigenous Forest. | _Ha, | b) Plantations. | Ha |
| c) Others (specify). | _Ha, | d) Labour Force. | <u>N/persons</u> |

II) Planting Programme

- | | |
|--|------|
| 2 Stations Annual Planting Programme. | Ha |
| 3 Stations Annual Cut, /Fell. | _Ha, |
| 4 Thin | Ha |
| 5 Actual Achieved Planting Annually (specify by tree species). | |
| 6 Current Planting Backlog. | Ha |
| 7 Thinning Backlog. | Ha |
| 8 Area Under Non-Resident Cultivation (NRC). | Ha |

9 No. Of Cattle Grazing in Forest_

10 Stations Remedy Towards Backlogs_

11. How is the Issue of NRC and grazing being addressed

12 Licensees Contribution to Replanting_

13. Seedlings:

i) Total_

ii) Indigenes_

iii) Exotic_

14 Seedlings Ready for Planting:

i) Indigenous_

ii) Exotic_

15 How prepared is the station for next planting? (E.g. staking, etc)

III) Indigenous Forest

16 Is the forest a water catchment area?_

17 Main rivers originating from forest_____;

18 No. Of licensed operators in indigenous forest and their capacity_

19 Magnitude of poaching of forest produce in indigenous forest (include the species and possible market)_

20 any other threat? (Specify)_

22 Total land lost from forest (last 5 years)_

23 Purpose of excision__

24 Any additional land to forest

25 Community participation in forest management

26 Benefits

What are the major constraints towards forest management

27 Suggested solutions: (e.g. infrastructure, labour, morale, interference, etc.)

Appendix

III

UNIVERSITY OF NAIROBIDEPARTMENT OF URBAN AND REGIONAL PLANNING

District agriculture office questionnaire

(To be answered by the officer in charge)

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Please support your explanation with relevant data

Interviewer_____date

Respondents name (optional)

1. Which is your concerned land uses in the district?
2. Is there a district physical development plan? Yes/no
3. What are your tools for development control?
4. What role do you play in land planning?
5. What can you say is the pattern of settlement in Lumakanda?
6. What was the pattern 10 years ago?
7. What guidelines do you follow during planning of agricultural land
8. How do you effect them?
9. What has been the agricultural land use policy in the District?
10. How has this changed over time?
11. What factors have influenced this process of change?
12. What are its impacts/threats?
13. How have these factors affected agricultural production and development in the district?
14. How can you measure or determine this process of change and its effects on production and general development in the district?
15. Why does this warrant urgent attention for planning policy?
16. What can you say about the in-migration process in the district?
17. What are the ecological constraints?
18. How are the current land use patterns unsustainable?
19. What was the policy of settlement in the 1960s
20. What was the original
 - a) Land use pattern?
 - b) land ownership
 - c) plot sizes
 - d) Production and productivity per area unit?
 - e) Cropping pattern?

- f) Land carrying capacity at the time of settlement?
- 22 What is the situation now?
 - a) Land use pattern?_
 - b) land ownership__
 - c) plot sizes__
 - d) Production and productivity per area unit?_
 - e) Cropping pattern?_____
 - f) Land carrying capacity at the time of settlement?
- 23 How have these changed? And why?
- 24 What are the implications?
- 25** What are the chances/opportunities for effective policy intervention?.
And with what consequences._____: