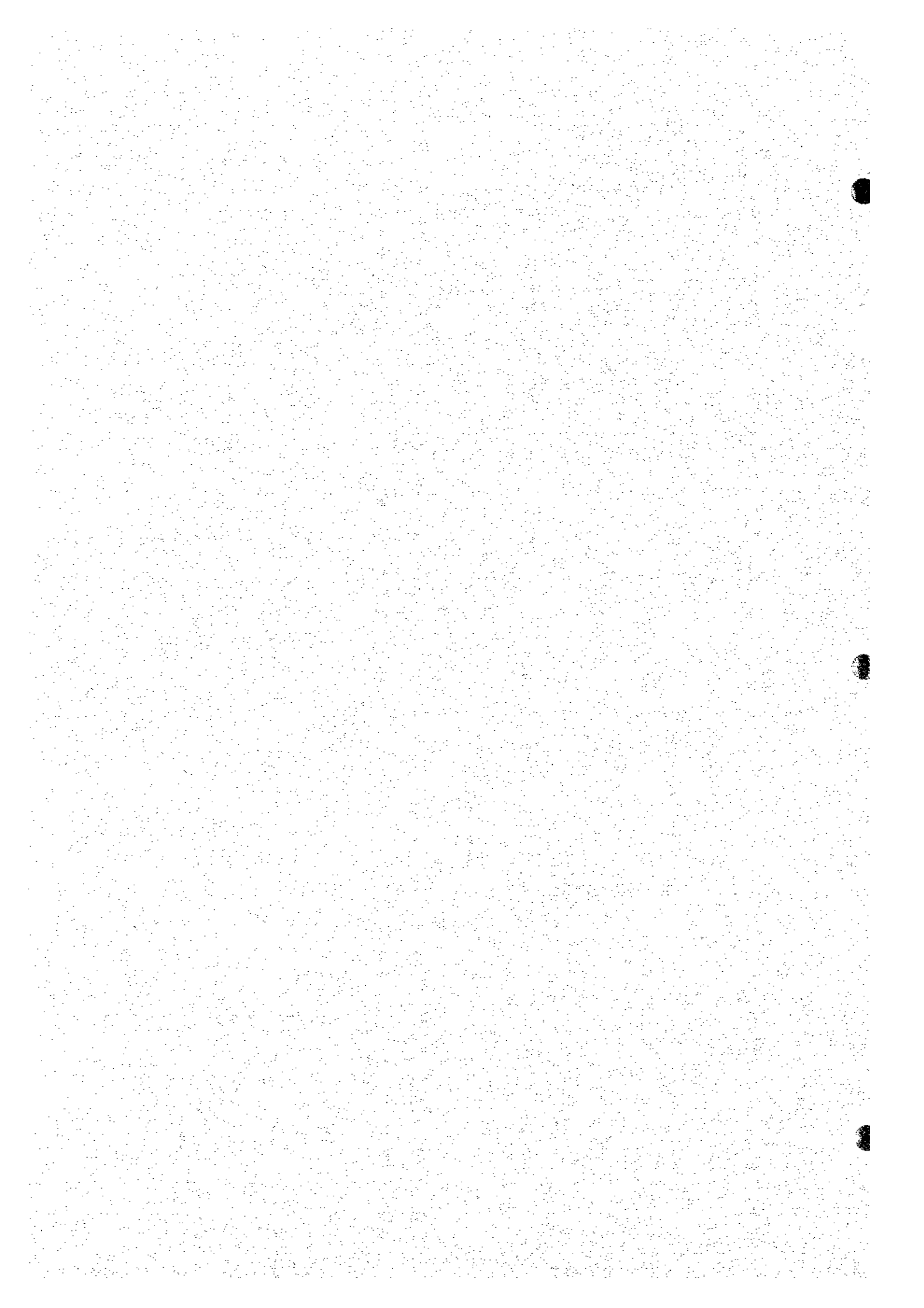


**THE STUDY ON WATER SUPPLY FOR
SEVEN TOWNS IN EASTER PROVINCE
IN THE REPUBLIC OF KENYA**

APPENDIX E

INSTUTUTION AND MANAGEMENT



APPENDIX E INSTITUTION AND MANAGEMENT

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1. ORGANIZATION AND INSTITUTION

1.1 General Organization for Water Supply

Urban and rural water supplies in Kenya had been under jurisdiction of the Ministry of Works and the Ministry of Agriculture, separately, up to 1964. In 1964, for controlling both urban and rural water supplies, Water Development Department was organized under the Ministry of National Resources by unifying these two functions. In 1968, further, the Department of Water Development was reorganized under the Ministry of Agriculture. In November 1974 when the Ministry of Water Development was established, all functions of the Department of Water Development were shifted under control of this ministry. At present all water supplies in Kenya are managed by the Ministry of Land Reclamation, Regional and Water Development (MLRRWD) which was established in January 1993.

The MLRRWD has the overall responsibility for planning, conserving and operating water supplies throughout the country with a view to providing safe and clean water to all nationals. The Ministry administers the Water Act (Cap 372) through the Water Apportionment Board (WAB) of which the Director of Water Development is the Technical Advisor.

1.2 Ministry of Land Reclamation, Regional and Water Development

(MLRRWD)

The Ministry of Land Reclamation, Regional and Water Development (MLRRWD) was reorganized in January 1993 as mentioned in the previous sub-section, integrating the functions of the following three ministries.

- Ministry of Water Development,
- Ministry of Reclamation and Development of Arid, Semi-Arid and Waste Land, and
- Ministry of Regional Development.

Major functions of MLRRWD are enumerated below:

- 1) Reclamation of Arid and Semi-Arid lands,
- 2) Water master plan implementation,
- 3) Water policy formulation & implementation,
- 4) Water supply systems development & implementation,
- 5) Water abstraction control & management,

- 6) Water quality and pollution control, and
- 7) Irrigation and dam construction projects.

MLRRWD currently look after and manage the following organization:

- 1) Lake Basin Development Authority
- 2) Coast Development Authority
- 3) Uaso Nyiro River Basin - North Development Authority
- 4) Uaso Nyiro River Basin - South Development Authority
- 5) Bura Irrigation Scheme
- 6) Turkana District Rehabilitation Project
- 7) National Irrigation Board.

The Director of Water Development controls six divisions, KEWI, the eight Provincial Water Offices and 60 District Water Offices. The organization of the MLRRWD is shown in *Figure E1-1*. The Water Resources Division carries out assessment, conservation and usage, pollution control of water, and registration of water right in cooperation with the WAB. The Planning and Design Division is in charge of studies, planning and design of water management and development. The Implementation Division executes construction of infrastructural facilities such as dams, pipelines, treatment works, sewers, irrigation canals and groundwater boreholes. The Operation and Maintenance Division is responsible for operation and maintenance of water supply and sewerage systems including operation policy making thereof. The Research Division is responsible for formulation of water research policies and action plans related to water resources and wastewater engineering. The Monitoring and Coordination Division coordinates all external and internal organizations under the direction of the Director. KEWI is responsible for training of employees in the Ministry and local authorities or other agencies in the country.

1.3 National Water Conservation and Pipeline Corporation, and Others

Apart from the MLRRWD, the National Water Conservation and Pipeline Corporation (NWCPC) which was established in June 1988 fulfills the water works mainly to urban centers including Mombasa, Kapsabet, Kakamega, Embu, Nyeri and Machakos. The NWCPC consists of Board, the Managing Director, five Departmental Managers and other junior staff mainly transferred from the MLRRWD. *Figure E1-2* shows the organization chart of the NWCPC. Large cities such as Nairobi, Kisumu, Nakuru, and Eldoret have self-sustained and independent water supply maintained and operated by their respective municipalities.

Besides the organizations mentioned above, many community based and/or privately owned water supplies are operated in the Republic of Kenya. They are self-help community water projects and institutional water schemes (run by religious groups, NGOs, etc.). The MLRRWD, however, monitors these activities, and involves in water right issues and providing technical advice on design, operation and maintenance.

1.4 Organization for Water Supply in the Study Area

Operation and maintenance of the existing water supply systems (owned by MLRRWD) are carried out by the Provincial Water Office and the District Water Office under the direction and control of the Deputy Director of Operation & Maintenance of the MLRRWD. *Figure E1-3* shows organization chart of the Eastern Provincial Water Office.

Actual activities for the operation and maintenance are done by the District Water Offices. Each District Water Offices has one District Water Engineer who has responsibilities for all operation and maintenance activities in his District. There are four Districts in the Study Area, namely Meru, Isiolo, Tharaka-Nithi, and Nyambene. Present organization charts and staffings for four Districts are shown in *Figures E1-4* to *7* and *Tables E1-1* to *4*, respectively.

Administration of each District Water Office is maintained by the water charges collected from consumers in the District. The water charges collected are mainly spent for the operation and maintenance of the water supply system as listed followings.

- Maintenance of Buildings and Stations
- Maintenance of Water Supplies and Sewage
- Renewal of Water Supplies
- Purchase of Water Meters
- Purchase of Plants and Equipment
- Transport Operating Expenses
- Traveling and Accommodation Allowances
- Miscellaneous and Others

2. SYSTEM OPERATION AND MAINTENANCE

The study area is in four districts of the Eastern Province. Each district has a district water office (DWO), an agency responsible for operation and maintenance of water supply facilities owned by the MLRRWD. Operation and maintenance exercised at each water

supply will be summarized with an emphasis on flow and pressure control, leakage abatement activities, storage, laboratory and training.

2.1 Flow and Pressure Control

In general, water supplies in the study area adopt gravity flow for water transmission and distribution. Pump sets are installed only in Isiolo for lifting backwash-water to the elevated tank. Flow meters installed at the inlet and outlet of the treatment works are not working or in most case not installed. Hence, flow control usually undertaken at the waterworks is based on gate valve operation. When raw water is extremely turbid, they are sometimes obliged to stop extraction by closing gate valves.

Treatment processes adopted differ from area by area. Generally, operation of the treatment facilities requires knowledge of water supply engineering and experience. Due to no chemical dosage, flow control is not undertaken.

In the distribution network, break pressure tanks are constructed. This is to protect the pipelines from the excess pressure. According to the survey conducted at Meru, any high pressure was not measured. Due to absence/damage of the flow control devices, excess water are overflowing from the break pressure tanks.

Water shortage is serious problem in most of the water supplies. Water rationing is chronically taking place. The area suffered from water rationing are tabulated below.

Table E2-1 Areas Suffering Water Shortage

Town	Areas
Meru	Northern parts of the supply area
Nkubu	None
Isiolo	LMD (Livestock marketing division, upstream area between the treatment works and Kulanawe area
Chuka	Lower town
Chogoria	All the area except areas near the Majira storage tank
Maua	None
Tigania	Kianjai, Akhithi, Maithene, Uringu, and upper parts of Muthara

Source:DWO

2.2 Leakage Control

Each waterworks has several number of plumbers and pipefitters. According to the district water engineers, leakage control is carried out by them. These activities are, however, characterized as passive one. When leakage occurs, they visit the site and repair them.

Intensive active leakage control are not exercised yet.

All the water supply officers expressed their shortage of equipment, materials and vehicles. As given in the following table, vehicles maintained by each office are apparently in shortage in view of their vast service area covered by water supplies.

Table E2-2 List of Vehicles Retained by Water Supply

Towns	Nos.	Conditions
Meru		
Folk Jembe (hole	3	Working
Nkubu	none	
Isiolo		
Vehicles	2	Grounded and not working
Dosers	8	Unserviceable
Chuka	none	
Chogoria	none	
Maua	none	
Tigania		
Motor cycle	1	Working

Source: DWO

2.3 Storage

(1) Chemicals

Each DWO has store houses for chemicals and equipment for delivery to water supplies. Engineers in each water supply request the delivery when required. As their delivery are controlled by DWO, however, chemicals (alum, chlorine) are not dosed on a continuous basis. Reconnaissance survey revealed that their stocks at the site, despite their information listed below, are chronically in shortage.

Table E2-3 Storage of Materials

Town	Meters	Calibrators	Pipes	Valves
Meru	-	-	-	-
Nkubu	-	-	-	-
Isiolo	nil	-	50-200mmx204m	75-100mmx3sets
Chuka	-	-	75-250mmx26m	-
Chogoria	-	-	50-150mmx 34m	-
Maua	-	-	-	-
Tigania	-	-	-	-

Source: DWO

(2) Materials

To operate and maintain the water supply facilities, stock of pipes, valves, fittings and meters are indispensable. In this regard, each water supply does not keep sufficient nos. of materials.

Table E2-4 Storage of Chemicals

Town	Alum	Chlorine	Soda	Frequency	Remarks
Meru	100 kg	300kg	-		Immediately
Nkubu	100 kg	100 kg	-		
Isiolo	40 tons of alums, chlorine and soda		-	Monthly	Immediately
Chuka	-	2 tons	-	Yearly	
Chogoria	-	100 kg	-		
Maua	-	100 kg	-	6 Months	
Tigania	-	-	-	-	

2.4 Laboratory

Laboratories of the WTPs or DWOs are not sufficient in terms of number of the equipment to normally operate the plants. Following table shows an outline of the water testing conducted at the WTP.

Table E2-5 Water Testing

Town	Daily	Weekly	Monthly	Yearly	Remarks
Meru	Turbidity	-	-	-	
	Residual chlorine	-	-	-	
Nkubu	-	-	-	-	
Isiolo	pH	Alkalinity	Bio-chemical	-	
	Turbidity	-	-	-	
	Residual chlorine	-	-	-	
	Jar testing	-	-	-	
Chuka	-	-	-	-	No laboratory
Chogoria	-	-	-	-	No laboratory
Maua	Residual chlorine	-	-	-	
Tigania	-	-	-	-	No laboratory

Source: DWO

As suggested in the table above, laboratory testing is not intensively carried out by water

supplies. Following table also suggests slightly weak organization of laboratory testing.

Table E2-6 Organization for Laboratory Testing

Town	Nos. of staff
Meru	2 no. of operators
Nkubu	no staff
Isiolo	1 no. of chemist 2 no. of laboratory technicians
Chuka	1 no. of pollution control officer 1 no. of chemical attendant 1 no. of operator
Chogoria	no staff
Maua	1 no. of operator
Tigania	no staff

Source: DWO

2.5 Training

Training of technical staff and engineers is being carried out by KEWI (Kenya Water Institute). Following are information obtained from DWOs.

Table E2-7 Training

Town	Frequency	Scope	Place
Meru	occasionally	WS operation	Kenya Water Institute
Nkubu	one staff two years ago	WS operation	Kenya Water Institute
Isiolo	occasionally	WS operation	Kenya Water Institute
Chuka	two staff at least every year	WS operation	Kenya Water Institute
Chogoria	none	-	-
Maua	none	-	-
Tigania	none	-	-

Source: DWO

As seen in the table, most of water supplies have frequent opportunity to attend the operator training courses held in Nairobi. As compared to other districts, Nyambene DWO had a little chance to attend the courses.

2.6 Problems Identified

All the problems described above originate from a serious shortage of financial and human resources. The financial constraint is a major reason for not procuring chemicals, meters, tools and equipment required for proper maintenance and operation, resulting in an absence

of maintenance.

There are many unmetered connections. Further, customer meters installed are not working. Such unmetered customers and customers with unfunctioning meters are charged on a flat rate tariff basis, not on a water consumption basis. This has led to a lack of water conservation behaviour among the people.

Shortages of the experienced staff, technicians and engineers are also serious in every waterworks. Acquisition of technology through on-the-job training is considered most efficient to operate and maintain the water supply facilities.

TABLES

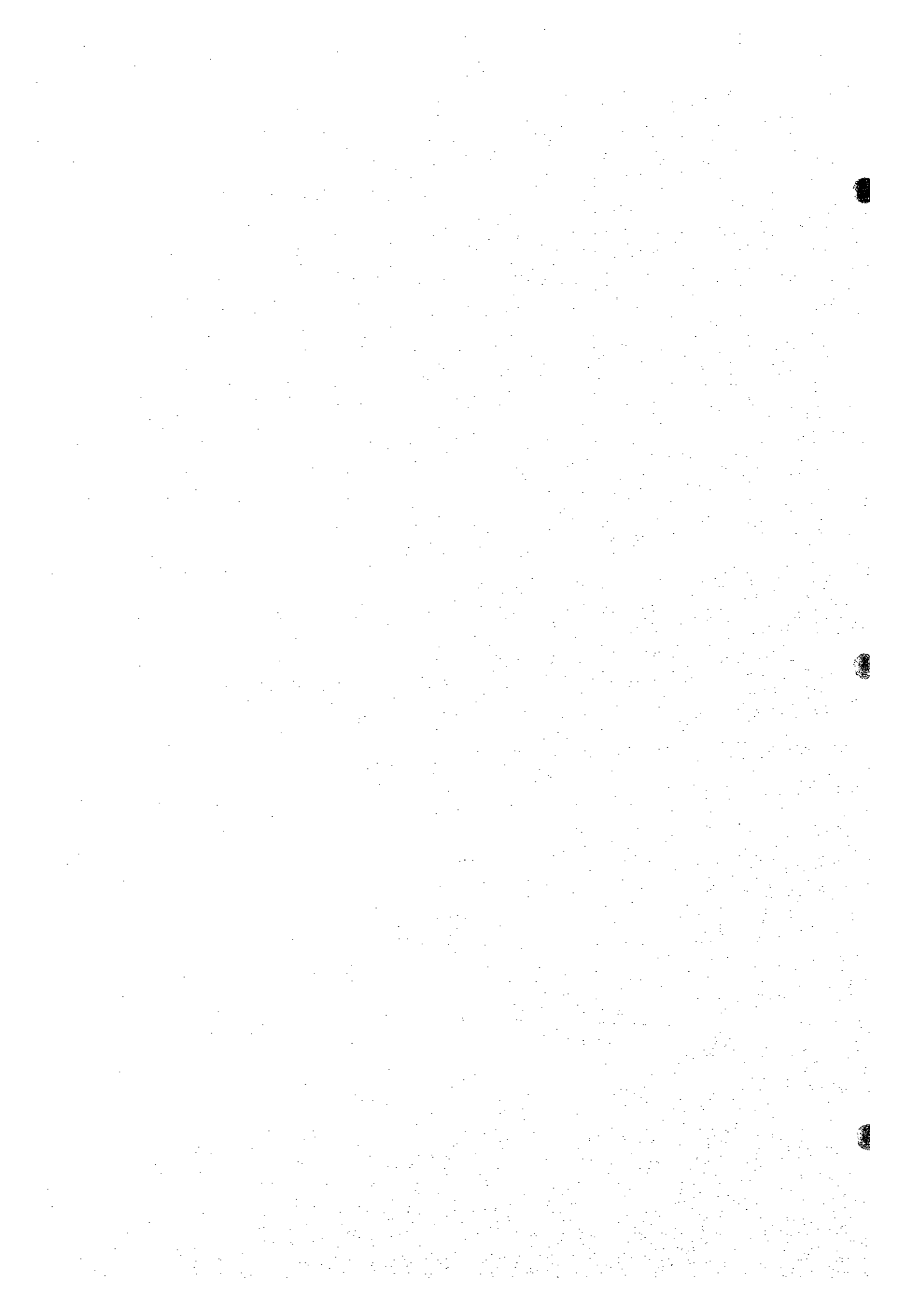


Table E1-1 Meru District Water Office

	Number of Staff
District Water Engineer	1
Operation and Maintenance	42
Administration	28
Pollution Control	2
Water Quality	1
Surface Water	7
Water Rights	8
Groundwater	6
Planning and Design	5
Electrical	2
Mechanical	17
Divisional Water Office	
Miriga Micyu West/Buuri	27
Miriga Micyu East	11
Nkuene	17
Abothuguchi West	7
Abothuguchi East/Central	3
Abogeta	9
Igoji	13
Timau	6
<i>Total Number of Staff</i>	212

Table E1-2 Isiolo District Water Office

	Number of Staff
District Water Engineer	1
Deputy Head	1
Water Resources	-
Water Law	1
Geology	5
Hydrology	7
Administration	-
Accounts	4
Personnel	14
Supplies	3
Administration	5
Electrical and Mechanical	-
Mechanical	17
Electrical	6
Development and Implementation	-
Planning and Design	4
Construction	8
NGO's	2
Range Water	3
Water Quality	-
Pollution Control	2
Water Quality	2
Operation and Maintenance / Divisions	-
Central	12
Revenue	13
Isiolo Water Supply	14
Merti	7
Garba-Tulla	4
Sericho	2
Kinna	2
Oldo-Nyiro	2
<i>Total Number of Staff</i>	141

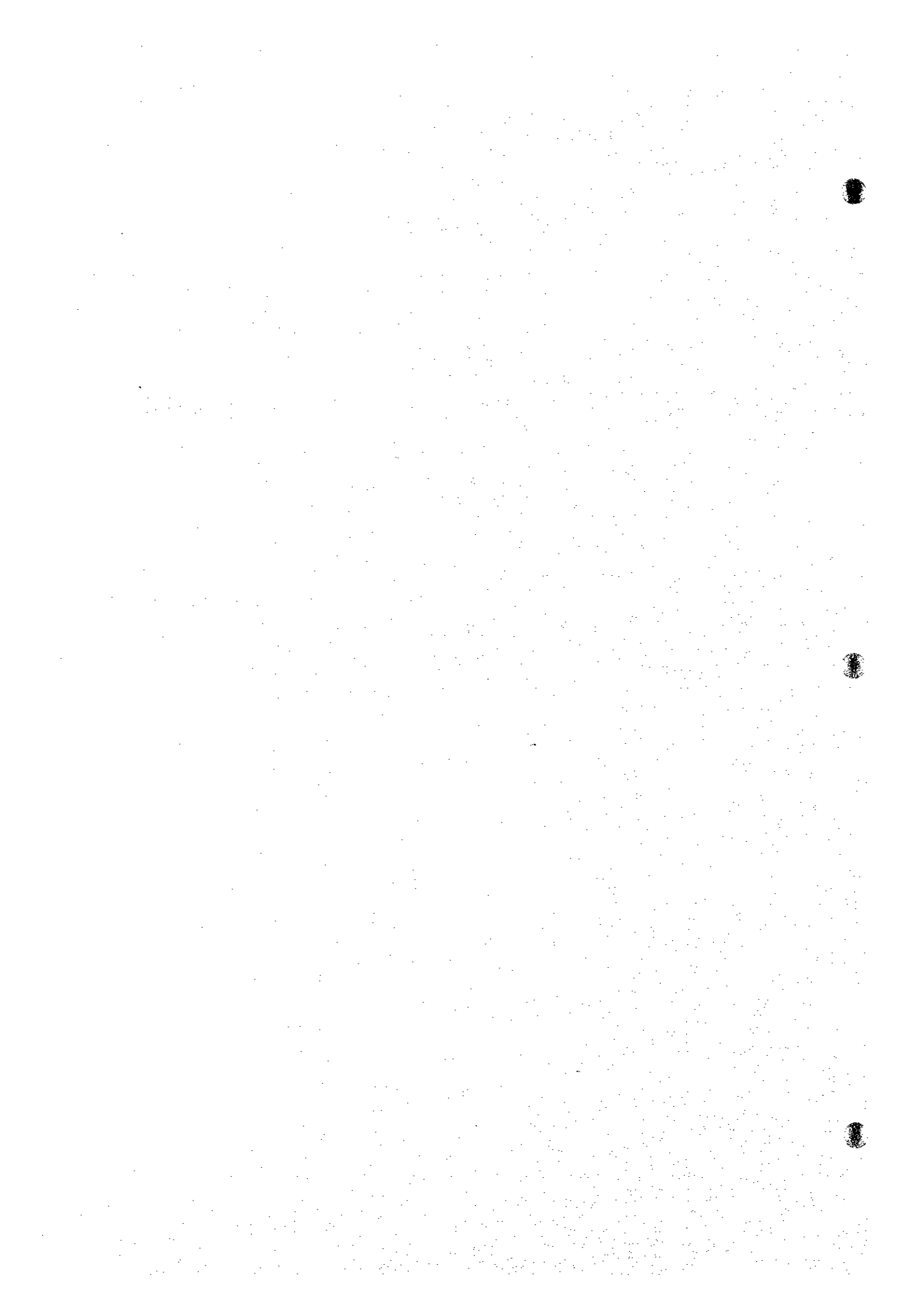
Table E1-3 Tharaka-Nithi District Water Office

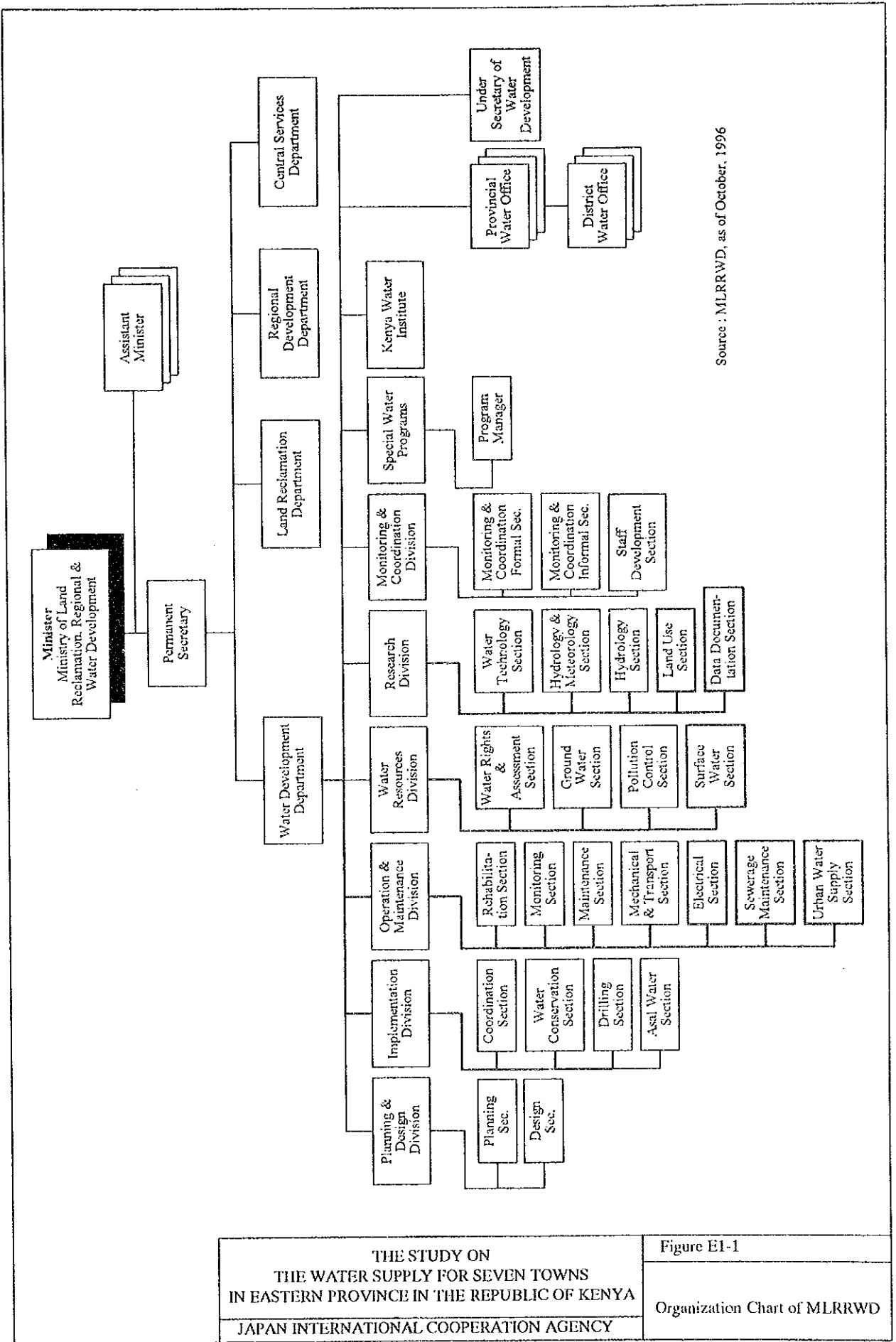
	Number of Staff
District Water Engineer	1
Water Resources	1
Pollution Control	1
Water Rights	2
Groundwater	2
Surface Water	11
Operation & Maintenance	1
Water Supply	1
Electrical	2
Mechanical	8
Rehabilitation	2
Development	1
Implementation	1
Self-help	1
Planning & Design	14
Survey	1
Office Services	1
Personal	7
Accounts	1
Supplies	2
Divisional Water Offices	-
Central Tharaka	2
North Tharaka	2
South Tharaka	10
Magumori	3
Chuka	28
Igamba	2
Muthambi	2
Mwimbi	11
Tharaka Water and Sanitation Project	34
<i>Total Number of Staff</i>	155

Table E1-4 Nyambene District Water Office

	Number of Staff
District Water Engineer	1
Electrical and Mechanical	-
Mechanical	4
Electrical	2
Planning and Design	8
Administration	30
Water Resources	22
Operation and Maintenance	28
<i>Total Number of Staff</i>	95

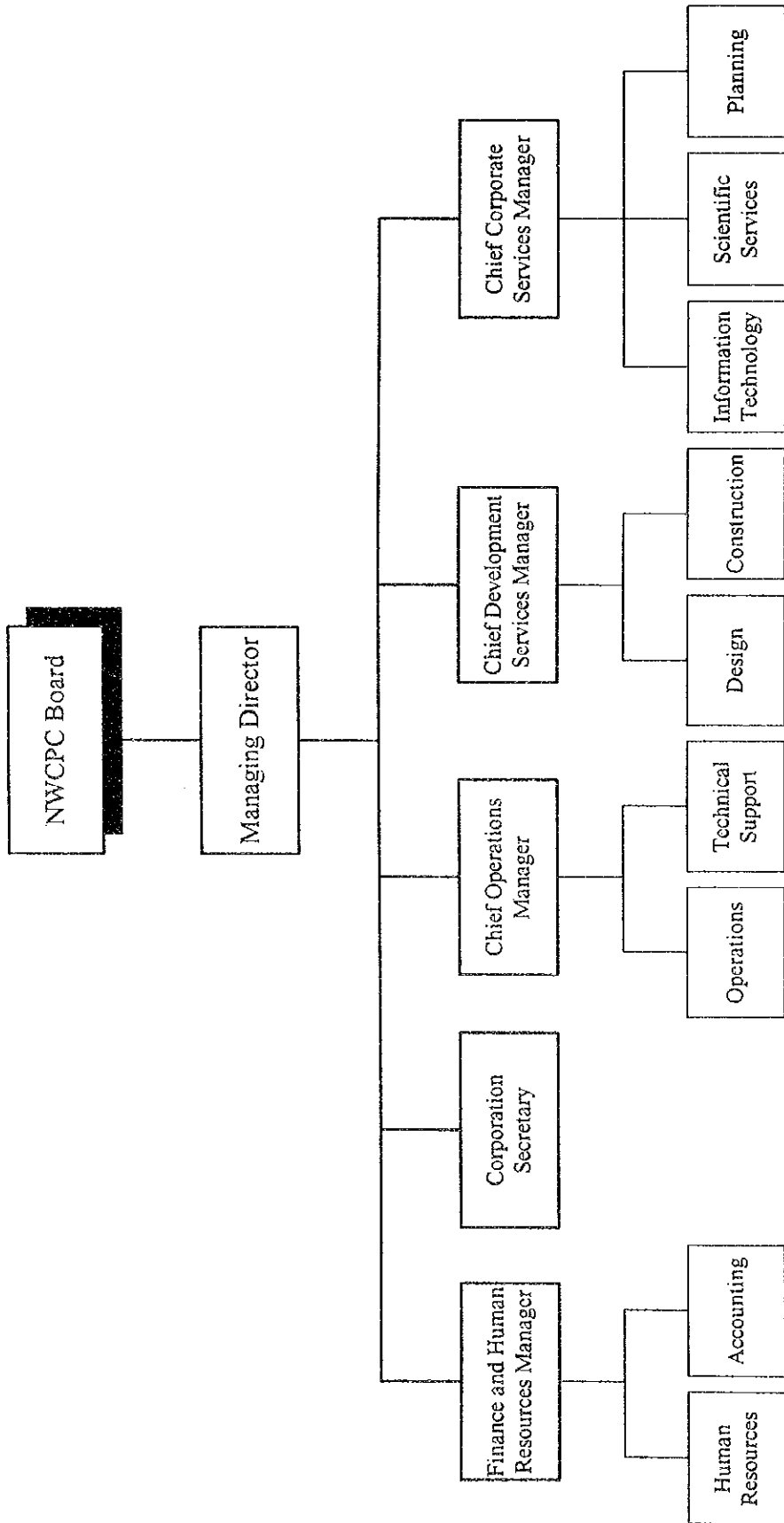
FIGURES





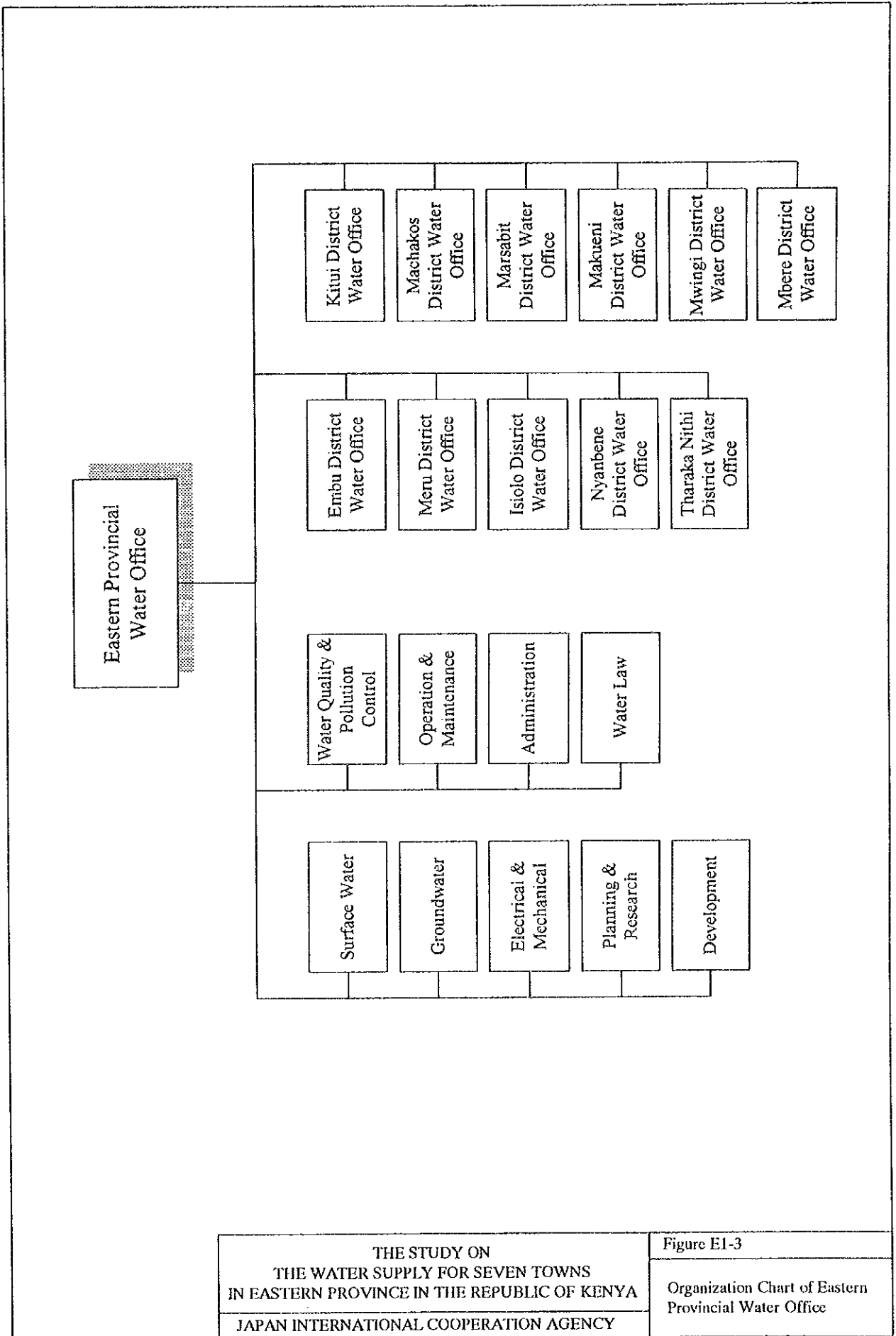
Source : MLRRWD, as of October, 1996

<p>THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY</p>	Figure E1-1
	Organization Chart of MLRRWD

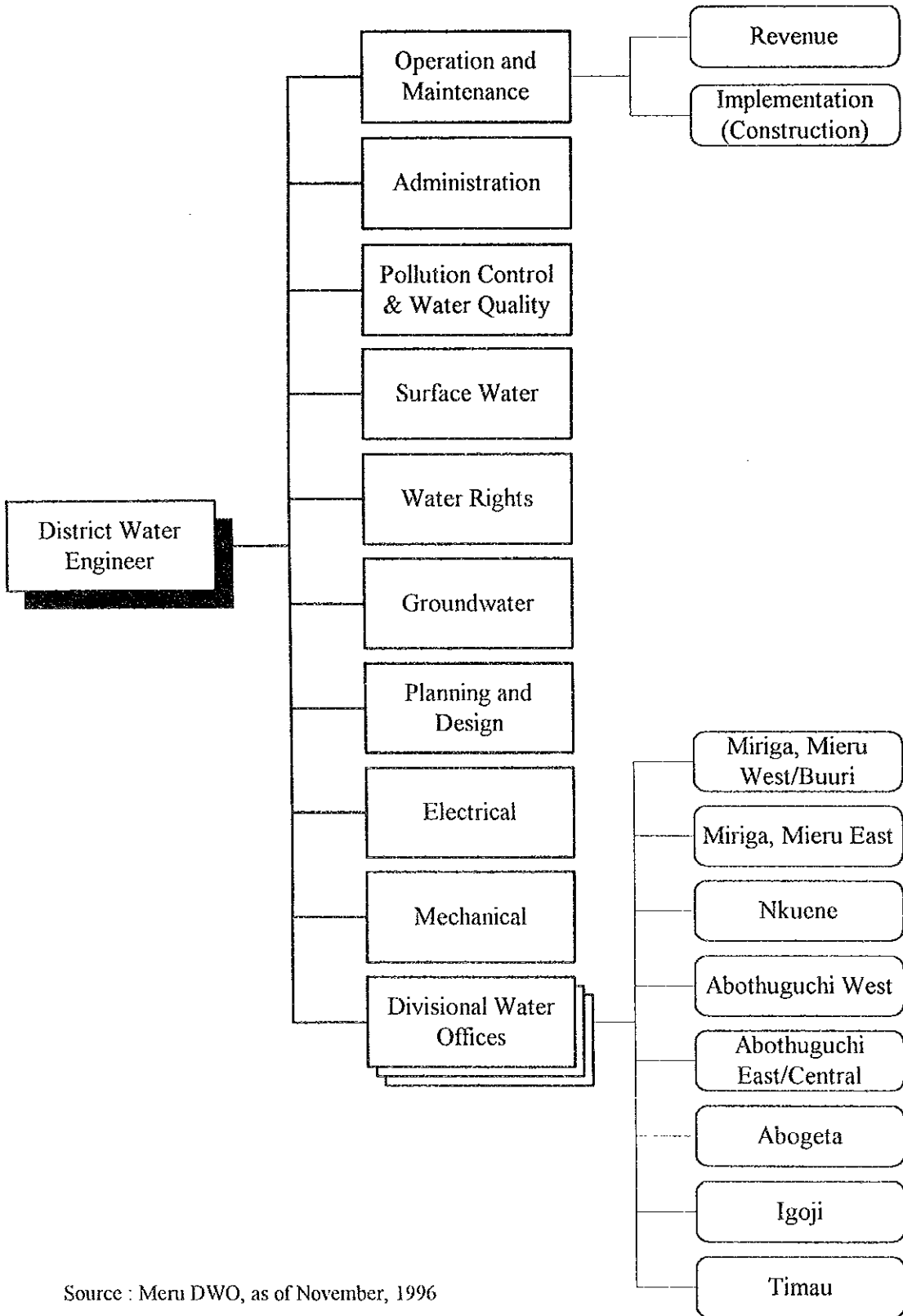


Source : "Nakuru Sewage Works Rehabilitation and Expansion Project", March 1994

THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY	Figure E1-2
	Organization Chart of NWCPC

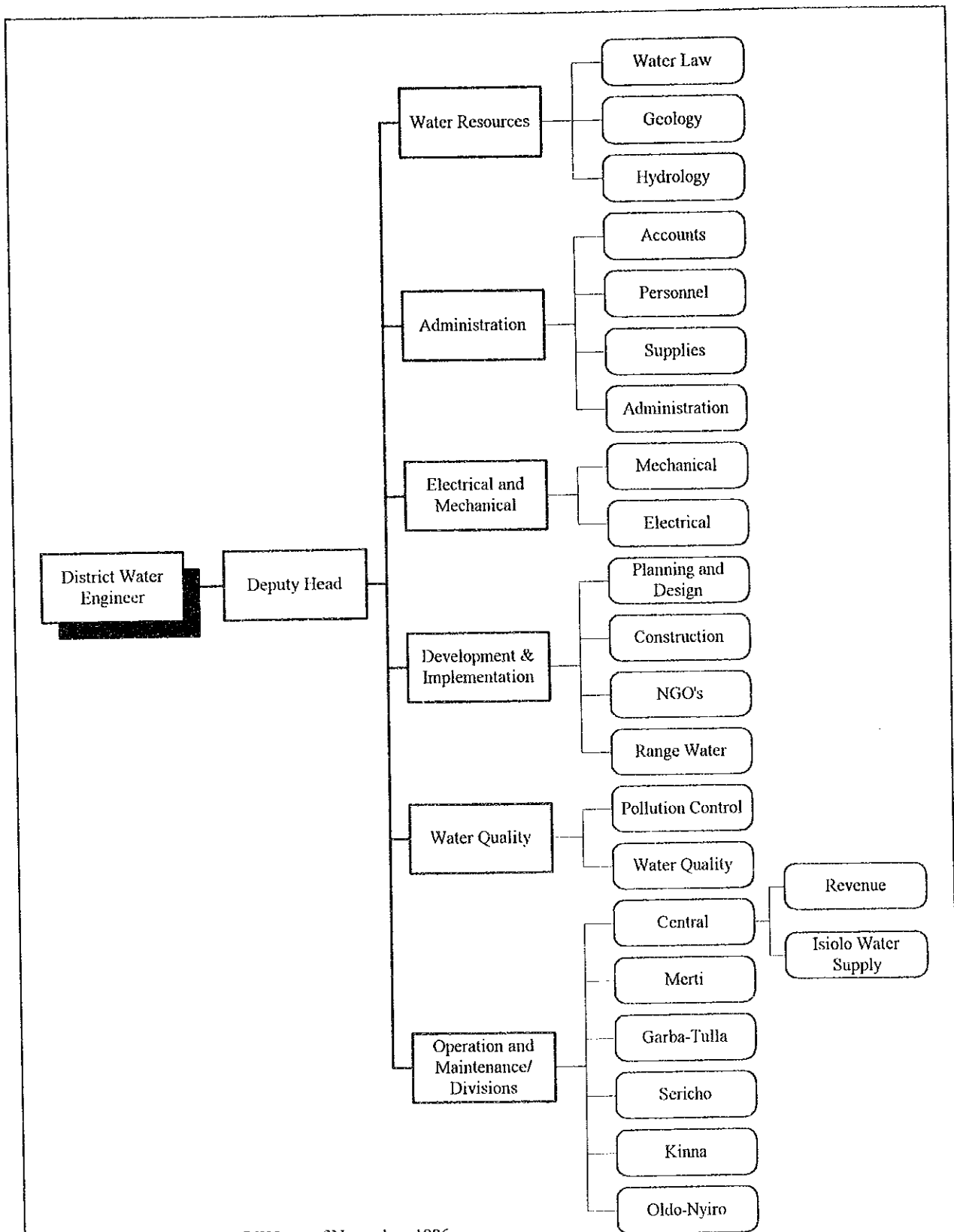


THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY	Figure E1-3
	Organization Chart of Eastern Provincial Water Office



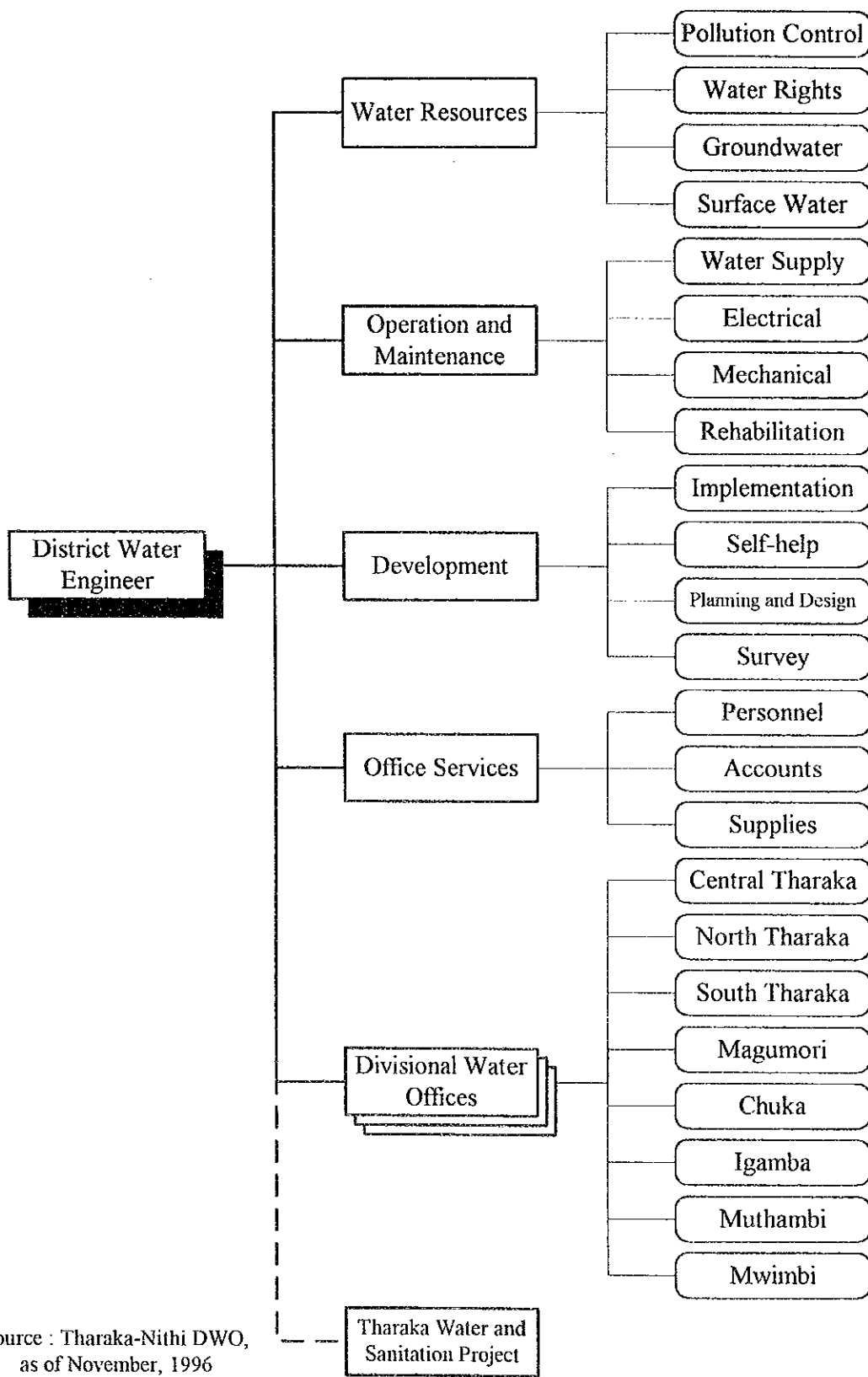
Source : Meru DWO, as of November, 1996

<p style="text-align: center;">THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>Figure E1-4 Organization Chart of District Water Office in Meru</p>
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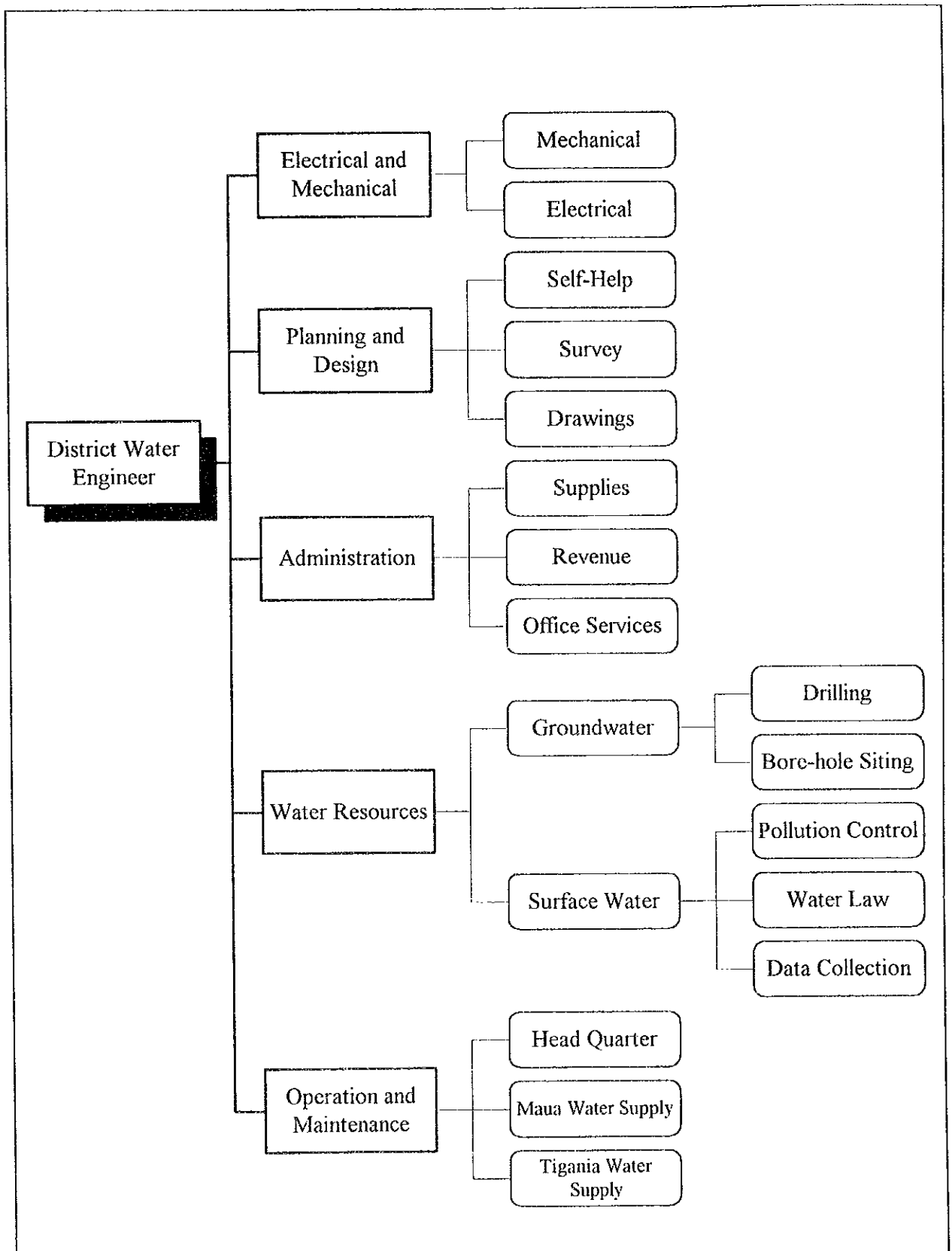
Source : Isiolo DWO, as of November, 1996

THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY	Figure E1-5
	Organization Chart of District Water Office in Isiolo



Source : Tharaka-Nithi DWO,
as of November, 1996

THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY	Figure E1-6 Organization Chart of District Water Office in Tharaka-Nithi
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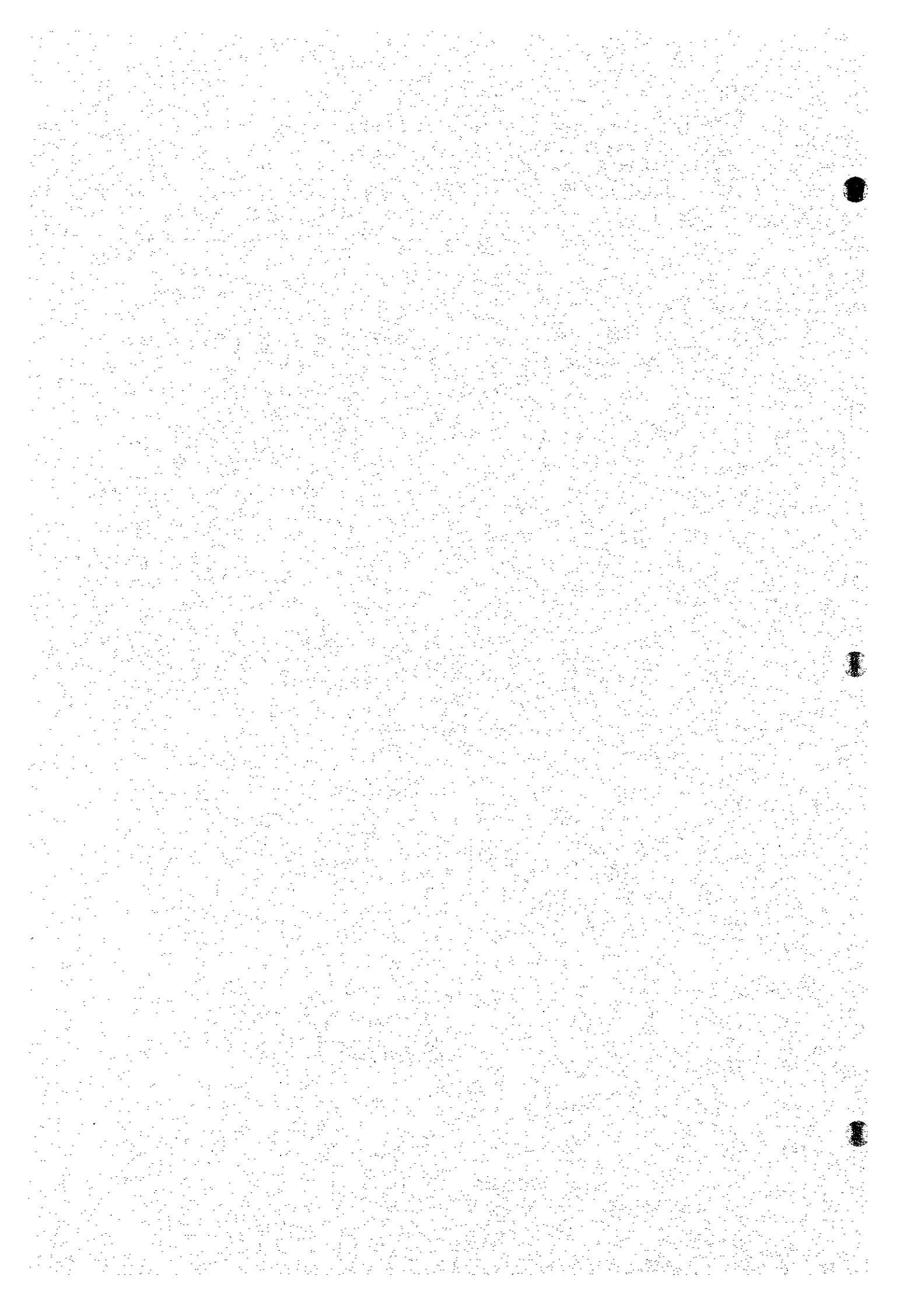
Source : Nyambene DWO, as of November, 1996

THE STUDY ON THE WATER SUPPLY FOR SEVEN TOWNS IN EASTERN PROVINCE IN THE REPUBLIC OF KENYA JAPAN INTERNATIONAL COOPERATION AGENCY	Figure E1-7 Organization Chart of District Water Office in Nyambene
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**THE STUDY ON WATER SUPPLY FOR
SEVEN TOWNS IN EASTER PROVINCE
IN THE REPUBLIC OF KENYA**

APPENDIX F

TOPOGRAPHIC SURVEY



APPENDIX F TOPOGRAPHIC SURVEY

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1 GENERAL DESCRIPTION

Topographic survey in compliance with aero-photo mapping combined with subsequent ground survey was conducted. Initial aerial photography was successfully implemented within two weeks and covered a wider area than indicated in the Scope of Works.

2 AERIAL-PHOTO SURVEY

Scope and specifications of the equipment utilized for the aerial photography were as follows :

1. Are Scales	: a) Meru Maua, Nkubu and Isiolo at 1:10,000 scale. : b) Tigania at 1:20,000 scale.
2. Aircraft	: Piper Navajo PA31 twin engined turbo charged aircraft reg. no. 5Y-MAP.
3. Crew	: Pilot - Capt. G. Gundersen (Norwegian) : Navigator/Camera Operator C. Aitchison (Scottish)
4. Navigation Equipment	: Garmin GPS 100 AVD and WILD NF2 navigation sight.
5. Camera	: WILD RC-10
6. Camera Lens-cone	: WILD 152 mm/88 mm
7. Film	: Kodak double X
8. Film Processor	: Zeiss FE-120
9. Film Drier	: Zeiss
10. Contact Printer	: SPEK SP25 electronic automatic dodging printer.
11. Contact Print/	: Kodamatic 65A automatic processor Diapositive Processor
12. Mosaicing Equipment	: Large size vacuum frame, copy camera and a Zeiss SEG5 enlarger/rectifier

3 GROUND TOPOGRAPHIC SURVEY

3.1 Meru

The survey was started in late August 1996 and was completed in the beginning of September 1996. Two of Survey of Kenya (SOK) Trigonometric stations were checked in the field and both found to be destroyed. At both sites, only holes in the ground could be seen, the centers of which were used as reference points. To verify the accuracy of these points, a vector was observed between them which resulted in a discrepancy of 0.07 m in planimetry and 0.90 m in height.

Occupying 108ST6 and 108T24 as reference stations, two base stations (M12 and M6) were observed from where all photo points could be fixed in turn connecting two reference stations. Twelve benchmarks (M1 to M12) along the proposed pipeline route

were established by spirit leveling. The height of M12 was held fixed and all other benchmarks were referred to the elevation of M12 of 1850 m.

As stated earlier, the photo control points were fixed from the two reference stations and the mean was taken as the result. The differences were in the region of 0.2 - 0.3 m in planimetry and height. For more details, refer to the control diagram.

Measurement of cross sections from the proposed intake to the proposed treatment plant was carried out from late September to early October 1996.

A main traversing was run from GPS station M3 via P27, P18 to GPS station 3Z resulting in an accuracy of 1: 17,410. A second traversing was run from 3Z up to the intake site at Kathia river.

Cross section lines No. 0 to 9, 12, 13, 15, 17, 18, 20, 21, 24, 27 and 28 were measured in the field. Cross section lines No.10, 11, 14, 16, 19, 22, 23, 25 and 26 were derived from the rectified 1:1,000 scale map. The intake site of 50 x 50 m area was measured by tachymetric survey method and plotted on a scale of 1:100 topographic map.

3.2 Photo Control Survey for Nkubu

The survey was carried out in early September 1996. Trigonometric station 122ST8 near the project area was found destroyed but the foundation of the pillar was still existing and the position of the original point was re-established with reasonable accuracy.

Two base points were established and observed within the project area. In reference to these base points (NI and N2), the photo-points were fixed and the mean was taken as the result. Differences were in the region of 0.1 - 0.2 m height which was spirit leveled between NI and N2. They differ from those obtained by GPS by 0.01 m.

3.3 Isiolo

The ground control survey was carried out for the 1:10,000 photographs for subsequent mapping at a scale of 1:5,000. Field work commenced in late August and all work was completed in early September 1996. Planimetry and heights were referred to SOK Trig. stations No. 107S4 and 108ST4. A pillar was found intact on 107S4 and 108ST4 was used for orientation.

It should be noted that the coordinates on Trig. index card was given for a point C.C. IN C (Cartridge Case in Concrete) which was also found. Coordinates and heights were

transferred to the pillar by using values given on the trig. index card i.e. $21^{\circ} 49' 48''$ and 4.65 m. The pillar was then used as a starting point for the traversing which was measured twice to IS6 and had a closure of 1:75,937. Adjustment was carried out accordingly.

From IS6, another traversing route was measured in the mapping area as a loop traversing with a closure of 1:50,401. Heights were transferred by reciprocal trigonometric leveling from 107S4 to IS1 and from there by double leveling to IS6. A loop closure was computed following the traversing back to IS6 which had a closure of +0.002m.

Trigonometric leveling was also carried out for all points as a check except the height points which were double leveled. Photo control points were measured by polar methods to the same standard as for the traversing. All permanent points i.e. traverse points were built in concrete by setting an iron pin and its number was written on the concrete surface. Instruments used were one set of EDM AGA-220, one set of T2 theodolite, and two sets of levels(Zeiss N12 and WILD NA2).

The survey work commenced in the early September 1996. A total of thirty two cross section lines were set out and measured starting from cross section B going upstream of Isiolo river with approximately 50 m interval and ending at cross section 29. All cross section lines were measured 100 m on both sides of the river. A total of 16 concrete beacons were established on the left side of the river facing downstream.

Every second cross section has a beacon namely B, 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26 and 28. These beacons and wooden pegs for other cross sections were established by measuring a traversing starting from IS30 and ending at IS32. It had a closure of 1:149,00 over a distance of 2,519 m. All beacons and pegs were also double leveled from IS30 and closing at IS32 with a closure of 2 mm.

3.4 Chogoria and Chuka

Control points between Chogoria area and Chuka area were connected to the Kenyan survey grid system by a GPS traversing, running from 122ST8 over Chogoria PH2X, PH3X,CK2 to 122ST5 which is one of the trigonometric stations still in good condition. The traversing was 31.7 km of total survey length and 0.46 m of closure in position (1:67,000).

In each mapping area, one reference station was established and marked by an iron pin in

concrete. They are CH1 for Chogoria and CK2 for Chuka. From these reference stations, the photo control points were fixed by GPS statistic observations.

At Chuka, additional heights were spirit leveled along the main track running approximately the center of the mapping area.

3.5 Maua

The ground control survey was carried out for 1:10,000 photographs Nos. 7865 and 7866. Field work was implemented in the early September 1996. Planimetry and height were referred to those of SOK Trig. station 108TT2 (foundation was found in good condition). A traversing was carried out from 108TT2 to 108TT5, with an accuracy of 1:21,130. Due to the fact that trig. station 108TT1 was destroyed (centre hole was assumed as point) and the foundation of 108TT2 was in good conditions, it was decided not to adjust the traversing.

Photo control points were measured by polar method. Height was measured by reciprocal trigonometric leveling using the Wild T2 and Zeiss ELDI 1 Optical distancer instruments. Computations were carried out referring to the UTM grid system. A mean scale factor of 0.9997783 was used for the survey area.

3.6 Tigania

Field work was implemented from the beginning to the late September 1996.

Planimetry and height were referred to SOK Trig. station 108TT10, and survey route between 108TT10 and TW7 was measured by traversing. A station TW2 was measured by GPS method and the traversed result was adjusted on the basis this GPS value. The accuracy of the traversing was 1:67,830.

The mapping area for the proposed treatment plant site which is in a forested area, was based on a tachymetric survey. Traversing line TW6 - TW7 was used as a grid base from where a 10 x 10 m grid was set out with a Zeiss T2 theodolite and steel tape. The grid interval in steep terrain area was set out in every 20m interval using a tachymetric theodolite Wild RDS. In flat areas, the grid line was leveled with a Zeiss N12 level.

Terrain details were also measured with a Wild RDS. The height was brought forward by double leveling from TW2 using the GPS value. A map was drawn at a scale of 1:200 for the 100 x 200 m of the proposed treatment plant site. Contour interval was 1m.

4 SUMMARY OF TOPOGRAPHIC SURVEY

In the course of the topographic survey for the Study, aerial photography, photo-mosaic, photo control point survey, ground survey and mapping were carried out. Summary of these tasks are given in the following five tables.

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Table F-1 Aerial Photographs (Contact Prints)

Location	Photo Scale	Frame Nos.	Quantity	Remarks
MERU	1:25,000	2311 - 2315	5	
MERU (Water supply)	1:10,000	7804 - 7811	8	
MERU (Township)	1:10,000	7804 - 7811	8	
		7791 - 7800	10	
TIGANIA (Water supply)	1:10,000	7825 - 7835	11	
MAUA (Water supply)	1:10,000	7862 - 7867	6	
ISIOLO	1:10,000	7689 - 7703	15	C-1
		7709 - 7725	17	C-2
NKUBU	1:25,000	2579 - 2581	3	
CHUCA	1:25,000	1958 - 1962	5	
CHOGORIA	1:25,000	2696 - 2698	3	C-1
		2701 - 2704	4	C-2

Table F-2 Photo Mosaic

Location	Photo Scale	Sheet Quantity	Remarks
MERU (Water supply)	1:3,000	2	
MERU (Township)	1:3,000	4	
TIGANIA	1:3,000	1	
MAUA	1:3,000	1	
ISIOLO	1:3,000	7	
NKUBU	1:3,000	1	
CHUCA	1:10,000	1	
	1:3,000	4	
CHOGORIA	1:3,000	3	

Table F-3 Topographic Map

Location	Site Location	Map Scale	Remarks
CHUCA	1. From water intake to water treatment plan site.	1:5,000	Width 500m
	2. Water intake	1:250	
	3. Water treatment plant site.	1:250	
CHOGORIA	1. From water intake to water treatment plan site.	1:5,000	Width 500m
	2. Water intake	1:250	
	3. Water treatment plant site.	1:250	
NKUBU	1. From water intake to water treatment plan site.	1:5,000	Width 500m
	2. Water intake and water treatment plant site.	1:250	
MERU	1. From water intake to water treatment plan site.	1:1,000	Width 500m
	2. From water treatment plant site to service reservoir.	1:5,000	Width 500m
	3. Water intake	1:100	Width 500m
	4. Water treatment plant site and service reservoir.	1:250	
TIGANIA	1. From water intake to water treatment plan site.	1:200	
MAUA	1. From water intake to water treatment plan site.	1:5,000	Width 500m
ISIOLO	1. From water intake to water treatment plan site and water spring to service reservoir	1:5,000	Width 500m
	2. Reservoir area	1:500	
	3. Spring area	1:100	
	4. Proposed water treatment plant site.	1:100	
	5. Water intake site	1:250	
	6. Existing water treatment plant site.	1:250	

Table F-4 Photogrammetric Cross Section and Profile

Location and Site	Cross Section	Longitudinal Profile
CHUCA	H=1:500, V=200 W=200m 100 interval 16 Sheets	H=1:5,000, V=1:200 2 Sheets
CHOGORIA	H=1:500, V=200 W=200m 100 interval 12 Sheets	H=1:5,000, V=1:200 1 Sheet
NKUBU	H=1:500, V=200 W=200m 100 interval 3 Sheets	H=1:5,000, V=1:200 1 Sheet
MAUA	H=1:500, V=200 W=200m 100 interval 2 Sheets	H=1:5,000, V=1:200 1 Sheet
MERU From water treatment plant to service reservoir site	H=1:500, V=200 W=200m 100 interval 9 Sheets	H=1:5,000, V=1:200 2 Sheets
ISIOLO 1. From proposed water intake to existing water treatment plant site	H=1:500, V=200 W=200m 100 interval 6 Sheets	H=1:5,000, V=1:200 1 Sheet
2. From water spring to service reservoir	H=1:500, V=200 W=200m 100 interval 11 Sheets	H=1:5,000, V=1:200 2 Sheet

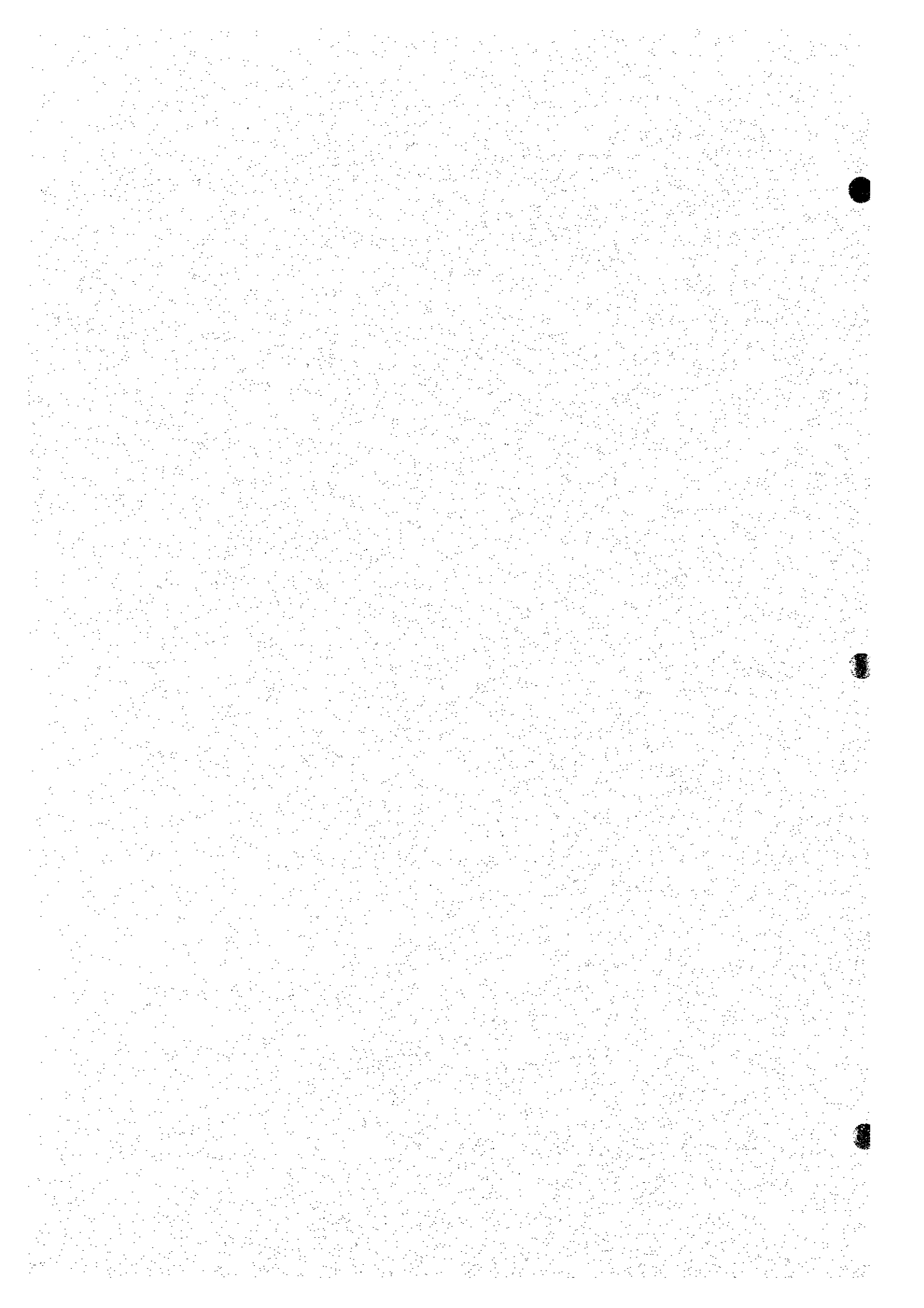
Table F-5 Cross Section and Longitudinal Profile by Ground Survey

Location and Site	Cross Section	Longitudinal Profile
MERU		
1. From proposed water intake to existing water treatment plant site.	H=1:500, V=200 W=200m 100 interval 15 Sheets	H=1:5,000, V=1:200 2 Sheets
2. From water sprint to service reservoir.	H=1:500, V=200 W=200m 100 interval 1 Sheet	H=1:5,000, V=1:200 1 Sheet
ISIOILO Reservoir area	H=1:500, V=200 W=200m 50 interval 5 Sheets	H=1:2,000, V=1:200 1 Sheet

**THE STUDY ON WATER SUPPLY FOR
SEVEN TOWNS IN EASTER PROVINCE
IN THE REPUBLIC OF KENYA**

APPENDIX G

MONITIRING OF COMMUNAL WATER POINTS



APPENDIX G MONITORING OF COMMUNAL WATER POINTS

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1. GENERAL

The communal water points discussed here implies supply points such as stand pipes, kiosks, springs and dug wells constructed to supply residents nearby. Hence, the sources of the supply points may be the piped water supply operated by Ministry, Community, NGOs and institutions, and/or springs and dug wells. These communal water points widely spread in Kenya have been developed in the Study Area as well. The present study include the inventory survey, construction of new communal water points, rehabilitation of the existing water points, and their monitoring.

2. INVENTORIES AND OUTLINE FEATURES

2.1 Meru

The concentration of communal water points is mainly in low income areas. There are three types of communal water points; water kiosks, stand pipes and springs protected and unprotected.

Apart from springs in the upper catchment zone, there are also springs within the supply area. These are located in Mujini, Salama, Shauri Yako and Majengo areas.

As other supply sources, there are six bore holes within the Municipality owned by individuals and institutions. The MLRRWD supply does not extract water from bore holes.

Table G2-1 below gives an analysis of the present status, date of construction and population served.

Table G2-1 Communal Water Points in Meru Town

Name of Water Point	Date of Const.	Assistance Received	Status	Number of Members
1 Hospital water Kiosk	1950	Min. of Public Works	Not Operational	-
2 Mjini Springs	1990	SIDA	Operational	Managed by village health Committee
3 Salama Spring	1993	ODA	Operational	Village Health Committee
4 Shauri Yako Water Kiosk	Not Known	Meru Munic. Council	Operational	Managed by individual who sells water to residents
5 Shauri Yako Upper Spring	1992	Meru Munic. Council	Not Operational	Managed by village health Committee
6 Shauri yako Lower Spring	Not known	Not Applicable	Not Protected	No Management
7 Shauri Yako Public Stand Pipe	Not known	Not Applicable	Not Operational	Not Applicable
8 Majengo Kiosk	Not known	Meru Munic. Council	Unprotected	Village Health Committee & Women groups organised on religious basis

Source: JICA Study Team

2.2 Isiolo

There are no community based water supply schemes in Isiolo town. However, there are 5 individual institution bore holes within Isiolo town.

Table G2-2 Institutional Bore Holes within Isiolo Town

Owner	Depth (m)	WRL		Yield m ³ /hr
		Dynamic	Static	
1 Isiolo Barracks	54.9	37.5	28.5	4.7
2 Veterinary Dept	97.4	50	34.4	10.9
3 Isiolo Airstrip	184	46.6	18	30
4 Ngare Mala	48	58	10.9	-
5 Isiolo District	-	-	-	-
6 Hospital	-	-	-	-

Source: DWO

Further, there are 10 Communal water points in the form of Kiosks. They are all connected to the Isiolo Water Supply. They are metered and run by women groups.

Table G2-3 Communal Water Point in Isiolo Town (Kiosks)

Name of CWP	Date of Const.	Assistance Received	Status	Number of Members
1. Kambi Wachu	Feb. 1994	SIDA	Operational	35: only 25 are active
2. Kambi Bule	1986	USAID	Operational	50
3. Christian Women Group Kula Mawe	1992	Members	Operational	30
4. Kambi Ngamia	1992	SIDA	Not operational	21
5. Kula Mawe	Not known	Individual	Not operational	Individual Const.
6. Bula Pesa	Not known	Min. Water Dev.	Not operational	None
7. Lower Bula Pesa	1970	Not known	Not operational	None
8. Kambi Garba	1992	Public Health Ofi.	Not operational	40
9. Kambi Hoda (Maisha Bora)	1986	Danish Volunteers	Not operational	30
10. Kambi ya Juu	1986	Rural Development Fund(RDF)	Not operational	35

Source: JICA Study Team

2.3 Chuka

There are four communal water points in Chuka as listed below.

Table G2-4 Communal Water Point in Chuka Town

Name of CWP	Date of Const.	Assistance Received	Status	Number of Members
1. Gachamboga spring	1994	MLRRWD to mark World Water Day	Operational, Sufficient yield	Many
2. Kabinde spring	1958	Not known	Poor yield	Data not available
3. Public standpipe	1996	Chuka Town Council	Leaking	9 members
4. Market Wash Place	Not known	Chuka Town Council	Not operational	None

2.4 Chogoria

The survey identified two types of communal water points: (i) Public Stand Pipes and (ii) Unprotected Springs.

Three stand pipes were put up by the MLRRWD at;

- Storage tank at Kabeche
- Kabeche market
- Chogoria Air Market.

The stand pipes were abandoned due to change in Government policy which favored individual connections.

2.5 Maua

There are two communal water points in Maua owned by institutions as given in the table below.

Table G2- 5 Communal Water Point in Maua Town

Name of Water Point	Date of Const.	Assistance	Status received	Number of Members
1 St. Pauls School Stand pipe	Date not given	Catholic Mission	Operational	No committee
2 Maua Hospital Nursing school water point	Date not given	Methodist Hospital		Water drawn free serves 1,200 people

2.6 Tigania

There are four communal water points in Tigania as illustrated in the table below.

Table G2-6 Communal Water Point in Tigania Rural Area

Name of Water Point	Date of Const.	Assistance Received	Status	Number of Members
1 Tigania Water Supply Point	Before 1980	MLRRWD	Abandoned	None
2 Kamathinwe springs	Not given	None	Yield good	No committee
3 Kirigithwa spring	1995	SIDA	Operational	Kirigithwa Women
4 Kamberia catholic water spring stand pipe	Not given	Catholic church & community	Operational	Run by the community

3. SELECTION OF COMMUNAL WATER POINTS FOR CONSTRUCTION AND REHABILITATION

3.1 Basis of the Selection

In selecting communal water points for construction and rehabilitation, main focus was placed on the water supply conditions in the study area. Initial investigation indicated that priority for new water supplies should be given to the densely populated urban areas of Meru and Isiolo where alternative water services were subject to high levels of pollution.

After carrying out a thorough survey of the communal water points and interviewing the residents in Meru and Isiolo, the following criteria were devised for construction and rehabilitation of communal water points:

(1) Isiolo

Three kiosk sites were selected for rehabilitation, these were; Kambi Garba, Kambi ya Juu and Kambi Ngamia. The main criteria for rehabilitation was based on solving management problems (Kambi Garba), increasing water pressure for kiosks which were temporary out of operation due to lack of water, e.g., Kambi ya Juu and Kambi Ngamia. Selection was also based on the presence of strong water committees in the area.

(2) Meru

In Meru the selection was based on the actual siting of the communal water points, which were concentrated in low income areas such as Shauri Yako and Majengo. In these areas, the communities being of low income status, they cannot afford individual connections.

The selection was also based on health factors whereby the residents of these two densely populated slum areas got water from unprotected sources such as springs (Shauri Yako), and the river Kathita for (Majengo).

3.2 Prioritization and Selection of Actual Sites

Once the sites were selected, the following had to be in place:

(1) Village Water Committee:

For Isiolo, the village water committees were already in existence, with women groups in-charge. In Meru, there were Health committees in-charge.

(2) Criteria for Prioritization:

- conditions of existing kiosks
- organizational management skills of the groups
- the share of women on the committees and their decision making roles
- cohesiveness of the committees
- history of water related diseases.

4. CONSTRUCTION AND REHABILITATION OF COMMUNAL WATER POINTS

4.1 Procedures Undertaken

Tenders were invited for two contracts for the construction and rehabilitation of the identified Water Kiosks.

The first contract, for the construction work was awarded to Njiru Builders of Embu. The construction was scheduled to commence in the beginning of September and to finish in the middle of October.

The second contract, for the site supervision of the contractor, was let to Kitololo & Partners, Consulting Engineers.

Construction commenced with the two new kiosks in Meru, and proceeded to the three

rehabilitation sites in Isiolo.

In order to rehabilitate one of the Isiolo kiosks it was found that it was necessary to lay an 800 m length of new pipeline due to the inadequacy of the existing distribution system. Nevertheless, good progress was achieved, and all kiosks were handed over to the respective District Water Engineers by the middle of October.

4.2 Description of Kiosks

Supply area and population served by the kiosks constructed and rehabilitated area are summarized in *Table G4-1* below.

Table G4-1 Supply Area and Population

Name of Kiosk	District	Population (Households)	No. Registered Members
Majengo	Meru	800	54
Shauri Yako	Meru	500	40
Kambi ya Juu	Isiolo	260	43
Kambi Ngamia	Isiolo	200	21
Kambi Garba	Isiolo	285	41

Source: Interviews with Residents and area chief.

(1) Shauri Yako Kiosk in Meru

The Kiosk is located near the sewerage treatment works, next to the open air market. The Kiosk serves low income slum dwellers who were moved in the area to give room for the construction of Meru bus station. The area has a population of 10,000 people. Housing is made of timber walling and iron sheet roofs.

The area has a strong health committee which educates residents on health related issues. Prior to sitting and constructing the water Kiosk, the residents used unprotected springs and a water Kiosk which was constructed by the Municipal Council during Cholera epidemics and leased to a private vender.

For purposes of managing the water Kiosk at Shauri Yako, an independent water committee was put in place. The committee of 12 members has registered with the Ministry of Culture and Social Services and has opened an account for safe keeping of the funds. Day to day management of the Kiosk is entrusted to the Kiosk attendant. The Kiosk started operating on 27th of October, but after selling 12 jerricans at 50 cents each, water disappeared. Due to the short spell of using the Kiosk, it was not possible to assess the residents willingness to use the water Kiosk.

(2) Majengo Kiosk in Meru

Mejengo is a slum settlement located next to Irinda Catholic Mission. There are about 10,000 people living in the estate, most of them are Muslims. There are about 10 individual connections connected to MLRRWD distribution main. The rest of the residents get water from river Kathita whose accessibility is difficult due to the steep banks and its water is contaminated. There is only one communal water point in the area which is not operational. There are 5 women groups in the area all organized on religious basis. In addition there is a health committee of 12 members, 5 of whom are women.

The water Kiosk is managed by Ezzibola women group. The group was selected by the residents because it is registered and it has an account. The group has appointed a Kiosk attendant who sells water to the residents. The Kiosk started operating on 23rd October 1996.

(3) Kambi Garba Kiosk in Isiolo

The Kiosk is located within Kambi Garba settlement area off Isiolo - Marsabit road. The Kiosk was initially constructed by the group members with assistance from Public Health Department. The Kiosk closed down due to mismanagement and misunderstanding between the group members. As a result, the residents bought water from neighbors with individual connections at Kshs 1.00 per 20 litre jerrican.

After rehabilitation, the group held elections and paid the outstanding water bill. Water was connected on 23rd of October, but the sales are low due to lack of customers.

(4) Kambi ya Juu Kiosk

The Kiosk is located off Isiolo water supply treatment works. The Kiosk was constructed with funds from Rural Development Fund in 1986. It has been out of operation due to low water pressure from the distribution main.

After rehabilitation, the Kiosk was handed over to Kambi ya Juu women group who were original owners. Training in operation and management and health education was conducted by KEIPET. As a result, the group keeps records of water sales and they have prepared a duty roaster for each member to sell water once a week.

The group decided to sell water at Kshs. 1 to the group members and Kshs. 2 to non-members. This has led to non-members not using the Kiosk.

(5) Kambi Ngamia Kiosk

The Kiosk is located at the boundary of Bula pesa and Kambi ya Juu area. The Kiosk was constructed in 1992 with the assistance from SIDA and the Ministry of Health. In addition, there is a 10m³ masonry water tanks which the group uses to store water for use during period of rationing. The Kiosk is managed by Kambi Ngamia women group with a membership of 22. It had been out of operation due to low water pressure.

After rehabilitation, the group cleared an outstanding bill of Kshs 220 and water was connected on 18th of October 1996. The group has been trained in operation, management and health education aspects. As in the case of Kambi ya Juu, the group sells water at Kshs 2 per 20 litre jerrican to non-members and Kshs 1 to the members. As a result most of the non-members do not buy water from the Kiosk.

5. MONITORING OF KIOSK OPERATION

5.1 Methodology

The monitoring of Communal Water Points was entrusted to a local consultant KEIPET. Monitoring commenced after the completion of the survey and the identification of sites for

the installation of 2 No. new water points in Meru, and rehabilitation of 3 No. existing communal water points in Isiolo.

Monitoring of communal water points aimed at improving the efficiency of the operation and maintenance of communal water points by local community water user groups. To achieve this goal, monitoring was geared toward the articulation of local water group needs, training on organisation and management skills, operation and maintenance and public health education on how diseases can be spread through common personal practices involving water, sanitation and other aspects of the environment.

The monitoring tasks were carried through visits to each of the five (5) Water Kiosks in Meru and Isiolo during the months of October, November, December 1996 and January 1997.

Key issues addressed during monitoring include:

(1) Identification of water user groups

The project team had to identify and establish a local water user group to run the water kiosks once developed. The identification of the water user groups was undertaken with assistance of the local District water office, and where a local user group did not exist, the project team mobilized the local people to form one. The village elders participated effectively in this exercise. The consultant facilitated the registration of the groups and opening of bank accounts.

(2) Training

Training of the local water user group was an important component of monitoring. Since the project resources and time were limited, the fundamental training of the local community was limited to the following key issues:-

- Organisation and management of group activities e.g. group cohesion, conducting group meetings and elections, roles and responsibilities of committee members in collaboration with supporting agencies (Government Department)

-
- Simple book keeping and opening of bank accounts.
 - Health education and sanitation
 - Operation and maintenance of water kiosks.

The Training was limited to 2 days per group sessions in the month of October, November, December 1996 and January 1997.

(3) Development of Training Materials

The study team developed some training materials to assist them during participatory training. The materials developed include posters on public health education and sanitation (a sample of key posters attached in Annex II) and water sales form for use at the kiosk was also developed.

The posters developed were intended to highlight key health and sanitation problems facing the community. The posters were also tailored to reflect the economic, socio-cultural and religious backgrounds of the beneficiaries. The posters facilitated ease group discussions and proved to be an effective tool for dissemination of information.

(4) Monitoring indicators

In order to assess the effectiveness of monitoring exercise the following indicators were adopted to evaluate the sustainability and effectiveness of operations that had been established at each of the five (5) kiosks.

- A functional water committee which holds regular meetings, and has clear understanding of group duties and responsibilities.
- Establishment of working links with support institutions - Government or otherwise.
- Establishment of an effective financial management system which involves revenue collection, record keeping and banking of the same.

-
- Number of water consumers using the kiosks
 - Amount of water sold from the kiosk
 - Revenue earned from the sales
 - Ability of local community to handle simple operation and maintenance tasks at water kiosks.
 - Adoption of sound health and sanitation practices at the kiosk and homesteads.

The greatest challenges facing the team was to establish indicators which hold us accountable for achieving effective participation of community members in decision making.

Participatory monitoring was applied which meant continuous review and adjustment of inputs to match the resources available to the community. The project staff were closely involved with users in collecting data and providing technical advice.

The results of the monitoring does not reflect the production targets, reflects the primary role of communities in decisions affecting both the pace and the form of development.

5.2 Supply Area and Population

The monitoring of community water points commenced after the completion of the survey and the identification of sites for the installation of 2 new communal water points in Meru and the rehabilitation of 3 existing communal water points in Isiolo.

In Meru, the selection of Majengo and Shauri Yako was based on the population density considerations vs the existing number of individual connections and the willingness of residents to pay for water.

In Isiolo, most of the non-operational water Kiosks had closed down after their service areas had been adequately provided with individual connections. Kambi ya Juu and Kambi

Ngamia were selected for rehabilitation because they had been out of operation due to low water pressure in the distribution mains. Therefore, the installation of an appropriate distribution main would go along way in reactivating the two Kiosks. On the other hand, Kambi Garba had management problems which could be addressed during monitoring.

Table G5-1 Supply Area and Population

Name of Kiosk	District	Population (Households)	No. Registered Members
Majengo	Meru	800	54
Shauri Yako	Meru	500	40
Kambi ya Juu	Isiolo	260	43
Kambi Ngaria	Isiolo	200	21
Kambi Garba	Isiolo	285	41

Source: Interviews with Residents and area chief.

All the (5) Kiosks are located in low income areas. Majengo and Shauri Yako are densely populated with average family of size of 8 people per household (public awareness survey).

Majengo is an older settlement with strong kinship relations. Shauri Yako is a newly settled village, having been created as a result of evacuations carried out by the municipal council to make room for the market and a bus park. The plots in the two settlements are very small, measuring 10m x 20m.

The main economic activities undertaken by the residents include hawking, beer brewing and car washing. Incomes are very low, they average Kshs. 1500 - 2000 per month per household.

Water sources in the area are mainly River Kathita, unprotected springs and individual connections.

In Isiolo, the 3 kiosks namely Kambi ya Juu, Kambi Ngamia, and Kambi Garba are settled by migrant communities. Kambi ya Juu is settled by Turkanas, Kambi Ngamia by Boranas while Kambi Garba is occupied by mixture of Boranas and Somalis.

The main economic activities in the three settlements are livestock rearing, small scale agriculture (for subsistence) and small informal business. The average incomes do not

exceed Kshs. 1,000.00 per month. MLRRWD provides safe water to the residents through kiosks and individual connections.

The maps (*Figures G5-1 to G5-2*) show the location of the kiosks in Meru and Isiolo.

5.3 Water Consumption

The charges for water at the kiosks vary between Meru and Isiolo. Kiosks in Meru charge 50 cents per 20 litre jerrican, whereas kiosks in Isiolo charge Kshs. 1.00 per 20 litre jerrican. This disparity may be explained by the abundance of alternative water sources in Meru and the corresponding scarcity in Isiolo.

Water consumption in the (5) kiosks differed from one kiosk to another as shown in *Table G5-2* below.

Table G5-2 Water consumption - Average daily water sales per Kiosk in K.Shs. Months

Kiosk	Oct.	Nov.	Dec.	Jan.	Remarks
Majengo	10.5	13	10.8	7.8	- low sales due to use of river water - Individual connections - neighbour's supply - only 20 members use Kiosks
Shauri Yako	10	130	72	77	- High consumption due to - increase in consumers using piped water - and decreased in use of river water
Kambi ya Juu	11	20	46.3	40	- High consumption of piped water - Reduction in price - Individual connections dry
Kambi Ngamia	25.8	18.5	25	26.8	- Consumption moderate Water sales very low
Kambi Garba	9.3	8	8.1	3.8	- High number of individual connection - Free water

Source: Data collected during monitoring.

The highest sales were experienced at Shauri Yako in Meru and Kambi ya Juu in Isiolo.

The following factors influenced high sales:

- Increase in consumers using piped water from the kiosk
- Proper organisation and management of the kiosk by the Shauri Yako Self Help group.
- Regular supply of water due to proper operation and maintenance put in place by the committee.

The lowest water consumption was at Kambi Garba and Majengo. The main factor influencing low consumption of water were observed as follows.

- Existence of individual connections in the settlement, therefore people prefer to use their neighbors or relatives supply.
- Availability of free water from the Muslim Teaching School, Madrassa.
- Poor leadership resulting into poor attendance of meetings and constant closure of the Kiosk.

The sales in Kambi Ngamia remained moderate.

The findings reveal that:

- Water consumption was very low. It was basically used for drinking washing clothes and bathing.
- The number of individual connections and other private vendors within the Kiosk service area determine the number of Kiosk users and the amount of water consumed.
- The cost of water affects the number of users. When the price is low, more people will use the Kiosk and less people will patronize the Kiosk when the price is high.
- Average water drawn from the Kiosk per household per day was 4-5 No. 20 litre jerricans. Household water utilization was found to be very low.

5.4 Organisation and Management

As part of monitoring, one of the tasks was to identify, establish organizations which would oversee the operations of the Kiosks.

During identification, meetings and discussions were held with consumers to determine the best way to manage the water kiosks. In all other Kiosks except Shauri Yako, there existed 4 women groups, 3 in Isiolo and 1 in Meru, which were already involved in managing kiosks.

In order to improve the efficiency in organisation and management of the Kiosks, the meetings and training sessions were organized for the consumers of each Kiosk.

(1) Majengo Kiosk

Activities undertaken to prepare members towards proper organisation and management include:-

- Meetings to identify and select the best structure. Hizbolla women group was selected and given responsibility to manage the Kiosk.
- The criteria for selection included registration, and existence of an operational bank account, strong membership, and legally elected officials.

(2) Shauri Yako Kiosk

The Kiosk is managed by Shauri Yako self help group. At the time of monitoring, the group was not registered. Therefore the monitoring team had to do the following:-

- Register the group with the Ministry of Culture and Social Services (MCSS).
- Prepare an inventory of water users, so as to assist identify the leaders.
- Elect the committee.
- Assist in opening the bank account.

(3) Kambi ya Juu

The Kiosk is managed by Kambi ya Juu Women Group, registered in 1986 with 43 members. Due to interference from men, the group had to be reorganised during monitoring. The monitoring team had to do the following:-

- Organize meetings to discuss the management strategy of the rehabilitated Kiosk.
- Organize elections for the new committee
- Assist to change signatures at the bank for the new committee to effectively manage finances.

(4) Kambi Ngamia

The Kiosk is managed by Kambi Ngamia Women Group. The group was selected because

its members are active, and meet monthly to deliberate on group activities.

The major problems identified during monitoring, high illiteracy level that militates against keeping records and minutes of meetings.

(5) Kambi Garba

The Kiosk is managed by Kambi Garba Women Group with a membership of 40 women. The main issues dealt with during monitoring include:-

- Selection of the site, several meetings had to be held to agree on the site.
- Fresh elections had to be held to reduce conflicts and misunderstanding.
- The major problems facing this group is mismanagement, poor leadership and frequent migration of the community members.

From the monitoring exercise, we learnt that most groups lack the organizational management know how to effectively run their activities. The inadequacy in organisation and management was as a result of low levels of literacy eminent in all low income areas.

The findings revealed that groups lacked clear roles and responsibilities and did not have a well established structure. Illiteracy rates were high among group members, and periodic shifting of members due to pastoral way of life among the communities residing in Isiolo contributes to lack of group cohesion, resulting into poor attendance to groups tasks.

Table G5-3 Organisation Structure in the Study Area

Name of Kiosk	Management Structure	No. on Committee	Meetings	Elections
Shauri Yako	Self Help Group	14	Weekly monthly	done as part of monitoring
Majengo	Women Group	8	No meetings	Every 5 years
Kambi ya Juu	Women Group	8	Twice a month	Not fixed
Kambi ya Ngamia	Women Group	8	Monthly	Not fixed
Gambi Garba	Women Group	8	No meetings	No elections

Source: Interviews in study area monitoring progress reports

5.5 Training in Organisation and Management

Training aimed at ensuring efficiency of the committees in managing water kiosk. Capacity building within the community involves various ways in which water committees transmit knowledge and skills among themselves and the extent to which users organize and manage finances for the upkeep of the kiosk. Training was repeated in all the (5) Kiosks.

The issues discussed include efficient organisation and management of water kiosk, committee roles and duties and provision of maintenance skills to the care takers.

To achieve the goals of a learner - centered approach, participatory tools and materials were used. Training on organisation was based on the adopted story with a gap page (118-119, Pictures 3A and 3B in *Attachment* to the present Supporting Report G).

Two sets of pictures depicting a 'before' and 'after' situation was supplied to the participants and their views sought as to what the problem was.

From discussions held, members attributed to the 'before' situation to be due to mismanagement and the 'after' picture as depicting better hygiene, clean environment and security provided at the Kiosk which they attributed to good management. It was evident from the discussions that members understood the consequences of bad management, and thus the sessions were then utilized to draw out the duties and responsibilities of the committee.

Duties of committee

- Organize consumer meetings and mobilize consumers to attend.
- identify and maintain an inventory of kiosk users.
- decide on charges for water
- collect revenue from users
- set up and enforce by laws to govern the kiosk
- open bank account
- pay water bills
- keep proper records of water sales
- educate consumers on environmental health and sanitation.

In order to analyze who was responsible for different tasks in the water and sanitation sector, a gender task analysis was done (picture 3C - 3G in Meru and 3K - 3P in Isiolo).

Discussions revealed that irrespective of cultural differences women perform most of the household chores including cooking, washing, collecting water and firewood. In Isiolo women participated in building houses, rearing of livestock and subsistence farming. This is attributed to cultural and traditional beliefs, customs and practices that are difficult to change.

At the end of the training, the participants were enlightened on the role played by women in the water utilization and the need to involve them more closely in the management of water facilities.

5.6 Operation and Maintenance

The sustainability of any facility put up must be backed by the establishment of an effective operation and maintenance system.

From the monitoring exercise, it was evident that the ability of the local community to handle the operation and maintenance tasks is limited. This creates a need for training.

Training in operation and maintenance focused on the establishment of an effective money collection system, clear and simple record keeping, daily operational procedures. Emphasis was placed on member/caretakers ability to handle simple maintenance tasks such as handling taps, daily meter reading, record keeping and cleanliness around the kiosk.

Training was offered to 2 Caretakers selected by the communities served by each kiosk.

The training covered the following aspects.

- Metre reading and recording
- Plumbing works in relation to the handling of the tap
- Care of superstructure including locking system and security on accessories process
- Cleaning the splash area and immediate surrounding to clear stagnant water.

The above tasks were accomplished at the site through demonstrations of the operation modalities.

Other issues that were addressed include daily running of the kiosk, administration of finances including settling up tariffs, collection of revenue and proper record keeping. The training also covered the preparation of daily duty rosters at the Kiosks, keeping water sales records.

The adoption of procedures put in place during monitoring was most effective in areas where committee members were literate like Shauri Yako in Meru and Kambi ya Juu in Isiolo. Record keeping remain poor in Kambi Ngamia and Kambi Garba.

As a result of training in operations and maintenance, kiosks adopted two systems of operation. Majengo employed an attendant while the other kiosks adopted a rotational duty rosta where members take turns to operate the kiosk.

The salaried kiosk attendant insurers that the Kiosk is opened on daily basis. The disadvantage is that during her absence a replacement may be difficult to find. This system is applied in Majengo where members are pre-occupied with other duties.

The rotational duty rosta system exposes members to operations at the kiosk and promotes a feeling of ownership. Duties at the Kiosk are viewed as members contribution to the project. This approach helps reduce operational costs. The system is effective where members commitment to group activities is high. Where the commitment is low, frequent absence and complete closure can render the kiosk unoperational. This situation was common in Kambi Garba. The rotational duty rota was very successful in Shauri Yako.

Table G5-4 Sample Statement Development during Training in O/M.

Cash Statement

Name of the Group

Date	Description	Cash in	Cash out	Balance
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Source: Data collected during monitoring of cwps

- Caretakers were expected to fill in the form on daily basis.
- The form together with cash were to be handed over to the treasurer at the end of the day.
- Due to illiteracy, Kambi Garba and Kambi Ngamia could not fill in the form.

5.7 Health Education

Health education training was carried out in order to facilitate hygienic process in water transportation, storage, utilization, environmental sanitation and community understanding about the cause, transmission and control of common diseases affecting the community.

The training centered on:

- Benefits of clean water
- Need for safe excreta disposal
- Common diseases in the community
- Personal hygiene and cleanliness at the kiosks.

The methodology used during training include group discussion, home visits and observations. Health education session selected a few people from the community with the intention of having follow up meetings organized by the water management committee.

On benefits of clean water, the participants were given three (3) posters depicting contaminated water source, alternative methods of water storage and water usage from a common container. Participants were required to describe what was happening in each picture.

The tool revealed the level of behaviour and knowledge existing in the community. By sorting out what was preferable to avoid contamination, the communities moved away from their old habits and adopted new hygienic behaviour (see posters 4A, 4B and 4C).

The result were as follows:-

- participants discouraged the utilization of river water and encouraged the use of piped water from the kiosk. (Poster 4A).
- Participants encouraged the storage of water in covered containers to avoid contamination (Poster 4B).
- Washing of hands was done in turns using clean water and soap (Poster 4C).

On safe excreta disposal, sanitation ladder was used. This is an analytical tool that helps to bring out a community's existing hygiene behaviour. The tool also allows community members to discuss effective strategies for improving their sanitation and helps them to identify the most appropriate and efficient procedures to arrive at solutions (adopted from

P.H.P., page 9).

Participants were asked to arrange pictures in a ladder according to what they considered desirable hygienic behaviour.

Defecation in the bush was found to be the lowest in the ladder, most commonly used due to absence and shortage of latrines. Participants discouraged its use due to spread of diseases.

From the monitoring of health aspects, we found out the following.

- Health education training , though essential, experienced very low rates of adoption due to the fact that practices taught are never disseminated to the larger population.
- Health education materials in form of posters help overcome specific area and problems. Materials have to be culture specific.
- Achieving optimum health benefits from investments in improved water and sanitation services depends on behavioral changes among the users. Public awareness campaigns and hygiene education are therefore important.
- Water storage methods were observed to be hygienic and interviews revealed clear understanding of the causes of transmission route and control of common diseases, like malaria, typhoid, dysentery and intestinal worm infection.
- Poor waste water disposal was common in densely populated areas of Majengo and Shauri Yako in Meru. Plot sizes were a major constraint to latrine construction in the two areas. On the other hand, assistance by other organizations such as (CCF and SIDA) to provide latrines was evident in Isiolo, although the community initiatives in providing latrines was very minimal due to taboos, culture and plenty of bush.

5.8 Main Findings and Recommendations

(1) Location of communal water points (CWP)

Supply of water through communal water points (CWP) is feasible in low income settlements where individual connections are inadequate, installation costs high. When identifying sites for their location, it is important that a detailed survey is conducted to identify and determine the targeted water user groups. Such survey

should consider (i) alternative water sources existing in the area, (ii) the extent to which the intended service area is served with individual connections. This will ensure the need for water in the area.

(2) Managements of CWP

The management of communal water points should be vested on women groups or self help groups with high women membership and high representation in the management. The main reason is that; women groups are the most organized entities in the communities and traditionally women are the users of water and sanitation facilities.

(3) Community organisation

Most community groups are poorly organized, therefore organisation and training of water users groups is necessary. The training should define the duties and responsibilities of the committee. Other issues to be addressed should include training in book keeping and financial management. Also the need for regular meetings and elections should be emphasized.

(4) Operation and Maintenance

The sustainability of (CWP) will depend on the O/M system put in place. The following could be of help.

- Daily operations of the Kiosk should be decided by the user community, this will ensure regular attendance of duties.
- The cost of water should be reasonable. It should cover the repair costs and be able to pay the water bill. High charges for water discourages water users who opt for free water, eg from other sources which may be contaminated.
- O/M training should be placed on the training of caretakers and provision of tools and spare parts.

(5) Health Education and Sanitation

All water and sanitation programmes should endeavor to include health education and sanitation. The approaches to disseminate it should be tailored in such a way

that it can reach bigger segments of the water users. One way could be through schools, churches and health clinics.

(6) Support Agencies

The intervention to bring change in the local communities should utilize existing public organisation so as to gain access and ensure acceptability. Such institutions include the Government Ministries, Churches, Schools and NGOs.