

REPUBLIC OF KENYA

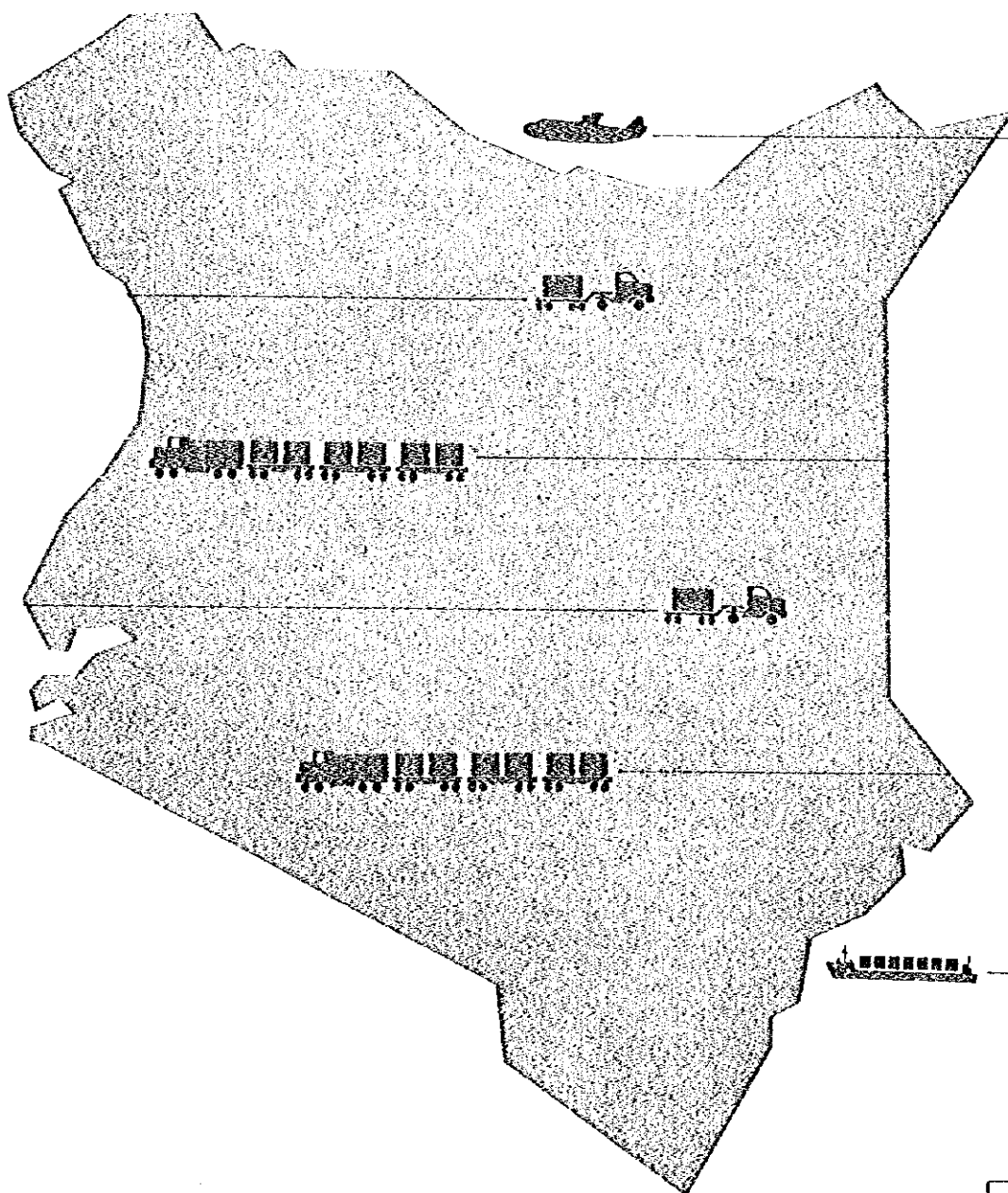
AUGUST 1984

# NATIONAL TRANSPORT PLAN

THE STUDY ON NATIONAL TRANSPORT  
PLAN IN THE REPUBLIC OF KENYA

## FINAL REPORT

SUMMARY AND RECOMMENDATIONS



JAPAN INTERNATIONAL  
COOPERATION AGENCY

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SUMMARY AND RECOMMENDATIONS

**JAPAN INTERNATIONAL  
COOPERATION AGENCY**

国際協力事業団	
受入 月日 '84.11.16	407
登録No. 10836	71
	SDF

国際協力事業団  
〒100 東京都千代田区千代田 1-1-1

## PREFACE

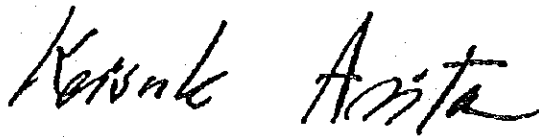
In response to the the request of the Government of the Republic of Kenya, the Government of Japan decided to conduct a study on the National Transport Plan in Kenya and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Kenya a survey team headed by Mr. Shigetake Ikeda (Mitsubishi Research Institute Inc.) from January 1983 to June 1983 under the guidance of the Advisory Committee chaired by Professor Yoshiji Matsumoto, University of Tokyo.

The team held discussion with the officials concerned of the Government of Kenya on their national transport plan and conducted a survey in Kenya. Subsequently, further studies were made in Japan and the present report has been prepared.

I hope that this report will serve for the development of the transport sector in Kenya and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to all the officials concerned of the Government of Kenya for their close cooperation extended to the team.

August 1984

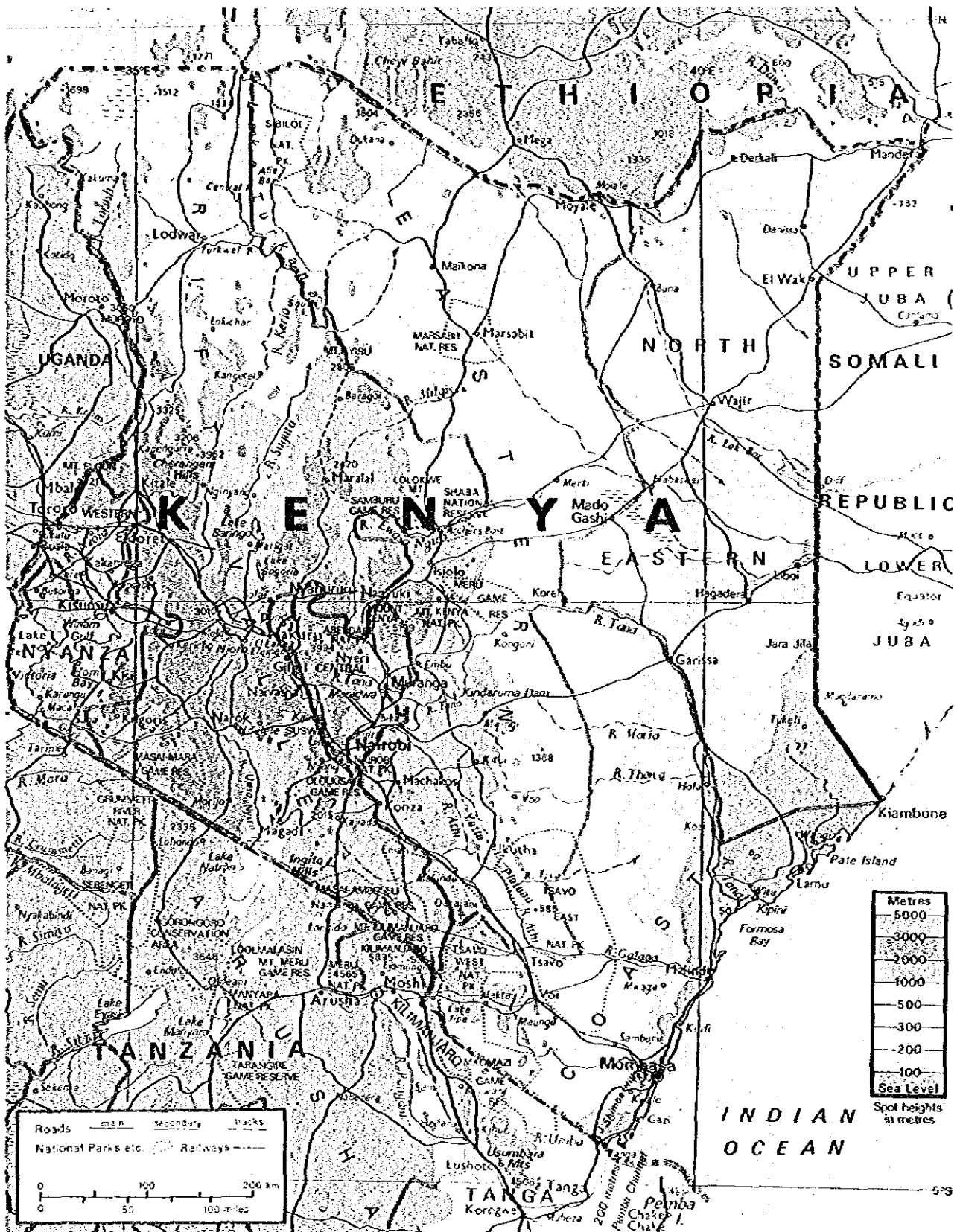


Keisuke Arita  
President

Japan International Cooperation Agency









### **EXCHANGE RATE**

**US\$1.00 = Ksh12.63 = Yen 240**

**K£1.00 = Ksh20**

### **ABBREVIATIONS**

- MOTC** – Ministry of Transport and Communications
- KQ** – Kenya Airways Limited
- RR** – Kenya Railways Corporation
- KPA** – Kenya Ports Authority
- KPC** – Kenya Pipeline Company



## CONTENTS

1.	Introduction .....	1
2.	Comprehensive Transport Plan .....	3
3.	Growth Trends of Socio-Economy .....	5
3.1	National Economy .....	5
3.2	Balance of Import/Export .....	7
3.3	Balance of Government Finance .....	9
3.4	Regional Balance .....	11
3.5	Balance of Finance by Each Mode .....	13
4.	Economic Prospect .....	15
4.1	National Economy .....	15
4.2	Tourism .....	17
4.3	Regional Development .....	21
4.4	Public Expenditure for Transport Sector .....	23
5.	Current Status of Transport Sector .....	27
5.1	Overview of Transport Sector .....	27
5.2	Usage of Transportation .....	29
6.	Transport Demand Forecast .....	31
6.1	Freight Transport .....	31
6.2	Passenger Transport .....	34
6.3	Railway Transport .....	35
6.4	Road Transport .....	37
6.5	Oil Transport .....	39
6.6	Port Cargoes .....	41
6.7	Airport and Civil Aviation .....	43
7.	Transport Development Plan .....	46
7.1	Transport Development Strategy .....	46
7.2	Railway .....	52
7.3	Road/Road Transport .....	57
7.4	Ports .....	65
7.5	Maritime Transport .....	71
7.6	Inland Waterway Transport .....	74
7.7	Civil Aviation .....	77
7.8	National Airlines .....	84
7.9	Pipeline .....	87
8.	Transport Investment Plan .....	90
8.1	Budgetary Demand .....	90
8.2	Financial Guideline .....	91
9.	Recommendation for Management .....	92
9.1	Principle .....	92
9.2	Financial Policy .....	92
9.3	Regulation and Organization .....	93
9.4	Training and Study .....	93

## 1. Introduction

In September 1982, in response to a request made by the Government of Kenya, the Government of Japan organised a survey mission to conduct a study to formulate a national transport plan for the Republic of Kenya.

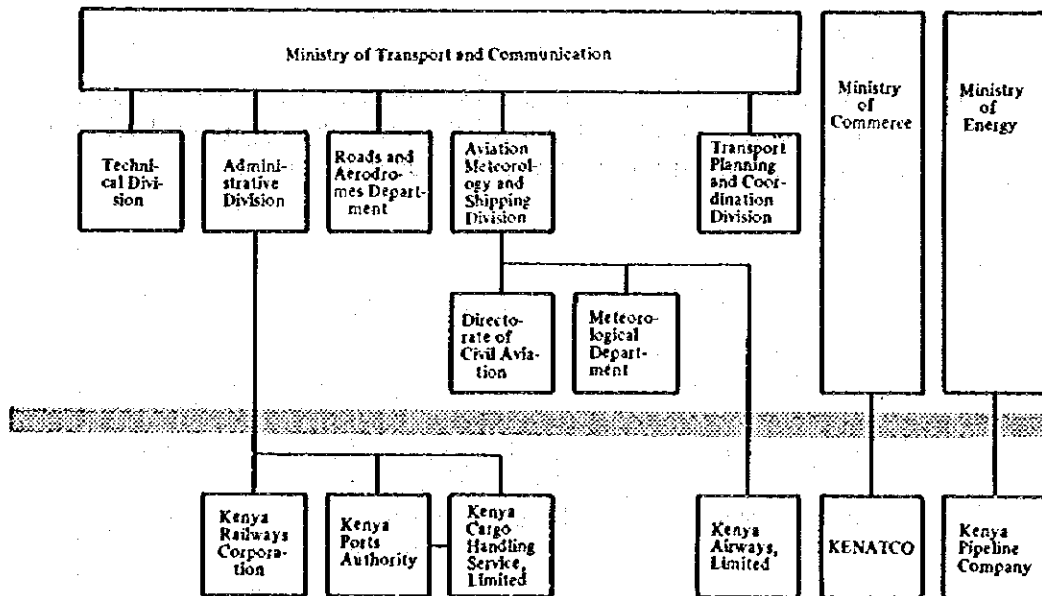
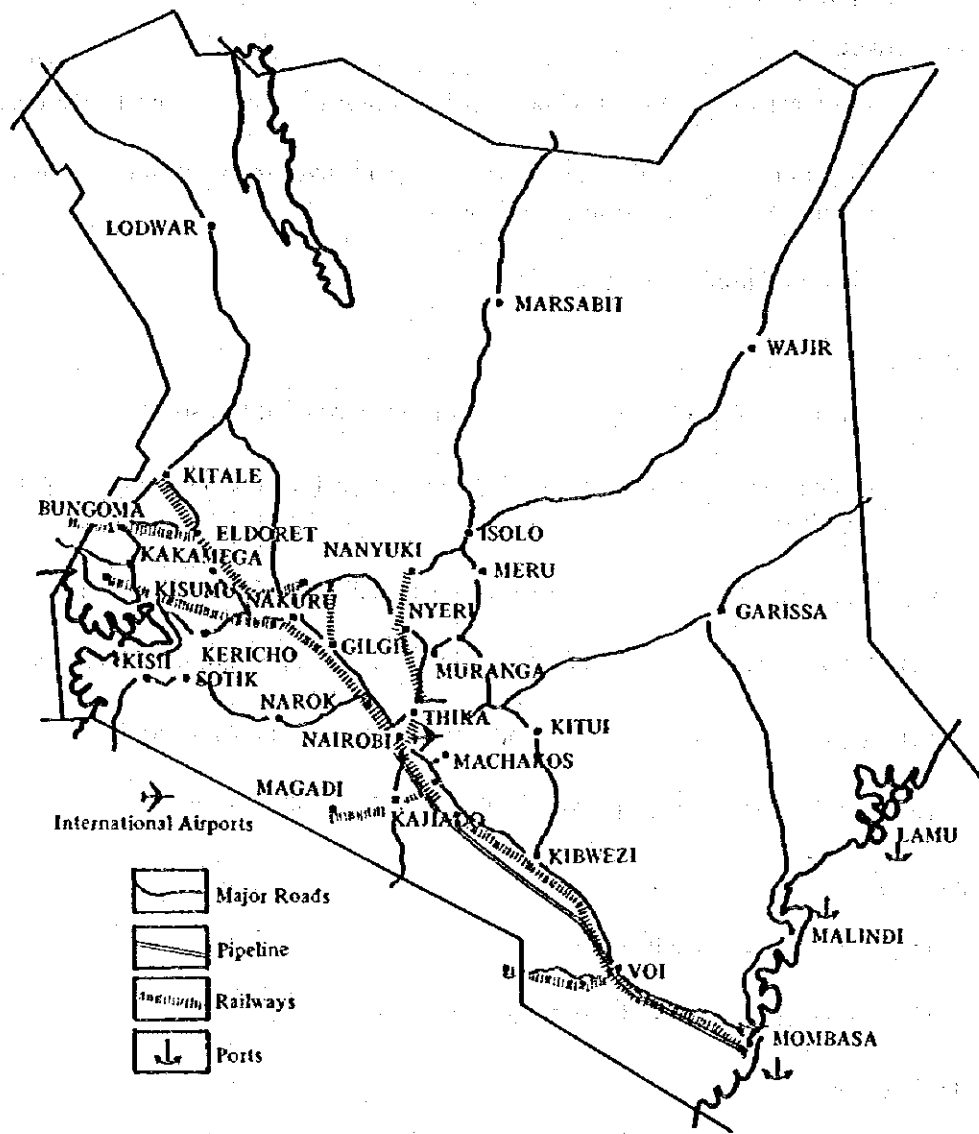
The objective of the survey was to establish a comprehensive transport plan integrating various modes, such as railways, roads, ports, maritime transport, inland water transport, aerodromes, civil aviation, and the pipeline.

### Chronology of events:

Sep.	1982	Survey in Kenya by the preliminary survey mission.
Dec.	1982	Signing of the S/W.
Jan.	1983	Dispatch of the survey mission. Submittal of the Inception Report.
Mar.	1983	Submission of progress report (I).
Jun.	1983	Submission of progress report (II).
Nov.	1983	Submission of interim report.
Mar.	1984	Draft of final report.
Aug.	1984	Final report

### Scope of survey:

Area	The entire area of Kenya.
Subjects	All modes of transport and inter-city traffic. Transport between towns.
Program periods	Short-term: 1984 to 1988 Long-term: 1988 to 2000
Survey term	December 1982 to August of 1984



## **2. Comprehensive Transport Plan**

### **Objectives:**

- (1) the means to realise maximum utilisation of existing transport facilities, and**
- (2) determination of the necessary transport investment in various modes to comply with future transport demand.**

### **Means of implementation:**

### **Policies:**

- (1) allotment of capital investment to various modes of transport,**
- (2) timing, size, and scale of development project of the transport network and terminals,**
- (3) operational improvements of transport facilities and human resources,**
- (4) intermodal coordination of container transport and regional development,**
- (5) adjustment of tariff and tax for a healthy financial balance and**
- (6) regulations and legal provisions for effective administration.**

### **Constraints:**

- (1) foreign exchange income, and**
- (2) funds available for development of the transport sector.**

### **Technology:**

- (1) use of technological innovation, and introduction of up-to-date transport technology; and**
- (2) consideration of transport characteristics (volume, costs, construction and operation expenses, etc.) in relation to the technology employed for each mode for the purpose of formulating a strategic transport plan.**



### Current General Condition of Transport Sector in Kenya

<b>Railways</b>	<p>Lines: 2,668 km in 1981 (principal lines: 1,450 km)  Stock at 31-12-80</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">Locomotives</td> <td style="text-align: right;">335</td> </tr> <tr> <td style="padding-left: 20px;">Carriages</td> <td style="text-align: right;">552</td> </tr> <tr> <td style="padding-left: 20px;">Wagons</td> <td style="text-align: right;">7,758</td> </tr> <tr> <td style="padding-left: 20px;">Staff employed (1980)</td> <td style="text-align: right;">21,534</td> </tr> </table>	Locomotives	335	Carriages	552	Wagons	7,758	Staff employed (1980)	21,534																
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<b>Roads</b>	<p>Road kilometres as of 1-6-1981</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 15%;">Bitumen</th> <th style="width: 15%;">Earth/Gravel</th> <th style="width: 30%;">Total</th> </tr> </thead> <tbody> <tr> <td><b>Kilometres</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>  Trunk (A, B)</td> <td style="text-align: right;">3,305</td> <td style="text-align: right;">2,893</td> <td style="text-align: right;">6,198</td> </tr> <tr> <td>  Other (C-E)</td> <td style="text-align: right;">2,582</td> <td style="text-align: right;">41,852</td> <td style="text-align: right;">44,434</td> </tr> <tr> <td>  Special</td> <td style="text-align: right;">34</td> <td style="text-align: right;">2,275</td> <td style="text-align: right;">2,309</td> </tr> <tr> <td>  <b>Total</b></td> <td style="text-align: right;"><b>5,912</b></td> <td style="text-align: right;"><b>47,020</b></td> <td style="text-align: right;"><b>52,941</b></td> </tr> </tbody> </table> <p>Vehicles with current licence, 247867 in 1982</p>		Bitumen	Earth/Gravel	Total	<b>Kilometres</b>				Trunk (A, B)	3,305	2,893	6,198	Other (C-E)	2,582	41,852	44,434	Special	34	2,275	2,309	<b>Total</b>	<b>5,912</b>	<b>47,020</b>	<b>52,941</b>
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<b>Ports</b>	<p><b>Mombasa:</b> Length of Berths</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 40px;">General cargo</td> <td style="text-align: right;">2,339 m</td> </tr> <tr> <td style="padding-left: 40px;">Container</td> <td style="text-align: right;">580 m</td> </tr> <tr> <td style="padding-left: 40px;">Cement</td> <td style="text-align: right;">315 m</td> </tr> </table> <p><b>Other Ports:</b> Kilifi, Malindi and Lamu</p> <p>Employees  as of the end of 1981: KPA 3986, KCHS 8616</p>	General cargo	2,339 m	Container	580 m	Cement	315 m																		
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Cement	315 m																								
<b>Airports</b>	<p>Kenya Airway's fleet, 6 jets (1 leased) and 2 F27s</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">International airports</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="padding-left: 20px;">Domestic airports for scheduled flights</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="padding-left: 20px;">General aviation airport</td> <td style="text-align: right;">1</td> </tr> <tr> <td></td> <td style="text-align: right;">(Wilson)</td> </tr> <tr> <td style="padding-left: 20px;">Other government aerodromes</td> <td style="text-align: right;">154</td> </tr> <tr> <td style="padding-left: 20px;">Other unlicensed aerodromes</td> <td style="text-align: right;">more than 300</td> </tr> </table>	International airports	2	Domestic airports for scheduled flights	2	General aviation airport	1		(Wilson)	Other government aerodromes	154	Other unlicensed aerodromes	more than 300												
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<b>Water Transport</b>	<p><b>Maritime transport</b></p> <p>All cargoes are transported by foreign flag vessels.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th colspan="2" style="text-align: center;">Export/Import Cargoes ('000 DWT) in 1981</th> </tr> </thead> <tbody> <tr> <td style="padding-left: 20px;">Exports</td> <td style="text-align: right;">2,750</td> </tr> <tr> <td style="padding-left: 20px;">Imports</td> <td style="text-align: right;">5,429</td> </tr> <tr> <td style="padding-left: 20px;"><b>Total</b></td> <td style="text-align: right;"><b>8,179</b></td> </tr> </tbody> </table> <p><b>Lake transport</b></p> <p>Fleet in operation: 3 passenger boats,  2 tugboats, and 9 fighters</p>	Export/Import Cargoes ('000 DWT) in 1981		Exports	2,750	Imports	5,429	<b>Total</b>	<b>8,179</b>																
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<b>Pipeline</b>	<p>Line 450 km (14-in pipeline for oil products transport)  Pumping unit installed at 4 points  Actual throughout 1,437 thousand m<sup>3</sup>/year in 1981  KPC personnel 445</p>																								

### 3. Growth Trends of Socio-Economy

#### 3.1 National Economy

The economy grew at an average annual rate of 5.2% between 1964–81.

With the 3.6% average growth rate of the population during the same period, per capita income has grown an average of 1.5% per year.

	The Kenya Miracle 1964 – 1973	Kenya in Global Crunch 1973 – 1976	The Coffee Boom 1977 – 1978	The Big Slide 1979 – 1982
Period	Strong government and major investment incentives overseas made Kenya the success story of free Africa with an expanding economy and increased the purchasing power of all Kenyans.	The Energy Crisis, rocketing inflation, rising population, reduced growth, the high cost of fuel imports and widespread drought all set Kenya back during this period.	Brazil's frost was Kenya's fortune in record coffee prices, and Kenya reaped a bonanza forgetting the Energy Crisis with a Balance of Payments surplus.	Recession in the West took Kenya along. With erratic farm output, soaring import prices and sluggish commodity prices, Kenya hit the trough of the depression.
Average Annual Real Growth	6.6%	3.1%	9.0%	4.3%

The record in recent few years thus shows a big slide:

- 1) the rate of economic growth has slowed,
- 2) per capita income has declined,
- 3) fixed capital formation has fallen sharply in real terms,
- 4) import volume has declined, and
- 5) domestic credit has risen substantially due to government borrowing.

The nation faces a hard choice between the following:

- 1) accepting a growth rate lower than that needed for development, or
- 2) mobilisation of its resources for a major domestic development effort.

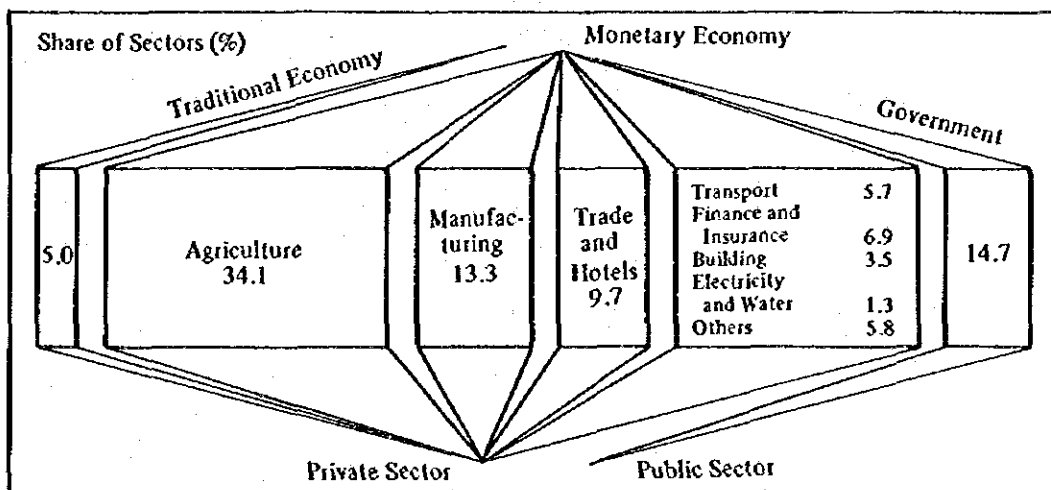
The theme of the Fifth Development Plan published in December 1983 is "Mobilising Domestic Resources for Equitable Development".

### Economic Overview 1964-82

(K€mn at Constant 1981 Price)

	Growth Rate 1964-81 %	Growth Rate 1964-81					1981	1982	Growth Rate 1981-82
		2	4	6	8	10			
Population '000s	3.6						16514	17142	3.8
GDP per Capita K€	1.5						184.0	181.6	-1.3
GDP at Market Price	5.2						3038	3113	2.4
Monetary Economy	5.3						2446	2536	2.4
Agriculture	3.7						815	852	4.5
Industry	7.2						510	509	0.0
Government Services	8.1						391	409	4.6
Others	5.3						730	766	4.9
Imports cif	7.1						981	889	-9.1
Exports fob	4.0						485	473	-2.5
Balance of Trade	13.6						-495	-416	-16.8
Foreign Currency Income									
Coffee	4.6						109.4	131.6	20.3
Tea	6.7						61.1	71.0	16.2
Oil export	20.0						157.6	128.9	-18.2
Tourism Earnings	7.5						90.0	109.3	21.4

### GDP Share of Sectors: 1982



## **3.2 Balance of Import/Export**

### **3.2.1 Past Trends**

Since 1964, the balance of merchandise trade has been negative. Growth of the deficit as a percentage of GDP has been substantial from 2.6% in 1964 to 16.3% in 1981.

Long-term capital inflow has been insufficient to finance the current account deficit since 1974, so that short-term financing was required from the country's reserve funds and from special international financing, e.g. the IMF.

Since 1980, imports have been drastically restricted as a result of deterioration in the trade balance.

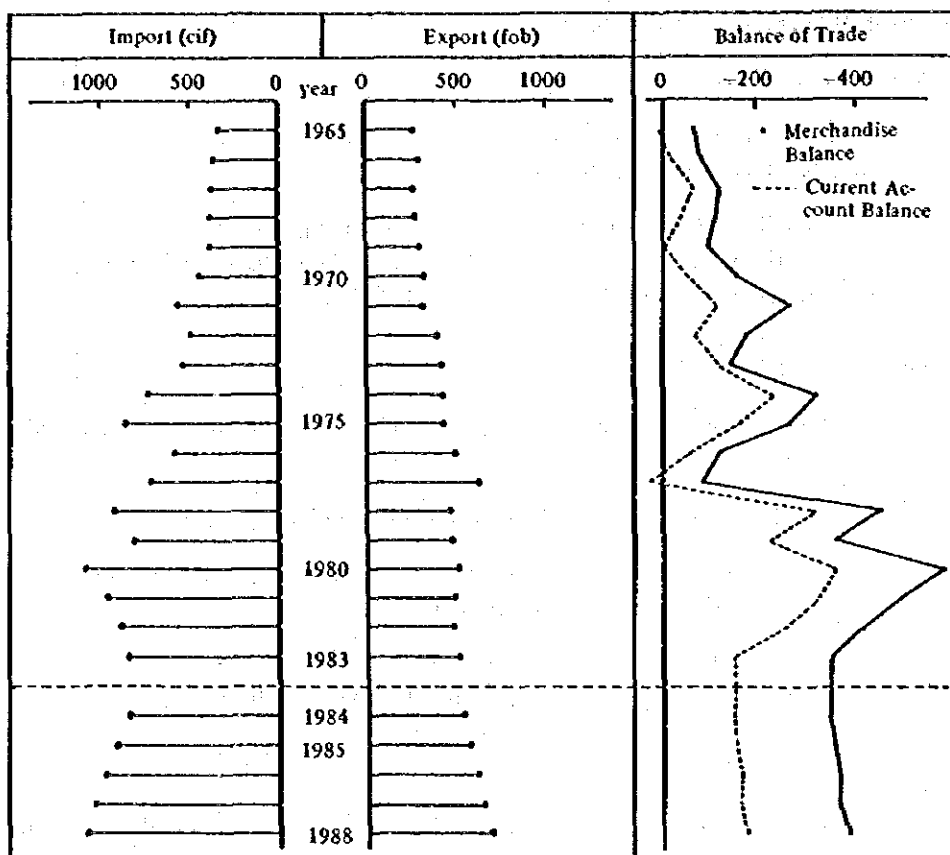
### **3.2.2 Policies**

Adjustment of the economy to the deterioration in trade should take several forms:

- 1) reduction of imports,
- 2) promotion of export earnings,
- 3) mobilisation of the nation's resources,
- 4) promotion of foreign currency income by tourism,
- 5) increasing private domestic savings, and
- 6) utilisation of productive capacity.

## Import/Export Balance

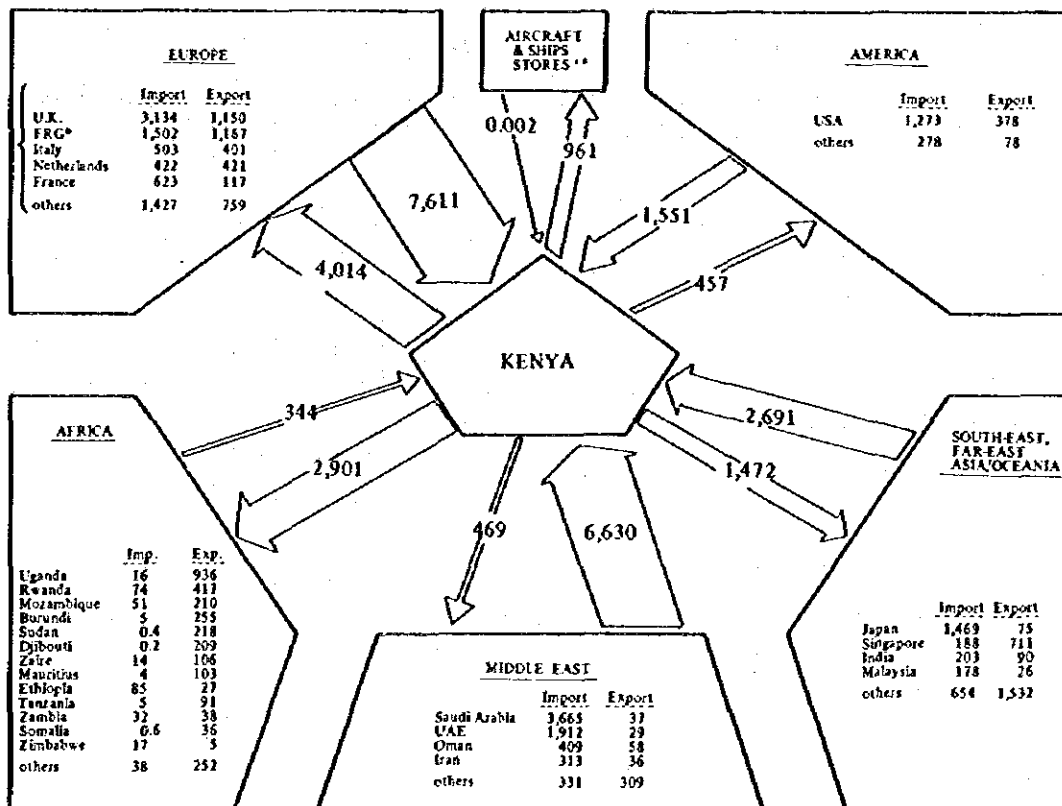
Kfmn



## Imports/Exports of Kenya, 1981

Annual Trade Report,  
CY 1981  
Customs and Excise Dept.  
Ministry of Finance,

Unit: KSh million



### **3.3 Balance of Government Finance**

#### **3.3.1 Government Revenue**

External events have depressed the economic growth in Kenya as well as the growth of Government revenues.

Nevertheless, Government revenues including grants have grown more rapidly than the economy as a whole, and in 1980/81 amounted to nearly 27% of GDP, as compared to 20% in 1976/77.

#### **3.3.2 Government Expenditure**

Expenditure has grown even more rapidly than revenue for the following reasons:

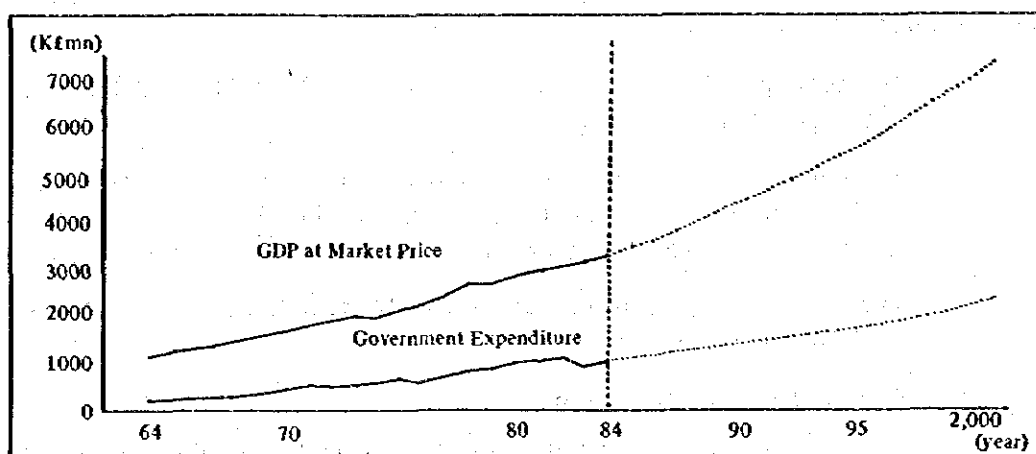
- 1) the rapid growth of debt service charges, and
- 2) the growth in demand for Government services due mainly to the population growth.

The share of Government expenditure to GDP was 35.5% in 1980/81. As a consequence, the percentage of deficit to GDP reached 9.5%.

#### **3.3.3 Management of Government**

It is necessary for the Government to recover a good financial balance by the following means:

- 1) elimination of nonessential investment and services,
- 2) sharing costs with beneficiaries,
- 3) adjusting charges for government services, and
- 4) improving the efficiency of governmental organisation and personnel.



### Government Accounts: Revenue and Expenditure

(K£mn in 1981 Constant Price)

Year	Recurrent Revenue	Expenditure				Deficit		
		Recurrent	Development	Investment	Total	100	200	300
1964/65	164.2	188.7	24.9	20.2	233.8	●		
65/66	184.6	207.1	28.1	18.7	253.9	●		
66/67	211.5	219.5	31.1	21.1	271.7	●		
67/68	244.0	237.3	38.6	23.4	299.3	●		
68/69	264.3	251.2	44.6	31.8	327.6	●		
69/70	299.7	278.9	59.1	33.7	371.7	●		
1970/71	366.4	328.9	87.8	46.4	463.1	○	●	
71/72	393.6	357.8	110.6	33.6	502.0	○	●	
72/73	384.2	360.0	115.5	44.1	519.6	○	●	
73/74	426.7	367.4	108.2	40.8	516.4	○	●	
74/75	435.5	397.7	118.9	61.7	578.3	○	●	
75/76	454.7	416.8	125.5	88.0	630.3	○	●	
76/77	458.7	407.9	123.1	55.4	586.4	○	●	
77/78	613.2	519.5	149.5	97.5	766.5	○	●	
78/79	636.4	592.1	182.6	93.5	868.2	○	●	
79/80	706.9	632.2	198.9	72.9	904.0	○	●	
1980/81	738.5	721.3	216.0	86.1	1023.4	○	●	
81/82	722.0	788.4	207.4	78.0	1073.8	○	●	
82/83	696.7	803.9	154.5	51.8	1010.2	○	●	
1983/84	707.3	731.8		219.7	951.5	○	●	
84/85	795.3	787.6		256.6	1044.2	○	●	
85/86	845.3	819.5		262.2	1081.7	○	●	
86/87	902.3	863.8		278.2	1142.0	○	●	
87/87	963.1	910.2		298.2	1208.4	○	●	

Future Prospects are based on "Development Plan, 1984-88"

### 3.4 Regional Balance

The total population of Kenya was 18,800,000 in 1983 and the average annual growth rate was 3.8%.

The population is generally concentrated in towns. About 2,300,000 people reside in 101 urban centres. The population in these urban centres increased greatly at the average rate of 7.6% per year between 1969 and 1979.

The Corridor ranging from Mombasa to Western Kenya via Nairobi is the most important area in the country.

According to the 1979 census,

- (1) The area of the Corridor covers 17% of the nation and 66 % of the country's population resides in this area.
- (2) Eighty-six percent of the population of all urban centres resides in the 57 centres located within the Corridor.

In order to fulfill the target economic growth by fully mobilising the natural resources of the country, a well-balanced development is necessary between the Corridor and remote areas.

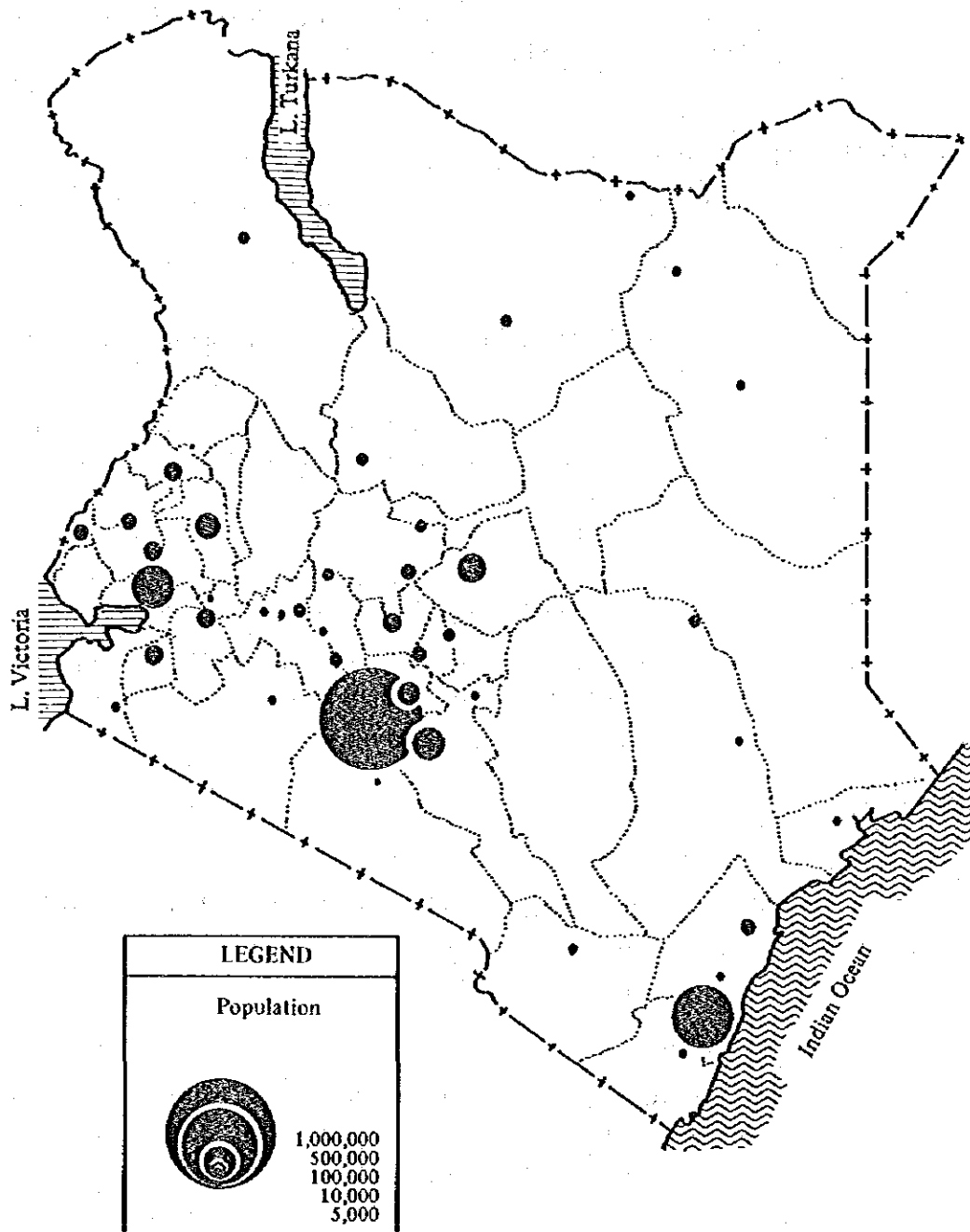
The link between urban centres is the most important aspect of the transportation policy.

**Population and Area of the Corridor (1979)**

	Population	Area
Corridor	10,281 (66%)	97,155 (17%)
Nationwide	15,657	564,162
Definition of the Corridor:	Nairobi, Central, and Western Province. Kilifi, Kwale, Mombasa, Machakos, Kisumu, Siaya, Kajiado, Nakuru, Uasin-Gishu, and Nandi District.	



## Urban Centers in Kenya



### Urban Centres and Their Population

Category	Number of Centres			Population of Centres		
	Corridor	Other	Total	Corridor	Other	Total
more than 100,000	3	0	3	1,321,566	0	1,321,566
30,000 – 100,000	6	1	7	336,783	72,049	408,832
10,000 – 30,000	9	6	15	180,978	101,699	282,677
5,000 – 10,000	7	11	18	48,439	76,561	125,000
1,000 – 5,000	32	26	58	79,045	57,806	136,851
<b>Total</b>	<b>57</b>	<b>44</b>	<b>101</b>	<b>1,966,811</b>	<b>308,115</b>	<b>2,274,926</b>

Base: 1979 Population Census

### **3.5 Balance of Finance by Mode**

The balance surplus for the transport sector as a whole is positive. However, modes other than harbour and the pipeline show deficits.

#### **3.5.1 MOTC's Departments**

Improving efficiency and cost sharing with beneficiaries are very important principles.

##### **(1) Roads**

Revenue from road vehicles constitutes licences, petrol and diesel oil taxes, and other import duties.

Expenses are divided into recurrent and development expenditures. The revenue is greater than each of the two expenditure categories, but the total expenditure is greater than the revenue.

##### **(2) Aerodromes**

Revenue comes from aviation landing fees and airport passenger tax.

Including civil aviation, the total expenditure is considerably more than the revenue. It is important to increase the revenue to a reasonable level.

#### **3.5.2 Parastatals**

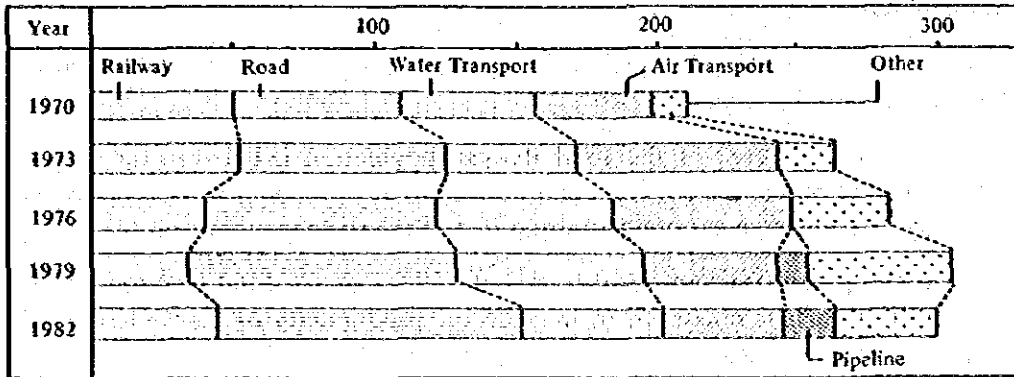
Both railways and airways show net deficits.

As stated in the Fifth Development Plan, parastatals should be operated on the following principles:

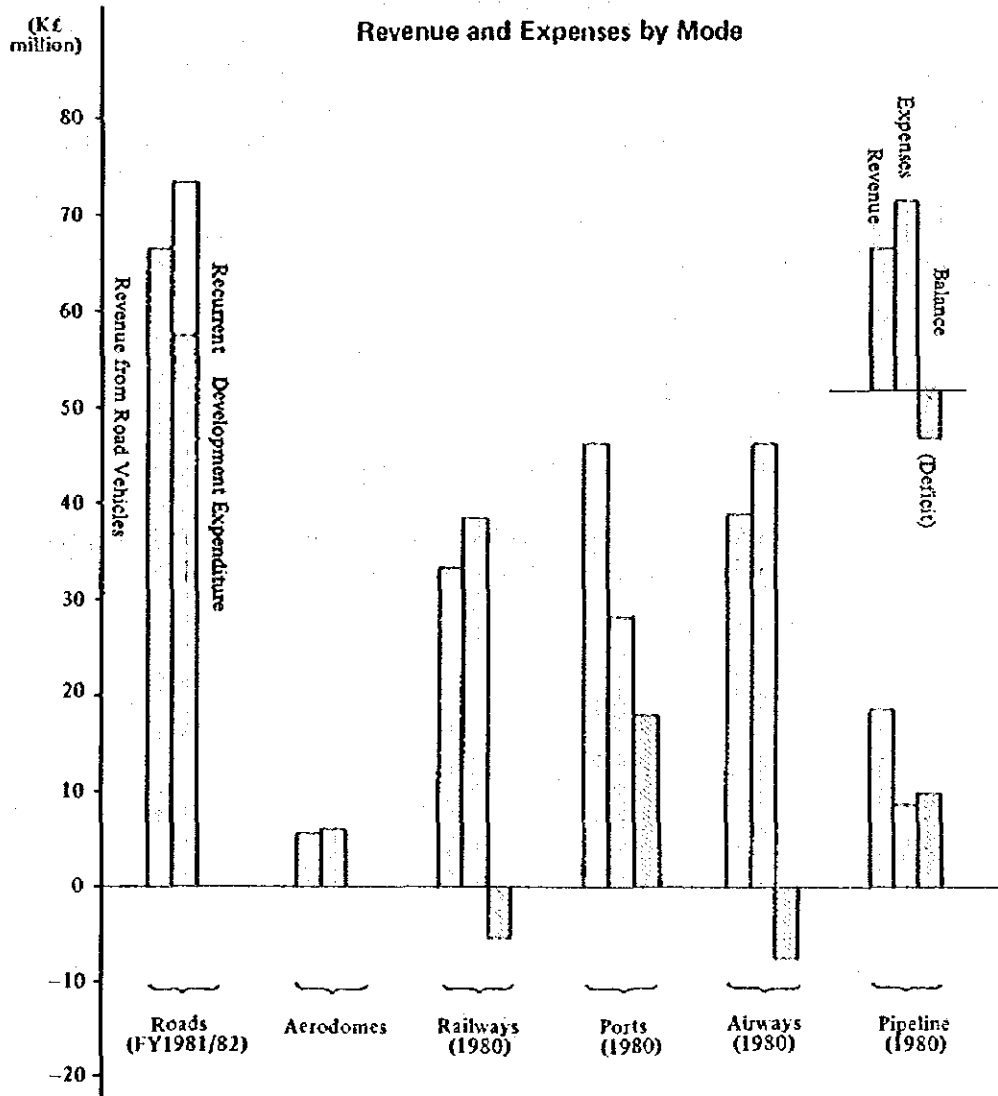
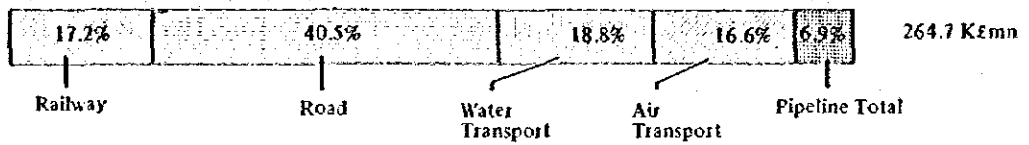
- 1) Full cost recovery;
- 2) Closed accounts; and
- 3) Improved efficiency through capacity utilisation, facility management, and cost reductions.

### Value of Output

(1981 constant price K£mn)



### Share of Each Mode: Value of Output



## 4. Economic Prospects

### 4.1 National Economy

Resources creating the production power of a nation are the labour force, capital stock, and land.

Forty-five percent of the total Kenyan population is between the productive ages of 15 and 59 years and utilisation of this labour force is necessary. Lack of employment opportunity is one of the socioeconomic problems.

At the present technological level, only 17.5% of the total land area can be cultivated. It is important to increase the productivity of the land as well as to expand irrigated areas.

The capital stock is insufficient and to maintain economic growth, an expansion of investment is necessary. The relationship between investment and economic growth is shown by the following Harrod-Domar growth model:

$$q \cdot k = s - e - r$$

where:  $q$  = output growth rate,  
 $k$  = incremental capital output ratio,  
 $s$  = growth saving ratio relative to gross output,  
 $e$  = surplus of exports over imports, and  
 $r$  = net factor income from abroad and net transfer from abroad.

Measures necessary to expand investments in Kenya's economy and thereby create funds for investments are:

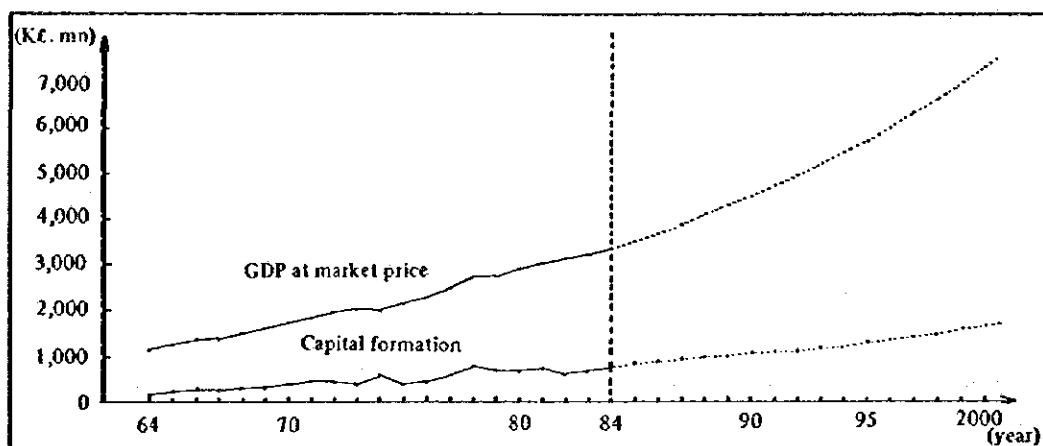
- (1) Increasing domestic savings,
- (2) Promoting exports, and
- (3) Increasing foreign currency income by tourism, etc.

If the measures above are implemented, the GDP of Kenya can be expected to increase at an annual growth rate of 5.0% between 1984 and 2000.

## Projection of Kenyan Economy

(Unit: K£ million, 1981 constant price)

Calendar Year	GDP at m.p.	GDP at Factor Cost	Distribution by Sectors			Capital Formation	Source of Investment	
			Agriculture	Manufacturing	Other Sectors		Domestic Savings	Foreign Funds
	K£ million							
1981	3,039	2,597	792	342	1,463	858.8	511.9	346.9
1984	3,355	2,886	899	396	1,591	739.0	494.5	244.5
1985	3,508	3,018	937	416	1,665	813.4	520.0	293.4
1986	3,683	3,169	978	436	1,755	883.9	547.8	336.1
1987	3,864	3,335	1,020	458	1,857	939.2	577.8	361.4
1988	4,095	3,523	1,063	481	1,979	1,003.3	610.9	392.4
1989	4,296	3,695	1,101	510	2,084	1,034.0	645.8	388.2
1990	4,506	3,876	1,141	540	2,195	1,063.8	682.5	381.3
1991	4,727	4,067	1,182	573	2,312	1,095.1	721.9	373.2
1992	4,959	4,266	1,225	607	2,434	1,127.0	763.9	363.1
1993	5,201	4,475	1,269	644	2,562	1,181.9	808.7	373.2
1994	5,457	4,695	1,306	682	2,707	1,215.4	856.6	358.8
1995	5,729	4,929	1,344	723	2,862	1,301.0	907.5	393.5
1996	6,015	5,175	1,383	767	3,025	1,366.1	962.4	403.7
1997	6,316	5,435	1,423	813	3,199	1,434.3	1,020.1	414.2
1998	6,632	5,706	1,464	861	3,381	1,506.0	1,081.6	424.4
1999	6,963	5,991	1,506	913	3,572	1,581.2	1,146.8	434.4
2000	7,312	6,291	1,550	968	3,773	1,660.2	1,215.9	444.3



## 4.2 Tourism

Tourism earnings in Kenya were 118 million K£ in 1982. Most of the passengers of Kenya Airways are foreign tourists, and the annual earnings of the company amounts to 48 million K£. The total from both these sources was thus equivalent to 4.8% of the GDP, greatly contributing to the country's foreign currency income. The amount is greater than that realised by coffee exports which bring the largest income of any commodity exported.

In 1982, 367,000 people visited Kenya and 75% of them spent their vacation at resorts. Ninety-four percent of these visitors left Kenya by aircraft. Many tourists stayed for an extended period, spending an average of 6,800 Ksh per person total or 464 Ksh per person per bednight.

### Growth of Tourism

(1981 constant price)

	1972	1982	Average Growth Rate 1972 ~ 82							
			(%)	0	2	4	6	8	10	
GDP	1953	3113	4.8							
Income from Tourism	73.0	109.3	4.1							
Visitors ('000)	428	367	-1.5							
Visitors by Air	286	345	1.9							

### Hotel Beds Occupied by Area

('000 bed-nights)

	1972	1982	Average Growth Rate 1972 ~ 82							
			(%)	0	2	4	6	8	10	
Nairobi High Class	481.6	543.7	1.2							
Other	626.6	857.0	3.2							
Coast Beach	763.2	2096.9	10.6							
Other	169.7	328.1	6.8							
Coast Hinterland	96.7	115.9	1.8							
Masailand	100.1	211.7	7.8							
Central	179.9	329.9	6.3							
Other	58.2	155.2	10.3							
Total	2474.7	4628.5	6.5							
National Parks	114.8	188.5	5.1							
Game Reserves	104.7	237.4	8.5							
Total	219.5	425.9	6.9							

### Visitors to National Parks

	1972	1982	Average Growth Rate 1972 ~ 82							
			(%)	0	2	4	6	8	10	
All Parks	522,210	805,641	4.4							
	1971	1981	Average Growth Rate 1971 ~ 81							
			(%)	0	2	4	6	8	10	
Ten Major Parks	441,822	557,832	2.4							

#### 4.2.2 Future Tourism Prospects

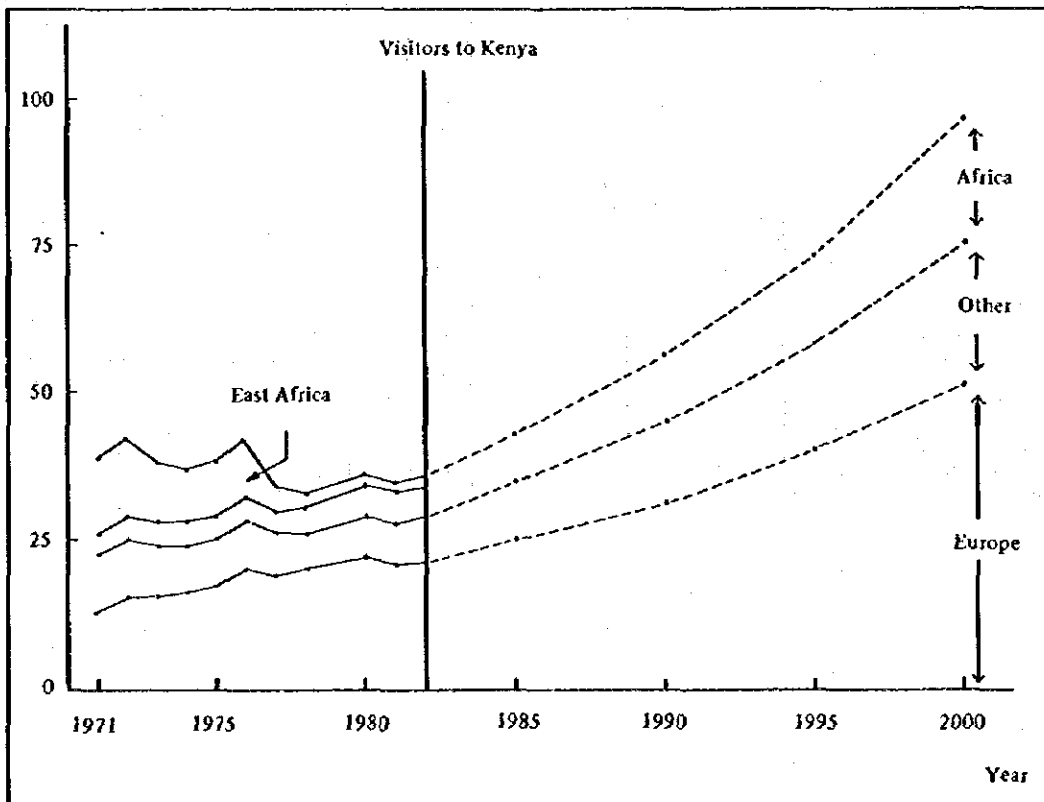
One of the main objectives of tourism should be to increase its contribution to the growth of GDP, and to increase foreign exchange income.

The Fifth Development Plan describes this target as follows:

“Efforts will be made to double by 1988 the number of foreign tourists from 362,000 in 1982. The total bednights will be increased from 4.6 million to 6.2 million in 1988. The total bed capacity bednights attributable to residents is expected to increase by about 9.9%. At the same time foreign exchange earnings are expected to rise steadily to K£213.5 million representing about 10% growth per year during the period 1982–88.”

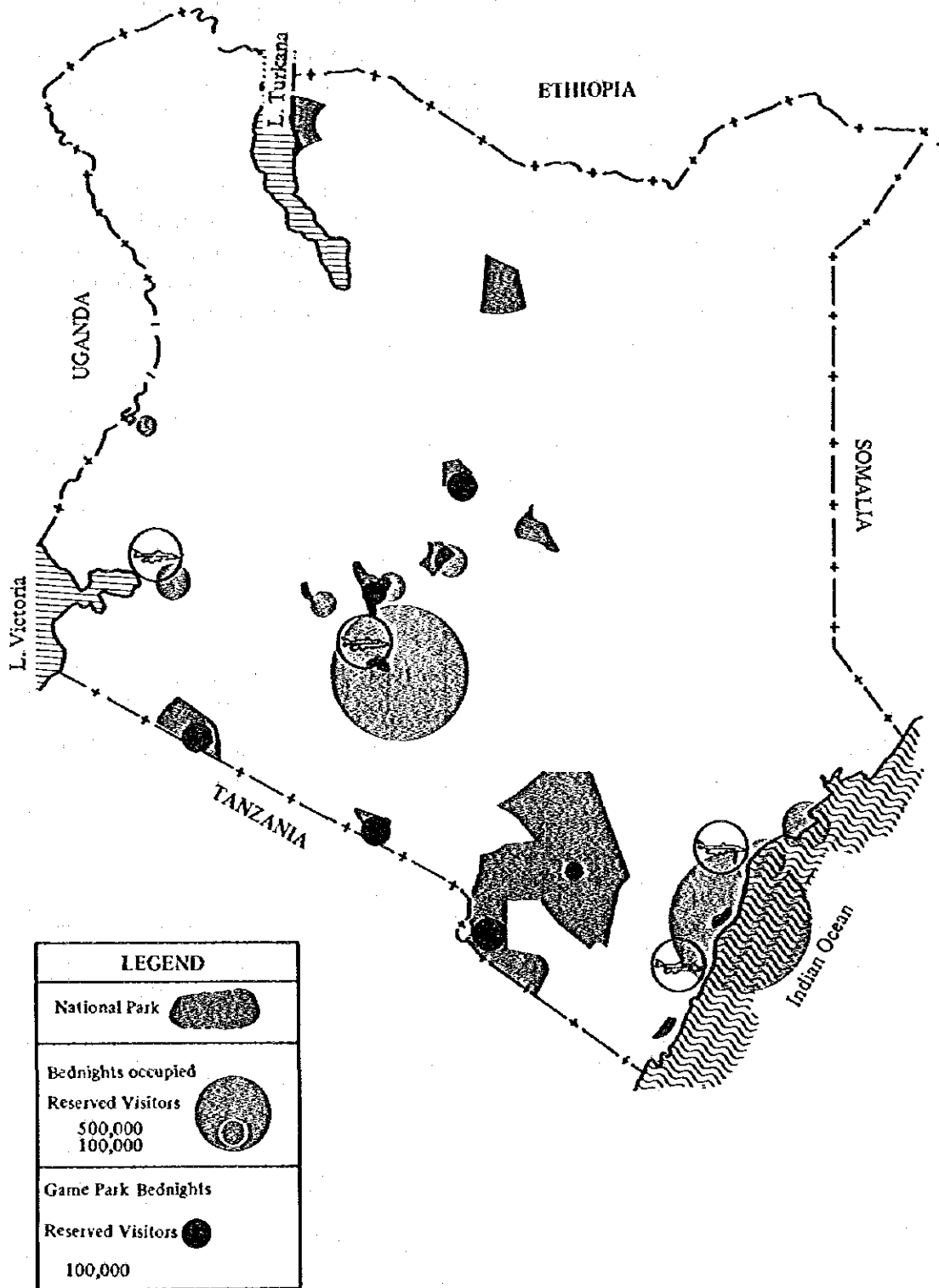
In order to achieve this target, selective and efficient marketing will be necessary in the following ways:

- (1) increasing tourist traffic during the low seasons;
- (2) increasing tourist traffic from foreign countries with high potential;
- (3) improving tourist facilities and attractions, especially in the beach coast areas;
- (4) increasing the average length of stay; and
- (5) encouraging joint promotion between private sectors, Kenya Airways, and the Government.





### Tourism and Beds Occupied by Area



### 4.3 Regional Development

The agricultural sector accounted for 34% of the total GDP in 1982.

The main products are maize, wheat, coffee, tea, sugarcane, sisal, pyrethrum, and cotton. The combined output of these eight items represented 71% of total agricultural output in 1981 (on a nominal price basis) (Source: Statistical Abstract 1981).

Only 17% of Kenyan soil has high or medium potential for cultivation. In the Central and Eastern Provinces, most of the land is already in use as farmland. The remaining land suitable for agriculture is used as pasture and for other purposes. Thus, future increase in agricultural production in this country depends greatly upon the improvement of land productivity, the application of advanced farming techniques, and the use of semi-arid and arid land.

The following table shows a projection of farm products for 1988 and 2000, which have been estimated considering both the restrictions of land productivity and the acreage of cultivatable land.

Projection of Agricultural Production

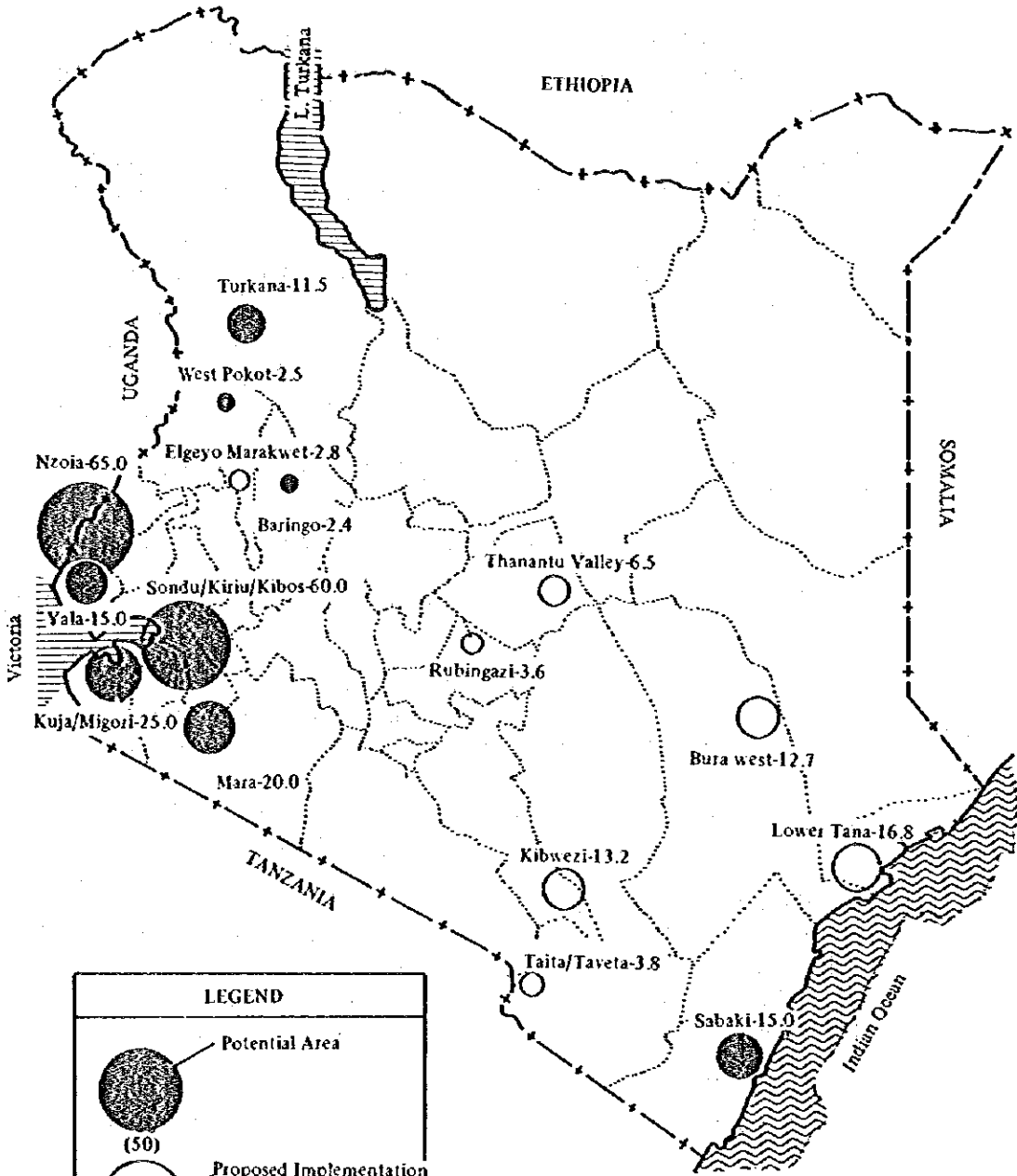
('000t)

Agricultural Products	1981**	Average Annual Growth Rate	1988	Average Annual Growth Rate	2000
Maize	2,241*	4.0%	2,935	3.3%	4,350
Wheat	199*	2.2%	238	2.3%	313
Sugarcane	3,670	1.6%	4,100	1.5%	4,905
Seed cotton	30	8.0%	53	3.3%	99
Coffee	87	4.6%	120	1.9%	150
Tea	91	3.7%	117	3.2%	170
Sisal	46	2.8%	56	2.8%	78
Other	3,620	4.1%	4,801	3.5%	7,234
Total	9,984	3.2%	12,420	2.8%	17,299

Note: \*) Average Production during 1980-1982

\*\*\*) Source: Data of Ministry of Agriculture

### Agricultural Development



**LEGEND**

- Potential Area
- Proposed Implementation Schedule
- Area-Irrigation Scale (1,000ha)

Source:  
 "Forward Planning 1982 ~ 1992", T&ARDA  
 "General Development Plan for the Kerio Valley Basin", KVDA  
 "Five Year Development Plan 1983 ~ 1988", LBDA

#### **4.4 Public Expenditure for Transport Sector**

##### **4.4.1 Target in the Fifth Development Plan**

During the past three years, Kenya has experienced a large payment deficit which resulted in heavy reliance on external borrowing. The country's service obligation has therefore increased beyond a prudent limit.

In order to decrease this budget deficit the Government, has under difficult circumstances, made a remarkable adjustment in its fiscal accounts during the past three years.

According to the Fifth Development Plan for the period 1984–1988, primary objectives during the planning period are to be the containment of the balance of payment deficit and budget deficit to a more manageable level. The curtailment of external borrowing is encouraged, as is the gradual reduction of the external debt burden on the economy as described below.

The target of the balance of trade deficits as a percent of GDP is approximately 10%.

The target of Government deficits as a percent of GDP is approximately 4%.

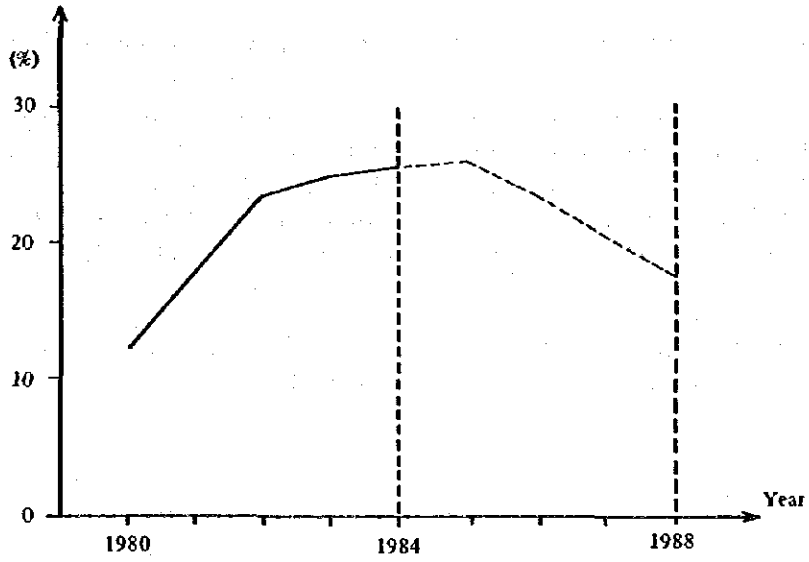
The target of total external debt to exports in 1987/ 88 is 17.6%, which is the same level as in 1981/82.

Public development and investment expenditure has been remarkably reduced to 7% of GDP since 1982, from approximately 10% during the period 1975–81. According to the Plan, 7.5% is to be employed as a budget-ceiling level during the planning period. It is also mentioned that the share of the budget for parastatal investments should diminish, thereby releasing a growing portion for the financing of ministry projects.

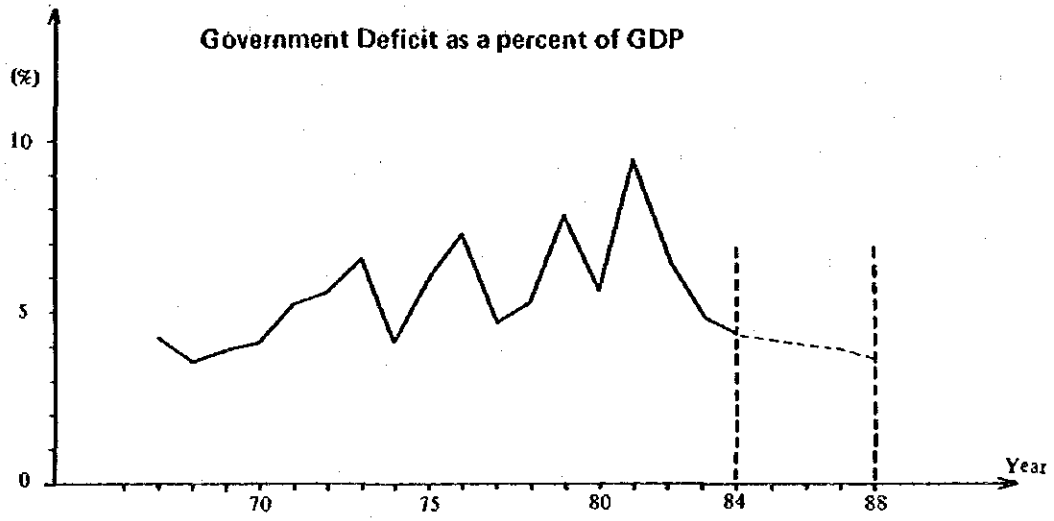
The transport sector share of the public development and investment allocation is shown in the figure on page 26 for each Development Plan. In the Fifth Development Plan, this share is planned to be about 20% during the period 1984–88, which is the same level as that in countries with per capita GDPs similar to Kenya's.

According to the Fifth Development Plan, 1.5% of GDP will be allowable of the public development and investment allocation for the transport sector during 1983 to 1988.

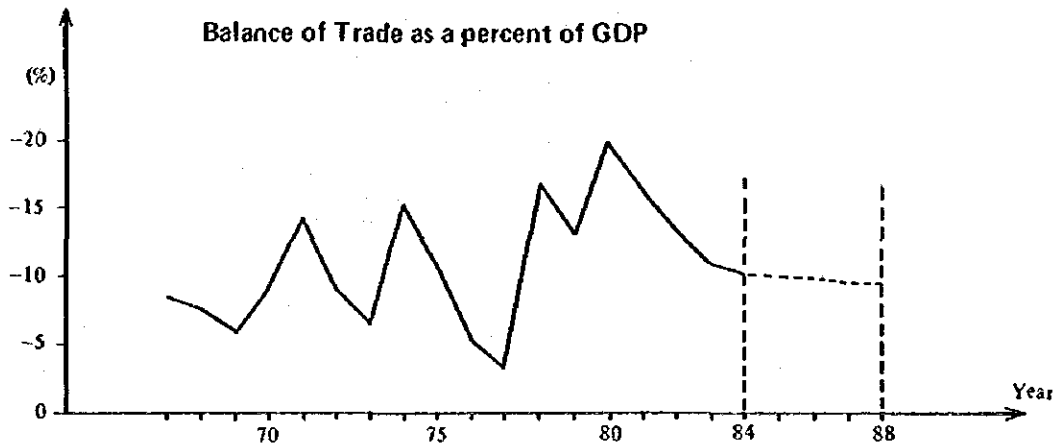
**External Debt to Exports**



**Government Deficit as a percent of GDP**



**Balance of Trade as a percent of GDP**



#### 4.4.2 Long-Term Target

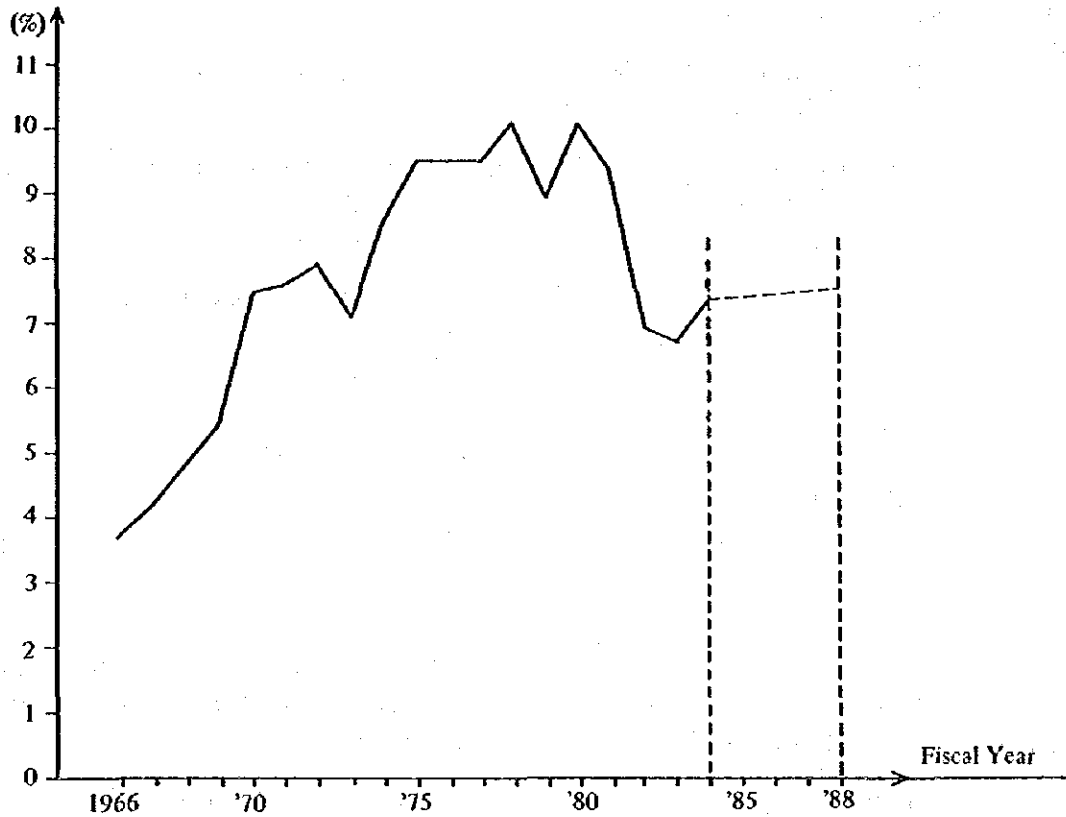
Based upon the assumption that the economy and public finance of Kenya will be improved as described in the Plan, it is assumed that the public development and investment allocation will constitute 10% of GDP during the period 1989–2000. Given the future uncertainty in the transport sector share, we have assumed two possible cases. The first case reflects a downward trend with the continuation of recent development at 18%, and the second is based on maintenance of the average level of the past ten years, 24%.

The table shows the targets of public development and investment funds for the transport sector, classified by time period, based upon these two assumptions.

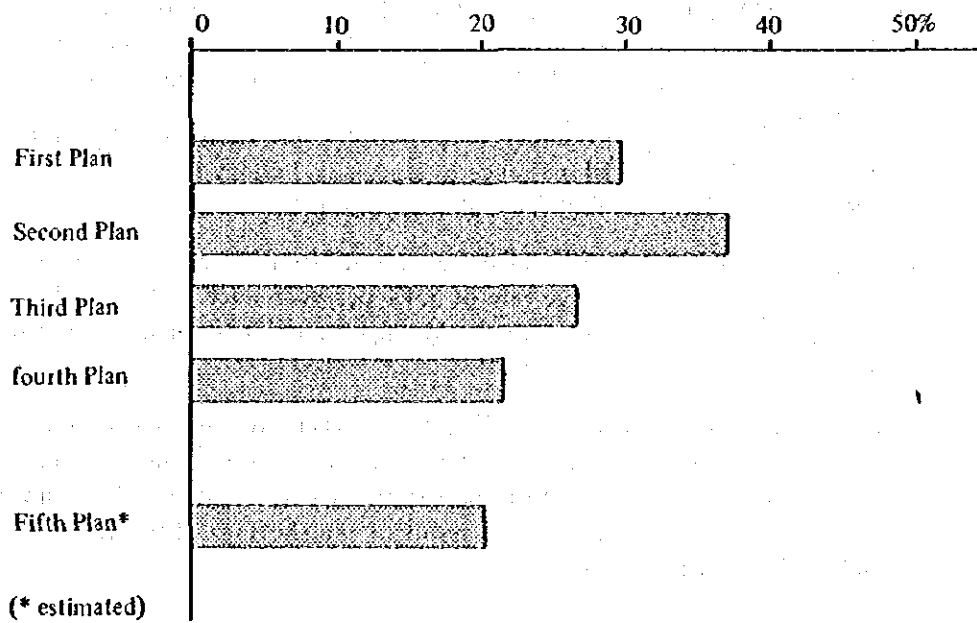
##### Target of Public Development and Investment for Transport Sector

(K£ million at 1983 prices)

Period	GDP at Market Prices	Public Development and Investment Allocation for Transport Sector
1984 – 1988	23,545	353
1989 – 1993	30,142	540 – 724
1994 – 2000	56,525	1,018 – 1,356



Public Development and Investment Allocation as % of GDP at Market Price



Transport Sector Share of Public Development and Investment Allocation

## 5. Current Status of Transport

### 5.1 Overview of Transport Sector

Basic facilities of the transport sector have contributed to other sectors, such as agriculture, industry, and commerce.

In 1981 the total value of transport output was 301 million K£ corresponding to about 10% of GDP.

(K£ mn at 1981 Constant Price)

	1969	1979	1982
Value of Output	202	307	301
GDP Share	12.5%	11.2%	9.6%
GDP at Market Price	1,612	2,745	3,112

**Roads:** Roads account for the largest output value figure which is 40% of all transport modes. The total vehicle-km travelled by road increased sharply between 1976 and 1981 at the rate of 4.6% per year.

**Railways:** Tonnage transported has maintained a constant level during the past ten years, the major cause being a decrease in the transit cargo volume. Domestic transport volume increased from 1971 to 1978 at an average rate of 3.8% per year.

**Port of Mombasa:** The cargo volume handled at this port increased from 1977 to 1981 at the average rate of 9% per year. However, the cargo volume decreased to 1/4 of the 1981 level as a result of a decrease in the import and export of petroleum and a decline in the import of dry cargo.

**Kenya Airways:** The number of passengers has risen as a result of an increase in international passengers, especially holiday tourists. Passenger-kilometers of domestic flights are almost constant.

**Airports:** The total number of passengers at Mombasa and Nairobi airports has increased at the average rate of 3.4% per year since 1977. The increase in the number of passengers at the Mombasa airport is particularly remarkable.

**Kenya Pipeline Company:** The KPC transports petroleum at a level which is 80 to 85% of the total domestic petroleum demand (including oil refinery usage). Since 1980, the import and export of petroleum and throughput of the pipeline have decreased as a result of the shortage of foreign currency and worsening of the economy.



## Overview of Transport Sector

(1981 constant price)

		1977	1978	1979	1980	1981	1982	Growth % 1977 - 82
<b>RAIL</b>								
Freight	'000 t	3,816	3,853	3,907	4,464	4,438	4,473	3.2
	mn t/km	2,211	1,988	1,998	2,281	2,245	2,307	0.9
	K£ mn	31.73	32.39	29.81	32.88	36.91	36.84	3.0
Passenger	'000	1,373	1,611	2,056	2,401	2,356	2,279	10.7
	K£ mn	1.72	2.21	2.79	3.43	4.4	4.55	21.5
<b>ROAD</b>								
Freight	K£ mn	45.08	56.72	63.41	72.52	68.74	71.99	9.8
Passenger	K£ mn	24.50	32.25	30.42	29.54	30.25	35.24	7.5
Vehicle								
V. km/day	'000	6,162	n.a.	7,607	6,666	7,359	6,702	1.7
Stock	'000	214	225	232	240	246	248	3.0
<b>PORT</b>								
Freight Handled at Mombasa	'000 t	5,884	6,067	5,893	7,506	8,432	6,558	2.2
<b>AIR TRANSPORT</b>								
Visitors by Air	'000	316	310	326	344	336	345	1.8
KQ Passengers	'000	241	363	390	403	412	n.a.	14.3
KQ International	mn Pas. km	542.6	811.6	n.a.	937.8	833.9	868.6	9.9
KQ Domestic	mn Pas. km	56.8	74.6	n.a.	80.6	76.8	73.1	5.2
KQ Revenue	K£ mn	30.8	44.7	48.3	46.0	39.9	44.0	7.3
Tourism								
Earnings	K£ mn	63.4	77.1	n.a.	91.2	90.0	107.4	11.1
Bednights	'000	3,838	3,982	4,338	4,717	4,691	4,629	3.8
<b>PIPELINE</b>								
Throughput	'000 m <sup>3</sup>	-	1,017	1,371	1,464	1,439	1,259	5.5
Domestic Petroleum Demand	'000 t	1,608	1,660	1,669	1,768	1,672	1,573	-0.4
<b>AIRPORT (Landing and Embarking Passengers)</b>								
Nairobi	'000	828	869	949	947	1,013	944	2.7
Mombasa	'000	268	309	320	360	373	351	5.5

## 5.2 Transport Usage

### 5.2.1 Cargo

The people of Kenya transport one tonne of cargo per person per year via railways and roads. They pay 140 Ksh per person per year for these services, an amount equivalent in 1982 to 4% of GDP per person (3630 Ksh). The average earnings that year for one tonne of cargo using railways and roads were 181 Ksh and 132 Ksh, respectively.

The transport volume through the pipeline corresponds to 68 kg per person for which 22.5 Ksh is paid.

Average transport expenditure per tonne-km using railways and roads is 0.35 Ksh and 0.56 Ksh, respectively; the cost via roads is 1.6 times that using the railway. Average trip distance of railway transport is 516 km, and that of road transport is 235 km.

### 5.2.2 Passengers

The people in Kenya pay 50 Ksh per person per year for railway and road transport services. The average trip distance for railway passengers is 330 km, which is three times larger than that for road passengers and shows the same tendency as cargo transport.

Transport costs per km are 0.131 Ksh for railways and 0.190 Ksh for roads.

The passenger-service earnings of Kenya Airways are 1,937 Ksh per passenger. About 92% of passenger-kilometres of Kenya Airways is used in international flights, contributing greatly to the foreign-currency income of the country. The transport costs per passenger-kilometre are about 1 Ksh.

## ■ Freight Transport

Average Freight Volume Per Capita

(1981 Constant Price)

	Freight Volume				Expenditure							
	(Kg)	0	200	400	600	(Ksh)	0	20	40	60	80	100
Rail (1982)	260					47.2						
Road (1983)	703					92.3						
Pipeline (1981)	68					22.5						

Average Transport Distance and Expenditure Per Ton

(1981 Constant Price)

	Transport Distance				Expenditure					
	(Km)	0	200	400	(Ksh)	0	100	200	300	
Rail	516					181				
Road	235					131.5				
Pipeline	449					331.6				

Average Transport Expenditure Per Ton-Km

	Transport Cost				
	(Ksh)	0	0.2	0.4	0.6
Rail	0.351				
Road	0.560				

## ■ Passenger Transport

Average Expenditure Per Capita

	Expenditure			
	(Ksh)	0	20	40
Rail	5.2			
Road	43.6			

Average Trip Distance and Expenditure Per Passenger

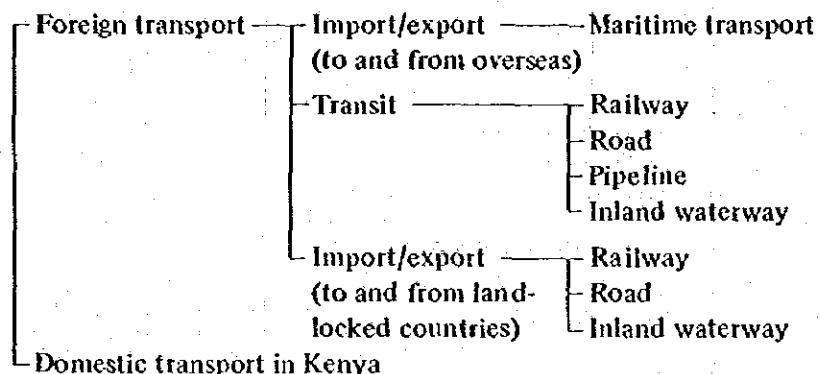
(1981 Constant Price)

	Trip Distance				Expenditure				
	(Km)	0	100	200	300	(Ksh)	0	20	40
Rail	330					40.3			
Road	116					19.8			
Air Transport	2210					1937			

## 6. Transport Demand Forecast

### 6.1 Freight Transport

Freight transport in Kenya is classified as follows;



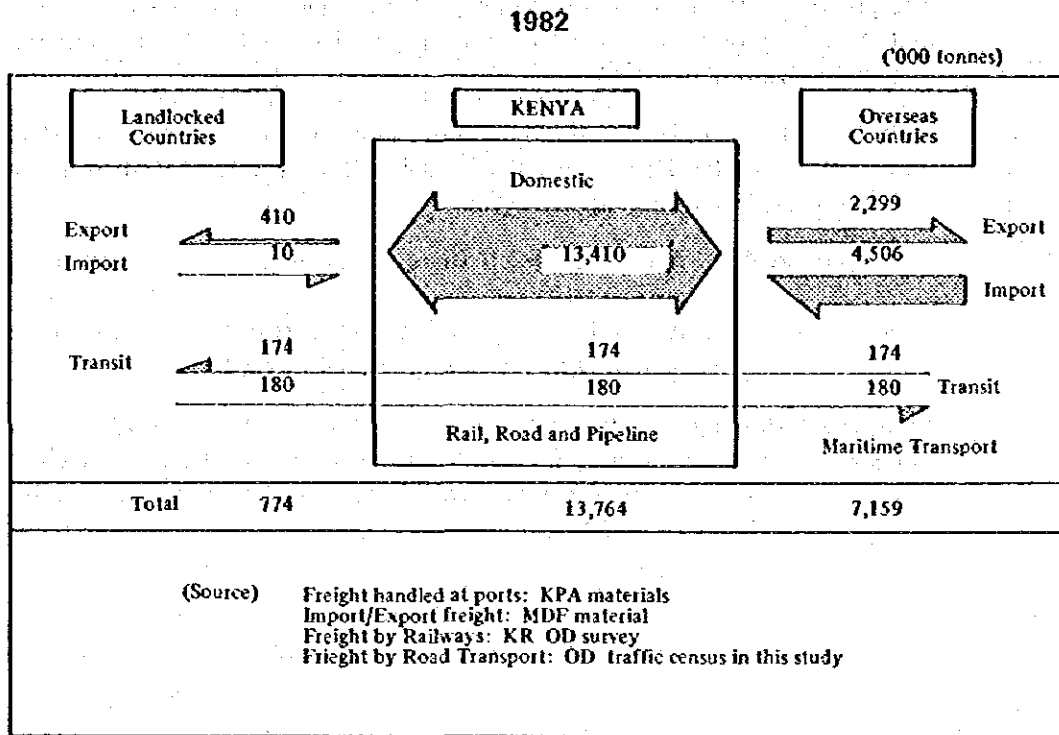
#### 6.1.1 Present Freight Flow

- (1) Freight originating in Kenya and going through the boundary section between Kenya and the landlocked countries amounts to 584,000 tonnes, exceeding the 190,000 tonnes of freight coming in from those countries by a wide margin.
- (2) 30% of the freight passing through the boundary section from Kenya to landlocked countries is imports in transit. Most of the freight coming into Kenya from these countries is in transit for export.
- (3) 15% of the exported freight goes to neighbouring countries, while 85% is sent overseas. In contrast, almost 100% of the imports come from overseas countries, and those from neighbouring landlocked countries are minimal.

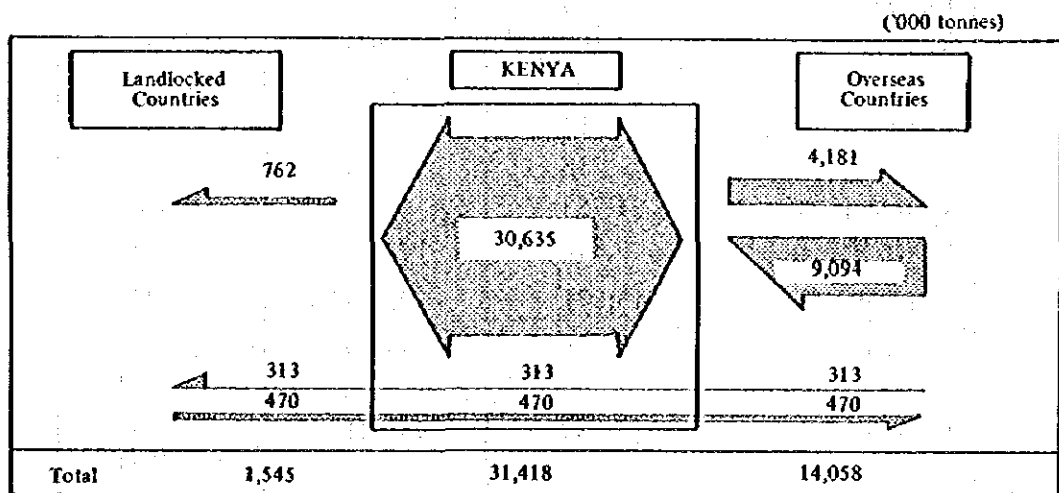
#### 6.1.2 Future Freight Flow

The total amount of freight is expected to increase from 20,989 thousand tonnes at present to 26,566 thousand tonnes in 1988 (an average annual growth rate of 3.4%) and to 45,455 thousand tonnes in 2000 (an average annual growth rate of 4.6%).

## 1982 and Projected Freight Flow



## Projected – Year 2000



### 6.3.1 Freight Transport by Rail and Road

The growth of the total quantity transported by rail and road between 1982 and 2000 is projected to be 2.33 times larger than that of the present (an annual growth rate of 4.8%).

A huge investment is necessary for rail transport in order to more than double its capacity. Hence, future demand will be studied based on these two scripts:

Scenario A: A case in which there are no restrictions on rail transport capacity.

Scenario B: A case in which railway transport capacity can only be increased to 1.5 times the present capacity.

In Scenario B, the maximum capacity would be reached by 1991. By 2000, railways would then be able to handle only 68% of the potential freight demand. In this case, roads would have to increase their flow capacity by 2,705 thousand tonnes by 2000.

**Projection of Transport Volume by Rail and Road**

('000t)

Commodity	1982	1988	2000
Maize	1,085	1,421	2,105
Wheat	582	672	1,015
Coffee	443	626	865
Tea	509	663	999
Cement	905	1,163	1,663
Sugar	514	472	543
Soda	238	595	992
Petroleum	1,753	2,041	2,856
Other	9,842	12,850	25,984
<b>Total</b>	<b>15,871</b>	<b>20,503</b>	<b>37,022</b>
<b>by Rail</b>	<b>3,841</b>	<b>5,019</b>	<b>8,466</b> <b>(5,716)</b>
<b>by Road</b>	<b>12,030</b>	<b>15,484</b>	<b>28,552</b> <b>(31,257)</b>

( ) Scenario B

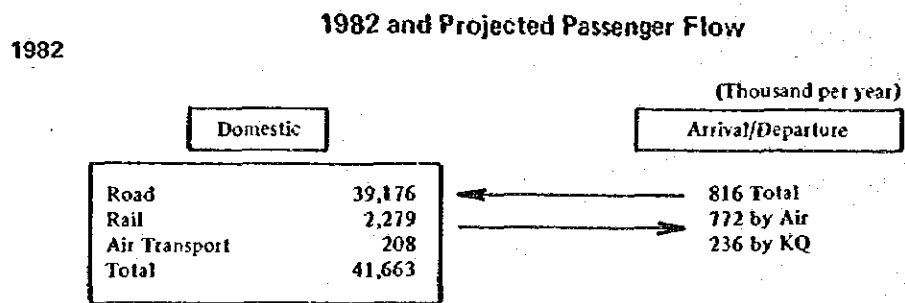
## 6.2 Passenger Transport

### 6.2.1 Present Passenger Flow

- (1) The total number of domestic passengers carried by railway and road within Kenya in 1982 was 41.6 million and 95% of these were transported by road.
- (2) The total number of arrivals and departures in Kenya was 816 thousand, and 30% of the visitors were transported by Kenya Airways.

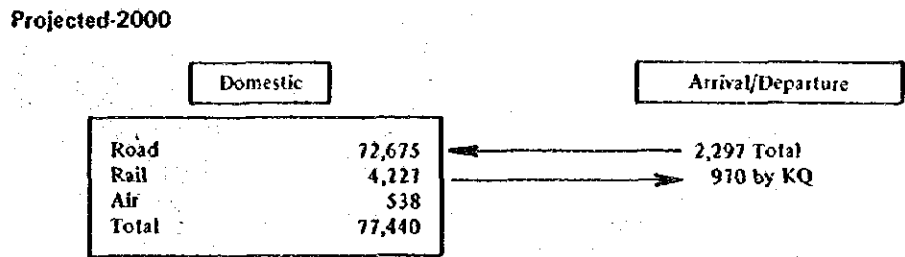
### 6.2.2 Future Passenger Flow

- (1) The total number of domestic passengers is expected to increase from the present 42 million to 77 million in 2000 (an average growth rate of 3.5%).
- (2) The number of foreign visitors will increase more rapidly than domestic passengers.

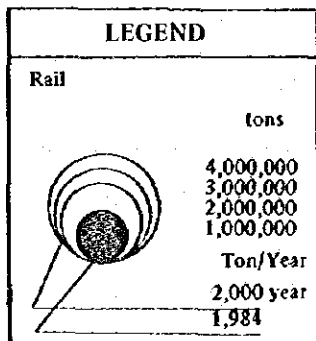
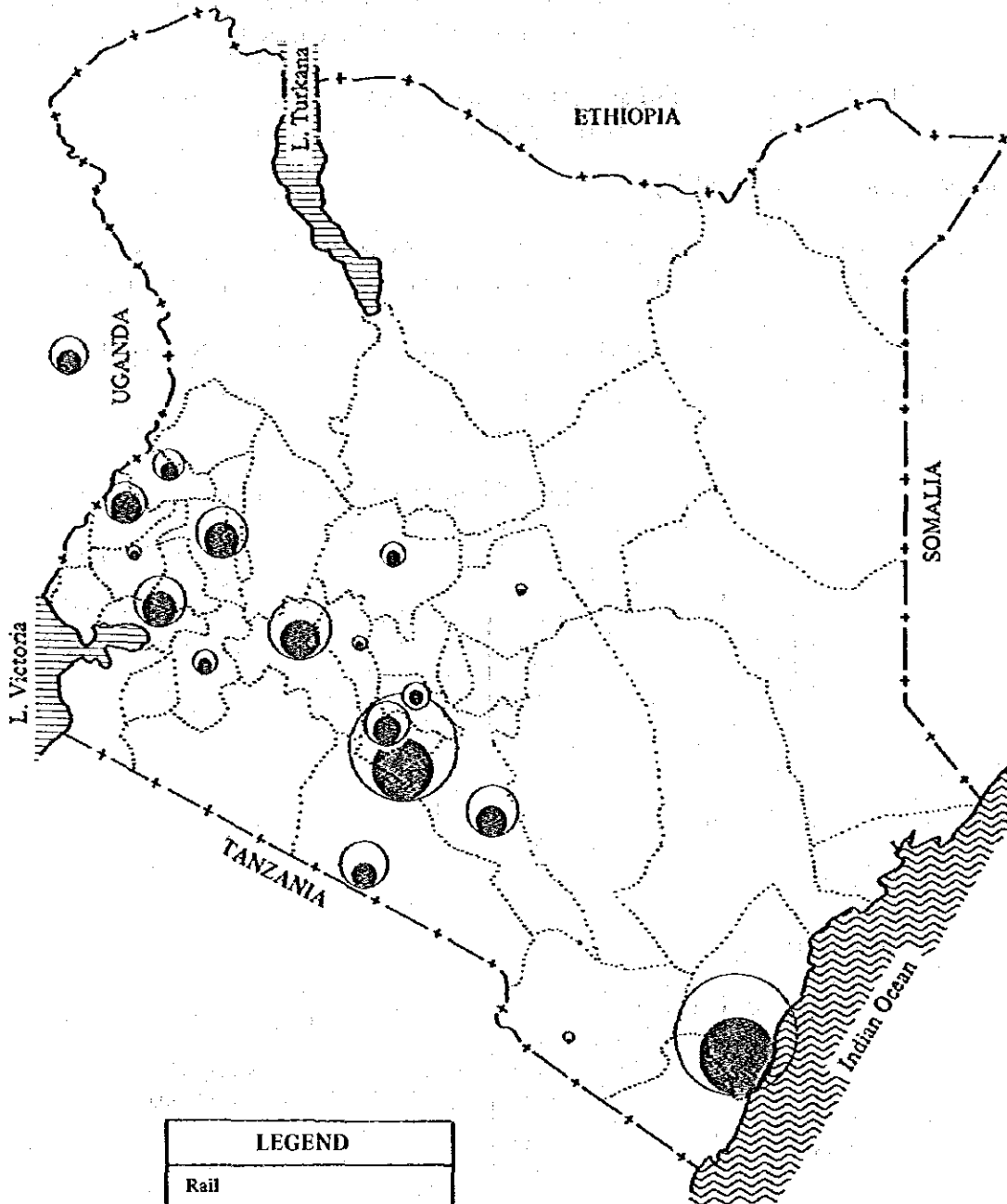


(Source)

Road: OD Traffic census by this study in 1983  
 Rail: OD Table by KR in 1982  
 Air: Economic Survey (1981 figures)

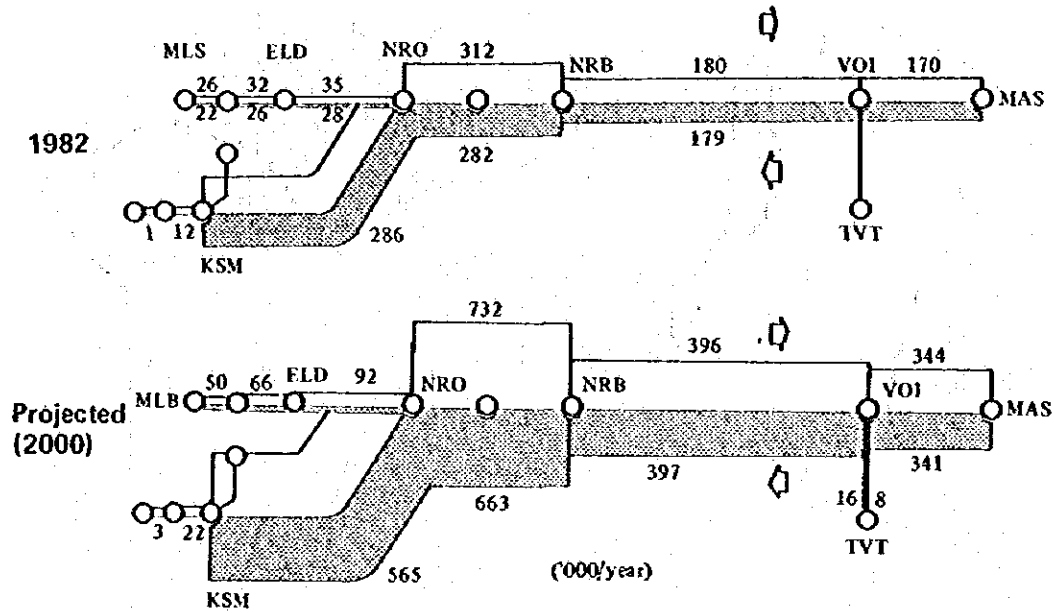


### 6.3 Railway Transport

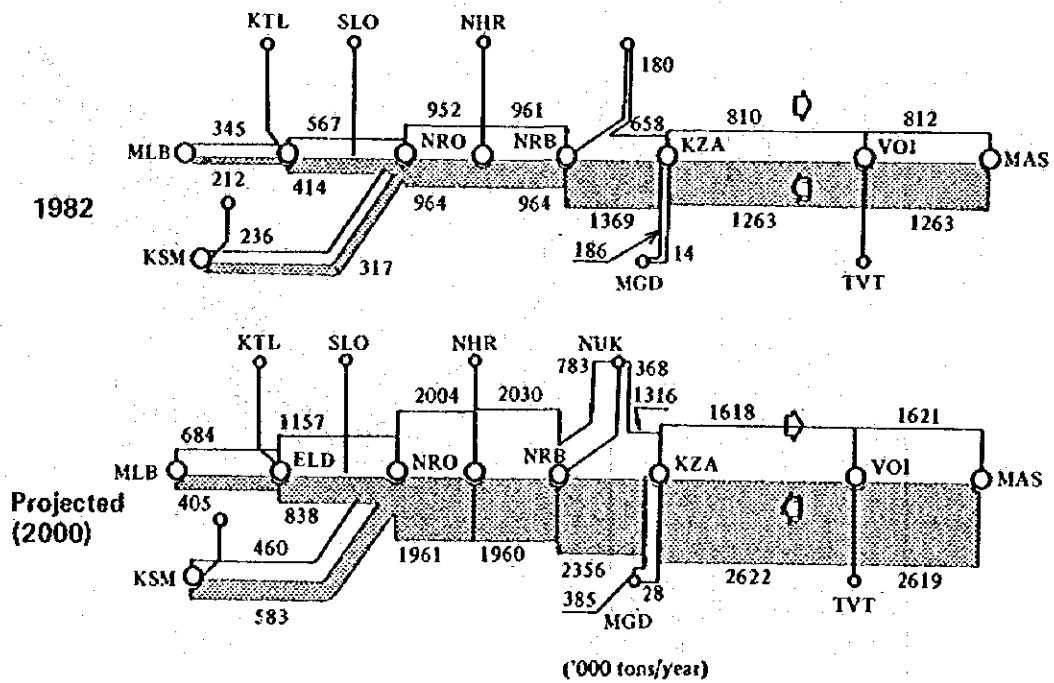




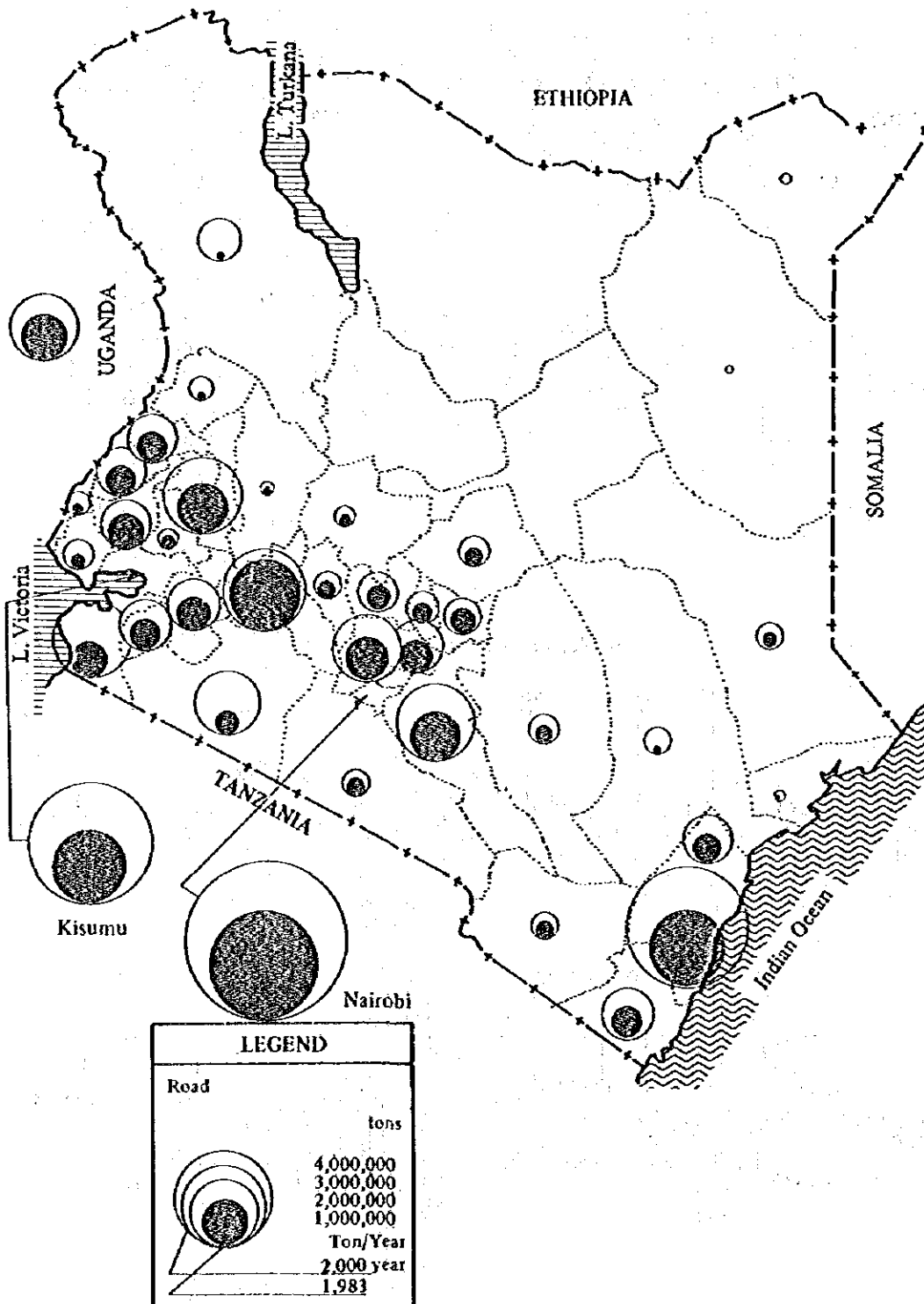
### Passenger Traffic by Railway



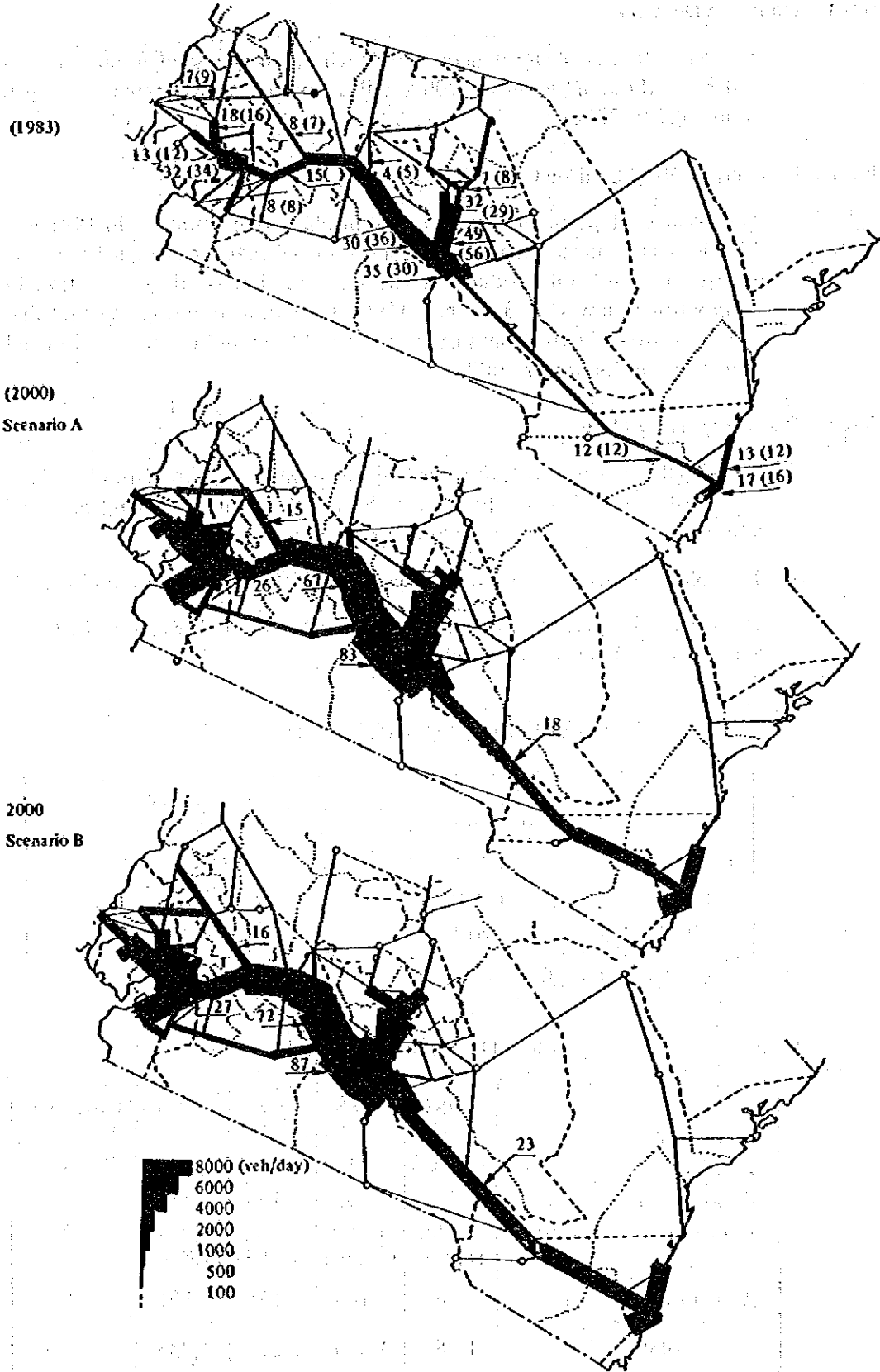
### Freight Traffic by Railway



## 6.4 Road Transport



Annual Average Daily Traffic: Vehicles/day



## 6.5 Oil Transport

### 6.5.1 Domestic Demand

The domestic petroleum demand will reach 1,960 thousand tonnes in 1988 and 2,735 thousand tonnes in 2000, with an average growth rate of 2.7% p.a. from 1983 to 2000.

### 6.5.2 Demand by Neighbouring Countries

The volume of petroleum exported to neighbouring countries in 1981 was 290 thousand tonnes. In this study, it is assumed that the growth rate of the export of petroleum products is the same as that of the population in neighbouring countries, 3.0% p.a. Under such an assumption, we find that future exports of petroleum products will be 357 thousand tonnes by 1988 and 509 thousand tonnes by 2000.

### 6.5.3 Oil Transport by Mode

Almost all petroleum is transported by the existing pipeline from Mombasa to Nairobi; from Nairobi to Western Kenya it is transported by road and railway.

The volume transported by railway was about 500 thousand tonnes in 1982.

The volume by pipeline was 1,121 thousand tonnes in 1981, and the transported tonnes/km was 503.4 million.

#### Forecast of Existing Pipeline Transport

	Throughout (000 tonnes)	Tonnes/km (000)
1981	1,121	503.4
1988	1,290	579.7
2000	1,871	839.8

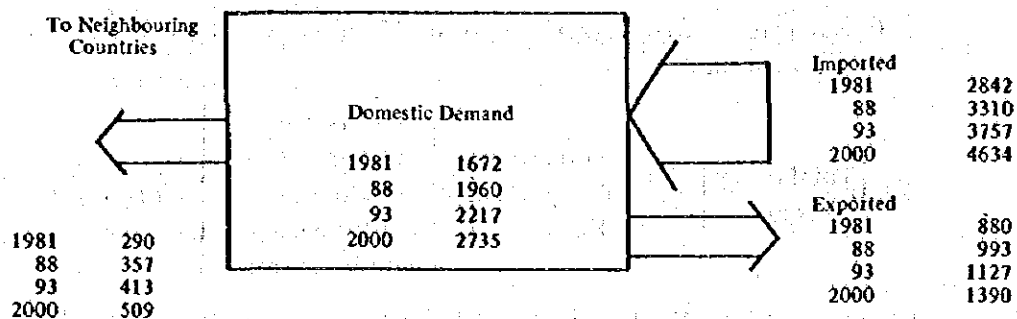
one cubic meter = 0.78 tonne

#### Future Domestic Petroleum Demand

	1983	1988	1993	2000	Growth %
Residential	82	115	161	259	7
Commercial	113	132	153	188	3
Industrial & Transport	1,508 (1,028)	1,608 (1,226)	1,768 (1,463)	2,097 (1,878)	2
Agriculture	82	105	135	191	5
<b>Total</b>	<b>1,785</b>	<b>1,960</b>	<b>2,217</b>	<b>2,735</b>	<b>2.7</b>

( ) shows Demand of Transport Sector

### Oil Traffic Flow



**OD Table in 1981**

(‘000t)

To \ From		Kenya	Foreign		Total
			Inland	Overseas	
Kenya		2,622*)	290	896	3,808
Foreign	Inland	0	—	—	0
	Overseas	2,747	—	—	2,747
<b>Total</b>		<b>5,369</b>	<b>290</b>	<b>896</b>	<b>6,555</b>

\*) Pipeline: 1,121, Rail: 478, and Road: 1,023

**OD Table in 2000**

(‘000t)

To \ From		Kenya	Foreign		Total
			Inland	Overseas	
Kenya		4,289	509	1,390	6,188
Foreign	Inland	0	—	—	0
	Overseas	4,634	—	—	4,634
<b>Total</b>		<b>8,923</b>	<b>509</b>	<b>1,390</b>	<b>10,822</b>

## 6.6 Port Cargoes

### 6.6.1 Mombasa Port

Ocean cargoes that pass the port of Mombasa can be expressed by the following formula:

$$\left[ \text{Total ocean cargo} \right] = \left[ \text{Exports from and imports to Kenya} \right] - \left[ \text{Exports from and imports to Kenya to and from neighbouring countries} \right] + [\text{Transit Cargoes}]$$

- (1) From 1981 to 1988, export and import cargoes handled at Mombasa will continue to increase at an annual average rate of 3.0%, while the growth rate will be 4.5% from 1989 to 2000.
- (2) From 1981 to 1988, the increase rate of imports will be 2.8%, while exports will grow at a rate of 3.3%. From 1989 to 2000 imports are expected to increase at an annual rate of 5.0%, whereas the growth rate of exports will be 3.4%. Import growth will be generated mainly by the import of raw materials for steel plants and other industries which are expected to grow in the future.

#### Projection of Cargo Volume Handled at Mombasa Port

	('000t)		
	1981	1988	2000
Imports (excluding oil)	1,548 <sup>1)</sup>	1,915	4,773
Oil	2,746 <sup>2)</sup>	3,310	4,634
Imports Total	4,294	5,225	9,407
Exports (excluding oil)	1,583 <sup>3)</sup>	2,110	3,261
Oil	896 <sup>3)</sup>	993	1,390
Exports Total	2,479 <sup>3)</sup>	3,103	4,651
Imports and Exports Total	6,773	8,328	14,058

Note: 1) KPA data less emergency food imports  
 2) Data from "Economic Survey 1982"  
 3) KPA data

## 6.6.2 Lamu Ports

Large-scale agricultural development is planned in the Bura region and the Lower Tana delta zone near the port of Lamu. If these development programs are implemented, cargo quantity will be increased in the Lamu and Tana River districts.

Estimated Cargo Volume in the Lamu and Tana River Districts (ton)

	1983	1988	1993	2000
Lamu	23,389	26,770	34,249	48,355
Tana River	33,479	83,411	157,298	382,318
Total	56,868	110,181	191,547	430,673

Of this future expected cargo, that transported to and from Mombasa and Kilifi is considered to represent a potential demand for ocean transport. At present, 88% of the cargoes generated at Lamu are considered potentially for marine transport. Using this percentage, potential cargo demand through the port of Lamu in future years is estimated as follows:

### Potential Cargo Demand through Lamu Port

1988	96,600 tons
1993	168,100 tons
2000	377,900 tons

The potential demand in 2000, 377,900 tonnes, is equivalent to 2.7% of the estimated volume which will be handled at Mombasa that year.

## 6.7 Civil Aviation and National Airline

### 6.7.1 Present Situation

#### (1) Airport Passengers by Air Service Category

The table lists the four major airports with existing scheduled airline services.

#### Present Air Passenger Movements: Arrival and Departure in 1981

Airport	Domestic		International		Total
	Scheduled	Non-scheduled	Scheduled	Charter	
Nairobi	185,000 <sup>1)</sup>	—	809,000 <sup>1)</sup>	—	994,000 <sup>1)</sup>
Mombasa	157,000	—	54,000 <sup>1)</sup>	141,000 <sup>3)</sup>	352,000 <sup>2)</sup>
Malindi	28,900 <sup>4)</sup>	36,400 <sup>4)</sup>	—	—	65,300
Kisumu	5,000 <sup>3)</sup>	5,000	—	—	10,000
Total	375,900	41,400	863,000	141,000	1,421,300

Source: 1) Nairobi Airport Traffic Forecast 1981–1996, (Dec. 1982)

2) Statistical Abstract, C.B.S., 1982

3) Aerodromes Annual Report

4) Malindi Airport Feasibility Study

#### (2) International Air Passengers and Share of KQ

#### International Air Passengers and KQ Share: 1979/1980

	('000)			
	Northern	Eastern	Regional	Total
Total Market	326,200	54,820	205,090	586,110
KQ share (%)	24.2	48.7	36.1	30.6
KQ Total	78,810	26,682	74,060	179,552

### 6.7.2 Future Air Traffic Demand

#### (1) Air passengers and Share of KQ

Kenya Airways currently handles about one-third of the volume of international air-passenger traffic. It is necessary for Kenya Airways to expand its share of this market for the following two reasons:

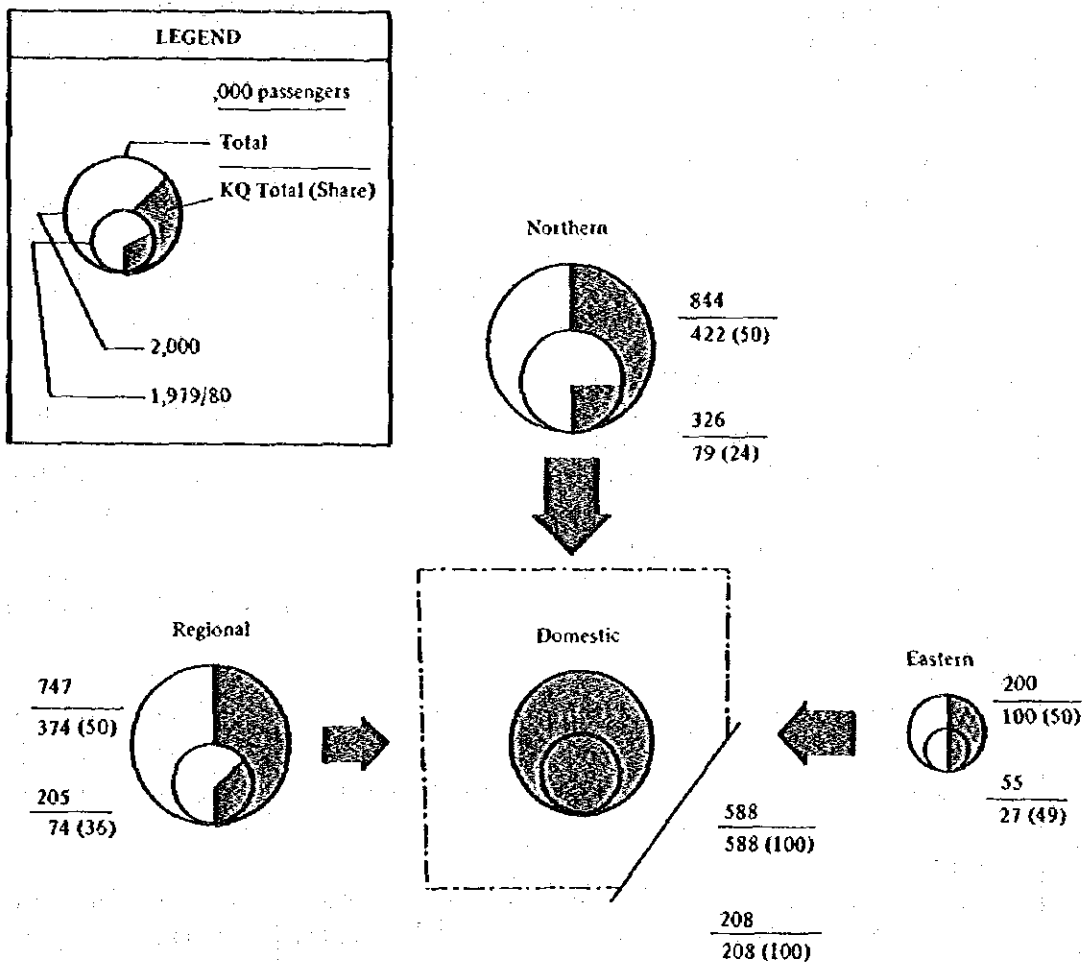
- a) to develop tourism in Kenya and thereby assure foreign currency income, and
- b) to develop the company's activity and improve its financial condition.



The earnings of the tourist industry in Kenya in 1982 were K£116 million, an increase over the 1981 earnings of K£90 million. Furthermore, the value of output by Kenya Airways that year was K£48 million, so that the total foreign currency obtained from the two sources was K£162 million.

The following target demand was set for 1990 in order to expand the air passenger traffic of Kenya Airways: The market share of Kenya Airways is international traffic should be 40% in the Northern Area, 50% in the Eastern Area and 45% in the Regional Area by 1990.

### Future Air Traffic Demand by Area



(2) Arrival and Departure by Airport

It is necessary by 1990 to develop the Malindi Airport to accommodate wide-body jets. Expansion of the airport will allow regional development in tourism and will attract a large number of tourists from Europe. The service of wide-body jets at the Malindi Airport will bring 29 thousand passengers per year into the north coast area, and a weekly charter flight will be possible.

400 seats x 0.7 x 52 weeks = 14,560 passengers

Future Airport Passengers: Arrivals & Departures.

	1981	1985	1990	1995	2000
<b>NAIROBI</b>					
Domestic Scheduled	185,000	230,415	304,280	397,871	520,540
International Scheduled	809,000	1,007,598	1,330,605	1,739,873	2,275,026
<b>Total</b>	<b>994,000</b>	<b>1,238,013</b>	<b>1,634,885</b>	<b>2,137,744</b>	<b>2,795,566</b>
<b>MOMBASA</b>					
Domestic Scheduled	157,000	187,225	233,316	297,776	380,046
International	195,000	232,541	289,788	369,851	472,034
<b>Total</b>	<b>352,000</b>	<b>419,766</b>	<b>523,104</b>	<b>667,627</b>	<b>852,080</b>
<b>MALINDI</b>					
Domestic Scheduled	(1980) 28,900	36,014	44,880	57,280	73,104
Non-Scheduled	(1980) 36,400	45,362	56,528	72,146	92,078
International			(58,000)	(116,000)	(203,000)
<b>Total</b>	<b>(1980) 65,300</b>	<b>81,376</b>	<b>101,408 (159,408)</b>	<b>129,426 (245,426)</b>	<b>165,182 (368,182)</b>
<b>KISUMU</b>					
Domestic Scheduled	5,000	5,803	7,349	9,345	11,926
International Scheduled					
<b>Total</b>	<b>5,000</b>	<b>5,803</b>	<b>7,349</b>	<b>9,345</b>	<b>11,926</b>
<b>Grand Total</b>					
Domestic Scheduled	375,900	459,457	589,825	762,272	985,616
Non-Scheduled	36,400	45,362	56,528	72,146	92,078
International	1,004,000	1,240,139	1,620,393	2,109,724	2,747,060
<b>Total</b>	<b>1,416,300</b>	<b>1,744,958</b>	<b>2,266,746 (2,324,746)</b>	<b>2,944,142 (3,060,142)</b>	<b>3,824,754 (4,027,754)</b>

( ) : Volume shown in Malindi Airport Feasibility Study.

## **7. Transport Development Plan**

### **7.1 Transport Development Strategy**

The transport sector provides Kenya with services which form a base for economic activities. The value of output is equivalent to 10% of GDP.

It is desirable to develop transport infrastructure in harmony with the country's economic expansion. However, the investment in plants and equipment is expected to be limited mainly to the recovery of the economic situation which has worsened since 1979.

#### **7.1.1 Short-Term Strategies**

For the transport sector, it is important to improve "the three balances" during the Fifth Five-year Program from 1984 to 1988.

These are:

- 1) Import-export balance,
- 2) Regional balance, and
- 3) Government financial balance, and earnings/expenditures balance for each mode

Therefore, a transport investment program is planned based on the following two strategies during the short-term program:

- 1) Maximum effective utilisation of existing facilities, and
- 2) Emphasizing of investment in projects with high efficiency.

Several modes of transport have facilities and equipment which are obsolete, having been manufactured during the period Kenya was one of the East Africa Communities and used continuously without improvement. Investment is necessary to bring them to a state of service commensurate with the transport demand.

#### **7.1.2 Long-term Strategies**

For the long term period until the year 2000, a transport development program must be established based on the following:

- |              |  |
|--------------|--|
| (Strategy A) | Expanding transport volume by using existing facilities in meeting transport demand.   |
| (Strategy B) | Improving the regional balance for the development of agriculture and industry.  |
| (Strategy C) | Completing transport terminals (stations and depots) in accordance with transport demand.  |
| (Strategy D) | Increasing foreign currency income and completing international transport routes to promote exports and imports.                       |
| (Strategy E) | Introducing innovative transport techniques to increase efficiency and to provide individuals with safe and smooth transport services. |

In Kenya, most of the transport demand originates in the Corridor from Mombasa to Western Kenya via Nairobi. This route is also important as an international one linking East Africa and West Africa; therefore, it is necessary to continue future development here.

On the other hand, transport to remote areas where the population density is low is also important for regional development in Kenya.

The transport techniques for each mode are indicated by a combination of speed, volume, transport cost, construction, operation and other costs. To establish a strategic transport program, the technical characteristics of each mode must be taken into consideration.

For the Corridor, the following are important:

- 1) Improving and expanding the existing transport capacity of railways and roads,
- 2) Improving and expanding the handling capacity of terminals in Mombasa and inland urban centers, and
- 3) Extending pipelines to Western Kenya.

For remote areas, the following are important:

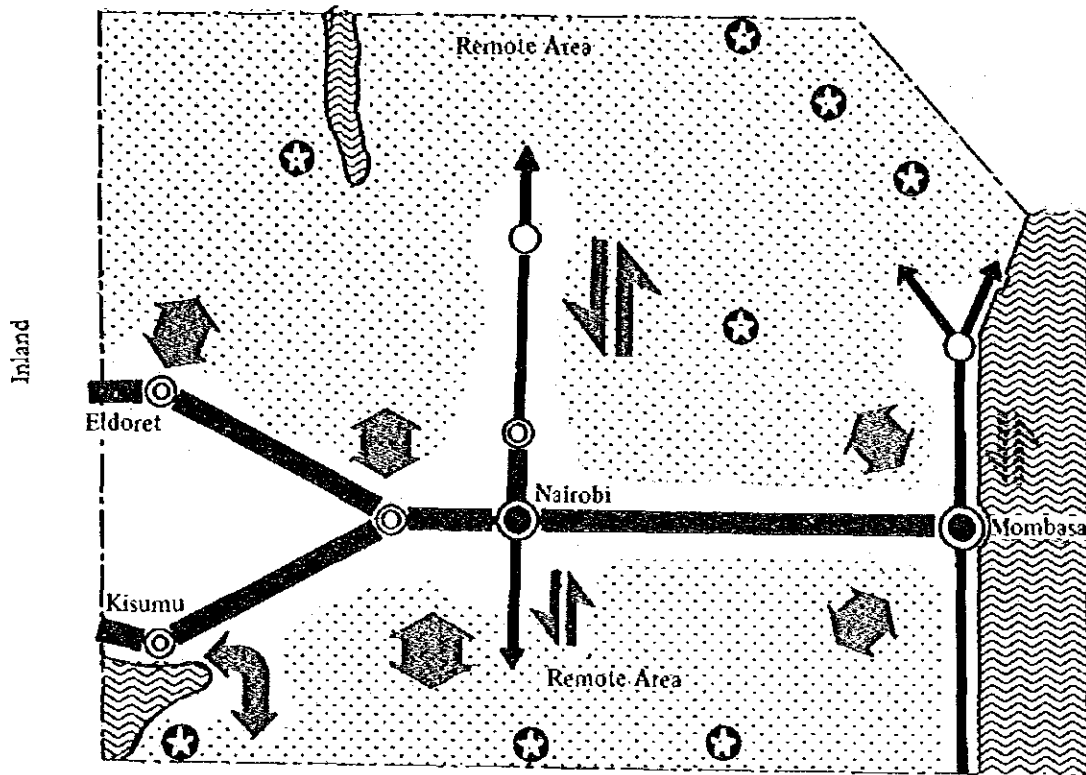
- 1) Completing all-weather roads, and
- 2) Using small aircraft for air transport services.

In order to increase foreign currency income, the following are important:

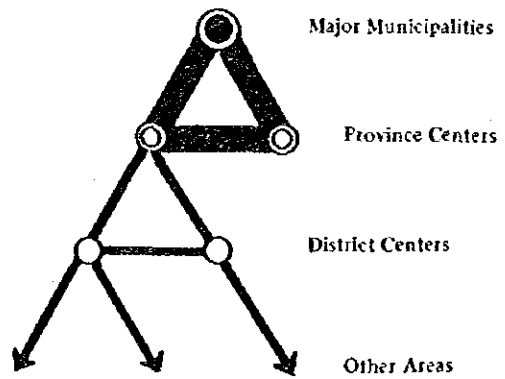
- 1) Increase in Kenya Airways international flights and improvement of routes which connect tourist spots.
- 2) A national flag carrier for the marine transport sector, and
- 3) Development of industrial areas and a free-trade zone in the South Mainland.

To introduce up-to-date techniques, the following are important:

- 1) Establishing a container transport system which harmonizes with harbours, railways, and roads; and
- 2) Improving the air traffic control system, seat booking system, etc.



LEGEND	
Ist Order Centers	●
Secondary Order Centers	○
District Centers	○
Trunk Connector	▬
Primary Connector	▬
Other Feeders	▬







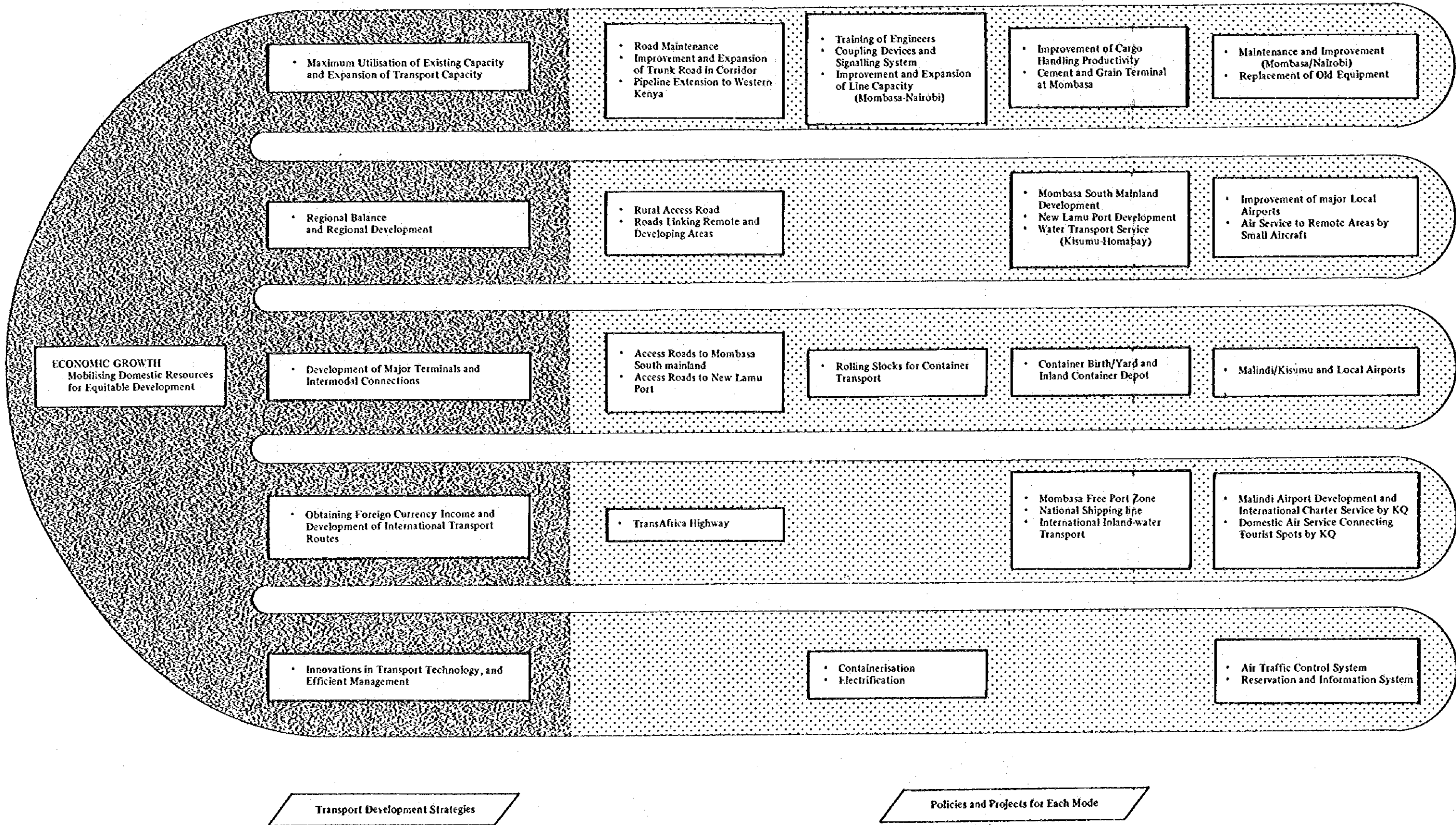
Transport Development Strategy

Road/Pipeline

Rail

Port/Water Transport

Air Transport







## **7.2 Railway**

### **7.2.1 Present Condition and the Issues**

#### **(1) Present Condition**

Since the independence, the most significant achievement of Kenya Railways has been the gradual change from motive power to diesel engines.

Kenya Railways has the following characteristics:

- 1) Transport is mainly for cargo.
- 2) The average annual transport distance per piece or person is long (500 km for cargo and 300 km for passengers)
- 3) On the trunk line between Nairobi and Mombasa, the cargo volume going uphill is larger than that for downhill.
- 4) The trend of cargo-transport between roads and railways, shows that the railways share has decreased as a result of competition with road transport.
- 5) Since changing to diesel engines, petroleum price and personnel expenses have increased, resulting in a worsening financial state.

#### **(2) Capacity Utilisation of Existing Facilities**

For greatest transport capacity using the existing railway facilities and personnel, the following improvements are necessary:

- 1) The existing line facilities will not be able to transport the expected increased future demand without modification. The cargo volume between stations from Mombasa to Nairobi is particularly unbalanced, and it is necessary to facilitate the passing of longer trains, by constructing by-pass tracks and by-pass stations.
- 2) The cargo yards at Mombasa and Changamwe are already at the limit of their cargo-handling capacity. Yard capacity must be expanded for smooth handling of the peak volume during the weeks or months when the harbour cargo increases sharply.
- 3) Capacities of locomotives and rolling stocks are sufficient to respond to the transport demand.
- 4) The number of officials in the head office and branch offices is large compared with that of operation employees. The number of personnel for train and traffic operation of the yards is insufficient.

### **(3) Fares and Rates**

To improve the present earnings/expenditure balance according to the principle of full cost recovery, an increase in fares and rates is necessary on a real time basis. According to the traffic analysis, such an increase of about 50% may be necessary once every three years.

### **(4) Training**

Of greatest importance is providing well-trained engineers with the ability to design locomotives, rolling stocks, station and yard facilities, and the know-how to place an order with a contractor for such equipment. With the standardisation of Kenya Railways through training, utilisation of the existing facilities may be maximised.

## **7.2.2 Basic Policies**

It is desirable to divide the transport program of Kenya Railways into three stages: (1) fundamental improvement, (2) expansion of transport capacity and (3) modernisation of the transport system. These stages must be carried out consecutively in accord with the investment program. The following projects are involved:

### **(1) Fundamental Improvements**

- 1) Standardisation by staff training
- 2) Improvement of coupling devices
- 3) Improvement of signalling and communication systems

### **(2) Expanding Transport Capacity between Mombasa and Nairobi**

- 1) Improvement of existing line capacity
- 2) Expanding transport capacity

### **(3) Modernisation of Transport System**

- 1) Containerisation
- 2) Railway electrification

Improvement of the present imbalance in line capacity and rolling stocks can achieve 1.5 times the present transport capacity when by-pass facilities are completed. The projected demand indicates the necessity of increasing transport capacity by 1.5 times by 1990.

**Line Capacity and Number of Operating Trains:  
Mombasa-Nairobi Section**

	miles	TD	IG	0	10	20	30	40	50
Mombasa	-	17	23*						
Changam									
Changam-W	-	6	5						
Miretini	4	6	7						
Mazeras	6	22	23*						
Mariakani	9	26	27*						
Majiya	8	22	23*						
Manjewa	4	17	18						
Samburu	9	12	12						
Mwembeni	6	14	14						
Taru	11	15	15						
Mackinon	8	20	21*						
Mwanatibu	6	12	16						
Bechuma	5	12	13						
Wangla	4	11	12						
Maungu	6	12	13						
Ndara	7	13	15						
	10	23	24*						
Voi									
Irima	4	13	14						
Ndi	8	15	16						
Mboloto	10	17	10						
Tsavo	7	17	18						
Kyuhu	6	21	22*						
Kenani	7	16	17						
Kanga	8	18	19						
Mtito	8	19	20						
Kathekani	5	15	16						
Darajani	4	13	14						
Ngwata	7	22	23*						
Masongaleni	3	10	11						
Kikumbu	5	13	14						
Kibwezi	6	17	18						
Mbuluzau	6	15	16						
	7	14	15						
Makindu									
Ikoyo	4	9	10						
Kiboko	6	15	16						
Simba	8	20	21*						
Kivati	4	9	10						
Emali	6	18	19						
Sultanham	8	18	19						
Kima	9	20	21*						
Kalenbwani	5	16	17						
Kiu	3	13	15						
Ulu	8	26	28*						
	8	21	24*						
Konsa									
Kapiti plain	6	16	16						
Stony Athi	13	11	12						
Lukenya	6	14	15						
Athiriver	7	17	18						
Marimbeti	3	10	11						
Embakasi	6	18	19						
Makadara	4	14	15						
Nairobi E.J	2	8	8						
Nairobi	-	4	10						

Operating Number  
Track Capacity

TD: Driving time between stations by passenger 87 Class Locomotive ( 660 tons)  
 IG: Driving time between stations by goods 87 Class Locomotive (1220 tons)  
 \* : Section necessary to improve line capacity

### 7.2.3 Project Evaluation

Evaluation of the individual projects by comparing investment costs with internal benefit reveals that improvement of existing line capacity, improvement of signalling and coupling devices, containerisation, and standardisation by staff training are recommendable investments.

The construction of a railway from Mombasa to the south mainland is essential for industrial development.

Since the investment for Kenya Railways to accomplish electrification and expand capacity to 250% of the present transport volume may be extremely large, a review should be made as to whether this is carried out as a national project.

### 7.2.4 Short/Long Term Investment Plans

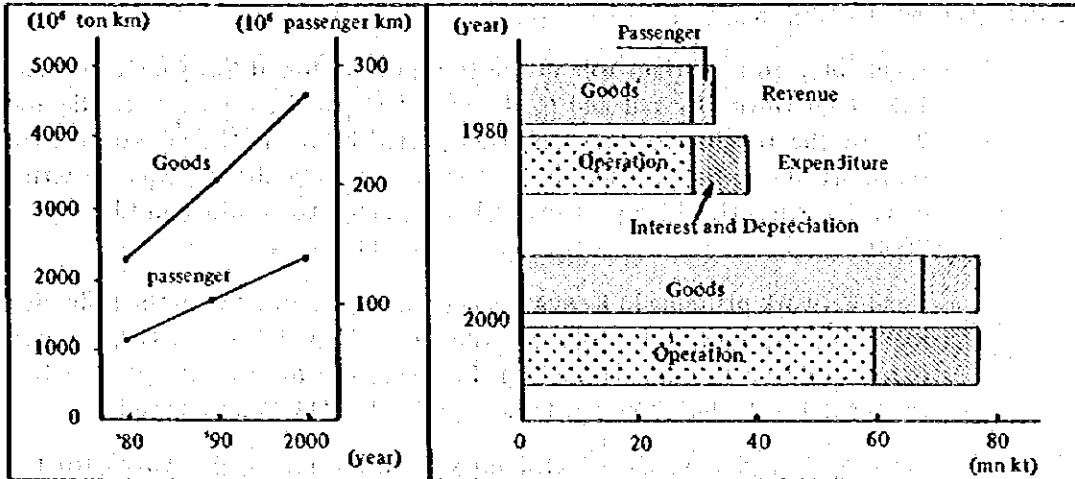
The short/long term investment plans are shown in the table.

#### Project and Required Funds: Railways

(K£ million at 1983 price)

Project	Period	Short Range (1984-1988)	Medium Range (1989-1993)	Long Range (1994-2000)	Total (1984-2000)
Standardisation	1985-1994	4.75	5.95	1.2	11.9
Coupling device	1984-1986	11.80	-	-	11.8
Replacement of PCC ties	1987-1993	11.80	39.45	-	51.25
Electrical token system	1992-1998	-	3.95	13.15	17.10
Improvement of existing line capacity	1984-1990	18.80	7.50	-	26.30
Expansion of transport capacity	1996-2000	-	-	340.80	340.80
Mombasa Port railway construction	1984-1986	(4.10)	(4.10)	-	(8.20)
Container terminal	1989-1997	-	(9.30)	(9.30)	(18.60)
Electrification	1991-2000	-	37.50	125.00	162.50
<b>Total</b>		<b>(51.25)</b> 47.15	<b>(107.75)</b> 94.35	<b>(489.45)</b> 480.15	<b>(648.45)</b> 621.65

### Traffic Demand and Revenue/Expenditure



\* It is assumed that the tariff will increase 15 percent per year in current price.

### Project Evaluation

Projects	Evaluation (million Ksh)		Efficiency			
	① Investment Cost	② Internal Benefit	① / ②			
			1	2	3	4
Standardisation	2.38	1.85	0.78			
Strengthening of track (replacement of PCC ties)	10.25	3.30	0.32			
Improvement of coupling device	2.36	2.00	0.85			
Improvement of signalling (electronic token)	3.42	2.93	0.86			
Improvement of Existing line capacity	5.26	9.55	1.82			
Expansion of transport capacity	68.16	15.16	0.22			
Electrification	32.50	12.77	0.39			
Containerisation	3.72	2.79	0.75			
Line construction at Mombasa south mainland	1.64	0.77	0.47			

## **7.3 Road/Road Transport**

### **7.3.1 Current Condition**

Roads play an important role in the transport sector of Kenya. Of the total 1983 land traffic by rail and road, about 95% of the passenger traffic and 73% of the freight (tonnes) were transported by road. The growth in road transport during the last decade has been recorded as about 5% p.a. in terms of vehicle/km. This high growth level is expected to continue until the year 2000.

Road network planning in Kenya has been well structured with the following road classifications: International Trunk (A), National Trunk (B), Primary (C), Secondary (D) and Minor (E). In 1982, the total length of classified roads totalled 52,940.7 km; of these, 5,921.2 km (11%) were paved.

Class A, B, and C roads, which jointly form the principal network for the development of international and domestic exchange in Kenya, have been extensively developed during the last decade. They now total a length of 13,867.3 km, 36% of which has been paved.

### **7.3.2 Current Issues**

Current issues regarding roads and road transport are as follows:

- (1) The percentage of the recurrent and development allocation in the road transport sector of the total government allocation has been reduced in recent years. Since paved road length has increased, it may be advisable to increase the budget for road maintenance.
- (2) There are many sections of principal trunk roads whose surfaces are seriously damaged and which require overlay to meet the increasing traffic they bear.
- (3) The development of minor roads has been delayed even in highly populated areas.
- (4) The use of aged vehicles and the lack of a sufficient number of vehicles have resulted in inefficient road transport and are thus holding down Kenya's economy.
- (5) Matatu is a mode of transport which greatly influences the national economy. However, some control is necessary in order to assure safety and efficient management.
- (6) Adequate data required to formulate a national transport plan has not yet been collected. A standardised nationwide traffic census including an OD traffic survey should be carried out.

### 7.3.3 Road Traffic Demand

The number of passengers transported by road per day in 1983 was 107,000. By 2000, this number will increase to a little less than double that figure – to 199,000 per day, raising passenger vehicular traffic from 12,000 veh./day in 1983 to 22,000 veh./day in 2000.

Freight road traffic in the year 2000 will become 2.37 times that of 1983. Correspondingly, freight vehicle traffic will increase to 31,000 vehicle/day in 2000 from 13,000 vehicle/day in 1983.

	1983	1988	2000
<b>Traffic Volume</b>			
Passengers/day	107,331	129,046 (3.8) <sup>1)</sup>	199,110 (3.7) <sup>2)</sup>
Freight '000 tonnes/year	12,030	15,484 (5.2)	28,552 (5.3)
<b>Vehicle Traffic</b>			
Passenger vehicle/day Scenario A <sup>3)</sup>	11,985	14,413 (3.8)	22,238 (3.7)
Freight vehicle/day Scenario B <sup>4)</sup>	13,136	16,908 (5.2)	31,177 (5.3)
Freight vehicle/day	13,136	16,908 (5.2)	34,135 (6.0)

Note: 1) Annual growth rate 1983–1988 (%)

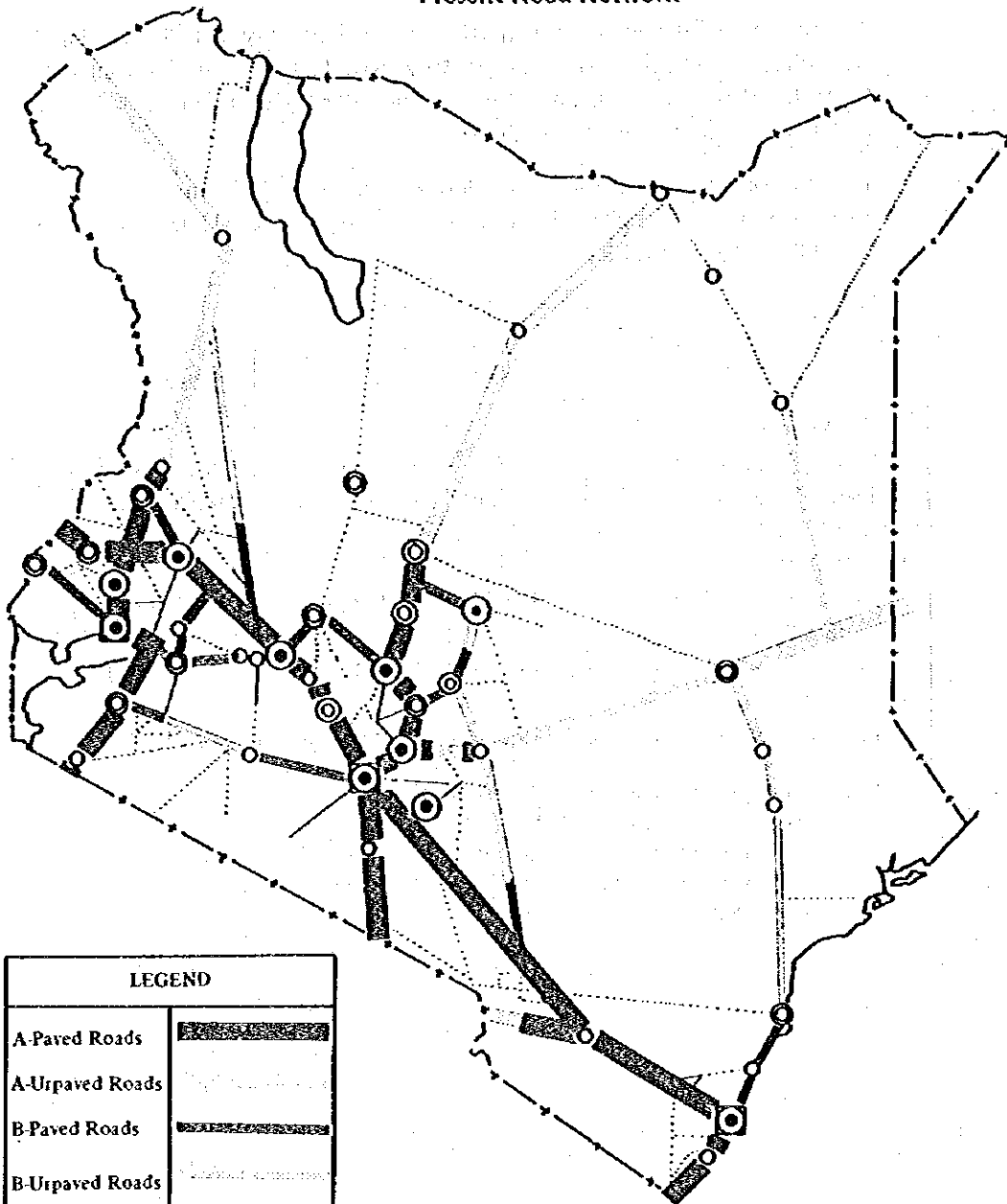
2) Annual growth rate 1988–2000 (%)

3) In which rail transport capacity will be increased to meet the demand.

4) In which rail transport capacity will be limited to 1.5 times present capacity.



### Present Road Network



LEGEND	
A-Paved Roads	
A-Urpaved Roads	
B-Paved Roads	
B-Urpaved Roads	
C-Paved Roads	
C-Urpaved Roads	

### 7.3.4 Principal Policies

The following policies have been considered in formulating a road development plan.

- (1) Roads linking major urban centers, major terminals, and industrial areas will be upgraded so that they can function as trunk roads.
- (2) At least one primary road will be provided in each agricultural development area.
- (3) High priority will be placed on the development of an international trunk road, especially the Trans-Africa Highway.
- (4) The percentage of paved A, B and C class roads (about 36% at present) will be 52% in the year 2000.

### 7.3.5 Road Transport Plan

Further improvement of the road system is vital for Kenya's development. In order to provide an adequate level of service by the year 2000, K£1,335 million is to be invested in road system developmental projects, including the classified and other roads.

The priority of each project can be evaluated with regard to its degree of importance and urgency. The degree of importance includes the level of traffic demand and indispensability to the region. The degree of urgency, on the other hand, is determined by the demand, severity of pavement damage, and effect on the reduction of running costs. As evaluated by the above criteria, each project is assigned to one of the planning periods: short, medium, or long range.

Besides the development of roads, there are several other issues to be resolved. Road maintenance is important for the support and promotion of road transport operations. Acquisition of funds is another problem. Automobile tax and toll systems may be new sources of such funding. The establishment of a public construction corporation would effect an increase in domestic potential for road construction in terms of manpower and technical ability. The development of rural access roads is another important program.

Improvement of fleet quality and quantity is a relevant issue for the road transport sector. Fleet modernisation would reduce transport costs. In order to avoid a shortage in the freight fleet, acquisition of an additional 1,000 trucks per year is required. In the passenger transport sector, optimal use of different modes, especially bus and matatu, should be studied.

The establishment of a system for collection and analysis of transport data is quite important in developing a transport strategy. A transport study center with a capable and educated staff should be established in the near future.

Special focus should be put on the following points of a road development plan. A great increase in traffic demand is expected on trunk roads, A104, A109 and B1, which constitute the corridor from Mombasa to western

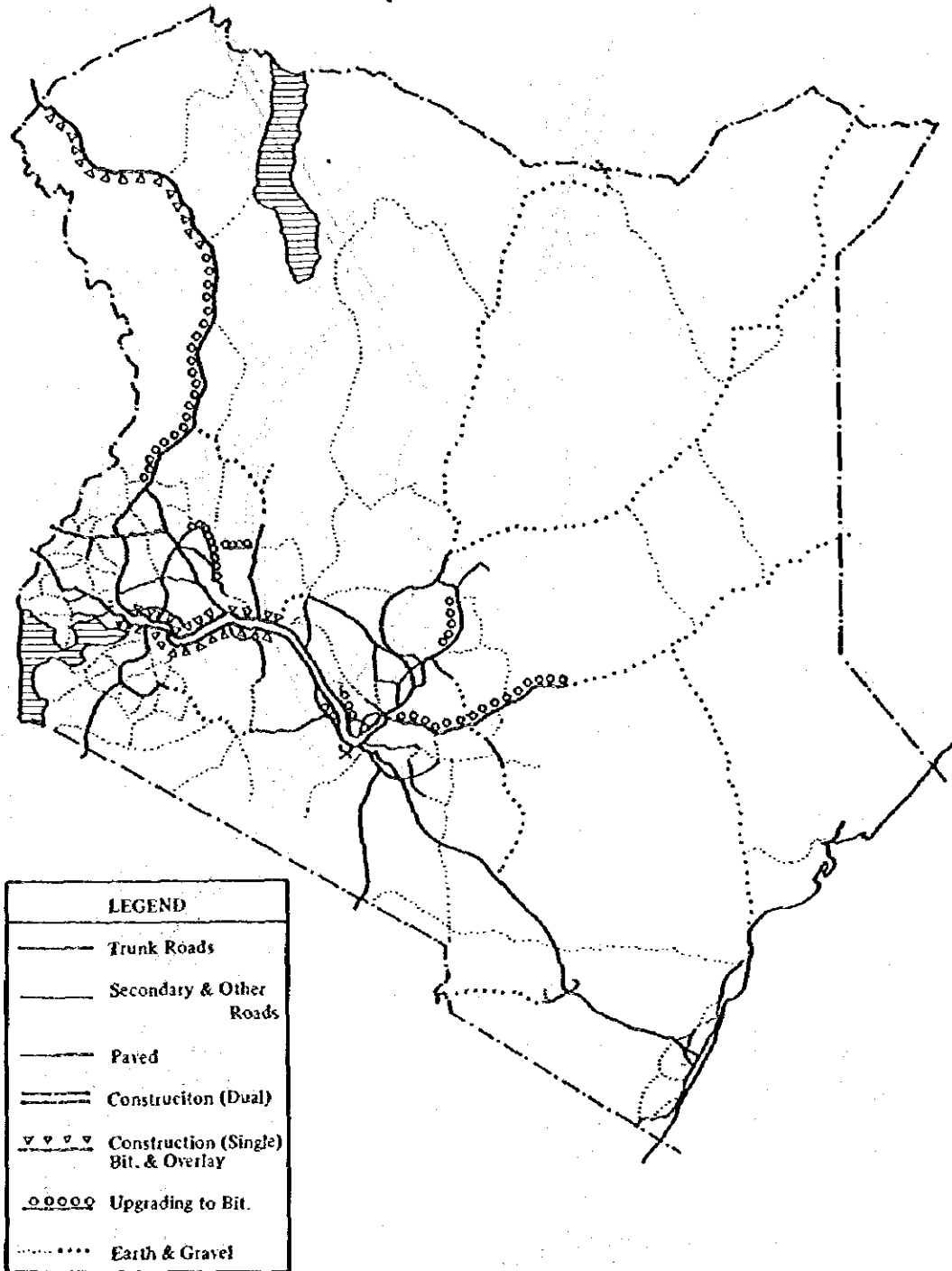
Kenya; these roads are part of the Mombasa-Lagos Trans-Africa Highway. Construction of a dual carriageway for this corridor should be promoted on a long-term basis with continuing investment. The provision of Nairobi-Bypass and Mombasa-Bypass are also important and their construction should begin promptly. The North-South trunk road, A2 and A104 (a part of the Cairo-Gaborone Trans-Africa Highway) should be all-weather roads.

**Total Length of Classified Roads (July 1982)**

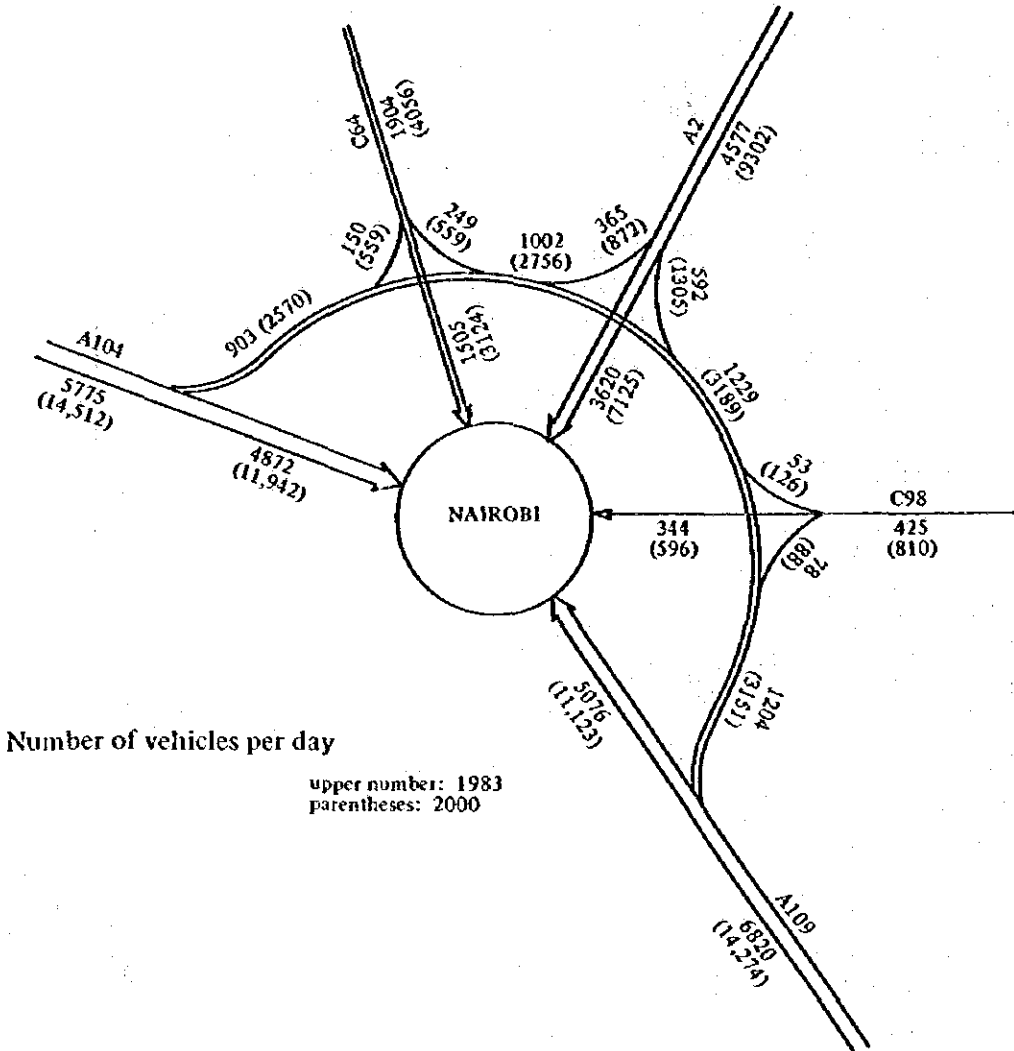
Class Type	Volume	Bitumen				Sub Total	Gravel/Earth			Total
		Over 2,000	2,000 ? 1,001	1,000 ? 501	500 ? 0		Over 300	300 ? 201	200 ? 0	
International Trunk A	362.5	800.4	361.1	662.1	2,186.1	—	—	1,256.4	3,441.6	
National Trunk B	28.8	265.6	337.5	486.5	1,118.4	56.7	176.0	1,403.8	2,754.9	
Primary Trunk C	37.6	185.4	625.7	833.5	1,682.2	142.5	272.5	5,572.3	7,669.8	
Secondary Trunk D	—	36.3	103.5	517.0	656.8	51.2	286.5	10,026.9	11,021.4	
Minor Trunk E	—	—	7.2	236.0	243.3	5.5	14.2	25,480.1	25,743.1	
Subtotal	428.9	1,287.7	1,435.0	2,735.2	5,886.9	255.9	749.2	43,739.5	50,631.6	
Special Purpose Road	—	—	—	34.4	34.4	—	—	2,274.5	2,408.9	
<b>Total</b>	<b>428.9</b>	<b>1,287.7</b>	<b>1,435.0</b>	<b>2,769.6</b>	<b>5,921.2</b>	<b>255.9</b>	<b>749.2</b>	<b>46,014.0</b>	<b>52,940.7</b>	

Source: MOTC maintenance of road allocation, 1982-83.

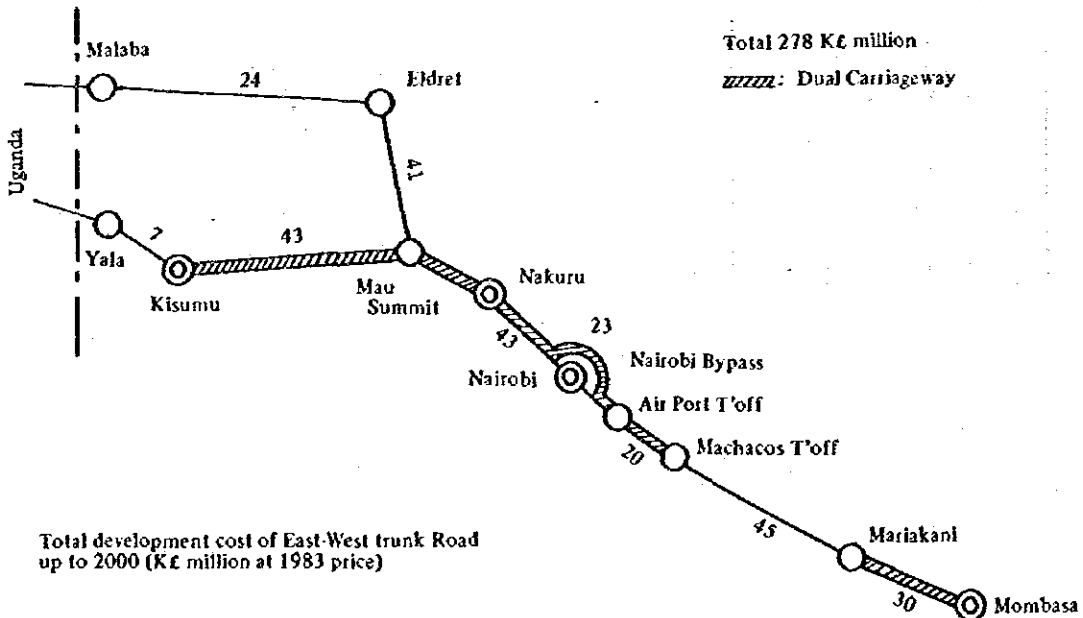
### Projected Road Network in 2000



### Nairobi Bypass: Location and Traffic Demand



### Development Cost



### Development Plan

Surface Type	Project Type	Road Class	Length to be Developed (km)				Cost (K£ million at 1983 price)			
			Short Range (1984-1988)	Medium Range (1989-1993)	Long Range (1994-2000)	Total	Short Range (1984-1988)	Medium Range (1989-1993)	Long Range (1994-2000)	Total
Pavement	Bitumen Overlay & Construction (Single Carriageway)	A	350	514	156.5	1,020.5	48	72	25	145
		B	127	77	80	284	15	9	9	33
		C	80	54	137	271	10	7	17	34
	Upgrading to Bitumen	A	130	33	1,647	1,810	10	2	131	143
		B	161	313	824	1,298	16	32	85	133
		C	227	279	1,638.4	2,144.4	21	25	152	198
	Construction (Dual Carriageway)	A	196	245	217	658	34	42	37	113
		B	68	47	193	308	15	4	19	38
		C	-	-	-	-	-	-	-	-
Other	A	-	-	-	-	2	4	47	53	
	B	42	42	163	247	5	29	9	43	
	C	-	-	299	299	-	-	24	24	
Subtotal	A	676	792	2,020.5	3,488.5	94	120	240	454	
	B	398	479	1,260	2,137	51	74	122	247	
	C	307	333	2,074.4	2,714.4	31	32	193	256	
A, B and C Total			1,381	1,604	5,354.9	8,339.9	176	226	555	957
D and E Total			-	-	-	-	106	106	186	398
Total			-	-	-	-	282	332	741	1,355

## 7.4 Ports

### 7.4.1 Present Situation of Ports

- (1) Along the Kenyan coasts of the Indian Ocean are four ports: Mombasa, Malindi, Lamu, Kilifi and Shimoni. Cargoes handled at Lamu, Kilifi and Shimoni are very small in quantity and almost all are dealt with at Mombasa. The cargoes handled at the Mombasa port are increasing and reached 8,179,000 tons in 1981.
- (2) The main facilities of Mombasa Port are:

General cargo wharf	(-10 m):	2,339 m
Container wharf	(-11 m):	580 m
Cement wharf	(-11 m):	315 m
- (3) The total cargo handling volume at Mombasa Port was about 8.2 million tonnes in 1981. Of this, general cargo accounted for about 1.9 million, dry bulk was 1.5 million, and crude oil was about 4.8 million tonnes.
- (4) Containerised export cargo is increasing rapidly and exports is more than double the import figure. An estimated 50% of the export cargo was sent by this means in 1983, as containerisation is progressing very rapidly.

### 7.4.2 Present Issues

#### (1) Port Facility and Cargo Handling Issues

##### 1) Mombasa Port

- a) The berth occupancy rate at the general cargo wharves was high at 75%, while 25% of all calling vessels waited an average of 3 days to berth. This congestion will be alleviated soon by the increased productivity in handling allowed by the containerisation of general cargo.
- b) The container terminal should be equipped with a container freight station and ancillary facilities, since a number of containers will be collected/delivered by truck.
- c) Development of railway transport capacity is needed to ensure the smooth transportation of containers.
- d) Pavement deterioration in the sheds and on the apron hinders the smooth handling of equipment.

##### 2) Lamu Port

Although Lamu city is highly dependent on sea transport, the port is not well developed.

## (2) Port Management and Operation Issues

Generally, liner ship operators expect the ports to handle 1,000 tonnes of general cargo per ship a day, but the rate in Mombasa is only half of this figure. Additionally, Mombasa port is able to provide container handling service at only 18% of the international standard rate.

### 7.4.3 Port Development Plan

#### (1) Cargo Volume Forecast

The following tables show the cargo volume forecast of Mombasa port by commodity (general, container, and dry bulk cargo) for certain years.

**Cargo Volume Forecast for Mombasa Port**

('000t)

Cargo	1988	1993	2000
General	701	668	936
Container	1,616	2,000	2,809
Dry bulk	1,578	2,590	4,089
Liquid	4,433	5,044	6,224
Total	8,328	10,302	14,058

**Cargo Volume Forecast for Lamu Port**

('000t)

	1988	1993	2000
General cargo	97	168	378



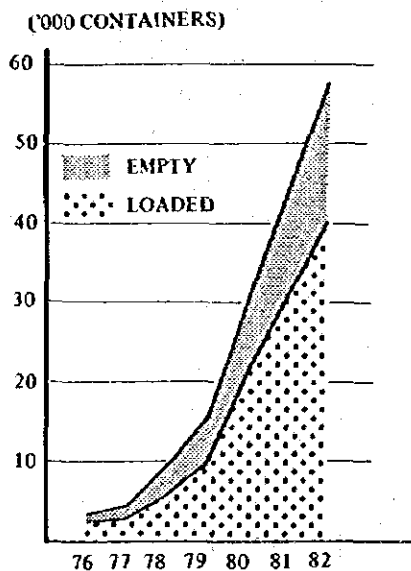
**Port Cargo Handled in Kenya**

(’000t)

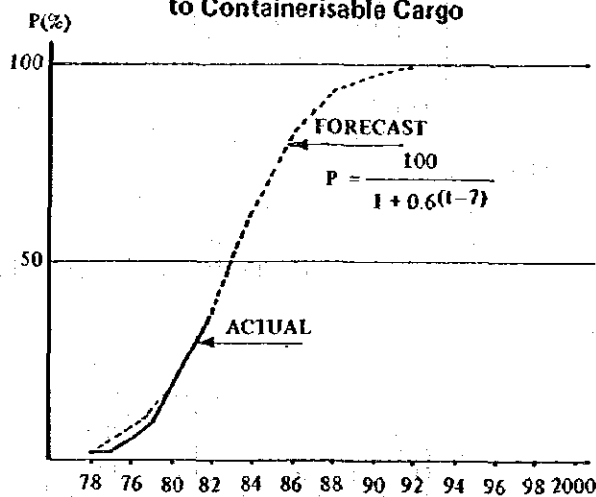
	Mombasa	Lamu	Malindi	Kilifi	Shimoni
1978	6,028	10.0	—	0.2	—
1979	6,006	8.0	1.2	0.0	—
1980	7,432	4.7	4.5	0.0	0.0
1981	8,179	5.8	—	0.3	0.0

Source: KPA “Annual Bulletin of Port Statistics, 1981”

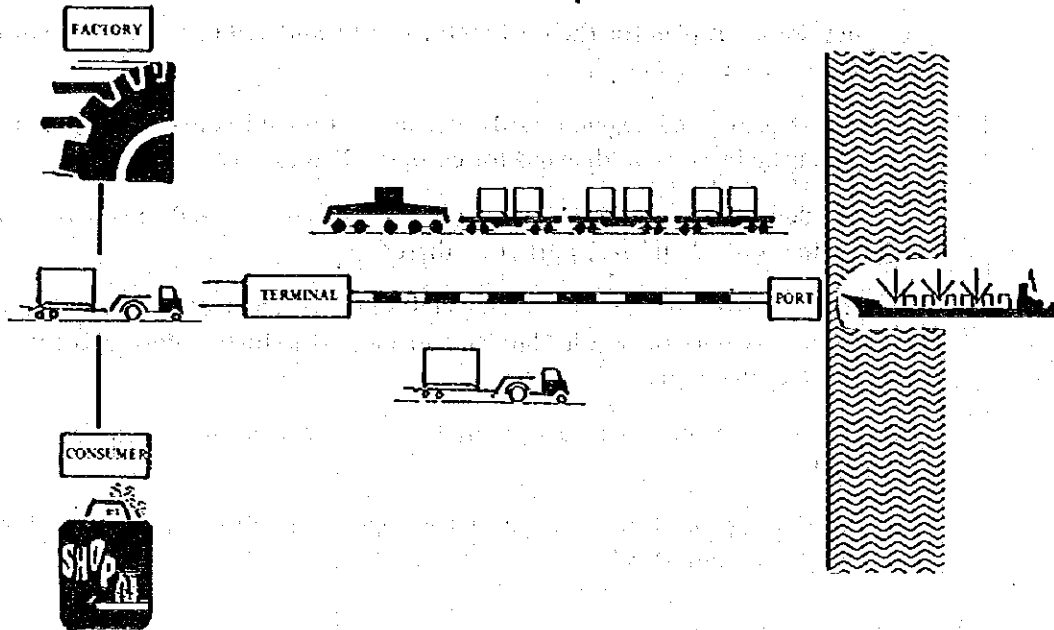
**Number of Containers Handled at Mombasa Port**



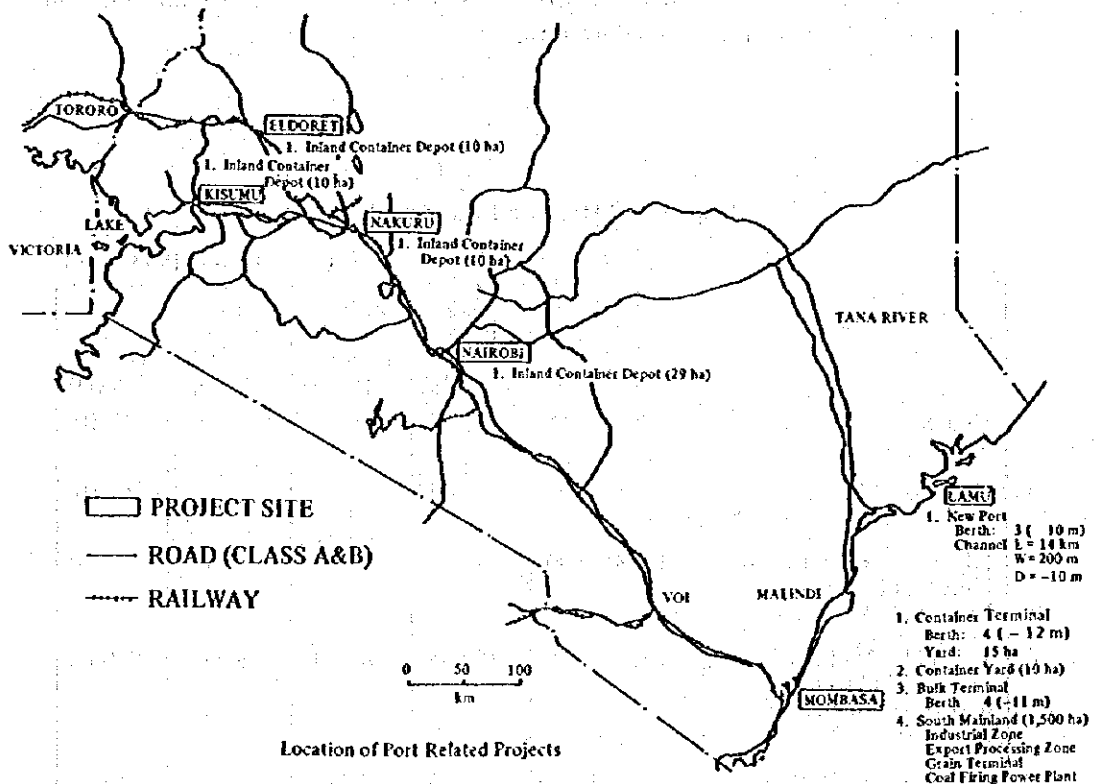
**Ratio of Containerised Cargo to Containerisable Cargo**



### Container Transport



### Location of Port Related Projects



## (2) Port Development Plan

The development plan for the port sector was formulated in accordance with the following strategies:

- 1) To improve and expand yards, berths, and inland container depots to meet the increase in demand for containerised cargo;
- 2) To develop the South Mainland as an industrial area, and to construct a grain terminal and free port zone there;
- 3) To improve and expand roads and railways connecting the existing Mombasa port to South Mainland to support industrial development in the Mombasa area;
- 4) To improve and expand cement terminals to meet increased demand; and
- 5) To develop the New Lamu port to support agricultural development in the Lamu hinterland.

## (3) Investment Plan

The investment plan for the port sector is shown in the table.

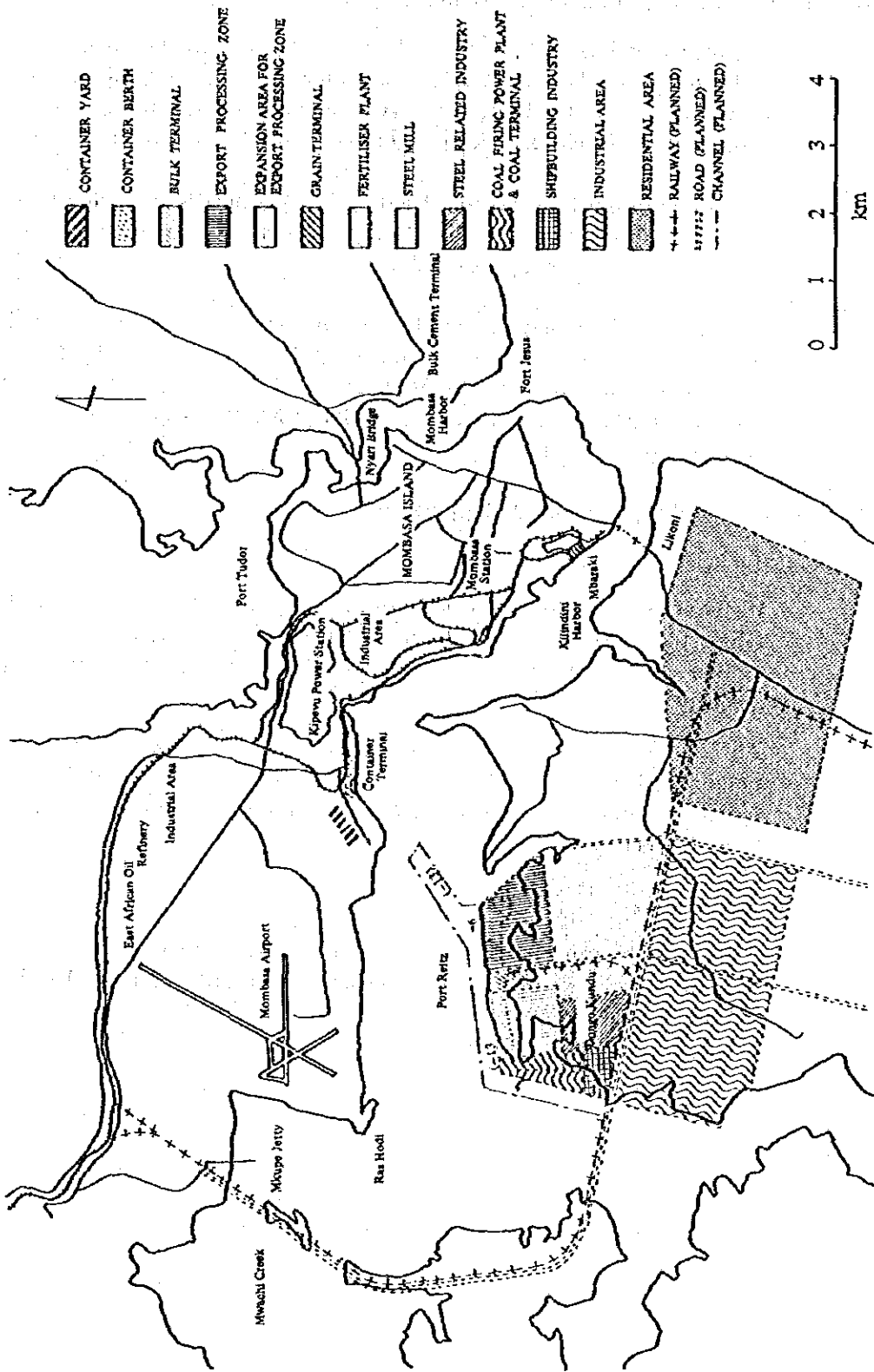
The priority in port investments is based on the demand of cargo handling and the rate of industrial development.

### Project and Required Funds: Ports

(K£ million at 1983 Price)

Project	Period	Short Range (1984-1988)	Medium Range (1989-1993)	Long Range (1994-2000)	Total (1984-2000)
Mombasa Port container berths	1984-1995	20.25	6.75	13.50	40.50
Mombasa Port container yard	1984-1992	7.05	7.05	-	14.10
Inland container depots-Nairobi, Eldoret, Kisumu, Nakuru	1988-2000	4.45	11.30	12.35	28.10
South Mainland development (including free port zone and grain terminal)	1985-1998	102.65	61.90	46.25	210.8
Bulk terminal development	1984-1992	5.05	8.20	-	13.25
Lamu Port New port development	1986-1997	7.35	34.20	7.35	48.90
<b>Total</b>		<b>146.80</b>	<b>129.40</b>	<b>79.45</b>	<b>355.65</b>

# Development of Mombasa Area



## **7.5 Maritime Transport**

### **7.5.1 Present Situation of Maritime Transport**

- (1) Coffee, tea and canned goods are the major items of general cargo exported, and cement in bulk is the biggest item in the bulk dry cargo category. Crude oil remains by far the biggest import item, and fertiliser, iron and steel, and manufactured articles are the main items of general cargo imported.
- (2) According to our investigation, UK/Continent countries are taking 40.2% of the total exports from Mombasa, and these same countries furnish 51% of the total imports to Kenya, excluding oil.
- (3) Containerisation is developing throughout the world at surprisingly high speed and Kenya cannot remain outside this worldwide trend. Moreover, most of the cargo to and from Mombasa can be containerised and this will continue to grow every year to the maximum handling capacity of Mombasa port and inland depots.

### **7.5.2 Validity of Kenyan National Shipping Line**

#### **(1) Tanker**

If the Company purchases and continuously operates one 80,000 TDW tanker for Gulf/Mombasa trade, the total shipping volume will be about 1.4 million tonnes, which corresponds to about 40% of the total import quantity.

An 80,000 TDW tanker about 5 years old purchased at a price of US\$10 million and which is to be time-chartered to major oil companies, would require a minimum monthly charter rate of US\$296,000 (for a ten year time-charter).

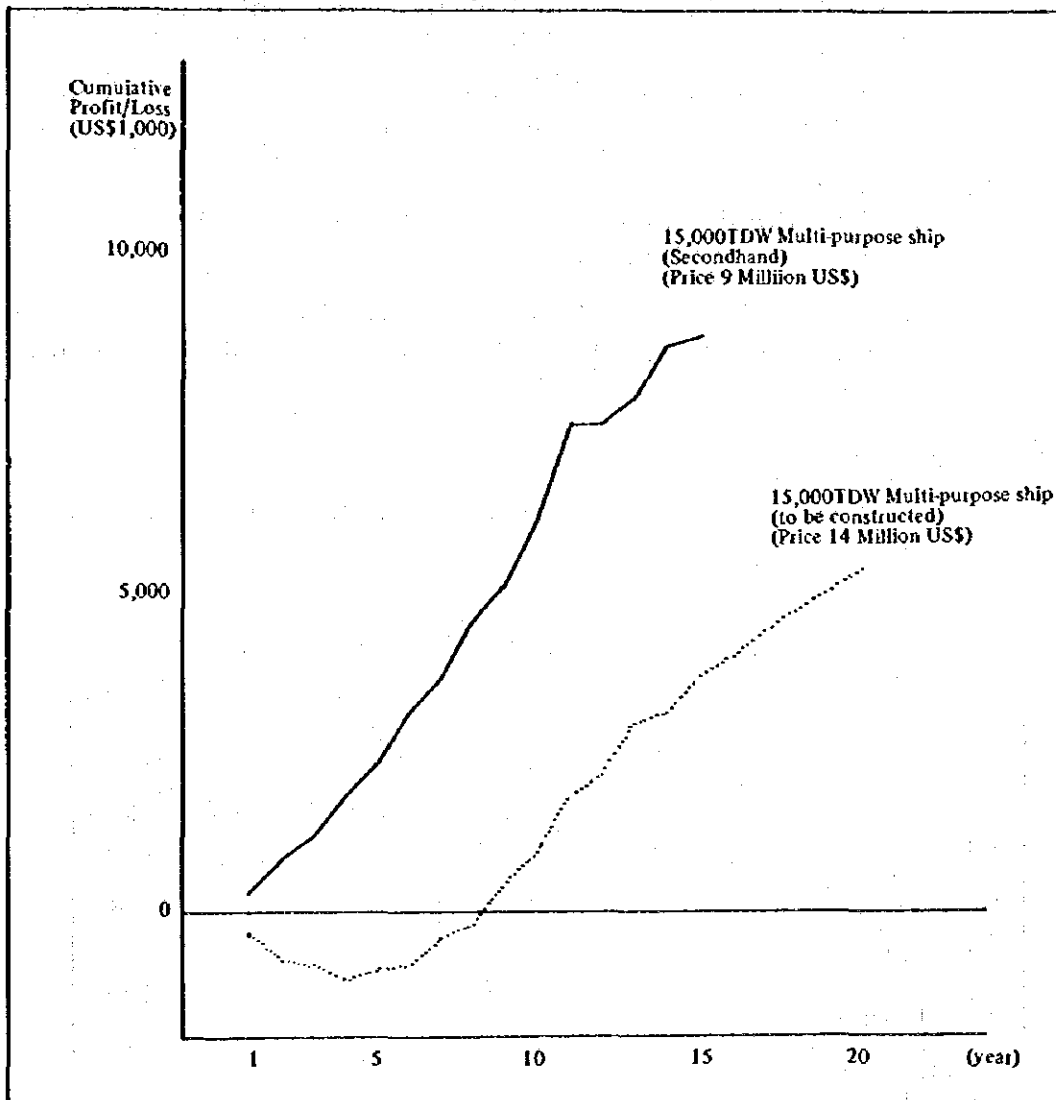
#### **(2) Bulk Carriers**

Cargoes which can be carried on bulk carriers at present are cement and soda ash. However, the quantity of these materials is still too limited to justify having such carriers.

### Area Statistics

		Average M/T per year	Average R/T per year	40% of R/T per year	40% of R/T per month
East Africa/ U.K. - N.W. Continent	Export	369,000	516,600	206,640	17,220
	Import	681,000	1,157,700	463,080	38,590
East Africa/ U.S.A.-Canada	Export	39,000	54,600	21,840	1,820
	Import	103,000	175,100	70,000	5,800
East Africa/ Japan	Export	Figures not available			
	Import	208,000	353,600	141,440	11,790

### Project Evaluation



### (3) Liner Vessels

It is apparent that if the Kenyan National Shipping Line can secure 40% of the total quantity carried to and from each area, the East Africa/Europe trade is best suited for liner trade. In order to commence regular monthly service to UK/Cont., three vessels will be needed. If the company purchases 15,000 TDW multipurpose ships about 5 years old at a price of US\$9,000,000 per vessel, the profit/loss will be as shown in the figure on page 72. Based on a net price of US\$3,072,000 per vessel per year, a profit of US\$2,260,000 for the first five years and US\$46,090,000 for a ten year period could be expected.

#### 7.5.3 Plan for Maritime Transport

The plan for maritime transport was drafted in accordance with the following strategies on the assumption that international maritime cargo transport by a national flag carrier is important as a policy of Kenya.

- (1) For maritime shipping, one tanker between the Middle East and Kenya and 3 multipurpose ships on the European sea route should be activated.
- (2) An analysis of the profitability of maritime transport in these regions shows that the project will pay off in the long term. Initial investments in used ships would be most appropriate.
- (3) In the medium or long term, maritime shipping service using container ships should be studied to meet the increased demand for containerised shipping.

#### 7.5.4 Investment Plan

The investment plan for maritime transport sector is shown in the following table.

##### Project and Required Funds: Maritime Transport

(K£ million at 1983 Price)

Project	Period	Short Range (1984 – 1988)	Medium Range (1989 – 1993)	Long Range (1994 – 2000)	Total (1984 – 2000)
Purchase of secondhand tanker (1 vessel)	1985	6.30	–	–	6.30
Purchase of secondhand multi-purpose vessels (3 vessels)	1985	17.05	–	–	17.05
Capital fund to establish national shipping line	1984	2.50	–	–	2.50
Construction of full-container vessel (1 vessel)	1989 – 1993	–	22.75	–	22.75
<b>Total</b>		<b>25.85</b>	<b>22.75</b>	<b>–</b>	<b>48.60</b>

## **7.6 Inland Waterway Transport**

### **7.6.1 Present Situation of Inland Waterway Transport**

- (1) Two large passenger boats and a wagon ferry, which were operated in the glorious age of International Lake Transport, are moored at Kisumu port but, unfortunately, have not been in operation in Kenyan waters because of the lack of facilities at local lake ports.

The fleet in operation at present is:

3 passenger boats,  
2 tugboats, and  
9 lighters.

- (2) The center of the Lake Transport is Kisumu, which is located at the north-east end of the Winam Gulf. When the trunk railway line from Nairobi is directly connected with the Lake Transport, most passengers and cargo to/from local lake ports will transfer to the railway.
- (3) Recent major commodities shipped through Lake Victoria are sisal, dried fish and cottonseed. The total volume has fallen to less than 10% that at the country's most prosperous period.

In the near future when the road from Rongo to Homa Bay is completed, it is expected that cereals will again be transported to the lake as will Sony (South Nyanza) sugar.

### **7.6.2 Plan for Inland Waterway Transport**

- (1) Reduction of mass transport costs is most desirable to benefit the national economy, and to achieve this it is essential that bulk and lot commodities be returned to the lake.

The fundamental policy on selection of projects is contingent upon how to effectively reinforce the capacity of the Lake Transport so that customers may enjoy better service.



Particulars of Ships and Boats

Name of ship/boat	Commissioned	Length (Ft.)	Width (Ft.)	Draft (Ft.)	HP	Speed (Knot)	Capacity		Remarks
							Passengers	Cargo (tonnes)	
<u>Passenger Boats</u>									
M. V. Reli	1947	98	18	7	360	9	136	-	Engine and generator replaced in March, 1983
M. V. Alestes	1957	85	20	4	380 (190x2)	9	200	20	Engine and generator replaced in April, 1983
M. V. Kamongo	1977	107.5	23	3	150 ( 75x2)	6	232	7	
(M. V. Tlapia)	(1983)	75	18	3.5					(Main engine removed in 1975)
<u>Tugboats</u>									
S. S. Kavirondo	1912	100	21	7	400	Bare 9 Tow 4.5	120 tonne lighter x 6		
M. V. Homa	1937	85	16	4	300 (150x2)		120 tonne x 1 or 65 tonne x 2		
<u>Lighters</u>									
(9)	~ 1937						120 tonne x 6 65 tonne x 3		
<u>Moored at Kisumu</u>									
M. V. Uhuru (Wagon Ferry)	1967	301	54	14	2,800	13	Rail Wagon 42 Units (1005 tonne)		1,200 gross tonnes
S. S. Nyanza	1907	220	35	10.2			No. 1 Hatch 19,824 c.ft. No. 2 Hatch 18,646 c.ft.		754 G/T
S. S. Usoga	(Tanzanian Registration)								

(2) The effective utilisation of existing ships is the most important task.

- 1) The wagon ferry (M.V. Uhuru) should be allocated for cargo transport service in the coastal areas of Lake Victoria. This service is particularly important between Homa Bay and Kisumu.
- 2) The engine power of the existing passenger and tugboats should be increased to allow faster speed.
- 3) The Uganda economy is now showing signs of recovery, and the opening of Kenya/Tanzania border is good news for the business in Kenya. The international water transport by a new passenger boat will contribute the promotion of greater cooperation among the East African countries.

### 7.6.3 Investment Plan

The Investment Plan for Inland Waterway Transport is shown in the table below.

#### Project and Required Funds: Inland Waterway Transport

(K£ million at 1983 Price)

Project	Period	Short Range (1984 – 1988)	Medium Range (1989 – 1993)	Long Range (1994 – 2000)	Total (1984 – 2000)
Reinforcement of passenger boats (M.V. Kamongo, and M.V. Tilapia)	1984	–	–	–	–
Reinforcement of tugboats (S.S. Kavirondo and M.V. Homa)	1984	0.3	–	–	0.3
Reinforcement of lighters (9 lighters)	1984	0.12	–	–	0.12
Revival of wagon ferry (installation of ramp and railcar loading facility at Homa Bay)	1985 – 1986	3.80	–	–	3.80
New passenger boat (International Transport)	1985 – 1988	4.93	–	–	4.93
<b>Total</b>		<b>9.15</b>	<b>–</b>	<b>–</b>	<b>9.15</b>

## **7.7 Civil Aviation**

### **7.7.1 Existing Airports**

Kenyan civil aerodromes include 159 "Government aerodromes" and more than 300 unlicensed aerodromes which are owned by the Government or private authorities. The A.I.P. (Aeronautical Information Publication) issued by the Directorate of Civil Aviation classifies 113 of these:

- Category A – Those aerodromes inspected at least once a day (6)
- Category B – Those inspected at least once a week (20)
- Category C – Those for which no inspection report has been received (87)

Among the large number of aerodromes, only the five of JKIA, MIA, Malindi, Kisumu, and Wilson are identified as having facilities which presently meet all or part of the operating requirements for aircraft and passengers.

Reduction in the total number of fields by coordination of many of those now in close proximity would result in the elimination of capital investment duplication and the wasteful overlapping of areas served.

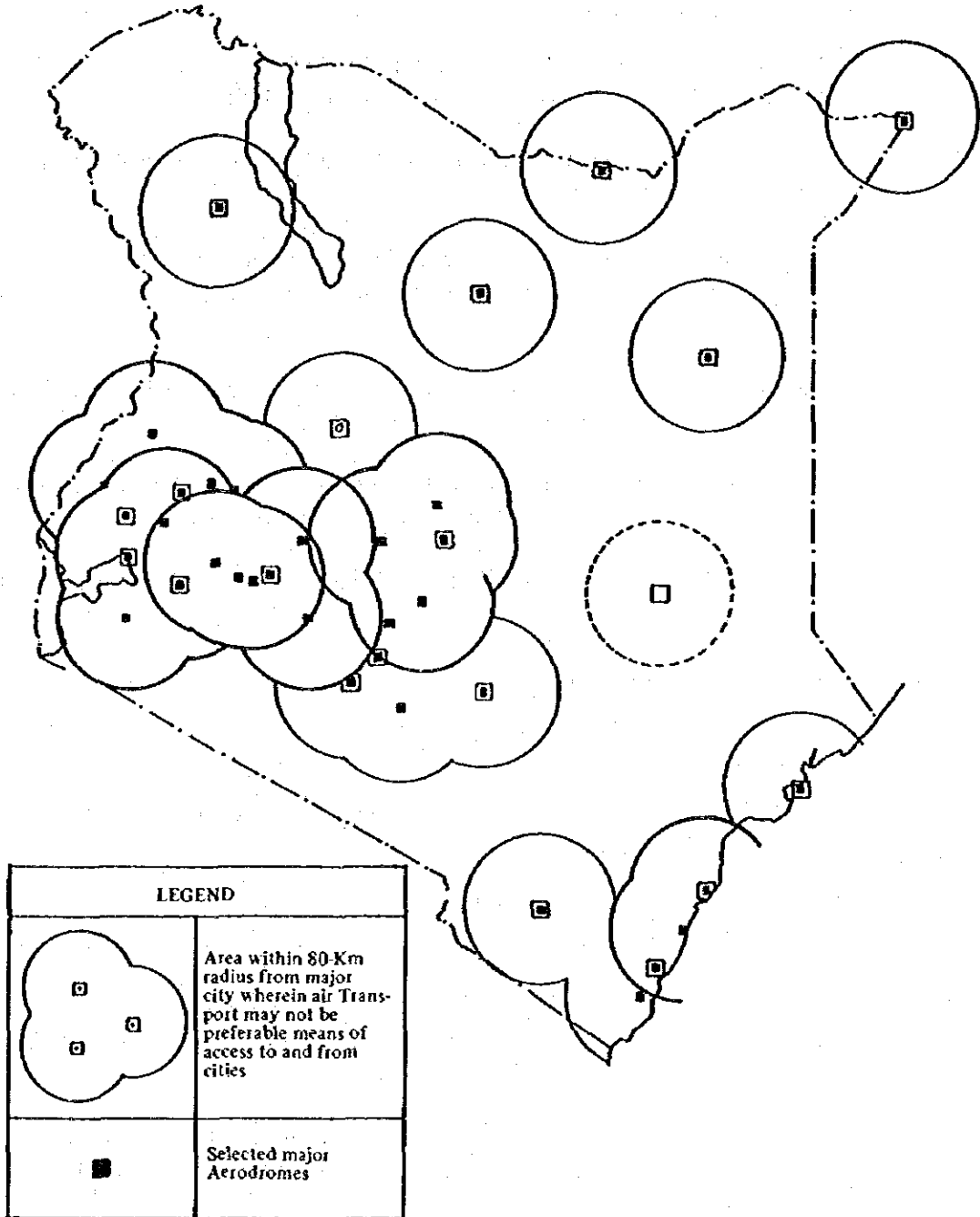
### **7.7.2 Basic Policy for Development**

The development plan of airports and air navigation facilities was formulated in accordance with the following policies:

- (1) to develop airports and air control systems meeting ICAO and national requirements, and future traffic demand;
- (2) to support the development of tourism and contribute to the foreign currency income; and
- (3) to provide air transport service to remote areas, and accelerate the popularisation of such service between major urban centers.

The replacement and rehabilitation of existing facilities and equipment are the most important tasks for the short range plan.

### Overlapping of Existing Airports Service Area



Note; Each service area is defined as that within 80km of an airport, which is selected for a city with a population of more than 3,000.

### **7.7.3 Major Projects and Investment**

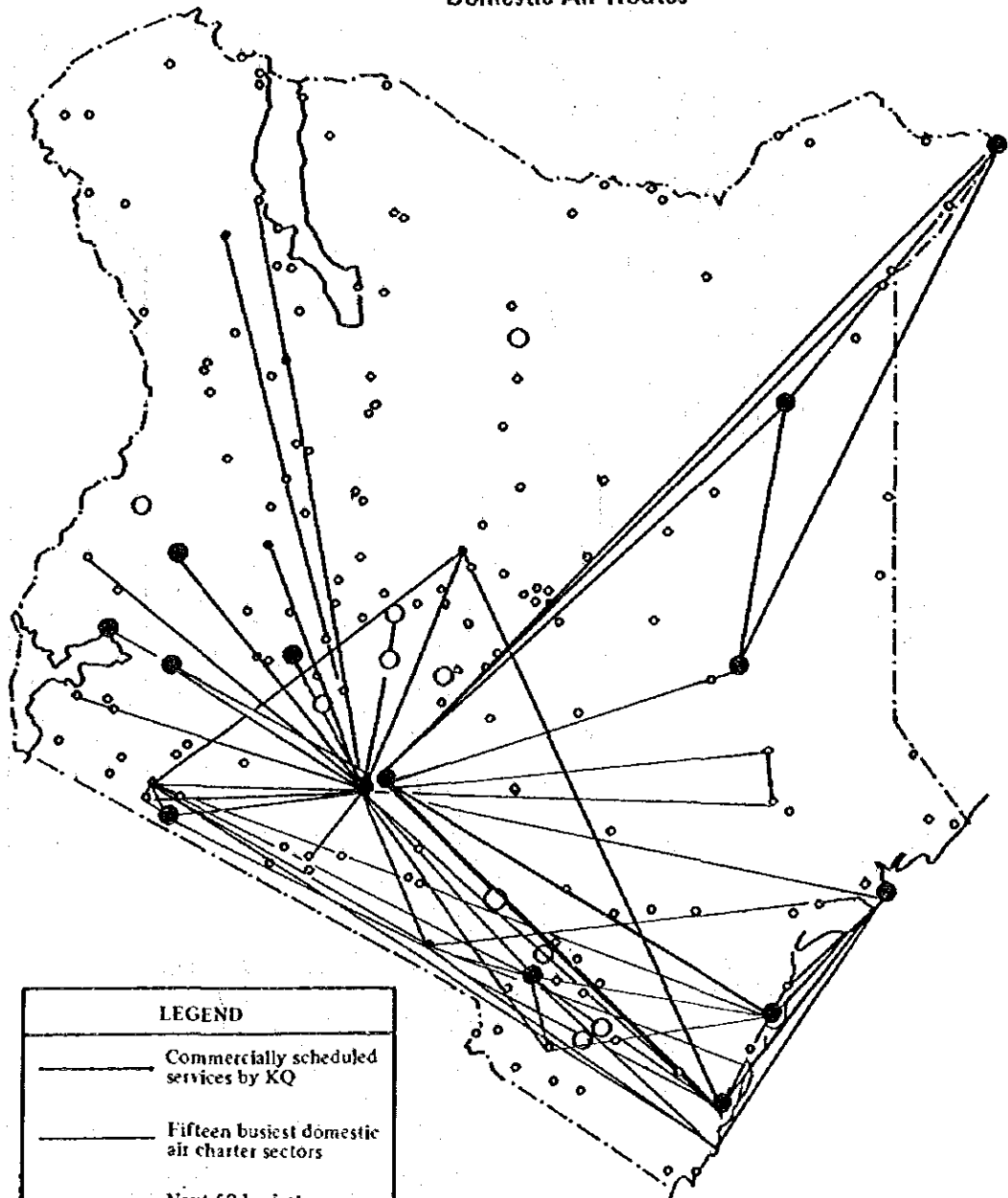
- (1) Improvement of facilities at JKIA and MIA.  
(JKIA-TWY extension, apron expansion, TML-building, etc.)  
(MIA-Pax. TML apron expansion, freight terminal building, etc.)
- (2) Improvement of basic facilities at Malindi and Kisumu airports for the use of middle-class jet aircraft.
- (3) Replacement and provision of air navigation facilities to meet the level of performance consistent with the ICAO and national requirements for safety and efficiency.
- (4) Improvement of basic facilities of major local airports with considerable passenger traffic for use by F-27 class aircraft.
- (5) Improvement of navigational aid facilities at Kisumu, Malindi and Wilson airports for night operation. Improvement of lighting facilities in JKIA.
- (6) Development of a training school for aerodrome operation and air traffic services.


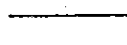
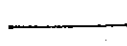




### **7.7.4 Administrative Recommendations**

The following changes or projects are proposed to achieve efficient administration:

- (1) A study on the feasibility of introducing a special purpose account system for airport development;
- (2) Clarification of the rights and duties of a registered owner and operator of an aerodrome and its facilities;
- (3) Improvement and strengthening of administrative responsibility at each field and separation of the administrative division from the actual airport operation and traffic services; and
- (4) Immediate implementation of a basic inventory to collect data and information on each airfield; this should be centralized in the administrative division in MOTC headquarters.

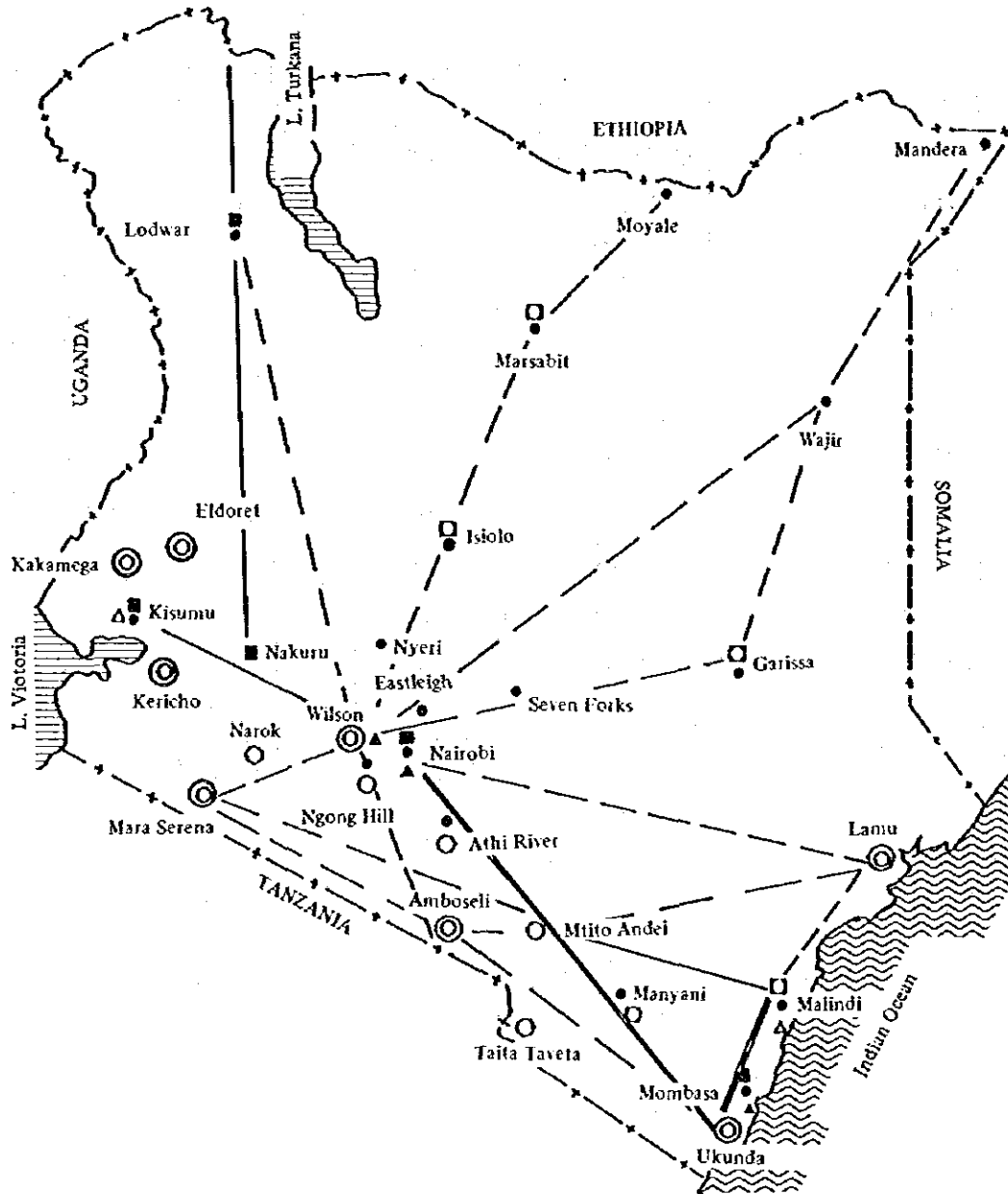
# Domestic Air Routes



LEGEND	
	Commercially scheduled services by KQ
	Fifteen busiest domestic air charter sectors
	Next 59 busiest domestic air charter sectors
 	Major airports
 	Aerodromes and Airstrips



### Navigation Aids Allocation Plan



LEGEND		
● Existing NDB	■ Existing VOR, DME	▲ Existing VDF
⊙ Planned NDB	◻ Planned VOR, DME	△ Planned VDF
	○ Planned VOR	

————— Trunk Airways

----- Frequent Travelled Air Routes



### Project and Required Funds: Civil Aviation

(K£ million at 1983 value)

Project	Short Range (1984-1988)	Medium Range (1989-1993)	Long Range (1994-2000)	Total (1984-2000)
JKIA (Nairobi)	6.76	11.49	32.50	50.75
MIA (Mombasa)	3.63	3.66	15.00	22.29
Malindi	10.27	2.58	7.50	20.35
Kisumu	4.23	3.25	5.00	12.48
Wilson	2.04	1.78	7.50	11.32
Local airports	17.92	21.52	18.50	57.94
Navigation aids system development	5.49	7.19	7.90	20.58
Telecommunications system development	2.89	3.35	3.60	9.84
ATS system development	7.01	8.29	14.63	29.93
Development of school of aviation	1.53	2.12	4.23	7.88
MET system development	3.45	4.75	5.02	13.22
<b>Total</b>	<b>65.22</b>	<b>69.98</b>	<b>121.38</b>	<b>256.58</b>

## **7.8 National Airline**

### **7.8.1 Existing Problems**

- (1) Lack of competitive aircraft is the most critical problem of KQ. KQ's main fleet of B707s is obsolete and completely non-competitive with other carriers (B747, DC10) flying between Kenya and Northern Europe. In addition, per seat fuel consumption of the B707 is 20% greater than that of the DC10 or current wide-body aircraft.**

Operation of the B707 and DC8 will be prohibited in Europe from 1987 because of their high noise level. The same measures will be implemented in the United States from 1985. Therefore it is anticipated that used aircraft such as the DC10 and L1011 will become much more expensive. It is strongly recommended that the Government of Kenya provide funds to KQ to enable the company to lease or purchase appropriate aircraft.

- (2) Another decisive defect in KQ management is the lack of a computer system for auditing and sales statistics. Such information is essential to establish an agent sales policy, sales strategy, overseas office administration, and an advertisement policy, fundamental items of airline management. Systematisation of revenue information is urgently required.**

- (3) A third level operation by KQ is essential to promote tourism. Information on domestic air service other than KQ's is not well known even by the company's overseas offices. The initiation of KQ's third level operation together with reservation services of interested hotels would definitely help further tourist promotion. In other words, KQ should act partly as a tour operator in Kenya, rather than merely providing passengers with plane seats. To carry out this policy, co-operation between KQ and KTDC is essential.**

For the introduction by KQ of a small "Third Level" operation, the purchase of two cost-efficient twin turbo-prop aircraft is essential.

## 7.8.2 Fleet Plan

Recommended projects for Kenya Airways are the purchase of aircraft, after due consideration of the following items:

- 1) Analysis of KQ's management and related issues,
- 2) Forecasts of demand for KQ II, and
- 3) Flight-operation schedule based on the above demand.

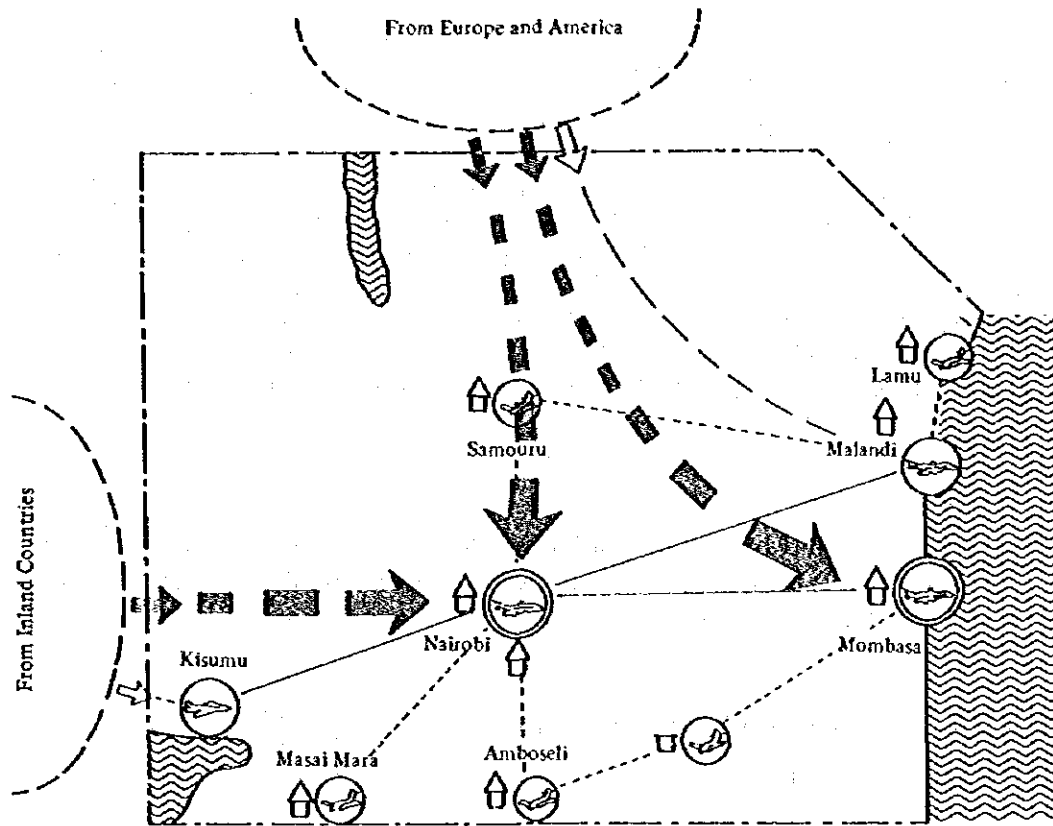
The fleet plan which has been made for target year 1988 is based on estimated flight frequencies for the European route, Eastern (India-Pakistan) route and Regional routes. Depending on the necessary frequency and total investment to be made, wide body jets and narrow body jets, such as DC-10s and DC-9s respectively may be the best equipment. However, this does not necessarily mean that this equipment is recommended by the survey team.

To further promote tourism in Kenya, it is essential to expand KQ's flight network to the U.S. and Japan; these are undoubtedly the biggest potential markets. The fleet plan up to 1988 is concentrated on the renewal of equipment and an increase in KQ capacity over the current network. For the decade after 1988, expansion of KQ's network should be considered, not for the company's sake but for that of the tourist industry in Kenya.

### Project and Required Funds: National Airline

(K£ million at 1983 price)

Project	Period	Short Range (1984-1988)	Medium Range (1989-1993)	Long Range (1994-2000)	Total (1984-2000)
Purchase of aircraft (three used DC-10s, two DC-9-30s)	1983-1988	43.5	—	—	43.5
Purchase of aircraft (used DC-10, DC-9-30)	1991-1993	—	16.5	—	16.5
Purchase of aircraft (two used DC-10s, DC-9-30, three DC-9-80s)	1994-2000	—	—	52.5	52.5
Sale of aircraft (five DC-9-30s)	1994-2000	—	—	-15.0	-15.0
Const. of hangars	1989-1990	—	14.5	—	14.5
Subtotal		43.5	31.0	37.5	112.0
Purchase of aircraft for third level operation (four small A/C).	1984-1985	2.5	2.5	—	5.0
Total		46.0	33.5	37.5	117.0



LEGEND	
<b>International</b>	
Present	
Future	
<b>Domestic</b>	
Present	
Future	

## 7.9 Pipeline

### 7.9.1 Present Condition and the Issues

#### (1) Present Condition

The throughput of the existing pipeline was 1,464 million m<sup>3</sup> in 1980 but decreased to 1,280 million m<sup>3</sup> in 1982. The existing pipeline transport capacity is sufficient to meet the anticipated demand until the year 2000.

The balance sheet of the Kenya Pipeline Company (KPC) shows a considerable profit. At present, the transport of almost all oil products is done through the pipeline; this means is more economical and effective than by railways or roads.

#### (2) Present Issues

The number of personnel at KPC is 455. Since an up-to-date pipeline control system is used, from an operational point of view the number of personnel needed may actually be less than 200. The maintenance and inspections of the facilities have been carried out properly.

### 7.9.2 Extension Program to Western Kenya

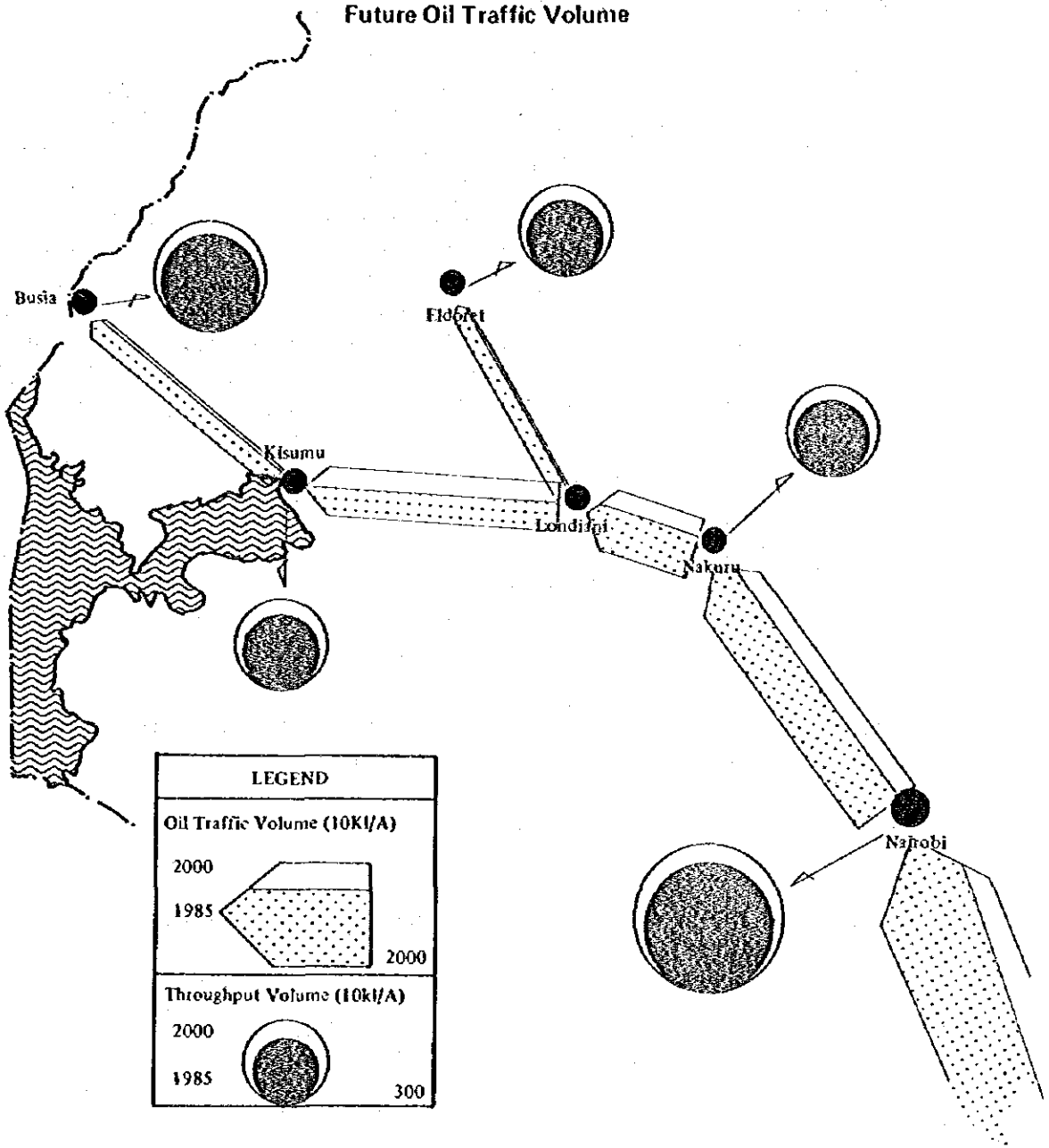
#### (1) Transport Demand

Extension of the Mombasa-Nairobi pipeline to Western Kenya may be effective for domestic transport of oil products as well as international transport to Uganda.

In this survey, transport requirements were estimated for an extension trunk line to Busia and a branch line to Eldoret. Assuming that the domestic oil demand increases at an average rate of 2.5% per year, one can expect the following:

	Mombasa -- Nairobi Pipeline		Extended New Pipeline	
	Throughput (000 m <sup>3</sup> )	Million tonne km	Throughput (000 m <sup>3</sup> )	Million tonne km
1981	1,438	503.4	—	—
1988	1,783	579.7	1,073	271.8
2000	2,399	839.8	1,446	394.3

### Future Oil Traffic Volume



**(2) Impact on Railway Transport**

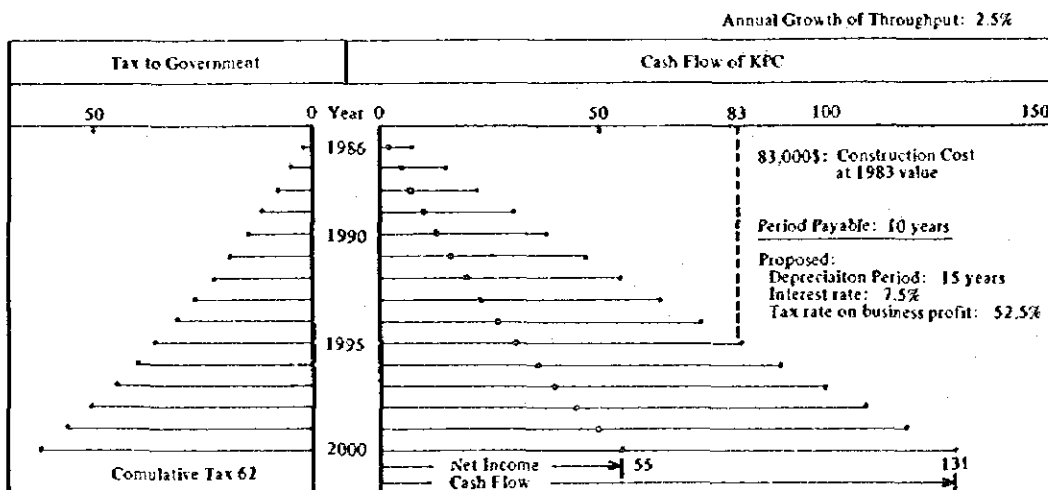
The extended pipeline portions will be able to transport about one half of the tonne-kilometres now transported by the existing pipeline. About 20% of this quantity through the extended portions will be transferred from railways and 80% from roads. Kenya Railways transported about 500 thousand tonnes of oil in 1982. As a result of the extended pipeline, the oil transport by railways from Nairobi to Western Kenya will be 210 thousand tonnes of which about 120 thousand (53 million tonne-kilometres) will go to Nakuru, Kisumu, and the border of Uganda. This amount corresponds to 2.3% of the total volume transported by Kenya' Railways. Oil products transported directly by railway from Mombasa to Western Kenya total 86,000 tonnes (72 million tonne-kilometres). When this is added to the cargo volume transported from Mombasa to Western Kenya, the total is about 5% of the total volume transported by Kenya Railways.

**7.9.3 Evaluation**

The construction cost for the extension of the pipeline is 83 million US dollars (52 million K£) at the 1983 price. Reviewing operational payability, it has been shown that the pay-out time will be ten years after starting the operation (1986). Evaluation of the pipeline extension project from the point of view of the national economy is as follows:

- (1) KPC will have obtained a net income of 34.7 million K£ during the fifteen year period following the start of he operation.
- (2) The Government will receive in taxes 39.2 million K£ during the fifteen years following the start of the operation.
- (3) It can also be expected that the damage to roads as a result of tank lorry traffic will be reduced.

**Cumulative Cash Flow of Pipeline: 10<sup>6</sup> \$**



## 8. Transport Investment Plan

### 8.1 Budgetary Demand

A variety of projects to close the gap between demand and supply have been chosen from the long-range transport forecast for the year 2000. The current status of social capital stocks in the transport sector, transport policies and strategies, and the criteria for the various modes were fully taken into consideration during the selection process.

Transport facilities are not presently adequate to cope with the future social and economic development of Kenya. Therefore, it is important to invest positively in this sector until the year 2000, at least to a level commensurate with the country's social and economic development. Fiscal income may not be sufficient to do this during the Fifth five-year Development Plan; however, such investment will become ever more important in the development of the social economy of Kenya.

#### Funds Required by Each Mode: Capital Expenditure

(K£ million at 1983 price)

	1984-88	1989-93	1994-2000	Total
<b>Public Sector</b>				
Roads	282	333	740	1,355
Civil Aviation	45	44	86	175
Air Control	20	26	35	81
<b>Subtotal</b>	<b>347</b>	<b>403</b>	<b>861</b>	<b>1,611</b>
<b>Quasi-Public Sector</b>				
Railways	51	98	480	629
Ports	147	129	79	356
Maritime Transport	26	23	—	49
Inland Waterway Transport	9	—	—	9
National Airline	46	34	38	117
Pipeline	79	—	—	79
<b>Subtotal</b>	<b>358</b>	<b>284</b>	<b>597</b>	<b>1,239</b>
<b>Total</b>	<b>705</b>	<b>687</b>	<b>1,458</b>	<b>2,850</b>



## 8.2 Financial Target

The probable capital investment in the transport sector can be estimated from a projection of Kenya's economy and the government budget. The target amount of this capital investment may differ by case:

- Case 1: A stringent target based on recent allocations to the transport sector
- Case 2: An aggressive target considering the recovery of investment for the transport sector based on allocations of the past ten years.

The budgetary targets are summarized in the table below. Since the demand exceeds the target, it may be necessary for the transport sector to seek an alternative source of funds and/or to politically adjust its priorities.

### Budgetary Targets of Transport Sector

(K£ million of 1983 price)

Period	Expenditure ***			
	Development	Investment*	Total**	
1984-1988	254	99	353	
1989-1993	Case 1	388	152	540
	Case 2	521	203	724
1994-2000	Case 1	732	286	1,018
	Case 2	975	381	1,356

- \*) Investment expenditure shows only the foreign exchange portion; the amounts largely depend on the foreign aid available for each project, self-financing etc.
- \*\*\*) Estimated figure based on "Fifth Development Plan"
- \*\*\*) Development expenditure: Roads, airports, and air navigation  
Investment expenditure: Railways, KPA, KQ and Kenya Pipeline Company

## **9. Recommendation for Management**

### **9.1 Principle**

The transport sector should be managed in a sound financial condition. Principles to follow in maintaining such a condition may be:

- (1) recovery of financial balance (balance between revenue and expenditure) within each individual mode of transport,
- (2) full cost recovery by tariff and tax, and
- (3) cost savings and efficient operation.

To achieve these goals, the following policies should be studied and undertaken.

### **9.2 Financial Policy**

#### **(1) Tax**

Investigation should be made of the possibility of increasing the petroleum consumption tax. It is also important to increase the tax for vehicle registration, and/or to investigate the possibility of introducing a weight tax on heavy lorries and trucks, to be utilised for a road maintenance fund.

An airport landing fee and passenger's tax may be an effective financial source for airport and air-control development. A study would be required to establish an adequate tax level. The possibility should be considered of introducing a special purpose account system and subsidy system for the development of roads and airports. Kenya Airways should take particularly prompt action to purchase aircraft under an appropriate subsidy system.

#### **(2) Tariff**

It may be necessary for Kenya Railways to increase its tariff by 1.5 times every three years in order to cope with the current inflation condition.

The Kenya Port Authority and Kenya Pipeline Company now maintain a favourable financial balance. These companies should promote their development projects following the priorities set for each one and using their own and foreign funds effectively.

#### **(3) Operations**

By 1990 Kenya Railways should increase its transport capacity by 1.5 times that at present by improving existing line capacity. This improvement should be made without increasing the number of employees.

Ports should promote containerisation and reduce the number of employees by half by the year 2000. Such a policy is essential to increase productivity.

KQ needs to improve its reservation and information system by introducing computers.

### **9.3 Regulation and Organisation**

#### **(1) Regulations**

**Matatu, a passenger transport, should be subject to regulations controlling its operating routes, frequency, and number of cars.**

**Clarification of the rights and responsibilities of the registered owner and operator of each aerodrome should be required.**

#### **(2) Organisation**

**A committee should be organised to undertake a containerisation project, promoting cooperation among railways, ports, and roads.**

**Sales promotion is a very important means of encouraging tourism, especially in foreign countries. KQ and the Ministry of Tourism should work together on this activity.**

### **9.4 Training and Study**

#### **(1) Training**

**A training school is needed to train individuals for aerodrome operation and air traffic service.**

#### **(2) Study**

**It is desirable to take a standardised nationwide survey on aircraft movement and passengers OD every year.**

**A road traffic census, including an OD traffic survey, should be performed every 3 or 5 years. Training of staff and the introduction of a computer system to analyse the data collected is important.**

**APPENDIX LIST OF KENYAN AND JAPANESE GOVERNMENT OFFICIALS  
CONCERNED AND STUDY TEAM MEMBERS**

**1. MEMBERS OF THE KENYAN GOVERNMENT WHO ACT AS  
COUNTERPARTS AND/OR LIAISON OFFICERS**

Mr. J.K. Kirika	Ministry of Transport and Communications Engineer In Chief
Mr. S. Asfaw	Ministry of Transport and Communications Chief Engineer
Mr. S.M. Kiguru	Ministry of Transport and Communications Chief Engineer
Mr. P.M. Wakori	Ministry of Transport and Communications
Mr. K. Guandai	Ministry of Transport and Communications
Mr. H. Kiragu	Ministry of Transport and Communications
Mr. A.L. Alusa	Ministry of Transport and Communications
Mr. D. Kaura	Ministry of Transport and Communications
Mr. M. Maingi	Ministry of Transport and Communications
Mr. J. Hieatt	Ministry of Transport and Communications Roads and Aerodromes Department
Mr. M. Mukwana	Ministry of Transport and Communications Roads and Aerodromes Department
Mr. F.N. Moindi	Ministry of Transport and Communications Design Division
Ms. C.N. Muturi	Ministry of Transport and Communications Planning Division
Mr. G. Wabuke	Ministry of Transport and Communications Roads and Aerodromes Department
Mr. P.M. Parkash	Ministry of Transport and Communications Roads and Aerodromes Department
Mr. R.N. Karimi	Ministry of Transport and Communications Roads and Aerodromes Department
Mr. G.A. Okumu	Ministry of Transport and Communications Roads and Aerodomes Department

<b>Mr. J.P. Ayuga</b>	<b>Ministry of Transport and Communications Directorate of Civil Aviation</b>
<b>Mr. T.G. Orucho</b>	<b>Ministry of Transport and Communications Directorate of Civil Aviation</b>
<b>Mr. B.A. Odera- Ongofa</b>	<b>Kenya Ports Authority</b>
<b>Mr. E.G. Njoroge</b>	<b>Ministry of Transport and Communications Meteorological Departments</b>
<b>Mr. G.P. Mbiti</b>	<b>Kenya Railways Corporation</b>
<b>Mr. J. Gatua</b>	<b>Kenya Railways Corporation</b>
<b>Mr. J.C. Ochido</b>	<b>Kenya Railways Corporation</b>
<b>Mr. J. Dillenbeck</b>	<b>Kenya Airways Limited</b>
<b>Mr. N.J. Okwemba</b>	<b>Kenya Airways Limited</b>
<b>Mr. F.B.J. Oluta</b>	<b>Kenya Airways Limited</b>
<b>Mr. G.J. Ngondi</b>	<b>Kenya Pipeline Company</b>
<b>Mr. Kabiru</b>	<b>Kenya Pipeline Company</b>
<b>Mr. C.N. Mwangangi</b>	<b>Ministry of Finance and Economic Planning</b>
<b>Mr. I.A. Onyango</b>	<b>Ministry of Finance and Economic Planning</b>
<b>Mr. D.B. Kimutai</b>	<b>Ministry of Finance and Economic Planning</b>
<b>Mr. M.I. Malova</b>	<b>Ministry of Finance and Economic Planning</b>
<b>Mr. S.A.R. Bagha</b>	<b>Ministry of Energy and Regional Development</b>
<b>Mr. A.M. Bereki</b>	<b>Ministry of Agriculture and Livestock Development</b>
<b>Mr. A.M. Getao</b>	<b>Ministry of Agriculture and Livestock Development</b>
<b>Miss M. Watiki</b>	<b>Ministry of Tourism and Wildlife</b>
<b>Mr. F.G. Kago</b>	<b>Registrar of Motor Vehicles</b>

## 2. MEMBERS OF JAPANESE SUPERVISORY COMMITTEE

Professor	Dr. Y. Matsumoto	University of Tokyo
	Mr. K. Miyota	Ministry of Transport
	Mr. S. Miyanaga	Ministry of Transport
	Mr. S. Uchiyama	Ministry of Construction
	Mr. T. Iijima	Ministry of Construction
	Mr. S. Isoda	Ministry of Transport
	Mr. H. Okuno	Ministry of Construction
	Mr. M. Miyashita	Ministry of Transport
	Mr. S. Fukumoto	Ministry of Transport
	Mr. Y. Suzuki	Ministry of Transport
	Mr. Y. Kitano	Ministry of Transport

## 3. MEMBERS OF JAPANESE STUDY TEAM

Team Leader	Mr. S. Ikeda	Economics and Management
	Mr. J. Kano	Comprehensive Transport Planning
	Mr. M. Tanimoto	Transport Planning
	Dr. N. Miyatake	Transport Demand Forecasting
	Dr. M. Fukuyama	Road Transport Planning
	Mr. H. Teshima	Economic Planning
	Mr. T. Sasaki	Regional Development Planning
	Dr. Y. Aoki	Transport Investment Planning
	Mr. A. Tani	Financial Analysis
	Dr. N. Sugino	Organisation and Training
	Dr. M. Harada	Railway Planning
	Mr. M. Yamazaki	Railway Facility
	Mr. H. Miyake	Highway Planning
	Mr. K. Kuroki	Highway Design and Maintenance
	Mr. T. Yagyu	Port Planning
	Mr. J. Ohbora	Port Management and Operation
	Mr. O. Horie	Maritime Transport

<b>Mr. K. Shishikura</b>	<b>Maritime Transport and Inland Waterway Transport</b>
<b>Mr. T. Tomishige</b>	<b>Airport Planning</b>
<b>Mr. K. Kosaki</b>	<b>Air Space Planning</b>
<b>Mr. K. Maekita</b>	<b>Air Transport Planning</b>
<b>Mr. K. Motosugi</b>	<b>Pipeline Planning</b>

**4. EMBASSY OF JAPAN**

<b>Mr. R. Hagio</b>	<b>First Secretary, Nairobi</b>
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**5. JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

<b>Mr. N. Fukushiro</b>	<b>JICA Headquarters</b>
<b>Mr. K. Notake</b>	<b>JICA Headquarters</b>
<b>Mr. T. Nagashima</b>	<b>JICA Nairobi Office</b>









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