

TOWARDS A FRAMEWORK FOR THE UTILISATION OF
FOREST RESOURCES: A STUDY OF NAKURU DISTRICT

BY

GEOFFREY NJOROGE

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DECLARATION

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

Signed:

Njoroge

NJOROGE GEOFFREY (Candidate)

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

Signed:

MR. G. NGUGI (SUPERVISOR)

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Njoroge, Geoffrey.

. ABSTRACT

Forest depletion, is one of the many critical problems facing Kenya today. Its gravity is seen from the emphasis laid on afforestation and reforestation programmes in the country. Forest depletion in Kenya and Nakuru District in particular, is accentuated by the lack of a comprehensive framework to guide the management and utilisation of the resource both in indigenous or plantation forests. The nature and magnitude of the problem is manifested by the large forest areas lost to agriculture, shortage of raw materials, etc. The search for such a tool, therefore assumes the main thrust of this study. However, this study lays its emphasis on management and utilisation of forest reserves managed by the forest department.

The findings of the study reveal that there is no direct relationship between the forest department, the main producer of forests and the consumers; i.e. saw mills and furniture and fixtures industry. This was found to be one of the major contributing factors of inefficiencies at all the three levels i.e. production, processing and marketing of forest products. In an attempt to arrest this situation the study attempts to suggest an integrated model which integrates the production, processing and marketing

of forest products together.

The study is divided into five chapters: Chapter one is devoted to the statement of the problem, study objectives and theoretical framework. Chapter two is a composition of the background information of the district. It covers the physical factors, economic, social factors and existing infrastructure in the district. Chapter three outlines the existing policy and legislation framework covering forest estates in Kenya. An attempt has been made in the same chapter to evaluate the existing forest conditions both at the national and district level. The fourth chapter highlights the salient problems faced by the forest department and forest based industries. Besides, it examines the existing relationship between production, utilisation and marketing of forest products. The last chapter outlines the policy proposals and the proposed model to guide the management and utilisation of forest resources in the district.

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CHAPTER ONE

INTRODUCTION

INTRODUCTION:

Forests are an association of trees in a particular area (Brasnett 1953). Forests play two major functions; protective and productive functions (Muiruri, 1977). Their protective functions include; their role in the regulation of climate, conservation of soils and water and offering habitat to wild animals, while their productive functions include the use of wood as fuel and the supply of timber for both domestic and industrial use. In recognition of the role of forest resources the Kenyan Government has launched a number of policies and programmes aimed at conserving forest resources. As an illustration the Government declared April 15th of every year a National tree planting day. Similarly, the Government supported the United Nations and FAO declaration of 1985 as the 'international Year of Forests'. In January, 1986, the Ministry of Environment and Natural Resources played a significant role in hosting a seminar on forestry in Nairobi in conjunction with the International Union Forestry Research Organization (IUFRO). The theme of the seminar was forest depletion in the African continent. These series of events show a recent awareness of the need to conserve and preserve forests in Kenya. A move aimed at sustaining the level at which the forests could continue to provide incomes by maintaining their productive capacity(Hyman 1982).

STATEMENT OF THE PROBLEM:

In Kenya, only 3% of the total area is under forests, an area often considered as dangerously low (Forest Policy, 1968, FAO 1972, Mwagiru 1983). At the same time, it is estimated that over 90% of the total demand for wood in Kenya will come from less than 2% of the total land area (FAO, 1970). Despite the very small area under forests and the continuously increasing demand for wood products, the resources are not effectively utilized (Standard 1986). For a long time, the sawmillers have continued to fell trees indiscriminately both from indigenous and plantation forests. This is attributed to lack of commitment to proper management of forest resources on the part of the public and private policy makers and limited application of appropriate methods in exploiting the resource.

At the national level, the forest policy clearly stipulates the government objective of meeting the present and future demand for wood in the country. Some of the constraints that hinder the achievement of this goal include : uncontrolled tree-felling, encroachment of agriculture on forest land and lastly, poor management of sawmills. The government has continued to allocate increasing resources towards the development of this sector. However, the royalty accrued does not meet the capital invested on the

development of forests. Hence in the continuing worsening financial situation in Kenya, the Government has drastically reduced its expenditure on forests plantations. This has had severe strains on the management of forests especially in districts like Nakuru, where a majority of forest-based industries are based.

In Nakuru district, over 20% of the total area is under forests (Republic of Kenya, 1984, NEHS 1984). These offer raw materials to forest based industries. The district accounts for over 43% of the total saw mills in Kenya (Ogendo, 1964); presently, the district is threatened by problems related to forest depletion. This is attributed to misuse and over-exploitation of forest resources. Depletion in this sense has assumed the following forms:-

- (a) deliberate excising of forest land for agricultural purposes.
- (b) Wanton destruction of forest by charcoal burners and timber extractors both in the indigenous and plantation estates.
- (c) an acute shortage of timber especially for industrial purposes.
- (d) lastly, the fast encroaching problem of environmental degradation.

These problems are somehow intertwined, all derived from an absence of an integrated land use plan to guide the production, utilisation and management of forest resources. The lack of this tool leads to inefficient utilisation of forest resources in the district. The search for such a tool, therefore, assumes the main thrust of this study. To illustrate the same, Nakuru district was chosen as a case study.

JUSTIFICATION OF THE STUDY

Forests and forest-based industries have been given very little emphasis in all the Kenyan five year development plans. The sector has been isolated institutionally from the broad objectives and process of Kenya's development programmes (Mcgaughey and Gregesen, 1983). Hence its contribution to the national income has remained very low. Presently, forest and forest-based industries contribute only less than 3% of the gross national product. (Development Plan 1979/83).

In Nakuru district, 75% of the total population live in rural areas and rely on agriculture for their livelihood. (Ministry of Finance and Planning 1984). Agriculture is the mainstay of the district. Between 1969 and 1979, the district experienced a high population increase as a result of the resettlement

programmes. The current high rate of sub-division of land is a manifestation of the sudden increase in population (Ministry of Finance and Planning, 1984). More and more land is needed for agriculture. The problem is critical for three main reasons: First, all the 20% of the district's area under forest lies in high agricultural potential zones. Secondly there is increasing pressure on forest land from adjacent arable land. And lastly, the cultural attitude of the people towards forests. With this trend of events, a large section of the people including policy makers see the forested land as the next potential land for crop production. This is manifested by the excision of large forest area in some parts of the district for agricultural purposes. In essence this defeats the purpose of the national policy of conservation, preservation and management of forests in this country.

The forest-based industries are among the oldest industrial establishment in Nakuru district. Their locations are dictated by the availability of raw materials. Most of them are labour intensive. But their employment pattern has stagnated. This is attributed to: First, shortage of raw materials, making a number of saw mills to close down or operate on part-time basis. Second, the unhealthy economic conditions of the saw mills, which in return increase the rate of their unemployment turnover

(Nicholson, 1931, Ogendo, 1964, IDR 1972). Lastly, the industry is mainly export oriented (Ndegwa, 1977), this reduces the rate of employment generation at the second stage of the industry (Furniture and fixtures). All these factors therefore activate the mismanagement and over-exploitation of forest resources in the district. This process led to a Presidential ban on tree-felling and export of timber in 1982 (Nation, 1982). This study is expected to produce a blue-print (plan for the development of forest resources in the district so as to meet anticipated demand for forest-based products.

LITERATURE REVIEW

The literature available on forest management can be divided into two:- scholarly and official. Scholarly literature incorporates mostly research conducted on the subject both in Kenya and at the global level by individuals and private organisations. Official literature incorporates policy documents in Kenya and the world in general. Scholarly literature is focused on the management aspects and on the role of forests in the economies of developing countries.

In essence, forestry deals with the growing and harvesting of trees; i.e. organisation and growing steady supplies of wood or other products

of the forests (Brasnett 1953, Picket 1964, Kigomo 1980). A process aimed at achieving a sustainable yield of forests, this forms one of the basic principles of forest management. Other principles are directed towards the protective functions of forests. But on the whole, the productive function is more important. The exploitation of forest resources in developing countries has to some degree improved the material welfare of the people (Howe, 1952). But different countries have their unique problems. Some have little or no forests at all. In most countries where some forest exists over-exploitation is a common phenomenon. (Picket 1964). Hence, most of the developing countries have responded by planting more exotic species with a hope of meeting the ever-growing demand for wood products.

The forest sector is poorly developed inspite of the high sustantial natural and human resources and and the growing demand for forest products in most developing countries (Howe, 1952). Its low contribution to the national economy is a resultant of the low priority accorded to it (Mcgaughey, 1983). Studies in Latin America (Gregesen 1953; Hyman 1982; Kings 1979) show that the sector has opportunities of alleviating important policy issues i.e. incomes, employment and foreign exchange, apart from the local needs

of water and soil conservation and preservation of the environment. This renders the narrow view of forest resources use invalid. The success of such a strategy elsewhere is based on the following assumptions; that better management techniques will be applied, investments on forests are increased; people will change their outlook towards forests and lastly that there would be a proper development of forest-based industries. One can therefore conclude that, proper management of natural and plantation forests can on the aggregate contribute to the well being of the people (Gregesen, 1983).

The exploitation of forest is not seen in isolation. It is viewed in relation to other land uses (Perse 1968, Tayeed 1972). Most developing countries have commercially viable forest potentials. But their present and future supply of timber depends on the capability of forests to compete with other land uses. The competing land uses include; agriculture, land for grazing and settlements. There exists a clash between man and his environment manifested in the conflict between land uses. (Tayeed 1972), a process which has reduced the protective role of forests in most countries. This is attributed to the high degree of specialisation and sophistication among officers working in the field.

In international circles, the subject of forest management has been a centre of debate for a long time. Much of the discussion is centred on the capability of the sector to alleviate the rate of unemployment and reducing inequalities in income distribution (FAO 1962). Most of the problems facing the sector are related to poor forest roads, harvesting techniques and the poor structure of the timber industry (FAO 1967). The timber industry was viewed in terms of satisfying the demand for wood products both in the domestic and international markets. Proposals put forward were aimed at improving and increasing efficiency of the utilisation processes of all forest products, from both indigenous and plantation forests (FAO 1980). Effective achievement of these proposals demands active participation from the local community. This creates awareness among the people on the need and role of forests in national development (FAO 1982).

In Kenya not much information on forest use and management is available. However, it is worth noting that much emphasis is laid on the production of forests. i.e. silviculture. To a large extent forest management in Kenya (IDRD 1972, Nicholson 1931) is linked with the future utilisation of the resource. The issue is centred around consumption versus the supply pattern of timber in Kenya (Gathu,

1981, Kigomo 1979). These studies suggest that the supply will outstrip the demand by five times between 1970 and 1990, as a result of which a good number of forest-based industries were established to meet this supply of wood (Kamweti, 1981). Eventually, this resulted in extensive forest destruction such that, the present available resources cannot meet the present demand for wood products. (Standard, 1986). All the same it is important to conserve and plan for their utilisation such that they will continue to provide benefits to the present and future generations.

The Kenyan forest sector has experienced problems since the declaration of forest states. (Wanjiku 1977, Nicholson 1931). One of the major problems since then has been that of inefficient utilisation of these resources (Standard 1986). This is attributed to the absence of an integrated land use plan. The conflict between land uses is a resultant of the vagueness of the policy framework (Lusigi 1983, Muiruri 1983, Kamweti 1981). In addition none of these proposals have ever been implemented because of the ineffectiveness of the legal framework. (Kamweti, 1981). In 1957, the primary role of forest estates was stipulated as Department of Forest was formed, it was charged with the responsibility of maintaining a sustained annual yield of timber (Nicholson 1931). Overtime

the productive role of forestry assumed more importance resulting in misuse of forest resources (Muiruri, 1983). Some of the contributing factors include : the present high population growth rate, the lack of understanding of the characteristics, structure and dynamics of forest resources in Kenya, scarcity of arable land and lastly, the outlook of the people towards forests (Lusigi 1983 , Muiruri, 1977). Accordingly, the dimension of land problem has serious implication for the continued stability of the economy- environmental interaction in Kenya vis-a-vis the forest resources (Muiruri, 1983). The problem of forest management is tied with the conflicts between policy objectives developed by different Government Institutions for the utilisation of a land carrying important resources. Hence most scholars tend to argue for (Mwagiru 1983, Lusigi 1983, Gathu 1981, Kamweti 1981, Kigomo, 1979) a comprehensive land use plan, while attempting to handle the enormous variety of ecological, social and environmental problems. It is however noted that though the government is embarking on extensive forest conservation programmes, there is a need for the people to be well informed on the role of forests in national development (Lusigi 1983). The lack of awareness on the dangers of forest depletion makes the people belittle the role of forests.

Since 1968, when the forest policy was revised and subsequently in all development plans, (Republic of

Kenya 1968, Ministry of Finance and Planning, 1970/74 1974/78, 1978/83 and 1983/88) the Government of Kenya has recognised the importance of forest management. Its objectives are clearly set; reservation of land for forestry, purpose, protection of forest estates, conservation and management of forests, promotion of forest-based industries etc. The aim of these principles is to ensure a sustainable and growing supply of timber for the more traditional domestic needs and to satisfy the expanding industrial demand for the forest products. As a result of the prolonged poor performance of the sector, the Government is set to improve the management and utilisation of forests by improving the quality of the products, encouraging small scale saw mills, training of Saw millers etc. (Development Plan 1979/83, 1983/88). But a question remains unanswered; is this being achieved? Presently the Government is engaged in afforestation programmes. All efforts are directed towards rehabilitating former forested areas, both communal and private land (NESS 1983).

In general, most of these studies have clearly identified the problems of forest depletion both at the national and international level. They all agree that depletion of forest resources in many parts of the world is a threat to the well being and often the survival of a large part of the

world's population. The dominant question throughout is how to conserve and where possible renew the forest resources in a sustainable manner. Forest renewal has been a crucial aspect of these studies, mainly directed on income gained from forests with inadequate investments. Some of the policy recommendations put forward include an increase in public awareness and participation in the rehabilitation of more forest areas; an increase in investments in the sector etc. Both the scholarly and official views tends to concur on the need for a comprehensive land use plan, as a means of facilitating efficient utilisation of forest resources. In spite of this view, neither the policy implementors nor the scholars have come up with such plan. It therefore becomes difficult to articulate the policy recommendations advanced by both parties. Besides, most proposals put forward tend to be directed towards production of forests perse, hence leaving behind utilisation and marketing processes. Under such circumstances forest depletion will automatically continue. In any attempt to control forest depletion, all the three processes; production utilisation and marketing should be tailored together. This is presently lacking both at the national and district level. In view of these shortcomings, this study will attempt to formulate a framework which will integrate these processes together. This will act as a guiding principle in management, utilisation and marketing of forest products in Nakuru district. This

may help alleviate the problems of mismanagement in the district as well as at the national level.

OBJECTIVES OF THE STUDY:

Given the limited forest resources in the country and Nakuru district in particular, this study seeks to answer one fundamental question; how can and should forests and forest-based industries contribute more to the development of the district? Therefore the objectives of this study are:

- (a) To establish the nature of problems facing forest resources and forest-based industries in Nakuru district.
- (b) To suggest a strategy or a model to guide the rational use of forest resources in the district.

SCOPE OF THE STUDY:

The study attempts to investigate management of forest resources at three levels: production, utilisation and marketing of forest products. Forest resources will be considered both at the district and national level as a basis for understanding their importance in national development. An attempt will be made to show how the production process, utilisation of timber and marketing of forest

products can be integrated together. An attempt will also be made to highlight the major conflicts between forests and other land uses. This study covers forest resources and forest-based industries in Nakuru district.

X RESEARCH METHODS

To achieve the objectives set forth, the following methods of data collection for both primary and secondary data were employed: library work and field survey. Library work involved scanning of existing relevant literature on forests and forest-based industries in the world, Kenya and Nakuru in particular. The field survey included: personal observation, interviews and administration of an industrial questionnaire.

First, a visit was made to Nakuru District forest headquarters. Annual reports of all stations in the District were scanned. This was necessary in order to prepare an inventory of existing forest resources showing their volume, age, acreage and species of trees grown in each station. Besides, this helped to establish the level of employment and royalty obtained each year per station.

To establish the problems faced in production of forests, Molo Division was chosen as the main area

of study. Its selection was based on the following assumptions:

- (a) It was difficult to visit all stations in the District within the limited time of study.
- (b) that over 90% of the total area under forests in the district fall in this division.
- (c) that all production and utilisation processes are the same in the district.

Thereafter three stations were visited. These are Kiptunga, Saino and Mariosioni forest stations. Interviews were held with foresters and forest Assistants. This was necessary to identify problems faced in the forest stations. DRS/25

Besides personal observations on forest areas in the District, visits were made to all towns in the district to establish the number of saw mills and furniture and fixtures workshops. These were identified and their location noted accordingly. This was necessary for preparing an inventory of the existing forest based industries in the district.

An industrial questionnaire was administered in order to come up with an up-to-date data on utilisation of forest resources in the region. In selecting the number of saw mills and furniture and fixtures workshops to be covered by the interviews

the following were taken into consideration. The District had 44 saw mills and 102 furniture and fixture workshops. These were distributed in a number of towns; Njoro, Molo, Elburgon, Mau Summit, Bahati, Mau Narok, Rongai, Molo South, Nakuru, Gilgil and Naivasha. It was decided to cover only those activities in the high potential zone where forests are mainly found. To ensure a fair representation, simple random sampling was applied to draw a sample of 22 saw mills and 30 furniture and fixtures workshops. This represents sample sizes of 50% and 30% for saw mills and furniture workshops respectively.

Personal interviews were held with relevant officers: These include District Forest Officers, District Trade Officer, District Officer, Molo, County Council officials and shopkeepers in the major towns.

The field survey revealed that there exists no proper channel of utilisation of forest resources. To illustrate proper management of forests, this study has attempted to formulate an integrated model. This articulates all parties with interest in forest resources in the district. It shows how the production, utilisation and marketing of forest product will proceed under a single organisation. In analysis of data collected, descriptive statistics,

tables, and percentages have been used, while maps and diagrams have been used to show the visual expression of the aspects under study.

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CHAPTER TWO

BACKGROUND INFORMATION

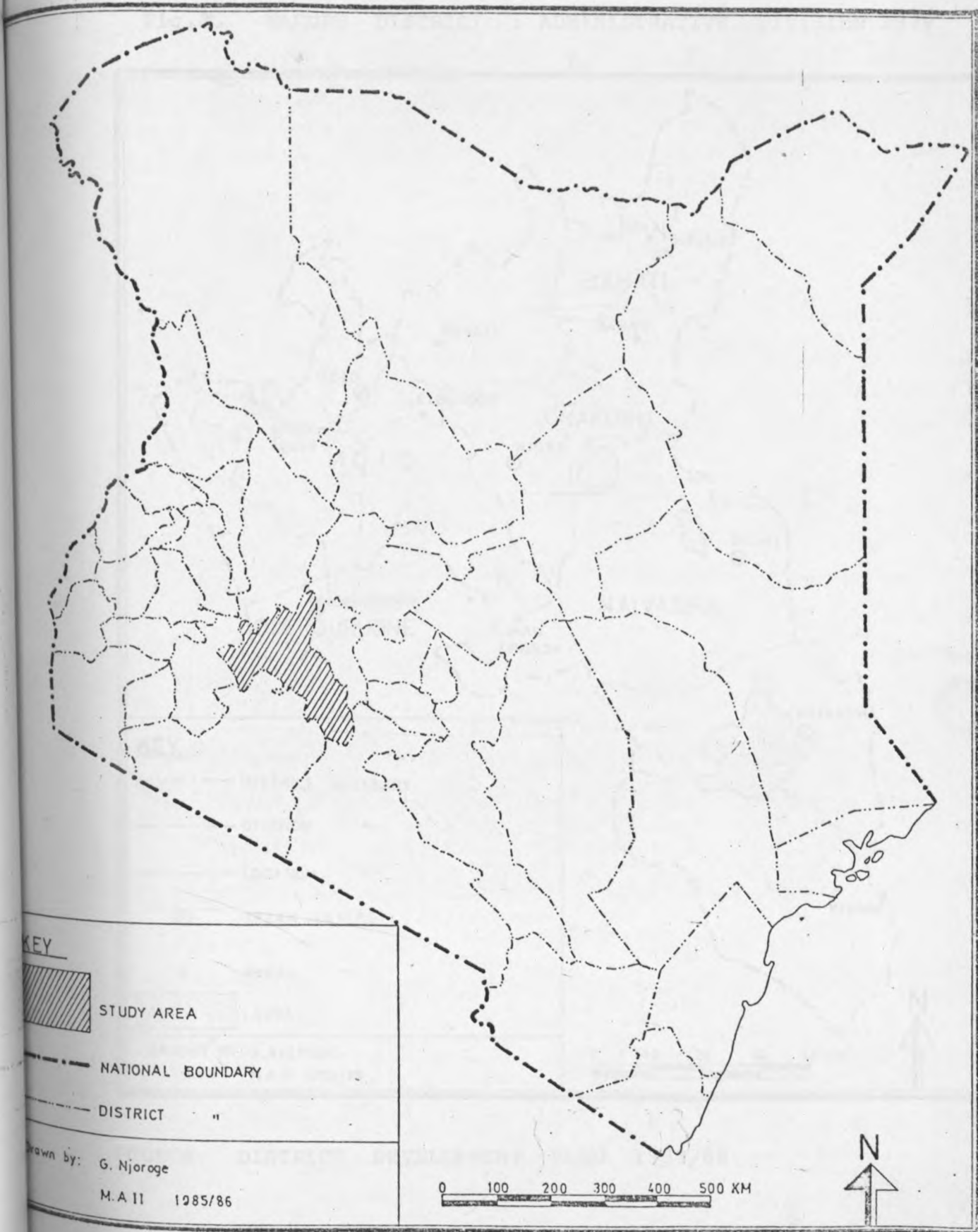
LOCATION AND EXTENT

Nakuru District lies between latitude $0^{\circ} 13'$ North and $1^{\circ} 10'$ south of the equator and longitude $33^{\circ} 27'$ and $36^{\circ} 8'$ east. It is situated 156 km. to the North west of Nairobi in Rift valley province. It covers an area of 7291 km.². The District is bounded by Kericho to the west, Baringo and Laikipia to the North, Narok to the South east, Kiambu and Kajiado to the south (Map No. 1). Administratively, it is divided into seven divisions, Molo, Olenguruone, Njoro, Rongai, Gilgil, Naivasha, Bahati and Nakuru Municipality. Njoro and Rongai were created in 1982, (Map.2).

TERRAIN

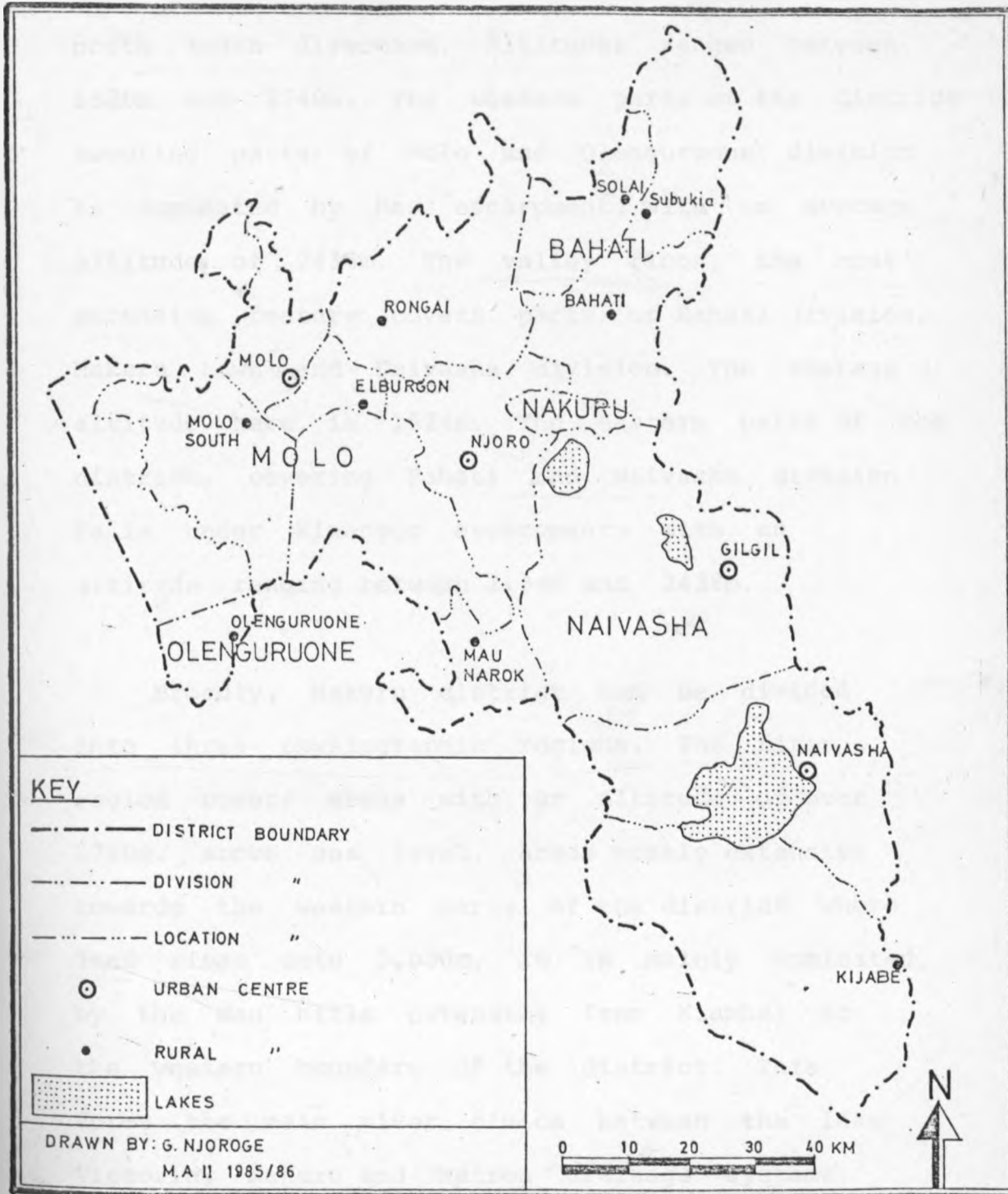
Most of Nakuru district lies within the great Rift Valley. The topography, a resultant of tectonic processes, exhibits a lot of variations. It is mainly dominated by the presence of extinct and dormant volcanoes. The most important are Longonot (9110 ft) Eburru (8879 ft) and Menengai (7478 ft). The faulting process is associated with the formation of the Aberdares, Mau escarpment and the series of lakes Nakuru, Naivasha and Elementaita. Generally, the

Fig.1 LOCATION OF NAKURU DISTRICT



Source: DISTRICT DEVELOPMENT PLAN 1983/88

Fig.2 NAKURU DISTRICT : ADMINISTRATIVE DIVISION 1979



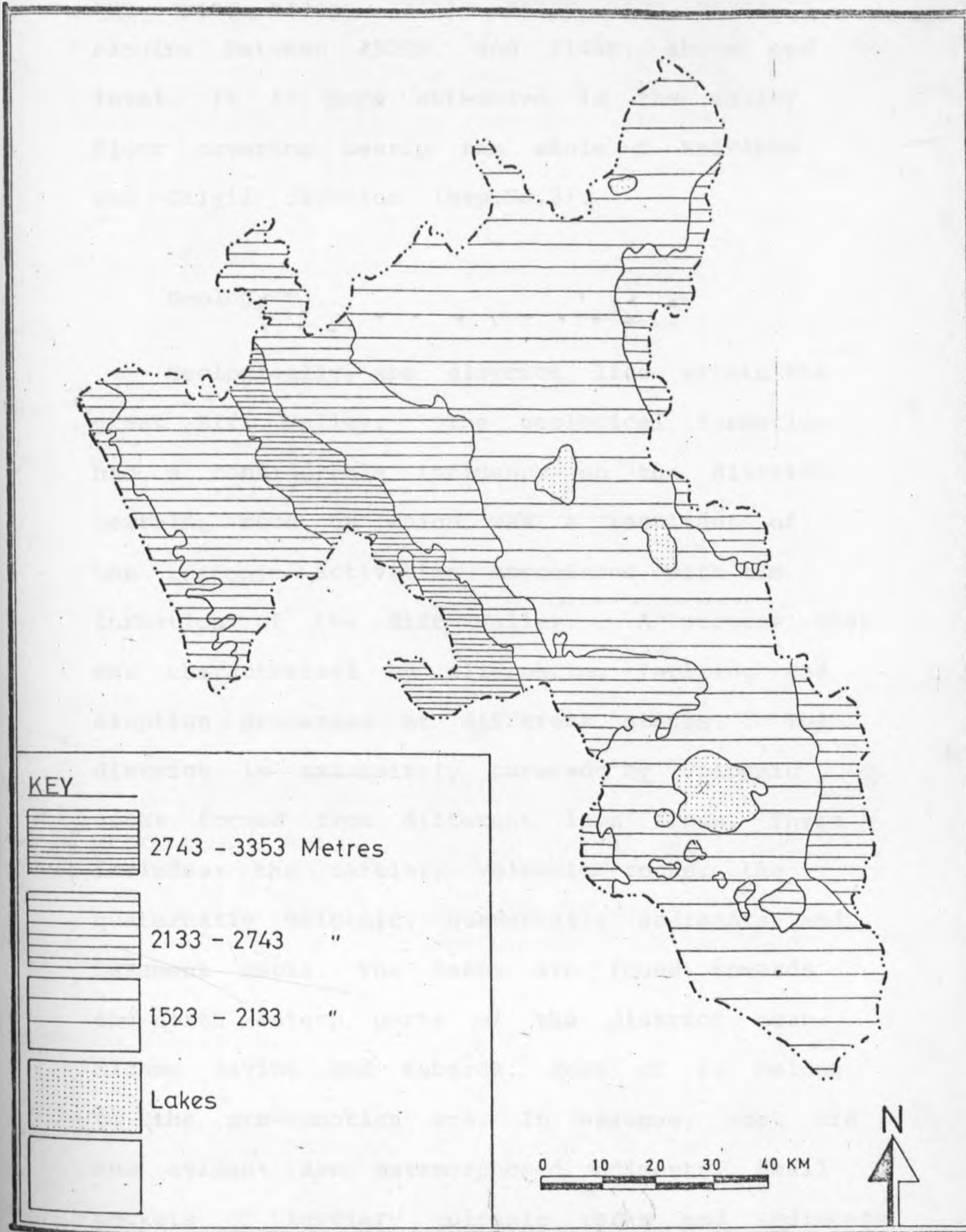
SOURCE: DISTRICT DEVELOPMENT PLAN 1983/88

district is characterised by a rolling topography, with parallel ridges and troughs running in a north south direction. Altitudes ranges between 1520m and 2740m. The western parts of the district covering parts of Molo and Olenguruone division is dominated by Mau escarpment, with an average altitude of 2438m. The valley floor, the most extensive feature covers parts of Bahati division, Nakuru town and Naivasha division. The average altitude here is 1524m. The eastern parts of the district, covering Bahati and Naivasha division falls under Kinangop escarpment, with an altitude ranging between 2134m and 2438m.

4:

Broadly, Nakuru district can be divided into three physiographic regions. The first region covers areas with an altitude of over 2740m. above sea level. Areas mostly extensive towards the western parts of the district where land rises upto 3,000m. It is mainly dominated by the Mau hills extending from Kiambai to the western boundary of the district. This forms the main river divide between the lake Victoria, Nakuru and Natron drainage systems. The second region includes areas with altitudes ranging between 2140m and 2740m. above sea level. It extensively covers the slopes of Mau hills, western parts of Kinangop, Bahati plateau and the highly dissected Kikuyu escarpment. Lastly,

Fig. 3 NAKURU DISTRICT : PHYSIOGRAPHIC REGIONS



SOURCE: NATIONAL HUMAN SETTLEMENT SECRETARIAT
NAKURU DISTRICT ENVIRONMENT ASSESSMENT REPORT 1982.

the third region covers areas with altitude ranging between 1520m. and 2140m. above sea level. It is more extensive in the valley floor covering nearly the whole of Naivasha and Gilgil division (Map.No.3).

Geology

Geologically, the district lies within the great Rift Valley. The geological formation had a considerable influence on the district terrain, much of which was a resultant of the tectonic activities associated with the formation of the Rift Valley. A process that was characterised by alternating faulting and eruption processes at different stages. The district is extensively covered by volcanic rocks formed from different lava flows. These includes: the tertiary volcanic rocks, the quaternally volcanic, quaternally sediments and basement rocks. The later are found towards the north western parts of the district near Eldama Ravine and Kabarak. Most of it belong to the pre-cambrian era. In essence, what are now evident are metamorphosed sediments. Small pockets of tertiary volcanic rocks and sediments are also found in the same area.

SOILS

Nakuru district has a complex soil type distribution. There is a direct relationship between the varied relief, climate and the process of soil formation in the district. The soils are formed from the weathered volcanic and basement systems. However, one tends to get different soil types at a more localised level. The soils in the district can be divided into seven broad categories. These include:

Andosols, cambisols, phaezems, lithosols, regosols, and several unclassified soils. Generally, the soils are quite fertile and well drained. However, their productivity is greatly influenced by climatic conditions and human practices on land. One of the major problems facing the district today is soil erosion. It is mostly attributed with steep slopes, high rainfall and intensive agricultural practices. This has reduced the productivity of most agricultural land. The district environmental assessment report identifies the following as the major causes of soil erosion:

- (a) poor agricultural practices
- (b) extensive destruction of natural resources to give room for agriculture and grazing
- (c) poor maintenance of existing methods of soil conservation
- (d) overgrazing in range areas
- (e) road construction.

CLIMATE

The district's climate is to a large extent influenced by altitude. The varied terrain consisting of escarpments, lakes and volcanic mountains do exert considerable variations in the climatic conditions of the district. Temperatures decrease, as one moves towards the western parts of the district or towards Mau escarpment, where the mean maximum temperature ranges between 14°C and 18°C while the mean minimum temperature ranges between 6°C and 10°C . Most of the escarpment is moderately cool, with daily temperatures approaching the freezing point, during the cold seasons in some parts. The valley floor is quite hot with the mean maximum temperatures ranging between 26°C and 30°C and mean minimum temperatures ranging between 10°C and 14°C .

The district shows the same pattern of rainfall as most parts of the country. Much of the rainfall comes during the long and short rain periods. To the south of Nakuru town, much of the rainfall comes between the months of March and May with a peak in April and during the short rains between October and December with a peak in November. To the north and eastern of Nakuru town, most of the rainfall occurs between March and September with a maxima in May and August. Areas around Nakuru town have May as the wettest month and January as the driest. The

rainfall distribution exhibits a lot of variations. The escarpments, for example receives 1270 mm x per annum. The valley floor, on the other hand receives only 510mm. In essence it lies in a rain shadow zone with plateaus on either side.

The district can be divided into three broad climatic regions. Region one encompasses areas with a rainfall of over 1015mm per annum. These are areas with a sub-humid equatorial climate and a moisture index of less than 10. It covers a broad zone extending from Molo, Mau Narok to the lower parts of Subukia. The second region is more extensive, covering parts of Bahati, Subukia, Njoro, and Rongai. It has a dry sub-humid to a semi-arid climate. The rainfall in this region ranges between 760mm and 1015mm, with a moisture index ranging between 10 and 30. The third region covers most of the valley floor extending from Longonot through Naivasha, Gilgil, Lanet to the northern parts of Rongai and Solai. It has a semi-arid climate with rainfall below 760 mm. It has a high moisture index ranging between 30 and 42.

DRAINAGE

Generally, the district lacks surface drainage. This is attributed to the geological structure and rainfall distribution in the district. The district

has an internal drainage system. Most rivers originate from the escarpments and flow into the few lakes in the district. The most important lakes include: lake Naivasha, the only fresh water lake, lake Nakuru and Elementaita. Most of the streams are seasonal, which dry up during the dry season. The only permanent rivers are Gilgil and Malewa. These two drain the eastern parts of the district. The Enjoro and Molo rivers drain the western parts of the district. (Map No.4). Besides the district has a number of hot springs mainly near Solai.

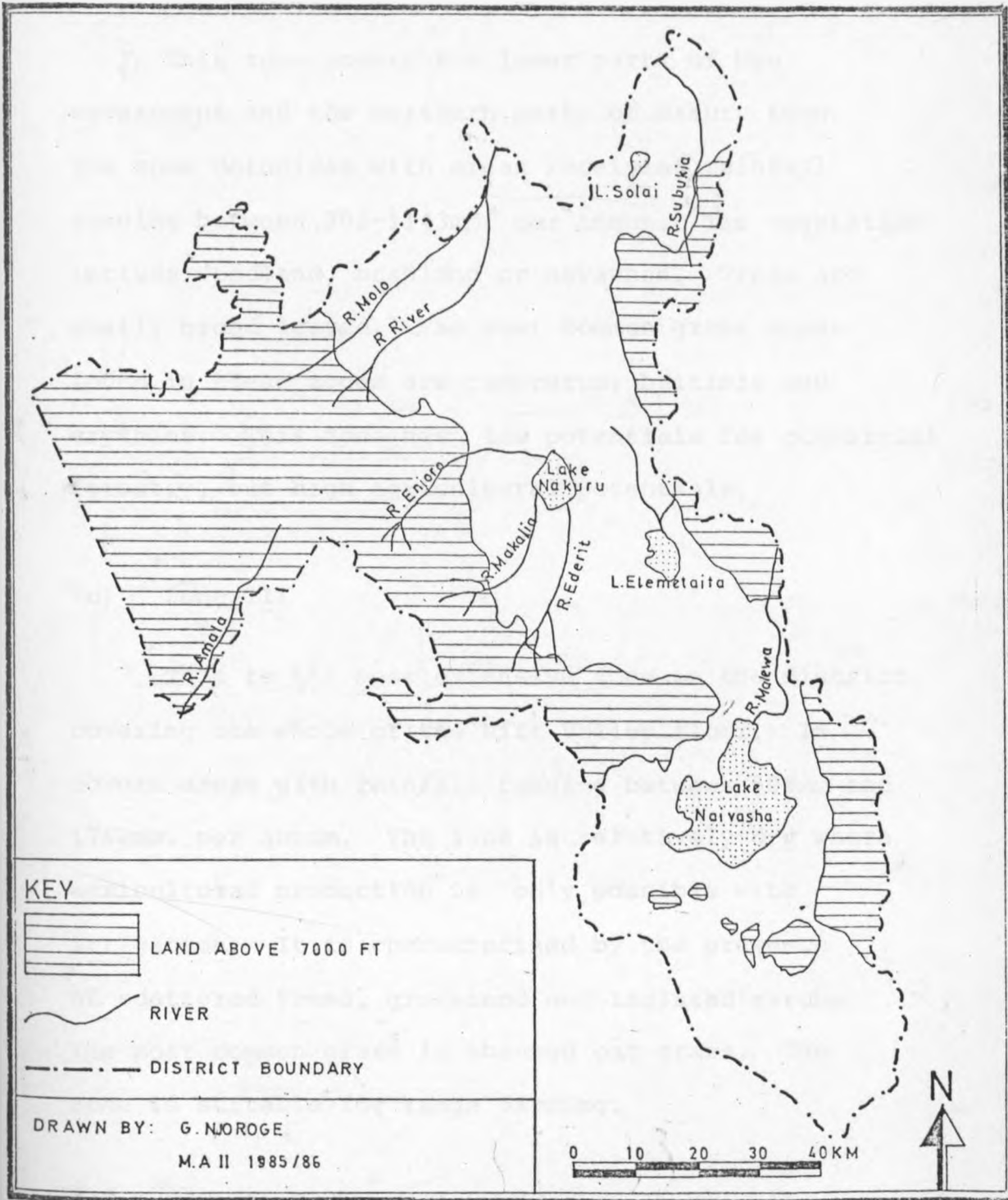
ECOLOGICAL POTENTIALS:

The district can be divided into three ecological zones. These are:-

(a) Zone I

This covers the western district along the Mau escarpment, the Kericho plateau and some parts of the Kinangop escarpment. These are areas with altitude ranging between 1072-2745mm above sea level and a rainfall of more than 1270mm per annum. The main vegetation in this zone comprises of forests grasslands and bushland. Most of the common tree found in this zone include podo, cedar and camphor. This zone has potential for commercial forestry. It is also suitable for intensive agriculture. Crops grown here include pyrethrum, coffee and tea at a high

Fig.4: NAKURU DISTRICT : DRAINAGE



SOURCE: MINISTRY OF FINANCE AND PLANNING
NAKURU DISTRICT DEVELOPMENT PLAN 1983/88

altitude. The zone is also suitable for dairy farming.

(b) Zone II

This zone covers the lower parts of Mau escarpment and the northern parts of Nakuru town. The zone coincides with areas receiving rainfall ranging between 702-1143mm. per annum. The vegetation include woodland, bushland or savannah. Trees are mostly broad leaved. The most common grass types found in these zones are cambretum, baitinia and erythina. This zone has low potentials for commercial forestry, but high agricultural potentials.

(c) Zone III

This is the most extensive zone in the district covering the whole of the Rift Valley floor. It covers areas with rainfall ranging between 508mm and 1762mm. per annum. The land is relatively dry where agricultural production is only possible with irrigation. It is characterised by the presence of scattered trees, grassland and isolated shrubs. The most common grass is the red oat grass. The zone is suitable for range farming.

ECONOMIC FACTORS:

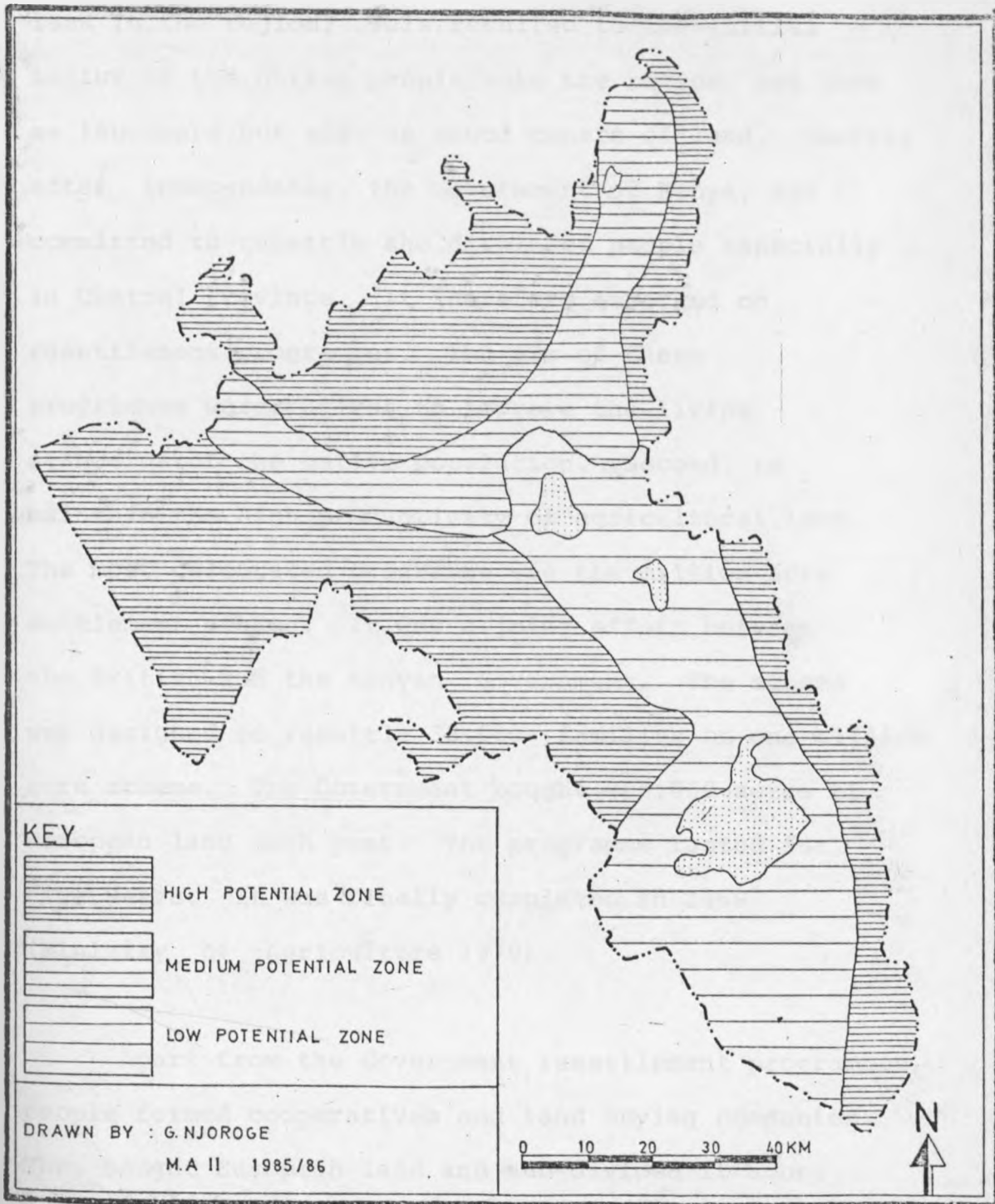
This section outlines the main economic activities in the district. This include: agriculture, industries, and tourism.

AGRICULTURE:

Like most districts in the Rift Valley, agriculture is mainstay of the district. The absence of minerals and other resources except forests (Ndegwa, 1977) has increased the dependability of the whole population on agriculture. Therefore the rich agricultural land has been recognised as the most important resource in the district. Over 40% of the district area falls under high potential, 5% as medium and 32.9% as low potential (Ministry of Agriculture, 1984). This demonstrates the suitability of agriculture in the district (Map No.5). Besides over 75% of the district population live in the rural areas and majority of them depend upon agriculture for their livelihood. Agriculture also accounts for over 50% of the wage employment in the district (Ministry of Agriculture, 1984).

The history of the development of agriculture in the district goes back to the beginning of this century. A period when the first Europeans settled in the rift valley. Subsequently, the district, a part of the commonly known as the white highlands was reserved for the white settlers. This caused shortage of land among the native population. Among the crops grown in the district by then included wheat maize and dairy farming. In 1960, the order of Council ended the reservation of the highland for the Europeans

Fig. 5: NAKURU DISTRICT : LAND USE POTENTIALS



SOURCE: MINISTRY OF FINANCE AND PLANNING
NAKURU DISTRICT DEVELOPMENT PLAN 1983/88

(Ndegwa, 1977). Africans were now allowed to own land in the region. This resulted to the initial influx of the native people into the region, not just as labourers but also as proud owners of land. Shortly after independence, the Government of Kenya, was committed to resettle the displaced people especially in Central Province. It therefore embarked on resettlement programmes. The aim of these programmes were: first to improve the living standards of the native population. Second, to maintain the high productivity of agricultural land. The most celebrated programme was the million acre settlement scheme. It was a joint effort between the British and the Kenyan Government. The scheme was designed to resettle 33,000 families on one million acre scheme. The Government bought 200,000 acres of European land each year. The programme lasted for five years. It was finally completed in 1969 (Ministry of Agriculture 1970).

Apart from the Government resettlement programmes, people formed cooperatives and land buying companies. They bought European land and sub-divided it among themselves. This formed the initial attempts of introducing small scale farming in the district. A district, previously dominated by large scale farming. This resulted into a complex pattern of

ownership and land tenure conditions (H.R.D.U,1985). The process of sub-division of large scale farms is likely to continue especially after the Presidential decree to sub-divide all land owned by cooperatives and land buying companies. This has had severe effects such as: First, there was a decline in the sheep industry in the district. Secondly, a lot of forest land was cleared to give room to settlement schemes. A case in mind, is the eastern parts of Olenguruone division. Third, there was an increase in water consumption. Lastly, an increase pressure on existing infrastructures.

Presently, it is estimated that over 41% of the agricultural land is under small scale farming (Ministry of Agriculture and Livestock Development, 1984). The average land holding stands at 1-5 hectares. Not all the district can sustain agriculture. For example, the eastern parts of the district agriculture is carried on marginal scale. Here the rainfall is very unreliable. Most farming is done in the medium and high potential zones, towards the western and northern parts of Nakuru town. Most crops grown here include wheat, pyrethrum, coffee and tea as commercial crops (Map. 6).

In total the agricultural potential land is estimated at 54,800 hectare. Only 52,800 hectare has been utilised so far (Ministry of Finance and

Planning, 1978) . . Food crops are the most important food crops grown. In 1979, for example over 80% of the total agricultural land was under maize crop (Ministry of Agriculture) . Other food crops include; beans, sorghum and potatoes. Besides horticultural crops such as vegetables, fruits are also grown. Sheep rearing and dairy farming are important activities around Molo-Njoro area. Ranching is practiced in the range land near Lanet extending eastwards towards Naivasha. This is an area dominated by large scale farming.

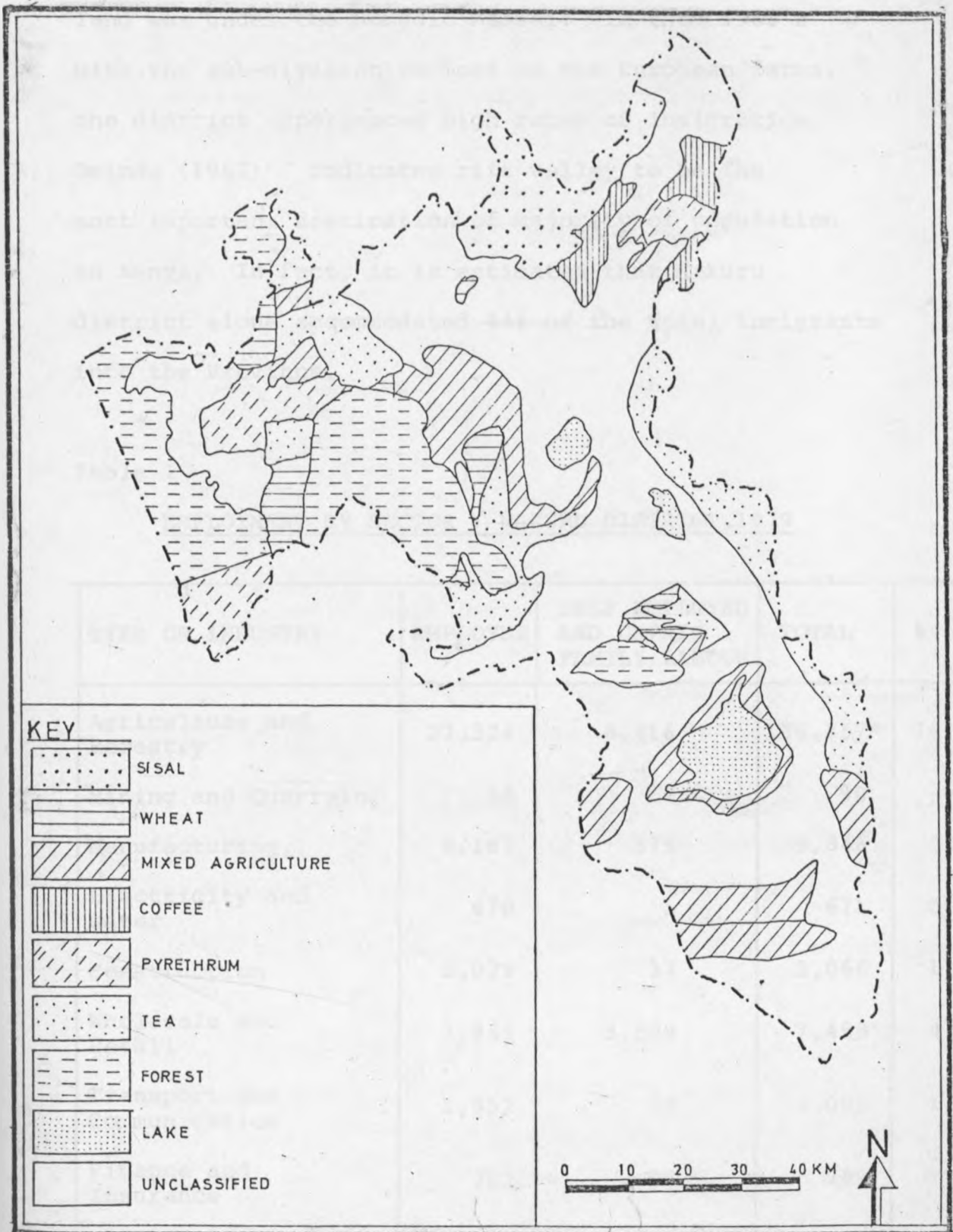
WAGE EMPLOYMENT

Most industries in the district are mainly agro-based. Majority of them are processing plants, i.e. Pyrethrum Board of Kenya, Kabagi Cannery, D.C.K. Sulmac, Panafric Vegetable etc. Due to shortage of raw materials, most of them operate under capacity. They offer limited employment opportunities to the population in the district. Hence agriculture remains the main source of employment in the district. In 1979, 76.5% of the total employed workers were in the agricultural sector, while only 5.5% were in manufacturing. 4.2% were employed in wholesale and retailing (Table I).

POPULATION

Before the influx of the Europeans into the district, it was sparsely populated. Most of the

Fig. 6 : NAKURU DISTRICT: AGRICULTURAL LAND USES



SOURCE: NATIONAL HUMAN ENVIRONMENT SECRETARIAT
NAKURU DISTRICT ENVIRONMENT ASSESSMENT REPORT, 1982

land was under the nomadic Maasai. In the 1960's with the sub-division of most of the European farms, the district experienced high rates of immigration. Ominde (1962) indicates rift valley to be the most important destination of majority of population in Kenya. In fact, it is estimated that Nakuru district alone accommodated 44% of the total immigrants into the Province.

Table I

EMPLOYMENT BY SECTOR : NAKURU DISTRICT, 1979

TYPE OF INDUSTRY	EMPLOYEE	SELF EMPLOYED AND UNPAID FAMILY LABOUR	TOTAL	%
Agriculture and Forestry	27,324	6,416	136,357*	76.5
Mining and Quarrying	88	2	90	--
Manufacturing	9,167	679	9,846	5.5
Electricity and water	670	1	671	0.4
Construction	2,029	37	2,066	1.2
Wholesale and Retail	3,949	3,509	7,458	4.2
Transport and Communication	1,952	50	2,005	1.1
Finance and Insurance	762	27	789	0.5
Business Services	18,431	553	18,984	10.6
Total	64,375	11,274	178,260	100

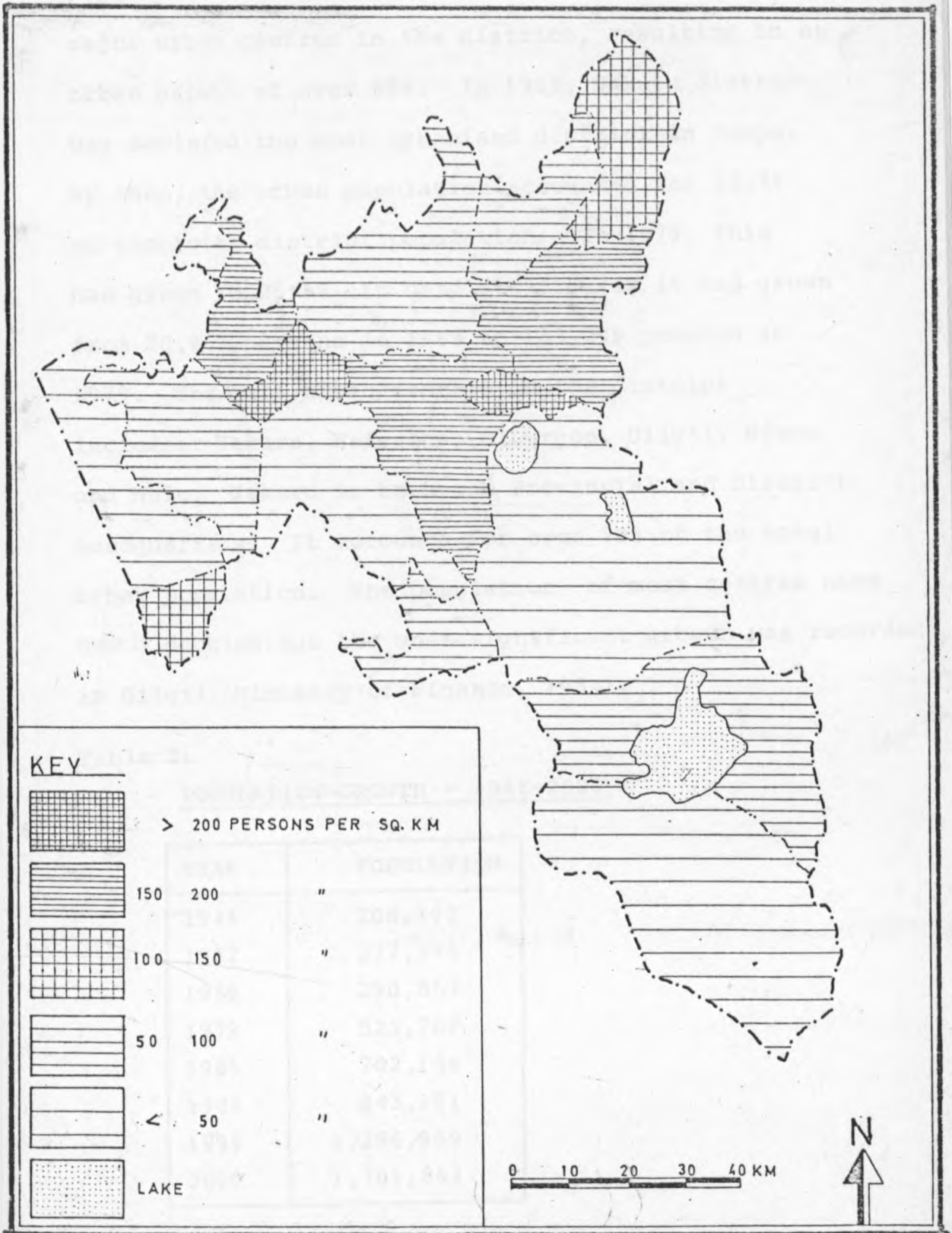
Source: H.R.D.U. 1985 : Rural Housing Condition in Nakuru District.

* This includes 102,611 workers not recorded in C.B.S. Survey.

Most of the population increase came between 1960 and 1979. In 1969, for example, the district had a population of 290,853 persons, which increased to 522,709 persons in 1979 census. This registered a growth of over 80% in a period of ten years. The growth rate in the same period was slightly more than 6%. If the population continues to grow at the same rate, it is likely to double by the year 1995 and triple by the year 2000 (Table 2). The distribution of population coincides with the good agricultural land. The western parts of the district accounts for high population densities. For example, Elburgon alone has a density of 302 persons per km.², while Njoro had a density of 192 persons per km.². (Map No.7). This may have serious implications on forest resources in the district in the near future. In 1979, over 60% of the total populations belonged to the Kikuyu ethnic group. The second largest group, the Kalenjin accounted for only 15.6% of the total population. The age-sex distribution shows that 49.3% of the population is under 15 years. The dependency ratio is about 53.2%. Besides over 60% of the population is below 20 years. The population is male dominated with a sex ratio of 105.8 (C.B.S. 1979).

In 1979, over 50% of the district population were immigrants. Between 1969 and 1979 over 100,000 persons entered and settled in the district. Of these central province accounted for the largest

Fig. 7: NAKURU DISTRICT : POPULATION DENSITY, 1979.



SOURCE: NATIONAL ENVIRONMENT AND HUMAN SECRETARIAT,
DISTRICT ENVIRONMENT ASSESSMENT REPORT, 1982.

population. Most immigration has been towards major urban centres in the district, resulting in an urban growth of over 88%. In 1969, Nakuru district was declared the most urbanised district in Kenya. By then, the urban population accounted for 24.4% of the total district population. In 1979, this had grown to 25.5%. In absolute figures, it had grown from 70,869 persons in 1969 to 133,299 persons in 1979. The main urban centres in the district includes: Nakuru, Naivasha, Elburgon, Gilgil, Njoro and Molo. Nakuru is both the Provincial and District headquarters. It accounts for over 70% of the total urban population. The population of most centres have nearly doubled but the most significant growth was recorded in Gilgil (Ministry of Finance, 1984).

Table 2:

POPULATION GROWTH - 1948-2000

YEAR	POPULATION
1948	208,192
1962	237,395
1969	290,853
1979	522,709
1985	702,146
1990	943,181
1995	1,266,909
2000	1,701,884

INFRASTRUCTURE

Most of the urban centres have water supplies. Unlike their counterparts in the urban areas, majority of the rural population in the district do not have potable drinking water. The most important sources of water for the rural population are boreholes, rivers and roof catchments. There are 25 rural and urban water supplies in the district. The most hit division is Naivasha. It's only Nakuru town that has a sewerage system. In other towns septic tanks are used.

The district has 5 Government hospital, 30 dispensaries, 12 health units, 2 maternity homes and one nursing home. Most of the health facilities are congested. A case in mind is Molo hospital.

Table 3:

DISTRIBUTION OF HEALTH FACILITIES BY
DIVISION 1979

DIVISION	HOSPITAL	DISPENSARIES	H.UNITS	MATERNITY HOMES
Nakuru	2	5	1	1
Molo	1	13	3	-
Bahati	-	6	6	-
Naivasha	2	6	1	1
Olunguruone	-	-	1	-
Total	5	30	12	2

Source: District Environment Assessment Report, 1984.

As per 1981, the district had a total of 255 primary schools and 41 secondary schools. The total enrolment in primary schools was 133,000 pupils with 3,500 teachers. The district has fleet of technical institutions , colleges and youth polytechnics. The two important colleges are Egerton College and Rift Valley Institute of Technology near Nakuru Town.

The district is well served with intensive network of roads. The main international truck road from Nairobi to Eldoret (A 104) runs for about 163.5 km. through the district. It has over 439.4 km. of tarmarced roads, 808 km. of murram gravel roads and 141.6 of earth roads. However most of these roads are impassable during the rainy season. Besides the district is traversed by the main railway line to Kampala and a minor one to Kisumu.

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CHAPTER THREE
POLICY FRAMEWORK AND EXISTING FOREST RESOURCES

INTRODUCTION:

This chapter attempts to outline the existing policy and legislation framework in Kenya. It also evaluates the existing forest resources condition both at the national and district level. The primary aim of the policy analysis is to lay down the basic principles underlying the development and control of forestry in Kenya, for the greatest common good for all (Forest policy, 1968). These laws and policies governing the relationship of man and forest resources are to a large extent influenced by the needs and aspirations of the common man. A proper understanding of this relationship tends to minimise conflicts arising between the high demand for wood products and other basic needs of the population. In so doing, the basic principle of management of forests is safeguarded, such that they can be handed over to the subsequent generations at least undiminished in value if not improved. In this respect, we view the policy framework and the existing legislation in this country, as tools of ensuring proper management of our forest.

EXISTING POLICY AND LEGISLATION

It is claimed that the forest Department was one of the earliest departments to be established in Kenya (Muiruri 1977, Nicholson 1931, Kamweti 1979). Besides, the policy and legislations governing the exploitation and conservation of forest estates were set very early. The first forest rules were set in 1902. A time marked by: one, the establishment of forest department and two, the first forest reserves were demarcated. Nine years later, the forest ordinance of 1911 was enacted. This was but a model of the Indian forest Act, Cap.7, 1878. After independence this came to be known as the forest Act, Cap 385. Unfortunately these laws were being applied without a proper policy guideline.

Kenya, did not have a proper forest policy till 1957. Prior to this, forest management was guided by; first, recommendations made by expatriates in the country and two on borrowed experiences of forest management from other countries of the world. The idea of a forest policy was first conceived during the 6th Commonwealth Conference in Ottawa, Canada in 1952. One of the many resolutions passed by

the conference under the Chairmanship of the then Chief Conservator of forests in Kenya, Mr. Waterer, was that each country should formulate and adopt a forest policy. Five years later, the Kenyan Government implemented the resolution. Hence, the birth of the first Kenyan forest policy often referred to as the white paper No.85 of 1957. After independence, forests were recognised as important national assets, in terms of their protective aspects of conservation of climate, water and soil; as a source of supply of forest produce of all uses by the inhabitants of this country; as a revenue earner of high potential. Besides, there was a need to incorporate the aspirations of the people. This awareness led to the revision of the white paper No.85 of 1957 in 1968. This was the birth of a forest policy in independent Kenya. It is still operational upto today.

Some of the fundamental principles outlined in the policy aimed at achieving the following:

- (a) Maintain and improve the climate and physical conditions of the country.
- (b) Conserve and regulate water supplies by protection of catchment and by any other means necessary for the purpose including

impounding of water in forest areas.

- (c) Conserve the soil by prevention of desiccation and soil movements carried by water and wind.
- (d) To provide for the needs of the country in timber and other forest products adequate to meet the requirements of the community under a fully developed national economy and to provide the greatest possible surplus of those products for export.
- (e) protect the forest estates by all means at the Government's disposal.
- (f) Manage these forests estates on the principle of sustained yield in accordance with approved plans so as to obtain the best returns on the capital value and on the expenses of management in so far as this is consistent with the primary aims of forest reservation set out above; and to make and maintain an inventory of forest resources.
- (g) Foster the conception of a mutually interdependent forests industry and integrate to the best advantage of Kenya, the production, harvesting and utilization of forest produce by ensuring close co-ordination between all interests

concerned in these aspects of the industry and whenever opportunities occur to encourage industrial processes consuming forest products.

These are the major principles covered by the policy. Other principles includes: provisions of adequate funds, employment, advice to county council and private forest owners, public amenities, research and education facilities.

In a nutshell this is what the forest policy has been since 1968. Though the policy is generally clear, the role of forestry in national development has been neglected. Initially the Government made very little efforts in educating the people on the need to conserve forests in this country. Therefore most of the scanty forests have now been destroyed. This is due to the high population growth, high demand for timber and charcoal, the laxity of the administration and forest department etc. Nevertheless, presently, this is viewed as one of the most critical problem facing the country. The continued celebration of the national tree planting week inaugurated in 1964, by the late President Jomo Kenyatta, the incorporation of afforestation and reforestation programmes in the national development plans, the formation of the Presidential

Commission of tree and soil conservation and lastly the active participation of both politicians and people from all walks of life in tree planting show the recent awareness of this problem. However, it is not too clear, what effects all these efforts will have on the exploitation of forest resources by the saw mills. Most of the efforts are directed towards controlling soil erosion. The demand for timber will still remain high. This aspect through addressed in the policy assumes only a secondary role. But today, it is one of the most critical problems in this country.

EXISTING FOREST RESOURCES

In Kenya, only 3% of the total land comprising of 3.3m hectares is under forests, (Map.8). This figure is quite low compared with other countries (Table No.4). Out of this 1.7m ha. is under indigenous forests, while 1.6m. ha. is made forests. Of the total forest area 44% is managed by Forest Department. Other forest areas are managed by the County Councils. Private forest owners accounts for 134,000 ha of forest area. Most of the forests estates under county Council have not been handed over to the forest department.(Table No.5).

The total area under plantations forests is only 156,592.37 ha. The plantations consists of

exotic softwoods such as *pinus radiata*, *pinus patula*, and *cypress lusitanica*. Kenya is one of the few African countries growing exotic trees.

TABLE No .4

PERCENTAGE OF FOREST LAND TO TOTAL LAND
IN SOME SELECTED COUNTRIES

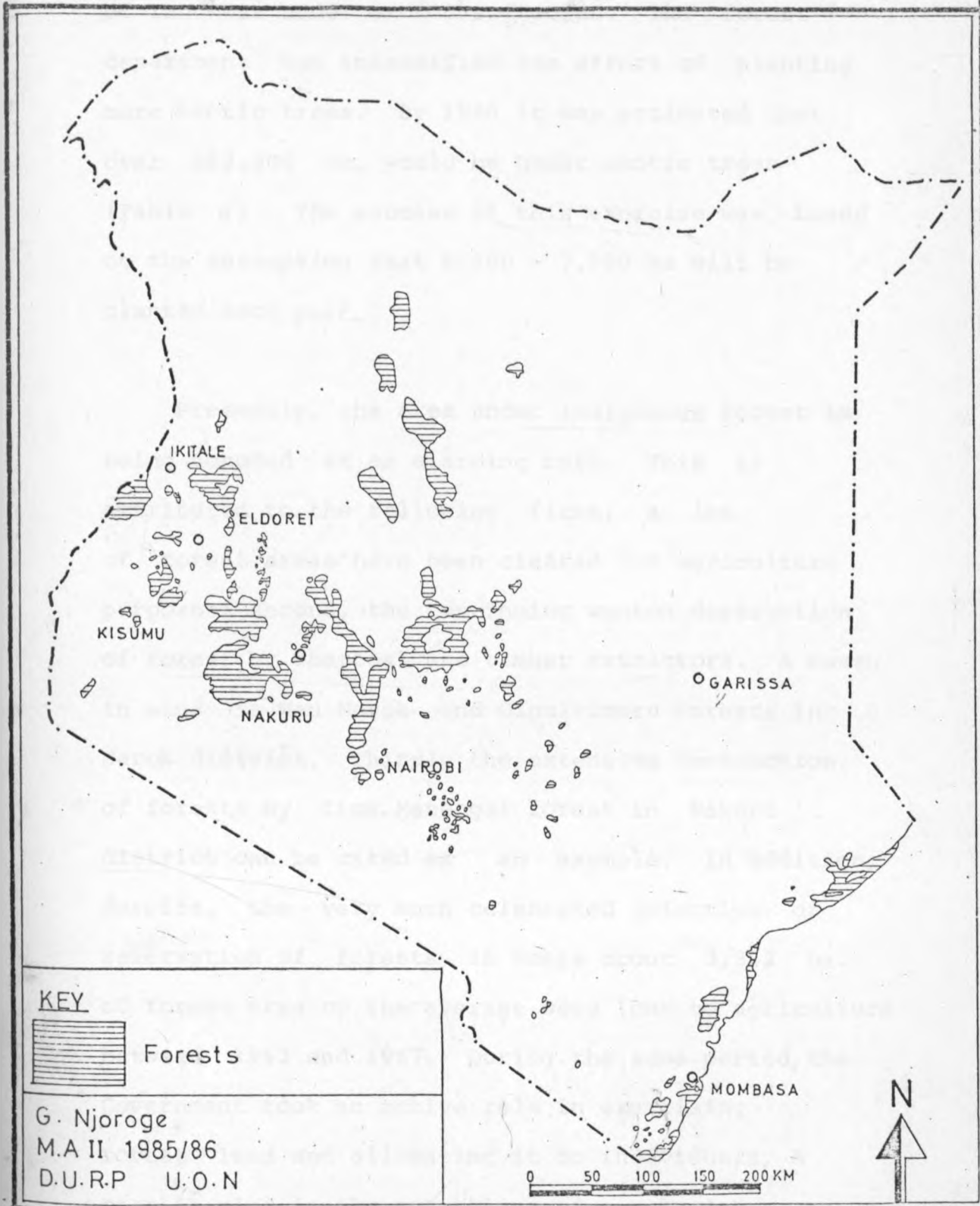
Country	Percentage
Angola	34.6
Cameroon	63.1
Finland	69.0
Gabon	74.7
Ghana	9.3
Ivory Coast	37.2
Kenya	2.7*
Liberia	43.7
Spain	30.6
Sweden	55.6
Tanzania	13.9
West Germany	29.0

Source: Kamweti 1979. The law and Forest Management.

For the last 50 years the progress has been satisfactory, infact Kenya remains the largest producer of soft woods in Africa. In 1977, for example over 90% of the forest produce came from only 6.2% of the total forested area; area mainly under exotic plantations (Muiruri 1977) . The first plantations

Fig.8

GAZETTED FORESTS IN KENYA



Source: Kamweti 1982: Law and Management of forests in Kenya

were planted sometimes in 1910. But the most extensive plantation came after 1945. By 1969 over 105,000 ha. of land was under exotic softwoods. The forest department has intensified its effort of planting more exotic trees. By 1980 it was estimated that over 162,000 ha. would be under exotic trees (Table 6). The success of this exercise was based on the assumption that 6,000 - 7,000 ha will be planted each year.

Presently, the area under indigenous forest is being denuded at an alarming rate. This is attributed to the following: first, a lot of forest areas have been cleared for agriculture purposes; second, the continuing wanton destruction of forest by charcoal and timber extractors. A case in mind is Mau Narok and Olpulsimoru forests in Narok district, Thirdly the extensive destruction of forests by fire. Menengai forest in Nakuru district can be cited as an example. In addition, despite, the very much celebrated objective of reservation of forests in Kenya about 3,362 ha. of forest area on the average were lost to agriculture between 1963 and 1967. During the same period, the Government took an active role in exercising forest land and allocating it to individuals. A case in mind is the resettling of people in Olenguruone area, once a forested area.

Table No.5:

KENYA: TOTAL FOREST AREA

GAZETTED FORESTS	AREA (ha.)
Natural high forest	919,157.29
Man made forest	156,592.37
Bush	164,308.16
Bamboo	166,303.42
Grass	127,012.43
Mangrove	45,068.00
Sub.Total	1,572,441.60
UNGAZETTED FORESTS:	
Forest managed by Forest Department	89,398.00
Total area under Forest Department	1,661,840.1
Private Forest on large farms	141,100.00
Total	1,763,871.5

In the process a total of over 108,772.2 ha. was excised and allocated for agriculture, while only 58,329.2 ha.were planted with trees. This gave a net loss of 50,442.5 ha. of forest area. This process has continued upto 1984. Between 1977 and 1984 another additional 31,000 ha. of forest land has gone to agricultre. If this is allowed to continue there might not be any forests in the near future.

TABLE 6

KENYA FOREST PLANTATION AREA

YEAR/	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
CYPRESS	50	53	57	60	63	67	68	71	74	58	59
PINES	59	61	65	67	68	70	72	74	76	65	67
TOTAL	129	135	131	132	137	139	140	143	147	155	161

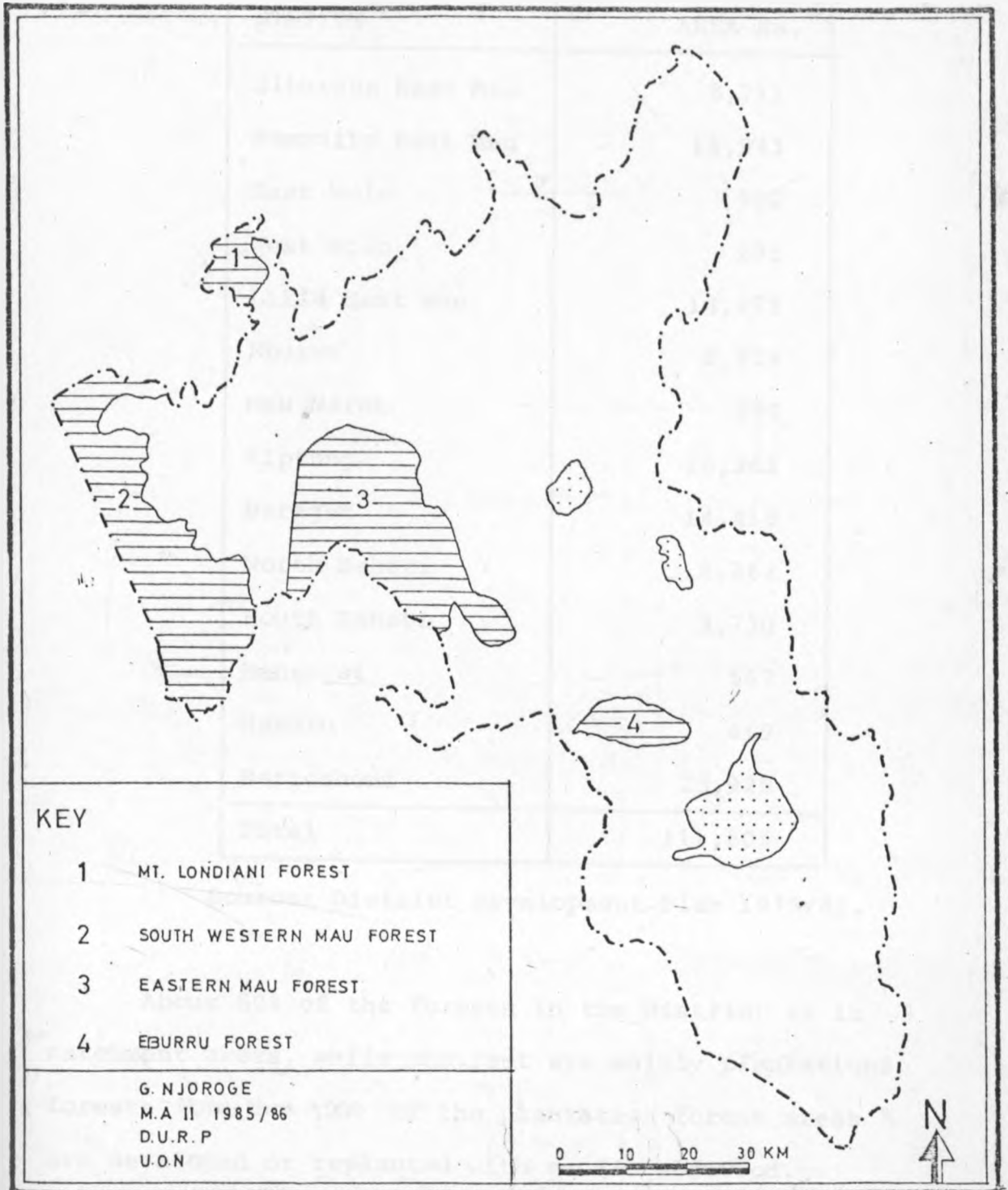
Source: C.B.S. Statistical Abstract 1984.

The indigenous forests do not have a high productive capacity. A fact attributed to; first, the forests are primarily composed of numerous indigenous hardwood species like cedar, podo, mahogany, mvule, etc. Hence their yield remains considerably low. Second, they have a big maturity period ranging between 60 - 80 years. Third, the seeds of most of these species are difficult to get. Fourth, the recent establishment of the plywood industry led to uneconomical exploitation of these forests. Hence most indigenous forests are mainly reserved for protection of the water catchment areas. However recent surveys show that over 8.9m^3 of podo and 7.7m^3 of cedar were exploited (Gathu, 1981). Given the existing stock reserves this would appear to be excessive utilisation. No wonder the President, banned the cutting down of any indigenous trees in the country in 1981.

... FOREST RESOURCES IN NAKURU DISTRICT

The district has a forest area covering 200,138 ha. Of this, 72,339 ha. have been designated as protective, and 99,443 ha. as productive forests. Similarly, 28,356 ha. is unproductive but planted with exotic trees. Only about 25% of these forests have been developed for economic exploitation (Nakuru development plan 1979/83). Forests cover about 26.8% of the total area of the district. Over 111,805 ha. are gazetted forests in the district. (table.7)

Fig.9: NAKURU DISTRICT: GAZETTED FORESTS



Source: Ministry of Finance and Planning

Table No.7

GAZETTED FORESTS IN NAKURU DISTRICT

STATION	AREA Ha.
Elburgon East Mau	8,711
Nessuite East Mau	15,943
East Molo	902
West Molo	275
Likia East Mau	14,473
Eburru	8,719
Mau Narok	798
Kiptunga	10,363
Baraget	14,418
North Bahati	6,362
South Bahati	3,730
Menengai	567
Nakuru	619
Marioshoni	25,925
Total	111,805

Source: District Development Plan 1979/83.

About 50% of the forests in the District is in catchment areas, while the rest are mainly plantations forests. More than 50% of the plantation forest areas are developed or replanted with exotic softwood. The Nakuru forest department is engaged in a severe campaign to replace the slow growing un economical indigenous tree species with faster growing species.

This is as a result of the high demand for wood products in the country. During the plan period 1979-83 the Nakuru district forest department had a target of planting 1,000 ha. land per year, and only allowed 500 ha. of wood to be harvested each year. The expected yield for the same acreage was 126,000m³. This accounted for an average yield of about 252m³ per hectare. Besides, an additional 56,000m³ was received from the thinnings. At this rate the department estimated that it would receive K£250,000 per year.

Planting is generally done by the casual labourers employed by the Department. Ordinarily, small shambas of about 50' x 10' are sub-divided and allocated to different individuals. Each allottee is required to pay a sum of Kshs. 30 per shamba allocated. After the land is cultivated the seedlings are planted. The allottee is charged with the responsibility of weeding the seedling while growing his crops. One is allowed to cultivate the land for three years. It is assumed that after this the seedling can grow without any problem. The allocation of shambas continues year after year. Hence it is assumed that planting of seedling is a yearly exercise. The use of a shamba system has greatly reduced the total costs of establishing a plantation. Another major operation is pruning. Pruning is done after every two years. Each station has a village which houses all the workers in the station. Thinning the last operation

is carried out to allow the forest to produce good quality timber. This may be carried out 5 - 10 years after the plantation was planted. Infact, most of the small scale saw mills do rely mostly on thinning because they are relatively inexpensive.

Like most parts in the country, the most important exotic tree species grown in the district include , pinus patula, pinus radiata, cypress lusitanica and eucalyptus saligna. Unlike some years ago, when pines were the most commonly used, cypress lusitanica has become very popular. The present low demand for pines can be traced back to the period marked by the decline of Kenyan's export of sawn timber.. Presently the demand for cypress timber is quite high. In response, most plantations are being planted with cypress species. For instance, most of the oldest plantations planted between 1911 and 1960 are mainly dominated . by the pines species. The use of cypress timber is boosted by absence of other popular hard wood species mainly used in the construction industry. Today, cypress covers more than 50% of the total forest area under exotic soft woods in the district. (table No. 3.)

From the information obtained in the field, it is clear that a large portion of the plantation were planted after 1960. Hence most of them are below the age of 30 years and 25 - 30 years for cypress and pines respectively. Ideally only 500 ha. of forest

area is allowed for clear fell in the district assuming that 1,000 ha. of land is planted each year. This is in principle of the fact that timber extraction should have only a minor effect on forest structure, because ideally the foresters aims to return the timber plot to some semblance of its original structure before the next phase of harvesting. In practice the usual intervals between successive timber extraction is too short to allow this to happen. The extraction of large timber also causes widespread disturbances in the forest and produces extensive areas of secondary growth (Edington and Edington, 1979).

Table No.8

ACREAGE OF TREE SPECIES BETWEEN 1911 AND 1984
(in ha.)

STATION	S P E C I E S				
	CYPRESS	PINES	EUCALYPTUS	OTHERS	TOTAL
BARAGET	1,072.4	864.7	50.6	-	1,987.7
KIPTUNGA	1,020.1	802.6	96.4	-	1,919.1
ELBURGON	2,290	1,653.8	962.3	309	5,215.1
MOLO	3,500	1,075	560	364	5,499
Marioshoni	654.1	442.3	13.0	191.0	1,300.39
Kerigeti	-	10.1	27.2	-	37.3
Saino	119.1	245.8	82.9	-	447.8
Ndoinet	215.5	206.8	122.7	-	545.0
Total	8,871	5,301.1	1,915.1	864	16,951.7

Source: Field Survey, 1985.

The use of this principle has failed in Nakuru district. Between 1911 and 1960, for example a total of 2,310 ha. was under exotic soft wood. Of this only 560 ha. were under cypress while 1,811.1 were under pines. The expected yield from both species is about $582,321.6\text{m}^3$. This was mature for clear fell. In contrast, in 1984 about $289,057.42\text{m}^3$ of wood was extracted from about 1,147.05 ha. of land. In essence, the present rate of extraction is double the recommended acreage. Besides, in the same year only 275 ha. of land in the district was planted with exotic soft wood. This was largely attributed to the drought curbing the whole country.

The Department of Forestry has a section called the Inventory Section. It is charged with responsibility of preparing an inventory stock of the volume of wood in each mature forests. Secondly licensing and allocation of forest areas to the saw millers. Third, measuring the volume for each saw miller. This section is poorly organised in Nakuru. Hence the measuring process has become a tedious exercise. The measuring process was done after the trees have been severed and cross cut into convenient sizes. Presently the standarding volume of measurement is being used.

RESOURCE BASE INDUSTRIES

In all the National development plans, the Government's policy of industrial development has been to promote resource base industries and foot-loose industries. The plan clearly states that Kenyan's long term prospects for achieving a high level of industrialisation depend on Kenya ability to produce goods for which she has a comparative advantage (Development Plan 1979-83) In this respect measures have been intensified to give priority to those industries which make maximum utilisation of local resources. It is assumed that upon success, such industries will have backward linkages to the rural areas, to foster the development of other sectors of the rural economy. Besides, they would concur with the general objective of creating more employment opportunities both at the production and processing levels. At the same time help to earn the country some foreign exchange.

Among the different measures adopted therefore includes: first, extensive services to provide knowledge on the industrial utilisation of local materials. Second, provision of infrastructure to provide access to production of raw materials; third, to finance some of these establishments through loans advanced by institutions like I.C.D.C., I.D.B. and D.F.C.K. Fourth, the Ministry of Commerce and Industry in corroboration with other Ministries will identify

resources for development and promote industrial activities that utilise these resources. Lastly, the Government shall encourage promotion of products of these industries. In a nutshell these are the general principles that guide the development of resource and Agro-based industries in this country. The timber industry is one of the most important industry that utilises forest resources in Kenya. Therefore it is expected that its development should be guided the same principles. We may pose a question here; to what extent has this been achieved?

Throughout the plan periods (1970-74, 1974-79, 1979/83 and 1983/88) one of the most recurring problem identified facing the industry is poor management of saw mills. One tends to wonder, as to what the Government has been doing for all this period to alleviate the problem. But instead most of the Government's efforts have caused severe strains on the industry. For example the closing of export of timber increased competition among saw millers, and as a result the small scale saw millers had to close down. This is contrary to what the policy guideline states. The only notable Government's contribution presently is the establishment of F.I.T.C. (Forest Institute Training Centre) in Nakuru, in 1974. This offers training facilities to saw millers and saw doctors for a period of six months.

The Kenyan timber industry is dualistic in nature. On one hand, are large scale saw mills producing timber complying with the basic grading standards (Export quality) while on the other hand, are small scale saw mills mainly operated by people with low operational skills specialising in production of timber for the construction industry. This timber is generally of low quality. Hence this has increased competition among the saw millers. In its attempts to improve the quality of products of the industry, the Government has introduced wide acceptable grading standards. To achieve this objective the saw mill advisory section was established in the forest department. It was charged with the responsibility of advising saw millers on the methods of production and identifying suitable markets.

THE TIMBER INDUSTRY

Timber industry in Kenya is small and young when compared with other countries of the world. (Gathu 1981). However in this country it is one of the oldest industry. It is also one of the most important industry utilising forest resources. It generally involves logging, transporting and marketing of the wood products. The number of saw mills have been growing tremendously, while that of furniture and fixtures have somehow remained constant. The first saw mill in this country were said to have been

started between 1902 and 1909. There is evidence to show that the first consignment of Kenyan timber touched the British market sometimes in 1909 (Ndegwa, 1977). By then, most saw mills were concentrating on indigenous hard wood species such as cedar, mvule, podo etc. Over time, the industry has grown to be an important forest based industry. However, it has of late been surpassed by other wood utilising industries such as plywood, fibreboard and paper mills.

The industry has been having managerial problems for a long time. As far as 1928 the timber industry was said to be heading for a disaster which led to the closure of most saw-mills especially small scale. A process, attributed to competition among saw mills. This reduces their profit margin, such that the net returns cannot cover the capital invested. A survey of saw mills in Kenya show that most of them are normally started with insufficient capital. This problem coupled with absence of adequate capital makes most of them operate on seasonal basis. This has had great impact on the growth in the number of timber establishments. In 1955, for example there were 79 saw mills in Kenya. This decreased to 70 in 1968. In 1972 this doubled to 165. Six year later this number had reduced to 147. In 1984 there were about 1,278 saw mills. One interesting characteristic of the industry is its

employment patterns. In 1955, the industry employed over 7,000 workers. 30 years later the number of employees was only 12,500 people (Table No.9).

Table No.9:

SAW MILLS AND FURNITURE ESTABLISHMENT -
1955 - 1984

YEAR	SAW MILLS	EMPLOYMENT	FURNITURE/ FIXTURES	EMPLOYMENT
1955	79	7,782	228	2,908
1961	77	6,156	197	1,940
1968	70	4,685	131	1,218
1972	165	6,168	383	2,189
1978	147	7,204	233	2,618
1984	1,278	12,500	286	3,112

Source: Forest Department Records : Ministry of Commerce and Industry.

From the table No.9 one can conclude that labour in the furniture/fixtures industry continues to grow. Unlike saw mills, where mechanisation is becoming quite important, the fixtures/furniture industry remains labour intensive.

There are two types of saw mills; the long and short term. Of the total 1,278 licensed saw mills, 100 of them are long term. The long term licence extends for a period of 5 years and above while that of a short term extends for a period between 1 and 5 years. With

Table No.10

KENYA : TIMBER PRODUCTION 1973 - 84

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Cypres (m ³)	168	182	185	299	314	280	216	290	222	214	108
Total Production(m ³)	308	297	304	332	414	426	423	482	475	366	173

Source: C.B.S. : Statistical Abstract 1984.

With the increase in saw mills the log intake per year has been increasing tremendously. By the year 1984, the sawn log intake had reached 650,000³:

(table No. 11).

Table 11

SAWN LOG INTAKE: (M³)1983-84

YEAR	VOLUME
1973	308,688
1974	295,349
1975	286,260
1976	403,950
1977	433,355
1978	327,324
1981	450,000
1984	650,000

Source: Forest Department Records.

In 1980, 482,000 m³ of timber was produced, which declined to 173,000m³ in 1983 (Table 10). Most of the sawn timber is consumed locally. The export market was finally banned in 1982. Kenya used to export timber to western Europe, Sudan, Burundi, Ethiopia, Uganda, Tanzania and middle east. About 50% of the timber produced is consumed in Nairobi and Thika. Nakuru and Mombasa accounts for 5% and 8% respectively. In total, it is estimated that over 57% of the recorded sawn timber is consumed in urban areas. The rest 43% is consumed in the rural areas.

TIMBER INDUSTRY IN NAKURU DISTRICT

The first saw mill was established in 1905. It was located at Elburgon town about 30 km. south west of Nakuru town. This was operated by a group of Indians. By 1909 two other groups of Indians had established two other mills. In 1950, the number of saw mills in the district, had grown to 26 - all owned by Indians. The first saw mill by an African was started in 1957. It was later closed during the emergency period. It was reopened in 1960. In 1964 the district had 81 saw mills and only 9 were African owned. Sometimes in the 1970s's most Indian saw millers fell out of business. This gave way to a sizeable number of enterprising African saw millers. This trend has continued till now. Presently there are 44 saw mills, of which 31 are owned by Africans 12 by Indian and one by the Government.

In 1964, the district accounted for over 48% (81) of the total saw mills in Kenya. This number has decreased to only 44 saw mills. Of these 8 of them are long term. In a survey carried out in 1972, Nakuru district ranked third, as the district with the largest number of rural factories (Ogendo, 1972) . These rural factories were mainly saw mills, which were concentrated in the small towns. In 1984, for example Elburgon accounted for 11 saw mills, 13 were in Molo and 9 in Njoro town. The rest were located in Mau Narok,

and Nakuru town. (table 12) Only 2 saw mills were located in forest estates.

Table 12:

DISTRIBUTION OF SAW MILLS
BY TOWNS : 1984

Town	No.
Elburgon	11
Molo	13
Njoro	9
Nakuru	4
Mau Narok	3
Bahati	2
Total	42

It is estimated that Rift Valley alone produces 49% of the total production of sawn timber in Kenya. Nakuru district alone accounts for 70% of the total Rift Valley production. However the district consumes less than 6% of the sawn timber produced. This is mainly for construction purposes. In 1984, of the sawn timber sold in the market 29.9% came from Nakuru district. Nairobi alone consumed 14.9%. This implies that Nairobi is the major market of the timber produced in the district.

FURNITURE AND FIXTURES INDUSTRY IN NAKURU

This industry is not very well developed. One of the reasons is that the County Council does not have an accurate reliable inventory for the number of establishment in the district. In 1984, there were about 102 establishments in the district. Nakuru, Elburgon, Molo and Naivasha accounts for more than 70% of the total furniture workshops in the district, (table 13.

Table No.13

DISTRIBUTION OF FURNITURE AND FIXTURES WORKSHOPS - 1984

Town	No.
Mau Summit	1
Molo	15
Turi	5
Elburgon	17
Naivasha	15
Kijabe	2
Solai	3
Subukia	1
Mau Narok	6
Rongai	6
Nakuru	30
Total	102

Source: County Council records.

EMPLOYMENT AND INCOME

It was quite difficult to determine the employment both in the forest department and in the saw mills in the district. The total figure obtained for some forest stations was 974. This figure includes 10 foresters, 3 assistant forests. The rest were mainly drivers, clerical officers and sub-ordinate staff (table 14).

Table 14:

EMPLOYMENT IN FOREST DEPARTMENT - 1984 :
NAKURU DISTRICT

STATION	FORESTER	FORESTER ASSISTANT	DRIVERS	CLERICAL OFFICERS	SUB-ORD STAFF	TOTAL
Marioshoni	2	-	1	1	127	132
Ndoinet	1	-	1	1	79	82
Baraget	1	1	1	1	142	146
Soino	1	-	1	1	66	69
Keriget	1	-	1	1	50	53
Kiptunga	1		1	2	139	145
Elburgon	2	1	3	2	166	174
Molo	1	-	2	4	166	173
Total	10	3	11	13	933	974

The saw mills employed 2,649 people. Elburgon station alone accounted for 82% of the total employment in the saw mills. Most of these people are employed in the Sokoro Saw mill, one of the largest saw mills in Kenya.

table 15).

Table 15: EMPLOYMENT IN SAW MILLS : 1984

Station	People Employed
Marioshoni	50
Kiptunga	45
Baraget	28
Elburgon	2,175
Molo	351

Source: Forest Department 1984 Annual Report.

As stated earlier the income obtained from forest and forest based industries was difficult to determine. But it was clear that most of the revenue accrued by forest department was mainly from royalties, money collected from allocation of shambas, and money collected from those grazing in the forest areas. In 1984 for example the department collected about £ 672,799 from tree felling. This was twice as much as the amount expected in 1982 of £ 250,000. This has one implication: that there has been excessive exploitation of forests by licensed and saw millers. In this respect, the Minister for Environment and Natural Resources has threatened that the Government will withdraw licenses issued to some tree cutters. He reiterated that the Government will not issue any more licenses for felling trees.

Conclusion:

From the foregoing discussion it is clear that the policy and legal framework are clearly spelt. However, none of this has had any effect. This has caused severe strains on forest resources both at the national and district level, particularly the strains are mainly felt in indigenous forests. At the same time, there was a decline in timber production between 1980 and 1984 in the country. In addition the furniture and fixture industries appear to be poorly developed. The preceding chapter therefore attempts to highlight the major causes of these problems.

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CHAPTER FOUR

APPRAISAL

This chapter attempts to outline the salient features observed during the field survey. It covers the forest department, saw mills and furniture and fixtures industry. It is an attempt to elucidate problems faced at each level i.e. production, processing and marketing of forest products. Besides, it seeks to establish the present existing relationship between forest department, saw mills and furniture and fixtures industry.

FOREST MANAGEMENT

About 44% of the forest estates, in the district are managed by forest department with its headquarters in Elburgon. The forest estates are divided into conservation, division and station, in order of importance respectively. Ideally, a station, the smallest unit is headed by two foresters. Forester is charged with the following duties: administrative functions, allocation of forest plantations, measuring the volume of trees, preparation of an inventory, protection of forest reserves, maintenance of roads silviculture etc. Most forest stations around Elburgon are headed by a single forester and sometimes without a forest assistant. This makes it difficult for the Forester, to execute their duties effectively.

One of the important duties of a forester is

allocation of plantation. Presently there exist no standard method of allocation. Hence most of the influential saw millers tend to be allocated the good forest estates. Allocation of plantations involves measuring their volume of trees. Presently the standing volume form of measurement is being used. Discussions with foresters revealed that, this was one of the most tedious duty. It involves visiting plantations allocated and determining the volume of trees per each hectare. As a result, most foresters resort to estimations of volumes of trees in a hectare.

The survey revealed that fire and game were the two main destroyers of forest estates in the district. In 1983/84, for example, 81 ha. and 30 ha. of forest areas were destroyed by fire and game respectively (Forest Department, 1985). Game found around Mariosioni, Kiptunga and Baraget, consists of buffaloes and rhinos. These often destroy the young seedlings. While the causes of random fire range from honey hunters, open fire left by picnic and holiday makers to that flickering cigarette stubs thrown carelessly into a thicket (Mzungu, 1986). A case in mind is the recent fire destruction of Mau Narok and Menengai forests in Nakuru (Nation, 1986).

During the last 3 years, because of shortage of water, not many plantations were planted. In 1984,

only 275 ha. were planted as compared to the planned 1,000 ha. (Forest Department, 1986). This will have severe strains on timber production because the rate of replacement is far below the rate of clearing. The availability of water affects the development of nurseries. Three stations: Kiptunga, Mariosioni and Baraget reported acute shortage of water in 1984. The forest department estimated that about 10,000 seedlings weathered during the same year. Mostly water was ferried using vehicles.

The forest department recommends that each station should have two foresters and four assistant foresters. There is no standard requirements for forest guards and casual labourers. Their number is determined by the size of an establishment of each station. However, all stations were reported to have shortages of the same. This frustrates the stations efforts of guarding forest reserves. In 1984, Kiptunga forest, reported 16 illegal cases of charcoal burning and 9 of timber and fencing posts extraction. Similarly 36 illegal cases of grazing were reported in Kiptunga and Nessit stations. It is our contention that such cases can only be arrested with enough forest guards.

Most of the funds are being marshalled to the implementation of afforestation and soil conservation

programmes. In the year 1983/84, Kshs. 29,365 was spent on the programmes alone, (District Development Plan 1984/88). Hence the forest department is allocated very little finance to maintain its forests. It has not been able to fulfill its roles of : one educating the people on the importance of forests, construction and maintenance of roads, engagement of more casual labourers, etc.

TABLE 16

TOTAL EMPLOYMENT IN SAW MILLS, 1984

No. of saw mills	Permanent	Casual	Total
1	8	72	80
2	34	8	42
3	30	5	35
4	98	-	98
5	16	54	70
6	20	35	55
7	18	22	40
8	-	5	5
9	25	25	50
10	3	79	82
11	6	101	107
12	3	29	32
13	20	16	36
14	2	36	38
15	7	45	52
16	21	11	32
17	91	-	91
18	35	6	41
19	16	41	57
20	6	25	31
21	4	41	45
22	40	9	49
Total	544	665	1,209

Source: Field Survey, 1985.

Saw Mills:

The survey covered 22 saw mills. Most of these saw mills were established in the 1970's. The average coverage per saw mill is about 3 acres. About 75% of the total saw mills covered by the survey occupied plots owned by the owners of the saw mills, while 17% occupied plots owned by the County Council and the rest were located in forest reserves.

The number of people employed in the saw mills was 1,205 persons of which 665 were employed as casual workers and the rest as permanent workers (Table 16). The industry mainly relies on unskilled labour. The only skilled workers were saw doctors, drivers and machine operators (Table 17). These account for only 3.9% of the total labour force. Similarly few saw mills send their workers to F.I.T.C. for training. This therefore accelerates inefficiency in the saw mills. Elburgon division alone accounts for 31% of the total labour force employed in saw mills. The rest of the labour force come from western Kenya. About 69% of these workers originate from western and Nyanza provinces most of these workers prefer going back to their places during the months of March and June. Hence there is normally shortage of labour during these two months, while in the rest of the months there is surplus labour.

TABLE 17

SKILLED WORKERS IN SAW MILLS, 1984

TRAINING	No.OF WORKERS	% TOTAL WORKERS
Saw doctors	29	2.7
Drivers	13	1.07
Machine operators	5	0.41
Total	47	3.9

Source: Field Survey, 1985.

RAW MATERIALS:

Majority of the saw mills use cypress trees, pines are sawn on special demand. The total quantity of sawn log is about 4,100m³ per day, out of which only 500m³ of pines are used. This demonstrates the low demand for pines. Therefore both large and small scale sawn mills are competing for cypress species.

After allocation of plantation, it is the duty of the saw mills to clear fell. He thereafter transports the logs to the saw mill. The most commonly used form of transport are the tractors. These are preferred because of the bad condition of roads especially during the rainy seasons. According to the forest department one hectare of a plantation is sold at a price of Shs. 60,000. A hectare has an average of about 265 stems. According to the saw millers, this price is not high. What is

alarming is the high frequency of increasing royalty and the percentage at which it increases. Besides the saw millers are not allowed to increase the prices of sawn timber. The prices are controlled by the forest department especially for graded standards of timber. In addition most of the forest roads are impassable during the rainy seasons. A period when only a few saw millers can afford to ferry their sawn logs. using sophisticated tractors. About 75% of saw millers interviewed identified this as a major problem. Under the forest department regulations, no short term saw mills are allocated clear fell plantation. Most of them have to rely on thinning. Hence most of them produce low quality timber. Yet, they are expected to compete with long term saw mills.

Most saw mills were operating below their maximum production capacity. About 75% of the saw mills interviewed were operating below their maximum level. This was attributed to lack of raw materials. Over 90% of the sawn millers were using circular saws. Given that $4,100\text{m}^3$ of saw logs are milled in a day, the ideal output should be $2,870\text{m}^3$ of sawn timber per day. Presently due to the present use of circular saws the output is about $1,640\text{m}^3$ of saw timber per day. The use of burnsaaws would increase the output to $2,665\text{m}^3$ per day. Hence there is deficiency in output of $1,025\text{m}^3$ per day. This accounts for a wastage of $30,750\text{m}^3$ per year. Based on these figures therefore

we can conclude that the circular is more inefficient. Most of the sawn millers tended to concur with the conclusion but identified lack of finance as the restricting factor.

MARKETING:

More than 60% of the saw mills sold their products within Nakuru district while over 75% of them sold timber in Nairobi. Timber from the region is also sold in Kisumu, Nakuru and Mombasa. The timber is either transported by the owners or the consumers. In 1984, over 60% of the timber merchants sold and transported the products to the consumers. Quite a good number of them have timber yards in these towns i.e. Mombasa, Nairobi Nakuru and Kisumu.

The prices of timber is controlled by the timber merchant association and forest department. In 1985, 1 tonne of sawn timber was valued at Kshs. 2,500 by T.M.A. while saw mills like F.I.T.C. was charging Kshs. 1,000. Moreover their timber is of a very high quality. This is because the saw mill has recently acquired equipment worth 80m. from the Swedish Government. This automatically throws other timber merchants out of market. Although 75% of the saw millers interviewed complained of the low demand for sawn timber within the district. Most of timber consumed locally is consumed by furniture and fixture

and construction industry. But none of these two industries is well developed to create demand for timber.

Another major problem facing this industry is the high rate of sales tax. Presently the tax is about 17% (Forest Department, 1985). Each saw miller must pay sales tax as soon as he sells a consignment of timber. Most of them have to pay from their pockets because some of the customers do not pay promptly. This is demoralising especially among small scale merchants.

Over 90% of the saw mills covered by the survey, were started with individual savings. Discussions with several of them revealed that they have tried to obtain loans without success. Less than 25% of those who applied got the loans.

Most residential building in these small towns are made of offcuts of timber. The saw millers give them freely. But of late a good number of saw millers are selling them at Kshs. 4 per piece. The off cuts are also used for fencing and as fuelwood. Saw dust is normally wasted. Only a few people who use it as a major source of energy.

During the survey, it was observed that the banning of exportation of timber had severe strains on the timber business in this country. With the large

number of saw mills in the region, competition is quite stiff, mainly from the well established saw mills, like F.I.T.C. and Kinare saw mills. F.I.T.C. is fully Government owned and well managed. It also has technically qualified personnel. In addition it is allocated the best plantations in the district. Hence it can afford to lower the production costs thus lowering the prices of timber. Under such circumstances other saw mills in the district are likely to fall out of business.

Most saw mills are run by people with low understanding of operational and management techniques of decision making. Nearly all saw mills (96%) covered by the survey had unqualified managers. This contributes greatly to the poor management of saw mills in the district. Hence most of them close down on petty issues. Recently, in 1983, Kitiro saw mill, by then the biggest saw mill in Elburgon employing over 400 people had to close down after a dispute with the trade union. Such incidences are as a result of lack of effective management.

FURNITURE AND FIXTURES INDUSTRY

Most of these establishments covered by the survey, were started within a period of less than 3 years ago. Over 73% are less than three years old (Table 13).

Table No. 18

FURNITURE AND FIXTURES
ESTABLISHMENTS - 1984

Period(year)	%
Less than 1 year	40
1 - 3	33.3
3 - 5	6.6
5 - 7	0
Above 7	20
Total	100

Source: Field Survey, 1985.

From the above table one can conclude that, most of these establishments do not operate for a long period. About 80% of them occupy an area of less than $\frac{1}{2}$ acre, 10% occupy $\frac{1}{2}$ acre and only 10% of these establishments occupy rented premises. Most of them occupy single rooms which act as their show rooms as well as workshops. One of the contributing factor is the lack of space allocated for such activities. Hence most of them are scattered all over the small towns. It therefore becomes difficult to organise them. Presently there exists no organisation for furniture makers.

EMPLOYMENT

Unlike the saw mills this industry is purely labour intensive. But the relative number of people

employed per establishment is quite small. The total employment in the sampled workshops was 115 workers. Of these 49% were employed on permanent basis, 11% as casual labourers and 40% on contract basis. Most of the workers employed on permanent basis were owners of the businesses (Table 19)

TABLE No. 19

CATEGORIES OF WORKERS EMPLOYED IN
FURNITURE AND FIXTURES INDUSTRY 1985

Category	Total	%
Permanent	57	49
Casual	13	11
Contract	45	40
Total	115	100

Source: Field Survey, 1985.

Most of the workers employed in the industry are semi skilled. Majority of them have been trained in workshops. Only less than 6% were trained carpenters.

Most of these workshops are specialised in making of furniture such as beds, chairs, tables, caskets and fixtures. Most of them use cypress. This has substituted the use of hardwoods which are hardly available. Over 60% of the respondents complained of the non availability of hard woods. Most of the timber is acquired from the neighbouring saw mills. Sokoro saw mill is the major supplier of

plywood and fibre board. Most products are made on order. Hence when there is no order there is no business. More over 80% of the respondents complained of transport problems. The most commonly used form of transport was the hard pulled cart.

Timber is acquired from small scale saw mills. The timber is normally cheap in these saw mills though it is of poor quality. It therefore affects the quality of products produced manifested by the low price fetched on the market. Most of these furniture makers rely on old tools. This limits not only the quality but also the quantity of products produced.

MARKETING

Most of the products are sold in the local markets in Elburgon, Molo and Njoro towns. This accounts for over 80% of all products produced by these establishments. About 10% of the products by these establishments. About 10% of the products are sent to Naivasha. Other towns that offer markets for products produced in this area are Kericho, Nairobi, Kisumu and Bungoma. Most of these products are transported by rail.

Another problem identified was the problem of uncontrolled prices of products. Individuals have their own prices for different items. This increases

competition among the furniture dealers. This is linked with the problem of poor organisation among them. Other problems include: lack of loan facilities, high prices of raw materials, etc. All these problems can be controlled with the introduction of effective organisation representing the interest of the furniture dealers.

CONCLUSION

From the above discussion, one can conclude that there is no relationship between the forest department saw mills and furniture and fixtures industry. However, all the problems at each level have a bearing on each other. Therefore the whole process ends in a lot of wastage and inefficiencies at each level. The forest department being the sole producer of raw materials used in both industries does very little to advice them.

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CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to formulate an acceptable and viable land use model for the utilisation of forest resources. An attempt aimed at alleviating the present problem of forest mismanagement in Kenya. A process which is greatly attributed to the absence of a land use plan to guide the utilisation of forest resources (Muiruri, 1977). The sector has been neglected for quite sometime. Hence, its contribution has remained very low. Therefore, the thesis of the study throughout was, how can the forests and forest based industries contribute more to national development.

The Kenyan forest policy (1968) emphasises on the importance of proper management of forest estates. This is an attempt to meet both industrial and demand for wood products. However, the non implementation of the policy and absence of an effective forest legal framework has resulted in over-harvesting of forests, not only in Nakuru District but in most parts of the country. This problem coupled with the shortage of personnel has frustrated the forest Department's efforts of protecting forest reserves from both licensed and unlicensed tree cutters. Hence, the Department has been forced to suspend all licences of felling trees in the country. In addition, most of the stations did not have working plans and up-date inventories.

The findings of the study reveal that there is no established relationship between the production and utilisation of forest resources. This has resulted to inefficient exploitation and management of forest resources and forest based industries. The major problems that forest based industries are facing includes: an acute shortage of raw materials. As a result, majority of them operate below their maximum production capacity. The second problem is that of poor management. In spite of the above, the demand for saw logs has continued to increase. Therefore, through the Nakuru case study, some promising aspects and opportunities for the development of the forest sector in Kenya has been examined. This is viewed as an attempt to alleviate the poor performance of the sector. The Nakuru example provides a further justification for a re-examination of the existing policy framework and the need for a comprehensive framework for the utilisation of forest resources in the country. The challenge, here is that of setting national priorities and objectives of optimising the use of forest resources.

Any of the proposals put forward in this study may only hold if the following assumptions are fulfilled:-

- (a) There is an urgent need for a strong commitment both on the part of the public and private policy makers to implement policy proposals

outlined in policy document.

- (b) that there is a need to improve the present institutional capacity (technical, managerial and administrative) in order to implement each identified viable project.
- (c) that all financial resources required must be available in the right form and under the right conditions to implement the projects chosen.

To fulfil the above assumptions, the writer feels that, if it were possible, it would be advantageous for each station to have a working plan. To facilitate smooth allocation of plantation, each station should have an up-to-date inventory of forest resources within its area of jurisdiction. Such an inventory should show the following details, all plantations indicating their location, and age, volume to be cut, volume allocated, the type of species and revenue expected. In addition it is proposed that:

- (a) that an average figure of royalty per hectare should be devised for each species of trees. The use of such a figure while determining the expected royalty would help reduce the amount of time spent measuring the volume of each plantation to be allocated.
- (b) The allocation of plantation should be done at the beginning of the year, in the presence

of all interested parties. The study suggests the use of balloting method.

- (c) Measures should be intensified to train more manpower. Institutions like Moi University, Egerton, Londiani forest guard college, etc. should increase their intakes.
- (d) The forest Department must ensure that all saw millers submit their annual reports. The reports must include the following details: the annual acreage of plantation allocated to them, annual timber sawn, the quantity sold, the revenue received and a summary of problems encountered during the year. This would help the department's saw mill advisory section device methods of advising the saw millers on how to improve their efficiency and reduce wastage. Strict measures should be taken against defaulters. These can include withdrawal of licences or non allocation of plantations.
- (e) The forest department should try to increase the storage capacities of the existing water facilities. This would provide more water for watering the nurseries especially during the dry seasons.

- (f) The forest department in conjunction with Forest Institute Training College (F.I.T.C.) should offer managerial courses to saw millers. The primary role of such courses is to improve the working skills of the saw millers.
- (g) All saw millers in the District should participate directly in planting of plantations.
- (h) The present forest policy should be revised to accommodate the present and future requirements of forest products. Besides, the legal framework should be strengthened to facilitate easier implementations of policy proposals.
- (i) There is a need for a more organised and effective co-ordination between all heads of departments in the district and the forest department.
- (j) Efforts should be made to provide upcoming saw millers/furniture and fixtures makers with loans through Institutions like: Development Finance Company of Kenya, Industrial and Commercial Development Company, Industrial Development Bank, Kenya Industrial Estates, etc.
- (k) The forest department should device a strategy of improving the condition of roads; Incorporating all saw millers in the district.
- (l) To improve efficiency, use of circular saws should be discouraged. Saw millers should be advised to use modern saws like burn saws which

are twice as efficient as the circular saw.

- (m) Offcuts from timber and saw dust should be put into better use. The department (Forest) should encourage saw millers to set up kilns which use these by-products to produce charcoal. This would help alleviate the present energy shortage in most of the towns in the district.
- (n) All towns in the district should have space for industrial development. Towns like Elburgon, Molo and Njoro have potentials for proper development of furniture and fixtures industry if plots were available.
- (o) There is a need for a better organisation of both saw millers and furniture makers. This can help reduce competition among these timber merchants.
- (p) All saw mills and furniture workshops should be encouraged to improve the quality of their staff. A move aimed at improving the quality of goods produced.
- (q) More efforts should be directed towards educating the people on the importance and efficient utilisation of forest resources.
- (r) The forest department must regulate the establishment of saw mills. This is possible if the department can control the number of licenced saw mills.

- (s) The Government through institutions like Kenya industrial estates should help the furniture merchants identify possible merchants.

In addition, to the above proposals, the purpose of the study was to develop a production, utilisation and marketing framework through which the district forest resources could be efficiently utilised. It is in this respect that this study, went a step further to design an integrated model to guide the utilisation of forest resources in the district. The proposed approach emphasizes on the management of forest resources. The rationale underlying the designing of this model is based on the following assumptions:

- (a) that presently it is difficult to forecast the market development of forest products due to lack of enough data. It is therefore assumed that with the adoption of the proposed approach more research will be done on the same.
- (b) that like other parastatal bodies in Kenya, it shall be a profit making body, in so far as it is consistence with the national objectives of the forest sector.
- (c) that there shall be a direct interrelationship between the various industries established in the region.

The basic aim of the model is to maximise the efficiency in the utilisation and management of the existing forest resources. This study, therefore, proposes the formation of a Nakuru District Forest Authority. Such an authority can be defined as a simple complex which integrates the production utilization and marketing processes of forest products together. The objective of the proposed authority is management of forest resources, through production of more forest resources, their utilisation and management, through identification of possible industrial activities likely to spring up in the region and marketing of products produced by these industries.

In short, the proposed approach attempts to stimulate a form of land use plan, That incorporates the three basic principles of the Kenyan forest policy; first to provide for the needs of the country in timber and other forest products adequate to meet the requirements of the community under a fully developed national economy and to provide the greatest possible surplus of forest products for export. Second, manage these forest estates on the principle of sustained yield in accordance with approved plans so as to obtain the best returns on the capital invested in their development. Third, foster the conception of a mutually interdependent forest industry

and integrated with other sectors of the economy to the best advantage of Kenya, by ensuring that the production, harvesting and utilisation of forest products is closely co-ordinated.

The model illustrated in figure (i) is divided into three levels: level I represents the production of forests, level II represents utilisation processes (mainly industrial processing) and level III represents the marketing process. It is the belief of the writer, that this model will help in the management of human activities in the district which affects forest resources through proper monitoring and management of all the activities in the region.

At level I, all department having relationship with forest resources would be included in the Nakuru District Forest authority. It is assumed that, these departments will provide information on economic, technical, financial, managerial, administrative and legal aspects of the production of forest resources. At this level a proper survey and inventory of forest resources should be prepared. Thereafter goals and objectives of the authority can be formulated. These should be in line with those formulated at the national level. Subsequently the authority through all its departments can prepare alland use plan to guide implementation of all projects

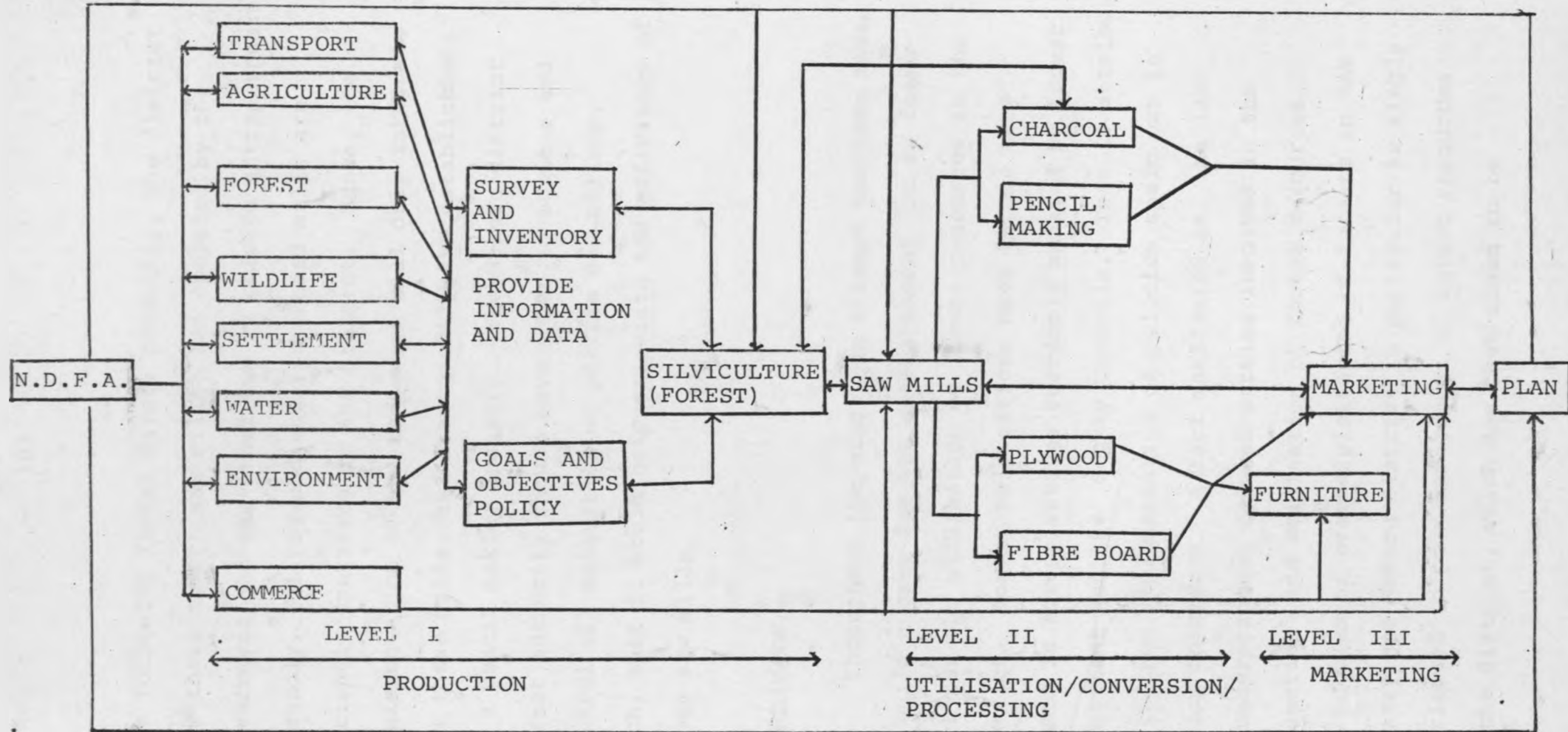
in the region.

At level II, the main activities will include harvesting (logging) transporting and sawing of logs. It is proposed that most of the existing saw mills should be allowed to operate in the district. But all of them must acquire and install modern equipment which would reduce wastage. In the event of doing so, industries that draw their raw materials from the saw mills should be established. These include: fibreboard, furniture, plywood and pencil making industries. A charcoal kiln should also be established to make use of the bye-products of the saw mills. All these industries shall be under direct management of Nakuru District Forest Authority.

Level III mainly consists of the market channels of raw timber, furniture and fixtures, plywood, fibreboards pencil and charcoal. The Nakuru development authority help market these products through operating show rooms and deposits in major towns. It is assumed that the Authority will have full control of all activities taking place in its area of jurisdiction, unlike other advisory authorities like Tana and Athi River development authority or Lake Basin Development Authority.

The viability of the framework is justified by

FIGURE I



PROPOSED MODEL FOR UTILISATION OF FOREST RESOURCES

the following facts: first, presently, the district has three modern saw mills; one operated by the Government and the other two by private entrepreneurs. Secondly, the plywood and fibreboard mills are currently operating in the District. Hence, the implementation of the framework will only integrate all these mills, and subsequently, the establishment of a pencil making industry. The Nakuru district forest authority should have power to monitor and control all activities of private saw millers. Such, that it would help alleviate the efficiency of their saw mills.

CONCLUSION:

Throughout the study, an attempt has been made, to build a case for the establishment for a framework for the utilisation of forest resources in the district. Forest malpractices have become very common in forest estates currently managed by forest department and the County Councils. This is attributed to the non implementation of policies spelt out in policy documents. A fact manifested in the lack of understanding between parties involved in the production and utilisation of forest resources. The problem of over-exploitation of forests in the country and Nakuru District in particular is singly attributed to poor management of forest resources in the district, which has been shown to be

associated with the use of old (outdated) tools and technologies. It is in this respect that this study recommends the formation of Nakuru Forest District Authority to handle and manage forest resources in the District. From the survey, it is clear that the District has enough resources to sustain its wood demand, if they are properly managed. However, it is the findings of this study that there is need for more research in the following areas: present and future trends in consumption of timber in the district and the country as a whole; present production methods and the factors responsible for the low quality of timber products and lastly, there is a need to establish the contribution of timber industry to the national development.

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APPENDIX

QUESTIONNAIRE FOR INDUSTRIAL ACTIVITIES

1. Type of activity -----

2. Date of establishment -----

3. Total area of the industry -----

4. Ownership of the plot -----

5. Total number of workers -----

6. Permanent ----- Temporary/casual-----

How many of your employees are trained -----

Type of training

No. of workers

7. What raw material do you use:

Raw materials (types)

Quantity

Source

8. How do you transport your raw materials -----

9. Do you encounter any problem in obtaining transport for the raw materials?

10. What is the maximum production capacity of this industry

11. Present production capacity:

Products:

Quantity:

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12. Do you encounter any problems with your machinery:

13. Where do you market your products -----

14. How do you transport the finished products?

15. What problem do you encounter while marketing your products:

16. What are your future plans for expansion-----

17. What other problems do you encounter while running your industry?

