THE REPUBLIC OF KENYA

SAFE WATER SUPPLY DETAILED DESIGN SURVEY UNDER THE COMMUNICABLE DISEASES RESEARCH AND CONTROL

MARCH 1983

JAPAN INTERNATIONAL COOPERATION AGENCY

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Preface

P R E F A C E

The Japan International Cooperation Agency (JICA), entrusted with its works by the Government of Japan, has been extending medical cooperation to the Government of the Republic of KENYA on Communicable Diseases Research and Control Project since 1979.

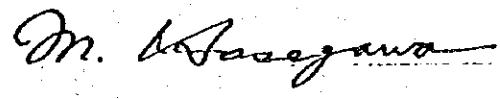
As part of the above Project, at the request of the Government of the Republic of KENYA, JICA has decided to conduct a study on the rural water supply facilities and dispached in January 1983 to the Republic of KENYA a survey team.

After the field survey, the survey team analysed and evaluated the findings and data obtained, and has completed this report.

I hope that the Project would contribute to the advancement of the welfare of the Kenyan people and to the strengthening of the friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of KENYA for their close cooperation and support extended to the team.

March, 1983



Masao HASEGAWA

Executive Director

Japan International Cooperation Agency

Fig. 1

LOCATION MAP

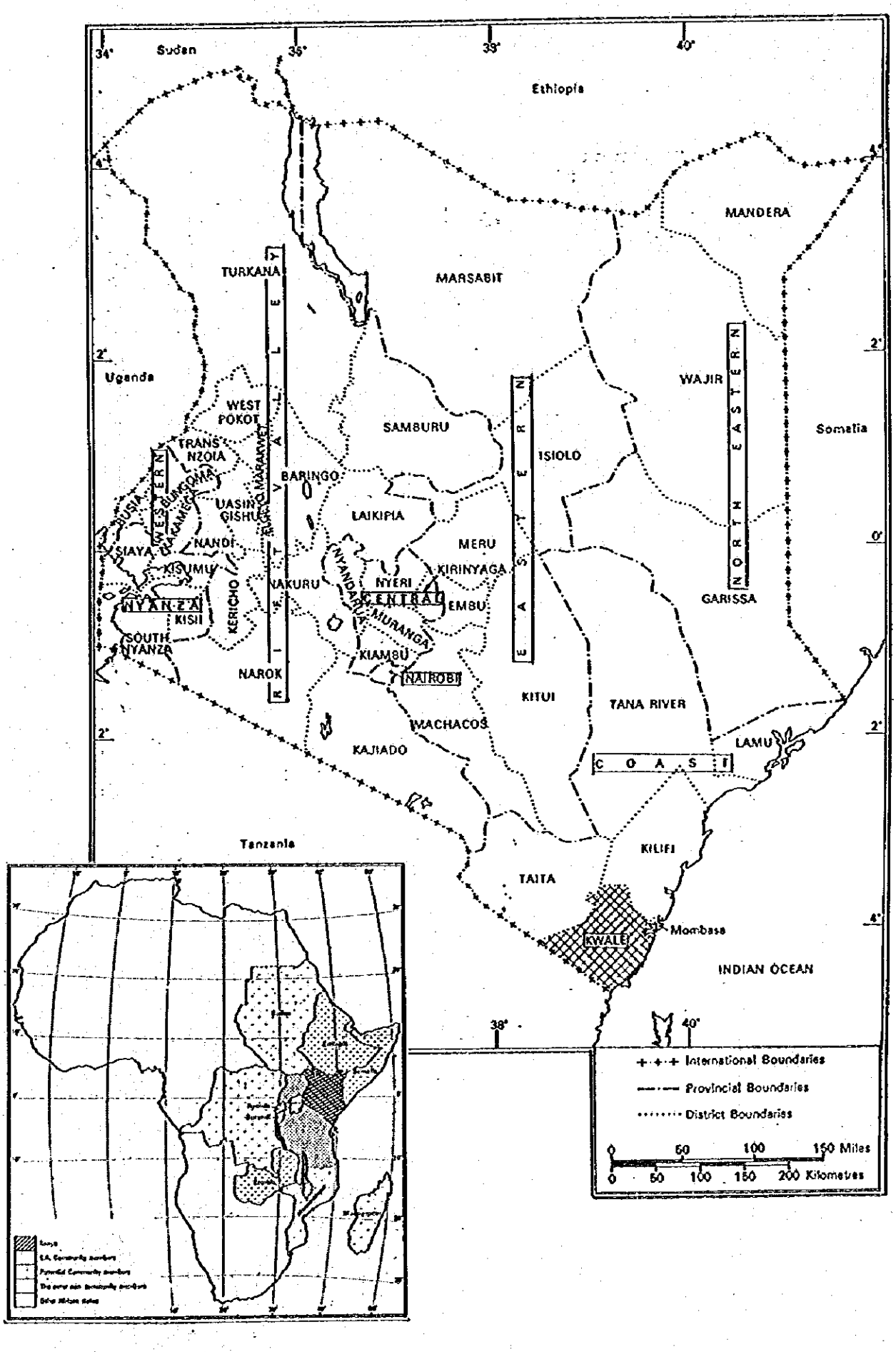
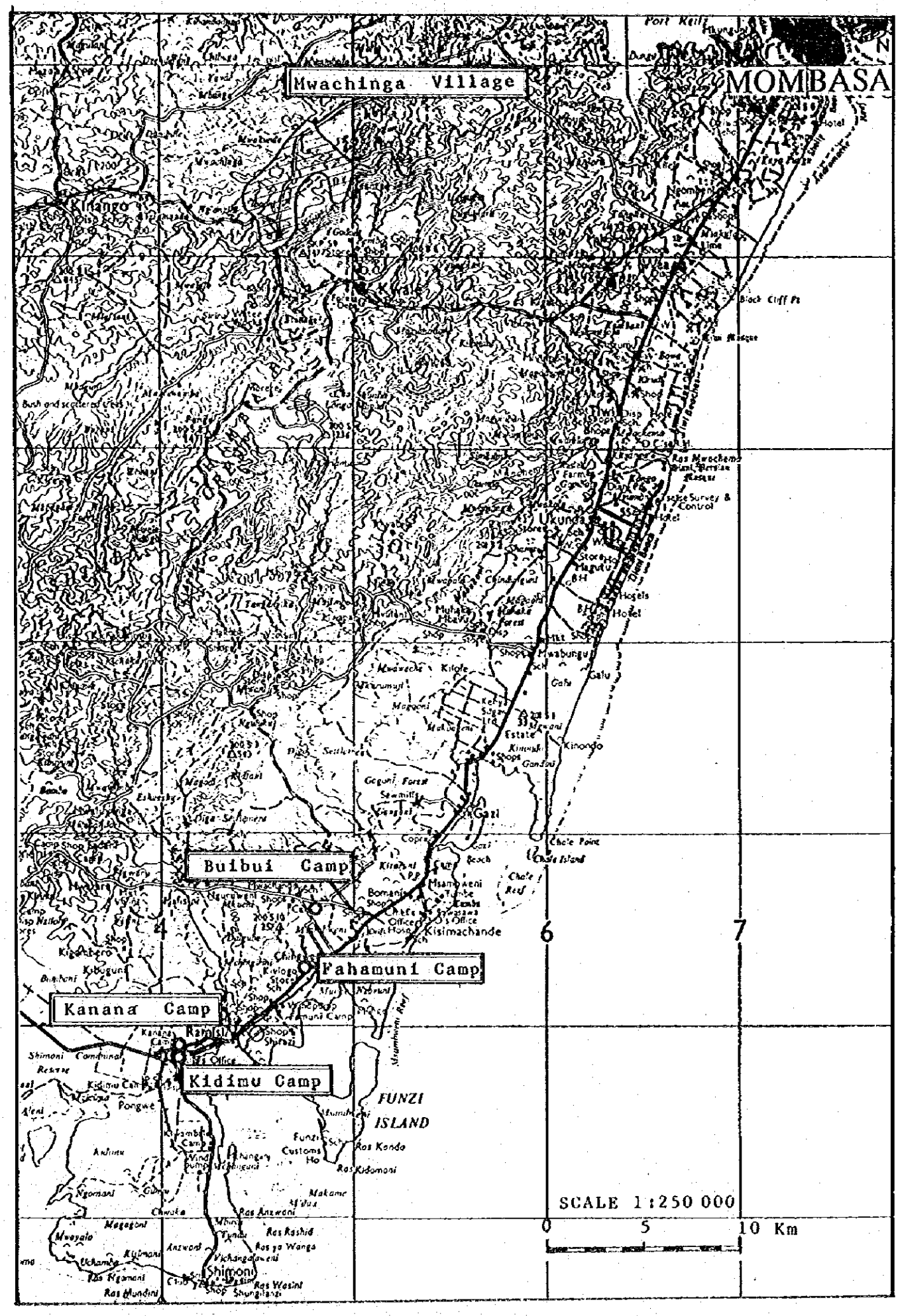


Fig. 2

PROJECT AREA



SUMMARY

S U M M A R Y

1. Objectives and Scope of the Survey

This Safe Water Supply Detailed Design Survey Project is an integral part of The Communicable Diseases Research and Control Project in Kenya which is being executed under the international technical cooperation of the Japan International Agency (J.I.C.A.). Its goal is to supply safe water to model camps and their surroundings.

The survey areas covered by the Communicable Diseases Research and Control Project, were classified into two categories: Hinterland and Coastal Area.
Data collection and field surveys were carried out for about one month between 17th January 1983 and 15th February 1983.

2. General Description of the Model Camps and the Necessity for Safe Water Supply Facilities

a) Coastal Area

The Coastal Area is located where the range of land elevation is between 10 m and 30 m above sea level. The area is almost flat and covered with dry sandy soil. The main plantations in this area are coconut, cashew nuts, sugar-cane etc.
A sugar factory is located in this area and about 16 camps for laborers are scattered throughout the area. Domestic water for the people in the camps is independent mostly on the water supply facilities for the sugar factory, however, most domestic water in this area comes from springs and wells which are about 2.5 m in diameter and 5 to 10 m deep.

Electric Power supply facilities are not yet available in this area.

The present status of water use differs in each camp. In place where a natural spring is available, people go to the spring to fetch domestic water just a few hundred meters from the camp. In many cases, the amount of water available is quite limited. In addition, since clothes and other items are washed at the spring, the spring water is always subject to pollution.

In other places where the ground-water level is shallow, simple dug wells are the domestic water source. In these cases the well opening is not covered so that well water is also subject to pollution.

Under these circumstances, it is obvious that the provision of safe domestic water will contribute to the protection of people from communicable diseases which may also be reflected in the upgrading of the peoples' standard of living.

b) Hinderland

Hinterland is located in a hilly area with some scattered rock outcrops. The elevation of this area is about 150 m above sea level. Since the soil is not very fertile, the area is almost completely covered with bush and only cashw nuts are planted. The soil is a very thin red soil or silty sand. Houses in this area are scattered and the standard of living seems to be lower than that in the coastal area.

The Pemba River and its branches which run near the area are a major source for domestic water. Four water connections located along the water supply pipeline to Mombasa City are also considered as a water source for the area, however, most people in the area depend upon

the river water because of the water charges required for use of the water obtained from the main pipeline.

It is quite difficult to obtain water during the dry season because the small tributaries of the Pemba River dry up.

Those people who live some distance from the tributaries must walk several kilometers in order to obtain their domestic water from the main river.

The Pemba River and its tributaries are polluted with Schistosomiasis Haematobium and most people in the area are infected with Schistosomiasis.

A safe water supply in this area might be effective for the control of not only Schistosomiasis but also other water born diseases which will result in contributing greatly to the welfare of the people in the area.

3. Basic Policy for a Safe Water Supply Plan

The following items were considered in the preparation of the plan:

a) Public electric power supply and a stable supply of oil or fuel were not anticipated for the study area, and therefore, it would be rather costly to utilize any facilities requiring.

It is therefore considered desirable that such a power supply facilities be avoided.

b) In selecting the type of water supply facilities the following conditions should be taken into account:

1) The facilities should consist of simple structures which are quite durable.

2) Operation and maintenance costs should be low.

c) A stable water source should be selected.

d) Construction cost of the facilities should be low

e) In selecting the facilities, the results of the study by the Communicable Diseases Research and Control project should be considered and the facilities selected should be effective as an objective for further study in the Project.

f) Facilities should be selected which can be operated easily by the people living in the area.

g) The facility selected should be free from water pollution.

4. Safe Water Supply Facilities

Based on the basic policy for a safe water supply plan stated in section 3 and the results of field surveys such as geoelectric resistivity surveys, yield tests, etc., the following facilities are considered to be the most suitable:

a) Coastal Area

Based on the information from results of geoelectric resistivity surveys and yield tests, it is estimated that free water exists 10 m to 20 m below the ground surface. Water quality and quantity will meet the requirements for drinking water. Shallow wells which are tightly covered at the top are considered to be the most suitable water source in this area.

The average diameter of well is estimated to be about 2.5 m and the depth will range from 10 m to 20 m. As a power source for pumping up the water from the wells,

a windmill and hand pumps are proposed. A washing space and bathing area are considered to be as required supplementary facilities.

The proposed location and number of wells are shown in the following table.

Table 1 The Location and Number of Wells and Other Facilities

Facilities	Well	Hand pump	Washing space	Windmill with Water Tank and Bathing Area	
(Name of camp)					
Buibui	1	1	1	1	To be constructed
Fahamuni	2	2	2	1	To be constructed and Rehabilitation
Kanana	2	2	2	1	ditto
Kidimu	1	1	1	1	To be constructed
Others	10	10	10	-	(*)
Total	16	16	16	4	

(*) Four selected camps including Buibui, Fahamuni, Kanana and Kidimu were surveyed at this time.

In order to control communicable diseases, the construction of additional facilities in other areas is considered desirable. Additional facilities will be surveyed during the construction period of the above facilities in the four selected camps.

b) Hinterland

Based on the results of the field surveys, it was found that pumping ground water from shallow wells is impossible from the hydrogeological stand point. Since deep well construction, power supply and operation and maintenance are expensive, it is considered that this method would not be suitable for this area.

As stated previously, the water supply pipeline to Mombasa City runs along the Pemba River. The Ministry of Water Development of Mombasa who administers the water supply system permits the withdrawal of domestic water for the people living in this area from the Mombasa Pipeline.

The Government of Kenya will possibly provide financial assistance for the water charge payments. Three intakes can therefore be installed along the pipeline and suitable washing space and bathing sheds can be provided as supplementary facilities.

5. Estimate of Construction Cost

Based on the commercial estimate of cost and unit prices available in February 1983 obtained at the site, the construction costs for each of the facilities have been estimated. The estimated cost includes a price escalation of 15% of the construction cost considering inflationary effects and an additional five percent for contingency. Table 2 on the next page indicates the estimated construction costs for each of the camps and hinterland.

Table 2 CONSTRUCTION COST

Camp Area	Facilities	Cost (Ksh)
Buibui	Well, Windmill, Washing place, Bathing shed & Pump.	188 600
Fahamuni	Rehabilitation of Well & Windmill. Washing place, Bathing shed & Pump.	169 500
	Well, Washing place & Pump.	38 100
Kanana	Rehabilitation of Well. Washing place & Pump.	20 300
	Well, Windmill, Washing place, Bathing shed & Pump.	217 400
Kidimu	Well, Windmill, Washing place, Bathing shed & Pump.	194 400
Others (10 sites)	Well, Washing place & Pump.	347 000
Hinter-land (3 sites)	Withdrawal pipes, Taps, Washing place & Bathing shed.	200 000
Sub total		1 374 900
Contingency	5% of Sub total.	68 700
Grand total		1 444 000

ABBREVIATIONS AND ACRONYMS

Unless otherwise stated in the text, the terms and abbreviations used have the following definitions:

WHO	:	World Health Organization
UNICEF	:	United Nations International Children's Emergency Fund
UNDP	:	United Nations Development Program
IBRD/IDA	:	International Bank for Reconstruction and Development/International Development Association
NPHLS	:	National Public Health Laboratory Services
KMRI	:	Kenya Medical Research Institute
P M O	:	Provincial Medical Office
MOWD	:	Ministry of Water Development
MOH	:	Ministry of Health
MOST	:	Ministry of Science and Technology
m^3	:	cubic meters
m^3/h	:	cubic meters per hour
EL	:	Elevation, meters
Fig.	:	Figure
kg/sq cm	:	Kilograms per square centimeter
kwh	:	Kilowatt-hour
kva	:	kilovolt-ampere
lpd	:	liters per day
l/sec	:	liters per second
Max	:	maximum
Max day	:	maximum day
Min day	:	minimum day
mg/l	:	miligrams per liter
min	:	minutes
Min	:	minimum
cm	:	Centimeters
cm/sec	:	Centimeters per second
mm	:	milimeters

mm/year	:	milimeters per year
m/day	:	meters per day
MVA	:	mega volt-ampere
pH	:	Hydrogen-ion concentration
ppm	:	parts per million
PVC	:	polyvinylchloride
rpm	:	revolutions per minute
cm^2	:	square centimeters
m^2	:	square meters
v	:	volts
m^3/sec	:	cubic meters per second
m^3/min	:	cubic meters per minute
m^3/day	:	cubic meters per day

CURRENCY EQUIVALENTS:

Currency Unit	=	Kenya Shilling (Ksh)
US$1	=	Ksh 12.80
US$ 1 million	=	Ksh 12.80 million
1 Ksh	=	US$ 0.078
Ksh 1 million	=	US$ 78,000

C O N T E N T S

Chapter 4 Facilities for Safe Water Supply

Chapter 5 Recommendations

Appendix

TABLE LIST

FIGURE LIST

Chapter I Description of the Survey

CHAPTER 1

Description of the Survey

1-1 Background of the Project

The Government of the Republic of Kenya requested cooperation from the Japanese government regarding the control of communicable diseases in order to increase the medical standards and improve the health of the people.

In response to this request, the Japan International Cooperation Agency (J.I.C.A.) sent a contact mission in July 1977, and an official mission for the scope of work in February 1979.

After these two missions were completed, The Communicable Diseases Research and Control Project (hereinafter referred to as "The Project") began in March 1979 and research and investigations were executed by Japanese experts.

Objectives of The Project were to implement a basic study on diseases caused by virus, bacteria and parasites at National Public Health Laboratory Services (N.P.H.L.S.) and to effectively apply the results obtained from the study to the improvement of health activities in model camps.

It had been determined through research and investigations over the past 4 years (since 1979) that the major communicable diseases existing in rural areas include cholera, dysentery and schistosomiasis and that these diseases might be caused by polluted domestic water.

Safe water supply is considered to be the most effective countermeasure for controlling these communicable diseases.

As a result of this conclusion, the Safe Water Supply Detailed Design Survey Project was requested and in response to this request a design team was dispatched in January 1983.

1-2 Objectives of the Study

The objectives of the study are to design the optimum safe water supply facilities and to submit a design report. For this purpose, several discussions were held with concerned key staffs of Kenyan Government and Japanese experts working for The Communicable Diseases Research and Control in order to clarify the background of the project and to identify the scope of The Project.

The results of the above discussions were further confirmed through site investigations where additional data was obtained and the information was included in the analysis.

This final report has been completed based on the above studies in Kenya and additional detailed analysis and discussions held in consultation with J.I.C.A. and the standing committee members for The Project.

1-3 Project Areas

The project site were selected as those sample areas for the Kenya Communicable Diseases Research and Control Project. These areas were located in Kwale District, Coast Province.

The areas are classified into two categories: coastal areas-4 camps at Buibui, Fahamuni, Kanana and Kidimu and inland areas.

Chapter 2 General Description of the Republic of Kenya

CHAPTER 2

General Description of the Republic of Kenya

2-1 Natural Environment and Socio-economic Factors

2-1-1 Natural Environment

The Republic of Kenya is located in the eastern part of the African Continent. The eastern part of this country faces the Indian Ocean and the northern part borders on Somali, Ethiopia and Sudan. The western part borders on Uganda and the southern part on Tanzania. Kenya is situated between latitude 4 degrees 40 minutes north and latitude 4 degrees 42 minutes south and between longitude 34 degrees east and 42 degrees east.

The total area of Kenya is about 580,000 square kilometer. (see Fig. 1)

There are 5,300,000 hectares of woodland, and 80,000 hectares of high or mountainous region which has no vegetation. The total cultivatable agricultural land area is 10,600,000 hectares. Land which is suitable for livestock farming (30,000,000 hectares), composes the largest part of this land area of the total land area available, about 18% of the land is suitable for agriculture with another 9% only marginally suitable. Grassy plains suitable for livestock farming includes 52% of the land and the remaining 21% is wasteland.

Based on climatic conditions, the most suitable agricultural land is the western highlands which range is elevation between 1,000 m to 2,000 m above sea level. Because the climate is very mild and there is plenty of fertile soil available agriculture development taken place from the early days.

The northern and northeastern regions, which make up 60% of the total land area, are semi-desert dry zones and are not suitable for agriculture.

The average annual maximum temperature on the coast of the Indian Ocean is 32.7°C and the average annual minimum temperature is 20°C. The climate in the highland area is relatively mild although the temperature is high. These climatic conditions as well as location, altitude and intensity of rainfall directly affect the productivity of the land.

Rainfall in many regions averages 600 mm per year. In the northeastern semi-dry zone, there is less than 250 mm of rainfall per year. In the western part, such as the coastal region of Lake Victoria and the southern slope of Mt. Kenya, there is approximately 2,000 mm of rain per year. Thus, there are great differences in the amount of rainfall by region and this causes a difference in agricultural productivity. (See Fig. 2-1, Fig. 2-2 and Appendix 7.)

Differences in the time cycle between the rainy season and dry seasons in each region regulate the cultivation of crops - the time for planting seeds and for harvesting. Although rain falls throughout the year in Kenya, there are two main rainy seasons. The time for planting seeds and harvesting is coordinated with these seasons.

2-1-2 Administration and Population

Kenya is divided into seven provinces and the Nairobi extra provincial district. Each province is further divided into districts and the latter into divisions. Each division is further divided into location and sub-locations. (See Tables 2-1, 2-2 and Appendix 8)

Fig. 2-1 Mean Annual Rainfall
(in inches : 10 inches = 254 mm)

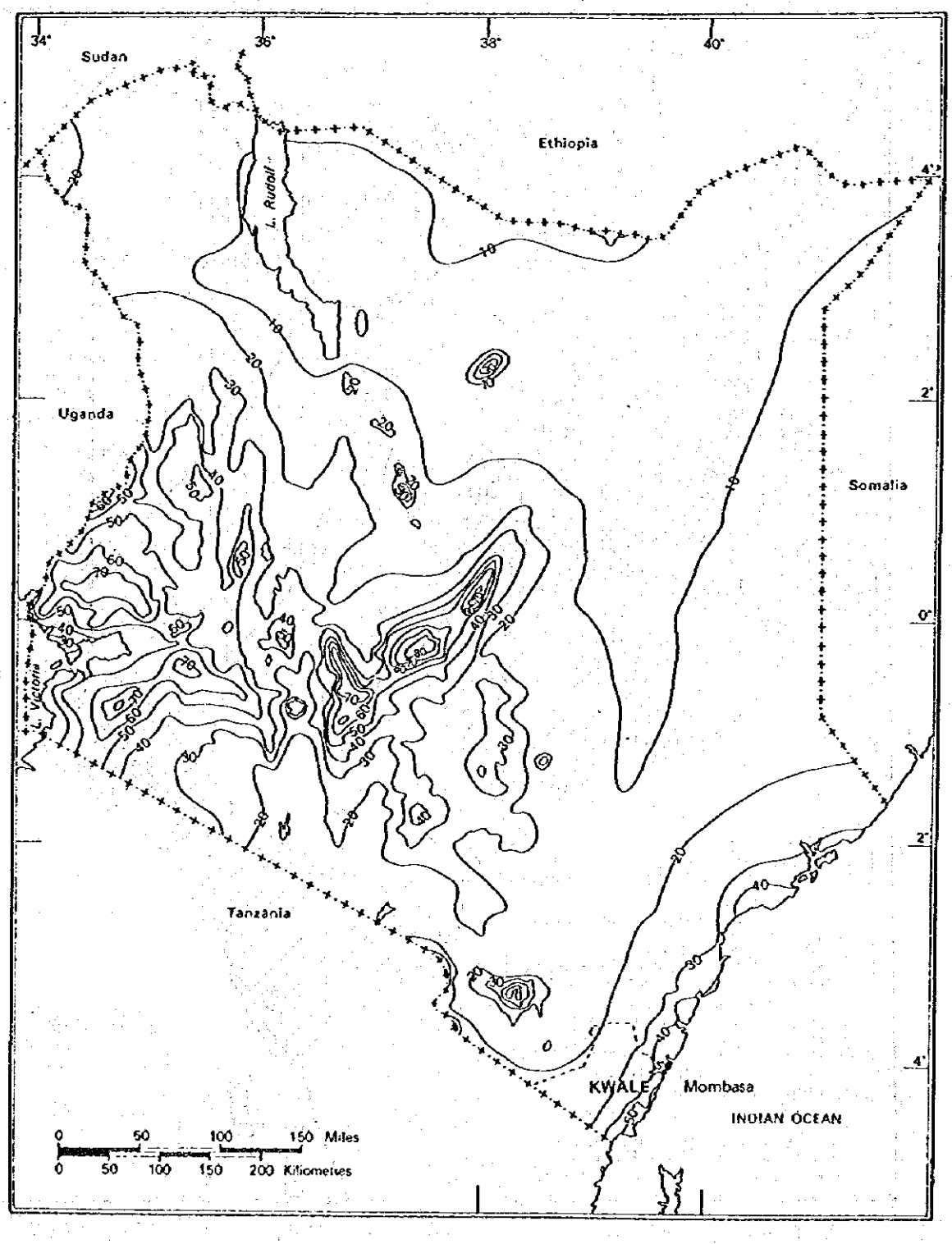


Fig. 2-2 Vegeto-ecological Regions

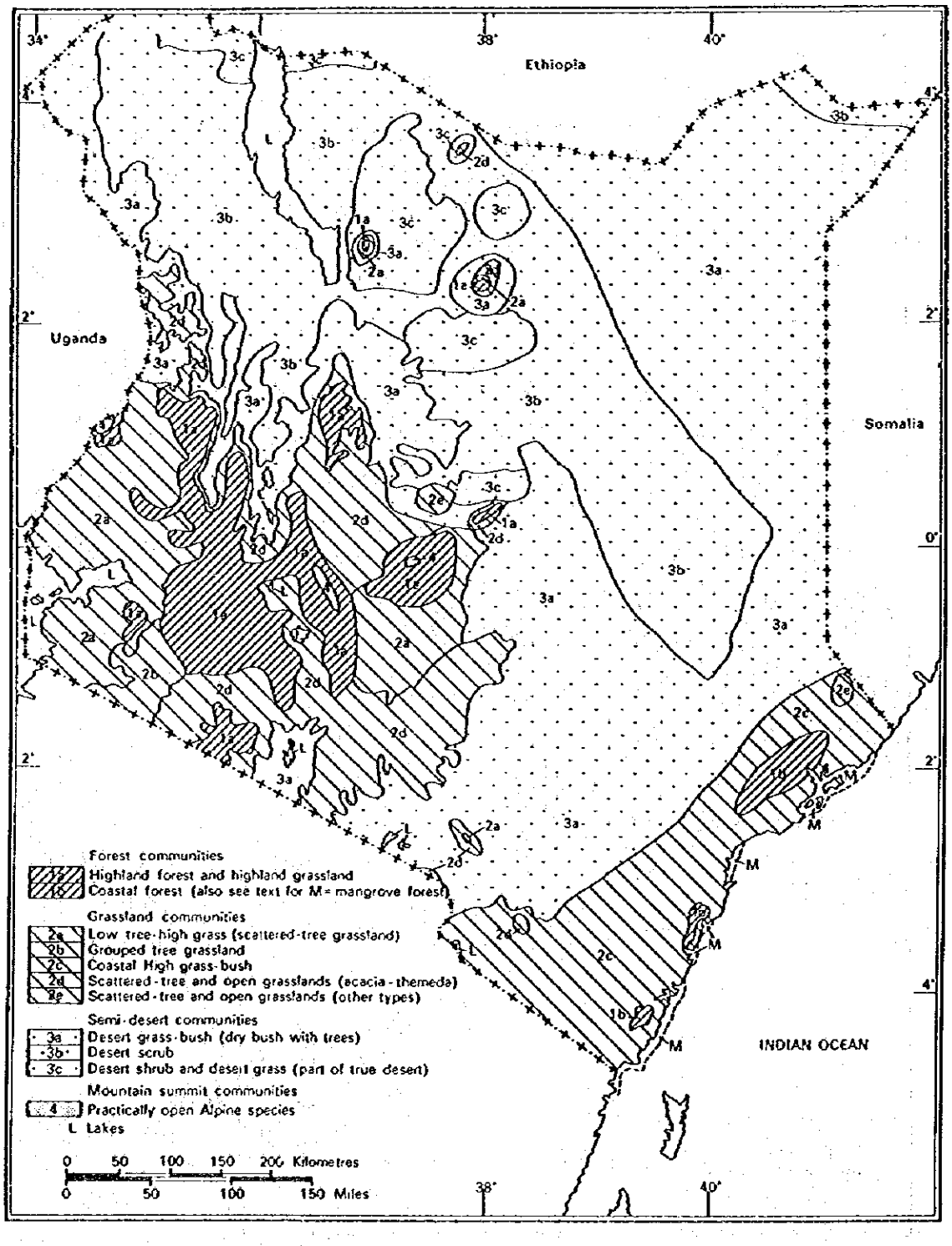


Table 2-1

Area Province and District (as at 31st December, 1978)

Sq. kilometres

	Land Area	Water Area	Total Area
Coast Province			
Kilifi ..	12,414	109	12,523
Kwale ..	8,257	65	8,322
Lamu ..	6,506	308	6,814
Mombasa ..	210	65	275
Taita ..	16,959	16	16,975
Tana River ..	38,694	—	38,694
Total ..	83,040	563	83,603
North-Eastern Province			
Garissa ..	43,931	—	43,931
Wajir ..	56,501	—	56,501
Mandera ..	26,470	—	26,470
Total ..	126,902	—	126,902
Eastern Province			
Machakos ..	14,178	5	14,183
Kitui ..	29,389	—	29,389
Embu ..	2,714	—	2,714
Meru ..	9,922	—	9,922
Isiolo ..	25,605	—	25,605
Marsabit ..	73,952	4,126	78,078
Total ..	155,760	4,131	159,891
Central Province			
Nyeri ..	3,284	—	3,284
Murang'a ..	2,476	—	2,476
Kirinyaga ..	1,437	—	1,437
Kiambu ..	2,448	3	2,451
Nyandarua ..	3,528	—	3,528
Total ..	13,173	3	13,176
Nairobi Area (Municipality)	684	—	684
Rift Valley Province			
Narok	18,513	—	18,513
Kajiado	20,963	142	21,105
Nakuru	7,024	176	7,200
Nandi	2,745	—	2,745
Kericho	4,890	—	4,890
Elgeyo/Marakwet ..	2,722	—	2,722
Baringo	10,627	163	10,790
Turkana	59,490	2,279	61,769
Samburu	20,809	—	20,809
Trans-Nzoia ..	2,468	—	2,468
Uasin Gishu	3,784	—	3,784
West Pokot ..	5,076	—	5,076
Laikipia	9,718	—	9,718
Total	168,829	2,760	171,589
Nyanza Province			
South Nyanza ..	5,714	2,064	7,778
Kisii	2,195	—	2,195
Kisumu	2,093	567	2,660
Siaya	2,523	1,005	3,528
Total	12,526	3,636	16,162
Western Province			
Kakamega	3,520	—	3,520
Bungoma	3,074	—	3,074
Busia	1,629	137	1,766
Total	8,223	137	8,360
Total	569,137	11,239	580,367

Source: Ministry of Lands and Settlement.

Table 2-2

Population

Male	Female	Total	No. of Households	Area Km^2	Population Density Km^2
7,607,113	7,719,948	15,327,061	2,956,369	564,162	27

According to the population census completed in 1979, the total population of Kenya was estimated to the 15.33 Million and density of population was 27 people per square kilometer. According to the 1969 census, the total population was 10.96 Million. This makes the average population increase for the past 10 years between 1969 and 1978 about 3.4%.

In the whole continent of Africa, many different tribes live together in a small region Kenya is no exception to this tradition. The living conditions and life style for each tribe vary depending on the natural conditions of the region where they live. The Major tribes in Kenya are Kikuyu (20%), Luo (14%), Luhya (14%), Kamba (11%), Kalenjin (11%) and Kisil (6%) and others (24%).

2-1-3 Description of National Economy

In 1963, the Republic of Kenya gained its independence from colonial British rule. It remains, however, a number of the British commonwealth of nations.

Major economic policies after independence included an increase in the per capita income, Kenyanization of the economy and equitable distribution of wealth. The equitable distribution of wealth under a free market economy is planned to be implemented by means of the development of various public cooperatives.

The average annual growth rate of the GDP by primary expenditures from 1964 to 1972 was 6.6 percent. This figure combines both the monetary and traditional sectors of the economy. The former sector showed a growth rate of 7.5 percent and the later 3.7 percent.

In the field of agriculture, the monetary economic sector experienced a 6% growth rate and non-monetary sector a 3.6%

growth rate. The first 5-year development plan for the agricultural village was given a lower priority. The second 5-year plan was estimated to develop farming village as the top priority from 1970 to 1974. Although the capital investment of the agriculture sector had been allocated to mechanization and livestock, sufficient funds were not allocated for land reformation and development of plantations. The third 5-year development plan from 1974 to 1978, followed the major policies of the second 5-year plan. Increased agricultural production was set as the ultimate target with special attention given to the equitable distribution of wealth.

Emphasis was placed on agricultural village development and the increase in employment opportunities. Since Kenya is not an oil producing country, its economy was heavily hit by the Oil Crisis in 1973 and 1979.

At the beginning of the fourth 5-year plan (1979 - 1983), the government of Kenya reaffirmed the basic principles for its economic development. In this fourth development plan, the highest priority was given to the elimination of poverty and an increase in the standard of living.

Tables 2-3 and 2-4 show the GDP growth rate in the years after 1978. (GDP per capital is calculated based upon a 3.6% growth rate in the total population).

Table 2-3

Gross Domestic Product, 1978 - 1981

K£million

	Current Prices				Constant (1976) Prices			
	1978	1979	1980	1981*	1978	1979	1980	1981*
A. Traditional Economy								
Forestry	13·30	15·21	16·66	19·22	10·04	10·32	10·69	11·06
Fishing	0·43	0·46	0·55	0·73	0·34	0·35	0·37	0·42
Building and Construction	31·01	37·19	41·57	47·67	23·32	24·32	25·74	26·55
Water Collection	12·66	14·04	15·10	17·12	9·63	9·63	9·79	9·95
Ownership of Dwellings	43·15	52·06	57·79	67·41	31·86	33·17	34·54	35·95
Total Traditional Economy	100·55	118·96	131·67	152·15	75·12	77·79	81·13	83·93
B. Monetary Economy								
1. Enterprises and Non-Profit Institutions								
Agriculture	631·73	648·78	688·13	791·74	533·31	529·05	522·03	554·39
Forestry	8·25	10·70	13·96	18·88	6·94	7·17	7·70	8·24
Fishing	3·52	3·70	4·37	5·91	2·75	2·89	2·97	3·52
Mining and Quarrying	4·41	5·04	5·73	5·16	4·14	4·08	4·05	3·32
Manufacturing	219·32	349·84	295·14	342·44	188·16	201·56	212·95	223·62
Building and Construction	66·87	82·26	96·33	100·56	55·26	59·38	59·92	58·78
Electricity and Water	23·05	27·57	32·48	40·86	17·82	19·57	21·21	22·49
Trade, Restaurants and Hotels	189·34	214·07	244·66	281·78	155·92	165·37	171·15	171·73
Transport, Storage and Communications**	100·84	114·65	127·81	143·39	81·40	87·26	93·46	94·86
Finance, Insurance, Real Estate and Business Services**	96·22	108·25	122·43	142·26	77·59	85·26	88·03	91·99
Ownership of Dwellings	78·43	87·20	103·41	132·52	62·49	66·62	69·97	79·65
Other Services	35·46	39·59	49·41	56·15	30·46	32·86	35·82	38·26
Less: Imputed Bank Service Charges	—37·31	—47·97	—47·64	—55·36	—28·76	—31·60	—32·62	—34·09
Total	1,420·13	1,549·68	1,736·22	2,006·29	1,187·48	1,229·47	1,256·64	1,316·66
2. Private Households (Domestic Services)	17·06	21·72	28·15	32·07	13·91	16·39	19·29	20·90
3. Producers of Government Services								
Public Administration	56·91	61·44	71·30	84·54	47·47	..	..	..
Defence	13·49	14·19	14·90	15·26	11·37	..	..	..
Education	107·51	129·57	154·18	185·55	89·20	..	..	..
Health	27·40	31·24	36·16	36·19	20·63	..	..	..
Agricultural Services	16·51	20·69	22·24	26·49	13·68	..	..	..
Other Services	28·84	32·13	33·68	43·79	24·08	..	..	..
Total	250·66	289·26	332·46	391·83	206·43	221·09	233·47	245·84
Total Monetary Economy	1,687·85	1,860·66	2,096·83	2,430·19	1,407·82	1,466·95	1,509·40	1,583·40
Total Traditional and Monetary Economy	1,788·41	1,979·62	2,228·50	2,582·34	1,482·94	1,544·74	1,590·53	1,667·33
Gross Domestic Production per Capita	120·38	129·16	140·08	156·37	99·82	100·78	99·98	100·96

*Provisional.

Source;Economic Survey,1982

Table 2-4 Gross Domestic Product; Percentage Rates of Growth, 1978 - 1981

Table **2-4** GROSS DOMESTIC PRODUCT; PERCENTAGE RATES OF GROWTH, 1978—1981 *Percentage*

	Current Prices				Constant (1976) Prices			
	1978–1979	1979–1980	1980–1981*	Cumulative 1976–1981*	1978–1979	1979–1980	1980–1981*	Cumulative 1976–1981*
A. Traditional Economy ..								
Forestry	14·4	9·5	15·4	15·3	2·8	3·6	3·5	3·4
Fishing	7·0	19·5	32·7	20·3	2·9	5·7	13·5	7·7
Building and Construction	20·0	11·8	14·7	16·9	4·3	5·8	3·1	4·1
Water Collection	11·0	7·5	13·4	13·9	0·7	1·7	1·6	2·3
Ownership of Dwellings	20·6	11·0	16·6	18·1	4·1	4·1	4·1	4·6
Total Traditional Economy	18·3	10·7	15·6	16·9	3·6	4·3	3·5	3·7
B. Monetary Economy								
1. Enterprises and Non-Profit Institutions								
Agriculture	2·7	6·0	15·1	11·2	—8·0	—1·3	6·2	3·5
Forestry	29·7	30·4	35·2	24·7	3·3	7·4	7·0	5·7
Fishing	5·1	18·1	35·2	20·1	5·1	2·8	15·2	7·7
Mining and Quarrying	14·3	13·7	—9·9	8·6	—1·4	—0·7	—18·0	—
Manufacturing	13·9	13·1	14·9	18·9	7·1	5·7	5·0	9·2
Building and Construction	23·0	17·1	4·4	17·3	7·5	0·9	—1·9	5·4
Electricity and Water	19·6	17·8	25·8	23·6	9·8	8·4	6·0	9·6
Trade, Restaurants and Hotels	13·1	14·3	15·2	16·2	6·1	3·5	0·3	5·4
Transport ,Storage and Communications	13·7	11·5	12·2	15·5	7·2	7·1	1·5	6·5
Finance, Insurance, Real Estate and Business Services ..	12·5	38·0	16·2	16·0	9·9	3·2	4·5	6·2
Ownerships of Dwellings	11·2	18·6	28·2	17·9	6·6	5·0	13·8	6·5
Other Services	11·6	24·8	13·6	15·8	7·9	9·0	6·8	7·3
Total (Excluding Imputed bank service Charges) ..	9·1	13·1	15·5	14·6	3·5	2·2	4·8	5·4
2. Private Households (Domestic Services)	27·3	29·6	14·1	24·0	17·8	17·7	8·3	13·8
3. Producers of Government Services								
Public Administration	7·9	16·0	18·6	14·4	..	..	..	..
Defence	5·2	5·0	2·4	9·6	..	..	..	..
Education	20·5	19·0	20·3	17·5	..	..	..	..
Health	14·0	15·7	—	15·8	..	..	..	..
Agricultural Services	25·3	7·5	19·1	18·3	..	..	..	..
Other Services	11·4	4·8	30·0	16·5	..	..	..	..
Total	15·4	14·9	17·9	16·2	7·1	5·6	5·3	5·9
Total Monetary Economy	10·2	12·7	15·9	17·5	4·2	2·9	4·9	5·6
Total Traditional and Monetary Economy ..	10·7	12·6	15·9	15·1	4·2	3·0	4·8	5·4
Gross Domestic Production per Capita	7·2	8·5	11·6	11·1	1·0	—0·8	1·0	1·7

*Provisional.

Source:Economic Survey.1982