A STUDY OF THE TRANSPORTATION PROBLEMS AND SOME OF THEIR IMPLICATIONS TO AGRICULTURAL DEVELOPMENT IN BUKOBA DISTRICT, TANZANIA.

BY

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DECLARATION

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

(Titus W.P. Kamulali)

This Thesis has been submitted for Examination with my/our approval as University Supervisor(s).

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Obviously, any errors of fact or judgement remain entirely the resp onsibility of the author.

Titus W.P. Kamulali.

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LIST OF ABBREVIATIONS

a.w.r.	All weather roads
BCC	Biharamulo Cotton Company
BUDECO	Bukoba Development Corporation
DDPC	District Development and Planning Committee
DPO	District Planning Office
EAC	East African Community
EARC	East African RailwaysCorporation
MOA	Ministry of Agriculture
MOTC	Ministry of Transport and Communications
MOW	Ministry of Works
NACO	National Agricultural Company
NARCO	National Ranching Company
NBC	National Bank of Commerce
NMC	National Milling Corporation
NTC	National Transport Corporation

PO	Post Office
RDD	Regional Development Director
RDPC	Regional Development and Planning Committee
RPO	Regional Planning Office
RTC	Regional Trading Company
RTLA	Regional Transport Licencing Authority
SUDECO	Sugar Development Corporation
TAPA	Tanzania Parents' Association
TCA	Tanzania cotton Authority
TCB	Tanzania Coffee Board
THB	Tanzania Housing Bank
TTA	Tanzania Tea Authority
UNDP	United Nations Development Programme
WLR	West Lake Region
WLRCOU	West Lake Regional Cooperative Union

ABSTRACT

This study stems from two general observations: stagnation of the economy of Bukoba district and a lack of a viable transportation system. This study attempts to ascertain these observations by drawing evidence from a field survey, and to establish relationships between these two observations. It, therefore seeks a full understanding of the transportation problems of Bukoba district and some of their implications to agricultural development. The study, furthermore, is an attempt to evolve a more viable transportation strategy which will ultimately boost agricultural development.

The study first examines the physical and socio-economic characterization of Bukoba district which might have had influence upon the development of agriculture and transport. This analysis shows that Bukoba district is one of the few areas in the country with ag good climate, fairly fertile soils, and ample vegetational resources and alarge labour force which may be very useful in transpot improvement and agricultural production. Thus the natural resource base favours agricultural development.

The study goes on to examine the charagteristics of the district agriculture and the problems and potentials to its devel opment. It is shown that the methods employed in smallholder production have remained nearly the same over the last fifty years, leading to deterioration of soil fertity in several parts of the district. It is also shown that lack of well organised marketing system for food crops, lack of an efficient farm inputs distribution mechanism, and above all lack of an efficient commodity and passenger transport system hampor agricultural development.

The study reveals that the transportation facilities are in a very poor state and that they are inequitably distributed within the district. The road density is one of the lowest in the country and the network does not permit interaction between different productive zones of the district. The commodity transport vehicle fleet does not cope with the demand, not because it is too small, but because it is mismanaged through rigid licencing and other policies. The passenger transport vehicle fleet has been declining in recent years, and yet the movement of a good proportion of food produce to the urban market depends upon it. As a result of the poor condition of the roads and vehicles the transportation of farm produce is very costly.

Efforts to improve transportation are frustrated by natural and manmade obstacles. The study area is hilly and swampy making the construction of roads very costly. Lack of enough financial resources, equipment and skilled manpower is yet another obstacle. Improving transport in the district essentially means overcoming these obstacles. The financial commitment that may be entailed may be colossal. This is why there is need to asses very carefully the contribution of transport to agricultural development. This study demontrates the effects of poor transport upon agriculture. Crop specialisation by different ecological zones has not been possible for example. Delivery of farm inputs to farmers during the rainy season is impossible, and the translocation of farm produce to the markets has not been easy either. Perishables as a result have been rotting on the farms, reducing farmers' enthusiasm to produce more. Where large land tracts suitable for agriculture are lacking access, have

remained idle while in areas with better accessibility land shortage is on the increase. Information on new market opportunities and better production methods never permeate rural areas since the transportation system upon which their flow depends is in a poor state.

The study finally formulates a transportation strategy aimed at fostering agricultural production. It is not considered essential in the short and medium term considerations to construct new classified roads, as this would be too heavy a financial burden on the regional economy. Stress is on the improvement and maintainance of the existing roads and vehicle fleet and revision of the planning approach and licencing policies.

Although the focus in this study is on Bukoba district, studies in other parts of East Africa make it clear that the conclusions have wider application. The course of action recommended in this study, it is hoped, will be found relevant in other parts of the country.

CHAPTER 0: INTRODUCTION

0.1 INTRODUCTION

Transportation is the lifeblood of any country's economy. Upon it the flow of goods, people and ideas depend. The vigour and even the very existence of any economy are pivoted upon it.

In overall national development transportation plays a multi-faceted role. Movement of inputs - human and material - to agricultural and manufacturing sectors and the transfer of the output of these sectors between and within production and consumption centres is but one of the major functions of transportation. In countries where this movement is between rural and urban settlements extension of monetary economy to the former kind of settlements is facilitated thereby tending to retard rural-urban migration, a malady that many countries today strive to eradicate but with infinitesimal success.

Besides facilitating intra- and inter-sectoral exchange of inputs and outputs, transportation is an indispensable private and public consumption good. As a private good it enables individuals to travel for private purposes.[1] As a public consumption good it serves to increase national defense capabilities, social cohesion and political stability.[2] Moreover transportation employs a good proportion of the populace and where the sector is being expanded or improved its role in combating unemployment may be remarkable.

That transportation is a concomitant and indispensable requirement for development has been appreciated by a majority of countries - developed and less developed alike. This appreciation is suggested by the magnitude of financial commitment exhibited by development plans of some countries to transportation in relentless efforts to overcome friction of distance. Generally speaking, it ranks first or second in size among expenditures of different sectors for national progress.[3] 20% to 40% of the resources being invested in socio- economic development is siphoned into this sector.[4] In Nigeria, for instance, at one time transportation accounted for about 47% of the total public sector investment.[5] In the first and second five year development plans of Tanzania, transport and communications together absorbed 27%[6] and 30%[7] respectively of the

total planned public sector investment.

In spite of the appreciation of the significance of transportation in the development process and of the emphasis laid on it as manifested by the heavy investment into it many countries - particularly the less developed ones - have on the development constraints catalogues mobility and accessibility problems. Needless to say, the nature, magnitude and complexity of these problems vary considerably from country to country, and even from district to district within a single country.

It is no wonder, therefore, that approaches to alleviate transportation inadequacies have been diverse. What seems to have been a common feature, however, is the understanding that transportation improvement cannot be a goal by itself, but that its role is that of a servant to other sectors of an economy.

In the proveious and in the current development plans Tanzania has aspired to expand and develop its agricultural sector that fetches about 40% of GDP and employs more than 90% of the total working population.[8] To her the need of evolving a mobility and accessibility strategy for rural development is, therefore, a paramount goal.

Since independence, in 1961, Tanzania has recorded both accomplishments and failures in agriculture. No doubt transportation has played a role in both. Export as well as food crop output has grown, new crops have been successfully introduced in some parts of the country where they had not been grown before, utilisation of fertilisers, pesticides and other modern inputs has increased and the storage, processing, distribution and marketing of agricultural output have improved. These successes have been possible owing to the ability of the transportation system to move inputs into and outputs from the agricultural zones. Nevertheless the pace of progress in agricultural production has not been very favourable, nor has it been recorded in all parts of the country. In some parts or regions a decline in output has occured

and in others, particularly peripheral ones shortages of agricultural inputs and consumer goods are still thecorder of the day. To a very large extent the inadequacies in the transportation structure whose facilities are not equitably distributed in the country have contributed to such failures.

The study area, Bukoba District, occupying a peripheral location is one of the areas in Tanzania with an inadequate transportation system. Despite its high agricultural potential the district has not made a significant stride in this sector over the past three decades. The district notably suffers from inadequacies in its transportation system. It is thus considered these transporation inadequacies have had a significant role in the agricultural stagnation of the area.

0.2 THE PROBLEM

The inequitable distribution of transportation facilities within Tanzania that has characterised the spatial system of the country since colonial days has had and will continue to have numerous repercussions, one of the principal ones being enhancing regional development disparities. It is by no means easy to assess to what extent these disparities owe to poor distribution of the transportation facilities, but in many cases the impact of this inequitable distribution is obvious. Bukoba district, an area without significant natural resource base constraints[9] for instance has almost stagnated agriculturally over the last three decades[10] and a number of writers have attributed this to problems related to mobility and accessibility.[11]

Whereas mobility into and out of the district is multi-modal, intra-district mobility is uni-modal; it is entirely road-borne. Except for the 14 Km stretch near Bukoba town which is bitumenised all other roads are of unengineered earth surface. During the rains most of them become slippery and impassable and during the dry weather they become very dusty making movement over them slow, unsafe and uncomfortable. Moreover, during rains some parts of the district become entirely isolated as some road stretches flood.

This isolation is magnified by lack of proper maintenance of the roads and the vehicles, as well as the smallness of the vehicle fleet. Resulting from the problems of maintenance of roads and vehicles is that roads become severely potholed and poorly drained and that a good proportion of vehicles remain grounded for some time. Costs of transportation of the part of operators and consumers become exorbitantly high so as to make transportation of some of the agricultural produce unprofitable. Aggravating the situation is that the spatial organisation of the road network within the district is unsatisfactory. Rural and market centres are not well linked to each other and nearly all vehicle movement is oriented towards Bukoba town a reflection of the fact that all trade in the district is export-oriented.

Impending agricultural produce translocation within the study district is the absence of storage facilities along roads, particularly at growth centres. Perishables, therefore, may be seen left over to rot at the peak of the harvest season. This problem may not have been as spectacular as it is today if the vehicular fleet and its capacity were large enough to transport all the produce to the markets at the right time.

The shortcomings in road transport highlighted above may have been less pronounced if the water-borne transport through Lake Victoria linking the towns on its shores was as efficient as it used to be before May 1975. Since May 1975 the volume of goods and passangers moving through Lake Victoria has drastically dropped because of the grounding of the East African Community owned vessels that were serving Lake Victoria ports in Tanzania, Uganda and Kenya. This has placed greater pressure upon the Bukoba-Kyanda road which is of unengineered earth surface. Alternative routes would have been across the Tanzania Uganda border and the Tanzania-Rwanda border but boundary restrictions and national transportation policies in general inhibit the utilisation of the routes. In addition they are very circuitous.

Air transport has not been very significant in the district economy. There is only one airport - which is gravel bound - in the district whose expansion, badly required as it is, is constrained by the physiography of the location site. One private company - CASPAIR - operates on it at very high costs. Few people use this mode of passenger transportation, therefore.

A high proportion of transport facilities in the study area are privately-owned, with goods transportation charges not fully controlled by the government. Moreover, coordination among operators generally lacks resulting into mismanagement of the limited facilities that exist in the study area.

Influencing agricultural progress in the study area, and undoubtedly in other parts of the country is homestead - farm distance and homestead - facilities/services distances which in some cases are large, requiring a long time by means of walking on foot which is the major mode of travel in rural areas. When this time is translated into labour-terms or in monetary terms the implications for the agricultural sector may be visualised. This problem is explored farther in the fifth chapter of this work.

0.3 OBJECTIVES OF THE STUDY

This study is, therefore, concerned with two aspects of the economy of Bakoba district - transportation and agriculture. The complexity of the interelationships between these two aspects on the one hand and between them and other sectors of the economy on the other, form the core of this study.

The main objective of the study, therefore, is to identify mobility and accessibility problems and estimate the magnitude, nature and spatial distribution of these problems within the study area.

Transportation is not an isolated phenomenon. Its impact on economies is enhanced by the interaction of a multiple of other phenomena. It is the objective of this thesis also to explore the implications that transportation problems identified bear on a specific sector of the study area economy-agriculture.

Finally, endevour is made to advance a set of proposals tailored to alleviate transportation problems identified. Another objective, therefore, is to evolve a mobility and accessibility strategy for agricultural development in the study area.

0.4 OUTLINE OF THE STUDY

This study is organised into eight chapters. The first one is a general introduction to the thesis. Briefly the role of transportation to overall economic development is surveyed. This is followed by a statement of the transportation problem of the study area, the definition of the objectives and the organisational frame-work of this thesis. Incorporated in the same chapter, also, is a description of the research methodology employed and a brief review of the existing literature that relates to this work.

Following the introductory chapter is Chapter 1 which describes the physical and socio-economic characteristics of Bukoba district. Ad hoc attention in this description is placed on the relation these features have on the stated aggregate problem of mobility and accessibility. In the second chapter an attempt is made to examine the agricultural development trends in the district. Included in this chapter is the forecast of the future output of the agricultural sector and how this forecast output is likely to influence the future transportation demand. An analysis of the present transportation system is made in chapter 3. In this analysis stress is laid on the spatial distribution of the transportation facilities in relation to the distribution of population, agricultural activities and resources of the district. Moreover salient transportation policies and natural obstacles that obstruct transportation improvement are explored. Chapter 4 begins with a critical review of the transportation problems identified in Chapter 3. In the last half of the chapter implications of the problems to agricultural development of the district are discussed. Uncommonly encountered in the transportation literature for East Africa but incorporated into this work is the impact of homestead-farm, and homestead-social services/facilities distances upon agricultural development of the district.

A review of programmes in progress and their impact upon future transportation demand is made in chapter 4.

In chapter 5 policy proposals and recommendations designed to foster agricultural development are made. In chapter 6 conclusions drawn from the findings and suggestions for further research are made.

0.5 ASSUMPTIONS Hypotheses

In this study endeavour is made to test the following set of assumptions:-

(a) In spite of absence of conspicuous natural resource base problems the study district has suffered economic stagnation particularly in the agricultural sector. Unquestionable

(b) Commensurate with agricultural stagnation Bukoba district experiences transportation drawbacks.[12]

(c) These transportation problems have been caused by a wide range of factors - natural and man-made.

(d) Transportation problems have played a key negative role in the development of agriculture in the study area.

(e) Unless a more efficient mobility and accessibility strategy is evolved for the district, agricultural development will remain hampered.

0.6 REVIEW OF RELATED LITERATURE

In many parts of this globe numerous transportation studies have been conducted and one cannot exhaust the list in such small work. The Brookings Institution,[13] perhaps takes a lead in such studies. The first in the series of the studies undertaken by the Institution, Strategy for Mobility[14] focusses on the problems and potential to development posed by transportation systems. This work, generally "considers how transport influences development, how obstacles imposed by poor transport can be reduced and how improved transport further economic, social and cultural ends." [15] The same Institution undertook another study, Distance and Development.[16] This one examines the role of transport and communications in the economic and social problems of India. It devotes one chapter[17] to the

discussion of the impact of India's Transportation and communication constraints upon agriculture and rural development. Some similarities in problems and implications to agricultural development between India and our study area may be discerned. Distance and Development, however, being a study for the whole sub-continent the chapter in reference is too brief to permit a very close analogy between our study area and India. Many other works[18] by Brookings Institution provide a valuable theoretical background for transportation scholars.

There are very few studies on the relationship between transportation and agriculture in East Africa. Madungha[19] and Alela[20] seem to have conducted almost similar studies both of which have investigated the role transportation has played in regional development in general in some selected areas in Kenya and Uganda. Hofmeir[21] on the other hand has analysed the role transportation has played in the economic development of Tanzania, but since there are no specific case studies selected to illustrate some of the generalisations and because of the wide scope of the field of economic development Hofmeir's work has little direct relationship with this study. It is the objective of this study to carry investigations farther than Hofmeir by taking a closer look at the mobility and accessibility problem in one particular district of the country, and to examine the impact of these problems to one specific sector of the economy-agriculture. Mkama,[22] like Hofmeir has surveyed the historical development of Tanzania's spatial system, the impact on economic development each stage of transportation has had. In Mkama's work the overall national transportation problem has been identified, but the problems faced by people at local level in overcoming homestead-farm, homestead-services/facilities distances have been overlooked.

The literature directly linked with development in West Lake Region is growing rather fast yet very little exists[23] on the transportation aspect, and almost in all of them implications of transportation problems bearing on the agricultural sector are lacking. None of

them, further, comes up with concrete policy proposals on planning for the alleviation of mobility and accessibility problems designed to accelerate agricultural development.

This study, thus attempts to draw up a policy for transportation improvement which will ultimately promote agricultural development, thereby resolving the stagnation that has plagued the study area for a long time.

0.7 RESEARCH METHODOLOGY

The title and outline of this thesis was conceived in June 1976 and it constituted the first phase of the total work done to give this study the shape it bears. The next stage was data collection in the field and it lasted from July to September 1976. It is during this time that the author conducted a field survey in the study area. Actual observation of the field situation, interviews with Regional and district authorities and heads of parastatal organisations based in the study district that play a key role in transportation decision making - e.g. RTLA, TCB, TTA, NMC, RTC, EARC,[24] and a sample of some households were made. Information obtained through interviewing and observation have been found to be almost adequate for this work but has been supplemented with information from written sources. Data analysis and actual drafting of this volume formed the last stage of the total work.

0.8 RESEARCH LIMITATIONS

The quality and scope of this study have been restricted by a number of limitations. Lack of enough time and financial resources have been the major constraints. The process of data collection in the field required alot of travelling around the study district. Being a constrained area in transportation the author found it always costly (in terms of time and money) to travel around.

Until June, 1975, the study district was forming one district with Maleba District - i.e. the latter was carved out of the older Bukoba district. The data existing today are for the two

districts combined. It has been a hard and a rather inaccurate attempt to sift the data for the study area. Making the task more difficult is the fact that the boundary between the two districts has not been mapped. The boundary in the maps accompanying the text is only approximate. Splitting of the district into administrative divisions and wards was effected recently so that their boundaries have not been mapped. Again these boundaries in the maps are only approximations.

1.0 PHYSICAL, SOCIAL AND ECONOMIC BACKGROUND

1.1 PHYSICAL BASE

1.1.1. Location and Size

Bukoba District, one of the five districts that constitute West Lake Region is located between about 31° E and 32°E of longitude and about 1°S and 2°S of latitude on the north-western corner of the United Republic of Tanzania as shown by Map I. The district is bordered on the north by Uganda, on the west by Karagwe district, on the south by Muleba district and on the east by Lake Victoria. Other districts that form West Lake Region are Karagwe, Muleba, Ngara and Biharamulo (see Map 2). All of them, together with the study district cover an area of 28,749 km^2 as shown in table 1.

Table 1: West Lake Region: Area

DISTRICT	AREA (KM^2)	%
Bukoba	5 100	18
Muleba	2 929	10
Karagwe	6 700	24
Ngara	2 849	10
Biharamulo	10 878	38

Source: Ngono Multi-Purpose Project, op.cit. table 12.1, p.155.

Bukoba town, the capital of the study district and of the region as a whole is located on the western shores of Lake Victoria. This town, and indeed the whole of West Lake Region, occupies a peripheral location in the country and is generally cut off from other main growth centres by the Lake and a huge expanse of tsetse infested, thinly peopled land. This peripheral location, coupled with poor transport and communication links with the rest of the country greatly influences the pace of development of the study area.

BUKOBA DISTRICT

NATIONAL SETTING

National Boundary

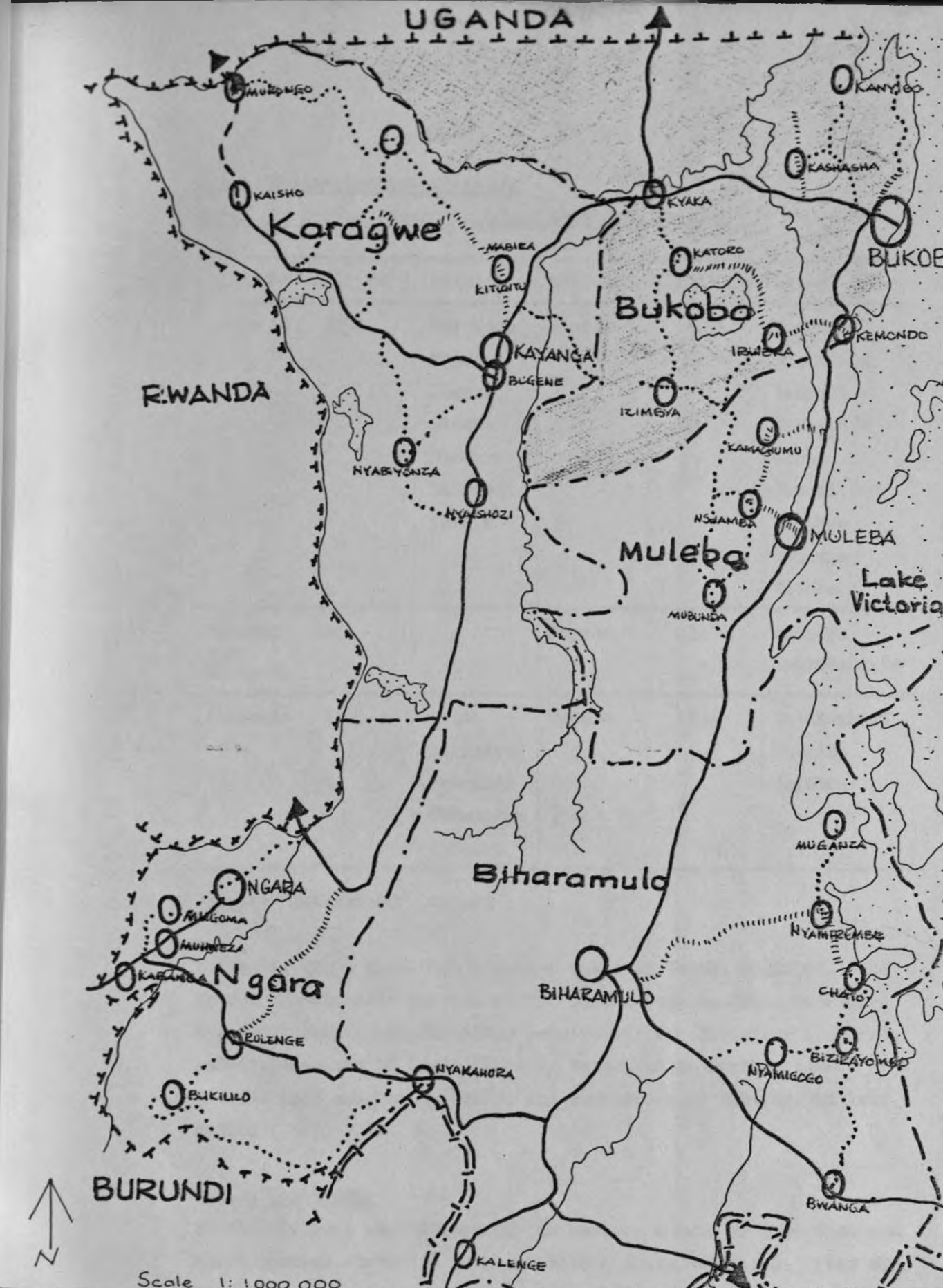
Regional

Roads

Railways

West Lake

Regional capitals



BUKOBA DISTRICT

REGIONAL SETTING

- NATIONAL BOUNDARY
- REGIONAL "
- DISTRICT "
- REGIONAL CENTRE
- DISTRICT CENTRE
- RURAL "
- NATIONAL, REGIONAL ROADS
- DISTRICT, ALL WEATHER -
- DISTRICT DRY " "

Kamulali [illegible]

1.1.2. Administrative Division

Table ii. Bukoba District: Administrative Division

DIVISION	AREA(KM^2)	WARDS	DIVISION	AREA(KM^2)	WARDS
Katerero	1054	Katerero	Kisiba	829	Kanyigo
		Bujugo			Bugandika
		Ibwera			Bwanjai
		Nikoni			Kisharije
		Kasharu			Gera
		Kaibanja			Ishozi
		Katoro			Buyango
					Rusinga
					Kitobo
Bukoba sub-district	248	-	Bugabo	348	Kagiya
				-	Bubendangabo
Missenye	1785	Kyaka	Rubale	836	Butelankuzi
-		Mirisiro			Rubale
		Mutukula			Izimbya
		Kasambya			
		Kakunyu			

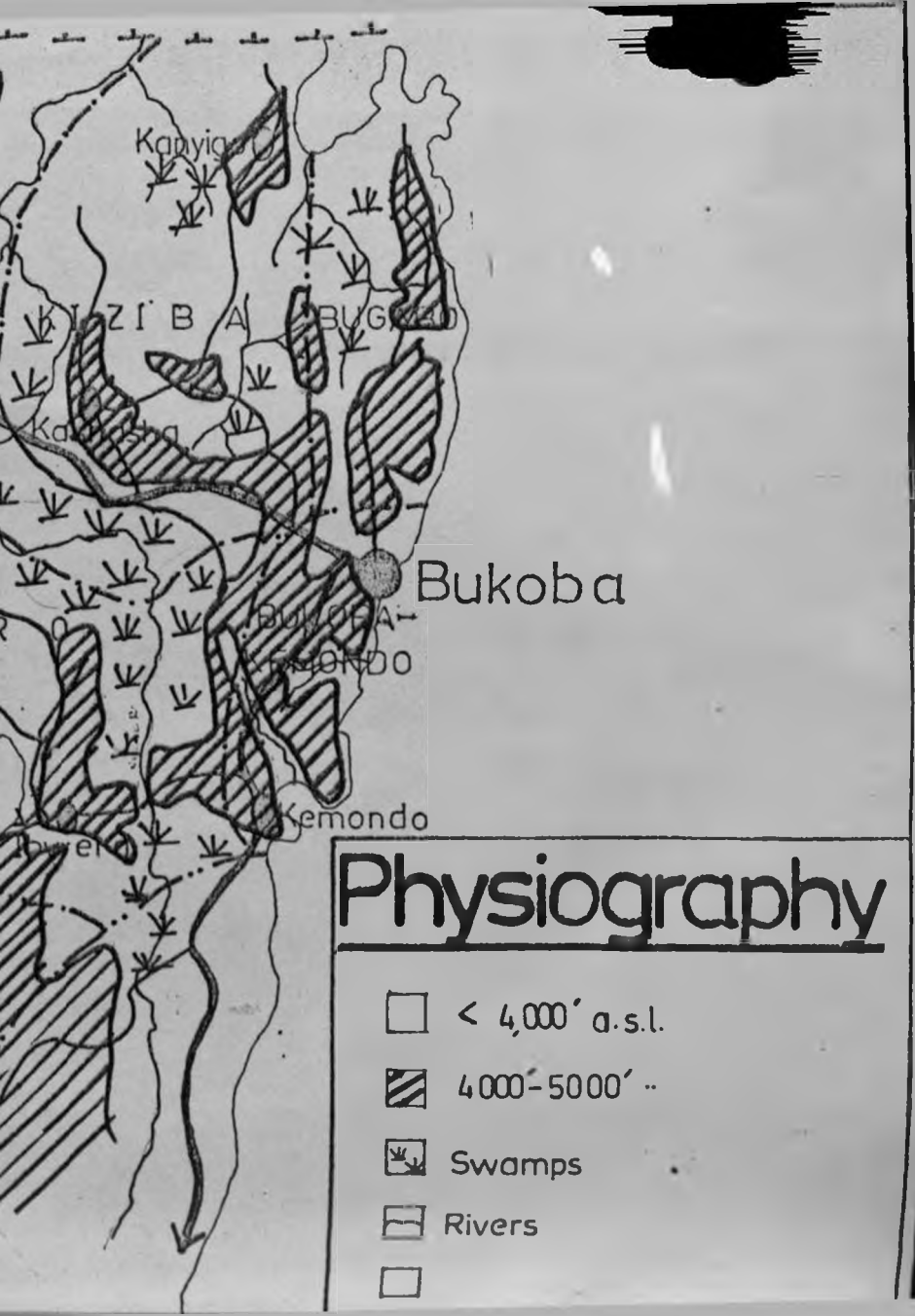
Source: District CCM Office.

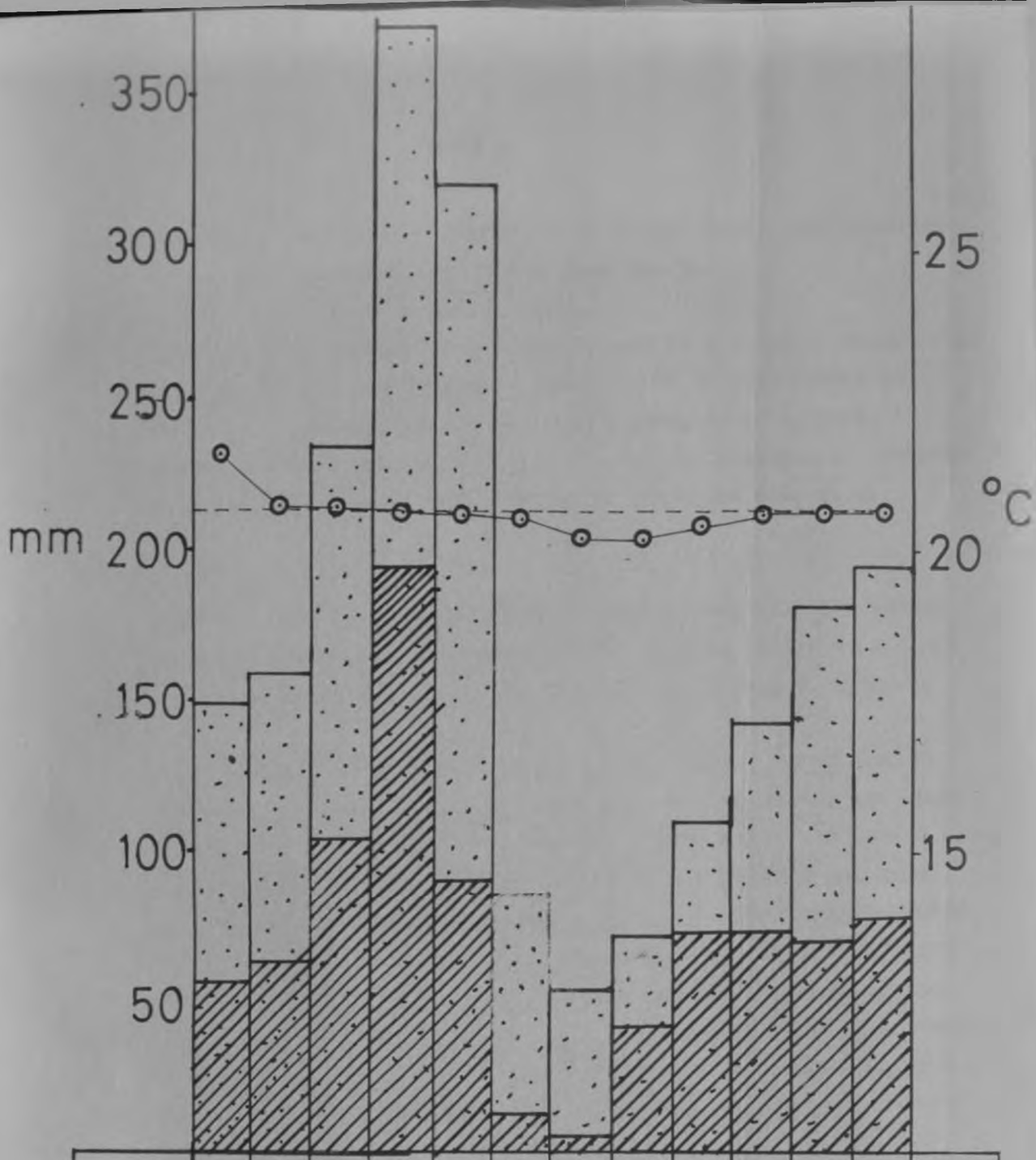
Table ii. shows the administrative units of Bukoba District. The Bukoba sub-district consits of the Bukoba-Kemondo Urban Corridor, and the Bukoba rural districts consits of five Divisions (TARAFA), sub-divided into 26 Wards (KATA). Each ward is further sub-divided into sub-wards (TAWI), and each sub-ward sub-divided into cells.

1.1.3. Topography

Bukoba district is situated on the western shores of Lake Victoria whose general elevation is about 1135 m above sea-level. From the Lake level land rises first very steeply, and then gently westwards where it forms a plateau which is part of the Western Plateau of Tanzania.

I S S E N Y E
KARAGWE
K A T E R E
Kaboro
L. IKIMBA
R U B A L E
MULEBA
5 0 5 10 15 20 25km


Kanyigo
Bukoba
Kemondo
Physiography
< 4,000' a.s.l.
4000-5000' ..
Swamps
Rivers



	J	F	M	A	M	J	J	A	S	O	N	D	Total
BUKOBA	149	159	234	373	321	86	54	72	110	143	182	195	2076mm
KYAKA	56	63	104	194	90	13	6	42	73	73	70	78	852mm
BUKOBA	238	215	215	214	213	211	205	205	209	213	213	213	213°C

FIG 1 : Monthly Rainfall and Temperature for Bukoba & Kyaka Stations

The plateau is cut by tributaries of Kagera River, the Ngono and Mwisa, and other smaller streams (see Map 3).

The topography of the study area is such that it poses engineering problems to road development. Further, it is very costly to construct roads on steep slopes and through river valleys. A general lack of east-west road links and the presence of numerous culverts are some of the evidences to the above assertion.

1.1.4. Drainage

Draining the district are two main rivers, East and west Ngono, which contribute as Ngono river to the Kagera. There is a large number of other streams in the district as portrayed by Map 3.

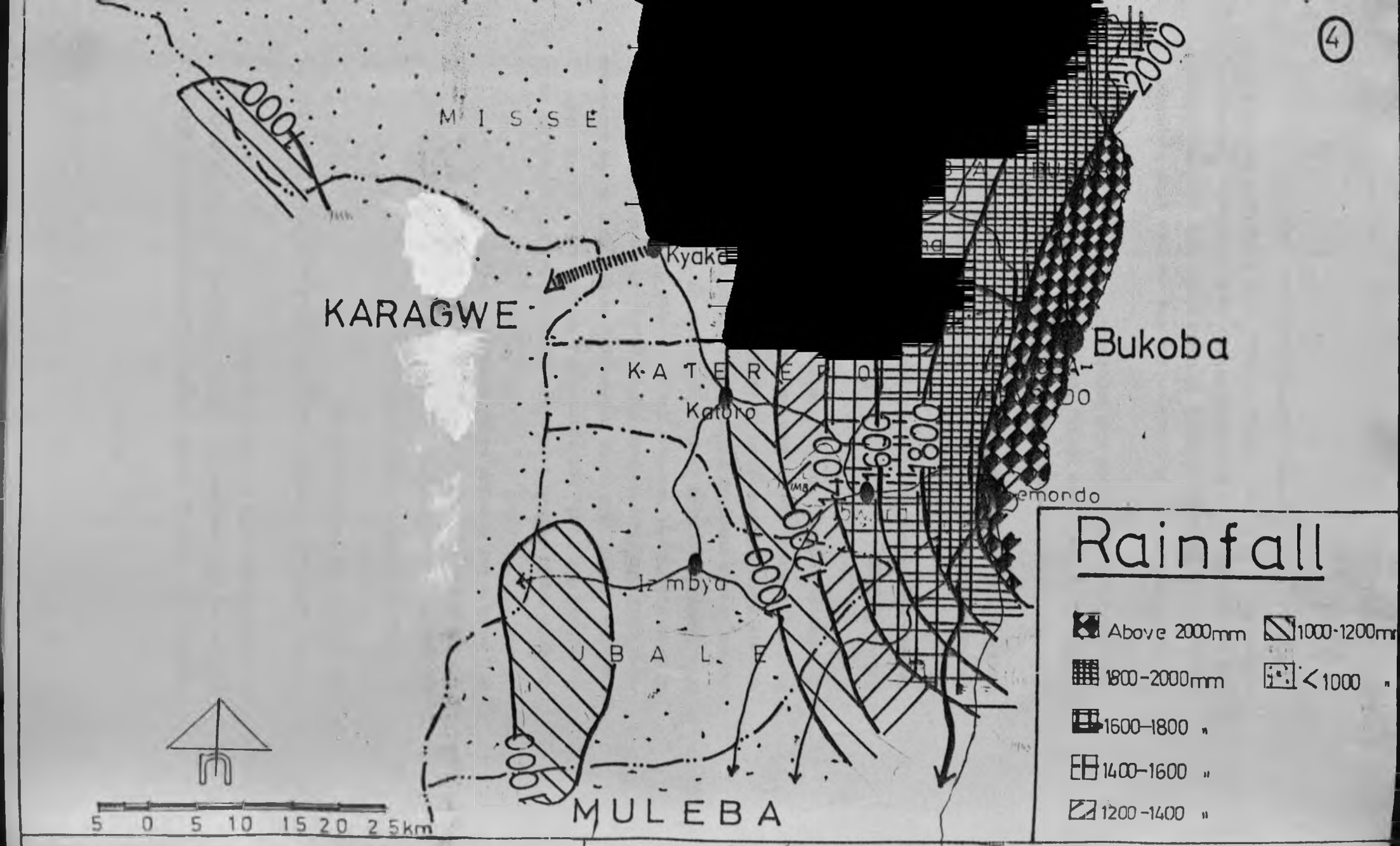
Lake Ikimba, the only significant inland lake is surrounded by swamps which from time to time cut off from the shores and float in the lake. This feature leads the shores unsafe for establishing terminals and settlements for navigation and fishing purposes. The swamps surrounding Lake Ikimba extend to the Ngono and Mwisa river valley and they run in a north-south direction. During the rainy season these swamps overflow causing flooding of the existing east-west road links. If the reclamation of these swamps, as stipulated in the Ngono Multi-Purpose Project (see chapter 4), succeeds the problem of intermittents flooding of these roads - especially the Bukoba-Nyaka stretch will be alleviated.

1.1.5. Climate

The district has a favourable climate with slight place-to-place variations. The distribution of temperature over the year for Bukoba town is shown by Fig. 1.

In comparison to other parts of the country, Bukoba district is endowed with ample, reliable rainfall which is well distributed in time and space.

The eastern parts receive the greatest rainfall amounts, in some places the annual total going beyond 2000 mm. It decreases westwards where it reaches 800 -900 mm per annum as shown on Map 4


MISSE
KARAGWE
Kyaka
Bukoba
KATERERO
Kaloro
Izimbya
JUBALE
MULEBA
Rainfall
Above 2000mm
1000-1200mm
1800-2000mm
<1000 "
1600-1800 "
1400-1600 "
1200-1400 "
5 0 5 10 15 20 25km

and Fig. 1. Fig. 1. shows rainfall differences between Bukoba station on the eastern part of the district, and Kyaka station on the western part of the district.

On the basis of rainfall occurance over a year four district seasons may be differentiated:

(a) June - August - Pronounced dry season
(b) September - December - Minor rainy season
(c) January - February - partially dry season
(d) March - May - major rainy season.

Owing to ample reliable rainfall agricultural activities go on throughout the year, but peaks for harvests occur in the dry seasons. During the rainy seasons, however, some roads stretches especially the Bukoba-Kyaka road flood. As an outcome marketing of farm inputs and consumer items becomes difficult. Adoption of alternative routes is made difficult by the fact that these routes become severely potholed and slippery during rains so that vehicle movement over them is almost halted. Rainfall, therefore, is a significant factor that has to be reckoned with when designing a transport network for the district.

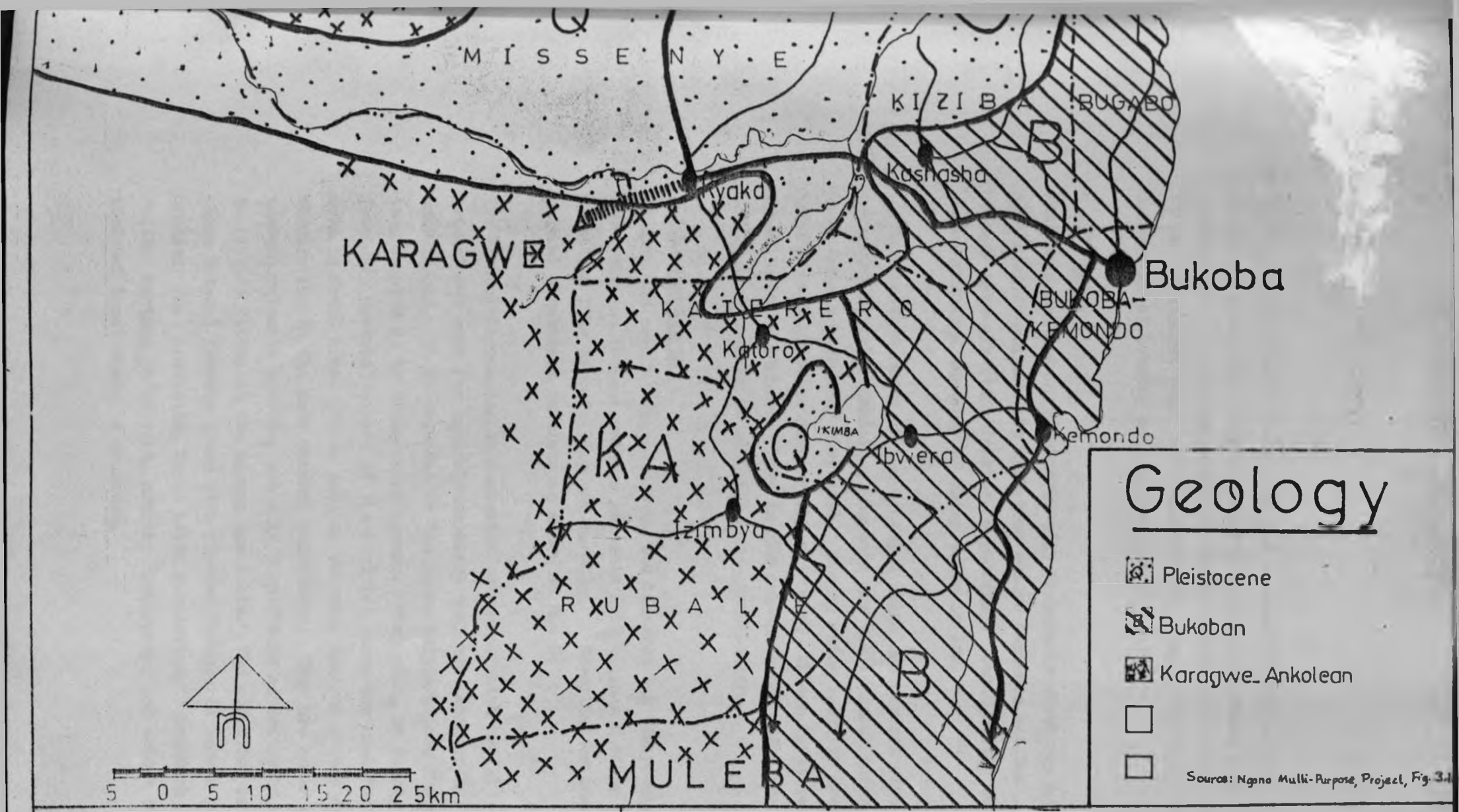
1.1.6. Geology

Salient geological features of the district are shown by Map 5.

The eastern zone of the district is characterised by the Bukoban rocks, which on geomorphological activity yield sandy soils.

Characterising Missenye division and the western shores of Lake Ikimba are pleistocene rocks, the main constituents of which are lake sediments, alluvium and moraines.

The remainder of the district - i.e. the western area bordering Karagwe district and a small north-western zone bordering Uganda are dominated by the Karagwe-Ankolean rock structure. These are sedimentary rocks are knownto contain high aluminium and iron proportions. They, however, conspicuously lack calcium.



BUKOBA DISTRICT

National boundary
District "
Divisional Boundary
National road
Regional road
District "

Sandstones of Bukoban formation are currently utilised in obtaining stones and pebbles for buildings and bitumen road foundations. On the principle of "local resource utilisation" it is anticipated that this resource will remain important in betterment of housing and improvement of roads.

1.1.7. Soils

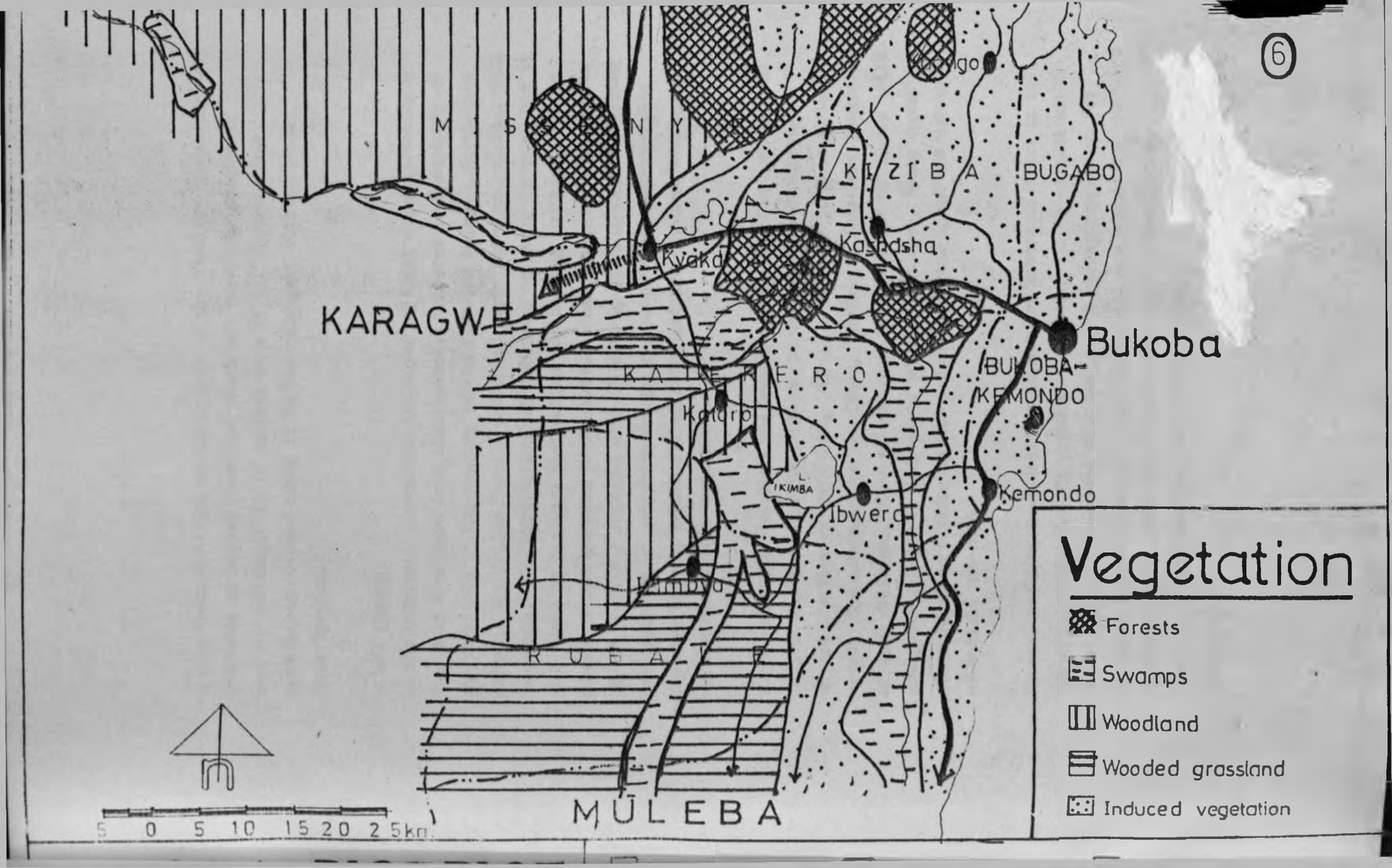
Hill-tops and slopes are covered with ferralsols which are sandy in character and contain high iron oxides contents but low primary minerals (e.g. felspar, magnesium). Consequently the cation exchange capacity of these soils is low.

In the northern parts of the district which are covered with lucustrine and alluvial deposits, gleysols are the dominant soils. They contain high clay component. During rains roads in areas covered with gleysols become very slippery. Unless built to gravel surface standard roads in gleysol-dominated parts are bound to remain a menance to mobility and accessibility.

1.1.8. Vegetation

Much of the natural vegetation in the district has disappeared or been modified through various economic activities and other practices like tree-felling and burning.[25] Nevertheless some natural vegetation persists as shown on Map 6.

The central depression is dominated by swamps which are at present not used for agriculture since they are permanently waterlogged. It is proposed in the Ngono Multi-Purpose Project (see chapter 4) to drain these swamps. They will, no doubt, form very productive part of the district since the most fertile soil is found here. Three natural forests, Rasina, Munene and Minsiro lie in the same central depression. They are known to contain valuable species, but only significant exploitation occurs in Minsiro forest at the Kagera Saw Mills. The potential role of these natural forests along with planted forests in timber production, fuel provision, burnt brick production,[26] woodwork related cottage industries, housing development and bridge construction for local roads is enormous.


6
KARAGWE
KIZIBA
BUGABO
Kashasha
Bukoba
BUKOBA-
KEMONDO
Kemondo
Ibwera
IKIMBA
MULEBA
0 5 10 15 20 25km
Vegetation
Forests
Swamps
Woodland
Wooded grassland
Induced vegetation

The north-western and western parts of the district are mainly dominated by wooded grassland which are currently marginally used for grazing. It is in this part of the district that ranching can expand since it is the only part with suitable grass species.

1.1.8. Issues

In the foregoing discussion the major physical characteristics of the study area have been highlighted. Compared to a majority of the districts in the country Bukoba district enjoys a favourable climate, has fairly fertile soils and ample water and vegetational resources. The physiography of the area, however, is such that it sets limit to the land that can be put into agricultural use and hampers transportation improvement. Land steepness in some parts of the district, presence of rock outcrop on hill-tops and slopes and occurance of extensive swamps are some of the physiographic features bearing inhibitory effects upon agricultural development and transportation improvement.

Ample rainfall, though on one hand indispensable for agricultural activities, poses unique problems to the economic development of the district on the other. During rains some road stretches, notably the Bukoba-Kyaka one flood, leading to temporary isolation of some villages. Morover, enhanced by the nature of clayey soils extensively found in some parts of the study area, rains render roads slippery leading to the reduction of the speed and safety of vehicle movement.

Comparatively agricultural development of Bukoba district is not severely constrained by physical obstacles. It is endowed with ample physical resources that can form a strong foundation for agricultural development. One, therefore, may wonder why the district with a good physical resource base is one of the districts that have made no visible stride in agricultural development.

1.2. DEMOGRAPHY

The population of West Lake Region was 658,712 people living in 167,449 households. It had increased from 456,000 people in 1948, to 514,000 people in 1957, showing growth rates of 1.35% per annum from 1948-57 and 2.5% per annum from 1957-67 (see Fig.2.).

Bukoba district occupying only 18% of the regional land had, in 1967 226,000 people or 31% of the regional population. It had grown from 150,000 in 1948 to 182,000 in 1957, showing a growth rate of 2.2% per annum (See Fig. 2).

In 1975 the population of Bukoba district was estimated to be about 253,000 inhabitants living in about 51,500 households.[27] Table iii. shows the distribution of the district population in 1975 among its Administrative Units.

1.2.1. Population Distribution and Density

The distribution of West Lake Region among its five districts for the past three census years is shown in Fig. 2. Bukoba district has had the largest population size. Biharamulo district, though the largest of all the districts, has had the smallest population size.

The uneven distribution discerned at the regional level is also evident at district levels. Missenye and Rubale divisions though with the largest land area have the lowest population sizes. Kiziba and Bugabo divisions and Bukoba sub-district have large population sizes compared to their land areas.

The differences within Bukoba district of the population distribution suggest differences in population density within the district, as shown by map 7 and table iv. In general the greatest density is found in the eastern parts of the district. It decreases westwards and north-westwards, where it drops to less than 10 people/Km^2.

Fig 2: Population 1948–67.

code	district	1948	1957	1967	a	b	c
1	Bukoba	150	182	226	22	22	442
2	Muleba	104	126	157	22	22	536
3	Biharam	50	41	82	-20	71	75
4	Ngara	105	102	96	-04	-06	338
5	Karagwe	48	63	97	30	45	145
6	W L R	456	514	659	135	25	229

a = 1948–57 GROWTH RATE %.

b = 1957-67

c = PEOPLE / km^2 IN 196'

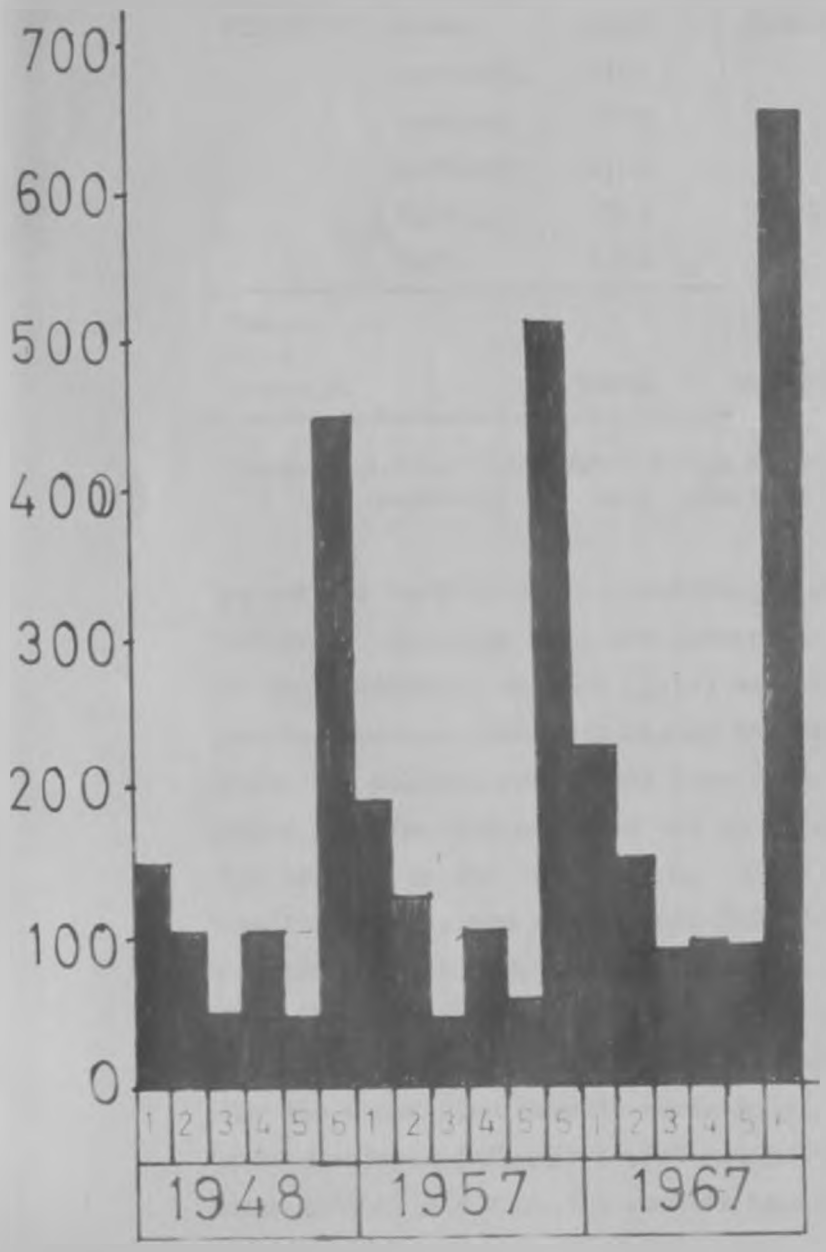
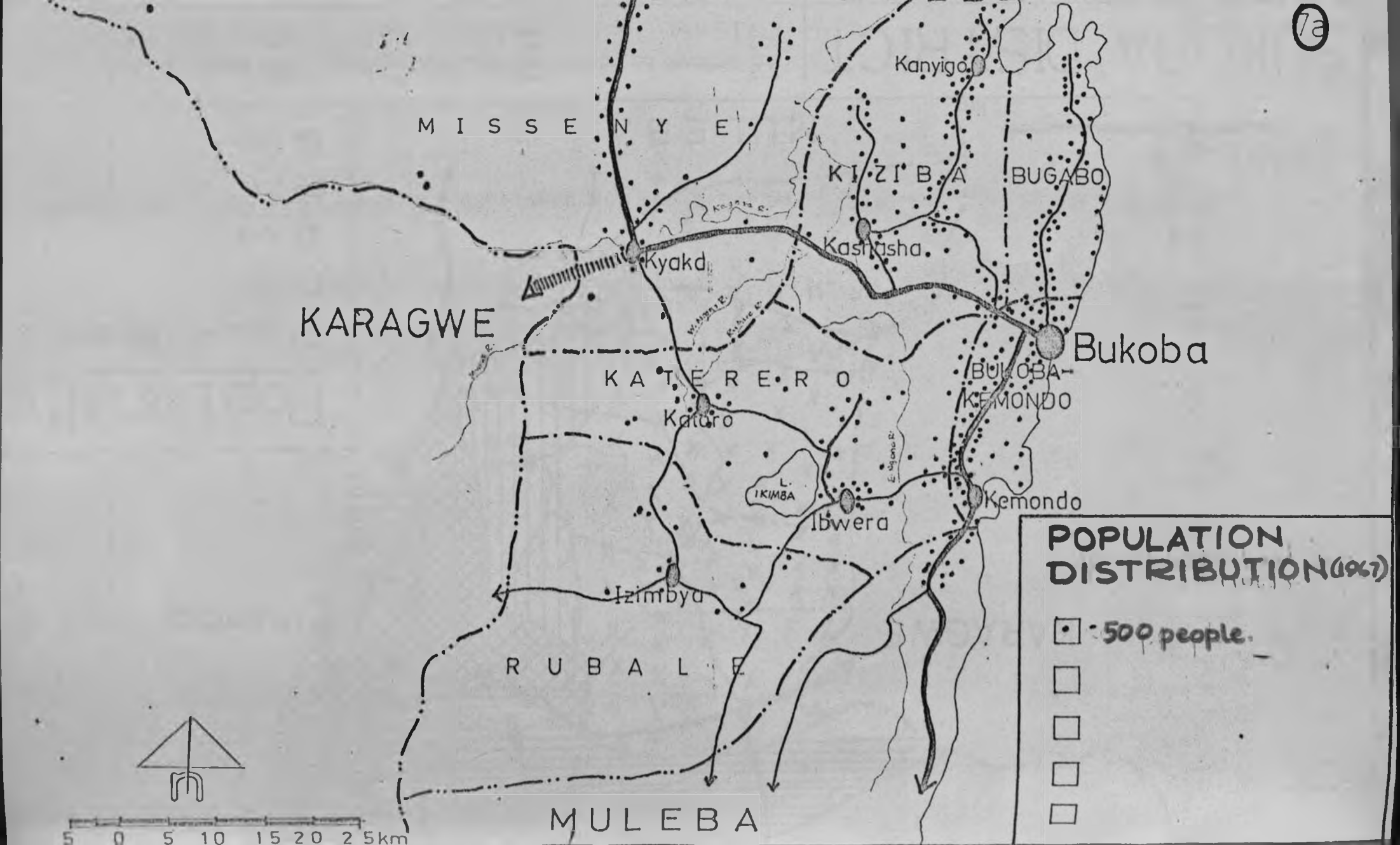


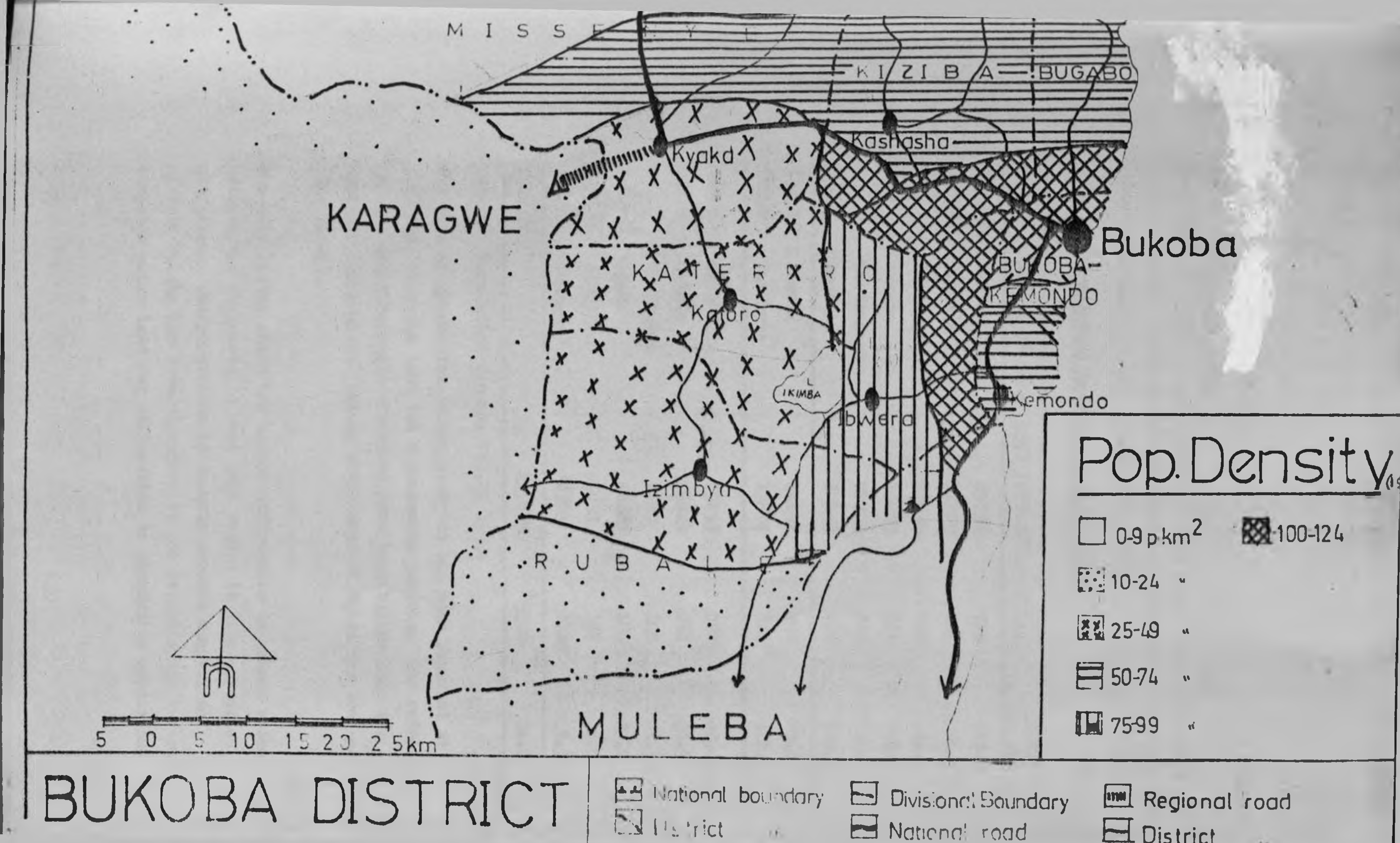
Table iii. Bukoba District: Population by Wards, 1975

DIVISION	WARD	POPULATION	DIVISION	WARD	POPULATION
KATOKERO	Katerero	7450	KIZIBA	Kanyigo	2190
	Bujugo	6250		Bugandika	2184
	Ibwera	11800		Bunanjai	1551
	Nikoni	5350		Gera	1040
	Kashara	14400		Ishozi	1840
	Kaibanja	9635		Buyango	1496
	Katoro	11340		Rusinga	710
	TOTAL	66225		TOTAL	11011
MISSENYI	Kyaka	2554	BUGABO	Kishanje	2000
	Kasambya	2198		Kaagya	1280
	Misiro	1180		Buhendangabo	1145
	Mutukula	1708		TOTAL	4425
	Kakunyu	714	RUBALE	Butelankuzi	1389
	TOTAL	8354		Rubale	3352
				Isingiro	2916
Bukoba sub-District		16000		TOTAL	7657

Source: Letter T/H2/BKV/MKM/Vol.2/60 of 2.1.76 from District Secretary to Chief Executive Secretary, Dodoma.

Behind the variations in distribution and density of the population in the study area are natural and man-made influences. In the proceeding section (1.1.) we noted that the more densely peopled eastern parts get higher and more reliable rainfall totals while the western parts have less rain. As a result of this water for domestic purposes can be obtained with difficulty in the dry seasons in the latter case. Until recently some parts of the woodland in western Bukoba were infested with tsetse-flies. They remained, therefore, unoccupied, until the government tried to free the zone from these harmful organisms. Inequitable distribution of social and economic infrastureture has also accounted for the population density variations. The eastern parts, having a more developed infrastructural network than the west, has attracted more inhabitants than the western parts.


7a
Kanyigo
MISSENYE
KIZIBA
BUGABO
Kyakd
Kashasha
KARAGWE
Bukoba
KATERERO
BUKOBA-
KEMONDO
Katuro
L.
IKIMBA
Kemondo
Ibwera
Izimbya
RUBALE
MULEBA
5 0 5 10 15 20 25km
POPULATION
DISTRIBUTION (1967)
- 500 people.



KIZIBA
BUGABO
Kashasha
Kyakd
KARAGWE
Bukoba
BUKOBA-
KEMONDO
Kemondo
L IKIMBA
Ibwera
Izimbya
MULEBA
5 0 5 10 15 20 25km
Pop. Density
0-9 p km2
100-124
10-24 "
25-49 "
50-74 "
75-99 "
National boundary
Divisional Boundary
Regional road
National road
District
BUKOBA DISTRICT

1.2.2. Population Growth

From 1948 to 1957 the population of West Lake Region increased by 1.35% per year, and from 1957 to 1967 it increased by 2.5% per year, compared to the national growth rate of 2.8 - 3.0% per annum.

Table iv. Population Density by Wards, 1967

ZONE	ENUMERATION AREA	1967 POPULATION	AREA(KM^2)	DENSITY PER KM^2
COASTAL	Gera	25736	220	117.0
BUKOBA	Kanyigo	11369	171	66.5
	Kdwariro	17632	280	63.0
	Bugabo	18805	321	58.6
	Karabagaine	29703	420	70.0
	Nyakato	20143	184	109.5
PLATEAU	Ibwera	24191	290	83.4
BUKOBA	Katerero	13894	124	112.0
OUTER	Katoro	15137	360	42.0
BUKOBA	Rubale	25229	684	36.9
	Kassambya	6687	109	61.3
	Kyaka	4682	186	25.2
	Minziro	5691	337	16.9
	Nsunga	6721	1140	5.9
DISTRICT		225625	5100	44.2

Source: Population Census, Vol.2, 1970.

The rate of growth for Bukoba district has been constant at 2.2% p.a. over the last two intercensal periods. The rates for Karagwe and Biharamulo districts have been higher than the national and regional rates, while that of Ngara has been negative (see Fig.2).

The main factor which has caused differences in growth rates between the districts in West Lake Region is inter-district migration. The population is densely peopled coastal and plateau Bukoba has been migrating to the neighbouring Karagwe district where land for cultivation is abundantly available.

As a result Karagwe has had a high growth of 4.5% p.a. while Bukoba has had a low rate of growth of 2.2% p.a. Other migrations have taken place, mainly from Ngara district to Biharamulo district and from Muleba district to Biharamulo and Karagwe districts.

The population growth rate has not been constant within Bukoba district. The rate of growth for Coastal and Plateau Bukoba has been 1.6% p.a. whereas that for Outer Bukoba has been 4.1% p.a.[28] Owing to land shortage in Eastern Bukoba[29] people have been migrating to Outer Bukoba, particularly Kubale Division, where land suitable for agriculture is available in abundance.

1.2.3. Population Projection

The population of West Lake Region is expected to grow, on the average, at the present rate of 2.5% p.a. at least up to towards the end of this century with differences between districts evident today persisting. The implementation of various projects like the Ngono Multi-Purpose Project, The Kagera River Basin Development Project, The Villagisation Programme and the Mwisa Ranching Scheme - are likely to alter significantly the internal distribution of population. The rate of growth of the parts involved in these projects is likely to rise, while that in the neighbouring parts to decline. Within Bukoba District migration from Coastal and Plateau Bukoba into the Outer Bukoba is expected to continue at even a rate higher than the existing one, through the government programme of villagisation.

In the light of these conditions, the population of Bukoba is expected to be about 290,000 by 1980 and 475,000 by 2000, as shown on table v. If outmigration into the neighbouring districts increases, a lower rate of growth of about 2.0%p.a. would result.

Table v. Bukoba District. Projected population, 1967 - 2000 in '000

	1967	1975	1980	1985	1990	1995	2000
2.0% rate	226	264	290	319	351	386	425
2.2% rate	226	258	290	323	368	419	475
2.5% rate	226	273	331	400	484	586	703

1.3. INFRASTRUCTURE

West Lake Region is one of the few regions in the country with well developed infrastructure, but the distribution, among the districts in the region, of the infrastructure is very uneven, with Bukoba district being best served than the rest of the region.

Even within Bukoba district the development of infrastructure is very uneven. Higher population density, earlier settlement and higher level of economic development among the population of the eastern parts (Coastal and Plateau Bukoba) has led to an increasing concentration of infrastructure in these areas at the expense of the areas with less population density but with high potential for agricultural development.

The concentration of infrastructure in eastern Bukoba has caused reluctance among the people in these overpopulated areas to move to outer Bukoba where land availability and suitability promises higher production.

1.3.1. Health Facilities

West Lake has 9 hospitals, two of which are located in Bukoba district. The regional hospital is located in Bukoba town and has a total of 240 beds. The other hospital - Nyamma is located about 20 km north-west of the town and has 105 beds. In addition to these two hospitals are four bedded dispensaries located at Ibwera, Isimbya, Kashozi and Kyaka, two health centres at Katoro and Bunazi and a number of dispensaries distributed in the district as shown on map 8, with coastal and plateau Bukoba being better served than the outer Bukoba.

Inspite of the high standard of health facilities in West Lake two health problems continue to haunt the district, namely malnutrition which is typical for banana areas where the food characteristically lack enough protein leading to Kwashiorkor in children, and that about 28% of the total population has to travel a distance exceeding 4 km to the nearest health institution. The implications of overcoming this distance upon agricultural development is examined later.

1.3.2. Education Facilities

The study area is one of the districts in the country well served with education facilities, and is one of the major supplies of educated manpower in the country.

Emphasis is placed upon adult education, with specific subjects as nutrition, health, crafts etc. forming the core of the programme.

Primary education which is compulsory and free to all children is attended in Primary Schools which are numerous and well distributed in Bukoba District. Nevertheless 2.4% of the primary school population have to travel more than 2 km on foot to the nearest schools.

There are seven Secondary Schools with a total enrolment of 2850 pupils. All these schools are located within or near Bukoba town (Coastal Bukoba). Recruitment to fill these secondary schools is done such that pupils come from almost all parts of the country, and through a similar procedure the district sends a large number of pupils to secondary schools outside the region. Consequently secondary school students have to cover large distances at the opening and closing of school sessions. Moreover a big stress upon the inadequate external transportation facilities results at beginning and end of school holidays.

Besides Primary and Secondary Schools there are a number of post-primary training institutions which apart from absorbing primary school leavers provide education designed to make individuals self-reliant. They include Home Craft, polytechnical and nursing schools.

Table vi: Bukoba District: Origin of Secondary School Students 1976

ORIGIN	NUMBER OF STUDENTS	%
Bukoba town	225	7.9
Bukoba and Muleba	835	29.3
Karagwe	234	8.2
Biharamulo	66	2.3
Ngara	143	5.0
Outside West Lake	1348	47.3
Total	2850	100

Source: Yield Survey, August, 1976.

1.3.3. Water Supply

About 74% of the population in Bukoba district obtain water for domestic purpose from natural sources as shown by table vii. 88% of the households cover a distance of less than 1 km in order to draw water. 10% of the households cover more than 3 km for a similar purpose (see Chapter 4).

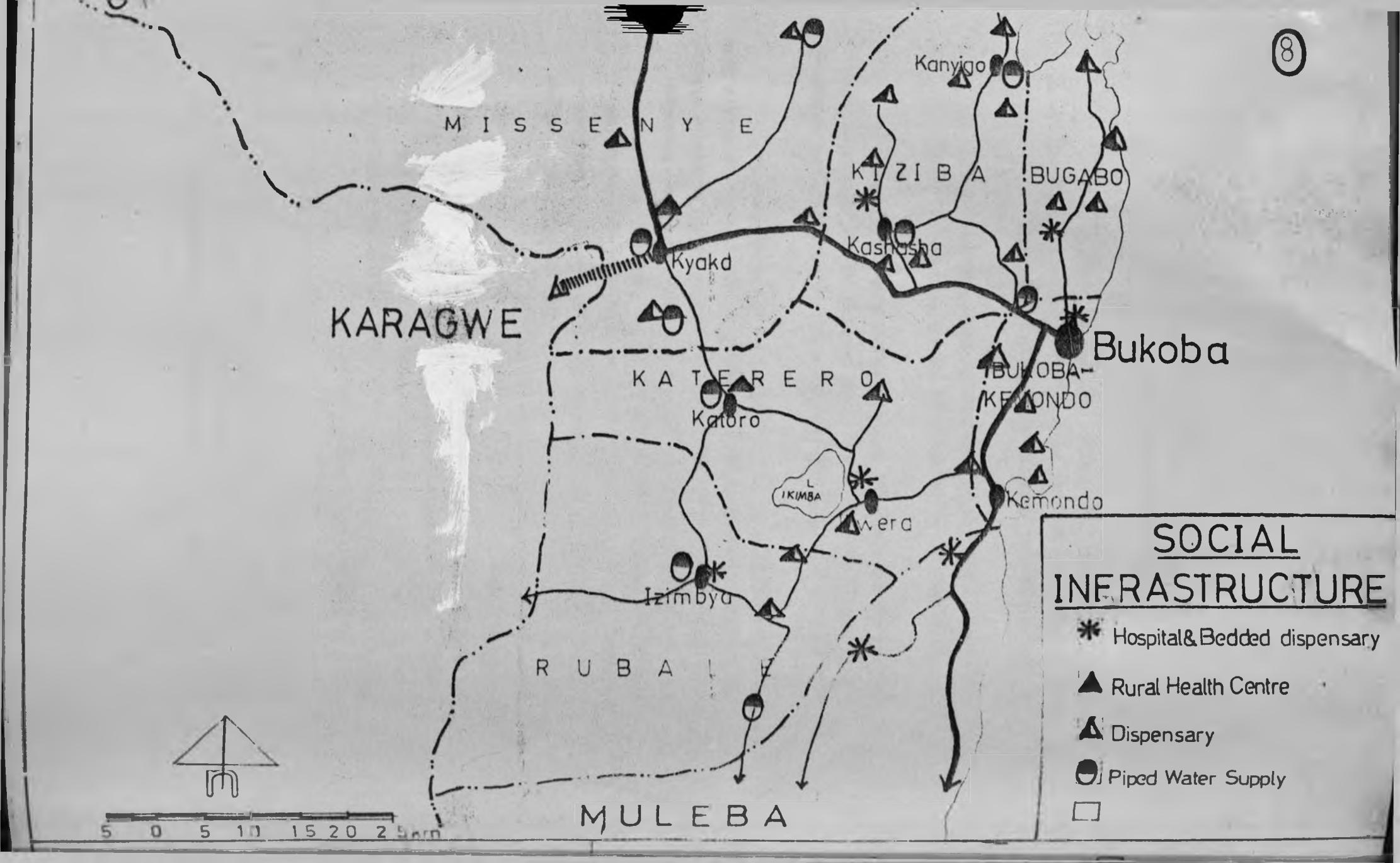
Table vii: Bukoba District: Water Sources

WATER SOURCE	NUMBER OF HOUSEHOLDS	%
Piped water	402	26
Springs	93	6
Streams/rivers	649	42
Lakes	154	10
Bore wells	185	12
Other Sources	62	4

Source: Field Survey, Aug. 1976.

1.3.4. Recreational/Cultural and Religious Facilities

Facilities for recreation are largely lacking in Bukoba district. The few existing ones are concentrated in or around Bukoba town. There is one regional stadium in Bukoba town and several play grounds attached to schools.


8
MISSENYE
KARAGWE
KYAZIBA
BUGABO
Kanyigo
Kyakd
Kashasha
Bukoba
KATERERO
BUKOBA-
KEMONDO
Kaloro
L
IKIMBA
Kemondo
Kwera
Izimbya
RUBALE
MULEBA
5 0 5 10 15 20 25km
SOCIAL
INFRASTRUCTURE
Hospital & Bedded dispensary
Rural Health Centre
Dispensary
Piped Water Supply

On the other hand, religious facilities are abundantly available and well distributed within the district. Only 0.8% of the population travels more than 2 km to the nearest worshipping institution.

1.3.5. Transport and Communications

Inequitable distribution of infrastructure in the district is evident also in transport and communications facilities. The eastern part is served better with roads than the west, but generally speaking the transport system in the whole district is inadequate.

The roads, a majority being of loose-earth standard and single-lane, are in deplorable condition for some months in the year. Moreover, the vehicle fleet is not sufficient, especially for passenger mobility, and a portion of the existing fleet is grounded at times owing to poor maintenance emanating from concentration of all vehicle repair and maintenance facilities within Bukoba town and a general shortage of motor spares. A closer look at transportation in the district is made in chapter 3.

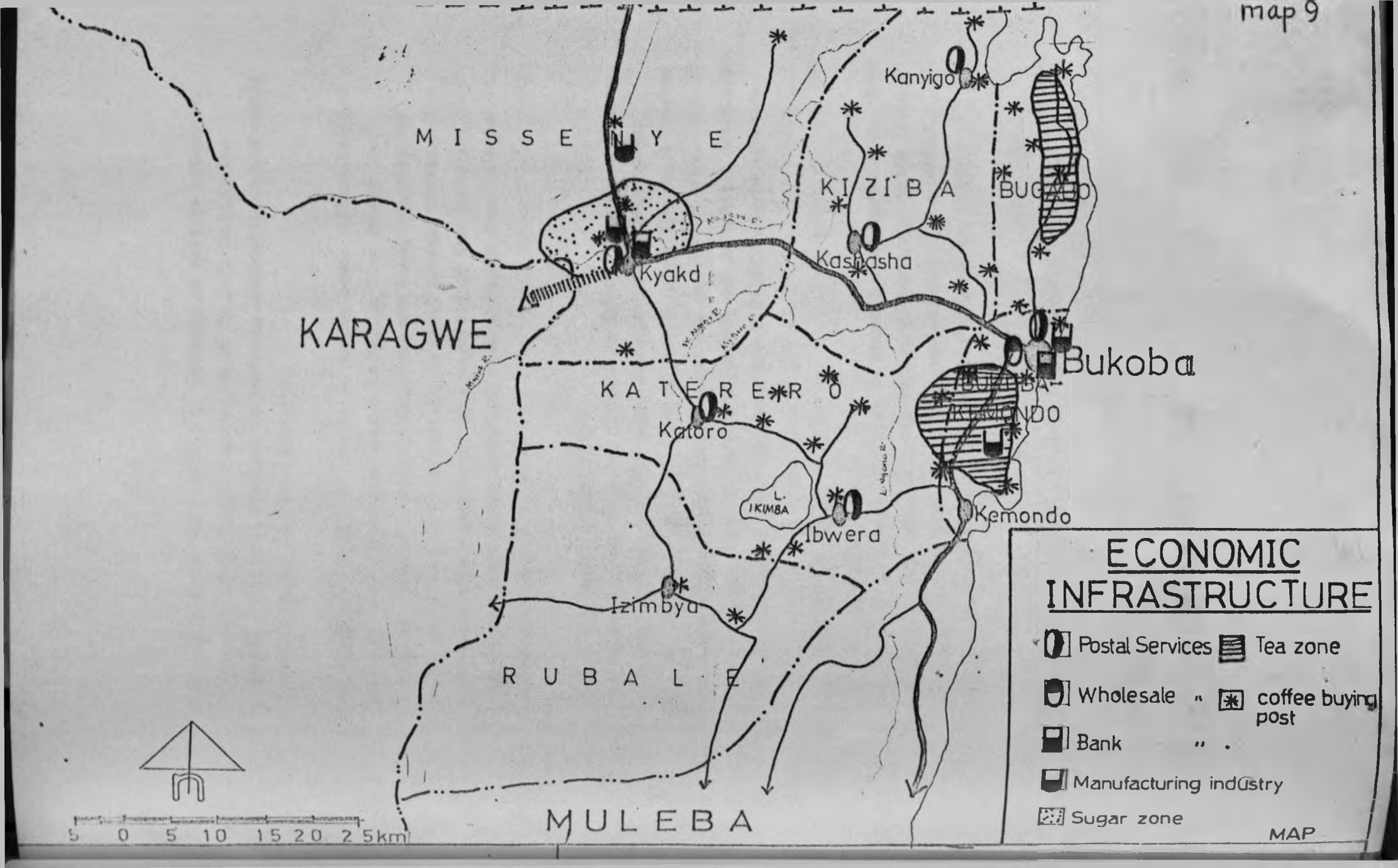
Nearly all intra-district communication depends upon the transport system within the district. Poor intra-district transportation, therefore, implies poor intra-district communication.

Postal services are existing in Bukoba town and in a number of rural centres - namely Kyaka, Katoro, Ibwera, Kashasha and Kanyigo.

Telecommunication facilities exist in Bukoba town only, and they are usually not in good condition so that communication between Bukoba district with rest of the country is poor.

1.3.6. Marketing and Distribution

Organised marketing system for the major export crops - coffee, tea and sugar exists and serves efficiently the whole district.


MISSENYE
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Kashasha
KARAGWE
Bukoba
KATERERO
Kaloro
L. IKIMBA
Ibwera
Kemondo
Izimbya
RUBALE
MULEBA
5 0 5 10 15 20 25km
ECONOMIC INFRASTRUCTURE
Postal Services
Tea zone
Wholesale "
coffee buying post
Bank " .
Manufacturing industry
Sugar zone
MAP

The marketing of food crops and products of cottage industries is rather unorganised. Each producer is left to sell his products privately, usually in periodic markets which are widely distributed all over the district.

All wholesale trade is located in Bukoba town. Retail traders from all over the region travel to Bukoba town to get their supplies. Since transportation costs are high, owing to bad roads goods tend to be expensive in rural areas. Although the prices all over the country of a majority of the goods are government-determined, retailers tend to raise them in order to cover transportaien costs.

1.3.7. Financial Institutions

All banking facilities are located in Bukoba town and in the district centres. Mobile units are also being operated for Kyaka. Banking facilities are of little significance to farmers at present since very limited loans are granted to them. With growing cooperative endeavor in farming and industrial activities, the importance of banks in rural areas is bound to be greater.

1.4. ECONOMIC ACTIVITIES

1.4.1. Agriculture

The economy of Bukoba district is founded upon agriculture, which is essence dominated by small holder production. Coffee and bananas are the major crops produced all over the district. Interplanted with these are annual crops, mainly legumes and maize.

During the last 20 - 30 years banana production increased through expansion of cultivated land resulting from population growth. This increase in banana production has been more pronounced in Western Bukoba than in eastern Bukoba, and in fact in the latter case production has dropped as a result of attack by banana-weevils.

The production of coffee has also increased in the last two decades mainly as a result of expansion of land under cultivation, and to a lesser extent as a result of improved husbandry.

In the last ten years the district started to produce tea and sugar-cane. Large scale and small holder farming have been important in the production of these crops. Owing to physical demands, production of tea is confined in Maruku and Bugabo, and sugar-cane production in Kissenye division. Further details on agricultural development are found in the next chapter.

1.4.2. Industry

The contribution of manufacturing industry to the regional economy is small. Tea, coffee and sugar factories are the only major industries found in Bukoba district (See Map 9).

Other registered industries, small in scale and number and are concentrated in Bukoba town. They include food processing, furniture and footwear production, steel windows and sheet metal work and motor vehicle repairing.

Unregistered cottage industries scattered in rural areas supply the population with building material, clothes, agricultural tools and repair of bicycles.

1.4.3. Forestry

About 12,700 ha of land in the district are covered with natural and planted forests. The level of exploitation of the forest resources is very low. A timber mill located in Kissenye division at Kabwoba produces a large quantity of timber for the Bukoba town market.

1.4.4. Fishing

Lake Victoria with estimated production potential of at least 600,000 tons is the major reservoir. At present limited fishing activities mainly for Bukoba market are going on in this Lake. Lake Ikimba and Kagera river are other potential sources of fish production, particularly for the rural population living near the lake and the river. Scope for expansion of fishing activities exists but transportation, preservation and marketing facilities for fish will need improvement.

1.5 EMPLOYMENT, INCOME AND EXPENDITURE

The major occupation of the rural people of Bukoba is farming. More than 90% of the population in this district are employed in agriculture. The remainder of the population which is less than 10% has permanent employment outside farming. A majority of the people employed permanently are engaged in work which is not directly productive.

Owing to proximity to Bukoba town, some farmers in Coastal Bukoba supplement their farm-derived incomes with part-time employment in the town. It is no wonder, therefore, that the coastal zone has higher average income than the balance of the district.

Coffee, tea, sugar-cane and to a smaller extent bananas are the major cash earning crops for the rural people in the district. Because of the interplay of various factors - e.g. distribution of marketing facilities, access to extension services and distribution of transportation facilities, there are large variations in farm-derived incomes between the Coastal, Plateau and Outer Bukoba as shown in table viii.

A large proportion of the income of the rural people in Bukoba District is spent on consumer goods like clothes, salt, soap, Kerosene, construction material like cement and iron sheets, with very little invested in agriculture and other directly productive sectors of the economy.

Table viii. Income in Tshs. per annum per household. 1975

ZONE	SAMPLE Village	INCOME (TSHS.)					
		Coffee	Tea	Sugar Cane	Bananas	Others	Total
COASTAL	Kibeta	440	100	-	-	250	790
	Busi	400	150	-	-	100	650
	Magongo	600	-	-	-	150	750
PLATEAU	Kaibaja	700	-	-	120	50	870
OUTER	Buhunga	320	-	-	100	50	470
	Kanhabe	300	-	120	60	80	560
DISTRICT		460	125	120	90	105	682

Source: Field Survey, Aug. 1976

1.6 DEVELOPMENT POTENTIAL

On the basis of variations in physiography, climate, natural vegetation, soils, population distribution and density and infrastructure distribution. Bukoba may be divided into the following development potential zones each of which has unique problems and would, therefore, require specific strategies in planning for development:-

Zone 1. Land covered by natural forests. A number of valuable species for timber production are known to exist in these forests. At present exploitation for timber production is confined to Minziro forest in which a timber mill is located (see Map 9). The total acreage of all natural forests is about 12700 ha, but the timber production potential in tons per year has not yet been assessed.

Since all the natural forests are located in the northern half of the district, the future production of timber from them would depend upon the Uganda border - Kyaka-Bukoba road for the transport of timber to the Bukoba town market.

Zone 1 is suitable only for timber production.

Zone 2. is land covered with permanently waterlogged swamps which are at present of no economic significance. Drainage of these swamps has been proposed in the Ngono Multi-Purpose Project. The land resulting from the drained swamps will be utilised for rice, sugar cane, grains, fruits and vegetable production.

If the drainage of the swamps becomes successful migrations to outer Bukoba from Coastal Bukoba is likely to be diverted to the Ngono Multi-Purpose Project Area.

Zone 3 - is land which at present is intensively used for coffee-banana cultivation. Since the land in this zone has been utilised for many decades with little or no measures to conserve the soil fertility, the soil has been rendered infertile. As a result there is very limited scope for agricultural intensification. This zone is also characterised by land shortage. Virtually all arable land is under cultivation, but some open land stretches which though unsuitable for banana-coffee growing are suitable for tea production. The only agricultural potential of this zone is the possibility of expansion of tea-production near Maruku and in Bugabo division.

Because of limited scope for expansion of cultivated land for food production and for intensification in order to get more yield per unit area of land, outmigration to other parts of the district which is already in progress is likely to increase in the future. In addition to this, the zone is likely to remain a food importing one.

Zone 4 - is like zone 3 under intensive use for coffee and banana production. Land here has been utilised for decades but has not deteriorated in fertility as in Zone 3. Scope for further intensification is, therefore, existing in this zone. Nearly all the arable land in this zone has been put under use and there is very little remaining for expansion. Increased productivity in this zone, therefore, depends upon intensive use of the land. This means that there is need to increase manure or fertiliser input into the soil, which in turn calls for a well organised distribution of the inputs necessary for this intensification.

At present Zone 4 - which is mainly Plateau Bukoba produces surplus food for export. The quantity of surplus food production is expected to decline with time due to the limited chances of the success of agricultural intensification. Outmigration to Outer Bukoba already existing at small scale is expected to increase with time, leading to a low population growth rate in this zone.

Zone 5 - consists of land which is almost vacant. The climate, physiography, vegetation and pedology of the zone suggest that it is suitable for arable farming and livestock keeping.

Over the last two decades the zone has been receiving migrants from Coastal and Plateau Bukoba (Zone 4 and 2), but large vacant tracts of land still remain unoccupied. As natural population growth in Zone 2 and 4 continues, more migrants are expected to settle in Zone 5. This is the only zone where large food surpluses for export to Zone 2 and 4, and to the markets outside the district are expected.

At present the zone has the least developed infrastructure, yet it is expected to support a large population in the future. In order to induce a more rapid rate of migration to this zone, more infrastructure may be provided.

Some parts of this zone, especially the north-western area are known to have low rainfall totals so that if farming is to support migrants, irrigation may be necessary, particularly in the production of crops like sugar cane and rice.

2.0 AGRICULTURE: EXISTING SITUATION AND DEVELOPMENT

2.1 INTRODUCTION

Until recently the role of agriculture in the development process of developing countries was considered minor. A change in attitude towards agriculture has been prompted by a number of events. First the population in developing countries has been growing rapidly necessitating increased food production. Secondly, the performance of the manufacturing sector has been very poor. It has not succeeded in alleviating rising unemployment and abject poverty for a majority of rural dwellers. Thirdly dramatic success has been achieved by many countries in strife for expanding food and cash crop production. The success recorded has demonstrated that with improved technology agriculture offers excellent investment opportunities.

In combating problems of poverty and unemployment agriculture is of unique significance. It is the only sector that provides employment for most typically 50 to 80% of the work force in developing countries.[30] In Tanzania more than 90% of the economically active population is engaged in agriculture,[31] and 40% of the GDP is derived from agriculture. For West Lake Region, the region where the study district is located, 60% of the GDP comes from the same sector. Agriculture is the only significant generator of foreign exchange for Tanzania, 70 - 75% of the revenue from exports being accounted for by the same sector.

Besides providing employment and thus income to a majority of the people in the country, agriculture forms a foundation for industrialisation. More than 80% of the industries in Tanzania use agricultural produce as raw materials. In the study area, all significant industrial activity are based on agricultural products, as shown in the previous chapter.

By the year 2000 the population of West Lake Region will about double. The region will not only be required to rebound from food deficits she suffers currently, but also to feed more people that continue to swell the population and to improve the

diet of the rural dwellers who are today undernourished. To accomplish this burden more agricultural inputs will have to be made available to farmers. Furthermore it will be necessary to have these inputs transported at the right time to farms, to organise markets for surplus food produce and to move the produce to these markets. Farmers, moreover, will have to be helped in improving animal and crop husbandry and storage techniques. For agriculture a great challange of attaining these objectives lies ahead.

2.2 LAND USE AND SETTLEMENT PATTERN

2.2.1. Land Use

Table ix shows the distribution of cultivated land by district for West Lake Region. Only 12.2%, i.e. 349,824 ha of the total regional land is under cultivation. Of this cultivated land 48% lies in Bukoba and Muleba districts, but when considered separately Bukoba district has 21.1% of its total land cultivated. The eastern and north eastern parts (Coastal and Plateau Bukoba) being more densely peopled and with higher and more reliable rains are more intensively cultivated than the balance of the district, and in fact land shortage has already set in.

Table ix: West Lake: Cultivated Area, 1975

DISTRICT	TOTAL AREA		CULTIVATED AREA		
	'000 ha	%	ha	% of district land	% of regional land
Bukoba and Muleba	8029	28	169,120	21.1	48
Karagwe	6700	24	85,575	12.8	24
Biharamulo	10878	38	26,615	2.4	8
Ngara	2849	10	68,514	24.0	20
Region	28749	100	349,824	12.2	100

Source: 1:50,000 Topographical Sheets.

2.2.2. Settlement Pattern

The settlement pattern in Bukoba district is very different from the pattern in other parts of Tanzania. Topography has been the major shaping factor of the pattern.

Coffee-banana plantations, localled bibanja[32] have been established on hills or ridges. Ownership of the bibanja is by family[33] On the slopes just outside the bibanja open grasslands occur. Periodically or seasonally these grasslands (rweya) are tilled for the growth of annual crops like maize, groundnuts, bambara nuts and potatoes on a rotational basis. All activities on farms outside bibanja are a responsibility of women who commute from homesteads located in bibanja to the omisiri,[34] as shown on figure 3.

The settlement pattern described above has existed since the beginning of this century and only very slight modifications to it has taken place. New villages, created through Ujamaa and Villagisation programmes exhibit a different pattern, but since less than 2% of the population of Bukoba district live in these, they are not going to concern us in this work.

Thus a majority of the people live in scattered homesteads at the centre of bibanja on ridges. The bibanja are crowded together with no open land between one kibanja and another, and in most cases no roads pass through them. Any attempt to construct a road means cutting down a large number of bananas and coffee plants.

2.2.3. Fragmentation

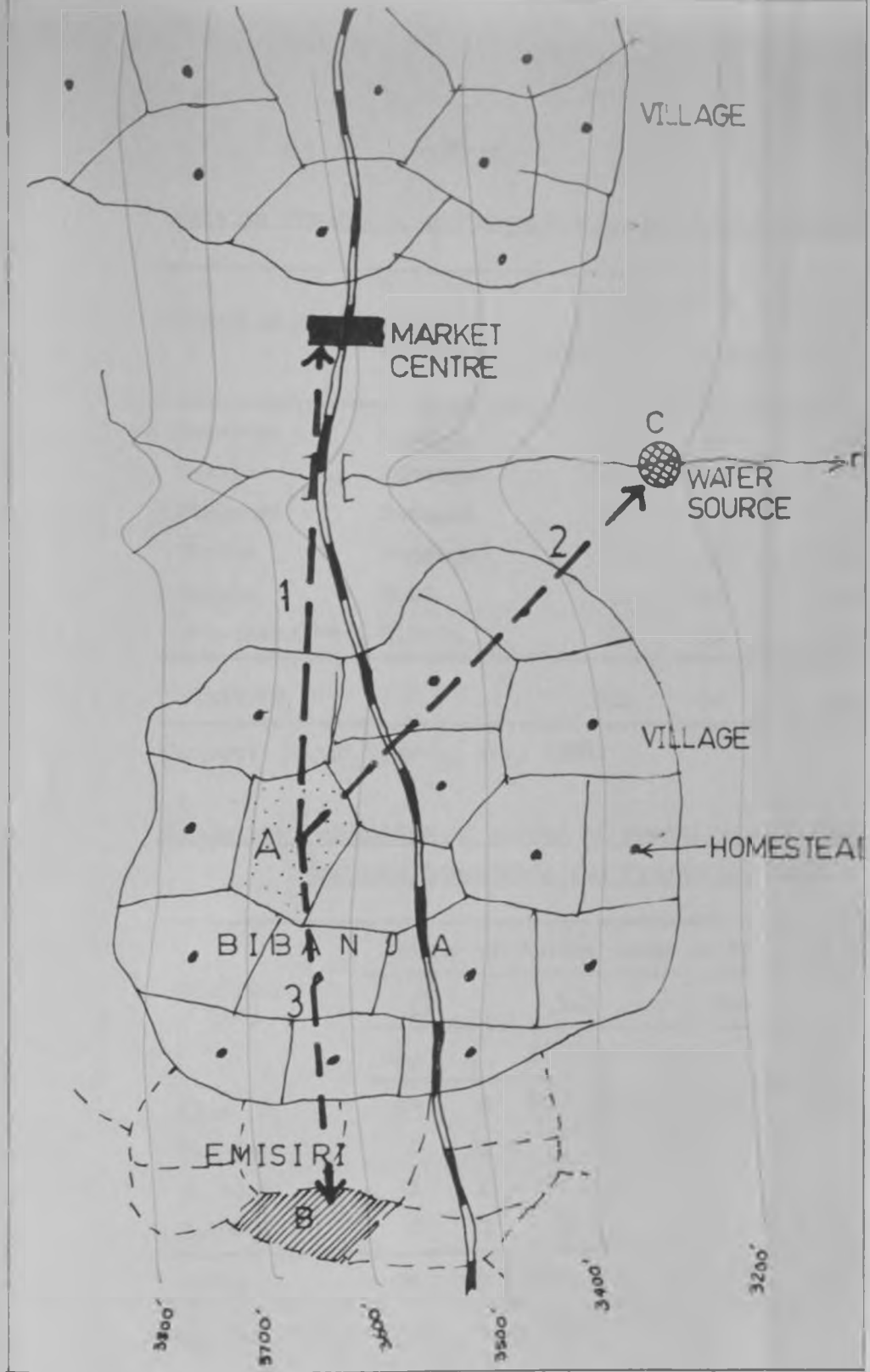
The settlement pattern described above may be diagramatically presented as in figure 3. A farmer owning kibanja A may own one or more annual crop plots, say B. The kibanja A and the omusiri B are separated from each other by several bibanja and emisiri belonging to other farmers. Between the homestead (located at the centre of kibanja A) and the omusiri, commuting by women (and rarely men too) whose daily frequency varies from season to season takes place. Farm inputs originate from the homestead and flow to the fragmented plot B. In the opposite direction flow farm

inputs for consumption or storage. The volume of flow of inputs depends upon the distance between the homestead and the fragmented plot, while the total yield determines the volume of output flowing to the homestead.

64% of farmers in Bukoba district carry out farming activities on more than one plot. Fragmentation is, therefore, a very common phenomenon. Commuting to fragmented plots is a vital factor in agricultural production.

Fragmentation and thus commuting is more pronounced in Bukoba sub-district, Kiziba and Bugabo divisions (Coastal and lesser extent Plateau Zones), this being mainly because of absence of grassland between bibanja. Farmers wanting to grow tea or annual crops that are not traditionally intercropped with bananas and coffee have to utilise open land on the periphery of villages. For some farmers the distances involved are great as demonstrated by table x and xi. The rate of fragmentation is lower in Rubale, Missenye and western parts of Katerero division (Outer zone) where open land is yet available between bibanja.

The period devoted to fragmented plots in the district is variable, depending, inter alia, upon the distance of plots from the homesteads and on the duration of the growing season of the crops grown. The longer the distance, the shorter the period of operation on the plot fragments, as per table xi. In a year, 3 months is the average time devoted to fragmented plots (emisiri) by all farmers in the district. The average distance for all fragmented plots from homesteads is 1.5 km (Field Survey, Aug. 1976). Since 64% of all homesteads in the district have fragmented plots the total distance covered by all households per trip (to and from the homesteads) is about 134,000 km per day and for the period of three months (90 days) this distance is about 12,096,000 km. This distance may be even far greater, for in some households more than one person may be involved in working on the plots, and this is more often than not. Nevertheless, the above figures portray the magnitude of the human energy utilised in covering distance which would otherwise be utilised in productive work.



A sample kibanja

B ,, omusiri

road or footpath

1 homestead-market centre interaction

2 ,, - water source ,,

3 ,, fragment plot ,,

Fig 3 Land use pattern & fragmentation

Table x: Occurance of fragmentation in Bukoba District

DIVISION	SAMPLE VILLAGE	OPERATORS OF 1 FARM		OPERATORS OF MORE THAN 1 FARM	
		No.	%	No	%
Katerero	Kasinga	229	55	188	45
Rubale	Ruhunga	145	67	71	33
Missenye	Kashaba	106	43	141	57
Kiziba	Mugongo	113	28	289	72
Bugabo	Buzi	14	10	125	90
Sub-district	Kibeta	14	11	115	89
DISTRICT		621	36	929	64

Source: Field Survey, Aug. 1976.

Table xi: Variation of period of commuting with distance between homesteads and fragmented plots

DISTANCE (KM)	Number of Months spent on fragmented plots per year									
	/1		1.2		3.4		5.6		7.6	
	No.	%	No.	%	No.	%	No.	%	No.	%
/1.0	95	8	154	13	355	30	284	24	59	5
1.1-2.0	0	0	1	1	9	6	3	2	1	1
2.1-3.0	1	1	2	2	4	3	0	0	0	0
3.1-	0	0	3	1	3	1	0	0	0	0
TOTAL	96	9	160	17	371	40	287	26	60	6

Source: Field Survey, Aug. 1976.

2.3 CROP PRODUCTION

2.3.1. General

Before the beginning of this century the economy of the study area was wholly pivoted upon livestock. The outbreak of rinderpest at the advent of German rule killed about 90% of the livestock in the area.[35] The inhabitants were compelled to take up permanent cultivation of bananas for food and coffee, particularly of Robusta type, for cash earning. Since then a few more crops have been introduced into the agricultural system of the district, but the methods and technology have virtually remained the same.

2.3.2. Food Crops

About a dozen of food crops are grown in West Lake Region but bananas are the most widely produced, and in terms of quantity they rank first. Except for Biharamulo district, bananas are a staple food for nearly all inhabitants of the region. In addition to bananas, maize, beans, cassava, potatoes, vegetables and fruits are widely grown and the total yield per year of these crops are shown in table xii.

The total production of bananas has been increasing as revealed by table xii. The increase from year to year may be attributed to the increase in hectarage of land under bananas, which in turn has been induced by the growth of population. Coastal and Plateau Bukoba have not had substantial increase in banana production because of the absence of idle land upon which cultivation could expand, and because of attack of banana plant by banana weevils. Outer Bukoba, on the other hand, has been receiving migrants from the Coastal and Plateau Bukoba who have opened land for crop production. Increase in banana production over time has mainly taken place in this zone.

Some surplus banana production exists in both outer and plateau Bukoba, but the field survey conducted in the area revealed that a small portion of the surplus ever reaches the markets owing to marketing and transportation problems.

The total production of other food crops has been rising too. As in case of banana production the rising production has been brought about by increased hectarage through opening up of new areas in Outer Bukoba. National campaigns for increased food production has also contributed to the increase in production, but unfortunately the campaign was conducted with little or no consideration to transport and marketing problems. Consequently surplus food production in some areas in the district has been left to rot, reducing farmers' enthusiasm for improving production techniques.

Table xii: West Lake Region, Agricultural Production, 1970-75 (Metric Tons

CROP	1970	1971	1972	1973	1974	1975 a)
Coffee	4,645	15,186	10,995	14,405	14,662	14,700
Cotton (raw)	6,707	9,074	8,378	11,386	10,659	11,641
Sugar (crystal)	6,416	7,500	7,400	6,192	6,370	4,669
Tea (green leaf)	1,192	1,414	1,881	1,833	2,110	2,020
Bananas	490,000	507,000	634,420	570,710	634,420	734,000
Grains	14,120	12,646	14,300	21,858	31,413	75,870
Root Crops	n.a.	86,000	463,087	516,537	168,550	158,921
Legumes	n.a.	46,329	42,500	n.a.	n.a.	56,000
Others	670	1,180	2,235	3,325	2,994	7,626
TOTAL	522,043	686,329	1,185,196	1,146,296	871,178	1,065,447

Source: Min. of Agriculture, Annual Reports, 1970-75
(a) A report given on Radio Tanzania, Dar es Salaam on 9.5.77 indicates that the total coffee yield for the region for 1976 rose to 17,600 mt.

Table xiii. Crop Production by Districts, 1975 in Metric tons

CROP	BUKOBA AND MULEBA	KARAGWE	BIHARAMULO	NGARA	W.L.R.
Coffee	12,000	2,800	200	200	14,700
Cotton(raw)	641	-	11,000	-	11,641
Sugar (Crystal)	4,669	-	-	-	4,669
Tea (green leaf)	2,020	-	-	-	2,020
Bananas	440,000	200,000	38,000	56,000	734,000
Grains	11,130	11,500	12,100	9,540	75,870
Legumes	26,000	15,000	8,000	10,000	56,000
Root crops	160,000	40,000	80,000	18,000	158,921
TOTAL	656,630	225,800	149,300	94,240	1,156,900

Source: Min. of Agriculture, Regional Office

2.3.3. Cash Crops

For cash earning coffee, sugar, tea and cotton are produced in the region. Unlike coffee which is grown in all districts, tea, sugar and cotton are produced in specific areas.

For a long time now coffee has been the pillar of the regional economy. About 90% of the coffee produced in West Lake Region is of Robusta type, and the remaining 10% is of Arabica type. About 80% of all coffee produced in West Lake comes from Bukoba and Muleba districts (see table xiii). Over 90% of the total yield is exported across Lake Victoria, the balance being processed into instant coffee at TANICA factory in Bukoba town.

The major coffee harvesting season begins in mid-May and ends in September (dry season). During this time the influx of coffee from farms to Bukoba town for hulling and export is maximum. It is at this time of the year that good roads are indispensable.

The annual production of coffee has been increasing (see table xii), but the yield per unit area of land has been declining. The total yield has been increasing mainly because of increased acreage of land under coffee. The decline in yield per hectare has been caused by a decline in soil fertility since little or no measures are taken to conserve it.

Another important factor which has influenced the production of coffee in the study area is the fluctuation of coffee prices on the world market. The 1950s were marked by high prices which then dropped in 1960s. Until 1976 the price has remained low leading to stagnation of the economy of the study district. The current price is expected to remain high for at least five years. Campaign to step production in Tanzania has already been launched, and major investment into coffee production has already been planned for. In short term, therefore, total coffee production is expected to remain high. Requirements to accommodate anticipated high production include efficiency in marketing, transportation of inputs and output to and from farms and storage facilities.

Sugar cane the second most important cash crop in the region is produced in the Kagera river valley in Missenye division. Over 90% of the sugar cane produced in the district comes from Kagera estate near Kyaka, the balance being produced by small-holder outgrowers near the refining factory (table xiv).

Table xiv: Bukoba District: Annual Sugar Production, 1960-75

YEAR	ESTATE PRODUCTION		OUTGROWER PRODUCTION		TOTAL
	Tons	%	Tons	%	Tons
1960	1600	100	n.a.	n.a.	1600
1961	2000	100	n.a.	n.a.	2000
962	2500	100	n.a.	n.a.	2500
1963	3000	100	n.a.	n.a.	3000
1964	3500	100	n.a.	n.a.	3500
1965	3162	98.8	38	1.2	3200
1966	4327	98.1	86	1.9	4413
1967	4473	94.6	253	5.4	4726
1968	5040	93.5	351	6.5	5391
1969	4405	81.9	975	18.1	5380
1970	5540	86.3	876	13.7	6414
1971	6610	94.1	414	5.9	7024
1972	7479	96.6	261	3.4	7740
1973	6168	93.6	422	6.4	6600
1974	6760	97.6	163	2.4	6923
1975	n.a.	n.a.	n.a.	n.a.	5160

Source: Lakes, P., Sugar Production in West Lake Region, p.2 Table 1 and p.4 table 2.

The sugar cane produced in the area is processed into sugar at Kagera Sugar Factory which is located within the Kagera Sugar Estate. Since the production of the sugar cane is all year round, the factory output needs transport from the factory to Bukoba town all the year round. The flooding of Bukoba-Kyaka road presents problems in the distribution of sugar within the region.

Tea was introduced in Bukoba district in 1960 for the purpose of diversifying the export economy which was dominated by coffee. It is grown in Maruku, Bugabo and Katoke on TTA-owned estate and on small farms owned by small holder outgrowers. It is transported by road to processing factory at Maruku.

Cotton is mainly produced on the western shores of Lake Victoria in Biharamulo district. The transportation of cotton is not oriented towards Bukoba port. It is exported through a small port of Nyamirembe in Biharamulo district.

2.4 LIVESTOCK

Tanzania's cattle herd is the second largest in Africa[36] but livestock currently accounts for only 18% of the value of agricultural output.[37] Owing to traditional value towards livestock as an indicator of wealth, commercial offtaker rates are still very low.

West Lake region has a very low livestock population. In 1969 11,427 heads of cattle, or 1% of the national total of 12,323,436 heads, were kept in the region. 66% of the herd was in Bukoba and Muleba districts. By 1973 the herd had grown to about 141500 heads.[38] The region still depends upon cattle imported from neighbouring regions of Mwanza and Musoma.

In recent years the number of cattle imported into West Lake Region has been declining as a result of the decrease in capacity of livestock ferries travelling between Bukoba, Mwanza and Musoma that has been caused by the grounding of the T.A.C. owned ships. At present there is acute shortage of livestock products in the region, especially in Bukoba town.

NARCO manages ranches at Kitengure but have been of little or no help in alleviating meat and milk shortage. Production costs of cattle products in the ranches are so high that only outside markets can meet the high prices of the livestock products from these ranches. Tanganyika Packers, therefore, is the chief buyer of cattle from the NARCO-owned ranches.

A field survey revealed that some milk surplus is produced in Karagwe district, but owing to absence of organised markets and storage facilities this surplus perishes within the rural areas. Igabiro farm in Muleba district is the sole supplier of fresh milk to Bukoba town, but the production is too low to meet the demand.

2.5 FARMING METHODS

2.5.1. General

Agriculture in West Lake region is of traditional subsistence nature, depending almost entirely on small-holder peasants. Large scale or estate farming is confined to tea and sugar, and to a lesser extent rice and maize growing.

Methods employed in farming on small-holder farms have remained virtually the same since the cultivation of bananas and coffee commenced at the beginning of this century. Consequently, although acreage of cultivated land has been increasing the yield per hectare has been declining on small-holder farms.

2.5.2. Technology

Before a hoe was introduced into the farming system of the study area peasants in West Lake region utilised various implements which were manufactured by local metal-workers.[39] The basic tool for small-holder farmers is a simple hand tool, the hoe. In addition to the hoe, there are 50 tractors, two combine harvestors and a mobile tractor repair unit in the region, which are mostly employed on estates and occassionally in Ujamaa farms. Because of high fuel costs and spare parts costs only a part of the tractor fleet is in full use.

Simple hand tools are likely to remain important impliments in promoting agriculture in Tanzania. Fortunately, West Lake Region has a strong human resource-base which is one of the requisities for utilising simple tools.

2.5.3. Use of Manures and Fertilisers

The soils in the study area have been utilised for a long time now without adopting measures to remedy depletion of soil fertility. Soils in the intesively cultivated Coastal and Plateau zones, as an aftermath, have lost fertility and any intensification of land use through use of more labour, better seeds and implments is not likely to lead to increased output per unit area of land unless such intensification is coupled with the use of manures or fertilisers.

The only method used by small holder farmers to conserve soil fertility on the bibanja is by mulching with old banana leaves. 8% of small holder farmers, in addition to mulching, use livestock manure and less than 1% use chemical fertilisers, but 86% of the farmers are willing to use manures and fertilisers if made available to them. (see table xv).

A fertiliser factory is planned for Busumo as part of the Kagera River Basin Development plan (see Chapter 4). Because it will locate within the study region, the use of fertilisers is expected to increase.

Table xv: Use of fertilisers and manure in Bukoba District

SAMPLE VILLAGE	DIVISION	ANIMAL MANURE		FERTILISERS		WILLING TO USE FERTILISERS IF AVAILABLE (YES)	
		No.	%	No.	%	No.	%
Kaibanja	Katerero	33	8	1	0.2	404	97
Ruhunga	Rubale	2	1	0	0.0	422	10
Kashaba	Kissenye	15	6	2	0.8	242	98
Nyagongo	Kisiba	40	10	1	0.2	398	99
Busi	Bugabo	17	12	3	2	138	99
Kibeta	Sub-district	19	15	6	5	123	99
TOTAL		126	8	13	1	1327	86

Source: Field Survey, Aug. 1976.

2.5.4. Irrigation and drainage

There is a UNDP-sponsored pilot project at Kyakakera near Kyaka which investigates the possibility of growing rice, maize and millets all the year round in the rather dry Outer Bukoba. Elsewhere the water balance is such that irrigation may not be necessary for crop production.

There are plans to undertake the drainage of the swamps found in the Ngono river valley and eventually utilise the drained swamps for agriculture.

2.5.5. Research and Extension

Research on bananas, coffee and tea is carried out at Maruku, 10 km south of Bukoba town and Kituntu (Karagwe district). An irrigation research facility has been established at Kyakakera. In principle the programmes of these research facilities encompass regional requirements but in practice the results of the research appear to have had very little impact on subsistence agriculture. One reason for this has been that research efforts have been in the past largely concerned with export crops. A change in emphasis to food crops is overdue. It is unlikely that export of cash crops will pay for the heavy food imports in the region. It is imperative that emphasis be placed on self-sufficiency in food production through producing improved seeds and planting material, recomending to farmers planting times and crop rotation, optimum use of fertilisers, insecticides, herbicides and storage practices.

The task of ensuring that the results of agricultural research are put into practice rests with extension services. Emphasis by the extension staff has been on cash crops particularly coffee, tea, sugar-cane and cotton. There is urgent need for involvement of extension sector into food production.

2.6 MARKETING, DISTRIBUTION AND STORAGE

2.6.1. Marketing

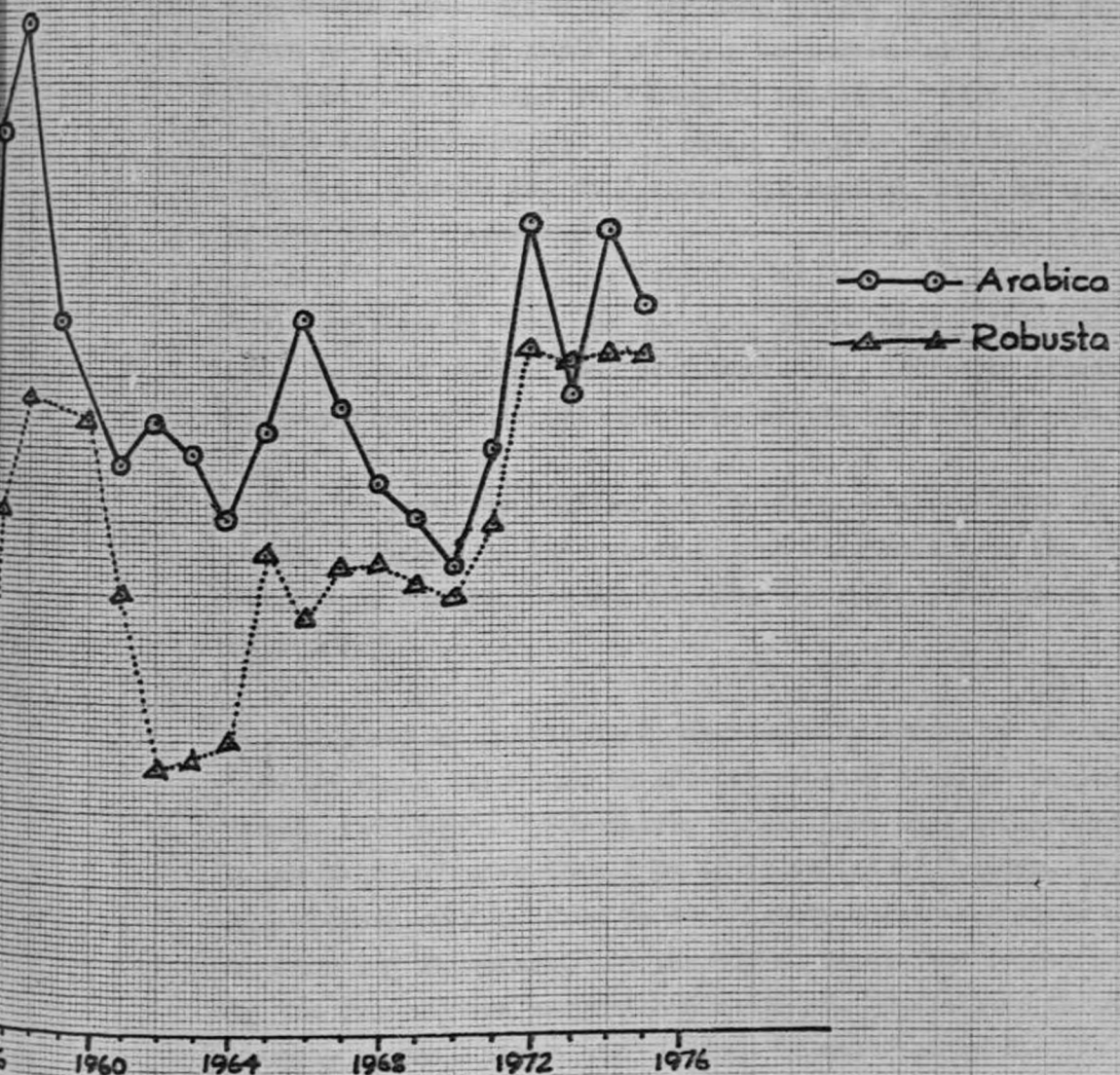
To date the formal marketing system in West Lake Region has concentrated activity on export crops. Consequently surpluses in perishable crops like bananas, fruits, root crops and vetables rot on farms.

All marketing activities for coffee and to a lesser extent grains and legumes were under the West Lake Region Cooperative Union (WLRCU) which linked about 188 primary cooperative societies. 40 out of these societies were located in Bukoba District. In May 1976 all unions in the country were dissolved and all marketing activities handed over to individual villages. All former cooperative societies in the region are now marketing centres for coffee. Like their predecessors, the new marketing institutions have not yet taken up the marketing of food products.

Map 11 shows all village buying centres where coffee and sometimes maize and grains are bought from farmers for marketing. These crops are transported from farms by individual farms on foot or by bicycle. When godowns at the village buying centres are filled the village development committees order for trucks owned or hired by TCB which then transport the produce to Bukoba town for processing and export. All hulled and graded coffee is then transported by TCB by Lake to Mwanza and by train to Moshi where auctioning takes place.

30% of the total population in the region live more than 5 km from the nearest village buying centres/posts, as shown in table xvi. The relationship between the posts/centres and road-network is shown by the same table, and map 11. The major problems in marketing of coffee affect the production. At present about 75% of robusta and 50% of arabica coffee is delivered unhulled to Bukoba where it is hulled by TCB-owned factory. This means that only 25% of robusta and 50% of arabica coffee produced in the region is hulled on farms. Labour involved in hulling on farms - which is by very simple hand grinders - is enormous but the difference in price offered to farmers between hulled and unhulled coffee is small. Farmers, consequently, find it more economic to sell unhulled coffee. Hulled robusta is 55% and arabica coffee 45% by weight of unhulled coffee, and in both types the reduction in volume by hullying is even greater. More than twice the transport capacity to haul unhulled coffee is required than the capacity required for hauling hulled coffee. If farmers are encouraged to hull coffee on farms by increasing the price per unit of weight between hulled and unhulled coffee lower truck capacity will be

IG4. COFFEE PRICES PAID TO FARMERS, 1956-75.



FIELD SURVEY, AUG 1976.

933. 90 GR. R. A.

required for hauling the total coffee produce. Another advantage accruing to hullying coffee on farms is that hulls are useful soil much which provide nutrients and lightens soil. The bulk of the hulls near the factory are used for burning to provide energy for further hulling, but a proportion is also left to rot outside the factory.

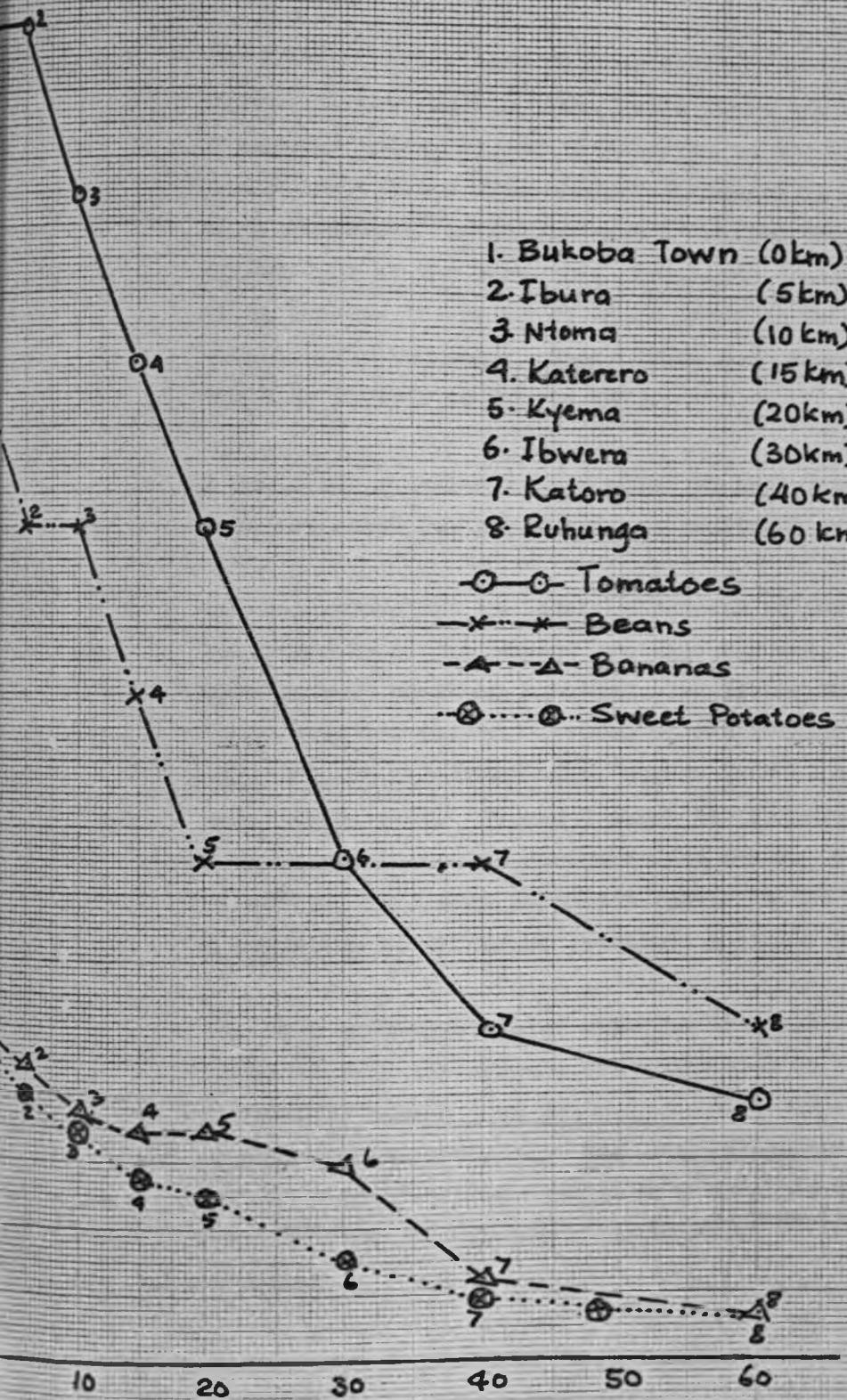
The second problem has been that coffee price on the world market has been fluctuating up and down. Correspondingly income of farmers from coffee has not been steady as shown by figure 4. Price systems play important role in investment decisions.[40] Declining prices lead to a drop in investment in terms of capital, labour and land devoted to a crop. Morever declining prices reduce income of farmers and thus financial capital that may be put into agricultural production.

Table xvii shows that the quantity of marketed coffee and returns from marketed coffee have been unsteady. The unsteadiness of world coffee prices must have one of the reasons for such trends.

Tea is produced by smallholder outgrowers and the TTA managed estate adjacent to the factory. Tea harvested from the TTA estates is directly transported to the factory for weighing and processing.

Tea produced by smallholder outgrowers is bought by TTA at points located along the roads in all tea growing areas in Karuku, Bugabo and Katoke. Purchasing points have been constructed in such a way that not more than 2 km is travelled by farmers. Tea is transported on foot from farms to these points two times a week - Mondays and Thursdays. At the buying points the leaves harvested by the farmer are weighed and recorded. Payment to farmers is on monthly basis. Green leaf is then transported by the TTA to the factory for processing. A very small quantity of produced tea is marketed within the region, so that most of it is exported to other regions through Bukoba port.

FIG 5. VARIATION OF PRICES OF PERISHABLE CROPS WITH DISTANCE FROM BUKOBA TOWN.



Marketing of sugar cane follows similar lines as tea. SUDECO has established points along roads where sugar cane is colleted at regular intervals and transported to the factory for sugar processing. Table xvii shows the changes in quantity of tea and sugar marketed. As in the case of coffee the prices have not been steady, and at the same time production costs have been rising. As an outcome the price of these products to consumers have tremendously increased. Sugar price for example rose from Shs. 1.65 in 1972 to 6/= in 1973.

A marketing organisation parallel to that described for cash crops does not exist for perishable agricultural products.

Surplus production is taken by farmers to periodic markets where the majority of the buyers are also farmers. As an outcome little crop is sold on these markets. The little that is sold is disposed of at very low prices. Prices of the produce in periodic markets at different locations vary, higher ones being found at markets near Bukoba town. Figure 5 shows the variation of prices for four commodities with distance from Bukoba town. Distance, therefore, is a very important factor in the prices offered for commodities at different locations in the district.

Periodic markets are also attended by small traders who buy food crops at very low prices, transport them on buses, pick-ups or lorries to Bukoba town where they fetch higher prices. Since transportation costs of these crops (see Chapter 4) are very high actual profit derived from this by small traders is not large, and in fact does not encourage continuation of this business by traders.

Bukoba town is the only large market for rural produce. 43.11% of dwellers in Bukoba town have bibanja in Bukoba, Karagwe and Muleba districts.[41] On weekends they visit their farms and collect food produce instead of depending on that sold on markets. This reduces farther the quantity of food marketed in Bukoba town.

Because of lack of formally organised markets for food produce no accurate data on the quantity sold to other regions are available.

Table xvi: Distribution of Cash Crop Marketing Posts, 1975

	BUKOBA AND MUL. BA	KARAGWE	BIHARAMULO	NGARA	N.W.R.
Number of buying posts	89	43	42	14	188
Number of posts not on a g.w.r.	42	22	27	8	99
Proportion of posts not on a g.w.r.(%)	47	51	64	57	53
Proportion of population with more than 5 km to nearest post (%)	38	14	23	28	30

Source: Muller, J. op.cit, Table 6

Table xvii: Marketed Agricultural Production, 1967 - 71
West Lake Region

CROP	1967		1969		1971	
	Mt.	'000/-	Mt.	'000/-	Mt.	'000/-
Coffee	103,915	21,579	10,677	22,064	11,165	53,202
Cotton (raw)	3,307	3,062	6,142	12,471	16,620	9,972
Tea (made)	86	57	124	455	301	2,107
Sugar (crystal)	4,802	7,886	5,974	9,879	7,560	12,474
Bananas	3,692	827	4,922	1,085	13,000	3,250
Beans	1,822	1,014	5,268	2,323	3,658	2,195
Sorghum	181	108	2,062	909	2,550	2,295
Groundnuts	66	89	277	609	800	950
Sweet Potatoes	269	59	2,103	464	1,100	275
Bambara nuts	2	2	312	345	120	72
Cassava	531	120	1,523	336	2,460	713
Maize	-	-	-	-	760	279
Vegetables	-	-	-	-	480	480
Onions	-	-	-	-	110	109
Ginger	-	-	-	-	370	246
TOTAL	118,673	34,803	139,389	50,940	161,796	99,317

2.5.2. Distribution

The supply of coffee seeds of improved varieties in West Lake Region is mainly from Maruku Research Station. Seedlings are produced at conveniently situated nurseries which are under the control of extension personnel. Farmers travel to these nurseries to obtain the seedlings which are given free, but since the rate of replacing old coffee trees is very low the rate of visits by farmers for seedlings is correspondingly low. For the whole of Bukoba, for instance only 68,900 seedlings[42] were collected by farmers from coffee nurseries, i.e. 1.4. seedlings per household in 1975.

Tea seedlings and stumps for planting are produced by the TTA at Maruku and distributed to farmers selected by TTA for the expansion of the crop.

Little attention has been paid to the supply of improved planting material for food crops, apart from the distribution of small amounts by improved seeds of maize, beans, wheat and rice. All the distributed supplies have been brought in from the outside of the region since there are no seed bulking facilities in the region. The Bukoba District Agricultural office has in the past attained limited quantities of improved maize variety - Ukiriguru Composite, and Katumani type from Kenya - but in the absence of facilities for maintenance of stock seed the varieties have quickly been lost. Limited quantities of improved bean variety - haricot - were imported into the region but for similar reasons the seed purity has been lost.

Limited quantities of fertilisers are imported into the region by the NCA and distributed to institutions and Ujamaa Villages, leaving small holder farmers outside these without any supplies. The TTA, TCA and SUDECO import fertilisers from Tanga for use on their own estates. Recently TTA has been selling some fertilisers to selected tea growers at subsidised prices. The distribution of plant protecting materials - pesticides, herbicides etc. has followed similar pattern. Before the dissolution of NARCU all

distribution of plant protecting material was undertaken by it. Sales to members of the Union were by credit. Today a small-holder farmer has to buy these on his own in shops mainly located in Bukoba town.

Virtually all wholesale activities for consumer goods, textiles and agricultural impliments are located in Bukoba town, on the eastern edge of the region. Retail cooperative and individual retail traders travel by road to the town to secure supplies of these goods, but the policy followed by NTC, the sole wholesale distributor, is to give preference to cooperative traders.

Farmers travel from their homesteads on foot or bicycle to rural or market centres where retail shops are located, and purchase their requirements. Prices for almost all goods are fixed and uniform within the region but it is not uncommon for traders to charge higher prices owing to shortages. The field survey revealed, for example, that a 50 kg. bag of cement which is to sell at Tsh. 45/= may sell at Tsh. 100/=, a litre of kerosene which is supposed to sell at Tsh. 2/50 sells at Tsh. 10/=.

Shortage of some essential items in the region may not be blamed on the distribution within the district but on low transportation capacity of marine vessels between Mwanza and Bukoba. Supporting this is the fact that items missing in Bukoba are in plentiful supply across the Lake in Mwanza. Another possible cause of shortages in West Lake Region is smuggling that takes place along the Uganda, Rwanda and Burundi borders

2.6.3. Storage

Traditional methods of storing foods are very widely used on farms. Two limitations confrot these methods - first the produce cannot be stored for a long time by using these methods, and secondly perishable produce have not found any storage techniques among traditional methods. Some of the techniques include sundrying of grains, legumes and root crops, smoking of fish and meat and ashing of legumes. Perishables like bananas, potatoes, vegetable and fruits have not found preservation methods and when not consumed or marketed rot on the farms.

Facilities for produce already marketed from farms are concentrated in Bukoba town. The only storage facilities that are widely distributed in the study area are coffee godowns which were constructed alongside cooperative societies. Capacities of these godowns are variable but are sufficient in relation to the present level of production.

Facilities found in Bukoba town are TCB-owned godowns for hulled coffee storage pending export, NFC owned godowns for storage of milled maize, wheat, rice, beans and sugar pending distribution to consumption centres, NMC owned godowns for storage of grains pending milling, and TTA owned godowns at Karuku for storage of processed tea pending transportation to Bukoba port for export. The capacities of the existing godowns in Bukoba town and port are able to meet fully the existing storage requirements.

In market, rural and district centres and in Bukoba town market there are no storage facilities for perishable goods. Rapid spoilage takes place and there are no immediate plans to install any facilities for this purpose. It is estimated that 10 - 15,000 tons of worth around 60,000/= perishable foods rot in Bukoba market every year.[43] The loss in periodic markets and farms must be enormous.

Expansion of Bukoba market is now in progress but installation of modern storage facilities - e.g. refrigiration are not in the plan. Cold storage facilities which were scheduled for Bukoba port are to be transfered to Kemondo port alongside the market which is already under construction.

2.7

2.7 THE FUTURE

By the year 20000 with the existing demographic ftrends the production, the population of West Lake Region will be about double, with more or less 95% of the populace residing on farmsteads. Imperative for the region is increased food production at least to keep pace with food demand of the growing population. Presently only small surpluses are produced but due to lack of marketing, distribution and storage facilities this little surplus is wasted through spoilage.

Besides feeding the growing population, agriculture is faced with a challenge of raising nutritional standards of the inhabitants. In order to sustain the present standards it will be necessary to increase food supplies in the region at an average rate of 2.5% to 3% annually, the same rate as population. In a region where industrialisation is in an infant stage the responsibility of generating capital for investment rests upon agriculture. Export crop production has to increase if this responsibility has to be met by agriculture.

In order to meet the challenges of attaining and maintaining self-sufficiency in food, maintain or raise the existing nutritional standrds, and generate capital for socio-economic investment, agriculture has to be planned on the basis of a strategy that gives priority to easy mobilisation of available resources, which are, for West Lake Region, human, soil and water resources. Such strategy will, therefore, have to emphasise the use of labour-intensive approach as opposed to capital-intensive approach and conservation of soil and water resources, through improved methods of farming.

Statistics are inadequate to provide a basis for accurate and detailed forecasts of the future performance of the agricultural sector.

Principal cash crops - tea, coffee and sugar are likely to fare well because of several reasons. Much of the research and extension have been oriented towards these crops and almost all organised marketing concentrates on these crops. In case of coffee production the recent sky-rocketing of coffee prices is likely to remain for several years to come. Farmers, therefore, are likely to increase efforts and employ better methods so as to get higher yields, thereby raising their incomes.

Table xviii: Projected Production for Kabale 1980 - 2000 in Mt.

CROP	1975	1980	1990	2000
Coffee	14,700	20,000	30,000	45,000
Tea	2,020	7,425	10,000	15,000
Sugar	4,669	90,000	115,000	125,000
Cotton	11,641	20,000	30,000	45,000
Bananas	734,000	1,020,000	1,513,000	2,250,000
Grains	44,000	79,000	117,000	175,000
Root crops	158,000	320,000	476,000	710,000
Legumes	56,000	92,000	137,000	203,000
TOTAL	1,025,030	1,643,475	2,428,000	3,568,000

Table xix: Projected Surplus in Food that will need transportation to Rukoba - Kamondo for Export

CROP	1975	1980	1990	2000
Bananas	-	-	-	-
Grains	-	21,500	28,900	38,500
Legumes	-	18,000	27,500	38,000
Root Crops	-	-	-	-
TOTAL	-	39,500	56,400	76,500

2.9 RESUME

In this chapter the importance and achievements of and future challenges for agriculture in West Lake regional economy have been examined. The problems confronting efforts in improving the performance of the sector have also been brought to light. The strategy designed for raising the standards of living of the populace through improving agricultural production has to focus on these problems.

In chapter one we noted that the study area has no severe physical constraints that retard agricultural development. In fact the physical set up is such that the region is one of the few parts in

Tanzania with high potential for agricultural development, yet its present contribution to the national economy does not match with its potential. This, however, is not to say that no progress has been made since independence. Through the nationalisation of all uncultivated land just after independence, improved technology involving use of fertilisers, manures and tractors, increased extension and research services, change in policy from individual to cooperative endeavor in farming and introduction of new crops (e.g. tea, sugar, cotton) in order to combat hazards of one-crop dependence, the region has managed to make a stride in meeting home demand for food, and raising their incomes by producing more export crops. Besides making a step towards self-sufficiency in food production and producing more cash earning crops the region has successfully established agro-based industries - coffee and tea processing, sugar refining and grain milling, which were non-existent at independence. The success in these industries, needless to say, has been possible through revenue from the agricultural sector.

These attainments have not come without obstacles. Obstacles of lack of organised markets for perishables, storage facilities for the same products and poor performance of the transportation sector, still continue to frustrate efforts of small holder farmers in increasing production. The West Lake Region Planning team summarise the problems facing agriculture as follows, "Without attention to improvement of marketing and distribution no increase in food production is likely."[44]

3.0 TRANSPORTATION: PAST. PRESENT AND PROBLEMS

3.1 HISTORICAL NOTE

3.1.1. Evolution of the National Transport Network

Tanganyika remained unopen to modern commerce until the beginning of this century. The first attempt to link the interior with the coast was made in 1876 when Mackinnon and Buxton undertook to construct a road from Dar es Salaam to Lake Nyasa.[45] The road never reached far, it stopped 73 miles inland when it was realised that the road would be useless because of tsetse-flies.

In 1890 Tanganyika became a German colony, and soon after this Germans settled in several parts of the country. Emin Pasha was the first German to reach Bukoba in 1891 where he built a boma.

The next attempt to penetrate Tanganyika's inland came in between 1896 and 1911 when the German East Africa Company built the Tanga-Moshi and the Central railway line. Because of the outbreak of World War I in 1914 the railway line from Tabora to Kuanda through Kgara and the line from Morogoro to Lake Nyasa were never completed.[46]

The German government hoped to stimulate raw material production and create markets for the manufactured goods by constructing railways. Success in doing so was recorded along the Tanga-Moshi line where sisal plantations mushroomed following the completion of the line. In other parts of the country little success took place.

During the German rule no important road development took place.[47] It was during the British era that major road network of the country was really shaped. The British policy vis-a-vis the German one was to concentrate on transport projects which promised immediate stimulation of the inland to produce raw materials, since the country was not regarded as tied to them as for example Kenya. Tanganyika was only entrusted to Britain by the League of Nations. Their activities, therefore, were of "hit-and-run" nature as illustrated by the Nachingwea Groundnut Scheme which a after failing, the rails were picked and sent to Uganda where a more instantaneously profitable scheme was at hand.[48]

Trucks hurriedly made by Germans to facilitate military movement during World War I were improved by the British Government and by 1938 long distance porterage between the interior and the coast had almost vanished.

Table xx shows the advancement the country had attained in road building by 1936, but a clearly defined policy in road construction had not hitherto been followed. 1946 marked the beginning of road construction based on defined policy. The policy was to build "low-cost-roads"[49] all over the country as follows:

> " a grid of trunk roads, four running from north to south and three from east to west. To these trunk routes main feeder roads must be provided and to these latter district feeder roads to the outlying markets and productive areas"[50]

The policy of building low cost roads was keenly pursued and by independence a spatial structure shown on map 12 had been attained.

Table xx: Existing Roads in 1936

Township roads	341 km
District Headquarters road	155 km
Main roads	4,445 km
Districts Roads, Grade A	2,365 km
Districts Roads, Grade B	14,970 km
TOTAL	22,276 km

Source: Econ. Survey of Colonial Empire, Lond., 1936.

One disadvantage of the policy was an adverse lack of feeder roads linking rural areas to urban areas. This feature characterises Tanzania's spatial system even today.

RAILWAYS AND TRUNK ROADS, 1961.

--- Trunk Roads

+++++++ Railway line

* National Capital

• Regional Capital.

Source: Muller, J. Map. 1 p. 12.

The development of feeder roads was further inhibited by post-independence modus operandi regarding road construction and improvement. Only 12.5% of all road expenditures between 1961 - 4 were spent on feeder roads.[51] The proportion spent on genuine feeder roads dropped to 8% during the 1964-69 plan period.[52]

3.1.2. Development of Motor Vehicle Fleet

The growth of motor vehicle fleet closely followed the development of roads. Peterage, however, remained a very important mode of movement until towards the beginning of World War 2.

In 1914 there were 26 motor-vehicles, of which 6 were motor-cars, 5 lorries and 15 motor-cycles in Tanzania. 14 were in Tanga where German settlers had concentrated on growing sisal, 1 in Kilimanjaro, 5 in Dar es Salaam, 1 in Mtwara, 1 in Morogoro and 1 in Mwanza, but none in West Lake. By 1935 the vehicle fleet had grown to 3727 (1 vehicle per 1000 people), and by 1972 there were 94,037 vehicles (1 vehicle per 145 inhabitants (See table xxi).

Table xxi: Growth of Tanzania's Vehicle Fleet, 1914-72

TOWNSHIP	TYPE	1914	1935	1955	1960	1965	1970	1972
Privately-owned vehicles	Motor cars	-	-	-	15994	23360	33574	34141
	Light Commercial V.	-	-	-	8830	10368	16000	14784
	Trucks/ Lorries	-	-	-	7207	8597	14059	14849
	Buses	-	-	-	1481	2094	3614	3816
	Motor-cycles	-	-	-	4328	5684	9613	10072
	Others	-	-	-	2128	4320	8569	7921
SUB TOTAL	-	-	-	-	37046	49699	78124	85583
Government owned vehicles	-	-	-	-	2922	4238	6629	8454
TOTAL	All types	26	3727	26421	39968	54422	85427	94037

Source: Hofmeir,(R), Table 33 and Kagera Project Report -TRANSPORTATION

3.1.3. The Development of Lake Victoria Waterway

The railway, road and vehicle fleet development outlined bov above has had little impact upon intra-regional mobility in the study area. Poterage remains an important mode of moving agricultural produce to marketing facilities.

Inter-regional movement from West Lake to the outside of the region owe little to road transport development. Nearly all connections of West Lake to the rest of the country and to the neighbouring East African coun ries have been through Lake Victoria, with Bukoba port as the only terminal along the western shores of the lake.

Steamer services between Bukoba and Mwanza were launched in 1905, and in the same year 243 tons of coffee, which was originally sent as porter load via Tabora to Dar es Salaam, were shipped to Kisumu en route to Mombasa.[53] By 1931 two more vessels, SS Usoga and SS Buzinga each with a capacity of 525 tons had been introduced on the Lake.[54] The major problem which was facing lake transport at the time is the low speed of vessels which were required to cope with the increasing coffee for export. In 1958 two specialised steamers - MV Mg'ombe for livestock and MV Nyangumi for oil products started operation[55] marking the advent of livestock trade between Bukoba and Musoma. The introduction of MV Nyangumi resulted in the reduction of oil products in Bukoba, 12 cents less per gallon of petrol and 23 cents less for a gallon of kerosene.

The next development in Lake transport was in 1961 when a new steamer, MV Victoria with higher speed and better passenger facilities was commissioned. It reduced travelling time between Mwanza and Bukoba by half thus reducing competition from road transport.

How many chapter 3's have you?

CHAPTER 3:

TRANSPORTATION:
PAST, PRESENT & PROBLEMS

3:1:4, Historical Development: Conclusion:

For centuries Tanzania's transportation system remained in primitive state with porterage as the sole mode of transportation. The construction of railways at the beginning of this century was a turning point in the history of Tanzanian transportation.

Besides replacing long caravans of porters between the interior and the coast, the railway reduced travel time and to some extent stimulated agricultural development, especial along the Moshi-Tanga line. Today, the role of the railway remains in import-export transportation, and to a lesser extent passenger movement.

The failure of railway to stimulate development in some parts of the country prompted a change in emphasis from railways to road development. The pre- and post independence policy favoured the development of trunk roads at the expense of feeder roads, leaving inter and intra-regional connectivity in miserable state.

For West Lake the development of roads and railways had little meaning until connection of Bukoba to the central

railway line and the Uganda-Kenya railway had been made through Lake Victoria. Coffee trade boomed as a result of the waterway. Today, the Lake remains the major link of the region to the rest of the country and the neighbouing Uganda and Kenya.

The problems in the existing transportation system which are to be explored in this chapter are linked with the past policies, but their solution, of course remain a challenge to the future.

3:2, THE EXISTING ROAD NETWORK:

3:2:1, Central Places:

In considering channels - or ways on which methods of transport operate - the most important type in the study area is the road. Primarily roads permit the movement of vehicles, at the same time linking various parts of a spatial system. The spatial system in the context of this work is the study area which is organized into central places of different sizes but almost similar functions and their hinterlands which in most cases overlap. It is indispensable that the central places be linked with their hinterlands and with each other so as to allow mobility of goods, people, ideas and information between them.

It is appropriate, therefore, to explore the nature and spatial organization of the central places in study area since they act as traffic origins and destination and

Table xxii

URBAN & RURAL CENTRE INVENTORY. 1976

URBAN/ RURAL CENTRE	ADMINISTRATION & ACCESSIBILITY				SOCIAL INFRASTRUCTURE				ECONOMIC INFRASTRUCTURE								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
BUKOBA	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	15
KANYIGO	■		■		■		■	■	■		■			■	■		8
KASHASHA		■	■		■	■	■	■	■	■							7
KYAKA	■	■	■		■	■	■	■	■	■	■						10
KATORO	■	■	■		■	■	■	■	■	■	■						9
IBWERA	■	■	■		■	■			■		■						7
IZIMBYA	■		■		■	■	■	■						■			7

ADMIN. & ACCESS

1. Ward or Division office
2. All weather access road
3. Bus route
4. Bus stand

SOCIAL INFRASTRUCTURE

5. School
6. Dispensary/Health Centre
7. Piped Water Supply

ECONOMIC INFRASTRUCTURE

9. Primary Marketing Post
10. Sub-whole sale facilities
11. Postal Services
12. Banking Services
13. Petrol and Garage
14. Small scale industries site & service Scheme
15. Grain Mill
16. Electricity

terminals.

At the top of the hierarchy is Bukoba town, the district as well as regional capital. It is the only major commercial centre in the district with virtually all whole sale trade located here. All exports and imports pass through this town. Being the only large urban centre is the only important market for food produce from its hinterland. On completion the Kemondo port in the south of the town will relieve Bukoba of some of its functions. It is when the district will have two urban centres and because of the good link between the two, urban sprawl is anticipated along the linking route. In fact some sprawl along the route has started at Rivamishenje and Kibeta. A Bukoba - Kemondo Urban corridor or complex will result along the road joining the two nodes.

Following in the hierarchy are 6 rural ~~agric~~ centres (designated so by West Lake Project)[56]. These are Kanyigo and Kashasha in Kiziba, Kyaka in Uissenye, Katoro and Ibivera in Katerero, and Izimbya in Rubale division, and their functions are shown in table XXII. The criteria employed in categorising these central placems into rural centres are:

The potential of the hinterland in terms of production, anticipated population distribution by 19 , the farm-centre travel distance and the existing infrastructure and economic activity.

At the bottom of the hierarchy we have numerous widely dispersed unclassified central places which because of their primary role is in marketing of agricultural produce may be called market centres. Each market centre has a periodic market, a coffee buying post and a number of shops. More than 75% of the traffic originating from farms is destined for market centres. Their role in marketing and transportation is, undoubtedly enormous.

The distribution in space of central places in the study area is by no means uniform. The more densely coastal and plateau zones have a larger number of central places than the outer zone. Because of the differences in density of central places a more comprehensive network of central places links has developed in eastern Bukoba, tending to enhance disparities in development within the district.

3:2:2, Roads: Classification and inventory:

All intra-district movement is by road. The district has a total road network of 639 km with road densities at 125 m of road per km^2 or 2,523 m of roads per 1000 inhabitants, which are below the regional densities of 130m/km^2 and 4,448 m/1000 people, but far above the national ones of 28 m/km^2 and 18885 m/1000 people. Comparative figures for neighbouring countries and all divisions in the study area are given in table XXIII.

Division	population	area(km²)	a.w.r.(km)	d.w.r.(km)	total length(km)	density	
						m/km²	m/1000 people
Bukoba – Kemondo corridor	16 000	248	30	65	95	383	5938
Kiziba	66 875	829	52	65	117	147	1749 5
Bugabo	24 150	348	34	20	54	155	2236
Missenye	42 260	1785	27	195	222	124	5253
Rubale	35 355	836	0	20	20	24	565.7
Katerero	68 675	1054	55	76	131	124	1902
Bukoba district	253 315	5100	198	441	639	125	2522.5
W L R	840 000	28 749	1329	1418	3736	130	4447.6
Tanzania	14 000 000	940 000	16 728	9 562	26 389	28	1885

source: 1: 50 000 Topo. sheets.

Table xxiii: Bukoba district: Road distribution and density.

On the basis of function, the MOW has devised a road classification system which when applied to the study area, the road inventory becomes (Table XXIV):-

Table XXIV: Bukoba District: Inventory of Roads

Class	National	Regional	District	Unclassified	Total
Length (km)	106	0	226	307	639

Source: 1:50,000 Topographical Sheets and Field Survey, Aug. 1976.

3:2:2:1, National Roads:

There is only one national road stretch running from the Uganda border through Kyaka, Bukoba, Kanazi and Biharamulo. Only 106 km of this road lies within Bukoba district. It is part of the western trunk (new international) road which crosses western Tanzania into Zambia. Nearly all traffic between West Lake and Dar es Salaam, at present flows along this national road.

This national road is of all weather standard. Nevertheless in exceptionally wet years (e.g. 1974) the road closed due to flooding between Kyaka and Bukoba town. Particularly affected by the intermittent flooding on this road is the transportation of sugar from the Kagera sugar factory to Bukoba for distribution, wood products from the Kagera Saw Mills in Missenye to Bukoba, the only major market product, and consumer goods from Bukoba town to all areas in Kiziba and Missenye divisions.

Except for the 15 km. stretch from Bukoba to Katerero which is bitumenised the road is of unengineered loose earth surface. The average width of the carriageway is about 6 metres, but because it passes through coffee-banana plantation which often reach its edge, and because of low geometric standard the sight distance along it are limited. As a result of this vehicles have to move at low speed in order to avoid accidents. The road is the only one with high traffic density (see 3.3) and owing to this and lack of proper maintenance severe surface potholing has result, which farther reduces the speed, causes uncomfort to passengers, inflates vehicle operating costs, and hastens vehicle wear and tear.

Being the only a.w.r. that runs in an east-west direction, all agricultural produce destined for Bukoba but originating from Missenye, Kiziba and parts of Bugabo divisions flow along it. Likewise, all agricultural inputs and consumer goods from Bukoba to these divisions flow along this road.

Since the decline of lake services in May, 1975 the road has been the only passenger outlet to neighbouring regions. International traffic on this road used to be very important especially after the construction of the Kyaka bridge on Kagera river in 1970. Political squabbles between Uganda and Tanzania have rendered the route insignificant as an international highway.

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3:2:2:2, Regional and District Roads:

Linking district centres to the regional centre or national roads are regional roads. In West Lake 394 km. (97 km. in Ngara, 297 km. in Karagwe) of the roads fall under this category. Next in the hierarchy are district roads whose primary function is to link rural centres to the regional road network. These are 1,214 km. of such roads in the region, 226 km. being in Bukoba district (see table XXV). 37% of the district roads in Bukoba district are a.w.r., bringing the total of a.w.r. in the district to 198 km., as shown by table XXV. Compared to the national standards,, where 63% of the roads are a.w.r. the district is far below this average. The problem of low road standard is not uniform over the shedy area. All roads in Rubale division. for instance, are d.w.r. whereas Bukoba sub-district, Kiziba and Katerero are better provided with a.w.r. It is important to note, however, that the areas served best by roads are the ones contributing most to the exports of the district. Map 13 shows a.w.r. and d.w.r. in the study area.

All district roads in the study area are single-lane and have unengineered loose earth surface. The carriageway width varies from place to place but the average is 3.5 m.

In addition to the classidfied national and district roads there are numerous unclassified roads totalling to 307 km. Like district d.w.r., unclassified roads, or motorable tracks are of unengineered loose earth standard with the

Road section	terrain	straight line distance, km(a)	actual road distance, km.(b)	$\frac{b}{a}$
Bukoba - Kyaka	rolling	45	52	1.15
Kanazi - Katoro	hilly	27	55	2.04
Katoro - Kyaka	flat	14	15	1 06

source 1: 50.000 topo. sheets

Table xxvi: Terrain & actual road lengths.

Road class	Bukoba	Muleba	Karagwe	Ngara	B'mulo	WLR
i national (km)	106	135	0	17	343	601
ii regional "	0	0	297	97	0	394
iii district "	226	185	317	264	222	1 214
iv unclassified "	307	369	325	226	300	1 527
v total "	639	689	936	604	865	3 736
vi a w.r. "	198	196	325	211	398	1 328
$\frac{vi}{v} \times 100$ %	31	28	34	34	46	36
%ge of population within 5km from awr	60	59	64	55	50	58

source: 1:50 000 topo sheets & Field survey

carriageway width averaging to 2.5 m. They are single lane, and are the genuine feeder roads linking farms to the market and rural centres. Upon them agricultural produce flow from farms to markets, yet they are in the worst condition.

We noted in chapter 1 that the study area is characterised, topographically by hills, ridges and valleys with flat or rolling ground in the north and north-west. Roads have to traverse land of varied topography. The outcome has been that nearly all roads meander on slopes and in valleys, tending to be longer than the actual (straight line) distances, say between two central places. In table XXVI a comparison is made between actual road lengths and straight line distances between selected points. In hilly topography the actual road distance is more than double the straight line distance. The costs of construction of such a road must have, also, been more than double, if it was constructed in flat topography. Besides increasing construction costs the hilly topography reduces vehicle running $\frac{AP}{S}$ speeds portrayed by table XXVII. It is no wonder, therefore, that the physiography of the district has been a significant factor in hindering transport improvement in the district.

3:2:2:3, Terminals:

Apart from the problems of poor road surface, alignment and carriageway width is a problem of lack of terminal facilities in the road network of the district.

Road section	Conditions	length (km)	average speed (km/hr)
Bukoba – Kyaka[a)]	fair gravel surface., fair alignment, rolling terrain, average width 7-8 m	52	52
Kanazi- Katoro[b)]	poor earth ,, ,, ,, hilly ,, ,, ,, 3-4 m	55	40
Katoro - Kyaka [b)]	,, ,, ,, ,, ,, flat ,, ,, ,, 3-4 m	15	60

sources: a) Kagera Report TRANSPORTATION
b) Field survey

Table xxvii: Travelling speeds for various road conditions.

Owner	number	capacity	Owner	number	capacity
BCC	16	139 M-tons	TCB	23	203M-tons
RTC	3	21 ,,	NGARADECO	1	8 ,,
NARCO	1	7 ,,	NMC	3	30 ,,
TTA	1	7 ,,	NACO	1	7 ,,
BUDECO	1	7 ,,	TAPA	1	7 ,,
OTHERS	366	880 ,,	TOTAL	429	1460 ,,

source RTLA

Only Bukoba town has some terminal facilities in form of a bus station which, however, is of low standard surface. During rains the station becomes flooded as it lacks proper drainage while in the dry season it becomes very dusty causing uncomfort to passengers waiting to board buses. The bus station is located in the centre of the town permitting people from rural areas to travel short distance within the town. The station has space which allows parking of twenty buses at a time and a tax-park. Attached to the station is a passenger waiting lounge of capacity of 200 - 300 people. It provides protection from rain and sun to passengers awaiting to travel. There is also a restaurant, a bar and toilet facilities. The bus station, however, lacks facilities for luggage and commodity storage. These were not provided probably because of fear of turning the station into a market place, since the distance between the market and the station is substantial. It may be recalled that some food products for Bukoba market from farms arrive by bus and are unloaded at the bus station. They have to be transported from here to the market place about 800 m. away. Handcarts, bicycles and seldom taxes are utilised to deliver bulky produce to the market. Theis distance, therefore, represents costs that are de facto met by farmers. In the final analysis this bus-station - market transport costs lower the farmers'real income and thence ability of farmers to invest into agriculture. The rural and market centres in the district act as bus stops. Here passengers board buses while others alight, and farm produce for Bukoba market is loaded.

To date there are no shelter provided in these quasi-bus stations for protection form rain and sun and for temporary storage of luggage and farm produce. The location of periodic market places in relatiðn to quasi-bus-station in rural and markte centres is, in contrast to Bukoba town market - bus-station relationship, favourable. The bus stops have naturally located near the markets where most of the loading of farm produce takes place.

A bus station has been planned for Kemondo Bay Port and construction has commenced. It will be of greater capacity and high surface standards, and will be located next to the planned market. The locational era evident in Bukoba town which is a menace to farm produce mobility to the market has at least been avoided. On completion of construction of the port the population in the area is expected to increase thereby providing another market for farm produce. Since the market will be located near the bus station there will be no costs incurred in moving goods from the latter to the former. The farmers will cotesis pasilus get higher return for their produce at Kemondo than at Bukoba.

3:2:2:4, Connectivity:

The concept of density as applied in the study in 3:2:2 Provides some idea on accessibility of different parts of the district to road but gives very little idea on connectivity, i.e., how and to what extent different parts of the district are connected to each other by roads.

Map 13 shows rural and important market centres, and the roads that connect them. There is only one a.w.r. running in a north-south direction, the other one being in Karagwe, i.e., the Kayanga - Rulenge road. The two roads are connected by only one east-west a.w.r., the Bukoba - Kyaka road which sometimes floods. The presence of swamps have been responsible for lack of east-west links, and as a consequence, limited movement and trade between rural centres takes place, leaving Bukoba town to monopolise the agricultural produce trade. A rural centre requiring farm produce from a neighbouring one has to travel first to Bukoba town and then to the neighbouring centre. The routing of buses has tended to enhance this circuitous movement as will be explored in 3:3.

3:3. ROAD TRAFFIC

3:3:1. Vehicle Fleet: Size and Capacity:

The motorisation history of Tanzania is rather short. Just before World War there were only 26 motor vehicles. The number had risen to 8,000 in 1947 and 84,000 in 1970 indicating a tenfold increase within about twenty years. The latest figures for 1972 show that there were 94,000 vehicles at that time (see also table XXI), the equivalent of 145 people/vehicle (cf Kenya 80 people/vehicle). The growth rate of the vehicle fleet has in recent years dropped from an average rate of 8.9% annually during 1962 - 66 to only 3.5% annually in 1970 - 72.[57] The government-owned fleet has been growing three times faster than the privately-owned fleet. In 1972 passenger

cars represented about 40% of the privately-owned fleet, light commercial vehicles 17% and heavy duty vehicles and buses 22%. For the transportation of farm produce the latter two are more relevant than the former.

Unfortunately there are no adequate data on vehicle fleet parallel to the national ones for West Lake Region or Bukoba district. Scanty information from the Central Registry ofMotor Vehicles show that there were 169 new registrations in 1966, 114 in 1967 and 144 in 1968, in West Lake Region [58]. The total number of vehicles in the region was only 2,120 vehicles (i.e. 3.2% of the vehicle fleet in Tanzania), or 311 persons/vehicle.
Growth rates of vehicle fleet for Tanzania as a whole range between 3 and 7% [59]. Recent economic trends in Tanzania and West Lake Region and the current restrictions on the import of motor vehicles, the use of petroleum suggest a long term growth rate towards the middle of this range, i.e, 5%.

436 heavy and light commercial vehicles of total capacity of 1,500 tons were licenced by the R.T.L.A. to operate in commodity carriage in West Lake Region. Table XVIII shows that 378 (88%) vehicles with capacity 1,024 tons were owned provately by more than 20 operators. The fleet has shoen domr invtrsdr gtom 104 with capacity of 543 tons in 1967 and 65 with capacity of 400 tons in 1969. The increase in the capacity to the present level has by no means alleviated the farm produce transportation in terms of both availability and cost for the capacity of fleet has

increased the level of production for marketing and the demand for farm inputs and consumer goods has gone up at a higher rate.

Vehicle fleet for passenger travel have been declining in both quality and quantity. Whereas 76 buses with a capacity of about 4,260 seats were licenced in 1970, 41 buses of a capacity of about 2,460 seats, and 37 buses of capacity 2,220 seats were licenced by the R.T.L.A. in 1974 and 1976 respectively. Today 1 bus seat serves 378 people while it served 174 people in 1970, reflecting deterioration not only in passenger transport, but also in food produce transport which relies heavily on bus services. The outcome of this deterioration is that many passengers do not get buses on the nearest roads on the days they require them or have to wait for many days before geting a bus. In many cases when the buses come, they are already full leaving behind many would-be passengers. The problem is felt more by rural or market centres that lie between origins of buses and Bukoba town. In the similar manner alot of food produce, most of which are perishable are left behind to be marketed at very low proces or to rot. Owing to low bus capacity, there is congestion in virtually all buses resulting into uncomfort rapid wear and tear of vehicles and peril to life. Vehicle fleet that connects the study district to neighbouring districts and regions is, like the fleet for intra-district mobility, small.

One privately-owned bus of capacity 65 passengers serves once everyday between Mwanza and Bukoba. It is in fact only reliable bus connecting the two centres. Several other buses serve between Bukoba and Mwanza at irregular intervals because of frequent breakdown and, as the owners claim lack of spare parts to keep buses in working condition. There is no direct bus service between Bukoba and other regional ~~capitals~~capitals. Passengers intending to travel to Dar es Salaam, for instance, have to change buses at Mwanza which constitutes loss of time and uncomfort since it involves shift of luggage from one bus into another.

Bukoba town is linked to Karagwe by the Kyaka - Kayanga road. Serving on this route are three buses of a total capacity of 180 passengers each of which makes one trip everyday save on Sundays. Connection to Ngora is by only one bus which passes through Kayanga and Kyaka. Biharamulo is along the Bukoba - Mwanza road. All traffic between the two towns passes through it, but because of the large number of passengers travelling between the two ends, bus operators are unwilling to transport passengers alighting at Biharamulo. Moreover, buses originating from Bukoba or Mwanza are filled before the start of the journey so that when they reach Biharamulo they cannot pick more passengers. Since only one bus originates from Biharamulo to Bukoba, passengers ~~are~~ have to wait for days. Muleba District is better linked to Bukoba by buses, but as a rule

all have to go to Bukoba town, leaving intra-district in poor condition. In total 11 buses with 600 passengers capacity ply daily, except on Sundays, between Bukoba and Muleba District.

3:3:2, Traffic Density:

Remarks about traffic density and traffic flows depend decisively on the completeness and quality of traffic counts that are taken [60]. Such counts are an important foundation for any rational planning of road transport. Such counts have been taken on major roads in the country since 1930s. No traffic data directly derived from traffic counts exists for the entire network in West Lake Region. Data given in this work are only estimated from various sources of information.

Road traffic volumes in West Lake Region are low compared to volumes on roads elsewhere in Tanzania [61]. Map 15 shows that apart from the Uganda border - Kyaka - Bukoba - Biharamulo road whose ADT exceeds 100 v.p.d. on some segments, other roads have very low ADT values.

The data on Map 15 does not undfortunately reflect seasonal differences in traffic density. From interviews with the officials in the regional office of the MOW it may be infered that during rains when a large proportion of roads become slippery and alsmost impassable ADT drops, but during the dry season when roads are in relatively better condition and also the peak for coffee harvest ADT rises.

The dry season is also when the farmers' income from coffee can enable them to meet transport costs. An evidence for this assertion is congestion in buses in the dry season, and a slump during the wet season.

As population grows more areas in norther and western parts of the district become opened for settlement and agricultural activities. Ngono-Multi-Purpose project which entails reclamation of swamps will induce agricultural activity in the drained areas. Both of these changes will dictate opening up the areas by road in order to faster their accessibility if marketing of the produce is to be effected. In short future ADT will depend upon the intensity of activity in newly opened up areas, the income realised through opening these new areas and many other factors.

3:3:3. Commodity Flow:

It is a difficult task to present an accurate picture of commodity flow between market and rural centres on one hand between market centres and farms on the other hand. It is worthy recalling that marketing of coffee, and food produce are located in market and rural centres and Bukoba town. Farmers transport their produce on foot or bicycles following motorable as well as unmotorable tracks, in most cases following the shortest possible distance. Moreover no official data exist for marketing most food products in periodic markets. The commodity flow between rural and market centres and Bukoba town is not as

difficult to sketch as flow from farms because marketing statistics for important crops from rural and market centres exist and provide important guide.

Preponderant in movement of commodity between farmsteads and marketing/rural centres is porterage. While commodity movement ~~bwt~~ between these places do not exert any significant pressure on the existing vehicle fleet capacity, it represents a problem - alot of time and labour that could have been utilised in productive work is utilised in moving commodity to markets. Nevertheless, a change in the near future from porterage to motor transport from the homestead to the market/rural centres is not envisaged.

The movement of farm products between rural and market centres is towards Bukoba town for two reasons. Bukoba is the only large market for food produce. In order to reach this market the produce has to be transported from the production areas. Secondly, virtually all exports crops are exported through Bukoba port.

Map 16 shows the pattern of flow of important cash crops on major routes within the district and from neighbouring districts. Carrying the largest volumes of commodity are the Kanazi - Bukoba and Kyaka - Bukoba stretches because besides carrying produce originating within the district carry commodity from neighbouring districts. If road improvement programme has to be instituted, these two roads would receive highest priority.

These stretches are sheduled for improvement engineered bitumen standard during the current plan period. This will facilitate faster transport of the commodity.

The exploration of imported goods flow is made difficult by the fact that distribution of goods from Bukoba town involves numerous retailers. Secondly, there are no records of the parts to which goods are sold at rural and market centre levels. A rough picture of the flow at least to rural centres can be attempted on the basis of income and population. Since all wholesale trade is the monopoly of NTC based in Bukoba town all movement of imported goods and some of locally manufactured goods originate from Bukoba town. High income, dencely populated Kiziba and Bukaba sub-district areas attract more goods. The Bukoba - Kyaka road, therefore, carries large imported goods volume. All goods destined for Biharamulo and Muleba and some of it for Ngora district flow along the Bukoba - Biharamulo road resulting into large volume along this road. Similarly, the Bukoba - Kyaka stretch carries goods for Karagwe and Ngara districts. The volume of the flow is, therefore, large. Other roads within the study area do not carry large volumes of imported goods.

Roads that carry large farm produce volumes are the ones which carry large volumes of imported goods into the interior strengthening the need for improvement of these roads and offering better vehicle services on these roads.

Coffee, being the largest user of the vehicles in the district is not transported throughout the year. During the peak of harvest season (which is also the dry season) it is when large volumes of the commodity flow on almost all roads in the district. The volume drops during the rainy season. All other commodities are transported throughout the year. In a nutshell, there are seasonal fluctuations in volumes of commodity flow following closely the harvest season of coffee.

3:3:4. Passenger Flow:

The lowest level at twhich passenger flow may be considered is at homestead - rural/market centres for medical, educational, commercial and other purposes. Movement between homesteads and rural and market centres is mainly on foot and by bicycle. 60% of households in the study area possess bicycles which reduce travel time four-fold the travel time on foot on flat terrain.

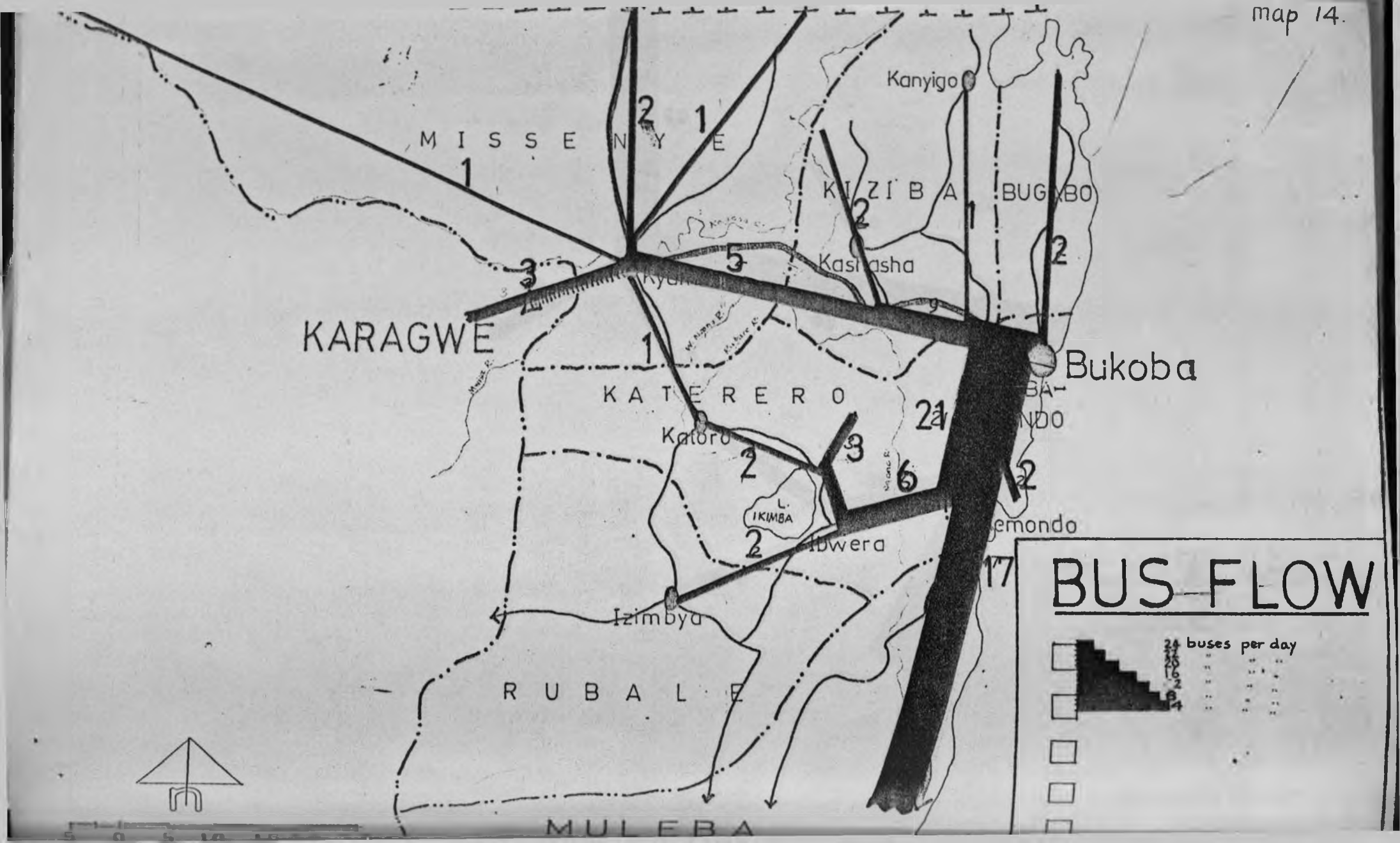
The distance between homesteads and rural/market centres is variable within the district. Because of this distance and time spent in trips to economic centres also varies. 52% of the population are within distance of 2 km from nearest market or rural centre while 23% is in a distance of more than 6 km. Only 3% is in a distance exceeding 10 km. The average distance for the whole district is 3.5 km.

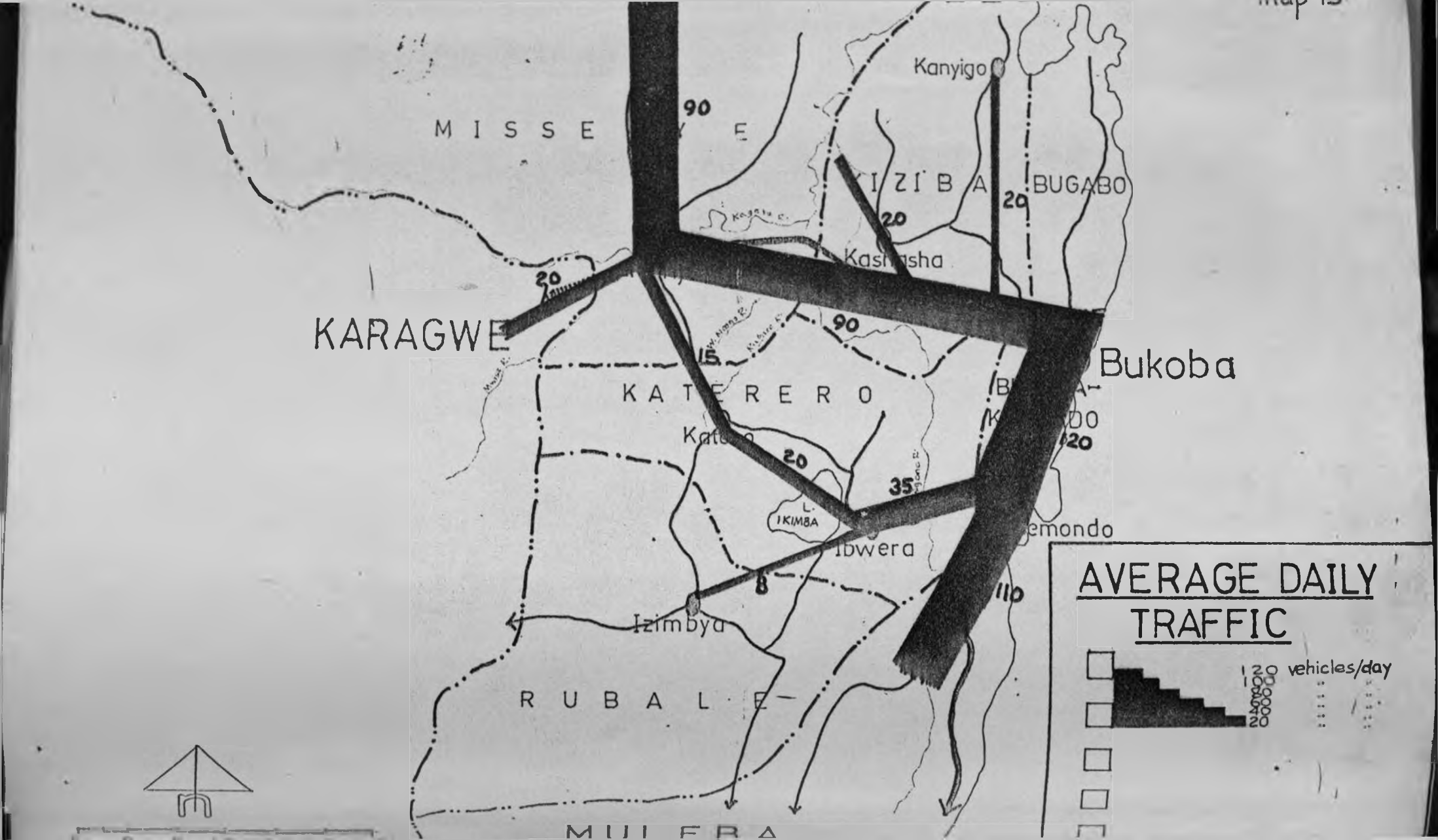
Passenger flow from rural and market centres to rural market centres in other locations or to Bukoba town is determined by the pattern of bus routes. In fact all buses originating from rural or market centres end in Bukoba town, so that there is virtually no inter-rural/market centre links except when buses pass through a centre on its way to or from Bukoba town. As a result exchange of goods between rural/market centres is limited.

Map 14 shows bus routes in the study area. Along the roads with a greater number of buses i.e. Bukoba-Mulebaa and to a lesser extent Bukoba - Kyaka road carry the largest passenger volumes.

All passenger movement in Bukoba district start early in the morning so that by around 18.00 hours (EAST) buses have returned to their origins - i.e. rural or market centres. During the night, therefore, intra-district passenger flow is almost non-existent. This is why after 14.00 hours (EAST) there are hardly any buses at Bukoba bus station. It is important to note, also that 93% of the licenced buses make only one trip daily, except on Sundays when they do not at all operate. This implies that those who miss the only trip because of either lateness or lack of seats in the buses (all buses travel over capacity) have to wait the following day. Passengers reaching Bukoba town from outside the district, e.g. Mwanza have to remain in Bukoba town till next morning when they can board buses to their respective rural or market centres since buses in the

map 14.


MISSENYE
KIZIBA
BUGABO
KARAGWE
KATERERO
RUBALE
MULEBA
Kanyigo
Kasharasha
Bukoba
Kaloro
L. IKIMBA
Ibwera
Izimbya
BUS FLOW
buses per day


Kanyigo
MISSE
IZIBA
BUGABO
Kashasha
KARAGWE
Bukoba
KATERERO
Kato
IKIMBA
Ibwera
Izimbya
RUBALE
MULEBA
90
20
15
35
8
110
AVERAGE DAILY TRAFFIC
vehicles/day

Unnecessary use of oil products had to be restricted. In 1975, the government introduced restrictions on petroleum sales in order to reduce unnecessary use of it. Drivers were not to buy petroleum in containers but would fill their car tanks. Moreover, instead of selling petroleum for twenty-four hours on all days as it used to be, petrol sales had to stop at 9p.m. on weekdays and no petroleum would be sold on Saturdays and Sundays. Of course, this policy contributed alot in saving foreign exchange but led to a chain of transport problems. A majority of Tanzania depend upon public carriers and buses. The restriction on fuel sales, therefore, could have been effected on private cars which are classified as luxury goods.

Further to restrictions on petroleum sales an order with similar objectives was issued that no driving was allowed on Sundays and public holidays from 2p.m. to 11 a.m. on the following day except for buses and other heavy commercial vehicles. In West Lake Region this had impact not so much on rural population but on urban population. A majority of Bukoba town dwellers come from within the district. On weekends they get an opportunity to visit their homes, but because of driving restrictions they are not able to do so.

4.1 INTRODUCTION

The first impression of the study area one gets on observation of the teeming mass of head-loaded pedestrians, occassionally punctuated by cycclists, might suggest that the main occupation of the people is moving themselves and their goods on dusty and muddy tracks. The observation, moreover, confirms the preponderant position porterage still holds in rural transportation. The diseconomies of porterage are well known and no doubt have contributed to the lag of economic development that Bukoba district has experienced in the past few decades. It requires for example, large quantity of human energy which can only be derived from a balanced diet, yet it is the slowest of all modes of transportation.

Fortunately, porterage is confined to short distance mobility, mainly within villages and between homesteads and rural or market centres. long distance movement of the people and their goods is by wheeled transport, the quality of which is determined by the condition of roads and vehicles, and the degree of efficiency with which the whole transport industry is managed and organised. But both the roads and the vehicles are not in satisfactory condition to guarantee safety, speed, convenience and comfort. Moreover, the transport facilities are not put into use in the most rational manner. The transport industry requires some reorganisation in order to secure better services from it. Before examining some of the implications of the shortcomings in transportation on the district agricultural development a review of these inadequacies is commendable.

4.2 TRANSPORT INADEQUACIES

Bukoba district has a total length of 639 km of classified and unclassified roads, more than half of which are of d.w. condition. The district road density is therefore 125 m/km^2 or 2523m/1000 inhabitants, one of the lowest density in the country. The district has a road network which is such that it provides limited spatial integration of the productive zones. Some of the rural and market centres situated in productive hinterlands are not linked to each other so that exchange of goods and ideas between them is limited.

The problems caused by an inadequate road network and poor connectivity would have been less pronounced if the condition of the roads was satisfactory. A majority of them are single-lane, severely potholed, poorly aligned and entirely lacking storm drains. When it rains they become muddy and slippery. As a consequence vehicular movement is slow, has limited safety, is uncomfortable, unreliable and costly (see Fig.5). Moreover, the wear and tear of vehicles is hastened making repair and maintenance costs and road-user charges in general exorbitant.

If the road surface condition and alignment problems are to be alleviated a number of natural and man-made obstacles will have to be overcome. Leading in impending improvement of roads in West Lake are problems imposed by the unfavourable physiography and climate. In construction and maintenance of the network a formidable combination of hills, rivers, swamps and too much rain have to be coped with. The task of providing n.w. transport becomes burdensome to the finances, since a large proportion of the regional financial resources have to be devoted to the task of penetrating hills, valleys and swamps in an attempt to provide access to all parts of the district.

With problems linked with the road network solved one would expect to have an efficient transportation system. This, however, is far from reality, for the problems associated with the vehicle fleet size, capacity condition and management, are perhaps more frustrating. First, the passenger vehicle fleet (buses) is too small to meet the present and future passenger transport demand.

In recent years this fleet has been declining (see 3.3.1) dashing hopes of attaining better passenger services in the near future. The same fleet is used in the transportation of some of the food products from rural and market centres to Bukoba town. The continuing decline of the bus fleet has led to the decline in the flow of food products to Bukoba town causing shortages in some foodstuffs in the town (especially bananas, fruits and vegetables).

Depending on the same fleet are some rural shopkeepers in transporting some of the shop supplies - e.g. sugar, tea, coffee, kerosene, etc. from Bukoba town to the rural areas. A recent decline in the bus fleet capacity has caused a decline in the volume of goods flowing from Bukoba town to farms, thereby causing shortages in some of the rural and market centres of some goods, as demonstrated by the field survey.

The commodity vehicle fleet, on the other hand, has been growing but at a slower pace than agricultural production of the hinterland of Bukoba town (see tables xxi and xii). Some operators of the commodity fleet have not been able to cope with the quantity of goods they are licenced to transport. RTC which monopolises the distribution of goods in the region has small vehicle fleet which does not satisfactorily transport the supplies to the sub-wholesale shopes in the district and rural centres. NMC which monopolises the collection of non-perishable products like legumes and grains from rural and market centres to Bukoba marketing for processing or redistribution has, also an insufficient truck fleet. As an outcome some of the food products remain uncollected in rural areas for too long, leading to spoilage.

The major problem tending to render the vehicle fleet insufficient is lack of coordination between operators, thus sometimes duplicating services on a single route. The case of RTC, TCB and NMC cited in section 3.7.2. verifies the assertion. As the burden for transportation of goods increases, greater coordination among vehicle operators becomes more indispensable.

The problems of inadequate road network and vehicle fleet, as mentioned earlier, owe their origin to both natural and man-made factors. The natural limitations e.g. physiography, climate etc. have been discussed. One of the principal man-made obstacles to transportation improvement is the combination of policies made from time to time seeking to solve problems in one sector while creating others in another sector. In recent years a ban on sale of petroleum and driving on weekends was enforced all over the country in order to minimise and rationalise

petroleum consumption so as to save the foreign exchange. Evaluated in the light of its objective, the policy is a success. It has, however, created some problems in the transportation field. We noted, for example, in Chapter 4 that nearly all buses in West Lake Region do not operate on Sundays. All passengers originating say from Kwansa and reaching Bukoba town on Sunday have to spend one or more nights in Bukoba town before reaching their destinations. Similarly rural people cannot reach Bukoba town on Sundays. There are some other policies, too, which have tended to constrain the transport system. Every bus operator is assigned a specific number of trips on a specific route per day. Usually one trip per day is permitted to the operators, meaning that the operator may not make another trip even if there are enough passengers to make an extra trip profitable. This policy dis designed to eliminate unnecessary intra-modal competition, which as already shown does not exist in West Lake Region.

Another frustrating obstacle to transport improvement is lack of enough financial and skilled human resources. The MOW cannot adequately maintain and improve the existing roads and the government-owned vehicle fleet because it is not able to meet the costs. Moreover, the MOW requires maintenance plant which require heavy financial investment - in reality foreign exchange. The Ministry also requires well trained personnel especially engineers. It is difficult to embark on training programmes without enough finance to do so. At present only a small team of man-power skilled in road construction, improvement and maintenance is found at the regional level. Some of the roads in the district are maintained by the rural population on a self-help basis. Their efforts cannot bear fruits without a helping hand from the MOW in terms of provision of advice and the necessary plant. Again financial difficulties, coupled with lack of skilled manpower, prevent the MOW from rendering a helping hand to local endeavour.

If transport has to be improved, the natural and man-made obstacles brought to light in the foregoing discussion will have to be overcome. The financial burden, however, will be too heavy for a regional economy which is heavily reliant on agriculture. At any rate if the regional economy is to bear this financial burden, the agricultural sector will have to be more productive than ever before. The question to be posed is: Can the agricultural sector be more productive under such transport inadequacies as existing today? The next section attempts to answer this question.

4.3 SOME OF THE IMPLICATIONS TO AGRICULTURAL DEVELOPMENT

4.3.1. General

"The process of development has many components and no one of them is sufficient in itself to bring about the improvement of living conditions that people and nations everywhere are striving to achieve. Better health and education, the discovery of resources, greater industrialisation, better organisation and administration and willingness to accept new ideas are some of the factors that together foster development and offer the promise of a more satisfying life."[64] Transport, however, has an ad hoc significance because of its pervasive role in facilitating other objectives. It is an ingredient of nearly every aspect of economic and social development,[65] and in many instances it plays a key role, and in all cases it sets a limit.[66] For the agricultural sector the limits are clear and obvious. Where transportation is poor, problems of supply of inputs impede agricultural production. Large tracts of arable land remain idle and cannot be adequately exploited. What has been produced on farms cannot easily reach markets, and for this reason farmers would lose interest in surplus production when they well know that what they grow cannot be moved to markets.

The objective of this chapter is to examine some of the implications of an inadequate transportation system on agricultural development with particular focus on Bukoba district.

4.3.2. Transport and the development of export trade

Before the building of the Central railway and the inauguration of the Lake Victoria water-way transportation between Bukoba and the coast was by porterage. A single trip lasted for months limiting the number and quantity of goods that could enter or leave the district. Inputs that could improve agriculture, for example fertilisers, plant protecting chemicals etc. hardly entered the district. As a result agriculture remained in a traditional subsistence form.

The building of the railway and the inauguration of the lake services in Lake Victoria changed the picture radically. The travel time from Bukoba to the coast was reduced from months to 48 hours, and a wide range and large quantities of goods started to flow between the coast and Bukoba. Agricultural output could now be transported for export, and goods produced in other parts of the country or imported from other countries could now reach Bukoba. The improvement of transport through railway construction and provision of lake services brought about economic transformation of the study area. Bukoba, an agriculturally productive zone and a market for manufactured goods became linked with a variety of world markets. This transport improvement, however, did not mean much to inter-regional trade in the country.

Besides promoting coffee production for export, transport improvement facilitated the penetration of some innovations, ideas and information from the outside into the district. Today internal mobility remains difficult yet the diffusion of innovations, ideas and information that can directly influence agricultural production depends upon it. The people in the study area continue to employ traditional methods and technology in agricultural production, despite the scientific inventions going on in the world.

4.3.3. Transport and Agricultural Specialisation

Bukoba district is differentiated, as shown in chapter 1, into three major zones, based on physical and socio-economic environmental conditions, each of which is suited to the growth of one or more crops. The central swampy plains in outer and plateau zones, for instance, are suitable for crops that require high soil moisture content. Crops like sugar cane, and rice would thrive well in this zone. The hilly, well-drained eastern and north-eastern parts (Coastal zone) would fit the production of crops that do require well drained soils. Crops like tea, legumes, grains and coffee would thrive well in this zone. In fact all the tea produced in the district today is grown in this zone.

On the other hand the rather dry western wooded grassland plains in outer zone would favour the growth of grains, root crops, legumes, bananas, coffee and ranching.

At present the differentiation into zones has not been taken advantage of in agricultural production planning. Each zone has tried to produce everything, at times at marginal or nil profit. This is to say that no ecological zone has specialised in one crop or a combination of crops. Specialisation, however, could not have been possible without a viable transport system, one which provides or guarantees maximum connectivity and accessibility to all zones. A network providing connectivity and accessibility is a pre-requisite to specialisation. It permits exchange between zones of agricultural produce since one zone acts as a surplus producer of certain products and at the same time a market for other produce grown in adjacent zones.

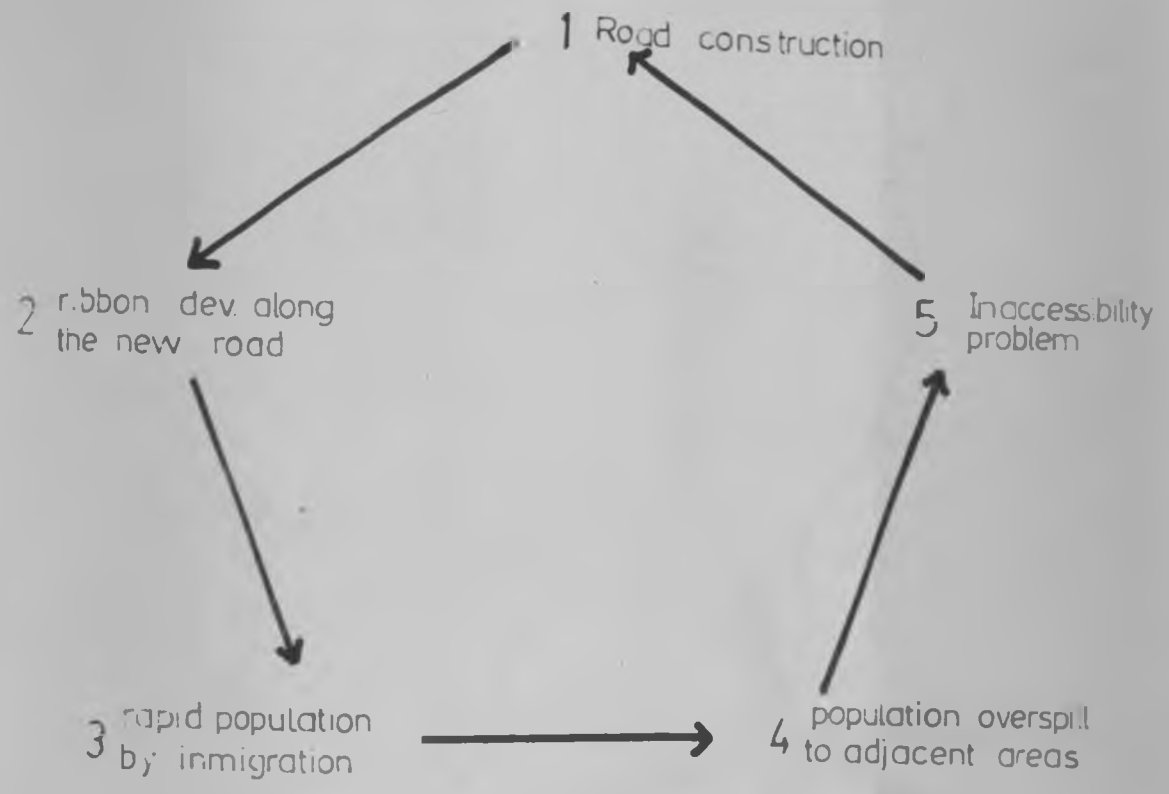
One of the weaknesses in the transport system of the study area is poor connectivity. As an aftermath of this weakness very limited interaction between different productive areas of the district takes place. Farmers in each part of the district strive to produce a little of everything in order to satisfy family requirements and probably retain some surplus. The farmers know too well that in the wake of shortages of certain crops,

sparked off say by bad weather, plant diseases or other physical catastrophes it would be very difficult and costly for them to secure deliveries from neighbouring zones owing to high friction of distance that transport has so far failed to conquer. Through the system where a farmer tries to be self-reliant by producing everything he does not optimise production by taking advantage of the favourable physical conditions. The yield per unit land area, per unit time, per capita remains low.

4.3.4. Transport, Agricultural and Settlement Patterns

The relationship between road networks, settlement pattern and location of agricultural activities has been of major concern to geographers, economists and other disciplinarians. An unlimited number of empirical studies that have been carried out in trying to derive and quantify this relationship have shown that construction of a road joining two growth nodes soon attracts settlement along it, provided it passes through a physically unconstrained tract of land.[47] Soon linear type of settlement merges along the road, and in rural communities, the activities that accompany this settlement are agricultural in character. As years pass the population in the new settlement continues to grow either naturally or through further immigration or both, necessitating increased agricultural production through either intensification or opening new land just away from the road. In developing countries where modern technology has not penetrated the agricultural systems, increased production is usually achieved through increasing acreage. Further cultivation takes place on the periphery of the land cultivated in the first phase of development. This trend of development produces two interesting phenomena. First, the number of homesteads per unit area of land declines as one moves away from the new road link, and second, as one moves away from the road the farm size for a single household increases. The events sparked off by a new road link does not terminate at the accentuation of farmland. The populations in the expanded farmland and in the settlements established in the first phases continue to grow pari passu and

a) CYCLE



b) DIAGRAM

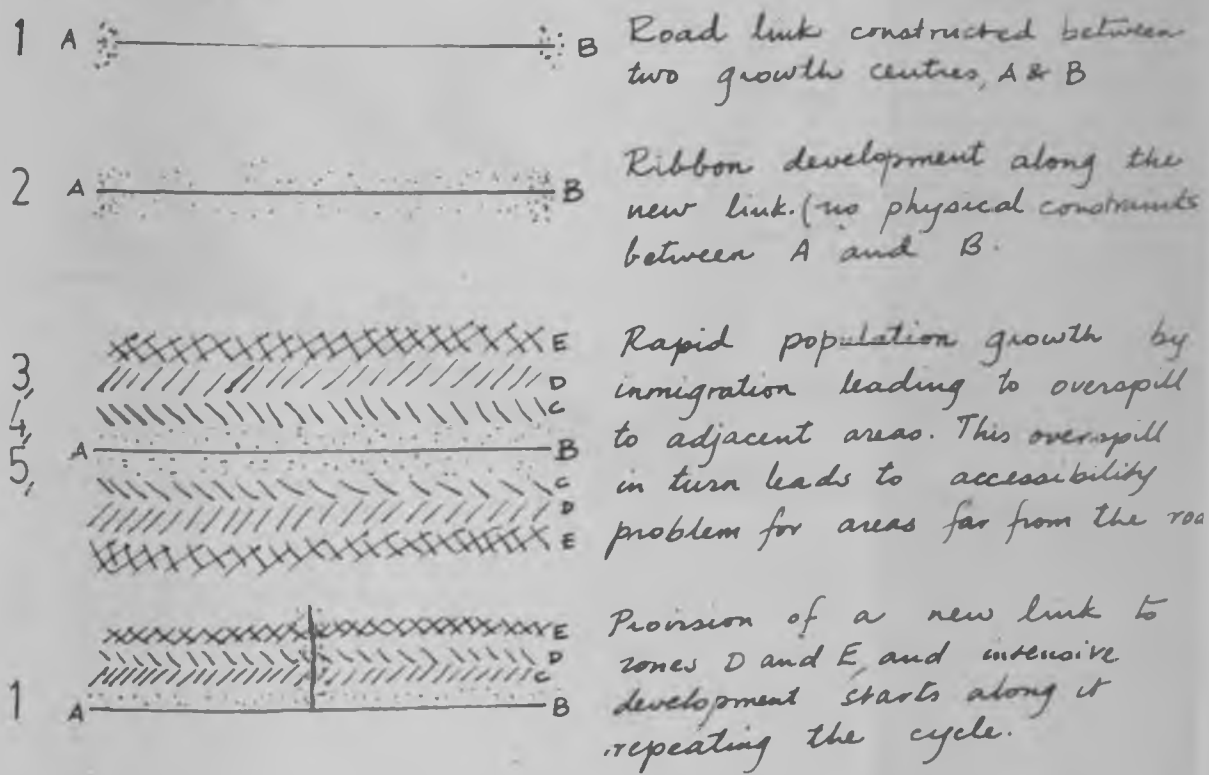
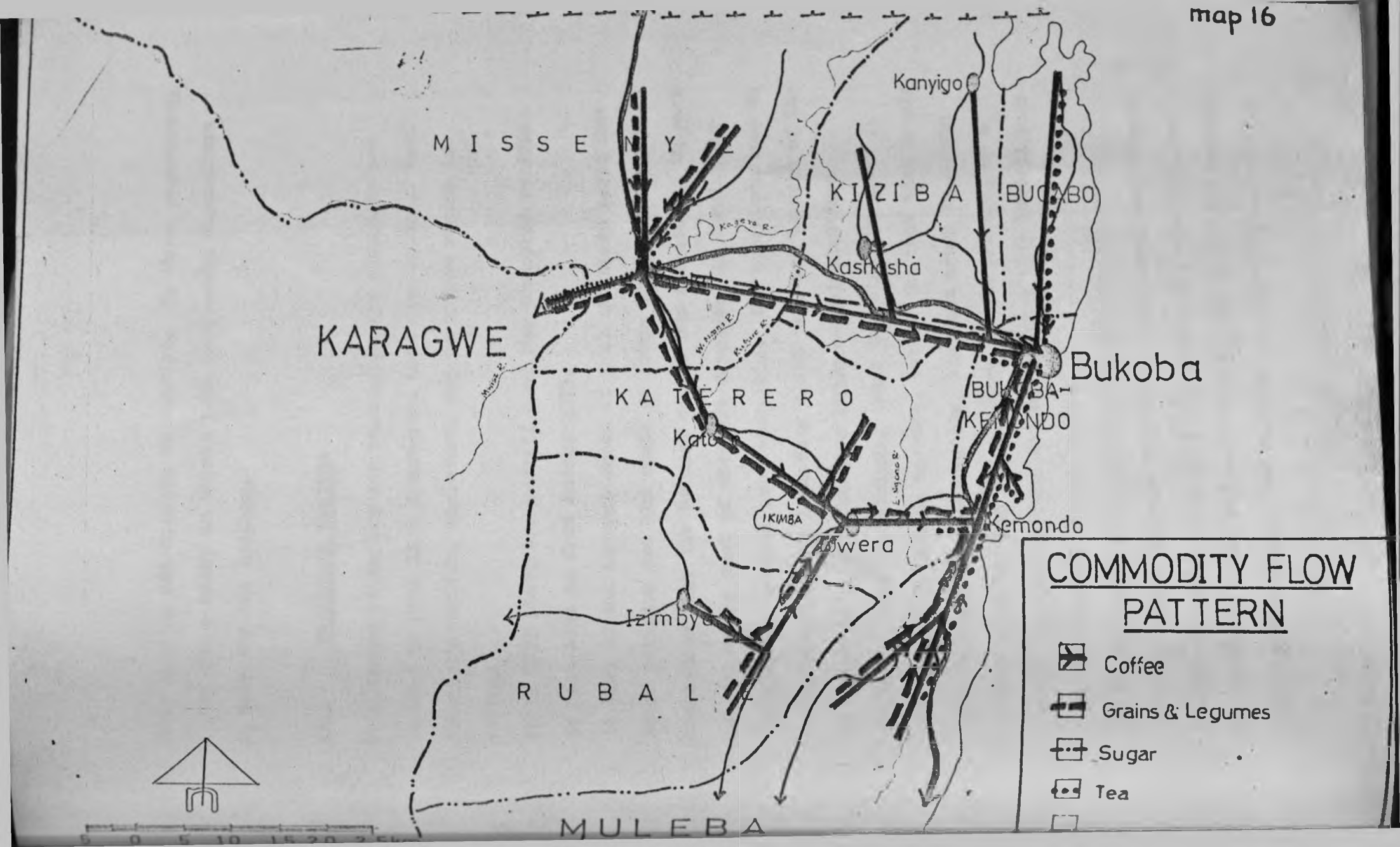


Fig.7: Settlement Development Model.

map 16


Kanyigo
MISSENYI
KIZIBA
BUGABO
Kashasha
KARAGWE
Bukoba
KATERERO
BUKOBA-
KEMONDO
Kato
L. IKIMBA
Kemondo
Kowera
Izimbya
RUBALE
MULEBA
COMMODITY FLOW PATTERN
Coffee
Grains & Legumes
Sugar
Tea

study area do not operate on Sundays. To these passengers, a stay for a night in Bukoba town represents expenditure on boarding and lodging.

3:4, TRANSPORT TARIFS:

Road transport tarifs for passengers and commodity are decided by RTLA in a frame-work laid down by TLA. Road transport tariffs, therefore, may vary from region to region.

Table XXIX shows the variation of bus transport tariffs in West Lake as from March, 1975.

In view of the current costs of fuel and spare parts for motor vehicles and the state of roads these tariffs are considered very low by most of the bus operators. On part of passengers most of whom are dependent on farming for income, the tariffs are reasonable. Bus operators tend to compensate for the loss they claim they get because of the low tariffs by overcharging luggage-including farm produce. This overcharging tends to raise the price of the produce on Bukoba markets, but at the same time people lose interest in transporting the food crops to Bukoba at high cost but low price. More of the produce, as a result, remains on farm too not because they control bear high transport costs on buses.

It is difficult to generalise tafiffs for commodity transportation because tariffs are differentiated according to distance, type of local transport, condition and standard of roads and according to the chance of obtaining a return load. The tariffs are, therefore, variable

Distance (km)	0 — 160	161 — 320	321 — 960	961 — 1600
Tariffs (cts/km)	8 75	8 125	7·5	6 875

source: RTLA

Table xxix: W.L.R: Bus Tariffs.

Transport Element	Total cost '000 Tsh.		%ge of total cost		cost/ton Tsh		cost/ton·km Tsh	
	a	b	a	b	a	b	a	b
Bukoba Port	400	780	8	8	32	32	2.8	
Lake transport Bukoba - Mwanza	620	1540	15	15	50	62	2.8	3.4
Mwanza Port	400	780	8	8	32	32	2 8	
Rail transport Mwanza - DSM	2460	4620	48	48	200	186	1.6	1.5
DSM port	640	1 280	13	13	54	54		
Others	38	280	8	8	30	32		
TOTAL	4900	9 780	100	398	398			2 8

a = exports, b = imports.

source: Kagera Report: TRANSPORTATION, tables 3·6, 3·7

Table xxx: Estimated Transport costs of goods via Bukoba Port, 1975.

even within a region and for different commodities.

130 cts per ton-km is charged for coffee and 115 cts per ton-km for other commodities within the region. Comparatively, the tariffs in West Lake are higher than anywhere else in Tanzania, reflecting the nature of the problem embraced in the whole transport system.. In the final analysis it is the farmer who meets these costs from the revenue derived from agricultural production. This supposition is supported by figure 5 which shows that as high as about 40%, of 25% and 60% of the proceeds from coffee, bananas and tea respectively may be spent in meeting transport, marketing and processing costs. Payment of high transport costs reduces the farmers' financial capital which may be invested into agriculture.

Tariffs for lake and railway transport are comparatively low, but they represent a high proportion of total production costs in agriculture. Table XXX shows estimated transport costs of exports via Bukoba port to Dar es Salaam and imports from Dar es Salaam via Bukoba port into the region.

A review of table XXX indicates that:

a. imports are more costly to transport than exports.

b. interchange costs are a significant proportion of total transport, and

c. railway transport is significantly cheaper than lake transport.

	via Bukoba port		other routes		total	
	mt	%	mt	%	mt	%
Exports	12 300	89	1 500	11	13 800	100
Imports	24 600	100	n.a	n.a	24 000	100
Total	36 900	96	1 500	4	38 400	100

source: Kagera Report: TRANSPORTATION, table 3·5

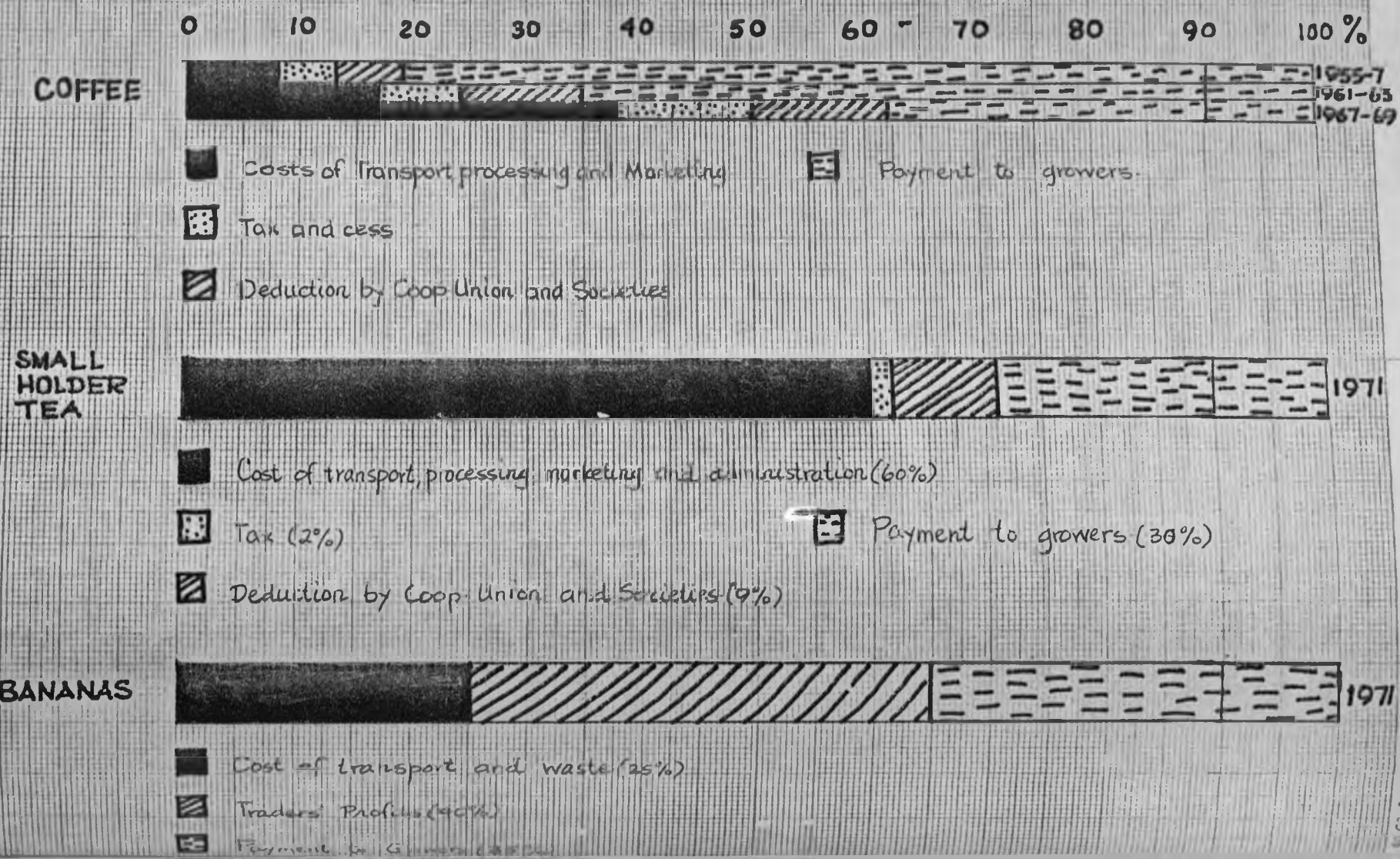
Table xxxi: Flow of Imports and Exports, 1974

	1971	1972	1973	1974	1975
Exports (mt)	19 000	16 405	17 913	12 300	17 210
Imports "	30 000	30 891	32 499	24 600	23 000
Cattle heads imported	n. d.	n. a.	16 000	11 400	8 000
Passengers	n. a.	36 237	53 048	41 504	18 200

source: E A R, Statistical Dept., Nairobi.

Table xxxii: Bukoba Port: Volume of goods & Passengers, 1971-5

FIG 6: DISTRIBUTION OF PROCEEDS FROM COFFEE, TEA AND BANANAS.



The main problems associated with the Bukoba - Dar es Salaam transport are:

a. high costs of moving goods through three ports - Bukoba, Mwanza and Dar es Salaam.

b. double handling costs on Bukoba/Mwanza link as Bukoba port cannot accommodate railway wagons. Kemondo port will wipe out this problem.

c. Lack of sufficient railway rolling stock capacity between Mwanza and Dar es Salaam.

The factors controlling the commodity transport between Bukoba and the world markets are, from the foregoing analysis, exogenous to the region. Attempts to solve these problems will require decision making on national level, but the advisory role of the regional authorities will have to be appreciated.

3.5. LAKE SERVICES:

3:5:1. Bukoba Port:

Nearly all goods going out and those entering West Lake Region pass through Bukoba port (table XXXI). The 180 km distance between Bukoba and Mwanza is by lake transport. Transhipment at Mwanza is followed by rail transport to and from Dar es Salaam.

Until May, 1975 when four vessels - MV Victoria, Usoga, Uhuru and Nyangumi were grounded at Kisumu nearly all passenger traffic between Mwanza and Bukoba was by lake as shown in table XXXII.

mode	minimum time	cost (Tsh)
air	30 minutes	183
Lake 1st class	8 hours	50
" 2nd "	8 "	28
" 3rd "	8 "	8.60
Bus	16 "	41

source: Field Survey, Aug, 1976

Table xxxiii: Comperative Travel times & costs for Passenger Transport, Bukoba to Mwanza.

The fact that the lake route has in the past dominated import/export and passenger traffic indicates that road route has been unable to compete with the lake services. Owing to constantly rising export crop production of mainly coffee, tea and sugar the volume of exports through the lake has been growing. The number of coffee getting into the region has been, however, declining since 1975 when the livestock canier was grounded. Passenger traffic has also shown slump in 1975 for the same reason-grounding of M.V. Victoria a 700-800 passenger ship and B.S. Usoga, a 300-400 passenger vessel. The resulting pressure on road and air transport has been enormous and in fact the two modes so far failed to cope with both commodity and passenger transportation demand between Mwanza and Bukoba. They have not even been able to attain the standards of lake services which were reliable, faster yet cheaper (table XXXIII).
The government recently announced that three vessels which will be launched to serve between the three ports of Mwanza, Bukoba and Musoma. These vessels, expected to start operations later this year are M.V. Bukoba (400 passengers and 200mt) M.V. Musoma (400 passengers and 200 mt) and M.V. Butiama (200 passengers and 250 mt).

3:5:2, Kemondo Port:

Some years back, E.A.R. with the approval of the government of Tanzania decided to shift some of the port activities from Bukoba to Kemondo bay, some 20 km south of the town.

The decision was reached on the following grounds:

a. Bukoba port is not deep enough to permit anchourage of bigger water vessels,

b. the present port yard has very little, if any, room for expansion or renovation,

c. there is no natural protection to anchoured vessels at the present port during stormy weather,

d. flooding sometimes occurs on the road from the port to the town,

e. lack of sufficient port facilities like cranes and tractors, and

f. the town of Bukoba has little growth prospects because of the topography and occassional flooding of some town parts. Land development costs are high because of these factors. Kemondo has topography which promises chapter growth of the town.

The new facilities which will be introduced at Kemondo include a railway wagon ferry which will eliminate double handling of goods at Mwanza, three or more fixed 30 ton cranes and cattle handling facilities which are lacking at Bukoba port.

In addition to handling cargo the new port will handle passenger traffic. Terminal facilities for passengers - which include a bus station are already being constructed.

Bukoba Port, nevertheless will remain to handle oil products as considerable investment in oil storage facilities has been made.

The two ports will be linked by an all weather road as heavy traffic volumes are expected. There will be a need to redirect intra-district traffic to Kemondo (see chapter 4).

3:6, AIR SERVICES:

West Lake Region is served by only one airport. It is situated on the southern edge of the town and maintained by the MOW. The runaway of the airport is one of the shortest-about 1000 m and one of the narrowest 37 m - in Tanzania. Its surface is unbound so that during rains some flooding occurs rendering landing and take off difficult.

The only services to the airport are those offered by Caspair Company [62]. The flights on this service are normally overbooked, and successful booking has to be made 3 or more weeks in advance. One deciding abruptly to travel, therefore, has to use other means - the buces which are also constrained.

Owing to the location characteristics approach to airport run-way is difficult. On one end of the run-way is a rocky escarpment which limits landing by land approach. On the other end is a lake in which an island is located less than 2 km. from the run-way, so that lake approach

landing and take off is also difficult. Only small crafts can use the airport without much risk. In addition to the dangers imposed by topography are those caused by the nature of the run-way surface, coupled with climatic factors. The airport is situated in an area of heavy rainfall (more than 2,000 per year). During rains (more than 200 days in the year get some rain) the run-way becomes slippery so that landings and take-offs are hazardous. Any efforts designed to improve air transport for the region have to include, inter alia, the shifting of the airport to a better site, where the run-way will be long enough to permit large crafts landing.

Air travel is the most expensive means of inter-regional travel yet the fastest (table XXXIII). The town of Bukoba is administratively becoming important, yet remote from other administrative centres, Telecommunications between the region and the rest of the country are very poor. Air travel, therefore, provides the quickest way of travelling for government matters where urgency exists.

3:7, ORGANISATION MAINTENANCE & POLICY:

3:7:1, Maintenance:

The responsibility of maintaining national, regional and district roads (classified) rests upon the MOW but owing to financial limitations the MOW (office of Regional Engineer) has not been able to maintain them to reasonable standard. This lack of finance is reflected farther by the fact that even planned construction of new roads ends

on paper. For example, Bukoba - Kyaka and Bukoba - Biharamulo stretches in the study area were planned for bitumenisation during 1969-74 plan. To date the plan has not been implemented.

When it was realised that failure to maintain the existing roads by MOW was impeding tea production the TTA, with the aid of World Bank embarked on tea roads projects. Now all roads relevant in tea marketing, i.e. Bukoba-Rubafu, roads in Maruku and Katoke areas are being impro improved to all weather standard.

Unclassified motorable tracks, which are access roads proper (i.e. providing access to farms) have been left in the hands of local people who on co-operative, self-help basis maintain them. But since hardly any motor vehicles use them the people have tended to neglect them. The efforts of local people in maintenance of these roads are frustrated by lack of technical advice from the MOW and lack of equipment that can help local people to improve their roads to all weather standards. In order to gravel but since the MOW faces similar problem in maintaining larger roads is not in position to help.

The Bukoba airport is maintained by MOW while ports are maintained by E.A.R., TTA, MOW and EAR own road maintenance plant and manpower separately. General lack of co-operative use of the plant and manpower in order to rationalise their use exists.

Financial limitations, lack of enough a road maintenance plant and manpower lack of cooperation in the use of limited maintenance resources among agencies, and frastration of the local efforts constitute major limitation to improving and maintaining roads.

The maintenance of government-owned vehicle fleet is the responsibility of the MOW which has one garage in the study area, located in Bukoba town. Vehicles owned by parastatal organisation and individuals are serviced or maintained by two garages located in Bukoba town. The mechanics in these garages are semi-skilled and are too few to do the repairing and servicing fast. Vehicles, as a result, have to remain in garages for several days or even weeks, creating temporary shortage of in transportation means. The second problem in vehicle maintenance is that there is shortage of spare parts in the garages, and even when they are available they are very expensive. Vehicles, therefore, become grounded for days, weeks or months while spardes are being waited for from Mwanza.or Dar es Salaam, again creating a temporary shortage in the means of transportation. The concentration of all vehicle maintenance facilities in Bukoba town implies that vehicles breaking down some distance away the town have to be towed to the town or the mechanics have to travel with equipment to the point of breakdown, thereby raising vehicle maintenance costs.

Fuel selling stations are also concentrated in Bukoba town. Drivers exhausting the fuel in their vehicles while some miles away the town have to travel to Bukoba town in another vehicle in order to buy the fuel. The problems of concentration of vehicle maintenance and fuel sale facilities have to be taken into account in a plan aiming at improving transport in the study area.

3:7:2. Transport Plant Ownership:

About one third of the bus fleet operating in West Lake is owned by USHIRIKA Bus Service, the remainder being individually-owned. Throughout the year the bus fleet capacity is below the demand as reflected by overloading, and by the large number of would-be passengers being left at at bus stops, owing to lack of seats in the buses. Because demand for bus seats exceeds the supply, competition among the bus fleet operators in non-existent. They, therefore, complement each other rather than compete. The ownership of good transport vehicle fleet was shown in table XXVIII. Whereas private transporters operate profitably and efficiently, parastatal operators do not maximise profits w owing to lack of cooperation between themselves. TCB-owned or hired fleet, for instance travel from Bukoba town (or any other origin) to the coffee marketing posts empty and carry coffee on the return trip. RTC fleet, on the other hand travel to district and some rural centres from Bukoba full of consumer goods to its sub-whole-sale branches. On the return trip they are empty. This is a very uneconomic use of vehicles,

and in fact a smaller fleet than the present one is required if cooperation among parastatal operators existed. There is urgent need to rationalise the goods transport plant through cooperation among operators.

3:7:3, Licencing:

The licencing of the use of vehicles on roads dates as back as 1930 when rail transport was in jeopardy as a result of competition from road transport.

In West Lake where intermodal and even intra-modal competition does not exist the licencing system would seem irrelevant. But licencing does not only give right to road use alone, it is also a way of taxing road users. In 1975, for instance, about Tsh.150,000 were collected by the R.T.L.A. as a payment for licences, though it was not necessarily used in improving the regional transport system.

There are four types of licences issued to vehicle operators:-

a. Road Service Licence: issued to passenger (bus) operators. The licence is valid for 2 years and is of Tsh.500 value. The operator issued with a road service licence is assigned a specific route and is given a fixed timetable. The aim of defining the route is to avoid unnecessary competition with other operators, but in West Lake region where the demand exceeds the supply this reason is not valid. At least the definition of routes to road service licence holders

d. Short Term Licence: granted to public carriers to transport goods in exceptional circumstances of temporary nature, so as to meet seasonal fluctuations in demand for more capacity. This is a very important licence in that it takes care of the demand for transportation of agricultural produce from farms to Bukoba town which is usually of seasonal nature. The licence is valid for 90 days and costs Tsh.400.

e. Private Carrier Licence: for lorries to carry goods belonging to the operator. The licence is valid for 2 years and costs Tsh.1,000. Very few licences in West Lake Region of this nature were issued reflecting that operators are not engaged. in large business or large-scale farming.

3:7:4. National Policies & Transportation:

From time to time the government issuese directives or orders designed to safeguard the national economy but bearing direct impact upon transportation.

Since 1973 the oil prices in the world market have been swelling Tanzania, like nearly all African countries imports oil and oil products, so that recent trends in the prices have had adverse effects on the overall economic development. One of such effects is that for the past few years the countries foreign reserves have gone down. In order to halt this trend Tanzania had to limit the amount of oil she imports by using as little oil as necessary.

as time passes the population may spill over to the land not yet occupied. Again, this overspill population starts to grow, dictating a further expansion of farmland. Up to this stage the vertical distance from the road link and the farthest homesteads from the road may be so great that we may say there is an accessibility problem in those areas, and therefore, a need to link them to the road. Another road link, therefore, may be provided to overcome the inaccessibility problem, but no sooner than provided, agricultural activity begins to mushroom and intensify all this second link, repeating the stages that necessitated the construction of the link.

This model of development of settlements along road links may be summarised diagramatically, as in Fig. 6.

The questions to be posed are: Is the settlement pattern development model relevant to the study area? If so to what extent? Can it be used to explain the pattern of agricultural activity in the study area? If so to what extent? What lessons are to be learnt from the model in planning considerations?

Crop cultivation in West Lake Region commenced at the beginning of this century. At this time the population was dispersed in the coastal zone, with the plateau and outer zones virtually uninhabited. But after a decade of coffee and banana cultivation a number of isolated villages developed along the lake shores and inside the district. By 1930 coffee and banana production had placed Bukoba in a position of one of the leading districts in the country in agricultural production. The only major road that had been built by then is the Uganda border - Kyaka-Bukoba-Biharamulo one, so that links within the district had not been established. The only intra-district links were foot tracks, usually unsuitable for motor-vehicle movement. This state of affairs corresponds to stage 5 in the settlement development cycle (Fig.5) because we have a highly agriculturally productive zones in the district which were not linked to either the Uganda border - Biharamulo road nor to each other. Some of the highly productive central places serving highly productive hinterlands that had developed by 1930 include Kanyigo, Omu, Kamachumu,

Ibwera, Kyaka, Ruzinga, Maruku, Katerero, Katoro and several others, but as already mentioned had no roads linking them to the outside. Coffee produced in the hinterlands of these centres could not be easily transported to Bukoba port for export, and in fact nearly all coffee was carried by porterage to Bukoba town, or across the Uganda border for export.

Let us focus attention on a specific case in Kiziba division where Ruzinga, Buyango, Mugana and Kanyigo had by 1930 developed as small service centres serving coffee producing hinterlands. They were not connected to the main road (Kyaka-Bukoba), so that we can say they had accessibility problems (Stage 5). A road link joining Ruzinga via Buyango to the main Kyaka-Bukoba road was provided in the early 1930's (Stage 1). By the end of the decade a "string of villages" had developed along this new link in a "beads-on-the thread" fashion. They included Kabashana, Kyasi, Kitobo, Kashasha and Bugandika (Stage 2). As the population in these new villages continued to grow (stage 3) overspill to the neighbouring areas in the 1940's took place, and villages like Mugana and Rukurungo developed (Stage 4). Again these new and old settlements continued to grow in the directions that were not physically constrained (Map 17), so that in the 1950's a need to provide access for Mugana, Bwanjai and Bukabuye had arisen (Stage 5). In the 1950's the Kanyigo-Kakono-Mugana-Rukandwa-Bwanjai link to the main Kyaka-Bukoba road was provided (Stage 1), completing the development cycle.

Map 17 shows the spatial distribution of settlements and cultivated land in relation to the road links in port of Kiziba division. The construction of road links in other parts of the district brought similar effects, but where such links were provided through physically constrained areas no such development was observed. Today there are many villages in the study area which are not linked to the main road network, while others have links which are too poor to guarantee reliable transport

(e.g. between Izimbya and Katoro; the Izimbya-Karagwe border link). Such villages with poor accessibility - for example Ruhanga in Rubale division, Minziro and Kakunyu in Missenye division - find difficulty in selling their surplus food produce. For this reason they farmers in these villages have no impetus for increasing production. Provision of reliable road links in areas with poor access is likely to stimulate, if there are no physical obstacles, increased agricultural production, as demonstrated by the settlement development model. Provision of access roads have an additional advantage in areas where all ideas, information and innovations move along transport lines. Access road provision may open such areas to new ideas, information and innovations that may be relevant to the improvement of agriculture.

4.3.5. Fragmentation and Agricultural Development

Fragmentation, or operation of a farm which is physically split into a number of plots, is a world-wide phenomenon which has attracted a number of studies from scholars - notably agricultural economists. None of such studies, however, rivals Chisholm's Rural Settlement and Land Use.[68] Chisholm advances a model relating to the interaction between the homestead and the farm. He envisages the farm in the following terms:[69]

(a) The homestead is the point of origin for all inputs which have to be applied to the farmland. The farmer and his family live here and each morning he leaves it to the holdings and he returns to it in the evening, and possibly at intervals during the day. Likewise manure accumulates in the yard or stables, and this and everything else which is applied to the land must be taken thence to the holdings.

(b) The homestead is also a point to which all the output from the plots is brought for either consumption or storage before marketing. The homestead is, therefore, a collecting and clearing centre in the chain of marketing (see Fig. 8).

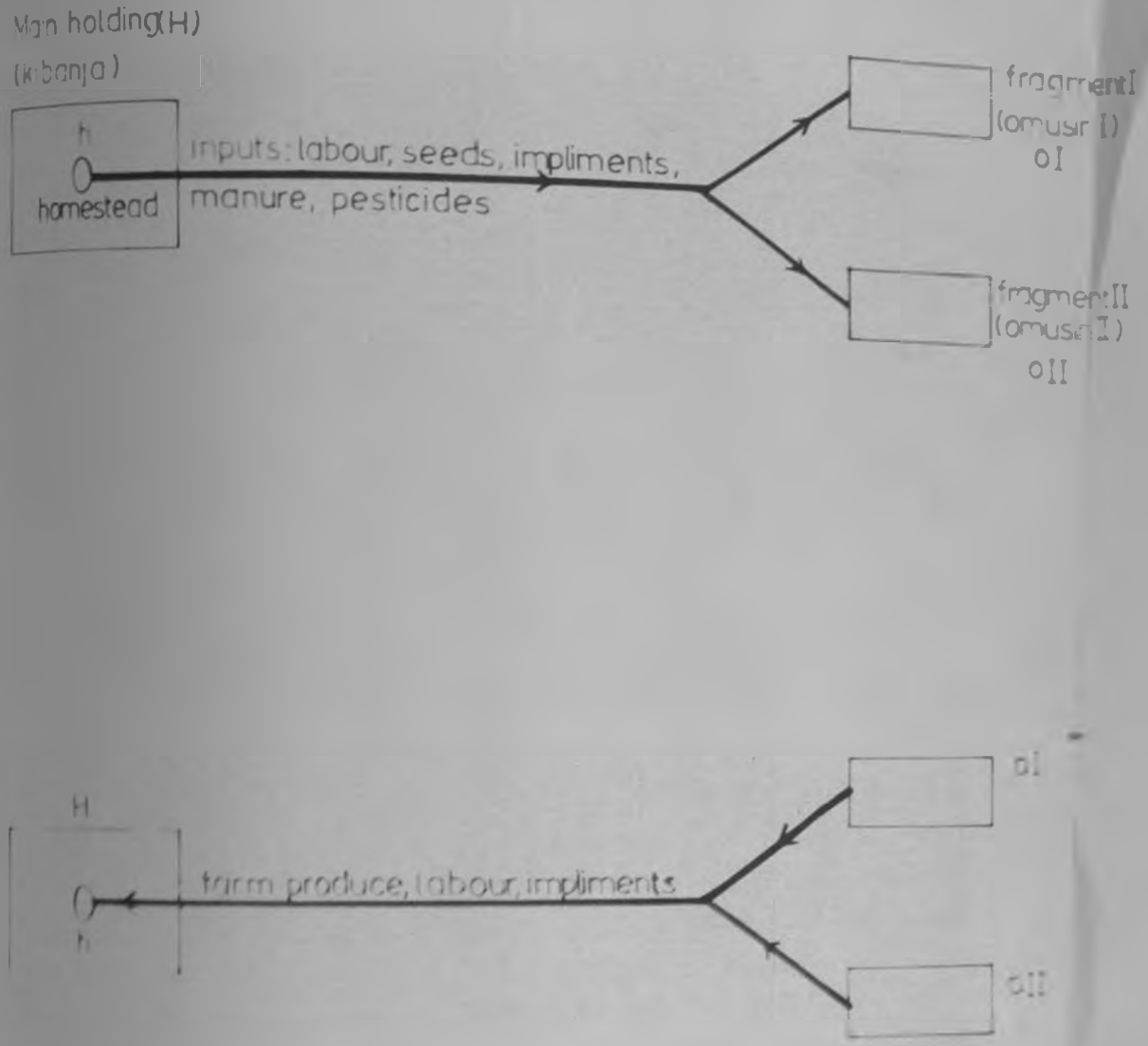


Fig 8: Chisholm's Model,

i.e. it relevant to fragmentation as observed in Bukoba?

In contemplating the operation of all farm holdings or fragments with the homestead as the centre of control, it becomes apparent that distance becomes a crucial factor in the movement of persons (labour) and goods. Whatever mode of transport is used, any shifting of goods between homesteads and fragments implies shifting one or more persons. All movements goods and persons may, therefore, be expressed in man-hours which can also be converted to money costs. The monetary costs derived from travel time (man-hours) can be compared directly with other money costs and money returns of the farms. Unfortunately, however, the market economy of the study district is not well developed, so that it would be an inaccurate attempt to calculate money equivalents of labour time or other inputs or the produce.

Nevertheless we can safely conclude that production on fragmented plots is lowered by expenditure of time and human energy (all of which can be, though clumsily, converted into monetary terms) in covering distances imposed by fragmentation.

The effects of fragmentation upon farm production has been also studied by Wiiala[70] while trying to measure benefits that can be derived from consolidation of holdings in Finland. He found out that as the average distance of the fields or fragments from the homestead increased, the per hectare returns declined,[71] and that the net-product declined much more rapidly than the gross output,[72] a situation which arises from the fact that the level of costs actually incurred diminish less swiftly than the level of gross output. Virri[73] and Suonela[74] conducted similar studies in the same country - i.e. Finland, but in different locations and obtained results similar to Wiiala's. Their findings have been explained by Chisholm in the following way: "that both the gross and net product should decline with diminishing rapidity at greater distances is to be expected. The land near the farmstead (or homestead) receives considerable inputs of manure as well as labour for cultivation, and therefore, a large proportion of the gross yield is attributable to factors other than the inherent fertility of the soil. With increasing distance, the various

inputs of fertilisers and labour become smaller and, therefore, an increasing proportion of the total yield arises from the natural capacity of the land until the point is reached that even with the minimal amount of care some level of production would be maintained."[75]

Table xxxiv shows the relationship between the distance of fragmented plots from the homestead and the yield per hectare for Bukoba district. The data were taken for six villages, one in each division, and average distance and yield calculated.

The results shown in the table show similarity to the findings of Virri, Wiiala and Suonsela - that with increasing distance from the homestead the gross yield per unit land area declines. The explanation made by Chisholm to this observation is also consistent with the findings in the study area - that manure/ fertilisers are never applied to holdings outside Kibanja (except for tea) so that all returns from fragments depend upon the natural land capacity, and that the labour input into plots outside kibanja is relatively low, a portion of it being dissipated in moving the inputs and output between homesteads and fragments. In short, therefore, distance is a very important factor in agricultural production as confirmed by findings in table xxxiv.

We observed, in chapter 3, that about 64% of the households in the study area operate more than one plot of land, and that the average distance covered annually between homesteads and these plots 12 million km. In man-hours the labour utilised in overcoming this distance is equivalent to about 3 million man-hours (assuming that 1 km can be covered in 15 minutes). Since the market economy of the district (with regard to food crop produce) we may not precisely calculate money equivalents of this labour equivalent. If all plots in the district were consolidated the labour time utilised in overcoming friction of distance would have been converted into useful labour - i.e. directly utilised increasing returns from a hectare.

distance(km)	Gross yield in kg/ha			
	maize	beans	bambaranuts	dry cassava
0 - 0 5	650	800	680	300
0.6 - 1.0	600	720	620	290
1.1 - 1.5	540	600	510	270
1.6 - 2.0	470	520	460	250
2.1 - 2.5	420	470	450	250
2.6 - 3.0	400	430	420	220
> 3.0	380	410	400	200

source: Field Survey, Aug., 1976

TABLE xxxiv: The Relationship between Distance of Plots from homesteads and the Gross Yield per hectare.

Facility/service	Distance(km)					
	<1.0	1.1-2.0	2.1 -3.0	3.1 -4.0	>4.0	Mean
water	88 %	4 %	0 %	4 %	6 %	1.5km
health	3 "	3 "	6 "	60 "	28 "	3.5 "
education	45 "	45 "	4 "	3 "	3 "	2.0 "
bus route	10 "	33 "	20 "	13 "	22 "	3.5 "
periodic market	92 "	4 "	1 "	1 "	2 "	1.0 "

source: Field Survey, Aug ,1976

TABLE xxxv: Homestead-Facility Distance in Bukoba District

4.3.6. Homestead – Facility/Service Distance

Besides commuting to holdings that are some distances from homesteads (a problem equivalent to place of work-residence relationship in urban areas), rural populations commute to locations of essential facilities, utilities and services – e.g. water, health, educational, commercial, recreational and religious facilities. In contrast to urban settlements where populations are concentrated so that a small geographical area contains a threshold population for provision of services or facilities, rural populations in the study area are scattered so that an agglomeration of services/facilities serves a large geographical area in order to reach a threshold population. Consequently some of the facilities are very far from some homesteads, and wherever such services are required people have to commute, usually on foot, to these facilities or services.

Table xxxv, a summary of the analysis made in Chapter 1 shows the proportion of homesteads found in specified distance ranges from specified facilities or services. 88% of the homesteads are in a distance of less than 1 km from a water source, and only 6% of the homesteads are in a distance exceeding 4 km from a water source (and most of these are found in the rather dry-western parts of the district). The average distance travelled by households to the water sources is 1.5 km. Since there are about 60,000 households in the study area the total distance covered daily (assuming that only one person in the household fetches water, once a day) in search for water is about 180,000 km. Assuming that each km may be covered in a minimum time of 15 minutes, we notice that 45,000 man-hours are expended in moving water to the households everyday. This figure becomes, on one hand collosal when we appreciate that more than one person per household is involved in drawing water, and reduced on the other when we appreciate that the task of drawing water in the study area is a responsibility of infant girls, who because of their age are not very useful in agricultural production.

Table xxxv reveals also that 88% of the households in the district are more than 3 km from the nearest medical or health facilities. The average distance between homesteads and health/medical facilities is 3.5 km for the whole district. Health/medical facilities are usually less frequently visited (as shown by the household survey) than the water sources, and the number of man-hours expended in overcoming this distance may be less than those spent in drawing water. Trips to education and commercial facilities are much more frequent than trips to health/medical facilities. In the former the movement usually involves more than one person in a single homestead. The man-hours spent in overcoming friction of distance between homesteads, schools and markets are therefore numerous.

The distance between homesteads and facilities/services is too great to be overlooked. Whether a single person or more in a household are involved in overcoming it the consequence remains that the man-hours which are indispensable to increasing agricultural productivity are expended in overcoming the friction of distance. In areas where this distance is enormous, as in Bukoba district, implication to agricultural development is obvious: production per household is lowered.

The western and north-western parts of the district (Outer zone) are known, from the analysis in Chapter 2, to be in greater disadvantage in that social services in these areas are dispersed. The impact of homestead-facility distance is therefore much more fit than in the eastern (Plateau and Coastal zones) Bukoba where the catchment area for a service is smaller. This difference in provision of services might have played a key role in determining the production per hectare from agriculture, for the western and northern zone with more dispersed services have lower yield per hectare, and thus low income per household as shown in chapter 2.

5.3.7.

4.3.7. Other Implications

The condition of roads during the rains is yet another factor frustrating the farmers' efforts for improving agriculture. During the rains roads in many parts of the district become impassable resulting into temporary isolation of some rural areas. These isolated areas cannot obtain farm inputs nor can they market their produce. Whatever surplus is realised during rains is locally marketed at very low returns or left to rot on farms. This is particularly true for vegetables, fruits, bananas and other perishable crops. From the past experience that produce harvested during the rainy season may not reach markets owing to bad roads farmers no longer bother to produce surplus perishables.

In 1974 and 1975 there was a shortage in Bukoba district of the most important tool for a smallholder farmer, the jembe. Because the shortage coincided with the collapse of the lake transport, the government officers in the Region have tended to blame the shortage on this collapse. The assertion by the regional authorities has been supported by the observation that at the time of shortage of jembes, there was abundance of the same tool across the lake in Kwanza. Interviews with the officials from MUKOCU, the former distributor of jembes, however, shows that the number of jembes which was thought to be enough for the region was ordered from Dar es Salaam and was received and distributed to retailers in time. The same officials attributed the shortage, therefore, to a sudden rise in demand for jembes which resulted from the national-wide campaign for more food production (Kilimo cha kufa na kupona). The shortage of the jembes, regardless of its cause, frustrated farmers' efforts in increasing food production.

In Bukoba district, the inadequate rural road network is the sole means of disseminating news, ideas, and information, and maintaining social and political cohesion. The road network is the principal channel that makes it possible for the rural populations

to share at all in the innovations stemming from scientific revolution. People have to move in order to communicate because, unlike in urban areas, telecommunication links are non-existent. Unless rural populations can become better informed on new techniques and market opportunities, they cannot be expected to participate meaningfully in the tasks required for accelerated economic development.

Extension services whose primary duty is to link the findings at research centres and the rural population entirely depend on the transportation system in order to execute this duty. The transport inadequacies examined previously, therefore, limit the movement, and therefore, the efficiency of the extension workers. This is why the extension services have been unable to break the "tradition-barriers" that continue to limit agriculture to "hand-to-mouth" level.

CHAPTER 5

A TRANSPORTATION STRATEGY FOR AGRICULTURAL DEVELOPMENT

5.1. INTRODUCTION:

It has now become clear that one of the greatest obstacles to agricultural development in Bukoba district is the inadequecy of the district transport system. Owing to lack of an efficient transport system crop specialisation by different ecological zones has not been possible,. It has not been possible, morover, to deliver farm inputs to farms, especially during the rainy season when the d.w.r. become impassable. Transportation of farm produce to consumption centres or markets has not been easy either. Consequently perishables have been rotting on farms, reducing farmers' enthusiam in increasing their production where large land tracts suitable for agriculture lack access roads, they remained idle. While in areas with better access land shortage is on the increase. The dissemination of ideas and information on new market opprotunities, better farming methods etc., have not permeated most of the farming zones. Farmers in Bukoba district, in addition, have to overcome distance dictated by fragmentation and inequitable distribution of socio-economic infra-structure. A large amount of human labour, which might have been put into more productive work is ~~also~~ dissipated through overcoming distance between homesteads and farms on one hand, and ~~on-the-other~~ between homesteads and facilities and/or services on the other.

The poor transport system of the district, therefore, calls for immediate efforts for alleviating them if economic staguation that Bukoba district has suffered over the past few decades is to be resolved. This implies a need for a more viable mobility strategy for agricultural development.

5:2. THE OBJECTIVES OF THE STRATEGY:

Since the launching of Arusha Declaration in 1967 the primary national development goal has been to bridge the gap in standard of living between the rural and urban populations. Stress has, therefore, been placed upon rural development. Since the main occupation of the rural people is agriculture, raising the standard of living in rural areas calls for increased productivity in that sector.

The primary objective of the proposed mobility strategy for Bukoba district is, therefore, to improve the transport system so as to stimulate increased agricultural productivity

One of the characteristics of the transport system of Bukoba district is the inequitable distribution of the transport facilities among the district's productive and potentially productive zones. The result has been dispairties in development within the district. It is, therefore, the objective of this proposed strategy to bridge or reduce the gap in development between agricultural zones in the district.

5:3. THE STRATEGY:

So as to promote agricultural development and reduce the

gaps in development between different parts of the district through improving transportation the following strategy 76 is proposed:-

7:3:1, A Shift in Planning Approach:

Up to the present Regional planning practice has been largely sectoral. Each sector formulates its plans usually with little or connection with the plans in other sectors. But transport, being a servant of other sectors of the economy, has to meet the overall aims of social, economic and political development of the region or district. Forstunately, national development goals and priorities are clearly defined in different policy documents such as the annual and five year plans. What is required at regional district levels is to redefine these goadls and prorities taking into account the prevailing local conditions and from these regional and district goals each sector has to derive its objectives and targets. From sectoral objectives and targets the transportation requirements have to be pspelt out and transportation plan made on the basis of these requirements.

In order to make transportation planning meaningful, therefore, a systems approach has to replace the traditional sectoral approach. Accordingly, the best time to prepare a transportation is the time when the district or regional plans are being prepared.

Allied to a shift in planning approach is the need for transport planning to be based on data regarding the re-

gional or district resources availabe for utilisation, the nature, condition and quality of the existing transport facilities and the present level of utilisation of these resources and facilities. It means that a continuous process involving collecthion of data on transportation system has to be set up, preferably in the regional office of the MOW. Today transport planning in the study district is constrained by lack of adequate data that are relevant for the process and no doubt this has contributed to the transport inadequncies examined in the preevious chapters.

5:3:2, Modification of Existing Policies linked with Transportation:

The existing transport inadequacies can partly be elucidated by the policies that have been pursued in the past in improving transport. Although a shift in emphasis from trunk road provision and improvement to feeder road development was proposed as early as in 1969 when the second Five Year plan for the country was about to be launched, no such a shift has been put into practice. Consequently, trunk and main roads in the country are in much better condition than the feeder roads. It is recommended, therefore, that emphasis now be placed on the roads that are actually linking farmers to the markets, i.e. the feeder roads proper. This is not to say that the main roads should be neglected. While construction of new trunk and main roads should not be undertaken in the next two plan periods, proper maintenance and betterment of these roads should continue.

We noted that the regulation, control and taxation of the transport industry is the concern of the RTLA on behalf of the TLA. Noted also was gross lack of coordination among commodity transport operators resulting into rather irrational operation of the commodity transport vehicles. At the national level there is the NTC which cooridnate large commodity transport operators. There is no parallel organisation at the regional level and it is proposed that the NTC be encouraged to open branches at the regional level in order to coordinate the activities of transporters so as to achieve a more rational use of the commercial vehicle fleet.

In order to combat inter- and intra-modal competition, the RTLA issues rigid timetable and routes to operators. But as pointed out earlier, intra - and inter - modal competition in West Lake is minimal. In order to alleviate some of the transport problems, especially in passenger transport, more flexible timetables should be given so as to allow bus operators to make as many trips as they may find necessary. A minimum number of trips, however, should be determined by the RTLA. In addition to this, some of the passenger and even commodity transport vehicles should be encouraged to make trips on Sundays. Another regulatory measure contributing to passenger transport shortage is the prohibition of light commercial vehicles form carrying passengers. When the harvest season is not at peak some of the light commercial vehicles (e.g. pick-ups) remain idle, and if allowed to carry passengers they can to some degree alleviate the passenger transport problem.

although comfort has to be sacrificed by passengers. In some parts of the country, notably the Moshi - Arusha area, light commercial vehicles carry passengers especially when the harvest season is low, and this practice has greatly reduced local passenger problems in those areas.

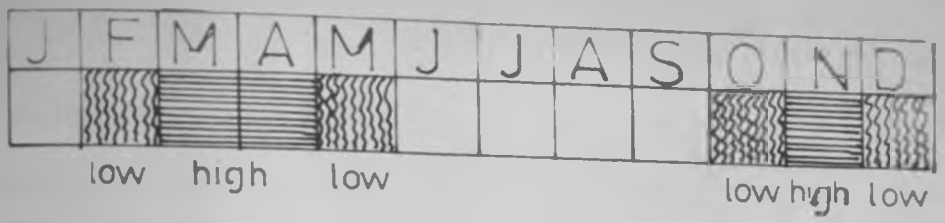
Also contributing to the current transport problem are the policies designed to safeguard petroleum. Some of the vehicles fail to operate fully because the petroleum they had bought finished while in between Dukoba town where all petroleum sales facilities are located, and the destination. If transporters were allowed to carry spare fuel such situations would not arise. It is not proposed that the restrictions aiming at minimising petroleum consumptions be removed, but that passenger and commodity transport vehicles be permitted to carry spare fuel. The restriction should be enforced for only private cars.

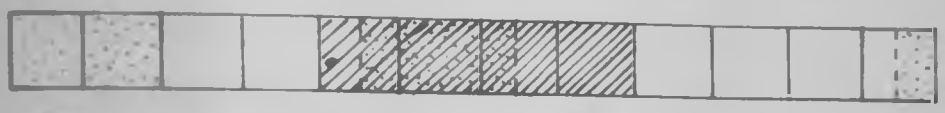
The problem of homestead-farm and homestead-facilities and/or services distance is difficult to overcome, especially in the coastal and to a lesser extent plateau zones where there is no availability of rwayu on the periphery of a kibanja. Th e Villagisation Programme is the only answer. Families without enough land for growing crops should be encouraged to migrate to the sparsely populated Outer zone. The Regional authorities may accelerate the rate of migration by providing more Community facilities and services to this zone. By providing more infrastructure the homestead-facility / services distance may be greatly reduced. Programmes for ifrastructural provision in the Outer zone shoul d place emphasis , or give priority to construction of access roads (unclassified) so that the programmes for collecting surplus perishable foods (see later sections) succeeds. Provision of roads is a very effective catalyst in attracting migrants to vacant land tracts as noted in chapter 4.

In some rural areas, particularly in Kisseneye and Kubale Divisions the population density is so low (sometimes below 10 people/km^2) that the threshold population for providing some of the services is reached by including a very large geographical area. Under such circumstances mobile facilities visiting each locality in one day each week or fortnight may be the only feasible alternative to a total absence of facilities over large areas. It is proposed that mobile bank, postal, health and wholesale facilities be introduced in the low density areas in Kisseneye, Kubale and to a lesser extent Katerere Division. The most suitable places for providing mobile services are market (periodic) places on market days. It might be economic to provide all mobile services to a particular market place on the same day, since the concerned agencies or ministries may use the same vehicle fleet. Moreover, this gives opportunity to the rural populations to concentrate visits to market centres on a single day, leaving other days for farm work.

5.3.3. Road Network and Vehicle Traffic Improvement.

One of the most frustrating drawbacks to transport improvement is the poor condition of the major part of the existing transportation facilities. It would be unrealistic to propose new classified road links before improving the existing ones. It is, therefore proposed that a road improvement programme by upgrading from loose earth standard be undertaken. Improvement of roads will not only reduce rapid wear and tear of vehicles, increases operating speed of vehicles and assures all weather movement of farm inputs and output, but also reduces vehicle operating costs.





coffee grains and legumes

CROP	TRANSPORT REQUIREMENTS
coffee	Roads passable in May - August
sugar	d.w.r in producing zone and between the factory & Bukoba town
tea	" " " " " "
grains and legumes	d.w.r. in all parts of the district. They should be passable in May - August and Dec - Feb.
bananas fruits and vegetables	d.w.r in all parts of the district

SOURCE Field Survey, Aug 1976

Table xxxvi Rainfall and crop transport requirements

The proposed upgrading schemein this study (table xxxvii and map 18) is based on the following criteria:

a. Provision of sufficient mobility and accessibility to as many parts of the district as to allow easy exchange of goods and services between different parts of the district and to allow easy penetration of all parts of the district for administration an d social services provision.

b. Provision of a road network which takes a form of hierarchy, with national roads linking Bukoba town, the regional capital , to other regional capitals; regional roads linking district centres to the national roads; district roads linking rural centres to t he regional roads; and the feeder roads proper (unclassified) linking the lowest level of economic centres, the market centres to the district roads or rural centres.

c. Different crop requirements based on the condions dictated by climatic conditions (refer to table xxxvi).

d. Tr affic densities: Threshold values of traffic densities upon which an upgrading programme may be based has been established for WLR as follows:

Earth	to Gravvel	150 - 200 vehicles/day
Gravel	to Bitumen	400 -450 " "

Only the Uganda border-Bukoba-Biharamulo road satisfies this criterion for improvement to gravel standard. All other roads are expected to have the gouted traffic density values after the year 2000.

On the basis of the criteria established above the upgrading programme shown in table xxxvii is proposed for implementation.

are in progress. These are the upgrading of the Uganda border - Kyaka - Bukoba - Biharamulo - Mwanza road (part of the Lake Victoria Circuit), and the construction of a Port at Kemondo which will handle rail wagons. Other improvements in progress include the upgrading of a road from Lusahunga to the Rwanda border at Rusumo. Generally these improvements will lead to a reduction in transport costs, lowering of prices of imports and increase of the competitiveness of the exports.

It is important to note, nevertheless, that the bitumenisation of the Uganda border - Bukoba - Mwanza road is likely to introduce competition between road and water transport between Mwanza and Bukoba. It is imperative that the RTLA takes measures to curb this competition.

5.4 IMPLEMENTING AND FINANCING THE STRATEGY

Proposals on the implementation and financing of the strategy are summarised in table xxxviii. These propasals reflect several features which require emphasis. These are:

a. Wherever and whenever possible self-help through labour and material, and even money contribution has to be employed.

b. Since transportation in developing countries demand large sums of foreign currency, whenever possible local materials are to be used in order to minimise the foreign exchange component of the expenditures.

c. Some of the proposed improvements in marketing and processing of agricultural produce requi re simple machines which may be too expensive to be afforded by individual farmers, given the current income levels. It is emphasised that

Strategy	Substrategy
SHIFT IN PLANNING APPROACH	Systems approach to planning
	Collection & storage of data
MODIFICATION OF EXISTING POLICIES	Shift in emphasis from trunk to feeder road development
	Coordination of transport operaters
	Relaxation of petrol sales restrictions to public transporters
	" " timetables and routing of buses
	Villagisation so as to reduce fragmentation
	Mobile banking postal health and wholesale services
ROAD AND VEHICLE IMPROVEMENT&MAINTENANCE	Upgrading and maintenance of district roads
	" " " " tea and sugar roads
	Building of petrol stations and vehicle repair units at rural centre
	Introduction of new bus routes
PROCESSING	Coffee hulling on farms
	Grain milling at marketing and rural centres
MARKETING DISTRIBUTION AND STORAGE	Establishment of a coffee authority
	Coffee buying posts to be used for marketing of legumes ns and root crops
	Establish bananas and other perishables collection points
	Construction of shelters and waste disposal facilities at p mar
	Provision of cold storage facilities at Bukoba market
TOTAL	

Table xxxviii: Implementat

the Strate

It is also recommended that new rural roads (unclassified) be contructed through self help in as many villages as possible. At first these self help roads may remain of loose earth standard and dry weather, but may be gradually upgraded after 1985. by MOW.

Alongside a road upgrading programme vehicle maintainance measures are essential if the road upgrading strategy is to be meaningful. It is proposed that a garage and a petrol station be set up at each rural centre in to ensure prompt vehicle repair and maintenance.

It is, moreover, proposed that greater attention be paid to regular road maintenance so as to minimise severe destruction of the road surfaces. This measure calls for increased skilled manpower to direct maintenance, and increased equipment. It will not be necessary, however, to increase skilled manpower and equipment in the short run because, as noted earlier, the existing manpower and equipment in the MO W, HARC (Tanzania) and TTA can be utilised jointly. What is required at present is the establishment of a joint utilisation mechanism of the manpower and equipment by these agencies.

At present passenger mobility is faced with the problem that a person wishing to visit another rural or market centre by bus has to pass through Bukoba town. As a result one has to pay more than he should have paid if the origin and destination centres were directly linked. I t is, therefore, recommended that re-routing of buses be effected in order to foster interaction between different parts of the district by establishing the following new routes:

a. Bukoba-Rubale-Mikoni-Nshamba-Bulebe-Kanonde-Bukoba.

b. Izimbya-Katoro-Kyaka-Bukoba and back to Izimbya through the same route.

c. Kyaka-Katoro-Izimbya-Ibwera and back to Kyaka through the same centres.

d. Bukoba-Ibwera-Izimbya-Bugene and back to Bukoba along the same route. (see map 19).

5.3.4. Processing of Agricultural Products.

It has been noted in chapter 2 that coffee the main user of the commodity vehicle fleet in the district is transported from farms to Bukoba town for hulling , and that hulling coffee on farms reduces the weight of the product by 45-55%. It is recommended therefore, that farmers be encouraged to hull coffee on their farms before delivering it to the the marketing posts. This would require an increase of the gap between the price of hulled coffee and the unhulledcoffee price. Hulling coffee on farms would not o nly reduce the vehicle fleet capacity required to move coffee to Bukoba town by about a half, but would also reduce the weight of coffee transported from the farms to the buying posts. Morover, coffee hulls, known to be useful in enriching the soil will remain on the farms to help raise the production capability of the land.

A large proportion of grains and some root crops are, at present milled by NMC at Bukoba town, with only very few small mills in some rural and market centres. Intead of increasing the NMC-owned vehicle fleet to cope with the anticipated increse in grain production transpotation from farms to Bukoba town for marketing, it is proposed that grain mills be introduced in more rural and market centres, especially in Missenye, Rubale and

Katerero divisions where surplus grain production occurs. Grain milling reduces the weight of the grains by 25-35%.

5.3.5 Marketing, Distribution and Storage Improvement.

Because o f the growing population and th e "self-reliance in food production" campaign higher food output is expected in the future. It will certainly place greater pressure on the a lready inadequate marketing, distribution and storage facilities. There is an urgent need to improve and expand t hese facilities if the increased production is to be coped with.

It is therefore recommended that the existing coffee marketing institutions concern themselves with legumes and grains. Although the present storage facilities at village cooperatives are sufficient for handling this new task, their expansion in the near future will be essential.

Up to the present there is no formal marketing of perishable food crops so that in Outer Bukoba surplus bananas, fruits and vegetables rot an farms. Whereas it is strongly recommended that periodic markets continue to operate for these crops, it is recommended also that BUDECOO or NMC util ise their vehicle fleet in collecting bananas, rootcrops and other perishables from established posts on similar lines as the collecting of tea and and sugar cane. Periodic markets would be the best collection points on market days. It is also recommended that in areas where people walk for more than 4km to the nearest periodic market, more periodic markets be established. The functioning of the existing periodic markets is sometimes jeopardised by heavy rains

since there are no shelters at market places. It is recommended that through local political leaders simple shelters be constructed from local materials at all market places. By improving market places and providing mobile services on market days more people may be attracted to markets.

The distribution of farm inputs to farmers is the responsibility of MOA, KTC, TTA and SUDECO. Itis proposed that:

a. TTA and SUDECO remain distributors of tea and sugar cane production inputs.

b. A coffee authority be established in the place of KCB and this authority concerns itself with, besides coffee marketing distribution of inputs necessary for improved coffee production including extension and research services.

c. The role of MOA be confined to the distribution of inputs necessary for food crop production only.

d. KTC's role in the distribution process be confined to farm implements and consumergoods, and that

e. KTC establishes wholesale and retail shops at every rural centre to begin with, and at market centres later.

Alongside improved marketing and distribution it is recommended that cold storage facilities be provided at Bukoba market in order to reduce losses in fish and perishable food crops. With the completion of the rural electrification programme in the 1980s as embodied in the Ugano and Kagera Projects, more storage facilities should be provided in rural and some market centres.

5.3.6 External Transportation Improvement.

Two important improvements of external links of the district

cooperative approach in the purchase of such machines be adopted. By putting into practise this approach we would be moving a step towards socialism and self-reliance.

6.0 CONCLUSION

The process of agricultural has many components and none of them can, by itself, bring about increased productivity that farmers everywhere strive to attain. Availability of arable land, and fa rm inputs, better marketing , distribution and storage facility facilities and techniques, and willingness to accept new ideas are some of the factors that together may foster agricultural development.

Provided this variety of components and their interrelations in influencing the pace of agricultural progress, the attempt in this study has been to seek understanding of the problems and the potentials of agricultural develop ment in Bukoba district by focussing on one aspect - the way people and goods are moved. This is not to say, however, that transport alone is the key to agricultural development. But transportation is of special impotance because of its pervasive role in facilitating development objectives. It is an indispensable ingredient of nearly all aspects of socio-economic development. It plays a key role in getting land into production, marketing of farm produce and in disseminating ideas that are input for agricultural production.

The principal objective of this study has been to identify transportation problems and explore the nature, magnitude and spatial patterns of these problems in Bukoba district. The study has also been attempting to examine the impact of poor transport upon the pace of agricultural progress in a district which is has high potential for agricultural development.

The study has examined the physical, social and economic characteristics of Bukoba district. Compared to a majority of other districts in the country, the study area enjoys a favourable

climate and has fairly fertile soils and ample water and vegetational resources. The physical set up, generally, is such that it can form a strong foundation for agricultural advancement.

The population of the district is about 268 000 inhabitants, and it is growing at a rate of 2.2% per annum. By the turn of the century it will have about doubled. The distribution of this population within the district is very uneven. The density is highest in the coastal zone. In recent years outmigration from this zone to the western prat parts has been taking place and it is expected to continue.

But the western parts which are expected to absorb the migrant population from the coastal zone are lacking essential infrastructure. If the rate of migration from eastern Bukoba which has a well developed infrastructure and land shortage is to be accelerated infrastructure provision policy shall have to be revised in favour of the western, almost empty parts, which nevertheless have high potential for agricultural development.

The study has also examined the characteristics, recent development trends, problems and potentials in the agricultural sector. Agriculture employs more than 90% of the economically active population and accounts for 60% of GDP. All manufacturing industries in the district depend on agricultural products for raw materials.

In essence, agriculture in Bukoba district is dominated by smallholder production. Coffee and bananas are the major crops produced all over the district. Interplanted with these are annual crops mai nly legumes and maize. Tea and sugar cane were

introduced recently so as to diversify the economy.

During the last 20-30 years banana and coffee production has been rising through the expansion of cultivated land resulting from population growth . This increase in production has been more pronounced in Outer Bukoba than Coastal and Plateau Bukoba, and in fact in the latter case production has dropped.

Methods and implimentsused in production have remained virtually the same over several decades. No increase in yield per hectare has been recorded, and as a result the income per household has remained level or declined. Commensurate with lack of improvement in farming methods have been problems linked with marketing, distribution, storage and fragmentation. So far only coffee, tea and sugar, and to a lesser extent grains and legumes have a formally organised marketing system. Food cropsare mainly market in periodic markets where very low prices are offered for the produce. A small portion has been finding way, through private small traders, to Bukoba urban market. The transportation costs to this market have been very high and in some cases it has been unprofitable to transport the produce to Bukoba town. In some villages, mainly those located far from roads, some surplus food produce has been wasted through lack of markets, yet Buk oba district has been substantial quantities of grains. If this importation is to be reduced or halted, a marketing system, and implicitly a transportation systemwhich will assure the movement of food produce from surplus to deficit zones will have to be formed.

Farmers' effortsto increase productivity have been frustrated by

periodic shortages of some of the farm inputs, particularly jembes, plant protecting chemicals and some essential consumer items, and a complete absence of storage facilities in urban and rural areas. If self-sufficiency in food production is to be achieved by the district, a way of remedying losses in surplus food products caused by lack of storage and transportation facilities will have to be found.

Distance imposed by fragmentation and the location and distribution of services in relation to homesteads is yet another obstacle to increasing farmers' productivity. A large amount of human labour which might have been put into productive work is dissipated throughh overcoming distance between homesteads and farms on one hand, and services on the other.

The study has also looked at the present transportation system but emphasis has been placed upon the spatial distribution of transportation facilities in relation to the distribution of population, resources and agricultural activities, and problems emanating from those aspects. The problems identified are those linked with the condition of the road network and vehicles, maintenance and management of the transport facilities and the distribution of those in the district.

The impact of transport inadequacies upon agricultural development have also been examined. The influence of transportation on the development of export trade , crop specialisation and the development of rural s ettlements has been examined in chapter 4. The analysis includes the impact of fragmentation and the distribution of facilities and services upon returns from the agricu lturul sector. Findings from this analysis have formed the

a foundation to policy formulation aimed at improving transport so as to promote agricultural development. The proposed policy incli includes improvement of the existing roads and vehicles, maintenance measures for roads and vehicles , betterment of marketing, distribution and storage systems and the reduction of the distances between homesteads and farms, and between homesteads and services. These propo

From the analyses it appears that Bukoba district has for the past few decades, cufforod economic stagnation, particularly in the agricultural sector inspite of the absence of conspicuous natural resource base constraints. Land,the basic natural resource regarded by Tanzania as a pre-requisite for development is abundantly available.[77] Only 21.1% of the total land area in Bukoba district is already under cultivation, with large fertile land tracts in Outer Bukoba still lying idle. The district, morover, enjoys a climate which permits agricultural activities throghout the year and has vast unexploited natural forests and vast open grasslands suitable for ranching and enormous fishing potential in Lakes Victoria and Ikimba. Inspite of high development potential no visible economic stride has been made by the district since independence.

Efforts to improve and raise productivity within the agricultural se sector have been frustrated by a number of obstacles, the major ones being lack of organised marketing institutions for food crops, inefficient farm inputs distribution system , absence of storage facilities in the district and above all a poor transportation system. The study has shown that inspite of the revolution in transportation reflected by inventions of rail and wheeled transport, aircrafts and marine transport, peasants in nearly all parts of the country still depend on porterage for moving goods. Wheeled transport

if at all available is restricted to long distance mobility. Even wheeled transport is facing a large number of limitations. The analysis has indicated that WLR has one of the lowest road densities and one of the smallest vehicle fleet in the country. Even the existing road network is in a deplorable state. Most of the roads being d w r are badly potholed and completely undrained. During the rainy season they become slippery and impassable leading to total isolation of some parts from the rest of the district. Operation of vehicles on such roads is very costly as reflected by vehicle operating costs and transport costs for farm produce. In addition, the road network and the operation of the vehicles is such that there is limited interaction between rural and market centres. All trade is, consequently, oriented towards Bukoba town. To aggravate the situation, the few sb-standard transport facilities are not fully utilised because of lack of cooperation among the operating agencies. In short, the road transport in its current state poses a multitude of problems which if development is to be fostered will have to be overcome as quickly as possible.

Lake and air transport provide alternative modes of travel to and from other parts of the country. Lake transport is very important in export/import transportation but in recent years it has faced alot of problems - problems associated with international cooperation. Because of the importance and economies of lake transport vis-a-vis road transport in promoting inter-regional trade and international trade, these problems have drawn attention of the government which in her efforts to alleviate them is to spend about Tsh. 100 million in importing ships to operate in lake Victoria. Lake transport will become even more important when the construction of a rail wagon ferry at Kemondo is completed.

Air transport has had little role in promoting mobility in WLR, because it is very expensive. Any attempts to improve air transport will have to involve the improvement of the existing airport, or a complete shift to a better location.

The problems in transportation identified in this study have been caused by a wide range of factors, natural and man-made. In providing access a formidable combination of hills, rivers, swamps and too much rain have been the principal natural obstacles. Consequently, providing all weather links has been burdensome to the regional economy, which is entirely based on agriculture. Man has added obstacles of his own creation in attempts to improve transport. The combination of policies made from time to time have become obstacles. Before and even after independence the road development policy has favoured the development of main roads at the expense of feeder roads. The latter being the most important link of farms with the immediate markets have remained in very poor state, making rural to urban settlements movement very limited. In recent years the government banned week end driving and week end sale of petroleum in order to minimise foreign exchange expenditure. Evaluated in the light of its objective, the policy has been a success, but it has created some problems in transportation as was demontrated in chapter 3. Policies pursued by RTLA in controlling and regulating transportation have also been obstacles to improved transport. RTLA issues rigid timetables anrd and routes to vehicle operators in order to minimise inter- and intra- modal competition which, as demonstrated in chap tre chapter 3, is nonexistent. Because of rigid timetables and routes transport operatorsou ought to stick to, they cannot operate extra trips , even if they consider these trips necessary in terms of demand. Lack of financial and skilled manpower resources

skilled manpower resources necessary for the construction and maintenance of the existing rods and vehicle- has been drawback. The existing resources fall under different agencies, namely MOW, AERC, TTA and no cooperation in the utilisation of these resources exists between them.

It has been shown by this study that the identified transport problems have played a negative role in the development of agriculture in the study area. Owing to lack of an efficient transportation system crop specialisation on the basis of differences in ecological setting has not been possible. It has been not possible, morover, to deliver farm inputs during the rainy season to the farms. Transportation of farm produce has not been easy either. Perishables as a result have been rotting on farms, reducing farmers' interest in increasing production. Where large land tracts suitable for agriculture lack access roads, these tracts have remained idle, while in areas with good access land shortage is on the increase. The dissemination of ideas and information in rural Bukoba depends entirely on the transportation system. Since the system is poor new ideas and information on new market opportunities, better farming techniques etc. have not permeated most of the farming zones. To aggravate the situation, farmers have to overcome distance imposed by fragmentation and inequitable distributionn of socio-economic infrastructure. A large amount of human labour which is indispensable for agricultural production is dissipated in overcoming distance. The distribution of income in the district has shown that the eastern zone which is served better with transport transportation derives higher incomes from agriculture than the western parts which in some cases completely lack transportation

services.

Unless a more efficient mobility and accessibility strategy is evolved, agricultural development is bound to remain hampered. The strategy proposed in this study entails the following principal features:

a. Shift in planning approach from the traditional sectoral to systems approach.

b. Setting up a data collection and storage process that will form a base for meaningful transpor tation planning.

c. Modificaton of some of the existing policies..eg. shift in emphasis main roads to tru feeder roads development; opening of of branches at regional level by KTC so as to coordinate commodity y transport; relaxation of timetables and routes since there is no intra-modal competition; acceleration of the implementation of the villagisation programme in order to halt fragmentation; provision of mobile services in low density areas.

d. Upgrading , repair and maintenance of the roads and vehicles, and the establishment of petroleum sales facilities in rural centres.

e. Emphasis in coffee hulling and grain milling at market centres or on farms.

f. Marketing of perishable crops remain in the hands of periodic markets, but in addition a collection programme from periodic markets to the deficit zones be introduced.

g. Reorganisation of the farm inputs distribution.

o. Provision of cold storage facilities in Bukoba town market.

emphasis need be placedon on self help, cooperative endeavor and the utilisation of local resources so as to minimise the foreign exhange component of the total expenditure.

On the whole this study has demonstrated that a good natural resource base is not a sufficient prerequisite for agricultural development. A number of other conditions must together be present if agricultural progress is to be registered. A viable transpor tation system, is perhaps the most indispensable. The study has demonstrated that without a viable transportation system agricultural development remains hampered. A number of obstacles - natural and manmade - have to be overcome and in the prevailing conditions large financial resources will have to be committed so as to overcome these obstacles. It becomes imperative therefore that a choice of combination of policies, strategies to be pursued minimises the financial costs. The strategy advanced in this work , it is hoped, will be found usefull in formulating programmes and projects aimed at improving transport in Bukoba district.

But in view of the limitations cited in the introductory chapter it has not been possible to exhaust the scope implied in the title of this work. Poor transportation, hinders not only agricultural progress but also other economic and social activities. Future research could therefore focus on the influence of poor transport-ation on other activities. This is necessary particularly to the small scale industrial production which is spelt out as a priority in the current Regional Development Plan.

NOTES

1. Ed. Fromm, G. (1965), Transport Investment and Economic Development, The Brookings Institution, Washington D.C. p.5.

2. Ibid p.5.

3. Owen, W. (1964), Strategy for Mobility. The Brookings Institution, Washington D.C. pp. 1 - 2.

4. Ibid. p.2.

5. Mkama, J. (1968), Transport Planning in Tanzania: An Assessment. Research Paper No.8, Bralup, p.7.

6. Ibid. p.7.

7. United Republic of Tanzania (1969), Tanzania Second Five Year Plan. Vol. II, Govt. Printer, Dar es Salaam, p.11.

8. Hofmeir, R. (1973), Transport and Economic Development in Tanzania. Weltforum, Verlag, Munchen, Afrika - Studien, Nr.78, p.29.

9. West Lake Planning Project (1975), Integrated Regional Five Year Development Plan, 1975 - 80, West Lake Region, p.II - 4.

10. See for example
Ibid p.II - 20, III - 1, III - 2.
Hoesen, J. et al (1972), Development Problems and a Proposed Strategy for Development Planning in West Lake Region, IDR Paper A73.3, p.2.

Gauff, H.P. (1974), Kamma Multi-Purpose Project. Feasibility Study. Part I: REPORT, Dar es Salaam, p.7.

Kamukala, G.L. (1976), Towards a Housing Policy for Bukoba Town. Unpublished M.A. (Planning) Thesis, University of Nairobi, p.113.

11. West Lake Planning Project, op. cit p.II, 5 and Boesen, J. et al, op. cit, p.39.

12. Transportation, for the purpose of this study is defined by the following components:

    a. Terminals or nodes and related facilities of marketing and storage and their spatial organization.

    b. Linkages (road network, waterways and air routes) of the nodes.

    c. Modes of movement - motor vehicles, marine vessels, air-crafts, bicycles and foot.

    d. Bodies managing, regulating and controlling the utilization of terminal facilities, linkages, and modes of movement.

13. The Brookings Institution is an independent organization in U.S.A. devoted to non-partisan research, education and publication in economics, government, foreign policy and social sciences in general. Transport Research Programme is just one of the programmes undertaken by the Institution.

Under this programme a number of volumes have been written, as shown in notes 14 onwards.

14. Owen, W. (1964), Strategy for Mobility, op. cit.

15. Ibid. p.1.

16. Owen, W. (1967), Distance and Development. Brookings Institution, Washington D.C.

17. Ibid. chapter III.

18. See, for example,
Ed. Fromm, G. (1965), op. cit.
Ed. Haefele, E.T. (1969), Transport and National Goals, Brookings Institution, Washington D.C.
Hunter, H. (1968), Soviet Transport Experience: Its Lessons to other countries, Brookings Institution, Washington D.C.

19. Madungha, J.K. (1975), The Role of Roads in Rural and Regional Development in E.Africa: Case Studies in Kenya & Uganda, Unpublished M.A. (Planning) Thesis, University of Nairobi.

20. Alela, J.E.N. (1976), Road Transport Network as a means towards Economic Development: A Case Study of Kakamega District, Western Province, Unpublished M.A. (Planning) Thesis, University of Nairobi.

21. Hofmeir, R. op. cit.

22. Mkama, J. op. cit.

23. See for example,

Min. of Works (1975), Lake Victoria Circuit. Sect.5. Biharamulo - Bukoba. Vol.1, Preliminary Design Report, Alexander Gibb & Partners (Africa).

U.N.D.P.(1975), Kagera River Basin Development, Phase 2. Sectoral Studies: TRANSPORTATION, Norconsult A.S. & Electrowatt.

United Research Co. (1970), The Economic Feasibility of Improving two International Road Links in Tanzania, Dar es Salaam.

24. See list of abbreviations at the beginning of this volume.

25. Kamulali, T.W.P. (1976), A critical Review of the Integrated Five Year Development Plan (1975 - 80), East Lake Region, M.A. (Planning) Term Paper, Nairobi University, p.6.

26. Kamukala, G. (1976), op. cit.

27. Letters Ref. TDHQ/BKV/MTOK/I/Vol.2/73 of 28.7.1976 and TDHQ/BKV/MKH/Vol.2/60 of 2.1.76 from the District Party Secretary to Chief Tanu Executive Secretary, Dodoma.

28. Boesen, J. et al (1972), op. cit., map 3.

29. Ibid. pp. 6 - 7.

30. World Bank (1972), Agriculture, Sector Working Paper, p.4.

31. Hofmeir, R. (1973), op. cit. p.29.

32. Kibanja (sing.) bibanja (pl) local name for banana-cum-coffee shamba or plantation with a homestead in the centre.

33. Before independence in 1961 all bibanja belonged to the chiefs. In 1962 the land tenure changed in the whole country, and since then bibanja belong to individual families. A majority of the people in the study area still live in traditional villages. Ujamaa production is still insignificant in Bukoba District.

34. Omusiri (sing), emisiri (pl.) annual crop shambas or plots located in Rweya. Rweya is a local name for open grassland on the periphery of bibanja where annual crops production or grazing may take place.

35. Rinderpest outbreak spread all over Eastern Africa. It has been associated with the coming of Europeans by several writers. See, for example, Kamarck, A.M. (1967), The Economics of African Development, New York, pp.13-14.

36. Lindi Region Integrated Development Plan for 1975/76 - 1979/80, Finplanco Ltd., p.115.

37. Ibid. p.115.

38. Ngono Multi-Purpose Project, op. cit, p.125.

39. See Muller, J. op. cit, table 30.

40. World Bank (1972), Agriculture op. cit. p.20.

41. Kamukala, G. op. cit. table 31, p.43.

42. Min. of Agriculture, West Lake (1976), Annual Report. 1975. p.14.

43. Ibid. p.22.

44. West Lake Planning Project, op. cit. p.II.28.

45. Mkama, J. op. cit. p.9.

46. Ibid. Fig.1.

47. Ibid. p.16.

48. Muller, J. op. cit. p.15.

49. A"low-cost-road" was defined as one which having regard to considerations of climate and design has been located and built to geometric standards commensurate with bases and surface to meet the present traffic requirements. It is, however, one which should be so designed, constructed and maintained that it allows for stage construction when traffic requires it and economic feasibility conditions permit". Development Plan for Tanganyika. Govt. Printer, Dar es Salaam, p.29.

50. Ibid.

51. Hofmeir, R. op. cit, p.81.

52. Ibid. p.81.

53. Kamukala, G.L. op. cit. p.8.

54. O'Connor, A.M. (1965), Railways and Development in Uganda. Nairobi, p.5.

55. E.A.R.H. Magazine (1959), p.11.

56. West Lake Planning Project, op. cit. See also Muller, J. op. cit. Appendix A.

57. U.N. (1975), Kagera River Basin Development. Phase 2: TRANSPORTATION. Norconsult & Electrowatt, p.2 - 8.

58. Central Registry of Motor Vehicles, Consolidated Motor Vehicle Registration Reports, 1966 - 8.

59. Lyons Associates (1972), Economic and Engineering Study. Tanzania. Highway and Maintenance and Organization. Min. of Communications, Transport and Labour, Dar es Salaam.

60. Hofmeir, R. op. cit. p.112.

61. U.N. (1975), Kagera River Basin Development Phase 2. Transportation. op. cit, p. 2-6.

62. Caspain Company stopped services between Mwanza and Bukoba in Feb., 1977 when the border between Tanzania and Kenya was closed. The company is based in Nairobi, and some of its aircrafts were impounded as a result of the border closure. At present, therefore, Bukoba airport has no air-craft services.

63. The Committee for Ngono Self-Reliance Project, Ngono Self-Reliance Project. Bukoba, chapter 2.

64. Owen, W. (1969), Strategy for Mobility, op. cit. p.1.

65. Ibid. p.1.

66. Owen, W. (1967), Distance and Development, op. cit p.1.

67. See for example,
Chisholm, M. (1968), Rural Settlement and Land Use, Hutchinson University Library, London.

Dunn, E.S. (1967), The location of Agricultural Production, University of Florida Press, Gainesville.

Brinkmann, T. (1935), Economic of Farm Business, University of California Press, Berkeley.

68. Chisholm, M. op. cit.

69. Ibid. pp.43-44.

70. Wiiala, A. (1948), Uudistuon Vaikutuksesta Jokokunnan Maatalouteen.

71. Chisholm, M. op. cit. p.49.

72. Ibid. p.49.

73. Virmi, T.J. (1946), "Maanjako-olejen Vaikutuksesta Maatalonstuotantoun" in Maatalons Agronomien Yhdistyksen Julkaisu, pp.6-11.

74. Soumela, S. (1950), "Pettojen Sijainnin Vaikutuksesta Maatilan Talouteen" in Acta Agralia Fennica, No.71, p.146.

75. Chisholm, M. op. cit. p.50.

76. A strategy is not a plan, as there are no proposals for targets, concrete projects, detailed allocation of resources, including time. It is simply a framework or guideline for future planning.

77. The Arusha Declaration and Tanu's Policy on Socialism and Self-Reliance, Publicity Section, Tanu, DSM, 1967, p.13.