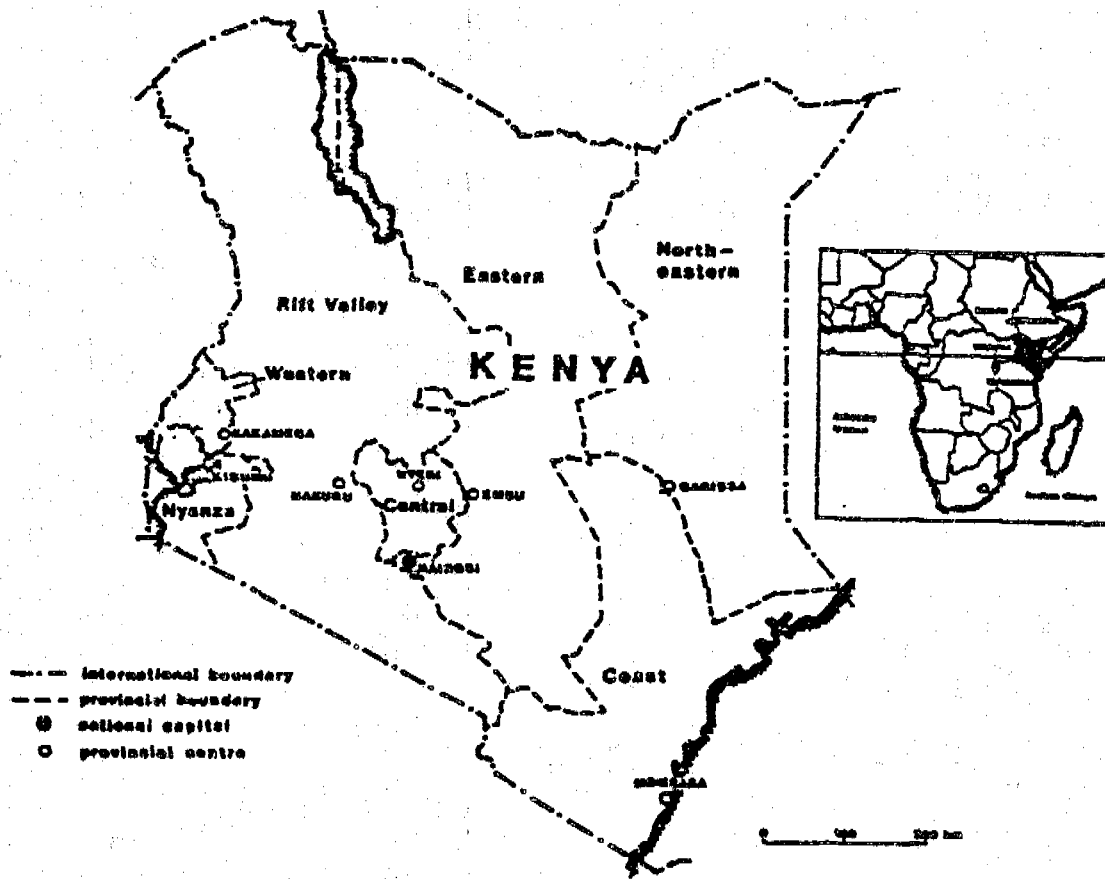


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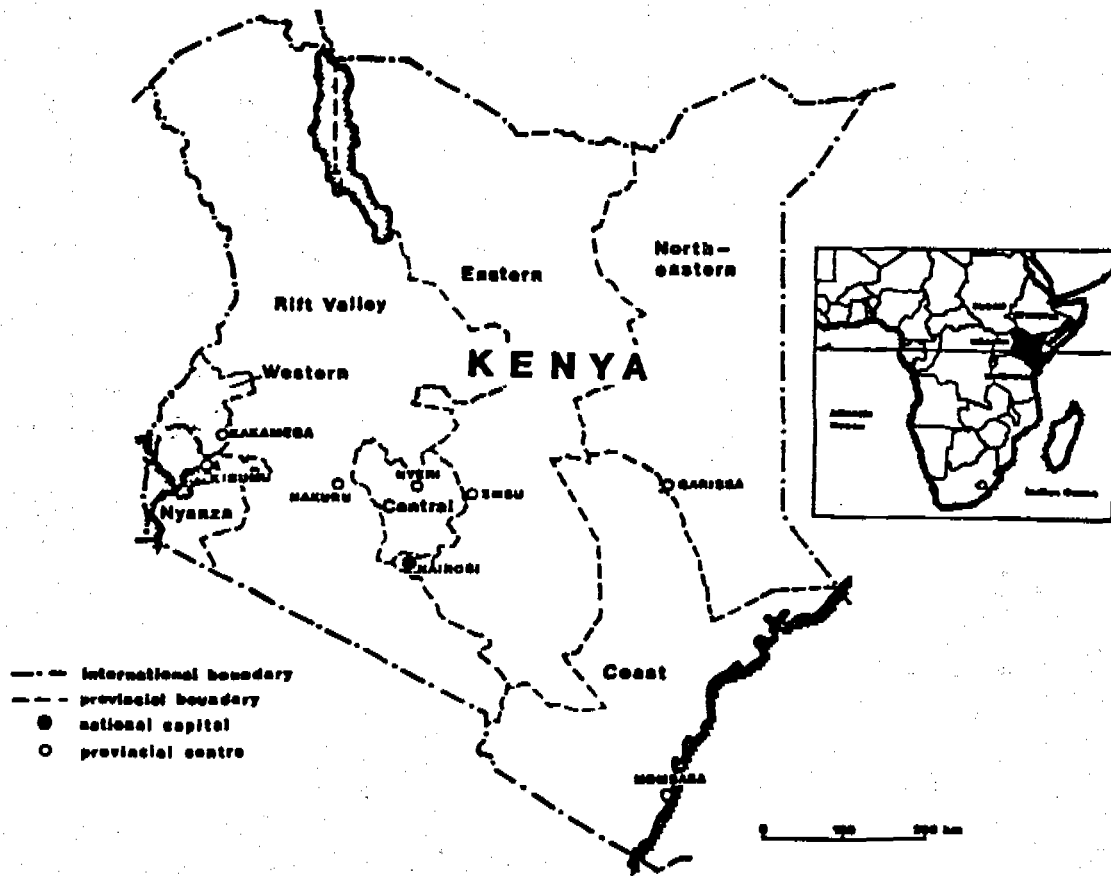
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REPORT ON THE NATIONAL WATER SUPPLY
PROJECT FOR THE RIFT VALLEY
AND THE WESTERN PROVINCE
Prepared for the Ministry of Water and Power, Nairobi
by the International Development Agency (IDA) and the
International Technical Group (ITG) on Water Supply
in Kenya, 1981-1982

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FOREWORD

This is a position paper prepared by Tampere University of Technology, Institute of Water and Environmental Engineering (TUT/IWEE), Finland. This paper is based almost exclusively on the literature and documentation review, and on informal discussions with the Kenyan and Finnish professional in the water sector. This paper will be available only in English.

The paper has been written particularly for the development of the cooperation between Kenya and Finland in water sector. Mr. E. Meskus, FINNIDA Coordinator, Ministry of Water Development, Kenya, Prof. M. Viitasaari, Mr. H. Mattila, and Ms. S. Sandelin, Institute of Water and Environmental Engineering, Tampere University of Technology participated actively in the preparation of this paper. The views and interpretations are those of the authors, and should not be attributed to Tampere University of Technology or to any of its departments or institutes, or to any individual acting on their behalf.

Finally, the authors wish to express their gratitude to the colleagues both in Kenya and Finland, whose help and comments have greatly improved this paper.

Tampere, 10 February 1992

Jarmo Hukka
MScTech., Research Associate

Tapio Katko
DrTech., Research Associate

Osmo Seppälä
MScTech., Director
Postgraduate Course in Water Supply and Sanitation

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Ms. M-L. Kiljunen, First Secretary, Development Co-operation, Embassy of Finland
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ABBREVIATIONS AND ACRONYMS

ADF	— African Development Fund
AfDB	— African Development Bank
A-in-A	— Appropriations-in-Aid
AMREF	— African Medical and Research Foundation
ARID	— Arid Region Irrigation Development
ASAL	— Arid and Semi-Arid Land
CARE	— Corporation for American Relief Everywhere
CIDA	— Canadian International Development Agency
DC	— District Commissioner
DDF	— District Development Fund
DDC	— District Development Committee
EDF	— European Development Fund
EEC	— European Economic Community
ESA	— External Supporting Agency
FAO	— Food and Agriculture Organization of the United Nations
FINNIDA	— Finnish International Development Agency
FRG	— Federal Republic of Germany
FY	— Fiscal Year (July 1 — June 30)
GDP	— Gross Domestic Product
GFCF	— Gross Fixed Capital Formation
GNP	— Gross National Product
GOF	— Government of Finland
GOK	— Government of Kenya
GTZ	— Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
hd	— head (person)
IBRD	— International Bank for Reconstruction and Development
IDA	— International Development Association
IFAD	— International Fund for Agricultural Development
ILO	— International Labour Organization
ITCZ	— Intertropical Convergence Zone
IWEE	— Institute of Water and Environmental Engineering (TUT)
KES	— Kenyan Shilling (USD 1 = KES 23.02, Aug 2 1990)
km	— kilometre
km ²	— square kilometre
KPC	— Kenya Power Company
KPL	— Kenya Power and Lighting
KVDA	— Kerio Valley Development Authority
KWAHO	— Kenya Water for Health Organization
KWSP	— Kwale District Water Supply and Sanitation Project
K£	— Kenyan Pound (K£ 1 = KES 20; USD 1 = K£ 1.15, August 2 1990)
LBDA	— Lake Basin Development Authority
LCB	— Local Contract Bid
LIC	— Low-Income Country
MDC	— Ministry of Development Cooperation
MIPAA	— Minor Irrigation Programme for Arid Areas
MLH	— Ministry of Lands and Housing
MOA	— Ministry of Agriculture
MOCSS	— Ministry of Culture and Social Services
MOE	— Ministry of Energy
MOENR	— Ministry of Environment and Natural Resources
MOH	— Ministry of Health
MOLD	— Ministry of Livestock Development
MOLG	— Ministry of Local Government
MORD	— Ministry of Regional Development
MORDASW	— Ministry of Reclamation and Development Arid, Semi-Arid and Wasteland
MOTW	— Ministry of Tourism and Wildlife

MOWD	— Ministry of Water Development
NDP	— National Development Plan
NGO	— Non-Governmental Organization
NIB	— National Irrigation Board
NORAD	— Norwegian Agency for International Development
NWCPC	— National Water Conservation and Pipeline Corporation
NWRRDU	— National Water Resources Research and Development Unit
OPEC	— Organization of Oil-Exporting Countries
O&M	— Operation and Maintenance
PA	— Preparatory Assistance
PQLI	— Physical Quality of Life Index
RNC	— Regional Training Network Centre
RTPC	— Rural Trade and Production Centre
SCHP	— South Coast Handpumps Project
SDC	— Swiss Development Corporation
SHWP	— Self-Help Water Project
SIDA	— Swedish International Development Authority
SSIU	— Small Scale Irrigation Unit
TARDA	— Tana and Athi River Development Authority
TARDC	— Tana River Development Company
TUT	— Tampere University of Technology
UN	— United Nations
UNDP	— United Nations Development Programme
UNEP	— United Nations Environment Programme
UNESCO	— United Nations Educational, Scientific and Cultural Organization
UNFPA	— United Nations Fund for Population Activities
UNICEF	— United Nations Children's Fund
UNIDO	— United Nations Industrial Development Organization
UK	— United Kingdom
USAID	— United States Agency for International Development
USD	— United States Dollar
WAB	— Water Apportionment Board
WB	— World Bank
WFP	— UN/FAO World Food Programme
WHO	— World Health Organization

GLOSSARY

Harambee	— any form of joint effort for development
Wananchi	— the citizenry, the common man and woman

EXECUTIVE SUMMARY

"Your best revenue source for paying water treatment costs is user charges. So, it's an economic problem. Right? A political problem. Right? Elected officials and customers won't support an increase in user fees. Right? Wrong!

Around the world, people are becoming more aware of the waste by-products of our society. Tied to that awareness is the understanding that it costs more to provide safe drinking water and keep our rivers clean. People care about their community and the quality of life for themselves and their children. Getting support for increasing water fees isn't an economic problem or a political problem, it's a problem of public education.

Educating the public means informing decision-makers and consumers that clean water has a price, letting them know what their money is buying, and explaining the consequences of poor water management. User charges can be increased with public support and little opposition. It requires work, organization, and attention." (AWWA 1990).

Background Data

The area of Kenya covers nearly 600000 km². Almost 80 % of the country falls within the arid and semi-arid land (ASAL) zones. According to the 1979 census Kenya's population was 15.3 million, and it is growing at a rate of nearly 4 % per year. The UN (1989) estimates amounted the population to be 24.4 million in the year 1990.

Administratively Kenya is organized into seven provinces. In addition Nairobi and its environs have the status of a province. Provinces in turn are sub-divided into a total of 43 districts. The districts are subdivided into divisions, locations and sub-locations.

Kenya's GNP per capita was USD 325 in 1989. The GNP per capita has been somewhat static the last 5 years after sustained growth since the independence in 1963. The economy is depending on agriculture for employment (19 % of wage employment, and 30 % of the GDP in 1989), and tourism for foreign exchange (total earnings K£ 432 million in 1989). The Government of Kenya (GOK) budget for the fiscal year 1990/91 is about USD 3400 million.

Development Policy

The five-year plans define Kenya's national development policy. The sixth national development plan (NDP) covers the years 1989-93. The most essential message in the development plan is the increasing financial contribution from the citizens and the cost-sharing. The approach is logical considering the continuously expanded public sector that has produced basic services quickly within a short period.

The high population growth rate urges a rapid development of basic services to the entire population. Now the rural population is about 81 % of the total population of 24 million. In 1993 the proportion will be close to 79 %, and the total population will be 27 million. There are two main outlets for the growing population; urbanization on the edges of urban centres and in semi-arid/arid areas.

The important issue is also the shortage of arable land. Almost 80 % of

the total area is arid or semi-arid, and the agriculture and livestock cannot fully use it. The lack of water for irrigation in some drainage basins is a severe constraint for crop production for the growing population. In rain-fed agriculture the more intensive crop production will cause local water scarcity for households and industries.

The public and private sectors employ about 1.4 million people representing about 15 % of the population at working age. The urbanization will bring more pressure on the modern sector wage employment. The employment in the private sector will increase by 5 % while it will decrease from 4.7 % to 3.2 % in the public sector. Because the population is moving to arid/semi-arid areas, the agriculture and livestock should be developed. In the marginal areas the growth rate of population is already 10 % because of migration. The development of the ASAL-areas is an important theme in the national development plan 1989-1993. This requires better methods for agriculture and livestock.

The financial resources are inadequate, and the development of Kenya's economy seems pessimistic. The inflation rate is about 10 % annually, and the balance of current payments is negative. Kenya's limited resources are also visible in the implementation of development plans. The total volume and relative share of the external financing have grown continuously, except in the early 1980s. The proportion of the external funding is 53 % of the GOK development expenditure estimates for the fiscal year 1990/91. The share of external financing in the budget is even greater, because only 60-70 % of the grants are in the budget. The relative share of the grants is also larger, because the main donors often replace loans by grants. The share of bilateral aid is 67 % of the external financing, and 33 % is multilateral in the fiscal year 1989/90 estimates.

Water Resources

Kenya has a mean annual precipitation of about 500 mm varying from below 200 mm in the arid areas to well over 2000 mm in the highlands. The mean annual free-water evaporation varies from 1250 mm in areas at an altitude of 3000 m, to over 2500 mm in areas below 300 m. The water resources have not yet been assessed, and therefore they should be investigated urgently to give information on availability of water for different development activities.

The surface area of fresh water lakes is about 4200 km². The average abstraction yield of groundwater from the boreholes is about 120 litres per minute. Major constraints regarding the groundwater quality are high salinity and fluoride contents. The areas favourable for groundwater development are Lake Basin, Lake Naivasha, Lake Amboseli and South East Coast.

Sector Coverage

The coverages of improved water supply and sanitation are still low in Kenya, about 35 % and 25 % of the total population. While almost 80 % of the urban population in Kenya has access to piped water, the urban population growth rate of about 7 % per annum weakens the capacity of the systems. This is a problem especially in low-income peri-urban settlements that are often without adequate water supply and sanitation facilities. Only about 20 % of the rural population has access to safe drinking water in spite of investments in the rural water supply sector over the past two decades. Sanitation coverage in rural areas is 20 % and in urban centres 40 %. The operation of the services has also been questionable, and the consumers have suffered from intermittent supply.

Sector Investments

During the fiscal years 1979/80-1988/89 the development expenditure of MOWD has been about K£ 300 million. The external finance has been K£ 95 million. This represents 32 % of the MOWD development expenditure according to the development appropriation accounts.

When the coverage growth of service between 1980 and 1989 is multiplied with per capita cost (urban water supply K£ 175, urban sanitation K£ 190, rural water supply K£ 30, and rural sanitation K£ 60), the total sector development expenditure for the decade is about K£ 430 million. The proportion of MOWD would be subsequently about 70 % of the sector investments, which is within the correct magnitude. This comparison also shows that the investments in the sector have not been sufficient to meet the GOK targets. **During the decade the GOK provided improved services for about 3.5 million people, but the population growth was about 7.5 million.**

Sector Development and Management

The provision of water supply and sanitation to all areas has been an important development strategy since the independence. Its proportion is 7.6 % of the total development budget 1990/91. Only the Ministry of Energy and the Ministry of Public Works have larger shares, 14.5 % and 11.4 % respectively. The Office of the President has 8.4 % of the development allocations. The allocation for the urban water and sanitation services development is K£ 63 million (66 %) in the fiscal year 1990/91. The share of the rural water and sanitation services development is K£ 32 million (34 %).

Water sector was under the Ministry of Agriculture (MOA) until 1974, when the Ministry of Water Development (MOWD) was established. It took over the general responsibility in the sector. In 1989 a part of the duties were transferred to the National Water Conservation and Pipeline Corporation (NWPC). During the 1970s and in early 1980s the planning and construction were intensive in the water sector. Almost 400 water supply projects were implemented, most of them as self-help projects supported by NGOs. MOWD completed 40-50 large water supply systems. Also tens of designs were done, but the implementation almost stopped in late 1980s. MOWD has concentrated in some large projects. External organizations and NGOs have built water supply projects both in rural and in small densely populated settlements.

It seems obvious that the insufficient resources have an effect on the development. Also operation and maintenance of the existing supplies has suffered from the lack of recurrent allocations. The cost recovery idea is not introduced to the consumers. The fee collection has been ineffective. The water tariff has been uniform (except Nairobi and some urban centres), and controlled by the GOK. The collected revenues will be debited to the Ministry of Finance. It allocates annually the resources to ministries. About 17 % of the recurrent budget of MOWD has been covered with revenues from water charges, and 83 % has been a government subsidy during the fiscal years 1979/80-88/89. The expected revenue has been about 25 % respectively.

Rural water supply systems are run by MOWD except those systems that are categorised as self-help, county council, individually owned and institutional systems. Ten municipalities operate and maintain their own water supply, waste disposal and sewerage. Five municipalities operate their own sewerage, waste disposal, purchase water in bulk from MOWD, undertake distribution of water and collect revenue. Five other

municipalities are responsible only for sewerage, waste disposal and its revenue collection. The rest of about 100 urban water supply systems are under MOWD. The National Water Conservation and Pipeline Corporation (NWPC) will be responsible for 26 water undertakers, 3 projects under construction and 14 projects at the planning stage.

Scope for Sector Improvement

The population growth in Kenya is high. Therefore the GOK should urgently assess the country's water resources and water availability for food production, households and industrial development. The national water master plan under preparation should form a bases for long-term water use strategy for economic development.

Decentralization in the planning process is emphasized in the District Focus for Rural Development policy initiated in 1983. This strategy is now gradually implemented. The Sixth National Development Plan (NDP, 1989-1993) calls for full involvement of the population in development. NDP urges cost-sharing and community participation in design and implementation. The community extension work is done either through the Ministry of Culture and Social Services (MOCSS), NGOs, or through workers employed directly by the donor agency. Recently there has also been a significant change in policy; funds collected from users are to stay within the district to meet operation and maintenance costs. Earlier they were sent to the Treasury. The external loans should still be paid back by the Ministry of Finance. This is not a financially sound long term policy in the country facing financial difficulties.

Financial constraints have considerably slowed development programme implementation. In the future MOWD will likely concentrate on water supply for small urban centres and rural areas. Especially after the establishment of a parastatal National Water Conservation and Pipeline Corporation (NWPC) that has taken over responsibility for 26 urban water supply systems and 35 major pipeline projects serving rural areas. The past development shows that the decisions made at national level have systematically weakened the achievements of the set sector targets. The recurrent and development allocations have been insufficient. The covering of the expenditure has been too inefficient to promote healthy and sustainable development in the sector.

The studies on water vending indicates that only the poor pay the full market price to the vendors or resellers. Those enjoying the better service levels pay only 30-50 % of the real price of the water. In Nairobi low-income group consumers are paying for vended kiosk water the unit cost four to five times higher than what the consumers are paying for water from individual connections.

The central government should be strengthened by redirecting its role as stated in the district focus policy. The GOK should be more the policy maker, financier, promoter, educator and regulator. The transfer of the responsibilities and ownership of the supplies to other parties, communities, autonomous utilities of local administration and private sector is a necessary structural adjustment in the water sector. To reach the GOK coverage targets the policy should be restructured. The central government should secure sufficient resources to local administration. The full cost recovery must be achieved after a transition period. Meanwhile the development expenditure has to be used to get the supplies operational. Before the services are reliable it is questionable to charge the full price of them. Therefore the tariffs have to be increased gradually after the improvements. This should be done at local levels by considering the special conditions. The uniform country tariffs simply

cannot cope with the situation of the individual utilities.

The recruitment rate of personnel in the sector is estimated to be 7 % in the years 1990-2000, and 10 % in the years 2000-2025 respectively. This also should be remembered when training requirements in Kenya are considered.

Sector Investment Requirements

The Sixth NDP 1989-1993 sets the water supply target coverage during the plan period. The estimated development expenditure allocations will be about K£ 440 million, but the needed development expenditure to fulfil the objective is about K£ 580 million. The shortage of development expenditure is thus about K£ 140 million. This is based on the current price level of the used technologies.

The investment requirement in water sector during the years 1990-2000 is at current price level about K£ 350 million annually. This is 3.7 times higher than the development expenditure estimates for the fiscal year 1990/91. **During the years 1990-2000 the average annual increase in development expenditure should be 44 %, if the GOK aims to meet the targets.** The investment requirement at current price level for the years 2000-2025 is about K£ 520 million annually. This is 5.5 times higher than the development expenditure estimates for the fiscal year 1990/91. During the years 1990-2025 the average annual increase in development expenditure allocations should be 16 %, if the entire population is to be served by 2025.

Action Framework for External Support

The external agencies should formulate a common long-term framework with the GOK to support sector activities in the coming two to three decades in Kenya. A debate should be started to increase considerably the level of investments in the water sector, if the present coverage targets in Kenya are to be reached.

The preconditions of the sustainable development in the sector, i.e. pricing of services and transferring the responsibilities and ownership to local levels, should be addressed thoroughly in the discussions. The action based on the discussions may require new orientation regarding the resources at local levels. The resources including personnel should be based on the actual development speed and operation and maintenance requirements.

During the transition period the external agencies should consider financing also recurrent expenditures to prevent the deterioration of the supplies constructed. The full cost recovery policy should be adopted gradually, e.g. by the year 2000. The technical assistance (expatriate personnel costs) should be on grant basis, but other financial assistance on loan basis. This may create pressure towards a correct climate for cost recovery. The GOK sector authorities should pay the loans back to the Ministry of Finance.

Major Government Institutions in Sector

The main governmental institutions in the water sector are the following: Ministry of Water Development (MOWD); National Water Conservation and Pipeline Corporation (NWCPC); Ministry of Health (MOH); Ministry of Culture and Social Services (MOCSS); Ministry of

Local Government (MOLG); Ministry of Regional Development (MORD); Ministry of Agriculture (MOA); Ministry of Reclamation and Development of Arid, Semi-Arid and Wasteland (MORDASW); Ministry of Lands and Housing (MLH); River Development Authorities (under Ministry of Energy).

Bilateral Support

The main bilateral donors have been the following: Austria, Belgium, Canada, Denmark, Finland, Federal Republic of Germany, France, Italy, Japan, the Netherlands, Norway (not active currently), Sweden, Switzerland, United Kingdom.

Multilateral and Other Support

The main multilateral donors are the following: AfDB, ADF, EDF/EEC, OPEC Fund, Saudi Fund, UNDP, UNICEF, WB, and WHO. The other supporters are generally NGOs (e.g. KWAHO and AMREF).

1 INTRODUCTION

This position paper on Kenya's water sector has been prepared within a considerably short time to highlight the sector position for Finnish International Development Agency (FINNIDA).

Although the paper is not comprehensive, it gives some ideas for the development of the cooperation between the GOK and the GOF in the sector. The institutional and financial framework, the development expenditure, and the cost recovery that the authors find to be the key issues, are discussed extensively.

It should also be noted that this paper does not include any analysis on the private sector resources in and for the water sector in Kenya.

2 COUNTRY BACKGROUND INFORMATION

Geography and Climate

The Republic of Kenya lies astride the Equator on Africa's East Coast. It is situated between approximately 5°N and 4°45'S and 34°E and 41°30'S. The area of Kenya extends from Indian Ocean and Somalia in the East to Lake Victoria and Uganda in the West, and from Sudan and Ethiopia in the North to Tanzania in the South.

Kenya is one of Africa's large countries with surface area of 582646 km². 569250 km² comprise land surface and the remaining 13396 km² water surface. Water area includes a number of smaller lakes with fluctuating limits and a part of Lake Victoria and most of Lake Turkana. While most of Lake Turkana lies in Kenya, only 3831 km² of Lake Victoria form part of Kenya. The coastline extends approximately 402 kilometres along the Indian Ocean. Recently Kenya declared 200 nautical mile Exclusive Economic Zone in Indian Ocean.

Kenya has a wide topographical diversity ranging from an uninhabitable volcanic desert to forests, fertile valleys and rich farmland. More than half of the land, particularly the northern area, is either semi-arid or arid. The southern part is relatively fertile although there are some arid areas. The entire national economic production, both agricultural and industrial, is centred in the southern two fifths of the country having over 85 % of the population.

Topography, location, climate, and vegetation in Kenya may be classified by six broadly contrasting regions: Coastal Belt, Plateau foreland, Semi-arid and arid plains, Highlands, Rift Valley, and Lake Victoria region.

Population

The population by sex, tribe, race and nationality according to the latest available census 1979 (Central Bureau of Statistics 1989) is given in Table 2.1. The population by province and density is shown in Table 2.2. Kenya's population according to the UN (1989) estimates is shown in Figure 2.1. Table 2.3 gives population density for the total land area and for arable lands, and the distribution of both active population and those below 15 years.

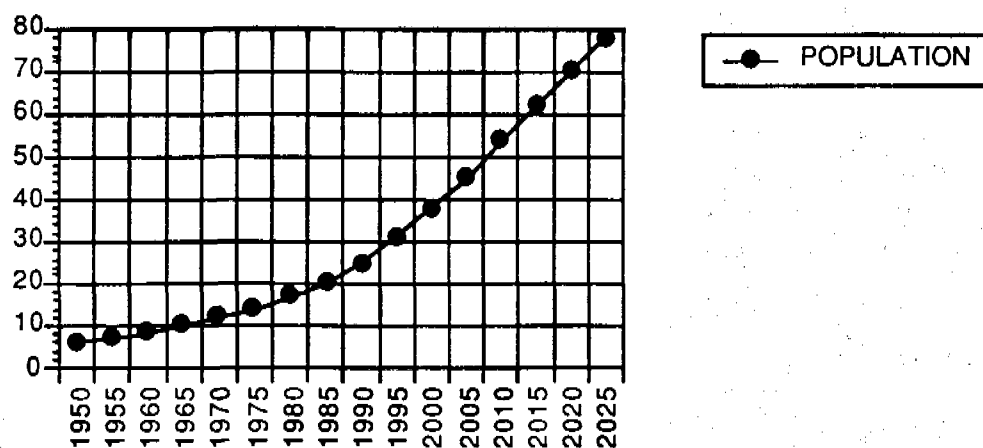


Figure 2.1 Population Size in Kenya (million).

Table 2.1 Population by Sex, Tribe, Race and Nationality (1979).

Tribe or Nationality	Male	Female	Total
Kenyans			
Kikuyu	1582145	1620676	3202821
Embu	89471	90929	180400
Meru	416800	423704	840504
Mbere	29242	32483	61725
Kamba	852360	873209	1725569
Tharaka	4763	4919	9682
Luhya	1048914	1070794	2119708
Kisii	469629	474458	944087
Kuria	46388	42781	89169
Mijikenda	357116	375714	732830
Pokomo	19835	19906	39741
Taita	74068	79051	153119
Taveta	3850	3826	7676
Swahili/Shirazi	2903	2743	5646
Bajun	18304	18667	36971
Boni/Sanye	2108	2062	4170
Luo	966548	989297	1955845
Kalenjin	820749	831494	1652243
Masai	120838	120557	241395
Samburu	36168	37457	73625
Turkana	106009	101240	207249
Taso	66192	66295	132487
Nderobo	3698	3502	7200
Njemps	3668	3878	7546
Rendille	10940	10854	21794
Boran	35306	33588	68894
Gabra	15467	15086	30553
Sakuye	926	898	1824
Orma	16134	15993	32127
Gosha	917	935	1852
Hawiyah	811	793	1604
Ogaden	13584	12058	25642
Ajuran	11309	10697	22006
Gurreh	41901	41182	83083
Degodia	49227	43808	93035
Somali (so stated)	83119	72575	155695
Basuba	29889	29779	59668
El Molo	277	261	538
Asian	17402	15152	32554
European	2200	2245	4445
Arab	9486	9375	18861
Other Kenyans	29711	27607	57318
Total Kenyans	7510372	7632528	15142900
Non-Kenyans			
Africans	39744	32074	71818
Asians	23755	22291	46046
Europeans	17409	18047	35456
Arabs	10562	9723	20285
Others	5102	5111	10213
Total Non-Kenyans	96572	87246	183818
Not stated	169	174	343
Total	7607113	7719948	15327061

Table 2.2 Population and Density by Provinces (1979).

Province	Population	Land Area km ²	Density hd/km ²
Nairobi	827775	684	1210
Coast	1342794	83040	16
North Eastern	373787	126902	3
Eastern	2719851	155760	17
Central	2345833	13173	178
Rift Valley	3240402	171108	9
Nyanza	2643956	12526	311
Western	1832663	3223	223
Total	15327061	564162	27

Table 2.3 Population, Estimates and Characteristics, 1979-2025.

Year	Rural	Urban	Total	Below 15 years	Active 15-60 yrs	Density Total Land Area	Density Arable Land Area
	million	million	million	million	million	hd/km ²	hd/km ²
1979	13.0	2.3	15.3	8.3	7.5	27	146
1988	18.7	4.0	22.7	11.5	10.4	40	216
1990	19.8	4.6	24.4	12.2	11.3	43	233
1993	21.6	5.6	27.2	13.4	12.9	48	259
2000	25.6	11.9	37.5			66	361
2025	37.7	40.0	77.7			136	740

Note: Figures for the years 2000 and 2025 have been abstracted from Prospects of World Urbanization 1988 (UN 1989)

Administrative System

The National Assembly has 188 Elected members, 12 Nominated Members (10 as at 18th September 1989), and the Speaker and the Attorney-General as an ex officio not entitled to vote (except that the Speaker has a casting vote). Parliamentary and presidential elections are normally held every five years.

The districts are subdivided into divisions, locations and sub-locations. A district also contains a system of local administration in the form of a county council. The boundaries of the county council usually coincide with those of the district, and frequently one or more town councils (Tostensen and Scott 1987). Kenya is organized administratively into seven provinces. In addition Nairobi and its environs has the status of a province. Provinces in turn are sub-divided into a total of 43 districts. Names of the Provinces and Districts are shown in Table 2.4 and in Figure 2.1.

Table 2.4 Administrative Areas.

PROVINCE	PROVINCIAL HEADQUARTERS	DISTRICTS	DISTRICT HEADQUARTERS
Western	Kakamega	Bungoma Busia Kakamega Vihiga	Bungoma Busia Kakamega Vihiga
Nyanza	Kisumu	Siaya Kisumu South Nyanza	Siaya Kisumu Homa-Bay
Rift Valley	Nakuru	Kisii Turkana West Pokot Trans Nzoia Elgeyo Marakwet Baringo Uasin Gishu Nandi Samburu Laikipia Kericho Nakuru Narok Kajiado Nyeri Nyandarua Kirinyaga Murang'a Kiambu	Kisii Lodwar Kapenguria Kitale - Iten Kabarnet Eldoret Kapsabet Maralal Nanyuki Kericho Nakuru Narok Kajiado Nyeri Nyahururu Kerugoya Murang'a Kiambu
Eastern	Embu	Embu Marsabit Isiolo Meru Kitui Machakos	Embu Marsabit Isiolo Meru Kitui Machakos
North Eastern	Garissa	Mandera Wajir Garissa	Mandera Wajir Garissa
Coast	Mombasa	Mombasa Tana River Lamu Kilifi Taita-Taveta Kwale	Mombasa Hola Lamu Kilifi Wundanyi Kwale

Table 2.5 Gross Fixed Capital Formation (Constant 1982 Prices).

Gross Fixed Capital Formation	1978	1983	1985	1989 ¹
K£ million	852.2	576.0	597.2	781.4
% of GDP	34.5	18.8	18.4	19.3

¹ Provisional

The total debt of K£ 526 million in 1978 has risen to K£ 3838 million in 1989, and external debt as % of GNP from 12.4 to 47.1 subsequently. The high and rising proportion of central government development expenditure was financed externally, 34 % in 1978 and 51 % in fiscal year 1988/89. The inflation rate declined sharply from the 1982 peak of 22.3 % to 5.7 % in 1985. It rose again to 10.7 % and 10.5 in 1988 and 1989 respectively. The average annual inflation rate has been about 10 % since 1981.

The consumer price index is given in Table 2.6 (1982=100).

Table 2.6 Consumer Price Index 1979-1989.

Year	Index
1979	69
1980	76
1981	86
1982	100
1983	115
1984	125
1985	138
1986	146
1987	156
1988	173
1989	191

Note: 1989 provisional

Table 2.7 shows structural change in the economy over the past 20 years. The share of agriculture & allied activities (fishing, forestry) in output has fallen, but the share of industry has not risen remarkably.

Table 2.7 Sector Shares.

Sector	Sector Shares. % of GDP at current prices				
	1964	1973	1983	1985	1989 ¹
Agriculture & Allied Activities	40	34	32	31	30
Industry	16	18	17	21	18
Services (incl. Government)	44	48	51	48	52
TOTAL GDP	100	100	100	100	100

¹ Provisional

Economic and Social Indicators of Development

The Physical Quality of Life Index, PQLI, a simple composite index for indicators — life expectancy at age one, infant mortality, and literacy — rates the performance of individual countries on a scale of 1 to 100. There 1 represents the "worst" performance by any country and 100 "best" performance. PQLI of Kenya was 58 (an average value for Africa Low-Income countries 43) in 1985, life expectancy at birth was 54 years (Africa LICs 48), infant mortality per 1000 live births was 91 (Africa LICs 126), and literacy 59 % (Africa LICs 41 %).

The military spending per capita in Kenya was USD 14 (Africa LICs USD 10) in 1983, and per capita public education spending was USD 17 (Africa LICs USD 11). The GOK water sector spending per capita was about USD 6 in the fiscal year 1988/89. The value of exports (FOB) was USD 1339 million in Kenya in 1986 (Africa LICs USD 332 million), and the value of imports (CIF) was USD 1831 million (Africa LICs USD 510 million).

Agriculture and Livestock

The most significant constraint regarding agricultural activities in Kenya is the shortage of area suitable for cultivation. The arable land area is only about 20% of the total, and further 10% producing crops is affected by periodic droughts. The agriculture is still the leading sector giving income to 70% of the population, and presenting 30% of GDP. The future of the sector is vital considering the employment of population, and the provision of food and materials for agro-industry.

The population growth has equalled to the growth of the agricultural sector in the 1980s. The population growth has been 39 % in 1980-89, and the growth of agricultural sector 41 % respectively. The gross marketed production share of small farms has declined from 54 % in 1981 to 47 % in 1988.

The objectives and strategies for the development of the livestock sector contained in the 1980 National Livestock Policy document will still remain valid during the current NDP period. The underlying assumption for long-term livestock development policy is that, given the current trends in domestic supply and demand, the country is likely to face large deficits of livestock products. This might lead to costly imports. While the demand for livestock products keeps rising in line with population growth rates, the supply of land for extensive grazing in the medium and high potential land areas is getting increasingly scarce. There are also considerable difficulties in increasing the productivity of the range areas. Thus the possibilities for increasing livestock production lie mainly in intensive feeding zero-grazing.

To meet expected demand, the strategy for development of animal feed will be based on two considerations. First, there will be need to expand fodder crops and improved grasses by individual farmers themselves. Seed varieties for fodder crops and grasses that are already available will be widely distributed to farmers for this purpose. Second, there will be need to promote the manufacture of animal feed in the country. Through the extension system the choice of feed for farmers of various categories will be determined according to nutrient requirements and costs. As far as possible, local materials will be utilised in feed production.

One of the major reasons for the relatively fast development of the livestock industry in Kenya is the considerable support the GOK has given to artificial insemination and animal health services. These

services have involved heavy subsidies that can no longer be sustained. As these vital services have made an important contribution to the development of the dairy and meat industry in the country, the GOK will maintain and improve them but with considerable restructuring in operation and management (Republic of Kenya. NDP 1989-1993).

Education

The 8-4-4 System of Education became operational in 1985, referring to 8 years of primary education, 4 years of secondary education and a minimum of 4 years of university education. The major changes in curriculum content was to emphasize more technically oriented education together with a movement away from a traditional examination-oriented education (Tostensen and Scott 1987).

Health Indicators

The crude death rate has declined from 22 per thousand in 1962 to 13 per thousand in 1987. The life expectancy at birth has improved from 44 years to 58 years over the same period (Odada and Otieno 1990). Tables 2.8 through 2.11 (adopted from World Bank 1988) show major out-patient and in-patient morbidity patterns, the ten most common infant and child diseases, and causes of morbidity by disease. Parasitic and infectious diseases are responsible for high morbidity and mortality rates in Kenya, accounting for 18 % of all deaths reported in 1980. This includes malaria, schistosomiasis, and other vector-borne diseases such as sleeping sickness, filariasis, etc. Intestinal and diarrheal diseases accounted for 10.9 % of out-patient morbidity in 1980. These, combined with diseases of the respiratory system, accounted for 60 % of total reported morbidity.

Table 2.8 Major Out-Patient Morbidity Patterns in Kenya, 1980.

	Total Cases Treated, %	
	1980	1986 ¹
Acute respiratory infections (including pneumonia)	20.0	20.7
Malaria	18.0	24.0
Skin diseases	9.8	6.7
Diarrheal diseases	6.3	5.4
Intestinal worms	4.6	5.0
Accidents (all forms)	2.9	2.4
Measles	2.6	0.6
Acute eye infections	2.4	2.7
Gonorrhoea	1.7	1.7
Acute ear infections	1.7	2.2
All others	30.0	28.6

Table 2.9 Major In-Patient Mortality Patterns in Kenya, 1980.

	Total Deaths Reported, %
Infections and parasitic diseases	18.0
Respiratory diseases (including pneumonia)	17.1
Circulatory system diseases	13.6
Diseases of the new-born and child bearing	5.5
Enteritis and other diarrheal diseases	4.9
Tuberculosis (all forms)	3.7
Digestive system diseases	3.0
Metabolic and nutritional disorders	2.6
Cerebral vascular diseases	2.5
All others	29.0

Table 2.10 Most Common Infant and Child Diseases in Kenya, 1973.

Disease	Infants %	(< 1 year) Ranking	Children %	(1-4 years) Ranking
Pneumonia	26	1	21	2
Enteritis and other diarrheal diseases	21	2	10	3
Measles	10	3	23	1
Malaria	6	4	8	4
Acute respiratory infections	5	5	4	6
Bronchitis, emphysema, and asthma	4	6	5	5
Tetanus	3	7	-	-
Symptoms and ill defined conditions	2	8	2	10
Anacmia	2	9	3	7
Meningitis	1	10	-	-
Burns	-	-	3	8
Avitaminoses	-	-	3	9
Others	20		18	
TOTAL ALL CASES	100		100	

Table 2.11 Childhood Mortality in Kenya, 1978.

Mortality by Cause	Infants (< 1 year) %	Children (1-4 years) %
Pneumonia	31	25
Tetanus	17	24
Enteritis and other diarrheal diseases	12	9
Measles	8	8
Other diseases	32	34
TOTAL	100	100

3 WATER RESOURCES

Meteorology

Kenya has a mean annual precipitation of about 500 mm varying from below 200 mm in the arid areas in the north and in the east to well over 2000 mm in the highlands. The predictability of annual rainfall is poor, and especially in arid areas the monthly rainfall is even less predictable.

The climate of Kenya is influenced by the two monsoon systems. The movement of air masses, between the two high pressure belts in the southern and northern hemispheres within the intertropical convergence zone (ITCZ), produces two rainy seasons a year at equatorial areas. The main one, also called "the season of long rains" occurs from March to June. The mean annual precipitation has been estimated to be 300000 Mm³, and the mean annual runoff 24000 Mm³ that is 8% of the total precipitation.

From December to March, Kenya is generally under the influence of the northeast monsoon, when the movement of dry air is in the northerly direction. From March to June the wind comes from the easterly direction bringing moist air from the Indian Ocean and causing heavy rains within the area. From June to September the southeast monsoon is prevalent, during which the country is dominated by air subsidence inhibiting rainfall and causing low temperatures. From September through November, the wind direction is again from the east, bringing moisture from the end of October to the beginning of January, also called "the season of short rains".

The mean temperatures in Kenya are closely related to ground elevation. The annual temperature variations are generally less than 5°C throughout the country. The highest temperatures are recorded in the arid regions of the North-Eastern Province along the Somalia Coast and to the west of Lake Turkana, where the annual mean of daily maximum temperatures can reach 34°C. The coldest areas are the mountains where night frost occurs above 3000 m and permanent snow and ice cover Mount Kenya above 5000 m.

The mean annual free-water evaporation in Kenya varies from 1250 mm in areas at an altitude of 3000 m to over 2500 mm in areas below 300 m. The mean monthly rates vary from 85 mm to 250 mm. The relative humidity varies between 70-90 % in the coastal belt and in areas with vegetative cover. In arid areas the maximum relative humidity does not exceed 70 %, and in the highlands the minimum is around 40 % during the dry season, and 60 % during the rainy season.

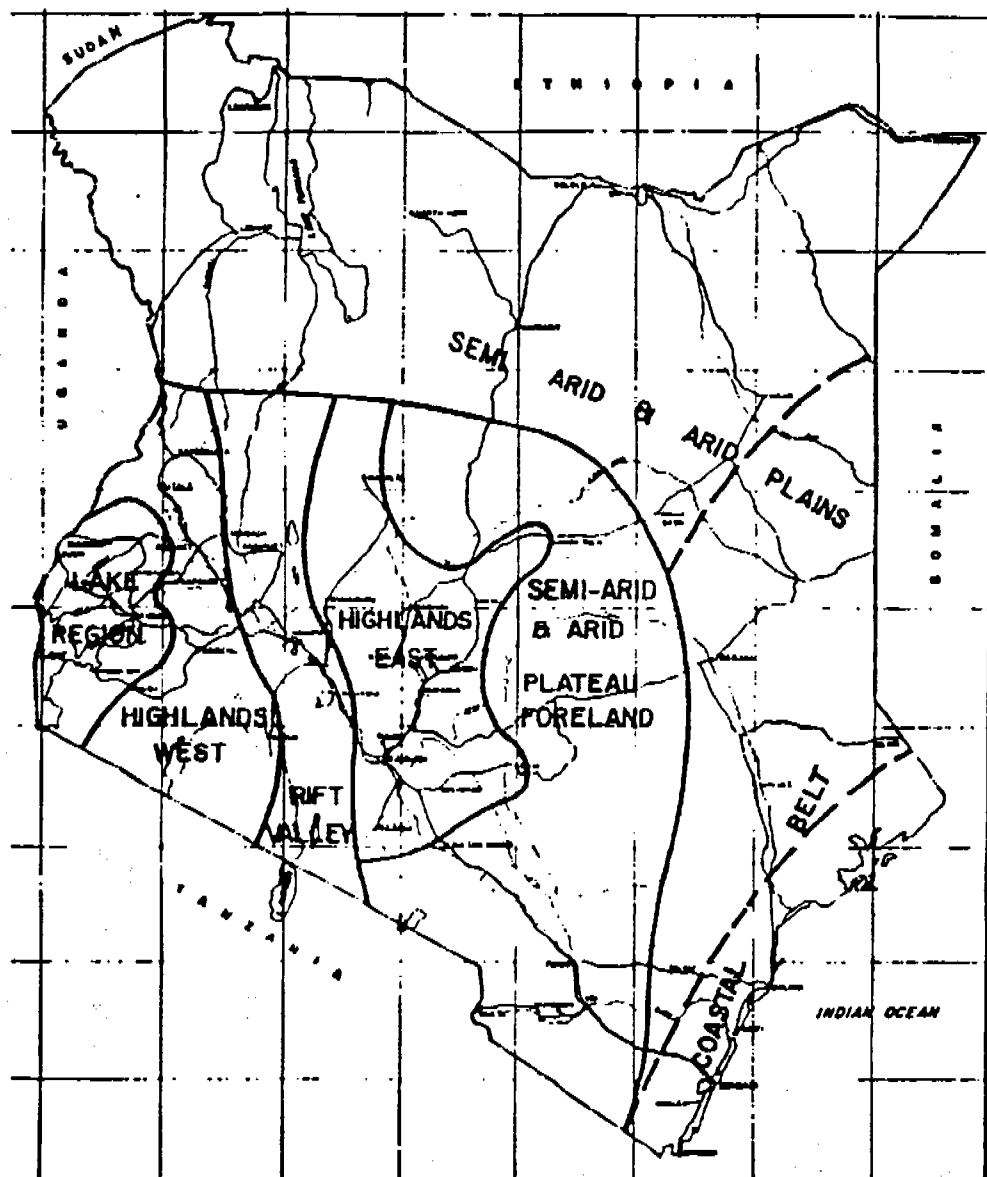


Figure 3.1 Major Regions in Kenya.

Drainage Basins

Kenya is divided into five major drainage areas: Lake Victoria, Rift Valley, Athi River, Tana River, and Ewaso Nyiro (Figure 3.2 and Table 3.1).

Table 3.1 Major Drainage Basins in Kenya.

Drainage Basin	Catchment Area km ²	Mean Annual Rainfall mm	Mean Annual Runoff m ³ x 10 ⁶	Mean Annual Runoff mm	Percentage of Total Land Area %
Lake Victoria	49000	1245	7.30	149	8.4
Rift Valley	127000	535	0.81	6	21.8
Athi River	70000	585	1.30	19	12.0
Tana River	132000	535	4.7	36	23.7
Ewaso Nyiro	205000	255	0.74	4	35.1
Kenya	583000	510	14.85	25	100.0

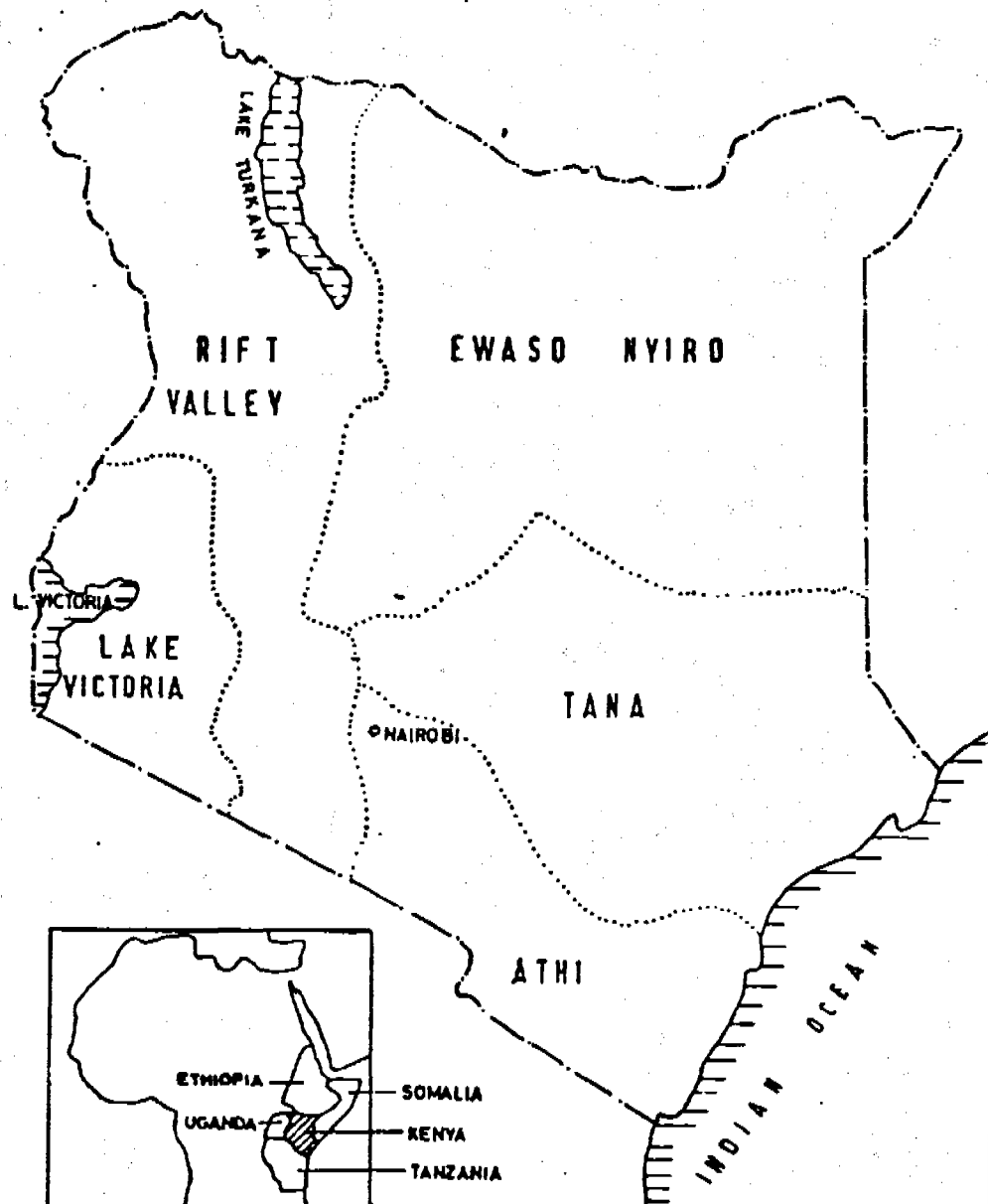


Figure 3.2 Major Drainage Basins in Kenya.

Geology

The major geological features of Kenya are summarized as follows:

- (i) A core of old rocks (bedrock) underlies western and central parts of the country. This relatively stable bedrock has been subject to a modest degree of arching and in some places to faulting. It has largely been above sea level, and undergone continuous erosion for many hundreds of millions of years.
- (ii) A more mobile section near the coast has been alternately elevated and depressed above and below the sea over a period of perhaps 250 million years. There, thousands of metres of sedimentary rocks, of both marine and continental origin, have accumulated. They dip gently east towards the sea.

- (iii) A complex series of separate events over some twenty million years bedrock was dislocated and displaced along a series of north-south trending fractures and thousands of cubic kilometres of volcanic rocks were erupted. The dislocations formed the Rift Valley that transects Kenya from north to south along meridian 36°E. Volcanic eruptions formed the massifs of Mt. Kenya, Mt. Kilimanjaro, Mt. Elgon, the Nyandarua Range, and many other less prominent peaks and ranges.
- (iv) The resulting complex of bedrock, volcanic rocks and coastal sediments has been weathered. Thick blankets of residual soils are common. In addition, river and lake deposits are found in many places not only covering older rocks but also as interbeds within volcanic.

The types of rocks according to their water-bearing properties in age from youngest to oldest areas follows:

- Quarternary and Tertiary sediments
- Quarternary and Tertiary volcanic
- Paleozoic and Mesozoic sediments
- Bedrock complex

Water Resources

The surface area of fresh water lakes is about 4170 km². The quantities available and the lake water balances have not yet been established. Table 3.2 shows the surface area of the major lakes in Kenya. Because there is no data established on the water flows, it is not possible to determine the availability of water for crop production and for technical supplies.

Table 3.2 Major Lakes in Kenya (31 December 1984).

Lake	Area, km ²	Water Quality
Victoria (Nyanza Gulf)	3785	fresh
Turkana	6405	saline
Naivasha	210	fresh
Baringo	129	fresh
Magadi	104	saline
Jipe	39	fresh
Bogoria	34	saline
Nakuru	30	saline
Elementaita	18	saline

Approximately some 6000 - 7000 boreholes have been drilled in Kenya. The local geology and geochemistry is largely unfavourable for substantial exploitation of groundwater from boreholes. The average abstraction yield has been estimated to be some 120 litres per minute. The observations from existing boreholes suggest that there is a high potential for borehole development in the Lake Basin, Lake Naivasha area, Lake Amboseli and in the South East Coast. The extensive assessment and development is still required, if groundwater resources are to be fully utilized. Major constraints regarding the use of boreholes water are high salinity in the north and east and high fluoride content in the Rift Valley.

4 NATIONAL WATER SECTOR POLICY

"The governments do not subsidize the water sector services fully. According to the present policies users are not expected to pay the remaining share of the price of the services provided. How can the financially sound operations be guaranteed? **Who on earth will pay the difference?** It must be a tiny green man from the outer space." (Coffee table discussions at TUT 1990).

The GOK has stated since the independence the objective of the **provision of piped portable water to all Kenyans by the year 2000**. During 1974, the GOK promulgated the National Water Master Plan with express aim of ensuring the availability of portable water within 4 kilometres of every household by the year 2000. To avoid conflict of interest and duplication of effort by institutions dealing with water affairs the Government has recently adopted a new policy, The District Focus for Rural Development Policy. This makes the Districts the operational centres for rural development and implementation. The aims and objectives of this policy are to:

- (i) Involve the beneficiaries in the identification, planning, implementation, operation and evaluation of development projects, including water development projects, within their areas.
- (ii) Coordinate the activities of different organisations with similar goals in development.
- (iii) Enable the local communities to select their priorities due to the limited resources available.
- (iv) Mobilize locally available resources, mainly labour and materials to enhance development which is in line with the Government policy of cost sharing.
- (v) Create the needs for artisans within the community and hence create employment for the semi-skilled, instead of importing this from outside without the community involvement.
- (vi) Create a sense of ownership for the project implemented within the community through cost sharing and consumer participation.

The strategy of District Focus for Rural Development is based on the principle of ministries and districts having complementary responsibilities. Responsibility for the operational aspects of rural development has been delegated to the districts, while the responsibility for broad policy, the planning and implementation of multi-district and national projects has remained with the ministries. The District Development Committees (DDCs) are responsible for the definition of priorities for locally identified projects coming through the Divisional Development Committees, identification of districtwide needs, preparation of District Development Plan, and the design of projects which fit within the priorities. The Membership of the DDCs include the following:

- District Commissioner (Chairman)
- District Development Officer (Secretary)
- Departmental Heads of Development - Related Ministries

- Members of Parliament from the District
- Chairmen of Local Authorities
- Clerks of Local Authorities
- Chairmen of Divisional Development Committees
- Representatives of Development - related Parastatals
- Invited representatives of non-governmental (NGO) development - related organisations.

5 SECTOR INSTITUTIONAL ARRANGEMENTS

Ministry of Water Development

The Ministry of Water Development (MOWD), established in 1974 (before 1974 the Water Department under the Ministry of Agriculture). MOWD has the key responsibility of all water oriented activities even though other ministries and agencies may plan, finance, construct or operate water supply and use facilities. MOWD responsibilities are to:

- provide safe water supply for domestic and livestock use to the entire population by the year 2000.
- control pollution
- achieve better balance between sewerage and water supply in larger urban areas
- increase water conservation effort in relation to arid zone supplies and to soil conservation
- expand flood protection for habited and agricultural land
- drain swamps and valley floors to increase the quantity of agriculturally productive land
- expand use of water for major and minor irrigation activity to increase agricultural production and employment
- upgrade private sector water development activity, including self-help activities, and integrate this effort more completely with public sector
- formulate, coordinate and monitor major river basin development programmes to achieve optimum multipurpose use of resources and investments

To achieve the objectives of water supply, the Ministry of Water Development (Water Development Department) implements the following programmes:

- Rural Water Supplies
- Urban Water Supplies
- Minor Urban Water Supplies
- Livestock Water Supplies
- Self-Help Water Supplies
- Sewerage Development Programme
- National Water Quality and Pollution Control
- Integrated Development Programme
- Water Conservation Programme
- Private Water Development
- Water Survey and Planning (Master Plans for Districts) Programme
- Livestock Water Supply Programme (Range and Ranch)
- Water Research Programme
- Personnel Development Programme

In May 1988, MOWD established the National Water Resources Research and Development Unit (NWRRDU), which is the precursor to the Kenya Water Resources Research and Development Institute (KWRRDI). The responsibilities of NWRRDU are:

- to synthesize reports already prepared related to water resources in the country
- to define the catchment areas of important lakes and rivers
- to review the existing hydrometeorological network and to recommend improvement in intensity and coverage of

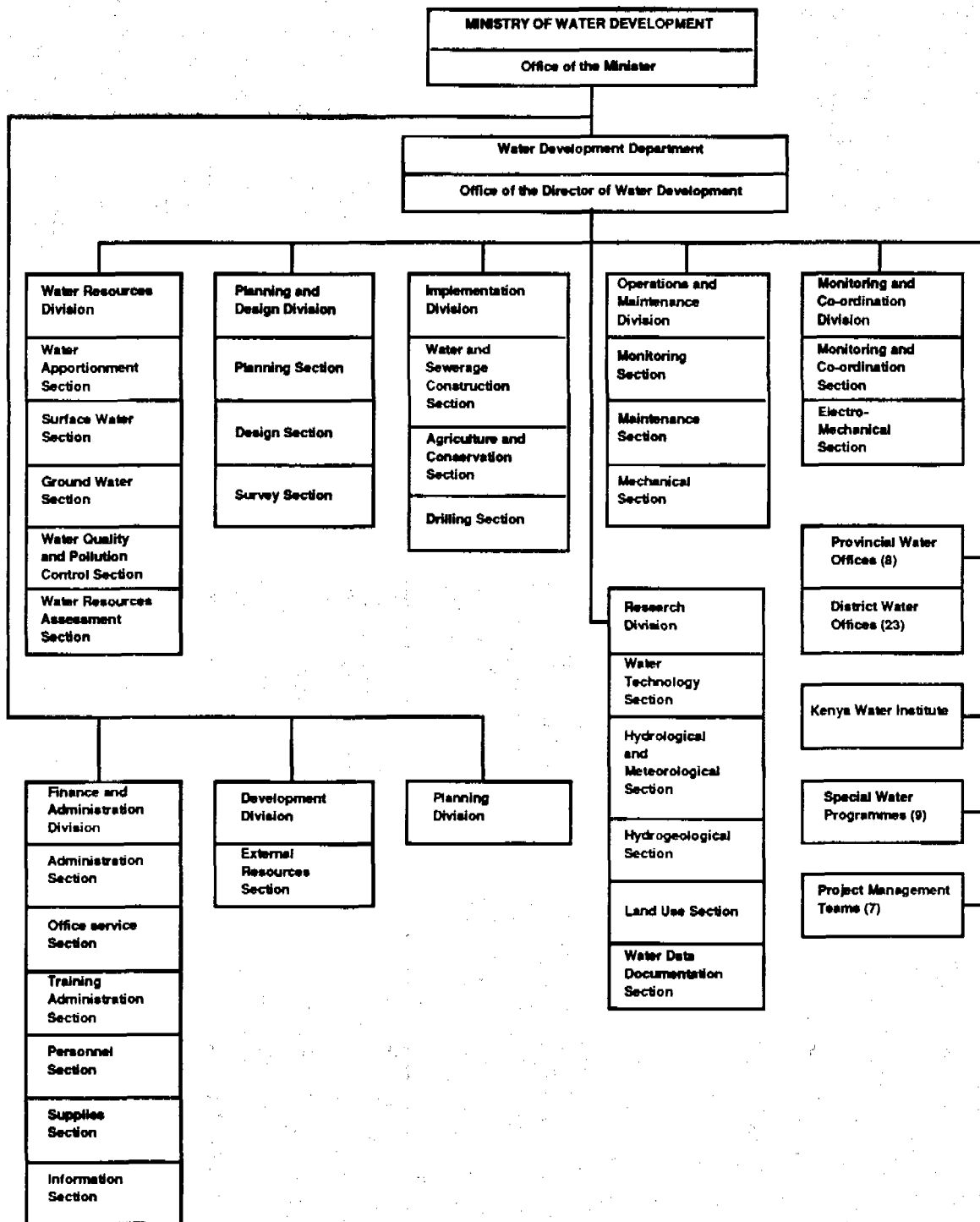


Figure 5.1 Organization Chart — Ministry of Water Development, Kenya.

- measurements of rainfall, stream/river flows and groundwater to study the climatology of major rivers and lakes within Kenya with a view to:
 - develop techniques for flood control as well as issuing of flood forecast
 - develop the appropriate methods for flood mitigation and to develop techniques for quantitative analysis of precipitation applicable to flood forecasting models
- to conduct detailed hydrological measurements to ascertain the water balance of the lakes and rivers and their catchments
- to study the existing land use activities and their possible influence on water resources.

The number of MOWD personnel was 11837 in the fiscal year 1989/90, and it is proposed to be 12148 in the fiscal year 1990/91. The motor vehicle establishment is 735, out of which 545 were load carriers, 19 special vehicles, and 74 motor cycles.

National Water Conservation and Pipeline Corporation (NWPC)

The National Water Supply and Pipeline Corporation (NWPC) was established in 1988 (Legal Notice No. 270, The State Corporations Act, Cap 446, The National Water Conservation and Pipeline Corporation Order, 1988). It has the following functions, powers and duties:

- manage and develop the water projects specified in the Schedule under the general direction of the Minister for the time being responsible for water development
- in connection with the water projects supply water in bulk to water undertakers, such persons or class of persons as the Minister may, after consultation with the Board of the Corporation, by notice in the Gazette, designate
- do all such things as may be necessary or advantageous for the management and development of the water projects and securing an adequate supply of water
- apply for and obtain all such licences, permits and other authorities required under any written law or as may be desirable
- assist the Government in the formulation and execution of a national water development policy

The schedule of water projects (16 June 1988) was as follows:

1. Nul-Turesh Pipeline and Water Supply
2. National Dam Construction Project
3. Greater Nakuru Water Project (East and West)
4. Second Mzima Pipeline
5. Great Rift Water Project
6. Tana/Lamu Water Project
7. Sabaki Water Project.

The schedule was amended 8 January 1989, and 35 water projects were added into the schedule (Annex I). Under the Water Act, Cap 372, 26 water undertakings were transferred to NWPC 8 January 1989 (Annex I). From the 1st July 1989 the Corporation will be responsible for 26 water undertakers, 3 projects under construction and 14 projects in the planning stage (Price Waterhouse Association 1989, Annex I).

The Corporation will have a regional structure with Regional managers of the four regions, Western, Central, Rift and Coast being based at Kisumu, Nyeri, Nakuru, and Mombasa. These regional offices will take over many of the functions carried out by the District and Provincial Water Engineers and the DC's Office including:

- monitoring of water quality
- provision of workshop and a mobile maintenance unit for local undertakers
- preparation of accounts and the collection of revenue, including activities relating to non-payment
- minor works design and engineering.

In addition, the Region will keep all personnel records, with copies being maintained at Headquarters. The Provincial and District Water Engineers will still provide services to those water undertakers not taken over. The headquarters function is:

- long range and strategic planning
- policy direction and monitoring
- project design
- construction (both sub-contract and own schemes)
- provision of central services, such as payroll
- financial management.

The undertakers will continue initially as at present, except they will report through to the Regional Office, and will sever all connections with DC's office, Provincial and District Water Engineers. Their tasks include:

- water treatment
- distribution
- meter reading
- maintenance, supported by Region where necessary
- bill distribution

The undertakers and the projects by the regions are given in Annex I.

Water and Sanitation Responsibilities of Other Entities

The Ministry of Local Government (MOLG) works in cooperation with MOWD in water sector. All major municipalities in Kenya can be divided into three categories with respect to water and sanitation facilities (Odada and Otieno 1990):

1. Operate and maintain their own water supply, waste disposal, sewerage and revenue collection: Nairobi, Kisumu, Nakuru, Eldoret, Thika, Kericho, Nyeri, Kitale, Nyahururu and Nanyuki.
2. Operate their own sewerage, waste disposal and collect revenue; also purchase water in bulk from MOWD, undertake distribution of water and collect revenue: Meru, Kisii, Bungoma, Embu and Kiambu.
3. Responsible only for sewerage, waste disposal and its revenue collection; water supply, distribution and revenue collection is by MOWD: Mombasa, Machakos, Malindi, Kakamega and Murang'a.

Table 7.3 indicates that the actual external finance has been 32 % of the development expenditure during 1979/89. The usage of the external finance has been about 80 % of the authorized estimated external finance. Table 7.4 shows the total expenditure of the municipal councils in water sector during the fiscal years 1982/83-1989/90.

Table 7.4 Municipal Councils: Current and Capital Expenditure on Sanitation and Water Undertakings, 1982/83-1988/89 (K£ million, current prices).

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Sanitation	9.41	8.30	6.51	13.99	11.11	10.88	23.04	32.44
Water Undertakings	15.40	15.45	16.21	32.20	18.94	23.90	33.45	38.07
TOTAL	24.81	23.75	22.72	36.84	31.05	35.27	54.49	70.51
% of Total Current and Capital Expenditure	33.3	32.2	34.8	27.9	29.3	30.1	37.8	34.1

Note: 1988/89 and 1989/90 provisional

Table 7.5 indicates that the shares of the total expenditure by MOWD and by the municipal councils are 60 % and 40 % correspondingly, when the total expenditures in water sector are compared during the fiscal years 1982/83-1988/89.

Table 7.5 Ministry of Water Development and Municipal Councils Expenditure 1982/83-1988/89 (K£ million, current prices).

Year	MOWD		Municipal Councils		Total Expenditure
	Actual	% of Total	Actual	% of Total	
1982/83	30.2	54.9	24.8	45.1	55.0
1983/84	44.5	65.2	23.8	34.8	68.3
1984/85	37.3	62.2	22.7	37.8	60.0
1985/86	41.5	53.0	36.8	47.0	78.3
1986/87	62.0	66.6	31.1	33.4	93.1
1987/88	49.9	58.6	35.3	41.4	85.2
1988/89	78.8	59.1	54.5	40.9	133.3
1982/89	344.2	60.0	229.0	40.0	573.2

Table 7.6 shows the past external sector investments (World Bank 1988, compiled by WHO, WB, and UN). These investments may be underestimated.

Table 7.6 Past Sector Investments (USD million, current prices).

	Total	Urban	Rural
World Bank ¹	151.0	131.0	20.0
Federal Republic of Germany	95.0	95.0	
Sweden (SIDA)	88.0	-	88.0
Saudi Fund	38.7	38.7	
Norway (NORAD)	32.6	32.6	
African Dev. Bank	31.7	31.7	
Finland	23.0	-	23.0
Canada (CIDA)	6.6	-	6.6
WFP	5.0	-	5.0
UNDP	3.3	0.3	3.0
OPEC Fund	3.0	3.0	
Japan	2.3	2.3	
UNICEF	2.0	-	2.0
IFAD	1.3	-	1.3
TOTAL	483.50	334.6	148.9

Note: Netherlands, United Kingdom, and NGOs are not listed. World Bank totals may include funds for projects not solely devoted to water supply.

Future Investment Needs

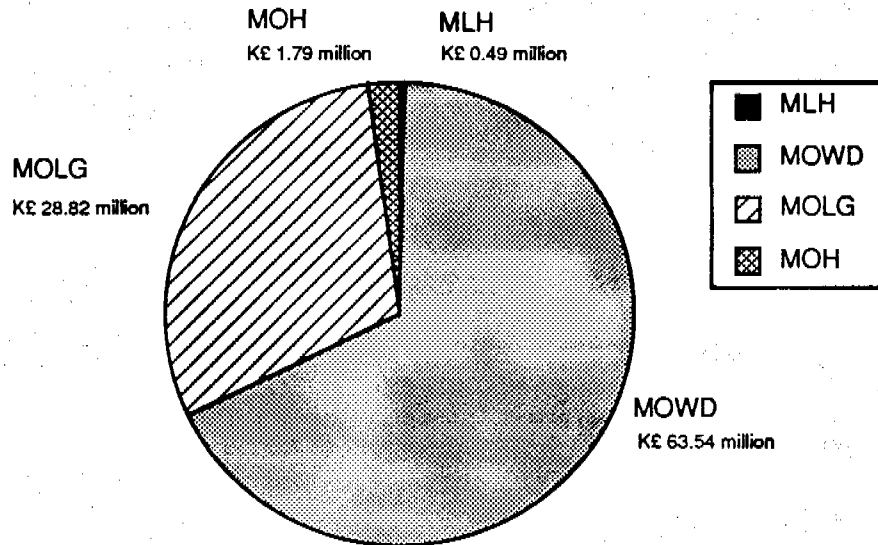
Table 7.7 and Figure 7.1 give the estimated shares of each ministry's development expenditure for the fiscal year 1990/91. The proportion allocated for the urban services development is K£ 63 million (66 %), and for the rural services development K£ 32 million (34 %) in the estimates 1990/91 (Annex II, Republic of Kenya 1990a).

Table 7.7 Development Expenditure Estimate 1990/91, Water Sector (K£ million, current prices).

Ministry	Developm. Estimate	% of Total Developm. Estimate	External Funding	External Funding % of Total External Funding	% of Total Developm. Estimate
MLH	0.49	0.52	0.30	0.45	0.32
MOA	0.04	0.04	0.04	0.06	0.04
MOCSS	0.18	0.19	0.18	0.27	0.19
MOH	1.79	1.88	0.67	1.01	0.71
MOLG	28.82	30.32	26.35	39.70	27.72
MORD	0.15	0.16	0.13	0.20	0.14
MORDASW	0.04	0.04	0.04	0.06	0.04
MOWD	63.54	66.85	38.66	58.25	40.67
Total	95.05	100.00	66.37	100.00	69.83

1 The GOK/Water Sector Development Estimates, see Annex II.

2 External Funding, see Annex III.



Ministries having less than K£ 0.2 million

MOA	K£ 0.04 million
MOCSS	K£ 0.18 million
MORD	K£ 0.15 million
MORDASW	K£ 0.04 million

Figure 7.1 Development Expenditure Estimate 1990/91, Water Sector (K£ million, current prices).

The share of the total water sector investments of the GOK development expenditure (K£ 1006.5 million) is approved to be 9.4 %, which can be considered a considerably high share from the public investments. The MOWD's share is 7.6 % of the total development expenditure. Only the Office of the President with 8.4 %, the Ministry of Public Works with 11.4 %, and the Ministry of Energy with 14.5 % will have the larger shares of the development expenditure than MOWD in the GOK 1990/91 budget estimates. Table 7.8 gives the investment requirements for the targets set in the NDP 1989-93.

Table 7.8 Investment Requirements during the Sixth NDP 1989-93. Water Supply, (K£ million, 1988 prices).

Year	Urban Water Supply Estimated Cost	Rural Water Supply Estimated Cost	Total Water Supply Development	
			Estimated Cost	Expenditure
1988/89	71.4	28.2	99.6	67.1
1989/90	68.0	36.6	104.6	92.6
1990/91	76.5	37.5	114.0	78.2
1991/92	79.9	40.8	120.7	97.6
1992/93	102.0	42.6	144.6	102.4
1988/93	397.8	185.7	583.5	437.9

- 1 Assume MOWD share is 65% of total water sector development expenditure.
- 2 Assume sanitation share is 20% of total water sector development expenditure
- 3 Assume per capita cost urban water supply K£ 170; Rural water supply K£ 30. (Costs are based on IDWSSD, FINNIDA, MOWD, and the Netherlands Lake Basin Development Authority Rural Domestic Water Supply and Sanitation Programme, Nyanza Province, see Table 7.9).
- 4 Development Expenditures are estimated based on MOWD 1988/89 actual expenditure, 1989/90 authorized estimates, 1990/91 estimates, and 1991/92 and 1992/93 forward budget ceilings.
- 5 The population targets to be served have been taken from Table 8.8.

Table 7.8 and Figure 7.2 indicate also that the targets set regarding the population to be served with improved water supply systems will not likely be met during the NDP 1989-93 due to the shortage of development expenditure of about K£ 150 million. The targets will be met only, if considerably cheaper technologies will be used.

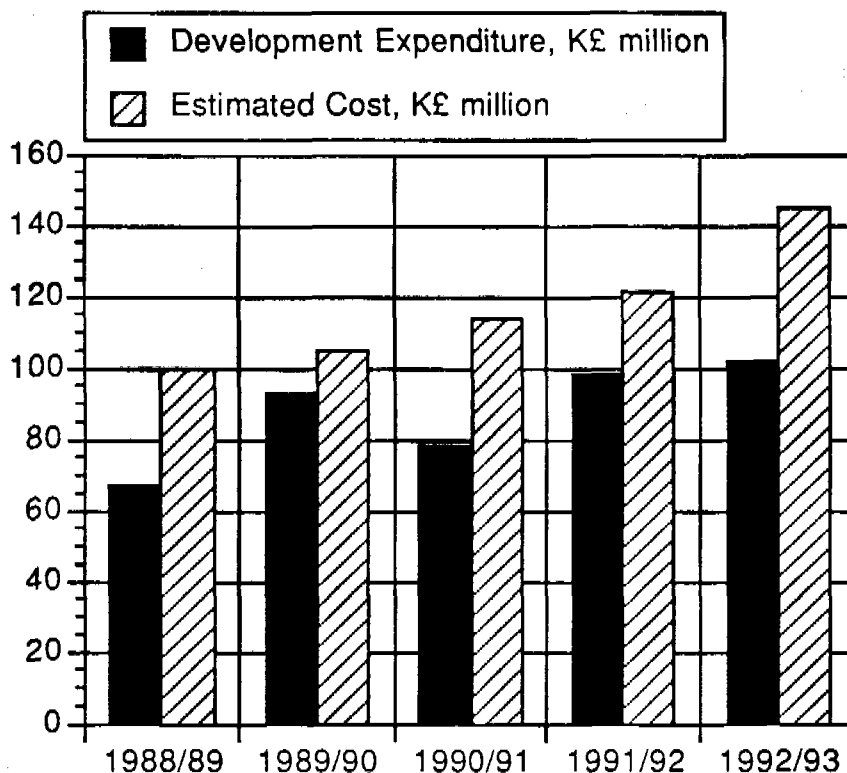


Figure 7.2 Investment Requirements and Development Expenditure Allocations for Water Supply, 1989-93 (K£ million, 1988 prices).

Table 7.9 shows the World Bank (1988) estimate for investment requirements by the year 2000.

Table 7.9 Investment Requirements by the Year 2000.

Estimated Coverage Costs and Population	Urban Water	Sanitation	Rural Water	Sanitation	Total
Population Served 1990	2.9	1.9	3.9	4.7	
Coverage Target 2000	9.8	8.8	21.4	14.3	
Shortfall/Unserved	6.9	6.9	17.5	9.6	
Cost USD	1035.0	1139.0	438.0	480.0	3092.0

- 1 Population and costs in millions. (1988 prices)
- 2 Assume 1988 population 4.7 M urban, 18.6 M rural; year 2000 9.8 M urban, 28.5 M rural.
- 3 Assume urban growth rate of 6.3 %
- 4 Assume % of access to water supply 1988 61% urban, 21% rural; year 2000 100% urban, 75% rural.
- 5 Assume % access to sanitation 1988 40% urban, 25% rural; year 2000 90% urban, 50% rural
- 6 Assume per capita cost urban water supply USD 150, sanitation USD 165;
Rural water supply USD 25, sanitation USD 50 (Costs are based on IDWSSD, FINNIDA, MOWD, and the Netherlands Lake Basin Development Authority Rural Domestic Water Supply and Sanitation Programme, Nyanza Province).

This estimate indicates that the total development expenditure in water sector should be annually on an average about K£ 350 million during 1990-2000 (USD 1 is K£ 1.15, 2 August 1990), if the GOK targets are to be met. This would require 44 % annual increase to the sector development expenditure starting from the fiscal year 1990/91 (K£ 95.05 million).

Table 7.10 shows that the annual development expenditure at current price level should be annually on an average well over K£ 500 million to give the full coverage of water services by the year 2025. This would require during the years 1990-2025 16 % annual increase to the sector development expenditure starting from the fiscal year 1990/91 (K£ 95.05 million).

Table 7.10 Investment Requirements, 2000-2025, (K£ million, 1988 prices).

Years	Urban		Rural		Total
	Water Supply	Sanitation	Water Supply	Sanitation	
2000/25	5134.0	5928.0	489.0	1404.0	12955.0

- 1 Population and costs in millions.
- 2 Assume population served year 2000 with water supply 9.8 M urban, 21.4 M rural; year 2025 40.0 M urban, 37.7 M rural.
- 3 Assume population served year 2000 with sanitation 8.8 M urban, 14.3 M rural; year 2025 40.0 M urban, 37.7 M rural.
- 4 Assume % of access to water supply year 2000 100% urban, 75% rural; year 2025 100% urban, 100% rural.
- 5 Assume % access to sanitation year 2000 90% urban, 50% rural; year 2025 100% urban, 100% rural.
- 6 Assume per capita cost urban water supply K£ 170, sanitation K£ 195; Rural water supply K£ 30, sanitation K£ 60 (Costs are based on IDWSSD, FINNIDA, MOWD, and the Netherlands Lake Basin Development Authority Rural Domestic Water Supply and Sanitation Programme, Nyanza Province, see Table 7.10).

Tables 7.9 and 7.10 indicate that to extend the service coverage in water sector in Kenya, the investment level should be about fourfold in 1990-2000 compared to the present development expenditure, and about sixfold in 2000-2025 respectively. If "Harambee" (joint effort for development) contributions for water sector are expected to cover a considerable share of the needed investments, GOK should introduce urgently a new policy and action plan for the coming years. Harambee contributions for the years 1979-85 shown in Table 7.11 have only been 3.5 % of the MOWD development expenditure.

Table 7.11 Harambee Contributions, Water, 1979-85 (current prices).

Year	K£ million
1979	0.88
1980	0.67
1981	0.74
1982	0.59
1983	0.79
1984	1.31
1985	1.04
1979/85	6.02

The rest of about 100 urban water supply systems are under the direct responsibility of MOWD. In urban centres where the municipality is undertaker or water distributor MOWD has seconded some personnel to help them in the management of the systems. Rural water supply systems are run by MOWD except those systems that are categorised as self-help systems, county council systems, individually owned systems and institutional systems serving schools, health centres etc.

The Ministry of Agriculture (MOA) has numerous agencies which have varying degrees of involvement with water resources development and operations:

- **Small Scale Irrigation Unit (SSIU)** was formed in 1977 to develop and rehabilitate minor, local irrigation and drainage projects up to several hundred hectares in size mainly in humid and sub-humid zones
- **Arid Region Irrigation Development (ARID)** was started in 1967 as the Minor Irrigation Programme for Arid Areas (MIPAA). ARID largely operates disaster relief, socially oriented projects in tribal and trust lands
- **Natural Resources Conservation Project** is presently being mobilized to generate applicable research for continuing development programmes within the scope of national resources conservation
- **Agricultural Engineering Project** is concerned with development of appropriate technologies for small farm production and soil and water engineering
- **Soil Conservation Service** primarily constructs small water detention structures for livestock ponds, local irrigation and sediment trapping
- **Soil Conservation Unit** is responsible for soil and water conservation activities on watersheds and farms
- **National Irrigation Board (NIB)** is a semi-autonomous agency in the Ministry of Agriculture and was established under the Irrigation Act. This Board is responsible for control and improvement of all national irrigation schemes in Kenya. These schemes are large irrigation projects, the size or complexity of which require a formal infrastructure.

The Ministry of Tourism and Wildlife (MOTW) is responsible for a wide range of development and operations related to water. It controls fisheries, manages wildlife and sponsors tourism development.

The Ministry of Environment and Natural Resources (MOENR) manages the forestry lands to provide basic forest products and to conserve soil and to preserve water supplies in key upland catchments.

The Ministry of Livestock Development (MOLD) has the responsibility for livestock extension.

The Ministry of Lands and Housing (MLH) is responsible for developing 400000 hectares of high potential land settled by farmers since independence. An important part of its programme has been providing and operating water supplies. The Department of Settlements plans and budgets water supplies for new settlements.

The Water Apportionment Board (WAB) issues, monitors and revokes permits for the abstractions of water in Kenya. MOWD provides the Board with technical advice, manpower for the Board's secretariat, and water bailiffs who are the Board's field workers. In effect, the WAB is a subsidiary of MOWD.

The Catchment Water Boards are located in each of Kenya's five major catchments with the Lake Victoria Area having two Catchment Water Boards: the North and the South. The Catchment Water Boards advise the Water Apportionment Board on the use of water supplies and adjustment, cancellation or alteration of permits.

The Kenya Power and Lighting (KPL), a parastatal organization, provides necessary centralized control for the planning, production and distribution of electricity in Kenya. Approximately half of Kenya's electricity is generated in Kenya by hydropower, mainly on Tana River.

The Kenya Power Company (KPC), a state organization, has the national responsibility for developing resources for generating electricity largely from geothermal and hydro sources.

The Tana River Development Company (TARDC), a government company, develops Tana River hydroelectric resources in close collaboration with TARDA, KPC and KPL.

The Ministry of Energy (MOE) has involved in water development and management programmes especially through its authorities, Kerio Valley Development Authority (KVDA), Lake Basin Development Authority (LBDA), and Tana And Athi River Development Authority (TARDA).

The Kerio Valley Development Authority (KVDA) was established by KVDA Act Cap. 441, and its objective is to plan and coordinate implementation of development projects in Kerio and Turkwell catchment areas. Its functions include inter alia:

- coordinate the various studies and schemes within the area so that human, water, animal, land and other resources are utilized to the best advantage and to monitor the design and execution of planned projects within the area
- co-ordinate the present and the planned abstraction and use of the natural resources especially water and set up an effective monitoring of abstraction and usage
- cause the construction of any works necessary for the protection and utilization of the water and soils of the area
- ensure that the landowners in the area undertake all the measures specified by the Authority to protect the water and soils of the area
- identify, assemble and correlate all the data related to the use of water and other resources within the area as may be necessary for the efficient forward planning of the area

The Lake Basin Development Authority (LBDA) was established by LBDA Act Cap. 442 and objective is to plan and co-ordinate implementation of development projects in Lake Victoria Catchment area. Functions are basically like those of Kerio Valley Development Authority.

The Tana And Athi River Development Authority (TARDA) was established by Tana- Athi Rivers Development Authority Act, Cap. 443 to advise on the institution and coordination of development projects in the Tana- Athi River Basins etc. Functions are basically like for Lake Basin Development Authority and Kerio Valley Development Authority.

The Water Undertakers are entrepreneurs and are licensed by MOWD to provide water as an industry supervised ultimately by MOWD. They include Director of Water Development, Local Authorities, private persons etc.

The Ministry of Culture and Social Services (MOCSS) in liaison with relevant ministries has promoted self-help systems in rural areas. The responsibilities have been transferred to the DDC.

The Ministry of Health (MOH) is responsible for public health under the Public Health Act. It is also responsible for urban and rural sanitation, and has been involved in a demonstration programme for small rural water supply systems. The sanitation activities are undertaken by different authorities i.e. MOWD (drainage and sewerage urban areas); MOLG (municipal councils). MOH has currently a supervisory and regulatory role on water quality and sanitation.

The Ministry of Reclamation and Development of Arid, Semi-Arid and Wasteland (MORDASW) is responsible for water and sanitation development regarding ASAL-Programme.

Self- Help Water Projects

Non-governmental organizations (NGOs) have participated in the development of community water supply and sanitation both in rural and urban areas.

Harambee self-help projects reflect a bottom-up rather than a top-down development project initiation. Harambee projects are normally initiated, planned, implemented and maintained by local communities. Harambee self-help activities are heavily biased towards the use of local resources, such as human labour and use of donations, like individual material property. The participation of individuals in Harambee self-help is guided by the principle of the collective good rather than the individual gain. The choice of projects is guided by the principle of satisfying the immediate need of participating members or groups.

The MOWD supported self-help water programme was started in early 1970s. In mid 1970s MOWD established the self-help section, which was in charge of coordination of all the government efforts to develop and assist in operation and maintenance of the self-help water systems through technical assistance. With the introduction of District Focus for Rural Development Strategy in June 1983, this section has been decentralized to District Water Offices. The sources of funding for the self-help water programme have been:

- 1) **Local finance:** The Government of Kenya (GOK) has financed many self-help water projects either through the Rural Development Fund (RDF) at the district level or through the normal voted estimates of MOWD. The beneficiaries have contributed time, money and labour to the self-help water projects.
- 2) **Non-governmental organizations (NGOs):** Several NGOs have financed self-help water projects in Kenya. The NGOs may be classified to those directly affiliated with a church organization and to those working independently.
- 3) **External support agencies (ESAs):** Many foreign donors have contributed also to the self-help water programme, mainly through loans provided to the GOK. In most cases the loans are in form of commodity aid.

There are several NGOs that have assisted in the provision of rural water supply, and e.g. in Kiambu District the following have been active:

- Corporation for American Relief Everywhere (CARE)
- Kenya Water for Health Organization (KWAHO)
- Rotary Clubs of Kenya
- Kenya Scouts
- Foster Parent Plan International
- Kenya Freedom for Hunger Council
- Kenya Charity Sweepstake
- National Christian Council of Kenya
- Green Belt Movement
- Ford Foundation

The coverage of potable water supply in Kiambu District is only 40 %. Various organizations have been contributing to the coverage as follows: MOWD 20 %, self-help groups 15 %, City Council of Kiambu 1 %, NGOs 1 % and others (private institutions, estates etc.) 3 % (Mwangi 1990).

Legislation

There exist many laws regarding water in general. The important legislation concerning water supply and sanitation in particular is the following:

- (i) The Water Act, Cap. 372, 1972.
- (ii) The Public Health Act, Cap. 242, 1986.
- (iii) Building Code, 1968.
- (iv) National Water Conservation and Pipeline Corporation Order, 1988. The State Corporations Act, Cap. 446.

The Water Act is currently being amended, and the revised water act is expected to be effective in mid-1991 (Weru 1990). The Water Act originating from 1929 has been revised in 1951 and in 1972 covers the following areas:

- Ownership and Control of Water
- General Powers of Minister
- Water Resources Authority
- Local Planning
- Water Apportionment Board and Local Water Authorities
- State Schemes
- Water Permits
- Abstraction of Ground Water and Permits
- Procedure on Issue of Permits
- Dams
- Execution and Maintenance of Works
- Variation and Cancellation of Permits, Etc.
- Easements
- Water Undertakings

The Water Act gives *inter alia* the authority to the Minister of MOWD to decide the water rates or charges on the advice of the Water Resources Authority. These rates and other charges are payable to the Government. The Minister of MOWD after consultation with the Water Resources Authority may appoint water undertakers to supply water. The water charges are regulated by the Minister.

The Public Health Act is dealing with the following:

- Sanitation and Housing
- Public Water Supplies

The Building Code includes the following major areas:

- Water Supply
- Drainage
- Sanitary Conveniences
- Sewers
- Septic and Conservancy Tanks
- Scheduled Special Areas and Special Buildings

The National Water Conservation and Pipeline Corporation Order inter alia gives the authority to the Board of Corporation, in consultation with the Minister of MOWD to determine the charges for water supplied by the Corporation. The Corporation can also establish water tariff structure for any particular consumer. These decisions are subject to the parliamentary approval, and thus the Order does not give the autonomy to the Corporation. The Order determines the responsibilities of the NWPC in the following major areas:

- Management and development of water projects
- Bulk supply of water to water undertakers
- Formulation and execution of the national water development policy.

6 REVIEW OF DECADE GOALS

Decade/Sector Targets and Achievements

At the beginning of the International Drinking Water Supply and Sanitation Decade (IDWSSD) in 1981 the GOK issued a statement outlining targets for the decade. The initial Decade strategy was comprised of the following:

1. The Immediate Programme (1981-1983) aimed at rehabilitating and completing all schemes included in the Ministry of Water Development Fourth Development Plan, 1979-83.
2. The Intermediate Programme (up to 1986) was to expand existing schemes and construct new ones to attain the following coverage:
 - a) water supply — a coverage of 70% and 50% in urban and rural areas respectively for 1986
 - b) sanitation — a coverage of 60% and 30% in urban and rural areas respectively for 1986
3. The Long-Range Programme (originally to 1990 now extended to 2000) is to complete Decade programmes and meet the following GOK targets:
 - a) water supply — a coverage of 100% and 75% in urban and rural areas respectively for 1990
 - b) sanitation — a coverage of 90% and 50% in urban and rural areas respectively for 1990.

The service coverage according to WHO (1984) for 1980 and the World Bank (1990) for 1989 are shown in Table 6.1 and in Figure 6.1.

Table 6.1 Water and Sanitation Service Coverage in Kenya.

	Population		Water Coverage		Sanitation Coverage	
	million	%	Population million	%	Population million	%
URBAN						
WHO, 1980	2.4	15	2.1	85	2.1	89
WB, 1989	4.9	22	3.8	78	1.9	40
Decade Target			4.9	100	4.4	90
(World 1990, estimate ¹)	1446	36	983	68	550	38
RURAL						
WHO, 1980	13.5	85	2.1	15	2.6	19
WB, 1989	17.2	78	3.4	20	3.4	20
Decade Target			12.9	75	8.6	50
(World 1990, estimate ¹)	2614	64	1100	42	392	15
TOTAL						
WHO, 1980	15.9	100	4.2	26	4.7	30
WB, 1989	22.1	100	7.2	33	5.3	24
Decade Target			17.8	81	13.0	59
(World 1990, estimate ¹)	4060	100	2083	51	942	23

¹ Note: World 1990 figures are estimates from: Rietveld (1988).

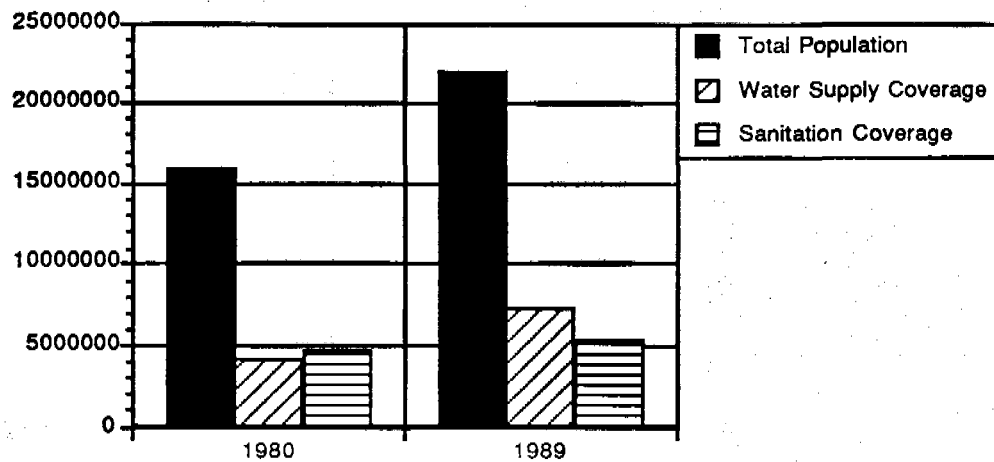


Figure 6.1 Water Sector Service Coverage in 1980 and 1989 (WHO 1984 and WB 1990).

A sanitation survey was carried out by MOWD in all the gazetted urban centres/towns in 1983. The results of the survey showed that there were 45 municipal sewerage disposal systems in operation; 12 conventional treatment works, 27 stabilization ponds, and 6 oxidation ditches. The length of the waste water sewers was 440 km, and the length of the storm water sewers 100 km.

7 REVIEW OF INVESTMENT STRATEGY

Historical Investment Strategy

During the 1970s, the emphasis was on large-scale schemes designed by consulting firms and constructed by contractors. Operation and maintenance was handled by staff from MOWD and little participation from the communities concerned. The technology applied was primarily gravity and diesel-pumped systems with a combination of on-plot connections and communal standpipes. Any user-fees collected were transferred to the Treasury, and not directly applied for operation and maintenance.

Table 7.1 shows that MOWD has exceeded K£ 13.6 million (9 %) of its authorized recurrent expenditure. On the other hand it has not been able to use K£ 44.4 million (13 %) of the approved development expenditure during the fiscal years 1979/80-1988/89. About K£ 14 million of the development allocations may have been used for the recurrent expenditures. Still it is obvious that about K£ 30 million have not been used for development projects. About K£ 25 million of these approved allocations have been from the external financing sources (see Table 7.3). About K£ 5 million of the GOK allocations have either not been available to MOWD or MOWD has not been able to use them for development projects.

Table 7.1 Ministry of Water Development, Expenditure 1979/80-1990/91 (K£ million, current prices).

Year	Recurrent				Development			
	Gross Auth.	Actual	Net Auth.	Actual	Gross Auth.	Actual	Net Auth.	Actual
1979/80	6.8	9.0	2.9	4.3	17.9	24.6	15.2	24.3
1980/81	7.8	13.2	1.9	6.5	24.0	27.9	22.3	-
1981/82	12.9	13.7	5.0	8.6	32.9	31.1	32.5	30.8
1982/83	13.4	13.1	5.8	9.3	36.6	17.1	32.1	17.1
1983/84	15.4	16.4	14.8	16.1	28.1	28.1	24.5	28.1
1984/85	16.1	16.0	15.6	15.5	29.6	21.3	19.4	19.9
1985/86	18.6	18.3	18.2	17.9	35.6	23.2	22.7	22.2
1986/87	19.1	21.3	18.6	21.1	41.1	40.7	26.3	26.8
1987/88	19.6	21.2	19.3	21.2	38.1	28.7	17.3	16.6
1988/89	23.2	24.3	13.3	17.8	57.7	54.5	17.4	16.4
1979/89	152.9	166.5	115.4	138.3	341.6	297.2	229.7	202.2
1989/90	23.7	-	21.6	-	75.2	-	27.7	-
1990/91	23.7	-	21.2	-	63.5	-	23.1	-
1991/92	32.8	-	22.4	-	79.3	-	-	-
1992/93	36.6	-	24.6	-	83.2	-	-	-

Note: Year 1989/90 authorized estimates
 Year 1990/91 estimates
 Years 1991/93 forward budget ceilings

During the fiscal year 1988/89 the GOK gross estimated recurrent expenditure was K£ 1606.7 million and the actual gross recurrent expenditure K£ 1539.3 million. The development expenditures were K£ 806.1 million and K£ 630.4 million respectively. The actual recurrent expenditure was 96 % of the estimated, and the actual development

expenditure 78 % of the estimated development expenditure.

During the fiscal year 1988/89 the MOWD estimated recurrent expenditure was K£ 23.2 million and the actual gross recurrent expenditure K£ 24.3 million. The development expenditures were K£ 57.7 million and K£ 54.5 million respectively. The actual recurrent expenditure was 105 % of the estimated, and the actual development expenditure 94 % of the estimated development expenditure. The comparison for the fiscal year 1988/89 shows that MOWD has been able to use the allocated resources better than the GOK generally.

Table 7.2 indicates that at constant 1982 prices both the recurrent expenditure and the development expenditure in the fiscal year 1988/89 have been almost at the fiscal year 1979/80 level.

Table 7.2 Ministry of Water Development, Actual Expenditure 1979/80-1988/89 (K£ million).

Year	Recurrent		Development	
	Gross Actual	Constant 1982 Prices	Gross Actual	Constant 1982 Prices
1979/80	9.0	12.4	24.6	33.9
1980/81	13.2	16.3	27.9	34.4
1981/82	13.7	14.7	31.1	33.4
1982/83	13.1	12.2	17.1	15.9
1983/84	16.4	13.7	28.1	23.4
1984/85	16.0	12.2	21.3	16.2
1985/86	18.3	12.9	23.2	16.3
1986/87	21.3	14.1	40.7	27.0
1987/88	21.2	12.9	28.7	17.4
1988/89	24.3	13.4	54.5	29.9
1979/89	166.5	134.8	297.2	247.8

Table 7.3 Ministry of Water Development, Development Expenditure and External Finance 1979/80-1988/89 (K£ million, current prices).

Year	Development		External Finance Actual	External Finance Authorized
	Gross Actual	Net Actual		
1979/80	24.6	24.3	0.3	16.6
1980/81	27.9	-	27.9	4.4
1981/82	31.1	30.8	0.3	8.5
1982/83	17.1	17.1	0.0	8.1
1983/84	28.1	28.1	0.0	3.5
1984/85	21.3	19.9	1.4	0.5
1985/86	23.2	22.2	1.0	1.9
1986/87	40.7	26.8	13.9	14.8
1987/88	28.7	16.6	12.1	20.8
1988/89	54.5	16.4	38.1	41.5
1979/89	297.2	202.2	95.0	120.6

8 NATIONAL DEVELOPMENT PLAN 1989 — 1993

Theme and Policy Framework

Kenya's Sixth Five-year National Development Plan (NDP) is covering the period 1989-1993. The theme of the NDP is "Participation for Progress" reemphasising the need for full participation by the entire population in the economic activities of the nation. The policy framework and the objectives of the NDP are:

- (i) Incorporate structural adjustment process with major institutional changes designed to cope with the inadequacy of financial and capital resources available for development.
- (ii) Decentralize the planning process to achieve efficiency in the management of public affairs (District Focus for Rural Development Strategy and Budget Rationalization Programme).
- (iii) Adopt an Integrated Approach to planning through viewing development issues intersectorally and addressing those priority areas important to development, including employment creation, improved management of available resources, maximization of agricultural production, more efficient and faster industrialization, preservation and development of natural resources and improvement of public welfare.
- (iv) Provide adequate and productive employment for 2.0 million people entering the labour market during the NDP period.
- (v) Achieve the annual growth rate of 5.4 % for the GDP.
- (vi) Maintain the gross investment rate at almost 20 %.
- (vii) Enhance wealth.
- (viii) Make the country self-sufficient in food production.
- (ix) Exploit the potential of the arid and semi-arid lands for agriculture.
- (x) Become an industrial nation through:
 - directing industrialization towards the production of intermediate goods in the medium-term towards the export market, and establishing a base for the eventual production of capital goods
 - enhancing the investment climate favourable for both local and foreign entrepreneurs through the effective implementation of measures designed for this purpose
 - enhancing the competitiveness of the business environment
- (xi) Direct industrial growth towards small urban centres.
- (xii) Utilize efficiently scarce resources through:
 - giving greater priority to directly productive activity
 - ensuring adequate budgetary provision to support those areas that will stimulate growth and enable the private sector to operate more efficiently
 - matching Public Service employment to operating expenses to avoid underutilisation of capacity and to ensure that work-

- force is effectively supervised and highly productive
- requiring the private sector to participate in the provision of some of the services such as education and health as a cost-sharing measure

(xiii) Continue with the work in developing the institutional framework and the monitoring and evaluation system that can provide information necessary to indicate the extent to which the process of development programming meets set objectives.

National Development Targets

The growth rate in per capita income is set at 1.6 % per annum. With population expected to grow at 3.7 %, the implied annual growth rate of the total GDP is 5.4 %. Projected sectoral growth rates and sector shares (agriculture & allied activities including forestry and fishing, industry, and services) in percentages have been shown in Table 8.1.

Table 8.1 Projected Sectoral Growth Rates and Sector Shares (Percentages).

Sector	Average Annual Growth Rate		Sector Shares		
	Fifth Plan	Sixth Plan	1983	1988	1993
Agriculture & Allied Activities	2.6	4.7	31.6	29.4	28.3
Industry	4.5	6.1	17.4	17.6	18.3
Services (incl. Government)	5.0	5.4	51.0	53.0	53.4
TOTAL GDP	4.2	5.4	100.0	100.0	100.0

The government services sector is expected to maintain the annual growth rate of 5.0 % achieved during the Plan period 1983-88. Gross Domestic Product in K£ million by agriculture, industry, and services have been shown in Table 8.2.

Table 8.2 Gross Domestic Product (Constant 1982 Prices, K£ million).

Sector	Actual	Projected	Target
	1983	1988	1993
Agriculture & Allied Activities	969.06	1106.18	1385.92
Industry	533.60	662.20	896.19
Services (incl. Government)	1563.98	1994.12	2615.12
TOTAL GDP	3066.64	3762.50	4897.23
Population (million)	18.75	22.66	27.21
GDP per capita (K£)	163.55	166.04	179.98

A modest increase in real investments to GDP ratio from 19.5 to 19.7 % is assumed to generate a substantially higher average growth rate of output from 4.2 % achieved during 1984-88 to 5.4 % per annum targeted for 1989-93 (Table 8.3). This is assumed to be due to the projected significant rise in the productivity of investment.

Table 8.3 Gross Fixed Capital Formation (GFCF), 1984-93
(Constant 1982 Prices).

Year	Actual GFCF (K£ million)	Projected GFCF (K£ million)	% of GDP
1984	593.6		19.2
1985	597.2		18.4
1986	676.7		19.8
1987	738.7		20.6
1988		741.4	19.7
1989		781.6	19.7
1990		823.2	19.7
1991		863.7	19.6
1992		916.0	19.7
1993		976.7	19.9

The sectoral allocations have been shown in Table 8.4.

Table 8.4 Sectoral Investment, 1989-93 (Constant 1982 Prices).

Sector	Average annual gross fixed investment 1989-93 (K£ million)	% Share in total fixed investment 1989-93	Sector's % contribution to total GDP
Agriculture & Allied Activities	77.03	8.8	28.7
Industry	221.57	25.4	18.0
Services (incl. Government)	573.65	65.8	53.2
TOTAL	872.25	100.0	100.0

Table 8.5 Investment, 1989-93.

% of GDP	1989	1990	1991	1992	1993	
(current prices)						
Gross Investment		23.2	23.2	23.1	23.2	23.4

Table 8.6 indicates that the government will introduce policy measures to reduce the budget deficit to a target 3.1 % of GDP in 1992/93 from the expected level of 4.5 % in 1988/89. The specific measures will include that **cost-sharing will be extended in the fields of health, education, water supply, agriculture and transport.**

Table 8.6 Government Revenue, Expenditure and Budget Deficit
(K£ million).

	1988/89	1989/90	1990/91	1991/92	1992/93
Total Revenue	1824.9	2099.5	2357.7	2626.7	2927.9
% of GDP at Market Prices	22.9	23.5	23.7	23.8	24.0
Foreign Grants	367.4	327.0	280.0	280.0	290.0
TOTAL (Revenue+Grants)	2192.3	2426.5	2637.7	2906.6	3217.9
Recurrent Expenditure	1287.8	1416.6	1528.5	1665.3	1833.9
Development Expenditure	775.4	833.1	877.4	955.9	1052.7
Total Ministry Expenditure	2063.2	2249.7	2405.9	2621.2	2886.6
% of GDP at Market Prices	25.9	25.2	24.2	23.8	23.7
Consolidated Fund Services	492.0	534.6	586.2	644.9	709.5
TOTAL EXPENDITURE	2555.2	2784.3	2992.1	3266.1	3596.1
TOTAL DEFICIT	362.9	357.8	354.4	359.5	378.2
Deficit as % GDP at Market Prices	4.5	4.0	3.6	3.3	3.1
Financed By Net External Loans	200.0	223.6	255.0	249.4	256.2
Net Internal Loans	162.9	134.2	99.4	110.1	122.0

The government will also encourage the flow of external resources into the economy and direct these into the most productive sectors. These resources are expected to finance approximately 18 % of the total government expenditure and respectively approximately 62 % of the development expenditure (Table 8.7).

Table 8.7 External Financing of Total and Development Expenditure
(K£ million).

	1988/89	1989/90	1990/91	1991/92	1992/93
TOTAL EXPENDITURE	2555.2	2784.3	2992.1	3266.1	3596.1
Development Expenditure	775.4	833.1	877.4	955.9	1052.7
TOTAL EXTERNAL FINANCING	567.4	550.6	535.0	529.4	546.2
% of Total Expenditure	22.2	19.8	17.9	16.2	15.2
% of Development Expenditure	73.2	66.1	61.0	55.4	51.9
Financed By Net External Loans	200.0	223.6	255.0	249.4	256.2
% of Total Expenditure	7.8	8.0	8.5	7.6	7.1
% of Development Expenditure	25.8	26.8	29.1	26.1	24.3
Financed by Foreign Grants	367.4	327.0	280.0	280.0	290.0
% of Total Expenditure	14.4	11.8	9.4	8.6	8.1
% of Development Expenditure	47.4	39.3	31.9	29.3	27.6

Water Sector under the NDP

To reach the targets shown in Table 8.8, the government will expand existing water programmes and also start new ones during 1989-93 period.

Table 8.8 Population Targets to be Served by Organized Water System Points, 1988-93 (million).

Year	1988	1989	1990	1991	1992	1993
Urban Population	3.08	3.50	3.90	4.35	4.82	5.42
Rural Population	4.91	5.85	7.07	8.32	9.68	11.10
Total	7.99	9.35	10.97	12.67	14.50	16.52
% of Total Population	35.20	39.80	45.00	50.10	55.30	60.74

"Harambee" fund-raising to supplement government allocations for future water projects will continue to be encouraged so that consumers meet a reasonable portion of expenses covering both capital development and maintenance costs. Measures are proposed to be taken to ensure that individual meter connections are fixed in all properties so that water rates reflect actual consumption.

The NDP states that provision of adequate good quality water for the growing urban population will receive high priority. The government will make available financial resources through the **District Development Fund (DDF)** for the provision of infrastructure, including minor water supply schemes under the Rural Trade and Production Centres programme (RTPCs). The estimated cost of this programme will be K£ 48.0 for the targeted 70 centres, 8 centres during 1988/89, 12 centres during 1989/90, 16 centres during 1990/91, 16 centres during 1991/92, and 18 centres during the fiscal year 1992/93. A minimum allocation of K£ 800000 per centre is taken in the programme to develop link roads, water and sewerage, market space, telephone, postal, electricity and storage facilities and services. **ASAL II Sector Programme Fund** (Arid and Semi-Arid Land) will be established especially to take care of the infrastructural and other needs of these areas.

The NDP indicates that the government will encourage the development of appropriate rainwater harvesting technologies suitable to particular environment. The NDP also indicates that during 1989-93 the government will, with community and local authority participation, develop sanitation facilities in both rural and urban areas involving the construction of reticulated latrines and septic water-borne facilities. Through the local authorities the GOK also will ensure that in the development of urban housing basic infrastructure such as water and sanitation facilities are provided.

9 FINANCING OF INVESTMENTS AND OPERATIONS AND MAINTENANCE

Budgetary Plans

The framework for development is given in five-year NDP, and the budget process of GOK consists of the following major budgets:

- (i) three-year forward budget
- (ii) annual estimates for recurrent and development expenditures, and estimates of revenue
- (iii) annual supplementary expenditure estimates

The annual estimates are submitted to the Parliament in June. When approved, they will give the legal authority for expenditure.

The GOK budget for the fiscal year 1990/91 is K£ 3870.5 million. The estimate for the recurrent expenditure is K£ 2899.8 million, and the estimate for the development expenditure is K£ 970.6 million. About 53 % of the development expenditure is from the external donors/lenders (Figures 9.1 and 9.2).

MULTILATERAL, K£ 169141105

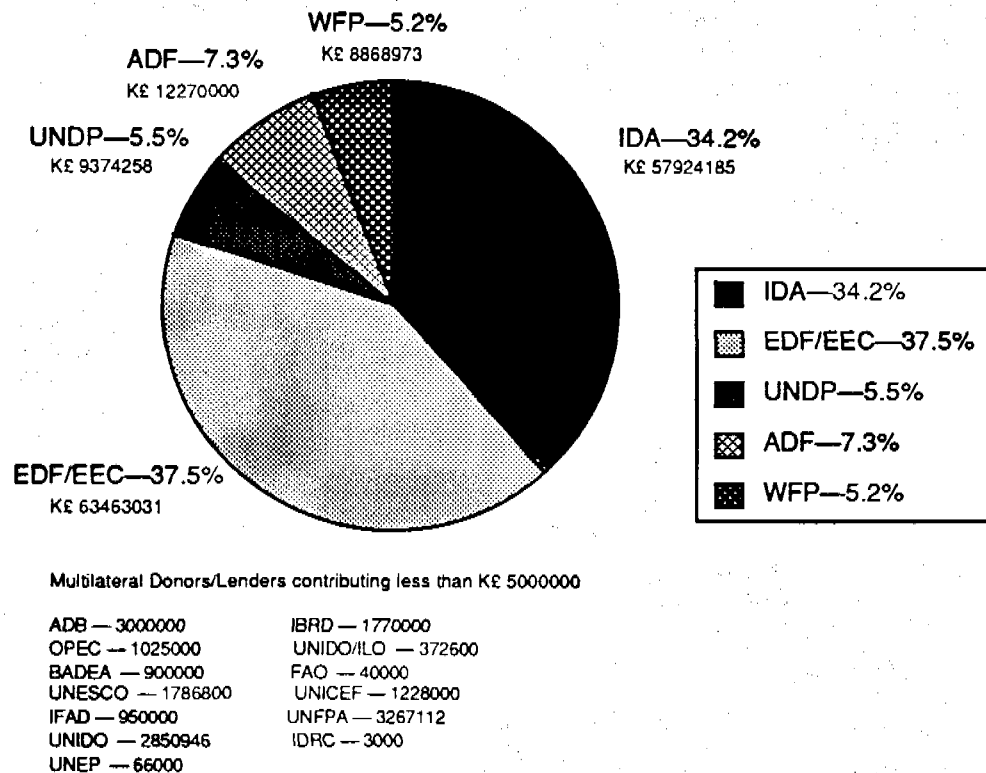


Figure 9.1 External Resources (Multilateral) for Projects in 1990/91 Budget (K£).

BILATERAL, K£ 345779292

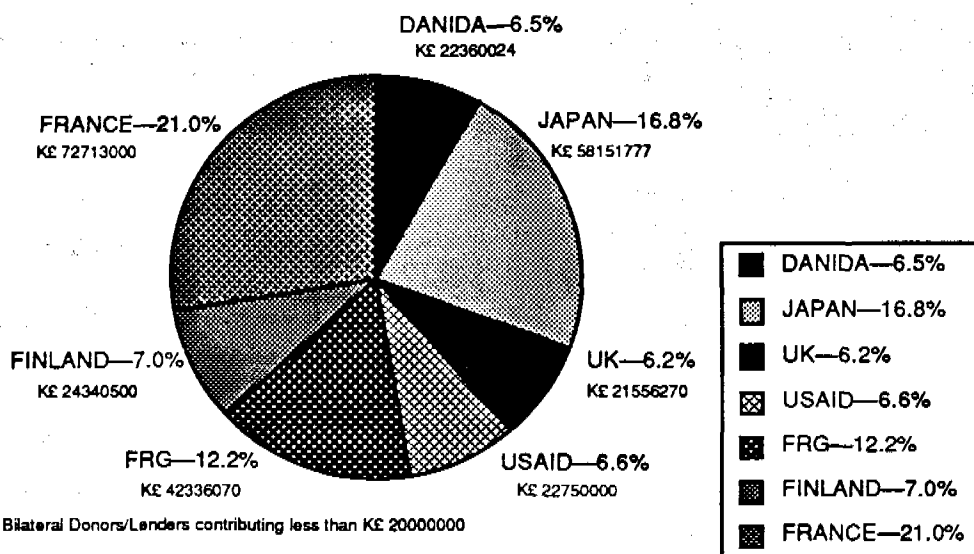


Figure 9.2 External Resources (Bilateral) for Projects in 1990/91 Budget (K£).

The budgetary system itself is weakened by the fact that the relevant background information for preparation of the estimates is practically unprocessed, or non-existing. The actual service coverage, service levels, and functioning of the water supplies are not well documented. The financial and costs history of the supplies for budgetary planning is not adequately known within MOWD.

Financial Framework

Table 9.1 shows that the rate of covering the expenditure has been about 17 % of the recurrent expenditure, and 6 % of the total expenditure (recurrent and development) during the years 1979-89. The corresponding rate during 1990-93 is estimated to be 23 % of the recurrent expenditure, and 6.5 % of the total expenditure.

Table 9.2 indicates that the share of personal emoluments of the recurrent expenditure estimates for the fiscal year 1990/91 is about 54 %. This announces a apparent effort by GOK to channel the recurrent expenditure to non-wage expenditure. This will allow better operation and maintenance practices of the water supplies. The proportion of the personal emoluments of the recurrent expenditure in the fiscal year 1988/89 was about 76 %.

Table 9.1 Ministry of Water Development, Expenditure 1979/80-1990/91 (K£ million, current prices).

Year	Recurrent			Development		
	Gross Actual	Net Actual	A-in-A	Gross Actual	Net Actual	A-in-A
1979/80	9.0	4.3	4.7	24.6	24.3	0.3
1980/81	13.2	6.5	6.7	27.9	-	27.9
1981/82	13.7	8.6	5.1	31.1	30.8	0.3
1982/83	13.1	9.3	3.8	17.1	17.1	0.0
1983/84	16.4	16.1	0.3	28.1	28.1	0.0
1984/85	16.0	15.5	0.5	21.3	19.9	1.4
1985/86	18.3	17.9	0.4	23.2	22.2	1.0
1986/87	21.3	21.1	0.2	40.7	26.8	13.9
1987/88	21.2	21.2	0.0	28.7	16.6	12.1
1988/89	24.3	17.8	6.5	54.5	16.4	38.1
1979/89	166.5	138.3	28.2	297.2	202.2	95.0
1989/90	23.7	21.6	2.1	75.2	27.7	47.5
1990/91	23.7	21.2	2.5	63.5	23.1	40.4
1991/92	32.8	22.4	10.4	79.3	-	-
1992/93	36.6	24.6	12.0	83.2	-	-
1989/93	116.8	89.8	27.0	301.2		

Note: 1979/89 actual
 1989/91 estimates
 1991/93 forward budget ceilings
 A-in-A is Appropriations-in-Aid (Grants and Loans)

Table 9.2 Recurrent Expenditure Estimates 1990/91 (K£ million, current prices).

	Gross Expenditure	A-in-A	Net Expenditure	Personal Emolument	Personal Emolument % of Gross Expenditure
General Administration and Planning	1.93	-	1.93	1.12	58.1
Water Development	5.84	0.02	5.83	2.61	44.7
Training of Water Development Staff	1.35	0.01	1.34	0.54	40.0
Rural Water Supply	8.14	2.00	6.14	4.92	60.4
Urban Water Supply and Sewerage	2.97	0.34	2.63	1.86	62.6
Special Water Programmes	2.77	0.12	2.65	1.79	64.6
Water Conservation and Pipeline Corporation	0.71	-	0.71		
Total	23.72	2.48	21.23	12.84	54.1

Note: A-in-A is Appropriations-in-Aid (Revenue)

Cost of Water Supply and Sanitation

According to the World Bank (1988, based on IDWSSD, FINNIDA, MOWD, and the Netherlands Lake Basin Development Authority Rural Domestic Water Supply and Sanitation Programme, Nyanza Province) the capital costs of water supply technologies are roughly as follows:

- (i) per capita cost urban water supply USD 150, sanitation USD 165
- (ii) per capita cost rural water supply USD 25, sanitation USD 50.

The annual payment per capita that will repay the capital costs of urban water supply and sanitation services in 20 years at 10 % interest rate is thus KES 850 (USD 37). The annual payment that will repay the capital costs of rural water supply and sanitation services is KES 200 (USD 9) accordingly.

The capital costs of the water supplies has varied widely depending on the type of the supply and the level of service (Musyoka 1986). The cost of Amboseli piped water supply was KES 5760 per capita, the cost of Western Kenya Rural Water Supply (based on hand pump technology) was KES 505, and the cost of Gatango gravity supply was KES 50 respectively. In Western Province the cost of dug well was KES 400 per capita, the cost of boreholes well KES 602 per capita, and protected spring KES 132 per capita (FINNIDA 1988).

The operation and maintenance costs vary also broadly depending on the type of the supply and the level of service (Ministry of Water Development 1984). Gravity supplies could have produced water at KES 3.50 per cubic metre (no treatment), KES 4.60 (treatment), and pumped supplies at KES 6.40 (treatment) respectively.

Cost Recovery

In the end of the IDWSSD external support agencies (ESAs) including those active in Kenya, have in principal agreed that in rural areas at least operation and maintenance costs should be covered whereas in the urban systems at least on the long-run costs should be covered fully. Many bilateral agencies have become interested in the issue (Katko 1990). Since 1987 WHO has developed the guidelines for cost recovery policies and practices as part of institutional development of community water supply and sanitation (WHO 1990).

Pricing of water especially in rural areas has been and still is quite sensitive issue in Kenya. During the 1970s rural water supply was viewed as a social good, and was priced accordingly. In early 1980s a new, significantly higher tariff was agreed by the GOK to meet the conditions of a large loan. The government had also made another agreement on external support based on highly subsidized water rates. Thus the two policy commitments were inconsistent (Haddow 1982). In early 1980s the water use and tariff study (MOWD 1984b), supported by an external donor, proved also the sensitivity of the issue. It seems that presently through better coordination and mutual understanding this kind of problems can be avoided. The introduction of the parastatal water corporation has made the cost recovery issues very relevant and acute.

NORAD has earlier supported for years the Minor Urban Water Supply Programme in Kenya. The 1987 aid review pointed out that particular

interest should be taken in revising the water tariff structure in order to bridge the revenue-expenditure gap and to provide poor groups with improved accessibility to water supplies (Tostensen and Scott 1987). One of the sectoral development objective spelt in the current Development Plan is the recognition of the principle of "Cost Sharing". This states that people should make contribution to the provision and maintenance of water systems according the principal theme of "Mobilizing Domestic Resources for Equitable Development". Among the strategies and policies announced in the plan are (MOWD 1989):

- (i) The provision, operation and maintenance of water supply facilities will be undertaken primarily through joint effort between the government and the beneficiaries. This require that the communities contribute significantly towards the construction and maintenance of facilities. In order to minimize the cost of providing water to people in their homesteads, individual farmers will be encouraged to employ cost effective technologies such as roof catchment, wells and the construction of small rural dams and pans.
- (ii) Cost recovery will be an essential element in the water supply programmes. Pricing policy for water is critical in this respect. In the rural areas generally, water rates should cover at least the direct operation and maintenance cost of the water supply. Prices should on the other hand cover both the maintenance and capital investment costs in the urban areas. The results of ongoing tariff review will provide guidelines for the appropriate fees to be charged.

The three key dimensions of sustainable water supplies are operational technology, appropriate institution and adequate cost recovery (Figure 9.3, Katko 1989).

FRAMEWORK FOR COST RECOVERY WITH KEY ELEMENTS

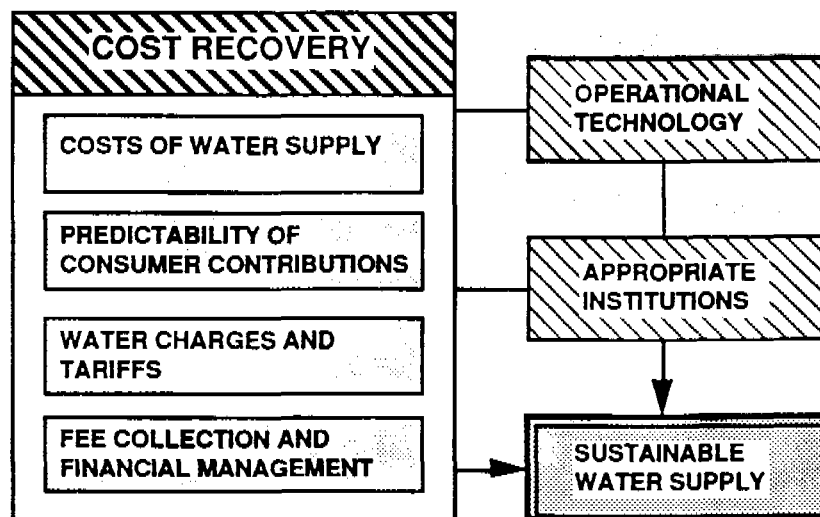


Figure 9.3 Framework for Cost Recovery with Key Factors and Their Relations to Technology, Institutions and Sustainable Water Supply.

Water Tariffs and Tariff Structures

The water tariffs have been adjusted in 1971, 1975, 1979 and 1981. The new tariffs were submitted to the Parliament for approval in 1990. It seems that some amendments are needed before they will be finally approved.

The 1975 tariff structure was designed in 1971 and adjusted 1975 (Idemalm 1979). Larger urban areas e.g. Nairobi and Mombasa have each their own tariffs (SIDA&WHO 1982). According to Idemalm (1979) the flat rates varied from KES 6 to 15 per month depending on the consumer's ability to pay and it included six different scales (SIDA&WHO 1982). In July 1979 a two-block tariff was introduced for rural areas; the first 6 m³ per month was subsidized and the second block was to cover operation and maintenance costs (SIDA&WHO 1982). In 1981 a Presidential directive on flat rates abolished metering based tariffs in rural areas. In May 1981 rural and minor urban tariffs were introduced (Table 9.3). They have not been adjusted thereafter (MOWD 1989). In 1984 it was estimated that about 60 % of the individual connections in rural areas had flat rates and 40 % metering based charges. However, the official price of water was often not the actual price paid which depended on several factors (MOWD 1984b). The latest urban tariff proposal subject to the parliamentary approval during 1990 was prepared in 1988, and was based on the suggested tariff increases up to KES 3.5 — 4 per m³. This can be regarded very modest in today's prices. The tariff structure proposed has increasing blocks.

The water tariffs applied in rural self-help water supply systems vary a lot and may in some cases exceed considerably the tariffs used for the MOWD managed systems. In Kiambu District, e.g. the range of tariffs in rural self-help systems in November 1989 are shown in Table 9.4. In most cases the self-help system tariffs give more realistic view than the rural MOWD tariffs on the required level to guarantee the cost recovery for rural operation and maintenance. In practice the MOWD tariffs do not generate revenue enough to cover the operation and maintenance costs. Figure 9.4 illustrates the declining development of metered urban and flat rate rural tariff levels at 1989 price level (See also: Table 2.6. Consumer Price Index).

Generally the water tariffs in Kenya have experienced a number of structural changes. The tariffs include different components such as minimum charge, non-volume based monthly (basic) charge or monthly meter rental charge and consumption charge. Therefore, in principle the structure is quite advanced. Later tariffs are slightly progressive i.e. higher charges per m³ are paid for consumption exceeding the minimum figure. In some cases lower tariffs have been applied to agricultural purposes.

The urban water tariffs remained unchanged from 1977 to 1984 (MOWD 1984b). In 1990 in Nairobi the water consumption charge is KES 2.65 per m³. The present urban water consumption charges are from KES 2.5 to 3 per m³. The tariffs for MOWD managed urban water supplies are KES 2.0 per m³ (MOWD 1989). The comparative average unit costs of water for different local authorities and MOWD urban tariffs are given in Annex VI. The combined sewerage charges and water bills for different local authorities are given in Annex VII (Odada and Otieno 1990).

Table 9.3 Rural and Minor Urban Tariffs from 1975 to April 1981 (MOWD 1984b) (KES).

Type of Charge	Price
RURAL	
Flat rate	15.00/month
Metered rates minimum charge	15.00/month+3.50 meter rent= 18.50
Metered rates charge/m ³ above 9	2.65/m ³ above 9m ³ per month
Kiosks	1.25/m ³ price to kiosk 2.50/m ³ (5 c for 20 litre) price to consumer

Note: There is no particular charge for non-metered commercial and institutional use. MOWD policy insists on meters for such consumers.

MINOR URBAN	Schedule I	Schedule L
Monthly meter rent ¹	3.50	3.50
Monthly water charge	15.00	18.00
Price per metered m ³ (above 9m ³)	1.65	2.00
Monthly non-metered charge	30.00	36.00
- domestic		
- commercial/institutional	120.00	150.00

Note: ¹Varies from KES 3.50 to 20.00 depending on meter size

The Mombasa schedule is not run on minor urban tariff basis although the Mombasa water supply is managed by MOWD. The Mombasa tariff system has a flat rate of 48.00 KES/month for domestic use and 190.00 KES/month for building purposes. For metered connections the consumption below 9m³ is charged at 2.90 KES/m³ and increases to 5.75 KES m³ above that limit. There is a minimum charge of 26.10/month for metered connections. Licensed retailers pay 1.10/m³ and sell at 0.05/20 litres.

Table 9.4 Water Tariffs in Rural Self-Help Water Systems in Kiambu District in November 1989 (Mwangi 1990) (KES).

Type of Charge	Price	
	Lowest	Highest
Flat rate	15.00/month	51.00/month
Metered rates	2.00/m ³	10.00/m ³
Mixed system (minimum charge)	40.00/month	105.00/month
Kiosks	0.25/litre	

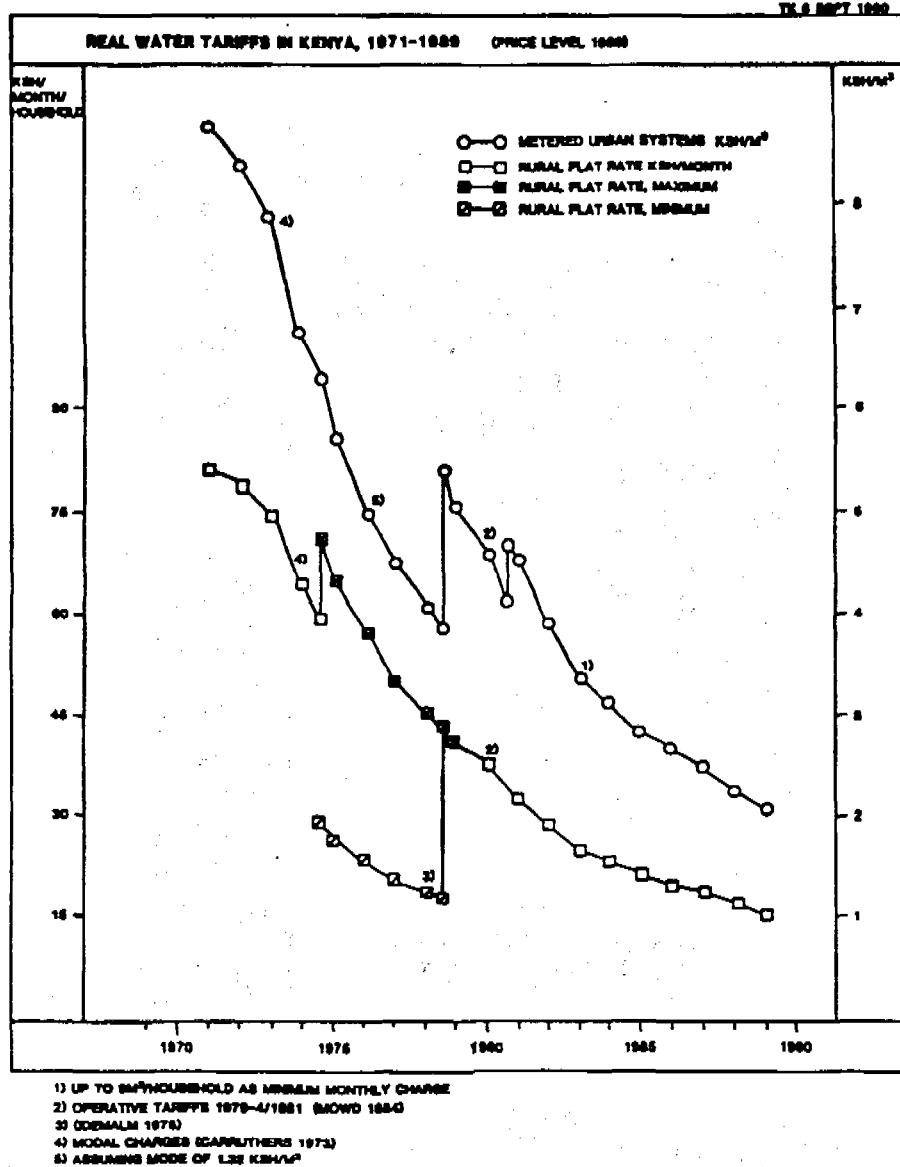


Figure 9.4 Water Tariffs at 1989 Price Level in Kenya from 1975 to 1986 (Various Sources).

Predictability of User Contributions

Consumers' actual willingness and ability to pay for operational water supply services is demonstrated through the relatively extensive and wide spread water vending and reselling practices in Kenya. Whittington et al (1988) made a survey on water vending in Ukunda, a village of 5000 people, about 40 km south of Mombasa in the Kwale District. In Ukunda people relied mainly on door-to-door vended water, if the distance to water kiosk or well was more than 200 to 250 meters. Vendors sold about 45 % of the total water consumed in the village, and people spent about 9 % of their income for vended water. Such studies, even quite limited ones, give practical guidance how to develop water supply services.

By introducing any conventional water supply technology it will be

possible to supply water for much lower and more fare prices than through vending. Thus the constraint is not among the consumers' willingness but rather on the willingness of decision-makers to allow water utilities to develop their services with proper water tariffs. In principle, the recent institutional change and development of an autonomous water supply corporation has given a possibility to develop more realistic cost recovery policies and practices than before. In practice the Parliament still approves the tariffs, and this may weaken considerably the professional input for the sustainable development of the sector.

10 DEVELOPMENT AND MANAGEMENT OF WATER SUPPLY

"Water Rates — (Under K£ 3246046) — The anticipated collection did not materialize **due to inadequate machineries to collect and poor consumer payment behaviour.**" (Reasons for material difference between Approved Estimates and Actual Expenditure — Republic of Kenya 1990).

Planning and Design Criteria

The Ministry of Lands and Settlement has categorized urban areas as service centres excluding Nairobi (Ministry of Water Development 1984a):

1. Principal Towns (population > 100000, serving > 1000000)
2. Urban Centres (population > 5000, serving > 100000)
3. Rural Centres (population > 2000, serving > 50000)
4. Market Centres (population negligible, serving 15000)
5. Local Centres (population negligible, serving > 5000)

The long-term guidelines for the location of infrastructural facilities in services centres indicates also water and sanitation services:

1. Principal Towns — sewage disposal system, water supply
2. Urban Centres — sewage disposal system, grid water supply
3. Rural Centres — sewage disposal system, grid water supply
4. Market Centres — public water supply
5. Local Centres — public water supply

Urban housing is generally classified as follows:

- (i) **High-class housing:** generally low density development plots of 0.2-0.8 hectares. Houses furnished with internal pipes and hot water, electricity supply, refrigerator, electric cooker, bathrooms, WC and internal arrangement for cloth and dish washing.
- (ii) **Medium-class housing:** generally low density development plots of about 0.1 hectares. Houses furnished with at least internal piped cold water, gas or electric refrigerator and cooker, shower, WC and internal arrangement for dish washing. Splash area outside for cloth washing.
- (iii) **Low-class housing:** generally high density development. Houses furnished with very simple piping for cold water or only external water points for cloth and dish-washing (splash area). Includes site and service scheme housing.

The Ministry of Water Development has developed a system of water supply service in relation to the agricultural potential of an area as follows:

1. **High-potential area** is normally considered to be an area with an annual rainfall more than 1000 mm. However, local factors such as very concentrated annual rainfall, adverse topography, soil conditions, special attitudes, tourism, roads, irrigation etc., should be taken into account.

- water supply through individual connections and/or kiosks with less than 1 kilometre walking distance recommended
2. Medium-potential area is normally considered to be an area with an annual rainfall of between 500 mm and 1000 mm. However, local factors may be adjusted as above.
 - water supply through kiosks and communal water points with walking distance not to exceed two kilometres
 3. Low-potential area is normally considered to be an area with an annual rainfall less than 500 mm. However, local factors may be adjusted as above. The schemes are invariably small serving trade centres, institutions and some people around the centre.
 - water distribution through communal water points with walking distance not to exceed five kilometres

MOWD recommends that livestock potential should be determined in liaison with the District Agricultural Officer. The water demand figures and the water quality requirements are given in the design manual (MOWD 1984a).

Priority of Investments and Project Selection Criteria

The District Development Committees (DDCs) are responsible for the definition of priorities for locally identified projects coming through the Divisional Development Committees, identification of districtwide needs, preparation of District Development Plan, and the design of projects which fit in the priorities. In Kenya piped water supply systems using surface water, often equipped with conventional chemical treatment, have dominated rural water supplies until recent years (Anon 1982). The FINNIDA-supported water supply project in Western Kenya is the largest water project using ground water and especially hand-pump technology. The hand-pump technology has been criticized quite strongly by the GOK. This is quite understandable, because the GOK has stated since the independence that **the objective is the provision of piped portable water to all Kenyans by the Year 2000.**

In case of shallow wells the direct action pump used in Western Kenya has proved to be very reliable and the operation and maintenance needs are really low. On the contrary it is obvious that too little attention has been paid to the actual operation and maintenance needs and costs of hand pumps in deeper wells.

The actual strategy of MOWD do not take into account the limited resources. Table 10.1 shows the number of projects being under design or construction in 1989/90. The figures in Table 10.1 give not the correct situation, because most of the project activities are overlapping; they are marked both under design and under construction. In fact some of the projects are not active at all. Most of the projects to be implemented are extensions of distribution networks or slowly progressing direct labour projects. Some of the projects could be completed in 3-5 years, but with today's investment level their implementation might take several years more.

Table 10.1 Projects under Design or Construction in 1989/90.

Project Type	Under Design	Under Construction
Rural WSS	133	134
Urban WSS	26	20
Self-help	43	not specified
Dams	10	8
Total	212	not available

The evaluation of the activities of NGOs in water sector is difficult. Organizations like Kenya Care, Freedom for Hunger and KWAHO, and religious associations are active in restricted fields. Usually these projects rely on self-help ideology and the contribution from local people. There are hundreds of projects, and in the central part of Kenya the projects cover large, totally independent water supply units (10000-20000 consumers) or small, well operated institutional (schools, hospitals and missions) distribution systems.

The district level survey could be the best way to invent the present water supply situation, because MOWD is obviously not aware of all integrated programmes and NGO-activities. The areal distribution of MOWD's implementation policy can be seen from Table 10.2.

Table 10.2. MOWD Development Expenditure Estimates 1990/91 by Provinces (Population Figures based on Census 1979).

Province	Proportion of Population %	Proportion of Budget %
Central	15.3	3.9
Coast	8.9	15.4
Eastern	17.7	9.8
North Eastern	2.4	1.3
Nyanza	17.2	5.0
Rift Valley	21.1	52.8
Western	12.0	11.8
	94.6¹	100.0

¹ Nairobi excluded.

Table 10.2 shows that the priority in the MOWD 1990/91 budget is given to the Rift Valley Province development. Table 10.3 shows the daily production of water and population served in 1988 (MOWD 1989b). It indicates that the Central and Rift Valley Provinces enjoy on an average better service coverage than the other provinces.

Table 10.3 Production of Water and Population Served, 1988.

Province	Production of Water m ³ /d	Population Served hd	Population Served % of total
Central	103000	1312200	28.5
Coast	11600	182900	4.0
Eastern	54200	691500	15.0
North Eastern	4400	59600	1.3
Nyanza	12200	232500	5.1
Rift Valley	85100	1458100	31.7
Western	29300	659800	14.4
Total	299800	4596600	100.0

Implementation Procedures

The District Focus for Rural Development Policy makes the Districts the operational centres for rural development and implementation. This focus encourages the beneficiaries to get involved in the identification, planning, implementation, operation and evaluation of development projects, including water development projects. The strategy of District Focus for Rural Development is based on the principle of ministries and districts having complementary responsibilities. Responsibility for the operational aspects of rural development has been delegated to the districts, while the responsibility for broad policy, the planning and implementation of multi-district and national projects has remained with the ministries.

The precise way in which the external supporting agencies are involved depends on separately negotiated agreement with the GOK. The contributions and the implementation procedures of the agencies takes many forms (McPherson et al 1984):

1. Funds are provided directly to the MOWD and Ministry of Finance.
2. Technical assistance is provided either in the form of short term consultants or longer term contract staff.
3. Consultants are contracted directly to implement projects.
4. Projects are implemented by agencies full collaboration with ministries.
5. Goods, and equipment are provided on an aid appropriations basis.

Operation and Maintenance of Water Systems

All municipalities in Kenya (Chapter 5) can be divided into three categories with respect to water and sanitation facilities (Odada and Otieno 1990):

1. Operate and maintain their own water supply, waste disposal, sewerage and revenue collection: Nairobi, Kisumu, Nakuru, Eldoret, Thika, Kericho, Nyeri, Kitale, Nyahururu and Nanyuki.
2. Operate their own sewerage, waste disposal and collect revenue; also purchase water in bulk from MOWD, undertake distribution of water and collect revenue: Meru, Kisii, Bungoma, Embu and Kiambu.

3. Responsible only for sewerage, waste disposal and its revenue collection; water supply, distribution and revenue collection is by MOWD: Mombasa, Machakos, Malindi, Kakamega and Murang'a.

Rural water supply systems are run by MOWD except those systems that are categorised as self-help systems, county council systems, individually owned systems and institutional systems serving schools, health centres etc. There are three levels of operations: provincial headquarters gives the broad directives and objectives in consultation with MOWD headquarters; district headquarters focuses on the systems within the district giving priority to forward planning; scheme level concentrates on the scheme itself giving top priority to routine work (MOWD 1989b). Musyoka (1986) estimated based on his study on seven piped water supplies in Busia managed by MOWD that supplies were out of operation 50 % of the time.

Once the construction of the self-help water project (SHWP) is completed, MOWD hands over the responsibilities of operation and maintenance to the local community. The only assistance MOWD gives at this stage is technical assistance in case of breakdown or failure in part of the system that the community can not repair on its own. The present scale of SHWPs exceeds MOWD's capacity to assist in O&M. In many districts during the period 1989-93 MOWD District Offices will educate the beneficiaries of SHWPs concerning the importance of the facilities and the high extra costs if the systems are handled without proper care. In addition to consumer education campaigns MOWD will continue offering technical assistance to SHWPs.

Water Metering

There has been continuous debate on the feasibility of water metering especially in rural areas. In any case there exists a number of community or user-managed private rural water supply systems, where full cost recovery is gained through metering and proper tariff rates. Generally metering of individual connections is practised in Kenya more than in the other East African countries. In 1990 a pilot survey is undergoing in Kakamega regarding metering issues.

Most of the water meters are semi-rotary piston type displacement meters (Wagacha 1980). There are many maintenance and management problems related to water meters such as installation and reading. In early 1980s only the Nairobi water works had proper facilities for meter repair and inspection. The use of water meters being the best way of controlling wastage of water is feasible only if these maintenance facilities are functioning.

The volume-based water meters, commonly in use in the region, are probably technically less appropriate for the often intermittent supply conditions. If external support is expanded towards upgrading of urban water supplies, product development should be considered.

Fee Collection and Financial Management

The fee collection and financial management are the most difficult issues at least in rural water supply. Innovative methods and practices are needed to organize and manage fee collection. In Western Kenya well committees have been given the whole responsibility of maintenance and fee collection for that purpose.

In urban and rural water systems only about 50 to 70 % of total billed revenue are collected (MOWD 1989b). This weakens also considerably the possibilities to manage the systems well, even if the collected revenue according the most recent policy is not necessarily anymore going to the Treasury. In existing water supply systems often the first development stage is to improve management related problems together with proper cost monitoring, analysis and decision making. It may be possible to improve revenue collection remarkably by finding the biggest bottlenecks and solving them (WHO 1990). This includes stricter disconnection policies like that one implemented recently by NWPC.

Tables 10.4 and 10.5 show the financial performance of the utilities run by the Kenya's local authorities (Odada and Otieno 1990, compiled by the authors). The billed revenue as a percentage of expenditure ranges from 11 % to 50 %, with an average of 46 %. The collected revenue varies from 9 % to 36 %, with an average of 30 %. On the basis of this data Odada and Otieno (1990) concluded that local authorities are heavily subsidizing their water, sewerage and refuse collection services. They also recommended that the municipalities should improve and intensify their revenue collection system.

Table 10.4 Monthly Revenue Collection Performance by Local Authorities in 1986 (KES thousand).

Local Authority	Total Expenditure	Total Revenue Billed	Total Revenue Collected	Billed Revenue as % of Expenditure	Collected Revenue as % of Billed	Collected Revenue as % of Expenditure
Nairobi	62863	31205	20983	50	67	33
Kisumu	4745	1783	962	38	54	20
Nakuru	4884	1423	927	29	65	19
Eldoret	3345	1220	525	36	43	16
Thika	2655	1054	834	40	79	31
Nyeri	1169	474	418	41	88	36
Kericho	1046	240	213	23	89	20
Kitale	na.	1017	259	-	25	-
Nanyuki	na.	1019	470	-	46	-
Nyandarua	na.	450	350	-	78	-
Kiambu	na.	100	54	-	54	-
Bungoma	421	100	46	24	46	11
Machakos	555	60	51	11	85	9
Murang'a	394	95	na.	24	-	-
Total ¹⁾	82077	37654	24959	46	66	30

1) Kitale, Nanyuki, Nyandarua and Kiambu not included.

Table 10.5 Unit Cost of Produced Water and Revenue per Unit in Local Authorities in 1986 (KES).

Local Authority	Unit Cost of Production	Billed Revenue per Unit	Collected Revenue per Unit
Nairobi	3.9	2.0	1.3
Kisumu	3.6	1.4	0.7
Nakuru	1.9	0.6	0.4
Eldoret	1.6	0.6	0.3
Thika	2.0	0.8	0.6
Nyeri	1.9	0.8	0.7
Kericho	2.5	0.6	0.5
Bungoma	2.6	0.6	0.3
Machakos	1.2	0.1	0.1
Murang'a	0.6	0.1	-

Personnel Development

The number of MOWD personnel was 11579 (excluding the personnel of Kenya Water Institute) in the fiscal year 1989/90. It is proposed to be 12148 in the fiscal year 1990/91. About 2000 has been transferred to NWPC. The manning ratio (employees/population served) calculated, assuming that the population served by MOWD was 6.5 million by 1990, gives a very high ratio of 1:560. The National Action Committee for the IDWSS Decade adopted the following in 1980:

Professional	—	2.7 employees/100000 persons
Sub-professional	—	9.1 employees/100000 persons
Skilled level/Semi-skilled	—	41.6 employees/100000 persons
Total personnel	—	53.4 employees/100000 persons

giving a manning ratio of 1:1870.

For the preparation of the Environmental Sanitation Master Plan for Training and Education in Tanzania, the USAID/WASH team used a manning ratio of 1 employee to 1600 population served. The team suggested the following staffing pattern of the water sector labour force (Carefoot and Gibson 1984):

Engineers	—	4%
Technicians	—	14%
Skilled Labour	—	28%
Admin. and Accounting	—	22%
Unskilled Labour	—	32%

Table 10.6 Staffing Patterns of MOWD in the Fiscal Years 1989/90 and 1990/91.

Classification	Number of Employees 1989/90	Number of Employees 1990/91	Employees % of Total 1989/90	Employees % of Total 1990/91	Employees/100000 hd 1989/90	Employees/100000 hd 1990/91
Engineers	406	593	4	5	6.2	8.1
Technicians	1157	1994	10	17	17.8	27.3
Skilled Labour	2583	2644	22	22	39.7	36.2
Admin. & Acc.	2365	1902	20	16	36.4	26.1
Semi-skilled L.	5068	4724	44	40	78.0	64.7
Total¹⁾	11579	11857	100	100	178.1	162.4

1) Figures excluding Kenya Water Institute. Figures are based on approved posts (Estimates for Recurrent Expenditure 1990/91).

Table 10.6 gives the manning ratio of 1:620 for the fiscal year 1990/91, assuming that the population served by MOWD will be 7.3 million by 1991. The remarkable change between the fiscal years 1989/90 and 1990/91 is that the proportion of the approved posts of the headquarters has declined from 8134 (69 % of total) to 2483 (21 % of total).

Table 10.7 indicates that the estimated personnel recruitment rate should be 7.1 % annually in the years 1990-2000, and the recruitment rate in the years 2000-2025 should be 10 % respectively, if the GOK targets are to be met.

Table 10.7 Estimated Staffing Patterns in 2000 and 2025 and Estimated Annual Recruitment of Employees in Water Sector.

Classification	Number of Employees 1989/90	Employees % of Total 2000/2025	Number of Employees 2000	Number of Employees 2025	Annual Recruitment 1990-2000	Annual Recruitment 2000-2025
Engineers	496	4	778	1554	51	78
Technicians	1424	14	2721	5439	212	272
Skilled Labour	3176	28	5443	10878	390	543
Admin.&Acc.	2912	22	4276	8547	364	427
Semi-skilled L.	6240	32	6220	12432	-	621
Total	14248	100	19438	38850	1017	1941

- 1 Assume access to water supply total 8.0 million in 1990.
- 2 Assume staffing patterns in municipalities similar to MOWD in 1989.
- 3 Assume % access to water supply 2000 100 % urban (11.9 million), 75 % rural (19.2 million), access to water supply total population 31.1 million.
- 4 Assume % access to water supply 2025 100% (77.7 million).
- 5 Assume staffing pattern in 2000 and in 2025: engineers 4 %, technicians 14 %, skilled labour 28 %, administration & accounting 22 %, and semi-skilled labour 32 %.
- 6 Assume the manning ratio of 1:1600 in 2000 and of 1:2000 in 2025.
- 7 Assume Labour Turnover Rate 3 %.

Donor Involvement

The role of the Nordic donors have traditionally been substantial. Both the organizational set-up of MOWD and its strategy were created during the 1970s by the technical assistance from NORAD and SIDA. During the 1980s the personnel assistance has decreased heavily, and there are no expatriates in the line-organization of MOWD. All foreign experts working in MOWD are also a part of the implementing staff (Table 10. 6).

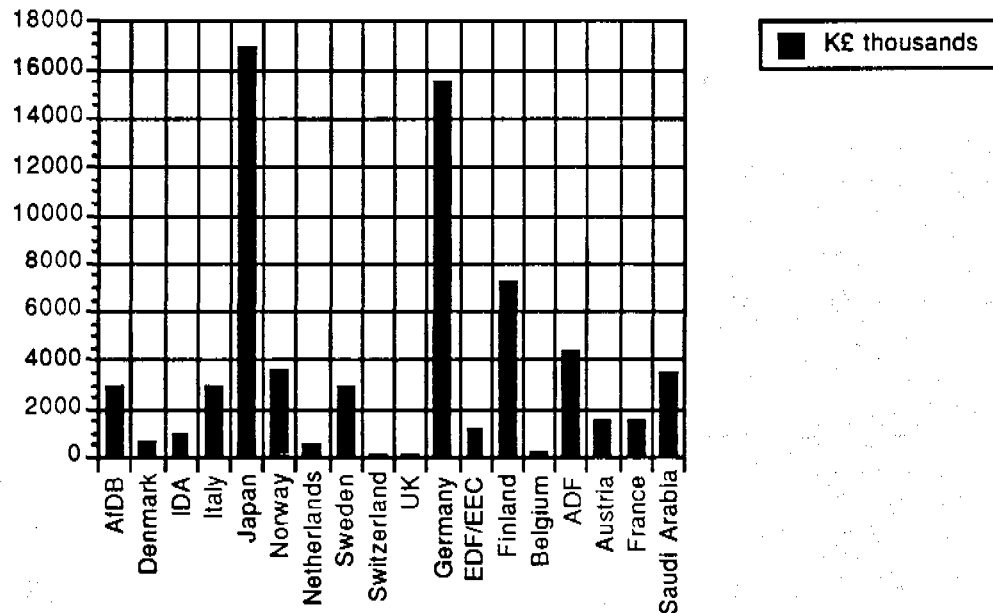


Figure 10.1 External Funding for Development Expenditure in Water Sector in the Fiscal Year 1990/91.

Table 10.8 Foreign Experts in Ministry of Water Development in 1990.

Donor	Personnel Sector	
Belgium	4	Small dams and irrigation
Finland	1	Coordination, technical assistance
The Netherlands	6	Water resources evaluation project
Japan	2	Coordination, technical assistance
Germany	3	Coordination, dam construction ¹
Norway	5	Coordination, small urban centres WS ²
Sweden	2	Coordination, rural WS ³

¹ 2 in NWCPC
² 4 in NWCPC
³ 1 in NWCPC

Most of the donors implement grant projects. Japan and West-Germany have also given several loans for water supply projects. In addition, France and Italy give loans for large water supply projects. The donor activities and contribution (for more detailed contributions for water sector in the fiscal year 1990/91, see Annex III and Figure 10.1) to MOWD are shortly as follows:

(i) Belgium:

The irrigation and small dam project, started with personnel assistance, is expanding into a project, the duration and the finance of which are not yet defined. A special emphasis is on the rehabilitation of small dams (mainly for livestock water supply). The objective is 4-6 rehabilitations per year. The finance is directed to personnel and to equipment and its maintenance. MOWD provides the implementing personnel, salaries and running costs. The financial contribution is about K£ 1 million per year.

(ii) Finland:

The large rural water supply project in Western-Kenya covers four districts. The annual costs are about K£ 8.7 million.

(iii) France:

France was the first country that significantly granted loans to MOWD in the beginning of the 1980s. The Greater Nakuru Project has been financed with these loans. The Western Nakuru has just been completed, and the total costs have been about K£ 50 million. NWCPC is trying to find funds for extending the project in Nakuru area.

(iv) Federal Republic of Germany:

MOWD's large dam projects have traditionally been supported by grants (design personnel and equipment, worth K£ 1 million per year) from Germany. The activities are design and supervision. A decision was made recently to stop the aid within three years. For ten years Germany financed the development of operation and maintenance in Baricho treatment plant. This was part of the Mombasa water supply project. She gave also a loan of K£ 10 million for Malindi water supply. Germany is financing also the Eldoret water supply project (K£ 25 million).

(v) Italy:

Italy finances with K£ 75 million the Nol Turesh Project conveying water from Kilimanjaro area to Machakos, Athin and Kajadon areas. The

loan was originally meant for the Mombasa water supply (part of the second phase of the Mzima project).

(vi) Japan:

The rather small grant project, Taveta-Lumi (K£ 3.4 million), has just been completed, and two new drilling units and earthmoving machinery (worth K£ 6.4 million) delivered to MOWD. A loan has just been granted for water supply project in the urban centres of Nakuru and Gilgil. This project, the cost estimate of which is K£ 40 million, is a part of the Greater Nakuru project. Japan gave also a grant for the feasibility study of Malewa dam and its environment impact assessment. The national water master planning is also implemented on grant basis.

(vii) Netherlands:

The main project is a water resources survey in Rift Valley Province. The development of district level master plans and training are also included in the project. The annual costs are about K£ 1.1 million.

(viii) Norway:

Minor Urban Supply Project has been financed with a grant (about K£ 4 million per year) for over ten years by NORAD. The project covers water supply of 3-5 small cities (5000 - 10000 inhabitants). The coordinator and four site engineers supervise this direct labour project, i.e. NORAD covers the material costs and supervision and MOWD, in principle, personnel costs. The duration will be 2-3 years. NORAD is also starting to assist Kenya Water Institute (KEWI) with personnel. The activities have been withheld due the breakdown in diplomatic relationships in 1991.

(ix) Sweden:

The activities of SIDA have traditionally been wide. The most important is the water supply project in Kwale District. The project is similar to the FINNIDA project, and the annual budget is K£ 3 million. SIDA has also financed the Water Use Study Project that was postponed like the Tharaka Water Supply and Sanitation Project. SIDA has traditionally assisted Kenya Water Institute (KEWI) with K£ 1 million per year, but the amount of aid has continuously decreased. It seems that SIDA's assistance to MOWD is yet to be defined, and its continuity is unknown.

(x) UNDP-WB:

Programme activities began in Kenya in late 1981. The South Coast Handpumps project (SCHP) was initiated by the Programme in 1983, and in December 1985 was scaled up into the Kwale District Water Supply and Sanitation Project (KWSP), financed by SIDA and the Government, with KWAHO playing an important role. The project developed the Afridev handpump, which is now being manufactured in Kenya and in several other countries in Africa, Asia and Europe, and also demonstrated the potential for community management of rural water supply.

Between 1984 and 1988, technical assistance was provided to MOWD and the Environmental Health Department of MOH for the training of trainers in software and hardware aspects of water supply, sanitation, and health education. A Regional Training Network Centre (RNC) was established at the African Medical and Research Foundation (AMREF) in 1985 with support from the Swiss Development Corporation (SDC) and GTZ. Through support to the evaluation and appraisal of programmes

sponsored by bilateral donors, the Programme has helped focus these programmes on low-cost technology options with a community-based approach. The Programme is actively participating in the work of the secretariat for informal sector meetings hosted by UNICEF, and involving government sector agencies, ESAs, and NGOs. Preparatory assistance (PA) has recently been agreed to in principle by UNDP for a demonstration project for community management of water supply and rangelands by pastoralists in arid and semi-arid lands (ASALs).

Role of Women

In Kenya as in many countries, women are not only the main collectors of water but also make the decisions on water sources to be used for various purposes; how much water to use, how to transport, store and draw the water etc. Women are the primary users of new or improved water systems in rural areas. According to Ahlberg (1983) the role of women in fetching water has become a normative law (and its considered to be natural. This law has in some cases even be guarded with taboos in a way that totally prohibits men from fetching water.

As the main drawers of water, women can provide important information during the identification, planning and design stages of the water projects. Women also make a large contribution in terms of unskilled labour for most self-help water projects in Kenya, since men often go to the urban areas to look for employment opportunities leaving the women to take care of self-help activities.

In Kenya women are often holding the key positions in the water committees or other organizations managing the rural water systems. The experiences e.g. from the Western Water Supply Programme confirm that women carry the responsibility of managing the operation and maintenance of rural water supplies successfully.

Table 10.9 Women in development, Kenya — Health and welfare (World Bank 1990b).

Risk of dying by age 5		Life expectancy at birth (years)				Maternal mortality (per 100000 live births) 1980
Female	Male	Female		Male		
1988	1988	1965	1988	1965	1988	
95	110	50	61	46	57	510 ¹⁾

1) Data refer to maternal mortality in hospitals and other medical institutions only.

Table 10.10 Women in development, Kenya — Education (World Bank 1990b).

Persistence to grade 4 as a percentage of cohort				Females per 100 males			
Female		Male		Primary		Secondary	
1970	1984	1970	1984	1970	1987	1970	1987
84	75	84	73	71	93	42	70

Ahlberg (1983) states that provision of water is not necessarily decreasing the woman's workload, because family water consumption is likely to increase. The existing values in the community also may conflict with the assumption that improved water supply would save time and energy for women to invest in social, leisure or productive activities.

11 CONCLUSIONS AND RECOMMENDATIONS

"It is only **improving cost containment and cost recovery** that the total coverage adopted by most governments can be regarded as feasible." (Laugeri 1990).

National Level

The coverage of improved water supply and sanitation services is still low in Kenya, about 35 % and 25 % respectively of the total population. During the IDWSS Decade the GOK has been able to provide improved services for about 3.5 million people. On the other hand the population growth has been about 7.5 million during the same period. The actual availability of water sector services is low because of the insufficient recurrent expenditure on water supplies. The major proportion of the MOWD recurrent expenditure has been used for personal emoluments.

The GOK intermediate coverage targets in the water sector were not reached by 1986. The targets set for the year 2000 will not be met without a considerable increment in the sector investments. The water sector development requires four to six times more investments than currently allocated by the GOK at the current price level. The investments required for the replacement of the existing systems are not considered. If cheaper technologies will be used, the investment requirements will be lower accordingly.

The overall water sector development is weakened due to the lack of investment finance, and this will have a major effect at national, provincial, district and municipal levels. If the level of investments will be increased to correspond with the actual needs, the recurrent expenditure has to be increased subsequently. This means that either the GOK has to continue to subsidize more the services provided or the consumers have to pay more for water services. The shortage of recurrent finance will otherwise cause deterioration of the systems built. In the present financial situation of the GOK this means that other resources either private or public have to be allocated to meet the increment of recurrent and development expenditure. The share of the development expenditure for water sector is considerably high in the national budget, and therefore it is unlikely that its share could be increased in the future. Therefore there is an urgent need to change the strategy, because the full coverage can be obtained only through the higher "consumers participation" in the costs of services.

A major constraint is the lack of a defined water sector policy and the sector action plan. This will weaken both the long-term and short-term planning and overall development in the sector at all levels. There have already been indications to improve the situation by the GOK. The most important is the preparation of the National Water Master Plan started at the beginning of 1990. The master plan financed by Japan covers all aspects of water supply and water resources. Also other ministries participate in the planning. More concrete planning principles will be given in the General District Plans, which were started as the Water Resource Assessment Project (WRAP) financed by the Netherlands. The District Plans are also prepared in Western Kenya.

The institutional responsibilities, although defined for each party, are not clear enough causing ineffectiveness in the implementation of the development programmes. It seems that there is need for improved coordination of the activities between the ministries and inside the ministries. The Fourth Five-Year National Plan 1979-1983 stated that 26

different agencies or boards participated in decision making process and provisions or maintenance of water supplies and resources. Although a high degree of overlapping responsibilities, duplication of effort and conflict of authority exist, a substantial number of these agencies have become either inactive or appended to a larger group of institutions.

During the fiscal years 1979/80-1988/89 the rate of covering expenditure within MOWD has been about 6 % of the total expenditure and 17 % of the recurrent expenditure. Although these estimates are higher in the forward budget ceilings for the fiscal years 1991/93, without major changes in the next NDP 1994-1998 regarding the cost recovery policy the development in the sector will remain unhealthy and unsustainable. The production of water sector services is a heavy burden to the central government. Therefore the responsibilities and ownership of water sector systems should be transferred to autonomous water utilities of the local authorities and for user communities. This would enable the GOK to use scarce resources for directly productive activity, and to stimulate economic growth more efficiently as stated in NDP 1989-1993.

The decentralization process to achieve efficiency in the management of public affairs, one of the key issues of the NDP, is also important in water sector. Many rural settlements will develop rapidly into urban settlements. In principle the local administration should be better equipped to cope with this kind of quick challenges than the central government. The GOK should promote privatization of services in the sector subject to government control to cope with the inadequacy of financial and capital resources available for development. This would enhance the investment climate favourable both local and foreign entrepreneurs, and enhance the competitiveness of the business environment in accordance with the NDP. The transfer of responsibilities and ownership will also reduce the power of the decision makers to regulate the prices of the individual services at national level. This would improve the sustainability of the water systems in the long run, but requires the changes in the current legislation.

Although MOWD is collecting data on water sector services, it seems that the reliability of data is not checked, not analyzed and accordingly not used as a tool in decision making. The information management system should therefore be strengthened to improve the decision making process. Especially the water availability nationwide should be assessed urgently for various development activities; crop production, household use, and industrial development. Kenya has a high population growth rate, and the major part of the land area is arid or semi-arid with little possibilities for either rain-fed or irrigated crop cultivation. If these areas are to be developed, the ecological risks involved (soil erosion, salination, overabstraction of water sources etc.) should be assessed carefully.

If the coverage targets are to be met, the annual recruitment rate of personnel in the sector should be 7 % in the years 1990-2000, and 10 % in the years 2000-2025 respectively. This should be considered when the training is developed in Kenya.

District Level

Presently the GOK district level in water sector should concentrate only on the priority services within their financial framework. It is not advisable to plan and develop the systems, if their functioning cannot be

guaranteed. Also the operation and maintenance should be diverted only to those priority services. The water industry works like the other industries according to the life cycle concept. After planning and construction of physical facilities to ensure the reliable operation, there should be adequate resources to operate and maintain, to repair, and finally to replace the facilities. Otherwise the needed services cannot be provided in the future.

At all levels the Kenyan water sector professionals should start using all their powers within the existing legal framework to get the priority supplies working. Even, if this would mean closing of the supply for those not paying their bills. This would probably get decision makers and users convinced that sound financial framework is a must to manage reliable services.

Recommendations for External Support

Because the GOK is facing a budget deficit of 4.5 % of GDP, development aid, although making initially a positive contribution to the development budget, leads the future increment in the recurrent budget. Tostensen and Scott (1987) have estimated that in the case of Kenya, externally supported development projects gave a rise to recurrent expenditures equivalent to 10-15 % of the original project cost. Therefore the externally supported programmes should be fully integrated into the GOK planning and budgetary processes.

Tostensen and Scott (1987) have pointed out:

"A major responsibility for achieving a better balance between financial resources for development projects and those for operating and maintaining such projects, lies with donors, if they are genuinely concerned about the impact of their aid on development. Only through more liberal attitude towards financing recurrent costs, can a better balance be achieved between investment in, and operation of, development projects. Even if this were to lead to a decrease of investment, this might, from a development point of view, be more than compensated through a better utilisation of existing structures".

In water sector the reorientation towards funding initial operation and maintenance is essential. This is especially during the consolidation periods to allow the viable fee collection and financial management policies and procedures to be introduced. The matter should be addressed thoroughly before the implementation of the new programmes and projects in the discussions between GOK and the donor agencies. This practice would give time for the organizations in charge of the operations of water supplies and policy making bodies to get themselves acquainted with the challenge of appropriate cost-recovery policies and practices.

If the GOK will increase the resources for financing externally supported development projects, this will lead into a situation, where the existing services are inefficiently utilized. The water supplies are deteriorating because of the shortage of recurrent expenditure. Therefore it will be very important that the future and immediate pressures of the water development projects and programmes on the recurrent expenditure will be cleared in the negotiations between GOK and the external support agencies.

It should be obvious to the donor agencies that the support for investment projects and programmes cannot be withdrawn easily. They

should have a proper understanding of both the GOK's fiscal and monetary policies and problems, and of the situation concerning the cost recovery issues before making any further decisions to withdraw their assistance. If the recurrent allocations for implemented projects are not increased by the GOK, or the consumers are not gradually charged for the services they obtain or they are not in charge of the systems themselves, the only foreseeable consequence is the deterioration of the water supplies. This will correspondingly indicate that the investment decision has based on desires and assumptions more than the hard facts.

It may be difficult to donor agencies to admit after the development of the water supplies that the decisions may not have been economically feasible in the first place. If the donor agencies have commenced massive rural or urban water supply developments, they should have also look after them in the cooperation with the GOK authorities until the systems are operated on economically sound basis. The major financial and technical assistance should not be diverted to new programmes from the on-going or from the completed projects without adequate analysis regarding the future management and further development. If the decisions are based only on evaluation of the projects or programmes at completion, it will be difficult to determine the long-term impacts. Therefore the sound analysis and dialogue between the donors/lenders and the GOK are vital in the present situation.

The assistance in the water sector should be channelled through the administrative and institutional framework of Kenya. The donor contribution should correspond with the GOK budget procedures, even though the direct payment system expedites the implementation of the programmes and keeps the disbursement rate high. The GOK procedures for accounting, auditing, and procurement should also be adopted in externally supported projects. If there are major constraints in the procedures, these sometime sensitive matters should be solved in the discussions between the GOK and the donors.

In addition to having a water sector programme coordinator in MOWD on long-term basis, it might be advisable to the donor agencies to consider using the expertise of macroeconomists on short-term basis to coordinate the preparation of the budget estimates and to assess the impacts of donor grants and loans in each sector. The long-term cooperation commitment in water sector, say 20-30 years subject to in-depth dialogue every five years, between GOK and the donor agencies would allow the formulation of policies and procedures more appropriately. This would also improve mutual understanding in sector development issues.

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NWPCP/WATER UNDERTAKERS BY REGIONS

WESTERN

Bungoma Water Project	(LN 43 of 1989)
Kakamega Water Project	(LN 43 of 1989)
Shitoli Water Project	(LN 43 of 1989)
Nyakach Water Project	(LN 43 of 1989)
Kisii Water Project	(LN 43 of 1989)
Maseno - Kombewa Water Project	(LN 43 of 1989)
Siaya Water Project	(LN 43 of 1989)

CENTRAL

Ndia Water Project	(LN 43 of 1989)
Othaya Water Project	(LN 43 of 1989)
Embu Water Project	(LN 43 of 1989)
Kandara Water Project	(LN 43 of 1989)
Kahuti Water Project	(LN 43 of 1989)
Mathira Water Project	(LN 43 of 1989)
Aguthi Water Project	(LN 43 of 1989)
Marmanet Water Project	(LN 43 of 1989)
Kiambu Water Project	(LN 43 of 1989)
Oloitokitok Water Project	(LN 43 of 1989)
Kiambaa Water Project	(LN 270 of 1988 as project)

RIFT

Kapsabet Water Project	(LN 43 of 1989)
Litein Water Project	(LN 43 of 1989)
Chebang'ang Water Project	(LN 43 of 1989)
Kabarnet Water Project	(LN 43 of 1989)
Greater Nakuru (West)	(LN 43 of 1989) in addition

COASTAL

Sabaki Water Project	(LN 43 of 1989)
Marere Pipeline Water Project	(LN 43 of 1989)
Tiwi Water Project	(LN 43 of 1989)
The Second Mzima Pipeline (Mombasa)	(LN 43 of 1989)

PROJECTS BY REGION

NATIONAL

The National Dam Construction Project	(LN 270 of 1988)
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WESTERN

Kipsigak Water Project	(LN 270 of 1988)
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CENTRAL

Kiambere Water Project	(LN 270 of 1988)
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RIFT

The Greater Nakuru Water Project (East) - under construction due to be completed 1993 (LN 270 of 1988)

The Great Rift Water Project	(LN 270 of 1988)
Inter-Basin Water Transfer Nzola/Kerio Project	(LN 270 of 1988)
Endo/Perderra Water Project	(LN 270 of 1988)
Kurgung Water Project	(LN 270 of 1988)
Chemususu Dam Project	(LN 270 of 1988)
Malewa Dam Project	(LN 270 of 1988)
Itare/Chemosit Dam Project	(LN 270 of 1988)
Soin Water Project	(LN 270 of 1988)
Kirandich Dam Project	(LN 270 of 1988)

COASTAL

The Nul-Turesh Pipeline and Water Supply - under construction due to be completed 1993 (LN 270 of 1988)

The Second Mzima Pipeline (LN 270 of 1988)

The Tana/Lamu Water Project - under construction due to be completed 1992 (LN 270 of 1988)

Taveta-Lumi Water Project (LN 270 of 1988)

DEVELOPMENT EXPENDITURE ESTIMATES 1990/91

Water Sector, K£ million	95.2003
Ministry/Item	
Ministry of Reclamation and Development of Arid, Semi-Arid and Wasteland	0.0443
Construction of Water Supplies and Sewerage	0.0443
Ministry of Agriculture	0.042
Construction of Water Supplies and Sewerage	0.042
Ministry of Health	1.785
Environmental Health Services	
Miscellaneous Operating Expenses (Waste Sanitation)	1.650
Equipment Minor Water Supplies	0.020
Minor Urban (Water and Sanitation)	0.115
Ministry of Local Government	28.82
Local Government Training (Water)	0.250
Municipal Council Sewerage	12.663
Nairobi Water III	15.410
Nairobi Water II	0.500
Ministry of Culture and Social Services	0.175
Community Development	
Minor Urban Water Supply and Sanitation Programme	0.175
Ministry of Water Development	63.54
Water Development	1.424
Training of Water Development Staff	0.430
Rural Water Supply	17.203
Self Help Water Supply	0.110
Urban Water Supply and Sewerage	4.421
Special Water Programmes	6.312
Water Conservation and Pipeline Corporation	33.637
Ministry of Lands and Housing	0.49
SFT Magarini Settlement Project	
Water Supply System	0.120
SFT Haraka Settlement Schemes	
Water Supply System	0.015
SFT Stateland Schemes	
Water Supply System	0.329
SFT Shrika Conventional Schemes	
Construction of Water Supplies	0.030

Ministry of Regional Development**0.15****Turkana Integrated Development Programme**

Community Wells

0.100

Water Harvesting and Spreading Project

0.030

Lake Basin Development Authority

Construction of Communal Wells

0.010

LBDA Water Resources Database

0.010

DEVELOPMENT EXPENDITURE ESTIMATES 1990/91

Water Sector, External Funding, K£ million

Donor/Lender	Ministry	Loan	Grant
African Development Bank		3.0	-
Thika Water Supply Project	MOLG	1.0	
Third Nairobi Water Supply	MOLG	2.0	
Government of Denmark		-	0.612
Busia, Homa Bay, Isiolo and Nyahururu Sewerages			
Busia	MOLG		0.153
Homa Bay	MOLG		0.153
Isiolo	MOLG		0.153
Nyahururu	MOLG		0.153
International Development Association		1.0	-
Third Nairobi Water Supply	MOLG	1.0	
Italian Government		3.0	-
Kilimanjaro-Machakos Water Project	MOWD	3.0	
Japanese Government		14.5	2.393
Nakuru Sewerage Master Plan	MOWD		0.25
National Water Master Plan	MOWD		2.143
Greater Nakuru Water Project	MOWD	12.5	
Nairobi Water Supply III	MOLG	2.0	
Government of Norway		-	3.535
Minor Urban Water Supply	MOWD		3.215
Minor Urban Water Supply and Sanitation Programme	MOH		0.115
Minor Urban Water Supply Karatina Sewerage	MOLG		0.03
Minor Urban Water Supply	MOCSS		0.175
Government of the Netherlands		-	0.593
Water Resources Assessment Programme	MOWD		0.593
Government of Sweden		-	2.845
Rural Water Supply Programme	MOWD		2.295
Miscellaneous Operating Expenses (Waste Sanitation)	MOH		0.550

Government of Switzerland		-	0.0443
ASAL-Laikipia Construction of Water Supplies and Sewerage	MORDASW		0.0443
British Government		-	0.042
EMI Soil and Water Conservation Construction of Water Supplies and Sewerage	MOA		0.042
Federal Republic of Germany		6.0	9.505
Local Government Training (Water)	MOLG		0.250
Kilifi Sewerage	MOLG		0.055
Malindi Sanitation	MOLG		0.250
Voi Sewerage	MOLG		0.050
Chuka Sewerage	MOLG		0.055
Keroka Town Sewerage	MOLG		0.050
Kisumu Sewerage Project	MOLG		0.8
Kericho Sewerage	MOLG	3.0	
Narok Sewerage	MOLG		0.050
Eldoret Sewerage (Study)	MOLG		0.32
Malakisi/Tamlega Sewerage	MOLG		0.050
Nyahururu Water Supply	MOLG		0.2
Kisumu Water Supply	MOLG		0.38
Kericho Water Supply	MOLG		1.5
Kitale Water Supply II	MOLG		0.9
Eldoret Water Supply	MOLG	3.0	
Water Project Construction and Supervision	MOWD		0.9
Malindi Water Supply Project	MOWD		0.9
Sabaki Water Supply (Baricho Int.)	MOWD		2.5
Lake Kenyatta Project	MLH		0.142
Hindi/Magogoni Scheme	MLH		0.108
Witu Scheme	MLH		0.045
European Development Fund (EEC)		1.0	0.13
3rd Nairobi Water Supply (EIB)	MOLG	1.0	
Turkana Integrated Development Programme	MORD		0.13
Government of Finland		-	7.18
Western Kenya Water Supply Programme	MOWD		5.78
New Rural Water Project	MOWD		1.4
Government of Belgium		-	0.141
Purchase of Equipment for Water Development	MOWD		0.141

African Development Fund		4.3	-
Murang'a, Kisii and Bungoma Sewerage (Murang'a)	MOLG	0.8	
Murang'a, Kisii and Bungoma Sewerage (Kisii)	MOLG	0.5	
Murang'a, Kisii and Bungoma Sewerage (Bungoma)	MOLG	1.0	
Third Nairobi Water Supply	MOLG	2.0	
Government of Austria		1.5	-
Kitui Water Supply	MOWD	1.5	
Government of France		0.55	1.0
Mombasa Water Distribution Network Fifth Financial Protocol (Greater Nakuru Water)	MOWD		1.0
	MOWD	0.55	
Government of Saudi Arabia		3.5	-
Mombasa Sewerage Project	MOLG	3.0	
Nairobi Water Supply II	MOLG	0.5	
Total		38.35	28.02

Kenyan Accounting and Auditing Procedures

(Adopted from: Tostensen and Scott 1987)

During recent years when most bilateral donors have used direct payment arrangements, there has been reduced interest in the disbursement and control performance of the Kenyan administrative system.

In contrast to most bilaterals, the IBRD, UN agencies and a few smaller donors have concluded agreements or covenants with the Kenyan authorities for utilising the existing accounting system. The IBRD is satisfied that these arrangements save time and effort, and facilitate disbursements, reporting and auditing at an acceptable level and within reasonable periods of time.

For their national agricultural extension programme, the IBRD is supplied with accounts, which are Treasury computer printouts of payments appearing in the government ledger; the expenditure reports are prepared by a project accountant in the implementation unit of the Ministry of Agriculture on both a monthly and annual basis. The audit is carried out under the Auditor-General's regular programme for auditing government accounts.

The key to the arrangement lies in the allocation to the individual project of a separate budget line, in effect a separate budget sub-head, in a three digit budget, which contains up to 999 items.

There is also formal provision on a project basis for the listing of individual accounts and disbursement categories, corresponding directly with expenditure 'items' in the government ledger. This covenant requirement, in turn, enables both project accounts and disbursement categories to be prepared directly from the government ledger.

The formal agreement or covenant with the government provides the IBRD with the right to scrutinise the underlying vouchers, and if necessary, to have the statements audited separately. But since the expenditures are audited on a routine basis by the Auditor-General, the IBRD would normally exercise its right only in special cases.

The completion of the monthly project expenditure report is generally made available about 30 days after the end of the month. The Auditor-General's report will, according to the special covenant, be available to the IBRD in its final form, accepted by Parliament, about 15 months after the conclusion of the budget year.

Within the project implementation unit of the ministry responsible, the project accountant would be expected to undertake normal budgetary duties, as well as producing monthly and annual expenditure reports.

If MDC/NORAD were to use the Kenyan system, similar arrangements to those established for the IBRD, could be considered as a model. These would require, in some cases, specific recruitment of new project accountants, specified printouts at agreed intervals, and right of separate audits in particular instances.

Kenya Government Procurement Procedures

(Adopted from: Tostensen and Scott 1987)

The Kenya government's procurement procedures are described in the Supplies Manual of 1978. The bidding or tendering procedures are outlined in the manual, which covers preparation of specifications, invitations to bid, receipt and opening of bids, as well as evaluation and final awards. The procedures are based on a policy of competitive public tendering.

The IBRD relies on the procurement procedures for Local Contract Bids (LCB). An IBRD Internal Memorandum of 30 April 1986 states that in cases where procurement problems occur, these are mostly related to shortcomings in practice, and do not emanate from the procedure itself. The IBRD has therefore decided to review and ascertain that the following requirements are comprehensively covered in bidding documents:

- foreign firms wishing to bid under LCB should be allowed to bid (although this is not excluded under Kenyan procedures);
- prequalifications of bidders are specified;
- evaluation and award criteria are specified (Kenyan procedure to award to lowest bidder);
- bid submission and opening procedures are specified;
- bidding documents are complete.

The District Tender Board can deliberate, and make final decisions for open tenders up to KES 60000 for procurement of a single item within a particular financial year. Amounts above this limit have to be adjudicated by Central Tender Board. In the tendering and bidding field, it is recommended that MDC/NORAD should consider following the type of procedures currently practised by the IBRD.

**Comparative Average Unit Cost of Water For Different Local Authorities And Ministry of Water
Development Urban Tariffs (K.Shs)**

Amount Consumed M3/Month	LOCAL AUTHORITIES																
	Nairobi	Kisumu	Nakuru	Eldoret	Thika	Kericho	Nyeri	Kisale	Nyahuru	Nanyuki	Mau	Kaji Bungoma	Embu	Kiambu	Mse/Mand	MOWD URBAN	
1	25.00	65.00	57.25	6.50	29.00	29.00	32.50	45.50	37.50	11.90	23.00	40.00	29.00	22.00	58.00	29.00	18.50
2	12.50	32.00	28.99	5.00	14.50	14.00	16.25	22.75	18.75	6.90	11.50	20.00	14.50	11.00	29.00	14.90	9.25
3	8.33	21.33	19.12	4.83	9.67	9.33	10.83	15.17	12.50	4.63	7.67	13.33	9.67	7.33	19.33	9.87	6.17
4	6.25	16.25	14.34	4.25	7.25	7.00	8.13	11.38	9.38	4.40	5.75	10.00	7.25	5.50	14.50	7.40	4.83
5	6.40	15.00	11.47	3.80	6.80	6.80	6.50	8.10	7.50	3.90	4.80	8.00	6.00	4.40	11.80	5.82	3.70
6	5.17	10.83	8.56	3.87	4.83	4.87	5.42	7.58	6.25	3.57	3.85	6.67	4.83	3.67	9.87	4.83	3.08
7	5.00	9.29	8.19	3.59	4.14	4.00	4.84	6.50	5.36	3.33	3.29	5.71	4.14	3.14	8.29	4.23	2.84
8	4.38	8.13	7.17	3.38	3.63	3.50	4.08	5.89	4.99	3.15	2.88	5.00	3.83	2.75	7.25	3.79	2.44
9	4.78	7.22	6.37	3.26	3.22	3.11	3.81	5.06	4.17	3.01	2.58	4.44	3.22	2.44	6.44	3.29	2.39
10	4.80	6.84	6.74	3.20	2.90	2.95	3.47	4.56	3.75	2.80	2.50	4.00	2.90	2.41	6.00	3.54	2.35
11	5.00	5.91	5.21	3.14	2.84	3.00	3.45	4.14	3.88	2.81	2.45	3.91	2.82	2.38	5.84	3.74	2.32
12	5.00	5.42	4.78	3.08	2.42	2.96	3.44	3.79	3.69	2.73	2.42	3.83	2.79	2.36	5.30	3.90	2.29
13	5.16	5.00	4.41	3.04	2.23	2.82	3.43	3.50	3.58	2.67	2.36	3.77	2.77	2.34	5.00	4.05	2.27
14	5.21	4.84	4.10	3.00	2.07	2.69	3.42	3.25	3.54	2.81	2.36	3.71	2.75	2.32	4.88	4.17	2.25
15	5.27	4.38	3.82	2.97	1.84	2.67	3.41	3.03	3.50	2.57	2.33	3.67	2.73	2.31	4.67	4.27	2.23
16	5.31	4.06	3.59	2.94	2.02	2.84	3.41	3.00	3.47	2.53	2.31	3.83	2.72	2.29	4.50	4.37	2.22
17	5.35	3.82	3.37	2.91	2.01	2.82	3.40	2.97	3.44	2.49	2.29	3.88	2.71	2.28	4.35	4.45	2.21
18	5.39	3.61	3.19	2.89	1.99	2.81	3.39	2.94	3.42	2.48	2.26	3.90	2.69	2.27	4.22	4.52	2.19
19	5.53	3.42	3.02	2.87	1.98	2.79	3.39	2.92	3.38	2.43	2.26	3.93	2.68	2.26	4.11	4.58	2.18
20	5.86	3.26	2.87	2.86	1.97	2.75	3.39	2.90	3.36	2.40	2.25	3.90	2.68	2.26	4.00	4.64	2.18
21	5.76	3.10	2.73	2.83	1.96	2.76	3.43	2.88	3.36	2.38	2.24	3.48	2.67	2.25	3.80	4.70	2.17
22	5.86	2.86	2.61	2.82	1.95	2.75	3.47	2.86	3.34	2.35	2.23	3.46	2.66	2.24	3.62	4.74	2.16
23	5.96	2.83	2.49	2.80	1.94	2.74	3.50	2.85	3.33	2.33	2.22	3.43	2.65	2.23	3.74	4.79	2.15
24	6.04	2.71	2.36	2.79	1.94	2.73	3.54	2.83	3.31	2.32	2.21	3.42	2.65	2.23	3.67	4.83	2.15
25	6.12	2.60	2.29	2.78	1.93	2.72	3.57	2.82	3.30	2.30	2.20	3.40	2.64	2.22	3.60	4.86	2.14
26	6.19	2.52	2.26	2.77	1.92	2.71	3.60	2.81	3.29	2.28	2.19	3.38	2.63	2.22	3.54	4.90	2.13
27	6.29	2.43	2.27	2.76	1.92	2.70	3.62	2.80	3.28	2.27	2.19	3.37	2.63	2.21	3.48	4.93	2.13
28	6.32	2.34	2.28	2.75	1.91	2.70	3.65	2.79	3.27	2.26	2.18	3.36	2.63	2.21	3.43	4.96	2.13
29	6.38	2.26	2.25	2.74	1.91	2.69	3.67	2.78	3.26	2.24	2.17	3.34	2.62	2.21	3.38	4.99	2.12
30	6.43	2.17	2.25	2.73	1.90	2.68	3.69	2.77	3.25	2.23	2.17	3.33	2.62	2.20	3.33	5.01	2.12
31	6.56	2.08	2.24	2.73	1.90	2.71	3.71	2.76	3.24	2.22	2.16	3.32	2.61	2.20	3.29	5.04	2.11
32	6.68	2.00	2.23	2.72	1.90	2.73	3.73	2.75	3.23	2.21	2.16	3.31	2.61	2.20	3.25	5.08	2.11
33	6.79	1.90	2.22	2.71	1.89	2.76	3.75	2.74	3.22	2.20	2.16	3.30	2.61	2.19	3.21	5.08	2.11
34	6.85	1.71	2.22	2.71	1.88	2.78	3.78	2.74	3.22	2.19	2.16	3.29	2.60	2.18	3.18	5.10	2.10
35	6.94	1.71	2.21	2.70	1.88	2.80	3.78	2.73	3.21	2.19	2.14	3.29	2.60	2.18	3.14	5.12	2.10
36	7.03	1.72	2.20	2.69	1.88	2.82	3.79	2.72	3.21	2.18	2.14	3.28	2.60	2.18	3.11	5.15	2.10
37	7.11	1.73	2.20	2.68	1.88	2.84	3.81	2.72	3.20	2.17	2.14	3.27	2.60	2.18	3.08	5.18	2.09
38	7.19	1.74	2.19	2.68	1.88	2.86	3.82	2.71	3.20	2.16	2.13	3.26	2.60	2.18	3.05	5.17	2.09
39	7.28	1.74	2.19	2.68	1.87	2.87	3.83	2.71	3.19	2.16	2.13	3.26	2.60	2.18	3.03	5.18	2.09
40	7.39	1.75	2.18	2.68	1.87	2.88	3.84	2.70	3.18	2.15	2.13	3.25	2.60	2.18	3.00	5.20	2.09

Combined Sewerage Charges and Water Bills for Different Local Authorities (In KShs.)

Amount Consumed M ³ /Month	Nairobi	Kisumu	Nakuru	Eldoret	Thika	Karicho	Nyeri	Kisumu	Nyahu ruu	Nanyuki	Meru	Kisumu	Bungoma	Embu	Kisumu	Mombasa	Maldindi	Mechakos	Kakamega	Nitanga
1	38.80	110.00	73.15	288.50	44.00	80.00	65.50	75.50	87.50	26.80	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
2	38.80	110.00	73.15	282.00	44.00	80.00	65.50	75.50	87.50	26.80	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
3	38.80	110.00	73.15	284.80	44.00	80.00	65.50	75.50	87.50	30.70	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
4	38.80	110.00	73.15	287.00	44.00	80.00	65.50	75.50	87.50	32.80	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
5	42.00	110.00	73.15	288.50	44.00	80.00	65.50	75.50	87.50	34.80	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
6	48.00	110.00	73.15	272.00	44.00	80.00	65.50	75.50	87.50	38.40	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
7	56.00	110.00	73.15	274.80	44.00	80.00	65.50	75.50	87.50	40.80	37.40	80.00	47.75	31.45	84.00	44.80	28.80	36.00	28.90	25.00
8	63.00	110.00	73.15	277.00	44.00	80.00	71.50	75.50	82.50	44.00	37.40	80.00	47.75	31.45	84.00	44.80	28.80	37.00	30.70	32.80
9	70.00	110.00	73.15	278.50	44.00	80.00	74.50	75.50	85.00	48.70	37.40	80.00	49.25	31.45	84.00	44.80	29.80	36.00	34.10	34.80
10	78.00	110.00	77.15	282.00	44.80	82.50	78.70	75.50	87.50	52.80	41.00	80.00	50.75	34.80	100.00	50.85	38.35	42.35	37.50	43.00
11	86.00	110.00	78.15	284.80	46.00	86.00	80.00	75.50	73.00	56.80	44.80	84.50	54.25	37.75	104.00	54.15	41.10	44.35	40.80	48.00
12	97.00	110.00	81.15	287.00	47.80	82.30	75.80	78.50	81.00	48.20	51.00	88.25	58.25	40.90	112.00	56.45	46.85	46.35	44.30	47.00
13	108.00	110.00	83.15	288.50	48.15	80.00	88.80	75.50	84.00	55.10	51.80	98.50	62.25	44.05	116.00	72.75	52.80	48.35	47.70	48.00
14	118.00	110.00	86.15	282.00	50.70	82.50	104.80	75.50	89.50	68.20	55.40	102.00	68.25	47.20	124.00	80.05	58.35	51.80	51.10	57.50
15	124.00	110.00	87.15	284.80	53.80	85.00	111.20	75.50	85.00	73.30	58.00	107.50	70.25	50.35	130.00	87.35	64.10	56.20	54.50	58.50
16	133.00	110.00	88.15	287.00	57.12	87.80	117.50	78.00	100.50	77.40	62.80	113.00	74.25	53.50	136.00	94.85	69.85	59.85	57.90	61.80
17	142.00	110.00	91.15	288.50	60.44	72.20	123.80	80.50	108.00	81.50	68.20	118.50	78.25	56.85	142.00	101.85	75.80	62.05	61.30	63.80
18	151.00	110.00	89.15	302.00	63.76	76.80	130.10	83.00	111.50	85.80	88.80	124.00	82.25	58.80	148.00	108.25	81.35	66.50	64.70	66.50
19	162.80	110.00	95.15	304.80	67.08	81.80	136.40	85.50	117.00	88.70	73.40	129.50	86.25	62.95	154.00	116.55	87.10	68.85	68.10	74.00
20	174.00	110.00	87.15	307.00	70.40	86.30	142.70	88.00	122.50	93.80	77.00	135.00	90.25	66.10	160.00	123.85	92.85	72.35	71.80	76.00
21	186.80	110.00	88.15	308.80	73.72	91.00	150.30	90.50	128.00	97.80	80.80	140.50	94.25	69.25	166.00	131.15	96.80	75.80	74.80	78.00
22	197.00	110.00	101.15	312.00	77.04	96.70	167.80	93.00	133.50	102.00	84.20	148.00	98.25	72.40	172.00	138.45	104.35	79.20	78.30	80.00
23	208.60	110.00	103.15	314.80	80.36	100.40	165.50	95.50	138.00	106.10	87.80	151.50	102.25	75.35	178.00	146.75	110.10	82.85	81.70	86.50
24	220.00	110.00	105.15	317.00	83.68	105.10	173.10	98.00	144.50	110.20	91.40	157.00	106.25	78.70	184.00	153.05	116.85	86.10	86.10	90.80
25	231.80	110.00	107.15	318.80	87.00	108.80	180.78	100.50	150.00	114.30	95.00	162.50	110.25	81.85	190.00	160.35	121.80	88.80	88.80	92.80
26	243.00	116.80	111.15	322.00	90.32	114.80	188.30	103.00	155.50	118.40	98.80	168.00	114.25	85.00	196.00	167.65	127.35	92.85	91.80	94.80
27	254.80	121.00	115.15	324.80	93.64	118.20	195.80	105.50	161.00	122.50	102.20	173.50	118.25	88.15	202.00	174.95	133.10	98.35	96.30	98.50
28	266.00	128.80	119.15	327.00	96.96	123.80	203.60	108.00	166.50	128.60	105.80	179.00	122.25	91.30	208.00	182.25	138.85	98.80	98.70	105.00
29	277.80	132.00	123.15	328.80	100.28	128.80	211.10	110.80	172.00	130.70	108.40	184.00	126.25	94.44	214.00	188.55	144.80	103.25	102.10	107.00
30	288.00	137.80	127.15	332.00	103.60	133.30	218.70	113.00	177.50	134.80	113.00	190.00	130.25	97.80	220.00	196.85	150.35	108.85	106.80	108.00
31	303.25	143.00	131.15	334.80	106.92	138.00	226.30	116.00	183.00	138.80	116.80	195.50	134.75	100.75	226.00	204.15	156.10	110.10	108.80	111.00
32	317.80	148.80	135.15	337.00	110.24	144.70	233.90	121.00	188.50	143.00	120.20	201.00	138.25	103.90	232.00	211.45	161.85	113.50	112.30	116.80
33	331.78	154.00	139.15	338.80	113.56	150.40	241.50	126.00	194.00	147.10	123.80	206.50	142.25	107.06	238.00	218.75	167.80	116.80	116.70	121.80
34	346.00	160.80	143.15	342.00	116.88	156.10	249.10	130.00	199.50	151.20	127.40	212.00	146.25	110.20	244.00	226.05	173.35	120.40	118.10	123.80
35	360.25	166.00	147.15	344.80	120.20	161.80	256.70	138.00	205.00	155.30	131.00	217.50	150.25	113.35	250.00	233.35	179.10	123.80	122.80	128.00
36	374.80	170.00	151.15	347.00	123.52	167.50	264.30	143.00	210.50	159.40	134.80	223.00	154.25	116.80	256.00	240.65	184.85	127.25	125.80	127.80
37	388.75	175.00	155.15	348.80	126.84	173.20	271.90	148.00	216.00	163.50	138.20	228.50	158.25	118.85	262.00	247.95	190.80	131.25	128.30	136.00
38	403.00	181.50	159.15	352.00	130.16	178.90	279.50	153.00	221.50	167.80	141.80	234.00	162.25	122.80	268.00	255.25	196.35	134.10	132.70	138.00
39	417.25	187.00	163.15	354.80	133.48	184.60	287.10	162.00	227.00	171.70	145.40	239.50	170.75	125.85	274.00	262.55	202.10	137.85	136.10	140.00
40	431.80	192.80	167.15	357.00	136.80	190.30	294.70	166.00	232.50	175.80	148.00	245.00	175.25	128.90	280.00	269.85	207.85	141.40	138.50	142.00