"FEEDER AND ACCESS ROADS PLANNING IN RURAL DEVELOPMENT: A CASE STUDY OF BUSIA DISTRICT, KENYA"

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"A THESIS SUBMITTED IN PART FULFILMENT FOR THE DEGREE OF MASTER OF ARTS (PLANNING) IN THE UNIVERSITY OF NAIROBI.

"THIS THESIS IS MY ORIGINAL WORK AND HAS NOT BEEN PRESENTED FOR A DEGREE IN ANY OTHER UNIVERSITY"

(Signed).....

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"THIS THESIS HAS BEEN SUBMITTED FOR EXAMINATION WITH MY (OUR) APPROVAL AS UNIVERSITY SUPERVISOR(S)

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A B S T R A C T

In Kenya, as in other less developed countries, most of the poor people are found in the rural areas. The rural areas are less developed than the urban areas, despite the fact that about 90% of the people live in the rural areas engaged in agricultural activities, and despite that agriculture accounts for acout 70% of exports and 30% of the G.D.P.

This situation aroze, in other countries in general and Kenya in particular, because the previous development policies and decisions favoured the urban centres more than rural areas. But later, it was realised that any development effort without stress on development in the rural areas was liable to fail. The previous policies resulted in high migration influx in few urban centres causing many problems including unemployment in the urban areas. So as early as 1969 this problem had been realised in Kenya and several programmes and projects were planned to develop the rural area (S.R.D.P., designated service centres and many others)

Included among the factors which influence rural development are an efficient and reliable transport system. In the past in Kenya a major stress was on trunk roads in general and development of efficient road system in few regions especially the White Highlands. The study areas which was among the former Native Reserves has got very good trunk roads system which transverse it and mostly carries through traffice to or from Uganda and are inadequately linked to the road system within the district.

There is a high potential in the district despite low standard of living and comperatively low levels of economic production. One of the factors which contributes to the underutilization of resources is the poor state of roads, where 92.7% of the roads lenght are earth and gravel, and are wet, muddy and impassable when it rains.

Many of the service centres plus other resources use areas are well served by roads except few places in the district. But regarding the condition of the roads, this is not true as most of the people are cut off from these centres and the services in them for sometime in the year. Therefore, there was need to improve the access roads in the district. There was also need to make a provision for the feeder roads especially in the planned sugar and rice schemes.

This study has tried to show that there are many facilities and services which contribute towards rural development. Rural development, by itself is a vague term which has not been adequately defined. But there have been several definitions on rural development, and from them it can be stated that in order for rural development to be attained there should be provision of economic and social services and physical facilities, transportation takes a prominent part and the lack of transportation can have adverse effects on development. Innovations usually move along transport channels and for development in the rural areas to take place, innovations are very important.

In Kenya, within the transportation network, the roads are most flexible than rail, water and air systems. The roads are also more adaptable for travel in the remote rural areas. Access roads which are comparatively cheaper to construct than other types of roads, increase accessibility in the rural areas. These types of roads if improved upon, have a vital role to play in the development of the rural areas!

CHAPTER 1.

INTRODUCTION:

1.1 STATEMENT OF THE PROBLEM:

In Kenya, as in most less developed countries, the major problem is the low level of development, especially in the rural areas. The comparative underdevelopment of the rural areas is not unique to the developing countries, but it seems to be a world wide phenomenon. The rural areas as such, tend to be the least developed of any economy. Rondinelli and Ruddle have stated that both relatively and absolutely the articles of rural settlements deal with the poor. Even in the most advanced economies the poorest people are usually found in the rural areas.(1) In Kenya, this is of significant magnitude because about 90% of Kenya's population still live in the rural areas (2) and earns its livelihood predominantly from agriculture, or in some cases, from agricultural related rural activities like processing industries. So, any planning study or research in the rural areas should address itself to the acceleration of development and hence the raising of the standard of living of the people in these areas with emphasis on agricultural development. This is not only due to the fact that agriculture is a major source of income in the rural areas, but at Kenya's present stage of development, agriculture plays a vital role in the country's general development. As shown in Table 1. agricultural products account for over 75% of domestic exports since 1966 to 1975, and from Table 11, agriculture forms about 30% of Gross Domestic Product. Manufacturing which forms an important element of G.D.P. in the industrialised countries, in Kenya, its contribution to Gross Domestic Product is less than a half of that one of agriculture. As such, agriculture is a very important element in the Kenyan economy. For example, the National Development Plan 1974-78 states that despite migration to the city, the rural population will continue to grow, and agriculture will continue to be the main source of employment throughout the plan period.(3)

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However, although agriculture and hence economic development form a correspondingly an important element in rural development, they are not the sole parameters of rural development. Rural development has been defined by Ominde et al as "a series of quantitative and qualitative changes occuring among a given rural population and whose converging effects indicate in time a rise in the standard of living and favourable changes in the ways of life".(4) While Uma Lele states that rural development is defined as improving living standards of the mass of the low income population residing in the rural areas and making the process of their development self-sustaining.(5) Further, Kimani and Taylor state that rural development is generally accepted to be a holistic concept which recognizes the complexity and interrelatedness of the many variables which influence the quality of life in rural areas.(6) Rural development, in broad terms, means increase in economic and social welfare, and it involves positive change in the standard of living of the people in the rural areas.

As it can be observed, these definitions like many others on rural development, are broad and embrace many interdependent and interrelated factors, such as economic facilities (i.e. agriculture, industry, commerce and trade), social services (i.e health, education, water, security and administration), and physical infrastructure (i.e transportation and communications) By the subsistence nature of the rural economy in the third world when these services are provided or introduced, they entail introduction of innovations These innovations are aimed at the identification of the needs and the satisfaction of the aspirations of the people, and exploitation of the human and natural resources in the rural areas.

It is a general view that development facilities and innovations move from more developed and usually urbanised centres through or along transportation routes to less developed areas usually rural areas.(7)

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TABLE 1: DOMESTIC EXPORSTS - PERCENTAGE OF THE TOTAL VALUE:

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1. CROP PRODUCTS	75.9	72.2	75.0	75.3	76.2	71.5	74.9	78.9	73.2	69.6
2. ANIMAL PRODUCTS	10.6	9.5	9.7	7.5	6.6	8.8	10.8	8.6	6.2	6.7
3. CROP + ANIMAL PRODUCTS (1+2)	86.5	81.5	84.7	82.8	82.8	80.3	85.7	87.5	79.4	76.3
4. PETROLEUM PRODUCTS	10.1	13.8	10.8	13.0	11.4	14.5	9.9	7.7	16.1	18.8
5. CEMENT/BUILDING	1.5	1.9	2.0	2.3	2.5	2.1	2.2	2.1	2.4	3.2
6. MINERALS/SCRAP METAL	2.7	2.6	2.5	2.0	3.3	3.1	2.2	2.7	2.1	1.7
7. TOTAL OF REST (4+5+6)	13.5	18.3	15.3	17.2w	17.2	19.7	14.3	12.5	20.6	23.7
	100	100	100	100	100	100	100	100	100	100

Source: Compiled from Statistical Abstract 1976
Central Bureau of Statistics
Kenya Government

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Table 11.

G.D.P. by Industrial Origin 1972-75 at Current Prices K£. Millions.

Gross Product at Factor Cost.

	1972	1973	1974	1975
Agriculture	205.11	222.92	254.38	302.31
Fishing & Forestry	9.87	11.05	12.61	13.53
Mining & Quarrying	2.33	3.20	3.14	3.47
Manufacturing	77.94	94.60	119.07	134.01
Electricity & Water	13.93	14.50	15.71	17.75
Building & Construction	47.38	52.35	58.08	61.09
Wholesale, Retail Trade etc.	66.26	80.48	115.88	120.34
Transport & Communication	39.61	46.13	55.65	60.59
Finance, Insurance, etc.	31.42	34.54	46.80	55.03
Ownership of Dwelling	41.33	46.97	54.07	66.24
Other Services	14.69	17.30	22.14	24.97
Private Households (Domestic Services)	5.12	6.15	7.27	8.86
Government Services	107.18	113.57	136.00	158.61
TOTAL GROSS PRODUCT AT FACTOR COST	662.07	743.76	900.80	1026,80
PERCENTAGES OF G.D.P.				
Agriculture	31%	30%	28%	29%
Manufacturing	12%	13%	13%	13%
Government Services	16%	15%	15%	15%

Source: Statistical Abstract 1976
Central Bureau of Statistics

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So, in spatial study or planning, communication routes assume an important role as means along which development innovations travel from more developed to less developed areas. Therefore, transportation is a necessary component to development. The World Bank considers transportation as a necessary concomitant of the exchange economy, and is indispensible to economic growth. Where there is no transportation, economic activity is restricted to hand-to-mouth subsistence levels. Specialization and the generation of supluses for exchange on the basis of comparative advantage are not possible without the capability to move resources and goods from one place to another. The demand for transport services increases with the extension of the input-output relationships of the economy, and the provision of transportation services can be an important determinant of the pace and locational pattern of development.(8) Even Morgan and Alden have indicated that by establishment of adequate infrastructure for agricultural and industrial development, and social progress creates favourable conditions for general development.(9)

There have been cases where it has been found out that transportation is not only concomitant to development as stated in the World Bank publication. Eliot Hirst, through several case studies has found out that:

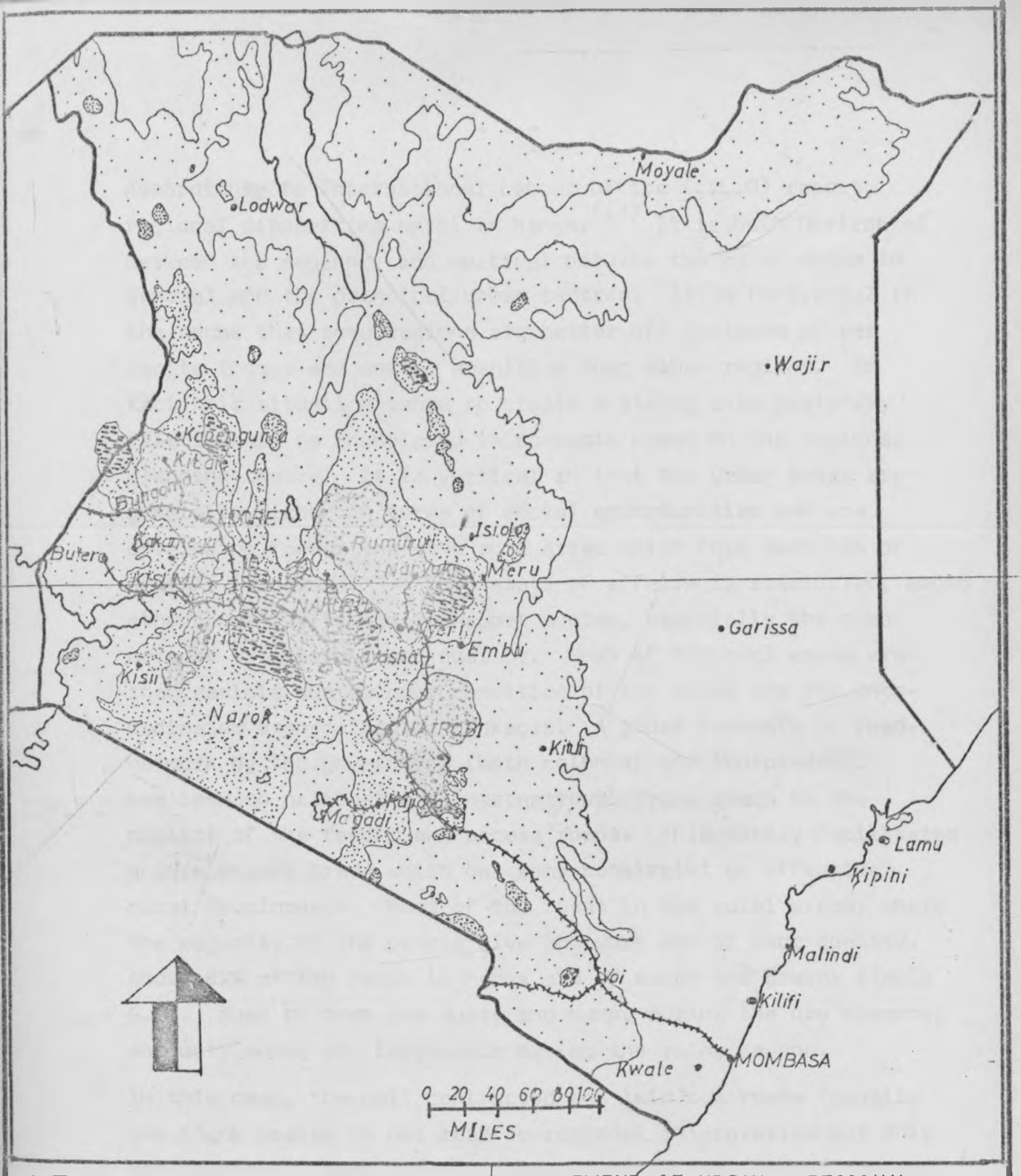
(a) the provision of transportation facilities predates economic growth and development;
(b) the provision of transportation is concomitant with economic growth; and
(c) the provision of transportation postdates economic growth.(10)

There are several examples of (a). At the start of the colonial period, the colonial governments constructed railways from the coast to the interior for purely political and administrative reasons, but in many cases, development started along the railway. As it will be shown later, the construction of the Uganda Railway at the beginning of this century is a good example of such situation. The second case is the most common one, where the provision of transportation facilities is concomitant to development. For example, when a railway line is

built to an area of high mineral potential in order to extract the mineral. The third case is found where there is some potential, but the present level of transportation facilities is a constraint to the optimal exploitation of that potential, as is usually the case in the rural areas. Eliot Hirst further observes that it is very difficult to have a clear cut-line between the three above cases for each particular situation.(11)

So far in this section, the general view has been that transportation is an important infrastructure for general development. But complementary to that, transportation provides both the general accessibility and convinience. Improvement in transportation facilities increases accessibility and hence increases the rate and frequency of movement of people and their goods. If this occurs in the rural areas, then innovations have a good chance to trickle to the rural areas much faster and thereby enhance rural development.

The transport system in Kenya was developed purely to serve the dual economy where the rural areas are tapped off resources geared for the export market. The primary role of the transport system has been to tap raw materials from the resource zones for export and to bring in imported manufactured products to serve mainly the urban centres. For example, there is an observation that many of the forces that have influenced the modern development of Africa have entered through the seaports, but at the present time the progress of African economic development has not yet reached a stage where internal trade rivals external trade in quantity or value. The developing economies of the countries of modern Africa are thus markedly orientated, through the seaports, towards external export markets and sources of imported goods.(12) The resultant development has followed the transport network so closely that the vast rural areas which do not have adequate transport facilities, in many cases, have lagged behind (Map No. 7). In the map, it is shown that development activities were concentrated in about a third of Kenya, which correlates very much with accessibility. The rest is grossly inaccessible purely because the earlier locational decisions neglected them.



LEGEND

- INTERNATIONAL BOUNDARY
- TOWNS
- SCHEDULED AREAS (WHITE HIGHLANDS)
- RAILWAYS
- OVER 8000 FEET
- 5000 – 8000 "
- 2000 – 5000 "
- UNDER 2000 "

DEPARTMENT OF URBAN & REGIONAL PLANNING
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M. A. (PLANNING) THESIS 1978

Map No. 1

Source: I.B.R.D. Sept. 1962 'Economic Development of Kenya.'

KENYA "WHITE HIGHLANDS"

According to International Labour Office (I.L.O) report, regional disparities exist in Kenya.(13) It is both horizontal between the regions, and vertical between the rural areas in general and the principal urban centres. It is horizontal in the sense that some regions are better off in terms of per capita income and social amenities than other regions. In fact this situation tends to create a strong core-periphery relationship as enunciated in concepts based on the regional planning theory. It is vertical in that the urban areas are generally richer in terms of social apportunities and are developing faster than the rural areas which form over 98% of Kenya's land mass.(14) This state of affairs is attributed, among other factors, to the transport system, especially the road network - in layout and quality. Most of the rual areas are inaccessible due to poor condition of the roads and the unco-ordinated transportation linkages. A great emphasis on road-network by the government (both colonial and independent) has been on national and international trunk toads to the neglect of the feeder and access roads. This mostly facilitates a pure export trade which has some constraint on effective rural development. Most of the roads in the rural areas, where the majority of the people live and work are of poor quality. About 92% of the roads in Kenya are of earth and gravel (Table 6.2). Most of them are dusty and bumpy during the dry seasons, and wet, muddy and impassable during the rainy season.

In this case, the well contructed and laid out roads (usually the trunk roads) do not lead to regional intergration but only act as direct links between areas of resources (labour and raw materials) and the core-areas. This facilitates the transfer of reaources from the rural areas to the better endowed areas with facilities (i.e urban centres). With the movement of labour from the rural areas to urban centres, it can be argued that it reduces unemployment in these depressed areas, but it does not necessarily follow so. Most of the labour that emigrates is usually the physically active and more skilled than the one which remains behind. Therefore, the transfer of

such type of resources from the rural areas is deterimental to rural development, and as such, the existing road network becomes one of the factors which constrains rural development.

As the Kenya government has noted for sometime, the objective of national development is the social and economic transformation of all the people, especially in the rural areas. In order to achive rural development, the provision of adequate facilities is a vital factor.(14) Included in the facilities, as an efficient and reliable transport system.

1.2 OBJECTIVE OF THE STUDY

In view of the above stated problems, in this study the author sets out to design a road network for the study area, with particular emphasis on feeder and access roads, within the limitations, physical and otherwise, presented by the area. The objective will be to have a road system which will play an effective role in rural development. In order to justify this proposal, the study will evaluate the role of roads, especially access and feeder roads, in the development process in the rural areas.

For the purpose of establishing the role of roads in rural development, first, the study will critically examine and analyse the relationship between road transport, especially access and feeder roads, and rural development. Particular attention will be directed to the evaluation of how lack or the presence of access and feeder roads as a means of transportation have affected rural development over time and space. The problems which have resulted due to the present road pattern will be examined in reference to the study area. Secondly, the study will assess the physical, economic and social resources of the study area so as to correlate them with optimal combinations of access and feeder roads to foster rural development.

The aim of the proposal will be to suggest guidelines for the siting and constructing of roads in the rural areas for effective, efficient and cheap movement of people and goods, and development

innovations. The quidelines will take into consideration:-

(a) The road pattern that the economy can afford and maintain, and which leaves room for easy alteration, upgrading and connection of new links as the economy progresses.

(b) The road network which encourages internal trade within the region as well as enables the region to interact with other regions and other more developed areas especially urban centres without adversely affecting its development prospects in the short and long run.

(c) The road system will have to increase accessibility by joining major settlement, resource and resource use areas.

Therefore, the guiding principle of the proposal will be that roads should be designed and constructed as vehicles for rural development.

1.3. LOCATION OF THE STUDY AREA:

In order to evaluate the effect of roads on rural development and to give viable suggestions and proposal, a case study was made of Busia District in Western Povince, Kenya. Busia District is one of the districts in Western Province. The other districts are Bungoma and Kakamega (Map No 2) The district with a surface area of about 1670 sq. km. of which 37 sq. km are apart of Lake Victoria, is the second smallest district in the country, after Kirinyaga District in Central Province.

The district lies along the Uganda/Kenya border, which forms the whole of its western boundary. The district's southern most boundary extends just to the south of the Equator to about 0^{0} 2'S, which is in Lake Victoria. It extends north to about latitude 0^{0} 47'N, which gives an approximate distance from north to south of 100 km. It lies within longitudes 33^{0} 55' and 34^{0} 26'E. approximately, which is roughly a distance of 55 km. It is a narrow district with a general trend of north-east to south-west. (Map No. 3).

It is bounded by Bungoma and Kakamega Districts to the North-east and east respectively, and by Siaya District of Nyanza Province to the south. (Map No. 4)

LEGEND

International Boundary.

W. Province "

STUDY AREA.

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University of Nairobi

LOCATION OF BUSIA DISTRICT IN KENYA.

BUSIA DISTRICT GEOGRAPHICAL LOCATION | MAP NO. 3

LEGEND

- INTERNATIONAL BOUNDARY
- PROVINCIAL BOUNDARY
- DISTRICT BOUNDARY
- TRUNK ROADS
- OTHER ROADS
- MARKET CENTRES
- RAILWAY
- SWAMPS
- RIVERS

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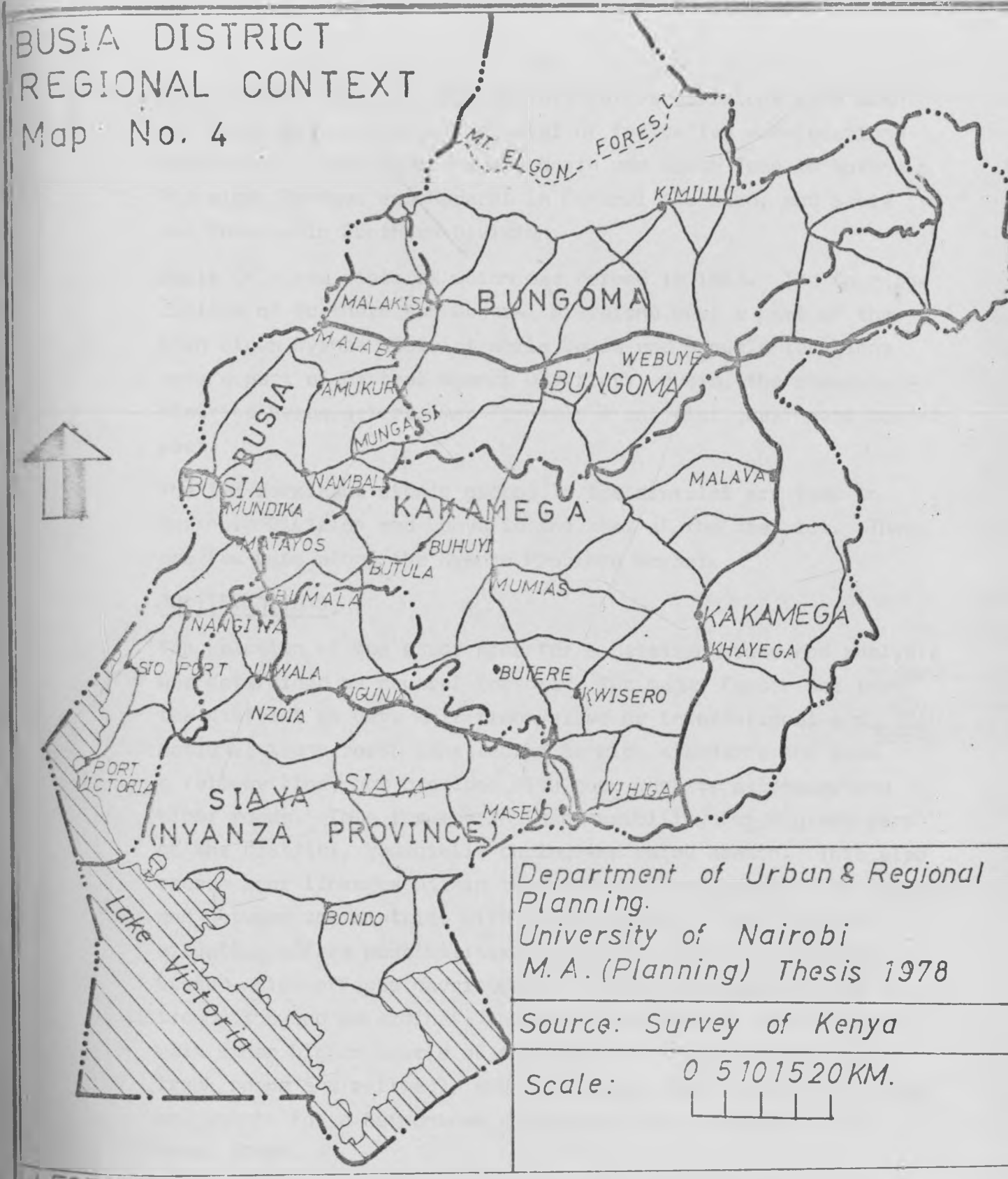
SCALE: 1 : 5,000,000

SOURCE: SURVEY OF KENYA

BUSIA DISTRICT
REGIONAL CONTEXT
Map No. 4



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Source: Survey of Kenya

Scale: 0 5 10 15 20 KM.

LEGEND

- International Boundary
- Provincial "
- District "
- Trunk Roads.
- Other Roads.

The district has got three administrative divisions each with two locations and has got a total of forty-five sub-locations (Map No.5) The locations are North and South Teso in Northern Division, Bukhayo and Marachi in Central Division, and Samia and Bunyala in Southern Division.

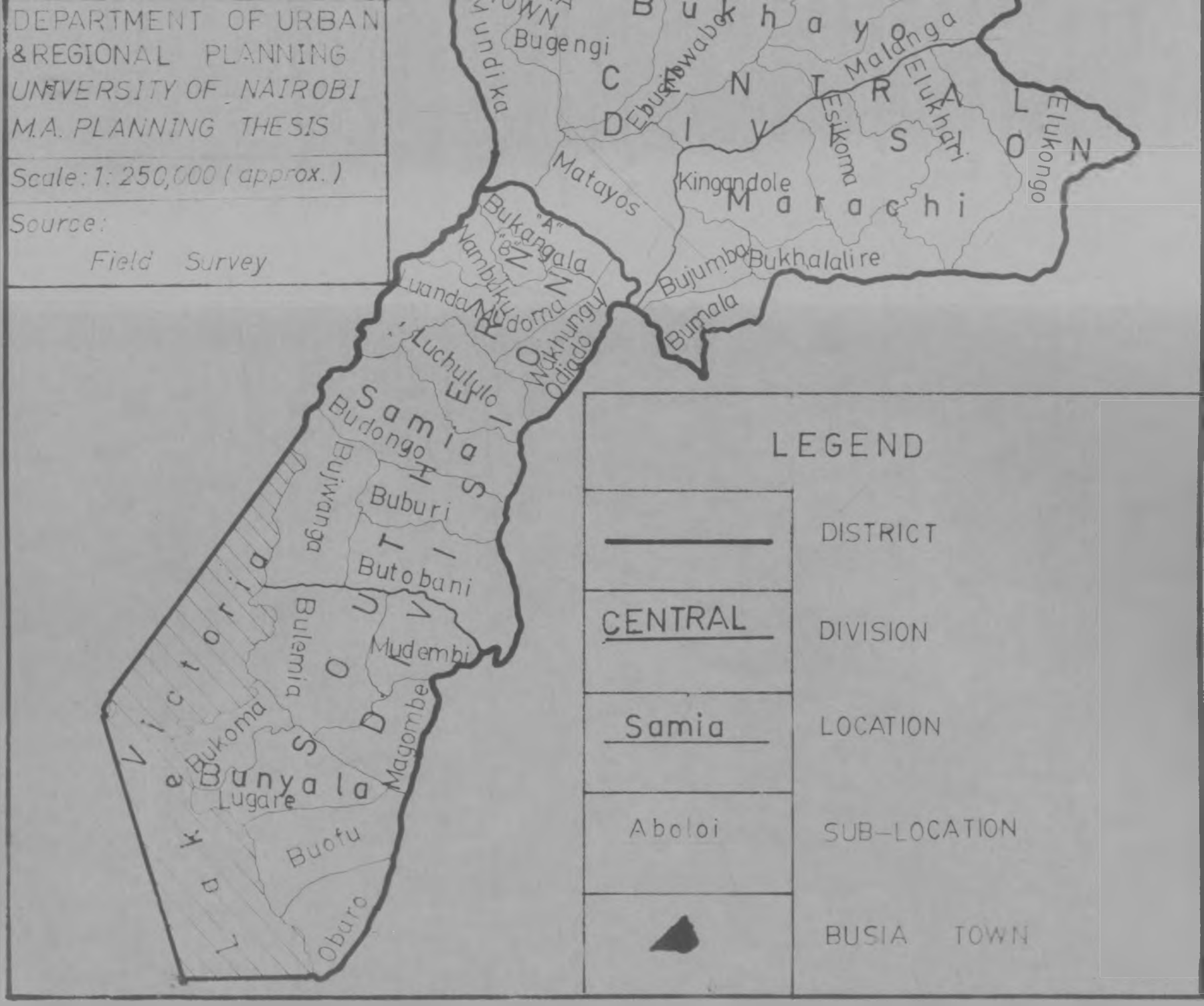
Busia is a new district which was formed in 1963. The four locations of Northern and Central Divisions were a part of the tnen Elgon Nyanza District while Samia and Bunyala locations were a part of Central Nyanza District. Busia, the present district headquarters, was formerly a colonial government border post.

The two dorminant ethnic groups in the district are Teso in Northern Division and Luhya in the rest of the district. There are few Luos along the Nyanza Province border.

JUSTIFICATIONS.

The selction of the study area for a detailed study and analysis was determined by several factors. The major factor was that the district is very well transversed by international and national trunk roads constructed to high standards and even a railway line, but provided with poor quality secondary and minor roads. This results in inaccessibility for a great part of the district, especially during the rainy season. This also causes poor linkages within the district, and between the district and between the district with other regions. This type of situation offers possibilities in planning for a road transport system which effects development. There are possibilities to s-tream-line and co-ordinate the access and feeder road system with other higher levels of the transportation network (i.e trunk roads and railway), and with other development facilities and points for a harmonious desired positive change in the rural areas.

The other reasons are that, first, the district has minimal


DEPARTMENT OF URBAN & REGIONAL PLANNING
UNIVERSITY OF NAIROBI
M.A. PLANNING THESIS
Scale: 1: 250,000 (approx.)
Source:
Field Survey
Mundika
Bugengi
Ebusiwabakhayo
Malanga
Elukhari
Esikoma
Elukongo
Matayos
Kingandole
Marachi
Bukangala
Vambuku
Luanda Nyudoma
Wakhungu
Odiado
Bujumba
Bukhalalire
Bumala
Luchululo
Samia
Budongo
Buduma
Buburi
Butobani
Mudembi
Bulemia
Bukoma
Busia
Lugare
Buofu
Oburo
Magombe
Victoria
LEGEND
DISTRICT
CENTRAL
DIVISION
Samia
LOCATION
Aboloi
SUB-LOCATION
BUSIA TOWN

level of urbanization, and the standard of living of the people is poor. This presents an ideal enviroment for the evaluation of problems of rural development. Secondly, despite the fact that land in the district has been classified as high potential,(15) the level of agricultural and other economic activities is comparatively low. This offers a good chance for planning for the exploitation and optimal use of the underutilized resources to accelerate the development process. Lastly, the other factor which had some bearing on the choice of the study area was that the author cames from the district The author has had general observation of development trends in the district in the past, and this is of some help for comparison purposes. Also with limited financial resources and time during the field survey period, this factor was a vital asset to the author, especially during interviews and for research assistance in the field.

1.4 SCOPE OF THE STUDY:

In this study, the theme is to make a feeder and access roads plan and to evaluate their contribution to rural development. In order to achive this objective, there are several strategies which are proposed. These strategies involve the review of previous government performance in the fields of spatial development and road transportation network over time. In addition there is a general examination of the present policy on road system and rural development. Secondly, the study makes an inventory of the economic resources, social facilities and physical factors of the study area in order to assess the potential and to try to match the resources with the existing and anticipated road infrastructure, and suggest guidelines as to what areas need improvement or changes. This calls for detailed analysis of the road network/land use relationship in order to fulfil the correlation between resources and access/feeder roads system. As it was stated at the beginning of this paragraph, the end result will be a feeder and access roads plan for the study area.

This study has been divided into four main parts. Part one consists of the general review of government policy and programmes on rural development and transport system. This includes the historical study of the transport network and settlement pattern in Kenya, and government policy of rural development. This part is presented in chapter two.

Part two consists of chapters three to five. In this part there will be an inventory and analysis of physical and population factors, economic resources and land use potential, and social facilities in order to assess the settlement patterns, plus establishing resource and resource use areas.

Part three, which is chapter six, is the transport system in relation to general land uses as established in part two. In this part, there is analysis of modes of travel, traffic generation potential, linkages (transport network co-ordination) and accessibility, and the inventory of transport network (layout and standards)

The last part is chapters seven and eight. In this part are the suggestions (recommendations) for policy guidelines and the actual road network plan. Included in this part is the summary and conclusions.

1.5 HYPOTHESIS:

In this study, the theme is that an efficient road transport system has a role to play in rural development. Rural development is a major policy objective in Kenya and there have been several proposals as to means and ways of achieving it. There are several factors which must be present in appropriate magnitudes in order to attain it. Some of them include economic and social facilities, plus physical infrastructure. Roads are an important element in the development infrastructure. As such, roads are a pre-requisite for development.

So in this thesis, access and feeder roads have been used as a basis in planning for rural development. In that respect the hypothesis can be stated, "An efficient access and feeder road system has role in rural development"

RESEARCH METHODOLOGY

Sources of data for this study included materials from reports, articles, books, and statistical returns and annual reports of the Government Ministries.

Field surveys were carried out during the months of August and September 1977. Basic statistical information was collected in most areas during the intensive tour of Busia District. The people interviewed and places visited included the District Commissioner's and Departmental offices, and the three Divisional offices at Nambale, Hakati and Kacholia, including the six locational offices at Port Victoria, Funyala, Butula, Nambale, Amukura and Angurai. Also visited are the cotton ginneries at Nambale and Luanda, customs offices at Malaba, Sio Port and Busia, hospitals at Busia, Amukura, Butula and Nangina, the proposed site for fish plant at Port Victoria and M.O.W. Roads depots at Busia Amukura, Mungatsi and Funyala. The levels of services at the above centres were recorded and the governmnent and other officials were interviewed. A survey of services and permanent residents was made for all the rural (including urban) service centres and the same was done for Sio Port, Port Victoria, Bumala and Amukura designated market centres.

Problems:

During the time of the survey, the Southern and Central Divisions of the study area were declared cholera infested region and movement of people was officially restrained. But after a permit from the District Commissioner, this problem was reduced. The second major problem was the difficulty to get information from the traders concerning their commercial activities because of the then prevailing smuggling activities along the border. The main suspicion was that the interviewer was a government agent.

Another problem was the means of transport since the author used public means of travel especially 'Matatus' which did not reach all the parts of the district. This was caused mainly by the poor state of the roads since it was during the short rains and many of the roads from primary roads to minor roads were impassable.

Methods of Data Analysis:

Methods of data analysis include data tabulation, graphs, mapping and sketch diagrams and trend surface analysis.

1.7 LIMITATIONS:

During the course of the study (field survey) it was found out that there were traffic volume counts for only three of the roads in the study area (i.e A104, B1. C31). In order to evaluate the role of roads in development effectively, it is importtant that traffic flows on most of the roads and the use of specific roads by surrounding areas especially centres, to be known. But with the amount of funds, and time available for the research it was not possible for this excercise to be carried out. This was noted as an important limitation. However, it is felt that despite this limitation, data and other information gathered for this study was sufficient to bring out the effects of access roads on rural development.

1.8 DEFINITIONS OF IMPORTANT TERMS.

International Trunk Road(A)

The Ministry of Works - Roads Department - completed the road reclassification in 1970. In this reclassification, International Trunk Roads (Class A) link centres of international importance (i.e. Nairobi), and crossing international boundaries or terminating at international port (i.e. Mombasa)(16)
They also link other principal towns (i.e Nakuru) These type of roads are usually constructed to very high standards, generally tarmac surfaced and have intensive road traffic usually going beyond international borders. Road A104 through the northern section of the study area (for about 12 km) to Uganda is one such roads (Map No.16)

National Trunk Road (B).

National Trunk Road (class B) link or are supposed to link nationally (principal) important centres (i.e. Kisumu , Kakamega, Embu) (17). These are also of high standard, nearly all of them are all-weather roads and the majority are bituminized. National Trunk Road B1 from Kisumu to Busia on the Uganda border passes through the Study Area (Map No.16)

Primary Roads (C)

Primary Roads (Class C) are supposed to link provincially important centres to each other, or to higher class roads.(18) Ideally, these are also supposed to be all weather roads and capable to take any type of traffic. Urban centres are supposed to progressively be linked with National Trunk Roads by means of Primary Roads(19) There are three Class C roads in the Study Area - C30, C31 and C32 - totaling about 104.7 km. (Map No.16 and Table No.XXI).

Secondary Roads (Class D)

Secondary Roads (class D) link locally important centres to each other and higher class roads.(20) Rural centres are supposed to be linked to the Primary Road network by Secondary Roads or roads of a higher classification(21) These are considered as access roads in the rural areas connecting local markets. There are about 168 km of Class D roads in the Study Area (Map No16)

Minor Roads (class E)

Minor Roads (class E) link minor centres and are supposed to reach small resources areas. Ideally, each area in the rural areas is supposed to be atleast a distance of 2 miles from a class E road . This is considered as a convinient distance for accessibility(22) These form the biggest percentage of roads in the study area and they account for 188 km.

Special Purpose Roads:

Special purpose Roads include tourist, township, agriculture, fish and strategic roads.(23) Tourist, agriculture and fish roads are the ones usually referred to as feeder roads, since they are connected with those particular projects. When a road segment is directly related to a development project sponsored by a specific sector (such as a sugar or irrigation schemes), the road is to be considered, justified and financed as a part of the scheme it supports.(24)

Access Roads.

Access Road in the rural area is generally any road usually Class D and E, and in some cases Class C which is for general movement of

people and goods, and connects nearly all important centres, in the rural areas (i.e Markets)[25] Access roads are considered necessary for stimulation of development in the rural areas. Ideally, accessibility is considered as 2 miles where the topography is generally flat and for other areas it could be less than the stipulated 2 miles. In any case, this stipulated distance of 2 miles also depends on the type of goods. For bulky goods using non-motorable means of transport, it seems as if the 2 miles is an excess distance. But even now, the present stage of the economy can hardly afford the 2 miles distance as stipulated.

Feeder Roads:

Feeder Roads are a special type of access roads which are ussually attached to a development such as a high value agricultural or irrigation schemes (i.e sugar, tea, wheat, coffee, fish rice, settlement roads)[26] The construction and maintenance of these type of roads is generally included in the cost of the relevant project. They are a part of investment in the project and they are considered as necessary part of the relevant projects, if the projects are to succeed. Most of the feeder roads are all-weather roads finished to Standard V and IV of the Earth/Gravel levels of roads and some are even bituminized. In the study area, there are no feeder roads according to this definition. But there are two agricultural schemes - Busia Sugar Project and Bunyala Rice Scheme - which were recommended by the Ministry of Agriculture which will need feeder roads. Therefore, there is need to plan for feeder roads in the district, especially for the two projects above.

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CHAPTER 2.

1.1 GENERAL REVIEW OF NATIONAL POLICY:

This chapter discusses the history of the settlement system and development of the transport network in Kenya from the earliest times possible to the present. In addition, there will be a general review of government policies on rural development, and road construction and transportation, plus evaluation of government activities on access roads.

The historical development of the transport system and settlement pattern will give the background to the origin of the distribution of facilities and the level of development as experienced in several places in Kenya, especially in the study area. This will also be a pointer to what can be achieved in the study area with the provision of access roads. The evaluation of government policies on road transport and rural development gives the framework within which to plan for access roads, especially as concerns financing.

HISTORICAL BACKGROUND OF TRANSPORTATION NETWORK AND SETTLEMENT SYSTEM:

The East African Coast had been a part of the Indian Ocean trade system for centuries before the advent of the 19th Century. At that time, trade was carried out between the coast and the Persians, Indians and the Portuguese through the ports of Kilwa, Mombasa, Zanzibar, Lamu, Malindi, Pate and Tanga [illegible]. Small coastal ports had developed having limited links with their hinter lands and a weak hierarchy of ports developed along the stretch of the coastline. Therefore, until the beginning of the 19th Century, the East African coastal belt belonged to the rest of the continent only in geographical sence. Before A.D. 1800 events at the coast passed almost unnoticed in the interior, while people living along the coast were rarely touched by what happened upcountry. But in the long run the destiny of the coast became indissolubly linked to that of the entire region. From our present perspective, the most significant development on the coast during the period 1500 to 1850 was the growth of long distance trade between the coast and upcountry Africans.

In Kenya, in the early 1800's, contacts with the interior were made through the Kamba traders.(1) But the presence of the Masai and the Nandi in the middle of the country made effective penetration by the Arabs very difficult.

In the middle of the 19th century structural changes took place at the coast due to the fact that the Sultan of Oman transferred his residence from Muscat to Zansibar in 1840. There was an increased trade in ivory and slaves. Obudho summarises this system in the following terms:- "The coastal towns along the coast were the initial cultural contacts between the indigenous Africans and non-immigrants during this period. It is these which played an important role in the expansion of inland trade. Inland trade links were reinforced by the Arabs caravan traders and caravan routes established to enable the ivory and slave develop!"(2) As the caravan trade developed, a series of posts sprang up on the caravan routes as central places of resting and procuring fresh supplies. The European involvement in this trade increased the tempo of the building of these towns between the coast and interior parts of East Africa.

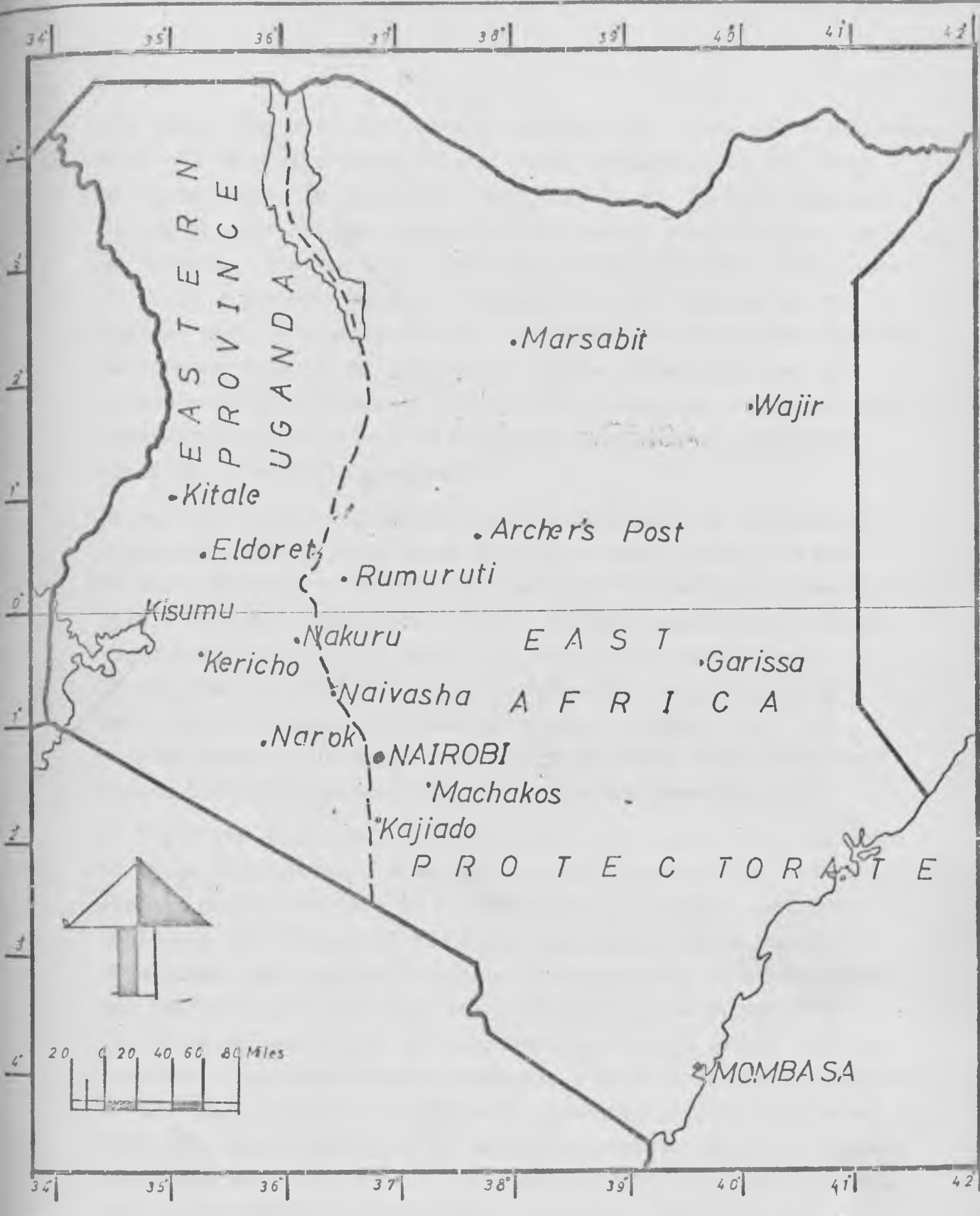
When the Sultan of Oman moved to Zanzibar, the British and other European colonial powers gradually became more involved in East Africa. Explorers, missionaries, trading companies and the English and Germany Governments were all in their own way interested to establish control over East Africa. The Arab states were forced to stop the slave trade, one of their main source of income, and to accept protectorate status in 1895.

After Kenya, then known as the British East Africa, being declared a protectorate in 1895, the British operational headquarters was moved from Zanzibar to Mombasa in 1896, which was the starting point for Uganda railway into the interior of East Africa. The East African Protectorate (Kenya) appeared in itself to be of little economic or strategic significance. As far as the interior of the then Kenya was concerned, the concern of the British Foreign Office between 1895 and 1901 was not so much the establishment of effective control over the different peoples, or the evolution of a suitable administrative system, but the main interest was the construction of the railway to connect Uganda to the Coast(3)

The then British East Africa was simply regarded as a barren country through which one had, of necessity, to pass on the way to Uganda.

This attitude of mind changed, when in 1902, the then Eastern Province of Uganda (in which the study is) was moved to Kenya (Map No).[4] This doubled the African population and also brought a lot of land suitable for Europeans into Kenya, later to be known as the White Highlands. From about 1904 settlers began to arrive from South Africa, and they were soon followed by other immigrants from Britain, Australia, New Zealand and Canada. The capital moved from Mombasa to Nairobi in 1907, although it had replaced Mombasa as Uganda railway headquarters in 1899. Various administrative centres were later established along the railway line. Nairobi later became the injection point for the diffusion of the colonial system using the railway as the major diffusion channel. The administrative centres which grew up along the railway were declared district headquarters: Kisumu, Nakuru, Voi, Lumbwa, Molo, Naivasha; and later Eldoret, Kitale, Nanyuki. As civil servants began to accumulate in these centres they had to be provided with the basic infrastructural services, so that centres became central places. However, these centres were set up to suite the objective of the colonialists regardless of the then existing traditional African market centres. The major objective in the new established centres was the provision of adequate facilities for the settler community in order to generate agricultural production for export and pay for the maintenance of the railway. Later, these centres acted as collecting points for agricultural produce from the African areas for export to the outside world.

The settlement organization which was developed during the colonial period was a reinforcement of the dual agricultural system, where the whole of Kenya was divided into two economic zones: the "Native Reserves" and the "White Settlers Zone" of which the White Highlands was the best example. This system effectively started in 1915 when the Crown Lands Ordinance gave statutory recognition to the so called "Native Reserves" and became absolute when the "White Highlands" were gazetted in 1939.[5]



LEGEND

INTERNATIONAL BOUNDARY (PRESENT)

UGANDA BORDER 1902

Source : National Atlas

DEPARTMENT OF URBAN & REGIONAL PLANNING
UNIVERSITY OF NAIROBI
M.A.(PLANNING) THESIS 1978

Map No. 6 | KENYA 19

The Native Reserves were peasant agricultural areas which included most of the African agricultural zones especially in the Lake Victoria region in which the study area lies. In these regions, the major activity was agriculture employing subsistence methods of farming. The few cash crops like cotton and maize introduced in these areas were mainly for export through Mombasa to the Western World and other places. The Native Reserves were reliable sources of cheap unskilled labour for the urban areas and the European settler enclave. Little effort was made to provide the necessary infrastructure to stimulate development, and hence resulted in economic stagnation.

Meanwhile, a unique settlement system developed in the central highlands of Kenya, the White Highlands, which were a citadel of White Settlers' domination. One East African Royal Commission report stressed preference of early European settlers for Kenya Highlands, an area where they could live free from the hazards of tropical diseases.(6) It is therefore not surprising that most upcountry towns like Nakuru, Kitale, Eldoret, Molo and Nairobi were established in this part of Kenya, where they soon became islands of modern economic and social emenities.

In the White Highlands, settlers owned very large farms and started large plantations. Although in theory both African and non-African production were to be encouraged, in actual fact when analysing the history of the White Highlands, only European production was promoted in Kenya. A prospective European farmer had adequate provision made for training, and he could obtain low interest loans from the Land Bank and direct grants for the purchase of capital farming equipment. Additional aid to European farmers was provided by government-sponsored agricultural research, maize and wheat subsidies, government-sponsored marketing schemes and transport facilities.(7) In addition there was good provision for social facilities like medical services, education and even sports. In order to sustain the white economy at the required level, there were several protective provisions made. The economy in the settler enclave was protected through tariffs and transport rates. For example, when exporting, no tariffs were charged. These were met by the peasant agriculture in the Native Reserves,

thereby subsidising the White economy. The crops grown in the White Highlands were not allowed to be grown in other areas.

The result of this form of spatial organization of settlements was that the White Highlands developed at a faster rate than other rural areas and became a labour intensive area, the centre of economic activities while the Native Reserves were convinient sources of cheap labour and a ready market for some of the manufactured goods. There was migration from the reserves to the White Highlands and from the rural areas to the urban centres. The urban centres acquired the status of intermediaries between the rural resources zones and the metropolitan Western World. Still, the urban centres were islands of modern amenities with piped water supply and sanitation, while the White Highlands acted as the core region to the greater part of rural Kenya.

2.2. DEVELOPMENT OF TRANSPORTATION SYSTEM IN KENYA:

Towards the end of the last century there were practically no roads into the interior of Kenya, except for tracks and foot-paths. The first wagon road was constructed from the coast to the interior up to Lake Victoria between 1895-1896 by a party of royal engineers whose instructions were to build a road of the simplest kind, unmetalled and in fact the roughest track along which a bullock cart would go.(9) The Mackinon road from Mombasa to Kibwezi (175 miles) inland had been built some years back. The new road continued from Kibwezi up through the Athi River plain, down the Kikuyu escapment, through Eldama Ravine, to the summit of the Mau Plateau and on to Port Victoria on the Lake [redacted].

In 1896, the Ugands railway was started at Mombasa and largely followed the earlier cart-track and reached Kisumu in 1901. The railway was built for effective control and administration of Buganda in particular and Uganda Protectorate in general. "The engineers came to Mombasa in 1896 to build the "Uganda Railway" and Kenya was merely a tract of land which had to be crossed to reach the goal of Lake Victoria".(10) The present railway network as we have it today was completed by 1930. The 589 mile line from Mombasa as it reached the shores of Lake Victoria make Kisumu the focus of the traffic that was developing in the well-watered region

around the Lake. The completion of the line thus laid the foundation for Kisumu to develop as one of the earliest urban centres in the country. The Nairobi-Thika lines was completed in 1913 and was finally extended to Nanyuki in 1930. Further west, the Uasin Gishu plateau was crossed to Uganda border in the 1920's (transversing the study area) and branch lines were laid to the farming centres of Kitale, Solai and Thompson's Falls (Nyahururu) by 1930. The Kisumu-Butere extension was completed in 1930. Meanwhile, the Magadi Soda line from Konza had been completed in 1914. Extensions of the branch lines to the rich farming districts represent a second stage in the motive behind the rail developments. It had become necessary to generate traffic to pay for an expensive line which had been initially built to meet political expediency. This was the rationale of the encouragement given to the settlement of the Europeans in the alienated areas of Kenya. There is no doubt as to the effect of the branch extensions on the traffic increase and general development.(11) This can be illustrated well by looking at the 1962 census. According to that census, out of a total population of 670,947 living in towns with over 2,000 inhabitants, 89.9% were found in those towns which had developed on the railway line. Even at present, the largest towns of Kenya with over 10,000 inhabitants are some of the major rail centres of the country.

The need for roads in Kenya arose when they were considered as feeders to the railway. The railway was considered as the major transport means and everything possible, including legislation, was effected to protect the railways from road competition. Although, at first the railway had been constructed for none economic reasons, it was found out later that it had to finance itself. Hence, roads were constructed as access means to it, tapping areas which were agriculturally viable but at a distance from the railway. But those areas which had low agricultural potential were opened up by roads to effect control and administration.

Before 1918, there were no official classification of roads in Kenya, and it is very difficult to distinguish roads from tracks.

But by 1919, it can be safely ascertained that there were about 400 miles of good maintained roads in the country. There were no motorable tracks in the study area before the end of World War 1. except the predecessor of the present International Trunk Road A 104 through Malaba to Uganda which transverses the northern part of the study district.

Immediately after the World War 1. and with the increased agricultural development of the economy, there was tremendous road construction. During the first road classification in 1927, which gave three road classes of main roads, district roads and administrative roads, there were about 8,825 miles of roads throughout the country. They were as follows:-

1. Main Roads - 2,578 miles
2. District Roads - 4,827 miles
3. Administrative Roads - 1,420 miles. (12)

Most of these roads were concentrated in the Mombasa-Kisumu Tororo Uganda corridor, with the highest concentration in the central highlands. Expenditure on public works, especially roads, increased from £206,000 in 1922 to £520,000 in 1929. By 1930, there were few places, either in European farming areas or in the more populous native reserves, that lay more than 30 miles from a railway station. Those which were more than 30 miles from the railway, were being made more accessible by gradually improving roads and by the advent of the motor lorry, the most important addition to East Africa's technical equipment since the construction of the original railway. (13)

Despite the fact that road developments were important and also included African tribal areas, the main development was done in the areas of European settlement. Fairly dense network emerged in the Ruiru-Kiambu-Limuru region and around Eldoret and Kitale The most important early access roads to the railway had been improved and expanded in the Machakos, Thika, Naivasha, Gilgil and Nakuru through to Lumbwa areas. Important trunk roads had been opened between Nairobi and Mombasa; Nyeri to Nanyuki and Meru; Nyeri to Rumuruti, Thompson's Falls (Nyahururu) and Gilgil; and Nairobi to Kericho via Narok and sotik. The road requirements in the African reserves were generally relegated for road improvement in the White Highlands and for the dual economy.

The transport pattern which emerges from the above is a railway system highly protected from competition by administrative and legislative means. Most of the roads act as feeders to the railway line and of those well constructed and maintained trunk roads are concentrated in the central highlands and specifically geared for the export economy which results in a road system which is space bridging but not space integrating.

Another factor which emerges is that Mombasa is the only Kenya port which is highly developed and well connected with the hinterland.

2.3 GOVERNMENT POLICY ON RURAL DEVELOPMENT:

When Kenya got independence at the end of 1963, it inherited a loopsided economic system in which there were adverse regional disparities in general and gross inequalities as regards social and economic facilities between the few urban centres and ru al areas in particular. Most of the rural areas, especially the former native reserves had been left to stagnate. Immediately after independence, the Kenya Government drew up a development plan which was revised and upgraded in 1966 to be the First Development Plan covering years 1964-1970. But this plan still kept on with the previous pattern of development where the interests of the rural areas were relegated to the progress of the urban areas and the export economy. As stated in the Development Plan 1970-1974, "The first two plans (1964-1970) paid insufficient attention to programmes and projects for the development of the rural areas. Rural development was insufficiently integrated into the overall plan although emphasis has already changed towards a co-ordinated and integrated rural development programme"(14)

During the course of the First Development Plan, the government came out with some statements of intention for rural development in Sessional Paper No. 10 of 1965 on "African Socialism and Its Application to Planning in Kenya." Despite such good pronouncements, the political will to act was still lacking, and the previous trends in development tended to predominate in the country. This type of planning and development tended to reinforce the already existing development problems. Since the rural areas did

not develop fast enough to satisfy the needs of a fast increasing population, migration to the urban centres increased at an alarming rate. The main causes of this rapid increase of urban growth have been summarised in the following terms:-

(1) Processing and service industries have gradually developed in the main urban areas, attracting a labour force far beyond the employment opportunities.

(2) People were attracted by higher wages, better educational and health facilities, and by the image of the town depicted by their urban relatives.

(3) The increased purchasing power of the urban population has rapidly increased commercial activities, which in tuwn have generated more urban employment.

(4) The restrictions on urban settlement for the local population had already been slackened before independence and have now been lifted completely.

(5) A part from the above "pull" factors, there has been the "push" from the rural areas, where the farm income has been inadequate to support large families. Many immigrants have, however, retained their land in their home area, often leaving their family to look after their farms.(15)

In order to cope with the general development of the country, the Kenya Government realised that there was an urgent need for comprehensive development planning to incorporate all aspects of urban and rural development. Hence a policy of regional approach to development was incorporated in the second Development Plan 1970-1974. But the revised 1st. Development Plan (1966-1970) outlined a method of achieving an integrated planning system by which ministries concerned with economic, social and physical planning came together in the planning process in such a way as to produce a comprehensive plan.(16) Around 1968, the Town Planning Department of Ministry of Lands and Settlement set up a regional planning section which was charged with the task of producing regional development plans for all regions (provinces) of the country The major problem confronting the regional planners of that day, was the lack of accurate information on the existing infrastructural development in urban centres in Kenya. Before any consideration could be given to a comprehensive regional plan, it was also

necessary to try to determine exactly what was the existing hierarchical order of settlements. To achieve these ends, it was decided to adopt a simplified form of "central place" analysis.

A points system was devised which enabled any data collection to be easily aggregated. Five categories of services were defined:

(a) Administration and protection - including civil servants, police, legal facilities, fire protection and ambulance service.

(b) Social Services - including health, education, social centres.

(c) Communications and transportation - including postal and telephone services, petrol station, bus, rail and air transport.

(d) Commerce - including shop, barter markets, banks, hotel and catering services.

(e) Industry and power - including manufacturing, extractive and agricultural, electricity, water and sanitation supply.

Each sub-service was assigned points depending on its level of importance- a three, two, one method was used. For example a hospital would achieve 3 points, a health centre 2 points, a dispensary 1 point; or 3 points for a six - form secondary school, and 1 point for a primary school and thus it was possible to rank the centres:-

-	Local centre	up	to	12 points
-	Market Centre	12	-	18 points
-	Rural Centre	18	-	35 points
-	Urban Centre	35	points upwards.(18)	

Following the ranking of hierarchy of service centres (central places), there are 86 designated urban centres in Kenya; there is one, Busia town, within the study area. There are 140 designated rural centres in Kenya; there are 6 in Busia District. There are 393 designated market centres planned in Kenya; there are 10 such centres in Busia District. There are 1,020 designated local centres in Kenya; there are 22 such centres in Busia District(19) (Map No. 7) As it will be shown later, there has been very little which is followed as far as this policy is concerned when planning and implementing development projects.

In addition to the policy of designated rural service centres, a strategy of limited deconcentration was adopted.(20) This is the present concept of principal town or designated major growth centres. This strategy was to be implemented by allowing the relative predominance of Nairobi and Mombasa to continue, at the same time selecting a small number of strategically placed urban centres, which would share both in the investment of social overhead capital and in the location of new productive activities. This strategy incorporated elements of proper timing of investment and the adoption of scientific methodology in the location of new industry. In addition to Nairobi and Mombasa, the other centres are Kisumu, Nakuru, Thika, Eldoret, Nyeri, Kakamega and Embu, of which none is in the study area. This strategy, from sociological standpoint could help bridge the fast - developing gap between urban and rural life in Kenya and would also provide high calibre service centres for this vast country.

The strategy for rural development incorporated communications network for the whole of Kenya starting with the trunk roads to the minor access roads. This is stated, " The strategy to be followed to achieve a satisfactory communication network between centres of growth will be as follows:-

(i) all principal towns are or will be linked by the National Trunk Roads system and in the majority of cases also by the International Trunk Roads system;

(ii) urban centres will be progressively be linked with National Trunk Roads by means of Primary Roads;

(iii) rural centres will be linked to the Primary Road network by Secondary Roads or roads of a higher classification.

(iv) all other centres will be linked in with the communication system either by minor roads or roads of a higher classification.(21)

In order to effect rural development, development committees at both the provincial and district levels were set up: Provincial and District Development Committees consisting of Government officials, and Provincial and District Development Advisory Committees which had wider membership. Later at the end of the 1970-74 Development Plan, the advisory committees were eliminated

and all functions amalgamated in the Development committees. The functions of these committees are to cordinate and stimulate development at the local level by involving in the planning process, not only government officials but also the people through their representatives. These committees are also supposed to be major instruments in Plan implementation.(22)

As the Kenya Government was committed to rural development, during the 2nd Development Plan - financial year 1969/70, it launched rural pilot schemes in six selected divisions (Special Rural Development Programme - S.R.D.P.), after the recommendation of the Kericho Conference held in September 1966 which concerned itself with the major problems of effective utilization of Kenya's human resources for full development.(23) The S.R.D.P. took a form of a co-ordinated development programme in a number of representative areas, aimed primarily at increasing the job opportunities and raising the level of incomes. Fourteen areas were originally selected for implementation of the programme, in which Central Division of the study area was included. The fourteen areas were selected in 1968 as broadly representing the problems of development in the small holder farming areas. It was intended to apply the lessons learnt from an action programme in the fourteen areas in similar areas throughout the country, and also to the purely pastoral and settlement areas. The Phase II of the programme in the remaining eight selected divisions (including the study area) which was supposed to start in financial year 1970/71 did not materialise and the whole programme was phased out in the financial year 1976/77.

It is during the 2nd. Development Plan 1970-74 that it can be said that Kenya Government committed itself to rural development. "The Plan (1970-74) demonstrates that although there will be no revolutionary changes in recent development policy, in a number of important ways the emphasis will change. Thus, although the overall objective is to accelerate the rate of growth of the economy as a whole, we are now proposing that an increasing share of development should be directed towards the rural areas. Special programmes are being put together to obtain a significant improvement in the standard of rural life. Rural development is the basic strategy of this Plan, for it is our aim that the fruits

of development will not be shared amongst a favoured few![24] Still it added, "The key strategy of this Plan is to direct an increasing share of the total resources available to the nation towards the rural areas. The Government believes that it is only through an accelerated development of the rural areas that balanced economic development can be achieved, that the necessary growth of employment opportunities can be generated and that the people as a whole can participate in the development process. Rural development should not be seen as a special programme but as the underlying strategy of the whole Plan. A raising of the levels of education and health in the rural areas, an emphasis on the improvement of the secondary road system, higher expenditures on rural water supplies, an extension of electricity to rural amenity schemes and an improvement of social services in the rural areas, all represent the planned efforts of the Government to raise the general standard of rural life. In addition, there are the other integrated schemes aimed at raising the level of agricultural income and developing non-agricultural enterprise more rapidly in the rural areas![25] This same theme has been followed in the 3rd Development Plan 1974-78 and it seems to be the trend in the next development plan which is still in preparation.

2.4 GOVERNMENT POLICY ON ROAD CONSTRUCTION AND TRANSPORT.

At the turn of the last decade, road development was mainly concentrated on trunk roads and access roads in the former White Highlands. The Development Plan 1970-74 states that the government had already created a network of good trunk roads throughout the country although the construction of some parts of the trunk system would not be completed for another few years. The next goal was to obtain a substantial improvement in the major secondary feeder road system so that people in the rural areas could move more freely and get their crops to the market in all weather conditions[26] It is worth of note that after road reclassification in 1970, those referred to as major secondary roads in the 1970-74 Development Plan are the present primary roads and some of them were upgraded to National Trunk roads. The bais towards trunk roads continued for several years even into the second Development Plan, although some mention of feeder and minor roads were made.

In the plan, it was realised that a transport system has to support the growth and development of agriculture, commence and industry with efficient movement of people and good throughout the country. In meeting this objective, the system has to ensure the availability of fast, safe and economical transport services that are aresponsive to the needs of a growing and changing economy and to enhance economic and social growth consistent with the broader national goals. Transport decisions have a significant impact on the quality and character of the community development, including the locational patterns of economic activity.

The transport system should therefore contribute towards an efficient allocation of productive resources through the stimulation of expanding production in the agricultural and industrial sectors, development of rural and urban markets and should enable people to travel so as they wish to safisfy their individual desires and to attain preferred regional distribution of population, industry and incomes. Improvement in the system through efficiency, speed and scope of the network enable human and material resources to be transferred more rapidly and effectively where they can be employed. The movement between producing and consuming centres and between rural and urban areas permits increased productivity in the agricultural sector and creates and supports an awareness of development potential of the country and its various regions.

Therefore, it was stated in the Development Plan that the Government supports the continued development of an efficient, dynamic and flexible transport system as being vital to the economic growth, expanding productivity and general progress of the nation. The efficiency and effectiveness of the system influence the cost of every commodity consummed or exported and thereby affect business, economic and industrial opportunities of every citizen. It is the intention of the Government that investment or capacity in both the total transport system and within each mode will neither substantially above nor substantially below that required to meet these objectives. It is fully recognized that chronic excess capacity involves misuse of economic resources needed in other vital sectors of the economy, but it is equally important that the lack or inadequate capacity jeopadises the nation's development(■■)

For example, in the 1970-1974 Development Plan K £43 million was earmarked for road development, which was more than double for the K£20 million which had been spent on roads from 1965-1970[27] Table 111). But the minor roads in general were priority to the trunk roads, as it was planned that 46% of the expenditure was to be spent on trunk roads, 34% on other roads, while 20% was to be spent on special development roads projects, although most of them were feeder roads (Table 111, 1V and V). All these were investments in general roads of 4,700 km and about 4,500 km. for special purpose development roads. At the start of this Plan (1970-74) there were about 40,000 km of all sorts of roads in the country.

To illustrate the fact that even as recent as 1974, the Kenya Government still preferred to invest in trunk roads and primary (by then major secondary) roads to the neglect of the secondary and minor (access and feeder) roads can be seen from 1969-74, of the 333 km. of roads to be developed in Coast Province, 177 km. (55%) were trunk roads, 136 km (40%) primary roads while secondary and minor roads were only 5% (20 km). It is the same trend for all the other provinces. In Western Province according to the Plan, there were 466 km. of roads earmarked for development 333 km. were trunk roads, 129 km. were primary roads and only 4 km were minor roads. In the study area (Busia District), there were 82 km. of roads planned to be developed of which (about 70) were trunk roads, 25 km (over 29%) were primary roads and only 1 km. was a minor road. The minor roads was access to the Busia Township water works, while the primary road was C30 which is Item 9/37 Bumala-Sio Port in Table V which was not carried out. So it can be stated that there was no access or feeder roads programme executed in the study area in the period 1969-1974.

In any case, it can be stated that roads policy in the rural areas was first stated in the 2nd Development Plan (1970-1974) "Transport development is very closely related to agricultural development since the speed, ease and economy with which agricultural inputs and outputs are moved spells the success or failure of commercial farming operations. It is equally closely related to the build-up of other sectors of the rural economy"[28]

Table III

Estimated Development Expenditures: Roads Programme 1969-1974

K£ '000	1969-1970	1970-1971	1971-1972	1972-1973	1973-1974	TOTAL 1969-1974
1. Miscellaneous Phase I (to complete)	26	11	-	-	-	37
2. Great North Road	455	-	-	-	-	455
3. Nairobi-Addis Ababa Rd.	878	825	1032	636	-	3,371
4. Trunk Roads	-	-	-	-	-	-
5. Trunk Roads	1490	865	-	-	-	2,355
6. Sugar Roads Phase I	322	-	-	-	-	322
7. Feeder Roads 1969-72	738	2260	1916	310	-	5,224
8. Tourist Rds Phases I&II	470	616	81	-	-	1,167
9. Trunk & Major Sec. Roads 1972/76	-	-	-	1395	3220	4,615
10. Sugar Roads Phase II	126	1023	295	-	-	1,444
11. Fish Roads I and Voi-Wundanyi	640	134	-	-	-	774
12. Fish Roads Phase II	-	-	406	103	-	509
13. Tourist Roads Phase III	42	-	74	207	193	516
14. Settlement Roads Phase I	310	217	90	-	-	617
15. Settlement Roads Phase II and III	-	-	-	510	476	986
16. Upgrading of Trunk Roads (Urgent Work)	189	-	-	-	-	189
17. Upgrading Phase I	885	1606	698	-	-	3,189
18. Upgrading Phase II	22	-	1043	1331	726	3,122
19. Upgrading Phase III	-	-	52	48	39	139
20. Tea Roads Phase II &III	25	24	-	689	966	1,704
21. Somalia Road	-	-	-	689	644	1,333
22. Rice Roads	369	-	-	-	-	369
23. Sugar Roads Phase III	42	40	391	723	676	1,872
24. Miscellaneous Phase II	421	632	738	-	-	1,791
25. Miscellaneous Phase III	25	79	295	276	258	933
26. Contributions to Municipalities	168	158	148	207	193	874
27. Contributions to Minor Townships	42	40	44	41	39	206
28. Consultants Design	210	221	221	207	193	1,052
29. Compensation	84	79	74	69	64	370
30. Upgrading-N.E. Province	101	101	101	101	101	505
Other expenditures	-	-	-	1250	1750	3,000
TOTAL	8080	8931	7699	8792	9538	43,040.

Table IV

Road Development Plan, 1969-74 by Districts in Km.

PROVINCE/DISTRICT	TRUNK ROADS	MAJOR SECONDARY ROADS	OTHER SECONDARY & MINOR ROADS	TOTAL
COAST				
Taita	42	16	-	58
Mombasa	10	-	-	10
Lamu	-	5	-	5
Kwale	125	45	-	170
Kilifi	-	70	20	90
Tana River	-	-	-	-
TOTAL - COAST	177	136	20	333
NORTH EASTERN				
Garissa	100	65	-	165
Wajir	-	65	-	65
Mandera	-	-	-	-
TOTAL - NORTH EASTERN	100	130	-	230
EASTERN				
Machakos	32	127	-	159
Kitui	172	-	-	172
Embu	61	69	-	130
Meru	98	95	-	193
Isiolo	14	-	-	14
Marsabit	255	-	-	255
TOTAL - EASTERN	632	291	-	923

Table IV (continued)

NYANZA				
Siaya	65	30	2	93
Kisumu	83	42	6	131
Kisii	52	145	8	205
Homa Bay	117	156	7	280
TOTAL - NYANZA	317	373	23	713
CENTRAL				
Nyeri	42	63	2	107
Murang'a	57	74	-	131
Kirinyaga	18	81	-	99
Kiambu	65	100	-	165
Nyandarua	47	-	-	47
TOTAL - CENTRAL	229	318	2	549
RIFT VALLEY				
Narok	117	58	5	180
Kajiado	132	25	-	157
Nakuru	157	188	23	368
Nandi	21	27	1	49
Kericho	161	-	4	165
Elgeyo/Marakwet	-	-	-	-
Baringo	-	85	1	86
Turkana	5	150	1	156
Samburu	119	-	-	119
Trans Nzoia	-	-	-	-
Uasin Gishu	169	-	1	170
West Pokot	-	30	-	30
Laikipia	-	-	-	-
TOTAL - RIFT VALLEY	881	563	36	1,480

Table IV(continued)

WESTERN				
Kakamega	174	52	2	228
Bungoma	103	52	1	156
Busia	56	25	1	82
TOTAL - WESTERN	333	129	4	466
KENYA - TOTAL	2,669	1,940	85	4,694*

* In addition to the 4,694 will be about 4,500 km of special development roads that are not divided by districts.

Source: National Development Plan 1969/70 - 1973/74. Page 386.

Table V.

specific Projects of Table 3..

Programme 1. - Miscellaneous Projects Phase 1.

1.1 Miriu Bridge and Approaches.

1.2. Homa - Kamagambo

1.3. Athi Bridge and Approaches.

1.4. Thika - Gatanga

1.5. Mirikin Jetty road

1.6. Tiwa Drift

1.7 Kitui Township roads

1.8. Garissa road (widening)

1.9 Kilifi Ferry

1.10 Lugari Link road

1.11 Fort Hall - Kangema

1.12 Thika - Seven Forks.

Programme 2. - Great North Road.

2.1. Athi River - Namanga

2.2. Leseru - Tororo*

Programme 3. - Nairobi - Addis Ababa Road.

3.1. Nairobi - Addis Ababa Road.

3.2. Isiolo - Lewa (Bituminization)

Programme 4. - Trunk Roads.

Nil.

Table V. (Continued)

Programme 5 - Trunk Roads.

5.1. Rimau - Meru and Embu Ena and Kutus - Kerugoya.
5.2. Ahero - Isebania
5.3 Eldoret - Kapsabet and Kakamega - Webuye.
5.4. Mzambweni - Lunga Lunga
5.5. 3 Bridges Nyeri
5.6. 2 Bridges Eldoret
5.7. 4 Bridges Sotik.

Programme 6 - Sugar Roads, Phase 1.

Phase 1 completed in 1969/70 and were in Nyanza Province - Miwani, Chemilil, Muhoroni and Fort Terran.

Programme 7 - Feeder Road Project 1969/1972

7.1. Ngombeni - Kwale
7.2. Mwingi Bride and Approaches
7.3. Maiyani - Nunguni
7.4. Ena - Thuchi
7.5. Meru - Nkubu
7.6. Nyeri - Ihururu
7.7. Fort Hall - Othaya
7.8. Uplands - Longonot T'off
7.9. Gilgil - Oljoro Orok
7.10 Njoro - Mau Summit
7.11 Njoro - Enangipiri
7.12 Jamji - Sotik
7.13 Kisii - Tinga T'off and Manga Link
7.14 Homa Bay - Kendu Bay
7.15 Kakamega - Mumias - Mayoni
7.16 Mulwanda - Bungoma
7.17 Kerugoya - Kagumo
7.18 Kimwani - Nandi - Kapsabet.

Table V (continued)

Programme 8 - Tourist Roads Phases 1 and 11.

8.1. Kijabe - Narok
8.2. Mara Area -
8.3. Tsavo
8.4. Meru
8.5. Aberdares

Programme 9 - Kenya Trhnk & Major Secondary Roads 1972/75

9.1. Rosslyn - Limuru
9.2. Banana Hill - Dagoretti
9.3. Upper Limuru Road
9.4. Kerugoya - Embu
9.5. Kagumo - Karatina
9.6. Thika - Kandera
9.7. Nyeri - Othaya
9.8. Nyeri - Ichagichiru
9.9. Makutano - Tana - Sagana
9.10 Tana - Embu
9.11 Nanyuki. - Timau
9.12 Machakos - Makutano
9.13 Thuchi - Nkubu
9.14 Meru-Katheri
9.15 Kiritiri - Kanja
9.16 Manyatta - Embu
9.17 Mariakani - Kilifi
9.18 Mazeras - Kaloleni
9.19 Kevale - Mrima
9.20 Narok - Kisii
9.21 Kisii - Kilgoris
9.22 Narok - Enangyeri
9.23 Nakuru - Subukia - Thompson's Falls
9.24 Nakuru - Solai
9.25 Baringo - Margat

Table V (Continued)

9.26 Marigat - Kabaret

9.27 Yala - Busia*

9.28 Keroka - Nyangusu

9.29 Rodi - Karungu

9.30 Kendu - Paponditi

9.31 Kisiani - Usenge

9.32 Asembo Bondo - Ngiya - Rangala

9.33 Kapsabet - Chavakali

9.34 Webuye - Kitale

9.35 Suam - Endebess

9.36 Maseno - Majengo

9.37 Bumala - Sio Port

9.38 Chwele - Bungoma

Programme 10 - Sugar Roads Phase 11.

Follow on to Phase 1. (Programme 6)

Programme 11. - Fish Roads Phase 1 Voi Wundanyi.

11.1 Lodwar - Ferguson's Gulf

11.2 Voi - Wundanyi.

Programme 12 - Fish Roads Phase 11.

Improvements in the Rurkana District after programme 11. is completed: Baringo - Lokoni - Lokichar - Lodwar route.

Prooramme 13. - Tourist Roads Phase 111.

National Parks, County Parks and beach areas.

Programme 14. - Settlement Roads Phase 1.

Access Roads mainly in the Kinango, Ol Kalou, and Sotik areas.

Table V. (Continued)

Programme 15. - Settlement Roads Phase II and III.

The access roads included will be mainly those in the Vasin Gishu areas and the following main roads: the Timboroa - Ainabkoi - Burnt Forest and the Ol Kalou - Dundori - Kabazi.

Programme 16. - Upgrading of Trunk Roads (Urgent Works)

Maintenance of trunk roads.

Programme 17. - Upgrading of Trunk Roads Phase I.

17.1 Thika - Kahawa (dual carriage way)
17.2 Kabete - Limuru
17.3 Nairobi - Mombasa (Parts)
17.4 Kericho - Mau Summit (Part)
17.5 Senetwet - Ahero (Part)
17.6 Mau Summit - Eldoret (Part)
17.7 Fort Hall - Makuyu T'off

Programme 18 - Upgrading of Trunk Roads Phase II.

18.1 Leseru - Eldoret
18.2 Sagana - Nyeri
18.3 Ahero - Kisumu
18.4 Kisumu - Kakamega
18.5 Senetwet - Kericho
18.6 Eldoret - Mau Summit (part)
18.7 Nakuru - Mau Summit
18.8 Limuru - Nakuru (part)
18.9 Mombasa - Msambweni

Table V. (continued)

Programme 19. - Upgrading of Trunk Roads Phase 111.

Design only.

Programme 20. - Tea Roads Phases 11. and 111.

Complete Phase 11 of Tea Roads programme and to implement Phase 111.

Programme 21. - Somalia Road

The first and major section of this road between Kangondi and Garissa is included in the Plan period.

Programme 22. - Rice Roads.

To improve roads in the Mwea - Tabere rice scheme area.

Programme 23 - Sugar Roads Phase 111.

The roads of this programme are in the sugar growing areas of Western Province near Mumias and in the Coast Province in the Shimba/Ramisi/Mrima Area.

Programme 24. - Miscellaneous Projects Phase 11.

24.1 Kangondi - Kitui

24.2 Dandori - Kangundo

24.3 Bulbul - Ngong

24.4. Nyamaya - Kabondo

24.5 Homa Bay - Mbita

24.6. Nakuru - Eldama Ravine

Programme 25 - Miscellaneous Projects Phase 111.

Roads proposed by District Development Committees.

Table V (continued)

Programme 26. - Contributions to Municipalities

26.1. Nairobi and Mombasa

26.2 Other Municipalities

Programme 27 - Contribution to Minor Townships.

27.1. Contribution to Minor Townships.

Programme 28. Design.

Design costs Public servants and consultants.

Programme 29. - Compensation

Compensation for land acquisition and the removal and reinstatement of public services resulting from the road development projects.

Programme 30. - Upgrading of Roads in N.E. Province

Includes betterments to the existing roads in the North Eastern Province.

* Whole or a part of the road passes through the study Area

Source: National Development Plan 1969/74 Page 387-392.

that the lack of adequate capacity jeopardises the Nation's progress.(29)

This government policy on roads development was reimphasized in the present plan (Development Plan 1974-78) in which expenditure on roads doubled that of the previous plan to about K£88 million (Table V1) For the first time, some tangible investments in minor and secondary roads surpasses investments in either trunk or primary roads. For example, during the plan period, K.E36,970,000 was earmarked for secondary and minor roads while K£27,240,000 and K£23,335,000 was for trunk roads and primary roads respectively. But the 100% increase in planned road expenditure should be viewed with caution since the major part of the increase might be due to inflation and higher standards of the roads.

The criteria used in the formulation of the Development Programme for roads during 1974-78 can be summarized as follows:-

(i) Major emphasis will be placed upon the improvement of secondary and minor roads in the rural areas.

(ii) High priority will be given to new access roads in agricul tural areas where communication is not possible in the wet season, or where the cost of road transport is excessively high.

(iii) Staged construction is to be a basic guiding the entire highway development programme. Standards will be directly correlated to the present and anticipated traffic volumes. Systematic upgrading of the highway network must be equally correlated to the present and anticipated traffic volumes.

(iV) New construction on the international trunk network is to be limited to works which will eliminate bottlenecks or other congestion points.

(v) When a road segment is directly related to a development project sponsored by a specific sector (such as a sugar or irrigation schemes), the road is to be considered, justified, and financed as part of the scheme it supports.

2.5 SPECIFIC GOVERNMENT PROGRAMMES ON FEEDER AND ACCESS ROADS

At the turn of this decade, the Kenya Government became committed to the policy rural development. In order to effect this policy it was realised that investments in infrastructure was as important as investment in other economic and social facilities. So development of feeder and access roads was taken as a part of rural development.

In the Development Plan 1970-74, K£5,224,000 was planned to be spent on feeder roads construction which in the real sence were general access roads (Item 7 Table 111). In addition to these feeder roads, there was Item 30 Table 111 of upgrading roads in Norther Eastern Province.

In addition to the general access roads, there are special development roads which are feeder roads in sugar - cane growing areas tourist roads, fish roads, settlement roads and tea roads. Involved were about 4,5000 km of roads costing about K£10,280,000 (Tables 111 and 1V). During the Development Plan 1970-74, sugar roads were in the Nyanza sugar belt, and at Mumias in Western Province and Ramisi in Coast Province. Tourist roads were developed in several game parks and near the coast (beaches) The fish roads were around the Lake Turkana (Rudolf) region. Rice roads were in Tabere - Mwea Rice Scheme in Kirinyaga District along the Tana River basin. Settlement roads were in the former White Highlands, while tea roads were in the tea growing areas (Table V)

During the Development Plan 1970-74 period, there was special Rural Development Programme (S.R.D.P) in operation in six selected divisions in Kenya. In four of them, Migori (South Nyanza), Vigiga (Kakamega), Kapenguria (West Pokot) and Mberee (Embu) incorporated access roads construction using labour - intensive methods in their programmes. For example, in Mberee, the project managed to construct about 113.5 km of roads and created employment for about 5300 people for a period of 5 years (April 1972 - March 1977). The S.R.D.P. has been phased out, but the lessons learnt from it were incorporated in the Development Plan 1974-78 as regards access roads using labour intensive methods in the rural areas.

Table V1

Planned Road Development Programme 1974-1978 K £'000

	1973/74	1974/75	1975/76	1976/77	1977/78	TOTAL
TRUNK ROADS	6,540	7,750	5,500	4,250	3,200	27,240
PRIMARY ROADS	5,895	6,040	5,400	4,000	2,000	23,335
SECONDARY ROADS	2,510	3,030	4,100	3,425	4,200	17,265
MINOR/UNICLASSIFIED ROADS	3,400	2,380	3,000	5,325	5,600	19,705
TOTAL	18,345	19,200	18,000	17,000	15,000	87,545

Source: Table 16.1
National Development Plan 1974/78
Volume 1 Page 347.

In the Development Plan 1974-78, special project development roads were incorporated and financed as a part of the relevant projects, i.e. sugar roads. As concerns other access and minor roads, they are to be financed through Rural Works Programme under the grants of the District Development Committees applying S.R.D.P. methods.

Chapter 2.

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CHAPTER 3

PHYSICAL BASE - STUDY AREA.

People and the land are the main resources of Kenya. Therefore, the nature of relationship between their resource base and the needs of the population of an area is an important background to an appreciation of development potential. So this chapter sets out to asses the physical resources of the study area.

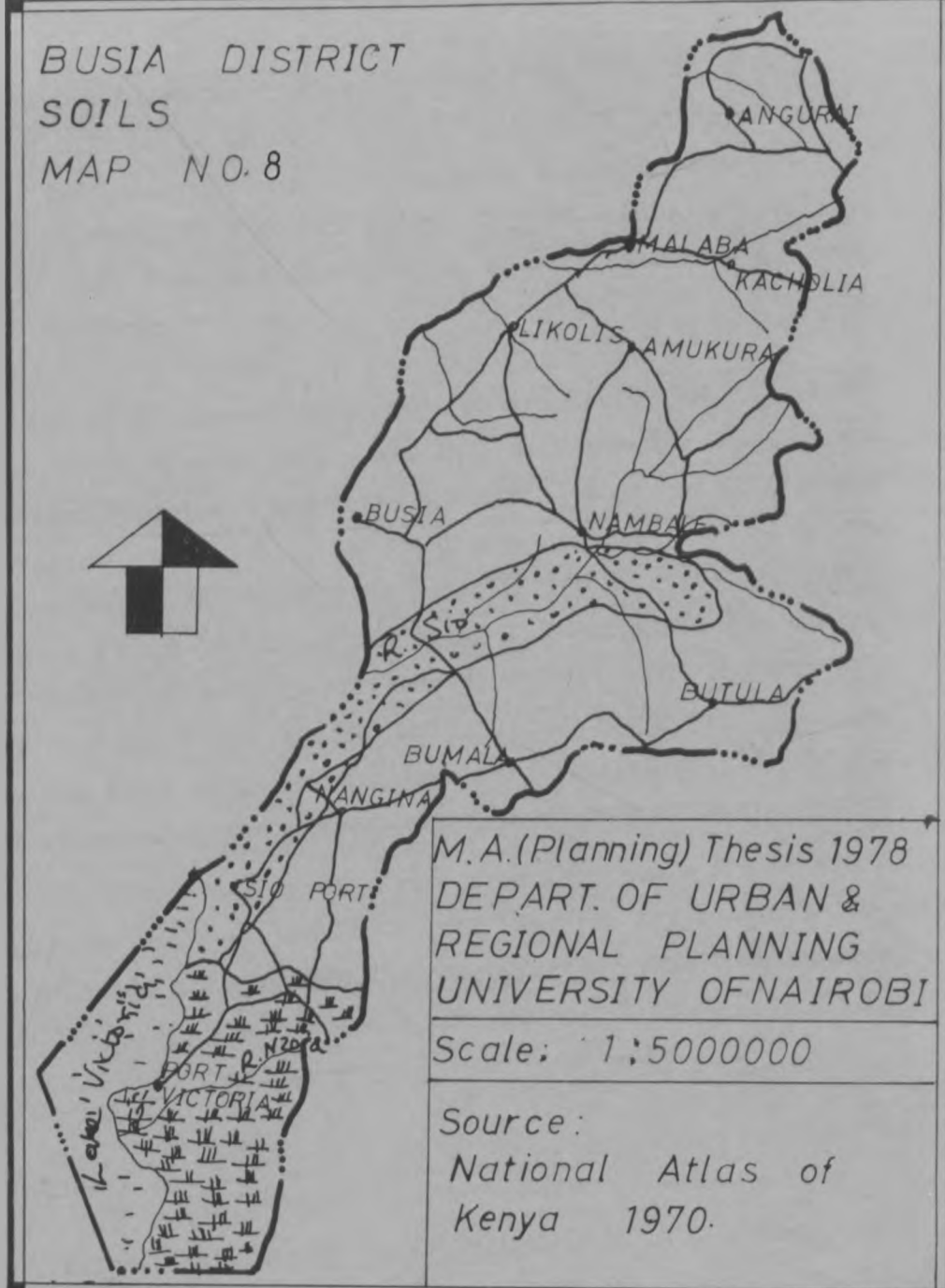
3.1. GEOLOGY AND SOILS

According to geological maps of the area the most predominant rocks are the Pre-Cambrian Kavirondo series mainly of sediments with conglomerate lenses. Granite intrusions are found forming the few hills that exist, especially in the Southern Division (Samia Hills) (Map No. 8). The Other series are Nyanzian and Basement systems.

The Kavirondo System is made up of a great thickness of lava flows, associated with variable thickness of proclastic rocks and in places with lenses of conglomerate. Locally the system includes other sediments and ironstones. While the Basement System rocks are mainly sediments - grifts, sandstones, shales and limestones - that have been metamorphosed by heat and pressure or by impregnation by pervading fluids. Other types are derived from lavas and volcanic fragmented rocks, It is in the Basement System that the granites are widely scattered.(2)

The above geological system in combination with the climate and topography, has produced a fairly deep developed soils about 50-80mm.deep) with high humic content ranging from 5-10% to 3-7% carbon. This is much so in the northern part of the district (Map No. 8). This is the area as shown as "Dark Sandy Loams." At present, the soils support crops like cotton, pulses, cassava, maize and groundnuts, and they are also suitable for sugar-cane growing. If the altitude could allow, they can even support highly priced cash crops like coffee, tea and pyrethrum.

BUSIA DISTRICT
SOILS
MAP NO. 8



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Scale: 1:5000000

Source:
National Atlas of Kenya 1970.

LEGEND

- PEATY SWAMPS
- RED FRIABLE CLAYS
- DARK SANDY LOAMS
- ROADS

The second type of soils found in the study area are the "Red Friable Clays with strong Brown Friable Clays" which have also got high humic content (from 3-5% to 3-7% carbon) which are derived from the basement complex rock and mostly occur on the summits of broad flat topped ridges, formed mainly by parallel rivers. They also support cotton as a cash and maize, cassava, pulses and beans.

The third type of soils are found near the lake and lower stages of the rivers. These are the Peaty Swamps, Alluvium and Lacustrine Deposits. The peaty soils are subjected to seasonal or permanent water table, impedded drainage being a major course. Alluvium and recent lacustrine deposits are as result of river sediments as well as those now being added to the flood plain, and lake deposits of geologically recent origin, without developed morphology other than a more humic surface horizon. This type of soil can optimally be utilized after irrigation. It can support crops of rice, cotton and maize.

The above soil types, apart from the peaty swamps and along river valleys, provide a fair base for any construction work such as roads and are even a good source for road construction materials such as murram and gravel.

3.2. CLIMATE

Rainfall :

Rainfall in Busia District ranges from over 1800mm. per annum in the northern parts to about 1000mm. towards the lake. (Map No. 9 , Table VII and Figures 1 -.....). Although the rainy seasons are not well defined as in other parts of Kenya, the long rains from March to June, and the short rains from Mid-September to December are the periods of heaviest rainfall.

Rainfall data are available for various centres in the district. Table VII gives the average rainfall for a few sections which lie within the study area. As shown in the table the dry period is between December, and February and the wet period is

J F M A M J J A S O N D

J F M A M J J A S O N D

J F M A M J J A S O N D

J F M A M J J A S O N D

Nambale

Matayos

Butula

Murumba

Bumala

Luanda

Nangina

Sio Port

Hakati

Port Victoria

Lugare

Bukoma

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Source: Busia District Annual Reports 1969-76

Scale: 1:250,000 (approx.)

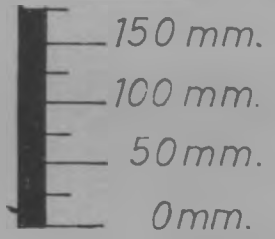
LEGEND

——— Roads

+++++++++++ Railway

•Nangina Centre with rainfall bar-graph.

Bar Scale



March to November. The dry period is computed for the months where the monthly average rainfall is less than 100mm.

The average monthly rainfall during the dry season is 60mm. or more and it can thus be stated on average the dry season is not very much pronounced or severe.

There are very few cases where some indication of rainfall reliability for the area during the dry season can be given.(3) The number of times per ten dry seasons that the rainfall will be less than 50; 100; 150; 200; 250; 300mm. has been estimated for the lowest, mean, and highest average rainfall in the area (Table VIII). The figures from Table VIII mean that for the mean of the area, it can be expected that out of 10 dry seasons ONE will have a rainfall less than 100mm. and SEVEN will have less than 300mm.

Table VII

Average Seasonal and Annual Rainfall in mm.

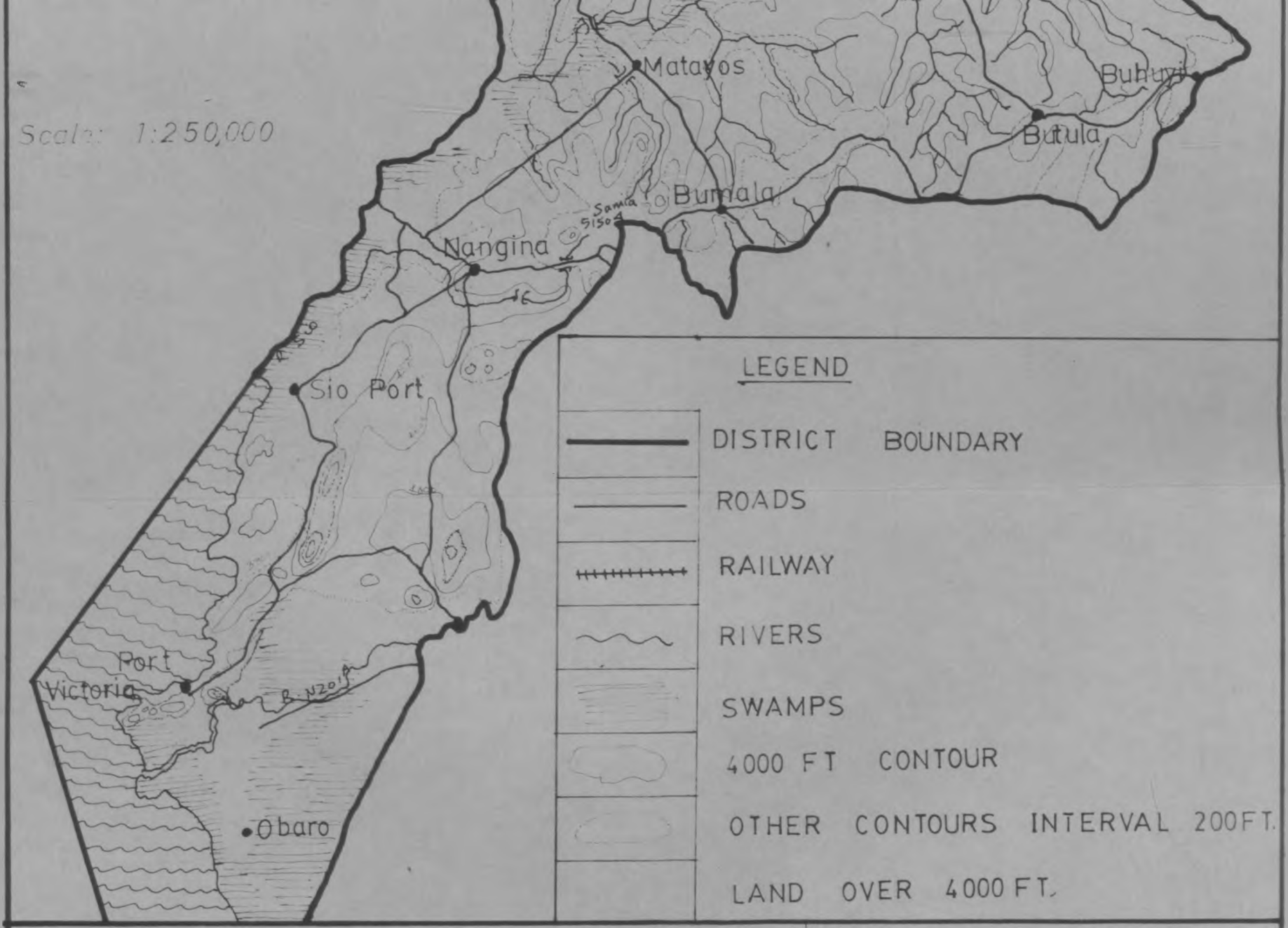
STATION	DRY SEASON DEC-FEB.	WET SEASON MAR-NOV.	ANNUAL	NO OF YEARS RECORDED
NANGINA CATHOLIC MISSION	181	1204	1387	32
BUSIA EXPRIMENTAL STATION	260	1515	1775	14
ALUPE LEPROSORIUM	227	1333	1494	9
AMUKURA MISSION	269	1466	1734	7
BUTULA CATHOLIC MISSION	302	1701	2000	24
LUKOLIS DISPENSARY	206	1408	1613	21
MEAN	241	1456	1886	

Table VIII

Rainfall Reliability

	LOWEST (NANGINA) 181mm	MEAN 241mm.	HIGHEST (BUTULA) 302
50 mm.	1	0	0
100 mm.	2	1	0
150 mm.	4	2	1
200 mm.	6	4	2
250 mm.	8	6	4
300 mm.	9	7	6

Source : Field Survey,
Ministry of Agriculture, and
Meterological Department.



M.A.(PLANNING) THESIS 1978
DEPARTMENT OF URBAN & REGIONAL PLANNING
UNIVERSITY OF NAIROBI.

Source: National Atlas 1970.
Survey of Kenya,
Nairobi.

3.3. RELIEF, TOPOGRAPHY AND DRAINAGE

The study area falls entirely within the portion of the Lake Victoria Basin in Kenya. The area is a peneplain with several rivers and the distributaries making several valleys. This peneplain is gently sloping from north where the altitude is between 1200 - 1800m. to the lake which is above 1100m. above sea level (this is the major part of the district). But the gentle sloping peneplain is interrupted in few places by granite hills, i.e. the Samia Hills with steep slopes which makes road construction difficult and expensive, and also puts a constraint on agricultural activities (Map No.10).

In the north, especially in Northern and Central Divisions, the peneplain has got two levels. The levels comprise the gently undulating to undulating peneplain forming the interfluves which are well drained imperfectly drained in places; and the rather wide zone of poorly drained flat to very gently undulating areas (mostly river valleys). The soil cover in the interfluves varies considerably with the general depth from 10mm. to 120 cm. though the general depth is between 40 and 80cm.(4)

In the South near the lake the land is generally flat with impedded drainage in the lower reaches of the Nzoia and Sio Rivers which form a part of the Yala Swamp.

There are four major rivers in the study area with numerous tributaries. There is the Rivers Sio and Walatsi which join South of Nambale. In the northern part, there is the river Malakisi which enters Uganda South of Malaba whereas in the extreme south is found R. Nzoia. Most of these rivers with their tributaries have low flow during the dry season, but have heavy flow during the rainy season. Sometimes submerging low-lying bridges and culverts, while there are seasonal floods on the Nzoia with devastating results to life and agricultural production.
Up to the present little use has been made of the waters of these rivers except in the Bunyala Rice Scheme for irrigation where the Nzoia enters Lake Victoria.

3.4 VEGETATION AND ECOLOGICAL ZONES :

According to the Ministry of Agriculture cash crop policy, the whole of Busia District falls into two vegetation and ecological zones : High Rainfall Savanna Zone and Lake shore Savanna zone and all the two zones being almost equal. (4)

High Rainfall Savanna Zone:

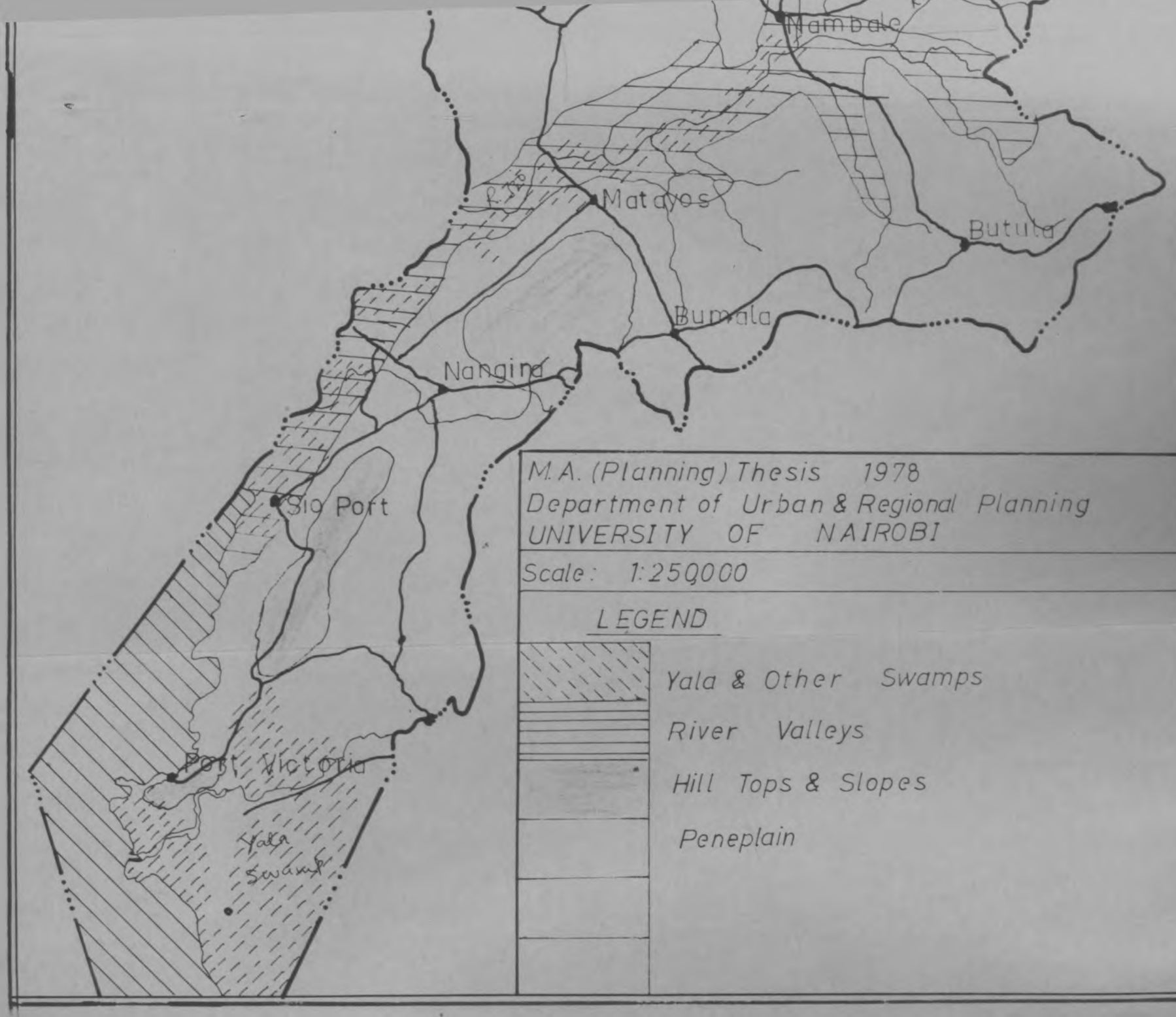
It is found at elevations from 1200 to 1350m. The rainfall averages between 1300 and 2000mm. per annum. It is a little dry for coffee, but well suited for cotton, sugar-cane, groundnuts, oil seeds, maize, beans, white millet, sorghum and root crops. Animal husbandry is possible in the entire zone.

Lake Shore Savanna Zone:

This zone is found from the lakeshore up to an altitude of 1200m and has got rainfall between 900mm. and 1300mm. per annum, but irrigation produces worthwhile benefits when the soil is suitable, and Bunyala Scheme has shown that rice can be grown with satisfactory returns. But the principal crops are maize, groundnuts, cotton and root crops.

The two zones above emerge when Busia District is evaluated in the general framework of Lake Victoria Region which comprises the whole of Western and Nyanza Provinces. But still, when considering rainfall only, the Ministry of Agriculture classifies the whole of Busia District as 'High Potential" land. (5) According to this classification, high potential land is any area in Kenya which get annual rainfall of 857.5mm or more (and over 980mm. in Coast Province). The whole of the study area gets over 857.5mm. of rainfall per year.

But when taking soils, topography and drainage, and as it will be shown later settlement pattern and land use potential into consideration, four refined ecological and potentiality zones, which may not be distinguishable from each other when viewed in general terms, do emerge. The four zones are the Yala Swamp, River Valleys, Hill Tops and Slopes and the General Peneplain.


Mambale
Matayos
Butula
Bumala
Nangina
Sio Port
Port Victoria
Yala swamp
M.A. (Planning) Thesis 1978
Department of Urban & Regional Planning
UNIVERSITY OF NAIROBI
Scale: 1:250,000
LEGEND
Yala & Other Swamps
River Valleys
Hill Tops & Slopes
Peneplain

Yala Swamp :

A small portion of the vast Yala Swamp extends into the study area in Bunyala near the lake at the mouth of Nzoia River. This swamp is due to impedded drainage and consists of recently deposited sedimentary materials. At present it seems to have the least potential, especially as it is liable to seasonal flooding during the rain season. But as it has been demonstrated in the Bunyala Rice Scheme, if well drained the area is a very high potential. Therefore the major constraint is the capital expenditure to make the swamp very productive. It can support rice, cotton, maize and, millets and even oil seeds.

River Valleys :

The rivers are Malakisi, Sio/Walatsi and Nzoia. But it is the first two rivers and tributaries which fall in this zone especially in Northern and Central Divisions. The river valleys have extensive swamps which are used as communal grazing areas in the dry season while left unused in the wet season. The valleys are hardly inhabited as people concentrate on the interfluves which are well drained. This zone when well drained can support a variety of agricultural activities and it can also be classified as of high potential.

Hill Tops and Slopes

Hill tops which are mostly composed of granite outcrops. These are the Samia Hills and hills near the lake at Port Victoria in Bunyala. The Samia Hills and their slopes are the sparsely populated and least agriculturally exploited in the whole of the study area. But the hills in Bunyala are densely populated and heavily worked as they are well drained than the surrounding swamps and they are above the flood-line.

Hill slopes are liable to soil erosion and they are suitable for tree planting in order to conserve their ecological balance.

The Peneplain :

The peneplains comprise most of the study area and they are well drained with deep soils suitable for most crops like cotton and maize. They are densely populated and they can still support more people if scientific methods of agriculture are used. The soils and topography are good for road construction.

Chapter 3.

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1. Republic of Kenya: National Atlas "Survey of Kenya, Nairobi, 1970.

2. Op. cit

3. Republic of Kenya:a Busia District Annual Report 1976.

"District Commissioner, Busia District, Busia Kenya 1977.

4. Republic of Kenya: Statistical Abstract, 1976" Central Bureau of Statistics, Nairobi, 1977

5. Op. cit.

CHAPTER 4

LAND USE POTENTIAL

4.1. AGRICULTURE - CROP PRODUCTION

The modern agricultural economy is the foundation upon which all plans for infrastructural development and urban growth in Kenya must be built. The same is much true of development in the rural areas.(1) As such, an evaluation of the agricultural potential of an area is very essential. In this section, crop production and pattern is to be examined including the effect of the provision or the lack of roads on the agricultural development, hence rural development, in the study area.

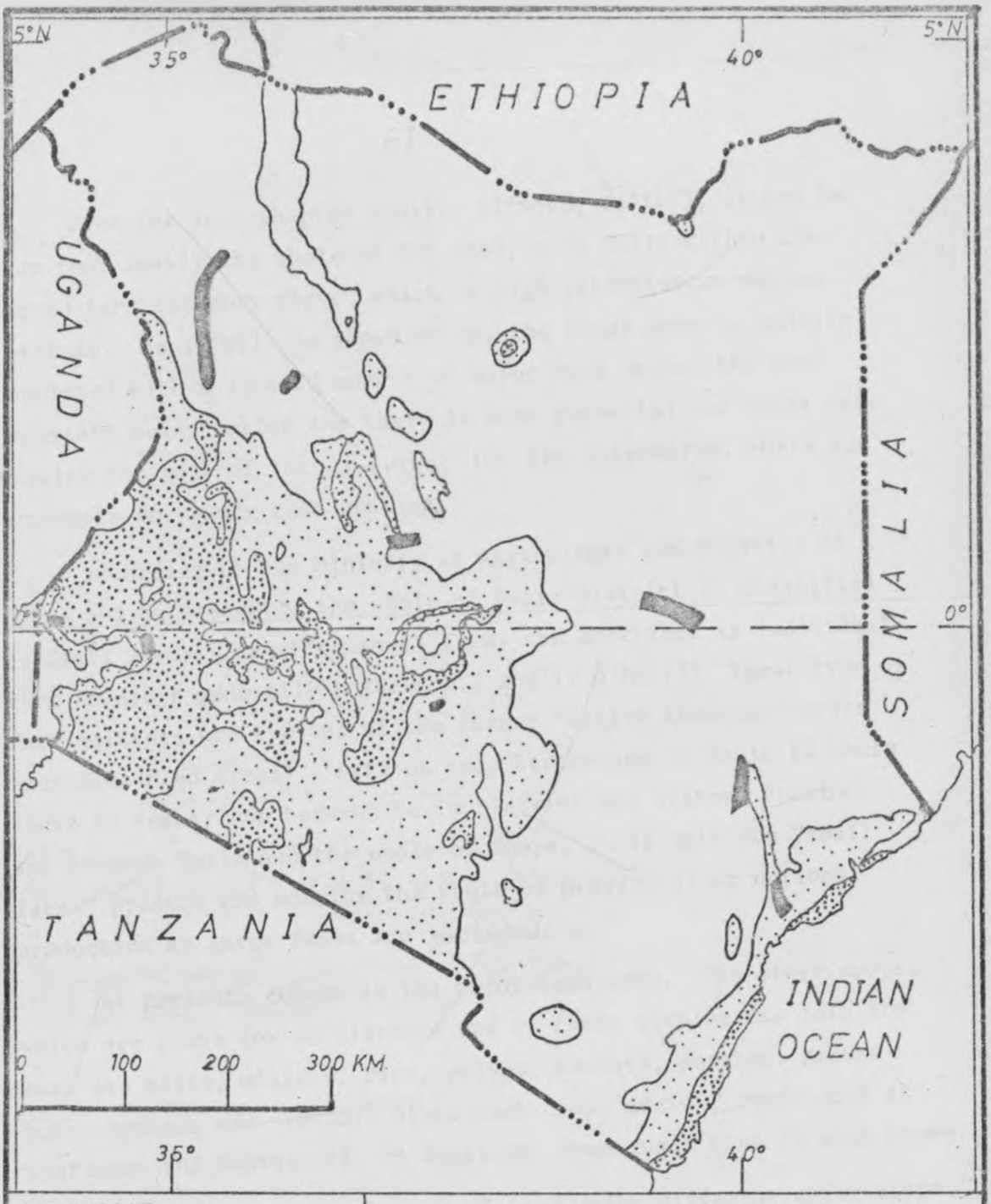
In Kenya, there are several ways of classifying agricultural land. For example, according to the National Development Plan 1974-78, the farming areas of Kenya may be conviniently classified into four major categories :-

a) The high potential areas at high altitude. These are general densely populated and suited to the production of valuable products such as coffee, tea, pyrethrum, wheat and milk.

b) The high potential areas at medium altitudes or at the Coast. Most of these are also heavily populated but the prospects for agricultural development at present are less favourable because it is not possible to produce such a wide range of valuable cash in these areas in the first category.

c) The medium potential areas where crop production is marginal on account of relatively low rainfall. These areas are well suited to extensive livestock production. However, increasing population pressure on the land is forcing more people to produce crops in them and this is a hazardous undertaking given existing techniques.

d) Finally, there are the more arid range areas where extensive livestock production is the only feasible type of land use. These areas cover a large proportion of Kenya's land area, but they are sparsely populated.(2)



LEGEND

HIGH POTENTIAL

MEDIUM "

LOW "

IRRIGABLE LAND

M.A.(Planning) Thesis 1978
Department of Urban and Regional Planning.
UNIVERSITY OF NAIROBI.

Source: Based on W.T.W. Morgan (Ed.) "EAST AFRICA.: it peoples and resourses." Oxford University Press Nairobi 1972

MAP NO. 15

KENYA: LAND POTENTIALITY

From the last chapter (soils, climate, relief), it can be seen that nearly the whole of the study area falls within the second land category above, which is high potential at medium altitude. As it will be shown below, the study area is densely populated with a limited number of major cash crops, the most important being cotton and there is some potential for sugar cane growing for most of the district. On the lakeshores, there are prospects for paddy rice growing.

According to the Ministry of Agriculture and Ministry of Lands and Settlements, the whole of Busia District is classified as Small Farms", in which small farms are described as individual farm holdings generally between 0.2 and 12.0 ha.(3) These type of farm holdings are typical of the former "Native Reserves" areas (non-Scheduled areas). Data on crop hectarages in Table IX where there is comparison between Busia District and Western Province and between Busia and the whole of Kenya, it is only for "small farms" produce and not for the whole of provincial or national production as large farms are excluded.

At present, cotton is the major cash crop. The other crops, which are grown for subsistence and if there surplus are sold for cash are maize, millets, rice, pulses, cassava, sorghum, groundnuts, bananas and simsim. Other cash crops are oil seeds such as sunflower and castor oil. In addition, some sugar cane is also grown.

Table IX gives hectarages of land under different major crops based on a survey of Central Bureau of Statistics in 1970. In the same table, there is a comparison for similar crops in Western Province and in the whole of Kenya. For Kenya and Western Province data, the table excludes those crops which are not grown in Busia, District, i.e. coffee, tea, wheat and sisal. The aggregate area of crops includes that land which has mixed crops, hence is greater than total cultivated land (i.e. land under mixed crops was double counted). It can be noted that the land under crops was only 41,900 ha. out of the total land mass of 162,900 ha. which is only 26% as cultivated land. Although this shows the state as it was in 1970, the general impression and as it will be seen from the evaluation of each individual crops below, the land in the study area is underutilized.

Since land in the whole district is high potential, there is room for much more intensive agriculture than what is practised now. With some innovation and other appropriate inputs, increased production and income would result, hence attainment of high standard of living would be realised in the study area.

For detailed study of crop production in the study area, an analysis of some particular crops is given in the rest of this section.

But it will be noted that all the crops, especially the commercial crops, are bulky and require proper transport. Secondly, they have to be transported in many stages, i.e. cotton has to be transported as raw seed cotton to stores and ginneries for sales and ginning, as lint from ginneries to textile factories and in some cases for export, and cotton seed from ginneries to oil mills and back to farmers for planting. All these operations require adequate and reliable transport and accessibility. As it will be shown below, when transport is poor, the situation deteriorities with respect to production. Thirdly, with increased production in the rural areas, there is increase in the income of the population, hence welfare, demand for goods and mobility, all of which require adequate transport.

Cotton:

Cotton is the major cash crop in the district, although yields per unit area are very low. Busia District accounted for 16% of land under cotton in Kenya, which was over 75% for the whole of Western Province (Table IX). Although cotton production in Kenya has been almost constant over the years, in Busia District it has been rising steadly from 2,100 tons in 1972 to over 7,500 tons in 1976 which was about 50% (in 1976) of cotton produced in the country (Tables X,XI, XII). Busia has increased its production from 12.4% of the total Kenya Production in 1972 to 46.3% in 1976. This increased production occured despite the fact that hectarages under cotton had decreased by 21% between 1974 and 1975 (Table XI, This increased production occured despite the fact that hectarages under cotton had decreased by 21% between 1974 and 1975 (Table XI).

Table IX

Small Farms and Settlement Schemes.

Estimated Crops Areas and Land Use by Districts

1969/70 in Hectares

LAND USE	KENYA	WESTERN PROVIN-CE.	BUSIA DISTRICT	BUSIA AS %AGE OF NATIONAL LAND USE	BUSIA AS %AGE OF PROVINC-IAL LAND USE
Improved Maize	147,000	65,100	2,100	1.42	3.23
Unimproved Maize	848,300	69,400	17,400	2.05	25.07
Bulrish Millet	44,700	900	-	-	-
Finger Millet	36,100	14,700	6,400	17.73	43.54
Other Millets	13,100	2,600	800	6.11	30.77
Sorghum	141,200	21,800	7,800	5.52	35.78
Other Cereals	3,300	500	-	-	-
Beans	322,600	20,400	5,000	1.55	24.51
Cow Peas	66,600	900	100	0.15	11.11
Black Grams	14,400	200	100	0.70	50.00
Cotton	65,600	14,200	10,500	16.01	75.00
Sugar Cane	28,300	2,300	100	0.35	4.35
Groundnuts	10,500	1,700	300	2.86	17.65
Oil Seeds	12,500	1,200	300	2.40	25.00
Cassava	76,800	16,800	7,200	9.38	42.86
Sweet Potatoes	22,700	3,000	800	3.52	26.67
Cabbages	12,400	2,200	-	-	-
Bananas	75,300	9,600	300	0.40	3.13
Aggregate Area of Crops.	1941,800	247,500	59,200	3%	24%
Total Cultivation	N/A	N/A	41,900	-	-
Paddocked Grazing	N/A	N/A	-	-	-
Other Farm Land	N/A	N/A	121,000	-	-
ALL FAR LAND	N/A	N/A	162,900	-	-

Sources : Statistical Abstract 1976

Tables 90 and 91

Table X

Principal Crops Production for Sale 1972-1976 in '000 Metric Tons.

	KENYA			BUSIA DISTRICT			DISTRICT AS %AGE OF NATIONAL PRODUCTION		
Year	Maize	Rice	Cotton	Maize	Rice	Cotton	Maize	Rice	Cotton
1972	373.0	33.8	17.0	1.1	2.3.	2.1	0.3	6.8	12.4
1973	440.8	36.1	16.2	2.0	0.9	5.2	0.5	2.5	32.1
1974	365.4	33.1	15.0	4.1	0.7	6.8	1.1	2.1	45.3
1975	487.8	32.1	16.1	7.7	0.8	7.2	1.6	2.5	44.7
1976	521.7	37.5	16.2	6.5	1.2	7.5	1.2	3.2	46.3

Source : Compiled from Statistical Abstract 1976
and Busia District Annual Report 1976.

Table XI

Busia District - Cotton Planted in Hectarages

DIVISION	1974	1975	1976
NORTHERN	23,679	21,928	22,672
CENTRAL	11,445	7,171	8,011
SOUTHERN	6,550	3,869	2,441
TOTAL	41,674	32,968	33,124

Source : Busia District Annual Report 1976.

This increased production despite decreased hectarages is partly accounted for by increased inputs like fertilizers and insecticides and better services like roads especially in the Northern Division. Northern Division usually accounts for over 50% of land under cotton in the district.

Cotton is grown from April/May up to July and picking starts towards the end of the short rains up to February. Cotton grows well all over the district especially on well drained soils. It does poorly in the river valleys and lowlands near the lake due to impedded drainage. The most suitable areas for cotton growing is Central Division followed by Northern Division which are at a higher altitude and well drained than the Southern Division. But when looking at Table XI and XII, Southern Division seems to yield much more cotton per unit area than either Northern or Central Divisions. From the tables, average yields for 1976 are :-

Northern Division	- 98 kg/ha.
Central Division	-218 kg/ha.
Southern Division	-1459kg/ha.

This discrepancy is accounted for by smuggled cotton from Uganda. "The Southern Division had much lower hectarages under the crop than in the previous years and still much less seed cotton due to crops being swept away by unexpected high rainfall in the middle of the year causing floods. Despite that, Samia Ginnery (Luanda) had alot of seed cotton this year because of smuggled seed cotton from Uganda".(3)

Yields per unit area are much lower in relation to the land potential. This is attributed, among other factors, to inadequate modern agricultural inputs, delayed and low payments, and inadequate transport. The transport problem was caused mainly by impassable roads during the wet periods. "It is very disheartening to see ginneries idle due to lack of seed cotton when the cotton stores in the interior are overstocked and more cotton gets spoilt in farmers homes because they have nowhere to sell it. This situation recurs yearly because the access roads are muddy and impassable, and the bridges and culverts are overflooded after a short spell of rain."(4) This was the general feeling at the district offices, and at the cotton stores and buying depots during the field survey.

BUSIA DISTRICT
CROPS & RESOURSE ZONES
Map No. 12

Malaba
Amagoru
Kocholia
Amukura
Mungatsi
Busia
Nambale
Matayos
Buhuyi
Butula
Bumala
Launda
Nangina
Sio Port
Luambwa
Port Victoria
Victoria
Lake

SUGAR CANE SOUTH LIMIT

LEGEND

- District Boundary
- Roads
- Rivers
- Swamps
- Recommended South Limit of Sugar cane
- Tobacco
- Rice
- G — Cotton Ginnery
- Other crops suitable all over the district except in few localities. (see text)

Scale : 1:250,000

Source:
Field Survey

Dept. of U.& R. Planning
UNIVERSITY OF NAIROBI
M. A.(PLANNING)
THESIS 1978

Table XII

Busia District - Seed Cotton Purchases 1976

	AR-GRADE		BR-GRADE		TOTAL	
GINNERY (& DIVISION	COTTON BOUGHT (KG)	CASH PAID (KSH)	COTTON BOUGHT (KSH)	CASH PAID (KSH)	COTTON BOUGHT (KG)	CASH PAID (SHS)
MALAKISI (N.DIVISION)	2134065	213406	80455	4022	2214520	217428
NAMBALE (C.DIVISION)	1716840	171684	29365	1468	1746205	173152
SAMIA (S.DIVISION)	3561775	356177	-	-	3561775	356177
TOTAL	7412680	741267	109820	5490	7522500	746757

Source : Busia District Annual Report'1976.

Table XIII

Hectarages Under Maize Crop - Busia District.

	1975			1976		
DIVISION	HYBRID	OTHER	TOTAL	HYBRID	OTHER	TOTAL
NORTHERN	5559	667	6226	5990	426	6416
CENTRAL	2210	3216	5426	4023	403	4426
SOUTHERN	191	2738	2929	63	2056	2119
TOTAL	7960	6621	14581	10076	2885	12961

Source : Busia District Annual Report 1976.

Cotton yield can be increased by better methods of farming as it has been proved by Cotton Block Farming in Settlement (irrigation) schemes. This method was tried in 1976 in Northern Division where yields achieved were over 750kg/ha. which was a very big margin from the division's average of about 100kg/ha. "This demonstration covered a 120 acres discontinuous Cotton Block Farming. Fifty-three neighbouring farmers contributed 2 to 3 acres each to the blocks at Kotier and Kosera in Northern Division. Most of the farmers cared for their crop, but the inavailability of insecticides led to most of the crops being destroyed by pests. The average yields were 750kg/ha. If timely control of cotton pests had been assured the yeild would have been higher than this. The project, therefore, showed that Cotton Block Farming is one of the ways cotton production can be boosted."(5)

What emerges from the above is that the district has a high potential for cotton which is not being realised to the maximum. In order to achieve maximum cotton production, the following among other things, should be provided for! adequate modern inputs and extension services at the required time, higher cotton prices since the crop is time consuming, and reliable transport system in the form of all weather roads.

Maize :

As per Table IX, in 1970, maize covered about 19500ha. which was about 33% of the aggregate area of crops in the study area. Much of the hectarages were for unimproved maize while only 2100ha. were for improved(hybrid) maize.

Maize is a major food crop, and in some cases a cash crop in the district. Yields per unit area are generally low. But there has been a steady increase in production for sale from 1100 tons in 1972 to 6500 tons in 1976 (Table X). This increased production for sale has occured despite the fact that hectarages under the crop have declined i.e. 19500 ha. in 1970 to 12961 ha. in 1976. This increased production is partly accounted for by increased use of modern inputs like hybrid maize.

Maize does well all over the district but Northern Division leads in hectarages, followed by Central Division. Lake Shore lowlands are only good for the crop with some drainage.

Paddy Rice:

Paddy rice is a cash crop usually grown in the irrigation scheme in Bunyala Location of Southern Division. Production is not much, involving about 130 plot holders and covering roughly about 400 ha. The average annual production is about 1200 tons (Table X). Other rice is grown in the Central and Northern Divisions along the river valleys, and in 1972, this accounted for about 30% of the rice crop produced in the district, but this has declined so much that in 1976, nearly all the rice produced in the district came from the Bunyala Scheme.

Sugar Cane:

Very little has been done to develop Sugar-cane in the district despite high potential for it. The district has similar physical features as the adjacent Mumias Sugar project area, especially Northern and Central Divisions.(6) After the Ministry of Agriculture Soil Survey in 1975, the Northern and Central Divisions were recommended for sugar cane growing.(7)

At present, the little sugar cane grown in the district is either sold at Mumias in Kakamega District or to four jaggery factories in the district. There was no data about jaggery production and employment in the industry since the government policy is to discourage its manufacture as it is the raw material for the illicit brew, "chang'aa".

Infact the four small jaggeries, at the time of field study, were operating unlicenced and their managements were unwilling to release any information on their operations.

There are plans to start a small sugar project in Northern Division. "Teso Location in Busia District, is geared for a major agricultural boom with a 'giant' white sugar project. A feasibility study is being carried out and the factory, which is expected to cost sh.42 million will be managed by Kamolo Sugar Growers and Industry Co-operative Society Ltd.

The people of Kamolo have donated 20 acres of land for the proposed factory. Farmers, who are interested in cane growing have been requested to start planting right away in order that factory will have enough raw material for production."(8) There is alot of scope for development of Sugar-cane growing.

As has been the trend in all recent sugar-cane growing projects (i.e. Mumias in Kakamega, Nzoia in Bungoma and Awendo in South Nyanza), development of elaborate road network system in form of feeder roads has been an important part of the schemes. For example, roads were about 20% of all the investments in the Mumias project.(9) So the Kamolo project should include investments in roads, constructing new ones where there were none and upgrading the existing ones.

Millets and Sorghum:

After maize, these two crops are the second widely grown in the district. In 1970, they accounted for over 25% of the aggregate area of crops. Little modern inputs are applied in their husbandry and get almost no support from extension workers in the field. Virtually the whole crop is used for subsistence, except in few cases where surplus production is sold on periodical markets. The crops do well all over the district except in some localities where impedded drainage is a permanent feature.

Cassava:

Cassava is also an important subsistence crop in the district, and in 1970 survey it covered over 7,200 ha. of land. It grows all-over the district, and during the last decade it used to be exported to India and other places in the country in form of "chipping" for the manufacture of laundry "starch". It is major food crop during drought seasons.

Pulses, Groundnuts and Oil Seeds.

Beans and cowpeas are grown in the district and as legiums they increase the fertility of the soil. They are mostly for subsistence but there is scope for surplus.

Groundnuts are also grown but the production levels are low when compared to the adjacent Bukedi District in Uganda.

The oil seeds are castor and sunflower. They are cash crops and they are newly introduced in the district and they are well catching up. (10)

Other Crops:

Other crops grown in Busia in Substantial amounts are hananas, cabbages, onions, and tobacco. Tobacco is a crop which was recently introduced in Northern Division of Busia District and Malakisi in Bungoma District by B.A.T.(K)LTD. with a centre at Malakisi. In Bungoma 44 ha. were planted and in Busia 45 ha. were planted." (11)

4.2. LIVESTOCK:

Most of the cattle in the district are Zebu cattle whose milk yield is very low. There were about 150,000 cattle, 75,000 sheep and about 440,000 poultry (Table XIV). Most of the livestock is for non-commercial purposes, i.e. for prestige, bride-prices and other traditional ceremonies. According to Table IX, there was no paddocked grazing, but 120,000 ha. which is about 74% of the district land area was listed as 'Other Farmland" which included communal grazing land. In livestock rearing, there is very minimal application of modern methods of animal husbandry. For example, out of the estimated 150,000 cattle, only 469 are grade animals.

All these animals are scattered over the district, except tsetseflies are prevalent on the lake shores.

Some of the by-products of livestock are hides and skins. In 1975, about 27,124 hides, 6392 goat skins and 2411 sheep skins were purchased in the district. In 1976, there was unbelievable increase of 300% for hides, 2,073% of goat skins and 1,222% for sheep skins. "This year (1976) very high figures of hides and skins were recorded due to illegal flow of the pieces from Uganda." (12) In 1976, Busia Country Council collected cess record of K£6,380 as compared to K£1720 only collected in 1975.

Table XIV
E
Estimated Number of Livestock

	CATTLE	SHEEP & GOATS	CHICKENS
1970	105,900	47,000	375,000
1976	150,000	75,000	440,000

Source : Statistical Abstract 1976 & Busia District Annual Report 1976.

Table XV
Grade Cattle Increase on Quarterly Basis 1976

QUARTER	COWS & HEIFERS OVER 1YEAR	HEIFERS UNDER 1YR.	BULL CALVES	STEERS	TOTAL
1ST.	256	38	37	12	343
2ND.	317	46	43	12	418
3RD.	357	45	50	6	458
4TH.	368	45	50	6	469

Source : Busia District Annual Report 1976

Table XVI
Hides and Skins Purchased 1975

PIECES	GRADE				
	I	II	000	IV	TOTAL
HIDES	16, 77	6,430	2,806	1,211	27,124
GOAT SKINS	3,917	1,636	577	262	6,392
SHEEP SKINS	1,572	522	219	98	2,411

Source : Busia District Annual Report 1976

Table XVII

Hides and Skins Purchased 1976

PIECES	GRADE				
	I	II	III	IV	TOTAL
HIDES	46,828	31,545	16,073	11,987	106,433
GOAT SKINS	56,058	40,183	26,888	15,779	138,908
SHEEP SKINS	14,699	11,648	3,637	1,888	31,872

Source : Busia District Annual Report 1976.

Table XVIII

Busia District - Trade and Commerce Facilities.

CENTRE	WHOLESALE *	LIVESTOCK MARKET	GRADE I MARKET
BUSIA	4		*
NAMBALE	2		*
FUNYULA	2	*	*
MALABA	2		*
BUTULA	1		
BUMALA	2	*	*
AMUKURA	1	*	*
AMAGORO	1		
PORT VICTORIA	1		
SIO PORT	1		*
MUNGATSI	1		
TOTAL	18		

* No. of whole shops at each centre.

Source : Field Survey August-September, 1977

Another product from livestock is milk. The grade and Zebu cows produced a surplus of 304,750 litres which were supplied to Busia Dairy Society. This is very low production compared to the number of cattle in the whole district.

From the above there seems to be potential for commercial livestock rearing as regards hides and skins, and dairy. In order to encourage dairy farming, loans were being offered to the farmers for importation of grade cows, and at the time of the field survey there were 33 operating dips, 1 dip was complete but not operating and 27 others were under various stages of construction. Also plans for introduction of Artificial Insemination (A.I.) services and expansion of the number of dairy co-operative were being formulated.

But to realise the aim of improving daily farming, one of the defects to be rectified before the plan could succeed is the improvement of the transport system especially in the rain season. This would enable the extension workers to render their services at the required time including A.I. services and it would also accelerate the transportation of milk to societyd depots since the existing society and the coming-up ones would not afford refrigrated vehicles and storage facilities.

4.3. INDUSTRIAL ACTIVITIES :

Busia District is mainly a small-holder agricultural area with limited number of highly priced cash crops and other natural resources. The main industrial undertakings in the district are the three ginneries at Nambale and Luanda (Samia) in Busia District and Malakisi which is just on the border in Bungoma District. Other industrial activities are four sugar jaggeries, two open air vehicle garages at Busia Town and one at Malaba, and a number of bicycle repairs and tinsmiths found in nearly all major market centres in the district.(13)

In 1976, Nambale ginnery operated continuously for 7 months compared for 5 months in 1975, while Samia ginnery operated continuosly for 11 months as compared to 3 months in 1975, and as stated above this was due to smuggled cotton from Uganda.

Nambale ginnery employed 100 casual labour during its period of operation in 1976 while it had about 20 permanent staff employed throughout the year. The Samia ginnery had about 140 casual employees and 26 permanent staff employed staff in 1976. Several people from Busia, especially Northern Division were employed at Malakisi ginnery.

The general impression was that the jaggeries did not employ many people, about 10 each at most. It was not possible to get any information on their operational activities. The two garages at Busia, employed between 5 and 10 men depending on the state of business, which at the time of the field study, was at its best because of the increased traffic at the border areas which was mainly due to smuggling activities.

In Busia District, it seems that the best prospects for industrial investment should be in agricultural products processing based industries. There are good prospects in cotton ginning, sugar cane processing, oil seed processing and in treatment of hides and skins. Despite all these prospects, Busia remains mainly an agricultural district.

4.4. TRADE AND COMMERCE :

In 1976, over 4000 trade licences were issued in the district. These trade permits covered wide range of commercial activities such retail and wholesale trade, stock trading, flour milling, hawking, etc. There were about 900 permits for retail trade only scattered over market centres in the district. There are 18 general wholesale shops which in most cases included retailing (Table XVIII). There are no specialised wholesale shops but general ones which stocked varied mechandise ranging from building materials to cooking fat. Most of the mechandise is consumer goods, mostly imported from outside the district.

There are about fifty periodical open air markets, seven (7) of which are licenced Grade I markets. These Grade I markets are usually held more than 3 times a week. Included in the Grade I markets is the Busia market which is constructed of permanent materials and it is a daily market.

Most of the goods in the markets are low order goods like foodstuffs and in some cases especially in the Grade I markets, textiles were also sold. Most of the products in the periodic markets are produced within the district.

There are 3 livestock markets at Funyula, Bumala and Amukura which are held once a week and from which the Busia County Council gets revenue through cess payments.

In the district, there is fair distribution of basic facilities for commerce and trade, and if the economy could expand, trade infrastructure will need little investment to cope with the expansion.

4.5. FISHING AND CO-OPERATIVES

At the time of the field study, there were about 200 licenced fishermen in the district especially in Southern Division. The fishermen use canoes, motorised canoes, while a few, less than ten use motor-boats. They catch fish in small quantities which are sold on local markets when still fresh. In 1974, a fish co-operative society was formed but it collapsed due to small turnover. Better fishing results could be achieved with better fishing methods and marketing facilities.

There are about 22 co-operative societies registered with the District Co-operative Offices. Apart from the one dairy society and three cotton societies at Luanda, Nambale and Malakisi, all, were dormant. Even of the active ones, the cotton societies have alot of management problems resulting in delayed collection of seed cotton, delayed payments and numerous deductions. This state of affairs has led to low moral and has weakened the societies and acts as a constraint to the societies fulfilling their objectives.

There is scope for the sale of agricultural production, especially maize, pulses, cotton, sugar-cane, oilseeds and milk including fish through co-operatives. What is needed is the re-organisation of the societies' management and the articulation of the farmers to the co-operative movement.

4.6. DESIGNATED SERVICE CENTRES :

Busia District has got one designated urban centre (Busia), 6 rural centres, 10 market centres, and 22 local centres (Table XIX and Map No. 7). Service centres concept is one of the strategies to achieve urbanization and rural development policies in Kenya according to 1971-74 and 1974-78 Development Plans. The urbanization policy is as follows :-

i) To achieve the maximum development of the rural areas so as to slow down the rate of migration from the rural to the urban areas.

ii) To establish a more even geographical spread of urban physical infrastructure in order to promote more balanced economic growth throughout the nation and a more equitable standard of social services between different areas.

iii) To encourage the expansion of several large towns in addition to Nairobi and Mombasa thereby providing more alternatives for the absorption of the migrant population and avoiding the problems arising from excessive concentration in these two towns.

iv) To continue to develop a network of communications, so as to link centres of economic and social development.

v) To adopt standards for urban infrastructure which closely relate to what can be afforded by the country as a whole.

The strategies adopted to meet the stated objectives are:-

I) Services and Service centres.
ii) Principal towns
iii) Communications network

In the case of the study area, the applicable and relevant strategies are the Service Centres and Communications Network. The planned network of service centres provides an arrangement of towns and villages of different levels of economic and social activity in accordance with a hicrarchy necessary to provide a satisfactory service at all levels.

BUSIA DISTRICT
DESTINATED SERVICE CENTRES

Map No. 7

LEGEND

- DISTRICT BOUNDARY
- ROADS
- RIVERS
- URBAN CENTRES
- RURAL "
- MARKET "
- LOCAL "
- OTHER "

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Source:
National Development Plan 1974—1978.

Scale:
1: 250,000

Table XIX

Schedule of Service Centres - Busia District.

URBAN	RURAI	MARKET	LOCAL
BUSIA	Amogoru	Chelelemuk	Kolait
	(Kacholia)	Malaba	Kolanya
	Nambale	Amukura	Mundika
	Hakati	Matayo	Igara
	Butula	Bumala	Kwangamor
	Funula	Sio Port	Mungatsi
	(Nangina)	Buhuyi	Luambwa
	Port Vic.	Likolis	Lugulu
		Murumba	Alupe(Chakol)
		Buyofu	Mabunge
			Tingolo
			Siribo
			Jairos
			Bumutiru
			Machakos
			Chamasiri
			Bukhalalire
			Bukayi
			Bukiri
			Lugare
			Luanda
			Lupida

Source : National Development Plan 1974/78
Page 143.

In order of importance, the four categories of centres are known as Urban, Rural, Market and Local Centres and the level of each service appropriate for each category is also set out in the plan. The overall objective adopted in planning the network is to provide eventually one "Local Centre" for every 5000 rural population, "Market Centre" for every 15000, "Rural Centre" for every 40000 and an "Urban Centre" for each 120,000.(5) Individual centres were selected and their place in the hierarchy allocated, after consideration of many factors, including the needs for the area, an examination of the local population distribution; an analysis of existing infrastructure and the transportation network; and the needs arising from development of local resources.

The strategy which was followed to achieve a satisfactory communication network between centres of growth was as follows :-

i) all principal towns are or will be linked by the National Trunk Roads system and in the majority of cases also by the International Trunk Road System.

ii) Urban centres will progressively be linked with National Trunk Roads by means of Primary Roads.

iii) rural Centres will be linked to the Primary Roads network by Secondary Roads or roads of a higher classification.

iv) all other centres will be linked in with the communication system either by minor roads or roads of a higher classification.(16)

In this thesis very little critism and analysis will be done on the adequacy of the service centres concept as was applied in Busia District, but an analysis will be made on the correlation of the centres and communication network (roads) in Chapter 6. But in passing, since according to the National Development Plan, there is need for one urban centre for a population of about 250,000, there is need for two designated urban centres. By looking at the infrastructural development of the rural centres, Funyula or Nambale could be upgraded to the level of the second urban centre in addition to Busia.

Of the designated rural centres, Hakati and Kocholia were recommended for upgrading purely on administrative criterion only (by then having been chosen as Divisional Headquarters), and up to today they have remained mere villages housing the District Officer (D.O) and his askaris with very little prospects for advancement.

4.7. RESOURCE ZONES :

Looking at Map No 11 of Ecological Zones, the whole of the study area is high potential with good climate and soils. The major resource is fish on the shores of Lake Victoria. Even the areas of impedded drainage are still of high potential and with some artificial drainage would be capable of producing crops like cotton paddy rice and maize plus other many minor crops. Apart from this area of impedded drainage, other constraints to development are river valleys with poorly developed soils and liable to flooding, and the hill-tops which are not recommended for intensive agricultural activities except affrostration.

In general, the Northern and Central Divisions are of higher potential than the Southern Division which this disadvantage is minimised by the presence of natural resources such as fish.

The resources zones are shown in Map No. 12 .

4.8. POPULATION CHARACTERISTICS AND LAND USE PATTERN

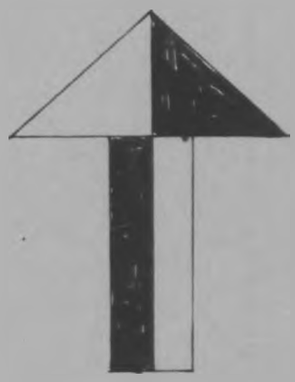
According to 1969 Population Census, Busia District with a land area of 1629 sq. km. and total population of 200486, had an average density of 123 persons per sq.km. This average density is comparable to some of the most densely populated districts in the country. Between 1962 census and 1969 census, the population grew by an average annual rate of increase of about 2.5.%. The study areas is a known area of surplus out-migration. The population prymid shows the characteristics of a less developed country with a broad base and shows out-migration in the working age-groups 15-19 years to 35-39 years.

Marachi Location had the highest average population density of 169 persons per sq. km. Others in the descenting order of population density are Bunyala (132 per sq. km), Samia 126 per sq.km),

BUSIA DISTRICT

POPULATION DENSITY 1969 CENSUS BY SUB-LOCATION

MAP NO. 13



Scale: 1: 250,000 (approx.)

Bukhayo (105 per sq.km , South Teso (102 per sq.km) and North Teso (196 per sq.km.). But when analysing 1969 census data at sub-location level, it is found out that Marachi Location with few large rivers and hence limited areas of marshes, has evenly distributed population. Locations like North and South Teso, and Bukhayo which are transversed by large rivers like Sio, Walatsi, Musokoto and Malakisi, have unevenly distributed population. For example, Matayos Sub-location in Bukhayo which is fairly flat has an average population density of 160 per sq.km. while Lupida with extensive swamps has got only 70 per sq.km. So is Bunyala Location which has population density of 237 per sq. km. in Mangombe which is on higher ground and 71 per sq.km. in Obaro Sub-location which is in the Nzoia swamp and liable to frequent floods. In Samia Location, Luanda Sub-location with flatter land has a population density of 225 per sq.km. while Bukangala Sub-location predorminated by Samia Hills has only 50 persons per sq.km.

This goes a long way to confirm a Ministry of Agriculture Survey carried out in 1975 on Land Use and Population Density. Extensive cultivation is carried out only on the interfluves where a variety of crops are grown. No cultivation or homes exist on dambos (mashes) and most probably they are covered by the natural vegetation (annual grasses) and are used for grazing purposes during the dry season. There is however still room in dambos for crops like sugar-cane and rice which can withstand a limited period of imperfect drainage as there are few cattle in the area as a whole. The better drained interfluves are in most cases densely populated."(17)

Therefore, when planning for road linkages, special attention should be paid to areas of high population density.

Table XX

Population by Sex and Age 1969 - Busia District

AGE GROUP	TOTAL	MALE	FEMALE
0 -4 YRS.	39819	19827	19992
5 - 9 "	33971	16995	16976
10 -14 "	25962	13478	12484
15 -19 "	18111	8928	9183
20 -24 "	13363	5400	7963
25 -29 "	12581	4466	8115
30 -34) "	20815	8307	12508
35 -39) "			
40 -44) "	13958	6293	7665
45 -49) "			
50 -54) "	10203	4657	5546
55 -59) "			
60 ± "	11703	6790	4973
TOTAL "	200486	95141	105345

Source : Kenya Population Census 1969 Volume I

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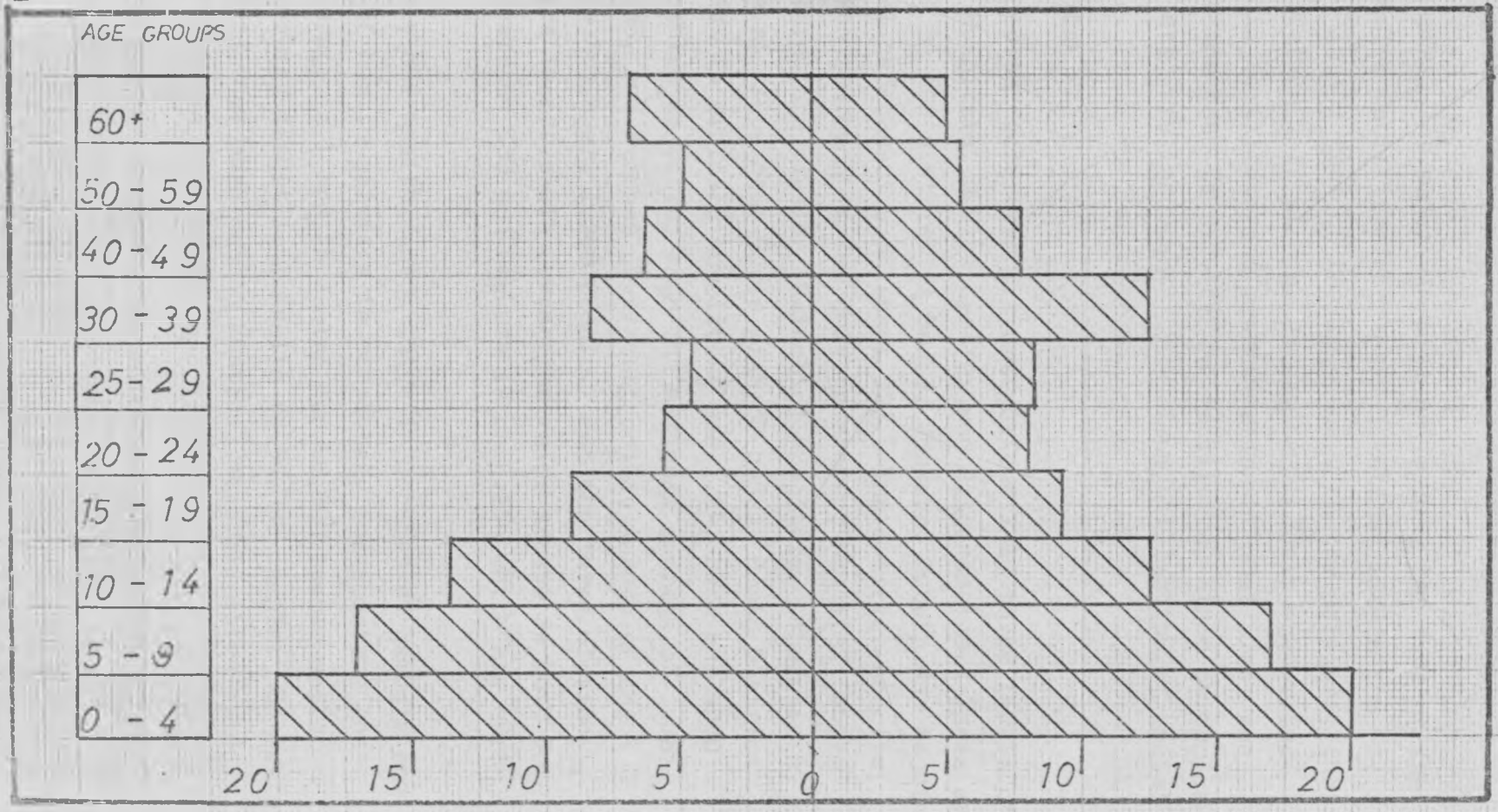
13. Op. Cit
14. Op. cit
15. Op. cit
16. Op. cit
17. Republic of Kenya" "Kenya Soil Survey Project 1975 Report No. 18 "Ministry of Agriculture Nairobi, 1975 (Restricted).

FIG. 1

BUSIA DISTRICT: POPULATION PYRAMID 1969 IN '000



SOCIAL INFRASTRUCTURE:

In this chapter, the major aim will be to give the type of the existing social facilities and their locations within the districts. In the case of the inadequacy of the services, their probable location will also be determined. Their number and location will facilitate the determination of what class and standard of the road to service the facilities, since communication links are very important for maximum utilization of social facilities.

5.1 MEDICAL FACILITIES:

In Kenya, health facilities are categorized into three levels of services: Hospitals, Health Centres and Dispensaries. There are 4 hospitals in the district at Busia, Amukura, Butula and Nangina with a total bed-capacity of about 320. The district hospital at Busia with 200 beds is the only government hospital, while the other three are mission (Catholic) hospitals. There is a leprosarium at Alupe near Busia with 50 beds. Busia District with 320 beds in ordinary hospitals, has 1.24 beds per 1000 population which is better than the national average of 1.38 beds per 1000, and reaches government policy target of one hospital bed for every 1,250 people. But the three mission hospitals are inaccessible during the rainy season as both Butula and Nangina are on C30 and Amukura is on D.256 which are earth roads.

There is only one health centre which is located at Nambale and this level of health services is completely inadequate. The national average is 1 health centre per 66,000 people while government policy target is 1 health to 50,000 people. So Busia District needs four more health centres, possible sites being Port Victoria, Matayos, Amagoru and Sio Port.

There are only three dispensaries which are inadequate as the government policy target is 1 dispensary per 20,000 people.

BUSIA DISTRICT
SOCIAL INFRASTRUCTURE
Map No. 14

LEGEND	
H	Hospital.
Hx	Leprosarium.
C	Health Centre.
D	Dispensery.
Ps	Police Station.
P	" Post.
W	Wholesale Shop.
B	Border Post.
Cc	Chief's Centre.
Do	Divisional Headquarters.
Dc	District "

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Depart. of U. & R. Planning
University of - Nairobi

Source:
Field Survey

Scale: 1:250,000 (approx.)

5.2. EDUCATION:

In December 1976, there were 245 primary schools with enrolment of over 85,000 pupils. This was a very high increase from 132 schools with enrolment of about 40,000 in 1970 before the introduction of free education in Standards 1 -1V. From 1974, new primary schools are being opened up at the rate of 6 per year. Some of the new primary schools are only accessible by footpaths.

There were 23 secondary schools in the district in 1976. Nearly all of them were located in designated service centres, and so the roads also serve the same purpose for the secondary schools.

5.3 ADMINISTRATION:

The district headquarters is located at Busia, and the District Commissioner with other district heads of departments are stationed in the town. Most of the parastatal corporations like I.C.D.C and Agricultural Finance Corporation (A.F.C) have their district offices at Busia. The only full-time bank in the district, a branch of the Standard Bank Ltd, is also located at Busia. Other bodies, located at Busia are the District Magistrates' Court, the Police Station, District Development Centre, and Busia County Council offices. Busia has grown from a small border post at the time of independence when it was made the headquarters for the new district of Busia, to have a population of 1,058 people in 1969. The general impression is that the 1969 population has more than trebled mainly due to increased activities in the recent past at the border. In 1970, the population estimate for Busia in 1980 was 3000 people.(4)

Busia is well connected with other districts and centres by B1 National Trunk road (which is tarmaced) and C31 which has got a murram surface.

The divisional headquarters are at Kocholia (Northern Division), Nambale (Central Division) and Hakati (Southern Division), all of which are designated rural centres. A part from Nambale which is a highly developed centre, Hakati and Kocholia were mere villages at the time they were made divisional headquarters.

They do not have much in form of facilities despite their designations and even most of their respective divisional activities are located in other centres. For example, a part from the District Officers and their askaris, all other activities are either at Amukura or Funyala for Kocholia and Hakati respectively.

The locational headquarters are located at Amogoru (North Teso) Amukura (South Teso), Nambale (Bukhayo), Butula (Marachi), Funyala (Samia) and Port Victoria (Bunyala).

5.4 OTHER FACILITIES:

In Busia District, there is only one police station at Busia and 5 police posts at Malaba, Amukura, Funyala, Sio Port and Port Victoria. There is need for police services in Central Division either at Butula or Nambale or at both of the two places. According to the District Development Committee (D.D.C), Busia Police Station should be elevated to full police divisional headquarter status and be separated from Bungoma Police Division. This will be in line with the tendency in Kenya where each district is supposed to have its own police division. The second reason is that the population in the district is large enough to warrant such action. One of the recommendations of the D.D.C is that the police posts at Malaba and Sio Port should be elevated to full police stations so that they could discharge their services effectively as customs border posts.(5)

As stated above, there is only one judicial court in the district at Busia.

There are full postal and telephone (munual) services at Busia and Funyala. Sub-postal services are at Malaba, Amukura, Nambale, Butula, Bumala, Sio Port and Port Victoria. There are plans to elevate the status of the postal services at some of these places.

At present, it is only Busia which is served by electricity, while all other rural centres including Busia urban centre and most of the dispensaries have piped water.

5.5. SETTLEMENT PATTERN:

As shown in Map No. 14 , three settlement patterns are found in Busia. These are linear, nucleated and dispersed settlement patterns. Linear settlements are only found near the major roads, especially on A104 International Trunk road between Bungoma and Malaba. According to Madungha, this road acts as an urban centre where people from the interior come to sell their produce while some settle along it to trade (6) The same trend can be observed on the recently tarmaced road B1 National Trunk.

But most of the people who move near the roads to trade, actually settle in the market centres along these roads So this gives us the second pattern of settlement which is nucleated. Nucleated settlement pattern is mostly found at Busia (estimated population of 3,500 people), and at Nambale and Funyala/Nangina, each with about 300-400 permanent residents (excluding students/pupils in boarding schools).(7) Other centres like Butula, Amogoru, Malaba, Sio Port, Amukura, Luanda, Bumala and Port Victoria have permanent residents between 100-200. The residents in the nucleated settlements are traders and other self-employed people, civil servants, teachers and other employees in the private sectors.

The people in the above settlements account for about 2% of the district population. Most of the population live on their own small farm holdings - their dispersal determined by physical and economic factors like relief, soils, drainage and agricultural potential. The flat highlands have more settlements than the low marshes near the lake and in the river valley, and on the hill - tops, This type of population settlement creates accessibility problem when served by roads.

It can be noted that settlement patterns are very much determined by topographical features (i.e dispersed), communication lines such as roads (i.e linear), and infrastructure facilities distribution (nucleated). Of the three patterns, nucleated settlement pattern resembles progress towards urbanization.

Chapter 5.

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Chapter VI

TRANSPORT SYSTEM/LAND USE RELATIONSHIP

6.1. MODES OF TRAVEL

In any economic and social system the mode and the use of transport facilities is mainly determined by the economic status of the individual family and the income and the occupation of society in general, the distance to be travelled, availability of different types of transport facilities, physical features of the land and the type and intensity of land use, and the government transport policy.

Generally, there is a tendency to own private means of travel when the economic status of the family are high. Affordability has a strong bearing on the mode of travel an individual chooses. Secondly, the distance to be travelled including time element also determines the mode of travel. The longer the distance to be travelled depending on affordability the more comfortable and quickest means of travel are desired. Thirdly, the availability of different types of transport, for example, water, air, road and rail, has an inclluence on the choice of mode of travel. This is much in evidence in industrialised countries where individuals have several options. Fourthly, the terrain of the land limits the options of the mode of travel, especially, land travel. Fifthly, the government transport policy also determines the choices of travel. For example, in Tanzania, there is a limit to tonnage of goods which can travel by road. In this case, there are kinds of goods by form of their nature (i.e. bulky goods) which must travel by rail. All the above five determinants of mode of travel depend on the state or level of the national economy. The more developed the economy, the more diversified the modes of travel.

In Busia, the transport facilities available are air, water, rail and road (land).

Air:

There are three airstrips in the district at Busia, Amukura and Nangina. The Busia airstrip is a government one and grass had never been cut at the airstrip for the last two years.

This situation arose because the Ministry of Power and Communications has got no district head at Busia District headquarters while the Ministry of Works maintains that they are not responsible for air-strips. The last light aircraft landed on the airstrip in 1973(1) The airstrip at Amukura belongs to the Catholic missionaries and it is attached to the Amukura Mission Hospital. It is usually used by private planes, especially for emergency cases referred from the hospital to either Kakamega or Kisumu Provincial Hospitals. Seven light planes landed there in 1976.(2) The busiest airstrip is the one at Nangina. It has landings about two to three times a month and there were 31 light planes landing on it in 1976. It is also attached to the hospital at Nangina and used for emergency airlifts to referal hospitals at Kisumu or for missionary work.(3)

By far, apart from emergency airlifts and missionary work at Nangina and Amukura, air travel is of no significance in the district.

Water :

There are canoes and motor-boats in the Lake Victoria used for small time fishing, and of late, used for smuggling traffic accross the border into Uganda. Apart from these few activities, there is no other water travel in the district, even on the rivers.

Rail :

The railway from Mombasa to Uganda passes for a few kilometres in the northern end of the study area. Malaba border post is the only railway station in the study area. Most of the produce from the district is carried by road to storage depots at Mayanga, Bungoma or Kisumu, which are all outside the study area. So very little is made of this section of the railway through the study area by the people within the district.

Roads (Land)

By far, the roads are the important means of travel in the district. In whole there are about 501.7 k.m of all sorts of classified roads (Tables XXI(a)&(b). In addition to these classified roads, are several unclassified motorable tracks which are useable during the dry season plus numerous footpaths.

M. O. W. CLASSIFIED ROADS

Map No. 16

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UNIVERSITY OF NAIROBI

Source Based on maps and data from M. O. W. Roads Department Planning Unit.

Scale: 1 250,000 (Approx.)

LEGEND

- International Boundary.
- Provincial "
- District "
- International Trunk Road. A
- National Trunk Road. B
- Primary Road. C
- Secondary Road. D
- Minor Road E
- Track (classified E)
- Centres
- X Census Point (see text)
- Inaccessible Areas (based on M. O. W. 2 miles Index walking distance - see text)
- Railway

These are used for the movement of people and their goods. The most important modes of travel are foot, bicycle and motorable vehicles (cars, buses, lorries). During the field survey it was not possible to obtain data on or make a survey of modal spilt of the three. But in section 6.5. are data for traffic counts on a few of the roads in the district as carried out by the Ministry of Works. But it must be noted that, the roads are the most important, and in nearly all over the district, the only means of transport.

6.2. ROAD NETWORK - LAYOUT AND STANDARDS

The study area has got about 501.7 km. of M.OW. classified roads (Tables XXI(a) & (b), and Map No.16). The International Trunk Road A104 through Bungoma to Malaba on Uganda border passes for about 12km through the district and so is the National Trunk Roads (36.4km) account for about 7.3% of all the roads in the district by length. All these are tarmac surfaced, and this compares well with the national average where tarmac roads account for about 8% of the road distances in the country (Table XXII).

There are 104.7km. of primary roads (class C) in the district, which are 20% of the total length of the roads, which is above the national average where Class C roads are earth/gravel while for the whole country 14% of Class C road length are tarmac surfaced. The 34% (168.8 km) of the roads in the district are Secondary Roads (Class D) which is also above the national average of 20% But none is tarmac surfaced while 3% of the country's Class D roads are tarmac surfaced. The last class of roads is Minor Roads (Class E). There are about 188 km. of these roads in the study area which are about 38% of all the roads in the district. These type of roads compare well with the national average of 40%. In Busia, the Minor Roads have two classifications - E and X. Class X are the recently opened up roads which are pending E and D reclassification. Class X roads are in Southern Division and were funded under the District Development Committee grants. The programme was phased out when the D.D.C ran out funds.

Special Purpose Roads, which include among others, tea, coffee, sugar, rice, fish, settlement, tourism, defence, urban and forest roads, are not found in Busia District, apart from 3.8km which are

Table XXI (a)

Busia District M.O.W. Classified Roads

CLASS	TYPE	BITUMEN	V	IV	III	II	I	TOTAL(KM)	AS PERCENTAGE OF OVERALL
INTERNATIONAL TRUNK ROAD	A	12 0	-	-	-	-	-	12.0	2.4%
NATIONAL TRUNK ROAD	B	24.4	-	-	-	-	-	24.4	4.9%
PRIMARY ROAD	C	-	-	-	32.2	62.0	10.5	104.7	20%
SECONDARY ROAD	D	-	-	-	-	99.3	69.5	168.8	34%
MINOR ROAD	E	-	-	-	-	-	143	143.0	29%
MINOR ROAD	X	-	-	-	-	-	45	45.0	9.0%
GOVERNMENT ACCESS		-	-	-	-	-	0.8	0.8	0.2%
K.P.&.T. VHF		-	-	-	-	-	3.0	3.0	0.6%
TOTAL (KM)		36.4	-	-	32.2	161.3	271.8	501.7	100%
AS PERCENTAGE OF OVERALL		7.3%	-	-	6.4%	32.0%	54.3%	100%	

Source : Ministry of Works - Roads Department Road Maintenance Schedule - Busia District
Summary Sheet 2.

Table XXI (b)

Ministry of Works Classified Roads - Busia District in km

A104	Malaba - Bungoma Boundary	12.0
B1	Junction C30 (Bumala) - Busia	24.4
C30	Luambwa Ferry - Junction D242 (Ralak)	46.5
C31	Kakamega Boundary - Junction B1 (Mubwekas)	32.2
C32	Junction C31 (Mungatsi) - Bungoma Boundary	11.0
D250	D251 (Mundere) - C30 (Nangina)	22.0
D251	C30 - Bukoma	19.4
D254	B1 (Matayos) - C30 (Nangina)	16.1
D255	A104 (Malaba) - B1	29.0
D256	D255 - C30 (Butula)	40.3
D257	D256 (Amukura) - Bungoma Boundary	14.3
D258	C31 (Mungatsi) - Bungoma Boundary	8.0
E145	D251 - D250 (Provincial Boundary)	15.0
E146	D250 - E161 - D254	6.6
E147	C30 (Nangina)	5.6.
E150	B1 (Matayos) - D256	12.2
E151	D255 (Alupe - B1(Busia) - C31.	31.9
E152	Kakamega Boundary (C30) - D256 - C30	25.8
E155	D257 (Amukura) - C32	8.4
E156	Buteba (Uganda Border) - D256 (Kaliwa)	16.0
E157	C31 (Khwirale) - D255	10.0
E161	Luanda E146	1.5
X6101	C30 (Luambwa) - D251	8.4
X6102	D250 (Sio Port) - D250	10.9
X6103	C30 (Bukiri) - D250	3.6
X6104	C30 (Nangina) - Ebukwamba	6.0
X6105	E147 (Nyakhobi) - D254	6.6
X6106	C30 (Odiado) - Kabuodo	3.0
X6107	(Bukiri) - Mumbaka	6.5
G6101	Busia Water Supply	0.8
VHF	Funyula aceess for K.R.&T. VHF	3.0
	TOTAL	501.7

Source : M.O.W. Roads Department (Road Maintenance Schedule Summary Sheet Nos. 3 - 7.

Table XXII

Kilometres of Roads in Kenya 1969

CLASS	BITUMEN	EARTH/GRAVEL	TOTAL	BITUMEN AS %AGE OF TOTAL
A	1770.2	1170.1	2940.3	65%
B	749.2	1693.9	2443.0	31%
C	1127.3	6909.7	8037.0	14%
D	267.1	9885.9 ,	10153.1	3%
E	131.2	20085.3	20216.5	
SPECIAL PURPOSE	-	6301.7	6301.7	-
TOTAL	4044.9	46046.6	50091.5	8%

Source : Statistical Abstract 1976.

Government Access Road to Busia Town waterworks (0.8 km) and Kenya Posts and Telecommunication Access to VHF. Equipment at Funyula (3.0 km).

As a whole, Busia with 1km of roads per 3.3 sq.km. of land is comparably better of than the national average of 1km. of roads per 11.4 sq.km. of land. But still, Busia's average is the lowest in Western Province:- Kakamega has got 1km. of road length per 2.2. sq.km. of land and Bungoma has got 1 km. of road length per 2.5. sq.km. of land. Even Busia's average is lower than the adjacent Siaya District in Nyanza Province (1km. of road length per 2.7 sq.km. of land) with comparable economic resources and development prospects.

The effect of the road network layout on linkages and accessibility within the district will be discussed in the next section.

Standards:

As stated above, 36.4km of roads in the district are trunk roads which are tarmac surfaced and hence passable throughout the year in all types of weather conditions. This has kept in trend in the past policies where development priorities were given to the trunk roads. The remainder of the roads are earth/gravel roads.

In Kenya, there are 5 standards of gravel/earth roads. The highest standard of these is Type V, which are murram and all-weather roads. The surface is murramed, consolidated and compacted, the drifts and drains are well constructed, and the bridges/culverts are high enough above river flood levels and strong enough to withstand any type of load. Type IV roads are nearly of the same construction as type V and are also all-weather gravel roads. These two types of gravel roads are not in Busia District (Table XXI (a). Therefore it can be stated that apart from the trunk roads, there are no any other all-weather roads in the study area.

Type III roads have an engineered base with some compacted murram and laid out drifts and drains, but they are not all-weather roads. In the study area, these type of roads are 32.2km (C31) which accounts for only 6.4% of the roads in the district (Tables XXI(a) & (b).

This road is muddy and some of the bridges, especially over Sio River near Nambale are always flooded for a few weeks almost every year.

Type II roads are not on an engineered base, and may be gravelled without compaction. They also have some drains but the bridges are weak and low, and some of them have restricted maximum loads to support (or pass over them). These type of roads are wet, muddy and impassable during the rainy season. A total of 161.3 km. (Class C = 62.0km. and Class D = 99.3km) are of type II. They account for 32.0% of the all the roads in the district.

The last type of roads are Type I. These roads consist just of graded (paved) surfaces without drains and the bridges are restricted to a total load (of the vehicle plus goods) of 5 tons. These type of roads are muddy and impassable in any type of wet weather. In the study area, there are 271.8 km of Type I roads accounting for 54.3% of all the roads in the district. Included in Type I roads are all the Minor Roads (Class E roads), 69.5 km. of Class D roads and 10.5 km. of Class C roads (Table XX1(a),. Some of the roads are classified as Class E and included in Type I, but they are still motorable tracks (Map No.16).

Although during road classification in 1970, a good number of roads in the study area were given high classifications, the state of the roads is poor and does not correspond to the classifications. It can be seen that 92.7% of the roads in the study are non-allweather roads, and are liable to flooding and being impassable during the rainy season.

6.3. LINKAGES AND ACCESSIBILITY

LINKAGES

In the study area, it seems as if most of production areas and designated service centres are well linked with those of lower and higher ranks, except in some parts near the lake in the Yala Swamp. Nearly all the designated service centres are well served with the appropriate class of roads.

As regards road network linkage, it can be stated that the layout is fairly well designed apart from few areas (i.e. Yala Swamp), but during the rainy season, the linkage are partially, and in some cases, completely cut off.

ACCESSIBILITY

According to the M.O.W., accessibility to road transport in the rural areas is considered to be a maximum distance of 2 miles from any standard (A to E) of M.O.W. classified road.(b) But this accessibility index can be varied to a lesser distance in case of a hilly or slopy area. Following this criterion, the whole of the district has got few isolated pockets of inaccessibility with much or complete inaccessibility experienced in the Yala Swamp area. The area best served with roads is the Samia Location of Southern Division.

But applying blindly this Accessibility Index of 2 miles walking distance may give misleading conclusions. First, apart from the trunk roads, all the other roads (92.7%) as shown before are not all-weather roads and viewing the situation in comparison with the rainfall pattern of the area, leads to an entirely contrasting result. The roads become wet, muddy and impassable during the rain season. Hence, apart from few metres along the trunk roads, most of the district can be considered as inaccessible during the rain season particularly to vehicular traffic. This situation is especially a cute on roads Types II and I which form about 86% of all road length in the district (i.e. excluding trunk, roads A104, B1 and in some cases primary road C30). Therefore, services and facilities at centres like Port Victoria, Sio Port, Nangina, Luanda, Bumala, Butula, Amukura, Amagoru and other several places are virtually in-accessible

or accessible at high costs to those people who would like to make use of them for some months in the year.

Secondly, the accessibility index of 2 miles walking distance makes it very difficult to transport agricultural bulky products in economically viable units to the buying/collecting centres for export. This is a major constraint to agricultural and economic development in the study area. Introduction of high value but bulky cash crops such as sugar cane is expensive since there must be prior massive investments in the feeder road network construction.

6.4. TRAFFIC GENERATION POTENTIAL

In Kenya generally and in the study area in particular, the upgrading of the lower classes of roads (Classes D and E) and their standards (Earth/gravel Type I-III and in some cases Type IV) is based on the population density of the area, type or level of the designated centre including the social infrastructure served by the road and the agricultural production and potential of the area.(7) The aim of the M.O.W. Road Department has been that upgrading should be based on Traffic Volume Counts (census) (T.V.C.), but this has not been possible to achieve due to shortage of funds and personnel.(8) Therefore, upgrading and level of maintenance depends on the crude methods mentioned above. Following this trend, it is only the trunk roads which have had traffic volume counts since 1954, and in addition, traffic volume records exist for C31 since 1959. Before 1970 re-classification programme, C31 was a primary road at par with the present National Trunk Road B1. There are annual estimates of vehicles on Class C roads in the district.

Traffic volume counts are carried out by the M.O.W. Road Department Planning Unit. T.V.C. are usually taken on monthly averages for each "Census Point." Annual estimates are also given per each category of roads. For example, according to M.O.W. records, there were about 15,000 vehicles on the trunk roads in 1954 in the district which increased to about 62,000 in 1974. On the primary roads, the estimates are 3,500 vehicles in 1954 to 16,000 in 1974.(9)

Traffic Volume Counts for 1975 and 1976 are given in Table XIII.

Table XXIII

Traffic Volumes at Census Points by Vehicle Types

CENSUS POINT	YEAR	CARS	LIGHT GOODS	SUB-TOTAL	MEDIUM GOODS	HEAVY GOODS	BUSES	SUB-TOTAL	GRAND TOTAL
A104									
1	1975	513	403	916	314	76	72	462	1378
2	1975	532	401	933	331	75	70	476	1409
1	1976	580	702	1282	394	98	86	578	1860
2	1976	595	732	1327	387	93	81	561	1888
BI									
3	1975	727	711	1438	242	53	220	515	1953
4	1975	750	777	1527	367	52	236	657	2184
3	1976	762	955	1717	628	46	307	981	2698
4	1976	831	1009	1840	623	48	389	1060	2900
C31									
5	1975	32	108	140	158	41	55	254	731
6	1975	49	121	170	152	38	51	241	736
7	1975	67	127	194	163	40	60	263	814
5	1976	48	361	409	199	52	71	322	731
6	1976	53	359	412	211	54	59	324	736
7	1976	72	370	442	234	58	80	372	814

Source : Compiled from tables and Maps of the
Ministry of Works
Roads Department
Planning Unit Road Surveys 1975 & 76.

These are for A104, B1 and C31. The census points have been tabulated as Points 1 to 7. This numbering was revised for Table XXIII and the Roads Map No. 16 . for convinience only but the data responds to the actual points on M.O.W. Roads Planning Unit maps and tables. "Light Goods" vehicles include "Matatu" pick-ups as they are not licenced passenger vehicles.

National Trunk road (B1) has more traffic than either A104 or C31. This could be accounted for among other factors, by it being a direct connection between Kisumu and the Uganda border. Traffic volumes between Census Points on A104 and B1 imply that it is through traffic or it goes atleast up to the border. Traffic volumes between Census Points on A104 and B1 imply that it is through traffic or it goes atleast up to the border. Traffic on C31 fluctuates between the Census points which gives inferences that it is more of a distributor than either A104 or B1. According to M.O.W. standards, traffic volumes on C31 qualifies it to an all-weather road of Type V standard.(10) Secondly the upgrading to Type V will be in confirmity with the whole length of the road since a part of it up to the district boundary on Kakamega side was upgraded in early 1976. Thirdly, according to Development Plan 1974/75, it should be an all-weather road because it links two regional centres; Kakamega the provincial headquarters and the important border urban centre and district headquarters of Busia.

Between 1975 and 1976, there was a general increase of traffic of about 38% on A104. "Light Goods" traffic increased by 78% in 1976. The increase on B1 was by 36% with 32% increase for "Light Goods" traffic, while great increase were for 'Medium Goods' (75%) and "Buses" (53%). Great increase in traffic flows were for C31, with 80% for total traffic, while 'Light' and "Medium Goods" traffic increased by over 200%. As there is evidence of increased smuggling along the border in 1976, this accounted for some of the increase in traffic volumes on the roads in 1976.

In 1975 and 1976, "Goods" traffic accounted for 62% of vehicles on A104 road, while it accounted for 45% only on B1. "Goods" traffic was 80% of the flows in the same years on C31, So more than 50% of the traffic on trunk roads were "Goods" vehicles, most of them through traffic to Uganda.

While C31, which is a distributor had got more than 80% of the traffic for movement of goods.

Considering the traffic flows and increases on the three roads and especially on C31, and inferring the same situation on other Class C roads (C30 and C32) since they are alsc distributors, there are grounds for them to be upgraded to all-weather standard roads - to atleast of Type IV grade. Further, considering D256 road which passes through high potential areas and connects important designated centres such as Butula,Nambale and Amukura, there are grounds for its upgrading to an all weather road (Type IV).

Chapter 6.

References

1. Fielf Survey August/September, 1977
2. Op. cit
3. Op. cit
4. M.O. Works Roads Department Planning Unit - Records (Restricted)
5. Op. cit
6. Op. cit
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8. Op. cit
9. Op. cit

CHAPTER SEVEN

RECOMMENDATIONS AND PROPOSAL

This chapter is divided into 3 sections: summary of the findings of the study, recommendations and the proposal. The proposal will be mainly the recommendations in map form, showing the road system in the district: their recommended classifications and standards.

7.1 FINDINGS OF THE STUDY:

The standard of living of the people in the rural areas is low compared to the urban centres. The rural areas in Kenya account for 90% of the population, also are mostly engaged in agriculture. Agriculture accounts for over 75% of the country's exports and accounts for over 30% of G.D.P. Therefore, any planning study or research in the rural areas should address itself to the acceleration of development and hence the raising of the standard of living of the people in these areas with particular emphasis on agricultural development.

Although agriculture and hence economic development is a correspondingly an important element in rural development, it is not the sole parameter of rural development as such. Rural development can be achieved by the provision of economic facilities, social services and physical infrastructure in appropriate combinations. Included in the physical infrastructure are transportation and communications. By the subsistance nature of the rural economies, when some of these services are provided or introduced, they entail introduction of innovations. Usually innovations move from more developed areas generally urbanised centres through or along transportation routes to less developed areas usually rural areas. As such, communication routes assume an important role as a means along which development innovations travel from more to less developed areas. Therefore, transportation was found to be a necessary component to development. Even the World Bank considers transportation as a necessary concomitent of the exchange economy, and it is indispensible to economy growth.

In addition to transportation being an important infrastructure for general development, it also provides general accessibility and convinience. Improvement in transportation facilities increases accessibility and hence increase the rate of frequency of movement of people and their goods. If this occurs in the rural areas, then innovations have a good chance to trickle to the rural areas much faster and thereby enhance rural development.

Kenya's transport system was designed to serve the dual economy. The primary role of the transport system has been to tap raw materials from the resource zones for export and to bring in imported manufactured products to serve mainly the urban centres.

There are regional disparities in Kenya. The disparities are both horizontal between the regions and veitical between the rural areas and the few principal urban centres. This situation has created core-periphery relationship between the regions, and the regions and the urban centres. This was also aggravated by the transport system, especially the road network. Most of the roads in the rural areas are inaccessible due to their poor conditions. The stress has been on the improvement of trunk roads and little attention was paid to the lower types of roads (primary, secondary and minor). Generally the trunk roads act as regional bridging rather than regional intergrating channels.

The study area, Busia District, is well served by roads when compared to the national average, except road length per unit areas in the district is lower than in other districts of comparable potential and development level. (i.e. Siaya). There are about 501.7 km. of roads in the district, of which 7.3% are trunk roads. The trunk roads are tarmac surfaced and most of the traffic on them is through traffic starting or ending outside the study area.

The rest of the roads (92.7%) are earth/gravel roads, mostly of low standard of construction and are wet, muddy and impassable during the rain season. This condition of the roads limits their affective use to few months every year especially during the dry season. There is urgent need to improve on the standard of the

roads in order for them to play their assigned role in rural development.

Roads transport is the major and in most cases the only means of travel in Busia District. The modal spilt is between vehicular, bicycle and foot traffic.

Busia District is a high potential area with generally fertile soils and reliable rainfall, except in few places such as the hilly areas and the Yala Swamp. This potential can only be optimally exploited after alot of improvement in the quality of the existing roads in the study area.

Crops like cotton, maiza, rice, oil seeds, groundnuts, millet and sorghum, pulses and cassava are grown in great quantities but production levels per unit area are low. There is room for expansion, and in the case of the cash crops like cotton, oil seeds, rice maize and groundnuts which are bulky products, need among other factors good quality roads in order to achieve increased output. There are prospects for large scale farming in sugar-cane and paddy rice, but these will need massive investiments in the transport system in form of feeder roads. There is also scope in livestock rearing.

Improvement in agricultural production is likely to result in industrial development based on the processing agricultural products like cotton ginning, oil extraction, rice milling, hides and skins treatment, sugar milling and other related activities. At present industrial production is minimal. Also fishing is carried out in the Southern Division and production is low and is wholly consumed within the district. There are several shopping centres and periodical markets scattered all over the district especially in designated centres. Most of them are on classified roads, but the standard of this roads affects them very adversely.

As regards designated service centres, Busia District is well provided for except there is need to upgrade one of the rural centres to urban centre status (i.e Funyala). Some of the centres were designated, but there is very little development can be achieved in them so as to fulfil their roles (i.e Hakati and Kocholia). Nearly all the designated service centres are well

linked with the appropriate class of roads but despite their classifications, the roads are of poor quality, and this makes accessibility and linkages of these centres very poor particularly in rain season. Examples are Butula, Nangina and Hakati on C30, Nambale on C 31, Butula, Nambale and Amukura on D 256 and Amukura. Amagoro and Kocholia on D , just to mention a few.

Most of social services like health, education, administration, police and postal services are located in the designated service and other centres. As noted above, these centres are located on classified roads. Improvement in the standard of the road system will result in increased utilization of these services.

Busia is densely populated and with the present level of development in the district, land pressure is witnessed resulting in net outmigration. The population is evenly distributed in the district except it is sparse on hill tops and slopes, marshy river valleys and in the Yala Swamp which is liable to frequent flooding. There are three settlement patterns in the study area: linear, nucleated and dispersed. Linear settlement pattern is found along the trunk roads which services through traffic. Nucleated settlement pattern is concentrated in the designated service and other centres which are located along the classified roads. This is a trend to urbanization especially in the centres of urban and rural designation. These nucleated settlements require goods and services from their hinterlands (i.e food) and the provision of a reliable transport system is very important. But the majority of the people in the study area live on their own small holdings in a dispersed manner depending on physical features and economic possibilities. This pattern of settlement raises difficulties in the provision of facilities including roads, especially with limited resources at the disposal of Kenya's economy.

7.2. RECOMMENDATIONS

General

The road C31 through Nambale to Busia goes through fertile area and has got enough traffic (Table XXIII) to warrant its upgrading to an all-wather road (Type V).

THE ROADS PLAN

Map No. 17

M. A. (PLANNING) THESIS 1978.

DEPARTMENT OF URBAN & REGIONAL PLANNING.

UNIVERSITY OF NAIROBI.

SOURCE: Base-map and data on existing roads from M.O.W. Roads Department and Survey of Kenya.

DRAWN AND PARTLY REDESIGNED BY Samuel V. Obiero.

SCALE:

1:250,000 (APPROX.)

LEGEND

- International Boundary
- Provincial "
- District "
- Railway
- A104 — International Trunk Road
- B1 — National Trunk Road.
- C30(V) — Primary Road with recommended standard V
- C(IV) — Secondary Road recommended for upgrading to C
- D250(III) — Secondary Road with recommended standard III
- Existing classified Minor Roads(E)
- Recommended new Minor Roads.
- S — Sugar Feeder Roads (see text).
- R — Rice Feeder Roads (see text).

Secondly, it acts as a distributor with the district and it is the most direct connection between the district and the provincial headquarters at Kakamega. Thirdly, this road up to the district boundary on Kakamega District side, was upgraded from Type III. to Type V all-weather gravel/earth road at the end of 1975/76 financial year.

The road C30 through Butula, Nangina and Hakati to Siaya District should also be an all-weather road at least up to Type IV. as it is a major distributor in the southern part of the district. It also connects the southern part of the district to Busia District Headquarters via Bumala on B1 and also connects this section of district with other parts of the province (Bungoma and Kakamega Districts). Still C30 joins or passes through important designated centres which provide important facilities and services to the sorrounding areas which need all year round accessibility Finally, C30 is an all-weather road up to Buhuyi on the Kakamega side.

Following on similar grounds as above, C32 should also be upgraded to an all-weather road to at least Type IV. since it connects the rest of the district to A104 and to Bungoma District. Secondly, with the construction of the Kamolo sugar factory, this road will be an important transport route for the processed sugar since Bungoma railway station will be the major outlet for it.

Road D256 from Butula, through Nambale to Amukura acts as a distributor like the three Class C roads mentioned above and connects southern part of the district through C30 to the northern part. It serves important centres with vital services and therefore it should be upgraded to a primary road Class C and an all-weather road Type IV.

The upgrading of the above roads to the stated standards will link the lower class roads to the higher class roads and will increase the integration of the trunk roads in the district's road system. It will increase accessibility for most of the resource and services use areas for most part of the year.

Access Roads:

(i) As shown on Map No.17 there are several roads to be opened up to improve linkages and accessibility. The base should be murram so as they could play their role effectively in rural development. This recommendation is based on the M.O.W. - 2 miles Index since it is felt that is the much the economy can afford.

(ii) Improve Class E roads which are still tracks to have murram base to either Type 11 or 1 (see Map Nos. 16 & 17) E151, 150,144.

(iii) The following Class D roads D250, D251, D257, D255 and D276 should be upgraded from their present standards to Type 111. earth/gravel roads with engineered base to increase their utilization even during the rain season. These are the roads which serve important centres and pass through areas of high agricultural potential and of high population density.

(iv) The remaining roads of Class D and E should be murramed so as to increase their utilization.

(v) The bridges and culverts on class D and E roads should be improved upon so as to enable them to withstand heavier loads (more than 5 tons) than they are allowed now.

Feeder Roads:

As described or defined before, feeder roads are connected with a particular development project especially agriculture: sugar, rice, wheat, tea, coffee irrigation and settlement. At present there are no feeder roads in the;district even speciall purpose roads account for only 3.8 km. of Class E roads.But as indicated before, there are high possibilities for sugar-cane and rice schemes to be started in the district. These are the rice scheme mostly in the Yala Swamp and sugar-cane in Northern and Central Divisions, althgugh the Kamolo Sugar Scheme only covers Northern Division. These two projects, as it is usually done in the recent sugar projects like Mumias, Nzoia and Awendo for sugar-cane and Taberce-Mwea for rice, will involve heavy and intensive investment in roads. The roads are financed and constructed as a part the project after feasibility studies.

Since recommendations on Access Roads also include these areas, the roads already recommended can easily be incorporated in these programmes.

7.3 THE ROADS PLAN

The ROADS PLAN (Map No. 17) is the recommendations in map form and all the factors stated earlier in this thesis but not repeated in Sections 7.1. and 7.2 were taken into consideration in framing this development model. As stated before, the plan aims at:-

(a) The roads should serve a relatively dense population and intensive agricultural activity.

(b) The roads will link rural dense populated areas to major service or urban centres for medical, educational, market and commercial purposes.

(c) The construction of stronger bridges will permit heavier vehicles which are necessary to serve the areas and will avoid bridge being washed off by floods and resulting in roads being unusable.