

UNITED REPUBLIC OF TANZANIA

KILIMANJARO REGION INTEGRATED DEVELOPMENT PLAN

MAIN REPORT: VOLUME THREE

October 1977

JAPAN INTERNATIONAL COOPERATION AGENCY



Summary

Introducing the Lands and the Peoples
The Kilimanjaro Today
Integrated Development Plans
Industrial Development Plans
Community Development Plans
Regional Infrastructure Development Plans
Implementation Plans
District Development Index

Volume One

Introduction
Planning Environments
Existing Conditions
Goals Systems
Orientation and Strategy
Land-Use Plan
Human Settlement Plan

Volume Two

Nature Conservation
Water Resources
Agriculture
Industry
Tourism

Volume Three

Transportation and Communications
Public Utilities
Town and Village
Social Services
Manpower
Financial Administration

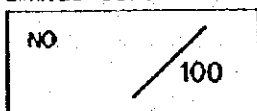
Overseas Technical Cooperation:

JAPAN INTERNATIONAL COOPERATION AGENCY

Consultants:

EPDC INTERNATIONAL
JAPAN CITY PLANNING
YACHIYO ENGINEERING

LIMITED COPY



Printed in Japan
October, 1977

JICA LIBRARY



1063496[2]

KILIMANJARO REGION INTEGRATED DEVELOPMENT PLAN

MAIN REPORT: **VOLUME THREE**

TRANSPORTATION AND COMMUNICATIONS
PUBLIC UTILITIES
TOWN AND VILLAGE
SOCIAL SERVICES
MANPOWER
FINANCIAL ADMINISTRATION

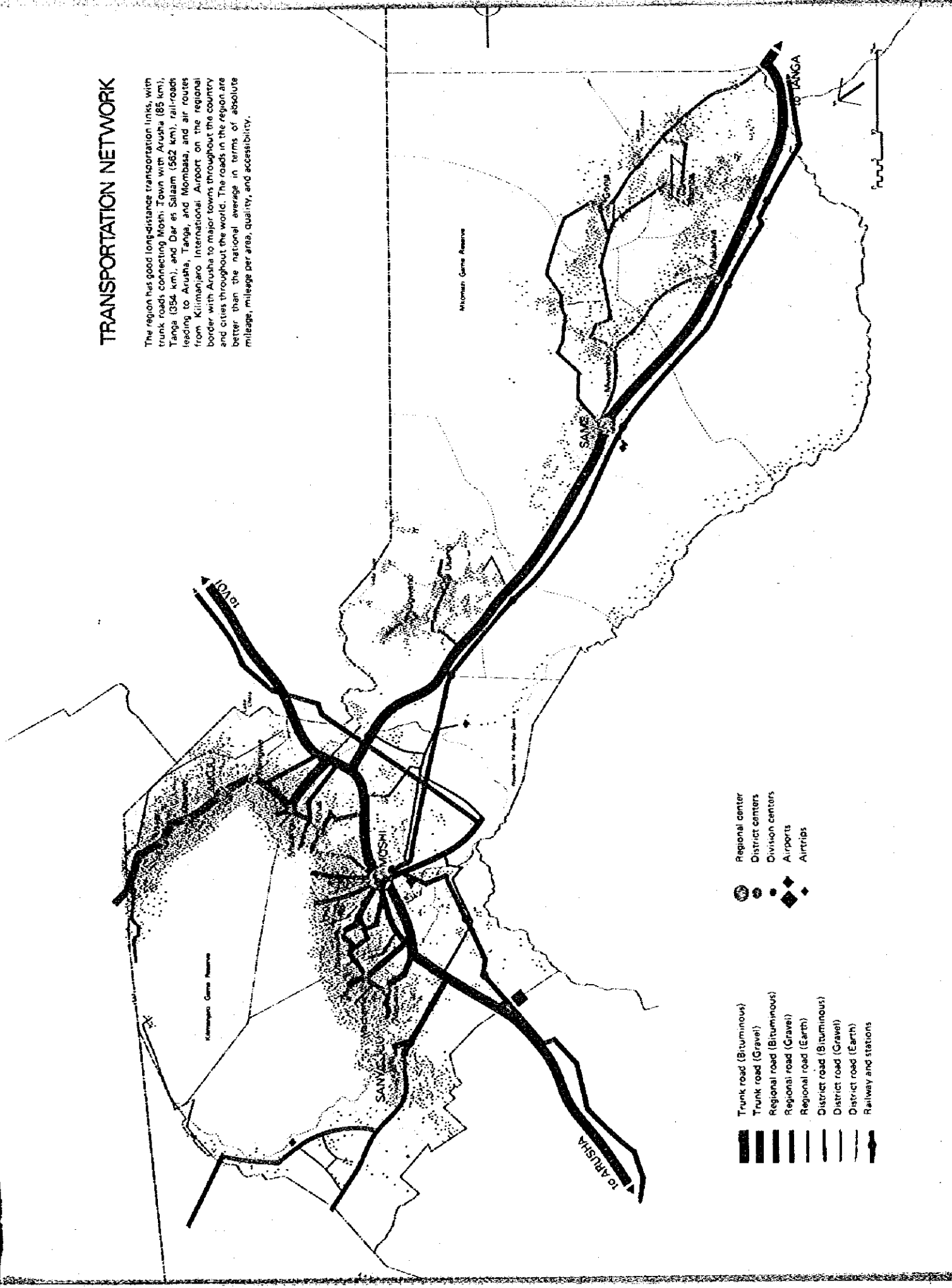
国際協力事業団	
受入 月日 '84. 3. 23	416
	36
登録No. 01864	PLC

KILIMANJARO IDP
TRANSPORTATION AND COMMUNICATIONS

12

TRANSPORTATION NETWORK

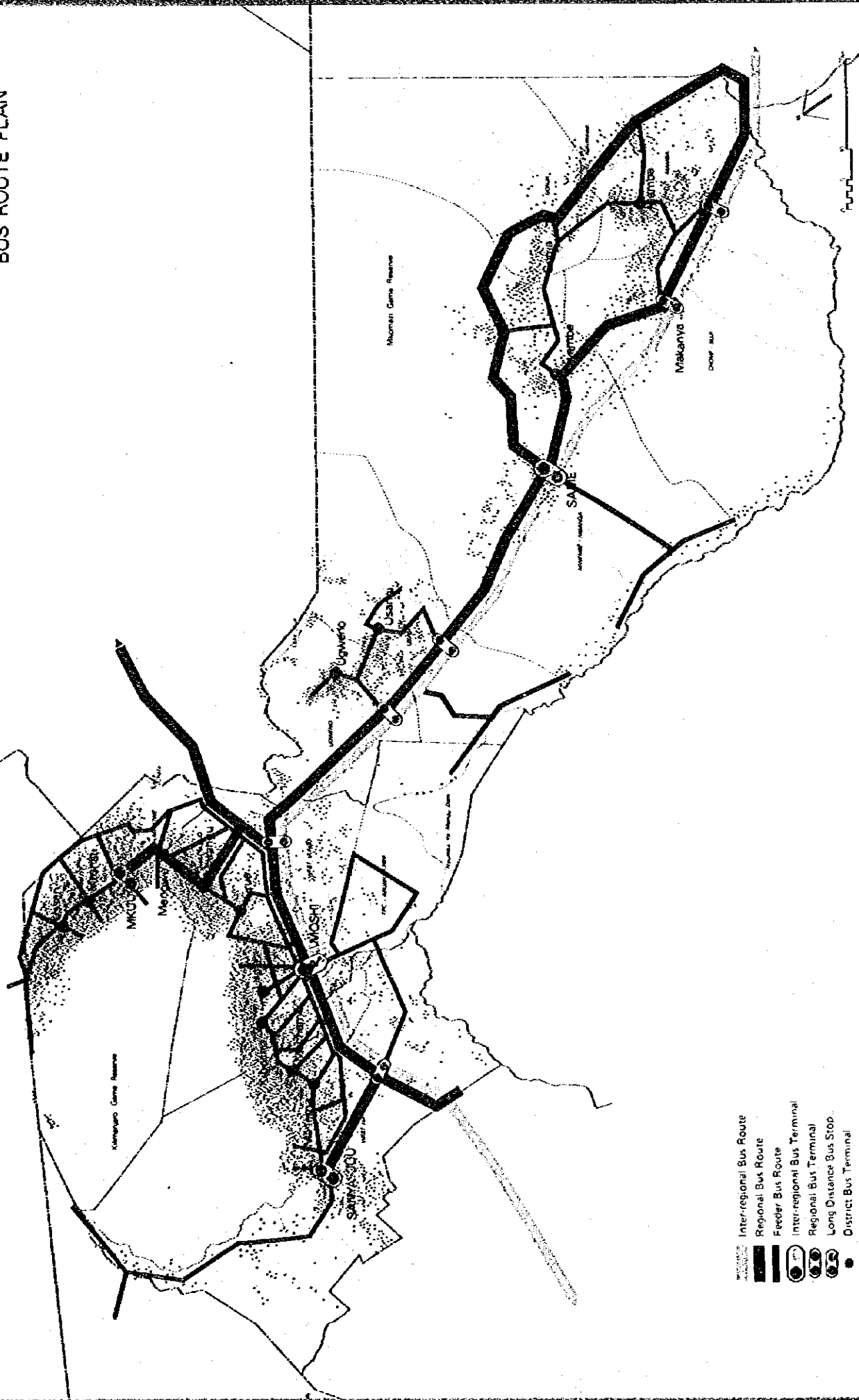
The region has good long-distance transportation links, with trunk roads connecting Moshi, Tanga with Arusha (85 km), Tanga (354 km), and Dar es Salaam (562 km), rail-roads leading to Arusha, Tanga, and Mombasa, and air routes from Kilimanjaro International Airport on the regional border with Arusha to major towns throughout the country and cities throughout the world. The roads in the region are better than the national average in terms of absolute mileage, mileage per area, quality, and accessibility.



- Regional center
- District centers
- Division centers
- Airports
- Airtrips

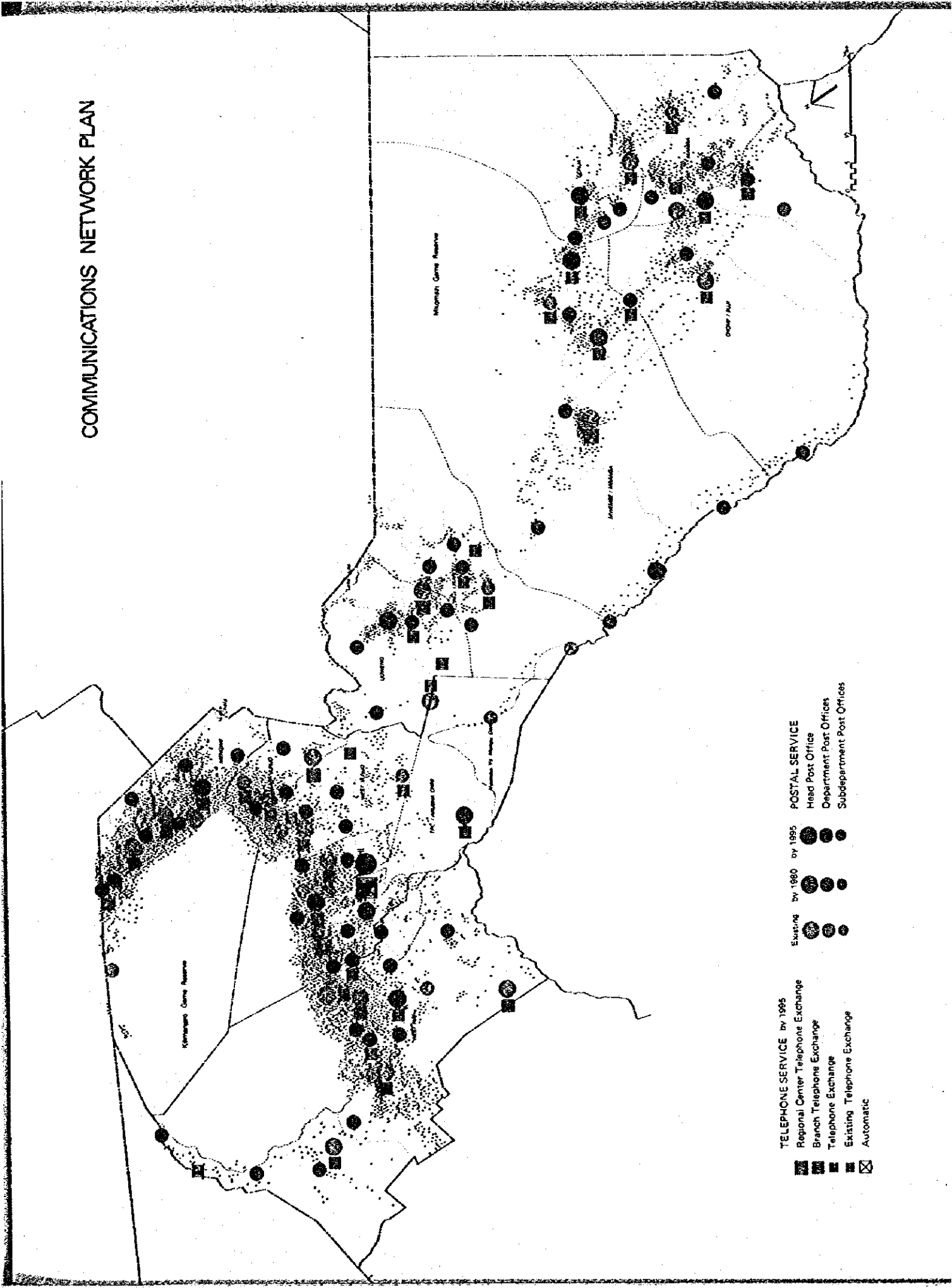
- Trunk road (Bituminous)
- Trunk road (Gravel)
- Regional road (Bituminous)
- Regional road (Gravel)
- Regional road (Earth)
- District road (Bituminous)
- District road (Gravel)
- District road (Earth)
- Railway and stations

BUS ROUTE PLAN



- Interregional Bus Route
- Regional Bus Route
- Feeder Bus Route
- Interregional Bus Terminal
- Regional Bus Terminal
- Long Distance Bus Stop
- District Bus Terminal

COMMUNICATIONS NETWORK PLAN



TRANSPORTATION AND COMMUNICATIONS

Contents

	Page
1. ANALYSIS OF PRESENT CONDITIONS	1
1.1 Present Condition of Long-distance Traffic	1
1.2 Present Traffic Situation in the Region	17
1.3 Present Condition of Roads in the Region	34
1.4 Present Condition of Communications Services	49
2. PLAN OBJECTIVES AND BASIC GUIDELINES	57
2.1 Objectives of Plan	58
2.2 Long-term Plan for Road Network	59
2.3 Long-term Plan for Bus Service	65
2.4 Long-term Plan for Railway	68
2.5 Long-term Plan for Communications Network	76
3. FIVE-YEAR PLAN	79
3.1 Road Network Plan	80
3.2 Bus Service Plan	96
3.3 Railway Plan	99
3.4 Communications Network Plan	101

1. ANALYSIS OF PRESENT CONDITIONS

1.1 Present Condition of Long-Distance Traffic

The Kilimanjaro Region, located in the north-east part of Tanzania with its border adjoining that of Kenya, has an old history of development. Forming a part of a corridor in the north of Tanzania, this region has a well developed traffic network.

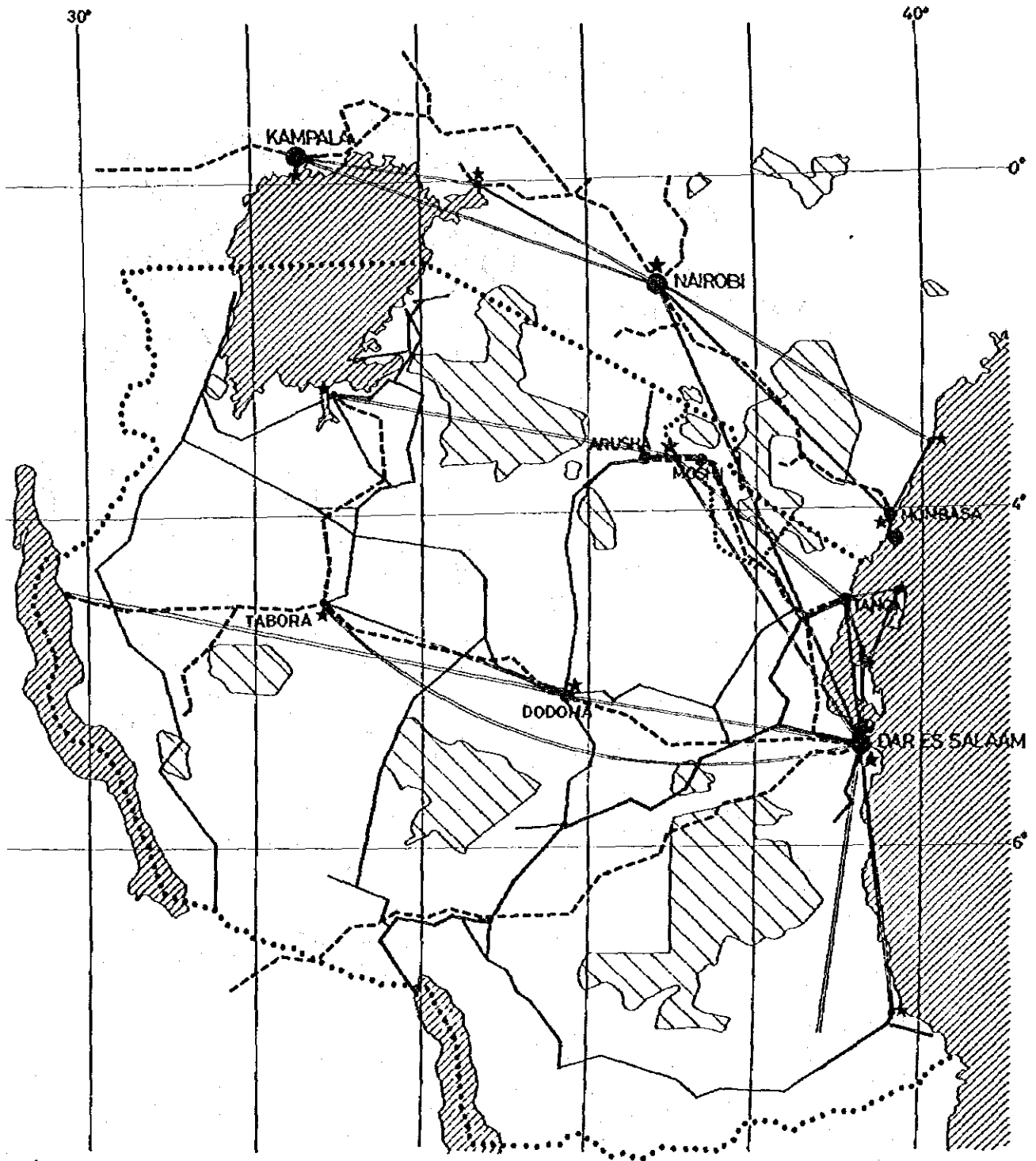
Aviation routes run throughout the country with modernized Kilimanjaro Airport at the hub. The railway system constitutes a base of East Africa Railways from which the lines branch out for Mombasa, Tanga and Arusha. Nationwide main roads run throughout the country, providing major interregional traffic networks.

(1) Aviation

The Kilimanjaro Region used to have an airport in Moshi Town for transportation of passengers and cargoes, but this has been replaced by Kilimanjaro Airport since the latter's opening in 1971. The Kilimanjaro Airport, which is located at the border between the Kilimanjaro and Arusha Regions, has the most modern facilities in Tanzania, with its runway extending to 3,600m. The annual number of embarking and disembarking passengers is about 40,000. Although this figure is gradually increasing it is still small compared with the present number of flights. Considering that it is favorably positioned at the main entrance to the sight-seeing area in the north of Tanzania, the number of passengers using this airport will prospectively increase, depending on the extent of the sight-seeing development to be made in the future.

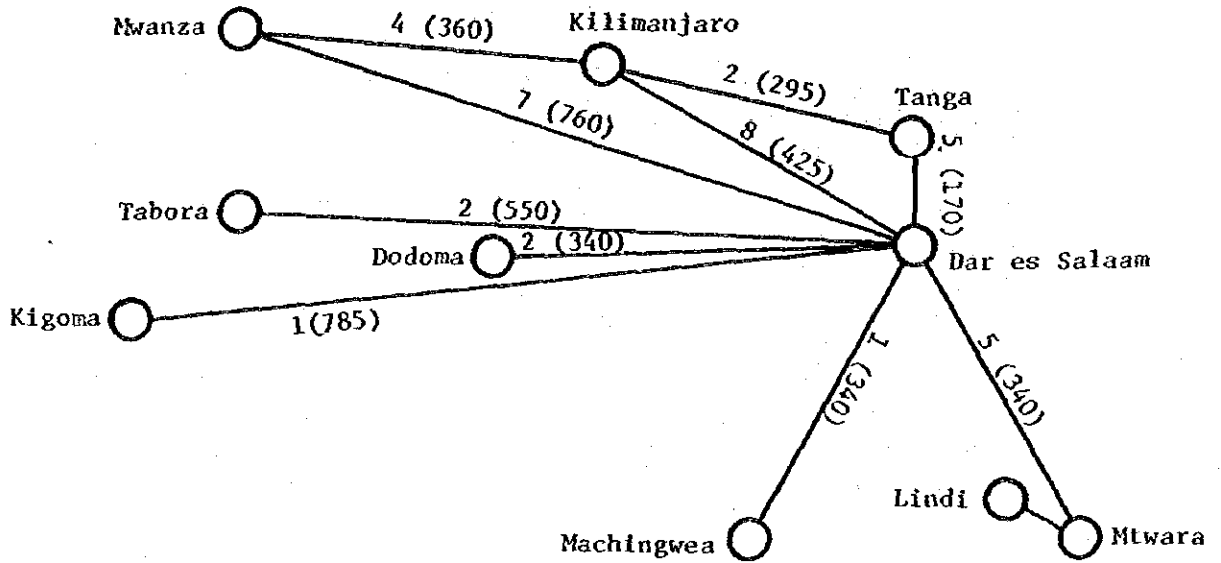
The air routes to and from this airport used to be operated by the East African Airways Corporation. Earlier this year, however, it was disbanded, and now the Tanzania Airways Company operates 14 flights a week to Mwanza, Tanga, and Dar es Salaam.

Interregion Transport Network (Fig.-1)

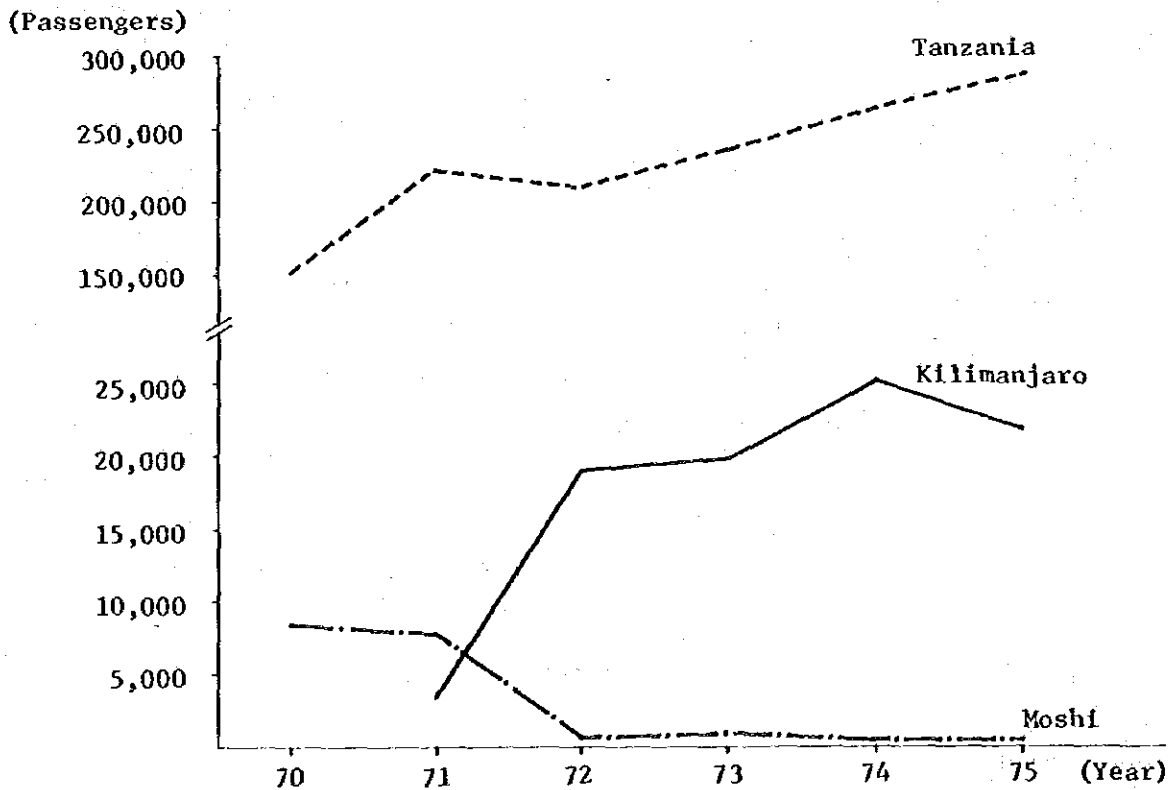


- ★ ★ Airport
- Railway
- Bitumen Road
- Gravel Road
- ▨ National Park
- International Boundary
- Regional Boundary

Airline Service Network (Fig.-2)



Number of Passengers (outgoing) (Fig.-3)



Source: Bureau of Statistics, from aircraft landing returns supplied by the Ministry of Works and the East African Directorate of Civil Aviation

Air Traffic Statistics (Table-1)

Airport	Number of passengers					Loaded (kg.)					Movement				
	Year		Rate of increase %		Total	Freight		Rate of increase %		Total	Rate of increase %	Number of flights	Rate of increase %		
	Embarcked	Disembarcked	Loaded	Unloaded		Loaded	Unloaded	Loaded	Unloaded						
Kilimanjaro	70	-	-	-	-	-	-	-	-	-	-	-	-		
	71	3,321	3,129	6,450	1.0	17,112	29,874	46,986	1.0	7,070	5,156	12,226	1.0	701	1.0
	72	19,068	18,400	37,468	5.8	180,627	228,933	409,560	8.7	30,369	37,367	67,736	5.5	3,546	5.1
	73	19,839	19,312	39,151	6.1	195,177	200,022	395,199	8.4	39,902	48,766	88,668	7.3	3,452	4.9
	74	25,920	20,091	46,011	7.1	176,692	132,991	309,683	6.6	29,325	34,675	64,000	5.2	3,848	5.5
75	21,894	20,622	42,516	6.6	406,193	170,632	576,825	12.3	38,489	22,215	60,704	5.0	3,857	5.5	
Moshi	70	8,361	7,851	16,212	1.1	60,318	65,078	125,396	0.7	1,545	20,714	22,259	0.8	2,142	1.3
	71	7,303	6,808	14,111	1.0	33,582	56,583	90,165	1.0	12,669	16,594	29,263	1.0	1,703	1.0
	72	338	319	657	0.05	-	-	-	-	-	-	-	-	296	0.2
	73	632	650	1,282	0.1	-	-	-	-	-	-	-	-	441	0.3
	74	422	410	832	0.1	-	-	-	-	-	-	-	-	324	0.2
75	397	446	843	0.1	-	-	-	-	-	-	-	-	372	0.2	
Tanzania	70	150,924	154,079	305,003	0.7	2,452,685	3,163,263	5,615,948	1.0	479,756	652,552	1,132,308	1.0	35,342	1.0
	71	218,010	191,926	409,936	1.0	2,488,552	3,328,782	5,817,334	1.0	460,451	621,651	1,082,102	1.0	37,197	1.0
	72	208,624	203,267	411,991	1.0	2,483,192	3,384,697	5,867,889	1.0	435,871	633,186	1,069,057	1.0	33,053	0.9
	73	232,437	219,775	452,212	1.1	2,435,519	3,980,548	6,416,067	1.1	424,060	539,220	963,280	0.9	33,268	0.9
	74	262,213	248,904	511,117	1.2	2,526,516	3,713,195	6,239,711	1.1	440,885	809,268	1,250,153	1.2	42,210	1.1
75	280,759	271,859	562,618	1.4	2,797,144	4,405,444	7,202,588	1.2	431,522	492,239	923,761	0.9	45,051	1.2	

* When a plane lands, it is one flight. When it takes off, it a second flight.

Source: Bureau of Statistics, from aircrafts landing returns supplied by the Ministry of Works and the East African Directorate of Civil Aviation.

(2) Railways

Moshi, the center of Kilimanjaro Region, occupies an important position in the north of Tanzania as a juncture of Tanga Line, Voi Line and Arusha Line of East African Railways.

Distance between Moshi and other Towns.

Arusha	85km
Tanga	350
Dar es Salaam	636
Nairobi	536
Mombasa	339

Of these lines, the Tanga line is the oldest, having been first laid between Moshi and Tanga in 1911 when the country was a colony of Germany. Other lines also have histories of several decades. Railways transportation plays a considerably important role in land transportation. The total number of passengers using railway transportation in Tanzania is still showing an increasing trend as a whole and so is the transportation volume of cargo. However, the number of both passengers and cargo using Moshi Station has been decreasing since 1973, its peak year.

The main reason for this decline is the temporary shutdown of the Voi line in 1974 and its permanent shutdown the following year, but there is also the fact that poor maintenance condition of locomotives has caused a decline in carrying capacity.

In railway transportation, cargo is handled with a higher ratio than passengers, the latter income amounting only to 15% of that of the former. (This figure comes down to less than 10% in Tanzania as a whole.) The railway does not seem to be a favorable means of transportation for passengers because it requires a longer travelling time than either automobiles or long-distance buses and, also, because its time schedule is not stable.

Among the items of cargo shipped from Moshi Station, coffee ranks as the highest in quantity. Following this are agricultural products such as maize, timber, wheat, etc. of the items of cargo shipped to Moshi Station, cement, fertilizers, and insecticides figure prominently.

Moshi Station Statistics (Table-2)

	1970	1971	1972	1973	1974	1975	1976
Passenger							
No. of passengers	65,205	79,765	93,692	114,280	100,548	67,514	58,093
Revenue	504,262	621,245	771,851	1,124,571	1,901,114	1,391,598	1,483,037
Goods							
Forwarded . Tons	71,152	74,820	79,425	94,035	48,137	50,754	46,740
. Revenue	3,849,138	3,740,035	4,809,534	6,484,918	4,542,439	5,065,719	5,304,404
Received . Tons	99,539	92,850	100,163	100,450	95,981	57,364	30,134
. Revenue	4,911,002	4,928,147	4,603,820	5,025,457	5,096,714	4,637,114	2,836,319
Totals . Tons	173,546	169,858	180,891	196,229	145,206	108,956	77,957
. Revenue	8,769,986	8,706,687	9,511,659	11,541,557	9,702,447	9,871,907	9,323,420

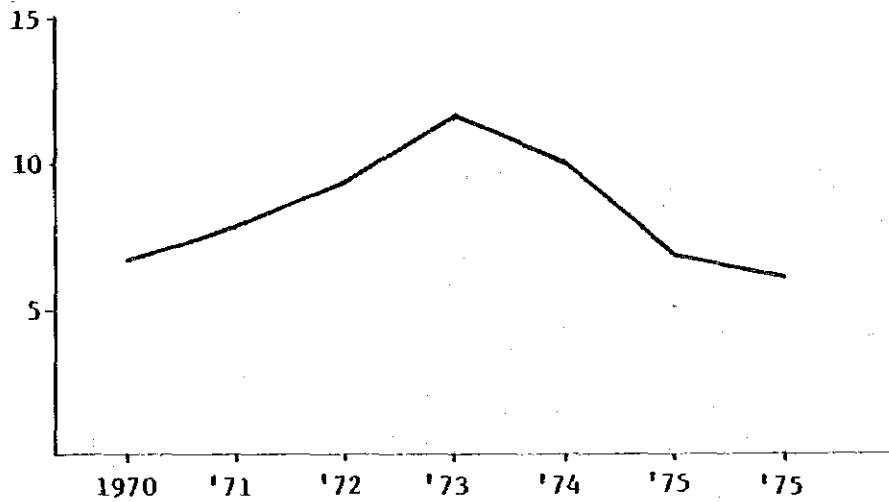
Note: (i) Unit of revenue: sh.

(ii) The difference between the total amount and the amount of forwarded and received goods is the amount of transfer.

Source: Moshi Station data.

Passengers at Moshi Station (Fig.-4)

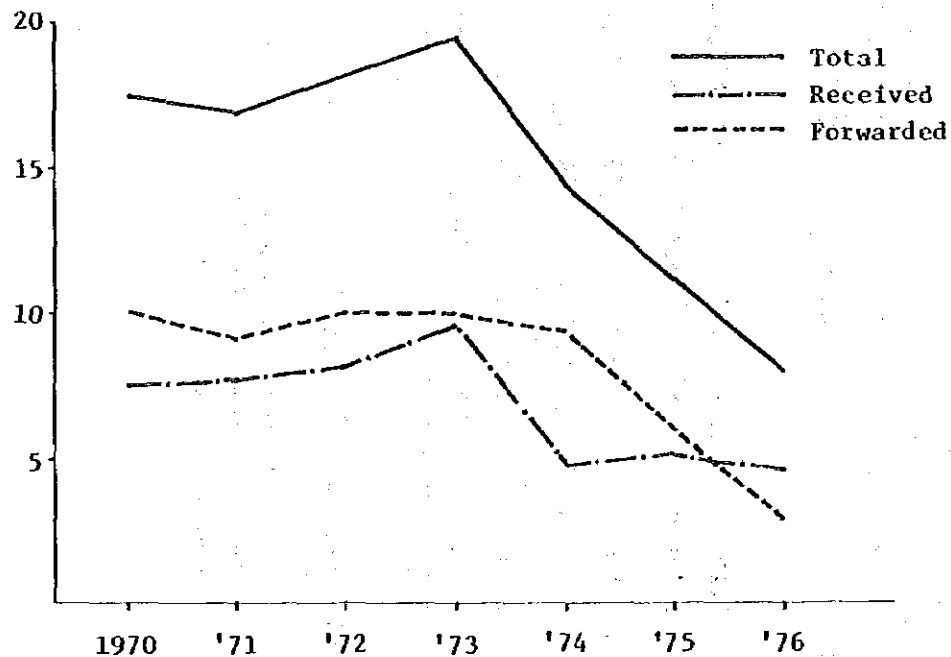
(1,000 persons)



Source Moshi Station Data

Freight Handled at Mosh Station (Fig.-5)

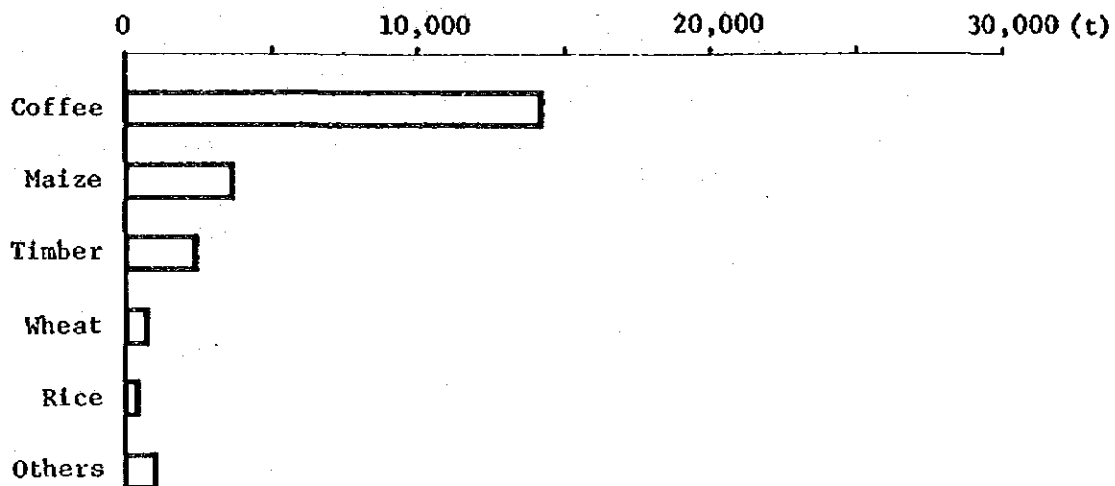
(1,000 t)



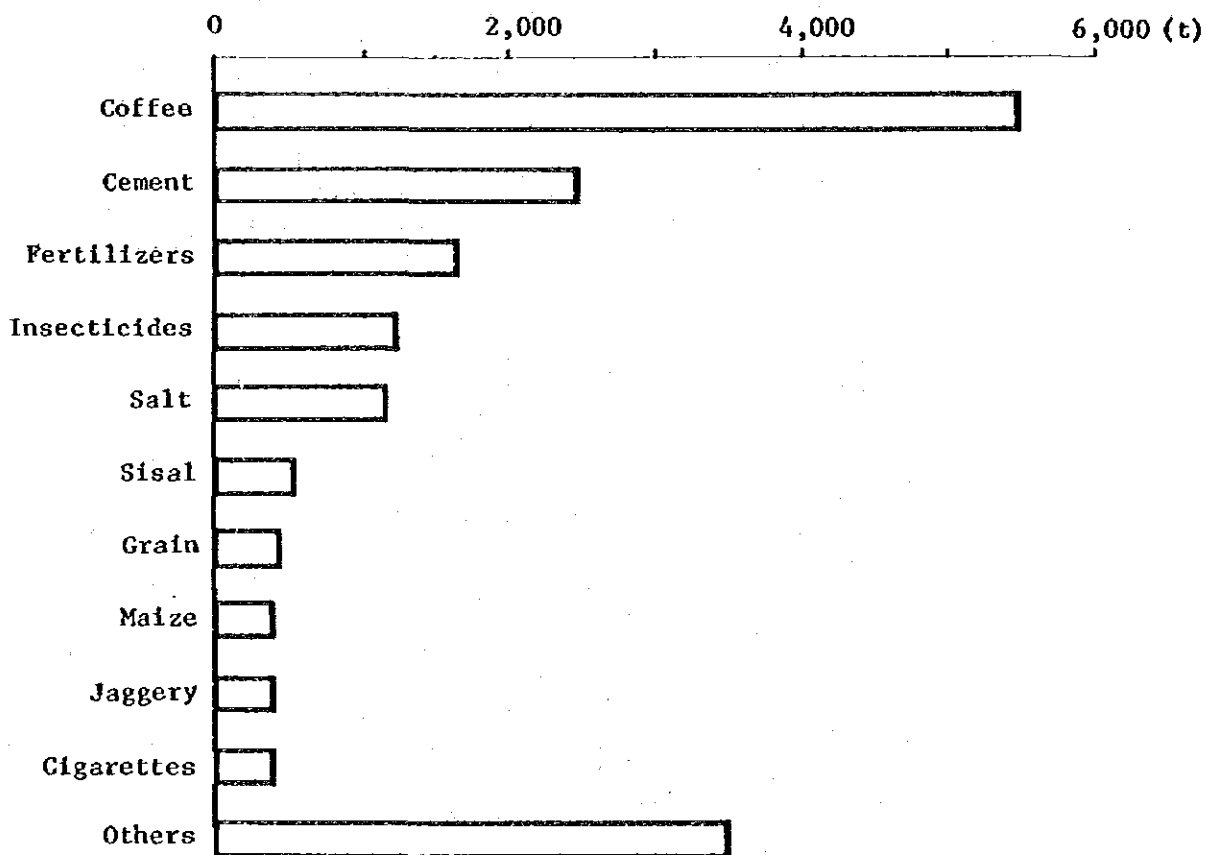
Note The difference between the tota amount and the amount forwarded and received is the amount of transfer.

Source Moshi Station Data

Main Commodities Forwarded at Moshi Station (1976) (Fig.-6)

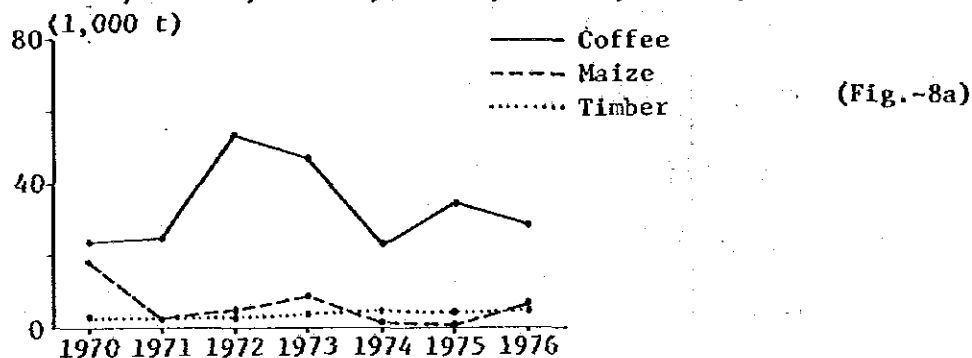


Main Commodities Received at Moshi Station (1976) (Fig.-7)



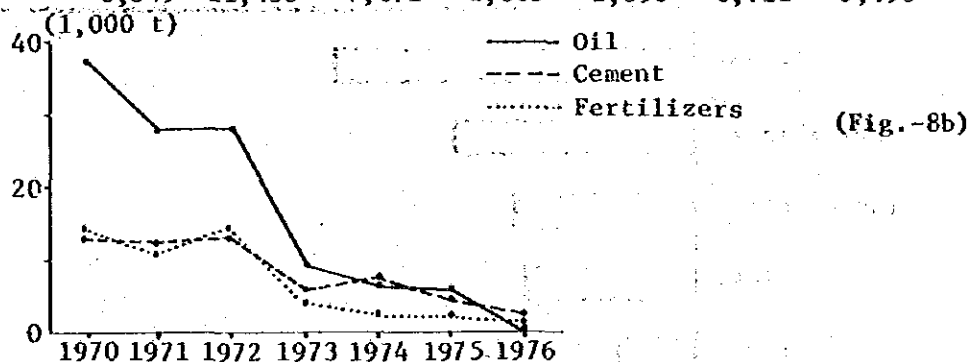
Main Commodities Forwarded at Moshi Station (Table-3)

	1970	1971	1972	1973	1974	1975	1976
Coffee	24,417	25,308	63,443	47,642	22,912	34,026	28,583
Maize	18,501	3,252	5,187	9,427	1,699	792	7,161
Timber	3,088	3,063	3,794	4,325	5,115	5,049	5,024

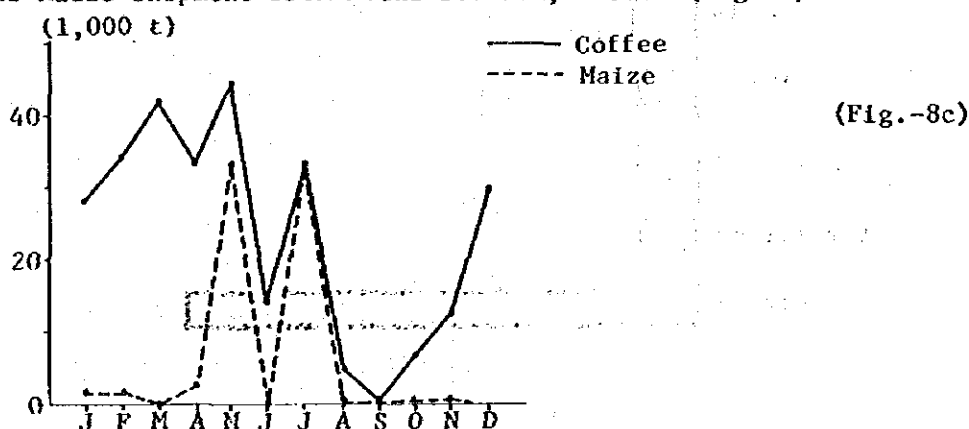


Main Commodities Received at Moshi Station (Table-4)

	1970	1971	1972	1973	1974	1975	1976
Oil	37,740	28,004	28,386	9,216	6,569	6,276	209
Cement	13,069	12,777	13,221	6,559	7,581	4,950	2,503
Fertilizers	14,685	11,269	14,228	4,520	2,854	2,601	1,711
Coffee	6,849	11,438	7,671	2,665	2,398	6,711	5,490



Coffee and Maize Shipment from Moshi Station, 1976 (Fig.-8)

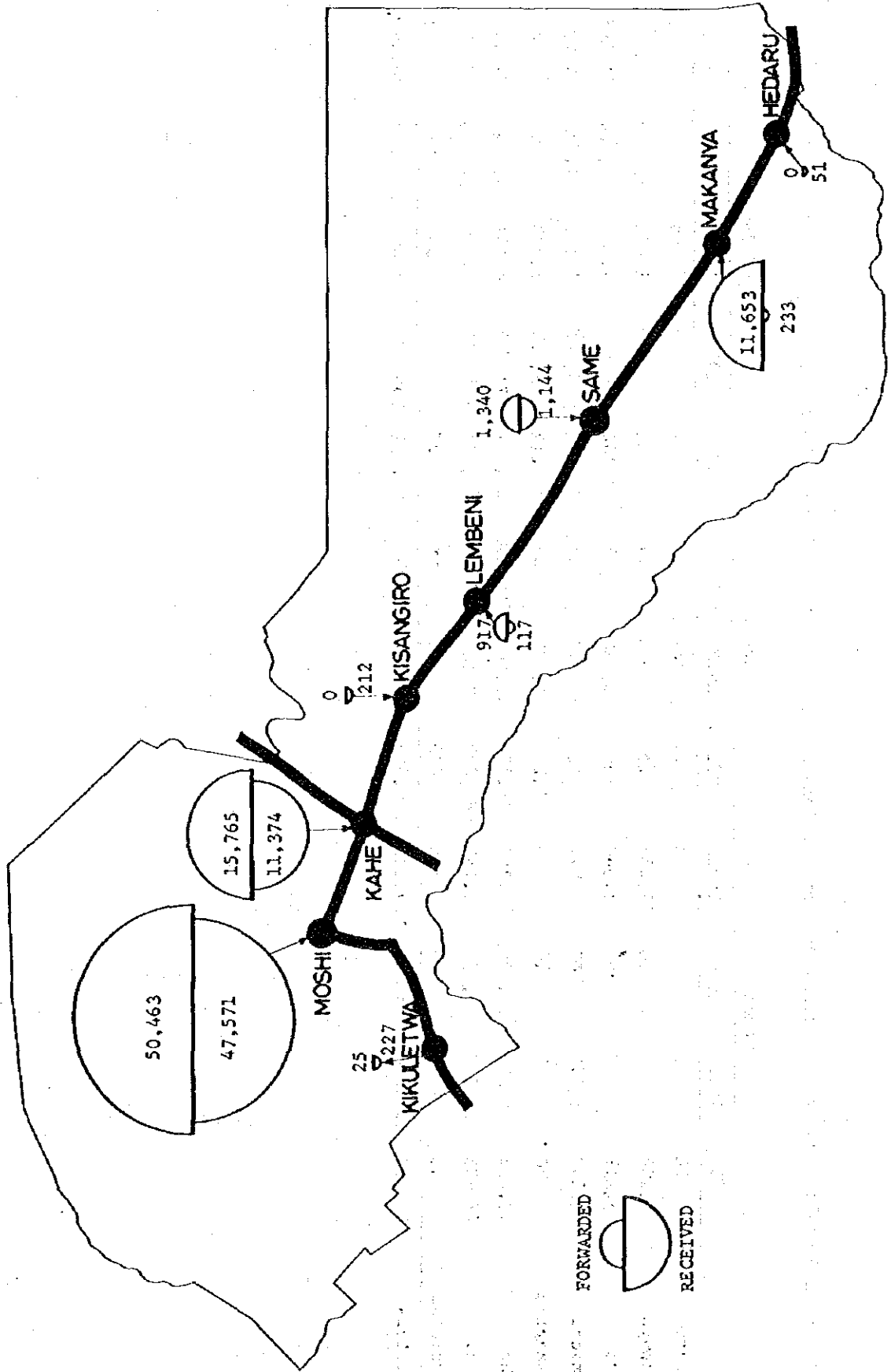


Amounts of Freight Handled at Various Railway Stations in the Kilimanjaro Region (Table-5)

(Tons)

	Forwarded					Received					Total				
	1972	1973	1974	1975	1976	1972	1973	1974	1975	1976	1972	1973	1974	1975	1976
Hedaru	20	6	57	0	44	89	134	194	51	64	95	191	51		
Makanya	8,106	11,326	13,136	11,653	257	346	194	233	233	8,363	11,672	13,330	11,886		
Same	3,119	1,032	699	1,340	699	3,880	2,752	1,144	1,144	4,459	9,657	3,784	1,843		
Lembeni	2,597	1,272	900	917	411	241	141	117	117	3,008	1,513	1,041	1,034		
Kisangiro	20	1	10	0	1,204	1,222	493	212	212	1,224	1,223	503	212		
Kahe	53,612	56,591	35,706	15,765	18,190	11,560	15,250	11,374	11,374	71,802	68,151	50,956	27,139		
Moshi	77,936	93,233	47,572	50,463	87,283	72,106	83,851	47,571	47,571	165,219	165,339	131,423	98,034		
Kikuletwa	140	-	28	25	825	830	582	227	227	965	830	610	252		
Totals	145,550	168,206	98,441	79,522	109,554	90,274	103,397	60,929	60,929	255,104	258,480	201,838	140,451		

Amount of Freight Handled at Various Railway Stations in the Kilimanjaro Region in 1975 (Fig.-5)

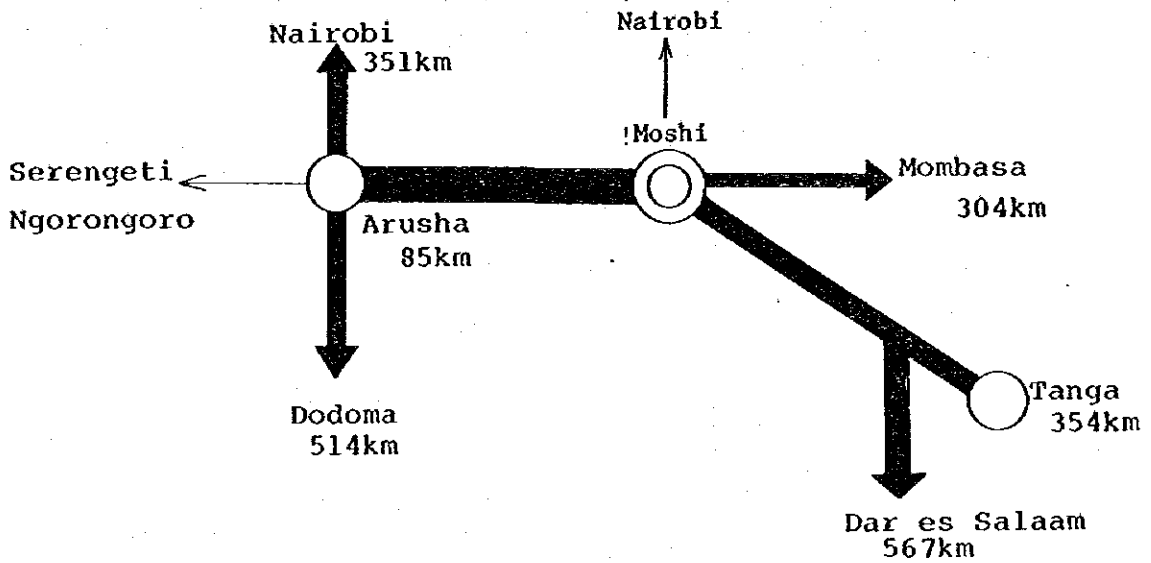


(3) Trunk roads

The Kilimanjaro Region, forming a part of the traffic axis in northern Tanzania, has paved trunk roads with proper alignment, allowing high speed driving of 100 km/hr.

The traffic volume on trunk roads although it has not been showing any noticeable increase from a regionwide point of view, is showing a considerable increase on the Tanga - Moshi - Arusha route except for the area bordering Kenya where it is somewhat decreasing.

	Course	Vehicles per day	
		1971	1974
International Traffic Volume	Nairobi	120	50
	Mombasa	150	70
Regional Traffic Volume	Tanga	250	200
	Arusha	1,000	1,100



(4) Harbors

Although Tanzania has several other harbors, including Tanga and Mtwara, that of Dar es Salaam is by far the largest in all respects, including the scale of facilities and the amount of cargo handled. In fact, it handles more than half of domestic cargo and services not only the whole country but also other countries farther inland.

The nearest port to the Kilimanjaro Region is the port of Tanga, which accounted for 6.6% of Tanzania's imported cargo in 1975, or 217,000 DWT, and 14.4% of its exported cargo, or 162,000 DWT. In 1976 the main imports were raw materials for industrial use and industrial products, and the main exports were sisal, coffee, tea, beans, cardamon, and other agricultural products. At present almost all of the country's coffee exports are by way of this port.

Since there are no berths for large vessels at Tanga Port, cargo has to be carried to and from anchorage by lighters. There is however, a multipurpose jetty being used by a fertilizer plant that can accommodate vessels with draughts of up to 14.5m.

The Kilimanjaro Region is linked to Tanga by both railway and road routes, and with the continuing development of it, Arusha, and other inland regions, this port will become increasingly important. Moreover, since the development of the port will also have a positive effect on the development of such regions, such port development should be encouraged.

Shipping Statistics (Table-6)

	Dar es Salaam					Tanga					Total All Ports				
	1971	1972	1973	1974	1975	1971	1972	1973	1974	1975	1971	1972	1973	1974	1975
Shipping															
Number of ships	977	1,031	991	965	1,016	376	450	379	357	379	1,496	1,666	1,554	1,512	1,586
Net registered tonnage (NRT)	3,391	3,676	3,687	3,362	3,835	1,584	1,630	1,492	1,388	1,505	5,250	5,713	5,474	5,043	5,558
Passengers															
Total passengers	50,788	50,542	62,055	47,958	49,018	352	95	374	80	259	52,071	57,076	72,085	59,830	78,706
Cargo Dealt with (1,000 D.W.T.)															
Imports															
Dry general cargo	883	950	796	1,144	1,231	94	57	66	122	140	1,003	1,043	907	1,313	1,420
Bulk fertilizer	-	-	-	-	-	-	32	61	105	51	-	32	61	105	51
Bulk cement	73	27	-	-	3	-	-	-	-	-	84	36	2	11	8
Bulk oils	1,062	1,324	1,596	1,698	1,772	23	21	21	26	26	1,108	1,364	1,633	1,744	1,816
Total Imports	2,018	2,301	2,392	2,842	3,006	117	110	148	253	217	2,195	2,475	2,603	3,172	3,295
Exports															
Dry general cargo	623	613	651	600	684	171	144	131	142	162	891	886	890	861	948
Bulk oils	139	213	169	249	179	-	-	-	-	-	139	213	169	249	179
Total Exports	762	826	820	849	863	171	144	131	142	162	1,030	1,099	1,059	1,110	1,127
Imports + Exports Total	2,780	3,127	3,212	3,691	3,869	288	254	279	395	379	3,225	3,574	3,662	4,282	4,422
Trans-shipment	10	2	2	6	2	4	3	1	-	1	24	6	3	8	3
Total all cargo	2,790	3,129	3,214	3,697	3,871	292	257	280	395	380	3,249	3,580	3,665	4,290	4,425

Source: East African Harbours Corporation

Principal Exports and Imports at Tanga Port, 1976 (Table-7)

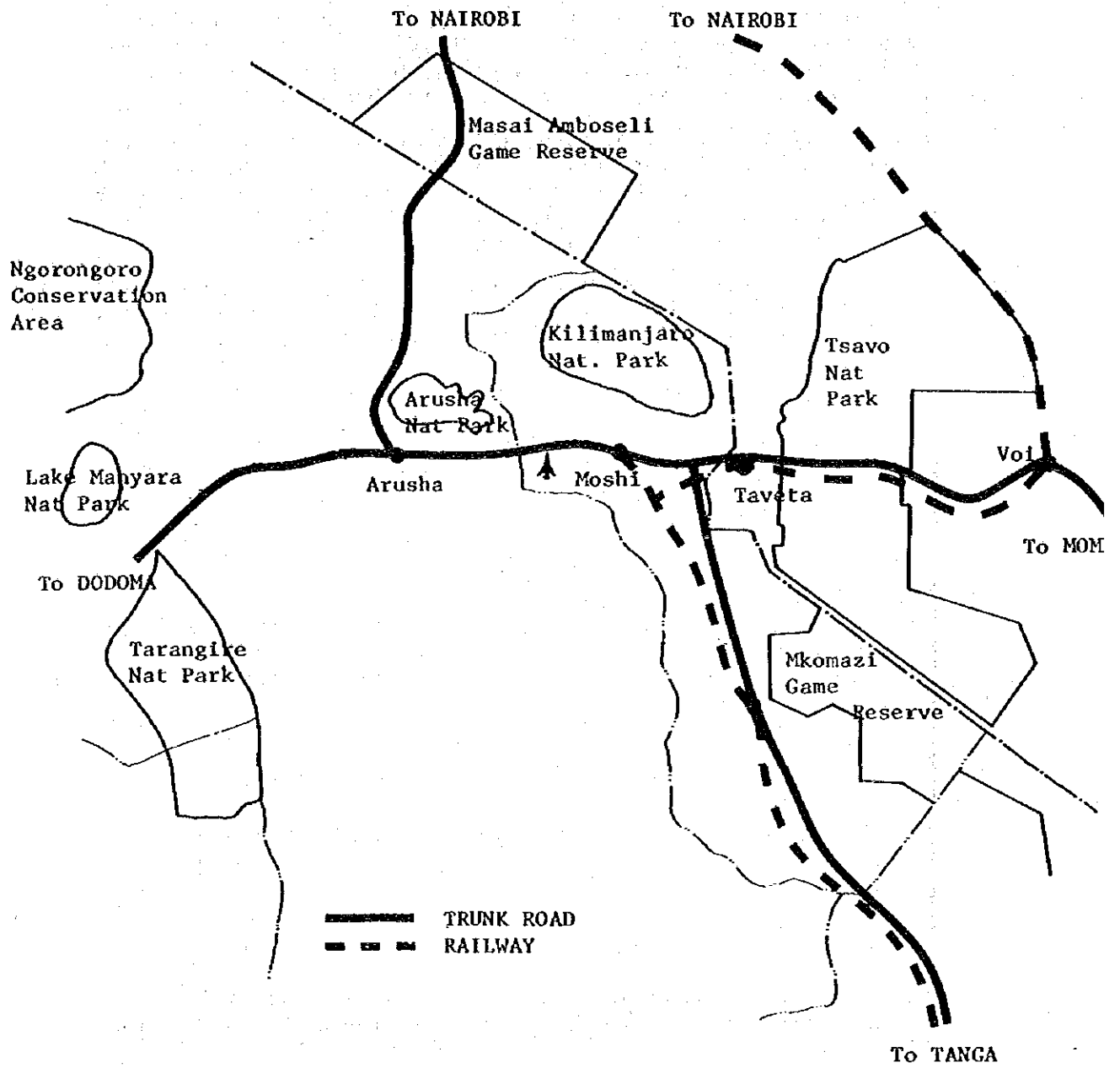
Exports		Imports	
		(Harbour Tons)	
Sisal	94,757	Fertilizers	64,074
Coffee	63,933	Machinery parts	2,272
Sisal rope twine	32,920	Cement	7,758
Tea	11,260	Tallow	30,331
Beams & peas	13,420	Iron and steel	15,796
Timber F/blocks	2,931	General cargo	29,024
Hides and skins	1,355	Bulk oils	19,954
Seed	3,058	Bales twills cunny bags	14,097
Cardamoms	5,036	Component parts for radios	3,156
		Marine oil fat	1,570
		Piece goods	5,824

(5) Sightseeing Traffic

The Kilimanjaro Region is included, together with Arusha Region, in the Northern Sightseeing Circuit of Tanzania. Running through the region from east to west are Mkomazi Game Reserve, Kilimanjaro National Park, Mt. Meru Game Reserve, the three national parks of Arusha, Tarangin and Lake Manuyara, Ngorongoro Game Reserve and Selengetti National Park, etc. The natural landscapes of these areas and the wild animals preserved in the said preserves or national parks offer primary objects for sightseeing. These areas are Tanzania's most abundant sightseeing resources.

The number of people visiting the four national parks on the Northern Sightseeing Circuit reached 244,000 in 1975 and has continued to increase since then. The seasonal statistics on these sightseers indicate that because of the heavy rainy season (March - May) and the light rainy season (November - January), sightseer visits are concentrated in the months January - March and July - September. In 1972, many of the sightseers who entered Tanzania came from Kenya (40.1%). The traffic means used by them were mostly automobiles (49.7%) and airplanes (42.3%). The ratio of people entering from the northern border was 47.7%, while that of people directly entering Moshi was only 0.9%. This indicates the importance of Kilimanjaro International Airport as a starting point for the Northern Sightseeing Circuit.

Tourist Resorts of North Tanzania (Fig.-10)



1.2 Present traffic situation in the Region

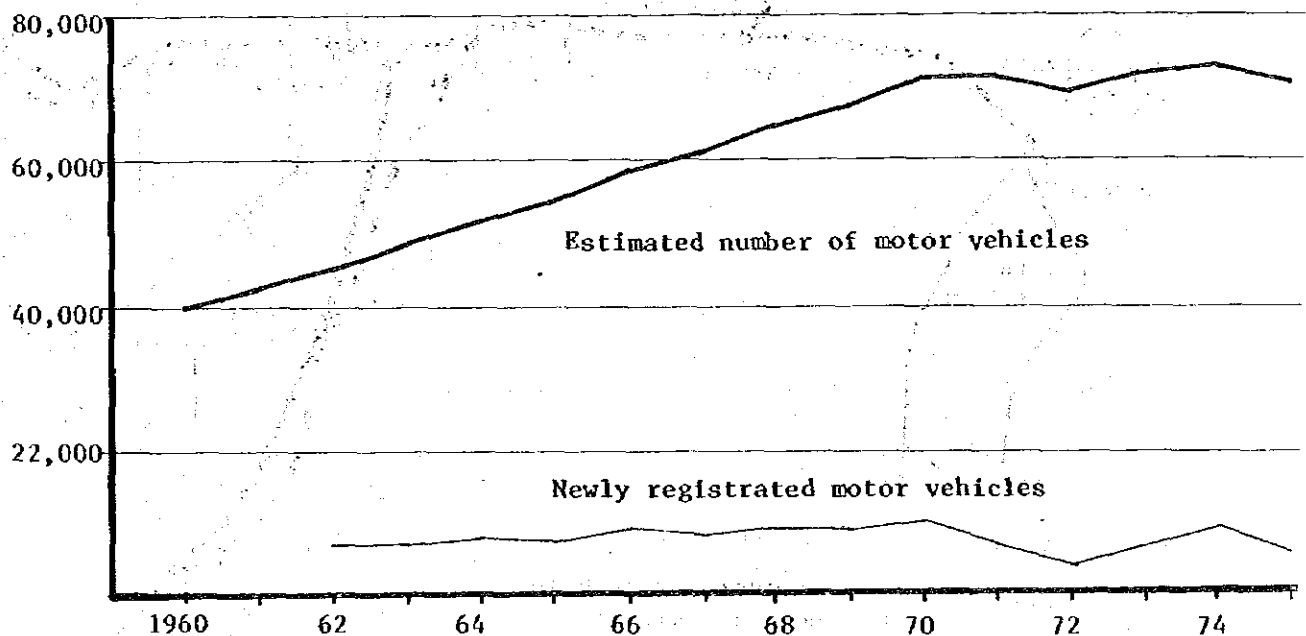
(1) Present vehicle ownership

Although the exact number of vehicles owned in Tanzania is not clear because the statistics are not presently available, this figure could be presumed to be between 70,000.- 100,000.-. According to new vehicle registration figures, about 8,200 vehicles have been registered per year in the past 10 years throughout Tanzania.

From a long-term point of view, the number of vehicles has shown a continuous but comparatively slow increase up to 1970. After this year, however, it has been on the decrease due to the drastic change in the economic situation caused by draught, the oil shock, and the resultant tightness of foreign currency.

The number of vehicles newly registered in the Kilimanjaro Region each year is 200-500, and on the basis of this figure the number of vehicles owned in the region in 1975 has been estimated at approx. 3,500.

Registration of Motor Vehicles (Fig.11)



The following is an estimate on the number of commercial vehicles in the region based on records of licence registration with the Licence Authority.

Buses (Licence A)		Pickups and lorries (Licence B)	
Passangers		Under 1 ton	41
0 ~ 15	28	Under 4 ton	289
16 ~ 25	38	Under 6 ton	47
26 ~ 45	37	Over 6 ton	43
46 ~	31		
Total	134	Total	420

(2) Traffic Volume

The automobile traffic routes in the Kilimanjaro Region are formed by the Tanga - Moshi - Arusha Long distance traffic routes and a radial traffic demand centered upon Moshi. The roads running to the heavily populated areas at the foot of Mt. Kilimanjaro (the Coffee - Banana Zone) are presumed to have traffic volumes of 200 cars/day respectively. The main roads for the Rombo and Hai Districts also have a considerable volume of traffic but this decreases at their ends. In the low lands, the roads leading to T.P.C. have a heavy traffic volume. The traffic volume in Pare District is light except for the main roads.

As to the kinds of vehicles, the ratio of commercial vehicles such as lorries, buses, etc. is comparatively high.

The traffic peak is generally from 7:00 to 9:00 in the morning.

(3) Quality of Traffic

The traffic survey carried out on the main roads (Except for the truck road, Arasha-Moshi-Mukomazi) in the Kilimanjaro Region (December 1976), disclosed a variety of information.

(i) Purpose of Traffic

Commercial business constitutes a considerable part of the traffic and this ratio would exceed 50% of the total if that of official business (going to work) is added to it. This indicates that the roads are used for industries. However, a considerably high portion is occupied by visiting or other purposes, indicating that the roads are also used for living.

(ii) Type of vehicle

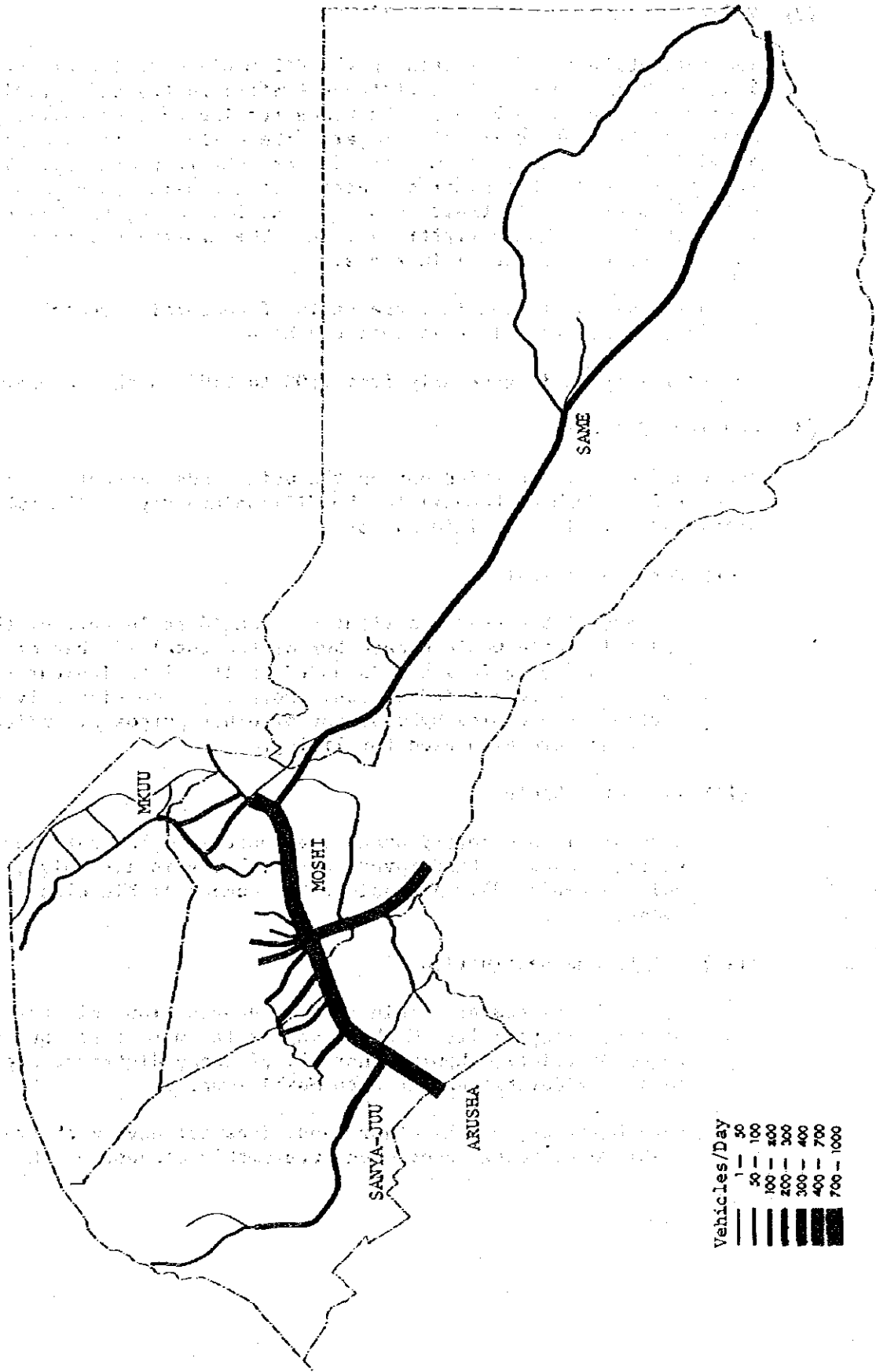
Cars are in a majority among the vehicles. The ratio of 4-wheel vehicles such as Land rovers and pick-ups is also high, the total of which exceeds 50%. A considerable number of bicycles is used on some roads.

(iii) Origin and Destination

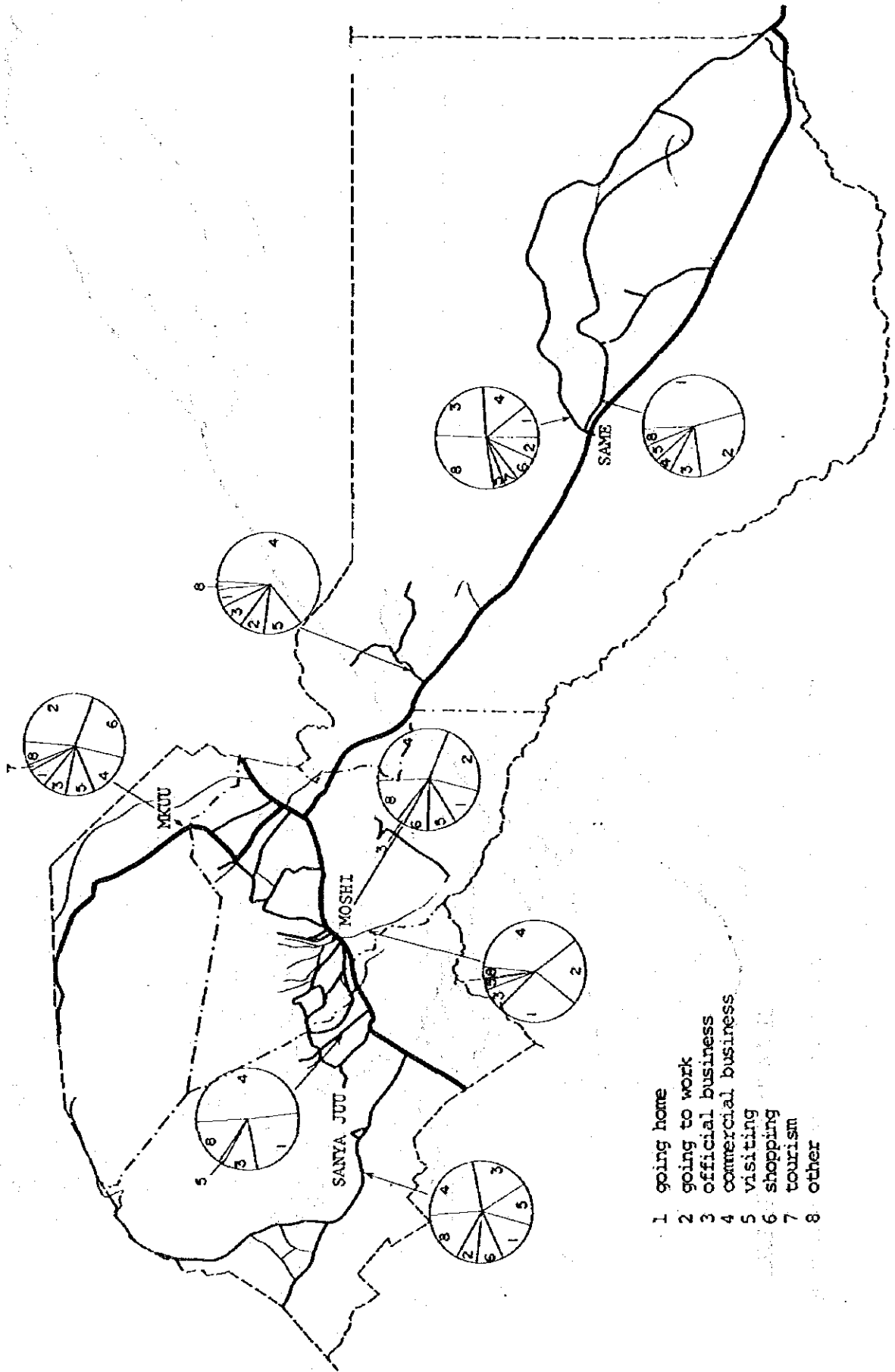
As to the places of origin and the destinations of traffic, Moshi District (especially, Moshi Town) is far more important than Hai and Rombo Districts, showing that all of these districts are integrated to a considerable extent with Moshi Town.

Pare District, on the other hand, does not have much traffic with Moshi Town, being independent presumably because of the distance.

Traffic Volume (Fig. 12)

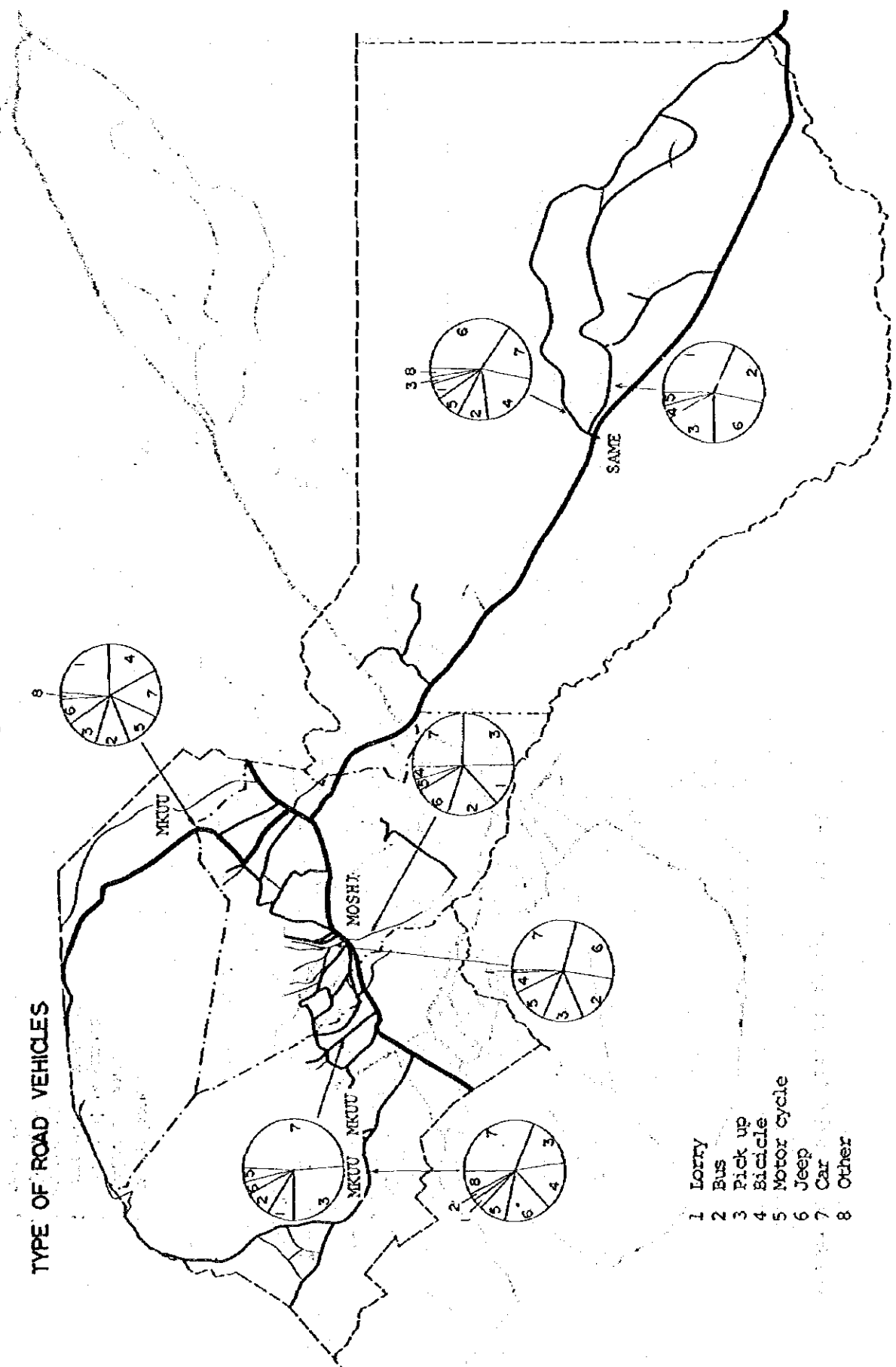


Breakdown of Road Traffic by Type (Fig.-13)

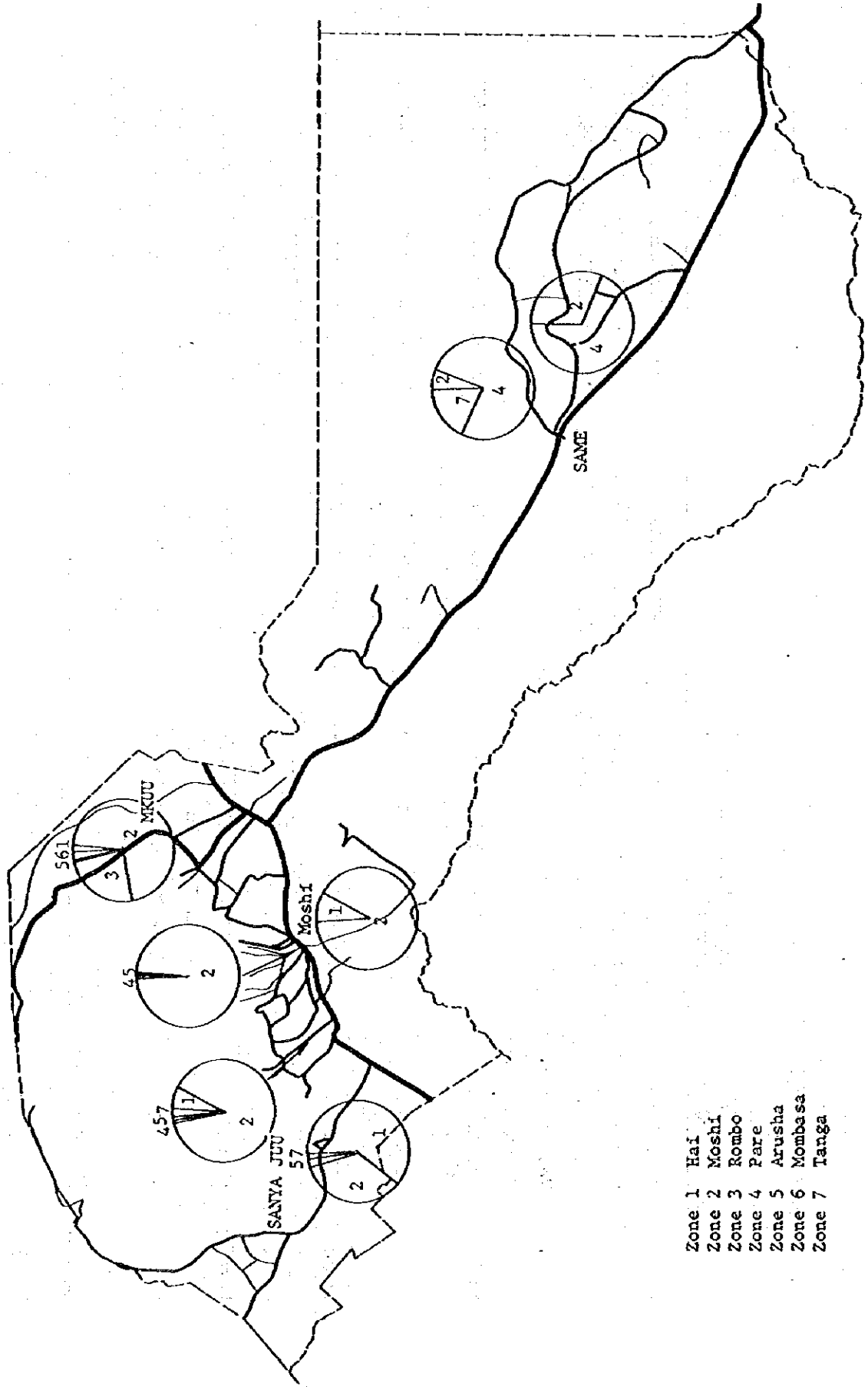


Breakdown of Road Traffic by Type of Vehicle (Fig.-14)

TYPE OF ROAD VEHICLES



Breakdown of Road Traffic by Destination (Fig,15)



Road Traffic Analysis (Table-8)

Division or Ward	Connection between Divisions	Type	Purpose
Hai	Hai District (60.8%)	Car (31.8%)	Commercial business (22.1%)
	Moshi District (35.4%)	Pick up (16.5%)	Official business (18.3%)
	Moshi District (89.0%)	Car (48.9%)	Commercial business (48.5%)
West Machama			
North Machame			
Moshi	Moshi District (93.8%)	Car (25.9%)	Commercial business (38.4%)
	Chini	Pick up (24.7%)	
East Hai	Moshi District (98.0%)	Car (26.3%)	Commercial business (31.9%)
		Jeep (26.0%)	Going to work (21.3%)
Rombo	Moshi District (71.8%)	Lorry (24.2%)	Going to work (28.8%)*
	Rombo District (23.4%)		Shopping (24.7%)
Pare	Pare District (77.3%)	Lorry (30.4%)	Going to home (44.4%)
	Moshi District (22.7%)	Bus (21.7%)	
Manba/Vunta	Pare District (76.6%)	Jeep (33.4%)	Official business (21.6%)**
Conta		Car (19.1%)	Commercial business (17.6%)
Mwenbe/Mbanga			

* Through traffic to Nairobi (1.6%)

** Through traffic to Tanga (10.9%)

(4) Commodity Movement

The major part of the commodity movement in the Kilimanjaro Region is composed of agricultural products. The agricultural production area can be divided into some zones according to such factors as geographical features altitude, rainfall, soil, etc. The agricultural products can be roughly divided into cash crops and food crop, principal particulars of which are as follows:

<u>Cash crops</u>	<u>Food crops</u>
Coffee	Maize
Sugar	Mixed beans
Sisal	Finger millet
Cotton, etc.	Paddy rice
	Wheat
	Iroh potatoes
	Cassava
	Sweet potatoes
	Bananas
	Vegetables, fruits, etc.

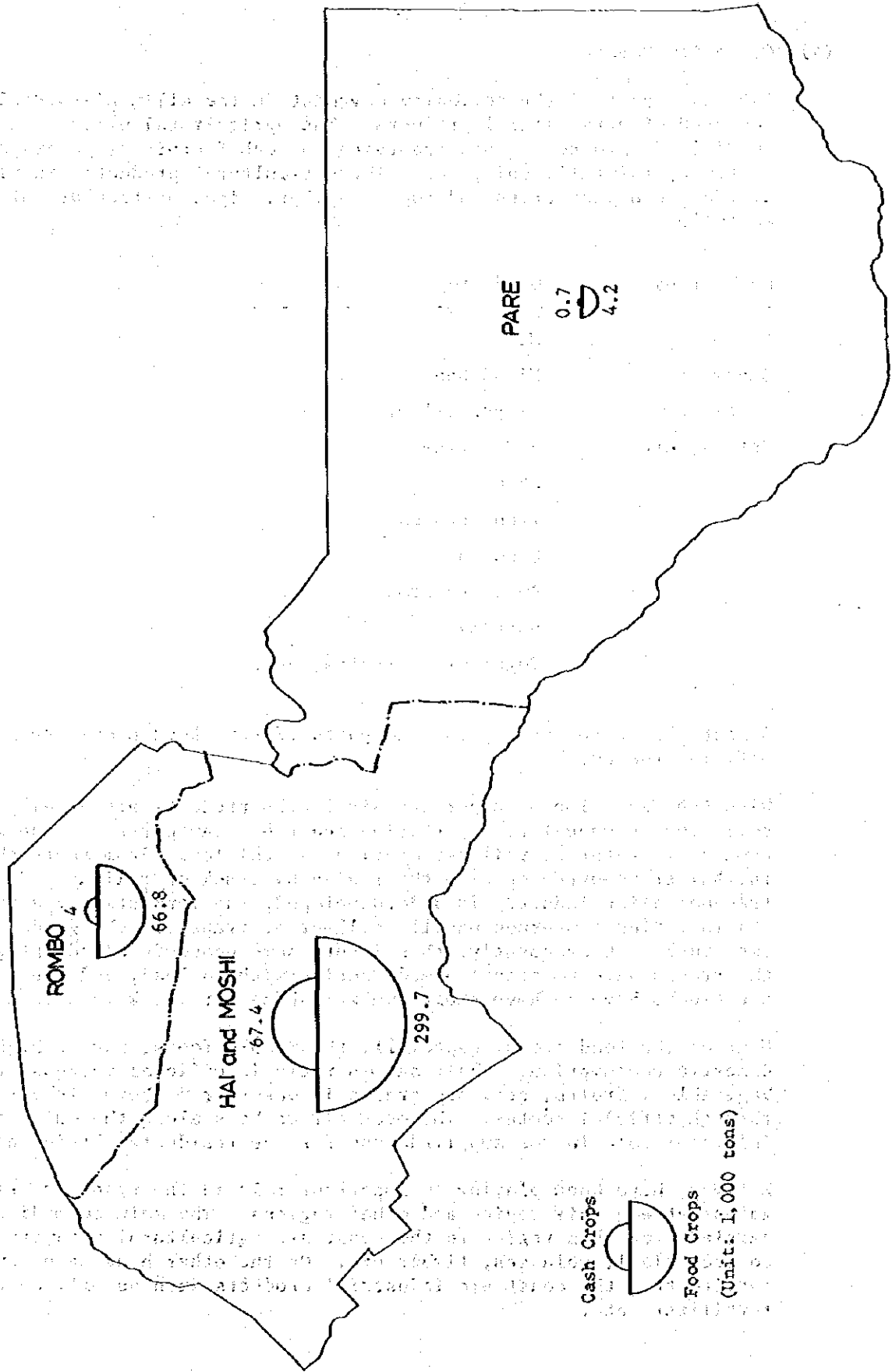
Almost all of the cash crops and parts of some food crops are moved through official routes.

With the exception of sugar and sisal, the products are usually brought to societies by manual transportation and then transported to the factory, commodity center or rail-way station by vehicles. From there they are further transported outside the region by truck or railway. Since the transportation industry is underdeveloped, the corporations, authorities and factories concerned usually collect or transport the goods by their own trucks. Consequently, this incurs some economic disadvantages: i.e. the trucks have to travel one direction with no load, and the owners of the trucks have to have their own workshops for truck maintenance.

Most of the food crops, especially the staple foods, have a high ratio of domestic consumption. Their sales ratio in official markets are very low. Vegetables, fruits, etc. are traded in open-air markets without going through official routes. The open air markets along the main roads play an important role in the supply/demand for the residents' living necessities.

Railways have been playing an important role in the transportation of goods between this region and other regions. The main commodities carried from this region to the coast are agricultural products such as coffee, sisal, molasses, timber etc. On the other hand main commodities carried from the coast are industrial products such as oil, cement, fertilizer, etc.

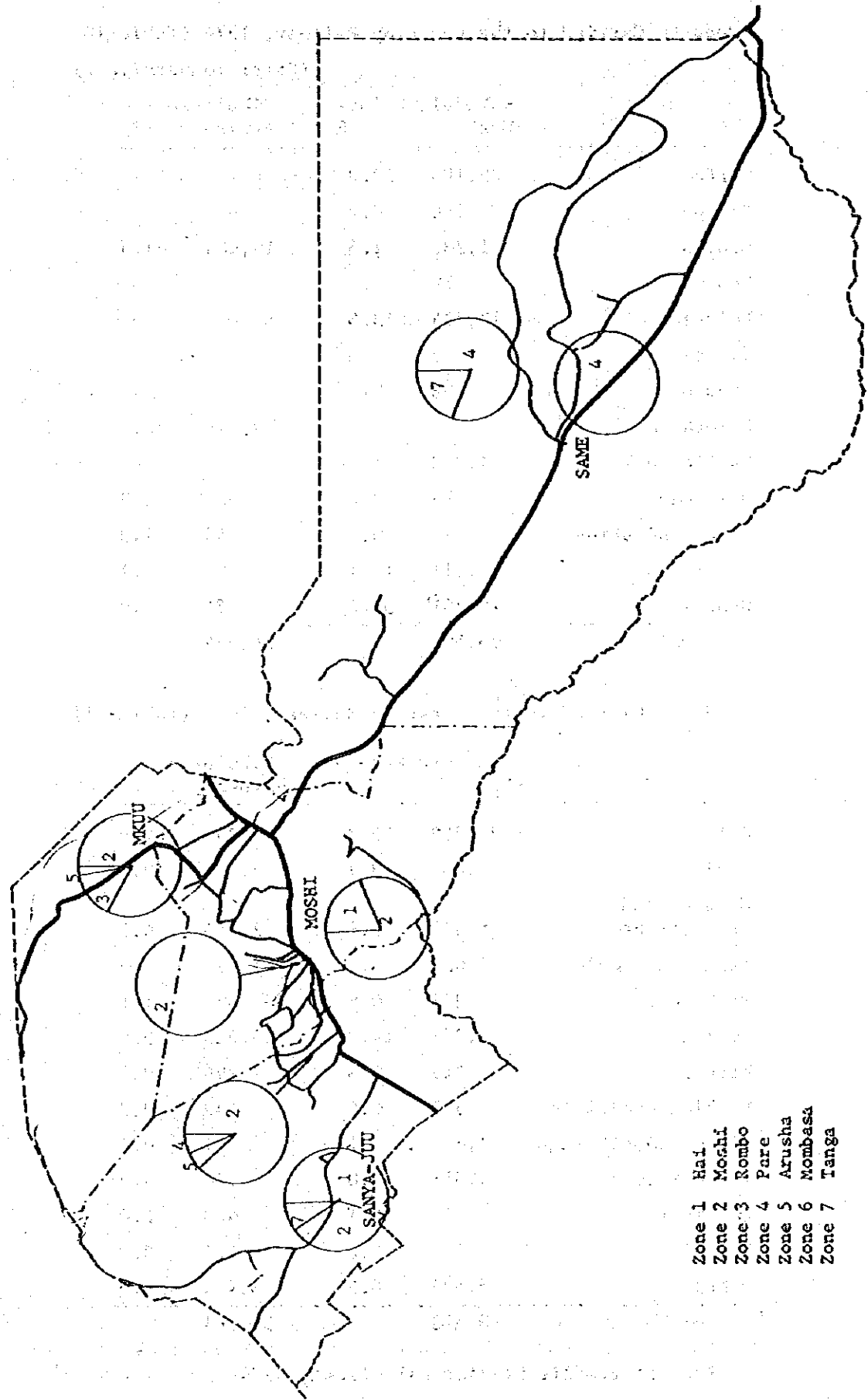
Agricultural Production, 1975 (Fig.-16)



Production Through Official Markets, 1975 (Table-9)

District	Crops	Societies	Selling value (Ton/Year)	Comment
Hai	Coffee	13	7,826.0	Export
	Maize	8	2,012.8	-
	Pyrethrum	1	43.6	-
	Castor	7	30.8	-
	Cotton	3	176.9	Export
	Wheat	-	6,000.0	-
	Sisal	-	260.0	Export
	Sweet beans	-	800.0	-
	Sub total		17,150.1	8,262.9 (Export)
Moshi	Coffee	22	12,901.0	Export
	Maize	16	1,992.8	-
	Sunflower	9	77.8	-
	Castor	5	10.1	-
	Cotton	5	320.0	Export
	Sugar	-	49,103.0	-
	Sisal	-	1,017.0	Export
		Sub total		65,421.7
Rombo	Coffee	8	7,646.0	Export
	Maize	-	21.7	-
	Paddy	-	3.7	-
		Sub total		7,671.4
Pare	Coffee	9	1,155.3	Export
	Cardamon	9	19.0	-
	Paddy	4	178.0	-
	Castor	4	21.2	-
	Cotton	5	149.4	Export
	Sisal	-	3,190.0	Export
	Sub total		4,712.9	4,494.7 (Export)
	Total		94,956.1	34,641.6 (Export)

Movement of Lorries (Fig.18)



Products Carried to the Coast by Railway, 1974 (Table-10)

(Unit: Tonners/year)

	Kwamdulu Estate		Kikuletwa	
	-Moshi	%	-Arusha	%
Coffee	22,185	22.2	-	-
Cotton	150	0.2	-	-
Grains	1,206	1.3	19,604	81.5
Tea	89	0.1	-	-
Molasses	13,224	13.8	-	-
Timber	9,402	9.8	-	-
Charcoal	468	0.5	-	-
Pyrethrum	-	-	2,930	12.2
Wattle bark	1,703	1.8	-	-
Oil seeds	595	0.6	304	1.3
Hides and skins	498	0.5	243	1.0
Sisal	16,311	17.1	499	2.1
Others	29,761	31.1	484	2.0
Total	95,592		24,064	

Products Carried to the Coast by Railway, 1974 (Table-11)

	Kwamdulu Estate		Kikuletwa	
	-Moshi	%	-Arusha	%
Oil	34,339	50.2	24,946	42.9
Grains	2,633	3.9	7,132	12.3
Manures and fertilizer	5,078	7.4	3,585	6.2
Iron and steel	3,623	5.3	1,179	2.0
Machinery	321	0.5	639	1.1
Comment	9,782	14.3	15,085	25.9
Bitumen	217	0.3	296	0.5
Packing materials	335	0.5	139	0.2
Pipes and fittings	1,635	2.4	331	0.6
Insecticides	1,355	2.0	774	1.3
Chemicals	50	0.1	443	0.8
Salt	3,170	4.6	127	0.2
Others	5,805	8.5	3,429	6.0
Total	68,343		58,167	

Source: Traffic Statistical Digest, 1974

(5) Bus Service

The buses run in the Kilimanjaro Region are all privately owned (private business), except for the long-distance buses running throughout the region (KAMATA), those of the east African Railways Corporation and those of Kilimanjaro Development Corporation (KIDECO) which handle the transportation in Moshi town.

The long distance buses have the following routes from Moshi:

State of Bus Services (Table-12)

	Hai	Moshi	Rombo	Pare	Total
Population (1,000 persons)	160.5	365.9	146.3	192.3	865.0
Round-trips per day	50	127	13	13	203
Passengers per day	1,861	6,322	1,044	1,185	10,412
Passengers per vehicle	18.6	24.9	40.2	45.6	-
Round-trips per passenger	0.027	0.020	0.013	0.011	-

KIDECO's routes are as follows:

Destination	Round-trips per day
Maili Sita	20
Kibosho	4
KCMC	30
Uru	2
Marangu	1

Other buses besides the above are mostly run on a private business basis for which the city's authorization is required. Their routes are fixed but they have no time tables and start operation when a crowd of passengers is collected.

The following summarizes the present bus operation in the center of Moshi Town:

- Moshi Bus Station handles about 200 round-trips/day.
- The number of passengers per day is about 10,000.
- Rush-hour is noon.

In Moshi area there are about 130 round-trips/day, with about 6,300 passengers a day. Both figures are larger than those of other areas.

Moshi and Hai districts have better connections with other areas than Rombo and Pare districts, the round-trip frequency per passenger of the former being 0.020 - 0.027 and that of the latter being 0.011 - 0.013. In addition, the average number of passengers is as many as 40 - 46 in the latter case.

The following table shows the operation frequency and density of bus routes in each area:

District	Bus routes	Bus trips
Hai	Bus routes from north to south. Density of route is high in Central Hai, but low in West Hai.	Some routes have 15 to 50 trips/day in the Southern part, but only 7 movements/day in the Northern part
Moshi	Bus routes of the highest density. Radial roads centering on Moshi Town.	Routes centering on Moshi Town have many trips and some routes have over 50 round trips/day.
Rombo	Bus routes from north to south. Bus routes of low density.	The nearer to Moshi, the more trips.
Paré	Bus routes of high density at Ugeno. Only bus routes from north to south, so bus routes of low density.	Many have 15 to 25/day at Ugeno, but a few have 3 to 7 movements/day in the Southern part.

The following is a table of the bus fares, which are the same for public buses as for privately run buses, from Moshi station to various destinations, the basic rate being 0.1 sh./km/person:

Bus of Fares (Table-13)

Masama	3/00	Kirua	3/00	Asusha	7/00
Machame	2/50	Marangu	4/00	Nairobi	36/00
Kibosho	2/50	Tarakia	8/50	Dar es Salaam	62/00
Uru	2/00	Ugwenno	7/00	Mombasa	35/00
TPC	2/00	Headaru	15/00		

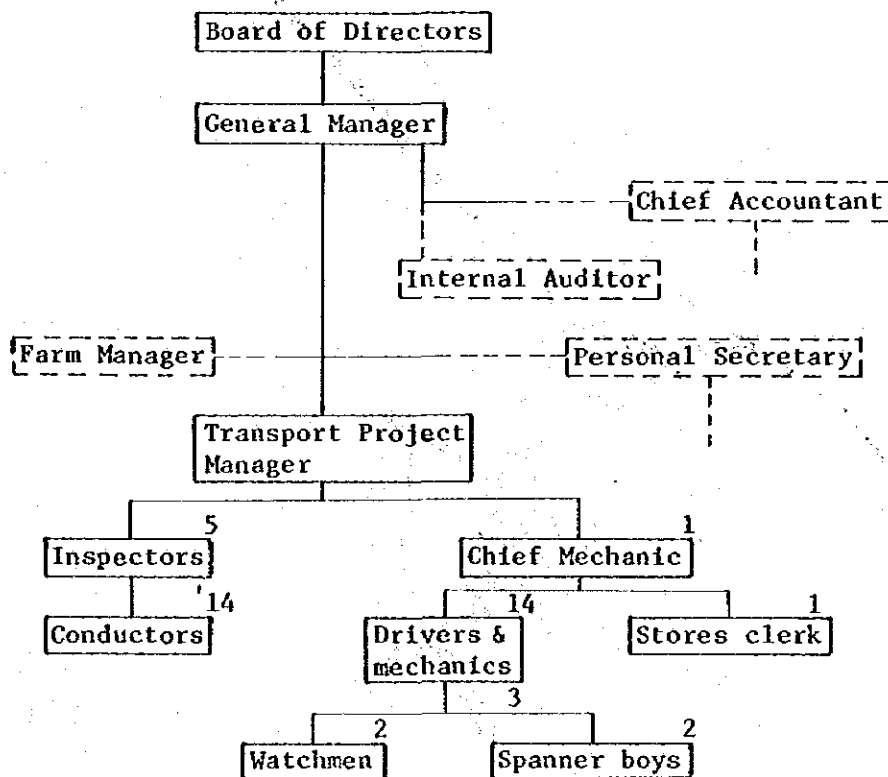
Interviews indicate that private bus companies have fairly high receipts and make considerable profits. As for the bus division of KIDECO, in 1975/76 its receipts stood at 1,216,000 sh. and its expenditures at 1,181,000 sh., the breakdown of the latter being as follows:

Salaries and wages	190,000 (sh.)	16%
Maintenance	348,000	29
Petrol and oils	426,000	36
Other expenditures	217,000	18

If one takes into account depreciation costs, however, the division is actually operating in the red.

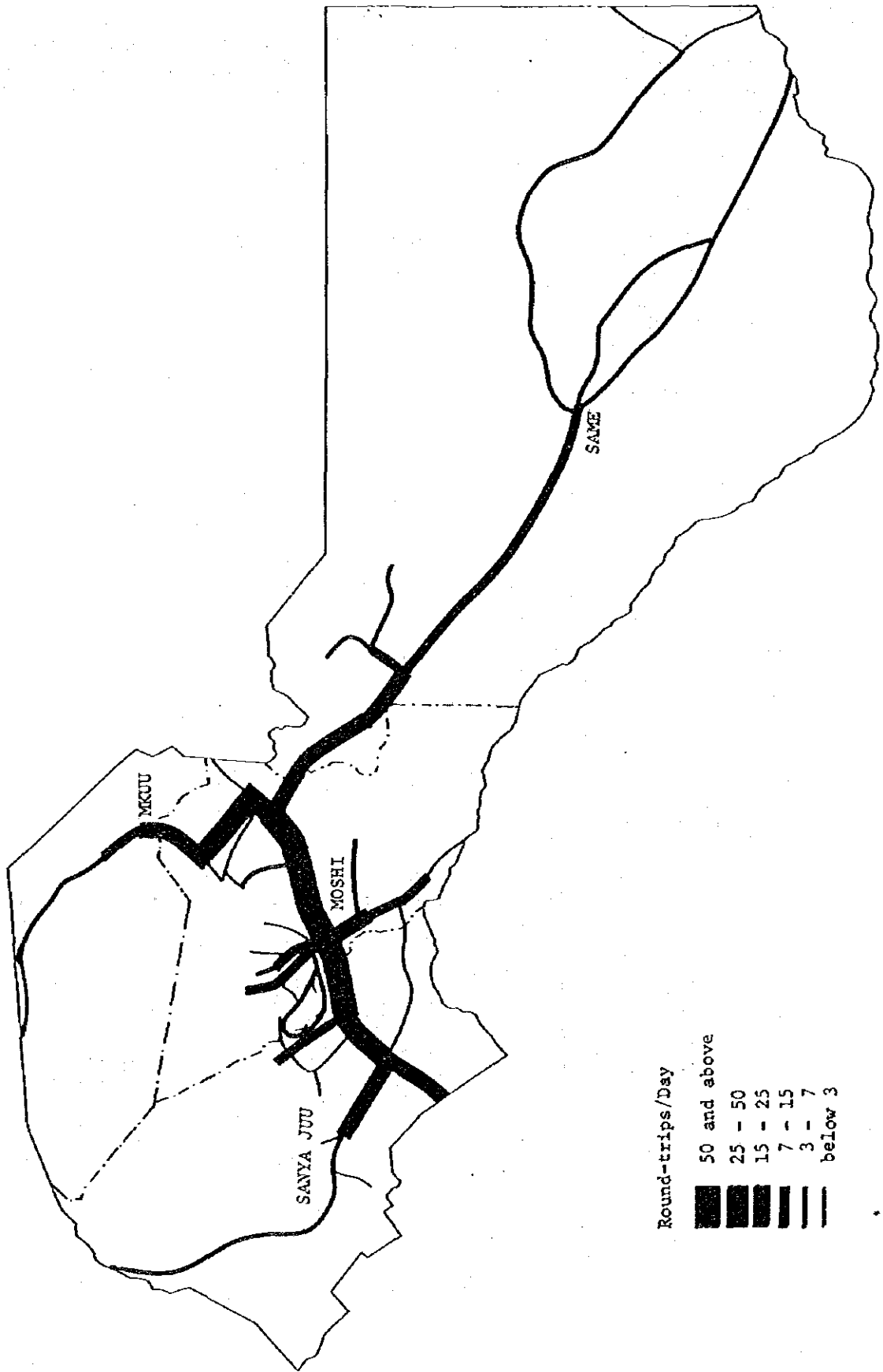
The following is a chart of the division's organization.

Organization Chart of the Bus Division of KIDECO (Fig.-19)



Note: The figures indicate the number of persons in each job category.

Bus Service Condition (Fig.-20)



1.3 Present Condition of Roads in the Region

(1) Road Classification

Officially, the roads are classified as follows:

Trunk Road	
Regional Road	Grade-A
	Grade-B
District Road	Grade-A
	Grade-B

Trunk roads are under the direct control of the Ministry of Works. Recently (in planning the 3rd five-year plan), territorial main roads have been promoted to trunk roads for the purpose of upgrading them. The central government is responsible for improvement of trunk roads but its enforcement is entrusted to Regional Engineers and sometimes is further entrusted to District Engineers.

Regional Roads connect the primary points in the region, supplementing the trunk road. Grade-A Regional Roads used to be called "Local Main Roads" and formed the main lines in the region. Improvement of Regional Roads is the Regional Engineer's responsibility but this also is entrusted to the District Engineer.

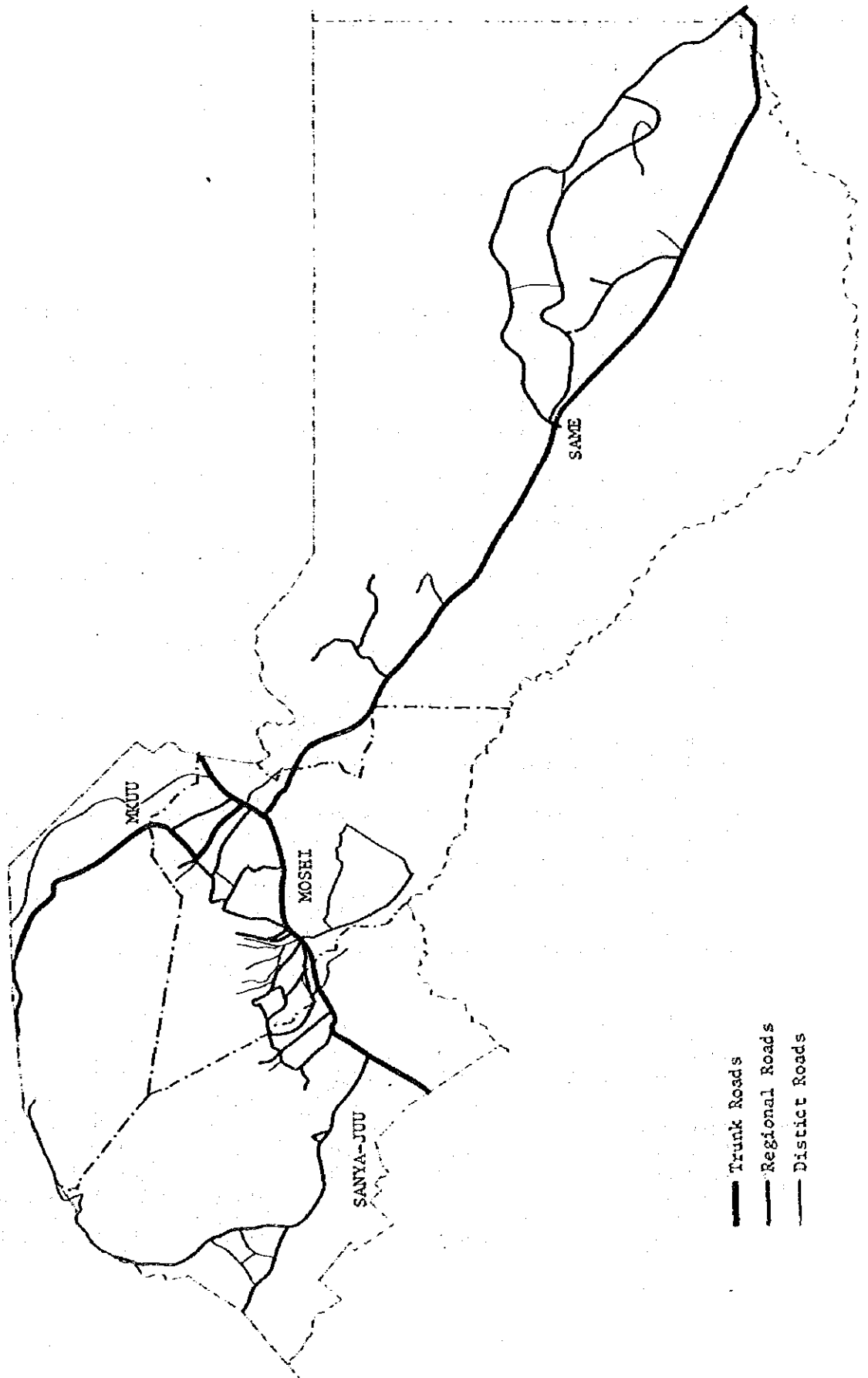
District Roads connect diverse points in various areas of the region. Their maintenance is the District Engineer's responsibility. Grade-B roads which previously were called "Freeder Roads" are mostly in such bad condition that vehicles find it difficult to utilize them. Therefore, these are not considered to be official roads. However, a plan is being drawn up to improve these roads by placing them under the control of the District Engineer.

In addition to the above are streets in Moshi Town - the so-called "Cotton Roads" - which were constructed with the Cotton Authority's funds, and the roads in the Forest Reserve and Game Reserve which are under the control of the respective offices.

Length of Road of Each Class in Each District (Table-14)

Class	Hai	Moshi	Rombo	Pare	(unit: Km)
					Total
Trunk road	34.5	77.7	40.0	144.0	296.2
Regional road-A	120.0	79.6	0.0	131.9	331.5
Regional road-B	36.8	84.0	18.0	192.0	330.8
Subtotals	156.8	163.6	18.0	323.9	662.3
District road-A	57.0	86.0	48.0	61.5	252.5
District road-B	382.2	769.3	466.6	266.0	1,884.1
Subtotals	439.2	855.3	514.6	327.5	2,136.6
Totals	630.5	1,096.6	572.6	795.4	3,095.1

Road Network (Fig. 21)



(2) Road Density

The table below shows the road density obtained by dividing the length of road by the area and population of each district. Pare district is the smallest in road density per area, followed by Hai district. In road density per population, Moshi District is the smallest, followed by Rombo.

Road Density (Table-15)

Class	Moshi		Hai		Rombo		Pare		Total	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Trunk road	0.05	0.21	0.02	0.21	0.08	0.27	0.02	0.75	0.03	0.34
Regional road A	0.05	0.22	0.08	0.75	0.00	0.00	0.02	0.69	0.03	0.38
Regional road B	0.05	0.23	0.02	0.23	0.04	0.12	0.02	1.00	0.03	0.38
Subtotals	0.11	0.45	0.10	0.98	0.04	0.12	0.04	1.72	0.06	0.77
District road A	0.06	0.24	0.04	0.36	0.10	0.33	0.01	0.32	0.02	0.29
District road B	0.50	2.10	0.25	2.38	0.93	3.19	0.03	1.38	0.16	2.18
Subtotals	0.56	2.34	0.29	2.74	1.02	3.52	0.04	1.70	0.19	2.47
Totals	0.72	3.00	0.41	3.93	1.14	3.91	0.10	4.14	0.27	3.58

Remarks: (A) Road length/Km²
(B) Road length/1,000 persons

(3) Road Quality

With regard to the road quality examined from the standpoints of pavement condition and weather-proofing, the Trunk Roads (B1 and A23) running through the region from the borders of Tanga Region and Arusha Region are 2-lane roads but are well-paved with a proper plane alignment, allowing high-speed driving of about 100 km/hr..

All the other roads, except for a few Regional Raods, are in extremely bad condition. The roads in the mountain areas are worst in with respect to their plane and longitudinal alignment and pavement. Improvement of the main roads, therefore, is highly desirable.

One of the most important conditions of a road is whether or not it can allow year-round usage. In the case of unimproved dirt roads, passage is often impossible in the rainy seasons. Even a temporary stoppage of traffic can cause a serious loss to the shipment of agricultural products and the life of inhabitants.

Length and Density of All-weather Roads (Table-16)

	Hai	Moshi	Rombo	Pare	Totals
Length of all weather roads					
Pavement (Km)	65.0	110.5	0.0	144.0	319.5
No pavement (Km)	70.5	157.1	40.0	0.0	267.6
Totals (Km)	135.5	267.6	40.0	144.0	587.1
Density by area					
(Km/Km ²)	0.10	0.17	0.08	0.28	0.05
Density by population (Km/1,000 Pop.)					
	0.84	0.74	0.27	0.75	0.68

The following can be considered as possible causes of deterioration in the road conditions:

- (i) Insufficient maintenance and repairs have presumably degraded some of all-weather roads to dry season roads.
- (ii) There were found some cases where the road surface has been eroded by heavy rain in the rainy seasons. Dirt and gravel has been washed away and as a consequence the road surface has been lowering year by year. This results from an inadequate road drainage system such as gutters, culverts, etc..
- (iii) The budget allotted for roads is not enough to carry out sufficient maintenance and repairs.
- (iv) Physical maintenance and repairs are impossible due to a shortage of road repair machinery. In addition to the shortage of machinery, the number of working days is decreasing due to the deterioration of the machinery and shortage of parts. For example, it was reported that out of a total of 8 tractors possessed by the Kilimanjaro Region, there were only three which worked properly and that out of a total 8 graders, only two were working.

Construction Equipment in the Kilimanjaro Region, 1975 (Table-17)

Type	Number	Average rate of operation (%)
Land Rovers	10	55
V/Wagons	3	39
L.W.B's	8	28
Tippers	14	24
Tractors	8	20
Motor Graders	8	12
Rollers	4	50
Compressors	2	40
Vibrators	1	0
Bulldozers	2	39

(4) Accessibility

To provide an indication of the road situation, the government has established, in its 3rd five-year plan, national objectives of the following aspects:

- The ratio of population living within 5 km of all-weather roads
- The ratio of population living within 5 km of bus routes

Shown in the following chart is the present state of two of these aspects:

Accessibility (Table-18)

	Moshi	Hai	Rombo	Pare	Totals
Coverage of All weather roads (%)	99.3	94.3	94.1	26.0	80.6
Coverage of Bus routes (%)	99.5	94.3	95.4	82.6	94.1

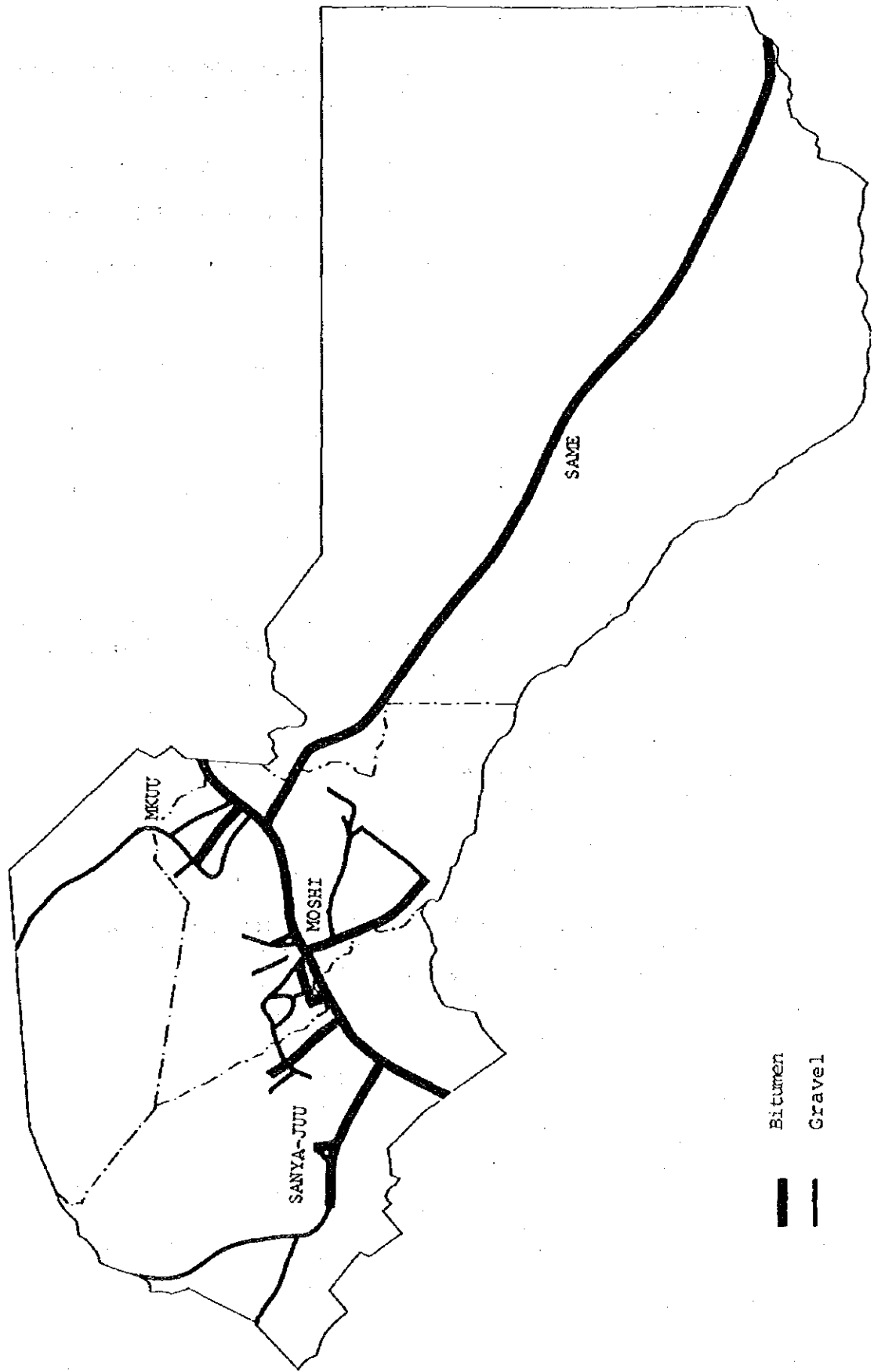
(5) Local Differences

In order to determine local differences in the region, the values of the following items were calculated by division and then compared.

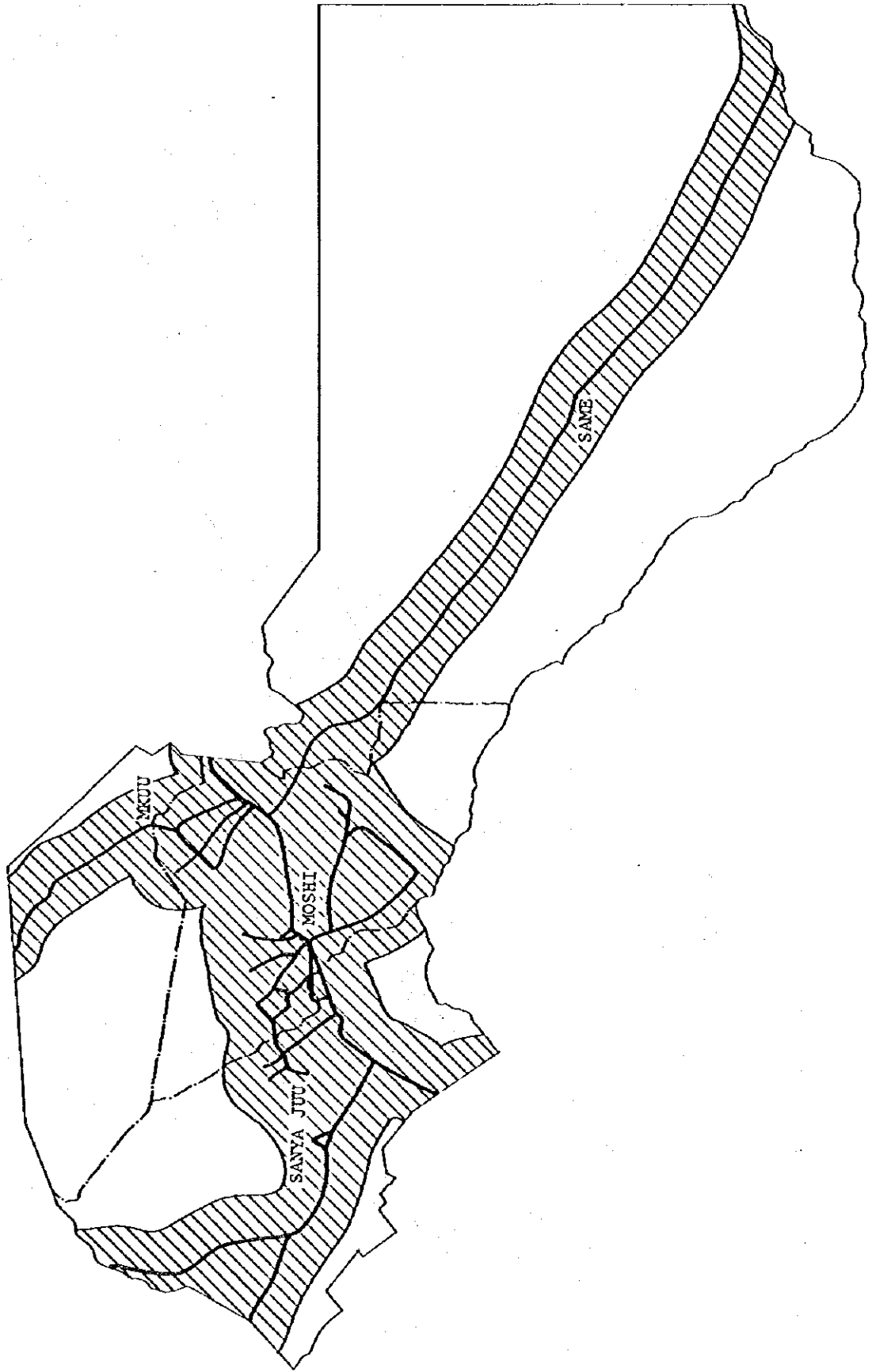
- Length of road per class
- Length of all-weather roads
- Length of road per area
- Length of road per population
- Length of all-weather roads per area
- Length of all-weather roads per population

Pare District's per area figure is naturally less because of its land utilization ratio. The per population figure is prominent in a part of Moshi, Rombo and a part of Pare.

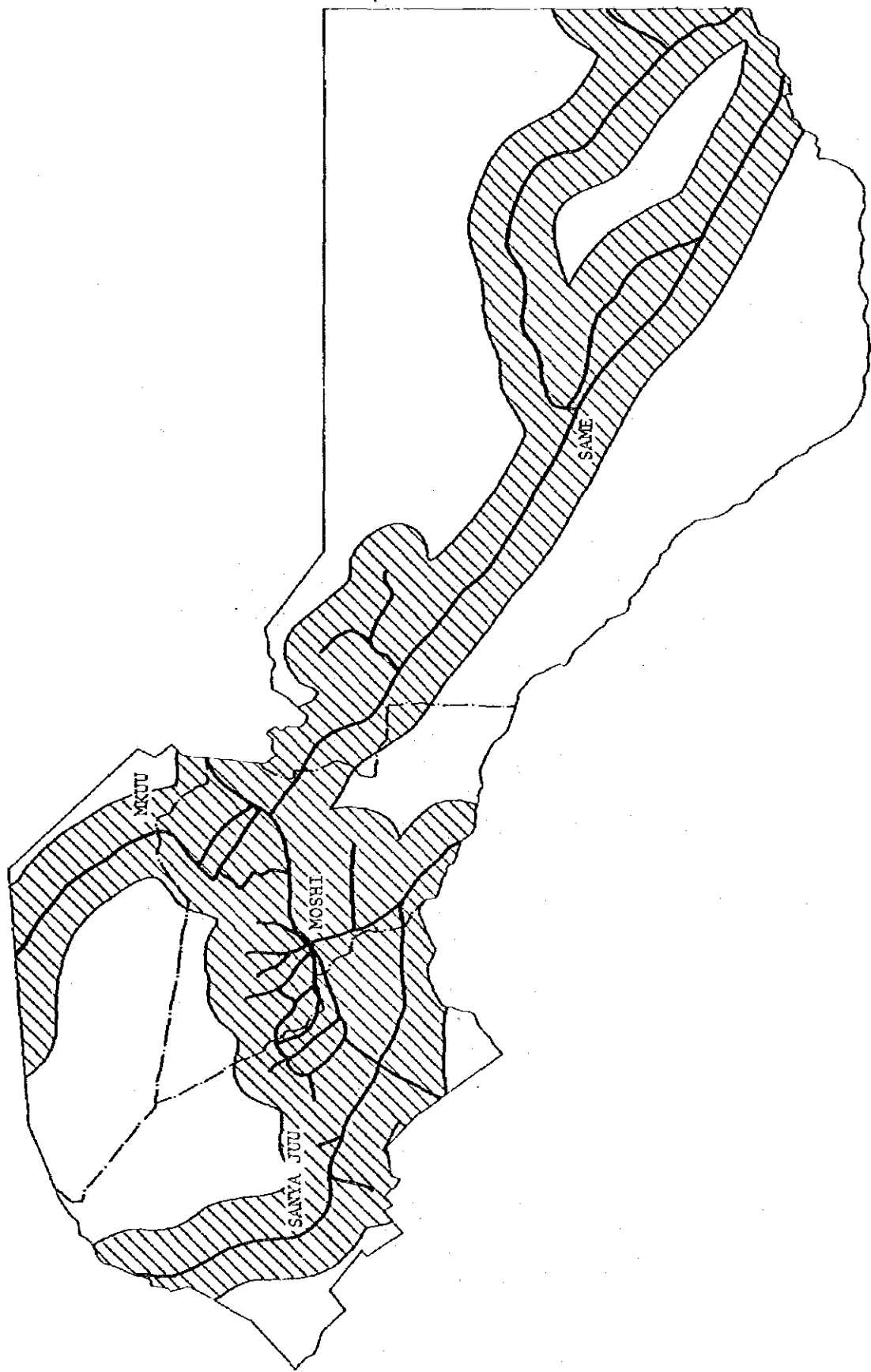
All-weather Roads (Fig.-22)



Area Within 5 km of All-weather Roads (Fig.-23)



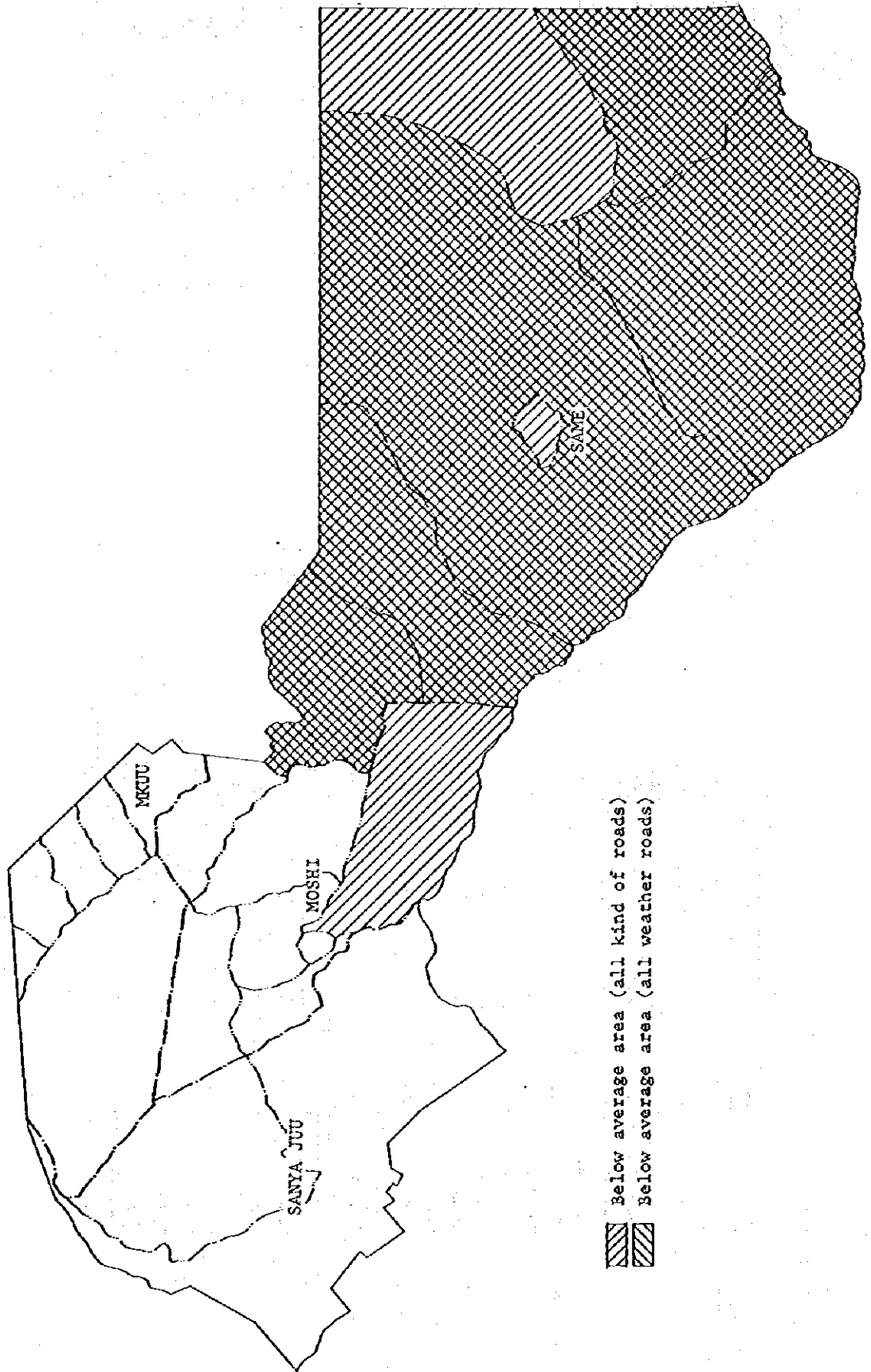
Area within 5km of Bus Routes (Fig.-24)



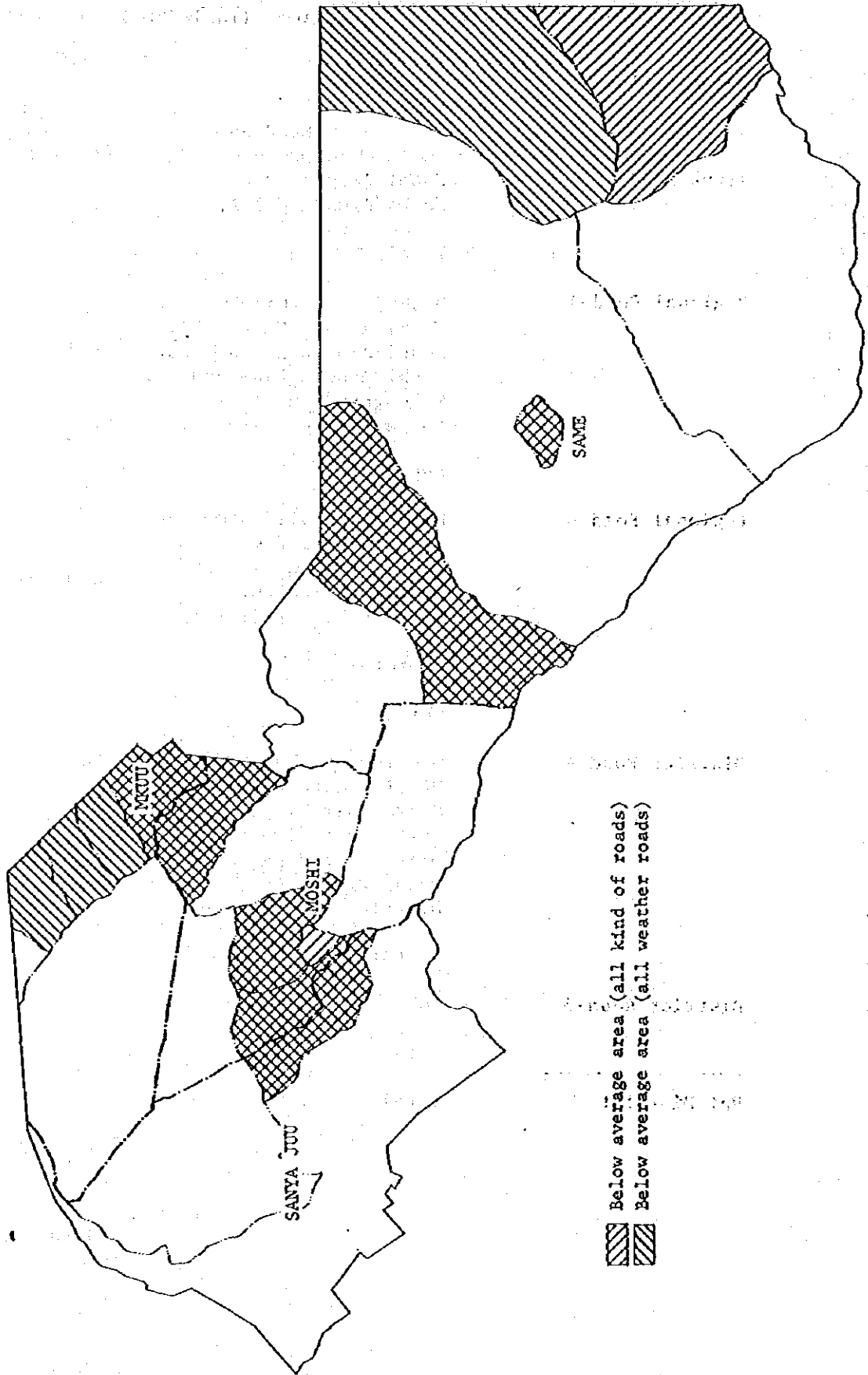
Road Density by Division (Table-19)

District	Division	Road Length			All-Weather Roads, Length			Road Length Density		All-Weather Roads Density			
		Trunk roads	Regional roads	District (A) District (B) roads	Total	Pavement roads	No pavement roads	/Km ²	/1,000 Population	/Km ²	/1,000 Population		
												Total	Total
Hai	West Hai	21.5	105.0	42.0	259.2	427.7	52.0	55.5	107.5	0.28	4.39	0.09	1.10
	Central Hai	13.0	51.8	15.0	123.0	202.8	13.0	15.0	28.0	1.12	3.22	0.15	0.44
	Subtotal	34.5	156.8	57.0	382.2	630.5	65.0	70.5	135.5	0.42	3.93	0.10	0.84
Moehi	Central Hai	2.7	36.8	5.0	122.0	166.5	10.0	28.3	38.3	1.43	2.22	0.33	0.51
	East Hai	10.0	35.5	27.5	170.5	243.5	10.0	29.5	39.5	1.41	2.71	0.23	0.44
	Moshi Town	4.0	5.0	4.0	23.7	36.7	34.2	2.5	36.7	1.18	0.73	1.18	0.73
Rombo	TTC	0.0	23.0	19.0	29.3	71.3	19.0	55.0	74.0	0.12	14.80	0.12	15.36
	West Vunjo	22.0	46.8	6.5	235.2	310.5	33.0	12.8	45.8	0.83	5.33	0.12	0.79
	East Vunjo	39.0	16.5	24.0	203.5	283.0	28.0	29.0	57.0	1.19	3.21	0.24	0.65
	Subtotal	77.7	163.6	86.0	784.2	1,111.5	134.2	157.1	291.3	0.73	3.04	0.19	0.80
Menge	Menge	3.3	0	15.8	77.2	96.4	0.0	3.3	3.3	0.58	2.76	0.20	0.09
	Muu	8.5	0	6.7	109.4	124.6	0.0	8.5	8.5	1.30	3.78	0.09	0.26
	Mashati	11.3	0	6.7	107.8	125.8	0.0	11.3	11.3	1.35	3.70	0.12	0.33
Uweno	Uweno	11.3	0	13.9	172.2	197.4	0.0	11.3	11.3	1.92	5.16	0.11	0.29
	Tarakia	5.6	18.0	4.8	0.0	28.4	0.0	5.6	5.6	0.62	4.66	0.12	0.92
	Subtotal	40.0	18.0	48.0	466.6	572.6	0.0	40.0	40.0	1.14	3.91	0.08	0.27
Uwango	Uwango	27.2	37.2	0.0	52.0	116.4	27.2	0.0	27.2	0.21	3.98	0.05	0.93
	Uwango	14.3	24.5	12.0	23.5	74.3	14.3	0.0	14.3	0.10	2.05	0.02	0.39
	Mwenbe/Mbaga	41.7	99.8	16.0	34.5	192.0	41.7	0.0	41.7	0.06	6.31	0.01	1.37
Para	Same	9.0	0.7	0.0	0.0	9.7	9.0	0.0	9.0	0.17	0.65	0.16	0.6
	Chome/Suji	45.8	27.7	12.0	102.5	188.0	45.8	0.0	45.8	0.11	10.42	0.03	2.54
	Manba/Vunta	6.0	58.5	0.5	16.0	90.0	6.0	0.0	6.0	0.14	2.46	0.01	0.16
Genja	Genja	0.0	75.5	12.0	37.5	125.0	0.0	0.0	0.0	0.13	4.68	0.0	0.0
	Subtotal	144.0	323.9	61.5	266.0	795.4	144.0	0.0	144.0	0.10	6.14	0.28	0.75
	Totals	296.2	662.3	252.5	1,899.0	3,110.0	343.2	267.6	610.8	0.27	3.60	0.05	0.71

Length of Road per Unit of Area (Table-25)



Length of Road per Unit of Population (Table-26)



List of Roads in the Kilimanjaro Region (Table-20a)

Hai District

Class	Road name	Length (K)
Trunk Road	Moshi-Arusha Rd.	28.5
	Moshi/Arusha-K.I.A.	6.0
	Total	34.5
Regional Road-A	Moshi/Arusha/Olmolog Rd.	65.0
	Moshi/Arusha/Masama Rd.	9.0
	Moshi/Arusha/Machame Rd.	15.0
	Moshi/Arusha/Lyamungu Rd.	13.0
	Kibongoto Sannatorium	3.0
	Rongai/Ngare Nairobi/Tingatinga	15.0
	Subtotal	120.0
Regional Road-B	Machame/Kalali/Masama Rd.	7.0
	Machame Makoa/Lyamungu	12.8
	Kibongoto Sannatorium	3.0
	Masama Lemira Rd.	8.0
	Machame Hospital/Nronga	6.0
	Subtotal	36.8
District Road-A	Total	156.8
	Olmolog Rd. Main Rd.	8.0
	Olmolog Main Rd. No. 36	15.0
	Ngare Nairobi Rd.	3.0
	Weruweru Farm Unit	9.0
	Olmolog Trading Center - Farm No. 8	
	Masai D.B.	16.0
	District Rd. Machame	6.0
Subtotal	57.0	
District Road-B	Subtotal	382.2
	Total	439.2
Hai District	Total	630.5

List of Roads in the Kilimanjaro Region (Table-20b)

Moshi District

Class	Road name	Length (Km)
Trunk Road	Moshi-Arusha Rd.	6.7
	Moshi-same Border Rd.	32.0
	Himo-Taveta Rd.	15.0
	Himo-Marangu Rd.	13.0
	Moshi/Rombo Border Marangu	11.0
	Total	77.7
Regional Road-A	Kindi/Kibosho/Umbwe Rd.	12.8
	Moshi/Mweka/Kibosho Rd.	2.0
	Moshi/Uru/Kibosho Rd.	15.0
	Moshi/Himo/Kawawa Rd.	15.0
	Moshi/Himo/Kilema Rd.	12.8
	Moshi/Taveta/Mwika	11.0
	Old Arusha Rd.	11.0
	Subtotal	79.6
Regional Road-B	Moshi/Himo/Old Moshi Rd.	35.0
	Kibosho Baraza/Lyamungu Rd.	11.0
	Moshi/Arusha Chini/Kahe Barazani	23.0
	Moshi/Himo/Mbokomu	11.0
	Marangu/Rombo/Ashire Girls School	2.0
	Kiborloni Loop Rd.	2.0
	Subtotal	84.0
District Road-A	Total	163.6
	Masama Rd. Uru East	6.5
	Mweka Training School Kifura	5.0
	Moshi/Uru Rd.	9.0
	Moshi/Arusha Chini Factory Rd.	22.0
	Himo/Tanga Rd.	8.0
	Himo Marangu Rd. Kilimanjaro Smit Rd.	16.0
	Kirua Vunjo Rd.-Maua District Rd.	6.5
	District Rd. Uru Shimbwe	6.5
	Moshi Uru - Uru Mission Turn Off	6.5
Subtotal	86.0	
District Road-B	Subtotal	769.3
	Total	855.3
Moshi District	Total	1,096.6

List of Roads in the Kilimanjaro Region (Table-20c)

Rombo District

Class	Road	Length (Km)
Trunk Road	Marangu-Kenya Border	40.0
	Total	40.0
Regional Road-B	Trakia Rongai	18.0
	Total	18.0
District Road-A	Lower Rombo Rd.	48.0
	Subtotal	48.0
District Road-B	Subtotal	466.6
	Total	514.6
Rombo District	Total	572.6

List of Roads in the Kilimanjaro Region (Table-20d)

Pare District

Class	Road	Length (Km)
Trunk Road	Moshi Border Mkomazi Rd.	144.0
	Total	144.0
Regional Road-A	Same-Gonja-Mkomazi	99.8
	Mwanga-Ligweno	21.0
	Kikweni-Usangi	9.6
	Same Mjini-Station	1.5
	Subtotal	131.9
Regional Road-B	Mwembe-Mamba-Kihurio	104.0
	Usangi-Kisombogo-Butu	21.0
	Ugweno-Kifula-Vuchama	10.0
	Gonja Maore-Bombo	20.0
	Mwembe-Makanya	29.0
	Mkanyeni-Vudee	8.0
	Subtotal	192.0
	Total	323.9
District Road-A	Makanya-Suji	12.0
	Mamba-Saseni	9.5
	Kisiwani-Msindo	16.0
	Gonja-Mpira-Bombo	12.0
	Lembeni-Kilomeni	12.0
	Subtotal	61.5
District Road-B	Subtotal	266.0
	Total	327.5
Pare District	Total	795.4

1.4 Present Condition of Communications Services

Postal and telecommunication services are operated by the East African Posts and Telecommunication Corporation which has its headquarters for the entire East Africa area at Kampala in Uganda and its regional headquarters for Tanzania in Dar es Salaam. The Kilimanjaro Region controls the postal service and telecommunication service from its head office in Moshi. The service level in this region is higher than the average Tanzania, but there still exists some local unevenness. Further improvement, therefore, is considered necessary.

(1) Postal Service

The management structure of the postal service consists of the following post offices:

(i) Head Post Office

As the headquarters of the region, this post office is responsible for all postal services in the region as follows:

- Sales of stamps.
- Acceptance and delivery of registered parcels and packets.
- Acceptance and delivery of letters
- Payment and acceptance of money order
- Saving bank service

(ii) Departmental Post Offices

There are seven in this region. They are operated by formal post office employers, carrying out services similar to those of the above Head Post Office. There is one mail collection and one delivery every day except Sundays.

(iii) Sub-Post Offices

These are also called "Postal Agencies" and are operated by trusted private individuals or cooperative societies. This region has 28 of them, whose services are as follows:

- Sales of stamps
- Delivery of mail and registered parcels.

There are usually three collections and deliveries a week. In setting up new sub post offices, it is hard to find suitable sub post masters, chiefly because of the fact that the monthly remuneration is only 150 sh.

Letters are carried outside the region by KAMATA bus and parcels by E.A. Railways, at present mail is carried within the region by private bus, but the rising cost there of is getting to be a problem.

Charges for Carrying Mail Between Different Points in the Region
(Table-21)

To	Charges	(shs.)
Moshi/Maraigu		
(Moshi/Mwanga)	50	
(Moshi/Bsangi)	200	250.00
Moshi/Same	300	
Same/Gonja	185	
Same/Kisiwani	65	800.00
Same/Mdungu	125	
Same/Kihurio	125	
Moshi/Kagongo		50.00
Moshi/Kilema		40.00
Moshi/Mirua Vunjo		100.00
Moshi/Ugweno		75.00
Moshi/Mkuu	225	
Moshi/Mwika	50	350.00
Moshi/Himo	75	
Moshi/Masama		100.00
Moshi/Langasani		100.00
Moshi/Sanya Juu/ W.Kilimanjaro		250.00
Moshi/Materuni		30.00
Same/Mamba Myamba		100.00
Moshi/Kibosho Manga		75.00
Mkuu/Rongai Forest		60.00
Moshi/Kahe		50.00
Moshi/Old Moshi		75.00
Moshi/Mbokomu		75.00
Moshi/Mombasa		250.00

There is a total of 3,350 P.O. boxes in the region, the breakdown being as follows.

Number of P.O. Boxes (Table-22)

Moshi HPO	2,050
KIA	100
Same DPO	100
Sanya Juu DPO	100
Usangi DPO	300
Lembeni DPO	60
Kihurio SPO	40
Himo DPO	100
Gonja SPO	100
Lengasani SPO	100
Ugweno SPO	100
Marangu DPO	200
Total	3,350

Amount of Mail (Table-23)

Kilimanjaro Region					
	Surface Mail	Air Mail			Tanzania
	All items of correspondence except packets and newspapers	All items of correspondence except aerogrammes, packets, and newspapers	Aerogrammes	Total	
1971	1,837,264	1,070,632	1,166,100	4,073,996	60,910,000
72	2,056,259	1,087,410	1,283,788	4,427,457	63,695,000
73	1,701,252	634,812	258,804	2,594,928	64,292,000
74	3,550,704	2,622,140	1,213,164	2,386,008	-
75	2,374,684	1,009,892	686,868	4,071,444	-

Source: Annual count of correspondence and parcels, head postmaster's summary (1971 - 1975)

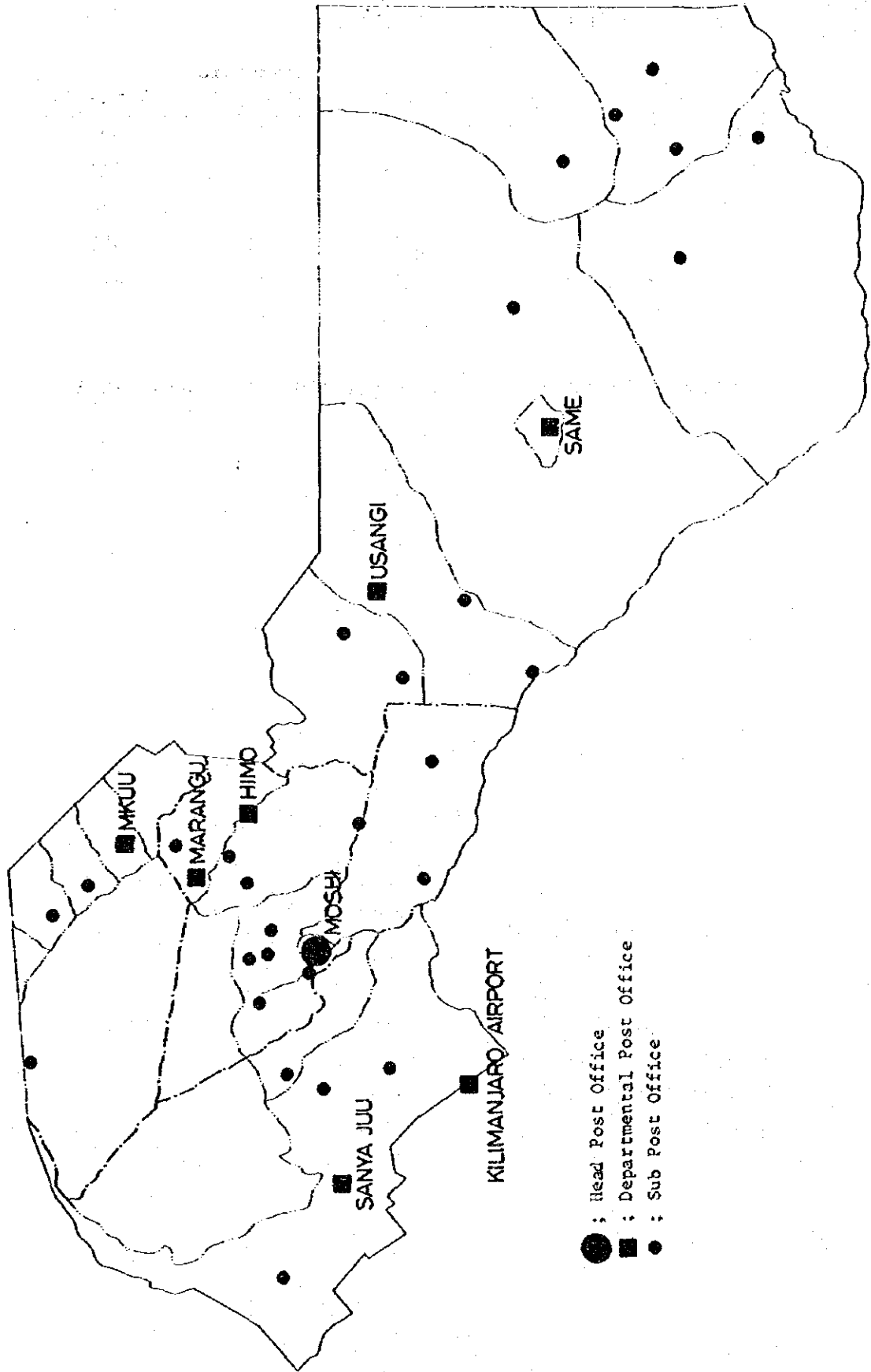
Number of Post Offices (Table-24)

	Hai	Moshi	Rombo	Pare	Kilimanjaro Region	Tanzania
1971	3	9	3	11	25	398
72	5	10	4	11	29	424
73						436
74	5	11	3	13	32	451
75	5	11	3	13	32	495
76	6	14	4	13	37	519

Number of Post Offices in 1976 per 100,000 Persons (1975 pop. figures)

3.7	3.8	2.7	6.8	4.3	3.4
-----	-----	-----	-----	-----	-----

Present Post Offices (Fig.27)



(2) Telecommunication Service

The telephone system in the region is connected with the rest of the country by radio under the control of the telephone office in the Moshi Head Post Office.

Telephones are currently in widespread use in the Moshi District. But for other districts, Rombo and Pare in particular, future improvement is desired in the telephone system. Two of the exchanges have been automated: Moshi and Kilimanjaro Airport.

Number of Telephone Subscribers (Table-25)

	Moshi	Hai	Rombo	Pare	Total	Tanzania
1974	1,163	98	0	70	1,331	24,857
75	1,279	105	0	74	1,458	-
76	1,508	128	28	83	1,747	29,066

Sources: Kilimanjaro Region - Monthly subscriber Installation Return, '74 - '76.

Tanzania-Economic and Statistical Review 57, Dec. '75,

Number of Subscribers per 100 Persons (1976) (Table-26)

'76	0.41	0.08	0.02	0.04	0.20	0.19
-----	------	------	------	------	------	------

Number of Telephone Stations (Table-27)

	Moshi	Hai	Rombo	Pare	Total	Tanzania
1974	2,656	259	0	152	3,067	58,082
75	2,818	274	0	167	3,322	-
76	3,104	325	28	178	3,635	67,119

Number of Telephones per 1,000 Persons (Table-28)

1974	7.26	1.61	0	0.79	3.55	4.05
75	7.87	1.71	0	0.87	3.84	-
76	8.65	2.02	0.19	0.93	4.20	4.50

Number of Exchanges (Table-29)

	Moshi	Hai	Rombo	Pare	Total
1974	5	3	0	1	9
1975	5	3	0	1	9
1976	5	3	1	1	10

Source: "Monthly Subscriber Installation Return", '74 - '76.

Number of Exchanges per 10,000 Persons (Table-30)

	Moshi	Hai	Rombo	Pare	Total
1976	0.0014	0.0019	0.0007	0.0005	0.0010

Number of Public Call Offices (Table-31)

	Moshi	Hai	Rombo	Pare	Total	Tanzania
1974	14	2	0	2	18	298
1975	13	3	0	2	18	-
1976	13	3	1	2	19	321

Telephone Rates

Basic charge

Basic monthly rental charge of 40 sh.

Call rates

Local 65 cent/call

Long-distance

Machame	65 c/call	
Kibosho	"	
Himo	"	
Marangu	3/90 per 3 minute	
K. I. A.	"	"
West Kilimanjaro	"	"
Sanya ju	"	"
Mkuu	"	"
Usagi	"	"
Same	7/80	"
Tanga	15/60	"
Dar es Salaam	19/50	"
Dodoma	19/50	"
Mwanga	19/50	"
Lindi	27/30	"
Mbeya	27/30	"

Charge for Installment of Telephone

300 sh. within a radius of 5.2 km, a special charge being levied in cases where this distance is exceeded.

Number of Telegrams (Table-32)

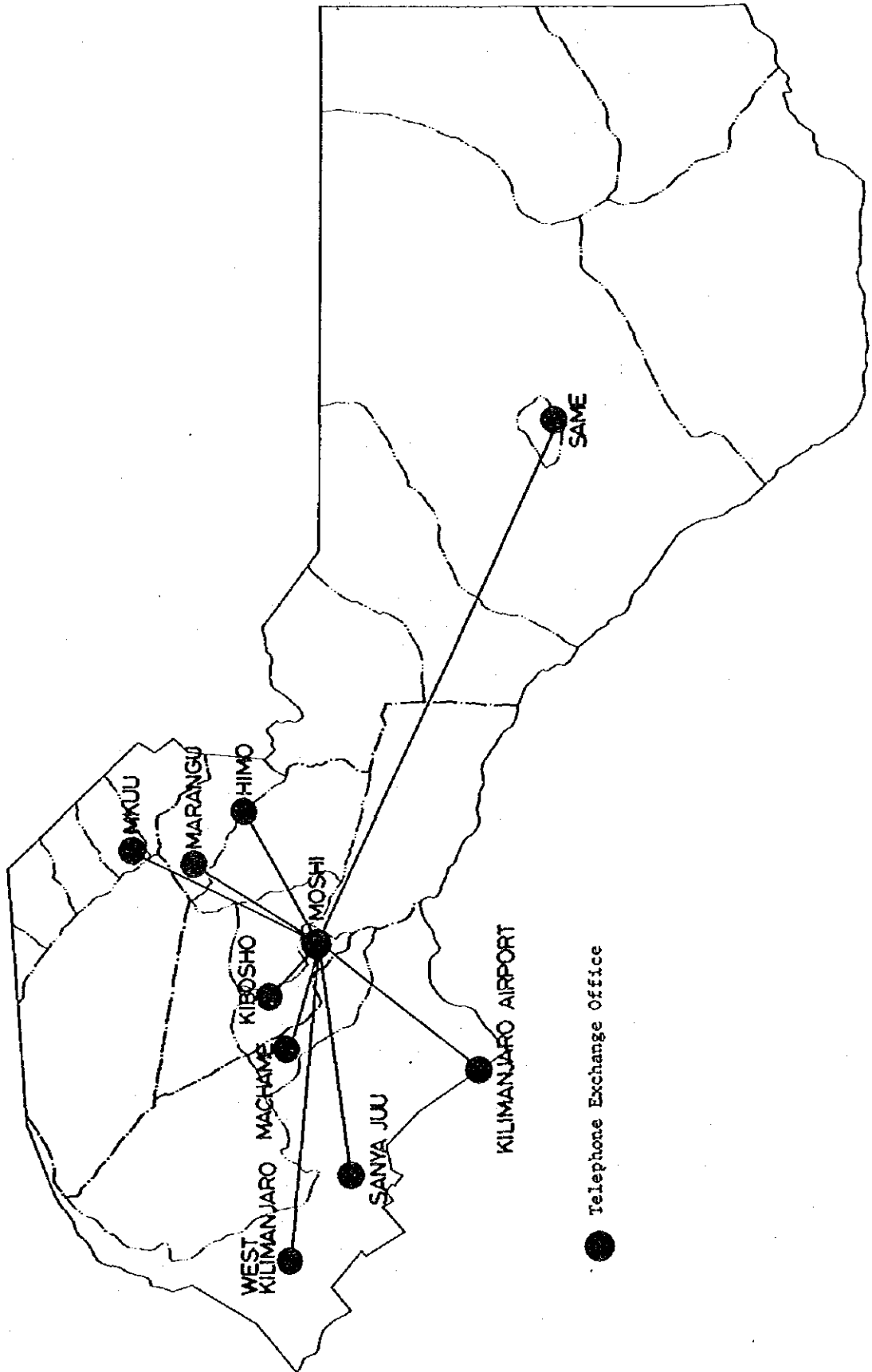
Year	Booked at Moshi counter and phanograms	Passing through Moshi Tel. Office	Delivered within Moshi
1971	2,155	5,460	*2,573
1972	2,338	5,641	*2,651
1973	1,936	1,212	**3,030
1974	2,280	1,805	**3,662
1975	2,381	1,916	**4,624
1976	2,701	2,717	**5,543

* Arusha included.

** Kilimanjaro Region alone on introduction of T.A.S. (Telegraph Automatic Switching System)

There are presently 19 telex lines, which are all managed by the Arusha Exchange.

Present Telephone Network (Fig.-28)



2. PLAN OBJECTIVES AND BASIC GUIDELINS

2.1 Objectives of Plan

The following are the objectives governing the transportation and communications plan.

- (1) Local differences must be corrected and class discrimination eliminated.

The Kilimanjaro Region is an advanced area compared with the nation's average level, and transportation and communications conditions are fairly good.

However, as the analysis indicates there exist noticeable differences among local areas in the region. To neglect these differences would go against the principle of fairness and would impede uniform development of the areas concerned. It is also important to offer convenience equally to people of all classes; the plan should not be such that it benefits a specific group of people only.

- (2) The plan must contribute to economic development of the region. Needless to say, transportation and communications are one of the bases for development of the regional economy. In this respect, it is first of all necessary to find out where the bottle-neck impeding such solution lies. Then it will be necessary estimate demand and to establish a plan to meet such demand. Furthermore, the plan must provide an infrastructure which invites the region's economic development. For this purpose, it is important to meet the requirements of the leading strategic industries participating in economic development of the region and to concentrate investment where it is most needed.
- (3) The plan must be based on a long-range view. Transportation and communications plans for the near future will have to be based on long-term thinking regarding such basic regional networks. The network would change its function to a considerable extent if a constituent is added or taken away. The network should be considered to be a living thing. For the above reasons, it should grow, always meeting the social-economic development of the areas concerned.

- (4) The plan must be efficient.

Since provision of transportation and communications facilities is expensive and improvement of the level of such facilities cannot be effected overnight, it is necessary to take into full account the economic effect and keep planning within the limitations thereof. Moreover, the plan must be such as to make it possible to implement it slowly but surely on the basis of creative local self-reliance.

- (5) The plan must be given the spirit of self reliance for its execution.

The plan must be worked out in such a way that development of transportation and communications will be carried out slowly but steadily with the spirit of self reliance.

2.2 Long-term Road Plan

(1) Existing problems

Roads are an infrastructural element indispensable to regional development. In the Kilimanjaro Region, however, most roads, with the exception of some trunk and regional roads, are in need of improvement with respect to horizontal alignment, vertical alignment, width, pavement, and bridges, culverts, and other structures. Moreover, road maintenance and rehabilitation is less than adequate.

The problems regarding roads in the region can be summarized as follows:

- Disparity between different areas with respect to road mileage and state of paving.
- Inefficiency of the road network.
- Inadequate budget for provision of roads.
- Shortage of construction machinery.
- Shortage of skilled manpower.
- Problems regarding the organization for implementation of plans for provision of roads.
- Inadequate basic data such as maps, statistics, etc.

(2) Future Road Network

The road network is officially divided into the following categories at present.

- Trunk road
- Regional road (A)
- Regional road (B)
- District road (A)
- District road (B)
- Other road

The above classification seems to have been made on the basis of road administration because the construction and management of roads variously falls under the control of the Ministry, Regions, Districts, and others. In planning the future road network, it is necessary to define the function of each individual road and re-constitute a more efficient network in accordance with the respective functional allotment without being restricted by the official classifications.

In the present planning, therefore, the road network shall be classified as follows:

- National Highways
- Regional Main Roads
- Major Distribution Roads
- Minor Distribution Roads
- Local Roads

National Highways

These roads constitute the principal network of the country and are the main axis of road communication in regions used for communication to and from neighboring countries and for inter-regional connections.

Regional Main Roads

These are main roads supporting long distance traffic and form the framework of the region these roads connect the main cities of the District or the main traffic bases.

Major Distribution Roads

Main Distribution Roads which connect to and supplement National Highways and Regional Main Roads. These run to the center of Divisions and connect main villages, industrial centers, traffic junctures, etc.

Secondary Distribution Roads

Distribution roads supplementing the Major Distribution Roads. These connect higher-class roads and living areas (Work centers) and also connect villages, industrial centers, traffic junctures, etc..

Local Roads

These are roads used for local communication such as to and from neighboring villages, city streets, village streets, etc.

(3) Long-range Plan

A five-year plan is a comparatively short period of time, so it is necessary to take a long range point of view. Described below is a presumed road network in Kilimanjaro Region in 1995.

National Highway

A trunk road forming the principal traffic axis, which longitudinally runs through Kilimanjaro Region from Tanga to Arusha.

Regional Main Roads

A circular road running around the mountainside of Mt. Kilimanjaro, roads leading to the neighboring country and the summit of Mt. North Pare, a road running on the east side of South Pare,

etc. will be constructed. These will be the principal roads in the region.

Major Distribution Roads

These form the framework of regional roads together with the Regional Main Roads, connecting division centers, main villages, traffic junctures, etc..

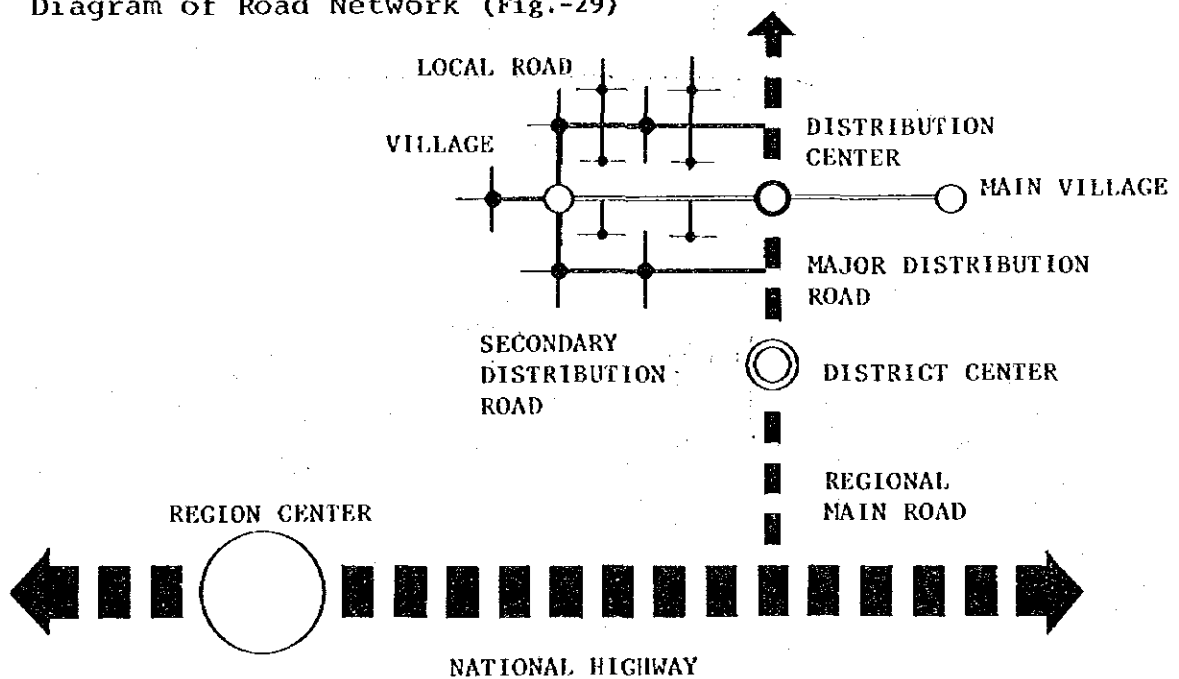
Secondary Distribution Roads

These provide corner-to-corner communication in the region, supplementing the Major Distribution Roads.

Official classification and classification in planning

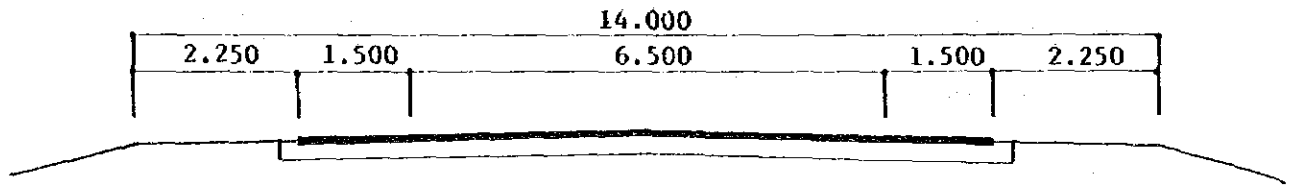
Name of roads (official classification)	Name of roads (classification in planning)
Trunk road	National highway
	Regional main road
Regional road (A)	Main Distribution road
Regional road (B)	
District road (A)	Secondary Distribution road
District road (B)	
Other road	Local road

Diagram of Road Network (Fig.-29)

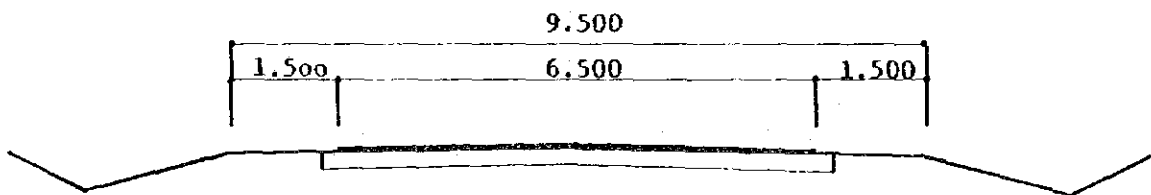


Typical Cross Section (Fig.30)

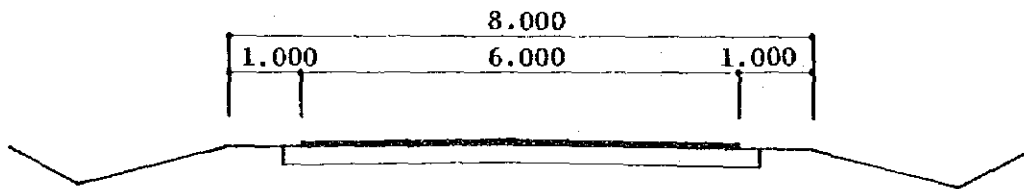
National Highway



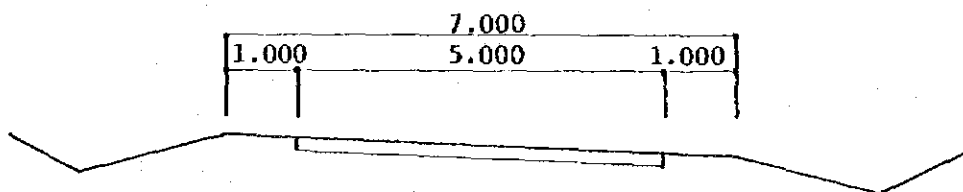
Regional Main Road



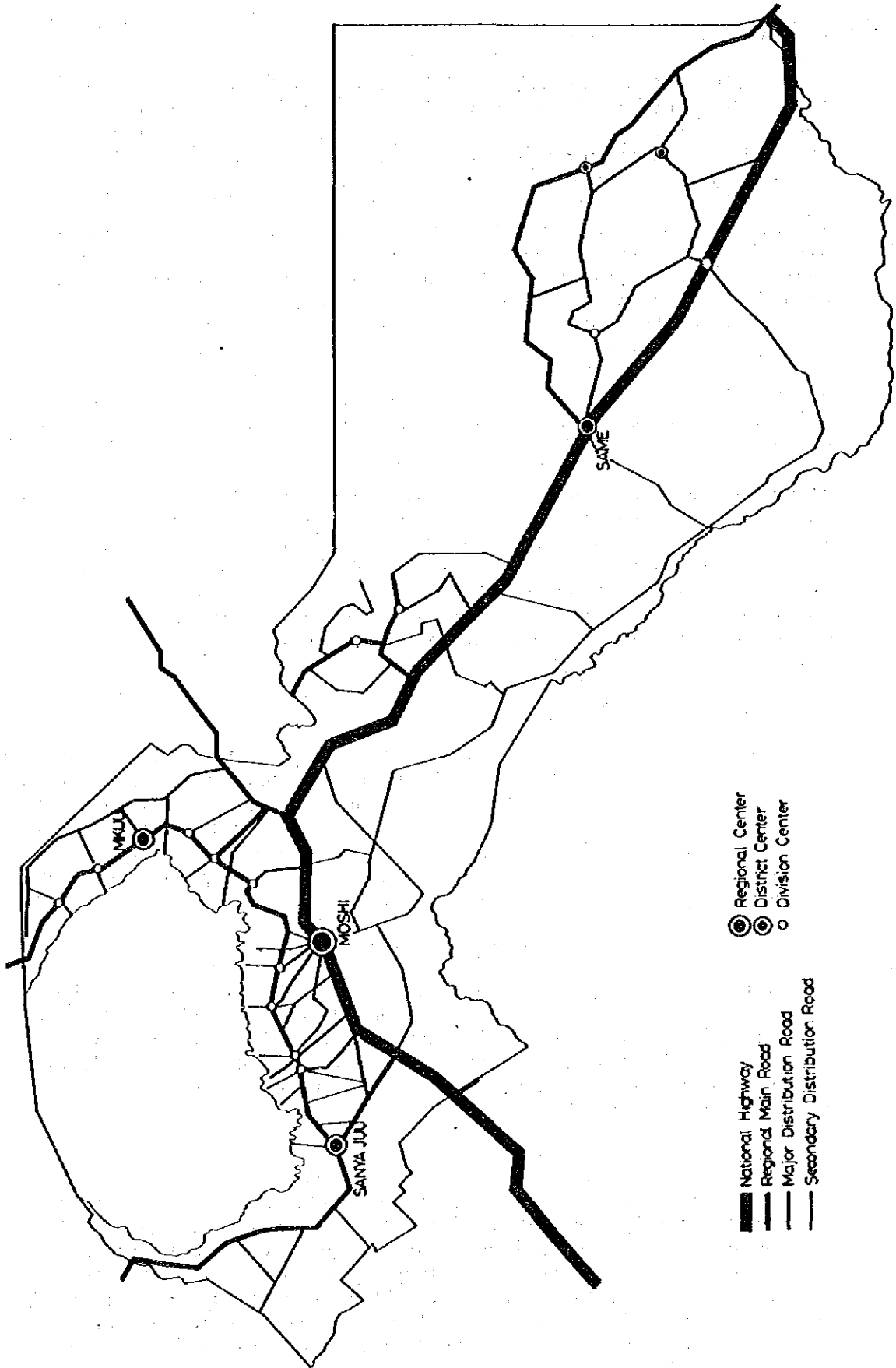
Major Distribution Road



Secondary Distribution Road



Road Network 1995 (Fig.-31)



2.3 Long-term Plan for Bus Service

The people in the Kilimanjaro Region are very much dependent on bus service for both local and long-distance travel because of the low rate of motor vehicle ownership and inadequate railway service. In fact, there are thirty times as many passengers at the Moshi bus station as at the town's railway station.

The bus routes in the region form a radial system centering on Moshi, with the frequency of service increasing the closer the distance from that town. Since all major regional roads have bus lines and the area within 5 km of these roads on both sides represents a very high percentage of the total area of the region, what is needed more than additional routes is greater frequency and regularity of service.

Bus service is mainly provided by private companies, the routes of which have become particularly numerous in the vicinity of Moshi as demand has grown.

Although there is nothing wrong with bus service being provided where there is demand for it, in this case there are too many overlapping lines on trunk roads near Moshi and too many large buses servicing them, resulting in considerable waste of energy and too low frequency of service in the Rombo, Hai, and Pare districts. This is to be expected, however, with such a preponderance of private bus companies. Hence the following proposal for reorganization of the bus service network.

-Long-distance bus service

Long-distance service to towns in other regions of Tanzania such as Tanga, Dar es Salaam, and Dodoma and towns in neighboring countries such as Nairobi should, as before, be provided by the National Transport Company (KAMATA) and a few private companies. The buses should seat approx. sixty passengers, and the number of stops should be reduced in order to carry a greater number of passengers over longer distances in less time.

-Intraregional main route bus service

These are lines connecting the center of Moshi Town with the district centers of Hai, Rombo, and Pare, which should each be provided with a bus station at a major traffic intersection complete with an indoor waiting room, kiosk, and facility offering simple meals. Large buses should be run on these lines according to regular schedules.

-Feeder line bus service

The region should be divided into several zones, with circuit or round-trip bus service connecting the main village traffic nodal points in each zone. The design of the bus stops should take into account the convenience of people waiting for the bus in the rain or in hot weather. Where road conditions are good, minibuses with a 15-30 passenger capacity should be operated. Where they are bad, the landrover type of vehicle with 4-wheel drive and a passenger capacity of about ten persons should be employed.

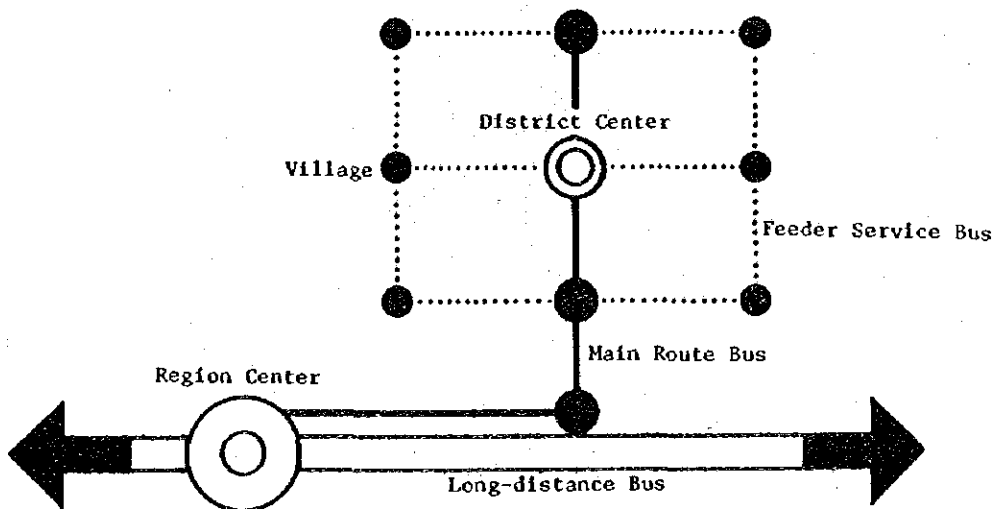
Set us now consider some of the problems that can be expected in the implementation of this proposal for a new system of bus service for the Kilimanjaro Region. The first problem is that most of the buses now operated in the region are done so by owner-drivers. That is to say, they are one-man proprietorships, and it will not be easy to organize them. One possibility is the establishment of cooperative entities as contractual relationships. In any case, the formation of such entities will require a great deal more forceful administrative guidance than is in evidence at the present time.

Secondary, there is the problem of profitability. If the system of bus service lines is geared entirely to demand, as now, the profitability situation will remain much as it is. If, however, the concept of the welfare of residents is introduced, it will be necessary to operate some lines with relatively few passengers which can be expected to run a deficit. What will be tricky here is balancing these deficit lines with the lines having large numbers of passengers and a satisfactory level of profits.

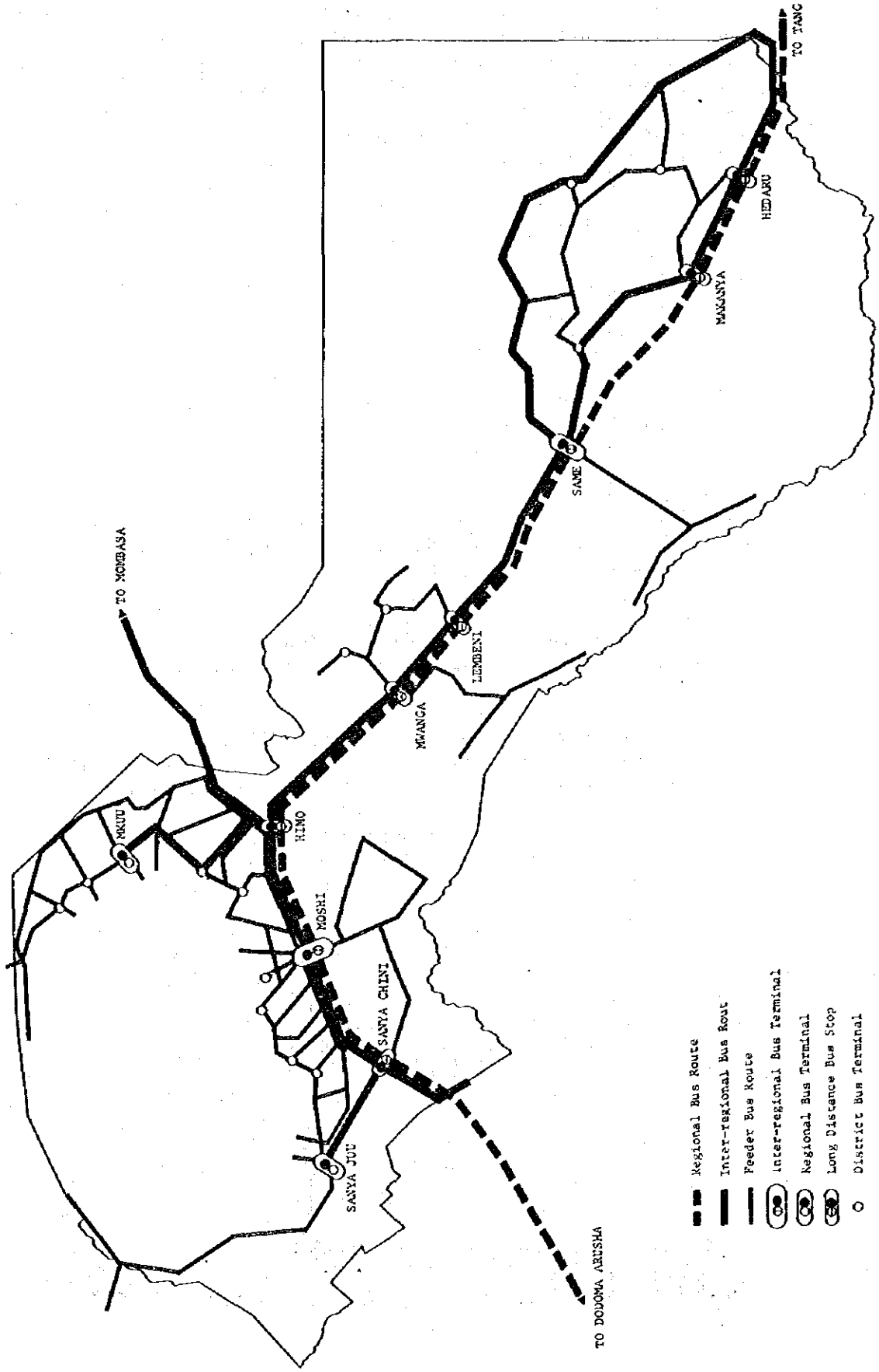
A third problem is that of the system of fares. Considering the level of incomes, the present fares are by no means low, and it will be necessary to consider ways of reducing them. Also, it will be necessary to sell tickets that can be used on any of a number of lines.

Besides these problems regarding various systems involved in bus service, the following are also problems that will have to be resolved:

- Provision of various operational facilities for joint use, including parking facilities, maintenance and repair facilities, filling stations, and driver rest facilities.
- Provision of adequate guidance with respect to the need to keep to the schedule of operations and to drive safely.



Bus Service Network, 1995 (Fig.-33)



2.4 Long-term Railway Plan

(1) Existing Problems

(i) Passenger Service

Lack of transport capacity is an overall problem.

— Shortage of trains

At present there are only three passenger train departures from Moshi a week, each of which consists of two sections, one bound for Tanga and the other for Dar es Salaam. Since there were nine departures a week back in 1969, there has been an inevitable decline in passenger convenience, to which the decline in the number of passengers since then can no doubt be attributed.

— Slowness

At present the passenger train takes fifteen and a quarter hours from Moshi to Tanga, at an average speed of 23 km/hr., and eighteen hours from Moshi to Dar es Salaam, at an average speed of 35 km/hr., which is 2-3 times the time it takes by bus, the bus trip to Dar es Salaam taking only eight hours, at an average speed of 70 km/hr. Particularly exasperating is the long train stop at Corogue on the way to Tanga for separation and connection of coaches and other reasons.

— Failure to Keep to Schedule

In 1975 only 27% of the trains on the Tanga line arrived on times, and this percentage is getting lower every year.

— Fares

The following table compares train fares with bus fares to Dar es Salaam and Tanga. The cheapest bus fare is about the same as the 2nd-class train fare.

Schedules of Train and Bus Fares (from Moshi to Dar es Salaam and Tanga) (Table-33)

Railway	sh.	km.	sh.	km.
1st	126/30	0.21	80/10	0.23
2nd	57/30	0.09	36/40	0.10
3rd	25/60	0.04	17/10	0.05
(Dar es Salaam)	(636 km)		(Tanga)	(350 km)
Bus	sh.	km.		
	80/	0.14	sh.	
	53/	0.09	35/	0.10
	(567 km)			(354 km)

(ii) Freight

The biggest problem is inadequate transport capacity. The amount of freight shipped has been declining since 1973, when it reached a peak. One reason for this is no doubt the closing of the Voi Line, which connected with Kenya, but another major reason is a decline in transport capacity caused by a shortage of locomotives and wagons.

—Shortage of locomotives and wagons

As of February 1977, there were 28 locomotives, all steam, on the Tanga line, 13 belonging to the Tanga shed and 15 to the Moshi shed. Their average age is 25 years, and four of them can be considered to have surpassed the number of years that they can reasonably be expected to operate. Such superannuation of locomotives, together with difficulty in obtaining spare parts owing to lack of foreign exchange, has seriously hampered maintenance and resulted in a decline in the average rate of operation to approximately 30%. The consequences have been the same as those in the case of passenger trains:

- (1) Running of too few trains
- (2) Lowering operating speeds
- (3) Failure to keep to operational schedules

As for the shortage of wagons, there is same problem of superannuation as in the case of locomotives. Moreover, the absolute number of wagons, too, is insufficient, making it sometimes impossible to meet peak transport demand fully. In addition, there is a shortage of special wagons such as those that carry oil and other fuels, which has made it necessary to ship some oil by truck.

—Track Problem

The following problems with respect to tracks have a great bearing on railway transport capacity:

- 1) Problems with respect to vertical gradient and curve radius.
- 2) Problems concerning rails and rail beds.
- 3) Problems concerning signals and safety equipment.
- 4) Shortage of drainage facilities.

(2) Railway Transport Demand

The main shipments out of the Kilimanjaro Region by rail are agricultural and forestry products, and the main shipments in by rail are industrial products and oil. This should continue to be the case in the future in view of the fact that the regional integrated development plan concentrates primarily on agricultural development.

On the basis of the production levels set for 1980 and 1985 in the present agricultural development plan and that set for 1995 in the

land-use plan and taking into account figures given in the EARC "Statistical Digest" and other publications, the amounts of cash crops, food crops, forestry products, leather goods, etc., that will be shipped out of the region have been estimated as follows.

Assuming that all cash crops, forestry products, and leather goods and that amount of food crops that is sold in official markets are shipped out of the region, such shipments can be expected to total 134,600 t. in 1980, 169,000 t. in 1985, and 205,000 t. in 1995.

Furthermore, assuming the same rate of increase in shipments out of the Arusha Region, the total of such shipments from the two regions taken together can be expected to be 193,400 t. in 1980, 253,000 t. in 1985, and 321,000 t. in 1995.

Projections of Project Levels in the Kilimanjaro Region and Amounts of Shipments
Out of the Region (Table-34)

(unit: t)

	At present *1		1980 *1		1985 *1		1995 *2	
	Production	Shipments	Production	Shipments	Production	Shipments	Production	Shipments
Coffee	20,518	20,518	24,960	24,960	30,370	30,370	37,020	37,020
Cotton	1,196	1,196	1,930	1,930	3,100	3,100	5,050	5,050
Sufar	49,103	49,103	62,660	62,660	76,100	76,100	84,060	84,060
Sisal	6,986	6,986	7,000	7,000	7,000	7,000	7,000	7,000
Seed beans	700	700	980	980	1,250	1,250	1,600	1,600
Pyrethrum	95	95	150	150	250	250	410	410
Cardanan	19	19	30	30	50	50	80	80
Castor	69	69	69	69	69	69	69	69
Jaggery	600	600	600	600	600	600	600	600
Sunflower	78	78	78	78	78	78	78	78
Subtotal	79,364	79,364	98,457	98,457	118,867	118,867	135,967	135,967
Maize	45,466	6,365	73,200	10,248 (14%)	117,760	16,486	174,280	24,399
Wheat	9,359	9,078	13,750	13,338 (97%)	20,200	19,594	29,900	29,003
Paddy rice	6,332	950	11,160	1,674 (15%)	19,670	2,951	29,120	4,368
Finger millet	3,600	418	5,080	559 (11%)	6,810	749	9,150	1,007
Subtotal	64,957	16,811	103,190	25,819	164,440	39,780	242,450	58,777
Timber		9,402		9,402		9,402		9,402
Leather goods		498		498		498		498
Charcoal		468		468		468		468
Subtotal		10,368		10,368		10,368		10,368
Total		106,543		134,644		169,015		205,112

*1 Agriculture Plan

*2 Land-use Plan

Projections of Amounts of Shipments Out of the Region (Table-35)

		(tons)			
		1975	1980	1985	1995
Cash crops	Kilimanjaro Region	79,364	98,457	118,867	135,967
	Arusha Region	15,665	19,425	23,498	26,787
Food crops	Kilimanjaro Region	16,811	25,819	39,780	58,777
	Arusha Region	25,402	39,119	60,202	88,907
Other items	Kilimanjaro Region	10,368	10,368	10,368	10,368
	Arusha Region	243	243	243	243
Totals	Kilimanjaro Region	106,543	134,644	169,015	205,112
	Arusha Region	41,310	58,787	83,943	115,937
Totals		147,853 (29,600)	193,400 (38,700)	253,000 (50,600)	321,000 (64,200)

The figures in parentheses are for the peak month of the year, it being assumed that they will be 20% of the annual total as in 1975-76.

(3) Number of Locomotives Required

Assuming a locomotive traction capacity of 322 t. for a 25 t. train with nine freight cars, the use of all available locomotives once every 1.5 days, and shipment by railway of all the freight shipped out of the region, the number of locomotives that will be required can be estimated as follows.

Since the amount of freight that can be hauled per train each month will be 30 days/1.5 days/run x 225 t., or 4,500 t., the following numbers of locomotives will be required:

1980	38,700 t./4,500 t. = 8.6
1985	50,600 t./4,500 t. = 11.2
1995	64,200 t./4,500 t. = 14.3

Since there are fifteen locomotives in the Moshi shed at present, the rates of operation that will be required of them are as follows:

1980	8.6/15 = 0.57
1985	11.2/15 = 0.75
1995	14.3/15 = 0.95

As things are now, however, the rate of operation on the Tanga line is very low because of the fact that old steam locomotives are being used and there is a shortage of parts. In Jan. - Feb. 1977, for instance, the rate of operation was only 30%. It will be necessary, therefore, to boost this rate by 27% by 1980 through the purchase of parts and improvement of maintenance techniques. Furthermore, considering the age of the present locomotives it will be necessary to purchase new ones after 1985 if the rate of operation is to be raised above 60%.

(4) Long-term Railway Plan

As already mentioned, there has been a decline recently in the transport capacity of the Tanga line owing to a shortage of available locomotives and wagons. As a traditional line that used to carry a great deal more passengers and freight, more effective use ought to be made of its assets. Furthermore, if the freight business that has been lost to lorried is recovered by the railways, it will mean more efficient use of oil resources and hence savings in foreign exchange.

Since freight and passenger transport by railway stimulates commercial activity in the railway nodal point of Moshi, the town will further prosper as railway transportation is further developed.

(i) Strengthening of Transport Capacity

Possible ways of boosting transport capacity on the Tanga line are to increase the number of trains and to increase the length of each train.

(a) Increasing the number of trains

-Increasing the number of locomotives and wagons

As already mentioned, the locomotives on the Tanga line, all of which are steam locomotives, are operating at a very low rate owing to superannuation and shortage of spare parts, and it is important that this rate be raised. As will be further discussed later, these steam locomotives should eventually be replaced with diesel locomotives for greater tractive power, but for the time being it is important to effect a smooth supply of spare parts.

-Increasing the number of signal yards

Since the distance between stations on the Tanga line varies considerably, additional signal yards should be provided where the distance between stations is long so as to make it possible to increase the frequency of train switches.

-Improvement of track curve radius

In order to increase the number of trains, it is necessary to raise the speed at which trains run. This will entail not only improvement of the performance of the locomotives themselves, but also elimination of sharp gradients and increase of the curve radius at certain points.

(b) Increasing the length of trains

-Improvement of sharp gradients

With present locomotive capacity, it would be impossible to increase the length of trains. What is necessary is elimination of sharp gradients. This, however, could require large-scale works considering the restrictive conditions of the terrain.

- Introduction of diesel locomotives

For longer trans, large locomotives are necessary, and the introduction of diesel locomotives is advisable in this respect from the addition standpoint of lower fuel and maintenance costs.

- Reinforcement of tracks

It will be necessary to replace the present 29.8 kg/m (Tanga-Moshi) and 22.5 kg/m (Moshi-Arusha) rails with 40 kg/m rails so as to be able to stand up to the large locomotives that are to be introduced. Furthermore, it will be necessary to replace the latelite rail bed between Moshi and Arusha with a crushed rock rail bed as well as considering replacement of the existing sleepers with Prestressed Concrete Sleepers.

- Lengthening of stations

As the length of trains increases, it will be necessary to improve the track lines in the vicinity of stations for switching trains.

(c) Stabilization of shipments

The amount of freight shipped should be steadily increased, and accidents should be reduced in order to improve punctuality, which is so important to railway operations.

- Elimination of fluctuations in amount of shipments

Since farm produce accounts for a large proportion of railway freight, there is inevitably considerable seasonal fluctuation. If capacity is increased enough to cope fully with the peak period of shipments, both facilities and personnel would be more than is needed during slack periods. Accordingly, it is necessary to level out operations in peak periods and ship other kinds of freight in the slack periods. This will entail provision of warehouses and other forms of storage capacity and more lively exchange of information with customers.

- Prevention of accidents

Safety is essential to the sound operation of railways, and the following measures are essential for safety:

- Improvement of block systems

The block system of the Arusha line should be improved.

- Increasing the number of signals stations should be provided with departure signals geared to shunting.

- Safety at level crossings

Besides making it obligatory for motor vehicles to stop at

level crossings before proceeding across them, crossing gates should be provided where the field of vision is not good.

— Provention of natural calamities

Since there are frequent reports of the track bed being washed away in torrential downpours in the Pare District, it will be necessary to improve drainage channels and provide bridges and culverts at strategic points.

2.5 Long-term Communications Network Plan

(1) Postal Service

Postal service is important to the residents of the region both as a means of receiving information, as are the newspapers and the radio, and as the sole means of getting in touch with others at a distance in a situation where the telephone network is underdeveloped and the rate of telephone subscription is low. Since, however, there are no house-to-house deliveries, there is the inconvenience of having to go the post office to pick up your mail. That is why it is desirable that the number of sub post offices be increased.

Of next importance is greater provision of departmental post offices, at which it is possible to remit money as well as have it remitted and at which there is a post office savings deposit system. Such a savings deposit system is made doubly significant by the fact that banks are located only in the towns.

The following criteria are therefore proposed as long-range targets (1995) with respect to post offices in the Kilimanjaro Region:

- 1) One post office for every 14,000 persons, as opposed to one for every 25,000 persons at present.
- 2) One post office for every 127 km², as opposed to one for every 389 km² at present.
- 3) A service radius of 2.5 km (30 minutes' walking distance) for each post office, and location so that in the future at least 10,000 persons will be living within each such sphere.
- 4) One departmental post office for every two sub post offices, as opposed to one for every four at present.
- 5) Six mail deliveries a week to each post office, as opposed to the present two deliveries a week.

	1975	1980	1985	1995
Post office	34	50	68	104
Pop. per post office (1,000)	25.4	20.4	17.5	14.0
Average area serviced by each post office (km ²)	389	264	194	127

(2) Telecommunications

Because of the speed and volume of conveyance of information of which it is capable, telecommunications service is indispensable to the modernization of industry and life in general. The development of industry has resulted in an increase in the amount of information that has to be conveyed, and the development of means of conveying information in turn has been a great boost to industry. The need for telephone service is keenly felt not only with respect to industry but also in connection with administrative functions and everyday life, especially in emergency situations.

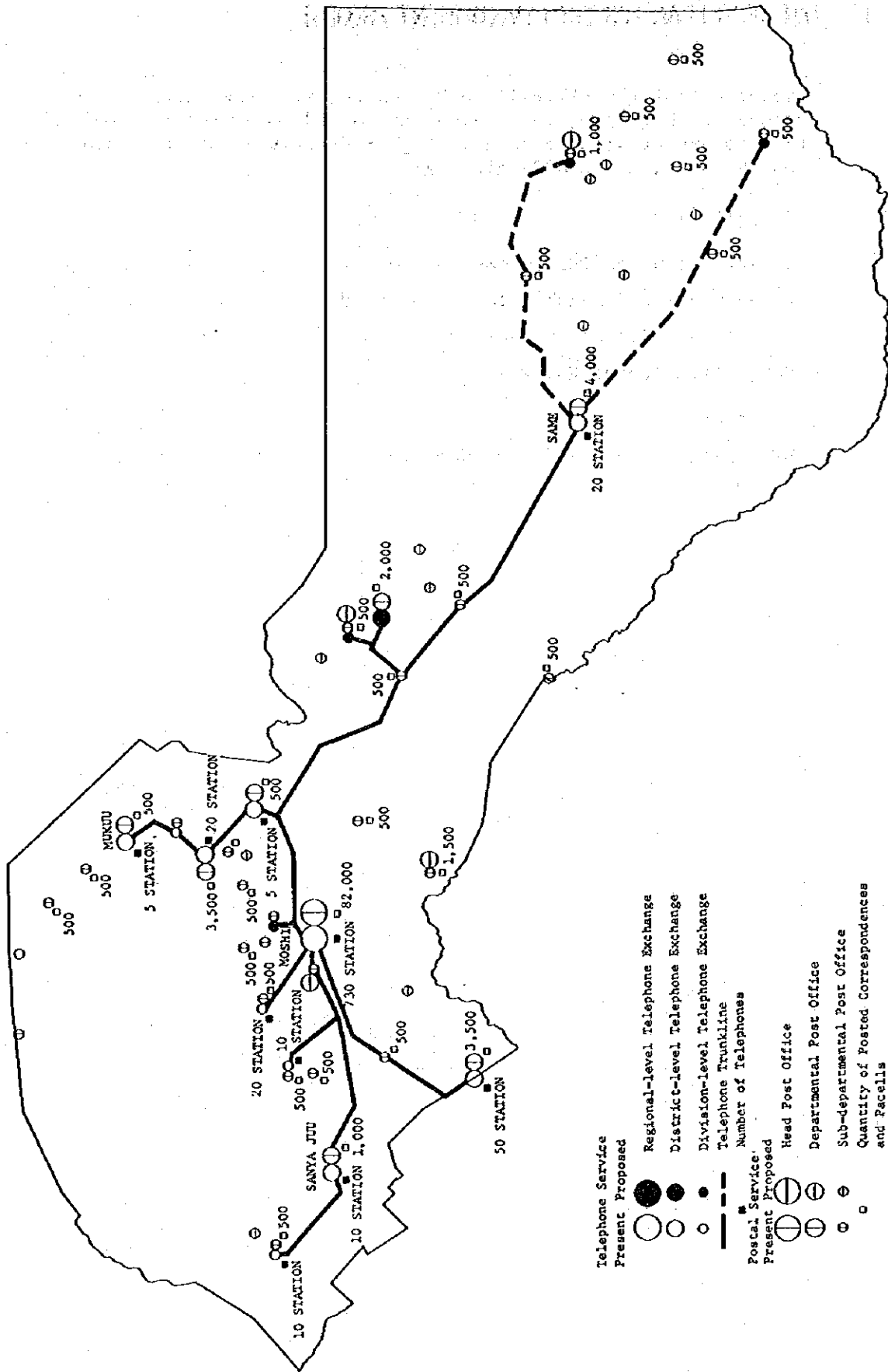
Because of the strong correlation between telephone demand and transportation demand, the former can be expected to be greatest along the Dar es Salaam (Tanga) - Moshi - Arusha axis and in a radial pattern within the region centering on Moshi Town.

There is also a strong correlation between growth in the number of telephones and growth in per-capita income. Assuming growth in the latter from \$165 in 1975 to \$385 in 1995, by 1995 there should be 21 telephones for every 1,000 persons in the region. This being the case, the telecommunications network of the region should be improved as follows:

- 1) The improvement plan that E.A.P.T.C. has should serve as a base.
- 2) Each division center should have a telephone exchange.
- 3) In infrastructural improvement areas each exchange should have a subscription area with a radius of 5 km, and it should be located so that there will be at least 5,000 persons living within such radius in the future.
- 4) The towns serving as district centers should each have an automatic exchange.
- 5) Wider use should be made of telex facilities, particularly in Moshi Town for communications between main offices and branches of large businesses in industries that require greater exchange of information than others, and in industries that have a great deal of international communications.
- 6) In remote areas, areas with sparse population, and other areas in which will be little provision of infrastructure and in which provision of telephone exchanges, would not be economically feasible, a radio telephone system should be introduced for emergency communications on the part of administrative units, hospitals, etc.

	1975	1980	1985	1995
Telephones per 100 persons	0.42	0.60	0.89	2.07
Telephones (1,000)	36	61	106	301
Exchanges	10	17	26	45
Pop. per exchange (1,000)	86.5	60.1	45.9	32.3
Area per exchange (km ²)	1,321	777	508	294
Automated exchanges	2	2	4	5

Communications Network, 1977-1980 (Fig.-34)



3 FIVE-YEAR PLAN FOR THE DEVELOPMENT PROJECT

Development of the Kilimanjaro Region requires the execution of various measures with respect to transportation and communications, the following projects are considered to have higher priorities in the light of existing problems and long-term development.

Transportation:

- Construction and Improvement of Roads
- Maintenance and Rehabilitation of Roads
- Re-organization of Bus Service System
- Rehabilitation of Railways

Communications

- Expansion of Communication Network

3.1 Road Network Plan

(1) Construction and Improvement of Roads

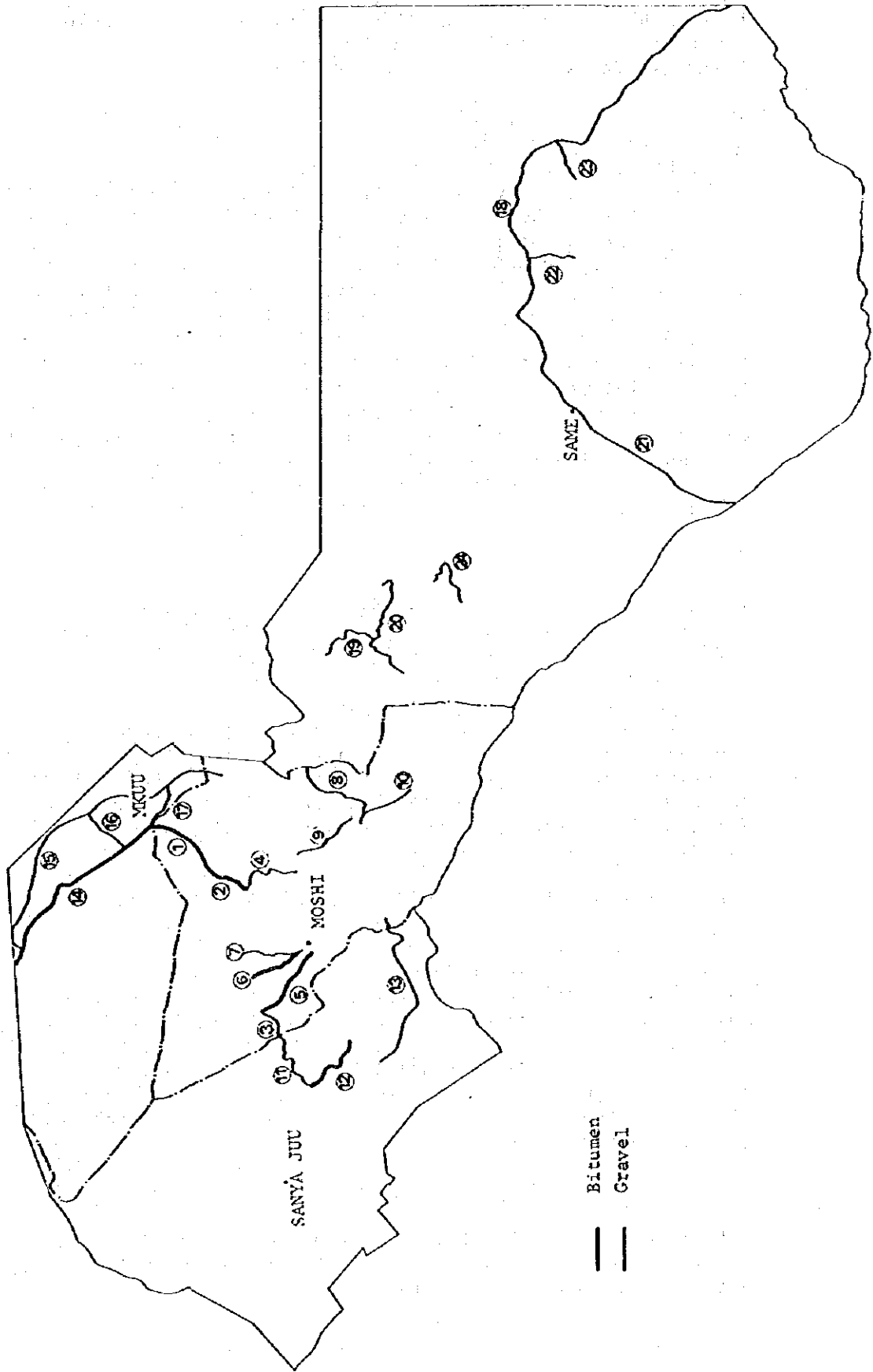
The priority of road improvement in the long-term road plan, was determined as follows:

- Roads in Rombo and Pare districts where the ratio of all-weather road is low are to be given higher priority.
- Regional Main Roads and Major Distribution Roads which will be trunk lines in the future network plan are to be improved with higher priority.
- Roads leading to districts where the development projects for agriculture (the strategic industry) are planned are to be improved with higher priority.
- Transportation routes for export products which are the only means of obtaining foreign currency now are to be given higher priority.

List of Road Construction and Improvement Projects (Table-36)

No.	Class	Function	Name of Road	Surface	Width(m)		Length (km)
					Forma- tion	Sur- face	
Moshi District							
1	Trunk	Main	Marangu-Mengwe	Bitumen	9.5	6.5	11.0
2	District	Main	Marangu-Kirua	Bitumen	8	6	11.4
3	Region	Main	Kibosho-Lyamungu	Gravel 15	9.5	6.5	7.9
4	Region	Major	Kawawa	Gravel 15	8	6	12.8
5	Region	Major	Moshi Uru Kibosho	Bitumen	8	6	15.0
6	District	Major	Moshi-Uru	Bitumen	8	6	9.0
7	District	Secondary	Rau-Kishumund	Gravel 15	7	5	6.5
8	District	Secondary	Kahe-Sirigi	Gravel 10	7	5	10.0
9	District	Secondary	Kahe-Uchira	Gravel 10	7	5	12.0
10	District	Secondary	Kahe-Make	Gravel 10	7	5	9.0
Hai District							
11	Region	Main	Lyamungu-Nasama	Gravel 15	9.5	6.5	13.0
12	Region	Major	Kibohehe-Masama	Bitumen	8	6	9.0
13	District	Secondary	Bowa la Ngomba - Kikafuchini	Gravel 10	7	5	28.8
Rombo District							
14	Trunk	Main	Mengwe-Tarakia	Bitumen	9.5	6.5	40.0
15	District	Major	Lower Lombo	Gravel 15	8	6	48.0
16	District	Secondary	Mkuu Lower Area	Gravel 15	7	5	8.0
17	District	Secondary	Mengwe-Lower Area	Gravel 15	7	5	7.5
Pare District							
18	Region	Main	Same-Gonja-Mkomazi	Gravel 15	9.5	6.5	99.8
19	Region	Main	Mwanga-Ugweno	Gravel 15	9.5	6.5	21.0
20	Region	Main	Kikweni-Usangi	Gravel 15	9.5	6.5	9.6
21	District	Secondary	Same-Marua	Gravel 10	7	5	27.5
22	District	Secondary	Kisiwani-Msindo	Gravel 15	7	5	16.0
23	District	Secondary	Gonja-Bombo	Gravel 15	7	5	20.0
24	District	Secondary	Lembeni-Kilomeni	Gravel 15	7	5	12.0

Location Map of Road Construction and Improvement Projects (Fig.-35)



Reasons Why the Following Roads are Selected for Improvement:

Marangu - Tarakia Road (No.1 and No.14)

This road, which runs along the eastern side of Mt. Kilimanjaro and through the eastern part of the Moshi District and the highland zone of the Rombo District, has the important role of connecting the two districts with each other and with neighboring Kenya. It used to be classified as a main local road, but recently it was upgraded to a trunk road in view of its importance. At present it can be directly used by 186,000 persons, and by another 48,000 persons indirectly, for a total of 234,000 persons in the entirety of the Rombo District and in the East Vonjo Division of the Moshi District (370,000 by 1995). Besides its importance in the everyday lives of residents and in administrative terms, the fact that it passes through the densely populated coffee/banana zone, with its high agricultural productivity, makes it even more important that it be improved for the purpose of shipping out farm produce, especially the coffee of the Rombo District, which amounts to approximately 8,000 t. a year. Also as a regional main road forming a stretch of the Kilimanjaro circumferential road envisaged in the long-term road plan, this road should be given one of the highest improvement priorities.

Marangu - Kirua Road (No.2) and Kibosho - Masama Road (No.3 and No.11)

These roads will constitute a part of the Kilimanjaro Mountain Circumferential Road in the future as Regional Main Roads and will be connected to "longitudinal" roads running along mountains and rivers. At present, population and public facilities are scattered along the "longitudinal" roads, and the division centers to which various facilities are expected to be collected in the future are also located along those main "longitudinal" roads. In order to provide each division center with real central functions, an improvement of the "transversely" running roads is desired. The present road sections shall be improved by 1980. These roads shall be, for the time being, completed as gravel roads and, in the future, as bitumen roads.

Kawawa Road (No.4), Moshi - Uru Kibosho Road (No.5),

These are "longitudinal roads" running to Kilimanjaro Mountain from Trunk Roads and they carry a considerable volume of traffic. These roads along which the respective division centers are supposed to be located in the future, will play important roles as Major Distribution roads. Of the above roads, (5) and (12) shall be improved to Bitumen Roads considering their important roles in the road network in this district. The others (4, 6) for the time being shall be completed as gravel roads and then, in the distant future shall be bituminized.

Rau - Kishumund Road (No.7)

This road follows, level-wise, the above-mentioned roads, functionally serving as a "longitudinal" road. Its improvement is in progress now and will be continued in the future.

Kahe - Sirigi Road (No.8 and Kahe - Uchira Road (No.9)

These are located in the lower Moshi area, the area falling under agricultural development project, and will be used for industries and living in the district.

Kahe - Make Road (No.10)

This connects Kahe and the entrance to the fishing villages scattered along Nymba ya Mungu Lake.

Lower Rombo Road (No.15)

This runs longitudinally through the lower area of Rombo District in parallel with the Marangu - Tarakia Trunk Road, and is an important road forming the road network of Rombo District together with "longitudinal" roads along the mountains and rivers.

Mkuu Lower Area Road (No.16) and Mengwe Lower Area Road (No.17)

These are "longitudinal" roads along the mountains and rivers in Rombo District, for which immediate improvement is considered necessary with higher priority than the other roads leading to District Center and Division Center.

Bowe la Ngombe - Kikaruchini Road (No.13)

This is used for the collection and transportation of the cotton grown in this area.

Same - Gonja - Mkomazi Road (No.18)

This runs around the lower area on the east side of South Pare Mountain and connects the main villages such as Kisiwani, Gonja, Kifuris, etc. running through agricultural development project areas. This road will be a part of the trunk roads in this area in the future as a Regional Main Road, and shall be tentatively completed first as a gravel road and then as a bitumen road in the future.

Mwanga - Ugweno Road (No.19) and Kikweni - Usangi Road (No.20)

These lead to the summit of North Pare Mountain and will be Regional Roads forming main traffic axes for industries and living in the district.

Same - Marua Road (No.21)

This connects Same and Pangani Valley. Numbers of villages included in agricultural development project are scattered along Pangani Valley and this road runs to one such village which is expected to be the largest of all in the future.

Kisiwani - Msindo Road (No.22) and Gonja - Bombo Road (No.23)

These roads run to the summit of Mt. North Pare from Same - Gonja - Mkomazi road, connecting the villages on the summit which have high population densities and abundant agricultural products with Regional Main Roads in the lower area.

Lembeni - Kilomeni Road (No.24)

This connects the National Highway and Kilomeni located to the south of Mt. North Pare's summit.

Cost Estimates for Road Construction and Improvement (Table-37)

	Name of road	Expenditure (sh)	Year
Moshi	Marangu Mengwe	6,820,000	77
	Marangu Kirua	6,270,000	79, 80
	Kibosho Lyamungu	2,686,000	80
	Kawawa	2,944,000	78, 79
	Moshi Uru Kibosho	8,250,000	79, 80
	Moshi Uru	4,950,000	78, 79, 80
	Rau Kishumund	1,170,000	77
	Kahe Sirigi	1,400,000	80
	Kahe Uchira	1,680,000	79
	Kahe Make	1,260,000	80
Hai	Lyamungu Masama	4,420,000	80
	Kibohehe Masama	4,950,000	77, 78
	Bowa la Ngombe Kikafunchini	4,032,000	78, 79
Rombo	Mengwe Tarakia	24,800,000	77, 78, 79
	Lower Lombo	11,040,000	79, 80
	Mkuu Lower area	1,440,000	79
	Mengwe Lower area	1,350,000	80
Pare	Same Gonja Mkomaji	22,954,000	77, 78, 79
	Mwanga Ugweno	6,090,000	78, 79, 80
	Kikweni Usangi	2,784,000	79, 80
	Same Marua	3,850,000	80
	Kikwani Msindo	2,880,000	80
	Gonja Bombo	3,600,000	80
	Lembeni Kilomeni	2,160,000	80

Cost estimates for road construction and improvement are difficult to arrive at in view of the scarcity of data and the disparity of unit costs with respect to what data is available. For the present integrated plan, only rough estimates have been made on the basis of past data, typical cross sections of each road classification, the required surface conditions, the topography of the area through which the road is to run, and other factors having been taken into account in determining the costs per kilometer.

Because of the urgent need for their improvement, the roads in the project list are to be only partially improved roughly along their present lines and at low cost instead of overhauling them completely.

Administrative management and engineering costs are not included in the present estimates, but rather are incorporated in the recurrent budget. Moreover, since these estimates are based on the assumption that the work will be undertaken directly by the government, a profit margin will have to be added if it is done instead by contractors. Another necessary addition is the cost of acquisition of land and of compensation.

Finally, it should be emphasized that once detailed survey data becomes available, and particularly up-to-date, detailed topographical maps, these cost estimates will no doubt have to undergo considerable revision.

Feasibility

When considering road construction or improvement, the advisability of such public investment should be studied in terms of whether or not the benefits that will derive therefrom are great enough to justify the cost. Since in this case it is too early a planning stage for a detailed study of this kind, we will confine ourselves to a rough study of the feasibility of the Marangu-Tarakea road, which is of high priority, as an example, taking into account the report "Feasibility, Kilimanjaro Area."

In a cost-benefit analysis consideration is usually given to both improvement cost and maintenance cost, but we shall take into account only improvement cost. Moreover, instead of the usual economic cost, we shall estimate the financial cost.

Besides savings in vehicle operating costs, the following kinds of benefit are involved:

- a) Saving of time for passengers.
- b) Reduction of accident cost.
- c) Increase in production.

Here, however, we will consider only savings in vehicle operating costs, as the most important benefit.

The average daily traffic volume has been estimated as follows:

	Marangu	-	Mkuu	-	Tarakea
1975	200				130
1995	1,870				1,215

Savings in vehicle operating costs are set as follows:

Marangu - Mkuu	1 sh. 29/vehicle/km
Mkuu - Tarakea	1 sh. 38/vehicle/km
Construction period	1977 - 1980
Period for which benefit is being estimated	1981 - 1995
Discount rate	15% per annum

Comparison of cost and benefit at present value (1977).
The following figures were obtained for cost and benefit:

Cost : 27,675,000 sh.

Benefit: 69,644,000 sh.

Since the benefit will be for greater than the cost, the conclusion is that the road is more than feasible, provided that the investment involved is of this amount. If, however, the rate of increase in traffic volume turns out to be lower than the rate assumed here turns out to be lower than the rate assumed here, it will take longer for the benefit to exceed the cost.

Road Construction and Improvement Budget (Table-38)

	1977	1978	1979	1980	1977-80	1981-85
Development budget	21,835	27,833	42,654	41,458	133,780	167,362
Recurrent budget	2,019	2,378	2,223	2,389	9,009	13,343
Total	23,854	30,211	44,877	43,847	142,789	180,705

(unit: 1,000 shs.)

(2) Road Maintenance and Rehabilitation

The maintenance and Rehabilitation of about 3,000 km of roads in the region presents a significant problem. These roads have been ruined and their values as properties have been depreciated year by year because of poor maintenance and repairs as aforementioned. Some measure to remedy this situation, therefore, is urgently required.

However, the annual cost required for the maintenance and repairs would amount to as much as 30 million shillings if all roads in the region are to be covered by the region's budget.

It is, therefore, recommended that the maintenance and rehabilitation of Trunk Roads be borne by the region as a direct-control operation and that half of the amount required for Regional Roads and District Roads-A be born by the region as a direct-control operation, and that the remaining half be borne by local volunteers.

Road Maintenance and Rehabilitation Project (Table-39)

Class	Surface condition	Length (Km)		Implementor
Trunk Road	Bitumen	245.2	- 296.2	Central Government
	Gravel	27.0	- 0	
Regional Road	Bitumen	52.3	- 68.8	R.D.D.
	Gravel	192.9	- 294.2	
	Earth	350.7	- 270.2	Local Volunteers
District Road-A	Bitumen	22.0	- 22.0	D.D.D.
	Gravel	0	- 70.9	
	Earth	226.0	- 107.6	Local Volunteers
District Road-B	Gravel	22.0	- 80.8	D.D.D.
	Earth	1,878.7	- 1,790.3	Local Volunteers

Budget of Road Maintenance and Rehabilitation (Table-40)

(unit: 1,000 shs.)

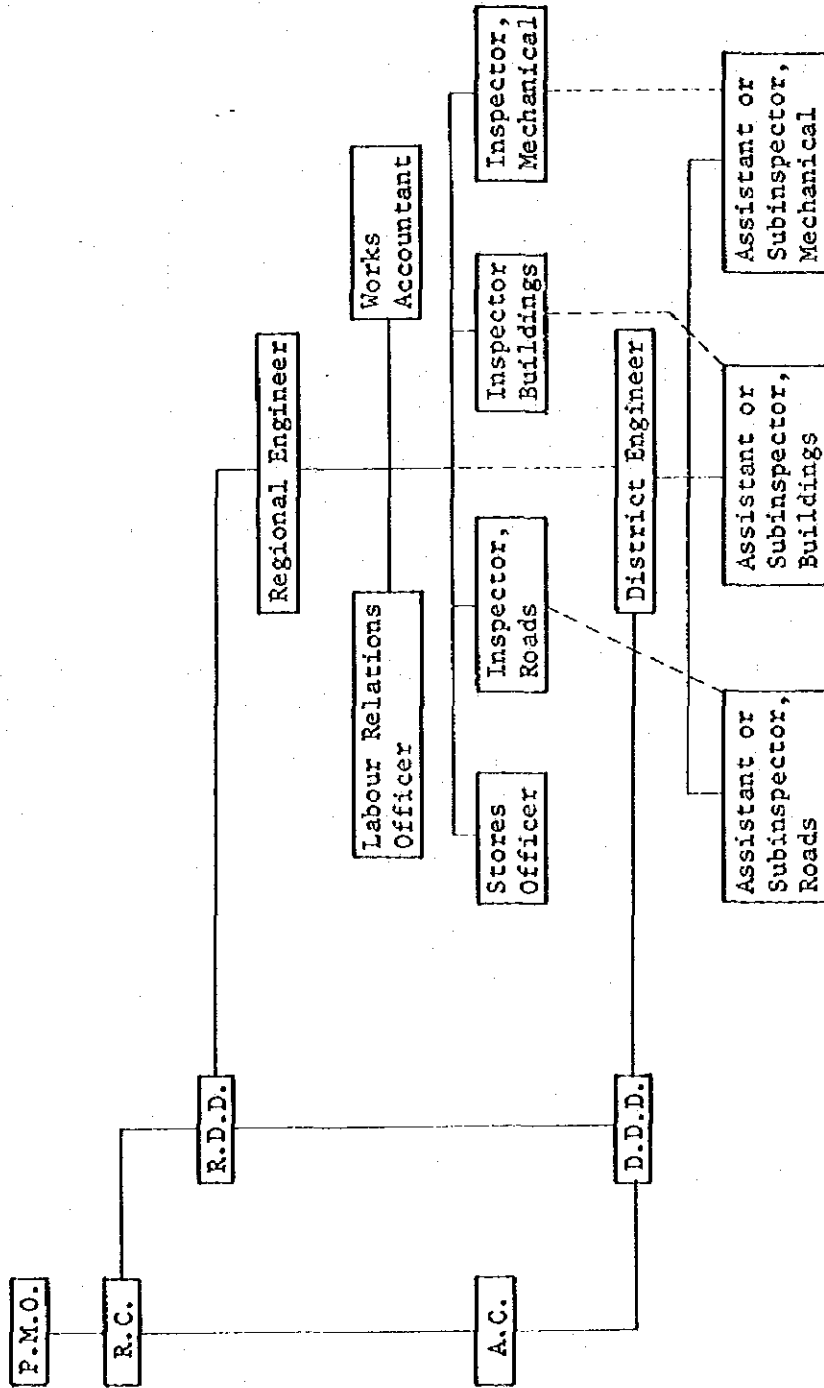
	1977	1978	1979	1980	1977-80	Totals
Development budget	12,450	12,762	13,784	14,279	53,275	71,500
Recurrent budget	1,641	1,648	2,206	2,483	7,978	11,017
Totals	14,091	14,410	15,990	16,762	61,253	82,517

(3) Executory Organization for Road Projects

For satisfactory execution of the road projects, the executive organization must be expanded, based on the existing one. Of particular importance is the sub-structure, since the projects are scattered throughout the area and mobility by means of vehicles, etc. is limited. Thus, emphasis must be placed on the carrying out of the road construction conjointly with the residents with a spirit of self reliance.

It is, of course, necessary to solve the problems of shortages of machinery, equipment and trained manpower.

Ministry of Works Organization Chart at Regional Level (Fig.-36)



In addition to the expansion of the existing Regional Engineer and District Engineer organization, organizations by division and village unit are further necessary.

(i) Regional Office

This office comes under the Regional Engineer and exercises control of the construction, improvement, maintenance and rehabilitation of roads in the region. For this purpose, engineers well versed in planning, surveying, designing, etc. are required. This office also controls the equipment in the region in principle and takes custody of special-purpose equipment. A workshop for the equipment shall be provided.

(ii) District Office

Carries out the construction and improvement of roads in the district and also supervises the maintenance and rehabilitation under District Engineer. Motor pools and workshops for the equipment required by the work shall be provided.

(iii) Division Office

To be provided as a sub-structure of the District Office mainly for the purpose of carrying out the maintenance and rehabilitation of roads. There shall be eight such offices for the first four years and one or two in the future. This office shall be provided with vehicles and equipment such as landrovers, motor graders, dump trucks, etc. in order to carry out mobile operations and to provide a training system for road maintenance and repairs.

(iv) Village Unit

An organization to carry out the maintenance and repairs of roads under the spirit of self reliance. Daily maintenance and rehabilitation are to be carried out by the residents themselves, but when equipment or material is necessary, they can contact the Division Office to ask for the latter's assistance. The hand tools necessary for the daily maintenance and rehabilitation shall be kept in a storage shack.

Function of the Offices (Table-41)

Office	Duty	Staff	Facilities
Region	<p>Supervision and control of construction of roads</p> <p>General supervision of maintenance</p> <p>.Plan, investigation, schedule and design</p> <p>.Supervision of the works</p> <p>.Supervision of budgets</p> <p>.General affairs, personnel matters and management</p>	<p>Engineer</p> <p>Assistant engineer</p> <p>Officer</p> <p>Inspector</p> <p>Sub-inspector</p> <p>Chief mechanic</p> <p>Mechanics</p>	<p>Office</p> <p>Housing accommodation</p> <p>Motor pool (large)</p> <p>Workshop (large)</p> <p>Various test rooms</p> <p>Oil station</p> <p>Storehouse for materials</p>
District	<p>Execution and maintenance of construction of roads</p> <p>Supervision of rehabilitation works</p> <p>.Design</p> <p>.Execution of the works</p> <p>.Supervision of budgets</p> <p>.General affairs</p>	<p>Engineer</p> <p>Assistant engineer</p> <p>Officer</p> <p>Inspector</p> <p>Sub-inspector</p> <p>Chief mechanic</p> <p>Mechanic</p> <p>Faremen</p> <p>Operators</p> <p>Drivers</p>	<p>Office</p> <p>Housing accommodation</p> <p>Motor pool (medium)</p> <p>Workshop (medium)</p> <p>Oil station</p> <p>Storehouse for materials</p>
Division	<p>Execution of maintenance and rehabilitation of the works</p>	<p>Inspector</p> <p>Mechanic</p> <p>Faremen</p> <p>Operators</p> <p>Drivers</p>	<p>Office</p> <p>Motor pool (small)</p> <p>Workshop (small)</p> <p>Oil station</p>
Village	<p>Liaison</p> <p>Summons of staff</p>	<p>Liaison staff</p>	<p>Liaison booth (hand tools)</p>

Manpower Plan

The following table lists the personnel presently employed in the Kilimanjaro Region in road-related positions.

Present Road Personnel (Table-42)

Road Section	Persons
Regional Engineer	0
Executive Engineer/Assistant	1
District Engineer	0
Works Accountant	0
Account II	0
Sen. Lab. Rel. Officer	1
Accounts Assistant	1
Personal Secretary II	1
Technician II	0
Technician III	0
Technician IV	0
Technician II (Roads)	2
Technician III (Roads)	4
Technician IV (Roads)	2
Technician Assistant II	1
Assistant Technician	6
Road Overseer	7
Road Headman	29
Technician II Works	1
Labourer	227
Dresser	1
Watchman	7
Tailor	1
Cleaner	6
Painter	5
Mason (Technical Attendant)	5
Station Hand	4
Carpenter (Technical Attendant)	1
Short Firer	4
W.C. Hand	1
Office Supervisor I, II	0
Registry I, II	2
Accounts Assistant II	2
Registry Clerk	3
Clenical Assistant	9
Typist Grade I, II	1
Telephone Operator	1
Messenger (Head)	1
Messenger	2
Total	339

Present Road Personnel (Table-42 contind)

Plant and Transport Section	Persons
Tech. I/Mech. Engineer	0
Technician II	2
Technician III	2
Technician IV (Electrical)	1
Technician IV (Mechanic)	1
Assistant Technician	10
Senior Technician Auxiliary Grade II	1
Technician Auxiliary Grade I	1
Driver	43
Technician Attendant (Mechanic)	78
Technician Attendant (Welder)	9
Tech. Att. (Electrician/Auto.)	16
Tech. Att. (Sprayer/Painter)	2
Plant Operator	17
Plant Attendant	10
Vehicle Attendant	8
Watchman	8
Panel Beater	2
Garage Attendant	0
Pump Attendant	1
Tech. Att. (Carpenter)	0
Tunner	1
Valcaniser	2
Labourer	5
Registry Assistant II	1
Registry Clerk	2
Clerical Assistant	9
Typist	0
Messenger	3
Cleaner	2
Store Attendant	1
Total	238

Road Manpower Plan (Table-43)

	Existing	1980	1985
Qualified	2	15	19
Technicians	36	88	108
Skilled labourers	138	224	256

(4) Introduction of Construction Equipment

The presently available equipment for road construction in the region is insufficient in terms of quantity and in addition is inadequately maintained or unusable because of a shortage of spare parts. The introduction of new machinery and equipment, therefore, is necessary in order to efficiently carry out the proposed construction, improvement, maintenance and rehabilitation of roads.

The principal equipment presently considered necessary is as follows:

Proposed Road Equipments (Table-44)

Equipment for Construction		Equipment for maintenance	
Landrover	4	Landrover	8
Truck (4t)	4	Motor grader	8
Truck (6t)	4	Dump truck (6t)	8
Water truck	4		
Dump truck (6t)	10		
Bulldozer (11t)	8		
Bulldozer (14t)	2		
Tyre roller (15t)	4		
Road roller (10t)	2		
Motor grader	5		
Shovel (0.4 m ³)	2		
Shovel (0.7 m ³)	1		
Wheel loader (2 m ³)	4		
Truck crane (16t)	2		
Air compressor	5		

In addition to the above-listed equipment, various other kinds of equipment can be considered necessary. For example, for pavement work, the equipment must be selected for the working speed and methods to be applied. Also, plants for gravelling, asphaltting or concreting may be required.

For the maintenance and repair of the existing and newly introduced equipment, it is necessary to provide workshops at the Regional Office, District Office and Division Office respectively. It is also necessary to supply a sufficient quantity of parts and to provide the equipment, tools, etc. required for maintenance and repairs to the respective workshops.

3.2 Bus Service Plan

In order to improve the present bus transportation system to the level planned for the future by straightening out the existing discrepancies, the following projects are proposed to be brought to effect by 1980:

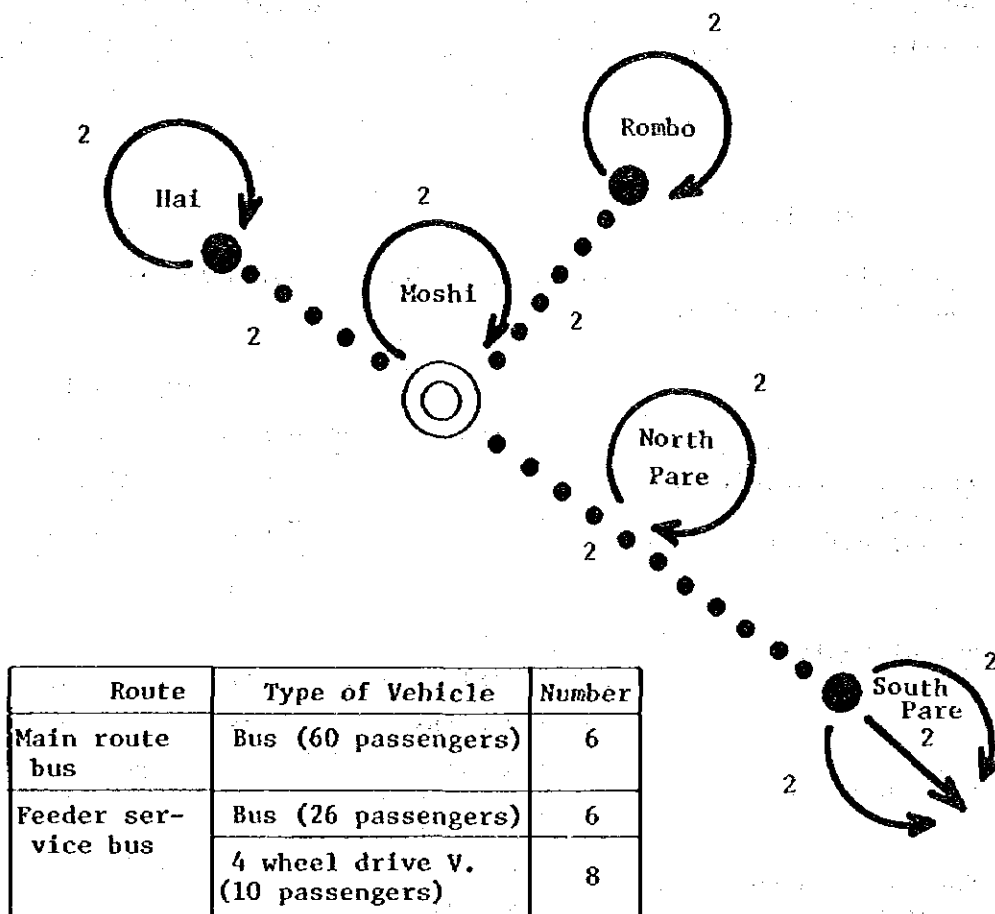
(1) Reorganization of Bus Service System

Establishment of a public bus corporation which will be a key constituent for organization of a cooperation system

For the time being, 6 main route buses and 14 feeder routes buses shall be procured and regularly scheduled operation be started.

The above-mentioned bus corporation will be managed by KIDEKO.

Bus Service Network, 1980 (Fig, 37)



(2) Improvement of Bus Stations and Bus Stops

Suggested below is the classification of bus stations and bus stops:

- Central Bus Station: Moshi
- Main Bus Station: Sanya Juu, Mkuu, Same
- Major Bus Stop: Main traffic junctures along main routes, and division centers
- Minor Bus Stop: Bus stops other than the above

All the Main Bus Stations and a part of the Major Bus Stops and Minor Bus Stops shall be completed by 1980.

(3) Budget

Bus Service Budget (Table-45)

(unit: 1,000 shs.)

	1977	1978	1979	1980	1977-80	1981 - 85
Development	1,522	1,050	1,050	-	3,622	4,342
Recurrent	53	5,337	10,537	10,537	26,464	36,023
Totals	1,575	6,387	11,587	10,537	30,086	40,365

(4) Income From Fares

The following are the assumed conditions on which future bus fare income has been calculated:

	Year	Type of bus		
		60 persons	25 persons	10 persons
Transport capacity per vehicle per day (passenger-kilometers)	'78 - '80	45,000	15,000	5,000
	'81 - '85	28,800	9,600	3,600
No. of vehicles	'78	3	3	4
	'79 - '80	6	6	8
	'81	12	12	12
	'82 - '85	18	18	16
Rate of operation (%)	'78 - '80		80	
	'81 - '85		60	
Fare per passenger-kilometer (sh.)	'78 - '80		0.1	
	'81 - '85		0.05	

Transport capacity per vehicle will be high during the period covered by the Third 5-year Plan because the bus routes will be only along roads

with high passenger demand. It is expected to fall, however, in the period of the Fourth 5-year Plan since some buses will be run along routes with lower passenger demand and during hours other than those of peak demand. There should also be a decline in the actual rate of operation as some of the vehicles approach the end of their operational life span.

Considering the fact that present bus fares are by no means low, however, the newly established companies should operate initially on the basis of the present fares, and these should be reduced by 50% as of 1981.

The following are the fare incomes that can be expected on the basis of the above conditions:

(unit: 1,000 sh.)

	1977	1978	1979	1980	1981 - 85
	0	5,840	11,680	11,680	38,316

(5) Manpower Plan

Bus Service Manpower (Table-46)

	Existing	1980	1985
Qualified	0	3	6
Technicians	0	6	14
Skilled labourers	0	58	149

3.3 Railway Plan

(1) Rehabilitation of Railways

Although the need to increase transport capacity is recognized, in the Third 5-year Plan improvement of the rate of operation through better maintenance of the existing locomotives and wagons is considered to be more urgent than large-scale civil engineering works or purchase of new diesel locomotives. Accordingly the first consideration is active provision of the spare parts of which there is a shortage. In addition, there is a need to improve drainage channels so that tracks will not be washed away in the wake of torrential down-pours.

In the Fourth 5-year Plan it will be necessary to introduce new diesel locomotives and undertake large-scale civil engineering works for additional signal yards and other purposes. (Needless to say, such plans will have to be revised to meet the needs of development projects along the Tanga line - for instance, the project for development of natural soda ash at Lake Natron - if such projects crystallize sooner than expected.)

(2) Budget

Railways Budget (Table-47)

	1977	1978	1979	1980	(unit: 1,000 sh.)	
					1977-80	1981-85
Development	6,401	7,041	7,745	8,520	29,707	143,905
Recurrent	13,632	14,995	16,495	18,144	63,266	90,720
Total	20,033	22,036	24,240	26,664	92,973	234,625

(3) Estimated Fare Income

According to railway statistics, present income is 16.6 sh. per passenger and 113.5 sh. and 94.1 sh. per ton of incoming freight and outgoing freight, respectively. Fares and freight rates should not be hiked for the time being considering the fact that hikes up to now have been partly responsible for the decline in transport capacity along with the closing down of the Voi line and the decline in transport volume already mentioned.

The following table gives the number of passengers and amounts of freight as well as the income from each that are expected in coming years as efforts are made to boost transport capacity so as to regain the peak levels of 1973.

		1977	1978	1979	1980	1981-85
Passengers	Passengers (1,000)	100	117	134	150	1,002
	Revenue, (1,000 sh.)	1,660	1,942	2,224	2,490	16,632
Freight	Forwarded (1,000t)	70	82	94	105	702
	Revenue (1,000 sh.)	7,945	9,307	10,669	11,918	79,678
	Received (1,000t)	30	42	54	65	502
	Revenue (1,000 sh.)	2,832	3,952	5,081	6,117	47,238
Total	Revenue(1,000 sh.)	12,428	15,201	17,974	20,525	143,548

Comparing such income with anticipated expenditures, it is obvious that a considerable amount of government subsidies will be necessary. This problem can be solved, however, at the same time as increasing efficiency of use of valuable oil resources and hence realizing foreign exchange savings, by making more effective use of present railway assets in order to win back the passenger and freight traffic that in recent years has been lost to road transportation. Actually, through such efforts to increase transport capacity as well as efforts to strengthen management policy, it should be possible to achieve figures substantially higher than those given in the table above.

(4) Manpower Plan

Railway Manpower Plan (Table-48)

	Existing	1980	1985
Qualified	7	23	30
Technicians	43	64	74
Skilled labourers	315	418	468

3.4 Communications Network Plan

(1) Postal Service

E.A.P.T.C. plans call for the opening of 40 new sub post offices and 15 new departmental post offices each year of this 5-year period throughout Tanzania. In addition, there is the following plan for the Kilimanjaro Region.

Upgrading of the sub-post offices to departmental post office

Moshi	- Kilimanjaro Road	Pare	- Gonja
	- Langasani		- Ugweni

Establishment of Sub-Post Offices

Moshi	- Kisomachi	Pare	- Uchama
			- Kilomeni
Hai	- Engare Nairobi		- Kwakoa
	- Rundugai		- Mwembe
			- Vudee
Rombo	- Menguwe		- Suji
	- Tarakea		- Bombo
			- Mtii

Postal Service Budget (Table-49)

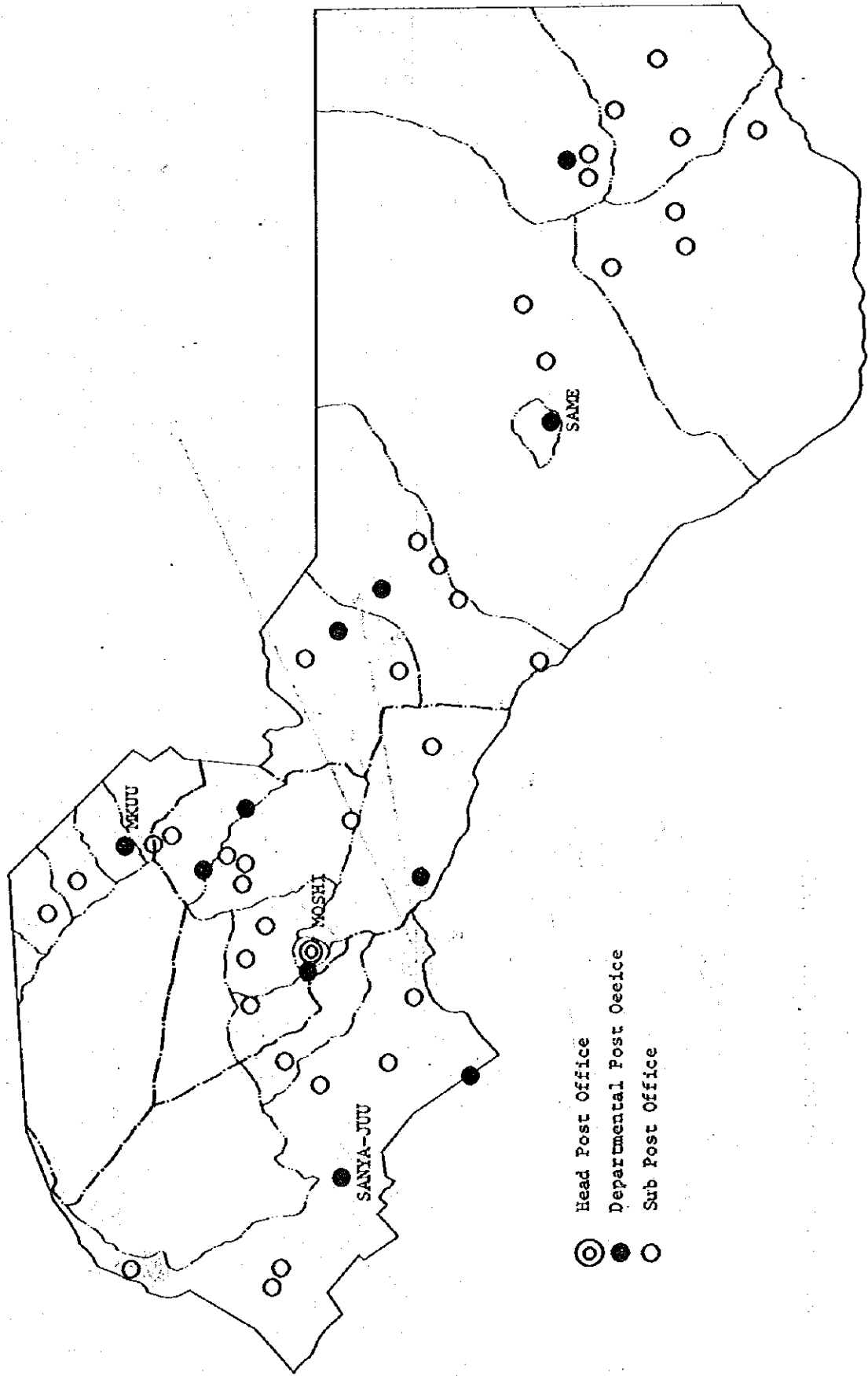
	1977	1978	1979	1980	1977-80	1981-85
Development	200	200	200	200	800	1200
Recurrent	2,443	2,700	2,957	3,242	11,342	21,360
Total	2,643	2,900	3,157	3,442	12,142	22,560

The following is a table of the postal service staff in the Kilimanjaro Region at the present time.

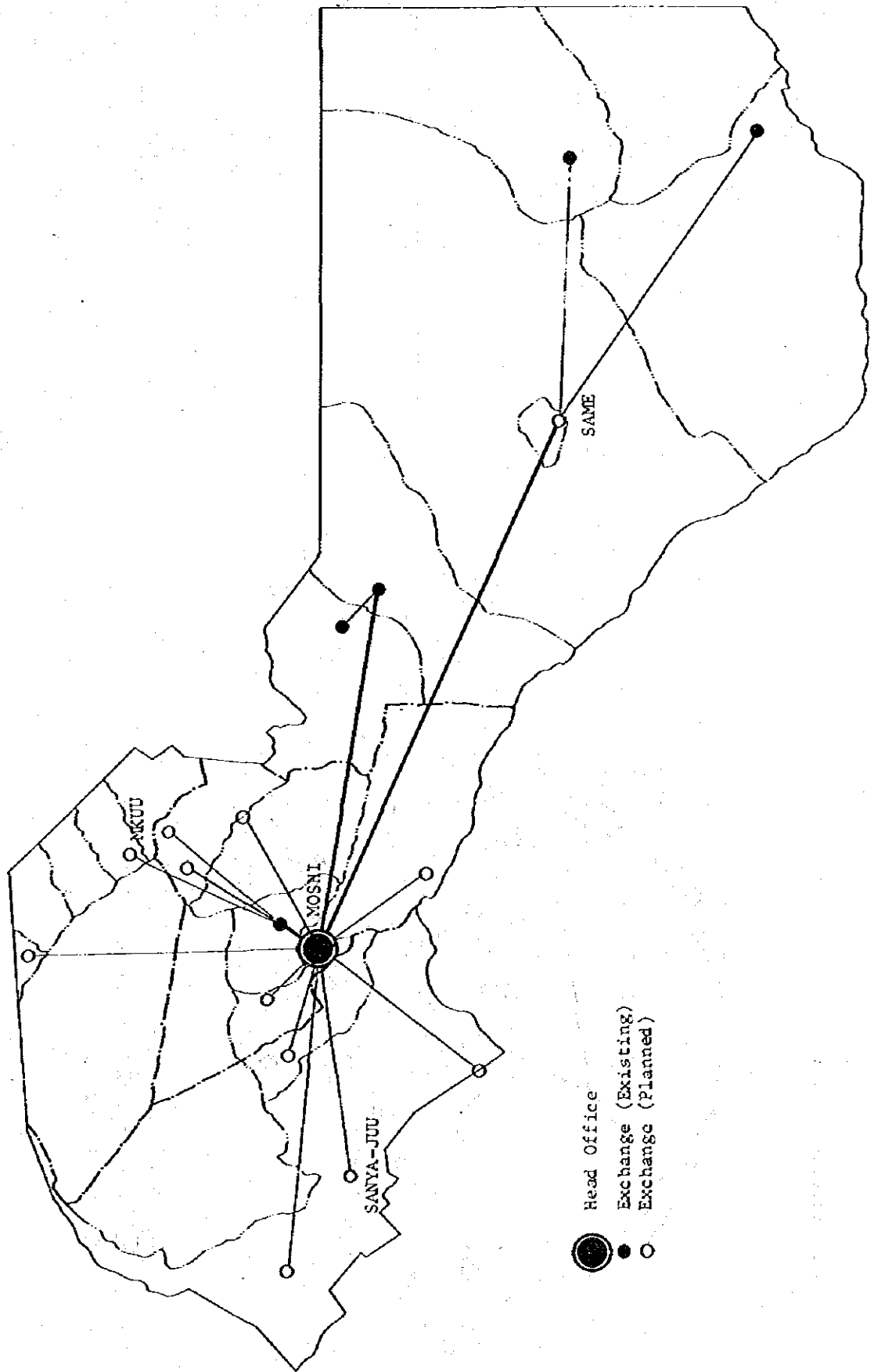
Present Postal Service Personnel (Table-50)

Designation	Persons
Senior Post Supervisor	2
Post Supervisor	2
Post Officer	36
Post Assistant	7
Office Manager	13
Driver	2
Typist	1
Watchman	1
Total	64

Postal Service Network Plan (Fig. 38)



Telecommunication Network Plan (Fig.39)



- Head Office
- Exchange (Existing)
- Exchange (Planned)

Postal Service Manpower Plan (Table-51)

	Existing	1980	1985
Qualified	2	3	4
Technicians	38	59	70
Skilled labourers	23	35	40

(2) Telecommunications Service

The following are the targets for the immediate future that E.A.P.T.C. has set in its natural plan for provision of telephone service:

- (a) Establishment of an automatic exchange in the head town of each region by 1980/81.
- (b) Establishment of a magnet exchange in the head town of each district by 1978/79.
- (c) Provision of telephone service in border towns by 1978/79.
- (d) Priority provision of telephone service in towns where a large number of people are waiting to subscribe and heavy use of telephone lines can be expected.

For the Kilimanjaro Region, E.A.P.T.C. has the following plan.

Improvement of Existing Exchanges and Lines

Moshi Head Office

- Switching System
- Underground Cable
- Micro Wave
- Multiplex equipment

Kilimanjaro Airport Exchange

- Switching System
- Underground Cable

Expansion of Telecommunication Network

Moshi	-Old Moshi	Pare	- Usangi
	-Mwika		- Uguweno
Rombo	-Tarakia		- Hedaru
			- Gonja

Cost Estimation of Telecommunication Projects (Table-52)

Year	Exchange	Cost (sh.)	Remarks
1977	Kilimanjaro	340,000	Automatic exchange underground
	Usangi	509,120	80 line switch exchange
	Mwica	433,000	70 line switch exchange
1978	Old Moshi	200,000	70 line switch exchange
1979	Ugweni	349,000	70 line switch exchange
	Tarakia	160,000	70 line switch exchange
1981	Moshi	14,866,000	Micro wave
	"	1,673,000	Multi plex equipment
	Gonja	877,000	70 line switch exchange
	Hedaru	901,000	30 line switch exchange

Telecommunication Budget (Table-53)

	1977	1978	1979	1980	1977-80	1981-85
Development	1,283	5,713	6,022	7,291	20,309	54,950
Recurrent	1,852	1,964	2,124	2,284	8,224	12,775
Total	3,135	7,677	8,146	9,575	28,533	67,725

The following is a table of the telecommunications staff in the Kilimanjaro Region at the present time.

Present Telecommunicational Service Personnel (Table-54)

Designation	Persons
Telecommunications Superintendent	1
Assistant Engineer	2
Senior Technical Officer	3
Senior Telephone Supervisor	1
Senior Technician	1
Technical Officer	6
Telecommunication Officer	2
Telegraph Supervisor	1
Telephone Supervisor	3
Technician	12
Telephone or Telegraph Operator	37
Technical Assistant	7
Telephone Assistant	13
Subordinate Staff	3
Typist	1
Driver	4
Messenger	4
Cleaner	1
Total	102

Telecommunicational Service Manpower Plan (Table-55)

	Existing	1980	1985
Qualified	3	6	10
Technicians	29	37	44
Skilled labourers	57	100	120

