- Large city with active industrial development	:	Nairobi and Mombasa
- Town encountering a specific environmental issue	:	Nakuru (see Section 4.10)
- Area where water resources are critically limited	:	22 urban centres in dry area (see Section 4.7)

Note: There are other areas where demand-supply balance is foreseen to be critically severe. The above shows the representative areas.

For these areas, positive measures to reduce and/or diversify the growth of water demands should be exercised. The measures will include, but not limited to; (i) regulation of regional development as a principal policy in the area, (ii) diversification of development activities particularly industrial development and (iii) higher water tariff to encourage the saving of water use.

6.2.2 Sewerage system

Sewerage facilities are, in almost all cases, confined in the areas of respective municipalities and urban centres. The beneficiaries are also in these areas. In this context, it is appropriate that the implementing agency responsible for sewerage development will remain with the local authorities. MOWD will act as the administrator responsible for policy formulation and technical advice for sewerage development.

6.2.3 Agriculture and irrigation development

(1) Implementing agencies

MOA is the administrator and also the main implementing agency for the country's overall agriculture and irrigation development. Other leading agencies are NIB and six river basin authorities (LBDA, TARDA, etc.) who are developing major irrigation schemes. The present administrative structure seems to be functioning well in general.

(2) Overall administration of irrigation development and water use

All the information (planning, implementation, and management) for irrigation schemes and their water use is inventoried and recorded at a central administration office. MOA is the appropriate ministry under the present Government structure. The inventory and water use , which must be periodically updated, should be reported to WAB. Since the irrigation sector is the largest user of water, the records will be quite important to achieve overall water management in the country.

6.2.4 Livestock and wildlife sectors

(1) Implementing agencies

Water development and conservation programmes for livestock and wildlife are currently managed by MOLD and MOTW respectively, with technical support from MOWD. For the livestock sector, the river basin authorities and MORDASW are also involved in formulating their projects, receiving coordination from MOLD. The present implementation system seems to function well, so the effort of inter-ministerial coordination should continue.

(2) Water facilities inventory list

The Study could not obtain information on existing water facilities in the form of an inventory list for both the livestock and wildlife. It will be necessary for MOLD and MOTW to list all the major watering points for basic information on water management in the country.

6.2.5 Hydropower development

(1) Organization of the power sector

MOE is responsible for formulating the national policy of the energy sector including electric power, oil and other fossil fuels, wind, biogas, solar, geothermal and woodfuel development. The electricity industry is composed of six entities - KPC, KPLC, TRDC, TARDA, KVDA, and LBDA.

(2) Implementation of hydropower development

KPC plays the leading role in planning, design, and also implementation of the hydropower projects in collaboration with the river basin development authorities. There seem to be no major difficulties nor constraints in proceeding with the implementation with the present institutional set-up. Hence, KPC will continue to play the leading role in the future development of the hydropower sector.

More positive coordination in water use between the power sector and other sectors, would become more important in the future. Major dams are owned by the river basin development authorities. This is favourable since the water impounded in reservoirs is open to multi-sectoral uses when such need arises in the future (NB: But, this does not deny the beneficial use of water for power generation).

6.2.6 River and flood control works

(1) Establishment of a responsible agency

Under the present institutional set-up, the organization responsible for the management of river courses is not clearly defined. Thus, it would be important

to establish a main agency in charge of this assignment, since the use of rivers and their facilities will increase in the future. This Study proposes that MOWD function as the responsible agency.

The Water Act designates MOWD to implement the works for disposal and control of flood water.

(2) Implementing agency for river works

In (1) above, MOWD is assigned as the responsible agency for the river management works. On one hand, some of the six river basin development authorities have been implementing flood control projects such as levee construction and canalization. Local authorities are authorized to undertake urban drainage works by the Local Government Act. In this regard, a practical approach may be appropriate as follows;

(i) Overall management of the rivers will be the responsibility of MOWD, while MOWD can entrust some of the river works (eg. river improvement work, flood control projects) to the river basin development authorities or local authorities on each project basis.

(ii) Other river related works (eg. dam, intake, bridge, etc.) can be implemented by any agencies as is practiced at present, but subject to prior reporting to and consent of WAB (as the agency responsible for water permit) and MOWD (as river administration).

These are under practice at present, but more clear understanding of the above principles should be established among the related agencies.

(3) Inventory of present river conditions

MOWD should accumulate inventory of present river conditions. The inventory should include hydrological information such as (a) rainfall in the catchment area, (b) river discharges at key gauging stations, (c) river water use, (d) flood record, (e) river water quality, etc., and structural information such as (a) plan, longitudinal profile and cross sections of the river channel, (b) land use condition along the river course and in flood-prone area, (c) engineering features of major river facilities, etc. The preparation of a complete inventory will require many years. Nevertheless, the information should be collected and accumulated henceforward.

(4) River conservation and improvement work

River conservation work is required in order to provide, maintain, and regain the stable regime of rivers. The work includes, but not limited to, the following physical works:

(a) Conservation of river course,s including the protection of bank erosion and stabilization of river bed

(b) Removal of excessively siltation
(c) Cleaning of interfering vegetation in the channel
(d) Arresting of sediment yield
(e) Canalization and/or levee construction for augmenting the channel capacity

Not many of the above works have been undertaken, though some works of (c) and (e) have been carried out in some areas in the country. These works should be promoted in succession in important rivers including urban rivers. To identify the required conservation works, the overseers in charge of river maintenance should inspect river conditions periodically.

(5) Operation and maintenance of river structures

According to the Water Act, builders are responsible for operating and maintaining the river structures and are under obligation to report to WAB failure or damage of the dams constructed by them. WAB has a right to give instructions to repair the failure or damage in pursuance of the inspection. That is restricted to the structures relating to the water permit. In the near future, however, WAB having the right of approval of water permit or MOWD, the overseer of rivers, should have the same right to all river structures as well as the structure relating to water permit. In addition, they should give instruction to the operators of the river structures to report the state of structures preserved safely and the records of operation (water use in particular) and maintenance.

There are virtually no comprehensive guidelines and/or criteria with regard to protection, conservation, and operation of river-related facilities. In the future, they should be established to keep a steady level of operation and maintenance.

(6) Flood area management

As is known widely, flood disasters cannot be abated economically only by structural measures. The following non-structural measures should also be exercised with the structural measures at the same time.

(a) Land use control in habitual flood prone areas
(b) Installation of flood forecasting and warning system
(c) Establishment of flood fighting team
(d) Formulation of an evacuation system for wide spread inundation

Since these non-structural systems cannot be exercised in a short time, they should be established one by one in the necessary areas over a long time. For establishing the system (b) above, MOWD should install observatory stations and formulate a correlation model for the habitual flood prone rivers at present.

6.2.7 Multipurpose development approach

In general, water resources in Kenya are not abundant. Although this current Study found that the water resources could meet the demands for the next 20 years, towards

the year 2010, the demands will continue to increase and ultimately all available water resources should be used most effectively.

(1) Concept of integrated river basin development

This concept covers both surface water and groundwater sources. To manage these resources well, it would be requisite to prepare a comprehensive river basin development study covering all water-related sectors and updated when the revision of this plan is deemed necessary, say, once every 10 years.

(2) Multipurpose development projects

A multipurpose development project is often more economic than a single purpose development project because of the merit of scale and the joint use of the facilities. In this case, it is necessary to introduce a system of cost allocation. A basis of calculating the cost sharing is generally embraced in the "separable cost-remaining benefit method".

(3) Storage reservoir/dam schemes

The storage dam scheme is an effective measure for augmenting water exploitation, which is particularly important in a dry country like Kenya. Since the damsite can only be used once, it is very important to select the optimum size of the dam development taking into account the long-term viewpoint. Although it may not always be the correct solution, the development agencies should consider exploiting the dam scheme to its maximum development potential. This is particularly emphasized for the Athi, Tana, and Lake Victoria basins where the demands for water use would continuously increase in the future.

(4) Coordination between ministries/agencies

Under the present institutional set-up, most of the multi-objective development projects will come from studies by the river basin development authorities. This is an ideal case and therefore should be strengthened. In some cases, proposals may be raised from studies by other agencies such as KPC, NIB, and NWCPC. In both cases, proper coordination will be required among the agencies concerned. A tentative proposal herein is that the proposed multipurpose project be discussed and coordinated for decisions and implementation by a special committee organized on an ad-hoc basis. MOWD should act as the leading agency for the coordination of the committee, since MOWD is, in coordination with WAB, the overseer of the country's water resources. However it is important that MOWD/WAB carry out this assignment in close collaboration with the river basin authorities concerned.

6.3 Water Resources and Use Management

6.3.1 Surface water management

(1) Hydrological data management

(a) Hydrological observatory work

MOWD is currently operating some 900 water level gauging stations, but many stations have deteriorated or are not working properly because of the limited availability of financial resources. Under this situation, a practical approach for the time being would be to reduce the number of stations.

On the other hand, a unique aspect that prevails in Kenya is that water abstraction is made mainly in tributaries and springs in upper watershed areas. These factors require hydrological observations at as many places as possible. This means that the number of observatory stations should be increased in the future. Thus, MOWD has to increase the budgetary resources for it.

(b) Processing and storage of data

The processing of data and interpretation of the results are carried out centrally by the Surface Water Section of MOWD. It is appropriate to apply this system for some time, but decentralization of a part of the work (e.g., digitization and/or input of the field records) will be considered in the future.

(c) Training of field hydrologists

The accuracy of collected hydrological data depends on the skill and motivation of hydrologists posted in provincial/district offices. For field hydrologists, therefore, it is important to organize training course such as annual seminars.

(d) Dissemination of hydrological information

The Surface Water Section/Data Units of MOWD would be responsible for dissemination of hydrological data to other Divisions/Sections within the Ministry and also to other government agencies and private firms. It is recommended that a publication programme be established so that hydrological information be more readily available to users. Some charges may be imposed for publication of data to cover expenditures of data retrieval, printing and other costs.

(2) Water abstraction permit

Up to the present, WAB has stored more than 25,000 proposal documents relating to abstraction permits. However, the accurate number of water permits currently effective cannot be known. According to the review by the Study, the

currently effective permits may number around 15,000. In actuality, there seems to be many cases where water users with an approved permit, tend to abstract as much water as they require and some users abstract water without a permit. In some basins, in high potential areas, it is reported that the abstraction volume permitted by WAB appears to have already exceeded the available natural flow.

In this context, the following countermeasures are required urgently:

(a) Renovation of the filing system for water abstraction permits
(b) Water use surveys for several critical river basins and ultimately for all basins
(c) Calculation of naturalized river flow and the maximum permissible amount of water for abstraction

The works for (b) and (c) above will require a lot of expertise. It is worth proposing the above studies as one of the priority programmes on a project basis.

The above data management has been conducted by WAB so far, but WAB does not have sufficient technical staff. Therefore, MOWD should be more involved in water permit data management.

(3) Water use monitoring and control

As mentioned in the previous section, improper usage of water occurs in many places, including over-abstraction, misuse, and other illegal abstractions. Hence, monitoring and control of this valuable resource are important tasks assigned to MOWD.

(a) Encouragement of water bailiffs' activities

Successful achievement of water use monitoring and control will depend largely on the capability and volition of the water bailiffs posted to provincial and district offices. For encouraging their activities, priority should be given to training as well as providing an adequate transportation facility which should help to increase the number of highly qualified water bailiffs. It is stressed that "proper water use" is linked with "reduction of water development costs".

(b) Measurement and reporting of water uses

The Water Act allows WAB to require a water permit holder to install controlling/measuring devices and to keep a record of water abstractions. MOWD and WAB should enforce this application over major water permit holders.

(c) Strengthening the imposition of penalties

Present laws allow the imposition of penalties (fines and imprisonment) for offenses in water use. It would be important to exercise the strict enforcement

of the penalties when the water bailiff identifies any illegal water uses. The cancellation of water permit may be the severest way of penalizing the users.

(4) River maintenance discharge

All surface water abstraction schemes should conform to the Water (General) Rules. Due considerations is to be taken to release compensation water downstream and to keep the required minimum flow in the river for the various water uses. The assessment of the river maintenance discharge should be made in all river basins or project studies to be carried out henceforth.

(5) Need for flow augmentation measures

Due to development in upstream areas, it is possible that downstream areas may have water shortage. Although WAB's effort for controlling water use and preserving the river maintenance discharges shall continue, there may arise such cases where the downstream water users experience water shortage. People's dependence on rivers and livestock watering should be secured even in the downstream areas. From the long-term viewpoint, MOWD will have to plan the construction of dams/reservoirs for augmentation of flows in the downstream reaches.

6.3.2 Groundwater management

(1) Water permits for groundwater development

The Water Act states that a water permit is required for groundwater development in any area which is situated within 92m (100 yards) of any body of surface water or within 805m (a half mile) of another existing borehole. Boreholes not falling in this category require only drilling permission (not a water permit). To keep an equitable water management and a uniform basis of water development, all boreholes and wells should be subject to the acquisition of water permits. The only exception may be for shallow hand-dug wells (say, less than 10m in depth) excavated on private land. The Water Act requires that drilling contractors submit to WAB within 30 days, a complete drilling completion record once they have finished their works. This regulation should be strictly enforced without fail in view of the importance of the records.

(2) Monitoring of water use

Monitoring of water use is necessary for groundwater and surface water. It is impractical and unnecessary to require water use recording of all boreholes/wells. The obligation may be limited to major water users such as public water undertakers and major enterprises undertaking bulk abstraction.

(3) Groundwater data management

Borehole completion records are currently filed in at the Groundwater Section of MOWD. The database of the following records should be managed properly and the quality upgraded further.

(a) Inventory of boreholes completed
(b) Water quality data
(c) Pumping test data

(4) Groundwater resources assessment

In the long run, the following studies should be implemented to assess the country's groundwater resources in detail :

(a) Groundwater balance analysis through computer simulation models (including groundwater modeling in major areas)
(b) Accumulation and evaluation of water quality data to establish practical water quality guidelines applicable to each region

6.3.3 Water quality and pollution control

(1) Water quality monitoring programme

The Water Quality and Pollution Control Section of MOWD is responsible for implementation of the nationwide water quality monitoring programme. This network covers 120 sampling points. The major constraint on the program is a lack of financial source. Nevertheless, the expenses for the programme should not be restricted. In the long run, it should be kept in mind that the benefits brought about through conservation of clean water will offset the costs of the programme.

It is worth proposing a comprehensive water quality survey for accumulation of a nationwide baseline data at this present stage so that water pollution will not progress. The survey will include;

(a) Surface water quality sampling at all reference/impact stations; minimum 4 times/year
(b) Groundwater quality sampling at selected public boreholes/wells; minimum 2 times/year

(2) Water pollution control

(a) Standards for effluent quality and receiving water quality

The Pollution Control Unit of MOWD has enforced a generalized effluent quality standard and some specific standards for industrial effluent sources (e.g., paper mill, sugar factory). It is recommended that more specific standards for discharges from other types of industrial sources be established.

In addition, there should be standards for control of the quality of the receiving waters such as rivers and lakes.

(b) Strengthening the imposition of penalties

As mentioned in the previous Section on Surface Water Management, it would be important to strictly enforce the penalties for cases of water pollution as well. The cancellation of water abstraction permits or the suspension of production operations may be the most effective way of penalizing the violators. To support the chemists and water bailiffs' activities, it would be necessary to provide a small water quality laboratory in respective Districts.

(c) Power for remedial measures

Water (General) Rules empowers WAB to make holders of water permits submit plan of the process they will use to purify the effluent. This power is limited to the case of pollution associated with water abstraction. This provision should be extended to cover all water users. Also there should be an explicit provision that WAB has the power to order remedial work.

6.3.4 Shared water resources in international rivers

There are 18 international drainage basins relevant to Kenya as shown in Figure 6.1. Water use in these basins should conform to the principles of "the Helsinki Rules on the Use of Waters of International Rivers (1966)". The following activities should be recommended as the initial step towards the long-range development in these basins.

Table 6.1 Proposed Activities in International Drainage Basins

No. in Figure 6.1	International Drainage Basin	Name of River in Kenya	Action Recommended
(1)	Malaba	Malaba	- Hydrological measurement
(2)	Lake Victoria	13 river basins	- Agreement of lake water use in case of bulk water transfer
(3)	Mara	Mara	- Hydrological Assessment on aspects of wildlife conservation
(5)	Lake Natron	Ewaso N'giro South	- Lake Natron environmental study
(8)	Lake Jipe	Lumi	- Lake Jipe environmental study
(10)	Umba	Umba	- Hydrological measurement
(12)	Lake Turkana	Lake Turkana	- Lake Turkana environmental study
(16)	Juba (*Somalia*)	Daua	- Hydrological measurement

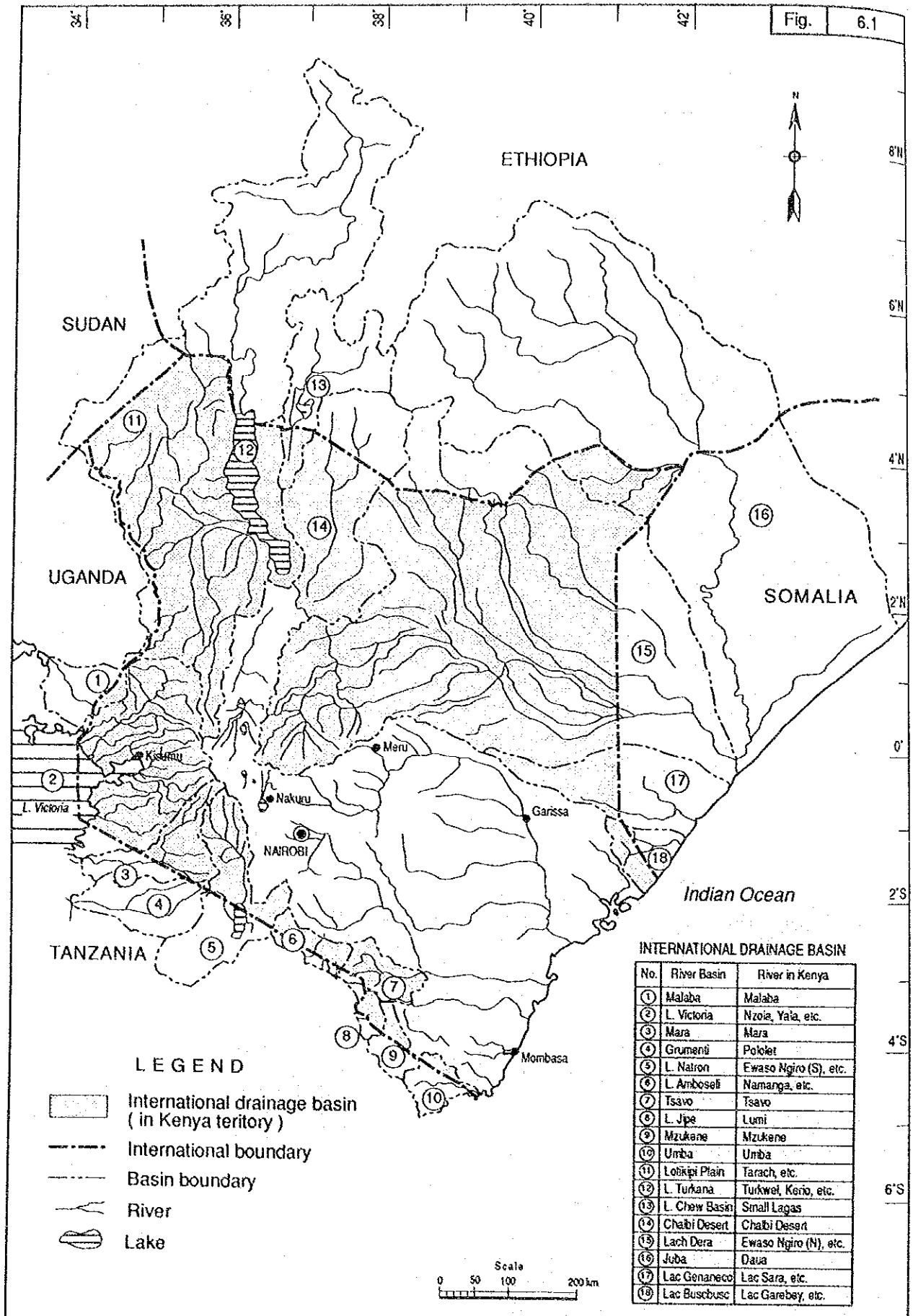

Figure 6.1 International Drainage Basins in Kenya

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6.3.5 Watershed protection

(1) Protection of Catchment Area

According to the Water Act, the Minister for Water Development can designate any part of a catchment area where special measures are necessary for the protection of water resources. An important area for protection is forest areas, particularly indigenous forest lands. In fact, there are in most cases many springs around the forest lands, which indicate the forests form natural water reservoirs.

These important areas, springs and forest lands functioning as sources of springs, should be designated as watershed protection areas. MOWD is urged to take the following actions:

(a) Preparation of a list of springs covering the whole country which include location and expected volume in accordance with the local information
(b) Identification of forest lands functioning as sources of the springs

According to the Forest Act, the Minister for Environment and Natural Resources may declare a forest area to be a natural reserve for the purpose of preserving natural amenities. In this regard, MOWD and MOENR should exchange information and exercise mutually coordinated regulations from both aspects of water resources conservation and natural amenity conservation. At present, budget allocation to this undertaking appears to be limited. Both MOWD and MOENR should be provided with sufficient funds so that they can fulfill their assigned duties to the required extent.

(2) Conservation of Soil

Excessive soil erosion is found in many rivers in the country. The notable problems are a functional disorder due to sedimentation in small reservoirs and devastation of river courses. MOWD would be required to launch the preventive construction works such as sand arresting dams (sabo dams), sand pockets, and river training works.

The soil conservation works conducted by MOA in conjunction with agricultural development should remain active as the intensification of land use expands in the future.

APPENDIXES

APPENDIX 1

LIST OF MEMBERS OF STEERING COMMITTEE, TECHNICAL SUB-COMMITTEE, ADVISORY COMMITTEE AND STUDY TEAM

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Appendix 1.1 List of Steering and Technical Sub-committee Members

Name	Organization	Position	Assignment	
			Steering Committee	Technical Sub-Committee
H.K. Rotich	NWCPC	MD	Chairman	–
E.K. Mwongera	MOWD	DWD	Co-Chairman	–
J.K. Gichuhi	OVP/MOF		Member	–
J.A. Mwinamo	MOE	PE	Member	Member
G. Muchiri	MOA	DDA	Member	Member
K. Ngugi/ Kinanjui	MORD	SPO	Member	Member
E.S. Osundwa	MPND	DCE	Member	–
W. Sakataka	MRDASAL	US/Development	Member	–
G.O. Ochieng	MENR		Member	–
F.N. Kihumba/ S. Munene	NES		Member	–
P.K. Karimi	PPCSCA	WCS	Member	–
M. Mutuaruchiu	KVDA		Member	–
P.J. Olum	NIB	ACE	Member	–
P.M. Gateri	TARDA	Tech. Manager	Member	–
D. Arunga	LBDA	Project Coordinator	Member	–
E.B.I.N. Rweria	MOTW	PE	Member	–
E.M. Musazi	MOLG		Member	–
B. Mwenezi	AGC		Member	–
S. Nchogu	MOWD	DDWD	Member	Chairman
W.N. Thitai	MOWD	DDWD	Member	Chairman
K. Njui	MOWD	DDWD	Member	Member
R.A. Ikobe	MOWD	APPWD	Member	Member
M.K. Migwi	MOWD	ADWD	Member	Member
J.O. Obongo	MOWD	PE	Member	Member
M.M. Mahamud	NWCPC	CCSM	Member	Member
F.M. Mwai	NWPCC	HHS	Member	Member
C.K. Koske	NWCPC	DM	Member	Member
P.K. Weru	MOWD	PC	Member	Member
T.W. Kibaki (*)	MOWD	ADWD	Member/ Secretary	Member/ Secretary

(*) Also act as the Project Coordinator for the Study

Appendix 1.2 List of Advisory Committee Members and JICA Coordinators

	Name	Organization	Assignment
	Advisory Committee		
(1)	K. Watado	MOC	Chairman
(2)	K. Shimada T. Aoyama	MOC	Member
(3)	J. Yoshitani	MOC	Member
(4)	S. Machida/ Y. Nakajima/ T. Fujiwara	MOC	Member
	Coordinator		
(1)	M. Suemori/ M. Kobayashi	JICA Tokyo	Chief Coordinator
(2)	T. Itoh/ Y. Teranishi	JICA Tokyo	Coordinator
(3)	M. Juro/ K. Makino	JICA Kenya	Coordination in Kenya

MOC : Ministry of Construction
JICA : Japan International Cooperation Agency

Appendix 1.3 List of Study Team Members

	Name	Organization	Assignment
(1)	M. Kato	NK	Team Leader
(2)	S. Ohtsuki	NK	Water Resources
(3)	M. Higuchi	CPC	Groundwater
(4)	Y. Inoue	NK	Hydrology(Water Balance)
(5)	K. Morishita	CTI	Hydrology (Flood)
(6)	N. Hirose	NK	Database (GIS)
(7)	A. Komatsu	NK	Database (Hydrology)
(8)	K. Ajiro	CPC	Well Survey
(9)	T. Nishikawa	PI	Remote Sensing
(10)	K. Itoh	CTI	Dam Development
(11)	T. Nakatsu	CPC	Dam Geology
(12)	Y. Kokufu	PI	Topographic Survey
(13)	Y. Uchida	CTI	River
(14)	Y. Miyagawa	NK	Power Development
(15)	A. Kojima	NK	Agriculture/Irrigation
(16)	M.R. Litterick	(NK)	Environment
(17)	Y. Takeuchi	NK	Law and Institution
(18)	T. Tashiro	PEI	Socio-economy
(19)	T. Gejo	NK	Agronomy

NK : Nippon Koei Co., Ltd.
CPC : Construction Project Consultants Inc.
CTI : CTI Engineering Co., Ltd.
PI : Pasco International Inc.
PEI : Project Economy Institute

APPENDIX 2

PROPOSED IMPLEMENTATION PROGRAMME (MASTER ACTION PLAN)

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Appendix 2.1 Urban Water Supply Schemes -Proposed Implementation Programme (1/5)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
110	Nairobi	U-1	Thika Dam, Ndarugu, Ruiru-A, Chania-B	1,061.6	1,337.7	● ● ● ● ● ● ● ●
210	Karuri	U-2	Kiambaa Dam (Rui Ruaka R.)	12.0	15.1	● ● ● ●
210	Kiambu	U-3	Kiambaa Dam (Rui Ruaka r.)	9.1	11.4	● ● ● ● ● ●
210	Gatundu & Ngenda	U-4	Thiririka River	0.3	0.4	● ●
210	Limuru	U-5	Chania P/L	14.2	17.9	● ● ● ●
210	*Ruiru*	U-6	Ruiru River	9.7	12.2	● ● ● ●
210	Thika	U-7	Chania River (Lower)	21.3	26.9	● ● ● ●
210	Githunguri	U-8	Ruiru river	5.0	6.3	● ● ● ●
210	Kikuyu	U-9	Kikuyu Dam	14.9	18.7	● ● ● ●
				86.4	108.8	
220	Wanguru	U-10	Thiba River	1.2	1.5	● ● ● ●
220	Sagana	U-11	Ragati River	3.6	4.5	● ● ● ●
220	Kerugoya	U-12	Kiringa River	8.3	10.5	● ● ● ● ● ●
220	Kutus	U-13	Thiba River	4.9	6.2	● ● ● ●
				18.0	22.7	
230	Kandara	U-14	Thika River	0.5	0.6	● ●
230	Maragua	U-15	Githanji river	15.1	19.0	● ● ● ●
230	Kangema	U-16	Mathioya River	1.2	1.5	● ● ● ●
230	Murang'a	U-17	Maragua river	11.4	14.3	● ● ● ● ● ●
230	Makuyu	U-18	Motoho river	4.8	6.0	● ● ● ●
				32.9	41.5	
240	Ol Kalou	U-19	Malewa River	10.7	13.5	● ● ● ●
250	*Karatina*	U-20	*Ragati River*	3.9	4.9	● ● ● ●
250	Othaya	U-21	Tuthi river	5.0	6.3	● ● ● ●
250	Nyeri	U-22	Chania River	50.3	63.4	● ● ● ● ● ●
				59.2	74.6	
310	Mariakani	U-23	2nd Mzima P/L	4.6	5.8	● ● ● ●
310	Kilifi	U-24	Rare reservoir	9.6	12.2	● ● ● ● ● ●
310	Watamu	U-25	Sabaki pipeline	5.2	6.5	● ● ● ●
310	Malindi	U-26	Sabaki Pipeline & Rare Dam	64.4	81.1	● ● ● ●
310	Mambrui	U-135	Sabaki river	4.5	5.6	● ● ● ●
				88.3	111.2	
320	Kwale	U-27	Marere pipeline	4.8	6.0	● ● ● ● ● ●
320	Kinango	U-28	Marere pipeline	4.8	6.0	● ● ● ●
320	Msambweni	U-29	Boreholes + Mkurumuji river	45.5	57.3	● ● ● ● ● ● ● ●
320	Lungalunga	U-136	Umba river	2.4	3.0	● ● ● ●
				57.4	72.3	
330	Witu	U-30	Mkondo wa Cambi river	5.4	6.8	● ● ● ●
330	Lamu	U-31	P/L from Tana River + B/H	37.5	47.3	● ● ● ●
				42.9	54.1	
340	Mombasa	U-32	*2nd Mzima/Mwachi Dam, Pemba Dam*	441.6	556.4	● ● ● ● ● ● ● ●

Note: ● Construction

Appendix 2.1 Urban Water Supply Schemes -Proposed Implementation Programme (2/5)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
350	Taveta	U-137	Njoro Spring	7.2	9.1	
350	Voi	U-33	2nd Mzim pipeline	7.7	9.7	
350	Wundanyi	U-34	Sigaso/Manguri River	0.9	1.2	
				15.8	19.9	
360	Bura & Madogo	U-35	Tana River	0.9	1.2	
360	Hola	U-36	Tana River	6.8	8.6	
360	Garsen	U-37	Tana River	3.0	3.8	
				10.8	13.6	
410	Runyenjes	U-38	Ena river	2.3	2.9	
410	Siakago	U-39	Ena River	0.0	0.0	
410	Embu	U-40	Lower Kepingazi River + Upper Rupingazi River	8.8	11.2	
				11.2	14.1	
420	Isiolo	U-41	Boreholes + Spring	152.6	192.2	
420	Ol Doinyo Ng'iro	U-42	Ewaso Ngiro River	8.3	10.5	
420	Garbatula	U-138	Boreholes	40.4	50.9	
420	Merti	U-139	Ewaso Ngiro	5.5	6.9	
				206.7	260.5	
430	Kitui	U-43	Masinga Dam	9.4	11.9	
430	Mutomo	U-44	Sub-Surface dam on Tiva river	0.0	0.0	
430	Mwingi	U-45	Kiambere Dam	16.1	20.3	
				25.6	32.2	
440	Machakos	U-46	Athi River P/L	78.1	98.4	
440	Mitaboni	U-47	Kaathana River	20.3	25.6	
440	Athi River	U-48	Upper Athi Dam	19.7	24.8	
440	Uaani/Tawa	U-49	Tawa river	1.1	1.4	
440	Kangundo	U-50	Pipeline from Athi River	19.5	24.6	
440	Tala	U-140	Pipeline from Athi river	8.4	10.6	
440	Nunguni	U-51	Kyangonyo river	1.5	1.9	
440	Wote	U-141	Kaiti river + Nzuuni river	3.3	4.1	
440	Emali	U-52	Nol Tresh P/L	1.7	2.1	
440	Mtito Andei&Kibwezi	U-53	Pipeline from Athi river	19.5	24.6	
				173.1	218.2	
450	North Horr	U-142	Boreholes	22.0	27.7	
450	Kargi	U-54	Boreholes + Subsurface Dam	66.8	84.1	
450	Korr	U-143	Boreholes	56.8	71.6	
450	Marsabit	U-55	Boreholes +Small dams/Sub-surface dam/Spring	177.7	223.9	
450	Sololo	U-56	Boreholes	63.3	79.7	
450	Moyale	U-57	Boreholes + Small Dam	68.3	86.0	
				454.9	573.2	
460	Meru	U-58	Kathita river	43.5	54.9	
460	Nkubu	U-59	Thingithu River	4.6	5.8	
460	Chogoria	U-60	North Mara River	1.7	2.2	
460	Chuka	U-61	Tungu river	4.2	5.2	
460	Maua	U-62	Ura river	3.8	4.8	
				57.9	72.9	

Note: ● Construction

Appendix 2.1 Urban Water Supply Schemes -Proposed Implementation Programme (3/5)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
510	Mudo Gashe	U-63	Boreholes + Subsurface Dam	19.6	24.7	
510	Ijara	U-64	Boreholes + Small dam	10.7	13.5	
510	Kotile	U-65	Boreholes/Subsurface Dam/Tana	15.6	19.7	
510	Masalani	U-66	Tana River	2.4	3.0	
510	Garissa	U-67	Tana River	12.9	16.3	
				61.2	77.1	
520	Mandera	U-68	Daua River	3.1	4.0	
520	Elwak	U-69	Boreholes	75.5	95.1	
520	Rhamu	U-70	Daua River	2.9	3.6	
				81.5	102.7	
530	Wajir	U-71	Boreholes + Ewaso Ngiro River	172.3	217.1	
530	Buna	U-72	Boreholes(Lago Bor river)	94.8	119.4	
530	Bute	U-73	Boreholes + Small Dams	18.4	23.2	
				285.4	359.6	
610	Manga	U-74	Bunyunyu Dam	3.6	4.5	
610	Keroka	U-75	Bunyunyu Dam	5.2	6.6	
610	Nyamira + Kebirigo	U-144	Kuja river	11.6	14.6	
610	Kisii	U-76	Bunyunyu Dam	27.5	34.7	
610	Ogembo	U-77	Kuja river	1.7	2.2	
				49.7	62.6	
620	Maseno	U-78	Edzawa Dam	15.6	19.6	
620	Kisumu & + Kiboswa	U-79	Kibos dam	104.8	132.1	
620	Ahero	U-80	Nyando river	5.9	7.4	
620	Muhoroni	U-81	Nyando River	7.6	9.6	
				133.9	168.7	
630	Bondo	U-145	Yala river	4.2	5.3	
630	Yala	U-82	Yala river	2.5	3.2	
630	Siaya	U-83	Yala River	16.0	20.1	
630	Ukwala	U-84	Nzoia River	1.9	2.4	
				24.6	31.0	
640	Homa Bay	U-85	Lake Victoria	12.5	15.8	
640	Migori	U-86	Migori river	5.4	6.9	
640	Kehancha + Tarang'anya	U-146	Migori river	4.8	6.0	
640	Nyabikaye	U-147	Boreholes	27.0	34.1	
640	Oyugis	U-148	Isanta river(Awach Tende)	4.9	6.2	
640	Kendu Bay	U-87	Lake Victoria	3.0	3.7	
640	Awendo/Sare	U-149	Sare river	5.3	6.6	
				62.9	79.3	
710	Oloitokitok	U-88	Nol-Turesh Spring	7.0	8.9	
710	Ngong	U-89	Kerarapon Spring	14.6	18.4	
710	Kajiado	U-90	Kiserian P/L	19.7	24.9	
710	Namanga	U-91	Namanga Spring	5.7	7.1	
710	Magadi	U-92	Oloibortoto river	10.7	13.5	
				57.7	72.7	

Note: ● Construction

Appendix 2.1 Urban Water Supply Schemes -Proposed Implementation Programme (4/5)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8
720	Sotik	U-93	Kipsonoi River	4.5	5.6	
720	Kericho	U-94	Dimlitch Dam, Kimugang Dam	24.2	30.5	
720	Kipkelion	U-95	Nyando River	2.1	2.6	
720	Londiani	U-96	Londiani dam	58.6	73.9	
				89.4	112.7	
730	Nanyuki	U-97	Liki River	18.6	23.5	
730	Rumuruti	U-150	Rumuruti Dam + Borehole	9.2	11.6	
730	Nyahururu	U-98	Nyahururu dam + Borehole	23.1	29.0	
				50.9	64.1	
740	Gilgil	U-99	Turasha P/L & Malewa Dam	43.3	54.5	
740	Naivasha	U-100	Turasha P/L & Malewa Dam	49.0	61.7	
740	Njoro	U-101	Itare Dam	27.3	34.4	
740	Elburgon	U-102	Itare Dam	26.4	33.2	
740	Molo	U-103	Itare Dam	21.4	27.0	
740	Nakuru	U-104	Turasha P/L + Malewa Dam + Itare Dam	212.0	267.1	
				379.3	478.0	
750	Narok	U-105	Upper Narok Dam	30.9	39.0	
750	Nairagie Ngare	U-106	Nasampolai River	1.8	2.2	
750	Kilgoris	U-151	Poroko River	4.3	5.4	
750	Lolkorian	U-152	Migori River	3.7	4.7	
				40.7	51.3	
760	Kitale	U-107	Koitobos River	34.8	43.8	
760	Kiminini/Saboti+Spr.Kita	U-108	Kabewyan River	4.0	5.0	
760	Endebess/Kwanza	U-109	Koitobos River	2.4	3.0	
				41.1	51.8	
770	Moi's Bridge	U-153	Nzoia River	2.9	3.7	
770	Turbo	U-154	Sosiani River	5.5	6.9	
770	Eldoret	U-110	Moiben Dam + Nzoia River	135.9	171.2	
770	Burnt Forest	U-111	Kipkarren River	2.1	2.6	
				146.4	184.5	
810	Kabarnet	U-112	Kirandich Dam	27.3	34.4	
810	Maji Mazuri	U-113	Maji Mazuri River	5.2	6.5	
810	Eldama Ravine	U-114	Chemususu Dam	26.6	33.5	
810	Mogotio	U-115	Molo river /Chemususu Dam	6.0	7.6	
810	Marigat	U-155	Perkerra River	2.5	3.2	
				67.6	85.2	
820	Iten+Tumbach	U-116	Moiben Dam	12.7	16.0	
830	Nandi Hills	U-117	Mokong River	4.0	5.0	
830	Kapsabet+Baraton	U-118	Mokong River	11.8	14.9	
				15.8	19.9	
840	Maralal	U-119	Loikas/Yamo River	16.0	20.2	
840	Wamba	U-120	Boreholes	82.0	103.3	
840	Baragoi	U-121	Boreholes + Sub-surface dam	123.7	155.8	
				221.7	279.3	

Note: ● Construction

Appendix 2.1 Urban Water Supply Schemes -Proposed Implementation Programme (5/5)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
850	Lodwar	U-122	Boreholes & sub-surface dam	132.6	167.1	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
860	Kapenguria/Makutano	U-123	Kapenguria River	8.9	11.2	● ● ● ● ● ●
910	Mawalie + Malakisi	U-156	Malikisi river	3.3	4.2	● ● ● ●
910	Bungoma	U-124	Kuywa River	26.8	33.7	● ● ● ● ● ●
910	Kimilili	U-125	Kimilili River	7.3	9.2	● ● ● ● ● ●
910	Webuye	U-126	Nzoia River	20.0	25.2	● ● ● ● ● ●
910	Chaptais	U-157	Sasuri river	2.7	3.4	● ● ● ● ● ●
				60.1	75.8	
920	Busia	U-127	Sio river	14.1	17.7	● ● ● ● ● ●
920	Nambale	U-158	Sio river	2.2	2.8	● ● ● ● ● ●
				16.3	20.5	
930	Luanda	U-128	Edzawa river	1.8	2.2	● ● ● ● ● ●
930	Vihiga+Majengo	U-129	Edzawa River (Kimondi River)	5.1	6.4	● ● ● ● ● ●
930	Kaimosi	U-130	Galagoli river	0.0	0.0	
930	Khayega	U-131	Yala river	1.8	2.2	● ● ● ● ● ●
930	Kakamega	U-132	Isiukhu River, Mukulusi Dam	29.2	36.7	● ● ● ● ● ●
930	Butere	U-133	Viratsi River	2.2	2.8	● ● ● ● ● ●
930	Mumias	U-134	Nzoia River	13.5	17.0	● ● ● ● ● ●
				53.5	67.4	
					0.0	
				4,949.2	6,236.0	

Note: ● Construction

Appendix 2.2 Rural Water Supply Schemes (Stage 1 : Source Development) (1/4) - Proposed Implementation Programme

Code	District	Source Development Plan									Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Roof Catch	Small Dam	Subsur-face Dam	Sand Dam	Rock Catch	Existing Pipeline		Up to 2000	2001-2010
	Nairobi Province											0	0
110	Nairobi												
	- Quantity (m3/d)	0	0	0	0	0	0	0	0	0	0		
	- No. of Facilities	0	0	0	0	0	0	0	0	0	0		
	- Cost (mill.US$)	0	0	0	0	0	0	0	0	0	0		
	(mill.K£)	0	0	0	0	0	0	0	0	0	0		
	Central Province												
210	Kiambu											32.3	67.7
	- Quantity (m3/d)	39,127	2,726	83	135	2,169	0	0	30	16,360	60,630		
	- No. of Facilities	0	93	17	3,718	25	0	0	3	0	3,856		
	- Cost (mill.US$)	0	10.54	0.08	2.24	1.87	0	0	0.05	0	14.77		
	(mill.K£)	0	13.28	0.1	2.82	2.35	0	0	0.06	0	18.63		
220	Kirinyaga											35.5	64.5
	- Quantity (m3/d)	23,036	758	76	40	973	0	0	0	977	25,860		
	- No. of Facilities	0	17	16	889	12	0	0	0	0	934		
	- Cost (mill.US$)	0	2.64	0.08	0.53	0.58	0	0	0	0	3.82		
	(mill.K£)	0	3.33	0.09	0.67	0.73	0	0	0	0	4.82		
230	Muranga											32.8	67.2
	- Quantity (m3/d)	52,242	1,031	474	82	2,819	0	0	0	458	57,106		
	- No. of Facilities	0	28	96	2,828	24	0	0	0	0	2,976		
	- Cost (mill.US$)	0	3.91	0.47	1.68	0.99	0	0	0	0	7.05		
	(mill.K£)	0	4.93	0.59	2.12	1.25	0	0	0	0	8.89		
240	Nyandarua											39.1	60.9
	- Quantity (m3/d)	16,155	6,917	255	545	1,160	0	0	164	380	25,576		
	- No. of Facilities	0	250	27	11,081	20	0	0	13	0	11,391		
	- Cost (mill.US$)	0	28.17	0.12	6.65	1.09	0	0	0.23	0	36.26		
	(mill.K£)	0	35.53	0.16	8.39	1.37	0	0	0.28	0	45.73		
250	Nyeri											24.8	75.2
	- Quantity (m3/d)	34,264	163	58	0	1,473	0	0	0	51	36,009		
	- No. of Facilities	0	6	12	0	28	0	0	0	0	46		
	- Cost (mill.US$)	0	0.58	0.06	0	0.87	0	0	0	0	1.5		
	(mill.K£)	0	0.73	0.07	0	1.09	0	0	0	0	1.89		
	Sub-total											32.5	67.5
	- Quantity (m3/d)	164,824	11,595	946	802	8,594	0	0	194	18,226	205,181		
	- No. of Facilities	0	394	168	18,516	109	0	0	16	0	19,203		
	- Cost (mill.US$)	0	45.84	0.81	11.1	5.4	0	0	0.28	0	63.4		
	(mill.K£)	0	57.8	1.01	14	6.79	0	0	0.34	0	79.96		
	Coast Province												
310	Kilifi											38.9	61.1
	- Quantity (m3/d)	765	3,957	6,123	3,195	30	51	55	0	9,449	23,625		
	- No. of Facilities	0	104	1,219	83,244	6	11	11	0	0	84,595		
	- Cost (mill.US$)	0	13.77	5.91	50.23	0.04	0.14	0.11	0	0	70.21		
	(mill.K£)	0	17.37	7.46	63.34	0.05	0.18	0.14	0	0	88.53		
320	Kwale											38.7	61.3
	- Quantity (m3/d)	1,566	5,038	4,775	2,720	101	49	133	0	3,071	17,453		
	- No. of Facilities	0	119	944	59,067	10	13	21	0	0	60,174		
	- Cost (mill.US$)	0	18.14	4.38	35.34	0.14	0.14	0.27	0	0	58.41		
	(mill.K£)	0	22.88	5.52	44.57	0.17	0.17	0.35	0	0	73.65		
330	Lamu											34.4	65.6
	- Quantity (m3/d)	0	652	777	259	0	0	0	0	299	1,987		
	- No. of Facilities	0	22	160	8,053	0	0	0	0	0	8,235		
	- Cost (mill.US$)	0	2.19	0.76	5.13	0	0	0	0	0	8.08		
	(mill.K£)	0	2.76	0.96	6.47	0	0	0	0	0	10.19		
340	Mombasa												
	- Quantity (m3/d)	0	0	0	0	0	0	0	0	0	0		
	- No. of Facilities	0	0	0	0	0	0	0	0	0	0		
	- Cost (mill.US$)	0	0	0	0	0	0	0	0	0	0		
	(mill.K£)	0	0	0	0	0	0	0	0	0	0		
350	Taita Tabeta											34.4	65.6
	- Quantity (m3/d)	1,971	1,310	1,481	551	74	25	25	174	838	6,449		
	- No. of Facilities	0	35	296	17,923	5	5	5	24	0	18,293		
	- Cost (mill.US$)	0	4.5	1.44	10.79	0.1	0.07	0.05	0.42	0	17.37		
	(mill.K£)	0	5.67	1.81	13.61	0.13	0.09	0.06	0.53	0	21.91		
360	Tana River											38.3	61.7
	- Quantity (m3/d)	948	918	1,906	541	21	15	15	40	97	4,501		
	- No. of Facilities	0	32	328	18,534	9	4	4	8	0	18,919		
	- Cost (mill.US$)	0	3.31	1.52	11.14	0.03	0.04	0.03	0.14	0	16.21		
	(mill.K£)	0	4.18	1.92	14.05	0.03	0.05	0.04	0.18	0	20.44		
	Sub-total											38.1	61.9
	- Quantity (m3/d)	5,250	11,875	15,062	7,266	226	140	228	214	13,754	54,015		
	- No. of Facilities	0	312	2,947	186,821	30	33	41	32	0	190,216		
	- Cost (mill.US$)	0	41.91	14.01	112.63	0.31	0.39	0.46	0.56	0	170.28		
	(mill.K£)	0	52.86	17.67	142.04	0.38	0.49	0.59	0.71	0	214.72		

Appendix 2.2 Rural Water Supply Schemes (Stage 1 : Source Development) (2/4) - Proposed Implementation Programme

Code	District	Source Development Plan									Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Roof Catch	Small Dam	Subsur-face Dam	Sand Dam	Rock Catch	Existing Pipeline		Up to 2000	2001-2010
	Eastern Province												
410	Embu											37.0	63.0
	- Quantity (m3/d)	14,378	3,120	2,668	638	646	23	23	0	555	22,051		
	- No. of Facilities	0	83	537	18,126	18	6	6	0	0	18,776		
	- Cost (mill.US$)	0	11.19	2.64	10.96	0.51	0.06	0.05	0	0	25.41		
	(mill.K£)	0	14.11	3.33	13.82	0.64	0.08	0.06	0	0	32.04		
420	Isiolo											16.5	83.5
	- Quantity (m3/d)	301	545	673	155	2	8	25	61	12	1,782		
	- No. of Facilities	0	20	115	7,776	1	6	8	14	0	7,940		
	- Cost (mill.US$)	0	1.91	0.58	4.71	0	0.02	0.05	0.24	0	7.52		
	(mill.K£)	0	2.41	0.73	5.94	0	0.03	0.06	0.31	0	9.48		
430	Kitui											42.6	57.4
	- Quantity (m3/d)	846	5,506	10,782	3,029	104	325	292	539	2,622	24,045		
	- No. of Facilities	0	177	2,149	114,343	3	44	40	96	0	116,852		
	- Cost (mill.US$)	0	20.46	10.17	68.71	0.14	0.93	0.62	1.65	0	102.68		
	(mill.K£)	0	25.79	12.83	86.64	0.18	1.18	0.78	2.08	0	129.48		
440	Machakos											36.4	63.6
	- Quantity (m3/d)	12,589	10,501	19,777	3,746	1,234	496	332	50	5,344	54,069		
	- No. of Facilities	0	312	3,860	157,275	34	63	47	13	0	161,604		
	- Cost (mill.US$)	0	38.62	18.6	94.38	1.69	1.42	0.69	0.2	0	155.59		
	(mill.K£)	0	48.7	23.45	119.01	2.13	1.79	0.87	0.25	0	196.2		
450	Marsabit											28.7	71.3
	- Quantity (m3/d)	54	1,502	1,270	365	9	64	70	13	206	3,553		
	- No. of Facilities	0	55	238	18,436	3	11	11	3	0	18,757		
	- Cost (mill.US$)	0	6	1.14	11.05	0.01	0.18	0.14	0.05	0	18.58		
	(mill.K£)	0	7.56	1.44	13.94	0.02	0.23	0.18	0.06	0	23.43		
460	Meru											37.3	62.7
	- Quantity (m3/d)	34,311	16,661	4,596	2,199	1,882	174	47	21	2,147	62,038		
	- No. of Facilities	0	481	923	90,443	39	21	9	5	0	91,921		
	- Cost (mill.US$)	0	60.91	4.56	54.59	2.08	0.5	0.1	0.08	0	122.82		
	(mill.K£)	0	76.8	5.74	68.84	2.63	0.63	0.12	0.11	0	154.87		
	Sub-total											37.3	62.7
	- Quantity (m3/d)	62,479	37,835	39,766	10,132	3,877	1,090	789	684	10,886	167,538		
	- No. of Facilities	0	1,128	7,822	406,399	98	151	121	131	0	415,850		
	- Cost (mill.US$)	0	139.09	37.69	244.4	4.43	3.11	1.65	2.22	0	432.6		
	(mill.K£)	0	175.37	47.52	308.19	5.6	3.94	2.07	2.81	0	545.5		
	North Eastern Province												
510	Garissa											19.0	81.0
	- Quantity (m3/d)	35	847	1,770	353	0	20	9	0	2	3,036		
	- No. of Facilities	0	31	343	16,174	0	10	5	0	0	16,563		
	- Cost (mill.US$)	0	3.02	1.59	9.68	0	0.06	0.02	0	0	14.36		
	(mill.K£)	0	3.81	2.01	12.21	0	0.07	0.02	0	0	18.11		
520	Mandera											30.1	69.9
	- Quantity (m3/d)	191	606	2,159	303	0	51	99	0	1	3,410		
	- No. of Facilities	0	28	437	17,573	0	10	15	0	0	18,063		
	- Cost (mill.US$)	0	2.2	2.13	10.64	0	0.14	0.21	0	0	15.32		
	(mill.K£)	0	2.78	2.69	13.41	0	0.18	0.26	0	0	19.32		
530	Wajir											22.8	77.2
	- Quantity (m3/d)	0	744	1,899	318	0	28	75	0	0	3,064		
	- No. of Facilities	0	40	369	16,739	0	10	20	0	0	17,178		
	- Cost (mill.US$)	0	3.12	1.75	10.1	0	0.08	0.15	0	0	15.19		
	(mill.K£)	0	3.94	2.2	12.73	0	0.09	0.19	0	0	19.16		
	Sub-total											24.2	75.8
	- Quantity (m3/d)	226	2,197	5,828	974	0	99	183	0	3	9,510		
	- No. of Facilities	0	99	1,149	50,486	0	30	40	0	0	51,804		
	- Cost (mill.US$)	0	8.34	5.47	30.42	0	0.28	0.38	0	0	44.87		
	(mill.K£)	0	10.53	6.9	38.35	0	0.34	0.47	0	0	56.59		

Appendix 2.2 Rural Water Supply Schemes (Stage 1 : Source Development) (3/4) - Proposed Implementation Programme

Code	District	Source Development Plan									Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Roof Catch	Small Dam	Subsur-face Dam	Sand Dam	Rock Catch	Existing Pipeline		Up to 2000	2001-2010
	Nyanza Province												
610	Kisii											31.8	68.2
	- Quantity (m3/d)	65,503	5,329	7,590	0	3,203	0	0	0	4,373	85,998		
	- No. of Facilities	0	137	1,525	0	26	0	0	0	0	1,688		
	- Cost (mill.US$)	0	19.78	7.43	0	1.68	0	0	0	0	28.9		
	(mill.K£)	0	24.95	9.37	0	2.12	0	0	0	0	36.44		
620	Kisumu											23.7	76.3
	- Quantity (m3/d)	14,808	4,350	8,238	2,629	593	0	0	116	0	30,734		
	- No. of Facilities	0	115	1,084	34,621	15	0	0	7	0	35,842		
	- Cost (mill.US$)	0	16.23	5.31	20.93	0.32	0	0	0.12	0	42.91		
	(mill.K£)	0	20.47	6.69	26.39	0.41	0	0	0.16	0	54.11		
630	Siaya											33.1	66.9
	- Quantity (m3/d)	18,041	6,380	15,369	1,827	1,134	0	0	98	1,041	43,890		
	- No. of Facilities	0	220	2,983	30,004	27	0	0	7	0	33,241		
	- Cost (mill.US$)	0	23.95	14.32	18.11	0.46	0	0	0.12	0	56.96		
	(mill.K£)	0	30.2	18.06	22.83	0.58	0	0	0.16	0	71.83		
640	South Nyanza											33.3	66.7
	- Quantity (m3/d)	24,460	11,171	17,346	7,043	1,924	176	176	0	292	62,588		
	- No. of Facilities	0	342	3,050	92,293	51	27	27	0	0	95,790		
	- Cost (mill.US$)	0	42.01	15.24	55.54	1.05	0.5	0.36	0	0	114.69		
	(mill.K£)	0	52.97	19.22	70.03	1.32	0.63	0.46	0	0	144.62		
	Sub-total											31.3	68.7
	- Quantity (m3/d)	122,812	27,230	48,543	11,499	6,854	176	176	214	5,706	223,210		
	- No. of Facilities	0	814	8,642	156,918	119	27	27	14	0	166,561		
	- Cost (mill.US$)	0	101.97	42.3	94.58	3.51	0.5	0.36	0.24	0	243.46		
	(mill.K£)	0	128.59	53.34	119.25	4.43	0.63	0.46	0.32	0	307		
	Rift Valley Province												
710	Kajiado											42.4	57.6
	- Quantity (m3/d)	2,381	3,312	2,501	995	125	56	58	43	2,357	11,828		
	- No. of Facilities	0	123	431	38,954	9	16	15	9	0	39,557		
	- Cost (mill.US$)	0	12.99	2.15	23.39	0.17	0.16	0.12	0.14	0	39.1		
	(mill.K£)	0	16.39	2.71	29.49	0.21	0.2	0.15	0.17	0	49.31		
720	Kericho											35.5	64.5
	- Quantity (m3/d)	60,499	2,605	1,641	0	2,678	0	0	0	1,189	68,612		
	- No. of Facilities	0	68	324	0	27	0	0	0	0	419		
	- Cost (mill.US$)	0	9.93	1.44	0	1.42	0	0	0	0	12.78		
	(mill.K£)	0	12.52	1.81	0	1.79	0	0	0	0	16.12		
730	Laikipia											37.9	62.1
	- Quantity (m3/d)	2,819	4,626	722	822	373	63	46	8	0	9,479		
	- No. of Facilities	0	156	145	22,725	19	18	14	1	0	23,078		
	- Cost (mill.US$)	0	17.73	0.69	13.71	0.48	0.17	0.09	0.02	0	32.89		
	(mill.K£)	0	22.35	0.88	17.29	0.6	0.22	0.12	0.02	0	41.47		
740	Nakuru											28.7	71.3
	- Quantity (m3/d)	18,557	14,086	298	2,629	1,547	166	98	72	11,058	48,511		
	- No. of Facilities	0	409	31	63,406	21	24	19	8	0	63,918		
	- Cost (mill.US$)	0	52.93	0.15	38.18	1.26	0.48	0.2	0.13	0	93.33		
	(mill.K£)	0	66.75	0.19	48.15	1.59	0.6	0.26	0.17	0	117.69		
750	Narok											41.3	58.7
	- Quantity (m3/d)	13,271	6,889	6,433	3,911	900	86	79	0	279	31,848		
	- No. of Facilities	0	245	1,128	60,853	28	13	13	0	0	62,280		
	- Cost (mill.US$)	0	26.44	5.47	36.62	0.72	0.24	0.16	0	0	69.66		
	(mill.K£)	0	33.34	6.9	46.18	0.91	0.31	0.2	0	0	87.84		
760	Trans Nzoia											35.3	64.7
	- Quantity (m3/d)	19,082	456	1,015	0	781	0	0	35	410	21,779		
	- No. of Facilities	0	31	205	0	15	0	0	3	0	254		
	- Cost (mill.US$)	0	1.87	0.93	0	0.5	0	0	0.05	0	3.35		
	(mill.K£)	0	2.36	1.17	0	0.63	0	0	0.07	0	4.23		
770	Uasin Gishu											21.9	78.1
	- Quantity (m3/d)	16,940	129	101	0	693	0	0	18	1,838	19,719		
	- No. of Facilities	0	4	21	0	20	0	0	2	0	47		
	- Cost (mill.US$)	0	0.4	0.1	0	0.42	0	0	0.04	0	0.95		
	(mill.K£)	0	0.5	0.12	0	0.53	0	0	0.04	0	1.2		
810	Baringo											37.8	62.2
	- Quantity (m3/d)	4,246	3,907	1,588	1,081	209	50	37	7	1,759	12,884		
	- No. of Facilities	0	119	173	27,659	29	26	17	1	0	28,024		
	- Cost (mill.US$)	0	14.21	0.85	16.64	0.18	0.13	0.07	0.02	0	32.09		
	(mill.K£)	0	17.91	1.07	20.99	0.23	0.17	0.09	0.02	0	40.47		
820	Elgey Marakwet											38.9	61.1
	- Quantity (m3/d)	6,769	1,751	3,475	503	272	15	0	9	1,193	13,987		
	- No. of Facilities	0	68	628	12,995	23	3	0	1	0	13,718		
	- Cost (mill.US$)	0	6.74	3.11	7.78	0.22	0.04	0	0.02	0	17.91		
	(mill.K£)	0	8.5	3.92	9.81	0.27	0.05	0	0.02	0	22.58		

Appendix 2.2 Rural Water Supply Schemes (Stage 1 : Source Development) (4/4)
- Proposed Implementation Programme

Code	District	Source Development Plan									Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Roof Catch	Small Dam	Subsur-face Dam	Sand Dam	Rock Catch	Existing Pipeline		Up to 2000	2001-2010
830	Nandi											38.1	61.9
	- Quantity (m3/d)	31,085	481	1,679	0	1,130	0	0	0	375	34,750		
	- No. of Facilities	0	25	340	0	23	0	0	0	0	388		
	- Cost (mill.US$)	0	1.85	1.62	0	0.63	0	0	0	0	4.1		
	(mill.K£)	0	2.33	2.04	0	0.79	0	0	0	0	5.17		
840	Samburu											34.6	65.4
	- Quantity (m3/d)	240	1,174	1,607	529	15	17	18	375	6	3,981		
	- No. of Facilities	0	67	319	16,898	4	8	8	57	0	17,361		
	- Cost (mill.US$)	0	5.18	1.47	10.19	0.02	0.05	0.04	0.99	0	17.93		
	(mill.K£)	0	6.53	1.85	12.85	0.02	0.06	0.05	1.25	0	22.61		
850	Turkana											38.6	61.4
	- Quantity (m3/d)	289	1,871	2,956	690	3	102	127	16	6	6,060		
	- No. of Facilities	0	77	500	31,371	1	20	22	2	0	31,993		
	- Cost (mill.US$)	0	6.78	2.49	18.88	0	0.29	0.26	0.03	0	28.74		
	(mill.K£)	0	8.55	3.14	23.81	0.01	0.36	0.33	0.04	0	36.24		
860	West Pokot											40.2	59.8
	- Quantity (m3/d)	3,077	1,522	4,456	961	129	49	25	0	0	10,219		
	- No. of Facilities	0	79	882	28,553	14	11	9	0	0	29,548		
	- Cost (mill.US$)	0	6.46	4	17.18	0.12	0.14	0.05	0	0	27.95		
	(mill.K£)	0	8.15	5.05	21.66	0.15	0.17	0.06	0	0	35.24		
	Sub-total											35.8	64.2
	- Quantity (m3/d)	179,255	42,809	28,472	12,121	8,855	604	488	583	20,470	293,657		
	- No. of Facilities	0	1,471	5,127	303,414	233	139	117	84	0	310,585		
	- Cost (mill.US$)	0	164	24	183	6	2	1	1	0	381		
	(mill.K£)	0	206	31	230	8	2	1	2	0	480		
	Western Province												
910	Bungoma											36.4	63.6
	- Quantity (m3/d)	46,022	2,867	5,728	0	2,210	0	0	258	977	58,062		
	- No. of Facilities	0	75	1,150	0	18	0	0	15	0	1,258		
	- Cost (mill.US$)	0	9.71	5.68	0	1.19	0	0	0.25	0	16.83		
	(mill.K£)	0	12.24	7.16	0	1.51	0	0	0.31	0	21.22		
920	Busia											38.2	61.8
	- Quantity (m3/d)	18,134	4,956	10,319	1,082	899	62	53	0	1,420	36,925		
	- No. of Facilities	0	161	1,991	16,717	16	9	8	0	0	18,902		
	- Cost (mill.US$)	0	19.04	9.92	10.1	0.51	0.18	0.11	0	0	39.86		
	(mill.K£)	0	24.01	12.51	12.74	0.65	0.22	0.14	0	0	50.27		
930	Kakamega											34.6	65.4
	- Quantity (m3/d)	96,625	3,166	7,478	0	3,462	0	0	0	891	111,622		
	- No. of Facilities	0	122	1,514	0	41	0	0	0	0	1,677		
	- Cost (mill.US$)	0	11.24	9.42	0	1.47	0	0	0	0	22.12		
	(mill.K£)	0	14.17	11.87	0	1.85	0	0	0	0	27.89		
	Sub-total											35.8	64.2
	- Quantity (m3/d)	160,781	10,989	23,525	1,082	6,571	62	53	258	3,288	206,609		
	- No. of Facilities	0	358	4,655	16,717	75	9	8	15	0	21,837		
	- Cost (mill.US$)	0	39.99	25.02	10.1	3.17	0.18	0.11	0.25	0	78.81		
	(mill.K£)	0	50.42	31.54	12.74	4.01	0.22	0.14	0.31	0	99.38		
	Total											34.7	65.3
	- Quantity (m3/d)	695,627	144,530	162,142	43,876	34,977	2,171	1,917	2,147	72,333	1,159,720		
	- No. of Facilities	0	4,576	30,510	1,139,271	664	389	354	292	0	1,176,056		
	- Cost (mill.US$)	0	540.65	149.77	685.8	22.96	6.16	3.95	4.99	0	1414.2		
	(mill.K£)	0	681.75	188.83	864.8	28.94	7.76	4.99	6.29	0	1783.32		

Appendix 2.3 Rural Water Supply Schemes
(Stage2 : Provision of Piped Water Supply System)
-Proposed Implementation Programme

Code	District	Executing Agency	Cost (million)		Implementation Programme (%)	
			US$	K£	Up to 2000	2001 - 2010
110	Nairobi	MOWD	-	-	-	-
210	Kiambu	MOWD	65.7	82.8	-	100
220	Kirinyaga	MOWD	28.1	35.4	-	100
230	Muranga	MOWD	62.1	78.2	-	100
240	Nyandarua	MOWD	26.7	33.6	-	100
250	Nyeri	MOWD	39.3	49.5	-	100
310	Kilifi	MOWD	24.1	30.3	-	100
320	Kwale	MOWD	17.4	21.9	-	100
330	Lamu	MOWD	1.9	2.4	-	100
340	Mombasa	MOWD	-	-	-	-
350	Taita Tabeta	MOWD	6.6	8.3	-	100
360	Tana River	MOWD	4.4	5.6	-	100
410	Embu	MOWD	23.1	29.1	-	100
420	Isiolo	MOWD	1.7	2.2	-	100
430	Kitui	MOWD	23.5	29.6	-	100
440	Machakos	MOWD	53.8	67.8	-	100
450	Marsabit	MOWD	3.4	4.3	-	100
460	Meru	MOWD	64.1	80.7	-	100
510	Garissa	MOWD	2.9	3.6	-	100
520	Mandera	MOWD	3.3	4.1	-	100
530	Wajir	MOWD	2.9	3.6	-	100
610	Kisii	MOWD	91.6	115.5	-	100
620	Kisumu	MOWD	31.4	39.5	-	100
630	Siaya	MOWD	44.2	55.7	-	100
640	South Nyanza	MOWD	63.4	79.9	-	100
710	Kajiado	MOWD	11.9	15.0	-	100
720	Kericho	MOWD	74.2	93.4	-	100
730	Laikipia	MOWD	9.4	11.9	-	100
740	Nakuru	MOWD	50.5	63.6	-	100
750	Narok	MOWD	32.5	40.9	-	100
760	Trans Nzoia	MOWD	23.5	29.6	-	100
770	Uasin Gishu	MOWD	21.5	27.1	-	100
810	Baringo	MOWD	13.1	16.5	-	100
820	Elgey Marakwet	MOWD	14.4	18.1	-	100
830	Nandi	MOWD	37.6	47.3	-	100
840	Samburu	MOWD	3.9	4.9	-	100
850	Turkana	MOWD	5.8	7.3	-	100
860	West Pokot	MOWD	10.1	12.8	-	100
910	Bungoma	MOWD	61.9	78.0	-	100
920	Busia	MOWD	37.7	47.5	-	100
930	Kakamega	MOWD	120.0	151.2	-	100
	Total		1,213.2	1,528.6	-	100

Appendix 2.4 Sewerage Development
-Proposed Implementation Programme (1/5)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
110	Nairobi	U-1	Thika Dam, Ndarugu, Ruiru-A, Chania-B	214.81	270.66	● ● ● ● ● ● ● ● ● ●
210	Karuri	U-2	Kiambaa Dam (Rui Ruaka R.)	1.59	2.00	● ● ● ●
210	Kiambu	U-3	Kiambaa Dam (Rui Ruaka r.)	0.57	0.72	● ● ● ● ● ● ● ●
210	Gatundu & Ngenda	U-4	Thiririka River	0.07	0.09	● ● ● ●
210	Limuru	U-5	Chania P/L	0.16	0.20	● ● ● ● ● ●
210	Ruiru	U-6	Ruiru River	1.39	1.75	● ● ● ● ● ●
210	Thika	U-7	Chania River (Lower)	14.13	17.80	● ● ● ● ● ●
210	Githunguri	U-8	Ruiru river	0.49	0.61	● ● ● ● ● ●
210	Kikuyu	U-9	Kikuyu Dam	0.77	0.98	● ● ● ● ● ●
				19.16	24.15	
220	Wanguru	U-10	Thiba River	0.05	0.07	● ● ● ●
220	Sagana	U-11	Ragati River	0.38	0.48	● ● ● ● ● ●
220	Kerugoya	U-12	Kiringa River	1.17	1.48	● ● ● ● ● ●
220	Kutus	U-13	Thiba River	0.81	1.02	● ● ● ● ● ●
				2.42	3.04	
230	Kandara	U-14	Thika River	0.06	0.08	● ● ● ● ● ●
230	Maragua	U-15	Githanji river	3.08	3.88	● ● ● ● ● ●
230	Kangema	U-16	Mathioya River	0.13	0.17	● ● ● ● ● ●
230	Murang'a	U-17	Maragua river	2.38	3.00	● ● ● ● ● ●
230	Makuyu	U-18	Motoho river	0.57	0.72	● ● ● ● ● ●
				6.22	7.84	
240	Ol Kalou	U-19	Malewa River	1.31	1.65	● ● ● ● ● ●
250	Karatina	U-20	Ragati River	0.71	0.90	● ● ● ● ● ●
250	Othaya	U-21	Tuthi river	0.63	0.80	● ● ● ● ● ●
250	Nyeri	U-22	Chania River	23.74	29.91	● ● ● ● ● ●
				25.09	31.61	
310	Mariakani	U-23	2nd Mzima P/L	1.13	1.43	● ● ● ● ● ●
310	Kilifi	U-24	Rare reservoir	1.86	2.34	● ● ● ● ● ●
310	Watamu	U-25	Sabaki pipeline	0.32	0.40	● ● ● ● ● ●
310	Malindi	U-26	Sabaki Pipeline & Rare Dam	10.56	13.30	● ● ● ● ● ●
310	Mambrui	U-135	Sabaki river	0.49	0.62	● ● ● ● ● ●
				14.35	18.08	
320	Kwale	U-27	Marere pipeline	0.53	0.66	● ● ● ● ● ●
320	Kinango	U-28	Marere pipeline	0.20	0.25	● ● ● ● ● ●
320	Msambweni	U-29	Borcholes + Mkurumuji river	1.19	1.50	● ● ● ● ● ● ● ● ● ●
320	Lungalunga	U-136	Umba river	0.28	0.36	● ● ● ● ● ●
				2.20	2.77	
330	Witu	U-30	Mkondo wa Cambi river	0.44	0.56	● ● ● ● ● ●
330	Lamu	U-31	P/L from Tana River + B/H	1.19	1.50	● ● ● ● ● ●
				1.63	2.05	
340	Mombasa	U-32	2nd Mzima/Mwachi Dam, Pemba Dam	57.41	72.33	● ● ● ● ● ● ● ● ● ●

Note: ● Construction

Appendix 2.4 Sewerage Development -Proposed Implementation Programme (2/5)

District Code	Urban Name		Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
350	Taveta	U-137	Njoro Spring	1.00	1.26	
350	Voi	U-33	2nd Mzim pipeline	1.24	1.57	
350	Wundanyi	U-34	Sigaso/Maguti River	0.28	0.35	
				2.53	3.18	
360	Bura & Madogo	U-35	Tana River	0.10	0.13	
360	Hola	U-36	Tana River	1.22	1.54	
360	Garsen	U-37	Tana River	0.41	0.52	
				1.74	2.19	
410	Runyenjes	U-38	Ena river	0.21	0.27	
410	Siakago	U-39	Ena River	0.03	0.03	
410	Embu	U-40	Lower Kapingazi River + Upper Rupingazi River	2.47	3.12	
				2.71	3.42	
420	Isiolo	U-41	Boreholes + Spring	3.41	4.29	
420	Ol Doinyo Ng'iro	U-42	Ewaso Ngiro River	0.70	0.89	
420	Garbatula	U-138	Boreholes	0.31	0.38	
420	Merti	U-139	Ewaso Ngiro	0.91	1.14	
				5.32	6.71	
430	Kitui	U-43	Masinga Dam	1.40	1.77	
430	Mutomo	U-44	Sub-Surface dam on Tiva river	0.06	0.07	
430	Mwingi	U-45	Kiambere Dam	1.10	1.39	
				2.56	3.22	
440	Machakos	U-46	Athi River P/L	22.81	28.74	
440	Mitaboni	U-47	Kaathana River	7.64	9.63	
440	Athi River	U-48	Upper Athi Dam	3.31	4.17	
440	Uaani/Tawa	U-49	Tawa river	0.02	0.03	
440	Kangundo	U-50	Pipeline from Athi River	1.50	1.89	
440	Tala	U-140	Pipeline from Athi river	0.22	0.28	
440	Nunguni	U-51	Kyangonyo river	0.03	0.04	
440	Wote	U-141	Kaiti river + Nzuuni river	0.31	0.39	
440	Emali	U-52	Nol Tresh P/L	0.03	0.03	
440	Mtito Andei&Kibwezi	U-53	Pipeline from Athi river	0.47	0.59	
				36.35	45.80	
450	North Horr	U-142	Boreholes	0.25	0.31	
450	Kargi	U-54	Boreholes + Subsurface Dam	0.65	0.81	
450	Korr	U-143	Boreholes	0.67	0.84	
450	Marsabit	U-55	Boreholes +Small dams/Sub-surface dam/Spring	1.65	2.07	
450	Sololo	U-56	Boreholes	0.56	0.70	
450	Moyale	U-57	Boreholes + Small Dam	1.02	1.28	
				4.78	6.03	
460	Meru	U-58	Kathita river	20.54	25.88	
460	Nkubu	U-59	Thingithu River	0.70	0.88	
460	Chogoria	U-60	North Mara River	0.10	0.13	
460	Chuka	U-61	Tungu river	0.43	0.54	
460	Maua	U-62	Ura river	0.43	0.54	
				22.20	27.97	

Note: ● Construction

Appendix 2.4 Sewerage Development
-Proposed Implementation Programme (3/5)

District Code	Urban Name		Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
510	Mudo Gashe	U-63	Boreholes + Subsurface Dam	0.24	0.31	
510	Ijara	U-64	Boreholes + Small dam	0.12	0.15	
510	Kotile	U-65	Boreholes/Subsurface Dam/Tana	0.12	0.15	
510	Masalani	U-66	Tana River	0.12	0.15	
510	Garissa	U-67	Tana River	8.08	10.19	
				8.68	10.93	
520	Mandera	U-68	Daua River	0.66	0.83	
520	Elwak	U-69	Borehores	0.89	1.12	
520	Rhamu	U-70	Daua River	0.37	0.47	
				1.93	2.43	
530	Wajir	U-71	Boreholes + Ewaso Ngiro River	2.65	3.34	
530	Buna	U-72	Borcholes(Lago Bor river)	0.67	0.84	
530	Bute	U-73	Borcholes + Small Dams	0.22	0.28	
				3.54	4.46	
610	Manga	U-74	Bunyunyu Dam	0.07	0.09	
610	Keroka	U-75	Bunyunyu Dam	0.21	0.27	
610	Nyamira + Kebirigo	U-144	Kuja river	1.12	1.41	
610	Kisii	U-76	Bunyunyu Dam	9.24	11.64	
610	Ogembo	U-77	Kuja river	0.09	0.12	
				10.73	13.52	
620	Maseno	U-78	Edzawa Dam	1.74	2.19	
620	Kisumu & + Kiboswa	U-79	Kibos dam	37.19	46.85	
620	Ahero	U-80	Nyando river	0.93	1.17	
620	Muhoroni	U-81	Nyando River	0.92	1.16	
				40.78	51.38	
630	Bondo	U-145	Yala river	0.30	0.38	
630	Yala	U-82	Yala river	0.23	0.28	
630	Siaya	U-83	Yala River	1.96	2.47	
630	Ukwala	U-84	Nzoia River	0.09	0.12	
				2.57	3.24	
640	Homa Bay	U-85	Lake Victoria	2.50	3.16	
640	Migori	U-86	Migori river	0.83	1.04	
640	Kehancha + Tarang'anya	U-146	Migori river	0.34	0.43	
640	Nyabikaye	U-147	Boreholes	0.32	0.40	
640	Oyugis	U-148	Isanta river(Awach Tende)	0.34	0.43	
640	Kendu Bay	U-87	Lake Victoria	0.30	0.38	
640	Awendo/Sare	U-149	Sare river	0.38	0.48	
				5.01	6.31	
710	Oloitokitok	U-88	Nol-Turesh Spring	0.87	1.10	
710	Ngong	U-89	Kerarapon Spring	2.86	3.61	
710	Kajiado	U-90	Kiscrian P/L	1.21	1.53	
710	Namanga	U-91	Namanga Spring	0.97	1.23	
710	Magadi	U-92	Oloibortoto river	0.57	0.72	
				6.49	8.18	

Note: ● Construction

Appendix 2.4 Sewerage Development
-Proposed Implementation Programme (4/5)

District Code	Urban Name		Future Raw Water Source	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
720	Sotik	U-93	Kipsonoi river	0.58	0.73	
720	Kericho	U-94	Dimlitch Dam, Kimugung Dam	9.72	12.24	
720	Kipkelion	U-95	Nyando river	0.27	0.34	
720	Londiani	U-96	Londiani dam	0.39	0.50	
				10.96	13.81	
730	Nanyuki	U-97	Liki river	7.94	10.01	
730	Rumuruti	U-150	Rumuruti Dam + Borehole	0.29	0.37	
730	Nyahururu	U-98	Nyahururu dam + Borehole	2.11	2.66	
				10.35	13.04	
740	Gilgil	U-99	Turasha P/L & Malewa Dam	2.55	3.21	
740	Naivasha	U-100	Turasha P/L & Malewa Dam	12.93	16.29	
740	Njoro	U-101	Itare Dam	1.60	2.02	
740	Elburgon	U-102	Itare Dam	2.17	2.74	
740	Molo	U-103	Itare Dam	1.92	2.41	
740	Nakuru	U-104	Turasha P/L + Malewa Dam + Itare Dam	55.47	69.89	
				76.65	96.57	
750	Narok	U-105	Upper Narok Dam	3.00	3.78	
750	Nairagie Ngare	U-106	Nasampolai river	0.09	0.11	
750	Kilgoris	U-151	Poroko river	0.58	0.73	
750	Lolkorian	U-152	Migori river	0.30	0.38	
				3.97	5.01	
760	Kitale	U-107	Koitobos river	16.08	20.26	
760	Kiminini/Saboti+Spr.Kita	U-108	Kabewyan river	0.15	0.18	
760	Endebess/Kwanza	U-109	Koitobos river	0.23	0.29	
				16.46	20.74	
770	Moi's Bridge	U-153	Nzoia river	0.35	0.45	
770	Turbo	U-154	Sosiani river	0.49	0.62	
770	Eldoret	U-110	Moiben Dam + Nzoia river	31.47	39.65	
770	Burnt Forest	U-111	Kipkaren river	0.25	0.32	
				32.56	41.03	
810	Kabarnet	U-112	Kirandich Dam	1.20	1.52	
810	Maji Mazuri	U-113	Maji Mazuri river	0.67	0.84	
810	Eldama Ravine	U-114	Chemususu Dam	0.72	0.91	
810	Mogotio	U-115	Molo river /Chemususu Dam	0.37	0.47	
810	Marigat	U-155	Perkerra river	0.30	0.38	
				3.27	4.11	
820	Iten+Tambach	U-116	Moiben Dam	0.70	0.88	
830	Nandi Hills	U-117	Mokong River	0.15	0.18	
830	Kapsabet+Baraton	U-118	Mokong river	1.93	2.44	
				2.08	2.62	
840	Maralal	U-119	Loikas/Yamo river	2.66	3.35	
840	Wamba	U-120	Boreholes	0.57	0.71	
840	Baragoi	U-121	Boreholes + Sub-surface dam	0.49	0.62	
				3.71	4.68	

Note: ● Construction

Appendix 2.4 Sewerage Development
-Proposed Implementation Programme (5/5)

District Code	Urban Name		Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
850	Lodwar	U-122	Boreholes & sub-surface dam	1.34	1.69	● ●
860	Kapenguria/Makutano	U-123	Kapenguria River	1.65	2.08	● ● ● ● ● ●
910	Mawalie + Malakisi	U-156	Malikisi river	0.37	0.47	● ● ● ●
910	Bungoma	U-124	Kuywa River	9.50	11.97	● ● ● ● ● ● ● ●
910	Kimilili	U-125	Kimilili River	1.08	1.37	● ● ● ● ● ●
910	Webuye	U-126	Nzoia River	8.60	10.84	● ● ● ● ● ●
910	Chaptais	U-157	Sasuri river	0.35	0.44	● ● ● ● ● ●
				19.90	25.08	
920	Busia	U-127	Sio river	2.39	3.01	● ● ● ● ● ●
920	Nambale	U-158	Sio river	0.28	0.35	● ● ● ● ● ●
				2.67	3.36	
930	Luanda	U-128	Edzawa river	0.44	0.55	● ● ● ● ● ●
930	Vihiga+Majengo	U-129	Edzawa River (Kimondi River)	0.50	0.63	● ● ● ● ● ●
930	Kaimosi	U-130	Galagoli river	0.04	0.06	● ● ● ● ● ●
930	Khayega	U-131	Yala river	0.05	0.06	● ● ● ● ● ●
930	Kakamega	U-132	Isiukhu River, Mukulusi Dam	12.30	15.49	● ● ● ● ● ●
930	Butere	U-133	Viratsi River	0.26	0.32	● ● ● ● ● ●
930	Mumias	U-134	Nzoia River	2.57	3.24	● ● ● ● ● ●
				16.15	20.35	
				704.95	888.24	

Note: ● Construction

Appendix 2.5 Major Irrigation Projects - Proposed Implementation Programme

District Code	Project	Development Area (ha)	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
220	Mwea extension	2,900	NIB	63.7	80.3	★ ★ ● ● ● ● ● ● ● ●
310	Sabaki Extension	3,000	TARDA	19.8	24.9	☆ ☆ ★ ★ ● ● ● ● ●
350	Taita Taveta	3,780	TARDA	11.9	15.0	☆ ☆ ★ ★ ● ● ● ● ● ●
360	Tana Delta	12,000	TARDA	141.4	178.2	● ● ● ● ●
410	Lower Rupingazi	1,800	TARDA	6.0	7.6	☆ ☆ ★ ★ ● ● ● ● ●
440	Kanzalu	4,055	TARDA	37.9	47.8	☆ ☆ ★ ★ ● ● ● ● ●
440	Kibwezi extension	13,200	TARDA	227.1	286.1	☆ ☆ ★ ★ ● ● ● ● ●
460	Kunati	1,050	TARDA	3.5	4.4	☆ ☆ ★ ★ ● ● ● ●
460	Thanantu	2,520	TARDA	17.3	21.8	☆ ☆ ★ ★ ● ● ● ● ●
620	Kano Plain	25,640	LBDA	232.5	293.0	★ ★ ● ● ● ● ● ● ● ● ● ● ● ●
630	Lower Nzoia/ Bunyala Extension	10,480	NIB	12.4	15.6	☆ ☆ ★ ★ ● ● ● ●
640	Lower Kuja	1,900	LBDA	5.6	7.1	☆ ☆ ★ ★ ● ● ● ● ● ● ● ● ●
640	Kimira	2,000	LBDA	18.1	22.8	☆ ☆ ★ ★ ● ● ● ● ●
710	Lower Ewaso N'giro	10,000	ENSDA	57.0	71.8	☆ ☆ ★ ★ ● ● ● ● ●
820	Arror	1,340	KVDA	6.3	7.9	☆ ☆ ★ ★ ● ● ● ●
850	Turkwel	600	KVDA	1.8	2.3	☆ ☆ ★ ★ ● ● ● ● ●
910	Upper Nzoia	7,550	LBDA	88.0	110.9	☆ ☆ ★ ★ ● ● ● ● ● ●
920	Yala Swamp	7,540	LBDA	65.0	81.9	☆ ★ ★ ● ● ● ● ● ● ● ●
	Total	111,355		1015.3	1279.3	

Note:
- ☆ Study
- ★ Design
- ● Construction

- Tana Delta : Commenced in 1992
- Lower Ewaso N'giro and Yala Swamp : Continue 2011 onward

Appendix 2.6 Small Scale Irrigation Schemes -Proposed Implementation Programme

District Code	Project	Area of Development	No. of Scheme	Executing Agency	Cost (million)		Implementaion of development area (ha)	
					US$	K£	up to 2000	2001-2010
		(ha)	(Nos)					
	Nairobi Province							
110	Nairobi	-	-	-				
	Central Province							
210	Kiambu	115	7	MOA	0.19	0.24	57.5	57.5
220	Kirinyaga	30	2	MOA	0.05	0.06	15	15
230	Muranga	500	9	MOA	0.81	1.03	250	250
240	Nyandarua	N.A	1	MOA				
250	Nyeri	77	6	MOA	0.13	0.16	38.5	38.5
	Coast Province							
310	Kilifi	330	9	MOA	0.54	0.68	165	165
320	Kwale	498	6	MOA	0.81	1.02	249	249
330	Lamu	N.A	5	MOA				
340	Mombasa	-	-	-				
350	Taita Taveta	360	4	MOA	0.59	0.74	180	180
360	Tana River	540	11	MOA	0.88	1.11	270	270
	Eastern Province							
410	Embu	1,509	22	MOA	2.46	3.09	754.5	754.5
420	Isiolo	50	1	MOA	0.08	0.10	25	25
430	Kitui	155	9	MOA	0.25	0.32	77.5	77.5
440	Machakos/Makueni	250	4	MOA	0.41	0.51	125	125
450	Marsabit	-	-	-				
460	Meru	1,000	10	MOA	1.63	2.05	500	500
	Northeastern Province							
510	Garissa	46	3	MOA	0.07	0.09	23	23
520	Mandera	-	-	-				
530	Wajir	-	-	-				
	Nyanza Province							
610	Kisii/Nyamira	-	-	-				
620	Kisumu	N.A	2	MOA				
630	Siaya	N.A	3	MOA				
640	South Nyanza	200	1	MOA	0.33	0.41	100	100
	Rift Valley Province							
710	Kajiado	N.A	2	MOA				
720	Kericho	-	-	-				
730	Laikipia	407	4	MOA	0.66	0.83	203.5	203.5
740	Nakuru	-	-	-				
750	Narok	-	-	-				
760	Trans Nzoia	-	-	-				
770	Uasin Gishu	335	2	MOA	0.55	0.69	167.5	167.5
810	Baringo	31	5	MOA	0.05	0.06	15.5	15.5
820	Elgeyo Marakwet	-	-	-				
830	Nandi	-	-	-				
840	Samburu	20	1	MOA	0.03	0.04	10	10
850	Turkana	N.A	1	MOA				
860	West Pokot	48	4	MOA	0.08	0.10	24	24
	Western Province							
910	Bungoma	155	2	MOA	0.25	0.32	77.5	77.5
920	Busia	353	5	MOA	0.57	0.72	176.5	176.5
930	Kakamega/Vihiga	3	1	MOA	0.00	0.01	1.25	1.25
	Total	7,012	142		11.41	14.37	3,506	3,506

Notes : (1) Schemes proposed above are based on information as of September 1991.
In actual implementation, due revision / addition should be made to incorporate the up-to-date schemes.
(2) N.A. : No information available, - : No schemes listed (as of Sept.1991)

Appendix 2.7 Livestock Water Development (1/4)
- Proposed Implementation Programme

Code	District	Source Development Plan							Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Small Dam	Subsur-face Dam	Sand Dam	Existing Pipeline		Up to 2000	2001-2010
	Nairobi Province									0	0
110	Nairobi										
	- Quantity (m3/d)	0	0	0	0	0	0	0	0		
	- No. of Facilities	0	0	0	0	0	0	0	0		
	- Cost (mill.US$)	0	0	0	0	0	0	0	0		
	(mill.K£)	0	0	0	0	0	0	0	0		
	Central Province										
210	Kiambu									36.3	63.7
	- Quantity (m3/d)	5,949	286	8	333	0	0	21	6,597		
	- No. of Facilities	0	13	2	28	0	0	0	43		
	- Cost (mill.US$)	0	1.07	0.01	0.3	0	0	0	1.37		
	(mill.K£)	0	1.35	0.01	0.37	0	0	0	1.73		
220	Kirinyaga									42.6	57.4
	- Quantity (m3/d)	3,779	58	14	154	0	0	0	4,005		
	- No. of Facilities	0	2	3	12	0	0	0	17		
	- Cost (mill.US$)	0	0.22	0.01	0.08	0	0	0	0.32		
	(mill.K£)	0	0.28	0.02	0.11	0	0	0	0.4		
230	Muranga									36.4	63.6
	- Quantity (m3/d)	5,734	19	79	305	0	0	0	6,137		
	- No. of Facilities	0	1	16	23	0	0	0	40		
	- Cost (mill.US$)	0	0.07	0.08	0.11	0	0	0	0.26		
	(mill.K£)	0	0.09	0.1	0.14	0	0	0	0.33		
240	Nyandarua									49.1	50.9
	- Quantity (m3/d)	10,186	1,855	49	881	0	0	51	13,022		
	- No. of Facilities	0	71	7	21	0	0	0	99		
	- Cost (mill.US$)	0	7.43	0.02	0.86	0	0	0	8.31		
	(mill.K£)	0	9.36	0.03	1.09	0	0	0	10.48		
250	Nyeri									24.7	75.3
	- Quantity (m3/d)	4,969	0	0	200	0	0	0	5,169		
	- No. of Facilities	0	0	0	27	0	0	0	27		
	- Cost (mill.US$)	0	0	0	0.11	0	0	0	0.11		
	(mill.K£)	0	0	0	0.14	0	0	0	0.14		
	Sub-total									40.6	59.4
	- Quantity (m3/d)	30,617	2,218	150	1,873	0	0	72	34,930		
	- No. of Facilities	0	87	28	111	0	0	0	226		
	- Cost (mill.US$)	0	8.79	0.12	1.46	0	0	0	10.37		
	(mill.K£)	0	11.08	0.16	1.85	0	0	0	13.08		
	Coast Province										
310	Kilifi									42.8	57.2
	- Quantity (m3/d)	237	1,255	2,371	8	8	7	39	3,925		
	- No. of Facilities	0	47	482	4	5	5	0	543		
	- Cost (mill.US$)	0	4.39	2.26	0.01	0.02	0.01	0	6.7		
	(mill.K£)	0	5.54	2.85	0.01	0.03	0.02	0	8.44		
320	Kwale									46.8	53.2
	- Quantity (m3/d)	921	2,639	2,529	65	17	49	75	6,295		
	- No. of Facilities	0	68	504	12	10	15	0	609		
	- Cost (mill.US$)	0	9.57	2.29	0.08	0.04	0.1	0	12.07		
	(mill.K£)	0	12.06	2.88	0.1	0.05	0.12	0	15.23		
330	Lamu									19.7	80.3
	- Quantity (m3/d)	0	1,203	1,442	0	0	0	0	2,645		
	- No. of Facilities	0	32	293	0	0	0	0	325		
	- Cost (mill.US$)	0	4.04	1.41	0	0	0	0	5.44		
	(mill.K£)	0	5.09	1.77	0	0	0	0	6.86		
340	Mombasa										
	- Quantity (m3/d)	0	0	0	0	0	0	0	0		
	- No. of Facilities	0	0	0	0	0	0	0	0		
	- Cost (mill.US$)	0	0	0	0	0	0	0	0		
	(mill.K£)	0	0	0	0	0	0	0	0		
350	Taita Tabeta									35.2	64.8
	- Quantity (m3/d)	1,876	1,167	1,468	96	22	22	87	4,738		
	- No. of Facilities	0	33	295	7	9	9	0	353		
	- Cost (mill.US$)	0	4.06	1.43	0.13	0.06	0.04	0	5.72		
	(mill.K£)	0	5.11	1.8	0.17	0.08	0.06	0	7.22		
360	Tana River									43.2	56.8
	- Quantity (m3/d)	2,100	1,852	3,779	65	47	47	30	7,920		
	- No. of Facilities	0	56	649	10	9	9	0	733		
	- Cost (mill.US$)	0	6.64	3.02	0.09	0.13	0.1	0	9.98		
	(mill.K£)	0	8.37	3.81	0.11	0.17	0.12	0	12.58		
	Sub-total									36.6	63.4
	- Quantity (m3/d)	5,134	8,116	11,589	234	94	125	231	25,523		
	- No. of Facilities	0	236	2,223	33	33	38	0	2,563		
	- Cost (mill.US$)	0	28.7	10.41	0.31	0.25	0.25	0	39.91		
	(mill.K£)	0	36.17	13.11	0.39	0.33	0.32	0	50.33		

Appendix 2.7 Livestock Water Development (2/4)
- Proposed Implementation Programme

Code	District	Source Development Plan							Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Small Dam	Subsur-face Dam	Sand Dam	Existing Pipeline		Up to 2000	2001-2010
	Eastern Province										
										44.8	55.2
410	Embu										
	- Quantity (m3/d)	2,176	596	710	102	3	3	12	3,602		
	- No. of Facilities	0	20	146	17	3	3	0	189		
	- Cost (mill.US$)	0	2.13	0.7	0.08	0.01	0.01	0	2.92		
	(mill.K£)	0	2.68	0.88	0.1	0.01	0.01	0	3.68		
										21.4	78.6
420	Isiolo										
	- Quantity (m3/d)	3,736	5,949	7,507	46	113	332	10	17,693		
	- No. of Facilities	0	182	1,241	2	14	37	0	1,476		
	- Cost (mill.US$)	0	21.01	6.47	0.07	0.33	0.7	0	28.57		
	(mill.K£)	0	26.49	8.15	0.08	0.41	0.89	0	36.03		
										49.5	50.5
430	Kitui										
	- Quantity (m3/d)	542	3,111	6,236	74	224	197	84	10,468		
	- No. of Facilities	0	103	1,251	6	36	34	0	1,430		
	- Cost (mill.US$)	0	11.46	5.91	0.1	0.64	0.4	0	18.5		
	(mill.K£)	0	14.44	7.45	0.12	0.8	0.51	0	23.33		
										38.4	61.6
440	Machakos										
	- Quantity (m3/d)	3,927	2,726	5,032	444	95	65	154	12,443		
	- No. of Facilities	0	96	994	34	33	28	0	1,185		
	- Cost (mill.US$)	0	9.93	4.69	0.6	0.26	0.13	0	15.61		
	(mill.K£)	0	12.52	5.91	0.75	0.33	0.17	0	19.69		
										21.0	79.0
450	Marsabit										
	- Quantity (m3/d)	753	14,425	11,587	132	539	711	262	28,409		
	- No. of Facilities	0	471	2,128	3	59	77	0	2,738		
	- Cost (mill.US$)	0	57.43	10.48	0.19	1.56	1.51	0	71.17		
	(mill.K£)	0	72.42	13.21	0.24	1.97	1.91	0	89.75		
										43.6	56.4
460	Meru										
	- Quantity (m3/d)	10,891	5,417	1,622	624	61	13	2	18,630		
	- No. of Facilities	0	171	331	39	11	8	0	560		
	- Cost (mill.US$)	0	19.7	1.6	0.71	0.17	0.03	0	22.21		
	(mill.K£)	0	24.85	2.02	0.89	0.22	0.03	0	28.01		
										27.6	72.4
	Sub-total										
	- Quantity (m3/d)	22,025	32,224	32,694	1,422	1,035	1,321	524	91,245		
	- No. of Facilities	0	1,043	6,091	101	156	187	0	7,578		
	- Cost (mill.US$)	0	121.66	29.85	1.75	2.97	2.78	0	158.98		
	(mill.K£)	0	153.4	37.62	2.18	3.74	3.52	0	200.49		
	North Eastern Province										
										19.4	80.6
510	Garissa										
	- Quantity (m3/d)	150	3,246	6,781	0	79	48	1	10,305		
	- No. of Facilities	0	91	1,305	0	13	13	0	1,422		
	- Cost (mill.US$)	0	11.61	6.13	0	0.22	0.1	0	18.06		
	(mill.K£)	0	14.63	7.73	0	0.28	0.12	0	22.77		
										34.1	65.9
520	Mandera										
	- Quantity (m3/d)	951	2,620	9,342	0	216	400	0	13,529		
	- No. of Facilities	0	94	1,875	0	28	45	0	2,042		
	- Cost (mill.US$)	0	9.55	9.26	0	0.62	0.85	0	20.28		
	(mill.K£)	0	12.04	11.67	0	0.78	1.07	0	25.57		
										16.4	83.6
530	Wajir										
	- Quantity (m3/d)	0	2,138	5,427	0	87	205	0	7,857		
	- No. of Facilities	0	98	1,040	0	19	31	0	1,188		
	- Cost (mill.US$)	0	8.99	5.01	0	0.24	0.43	0	14.67		
	(mill.K£)	0	11.34	6.32	0	0.31	0.54	0	18.5		
										25.4	74.6
	Sub-total										
	- Quantity (m3/d)	1,101	8,004	21,550	0	382	653	1	31,691		
	- No. of Facilities	0	283	4,220	0	60	89	0	4,652		
	- Cost (mill.US$)	0	30.15	20.4	0	1.08	1.38	0	53.01		
	(mill.K£)	0	38.01	25.72	0	1.37	1.73	0	66.84		

Appendix 2.7 Livestock Water Development (3/4)
- Proposed Implementation Programme

Code	District	Source Development Plan							Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Small Dam	Subsur-face Dam	Sand Dam	Existing Pipeline		Up to 2000	2001-2010
	Nyanza Province										
610	Kisii									33.3	66.7
	- Quantity (m3/d)	13,430	275	299	563	0	0	0	14,567		
	- No. of Facilities	0	10	63	26	0	0	0	99		
	- Cost (mill.US$)	0	1.01	0.29	0.29	0	0	0	1.58		
	(mill.K£)	0	1.27	0.37	0.36	0	0	0	2		
620	Kisumu									27.9	72.1
	- Quantity (m3/d)	6,489	1,377	2,940	287	0	0	0	11,093		
	- No. of Facilities	0	41	384	16	0	0	0	441		
	- Cost (mill.US$)	0	5.09	1.83	0.15	0	0	0	7.07		
	(mill.K£)	0	6.42	2.3	0.19	0	0	0	8.92		
630	Siaya									34.9	65.1
	- Quantity (m3/d)	4,776	1,484	3,221	263	0	0	13	9,757		
	- No. of Facilities	0	62	623	28	0	0	0	713		
	- Cost (mill.US$)	0	5.55	2.94	0.1	0	0	0	8.59		
	(mill.K£)	0	6.99	3.71	0.13	0	0	0	10.83		
640	South Nyanza									36.0	64.0
	- Quantity (m3/d)	3,025	1,428	2,148	209	8	8	0	6,826		
	- No. of Facilities	0	68	366	47	8	8	0	497		
	- Cost (mill.US$)	0	5.38	1.77	0.1	0.02	0.02	0	7.28		
	(mill.K£)	0	6.79	2.23	0.13	0.02	0.02	0	9.18		
	Sub-total									31.1	68.9
	- Quantity (m3/d)	27,720	4,564	8,608	1,322	8	8	13	42,243		
	- No. of Facilities	0	181	1,436	117	8	8	0	1,750		
	- Cost (mill.US$)	0	17.03	6.83	0.64	0.02	0.02	0	24.52		
	(mill.K£)	0	21.47	8.61	0.81	0.02	0.02	0	30.93		
	Rift Valley Province										
710	Kajiado									47.7	52.3
	- Quantity (m3/d)	9,193	9,559	7,539	593	160	190	174	27,408		
	- No. of Facilities	0	328	1,311	11	25	30	0	1,705		
	- Cost (mill.US$)	0	37.2	6.52	0.8	0.46	0.4	0	45.37		
	(mill.K£)	0	46.91	8.22	1.01	0.57	0.5	0	57.21		
720	Kericho									43.6	56.4
	- Quantity (m3/d)	25,541	281	238	1,148	0	0	0	27,208		
	- No. of Facilities	0	10	50	27	0	0	0	87		
	- Cost (mill.US$)	0	1.12	0.22	0.61	0	0	0	1.94		
	(mill.K£)	0	1.41	0.27	0.77	0	0	0	2.44		
730	Laikipia									27.0	73.0
	- Quantity (m3/d)	6,650	9,227	1,816	943	113	91	0	18,840		
	- No. of Facilities	0	279	360	20	21	18	0	698		
	- Cost (mill.US$)	0	35.51	1.75	1.22	0.32	0.19	0	38.99		
	(mill.K£)	0	44.77	2.21	1.53	0.4	0.24	0	49.16		
740	Nakuru									19.7	80.3
	- Quantity (m3/d)	19,604	14,484	2,694	1,925	182	117	1,762	40,768		
	- No. of Facilities	0	470	277	26	25	22	0	820		
	- Cost (mill.US$)	0	56.82	1.44	1.64	0.52	0.24	0	60.66		
	(mill.K£)	0	71.65	1.81	2.07	0.66	0.3	0	76.49		
750	Narok									55.4	44.6
	- Quantity (m3/d)	25,717	11,730	13,201	1,954	151	139	77	52,969		
	- No. of Facilities	0	392	2,326	28	22	21	0	2,789		
	- Cost (mill.US$)	0	44.52	11.27	1.63	0.43	0.29	0	58.14		
	(mill.K£)	0	56.14	14.22	2.05	0.54	0.37	0	73.32		
760	Trans Nzoia									35.1	64.9
	- Quantity (m3/d)	6,529	0	0	268	0	0	0	6,797		
	- No. of Facilities	0	0	0	15	0	0	0	15		
	- Cost (mill.US$)	0	0	0	0.17	0	0	0	0.17		
	(mill.K£)	0	0	0	0.21	0	0	0	0.21		
770	Uasin Gishu									22.9	77.1
	- Quantity (m3/d)	11,335	0	0	466	0	0	0	11,801		
	- No. of Facilities	0	0	0	22	0	0	0	22		
	- Cost (mill.US$)	0	0	0	0.28	0	0	0	0.28		
	(mill.K£)	0	0	0	0.35	0	0	0	0.35		

Appendix 2.7 Livestock Water Development (4/4)
- Proposed Implementation Programme

Code	District	Source Development Plan							Total	Implementation Program (%)	
		Surface Water	Borehole	Shallow Well	Small Dam	Subsur-face Dam	Sand Dam	Existing Pipeline		Up to 2000	2001-2010
810	Baringo									42.5	57.5
	- Quantity (m3/d)	3,932	3,067	1,574	210	30	26	51	8,890		
	- No. of Facilities	0	97	172	31	16	12	0	328		
	- Cost (mill.US$)	0	11.11	0.84	0.18	0.08	0.05	0	12.25		
	(mill.K£)	0	14.01	1.05	0.23	0.1	0.07	0	15.45		
820	Elgey Marakwet									40.8	59.2
	- Quantity (m3/d)	9,895	1,730	4,028	455	24	0	207	16,339		
	- No. of Facilities	0	63	675	25	3	0	0	766		
	- Cost (mill.US$)	0	6.61	3.46	0.39	0.07	0	0	10.52		
	(mill.K£)	0	8.33	4.36	0.49	0.09	0	0	13.27		
830	Nandi									51.8	48.2
	- Quantity (m3/d)	12,211	0	0	414	0	0	0	12,625		
	- No. of Facilities	0	0	0	23	0	0	0	23		
	- Cost (mill.US$)	0	0	0	0.22	0	0	0	0.22		
	(mill.K£)	0	0	0	0.28	0	0	0	0.28		
840	Samburu									36.7	63.3
	- Quantity (m3/d)	909	4,702	6,544	86	112	155	2	12,510		
	- No. of Facilities	0	242	1,287	6	21	24	0	1,580		
	- Cost (mill.US$)	0	20.68	5.98	0.12	0.32	0.32	0	27.42		
	(mill.K£)	0	26.07	7.54	0.15	0.4	0.41	0	34.57		
850	Turkana									34.7	65.3
	- Quantity (m3/d)	3,781	22,265	34,948	64	1,157	1,417	0	63,632		
	- No. of Facilities	0	796	5,765	2	124	150	0	6,837		
	- Cost (mill.US$)	0	80.87	29.46	0.09	3.35	3.02	0	116.78		
	(mill.K£)	0	101.97	37.15	0.11	4.22	3.8	0	147.26		
860	West Pokot									52.0	48.0
	- Quantity (m3/d)	1,588	692	2,095	75	20	10	0	4,480		
	- No. of Facilities	0	38	417	14	10	7	0	486		
	- Cost (mill.US$)	0	2.85	1.88	0.07	0.05	0.02	0	4.87		
	(mill.K£)	0	3.6	2.37	0.09	0.07	0.03	0	6.14		
	Sub-total									35.4	64.6
	- Quantity (m3/d)	136,885	77,737	74,677	8,601	1,949	2,145	2,273	304,267		
	- No. of Facilities	0	2,715	12,640	250	267	284	0	16,156		
	- Cost (mill.US$)	0	297.29	62.82	7.42	5.6	4.53	0	377.61		
	(mill.K£)	0	374.86	79.2	9.34	7.05	5.72	0	476.15		
	Western Province										
										45.6	54.4
910	Bungoma										
	- Quantity (m3/d)	8,921	167	409	425	0	0	0	9,922		
	- No. of Facilities	0	9	84	19	0	0	0	112		
	- Cost (mill.US$)	0	0.57	0.4	0.22	0	0	0	1.19		
	(mill.K£)	0	0.72	0.5	0.28	0	0	0	1.5		
920	Busia									49.0	51.0
	- Quantity (m3/d)	3,860	645	1,643	162	5	4	0	6,319		
	- No. of Facilities	0	28	308	16	3	2	0	357		
	- Cost (mill.US$)	0	2.5	1.53	0.09	0.01	0.01	0	4.14		
	(mill.K£)	0	3.16	1.92	0.11	0.02	0.01	0	5.22		
930	Kakamega									43.1	56.9
	- Quantity (m3/d)	12,226	0	0	365	0	0	0	12,591		
	- No. of Facilities	0	0	0	41	0	0	0	41		
	- Cost (mill.US$)	0	0	0	0.14	0	0	0	0.14		
	(mill.K£)	0	0	0	0.17	0	0	0	0.17		
	Sub-total									45.5	54.5
	- Quantity (m3/d)	25,007	812	2,052	952	5	4	0	28,832		
	- No. of Facilities	0	37	392	76	3	2	0	510		
	- Cost (mill.US$)	0	3.07	1.93	0.45	0.01	0.01	0	5.47		
	(mill.K£)	0	3.88	2.42	0.56	0.02	0.01	0	6.89		
	Total									33.9	66.1
	- Quantity (m3/d)	248,489	133,675	151,320	14,404	3,473	4,256	3,114	558,731		
	- No. of Facilities	0	4,582	27,030	688	527	608	0	33,435		
	- Cost (mill.US$)	0	506.69	132.36	12.03	9.93	8.97	0	669.87		
	(mill.K£)	0	638.87	166.84	15.13	12.53	11.32	0	844.71		

Appendix 2.8 Provision of Water Points in Nomadic Pasturage Area - Proposed Implementation Programme

District Code	Project	Asumed Nomadic Pasturage Area	No. of Watering Points	Executing Agency	Cost (million)		Implementaion of watering points (No.)	
					US$	K£	up to 2000	2001-2010
		(km2)	(Nos)					
	Nairobi Province							
110	Nairobi	–	–	–	–	–	–	–
	Central Province							
210	Kiambu	–	–	–	–	–	–	–
220	Kirinyaga	–	–	–	–	–	–	–
230	Muranga	–	–	–	–	–	–	–
240	Nyandarua	–	–	–	–	–	–	–
250	Nyeri	–	–	–	–	–	–	–
	Coast Province							
310	Kilifi	7,562	12	MOWD	2.3	2.8	4	8
320	Kwale	5,503	9	MOWD	1.9	2.4	3	6
330	Lamu	3,481	6	MOWD	1.1	1.4	2	4
340	Mombasa	–	–	–	–	–	–	–
350	Taita Taveta	4,889	8	MOWD	1.5	1.9	2	6
360	Tana River	32,277	52	MOWD	8.9	11.2	16	36
	Eastern Province							
410	Embu	–	–	–	–	–	–	–
420	Isiolo	21,423	34	MOWD	4.9	6.2	10	24
430	Kitui	20,889	33	MOWD	5.3	6.7	10	23
440	Machakos/Makue	6,424	10	MOWD	1.7	2.1	3	7
450	Marsabit	20,305	32	MOWD	4.9	6.2	10	22
460	Meru	3,098	5	MOWD	0.8	1.0	2	3
	Northeastern Province							
510	Garissa	39,187	63	MOWD	11.6	14.6	19	44
520	Mandera	23,946	38	MOWD	5.3	6.6	11	27
530	Wajir	53,124	85	MOWD	11.1	14.0	26	59
	Nyanza Province							
610	Kisii/Nyamira	–	–	–	–	–	–	–
620	Kisumu	–	–	–	–	–	–	–
630	Siaya	–	–	–	–	–	–	–
640	South Nyanza	–	–	–	–	–	–	–
	Rift Valley Province							
710	Kajiado	13,830	22	MOWD	3.2	4.0	7	15
720	Kericho	–	–	–	–	–	–	–
730	Laikipia	7,530	12	MOWD	1.9	2.4	4	8
740	Nakuru	–	–	–	–	–	–	–
750	Narok	13,481	22	MOWD	3.2	4.0	7	15
760	Trans Nzoia	–	–	–	–	–	–	–
770	Uasin Gishu	–	–	–	–	–	–	–
810	Baringo	7,087	11	MOWD	1.9	2.4	3	8
820	Elgeyo Marakwet	–	–	–	–	–	–	–
830	Nandi	1,690	3	MOWD	0.5	0.6	1	2
840	Samburu	13,563	22	MOWD	2.4	3.1	7	15
850	Turkana	44,837	72	MOWD	9.1	11.5	22	50
860	West Pokot	4,855	8	MOWD	1.1	1.3	2	6
	Western Province							
910	Bungoma	–	–	–	–	–	–	–
920	Busia	–	–	–	–	–	–	–
930	Kakamega/Vihiga	–	–	–	–	–	–	–
	Total		559		85	107	171	388

Note : Normadic pasturage area assumed to be bushland and grassland in ASAL area after deleting area for managed pasture. (see Table F1.9)
30 % of schedule quantity to be implemented twards year 2000

Appendix 2.9 Hydropower Development - Proposed Implementation Programme

District Code	Project	Description	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
620	Sondu/Miriu	Hydropower 60MW (No.1 P/S) Sondu river -detailed design completed in 1991 -Irrigation included	KPLC/ LBDA	133	168	● ● ● ● ●
		Hydropower 20.6MW (No.2 P/S) -Feasibility study completed in 1991 -Cost of detail design included in No.1 P/S	KPLC	36	45	★ ★ ● ● ● ●
460	Low Grand Falls	Hydropower 120MW (Tana river) -Multipurpose development to be assessed	KPC/ TARDA	291	367	☆ ☆ ★ ★ ● ● ● ●
750	Oldorko	Hydropower 72MW (Ewaso Ngino South river) -Irrigation included	KPC	71	89	☆ ☆ ★ ★ ● ● ● ●
610	Magwagwa	Hydropower 120MW (Sondu river) -Irrigation included -Feasibility study completed in 1991	KPC/ LBDA	329	415	★ ★ ● ● ● ●
410	Gitaru #3 Extension	Hydropower 72.5MW (Tana river) -Extension of existing Gitaru P/S	KPC/ TRDC	25	32	☆ ★ ★ ● ● ● ●
460	Mutonga	Hydropower 60MW (Tana river) -Multipurpose development to be assessed	KPC/ TARDA	149	188	☆ ☆ ★ ★ ● ● ● ●
	Total			1,034	1,304	

Note:
- ☆ Study
- ★ Design
- ● Construction

No hydorpower schemes envisaged for period of 2005 - 2010.

Appendix 2.10 Major Flood Control Projects - Proposed Implementation Programme

District Code	Project	Description	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
620	Kano Plain (Nyando river)	– Heightening of existing dykes (2 km) – Construction of new dykes (69 km)	MOWD/ LBDA	20.7	26.1	☆ ☆ ☆ ● ● ● ●
110	Nairobi City (Nairobi river, etc)	– Enlargment of existing channels/culverts (13 sites) – Channel improvement (11 sites)	MOLG	10.8	13.6	☆ ☆ ☆ ● ● ●
630	Yala Swamp (Yala/Nzoia river)	– Rehabilitation of existing dykes (25 km) – Construction of new dykes (16 km)	MOWD/ LBDA	17.7	22.3	☆ ☆ ☆ ● ● ● ●
640	Kuja Rivermouth (Kuja river)	– Construction of new dykes (10 km)	MOWD/ LBDA	5.0	6.3	☆ ☆ ☆ ● ● ●
350	Lumi Rivermouth (Lumi river)	– Construction of new dykes (11 km)	MOWD	8.3	10.5	☆ ☆ ☆ ● ● ●
	Total			62.5	78.8	

Note: ☆ Study/Design
● Construction

Appendix 2.11 Urban Drainage and River Improvement Projects - Proposed Implementation Programme (1/2)

District Code	Project	Description	Executing Agency	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
	Urban Drainage Projects					
110	Nairobi	P = 1,413,100 , A = 90.0 Km2	MOLG	360.0	453.6	☆ ☆ ● ● ● ●
210	Kiambu	P = 4,500 , A = 1.6 Km2	"	12.9	16.3	☆ ☆ ☆ ● ● ●
210	Thika	P = 59,000 , A = 1.9 Km2	"	14.8	18.6	☆ ☆ ☆ ● ● ●
220	Kerugoya	P = 8,900 , A = 1.0 Km2	"	7.7	9.7	☆ ☆ ☆ ● ● ●
230	Murang'a	P = 21,700 , A = 5.3 Km2	"	31.5	39.7	☆ ☆ ☆ ● ● ●
240	Olkalou	P = 9,700 , A = 0.8 Km2	"	6.0	7.5	☆ ☆ ☆ ● ● ●
250	Nyeri	P = 97,000 , A = 1.6 Km2	"	13.1	16.5	☆ ☆ ☆ ● ● ●
310	Kilifi	P = 12,500 , A = 0.6 Km2	"	4.9	6.2	☆ ☆ ☆ ● ● ●
310	Malindi	P = 36,700 , A = 1.0 Km2	"	7.6	9.6	☆ ☆ ☆ ● ● ●
320	Kwale	P = 3,700 , A = 0.9 Km2	"	7.2	9.1	☆ ☆ ☆ ● ● ●
330	Lamu	P = 9,000 , A = 0.9 Km2	"	7.0	8.8	☆ ☆ ☆ ● ● ●
340	Mombasa	P = 479,600 , A = 11.6 Km2	"	46.6	58.7	☆ ☆ ☆ ● ● ●
350	Voi	P = 12,200 , A = 1.2 Km2	"	9.2	11.6	☆ ☆ ☆ ● ● ●
350	Wundanyi	P = 2,700 , A = 0.3 Km2	"	2.2	2.8	☆ ☆ ☆ ● ● ●
360	Hola	P = 8,100 , A = 0.9 Km2	"	7.4	9.3	☆ ☆ ☆ ● ● ●
410	Embu	P = 18,400 , A = 1.0 Km2	"	7.6	9.6	☆ ☆ ☆ ● ● ●
420	Isiolo	P = 15,900 , A = 0.5 Km2	"	3.6	4.5	☆ ☆ ☆ ● ● ●
430	Kitui	P = 9,300 , A = 0.5 Km2	"	3.6	4.6	☆ ☆ ☆ ● ● ●
440	Machakos	P = 91,100 , A = 2.8 Km2	"	22.1	27.8	☆ ☆ ☆ ● ● ●
440	Mitaboni	P = 29,400 , A = 0.2 Km2	"	1.6	2.0	☆ ☆ ☆ ● ● ●
450	Marsabit	P = 11,100 , A = 0.1 Km2	"	0.8	1.1	☆ ☆ ☆ ● ● ●
460	Meru	P = 78,900 , A = 0.3 Km2	"	2.7	3.4	☆ ☆ ☆ ● ● ●
510	Garissa	P = 29,100 , A = 0.8 Km2	"	6.4	8.1	☆ ☆ ☆ ● ● ●
520	Mandera	P = 6,500 , A = 0.1 Km2	"	0.5	0.6	☆ ☆ ☆ ● ● ●
530	Wajir	P = 21,400 , A = 0.2 Km2	"	1.5	1.9	☆ ☆ ☆ ● ● ●
610	Kisii	P = 45,800 , A = 2.6 Km2	"	21.1	26.6	☆ ☆ ☆ ● ● ●
620	Kisumu	P = 188,700 , A = 5.6 Km2	"	33.5	42.2	☆ ☆ ☆ ● ● ●
630	Siaya	P = 19,400 , A = 0.1 Km2	"	1.0	1.2	☆ ☆ ☆ ● ● ●
640	Homa Bay	P = 23,000 , A = 1.2 Km2	"	9.2	11.6	☆ ☆ ☆ ● ● ●
710	Kajiado	P = 6,000 , A = 1.2 Km2	"	9.2	11.6	☆ ☆ ☆ ● ● ●
720	Kericho	P = 41,200 , A = 1.2 Km2	"	9.4	11.8	☆ ☆ ☆ ● ● ●
730	Nanyuki	P = 25,100 , A = 2.0 Km2	"	15.6	19.7	☆ ☆ ☆ ● ● ●
740	Naivasha	P = 38,500 , A = 0.9 Km2	"	7.2	9.1	☆ ☆ ☆ ● ● ●
740	Nakuru	P = 172,200 , A = 13.0 Km2	"	51.8	65.3	☆ ☆ ☆ ● ● ●
750	Narok	P = 12,000 , A = 0.8 Km2	"	6.4	8.1	☆ ☆ ☆ ● ● ●
760	Kitale	P = 56,400 , A = 4.2 Km2	"	25.2	31.8	☆ ☆ ☆ ● ● ●
770	Eldoret	P = 112,900 , A = 8.6 Km2	"	34.3	43.2	☆ ☆ ☆ ● ● ●
810	Kabarnet	P = 9,400 , A = 0.2 Km2	"	1.3	1.6	☆ ☆ ☆ ● ● ●
820	Iten	P = 6,300 , A = 0.3 Km2	"	2.6	3.3	☆ ☆ ☆ ● ● ●
830	Kapsabet/Baraton	P = 13,400 , A = 1.6 Km2	"	13.1	16.5	☆ ☆ ☆ ● ● ●
840	Maralal	P = 17,800 , A = 0.7 Km2	"	5.6	7.1	☆ ☆ ☆ ● ● ●
850	Lodwar	P = 9,300 , A = 0.2 Km2	"	1.8	2.2	☆ ☆ ☆ ● ● ●
860	Kapenguria/ Makutano	P = 12,000 , A = 0.4 Km2	"	2.8	3.5	☆ ☆ ☆ ● ● ●
910	Bungoma	P = 29,500 , A = 1.9 Km2	"	15.0	18.8	☆ ☆ ☆ ● ● ●
910	Webuye	P = 26,600 , A = 0.2 Km2	"	1.8	2.3	☆ ☆ ☆ ● ● ●
920	Busia	P = 13,300 , A = 0.1 Km2	"	0.9	1.1	☆ ☆ ☆ ● ● ●
930	Kakamega	P = 49,200 , A = 2.1 Km2	"	16.6	20.9	☆ ☆ ☆ ● ● ●
	Sub-total	P = 3,417,500 , A = 174.6 Km2	"	874.0	1,101.2	

Note: ☆ Study/Design
● Construction
P = Estimated population (1990) A : Area

Appendix 2.11 Urban Drainage and River Improvement Projects - Proposed Implementation Programme (2/2)

District Code	Project	Description	Executing Agency	Cost (million) US$	Cost (million) K£	Implementation Schedule 93		95					2000		2		4		6		8		10
	Minor Ad-hoc River Improvement Works																						
All	Various rivers	To be taken up as the need is identified	MOWD	90	113.4	☆	☆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Long-term Improvement of Lower Tana River																						
360	Lower Tana improvement	Experimental work for rectifying river meanders and bank protection	MOWD/ TARDA	40	50.4	●	●	●	●	●	●	●	●										
	Sub-total			130	163.8																		
	TOTAL			1004	1265.0																		

Note: ☆ Study/Design
● Construction

Appendix 2.12 Summary of Development Cost
(Basic Case : Full Development Meeting Whole Demands)

Development Sector	Budget Appropriated for	Financial Requirement (Million)					
		1993 - 2000		2001 - 2010		Total	
		US$	K£	US$	K£	US$	K£
1. D&I Water Supply		3,470	4,372	4,106	5,174	7,576	9,546
(1) Urban water supply	MOWD *1						
– Source development (Dam)		366	461	211	266	577	727
– Water supply system		2,614	3,294	1,758	2,215	4,372	5,509
Sub-total		2,980	3,755	1,969	2,481	4,949	6,236
(2) Rural water supply	MOWD *2						
– Source development		490	617	924	1,165	1,414	1,782
– Water supply system		-	-	1,213	1,528	1,213	1,528
Sub-total		490	617	2,137	2,693	2,627	3,310
2. Sewerage Development	MOLG *3	420	529	285	359	705	888
3. Irrigation Development		201	253	772	973	973	1,226
(1) Major irrigation projects	MORD *4	196	247	767	966	963	1,213
(2) Small irrigation schemes	MOA *5	5	6	5	7	10	13
4. Livestock Water Development		252	318	503	633	755	951
(1) Source development	MOLD *6	227	286	443	558	670	844
(2) Water points in nomadic pasturage land	MOLD *6	25	32	60	75	85	107
5. Hydropower Development	MOE *7	542	683	492	621	1,034	1,304
6. River and Flood Works		624	785	443	558	1,067	1,343
(1) Major flood control projects	MOWD *8	32	40	31	39	63	79
(2) Urban drainage works	MOLG *3	525	661	349	440	874	1,101
(3) Minor river improvement	MOWD *8	27	34	63	79	90	113
(4) Improvement of Lower Tana	MOWD *9	40	50	-	-	40	50
Total		5,509	6,940	6,601	8,318	12,110	15,258

Notes: Executing agencies will be;

*1 : MOWD, NWCPC, Municipalities (NCC, etc)

*2 : MOWD, NWCPC, County councils, NGO, etc

*3 : Municipal and urban councils under technical assistance by MOWD

*4 : NIA, LBDA, TARDA, KVDA and other basin development authorities

*5 : MOA and some agencies listed for *4

*6 : Implementation to be entrusted to MOWD and/or basin development authorities

*7 : KPC, KPLC and basin development authorities

*8 : MOWD or to be entrusted to basin development authorities and municipal/urban councils

*9 : To be entrusted to TARDA

- Irrigation development cost represents the cost disbursed during 1993-2010 and is therefore different from total project cost

Appendix 2.13 Annual Budgetary Schedule (Basic Case : Full Development Meeting Whole Demands)

(Unit : million US$)

Development Sector	Year																		Total
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
1 D&I Water Supply	509.7	509.7	497.1	497.1	388.8	388.8	339.6	339.6	385.7	385.7	428.0	428.0	441.3	441.3	398.6	398.6	399.4	399.4	7,576
(1) Urban water supply																			
Source development (dam)	77.9	77.9	36.3	36.3	29.9	29.9	39.0	39.0	25.0	25.0	56.8	56.8	23.8	23.8	0.0	0.0	0.0	0.0	577
Water supply system	370.5	370.5	399.5	399.5	297.6	297.6	239.3	239.3	147.0	147.0	157.5	157.5	203.8	203.8	185.0	185.0	185.8	185.8	4,372
Sub-total	448.4	448.4	435.8	435.8	327.5	327.5	278.3	278.3	172.0	172.0	214.3	214.3	227.6	227.6	185.0	185.0	185.8	185.8	4,949
(2) Rural water supply																			
Source development	61.3	61.3	61.3	61.3	61.3	61.3	61.3	61.3	92.4	92.4	92.4	92.4	92.4	92.4	92.3	92.3	92.3	92.3	1,414
Water supply system									121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	1,213
Sub-total	61.3	61.3	61.3	61.3	61.3	61.3	61.3	61.3	213.7	213.7	213.7	213.7	213.7	213.7	213.6	213.6	213.6	213.6	2,627
2 Sewerage Development (for 158 urban centres)	80.6	80.6	80.4	80.4	22.6	22.6	26.3	26.3	22.7	22.7	22.9	22.9	37.0	37.0	33.0	33.0	27.2	27.2	705
3 Irrigation Development	32.7	33.9	9.9	15.4	44.4	22.8	16.3	24.9	34.6	36.3	49.8	54.1	124.7	140.7	133.5	103.6	79.9	15.8	973
(1) Major irrigation projects	32.1	33.3	9.3	14.8	43.8	22.2	15.7	24.3	34.0	35.7	49.2	53.5	124.1	140.1	132.9	103.0	79.3	15.2	963
(2) Small irrigation schemes	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	10
4 Livestock Water Development	31.5	31.5	31.5	31.5	31.5	31.5	31.6	31.6	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	755
(1) Source development	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	670
(2) Water points in nomadic pasturage land	3.1	3.1	3.1	3.1	3.1	3.1	3.2	3.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	85
5 Hydropower Development	20.0	27.0	52.0	45.0	63.0	93.0	113.0	129.0	129.0	159.0	121.0	56.0	27.0						1,034
6 River and Flood Works	5.0	5.0	99.5	104.7	139.9	162.5	73.4	33.1	31.4	50.6	66.4	46.5	22.1	22.3	38.2	71.2	55.3	39.4	1,067
(1) Major flood control projects				5.2	5.2	8.8	8.8	3.6	4.4	4.4	4.4	4.4	0.0	1.7	1.7	4.4	2.8	2.8	63
(2) Urban drainage works			90.0	90.0	125.2	144.2	55.1	20.0	20.7	39.9	55.7	35.8	15.8	14.3	30.2	60.5	46.2	30.3	874
(3) Minor river improvement			4.5	4.5	4.5	4.5	4.5	4.5	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	90
(4) Improvement of Lower Tana	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0											40
Total (US$)	679.5	687.7	770.4	774.1	690.2	721.2	600.2	584.5	653.7	704.6	738.4	657.8	702.4	691.6	653.6	656.7	612.1	532.1	12,110
(K£)	856.1	866.5	970.7	975.3	869.6	908.7	756.2	736.4	823.6	887.8	930.3	828.8	884.9	871.3	823.5	827.3	771.1	670.3	15,258

APPENDIX 3

IMPLEMENTATION PROGRAMME UNDER ALTERNATIVE BUDGETARY SCENARIO A

(Budget availability: 50% approximately)

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Appendix 3.1 Urban Water Supply Schemes
Proposed Implementation Programme for Alternative-A

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million)		Implementation Schedule																	
				US$	K£	93		95					2000		2		4		6		8		10
110	Nairobi	U-1	Thika Dam, Ndarugu, Ruiru-A, Chania-B	1,061.6	1,337.7	●	●	●	●					●	●	●	●			●	●	●	●
210	Kiambu	U-3	Kiambaa Dam (Rui Ruaka r.)	9.1	11.4			●	●			●	●							●	●		
220	Kerugoya	U-12	Kiringa River	8.3	10.5	●	●													●	●		
230	Maragua	U-15	Githanji river	15.1	19.0			●	●													●	●
240	Ol Kalou	U-19	Malewa River	10.7	13.5							●	●									●	●
250	Nyeri	U-22	Chania River	50.3	63.4					●	●							●	●				
310	Malindi	U-26	Sabaki Pipeline & Rare Dam	64.4	81.1							●	●									●	●
320	Kwale	U-27	Marere pipeline	4.8	6.0							●	●							●	●		
330	Lamu	U-31	P/L from Tana River + B/H	37.5	47.3							●	●							●	●		
340	Mombasa	U-32	2nd Mzima/Mwachi Dam, Pemba Dam	441.6	556.4			●	●	●	●			●	●	●	●			●	●	●	●
350	Wundanyi	U-34	Sigaso/Manguri River	0.9	1.2															●	●		
360	Hola	U-36	Tana River	6.8	8.6							●	●							●	●		
410	Embu	U-40	Lower Kapingazi River + Upper Rupingazi River	8.8	11.2							●	●							●	●		
430	Kitui	U-43	Masinga Dam	9.4	11.9	●	●													●	●		
440	Machakos	U-46	Athi River P/L	78.1	98.4					●	●							●	●				
440	Wote	U-141	Kaiti river + Nzuuni river	3.3	4.1							●	●									●	●
450	Marsabit	U-55	Boreholes +Small dams/Sub-surface dam/Spring	177.7	223.9			●	●	●	●	●	●			●	●	●	●	●	●	●	●
460	Meru	U-58	Kathita river	43.5	54.9					●	●									●	●		
510	Garissa	U-67	Tana River	12.9	16.3							●	●							●	●		
520	Mandera	U-68	Daua River	3.1	4.0							●	●							●	●		
530	Wajir	U-71	Boreholes + Ewaso Ngiro River	172.3	217.1			●	●	●	●	●	●	●	●	●	●	●	●	●	●		
610	Nyamira + Kebirigo	U-144	Kuja river	11.6	14.6							●	●									●	●
610	Kisii	U-76	Bunyunyu Dam	27.5	34.7					●	●	●	●							●	●		
620	Kisumu & + Kiboswa	U-79	Kibos dam	104.8	132.1					●	●							●	●				
630	Siaya	U-83	Yala River	16.0	20.1							●	●							●	●		
640	Homa Bay	U-85	Lake Victoria	12.5	15.8							●	●							●	●		
710	Ngong	U-89	Kerarapon Spring	14.6	18.4					●	●											●	●
720	Kericho	U-94	Dimlitch Dam, Kimugung Dam	24.2	30.5							●	●							●	●		
730	Nanyuki	U-97	Liki river	18.6	23.5							●	●							●	●		
740	Nakuru	U-104	Turasha P/L + Malewa Dam + Itare Dam	212.0	267.1					●	●							●	●				
750	Narok	U-105	Upper Narok Dam	30.9	39.0							●	●							●	●		
760	Kitale	U-107	Koitobos river	34.8	43.8							●	●							●	●		
770	Eldoret	U-110	Moiben Dam + Nzoia river	135.9	171.2					●	●							●	●				
810	Kabarnet	U-112	Kirandich Dam	27.3	34.4	●	●													●	●		
820	Iten+Tambach	U-116	Moiben Dam	12.7	16.0					●	●	●	●							●	●		
830	Kapsabet+Baraton	U-118	Mokong river	11.8	14.9							●	●							●	●		
840	Maralal	U-119	Loikas/Yamo river	16.0	20.2							●	●							●	●		
860	Kapenguria/Makutano	U-123	Kapenguria River	8.9	11.2					●	●									●	●		
910	Bungoma	U-124	Kuywa River	26.8	33.7							●	●							●	●		
920	Busia	U-127	Sio river	14.1	17.7							●	●							●	●		
930	Vihiga+Majengo	U-129	Edzawa River (Kimondi River)	5.1	6.4					●	●											●	●
930	Kakamega	U-132	Isiukhu River, Mukulusi Dam	29.2	36.7							●	●							●	●		
	TOTAL			3,015.9	3,800.1																		

Note: ● Construction

Appendix 3.2 Sewerage Development
Proposed Implementation Programme for Alternative-A

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
110	Nairobi	U-1	Thika Dam, Ndarugu, Ruiru-A, Chania-B	214.81	270.66	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
210	Kiambu	U-3	Kiambaa Dam (Rui Ruaka r.)	0.57	0.72	● ● ● ● ● ● ● ●
220	Kerugoya	U-12	Kiringa River	1.17	1.48	● ● ● ● ● ●
230	Maragua	U-15	Githanji river	3.08	3.88	● ● ● ● ● ●
240	Ol Kalou	U-19	Malewa River	1.31	1.65	● ● ● ● ● ●
250	Nyeri	U-22	Chania River	23.74	29.91	● ● ● ● ● ● ● ● ● ● ● ●
310	Malindi	U-26	Sabaki Pipeline & Rare Dam	10.56	13.30	● ● ● ● ● ●
320	Kwale	U-27	Marere pipeline	0.53	0.66	● ● ● ● ● ●
330	Lamu	U-31	P/L from Tana River + B/H	1.19	1.50	● ● ● ● ● ●
340	Mombasa	U-32	2nd Mzima/Mwachi Dam, Pemba Dam	57.41	72.33	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
350	Wundanyi	U-34	Sigaso/Manguri River	0.28	0.35	● ● ● ● ● ●
360	Hola	U-36	Tana River	1.22	1.54	● ● ● ● ● ●
410	Embu	U-40	Lower Kapingazi River + Upper Rupingazi River	2.47	3.12	● ● ● ● ● ●
430	Kitui	U-43	Masinga Dam	1.40	1.77	● ● ● ● ● ●
440	Machakos	U-46	Athi River P/L	22.81	28.74	● ● ● ● ● ● ● ● ● ● ● ●
440	Wote	U-141	Kaiti river + Nzuuni river	0.31	0.39	● ● ● ● ● ●
450	Marsabit	U-55	Boreholes +Small dams/Sub-surface dam/Spring	1.65	2.07	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
460	Meru	U-58	Kathita river	20.54	25.88	● ● ● ● ● ● ● ● ● ● ● ●
510	Garissa	U-67	Tana River	8.08	10.19	● ● ● ● ● ●
520	Mandera	U-68	Daua River	0.66	0.83	● ● ● ● ● ●
530	Wajir	U-71	Boreholes + Ewaso Ngiro River	2.65	3.34	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
610	Nyamira + Kebirigo	U-144	Kuja river	1.12	1.41	● ● ● ● ● ●
610	Kisii	U-76	Bunyunyu Dam	9.24	11.64	● ● ● ● ● ● ● ● ● ● ● ●
620	Kisumu & + Kiboswa	U-79	Kibos dam	37.19	46.85	● ● ● ● ● ● ● ●
630	Siaya	U-83	Yala River	1.96	2.47	● ● ● ● ● ●
640	Homa Bay	U-85	Lake Victoria	2.50	3.16	● ● ● ● ● ●
710	Ngong	U-89	Kerarapon Spring	2.86	3.61	● ● ● ● ● ● ● ●
720	Kericho	U-94	Dimlitch Dam, Kimugung Dam	9.72	12.24	● ● ● ● ● ● ● ●
730	Nanyuki	U-97	Liki river	7.94	10.01	● ● ● ● ● ● ● ●
740	Nakuru	U-104	Turasha P/L + Malewa Dam + Itare Dam	55.47	69.89	● ● ● ● ● ● ● ● ● ● ● ●
750	Narok	U-105	Upper Narok Dam	3.00	3.78	● ● ● ● ● ●
760	Kitale	U-107	Koitobos river	16.08	20.26	● ● ● ● ● ●
770	Eldoret	U-110	Moiben Dam + Nzoia river	31.47	39.65	● ● ● ● ● ● ● ● ● ● ● ●
810	Kabarnet	U-112	Kirandich Dam	1.20	1.52	● ● ● ● ● ●
820	Iten+Tambach	U-116	Moiben Dam	0.70	0.88	● ● ● ● ● ● ● ● ● ● ● ●
830	Kapsabet+Baraton	U-118	Mokong river	1.93	2.44	● ● ● ● ● ●
840	Maralal	U-119	Loikas/Yamo river	2.66	3.35	● ● ● ● ● ●
860	Kapenguria/Makutano	U-123	Kapenguria River	1.65	2.08	● ● ● ● ● ●
910	Bungoma	U-124	Kuywa River	9.50	11.97	● ● ● ● ● ●
920	Busia	U-127	Sio river	2.39	3.01	● ● ● ● ● ●
930	Vihiga+Majengo	U-129	Edzawa River (Kimondi River)	0.50	0.63	● ● ● ● ● ●
930	Kakamega	U-132	Isiukhu River, Mukulusi Dam	12.30	15.49	● ● ● ● ● ●
	TOTAL			587.82	740.65	

Note: ● Construction

Appendix 3.3 Irrigation Project
Proposed Implementation Programme for Alternative - A

District Code	Project	Development Area (ha)	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
	Small Scale Schemes	7,000	MOA	11.4	14.4	
220	Mwea extension	2,900	NIB	63.7	80.3	
360	Tana Delta	12,000	TARDA	141.4	178.2	
410	Lower Rupingazi	1,800	TARDA	6.0	7.6	
460	Kunati	1,050	TARDA	3.5	4.4	
620	Kano Plain	25,640	LBDA	232.5	293.0	
630	Lower Nzoia/ Bunyala Extension	10,480	NIB	12.4	15.6	
640	Lower Kuja	1,900	LBDA	5.6	7.1	
640	Kimira	2,000	LBDA	18.1	22.8	
	Total	57,770		483.2	608.8	

Note:
- ☆ Study
- ★ Design
- ● Construction

Appendix 3.4 Major Flood Control Projects
Proposed Implementation Programme for Alternative-A

District Code	Project	Description	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
620	Kano Plain (Nyando river)	– Heightening of existing dykes (2 km) – Construction of new dykes (69 km)	MOWD/ LBDA	20.7	26.1	☆ ☆ ☆ ● ● ● ●
110	Nairobi City (Nairobi river, etc)	– Enlargment of existing channels/culverts (13 sites) – Channel improvement (11 sites)	MOLG	10.8	13.6	☆ ☆ ☆ ● ● ●
	Total			31.5	39.7	

Note: ☆ Study/Design
● Construction

Appendix 3.5 Urban Drainage and River Improvement Projects Proposed Implementation Programme for Alternative-A

District Code	Project	Description	Executing Agency	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
	Urban Drainage Projects					
110	Nairobi	P = 1,481,800 , A = 90 km2	MOLG	360	454	☆ ☆ ● ● ● ●
340	Mombasa	P = 529,200 , A = 11.6 km2	"	47	59	☆ ☆ ☆ ● ● ●
	Sub-total	P = 2,011,000 , A = 101.6 km2	"	407	513	
	Minor Ad-hoc RiverImprovement Works					
All	Various rivers	To be taken up as the need is identified	MOWD	45	57	☆ ☆ ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
	Long-term Improvement of Lower Tana River					
360	Lower Tana improvement	Experimental work for rectifying river meanders and bank protection	MOWD/ TARDA	20	25	● ● ● ● ● ● ● ●
	Sub-total			65	82	
	TOTAL			472	595	

Note: ☆ Study/Design
● Construction

Appendix 3.6 Summary of Development Cost for Alternative-A

Development Sector	Budget Appropriated for	Financial Requirement (Million) 1993 - 2000 US$	1993 - 2000 K£	2001 - 2010 US$	2001 - 2010 K£	Total US$	Total K£
1. D&I Water Supply		2,081	2,622	2,249	2,834	4,330	5,456
(1) Urban water supply	MOWD *1	1,836	2,313	1,180	1,487	3,016	3,800
(2) Rural water supply	MOWD *2	245	309	1,069	1,347	1,314	1,656
2. Sewerage Development	MOLG *3	353	445	235	296	588	741
3. Irrigation Development		201	253	285	360	486	613
(1) Major irrigation projects	MORD *4	196	247	280	353	476	600
(2) Small irrigation schemes	MOA *5	5	6	5	7	10	13
4. Livestock Water Development	MOLD *6	128	161	249	314	377	475
5. Hydropower Development	MOE *7	542	683	492	621	1,034	1,304
6. River and Flood Works		235	296	269	339	504	635
(1) Major flood control projects	MOWD *8	21	26	11	14	32	40
(2) Urban drainage works	MOLG *3	180	227	227	286	407	513
(3) Minor river improvement	MOWD *8	14	18	31	39	45	57
(4) Improvement of Lower Tana	MOWD *9	20	25	-	-	20	25
Total		3,540	4,460	3,779	4,764	7,319	9,224

Notes: Executing agencies will be;

*1 : MOWD, NWCPC, Municipalities (NCC, etc)

*2 : MOWD, NWCPC, County councils, NGO, etc

*3 : Municipal and urban councils under technical assistance by MOWD

*4 : NIA, LBDA, TARDA, KVDA and other basin development authorities

*5 : MOA and some agencies listed for *4

*6 : Implementation to be entrusted to MOWD and/or basin development authorities

*7 : KPC, KPLC and basin development authorities

*8 : MOWD or to be entrusted to basin development authorities and municipal/urban councils

*9 : To be entrusted to TARDA

Appendix 3.7 Annual Budgetary Schedule for Alternative-A

(Unit : million US$)

Development Sector	Year																		Total
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
1 D&I Water Supply	282.4	282.4	246.1	246.1	294.2	294.2	217.8	217.8	220.7	220.7	210.5	210.5	239.9	239.9	230.6	230.6	222.5	222.6	4,330
(1) Urban water supply	251.8	251.8	215.5	215.5	263.6	263.6	187.2	187.2	113.8	113.8	103.6	103.6	133.0	133.0	123.7	123.7	115.6	115.6	3,016
(2) Rural water supply	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	106.9	106.9	106.9	106.9	106.9	106.9	106.9	106.9	106.9	107.0	1,314
2 Sewerage Development (for 158 urban centres)	57.4	57.4	32.4	32.4	61.9	61.9	25.1	25.1	18.6	18.6	3.9	3.9	36.2	36.2	35.2	35.2	23.2	23.2	588
3 Irrigation Development	32.7	33.9	9.9	15.4	44.4	22.8	16.3	24.9	34.6	28.7	30.9	31.2	39.0	56.0	44.4	20.4	0.9	0.6	486
(1) Major irrigation projects	32.1	33.3	9.3	14.8	43.8	22.2	15.7	24.3	34.0	28.1	30.3	30.6	38.4	55.4	43.8	19.8	0.3	0.0	476
(2) Small irrigation schemes	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	10
4 Livestock Water Development	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9	377
5 Hydropower Development	20.0	27.0	52.0	45.0	63.0	93.0	113.0	129.0	129.0	159.0	121.0	56.0	27.0						1,034
6 River and Flood Works	2.5	2.5	5.5	10.7	10.7	10.7	100.7	95.5	92.7	92.7	2.7	6.3	6.3	6.3	2.7	18.4	18.4	18.4	504
(1) Major flood control projects				5.2	5.2	5.2	5.2					3.6	3.6	3.6					32
(2) Urban drainage works							90.0	90.0	90.0	90.0						15.7	15.7	15.7	407
(3) Minor river improvement			3.0	3.0	3.0	3.0	3.0	3.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	45
(4) Improvement of Lower Tana	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5											20
Total	411.0	419.2	361.9	365.5	490.1	498.5	488.8	508.3	520.5	544.6	393.9	332.8	373.3	363.3	337.8	329.5	289.9	289.7	7,319

APPENDIX 4

IMPLEMENTATION PROGRAMME UNDER ALTERNATIVE BUGETARY SCENARIO B

(Budget availability: 75% approximately)

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Appendix 4.1 Urban Water Supply Schemes (1/2)
Implementation Programme for Alternative-B

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
110	Nairobi	U-1	Thika Dam, Ndarugu, Ruiru-A, Chania-B	1061.6	1,337.7	
210	Karuri	U-2	Kiambaa Dam (Rui Ruaka R.)	12.0	15.1	
210	Kiambu	U-3	Kiambaa Dam (Rui Ruaka r.)	9.1	11.4	
210	Ruiru	U-6	Ruiru River	9.7	12.2	
220	Kerugoya	U-12	Kiringa River	8.3	10.5	
230	Maragua	U-15	Githanji river	15.1	19.0	
230	Makuyu	U-18	Motoho river	4.8	6.0	
240	Ol Kalou	U-19	Malewa River	10.7	13.5	
250	Nyeri	U-22	Chania River	50.3	63.4	
310	Mariakani	U-23	2nd Mzima P/L	4.6	5.8	
310	Malindi	U-26	Sabaki Pipeline & Rare Dam	64.4	81.1	
320	Kwale	U-27	Marere pipeline	4.8	6.0	
330	Lamu	U-31	P/L from Tana River + B/H	37.5	47.3	
340	Mombasa	U-32	2nd Mzima/Mwachi Dam, Pemba Dam	441.6	556.4	
350	Taveta	U-137	Njoro Spring	7.2	9.1	
350	Wundanyi	U-34	Sigaso/Manguri River	0.9	1.2	
360	Hola	U-36	Tana River	6.8	8.6	
410	Embu	U-40	Lower Kapingazi River + Upper Rupingazi River	8.8	11.2	
420	Isiolo	U-41	Boreholes + Spring	152.6	192.2	
420	Ol Doinyo Ng'iro	U-42	Ewaso Ngiro River	8.3	10.5	
420	Merti	U-139	Ewaso Ngiro	5.5	6.9	
430	Kitui	U-43	Masinga Dam	9.4	11.9	
430	Mwingi	U-45	Kiambere Dam	16.1	20.3	
440	Machakos	U-46	Athi River P/L	78.1	98.4	
440	Mitaboni	U-47	Kaathana River	20.3	25.6	
440	Kangundo	U-50	Pipeline from Athi River	19.5	24.6	
440	Wote	U-141	Kaiti river + Nzuuni river	3.3	4.1	
450	Kargi	U-54	Boreholes + Subsurface Dam	66.8	84.1	
450	Marsabit	U-55	Boreholes +Small dams/Sub-surface dam/Spring	177.7	223.9	
460	Meru	U-58	Kathita river	43.5	54.9	
510	Garissa	U-67	Tana River	12.9	16.3	
520	Mandera	U-68	Daua River	3.1	4.0	
520	Elwak	U-69	Borehores	75.5	95.1	
530	Wajir	U-71	Boreholes + Ewaso Ngiro River	172.3	217.1	
530	Buna	U-72	Boreholes(Lago Bor river)	94.8	119.4	
610	Nyamira + Kebirigo	U-144	Kuja river	11.6	14.6	
610	Kisii	U-76	Bunyunyu Dam	27.5	34.7	
620	Kisumu & + Kiboswa	U-79	Kibos dam	104.8	132.1	
620	Ahero	U-80	Nyando river	5.9	7.4	
620	Muhoroni	U-81	Nyando River	7.6	9.6	
630	Siaya	U-83	Yala River	16.0	20.1	
640	Homa Bay	U-85	Lake Victoria	12.5	15.8	
640	Migori	U-86	Migori river	5.4	6.9	
710	Oloitokitok	U-88	Nol-Turesh Spring	7.0	8.9	
710	Ngong	U-89	Kerarapon Spring	14.6	18.4	
710	Kajiado	U-90	Kiserian P/L	19.7	24.9	
710	Namanga	U-91	Namanga Spring	5.7	7.1	
720	Sotik	U-93	Kipsonoi river	4.5	5.6	
720	Kericho	U-94	Dimlitch Dam, Kimugung Dam	24.2	30.5	
730	Nanyuki	U-97	Liki river	18.6	23.5	
740	Nakuru	U-104	Turasha P/L + Malewa Dam + Itare Dam	212.0	267.1	
750	Narok	U-105	Upper Narok Dam	30.9	39.0	
760	Kitale	U-107	Koitobos river	34.8	43.8	
770	Eldoret	U-110	Moiben Dam + Nzoia river	135.9	171.2	
810	Kabarnet	U-112	Kirandich Dam	27.3	34.4	
810	Maji Mazuri	U-113	Maji Mazuri river	5.2	6.5	
820	Iten+Tambach	U-116	Moiben Dam	12.7	16.0	

Note: ● Construction

Appendix 4.1 Urban Water Supply Schemes (2/2)
Implementation Programme for Alternative-B

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
830	Kapsabet+Baraton	U-118	Mokong river	11.8	14.9	
840	Maralal	U-119	Loikas/Yamo river	16.0	20.2	
850	Lodwar	U-122	Boreholes & sub-surface dam	132.6	167.1	
860	Kapenguria/Makutano	U-123	Kapenguria River	8.9	11.2	
910	Bungoma	U-124	Kuywa River	26.8	33.7	
910	Kimilili	U-125	Kimilili River	7.3	9.2	
920	Busia	U-127	Sio river	14.1	17.7	
930	Vihiga+Majengo	U-129	Edzawa River (Kimondi River)	5.1	6.4	
930	Kakamega	U-132	Isiukhu River, Mukulusi Dam	29.2	36.7	
				3,714.5	4,680.3	

Note: ● Construction

Appendix 4.2 Sewerage Development
Proposed Implementation Programme for Alternative-B (1/2)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
110	Nairobi	U-1	Thika Dam, Ndarugu, Ruiru-A, Chania-B	214.81	270.66	● ● ● ● ● ● ● ● ● ●
210	Karuri	U-2	Kiambaa Dam (Rui Ruaka R.)	1.59	2.00	● ● ● ●
210	Kiambu	U-3	Kiambaa Dam (Rui Ruaka r.)	0.57	0.72	● ● ● ●
210	Ruiru	U-6	Ruiru River	1.39	1.75	● ● ● ●
220	Kerugoya	U-12	Kiringa River	1.17	1.48	● ● ● ●
230	Maragua	U-15	Githanji river	3.08	3.88	● ● ● ●
230	Makuyu	U-18	Motoho river	0.57	0.72	● ● ● ●
240	Ol Kalou	U-19	Malewa River	1.31	1.65	● ● ● ●
250	Nyeri	U-22	Chania River	23.74	29.91	● ● ● ● ● ●
310	Mariakani	U-23	2nd Mzima P/L	1.13	1.43	● ● ● ●
310	Malindi	U-26	Sabaki Pipeline & Rare Dam	10.56	13.30	● ● ● ●
320	Kwale	U-27	Marere pipeline	0.53	0.66	● ● ● ●
330	Lamu	U-31	P/L from Tana River + B/H	1.19	1.50	● ● ● ●
340	Mombasa	U-32	2nd Mzima/Mwachi Dam, Pemba Dam	57.41	72.33	● ● ● ● ● ● ● ● ● ●
350	Taveta	U-137	Njoro Spring	1.00	1.26	● ● ● ●
350	Wundanyi	U-34	Sigaso/Manguri River	0.28	0.35	● ● ● ●
360	Hola	U-36	Tana River	1.22	1.54	● ● ● ●
410	Embu	U-40	Lower Kapingazi River + Upper Rupingazi River	2.47	3.12	● ● ● ●
420	Isiolo	U-41	Boreholes + Spring	3.41	4.29	● ● ● ● ● ● ● ● ● ● ● ● ● ●
420	Ol Doinyo Ng'iro	U-42	Ewaso Ngiro River	0.70	0.89	● ● ● ●
420	Merti	U-139	Ewaso Ngiro	0.91	1.14	● ● ● ●
430	Kitui	U-43	Masinga Dam	1.40	1.77	● ● ● ●
430	Mwingi	U-45	Kiambere Dam	1.10	1.39	● ● ● ●
440	Machakos	U-46	Athi River P/L	22.81	28.74	● ● ● ● ● ●
440	Mitaboni	U-47	Kaathana River	7.64	9.63	● ● ● ●
440	Kangundo	U-50	Pipeline from Athi River	1.50	1.89	● ● ● ●
440	Wote	U-141	Kaiti river + Nzuuni river	0.31	0.39	● ● ● ●
450	Kargi	U-54	Boreholes + Subsurface Dam	0.65	0.81	● ● ● ● ● ● ● ● ● ● ● ● ● ●
450	Marsabit	U-55	Boreholes +Small dams/Sub-surface dam/Spring	1.65	2.07	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
460	Meru	U-58	Kathita river	20.54	25.88	● ● ● ●
510	Garissa	U-67	Tana River	8.08	10.19	● ● ● ●
520	Mandera	U-68	Daua River	0.66	0.83	● ● ● ●
520	Elwak	U-69	Borehores	0.89	1.12	● ● ● ● ● ● ● ●
530	Wajir	U-71	Borcholes + Ewaso Ngiro River	2.65	3.34	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
530	Buna	U-72	Borcholes(Lago Bor river)	0.67	0.84	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
610	Nyamira + Kebirigo	U-144	Kuja river	1.12	1.41	● ● ● ●
610	Kisii	U-76	Bunyunyu Dam	9.24	11.64	● ● ● ●
620	Kisumu & + Kiboswa	U-79	Kibos dam	37.19	46.85	● ● ● ● ● ●
620	Ahero	U-80	Nyando river	0.93	1.17	● ● ● ●
620	Muhoroni	U-81	Nyando River	0.92	1.16	● ● ● ●
630	Siaya	U-83	Yala River	1.96	2.47	● ● ● ●
640	Homa Bay	U-85	Lake Victoria	2.50	3.16	● ● ● ●
640	Migori	U-86	Migori river	0.83	1.04	● ● ● ●
710	Oloitokitok	U-88	Nol-Turesh Spring	0.87	1.10	● ● ● ●
710	Ngong	U-89	Kerarapon Spring	2.86	3.61	● ● ● ●
710	Kajiado	U-90	Kiserian P/L	1.21	1.53	● ● ● ●
710	Namanga	U-91	Namanga Spring	0.97	1.23	● ● ● ●
720	Sotik	U-93	Kipsonoi river	0.58	0.73	● ● ● ●
720	Kericho	U-94	Dimlitch Dam, Kimugung Dam	9.72	12.24	● ● ● ●
730	Nanyuki	U-97	Liki river	7.94	10.01	● ● ● ●
740	Nakuru	U-104	Turasha P/L + Malewa Dam + Itare Dam	55.47	69.89	● ● ● ● ● ●

Note: ● Construction

Appendix 4.2 Sewerage Development
Proposed Implementation Programme for Alternative-B (2/2)

District Code	Urban Name	City Code	Future Raw Water Source	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
750	Narok	U-105	Upper Narok Dam	3.00	3.78	● ● ● ● ● ●
760	Kitale	U-107	Koitobos river	16.08	20.26	● ● ● ● ● ●
770	Eldoret	U-110	Moiben Dam + Nzoia river	31.47	39.65	● ● ● ● ● ●
810	Kabarnet	U-112	Kirandich Dam	1.20	1.52	● ● ● ● ● ●
810	Maji Mazuri	U-113	Maji Mazuri river	0.67	0.84	● ● ● ● ● ●
820	Iten+Tambach	U-116	Moiben Dam	0.70	0.88	● ● ● ● ● ●
830	Kapsabet+Baraton	U-118	Mokong river	1.93	2.44	● ● ● ● ● ●
840	Maralal	U-119	Loikas/Yamo river	2.66	3.35	● ● ● ● ● ●
850	Lodwar	U-122	Boreholes & sub-surface dam	1.34	1.69	● ● ● ● ● ●
860	Kapenguria/Makutano	U-123	Kapenguria River	1.65	2.08	● ● ● ● ● ●
910	Bungoma	U-124	Kuywa River	9.50	11.97	● ● ● ● ● ●
910	Kimilili	U-125	Kimilili River	1.08	1.37	● ● ● ● ● ●
920	Busia	U-127	Sio river	2.39	3.01	● ● ● ● ● ●
930	Vihiga+Majengo	U-129	Edzawa River (Kimondi River)	0.50	0.63	● ● ● ● ● ●
930	Kakamega	U-132	Isiukhu River, Mukulusi Dam	12.30	15.49	● ● ● ● ● ●
				620.38	781.68	

Note: ● Construction

Appendix 4.3 Irrigation Project

Proposed Implementation Programme for Alternative-B

District Code	Project	Development Area (ha)	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8 10
	Small Scale Schemes	7,000	MOA	11.4	14.4	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
220	Mwea extension	2,900	NIB	63.7	80.3	★ ★ ● ● ● ● ● ● ● ● ●
310	Sabaki Extension	3,000	TARDA	19.8	24.9	☆ ☆ ★ ★ ● ● ● ● ●
360	Tana Delta	12,000	TARDA	141.4	178.2	● ● ● ● ● ● ●
410	Lower Rupingazi	1,800	TARDA	6.0	7.6	☆ ☆ ★ ★ ● ● ● ● ●
440	Kanzalu	4,055	TARDA	37.9	47.8	☆ ☆ ★ ★ ● ● ● ● ●
460	Kunati	1,050	TARDA	3.5	4.4	☆ ☆ ★ ★ ● ● ●
460	Thanantu	2,520	TARDA	17.3	21.8	☆ ☆ ★ ★ ● ● ● ● ●
620	Kano Plain	25,640	LBDA	232.5	293.0	★ ★ ● ● ● ● ● ● ● ● ● ● ● ●
630	Lower Nzoia/ Bunyala Extension	10,480	NIB	12.4	15.6	☆ ☆ ★ ★ ★ ● ● ● ●
640	Lower Kuja	1,900	LBDA	5.6	7.1	☆ ☆ ★ ★ ● ● ● ● ● ● ● ● ●
640	Kimira	2,000	LBDA	18.1	22.8	☆ ☆ ★ ★ ● ● ● ● ●
820	Arror	1,340	KVDA	6.3	7.9	☆ ☆ ★ ★ ● ● ● ● ●
920	Yala Swamp	7,540	LBDA	65.0	81.9	☆ ★ ★ ● ● ● ● ● ● ●
	Total	83,225		640.9	807.5	

Note:

☆ Study
★ Design
● Construction

- Tana Delta : Commenced in 1992
- Lower Ewaso N'giro and Yala Swamp : Continue 2011 onward

Appendix 4.4 Major Flood Control Projects
Proposed Implementation Programme for Alternative-B

District Code	Project	Description	Executing Agency	Cost (million)		Implementation Schedule
				US$	K£	93 95 2000 2 4 6 8
620	Kano Plain (Nyando river)	– Heightening of existing dykes (2 km) – Construction of new dykes (69 km)	MOWD/ LBDA	20.7	26.1	☆ ☆ ☆ ● ● ● ●
110	Nairobi City (Nairobi river, etc)	– Enlargment of existing channels/culverts (13 sites) – Channel improvement (11 sites)	MOLG	10.8	13.6	☆ ☆ ☆ ● ● ●
630	Yala Swamp (Yala/Nzoia river)	– Rehabilitation of existing dykes (25 km) – Construction of new dykes (16 km)	MOWD/ LBDA	17.7	22.3	☆ ☆ ☆ ● ● ●
	Total			49.2	62.0	

Note: ☆ Study/Design
● Construction

Appendix 4.5 Urban Drainage and River Improvement Projects Proposed Implementation Programme for Alternative-B

District Code	Project	Description	Executing Agency	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 95 2000 2 4 6 8 10
	Urban Drainage Projects					
110	Nairobi	P = 1,413,100 , A = 90.0 Km2	MOLG	360.0	453.6	☆ ☆ ● ● ● ●
210	Thika	P = 59,000 , A = 1.9 Km2	"	14.8	18.6	☆ ☆ ☆ ● ● ●
250	Nyeri	P = 97,000 , A = 1.6 Km2	"	13.1	16.5	☆ ☆ ☆ ● ● ●
340	Mombasa	P = 479,600 , A = 11.6 Km2	"	46.6	58.7	☆ ☆ ☆ ● ● ●
440	Machakos	P = 91,100 , A = 2.8 Km2	"	22.1	27.8	☆ ☆ ☆ ● ● ●
460	Meru	P = 78,900 , A = 0.3 Km2	"	2.7	3.4	☆ ☆ ☆ ● ● ●
610	Kisii	P = 45,800 , A = 2.6 Km2	"	21.1	26.6	☆ ☆ ☆ ● ● ●
620	Kisumu	P = 188,700 , A = 5.6 Km2	"	33.5	42.2	☆ ☆ ☆ ● ● ●
720	Kericho	P = 41,200 , A = 1.2 Km2	"	9.4	11.8	☆ ☆ ☆ ● ● ●
740	Nakuru	P = 172,200 , A = 13.0 Km2	"	51.8	65.3	☆ ☆ ☆ ● ● ●
760	Kitale	P = 56,400 , A = 4.2 Km2	"	25.2	31.8	☆ ☆ ☆ ● ● ●
770	Eldoret	P = 112,900 , A = 8.6 Km2	"	34.3	43.2	☆ ☆ ☆ ● ● ●
930	Kakamega	P = 49,200 , A = 2.1 Km2	"	16.6	20.9	☆ ☆ ☆ ● ● ●
	Sub-total	P = 2,885,100 , A = 145.4 Km2	"	651.2	820.5	
	Minor Ad-hoc RiverImprovement Works					
All	Various rivers	To be taken up as the need is identified	MOWD	68.0	86.0	☆ ☆ ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
	Long-term Improvement of Lower Tana River					
360	Lower Tana improvement	Experimental work for rectifying river meanders and bank protection	MOWD/ TARDA	30.0	38.0	● ● ● ● ● ● ● ●
	Sub-total			98.0	124.0	
	TOTAL			749.2	944.4	

Note: ☆ Study/Design
● Construction

Appendix 4.6 Summary of Development Cost for Alternative-B

Development Sector	Budget Appropriated for	Financial Requirement (Million) 1993 - 2000 US$	1993 - 2000 K£	2001 - 2010 US$	2001 - 2010 K£	Total US$	Total K£
1. D&I Water Supply		2,606	3,284	3,079	3,879	5,685	7,163
(1) Urban water supply	MOWD *1	2,238	2,820	1,476	1,860	3,714	4,680
(2) Rural water supply	MOWD *2	368	464	1,603	2,019	1,971	2,483
2. Sewerage Development	MOLG *3	371	467	249	314	620	781
3. Irrigation Development		200	252	398	502	598	754
(1) Major irrigation projects	MORD *4	195	246	393	495	588	741
(2) Small irrigation schemes	MOA *5	5	6	5	7	10	13
4. Livestock Water Development	MOLD *6	192	242	374	471	566	713
5. Hydropower Development	MOE *7	542	683	492	621	1,034	1,304
6. River and Flood Works		462	582	336	423	798	1,005
(1) Major flood control projects	MOWD *8	21	26	28	36	49	62
(2) Urban drainage works	MOLG *3	391	493	260	327	651	820
(3) Minor river improvement	MOWD *8	20	25	48	60	68	85
(4) Improvement of Lower Tana	MOWD *9	30	38	-	-	30	38
Total		4,373	5,510	4,928	6,210	9,301	11,720

Notes: Executing agencies will be;

*1 : MOWD, NWCPC, Municipalities (NCC, etc)

*2 : MOWD, NWCPC, County councils, NGO, etc

*3 : Municipal and urban councils under technical assistance by MOWD

*4 : NIA, LBDA, TARDA, KVDA and other basin development authorities

*5 : MOA and some agencies listed for *4

*6 : Implementation to be entrusted to MOWD and/or basin development authorities

*7 : KPC, KPLC and basin development authorities

*8 : MOWD or to be entrusted to basin development authorities and municipal/urban councils

*9 : To be entrusted to TARDA

Appendix 4.7 Annual Budgetary Schedule for Alternative-B

(Unit : million US$)

Development Sector	Year																		Total
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
1 D&I Water Supply	471.8	471.8	395.0	395.0	201.5	201.5	234.8	234.8	332.2	332.2	363.9	363.9	323.9	323.9	296.6	296.6	223.0	223.0	5,685
(1) Urban water supply	425.8	425.8	349.0	349.0	155.5	155.5	188.8	188.8	171.9	171.9	203.6	203.6	163.6	163.6	136.3	136.3	62.7	62.7	3,714
(2) Rural water supply	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	1,971
2 Sewerage Development (for 158 urban centres)	78.7	78.7	79.2	79.2	11.1	11.1	16.4	16.4	22.7	22.7	22.7	22.7	36.6	36.6	31.4	31.4	11.4	11.4	620
3 Irrigation Development	32.7	33.9	9.9	15.4	44.4	22.8	15.6	24.9	33.4	28.6	36.9	46.0	54.1	76.0	63.9	39.1	11.3	9.0	598
(1) Major irrigation projects	32.1	33.3	9.3	14.8	43.8	22.2	15.0	24.3	32.8	28.0	36.3	45.4	53.5	75.4	63.3	38.5	10.7	8.4	588
(2) Small irrigation schemes	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	10
4 Livestock Water Development	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	566
5 Hydropower Development	20.0	27.0	52.0	45.0	63.0	93.0	113.0	129.0	129.0	159.0	121.0	56.0	27.0						1,034
6 River and Flood Works	3.7	3.7	97.1	102.3	102.4	102.4	27.9	22.7	20.3	44.2	44.2	43.9	21.5	21.6	25.8	38.1	38.4	38.2	798
(1) Major flood control projects				5.2	5.2	5.2	5.2			3.6	3.6	3.6			4.4	4.4	4.4	4.4	49
(2) Urban drainage works			90.0	90.0	90.0	90.0	15.5	15.5	15.6	35.9	35.9	35.6	16.7	16.8	16.6	28.9	29.2	29.0	651
(3) Minor river improvement			3.4	3.4	3.4	3.4	3.4	3.4	4.7	4.7	4.7	4.7	4.8	4.8	4.8	4.8	4.8	4.8	68
(4) Improvement of Lower Tana	3.7	3.7	3.7	3.7	3.8	3.8	3.8	3.8											30
Total	630.8	639.0	657.2	660.9	446.3	454.7	431.6	451.7	575.0	624.1	626.1	569.9	500.5	495.5	455.1	442.6	321.5	319.0	9,302

Note : Development cost of rural and livestock water supply systems were estimated at 25 % of full scale development plan.

APPENDIX 5

IMPLEMENTATION PROGRAMME OF DOMESTIC/INDUSTRIAL WATER SUPPLY SCHEMES UNDER REDUCED DEVELOPMENT SCENARIO

(Reduced development just enough to meet the demand level projected for year 2000)

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