2) Desination of a capable administrative division to be put into MOTIC headquarters, separated from the organisation actually responsible for airport operation, such as JKIA under the Department of Aerodromes, and also separate from the organisation handling air traffic services under the Directorate of Civil Aviation.

3) Urgent implementation of a basic inventory to collect eata and information on each airport; such work should be centralised in the above-mentioned division in MOTC headquarters.

4) Improvement of staff quality, number and training.

(6) Implementation of national air transport development greatly depends upon successful fund allocation which will allow achievement of the projects.

These are recommended for Government action:

1) Set up an advisory committee chaired by the Minister of MOTC to study possible issuance of a special national account system for airport development.

2) Constructive use of technical and economic assistance from international financing agencies and developed countries.

Assign a staff member in MOTC headquarters who is responsible for the promotion of such technical and economic assistance.

3) Conduct a feasibility study of major development projects for which capital investments are anticipated.

2.2 Airport Facilities

2.2.1 Basic Facilities

As stated in 1.3.2. of this chapter, classificationof basic runway length has been done, runways classified in Code A are JKIA and MIA primary runways, there is none classified in Code B, and other runways are classified in Code C and below.

There are twelve runways which are over 1,500m in length, however these are evaluated as shorter because of the effect of such local airport conditions as runway elevation and temperature.

Therefore, at present only JKIA and MIA have runway lengths suitable to serve middle-class jet aircraft which require a long distance for landing and taking off.

The main themes of the forthcoming Five-Year Plan for Airport Improvement, considering the results of the air traffic forecast in Part IV, Chapter 6 are:

(1) Improvement of such basic facilities as runways, taxiways, etc. of Malindi and Kisumu airports for use by middle-class jet aircraft.

(2) Improvement of such basic facilities as runways, taxiways, etc. of four local

airports other than JKIA, MIA, Malindi, Kisumu and Wilson which have considerable passenger traffic as a result of operations by domestic charter flights, for the use of F-27 class or similar scheduled aircraft.

2.2.2 Navigation Aid Facilities

(1) Lighting Facilities

Airfield lighting installed in aerodromes is shown in Table 2-2-1.

Improvement of airfield lighting facilities in Kisumu, Malindi and Wilson airports should be carried out for 24-hour or night operation. In JKIA, such improvements should be done to realise CAT-II precise approach, based on ICAO recommendation. The program for conversion from the current VASIS to PAPI should be decided, based on the recommendation of the Visual Aid Facility Conference under the 8th Aeronautical Conference.

(2) Aeronautical Radio Navigation Aid and Communication Facility

These will be mentioned in paragraph 2-3.

Table 2-2-1 Current Airfield Lighting Installed in Aerodromes

Airfield Lighting (ICAO) Annex-14 / Aerodromes / Operational Hours	JKIA	MIA	KISUMU	MALINDI	WILSON
	24 hrs.	24 hrs.	0630-1830	0630-2015	0630-2030
Aerodrome Beacon					
Identification Beacon					
Standard Approach Lights	o (CAT-1)	o (CAT-1)			
Simple Approach Lights	o	o			
VASIS	o (3 Bar)	o (3 Bar)		o	o (AVASIS)
PAPI					
Circling Guidance Lights					
Runway Lead-in Lighting System					
Runway Threshold Identification Lights					
Runway Edge Lights	o	o		o	o
Runway Threshold and Wing Bar Lights	o	o			
Runway End Lights	o	o			
Runway Center Line Lights					
Runway Touchdown Zone Lights					
Stopway Lights	o				
Taxiway Centerline Lights					
Taxiway Edge Lights	o	o		o	
Stop Bars					
Clearance Bars					
Apron Lighting	o	o			
Visual Docking Guidance System	o				
Aircraft Stand Maneuvering Guidance Lights	o				
Wind Direction Indication Lights					

2.2.3 Terminal Facilities

(1) Passenger Terminal Building

In Malindi and Kisumu airports expansion of passenger terminal buildings are necessary. In Malindi airport in particular, improvement is urgent for jet aircraft operation from 1990, since the terminal building is completely obsolete and the floor is very narrow.

With the possibility of flights originating from Kisumu airport to the neighbouring country of Uganda in near future, the terminal building will require expansion.

In local airports, improvements of passenger terminal buildings will be necessary by the time the F-27 is scheduled to start operations.

(2) Cargo Terminal Building

In MIA, construction of a cargo terminal building is recommended since cargo handling is now being done in part of the passenger terminal building.

(3) Control Tower and Administrative Building

In Malindi airport, the edges of primary and secondary runways cannot be seen from the control tower because of the lack of elevation of the VFR room. The administration building is very obsolete and narrow. Therefore, improvement of the control tower and administration building is urgently required for safe aircraft operation.

2.2.4 Candidate Projects

Candidate projects of airport facilities are shown in Table 2-2-2, and a draft development plan for 1984–2000 is shown in Table 2-2-3.

Table 2-2-2-(1) Candidate Project: Airport (Short Range 1984—1988)

No.	Project	Contents	Cost (million Kshs.)			Period	Degree of Importance	Degree of Urgency	Remarks
			Local	Foreign	Total				
1	JKIA JOMO KENYATTA INT'L AIRPORT (NAIROBI)	Parallel TWY Extension Airfield Lighting for CAT-II/ RWY06	47.2	88.0	135.2	1985-1988	A	A	RWY06 CAT-II Operation
2	MIA MOI INT'L AIRPORT (MOMBASA)	Pax. TML Apron Expansion Apron Floorlights Freight TML Bldg. (Phase 1)	22.0	50.6	72.6	1987 - 1988	A	B	
3	MALINDI AIRPORT (COAST PROVINCE)	RWY Extension TWY, Apron Pax. TML Bldg. ATC TWR & Operation Complex Airfield Lighting	89.1	116.2	205.3	1985 - 1988	A	A	1989 - JET Domestic Services
4	KISUMU AIRPORT (NYANZA PROVINCE)	Overlay for RWY, TWY & Apron Apron Expansion	35.2	49.2	84.6	1987-1988	A	B	1990 - JET Service
5	WILSON AIRPORT (NAIROBI)	ATC TWR & Operation Complex Airfield Lighting (Phase 1) CFR Bldg. Power STN Bldg. Expansion	10.2	30.5	40.7	1985 - 1986, 1988	A	A	
6	LOCAL AIRPORTS (4)	Amboseli, Kilaguni, Lamu Mara Serena RWY, TWY & Apron Pax. TML Bldg.	167.8	190.6	358.4	1986 - 1988	A	A	1989 - F-27 Scheduled
		TOTAL	371.6	525.4	897.0				Without Comm. Facilities

Table 2-2-2-(2) Candidate Project: Airport (Medium Range 1989–1993)

No.	Project	Contents	Cost (million Kshs.)			Period	Degree of Importance	Degree of Urgency	Remarks
			Local	Foreign	Total				
1	JKIA JOMO KENYATTA INT'L AIRPORT (NAIROBI)	Resurfacing RWY Apron Expansion Airfield Lighting for CAT-II/ RWY06 PWR STN Expansion Others	79.2	150.6	229.8	1989 - 1993	A	A	
2	MIA MOI INT'L AIRPORT (MOMBASA)	Resurfacing RWY Apron Expansion (Freight) Freight TML Bldg. (Phase 2) PWR STN Expansion Others	22.6	50.6	73.2	1989 - 1993	A	B	
3	MALINDI AIRPORT (COAST PROVINCE)	RWY Extension Apron Expansion AFL Expansion Pax TML Expansion	22.4	29.2	51.6	1989 - 1992	A	B	Int'l Operation/1990 Phase II Development
4	KISUMU AIRPORT (NYANZA PROVINCE)	Pax TML Expansion CFR Bldg. PWR STN Expansion AFL Expansion	14.2	50.8	65.0	1989 - 1992	A	B	
5	WILSON AIRPOT (NAIROBI)	AFL (Phase 2) PWR STN Expansion	15.6	20.0	35.6	1989 - 1990 1992 - 1993	A	A	
6	LOCAL AIRPORTS (5)	Samburu, Baringo, Mandera, Lodwar, Eldoret	201.0	228.8	430.4	1989 - 1993	A	A	F-27 Scheduled
		TOTAL	355.6	530.0	885.6				Without Comm. Facilities

Table 2-2-2-(3) Candidate Project: Airport (Long Range 1994–2000)

No.	Project	Contents	Cost (million Kshs.)			Period	Degree of Importance	Degree of Urgency	Remarks
			Local	Foreign	Total				
1	JIKA JOMO KENYATTA INT'L AIRPORT (NAIROBI)	Parallel RWY with TWY. Apron Pax. TML Bldg. Expansion Operation Complex Expansion Freight TML Bldg. Expansion Others	195	455	650	1994 - 2000	B	B	Phase II Development
2	MIA MOI INT'L AIRPORT (MOMBASA)	Overlay for RWY, TWY Pax. TML Bldg. Expansion Operation Complex Expansion Others	90	210	300	1994 - 2000	A	A	Phase II Development
3	MALINDI AIRPORT (COAST PROVINCE)	Overlay for RWY TWY Extension Apron Extension Others	45	105	150	1994 - 2000	B	B	
4	KISUMU AIRPORT (NYANZA PROVINCE)	RWY Extension TWY, Apron Pax. TML Expansion Others	30	70	100	1994 - 1995 1999 - 2000	B	B	
5	WILSON AIRPORT (NAIROBI)	Overlay for RWY, TWY & Apron Airfield Lighting Expansion Pax. TML Bldg. Others	50	100	150	1994 - 2000	A	B	Public Terminal Bldg.
6	LOCAL AIRPORTS (6)	Elwak, Wajir, Garissa, Meru, Nakuru, Moyale	200	170	370	1994 - 1995 1997 - 2000	A	A	F-27 Scheduled
		TOTAL	610	1,110	1,720				Without Comm. Facilities

Table 2-2-3 (1) Airport Development Plan

AIRPORTS & AERODROMES	DEVELOPMENT PROJECTS	DEVELOPMENT PLAN																REMARKS
		CY 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
JKIA Jomo Kenyatta Int'l Airport (Nairobi)	1. Runway & Landing Strip								Resurfacing					New Para. Rwy					
	2. Taxiway & Taxiway Strip		Extension											New Twy for New Rwy					
	3. Apron & Strip						Expansion								New Apron				
	4. Airfield Lighting System			CAT-II RWY & TWY					For Apron								For New Rwy & Twy, Apron		
	5. Passenger Terminal Bldg.											Expansion							
	6. Freight Terminal Bldg.																Expansion		
	7. Control Tower & Operation Complex											Expansion							
	8. Crash Fire & Rescue Bldg.																	2nd New	
	9. Power Station Bldg.						Expansion						Expansion						
	10. Other Bldgs.						Animal Quarantine												
	11. Fuel Supply Facility																Expansion		
	12. Water Supply Facility													Expansion					
	13. Drainage & Sewage Treatment Facility		For TWY				For Apron					For New Rwy, Twy & Apron							
	14. Power Supply Equip. & Installation			For TWY & CAT-II										For New RWY, TWY & TML Complex					
	15. Vehicles for FCR, Mainte. Administ.									For Maintenance							FCR, Adm.		
	16. Special Equip. & Installation									CCTV. Bagg. Convey'r					B. Bridges & Others				
	17. Car Parking & Roads														New TML				
	18. Other Ancillaries																		

Table 2-2-3 (2) Airport Development Plan

AIRPORTS & AERODROMES	DEVELOPMENT PROJECTS	DEVELOPMENT PLAN																	REMARKS
		CY 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
MIA Moi Int'l Airport (Mombasa)	1. Runway & Landing Strip										Resurfacing								
	2. Taxiway & Taxiway Strip											Resurfacing							
	3. Apron & Strip						New(Freight)					Pax. Expansion							
	4. Airfield Lighting System								Apron & TWY										
	5. Passenger Terminal Bldg.				Expansion							Pax Tml Expansion							
	6. Freight Terminal Bldg.					New Bldg.													
	7. Control Tower & Operation Complex						Expansion										Expansion		
	8. Crash Fire & Rescue Bldg.																		
	9. Power Station Bldg.							Expansion											
	10. Other Bldgs.														Staff Houses				
	11. Fuel Supply Facility																		
	12. Water Supply Facility											Improvement							
	13. Drainage & Sewage Treatment Facility																		
	14. Power Supply Equip. & Installation								Improvement										
	15. Vehicles for FCR, Mainte. Administ.												For Mainte. V.						
	16. Special Equip. & Installation					Bagg. Conv'r								Bagg. Conv'r/FLT Inf. System					
	17. Car Parking & Roads													Parking					
	18. Other Ancillaries																		

Table 2-2-3 (3) Airport Development Plan

AIRPORTS & AERODROMES	DEVELOPMENT PROJECTS	DEVELOPMENT PLAN																	REMARKS
		CY 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
Malindi Airport (Coast)	1. Runway & Landing Strip		Extension				Extension									Resurfacing			
	2. Taxiway & Taxiway Strip			New								Extension							
	3. Apron & Strip			New				Expansion									Resurfacing		
	4. Airfield Lighting System				New				Extension				Extension				Replacement		
	5. Passenger Terminal Bldg.				New			Expansion											
	6. Freight Terminal Bldg.																		
	7. Control Tower & Operation Complex			New												Expansion			
	8. Crash Fire & Rescue Bldg.					New													
	9. Power Station Bldg.				New											Expansion			
	10. Other Bldgs.											Workshop							
	11. Fuel Supply Facility				New														
	12. Water Supply Facility				New														
	13. Drainage & Sewage Treatment Facility					New													
	14. Power Supply Equip. & Installation			New				Expansion											
	15. Vehicles for FCR, Mainte. Administ.																		
	16. Special Equip. & Installation																		
	17. Car Parking & Roads			New												Expansion			
	18. Other Ancillaries																		

Table 2-2-3 (4) Airport Development Plan

AIRPORTS & AERODROMES	DEVELOPMENT PROJECTS	DEVELOPMENT PLAN																	REMARKS
		CY 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
Kisumu Airport (Nyanza)	1. Runway & Landing Strip				Overlay							Extension							
	2. Taxiway & Taxiway Strip				Overlay							New							
	3. Apron & Strip				Overlay & New							New							
	4. Airfield Lighting System						New												
	5. Passenger Terminal Bldg.						Expansion										Expansion		
	6. Freight Terminal Bldg.																		
	7. Control Tower & Operation Complex																		
	8. Crash Fire & Rescue Bldg.								New Bldg.										
	9. Power Station Bldg.						Expansion												
	10. Other Bldgs.																		
	11. Fuel Supply Facility				Expansion														
	12. Water Supply Facility						Expansion												
	13. Drainage & Sewage Treatment Facility																		
	14. Power Supply Equip. & Installation					Improvement													
	15. Vehicles for FCR, Mainte. Administ.																		
	16. Special Equip. & Installation																		
	17. Car Parking & Roads																		
	18. Other Ancillaries																		

Table 2-2-3 (5) Airport Development Plan

AIRPORTS & AERODROMES	DEVELOPMENT PROJECTS	DEVELOPMENT PLAN																	REMARKS
		CY 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
Wilson Airport (Nairobi)	1. Runway & Landing Strip											Resurfacing							
	2. Taxiway & Taxiway Strip												Resurfacing						
	3. Apron & Strip													Expansion					
	4. Airfield Lighting System					New									Expansion				
	5. Passenger Terminal Bldg.										New Bldg.								
	6. Freight Terminal Bldg.																		
	7. Control Tower & Operation Complex		New																
	8. Crash Fire & Rescue Bldg.		New																
	9. Power Station Bldg.						Expansion												
	10. Other Bldgs.									Workshop									
	11. Fuel Supply Facility																Expansion		
	12. Water Supply Facility											Expansion							
	13. Drainage & Sewage Treatment Facility																		
	14. Power Supply Equip. & Installation						Expansion												
	15. Vehicles for FCR, Mainte. Administ.																		
	16. Special Equip. & Installation																		
	17. Car Parking & Roads										Expansion								
	18. Other Ancillaries																		

Table 2-2-3 (6) Airport Development Plan

AIRPORTS & AERODROMES	DEVELOPMENT PROJECTS	DEVELOPMENT PLAN																	REMARKS
		CY 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
Local Airports	1. Runway & Landing Strip			5 Rwys					6 Rwys							6 Rwys			
	2. Taxiway & Taxiway Strip																		
Phase 1.	3. Apron & Strip																		
Amboseli Kilaguni Lamu Mara Serena Kakamega	4. Airfield Lighting System																		
	5. Passenger Terminal Bldg.			5 Bldgs.					6 Bldgs.							6 Bldgs.			
Phase 2.	6. Freight Terminal Bldg.																		
Samburu Baringo Mandera Lodwar Eldoret Embu	7. Control Tower & Operation Complex																		
	8. Crash Fire & Rescue Bldg.																		
	9. Power Station Bldg.																		
	10. Other Bldgs.																		
Phase 3.	11. Fuel Supply Facility																		
Elwak Wajir Garissa Meru Nakuru Moyale	12. Water Supply Facility																		
	13. Drainage & Sewage Treatment Facility																		
	14. Power Supply Equip. & Installation																		
	15. Vehicles for FCR, Mainte. Administ.																		
	16. Special Equip. & Installation																		
	17. Car Parking & Roads																		
	18. Other Ancillaries																		

2.3 Air Navigation Facilities

2.3.1 General Criteria for Candidate Projects

Although existing airspace configuration seems to be appropriate, it is essential that the air navigation facilities should provide a level of availability and performance consistent with the requirement for safety and efficiency. In this context, projects are proposed for modernization of the facilities and services to establish and maintain the basic communication, surveillance and navigation system during 1984–1993.

Projects such as introduction of sophisticated system and enlargement of communications and surveillance capabilities are proposed during 1994–2000.

General criteria for candidate projects for the first 10 years are as follows:

(1) Replacement of facilities and equipment approaching the end of their useful life, such as NDB, VDF, radio and radar equipment.

(2) Rehabilitation of existing facilities and equipment to meet operational requirements such as improvement of teletype exchange system.

(3) Provision of facilities meeting ICAO and national requirements such as installation of NDB, VOR/DME, ILS and additional radio relay stations.

2.3.2 Candidate Projects

Candidate projects for air navigation facilities are shown in Table 2-3-1. They are presented in three stages; the first for projects during 1984–1988, the second during 1989–1993 and the third during 1994–2000. Each stage contains projects on radio navigational aids, telecommunication services, air traffic services, training and meteorological services relating to aviation.

Brief descriptions of projects throughout the plan period are:

(1) Replacement/Improvement of Existing Facilities and Equipment

Replacement ,of existing radio navigational aids (NDB, VOR/DME, ILS, VDF), telecommunication equipment (teletype, HF and VHF radio equipment, etc.) and radar equipment are planned. With solid-state technology, most of the navigation and communications system will be significantly improved through highly reliable, low maintenance equipment.

(2) Establishment of New Facilities

To cope with the predicted growth of aviation, establishment of new facilities are planned.

ILSs will be installed to Malindi and Kisumu Airports with the introduction of jet aircraft to both airport.

VOR/DMEs, supplemented by NDBs, will be installed along the trunk airways and frequent-travelled air routes. Increased numbers of navigation aids will enable navigation by VOR/DMEs for transport aircraft flying at

high altitude from Malindi or Mombasa to Nairobi and to Kisumu and will give accurate position information by VOR/DMEs and NDBs to small aircraft flying at low altitude between those major or large hubs and small hubs in remote areas by 1993.

Also, increased numbers of radio relay stations will cover national airspace by 2000.

(3) Computer Application

Improvement of existing teletype exchange system in Nairobi Communication Centre and FDP system in Nairobi ACC are planned in the first stage. However, application of computer techniques to radar air traffic control is planned in the third stage after completion of radar replacement programme.

(4) Improvement of Aviation Related Meteorological Services

Two major meteorological service projects, upgrading existing telecomunication equipment and meteorological instruments and equipment, are given priority to provide users with the latest meteorological information.

Summary of candidate projects are shown in Table 2-3-2. Draft air navigation system development plan during 1984–2000 are shown in Table 2-3-3.

Table 2-3-1 Candidate Projects for Air Navigation System Development

V - 1984-1988
VI - 1989-1993
VII - 1994-2000

No.	Project	Contents	Cost (Million Kshs.) Local	Foreign	Total	Estimated Time to Completion	Degree of Importance	Degree of Urgency	Remarks
1	NAV AIDS SYSTEM DEVELOPMENT (FIRST STAGE)	(1) REPLACEMENT OF EXISTING 20 NDBs Nairobi (4) Mombasa (2) Kisumu Malindi Garissa Isiolo Lodwar Mandera Manyani Marsabit Moyale Ukunda Kabarak Nyeri Wajir Seven Forks	8.8	40.6	49.4	5 years			V
		(2) VDF REPLACEMENT AND INSTALLATION Nairobi Mombasa Wilson (REPLACEMENT) Malindi Kisumu (INSTALLATION)	0.8	11.3	12.1	2 years			
		(3) VOR, ILS INSTALLATION Mtito Andei Taita Taveta Athi River Narok (VOR) Malindi (ILS)	7.5	40.7	48.2	3 years			
		TOTAL	17.1	92.6	109.7		A	A	
2	TELECOMMUNICATION DEVELOPMENT (FIRST STAGE)	(1) REPLACEMENT/INSTALLATION OF TELETYPE EQUIPMENT	1.1	14.9	16.0	2 years			V
		(2) INSTALLATION OF VHF. HF RADIO EQUIPMENT TO LOCAL AIRPORTS	1.6	14.8	16.4	2 years			
		(3) IMPROVEMENT OF AUTOMATED TELETYPE EXCHANGE SYSTEM AT NAIROBI COMM. CENTER	4.3	21.1	25.4	2 years			
		TOTAL	7.0	50.8	57.8		A	A	

(Continued)

No.	Project	Contents	Cost (Million Kshs.) Local	Foreign	Total	Estimated Time to Completion	Degree of Importance	Degree of Urgency	Remarks
3	ATS SYSTEM DEVELOPMENT (FIRST STAGE)	(1) REPLACEMENT OF RADIO EQUIPMENT AT RADIO RELAY STATIONS Ngong Hill Londiani	1.4	35.5	36.9	5 years			V
		(2) IMPROVEMENT OF FLIGHT PLAN DATA PROCESSING SYSTEM AT NAIROBI ACC	6.4	31.6	38.0	2 years			
		(3) REPLACEMENT OF NAIROBI TERMINAL APPROACH RADAR	2.3	30.3	32.6	4 years			
		(4) REPLACEMENT OF MOMBASA TERMINAL APPROACH RADAR	2.3	30.3	32.6				
		TOTAL	12.4	127.7	140.1		A	A	
4	DEVELOPMENT OF SCHOOL OF AVIATION (FIRST STAGE)	(1) INSTALLATION OF TELECOMMUNICATION AND NAV AIDS EQUIPMENT FOR MAINTENANCE TRAINING	1.4	12.5	13.9	2 years	A	A	V
		(2) INTRODUCTION OF COMPUTER BASED INSTRUCTION	1.7	14.8	16.5	2 years	A	A	
		TOTAL	3.1	27.3	30.4				
5	AVIATION RELATED METEOROLOGICAL SYSTEM DEVELOPMENT (FIRST STAGE)	(1) REPLACEMENT/INSTALLATION OF TELECOMMUNICATION EQUIPMENT	3.3	44.7	48.0	3 years	A	A	V
		(2) REPLACEMENT/INSTALLATION OF METEOROLOGICAL INSTRUMENT AND EQUIPMENT	2.4	18.5	20.9	2 years	A	A	
		TOTAL	5.7	63.2	68.9				
6	NAV AIDS SYSTEM DEVELOPMENT (SECOND STAGE)	(1) NDB INSTALLATION Eldoret Kericho Lamu Amboseli Mara Serena Wilson Kakamega	4.9	14.7	19.6	3 years			VI

(Continued)

No.	Project	Contents	Cost (Million Kshs.)			Estimated Time to Completion	Degree of Importance	Degree of Urgency	Remarks
			Local	Foreign	Total				
		(2) VOR/DME INSTALLATION Garissa Isiolo Manyani Marsabit	4.0	29.4	33.4	4 years			
		(3) VOR/DME REPLACEMENT Nairobi Mombasa Lodwar	3.0	22.1	25.1	4 years			
		(4) ILS INSTALLATION Kisumu	2.2	17.8	20.0	2 years			
		(5) ILS REPLACEMENT	4.6	41.0	45.6	3 years			
		TOTAL	18.7	125.0	143.7				
7	TELECOMMUNICATION SYSTEM DEVELOPMENT (SECOND STAGE)	(1) IMPROVEMENT OF HF ENROUTE RTF AND TERMINAL VOICE COMMUNICATION SYSTEM AT NAIROBI & MOMBASA	8.6	42.2	50.8	2 years	A	B	VI
		(2) INSTALLATION OF TELETYPE EQUIPMENT	1.1	14.9	16.0	2 years			
		TOTAL	9.7	57.1	66.8				
8	ATS SYSTEM DEVELOPMENT (SECOND STAGE)	(1) INSTALLATION OF RADIO EQUIPMENT AT NYAMBENE, MARSABIT AND MARUBUI RADIO RELAY STATIONS	6.9	53.2	60.1	5 years			VI
		(2) REPLACEMENT OF EXISTING NAIROBI LONG RANGE RADAR	2.9	102.8	105.7	3 years			
		TOTAL	9.8	156.0	165.8		A	B	
9	DEVELOPMENT OF SCHOOL OF AVIATION (SECOND STAGE)	(1) PURCHASE OF TRAINING AIRCRAFT	7.1	35.2	42.3	2 years	B	B	VI
		TOTAL	7.1	35.2	42.3				
10	AVIATION RELATED METEOROLOGICAL SYSTEM DEVELOPMENT (SECOND STAGE)	(1) REPLACEMENT/INSTALLATION OF TELECOMMUNICATION EQUIPMENT	4.4	59.5	63.9	3 years	B	B	VI

(Continued)

No.	Project	Contents	Cost (Million Kshs.)			Estimated Time to Completion	Degree of Importance	Degree of Urgency	Remarks
			Local	Foreign	Total				
		(2) REPLACEMENT/INSTALLATION OF METEOROLOGICAL EQUIPMENT AND INSTRUMENTS	3.5	27.5	31.0	2 years			
		TOTAL	7.9	87.0	94.9				
11	NAV AIDS SYSTEM DEVELOPMENT (THIRD STAGE)	(1) REPLACEMENT/INSTALLATION OF VOR/DME (8)	8.0	58.8	66.8	5 years	C	C	VII
		(2) REPLACEMENT/INSTALLATION OF ILS/MLS (4)	9.2	92.0	91.2	5 years			
		TOTAL	17.2	140.8	158.0				
12	TELECOMMUNICATION DEVELOPMENT (THIRD STAGE)	(1) REPLACEMENT/INSTALLATION OF TELECOMMUNICATION EQUIPMENT	11.1	60.8	71.9	3 years	C	C	VII
		TOTAL	11.1	60.8	71.9				
13	ATS SYSTEM DEVELOPMENT (THIRD STAGE)	(1) INSTALLATION OF TERMINAL RADAR DATA PROCESSING SYSTEM TO NAIROBI AND MOMBASA	10.6	52.8	63.4	4 years	C	C	
		(2) INSTALLATION OF EN-ROUTE RADAR DATA PROCESSING SYSTEM TO NAIROBI ACC	10.6	52.7	63.3	2 years			VII
		(3) INSTALLATION OF SECOND LONG RANGE RADAR TO NAIROBI ACC	2.9	102.8	105.7	3 years			
		(4) INSTALLATION OF 3 ADDITIONAL RADIO RELAY STATIONS	6.9	53.2	60.1	3 years		C	
		TOTAL	31.0	261.5	292.5		C		
14	DEVELOPMENT OF SCHOOL OF AVIATION (THIRD STAGE)	(1) PURCHASE OF TRAINING AIRCRAFT	14.2	70.4	84.6				VII
		TOTAL	14.2	70.4	84.6	2 years	C	C	
15	AVIATION OF RELATED METEOROLOGICAL SYSTEM SYSTEM DEVELOPMENT (THIRD STAGE)	(1) INSTALLATION OF TELECOMM. AND METEOROLOGICAL INSTRUMENTS AND EQUIPMENT	9.2	91.2	100.4	3 years	C	C	VII
		TOTAL	9.2	91.2	100.4				
		GRAND TOTAL	181.2	1,446.6	1,627.8				

Table 2-3-2 Summary of Candiate Projects for Air Navigation System Development

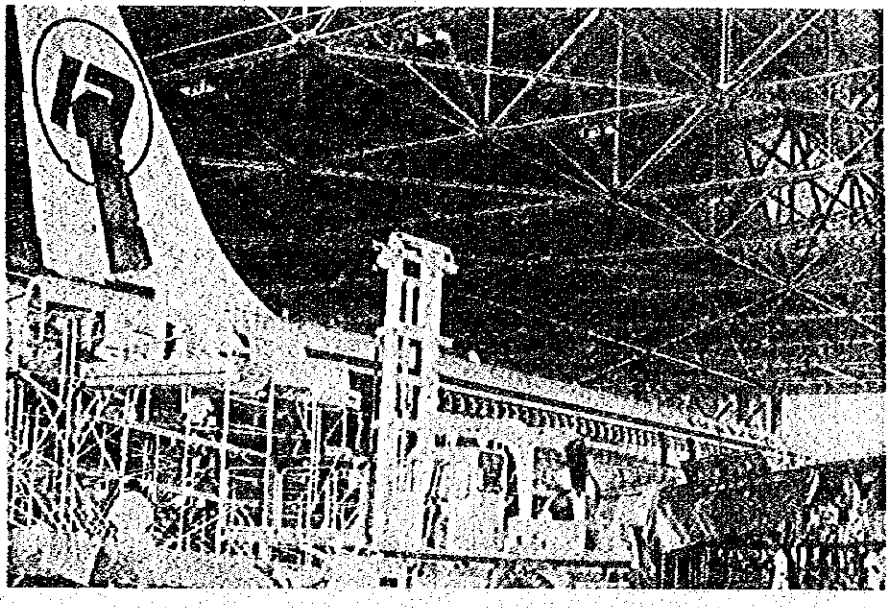
Project	Contents	Cost (Million Kshs.)		
		Local	Foreign	Total
First Stage Development	Nav Aids	17.1	92.6	109.7
	Telecomm.	7.0	50.8	57.8
	ATS	12.4	127.7	140.1
	School of Aviation	3.1	27.3	30.4
	MET	5.7	63.2	68.9
	Subtotal	45.3	361.6	406.9
2nd Stage Development	Nav Aids	18.7	125.0	143.7
	Telecomm.	9.7	57.1	66.8
	ATS	9.8	156.0	165.8
	School of Aviation	7.1	35.2	42.3
	MET	7.9	87.0	94.9
	Subtotal	53.2	460.3	513.5
3rd Stage Development	Nav Aids	17.2	140.8	158.0
	Telecomm.	11.1	60.8	71.9
	ATS	31.0	261.5	292.5
	School of Aviation	14.2	70.4	84.6
	MET	9.2	91.2	100.4
	Subtotal	82.7	624.7	707.4
	Grand Total	181.2	1,446.6	1,627.8

Table 2-3-2 Draft Air Navigation Development Plan

Service \ Stage	First Stage Development					Second Stage Development					Third Stage Development							Total
	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	
Nav Aids System	NDB Replacement (20) VDF Replacement & Installation (5) VOR Installation (4), ILS Installation (1) 109.7 MKShs					NDB Installation (7) VOR/DME Replacement/Installation (7) ILS Replacement/Installation (3) 143.7 MKShs					VOR/DME Replacement Installation (8) ILS/MLS Replacement/Installation (4) 158.0 MKShs							411.4 MKShs
Tele-communications Services	Teletype Equipment Replacement Radio Equipment Installation Automated Teletype Exchange Improvement 57.8 MKShs					Radio Equipment Improvement Teletype Equipment Installation 66.8 MKShs					Telecomm. Equipment Replacement/ Installation 71.9 MKShs							196.5 MKShs
Air Traffic Services	Radio Equipment Replacement (Ngong Hill, Londiani Relay Stations) TAR Replacement (Nairobi, Mombasa) FDP System Improvement (Nairobi) 140.1 MKShs					Radio Equipment Installation (Nyambene, Marsabit, Marubui Relay Stations) Long Range Radar Replacement (Nairobi) 165.8 MKShs					ARTS Installation (Nairobi, Mombasa) Second Long Radar Installation RDP System Installation (Nairobi) Radio Relay Station Installation 292.5 MKShs							598.4 MKShs
School of Aviation	Telecomm. Equipment & Nav Aids Installation 30.4 MKShs					Purchase of Training Aircraft 42.3 MKShs					Purchase of Training Aircraft 84.6 MKShs							157.3 MKShs
Meteorological Services	Telecomm. Equipment Replacement/ Installation MET Instrument Replacement/ Installation 68.9 MKShs					Telecomm. Equipment Replacement/ Installation MET Instrument Replacement/ Installation 94.9 MKShs					Telecomm. MET Instrument Installation 100.4 MKShs							264.2 MKShs
Total	406.9 MKShs					513.5 MKShs					707.4 MKShs							1,627.8 MKShs

PART VIII. NATIONAL AIRLINE

1 . Present Condition
  1.1 Kenya Airways Transport
  1.2 Organisation and Operation of Kenya Airways
  1.3 Analysis of KQ Management and Relevant Issues
2 . Fleet Plan
  2.1 Basic Concept for Project Selection
  2.2 Fleet Plan
3 . Third Level Operation
  3.1 Policy and Objectives
  3.2 Fleet Plan
  3.3 Recomdation



1. Present Condition

1.1 Kenya Airways Transport

1.1.1 Kenya Airways Aircraft Fleet

Kenya Airways (hereinafter referred to as KQ) has one B747, three B707s, one B720, one DC9 and two F27s (Table 1-1-1). Of these eight aircraft, the B747 is on lease. Total seating capacity is about 1,100.

Table 1-1-1 Kenya Airways Aircraft Fleet

Number of Aircraft	Type	Date of Purchase	Date of Manufacture	Remarks
3	B707-320B	11.10.77	April 1968 September 1968 April 1968	153 seats
2	F27-500	01.04.78	October 1962 November 1962	43 seats
1	DC9-30	01.06.78	January 1971	96 seats
1	B-720	05.02.79	April 1963	126 seats
1	B-747	Lease (KLM)	--	340 seats

Source: Kenya Airways

1.1.2 Kenya Airways Fleet

Kenya Airways operates both international and domestic flights; international flights are all scheduled and it has no charter flights. The company's share of traffic on almost all air routes is less than 50 percent, on Northern European routes it was about 24 percent in 1979/80 (Table 1-1-2). Domestic flights of Kenya Airways are also all scheduled with no charter flights; these latter are operated for tourists by smaller charter flight companies.

The international air routes operated by Kenya Airways are spread from Nairobi and Mombasa to Europe, East Africa, the Middle East and South Asia.

Table 1-1-2 Passenger Traffic Historical

(Total Market and Kenya Airways' Share 1977/78 - 1979/80)

ROUTES	1977/78			1978/79			1979/80			1977/78-1979/80 % Av. Ann. Growth	
	Total Market	KA % Share	KA Total	Total Market	KA % Share	KA Total	Total Market	KA % Share	KA Total	Total Market	KA Total
NORTHERN											
London	104,404	35.7	37,291	124,015	31.2	38,709	136,300	26.5	36,150	14.3	- 1.5
Frankfurt	76,616	8.4	6,471	82,185	9.7	7,982	98,100	12.7	12,420	13.2	38.5
Zurich	44,279	15.4	6,825	49,725	13.4	6,671	46,300	20.5	9,490	2.3	17.9
Rome	52,697	30.8	16,213	41,854	53.3	22,289	45,500	45.6	20,750	- 7.1	13.1
Total	277,996	24.0	66,800	297,779	25.4	75,651	326,200	24.2	78,810	8.3	8.6
EASTERN											
Bombay	42,288	44.2	18,683	47,876	47.8	22,867	43,480	51.7	22,458	1.4	9.6
Karachi	11,514	30.4	3,506	12,084	30.7	3,710	11,340	37.2	4,224	- 0.8	9.8
Total	53,802	41.2	22,189	59,960	44.3	26,577	54,820	48.7	26,682	0.9	9.7
REGIONAL											
Mauritius	8,545	62.8	5,370	9,441	64.6	6,102	8,570	43.8	3,752	0.1	- 16.4
Addis Abab	27,038	5.4	1,451	27,718	11.7	3,252	40,550	9.2	3,723	22.5	60.2
Seychelles a	22,129	65.8	14,563	31,398	77.1	24,213	32,380	86.3	27,938	21.0	38.5
Mogadishu	8,338	22.2	1,850	7,973	48.2	3,844	9,600	45.5	4,370	7.3	53.7
Lusaka	37,146	21.0	7,787	40,344	42.5	17,143	39,310	41.7	16,408	2.9	45.2
Entebbe	-	-	-	-	-	-	7,800	78.6	6,129	-	-[A]
Khartoum	18,752	0.0	-	18,752	2.5	467	24,180	3.1	742	13.6	58.9[A]
Cairo	9,082	24.4	2,213	18,761	21.6	4,045	25,780	15.9	4,095	68.5	36.0[A]
Jeddah	10,048	0.0	-	13,301	22.1	2,937	16,920	40.8	6,903	29.8	135.0[A]
Total	141,078	23.6	33,234	167,688	37.0	62,003	205,090	36.1	74,060	20.5[B]	34.7[B]
Total Int'l	472,876	25.8	122,223	525,427	31.3	164,231	586,110	30.6	179,552	10.6[B]	16.5[B]
DOMESTIC	171,380	100.0	171,380	195,780	100.0	195,780	208,110	100.0	208,110	10.2	10.2
GRAND TOTAL	644,256	45.6	293,603	721,207	49.9	360,011	794,220	48.8	387,662	10.5[B]	12.8[B]

A: 1978/79 to 1979/80 grown only.

B: Using available data only.

Source: Kenya Airways and IATA Project Team.

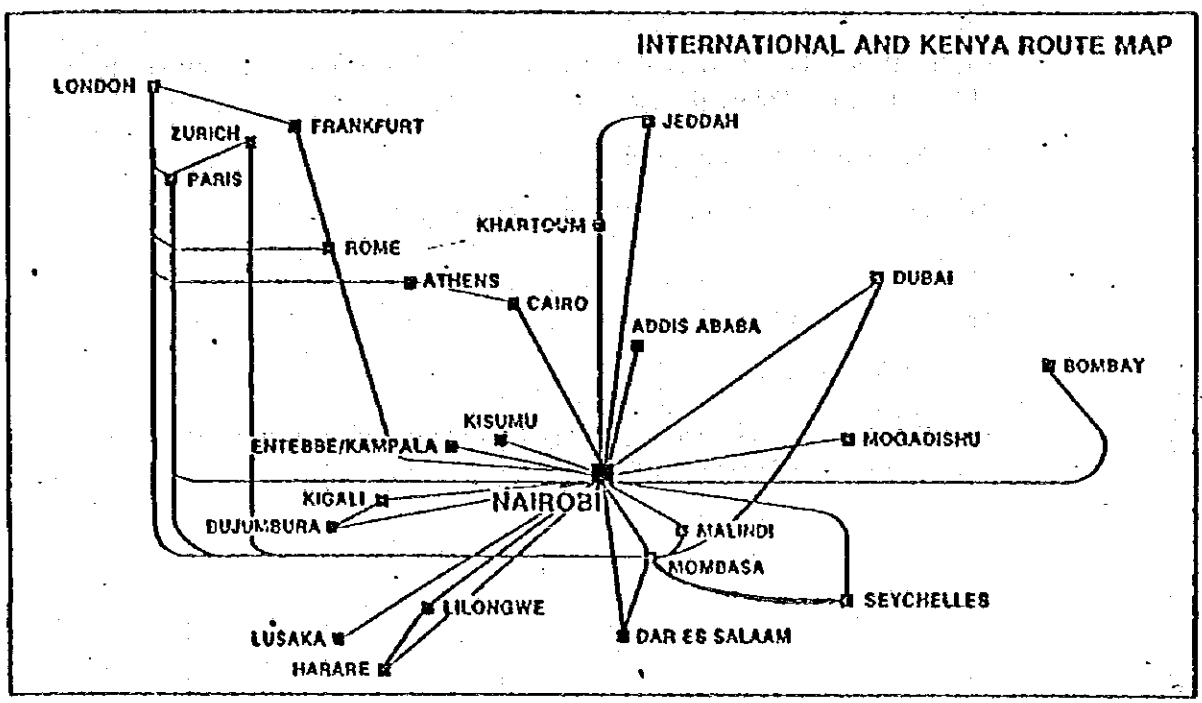


Fig. 1-1-1 Kenya Airways Route Map

1.2 Organisation and Operation of Kenya Airways

1.2.1 Organisation of Kenya Airways

Kenya Airways is headed by a board of directors and managing director (Fig. 1-2-1); the chairman and managing director are appointed by the Government.

Organisational functions of the company are divided into five sections, four of which are headed by the general manager.

1) Assistant to managing director
2) Corporate planning and management services
3) Finance
4) Commercial section
5) Technical section

Two thousand eight hundred persons were employed as of April 1982, most of them Kenyans working in Nairobi.

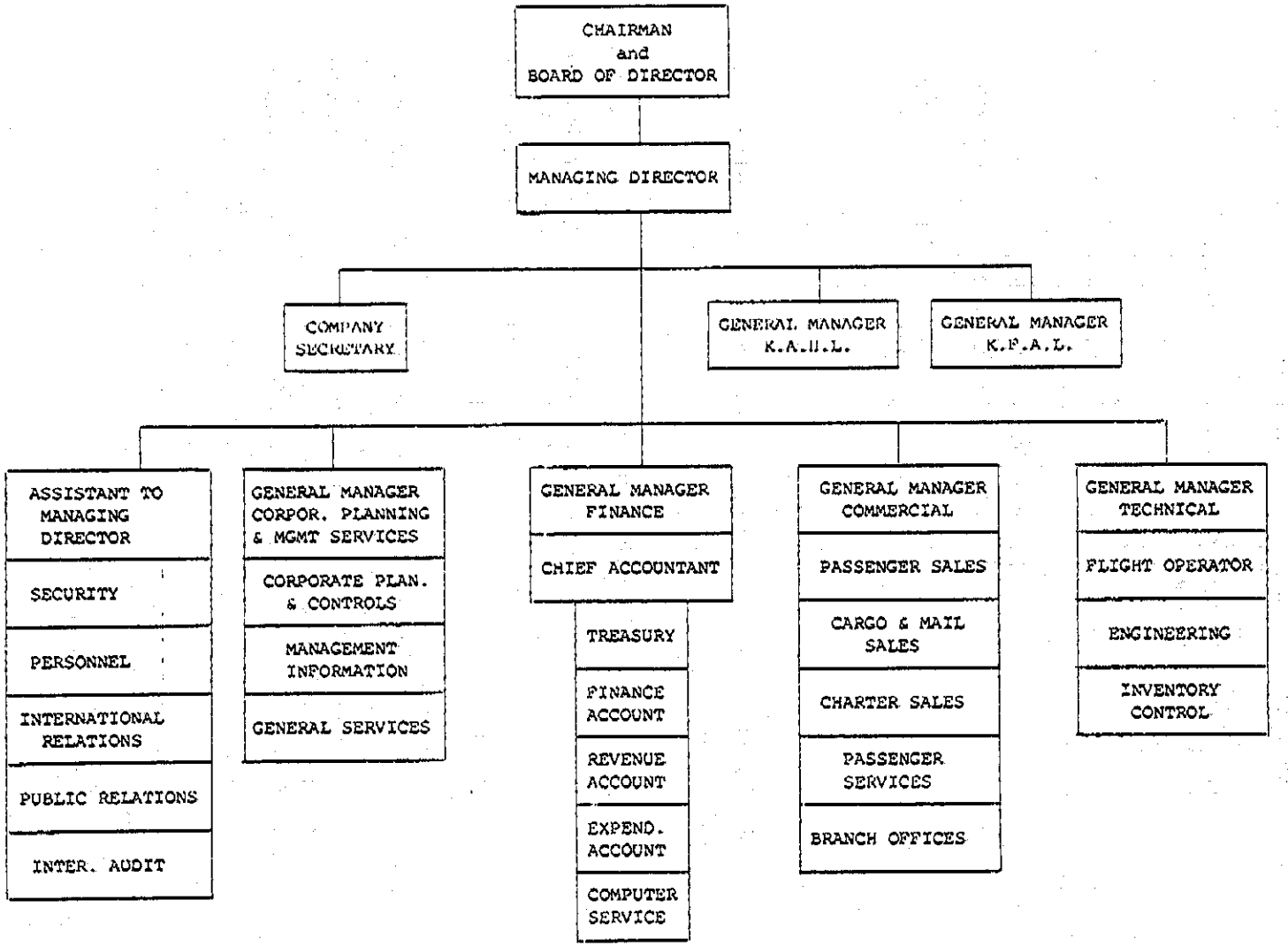


Fig. 1-2-1 Kenya Airways Organisation Chart

1.2.2 Financial Situation of Kenya Airways

The airline industry has passed through a critical period in recent years and Kenya Airways has shown a financial deficit since its inception (Table 1-2-1).

Table 1-2-1 Financial Operations of Kenya Airways (Million Ksh.)

	1978-79	1979-80	1980-81
Revenue	568.802	690.303	781.560
Expenditure	611.322	816.402	883.767
Interest	23.973	33.964	43.832
Net operating loss	-66.493	-160.063	-146.039

Source: Kenya Airways documents

Reduction of deficit can easily be done by promoting cost saving and increasing revenues.

1.3 Analysis of KQ's Management and Relevant Issues

(1) Lack of competitive aircraft is the most critical issue for KQ. Its main B707 fleet is completely obsolete compared with other carriers serving Kenya from Northern Europe (Table 1-3-1). Additionally, per seat fuel consumption of the B707 is 20 percent greater than the DC10 or current wide body aircraft.

As of 1987, operation of the B707 and DC8 will be prohibited in Europe because of their noise; in the U.S., these measures will be implemented from 1985. It is anticipated that this will result in used aircraft such as the DC10, L1011 becoming much more expensive. It is therefore strongly recommended that the Kenyan Government furnish KQ with the financial equity to enable the company to lease or purchase appropriate aircraft.

Table 1-3-1 Flights and Type of Aircraft Operating by Foreign Airlines between Europe and Kenya

City		Airline	Flights/Week	Type of Aircraft
London	(LDN)	British Airways	9	B-747
Frankfurt	(FRA)	Lufthansa	4	B-747
Paris	(PAR)	Air France	4	B-747
Amsterdam	(AMS)	KLM	4	B-747
Copenhagen	(CPH)	SAS	3	DC-10
Brussels	(BRU)	Sabena	2	DC-10
Madrid	(MAD)	Iberian Airlines	2	DC-10
Athens	(ATH)	Olympic Airways	4	B-747
Zurich	(ZRH)	Swiss Air	2	DC-10
Rome	(ROM)	Alitalia	3	DC-10

Source: Airline Timetables

The current KQ fleet presence in Europe is not strong enough to spur tourism to Kenya. In The Netherlands, KQ is not acknowledged as an operator to Europe but is regarded only as a domestic operator by tour wholesalers, though they know of the firm's operations from London or Frankfurt. Because KQ has no direct flight from Amsterdam and because of its limited capacity, it is almost impossible for them to use KQ flights for their tours to Kenya.

For horticultural cargo, other carriers serving Kenya are offering container rates to shippers. This kind of sales is not feasible for KQ because of its current equipment.

It is obvious that the company is losing business opportunities because of its obsolete aircraft.

(2) Since the staff and labor costs make up only 16 percent of total expense, it is not likely that KQ is overstaffed from the viewpoint of cost components. However, this condition can be found in overseas stations such as Rome; local union problems may be involved. It is worthwhile reviewing the effiency of overseas stations to seek measures to reconstruct the company's sales and operation network, including evaluation of the general sales agents.

(3) Another telling defect of KQ management is the lack of a computer system for auditing and sales statistics. This information is essential to establish agent sales policy, sales strategy, overseas office administration and an advertising policy which are fundamental to airline management. Systematisation of information on revenues is urgently required.

(4) Both passenger and cargo tariff should periodically be carefully checked. Special commodity rates applicable to horticultural products which are set at a low level to promote Kenyan exports should be adjusted upward when the Kenyan shilling is devalued. Flexible and quick actions in response to such changes are necessary.

(5) Third level operation by KQ is essential in tourism promotion. Information on domestic air services other than KQ's is not well known even by KQ's overseas offices. Beginning of a third level operation together with hotel reservation service would definitely help further tourism. In other words, KQ should act partly as a tour operator in Kenya, rather than merely providing passenger seats. This can only be accomplished with cooperation between KQ and KTDC.

(6) A positive image of Kenya should be presented to the overseas market by KQ and Kenyan tourist promotion offices. In our judgment, Kenyan flowers should be brought in as a main theme of this image together with the wildlife which is now familiar. For high yield passenger sales promotion, titles associated with flower names should be used for business class service and advertising in the manner that Thai International has adopted, such as "Orchid Service". Posters and calenders produced by tourist offices and KQ should be synchronised. When Malindi airport is opened, tropical fish can be added to the main themes and thereafter, wildlife, flowers and tropical fish can be used as advertising symbols promoting Kenyan tourism.

2. Fleet Plan

2.1 Basic Concept for Project Selection

The primary project for Kenya Airways therefore is the purchase of aircraft, after due consideration of these items:

(1) Analysis of KQ's management and issues surrounding it

(2) Demand forecast for KQ as shown in Volume II, Part IV, Chapter 6, and

(4) Flight operation schedule based on the above demand.

2.2 Fleet Plan

2.2.1 Fleet Plan for the Target Year 1988

A summary of the 1988 fleet plan and provisional KQ schedule follow:

(1) Premises of the Plan

1) Estimation of passenger traffic demand based on the results shown in Volume II, Part IV, Chapter 6.

2) KQ's market share of the estimated international traffic shall be 40% – 50%.

3) Charter flight frequencies provided by European supplemental carrier shall be decreased when KQ offers charter flight service from Mombasa.

4) In principle, no increase of seat capacity offered by European scheduled carriers shall be authorised by the Kenyan government. When it is deemed necessary to approve such requests, approval shall be given under the condition that, as soon as KQ becomes ready to increase its own capacity, the approval shall be cancelled.

5) Malindi Airport will be an international airport from 1990.

6) 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, may be the best equipment. However, this does not necessarily mean that this equipment is recommended by the survey team.

7) To economise in total operating cost, KQ's destinations in Europe shall be London, Frankfurt, Rome and Zurich.

8) The same flight frequency and schedule in both summer and winter periods is planned. In busy seasons, charter flights would be utilised.

9) Kenya's relationship with other countries may change in future, but such changes are totally unforeseeable, and therefore this factor has not been considered in the flight schedules planned.

(2) Estimation of Flight Frequencies

Basic data and figures used in arriving at the necessary frequency of service are:

1) European route

Based on the results in Volume II, Part IV, Chapter 6, total passenger traffic between Kenya and London (LON), Frankfurt (FRA), Zurich (ZRH) and Rome (ROM), and KQ's share for the year 1988 are estimated as:

(unit: persons)

	Total passenger traffic	KQ's traffic	Share
Kenya = LON, FRA, ROM, ZRH	474,213	189,685	40%

Breakdown of the traffic into Nairobi (NBO) and Mombasa (MBA) airports is:

(unit: persons)

	Total passenger traffic	KQ's traffic
MBO = LON, FRA, ROM, ZRH	312,980	125,192
MBA = FRA, ZRH	161,233	64,493
Total:	474,213	189,685

(a) Flight frequencies required for KQ's NBO = LON, FRA, ROM, ZRH traffic

DC-10 with seat capacity of 250 is used and 65% average load factor is assumed. Then, frequency required is 7.4 round trips per week. If a daily flight is operated, the load factor during busy and slack seasons in 1988 will be:

In season (Jul. – Sep.)	82%
Off season (Apr. – Jun.)	51%

(b) Flight frequencies needed for KQ's MBA = FRA, ZRH traffic

DC-10 with seat capacity of 300 is used for charter operation and 85% average load factor is assumed. Then, frequencies required are 2.4 round trips per week.

By adjusting charter applications of European supplemental carriers it should be rather easy to compare scheduled flights and obtain a 50% market share. Therefore, it is advisable to operate 3 round-trip charter flights out of Mombasa throughout the year.

2) Eastern route (India-Pakistan)

Estimate of total passenger traffic and KQ's proportion on the sector between Nairobi and Bombay (BOM)/Karachi (KHI) is calculated based on the results in Volume II, Part IV, Chapter 6:

(unit: persons)

	Total passenger traffic	KQ's traffic	Share
NBO = BOM	74,568	37,284	50%
NBO = KHI	27,580	13,790	50%
Total	102,148	51,074	50%

Flight frequencies required for KQ's traffic with a B-707 (seat capacity 153) and 65% load factor are:

Frequency required: 4.9 round trips per week

If current local traffic right restrictions between BOM/KHI are to be continued, it is not economical to operate NBO – KHI – BOM – NBO. The solution is to operate KHI and BOM flights separately, or to continue suspension of the KHI flight. In these cases, frequency required is:

Frequency required for BOM only	3.6 round trips per week
Frequency required for KHI only	1.3 round trips per week

Only one flight per week of NBO = KHI is not advisable from the view of profitability.

3) Regional route (within Africa)

As shown in Table 2-2-1, there are substantial discrepancies between the passenger traffic estimate made by the IATA survey team and the actual development of passenger traffic. Contrary to the traffic on the northern route, that on the regional route is supposed to be mainly business traffic and tends to be easily influenced by various factors. Calculations to determine flight frequency needed on each sector were made in the same manner as before, using 1981/82 actual traffic results as a basis for traffic demand and the growth rate shown in Volume II, Part IV, Chapter 6.

KQ's market share in every sector was estimated as 50% except the sector Nairobi and Seychelles where it can enjoy an 85% share. Though the annual increase of traffic is estimated as 5%, a greater increase can be expected in the sectors NBO = EBB, NBO = HRA, NBO = JED, NBO = CAI, and NBO = DXB, as reflected in the assessment of required capacity.

Flight frequencies required to handle KQ traffic with DC-10s, DC-9s and B-707s are:

Type	Sector	Round trips per week
DC-10	NBO = CAI	2
DC-10	NBO = KRT = JED	3
DC-10	NBO = DXB	2
DC-9	NBO = ADD	3
DC-9	NBO = EBB	4
DC-9	NBO = LUN	3
DC-9	NBO = MGQ	1
B-707	NBO = SEZ	3
B-707	NBO = HRA	3

4) Summary

Total flight frequencies required to handle KQ's anticipated traffic are shown in Table 2-2-2, summarising the results from 1) to 3).

Table 2-2-1 Trend of Passenger Traffic on Regional Routes
(Arrivals and Departures

(Unit: persons)

City		1977/78	1978/79	1979/80	1980/81	1981/82	IATA Estimate 1982
Mauritius	(MRU)	8,545	9.441	8,570	N.A.	4,091	11,200
Addis Ababa	(ADD)	27,038	27,718	40,550	N.A.	34,692	52,500
Seychelles	(SEZ)	22,129	31,398	32,380	N.A.	25,482	41,900
Mogadiscio	(MGQ)	8,338	7,973	9,600	N.A.	11,113	12,500
Lusaka	(LUN)	37,146	40,344	39,310	N.A.	29,713	55,300
Entebbe	(EBB)	-	-	7,800	N.A.	33,525	17,100
Khartoum	(KRT)	18,752	18,752	24,180	N.A.	19,554	29,500
Cairo	(CAI)	9,082	18,761	25,780	N.A.	23,653	26,500
Jeddah	(JED)	10,048	13,301	16,920	N.A.	22,246	23,300
Subtotal		141,078	167,688	205,090	N.A.	204,069	269,800
Accra	(ACC)					1,245	
Abidjan	(ABJ)					3,464	
Blantyre	(BLZ)					17,427	
Bujumbra	(BJM)					7,524	
Dakar	(DKR)					723	
Djibouti	(JIB)					2,378	
Kinshasa	(FIH)					5,499	
Juba	(JUB)					1,937	
Kigali	(KGL)					9,972	
Lagos	(LOS)					17,171	
Doala	(DLA)					4,904	
Harare	(HRA)					26,461	
Dubai	(DXB)					7,839	

Note: N.A. = Not available
(Source: MOTC documents)

Table 2-2-2 Total Frequency Required for KQ's Traffic in 1988

Route		Equipment	Frequency
Scheduled	1) Northern		
	NBO/FRA/LON	DC-10	3
	NBO/ROM/LON	DC-10	2
	NBO/ZRH/LON	DC-10	2
	2) Eastern		
	NBO/BOM	B-707	3
	3) Regional		
	NBO/CAI	DC-10	2
	NBO/KRT/JED	DC-10	3
	NBO/DXB	DC-10	2
	NBO/ADD	DC-9	3
	NBO/EBB	DC-9	4
	NBO/LUN	DC-9	3
	NBO/MGQ	DC-9	1
	NBO/SEZ	B-707	3
	NBO/HRA	B-707	3
Charter	1) Northern		
	MBA/FRA	DC-10	2
	MBA/ZRH	DC-10	1

(3) Image of flight operation schedule for the year 1988

Summarising the above studies, provisional flight operation schedules are illustrated in Fig. 2-2-1.

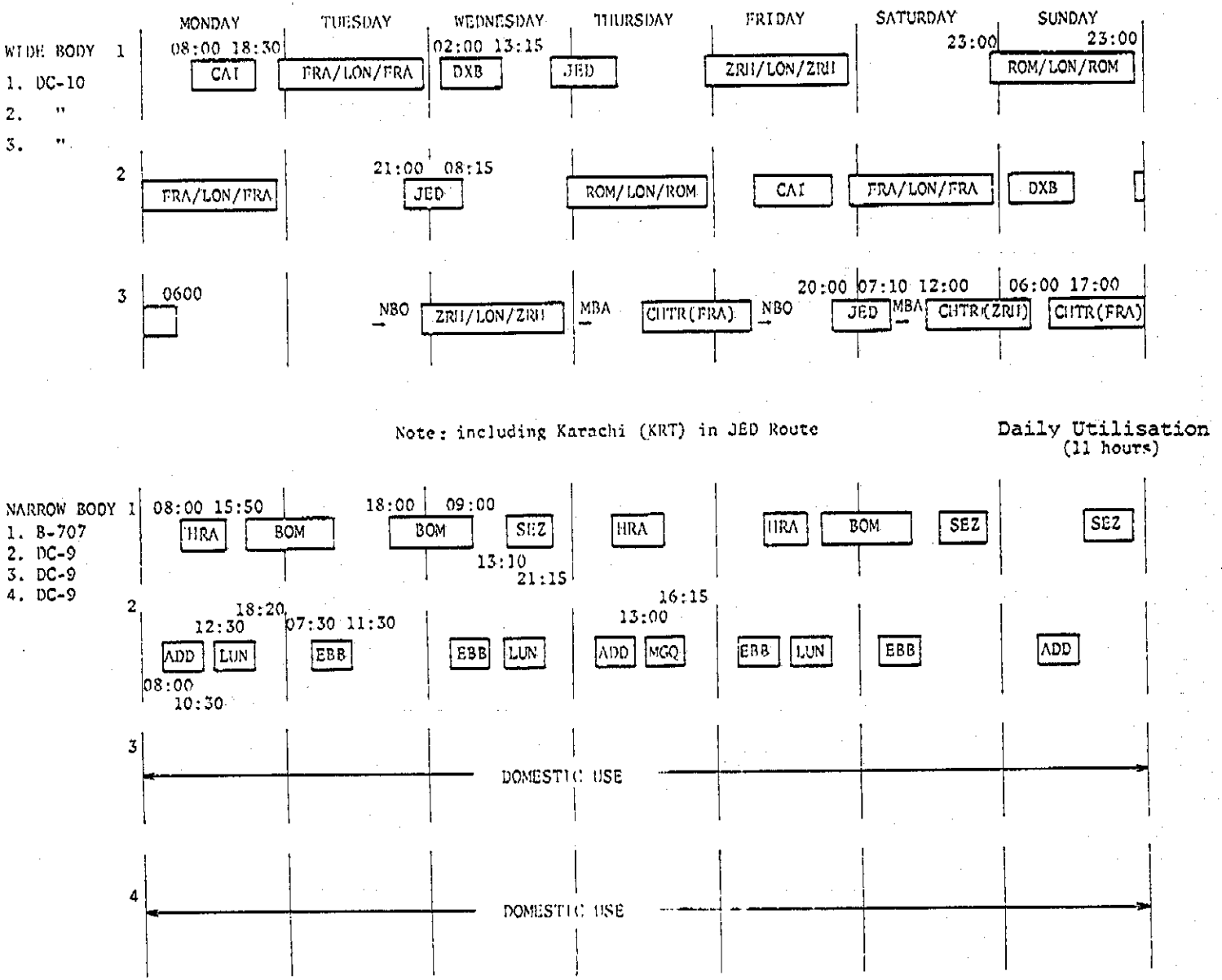


Fig. 2-2-1 Image of KQ Flight Schedule in 1988

(4) Fleet purchase plan

Based on this study, purchase of the equipment shown in Table 2-2-3 is recommended.

After 1985 in the U.S. and after 1987 in Europe operation of DC-8s and B-707s will be prohibited because of their noise. Therefore, it is expected that the price of used DC-10s will increase, and this has been assumed in this study.

There is little possibility that the B-720s and B-707s in KQ's present fleet can be sold, and their fuel consumption efficiency is not good, so these aircraft should be replaced as soon as possible.

In 1988, the F-27s can be used for some of the third level operations.

Table 2-2-3 Candidate Projects for 1988: National Airline

No.	Project	Contents			Cost (million Ksh.)			Period	Degree of Importance	Degree of Urgency	Remarks
					Local	Foreign	Total				
		Year	Aircraft	No. of A/C							
1.	Purchase of Aircraft	1983/1984	used DC-10	1		230	230		A	A	Including spare engines and parts
2.	"	1983/1984	used DC-9-30	1		60	60		A	A	
3.	"	1985/1986	used DC-10	1		250	250		A	A	
4.	"	1987/1988	used DC-10	1		270	270		A	B	
5.	"	1987/1988	used DC-9-30	1		60	60		A	B	
		Total				870	870				

2.2.2 Fleet Plan for the Target Year 2000

For further tourism promotion of Kenya, it is essential to expand the KQ flight network to the U.S. and Japan; these undoubtedly hold the greatest potential tourist market. The fleet plan up to 1988 is concentrated on the renewal of equipment and increase in capacity of the current network. For the decade after 1988, the network should be expanded, not for the sake of KQ but for the tourist industry in Kenya.

(1) New York should be the point served by KQ when it begins operation to the U.S. Extension of several London flights to New York would be most reasonable. However, detailed comment is not feasible due to the fact that bilateral air agreements between Kenya and the countries concerned are not now available.

(2) Tokyo should be the destination of KQ's flight to the Far East. As transiting points, Hong Kong, Bangkok, Taipei, Singapore or Manila in Southeast Asia and Bombay, Seychelles or Colombo in the Indian Ocean can be considered. The situation of Hong Kong around the end of this century is totally ambiguous; additionally, traffic between Hong Kong and Tokyo is rather poor due to the surplus capacity available in this sector. Taipei might be an alternative from the viewpoint of good traffic demand and the open sky policy of the government. Singapore is rather strict on traffic rights issues, specifically on the beyond traffic right. It is understood that Air Lanka is interested in starting service from Colombo to Kenya, since they have already obtained traffic rights to Tokyo and will start operation from next April. There is no doubt that Air Lanka is aiming at promoting tours to East Africa from Japan to augment their new service between Colombo and Japan. It is advisable for KQ to negotiate with Air Lanka to establish measures enabling the company to start Far East services.

Negotiations with Japan to conclude an air agreement will normally be lenghy unless JAL wishes to expedite them. It is advisable to remember this.

(3) Fleet Plan

A fleet plan covering the period 1988 through 2000 is shown in Table 2-2-4 Justification for the equipment follows:

1989/90	Construction of a hangar in Nairobi Airport
1991	Starting of charter service with DC-10s from Malindi to Europe; starting of DC-10 flight service on NBO/BOM route, and B-707s are retired.
1994	Starting of New York route with DC-10s, and strengthening of European route, including Paris and Copenhagen, or Middle Eastern route.
1998	Starting of Far Eastern route with DC-10s, or increasing flight services on existing routes.
1999	Retirement of DC-9-30 or DC-9-50; replacement by DC-9-80.

According to the above schedules, three DC-10 aircraft are necessary to handle the new routes and the increased demand on existing routes. Two narrow body jets (DC-9-30) are also necessary from 1988 to 2000, however these will be replaced by DC-9-80s in 1999.

Table 2-2-4 Candidate Projects from 1989 to 2000: National Airline

No.	Project	Contents			Cost (million Ksh.)			Period	Degree of Importance	Degree of Urgency	Remarks
		Year	Aircraft	No. of A/C	Local	Foreign	Total				
1.	Purchase of Aircraft	1991/1992	used DC-10	1		270	270		A	A	B-707 replaced by DC-10 on NBO/BOM route would have no possibilities to be sold.
2.	"	1992/1993	used DC-9-30	1		60	60		A	A	
3.	"	1994/1995	used DC-10	1		270	270		A	A	
4.	"										Seat Capacities of DC-9 series (All Economy Class)
5.	"	1996/1997	used DC-9-30	1		60	60		A	B	DC-9-30 105
6.	"	1998/1999	used DC-10	1		270	270		A	B	DC-9-110 182
7.	"	1999/2000	used DC-9-80	3		450	450		A	B	DC-9-50 139
8.	Selling of Aircraft		DC-9-30	5		300	300		A	B	DC-9-80 172
9.	Construction of Hangar	Construction of a Hangar in Nairobi (1989/1990)			53	237	290		A	A	
		Total			53	1,327	1,370				

3. Third Level Operations

3.1 Policy and Objectives

3.1.1 Policy

Third level operation by KQ is essential for tourism promotion. Information concerning domestic air services except KQ's services are not well known even by KQ's overseas offices. If KQ's third level operation is started, together with reservation services of hotels concerned, it would definitely help further tourism promotion. In other words, KQ should function partly as a tour operator in Kenya, and should not be in the position of merely providing seats. In this policy, cooperation between KQ and KTDC is essential.

The introduction by Kenya Airways of a "Third Level" Operation would benefit tourism and offers many other substantial advantages to both Kenya and Kenya Airways:

(1) Additional tourist traffic will be generated by promoting integrated package tours, thus contributing to the viability of the company's international routes.

(2) The competitiveness of Kenya Airways' international services will be improved. Third level operation will act as a feeder service, linking domestic tourist traffic with international flights. Scheduling will be designed to favour Kenya Airways' own international departure and arrivals.

(3) Outlaying centers will be able to develop on the back of the tourist market.

(4) Better tourist bed occupancy will result from the improved ability to spread the tourist population between the game parks, Nairobi, Mombasa and elsewhere.

(5) Tourists with more funds but little time spend in Kenya will be better catered to.

3.1.2 Objectives

The basic objectives of thief level services are as follows:

(1) The development of a third level scheduled passenger market which will economically justify such operation. Initially, the focus will be on tourist travel to the scattered game parks and the coast.

(2) A large proportion of this market should be made up of new air travellers in order not to affect adversely existing operation.

(3) The operation should quickly become profitable in order not to burdern the taxpayer with additional cost.

3.2 Fleet Plan

The JICA study team accept the new development strategy for Kenya Airways reported by the IATA study team, and the inception of third level operations by the Kenya Airways' Fleet Planning Team.

Their main recommendations of routings and aircraft type are summalized in Table 3-2-1 and Table 3-2-2.

Table 3-2-1 Routes and Aircraft Recommended

	KQ Fleet Planning Team	IATA Study Team
Routes	R.1 MBA/MYD/LAU R.2 NBO/AMB/KIL/MBA R.3 NBO/MMA/AMB R.4 NBO/KIS	R.1 NBO/AMB/KIL/MBA/LAU R.2 NBO/SAM/L.BAR/MMA R.3 NBO/KIS R.4 NBO/MMA
Suggested Aircraft Type	1. Dornier 228/200, 19 seats 2. Casa 212/200, 26 seats 3. DHC Twin Otter 300, 19 seats	1. Twin Otter 2. Beach 99 3. S.D 3/30 4. Mohawk 298 5. Metro II
Number of Aircraft	2 to 3 aircrafts	2 aircrafts

Code:						
	MBA	Mombasa	NBO	Nairobi	MYD	Malindi
	LAU	Lamu	AMB	Ambaseri	KIL	Kilaguni
	MMA	Masai Mara	KIS	Kisumu	SAM	Samburu
	L.BAR	Lake Boringo				

Table 3-2-2 Flight Frqquencies by KQ Fleet Planning Team

	Mon.	Tues.	Weds.	Thurs.	Fri.	Sat.	Sun.	Weekly Frequencies
Route 1:	x		x	x	x	x	x	6
Route 2 (a)		x	x	xx	x		x	6
(b)	x		x	x	x	x	x	6
Route 3:	x	x	x			x	x	5
Route 4:	x		x		x		x	4

Route 1: Mombasa-Malindi-Lamu,
Route 2: Nairobi-Amboseli-Kilaguni-Mombasa,
Route 3: Nairobi-Masai Mara-Amboseli, and
Route 4: Nairobi-Kisumu.

Notes: (x) One return flight
(a) Outward bound from Nairobi
(b) Inbound to Nairobi.

3.3 Recommendation

(1) For the introduction by Kenya Airways of a small "Third Level" operation, the purchase of two cost-efficient twin turbo-prop aircraft as soon as possible is essential.

(2) An initial investment for the two required aircraft, one spare engine, spare parts and ground service equipment is estimated at US$4 million by the Kenya Airways Fleet Planning Team, and the amounts is quite reasonable.

(3) The potential success of Kenya Airways' proposed scheduled third level services is dependent on the following policies;

a) exclusive KQ service on the route,

b) use of Joma Kenyatta International Airport in Nairobi,

c) Future tour operator services by KQ, etc.

PART IX. PIPELINE

1 . Current Condition
  1.1 State of Pipeline
  1.2 State of Pipeline Transport
  1.3 Organisation and Management
  1.4 Problems requiring Improvement
2 . Pipeline Extension Plan
  2.1 Basic Plans for Extension to Western Kenya
  2.2 Oil Transport Demand
  2.3 Design of Extension Plans
  2.4 Preliminary Feasibility Study
  2.5 Suggestions

1. Current Condition

1.1 State of Pipeline

(1) General

As Kenya is a non-oil-producing country, crude oil has been imported primarily from Middle and Near East countries and refined in Mombasa on the Indian Ocean. Refined oil was transported to inland cities and neighbouring countries such as Uganda and Rwanda by means of railways and tank lorries.

Recently oil consumption in inland cities has been increasing while air traffic becomes busier as an increased number of sightseers visit the country. This has raised oil demand beyond the limit of the capacity of existing transport such as railway, inevitably requiring pipeline transport.

In 1972 a decision was made on installation of a pipeline to transport white products between Mombasa and Nairobi with loans from the World Bank and the Export-Import Bank of Japan. To operate the pipeline, Kenya Pipeline Company, Ltd. (KPC) was established with capital subscribed by the Kenyan Government.

Construction of the pipeline, started in 1976, was completed in 1978 and it was put into operation in February of the same year. To date products have been transported without problem.

(2) Products

Crude oil is refined at the East African Oil Refinery (EAOR) established jointly by the Kenyan government and oil companies such as BP/Shell, and 5 kinds of product are transported through a 14-in pipeline over nearly 450km from KPC's Mombasa Pump Station adjacent to EAOR to Nairobi, the final destination.

Yearly transport ratios of 5 kinds of products are shown below.

Table 1-1 Transport rate of products

(%)

Products	1978	1979	1980	1981	1982
MSP*	27	23	23	19	19
MSR	13	13	14	15	15
Kero	6	7	7	8	8
Jet	27	28	27	28	28
AGO	27	29	29	30	30

Source: KPC

Here it is clear that more than 90% of the white products are consumed by vehicles such as automobiles and airplanes.

Automotive fuels have been shifting from expensive premium gasoline to regular gasoline and from gasoline to kerosene, used by diesel engine vehicles.

The consumption of kerosene as household fuel is small, because in most cities cheaper charcoal and firewood are more often used. The consumption of aircraft fuel has remained constant at 28%.

The above data suggests that future demand for pipeline transport of these products will be proportional to the growth of automobiles and air transport.

*Note MSP : Motor spirit premium
MSR : Motor spirit regular
KERO : Illuminating kerosene
AGO : Automotive gas oil

(3) Shippers

At present, 7 oil companies are shipping their white products through the pipeline. Their shares are given below.

Table 1-2 Shippers

Company	Share (%)
Shell	31
Caltex	18
Esso	15
Total	10
Mobil, Agip, Kenyon	26
Total	100

Source: KPC

(4) Pipeline Transport Capacity

There is an altitude difference of about 1,600m between Mombasa and Nairobi. Thus booster pump stations including the Mombasa Pump Station will ultimately be installed at 8 points in this section. At present, pumping units have been installed at 4 points: No. 1 (Mombasa Pump Station), No. 3, No. 5 and No. 7 and the pipeline will be operated depending on transport load:

Table 1-3 Pipeline Capacity

Operating Pump Station	Operating range (kℓ/hr)	Pump Unit
No. 1 and 3	180 - 230	Existing
No. 1, 5 and 7	260 - 290	"
No. 1, 3, 5 and 7	350 - 400	"
No. 1 to No. 8	760 - 810	*

*Pumping units at Nos. 2, 4, 6 and 8 will be installed when flow rate exceeds 400kℓ/hr.

(5) Current State of Facilities

The stations (Mombasa, Nos. 3, 5 and 7 and Nairobi Terminal) on the pipeline are under individual control systems and are provided with safety protection.

The pipeline as a whole is under computer control via a communications system. Operational commands are given by the dispatching center located at the Nairobi Terminal. The dispatcher is in a position to be informed via a telemetering system of data necessary for controlling the pipeline system such as the operational condition of pump units, valve positions, the amount of products to be received or shipped and emergency information.

A flow control system operates at the Mombasa Pump Station and a pressure control system, designed to keep pressure at pump inlets and outlets within allowable ranges, is functioning at booster stations Nos. 3, 5 and 7.

The Nairobi Terminal measures with a turbine type flow meter products delivered from Mombasa and stores them in different product tanks. Product qualities are uniform among shippers. Products of the same kind are delivered from the Nairobi Terminal to shippers' storage yards in the suburbs through distribution lines in amounts based on individual shipments.

The pipeline is periodically (biweekly) inspected from a helicopter. Main check points are possible damage by work being done in the vicinity, the condition of portions of the pipe that across rivers, the coating and leakage.

Preventive maintenance is carried out on main line pumps at the stations after 1,000 and 5,000 hours of operation and thereafter at 5,000-hour intervals.

The pump stations and pipeline facilities are outlined below.

a) Mombasa Station (PS. 1)
- Products Receiving Manifold
- Suction Booster Pump x 2
- Turbine Type Flow Meter x 2

- Meter Proover Loop x 1
- Mainline Pump x 2
- Pig Launcher
- Telemetering & Telecommunication System

b) PS. 3, 5 and 7
- Pig Launcher/Receiver (for PS. 5 only)
- Mainline Pump x 2
- Telemetering & Telecommunication System

c) Embakasi Terminal (at Nairobi Airport)
- Pressure Control System
- Turbine Type Flow Meter
- Meter Proover Loop
- Product Storage Tanks
- Telemetering & Telecommunication System

d) Nairobi Terminal
- Pig Receiver
- Pressure Control System
- Turbine Type Flow Meter
- Meter Proover Loop
- Product Distribution Manifold
- Product Storage Tanks
- Loading Facility
- Supervisory Control System
- Telecommunication System

e) Pipeline
- Pipe Diameter : 14 inches
- Length : 448.8 km
- Highest Point : 1,720 m

1.2 State of Pipeline Transport

(1) Data on Past Transport

As mentioned earlier, the transport capacity of the pipeline as it is ranges from 1,500,000 to 3,000,000t per year (1m^3 of white products = 0.78t on average), and this will be raised to 5,100,000t when other booster pump stations (Nos. 2, 4, 6 and 8) are in operation.

However, rises in crude oil prices after the second oil shock caused oil consumption to decline, causing shipments to drop to around 50–60% of the planned levels.

The planned and actual annual throughputs are shown below.

Table 1-4 Appraisal estimate and actual throughput of existing pipeline

Year	Appraisal	Actual	Actual/Appraisal	% Growth
1978	1,870	1,011	0.54	-
1979	1,970	1,378	0.70	36.3
1980	2,100	1,464	0.70	6.2
1981	2,240	1,437	0.64	-1.8
1982	2,390	1,279	0.54	-11.0
1983	2,540	1,440	0.55	9.5

* Total throughput in 1983 was supposedly based on the actual throughput from Jan. to May in 1983.

(2) Current Oil Transport by Other Modes

Since the Mombasa-Nairobi pipeline was put into operation, all products (gasoline, kerosene, jet fuel and automotive gas oil) delivered from the East African Oil Refinery to inland cities and neighbouring countries have been shipped through the pipeline instead of by conventional tank trucks and rail.

Thus, LPG, fuel oil, bitumen, etc. other than the products mentioned above are transported by conventional means: tank trucks and rail.

The percentages of shipments by the pipeline, rail and trucks between Mombasa and Nairobi are 65%, 28% and 7% respectively.

(3) Cost of and Tariff for Pipeline Transport

Actual transport costs between 1980 and the first half of 1982 and budgets for the second half of 1982 and the first half of 1983 are shown in Table 1-5.

Profits, throughputs and mean tariffs between 1979 and the first half of 1981 are shown in Table 1-6.

Table 1-5 Average Pipeline Tariff

Year	1979	1980	1981(1/2)
Product transport revenue	224,930	362,826	179,750
Throughput	1,378	1,464	695
Average tariff	163	248	259

Source: KPC Annual report

Table 1-6 Kenya Pipeline Company Limited Average Transport Cost of Products per m^3

	1980	1981 ½ Year	1981/82	BUDGET 1982/83 ORIGINAL	2.REVISED
Throughput in M^3	1,463,689	695,113	1,429,477	1,450,000	1.363,042
OPERATING COSTS					
Staff costs	9.41	11.22	15.80	16.70	17.12
Maintenance Spares Usage	1.73	2.57	7.67	8.01	6.96
M.V. Running Expenses	1.41	1.95	2.36	2.61	2.40
Travel & Entertainment	0.72	0.74	0.85	1.02	0.89
Postage & Telephone	0.59	5.00	1.61	1.12	0.93
Management & Consultancy Fee	0.25	0.09	-	-	-
Rent & Rates	0.53	0.79	1.85	1.71	1.61
Water & Electricity	5.88	6.53	7.55	9.16	8.92
Insurance	3.74	3.89	2.55	4.87	5.13
Depreciation	27.73	29.05	28.40	35.86	36.68
Pre-operational expenses	15.84	16.67	8.10	-	-
Other operating costs	0.88	0.94	0.86	1.03	1.43
Subtotal (Ksh/m^3)	68.71	79.44	77.60	82.09	82.07
FINANCE COSTS					
Finance charges	45.15	50.84	53.09	41.95	44.61
Foreign Exchange Losses	3.61	6.02	13.17	10.95	11.62
Exchange Amortization charge	0.91	5.92	17.30	-	-
Subtotal	49.67	62.78	83.56	52.80	56.23
T O T A L	118.38	142.22	161.16	134.89	138.30

Source: KPC

1.3 Organisation and Management

(1) Organisation of KPC

KPC has a total staff of 455 personnel including its head office and pipeline operation and maintenance divisions. Details are shown below.

Table 1-7 KPC Organisation

No.	Duty	No. of Persons
1	Senior Manager	3
2	Secretary	2
3	Audit	6
4	Personnel	9
5	Accountant	24
6	Planning	2
7	Administration	143
8	Quality Control	5
9	Operation	52
10	Transportation	67
11	Stores Man	11
12	Security	68
13	Maintenance	63
	Total	455

Source: KPC

(2) KPC Management

From its second year KPC's income grew steadily enough to make up the loss incurred in the first year following the initiation of operation in February 1978 and accumulated deficits in 1980, and to further pay dividends from 1980 on. However, since the latter half of 1981, income growth has lessened as a result of reduced shipments, and dividends have again fallen to zero (see Table 1-8).

The balance sheet for the first half of 1981 and the statement of income and expenditure for 1980 and the first half of 1981, extracted from the KPC Annual Report, are shown below.

Table 1-8 Kenya Pipeline Company Limited
Comparative Opeating Statements

Kshs. 000's

	1978	%	1979	%	1980	%	1981	%	1981/82	%
Oil Transport Revenue	123,345	100.0	224,930	100.0	362,826	100.0	179,750	100.0	370,266	100.0
Operating Expenses	108,339	87.8	107,659	47.9	98,480	27.2	55,234	30.7	111,464	30.1
Operating Revenue	15,006	12.2	117,271	52.1	264,346	72.8	124,516	69.3	258,802	69.9
Finance Costs	75,295	61.0	78,398	34.8	66,083	18.2	35,342	19.7	75,893	20.5
Exchange Losses & amortization	735	0.6	(9,317)	(4.1)	6,619	1.3	8,296	4.6	43,549	11.7
Balance	(61,024)	(49.4)	48,190	121.4	191,644	52.8	80,878	45.0	139,360	37.6
Interest Earned & Other Income	2,277	1.8	5,011	2.2	7,556	2.1	9,426	5.2	31,427	8.5
Income Before Tax	(59,747)	(47.6)	53,201	23.6	199,200	54.9	90,304	50.2	170,787	46.1
Taxation	-	-	-	-	27,050	7.5	21,914	12.2	102,130	27.6
Income after Tax	(58,747)	(47.6)	53,201	23.6	172,150	47.4	68,390	38.0	68,657	18.5
Dividends	-	-	-	-	64,835	17.9	30,874	17.2	-	-
Balance End of the Period	(58,747)	(47.6)	53,201	23.6	107,315	29.5	37,516	20.8	68,657	18.5

Source: KPC

Kenya Pipeline Company Ltd.
Balance Sheet at 30 June 1981

	Note	1981 K.Shs.000's	1980 K.Shs.000's
ASSETS EMPLOYED			
PROPERTY, PLANT AND EQUIPMENT	3	662,676	673,204
DEFERRED CHARGES	4	61,849	38,974
CURRENT ASSETS			
Inventories		17,776	15,560
Accounts receivable and prepayments	5	36,804	39,214
Bank balances and cash	6	182,889	155,927
		237,469	210,701
CURRENT LIABILITIES			
Accounts payable and accruals	7	28,217	27,208
Current portion of term loans		69,674	83,416
Taxation	8	21,959	27,050
Proposed dividend		30,874	24,835
		150,724	162,509
NET CURRENT ASSETS		86,745	48,192
		811,270	760,370
FUNDS EMPLOYED			
SHAREHOLDERS' FUNDS			
Share capital	9	154,368	154,368
Retained earnings		139,285	101,769
		293,653	256,137
NON CURRENT LIABILITIES			
Term loans	10	517,617	504,233
		811,270	760,370

W.N. Mbote _____ Director

G. Muchiri _____ Director

The attached notes 1 to 15 form part of these financial statements.

Kenya Pipeline Company Ltd.
Statement of Income and Retained Earnings
for Six Months ended 30 June 1981

	Note	6 months to 30 June 1981 K.Shs.000's	12 months to 31 December 1980 K.Shs.000's
INCOME			
Oil transport revenue		179,750	362,826
Interest		9,063	7,223
Other income		363	333
Product losses - Overprovision in previous years		-	2,087
		189,176	372,469
EXPENDITURE			
Administration costs		23,402	36,696
Finance costs		35,342	66,083
Auditors' remuneration		45	100
Pre-operational expenses		11,589	23,179
Depreciation		20,198	40,592
Net loss on exchange		4,182	5,288
Exchange amortisation charge	4	4,114	1,331
		98,872	173,269
INCOME BEFORE TAXATION		90,304	199,200
Taxation	8	21,914	27,050
NET INCOME FOR PERIOD		68,390	172,150
STATEMENT OF RETAINED EARNINGS			
Balance at beginning of period		101,769	(5,546)
Net income for period		68,390	172,150
		170,159	166,604
Dividends	11	30,874	64,835
Balance at end of period		139,285	101,769

The attached notes 1 to 15 form part of these financial statements.

Kenya Pipeline Company Ltd.
Statement of Source and Application of Funds
for Six Months ended 30 June 1981

	6 months to 30 June 1981 K.Shs.000's	12 months to 31 December 1980 K.Shs.000's
SOURCE OF FUNDS		
From operations:		
Net income for period	68,390	172,150
Charges not requiring current outlay of funds:		
Depreciation	20,198	40,592
Amortisation of deferred charges	11,589	23,179
Deferred exchange loss	(34,464)	(26,745)
Total generated from operations	65,713	209,176
Other sources:		
Disposal of property, plant and equipment at net book amount	37	259
Increase in term loans	13,384	
Total sources	79,134	209,435
APPLICATION OF FUNDS		
Purchase of property, plant and equipment	9,707	11,877
Pipeline extension study costs	-	256
Pre-operational expenditure	-	1,281
Reduction in term loans	-	52,375
Dividends	30,874	64,835
Total applications	40,581	130,624
INCREASE IN WORKING CAPITAL	38,553	78,811
INCREASE IN COMPONENTS OF WORKING CAPITAL		
Current assets:		
Inventories	2,216	12,985
Accounts receivable and prepayments	(2,410)	7,206
Bank balances and cash	26,962	104,616
	26,768	114,807
Current liabilities:		
Accounts payable and accruals	1,009	(21,149)
Current portion of term loans	(13,742)	5,260
Taxation	(5,091)	27,050
Proposed dividend	6,039	24,835
	(11,785)	35,996
	38,553	78,811

The attached notes 1 to 15 form part of these financial statements.

1.4 Problems Requiring Improvement

Soaring oil prices after the second oil crisis, together with the Government's control of consumption, changed oil consumption growth to a negative growth after the peak recorded in 1980. Recently Kenya's export and import of white products decreased from the peak of 3,300,000t in 1980 to 2,750,000t in 1981 and further to 2,550,000t, or 77% of the peak level, in 1982. Export to neighbouring countries, in particular, decreased almost to half from 1,620,000t in 1980 to 890,000t in 1982. Despite the decrease in imports mentioned above, a 35% increase in payments from 277 million Kenya pounds in 1980 to 371 million Kenya pounds occurred in 1982, accounting for a large portion of the country's foreign currency expenditure.

As described in section 2.2, pipeline throughput in 1982 was 1,279,000t, a 12% decrease from the peak 1,464,000t in 1980. A comparison of these actual throughputs with the initial planned figures reveals that the actual for 1979 and 1980 and for 1982 are 70% and 54%, respective to the planned. Thus, actual operation has now decreased to 50%, or every other week operation. This is very low considering that actual operation is generally designed to be 95%, and naturally has had a direct and unfavorable effect on KPC's profits. However, the company's actual balance sheet, shown above, shows profits except for the first year, 1978. This is because of the special design of the pipeline tariff, which was established using the railway tariff as a target. In this respect, the economy of pipeline transport is considered better than railway transport yet its true economy remains latent. However, the pipeline is considered very advantaveous in that it provides safety by eliminating growing traffic congestion, damage to subgrades and traffic hazards involved in truck transport while ensuring a stable supply of aircraft fuel to the Nairobi New International Airport.

The pipeline also transports more than one kind of oil through a single line using a turbulence transport system and has a special communications circuit to transmit data to the Nairobi Terminal for the central control of pipeline operation.

The pipeline control system is also most up-to-date, permitting substantial labor saving. Considering the present actual operation, a KPC staff of 100 personnel seems appropriate.

The maintenance and inspection of the pipeline and the pump stations are being carried out properly in accordance with KPC's Maintenance Manual and the entire facilities are kept in good condition.

2. Pipeline Extension Plan

2.1 Basic Plans for Extension to Western Kenya

2.1.1 Extension Philosophy

Excluding portions for consumption on location, products delivered to Nairobi through the existing pipeline are forwarded to western Kenya by freight cars and to neighbouring countries by tank trucks.

Consumption in areas north of Nairobi, western Kenya and neighbouring countries accounts for nearly 50% of the products delivered to Nairobi through the existing pipeline and depending on future demand growth, alternative pipeline transport may be needed.

Transport with tank trucks, in particular, to neighbouring countries has brought about traffic congestion and damage to highway road surfaces. This is another reason why consideration should be given to extending the pipeline to western Kenya.

2.1.2 Planned Extension Routes

North of Nairobi, the main areas of white product consumption are concentrated in western Kenya.

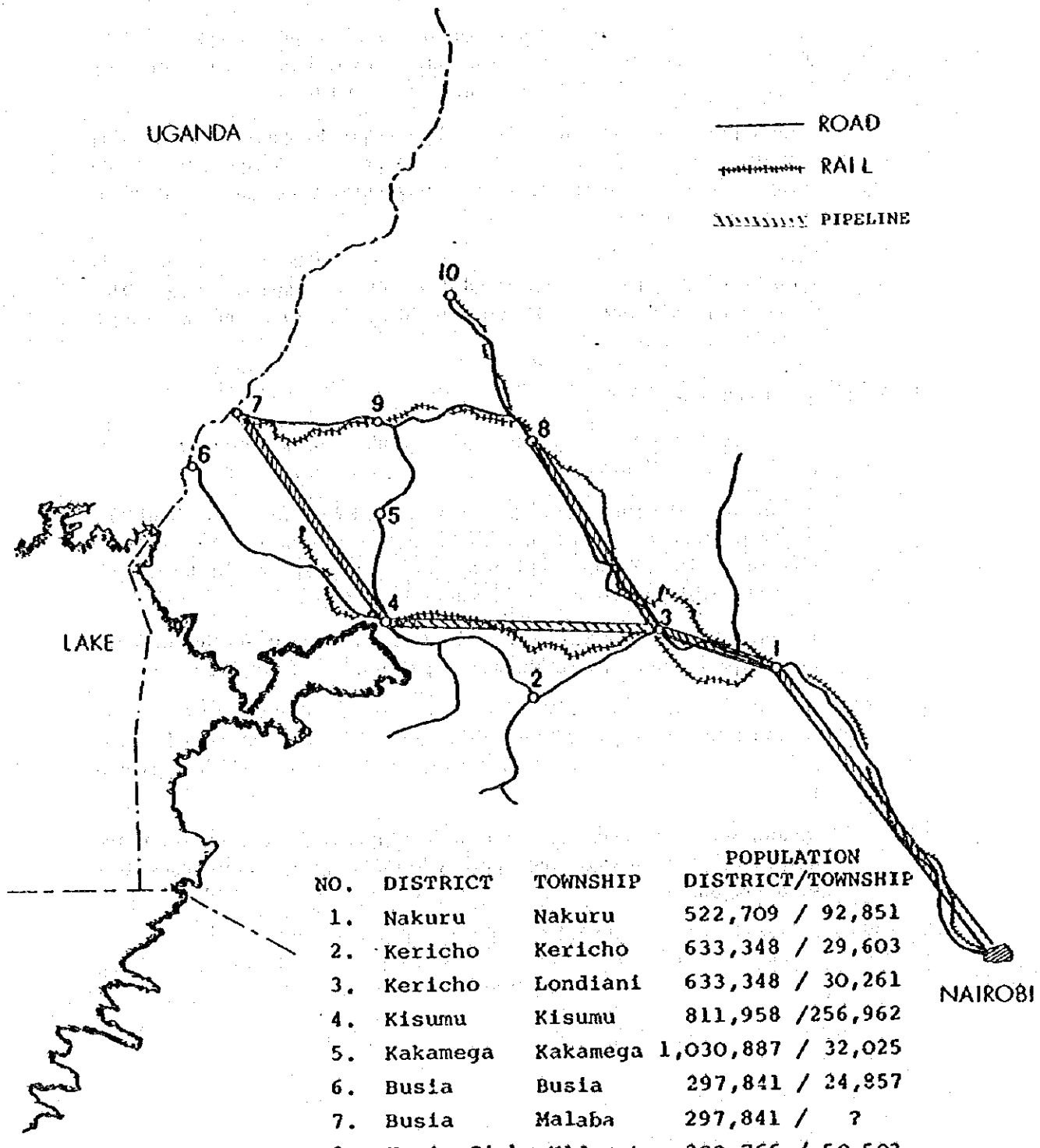
According to the 1982 OD table issued by the Kenya Railways, about 90% of the products freighted to north of Nairobi is consumed in such cities as Nakuru, Kericho, Kisumu and Eldoret in western Kenya and this tendency is correlated with population distribution in these districts.

Western Kenya has railways and roads more developed than other districts, being expected to be in an advantageous position in constructing pipelines.

With these advantages taken into account, a hopeful extension route may start at Nairobi and pass Nakuru, Kericho and Kisumu, arriving at Busia, as shown in Fig. 2-1-1. Busia can be a distribution base to neighbouring countries.

In addition, the route can branch off at Kericho, as a distribution base to the northern parts of western Kenya, down to Eldoret, where a terminal station should be built.

Fig. 2-1-1 Extension Pipeline Route in Western Kenya



NO.	DISTRICT	TOWNSHIP	POPULATION DISTRICT/TOWNSHIP
1.	Nakuru	Nakuru	522,709 / 92,851
2.	Kericho	Kericho	633,348 / 29,603
3.	Kericho	Londiani	633,348 / 30,261
4.	Kisumu	Kisumu	811,958 /256,962
5.	Kakamega	Kakamega	1,030,887 / 32,025
6.	Busia	Busia	297,841 / 24,857
7.	Busia	Malaba	297,841 / ?
8.	Uasin Gishu	Eldoret	300,766 / 50,503
9.	Bungoma	Webuya	503,935 / 17,963
10.	Trans Nzoia	Kitale	259,503 / 28,327

2.2 Oil Transport Demand

2.2.1 Petroleum Transport Demand By Pipeline

Existing Pipeline:

The consumption of products in Kenya and neighbouring countries turned downward after the peak in 1980, recording 73% of the peak in 1982. The annual throughout of the existing pipeline showed the same trend, declining in 1982, according to KPC statistics, to 87% of its peak.

However, consumption turned upward in 1983, being likely to achieve in the first half a 9.5% growth over the same period of the previous year.

Demand for product transport by the existing pipeline is estimated here with different annual growth rates: 2.0%, 2.5% and 5.0% over the 16 years between 1985 and 2000.

2.2.2 Demand for Products in Western Kenya and Neighbouring Countries

Annual throughput made in 1980 by KPC to Nairobi was used as a basis for the estimation of demand. This amount minus consumption in and around Nairobi is the consumption in western Kenya and neighbouring countries, which should be the throughput of a new extension pipeline.

The 1980 consumption of products in neighbouring countries (Uganda and Rwanda) was determined to be 300,000kℓ from the EIU report. It was assumed that consumption in and around Nairobi equals that in the other parts of western Kenya (from the Statistical Digest). The method of distribution in western Kenya was assumed to be tank truck transport with terminal stations built at major points: Nakuru, Eldoret, Kisumu and Malaba. Consumption in major district was estimated from the 1982 OD Table issued by the Kenya Railways.

Table 2-2-1 Forecasts of throughput for products on Mombasa-Nairobi Pipeline

(x 1,000m³/A)

Year	Increase of Demand (Annual Rate)		
	2.0%	2.5%	5.0%
1980	1,464	1,464	1,464
1985	1,616	1,656	1,868
1990	1,785	1,874	2,385
1995	1,970	2,120	3,044
2000	2,175	2,399	3,884

Table 2-2-2 Forecasts of demand for products in Western Kenya

(x 1,000m³/A)

Year	Increase of Demand (Annual Rate)		
	2.0%	2.5%	5.0%
1980	582	582	582
1985	643	658	743
1990	709	745	948
1995	783	843	1,210
2000	865	954	1,544

Table 2-2-3 Forecasts of demand for products in Neighbouring countries

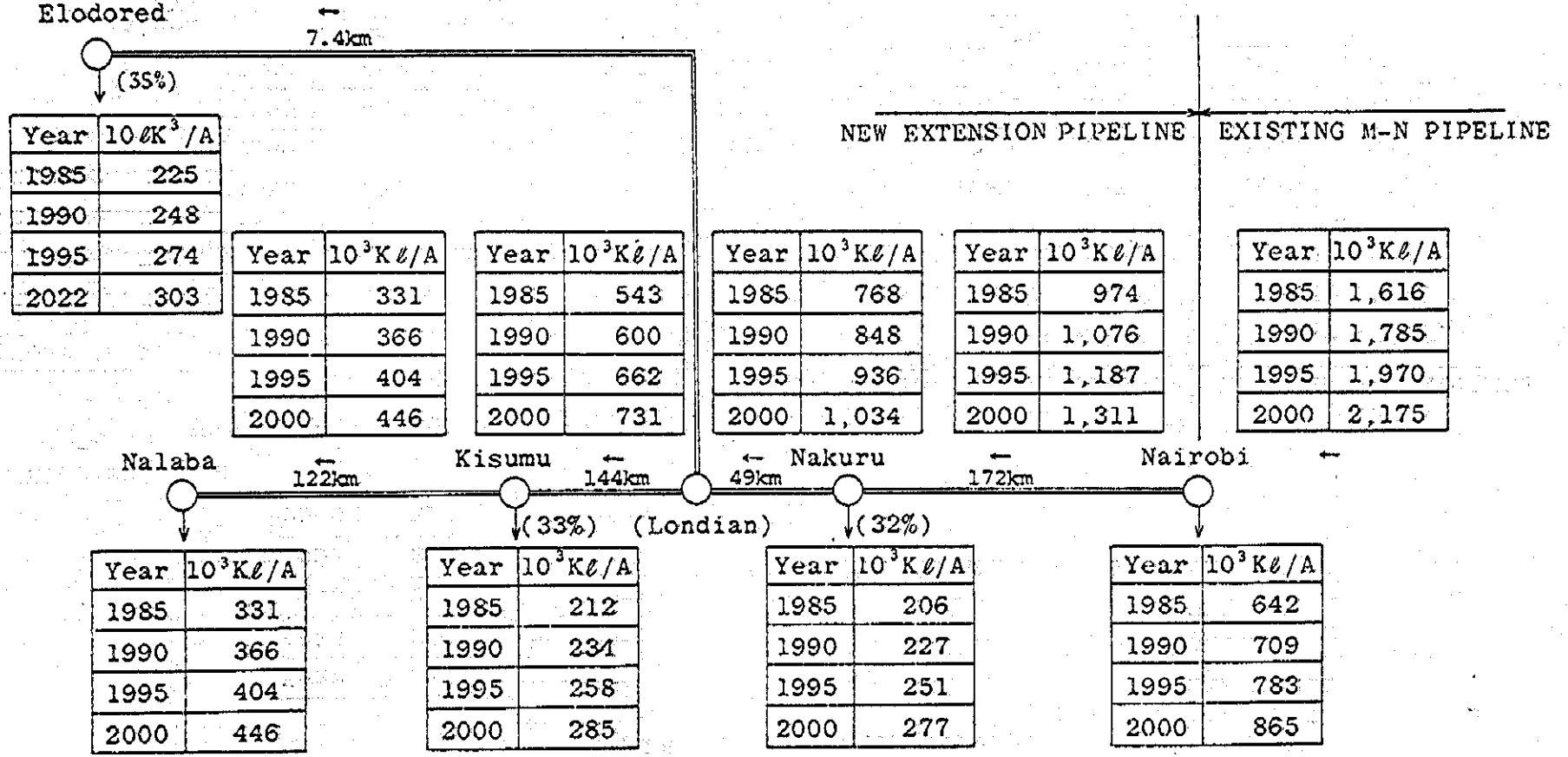
(x 1,000m³/A)

Year	Increase of Demand (Annual Rate)		
	2.0%	2.5%	5.0%
1980	300	300	300
1985	331	339	383
1990	366	384	489
1995	404	434	624
2000	446	492	796

Table 2-2-4 Annual Throughput of Products

Year	10^3Kℓ/A
1985	225
1990	248
1995	274
2000	303

Growth Rate: 2.0 %



Year	$10\ell K^3$/A
1985	225
1990	248
1995	274
2022	303

Year	10^3Kℓ/A
1985	331
1990	366
1995	404
2000	446

Year	10^3Kℓ/A
1985	543
1990	600
1995	662
2000	731

Year	10^3Kℓ/A
1985	768
1990	848
1995	936
2000	1,034

Year	10^3Kℓ/A
1985	974
1990	1,076
1995	1,187
2000	1,311

Year	10^3Kℓ/A
1985	1,616
1990	1,785
1995	1,970
2000	2,175

Year	10^3Kℓ/A
1985	331
1990	366
1995	404
2000	446

Year	10^3Kℓ/A
1985	212
1990	234
1995	258
2000	285

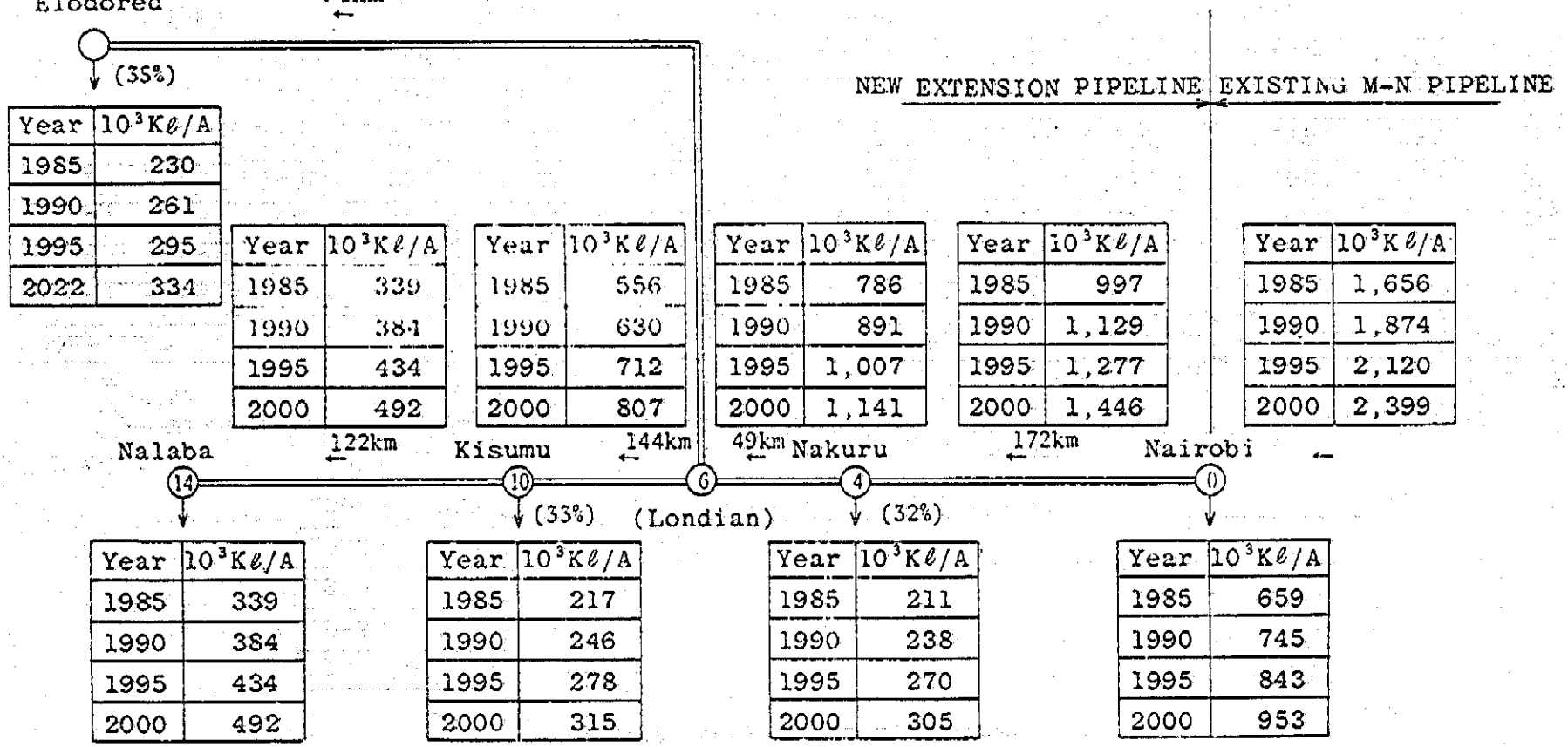
Year	10^3Kℓ/A
1985	206
1990	227
1995	251
2000	277

Year	10^3Kℓ/A
1985	642
1990	709
1995	783
2000	865

Table 2-2-5 Annual Throughput of Products

Year	10^3Kℓ/A
1985	230
1990	261
1995	295
2000	334

Growth Rate: 2.5 %



Year	10^3Kℓ/A
1985	230
1990	261
1995	295
2022	334

Year	10^3Kℓ/A
1985	339
1990	384
1995	434
2000	492

Year	10^3Kℓ/A
1985	556
1990	630
1995	712
2000	807

Year	10^3Kℓ/A
1985	786
1990	891
1995	1,007
2000	1,141

Year	10^3Kℓ/A
1985	997
1990	1,129
1995	1,277
2000	1,446

Year	10^3Kℓ/A
1985	1,656
1990	1,874
1995	2,120
2000	2,399

Year	10^3Kℓ/A
1985	339
1990	384
1995	434
2000	492

Year	10^3Kℓ/A
1985	217
1990	246
1995	278
2000	315

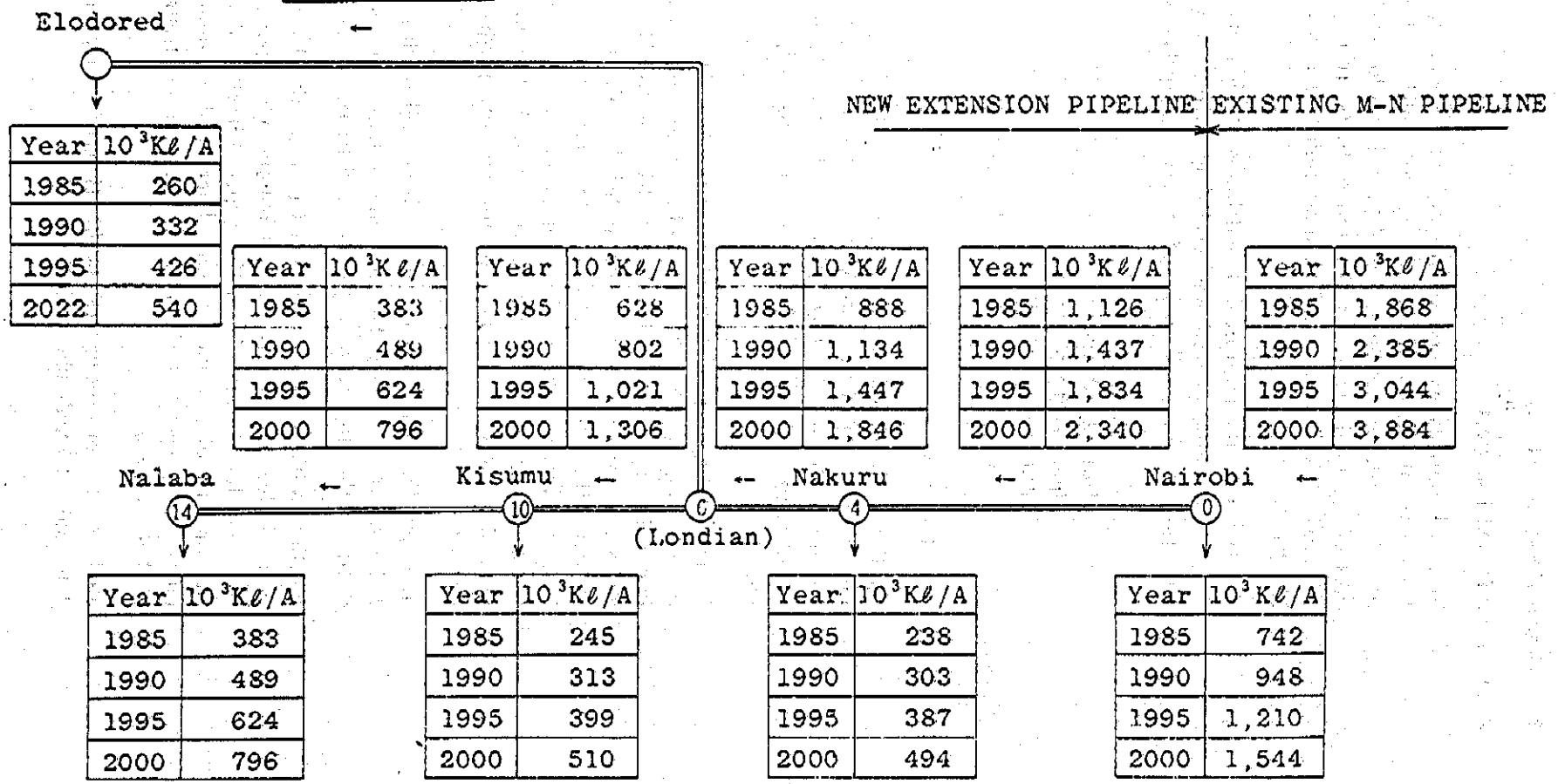
Year	10^3Kℓ/A
1985	211
1990	238
1995	270
2000	305

Year	10^3Kℓ/A
1985	659
1990	745
1995	843
2000	953

Table 2-2-6 Annual Throughput of Products

Year	10^3Kℓ/A
1985	260
1990	332
1995	426
2000	540

Growth Rate: 5.0 %



Year	10^3Kℓ/A
1985	260
1990	332
1995	426
2022	540

Year	10^3Kℓ/A
1985	383
1990	489
1995	624
2000	796

Year	10^3Kℓ/A
1985	628
1990	802
1995	1,021
2000	1,306

Year	10^3Kℓ/A
1985	888
1990	1,134
1995	1,447
2000	1,846

Year	10^3Kℓ/A
1985	1,126
1990	1,437
1995	1,834
2000	2,340

Year	10^3Kℓ/A
1985	1,868
1990	2,385
1995	3,044
2000	3,884

Year	10^3Kℓ/A
1985	383
1990	489
1995	624
2000	796

Year	10^3Kℓ/A
1985	245
1990	313
1995	399
2000	510

Year	10^3Kℓ/A
1985	238
1990	303
1995	387
2000	494

Year	10^3Kℓ/A
1985	742
1990	948
1995	1,210
2000	1,544

2.3 Design of Extension Plans

2.3.1 Plans for Oil Transport

Terminal stations will be constructed at Nakuru, Kisumu, Eldoret and Malaba on the route of a new extension pipeline. These stations will be provided with tank farms and loading facilities to enable tank truck transport of the products to neighbouring districts. To neighbouring countries, the products will be delivered from a terminal station which will be built in Malaba.

To determine the ratio of different kinds of products consumed in these districts, the ratio of oil kinds, excluding jet fuel, in products shipped in 1982 from the Nairobi Terminal of the existing pipeline will be used.

Motor spirit premium	26%
Motor spirit regular	20
Illumianting kerosene	12
Automotive gas oil	42
	100%

2.3.2 Plans for Facilities

Starting at the Nairobi Pump Station, the extension pipeline will run up to Limuru, an inlet of the Rift Valley, and run straight down the valley to Nakuru. In Nakuru, loading facilities and a tank farm for distributing the products to neighbouring districts will be provided, together with booster pumps.

From Nakuru, the pipeline will run sharply up to Londiani, the highest point of the entire pipeline, where it will branch to main and spur lines. The main line will run down from Londiani to Kisumu. In Kisumu, loading facilities and a tank farm will be provided to distribute the products to neighbouring districts. Then, the pipeline will finally reach a terminal station in Malaba. Since the route in this final section is downward toward the terminal, no booster pumps will be needed in Kisumu. In Malaba, loading facilities and a tank farm will be provided to forward the products to neighbouring countries.

The spur line, branching off at Londiani, will reach a terminal station in Eldoret, where loading facilities and a tank farm will be provided to distribute the products to neighbouring districts.

Pipeline facilities should be planned to meet the demand in 2000, and an optimal pipeline diameter and required pump horsepower determined which will meet target demands. In this paper, 3 levels of demand were assumed and optimal pipe diameters were determined accordingly. Also, required pump horsepower was obtained for 3 cases from throughputs and required discharge pressures.

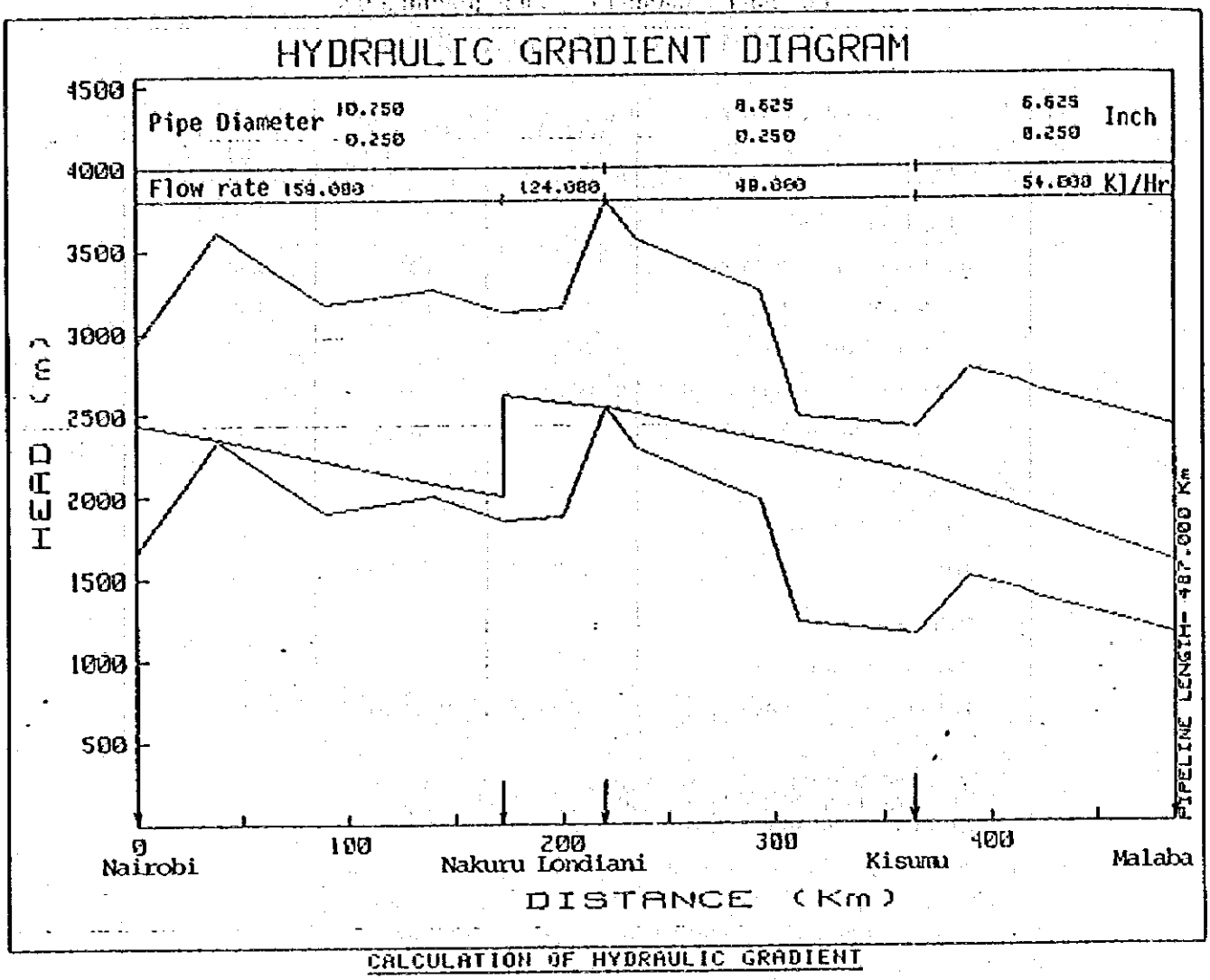
Table 2-3-1 shows the general specifications of the pipeline and Tables 2-3-2, 2-3-3 and 2-3-4 hydraulic gradients.

Table 2-3-1 General Pipeline Specifications

Facilities \ Annual % Growth	Case 1 2%	Case 2 2.5%	Case 3 5%
1. Pipeline Size			
a. Nairobi - Nakuru	10"	10"	10"
b. Nakuru - Londiani	10"	10"	10"
c. Londiani- Kisumu	8"	8"	8"
d. Kisumu - Malaba	6"	6"	8"
e. Londiani- Eldored	6"	6"	6"
2. Pump Station			
No. of Stations	2	2	* 2 & 3
Total Pump Capacity	1,000HP	1,250HP	3,250HP
3. Tank Farm			
No. of Locations	5	5	5
Total Tank Capacity	73,000kℓ	84,000kℓ	134,000kℓ

* Two pump stations at Nairobi and Nakura will be installed in the initial stage, then additional pump stations between Nairobi and Nakuru will be installed in 1997.

Fig. 2-3-1 CASE-1 Annual % growth: 2.0%

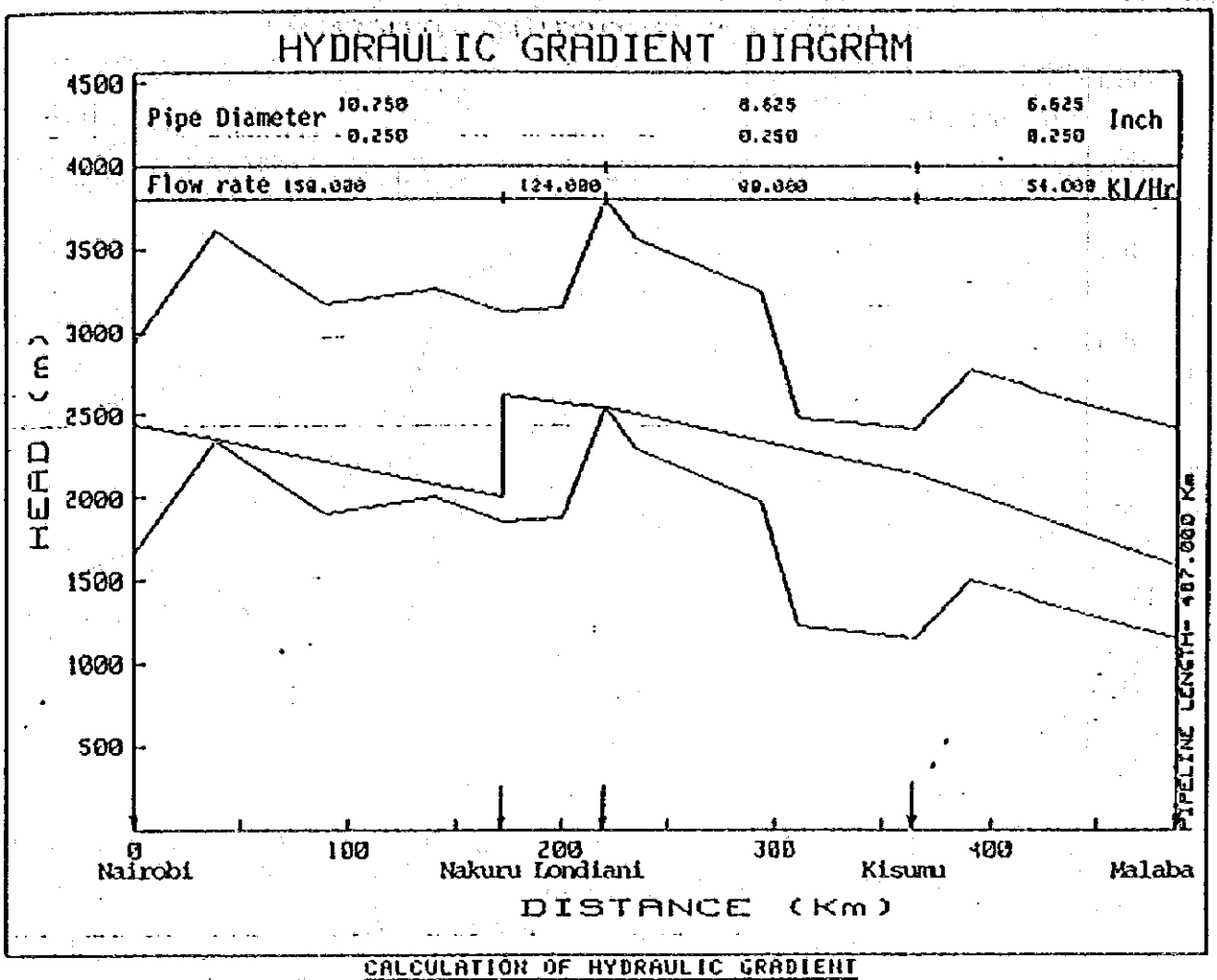


CALCULATION OF HYDRAULIC GRADIENT

(1) PROFILE

POINT	LENGTH (Km)	HEIGHT (m)
0	0.000	1662.000
1	38.000	2344.000
2	89.000	1900.000
3	140.000	1998.000
4	172.000	1851.000
5	200.000	1878.000
6	221.000	2537.000
7	235.000	2296.000
8	293.000	1981.000
9	311.000	1220.000
10	365.000	1146.000
11	390.000	1502.000
12	415.000	1412.000
13	420.000	1375.000
14	487.000	1150.000

Fig. 2-3-1 CASE-1 Annual % growth: 2.0%

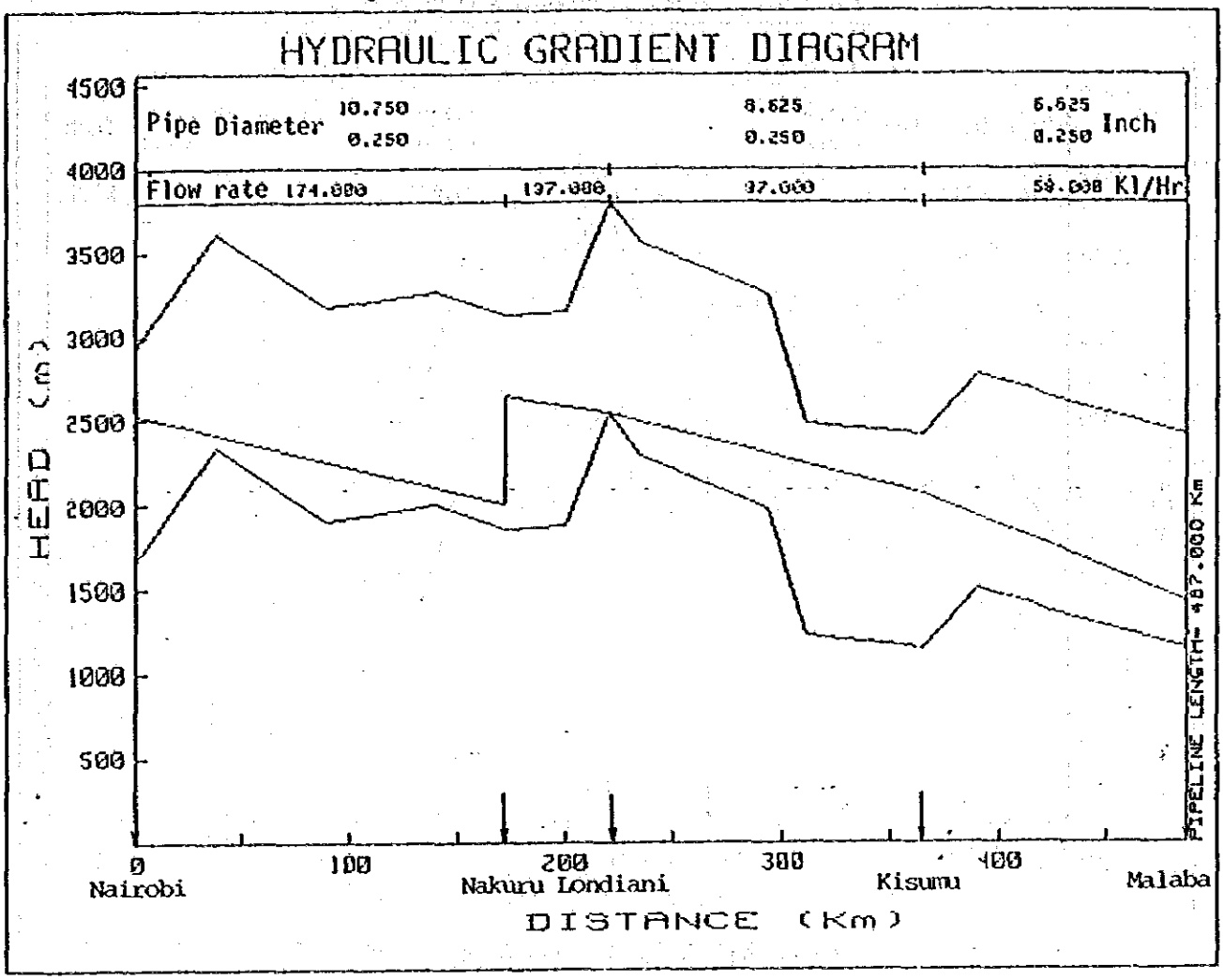


CALCULATION OF HYDRAULIC GRADIENT

(1) PROFILE

POINT	LENGTH (Km)	HEIGHT (m)
0	0.000	1662.000
1	38.000	2344.000
2	89.000	1900.000
3	140.000	1998.000
4	172.000	1851.000
5	200.000	1878.000
6	221.000	2537.000
7	235.000	2296.000
8	293.000	1981.000
9	311.000	1220.000
10	365.000	1146.000
11	390.000	1502.000
12	415.000	1412.000
13	420.000	1375.000
14	487.000	1150.000

Fig. 2-3-2 CASE-2 Annual % Growth: 2.5%

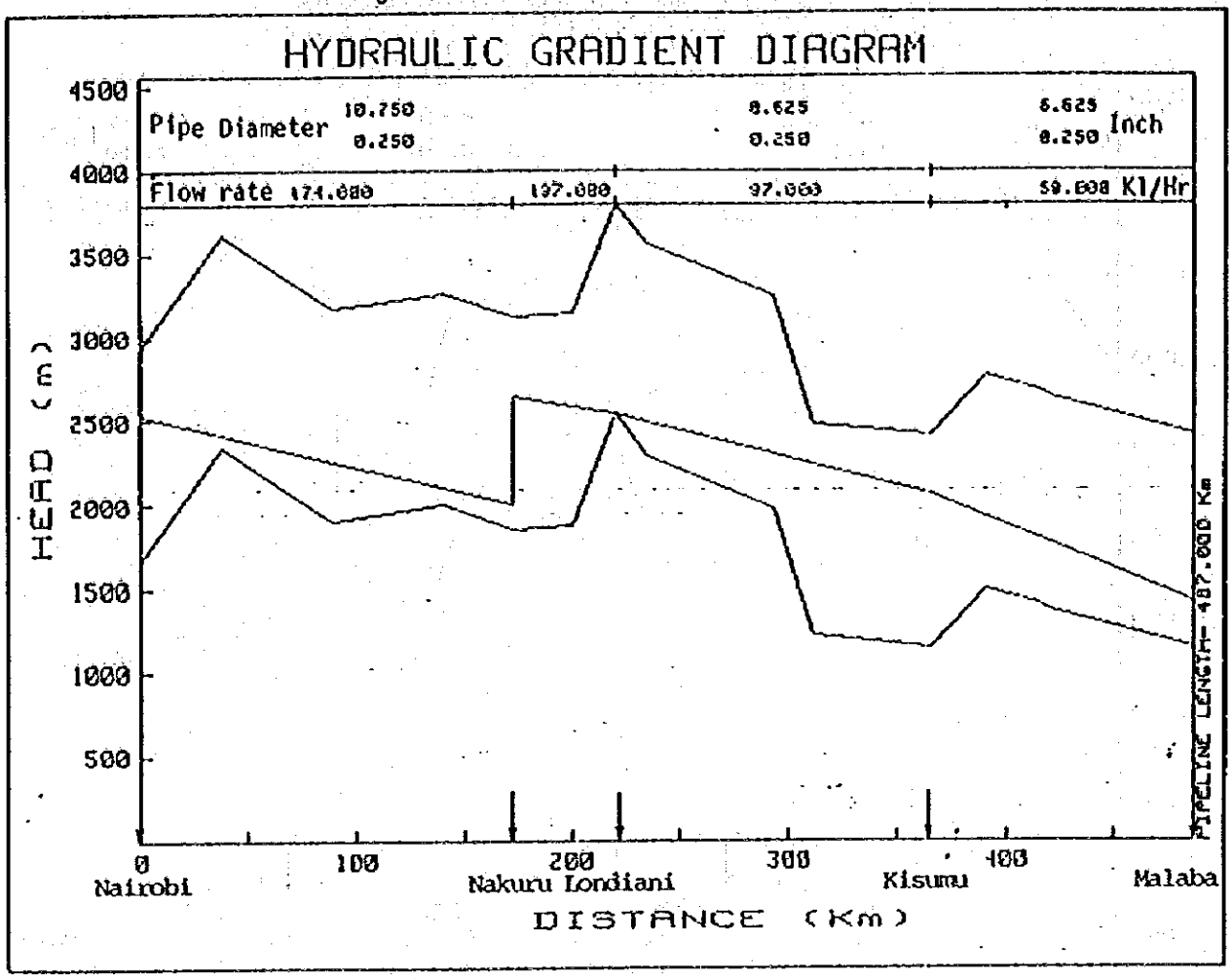


CALCULATION OF HYDRAULIC GRADIENT

(1) PROFILE

POINT	LENGTH (Km)	HEIGHT (m)
0	0.000	1662.000
1	38.000	2344.000
2	89.000	1900.000
3	140.000	1998.000
4	172.000	1851.000
5	200.000	1878.000
6	221.000	2537.000
7	235.000	2296.000
8	293.000	1981.000
9	311.000	1220.000
10	365.000	1146.000
11	390.000	1502.000
12	415.000	1412.000
13	420.000	1375.000
14	487.000	1150.000

Fig. 2-3-2 CASE-2 Annual % Growth: 2.5%

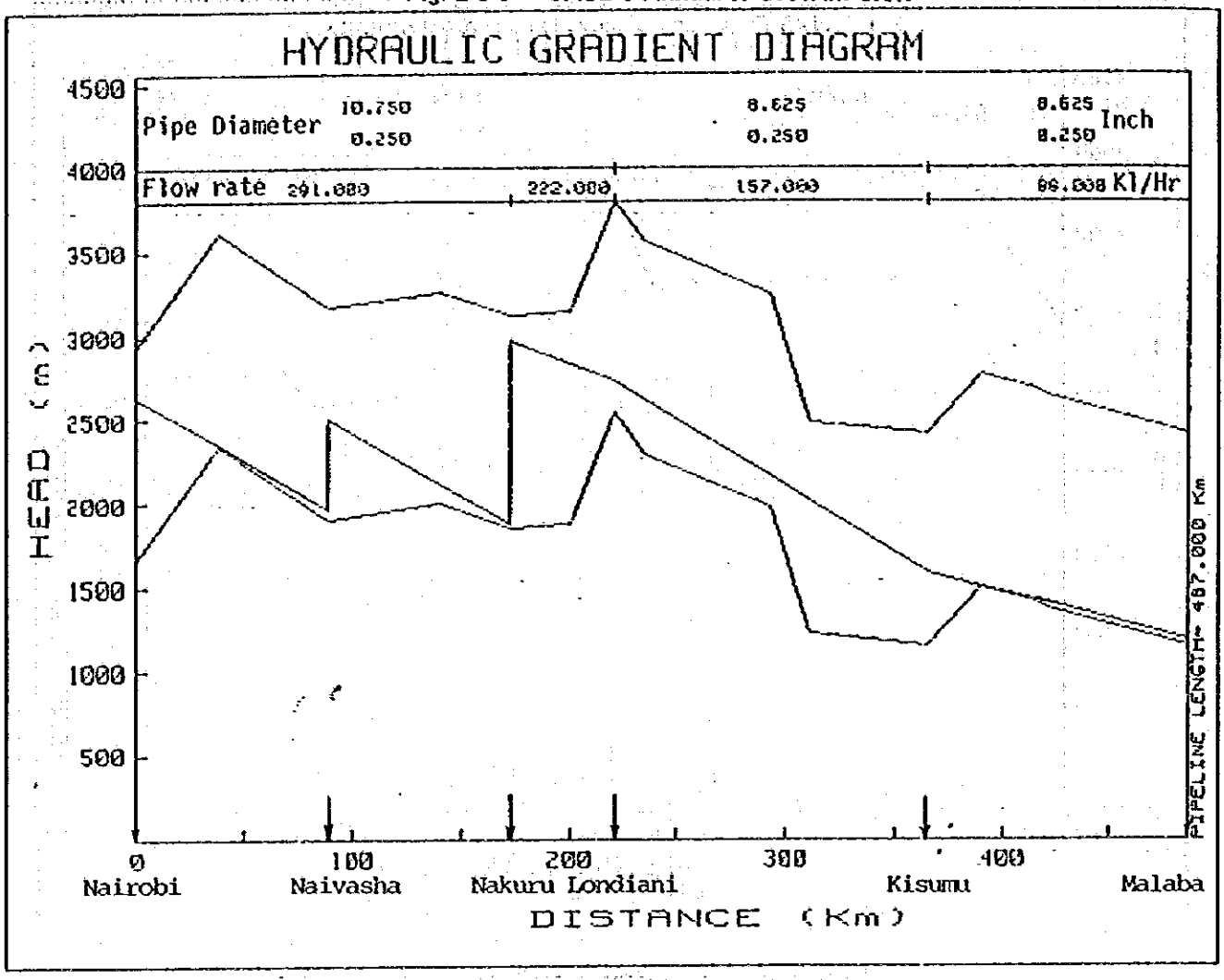


CALCULATION OF HYDRAULIC GRADIENT

(1) PROFILE

POINT	LENGTH (Km)	HEIGHT (m)
0	0.000	1662.000
1	38.000	2344.000
2	89.000	1900.000
3	140.000	1998.000
4	172.000	1851.000
5	208.000	1878.000
6	221.000	2537.000
7	235.000	2296.000
8	293.000	1981.000
9	311.000	1220.000
10	365.000	1146.000
11	398.000	1502.000
12	415.000	1412.000
13	420.000	1375.000
14	487.000	1150.000

Fig. 2-3-3 CASE-3 Annual % Growth: 5.0%

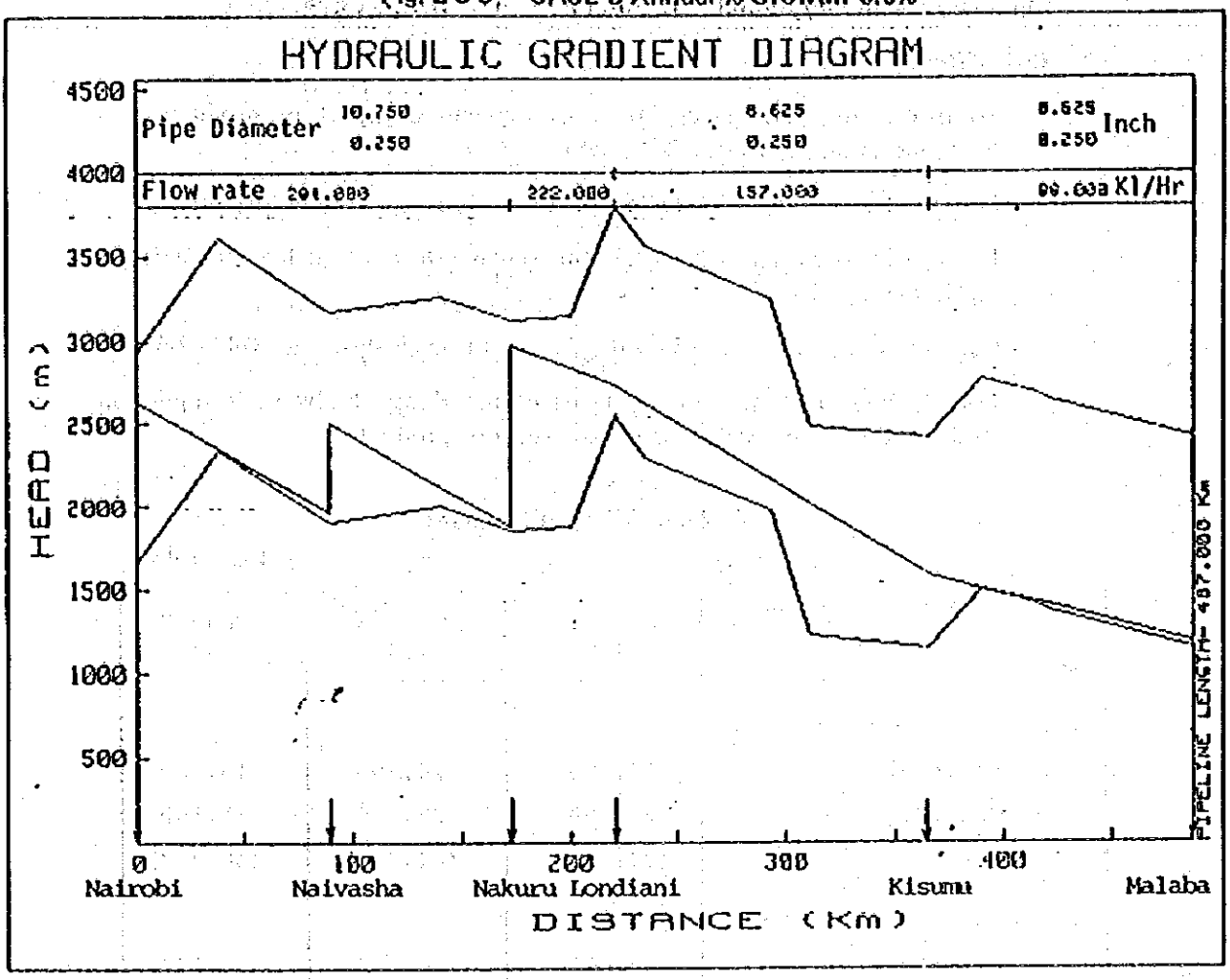


CALCULATION OF HYDRAULIC GRADIENT

(1) PROFILE

POINT	LENGTH (Km)	HEIGHT (m)
0	0.000	1662.000
1	38.000	2344.000
2	89.000	1900.000
3	140.000	1998.000
4	172.000	1851.000
5	200.000	1873.000
6	221.000	2537.000
7	235.000	2296.000
8	293.000	1981.000
9	311.000	1220.000
10	365.000	1146.000
11	390.000	1502.000
12	415.000	1412.000
13	420.000	1375.000
14	487.000	1150.000

Fig. 2-3-3, CASE-3 Annual % Growth: 5.0%



CALCULATION OF HYDRAULIC GRADIENT

(1) PROFILE

POINT	LENGTH (Km)	HEIGHT (m)
0	0.000	1662.000
1	38.000	2344.000
2	89.000	1900.000
3	140.000	1998.000
4	172.000	1851.000
5	208.000	1878.000
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8	293.000	1981.000
9	311.000	1220.000
10	365.000	1146.000
11	390.000	1502.000
12	415.000	1412.000
13	420.000	1375.000
14	487.000	1150.000

2.4 Preliminary Feasibility Study

2.4.1 Cost/Effect

To investigate cost versus effect of pipeline transport of products, the following assumptions should be made.

Construction cost is estimated on the basis of present commodity prices.

For operating expenses 3.5$/Kℓ, the actual rate expended on the existing pipeline, is applied.

Construction cost estimated on these assumptions is shown in Table 2-4-1.

For pipeline tariff, the present tariff of the Kenya Railways is applied in studying the economy of pipeline transport of products.

Table 2-4-1 Project Estimation

Unit: $10^3$$

Item \ Annual % Growth	Case 1 2%	Case 2 -2.5%	Case 3 5%
1. Pipeline Construction			
a. Materials	14,700	14,700	15,600
b. Construction	29,500	29,500	31,100
Subtotal	(44,200)	(44,200)	(46,700)
2. Station Construction			
a. Materials	5,600	6,300	12,100
b. Construction	3,700	4,200	8,000
Subtotal	(9,300)	(10,500)	(20,100)
3. Teleme. Telecom	6,400	6,400	6,400
4. Duty & Tax	6,000	6,100	7,300
5. Engineering Fee	1,500	1,500	1,800
6. Overhead & Profit	10,100	10,300	12,300
7. Project Managing Fee	3,900	4,000	4,700
Total	81,400	83,000	99,300

2.4.2 Running Profitability

As a method of investigating running profitability, pay-out time for the investment is given here.

It is assumed that the pipeline starts operation in 1986, the equipment depreciation period is 15 years ending in 2000 and that equipment funds are all covered by loans.

The interest rate is an annual 7.5% unredeemable for the first three years and repayment is at a constant rate. The tax rate on business profits is 52.5%.

On these assumptions, pay-out time can be obtained as follows:

Case	Pay-Out Time
1	10.3 years
2	9.8 years
3	9.5 years

Cash flows between 1986 and 2000 for the 3 cases are shown in Tables 2-4-2, 2-4-3, and 2-4-4.

Table 2-4-2 Cash Flow [Case 1. Annual % Growth: 2%]

No.	Year	Throughput	Oil Transport Revenue	Operational Expenditure	Total Expenditure	Income Before Taxation	Net Income	Cash Flow	Cumulative Cash Flow	Pay-Out Time
1	1986	993	16,881	3,476	11,860	5,021	2,385	7,245	7,245	
2		1,013	17,221	3,546	11,930	5,291	2,513	7,373	14,618	
3		1,034	17,578	3,619	12,003	5,575	2,648	7,508	22,126	
4		1,054	17,918	3,689	12,073	5,845	2,776	7,636	29,762	
5	1990	1,075	18,275	3,763	12,147	6,128	2,911	7,771	37,533	
6		1,097	18,649	3,840	12,224	6,425	3,052	7,912	45,445	
7		1,119	19,023	3,917	12,301	6,722	3,193	8,053	53,498	
8		1,141	19,397	3,994	12,378	7,019	3,334	8,194	61,692	
9		1,164	19,788	4,074	12,458	7,330	3,482	8,342	70,034	
10	1995	1,187	20,179	4,155	12,539	7,640	3,629	8,489	78,523	
11		1,211	20,587	4,239	12,623	7,964	3,783	8,643	87,166	10.3 Year
12		1,235	20,995	4,323	12,707	8,288	3,937	8,797	95,963	
13		1,260	21,420	4,140	12,794	8,626	4,097	8,957	104,920	
14		1,285	21,845	4,498	12,882	8,963	4,257	9,117	114,037	
15	2000	1,311	22,287	4,589	12,973	9,314	4,424	9,284	123,321	

Table 2-4-3 Cash Flow [Case 2. Annual % Growth: 2.5%]

No.	Year	Throughput	Oil Transport Revenue	Operation Expenditure	Total Expenditure	Income Before Taxation	Net Income	Cash Flow	Cumulative Cash Flow	Pay-Out Time
1	1986	1,022	17,374	3,577	12,168	5,206	2,473	7,453	7,453	
2		1,047	17,799	3,665	12,256	5,543	2,633	7,613	15,066	
3		1,074	18,258	3,759	12,350	5,908	2,806	7,786	22,852	
4		1,101	18,717	3,854	12,445	6,272	2,979	7,959	30,811	
5	1990	1,128	19,176	3,948	12,539	6,637	3,153	8,133	38,944	
6		1,156	19,652	4,046	12,637	7,015	3,332	8,312	47,256	
7		1,185	20,145	4,148	12,739	7,406	3,518	8,498	55,754	
8		1,215	20,655	4,253	12,844	7,811	3,710	8,690	64,444	
9		1,245	21,165	4,358	12,949	8,216	3,903	8,883	73,327	
10	1995	1,276	21,692	4,466	13,057	8,635	4,102	9,082	82,409	10 Year
11		1,308	22,236	4,578	13,169	9,067	4,307	9,287	91,696	
12		1,341	22,797	4,694	13,285	9,512	4,518	9,498	101,194	
13		1,374	23,358	4,809	13,400	9,958	4,730	9,710	110,904	
14		1,408	23,936	4,928	13,519	10,417	4,948	9,928	120,832	
15	2000	1,446	24,582	5,061	13,652	10,930	5,192	10,172	131,004	

Table 2-4-4 Cash Flow [Case 3. Annual % Growth: 5%]

No.	Year	Throughput	Oil Transport Revenue	Operation Expenditure	Total Expenditure	Income Before Taxation	Net Income	Cash Flow	Cumulative Cash Flow	Pay-Out Time
1	1986	1,182	20,094	4,137	14,487	5,607	2,663	8,663	8,633	
2		1,241	21,097	4,344	14,694	6,403	3,041	9,041	17,704	
3		1,303	22,151	4,561	14,911	7,240	3,439	9,439	27,143	
4		1,369	23,273	4,792	15,142	8,131	3,862	9,862	37,005	
5	1990	1,437	24,429	5,030	15,380	9,049	4,298	10,298	47,303	
6		1,509	25,653	5,282	15,632	10,021	4,760	10,760	58,063	
7		1,584	26,928	5,544	15,894	11,034	5,241	11,241	69,304	
8		1,664	28,288	5,824	16,174	12,114	5,754	11,754	81,058	
9		1,747	29,699	6,115	16,465	13,234	6,286	12,286	93,344	9.5 Year
10	1995	1,834	31,178	6,419	16,769	14,409	6,844	12,844	106,188	
11		1,926	32,742	6,741	17,091	15,651	7,434	13,434	119,622	
12		2,022	34,374	7,077	17,427	16,947	8,050	14,050	133,672	
13		2,123	36,091	7,431	17,781	18,310	8,697	14,697	148,369	
14		2,229	37,893	7,802	18,152	19,741	9,377	15,377	163,746	
15	2000	2,341	39,797	8,194	18,544	21,253	10,095	16,095	179,841	

2.5 Suggestions

Although declining oil consumption turned upward in 1982, there is little hope of rapid recovery of consumption considering the expected growth of Kenya's economy and the Government's energy policies. The economic growth rate is expected most definitely to be an annual 2.5% from the results of extensive economic analysis, the growth of oil demand estimated by the Ministry of Energy being the same 2.5%. Even assuming this modest annual growth rate, the invested money will be recovered around 1995, 9 years after the pipeline is put into operation in 1986 (see Table 8-4-2). This implies that KPC's business if the present project is carried out will pay.

This pipeline business will help eliminate road damage caused by large-capacity tank trucks, while enabling the Government to increase its income, and will bring about positive economic effects outside the company.

To achieve these purposes, it is preferable to complete this project during the fifth Five-Year Plan.

APPENDIX

List of Kenyan and Japanese Government Officials concerned and Study Team

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

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

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	Ministryof Construction
	Mr. T. Iijima	Ministryof Construction
	Mr. S. Isoda	Ministry of Transport
	Mr. H. Okuno	Ministry of Construction
	Mr. M. Miyashita	Ministryof 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

Mr. K. Shishikura	Maritime Transport and Inland Waterway Transport
Mr. T. Tomishige	Airport Planning
Mr. K. Kosaki	Air Space Planning
Mr. K. Mackita	Air Transport Planning
Mr. K. Motosugi	Pipeline Planning

4. EMBASSY OF JAPAN

Mr. R. Hagio	First Secretary, Nairobi

5. JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Mr. N. Fukushiro	JICA Headquarters
Mr. K. Notake	JICA Headquarters
Mr. T. Nagashima	JICA Nairobi Office