

**Aftercare Study on
the National Water Master Plan**

OL DOINYO NG'IRO(1/1)

General

Name of Urban Centre : *Ol Doinyo Ng'iro*

Organisation/Water Undertaker : *Catholic mission*

District : *Isiolo*

Location: *Okdo Nyiro*

Map (1/50,000) Ref. no : *92/24*

Co-ordinates *X 36° 59' Y N 00° 38'*

Drainage Sub-basin : *SDD*

Existing facilities:

Source : *Ewaso Nyiro river*

Type of Intake : *Dam* Elevation : *463m*

Raw water system : *pumping*

H: *m* Dia : *150mm, 14 km long*

Treatment Process : *None.*

Most of the water is used for irrigation. Pump is driven by the electricity generated by a turbine. Driven by the river water. No quality control is carried out.

Designed Capacity :

Treated water/Distribution system -

Area covered: *1.0km²*

Distribution mains (80mm and above): *80mm*

Total length : *3.5km*

UFW (Estimated) : *m³/d 1996*

Consumers - Total no :

Working Meters: *None*

Metered : *Data not available.*

Unmetered :

Water production : *850m³/d*

Remark : *Most of water is used by the catholic mission plantation, gardening and washing. No charge is made to any other user.*

Service area population :

Population served :

Financial/Revenue

O & M costs : *Kshs*

Revenue earned : *Kshs*

Revenue collected : *Kshs*

Rehabilitation required/costs

Kshs Estimated

Total

Future development plan

Source : *Ewaso Nyiro river*

Treatment : *Conventional* Capacity : *1,200 m³/d*

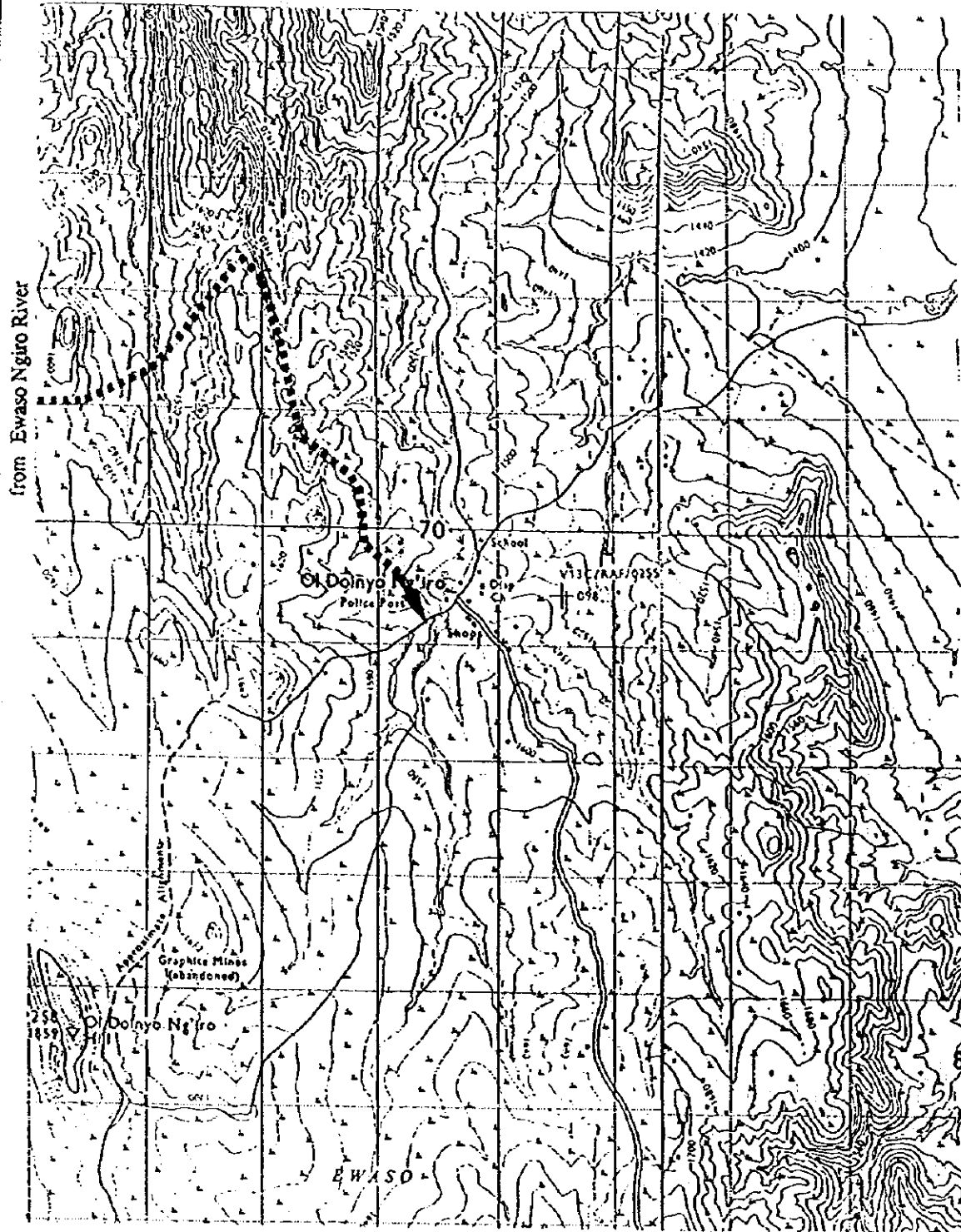
Design year :

Design population:

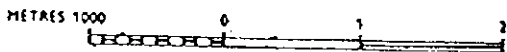
Remarks

The current system may be expanded to supply treated water to the public after treatment.

Fig.



Ol Doinyo Ng'iro



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GARBATULA (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : Garbatula

Organisation/Water Undertaker : MOWA

District : Isiolo Location: Garbatula

Map (1/50,000) Ref. no : 96/3

Co-ordinates X 38° 34' Y N 00° 33'

Drainage Sub-basin : 5FA

Existing facilities:

Source : 1 No bore hole C9573, 2 No. not operational Type of Intake : Elevation : 400m

Raw water system : pumping H : m Dia : 100mm

Treatment Process : None.

Shallow bore hole pump is powered by the generator set to pump water to storage tanks. Test are periodically done district water office

Designed Capacity :

Treated water/Distribution system -

Area covered: 2.5km² of Isiolo urban

Distribution mains (80mm and above): 100mm to mm

Total length : 2.35km

UFW (Estimated) : m³/d

Consumers - Total no : 70-1996

Working Meters: None, all consumers are charged flat rate

Metered :

Unmetered : 106

Water production : 56m³/d

Remark :

Service area population : 5,000

Population served : 2,000

Financial/Revenue - 1996

O & M costs : Kshs 90,000 power and repairs

Revenue earned : Kshs

Revenue collected : Kshs 300,000

Rehabilitation required/costs

Kshs Estimated

i) Generator set

2,500,000

ii) Distribution system renovation and extension

8,000,000

iii) Storage tank and Chlorination

800,000

Total

11,300,000

Future development plan

Source : Shallow wells

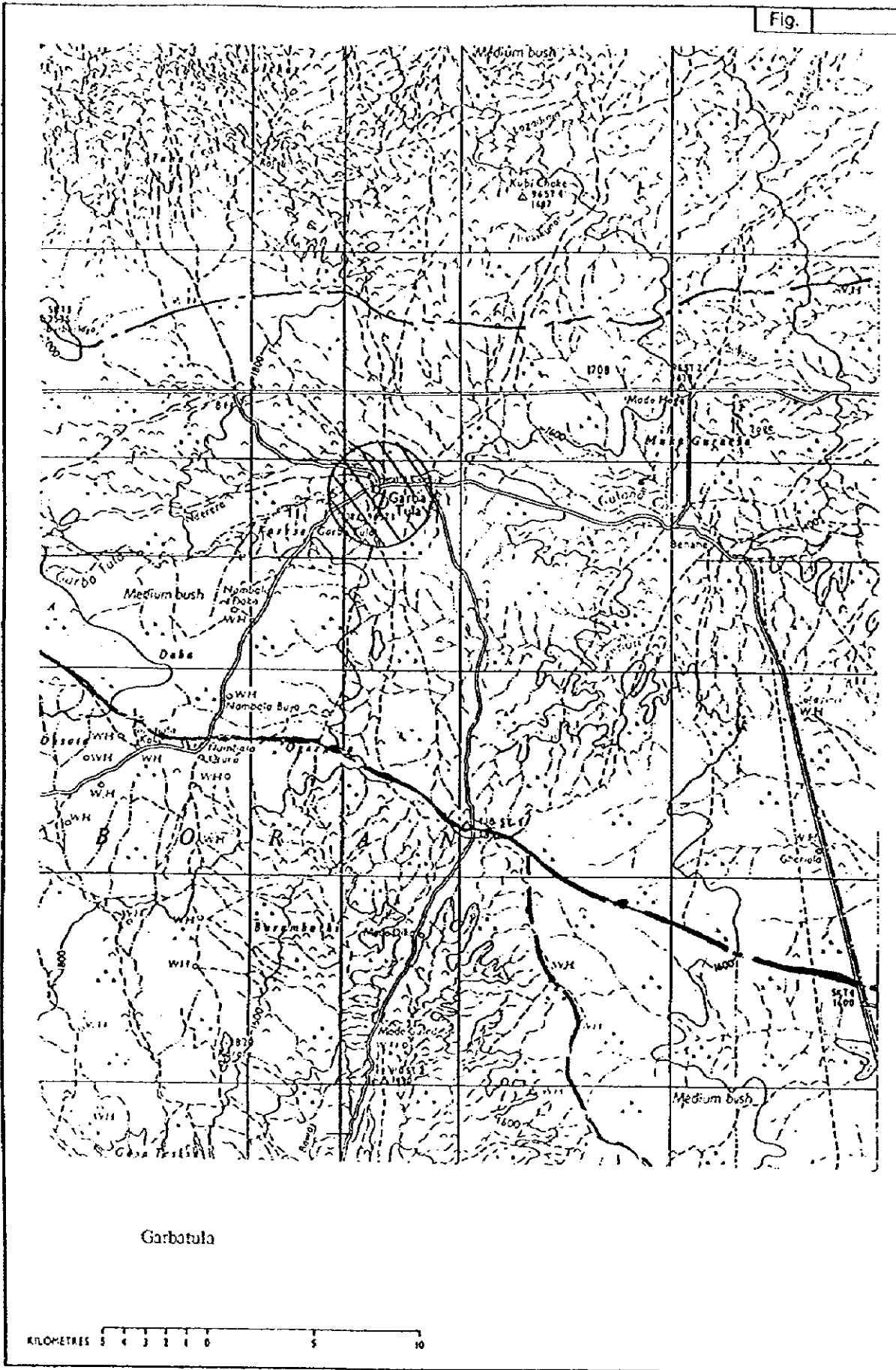
Treatment : Chlorination Capacity : 300 m³/d

Design year : 1999

Design population: 6,000

Remarks

Most residents are not connected to the supply system and they use their own shallow wells using hand pumps.



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the National Water Master Plan**

MERTI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Merti*

Organisation/Water Undertaker : *Community*

District : *Isiolo* Location: *Merti*

Map (1/50,000) Ref. no : *82/3*

Co-ordinates *X 38° 41' Y N 01° 05'*

Drainage Sub-basin : *5ED*

Existing facilities:

Source : *1 No bore hole (not operational)*

Type of Intake : Elevation : *305m*

Raw water system : *Pumping - 8m³/hr.*

H : *29 m* Dia : *80mm B,H Dia.*

Treatment Process : *None.*

Pumping from shallow borehole is done by submersible pump powered by the generator

Designed Capacity :

Treated water/Distribution system -

Area covered: *2.5km²*

Distribution mains (80mm and above): *100mm to 60 mm*

Total length : *3.59km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *230*

Working Meters: *None, all consumers are charged flat rate*

Metered :

Unmetered : *230*

Water production : *128m³/d*

Remark : *Pump works only 3 days a week*

Service area population : *6,248*

Population served :

Financial/Revenue

O & M costs : *Ksh 128,000*

Revenue earned : *Kshs*

Revenue collected : *Kshs*

Rehabilitation required/costs

i) *Borehole renovation and equipment*

Kshs Estimated

2,200,000

ii) *Chlorination system*

300,000

Total

2,500,000

Future development plan

Source :

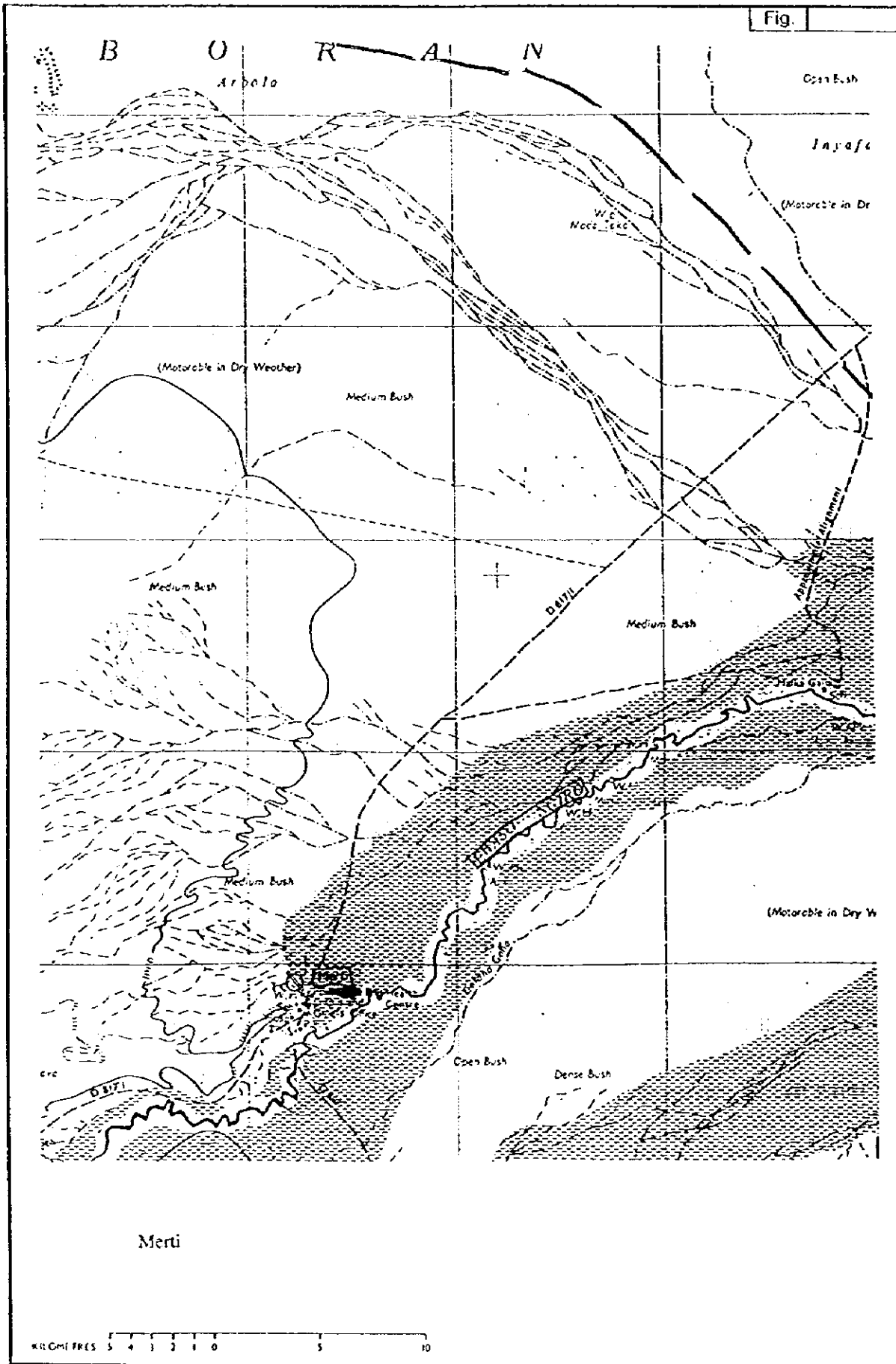
Treatment : Capacity : *m³/d*

Design year :

Design population:

Remarks

The current water supply was constructed by Action - Aid which serves a very small section of the community. Most of the residents depend on shallow bore holes. The first borehole was sunk in 1977, which is still functional. The second one drilled in 1993 was washed out while the third was drilled in 1997 and is yet to be equipped.



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MADO GASHI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Mado Gashi*

Organisation/Water Undertaker : *Community*

District : *Isiolo* Location: *Mado Gashe*

Map (1/50,000) Ref. no : *NA - 37-15* Co-ordinates *X 39° 10' Y N00° 44'*

Drainage Sub-basin : *4BF*

Existing facilities:

Source: *River Gaza Gof* Type of Intake : *River* Elevation : *1000m.*

Raw water system : *Pumping* H: *m* Dia : *75mm*

Treatment Process :

Intake is infiltration galleries serving 2 No shallow wells on seasonal river bed.

Designed Capacity: *m³/day*

Treated water/Distribution system

Area covered: *km²*

Distribution mains (80mm and above): *75 mm to mm*

Total length : *1.8 km*

UFW (Estimated) : *m³/d*

Consumers - Total no :

Metered :

Unmetered :

Working Meters: *None*

Water production : *m³/d*

Service area population :

Population served :

Remark :

Water supply not operational as rehabilitation is not complete yet.

Financial/Revenue:

O & M costs : *Ksh*

Revenue earned : *Kshs*

Revenue collected : *Kshs*

Rehabilitation required/costs

Kshs Estimated

<i>i) Construction of 100m³ reservoir</i>	<i>800,000</i>
<i>ii) Purchase of 2 No pumps</i>	<i>300,000</i>
<i>iii) Construction of road crossings for 1.5 km transmission main.</i>	<i>100,000</i>
Total	<i>1,200,00</i>

Future development plan

Source :

Treatment : Capacity : *1,200 m³/d*

Design year : *2010*

Design population: *10,000*

Remarks

This is an old community managed water supply scheme which is currently being rehabilitated.

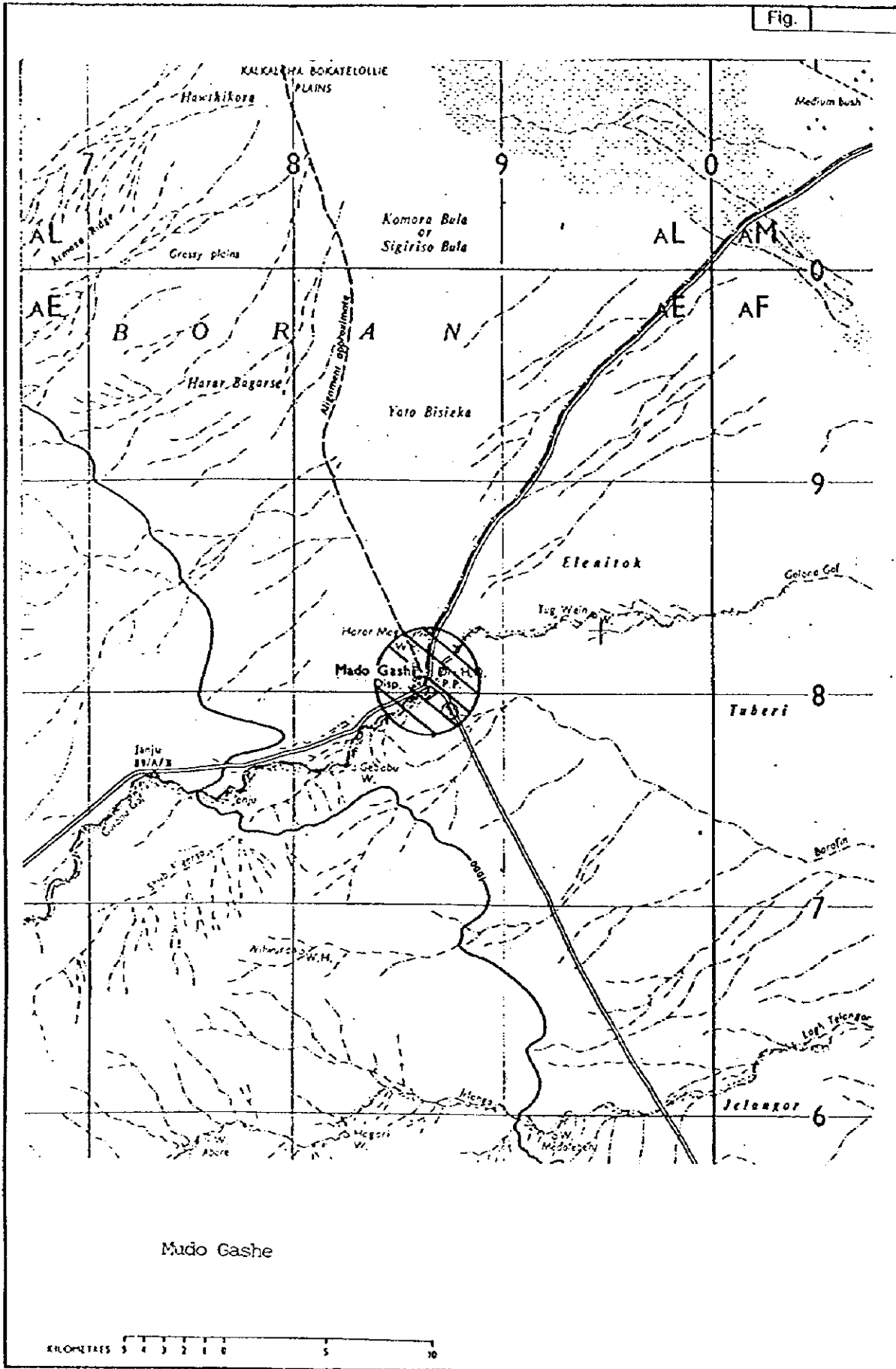


Fig.

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KITUI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Kitui*
 Organisation/Water Undertaker : *MOWR*
 District : *Kitui* Location: *Kitui*
 Map (1/50,000) Ref. no : *151/3* Co-ordinates X : *38° 01' Y: S01° 22'*

Drainage Sub-basin : *4HA*

Existing facilities:

Source : *Borehole (No.C4136)* Type of Intake : *Boreh* Elevation : *11140m*
 Raw water system: *Pumping* H: *m* Dia : *80mm*
 Treatment Process : *None.*
*Tests show that water does require chlorination during rainy season.
 But none is carried out.*

Designed Capacity : *3,000m³/day -By use of 4No boreholes, but only one is functioning at present*
 Treated water/Distribution system - Area covered: *10km² currently but needs to be extended*
 Distribution mains (80mm and above): *150 mm to 80mm*
 Total length : *21.2km*

UFW (Estimated) : *m³/d*
 Consumers - Total no : *900* Working Meters: *650*
 Metered : *900*
 Unmetered : *250 (meters removed)*

Water production : *530m³/d* Remark *Pump works for 24 hrs /day to cater for higher demands.*
 Service area population : *25,000*
 Population served : *11,000*

Financial/Revenue 1997

O & M costs : *Kshs 1,467,128*
 Revenue earned : *Kshs 1,714,134*
 Revenue collected : *Kshs 486,726*

Rehabilitation required/costs

i) <i>2 No Bore holes to be deepened and re- equipped.</i>	Kshs Estimated
ii) <i>Total renovation and extension of distribution system</i>	<i>2,000,000</i>
Total	<i>40,000,000</i>
	<i>42,000,000</i>

Note: The above bore holes will supplement the supply from Masinga dam which will be connected to Kitui water supply system shortly

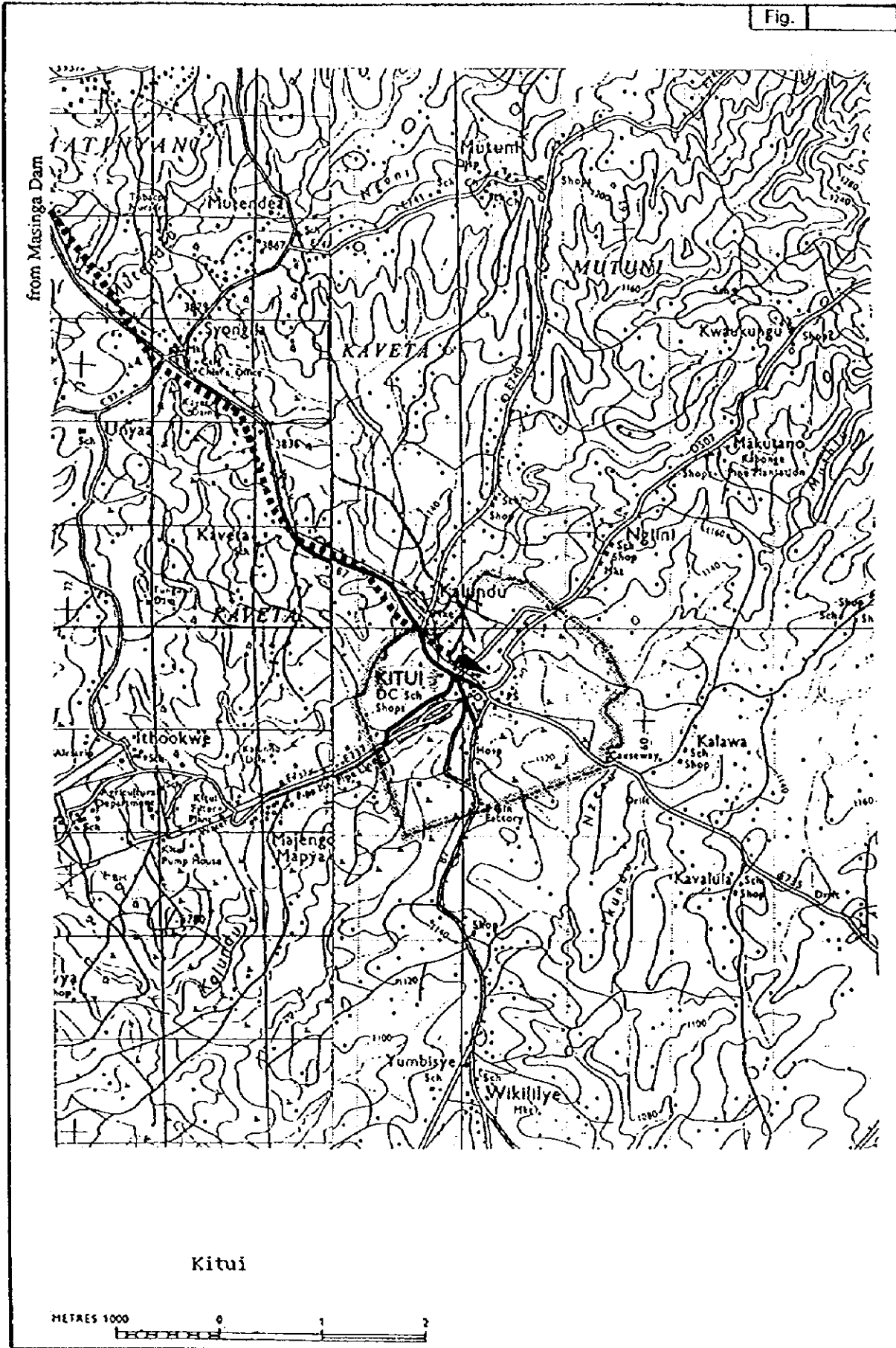
Future development plan

Source : *Masinga Dam*
 Treatment : *Full* Capacity : *5,270 m³/d*
 Design year : *1998*
 Design population : *25,000*

Remarks

The Kitui water supply will be connected to Masinga - Kitui Water scheme. Treated water will be transmitted to 1500m³ tank in Kitui township in about 2 years. Kitui distribution system needs to be improved and extended - the provision of this is not allowed in Kitui Masinga scheme. At present, the demand is outstripping the supply as minimum disinfection is required, whilst waiting for the supply to be connected to Masinga - Kitui pipeline. 2No. boreholes should be rehabilitated to supplement the existing supply.

Fig.



Kitui



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MUTOMO (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Mutomo*

Organisation/Water Undertaker : *MOWR*

District : *Kitui* Location: *Mutomo*

Map (1/50,000) Ref. no : *164/3*

Co-ordinates X : *38° 11' Y: 501° 51'*

Drainage Sub-basin : *4 HA*

Existing facilities:

Source : *Bore hole (not operationa since 1991)*

Type of Intake *B/H* Elevation : *855m*

Raw water system: *borehole*

H : *m* Dia : *75 mm*

Treatment Process : *None .*

Borehole yield deteriorated gradually, until it was un-economical to operate and finally in 1991.

Designed Capacity :

Treated water/Distribution system -

Area covered *20km²*

80 mm to 50mm Rising main

Distribution mains (80mm and above):- *also acted as distribution*

Total length : *18.5km*

mains

UFW (Estimated) : *m³/d*

Consumers - Total no :

Working Meters: *None*

Metered :

Unmetered :

Water production : *341m³/d maximum at the time borehole was workir. Remark : Pumps used to work 16 Hrs a day minimum*

Service area population : *9,500*

Population served :

Financial/Revenue

O & M costs : *Kshs*

Revenue earned : *Kshs Non functioning since 1991.*

Revenue collected : *Kshs*

Rehabilitation required/costs

Kshs Estimated

i) *New boreholes*

7,200,000

ii) *Larger pipe for 18 km*

36,000,000

iii) *Reno/ate and replace pumps and generators*

7,000,000

iv) *Extend distribution system*

20,000,000

Total

70,200,000

Future development plan

Source : *Boreholes or Dam on river Tiva*

Treatment : *Full*

Capacity : *1,300 m³/d*

Design year :

Design population : *12,000*

Remarks

It was indicated by district water officer that there is consideration for design of dam and new water supply system with River Tiva on source which is about 8km from Mutomo. Since abandonment of the scheme in 1991, sections of the distribution has been removed and residents have to fetch water from Tiva River, a distance of 8km.

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MWINGI (1/1)

Urban Water Supply
System Survey

General

Name of Urban Centre : *Mwingi*
 Organisation/Water Undertaker : *Ministry of Water Resources.*
 District : *Mwingi* Location: *Mwingi*
 Map (1/50,000) Ref. no : *151/3* Co-ordinates *X:38° 03' Y:500° 55'*
 Drainage Sub-basin : *4ED*

Existing facilities:

Source : *River Tyaa* Type of Intake : *Shallow well* Elevation : *930m*
 Raw water system: *Pumping* H: *45 m* Dia : *63mm*
 Treatment Process : *Chlorination occassionally (Twice a week) About 5 kg of Hypochlorite is dosed into the tanks twice a week. No other chemicals are used.*

Designed Capacity : *400m³/day Maximum 90m³/day during dry season.*

Treated water/Distribution system - Area covered *1.5km² currently but needs to be extended*
 Distribution mains (80mm and above): *80mm to mm*
 Total length *:1.5km for 80mm*

UFW (Estimated) : *m³/d*
 Consumers - Total no : *314* Working Meters: *18*
 Metered : *18*
 Unmetered : *296*

Water production : *300 m³/d* Remark : *Only few meters are damaged but billing is done on estimated consumption*
 Service area population : *15,000*
 Population served : *12,000*

Financial/Revenue 1997

O & M costs : *Kshs 1,551,408 (1996)*
 Revenue billed : *Kshs 555,600*
 Revenue collected : *Kshs 120,747*

Rehabilitation required/costs

<i>1) Distribution system will have to be improved.</i>	Kshs Estimated
	<i>45,000,000</i>
<i>It is likely that most of the water demand will be met from Kambere water supply project due to be completed in the year 1999 to supply 2,700m³/day</i>	Total
	<i>45,000,000</i>

Future development plan - Kambere Water Project.

Source : *Tana river*
 Treatment : *Full conventional.* Capacity : *2,700 m³/d to supply Mwingi.*
 Design year : *2011*
 Design population : *50,000*

Remarks

Most of the demand of 2,700/m³ day for Mwingi urban will be supplied by Kambere Water Supply project being implemented/constructed by Tana and Athi River Development Authority (TARDA) to be completed in 1999. The current Mwingi water supply abstraction from river Tyaa may become obsolete.

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MACHAKOS (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Machakos*
 Organisation/Water Undertaker : *NWCPC*
 District : *Machakos* Location: *Machakos*
 Map (1/50,000) Ref. no : *161/4* Co-ordinates X : *37° 14' Y S 01° 32'*
 Drainage Sub-basin : *3 EA*
Existing facilities: *2 No facilities 1. Maruba dam 2. Nofuresh connection*
 Source : *Pipe connection* Type of Intake : *Earth Dam* Elevation : *1550 m*
 Raw water system: *Treated water* H: m Dia : *300 mm*
 Treatment Process : *Only Chlorination at source is carried out and further rechlorination is done by NWCPC at the new receiving tank near NWCPC office in Katoloni area Machakos*

Designed Capacity : *5800m³/Day from off take pipeline of Nofuresh*
 Treated water/Distribution system - Area covered *22.5 km²*
 Distribution mains (80mm and above): *150 mm to 80mm*
 Total length : *22.5km*

UFW (Estimated) : *m³/d*
 Consumers - Total no : Working Meters: *About 15%*
 Metered :
 Unmetered :

Water production : *1740 m³/d* Remark : *Nofuresh supply is decreasing as more consumers are connected upstream of Machakos.*
 Service area population : *120,000*
 Population served : *80,000*

Financial/Revenue -1996 Figures

O & M costs : *Kshs 1,560,000*
 Revenue earned : *Kshs 16,509,095*
 Revenue collected : *Kshs 14,780,280*

Rehabilitation required/costs

	Kshs Estimated
i) Desiltation of impoundment area of the dam	5,000,000
ii) Laboratory Equipment, test chemicals	300,000
iii) Gate valves pipe work at T' works	700,000
iv) Flocculation tanks	1,500,000
v) Pumping Equipment	5,000,000
vi) Distribution System Repair and Augmentation of Disnetwork	40,000,000
vii) Flow equipment at various strategic points	5,000,000
Total	57,500,000

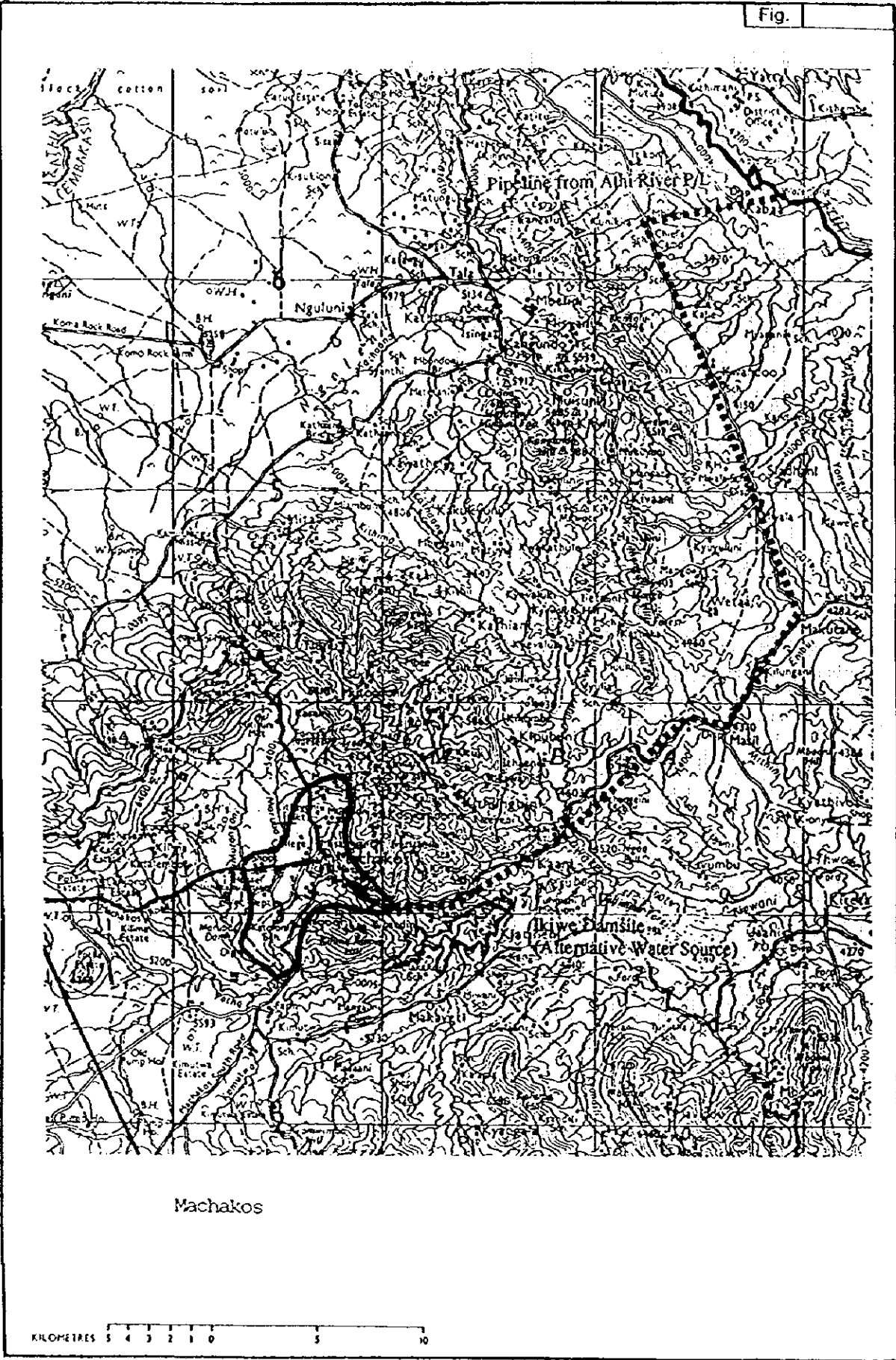
Future development plan

Source :
 Treatment : Capacity : *m³/d*
 Design year :
 Design population : *120,000 current*

Remarks

Supply from Nofuresh is decreasing due to increasing connections before Machakos town

Fig.



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MITABONI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Mitaboni*
 Organisation/Water Undertaker : *MOWR*
 District : *Machakos* Location : *Mitaboni*
 Map (1/250,000) Ref. no : *149/3,4* Co-ordinates X : *37° 15'* Y : *501° 22'*
 Drainage Sub-basin : *4AC*
Existing facilities: *2 No facilities 1. Maruba Dam 2. Nol Turesh*
 Source : *Kaihaama river and 2No boreh* Type of Intake : *Dam* Elevation : *1420 m*
 Raw water system : *Gravity 2. Hand pur H :* *m* Dia : *50 mm*
 Treatment Process : *None*

Designed Capacity : *3500 m³/d*
 Treated water/Distribution system - Area covered : *2.5 km²*
 Distribution mains : *50 mm*
 Total length : *3km*

UFW (Estimated) : *m³/d*
 Consumers - Total no : Working Meters:
 Metered :
 Unmetered :

Water production : *483m³/d* Remark :
 Service area population : *4,000* *Water is free no charges are made since no revenue is*
 Population served : *3,000* *collected*

Financial/Revenue

O & M costs : *Kshs*
 Revenue earned : *Kshs* See remark
 Revenue collected : *Kshs*

Rehabilitation required/costs

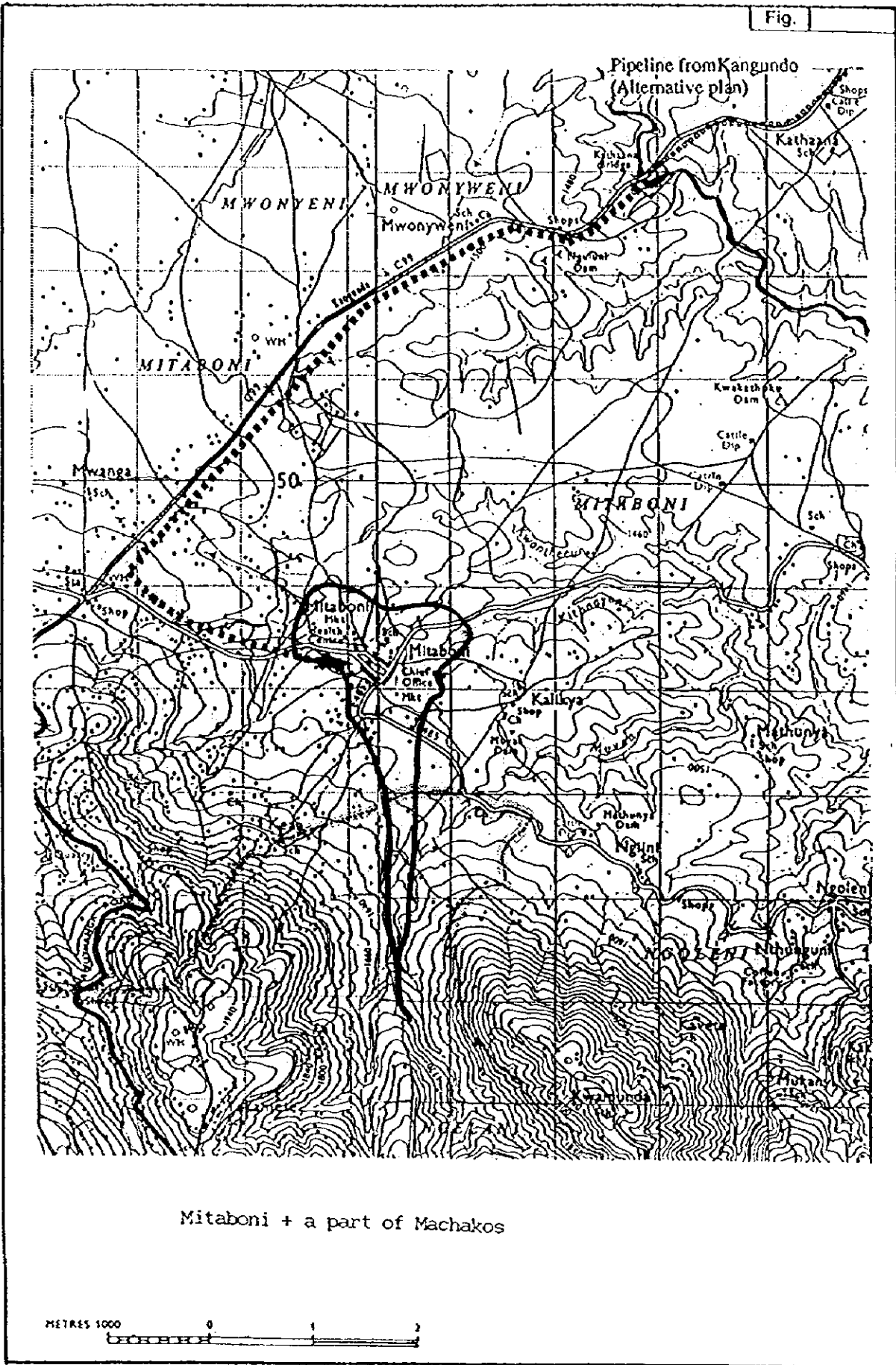
	Kshs
i) <i>Distribution system</i>	<i>5,000,000</i>
ii) <i>Larger raw water main</i>	<i>2,000,000</i>
iii) <i>Treatment works</i>	<i>25,000,000</i>
iv) <i>Dam and Intake</i>	<i>10,000,000</i>
Total	<i>42,000,000</i>

Future development plan

Source : *None proposal*
 Treatment : Capacity : *80 m³/d*
 Design year :
 Design population : *120,000 current*

Remarks

The scheme is gravity funds needed are provided by the church and institutions. The scheme is not old.



**Aftercare Study on
the National Water Master Plan**

ATHI RIVER (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Athi river*

Organisation/Water Undertaker : *Mavoko municipal council.*

District : *Machakos*

Location:

Map (1/50,000) Ref. no : *148/4*

Co-ordinates *X 37° 02' Y S 01° 31'*

Drainage Sub-basin : *3AB*

Existing facilities: *1. Nolturesh - 1 connection*

Source: *2 EPZ - 3 connections*

Type of Intake :

Elevation : *1500m*

Raw water system : *See below*

H : *m*

Dia : *250mm*

Treatment Process :

1. Supply from Nolturesh is chlorinated at source.

2. supply from pipeline to EPZ (Export promotion zone) connection is from Nairobi City Council and is fully treated.

Designed Capacity:

Treated water/Distribution system -

Area covered: *35 km²*

Distribution mains (80mm and above): *200mm to 100 mm*

Total length : *16 km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *1210*

Metered : *1200*

Unmetered :

Working Meters: *10 meters removed due to non payment*

Data on meters not working not available.

Water production : *2000 m³/d*

Remark :

Service area population : *50,000*

Population served : *12,500*

Financial/Revenue 1996

O & M costs : *Ksh 1,916,400*

Revenue earned : *Kshs 4,925,132*

Revenue collected : *Kshs 4,472,018*

Rehabilitation required/costs

i) *Distribution system*

Kshs Estimated
60,000,000

ii) *Flow control equipmet*

3,000,000

iii) *Storage tanks*

5,000,000

Total

68,000,000

Future development plan

Source : *Dam on Mbagathi river.*

Treatment : *Full conventional* Capacity : *m³/d*

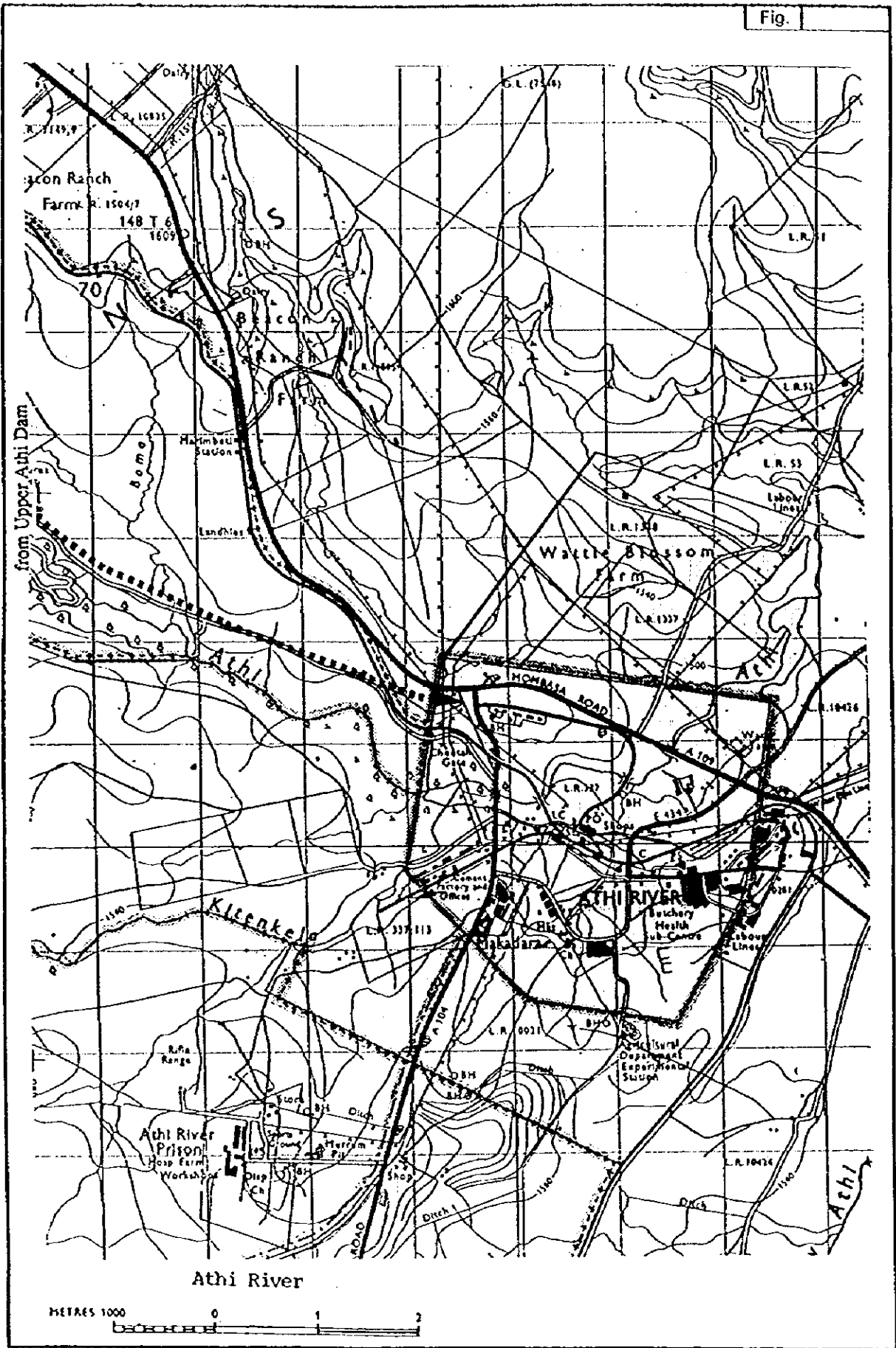
Design year : *Under final design.*

Design population:

Remarks

Athi River had conventional treatment works which was abandoned in 1991. Nolturesh supply is not reliable. Supply from offtakes from pipeline to EPZ is sold to Athi river at Kshs. 27/m³ and Nolturesh at Kshs.10/m³ customers are charged kSHS.50/m³. Athi River has to have independent supply which is reliable.

Fig.



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UAANI-TAWA (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Uaani - Tawa*

Organisation/Water Undertaker : *Mulima Self Help Community Water Project*

District : *Machakos* Location:

Map (1/50,000) Ref. no : *162/2*

Co-ordinates *X 37° 46' Y S 01° 33'*

Drainage Sub-basin : *1 EB*

Existing facilities:

Source: *Pipe offtake from Mulima water supply*

Type of Intake : *Pipeline offtake*

Elevation : *1410m*

Raw water system : *Gravity*

H: *m* Dia : *150mm*

Treatment Process : *None*

Before 1963, Uaani and Tawa were supplied from a old borehole which broke down. In 1983 it was connected to a large scheme in the area called Mulima Self Help water project (it is all gravity scheme)

Designed Capacity: *m³/day*

Treated water/Distribution system

Area covered: *4 km² Uaani/Tawa*

Distribution mains (80mm and above): *50 mm to 80 mm*

Total length : *km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *844*

Metered : *None*

Unmetered : *844*

Working Meters: *All connections are charged on flat*

Water production : *m³/d*

Remark : *All metres were removed due to conflicts and damage by the users.*

Service area population : *18,000*

Population served : *10,000*

Financial/Revenue:

O & M costs : *Ksh 220,000*

Revenue earned : *Kshs 700,000 billed*

Revenue collected : *Kshs 350,000*

Rehabilitation required/costs

i) *Distribution system extension of Uaani and Tawa*

ii) *Full treatment of Mulima supply*

Kshs Estimated

4,000,000

20,000,000

Total

24,000,000

Future development plan

Source : *Spring near Ikokani dam.*

Treatment : *Full conventional* Capacity : *m³/d*

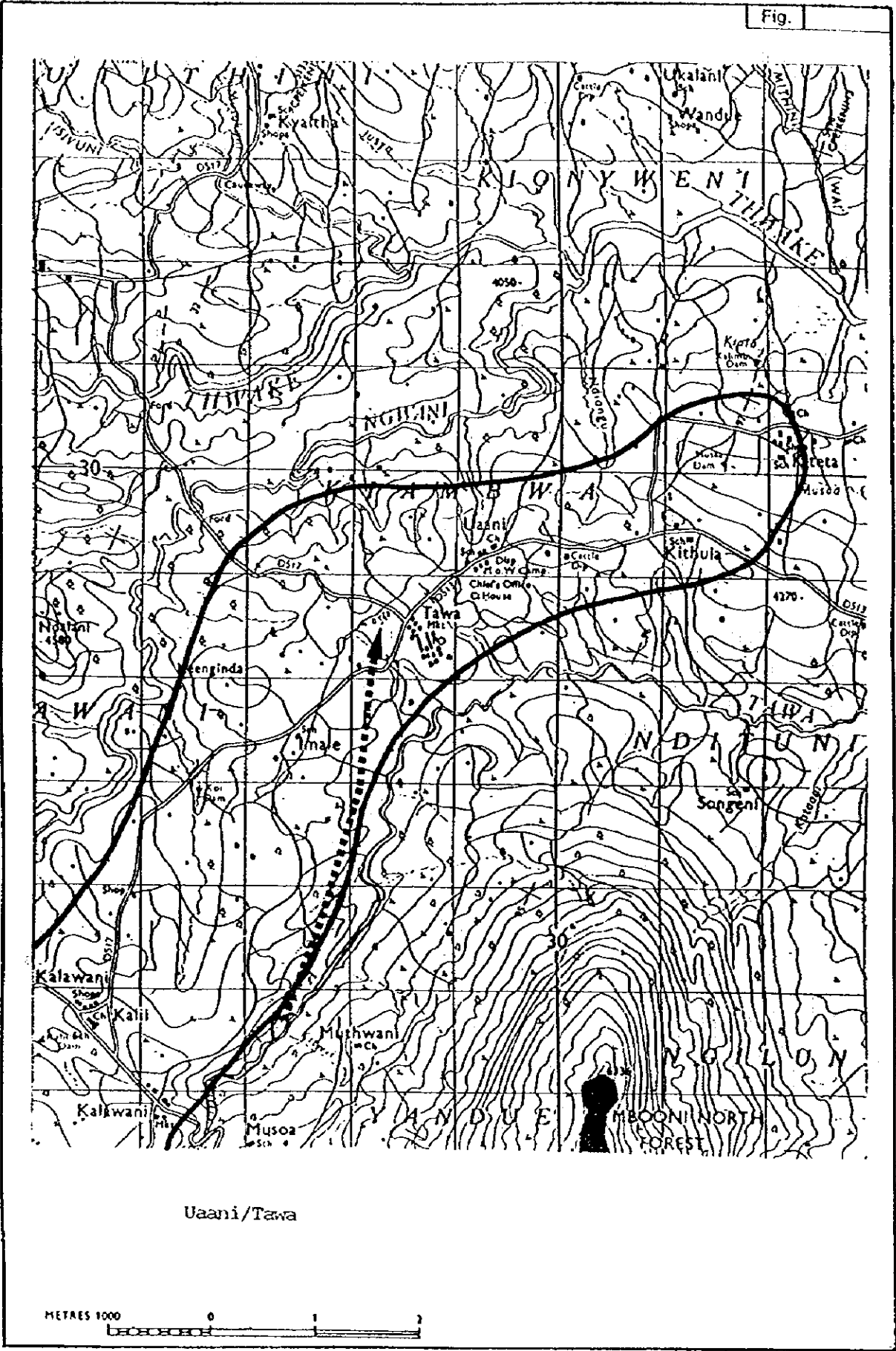
Design year :

Design population:

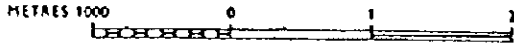
Remarks

Mulima Self Help Water Project has a large supply area, and requires full conventional treatment.

Fig.



Uaani/Tawa



**Aftercare Study on
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KANGUNDO (1/1)

**Urban Water Supply
System Survey**

No 55

General

Name of Urban Centre : *Kangundo*

Organisation/Water Undertaker : *Kangundo -Tala Town Council*

District : *Machakos*

Location: *Kangundo*

Map (1/50,000) Ref. no :*149/4*

Co-ordinates X: *37° 22'* Y: *S01° 22'*

Drainage Sub-basin : *3 EA*

Existing facilities:

Source : *2No boreholes only one is working.*

Type of intake : *Borehole* Elevation : *1620m*

Raw water system: *Pumping 17.4m³/hr*

H: *50m* Dia : *80 mm*

Treatment Process :

No treatment. Except for chlorination done by Tropical Chloride of Lime @ 1/2kg/d, done twice a week. From borehole, water is pumped to storage tank then boosted to hill tank and gravitated to consumers.

Designed Capacity :

Treated water/Distribution system -

Area covered *4km²*

Treated water is pumped from hospital pumping station to Kangundo town.

Distribution mains (80mm and above): *80 mm to 40mm*

Total length : *4.5km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *436*

Working Meters: *Approx. 50%*

Metered : *316*

Unmetered : *120*

Water production : *34fm³/d maximum*

Remark : *Pumps work 16 Hrs a day (minimum).*

Service area population : *9,500*

Population served : *4,500*

Financial/Revenue -1996 Figures

O & M costs : *Kshs 300,000*

Revenue earned : *Kshs 451,000*

Revenue collected : *Kshs 363,160*

Rehabilitation required/costs

i) *More power - full borehole pumps and storage*

Kshs Estimated

1,500,000

ii) *Larger rising main from borehole*

500,000

iii) *Improvement of distribution system*

5,000,000

iv) *Staff housing facilities*

4,000,000

v) *Treatment works*

7,000,000

Total

18,000,000

Future development plan

Source : *New boreholes*

Treatment : *Full*

Capacity : *1,200 m³/d*

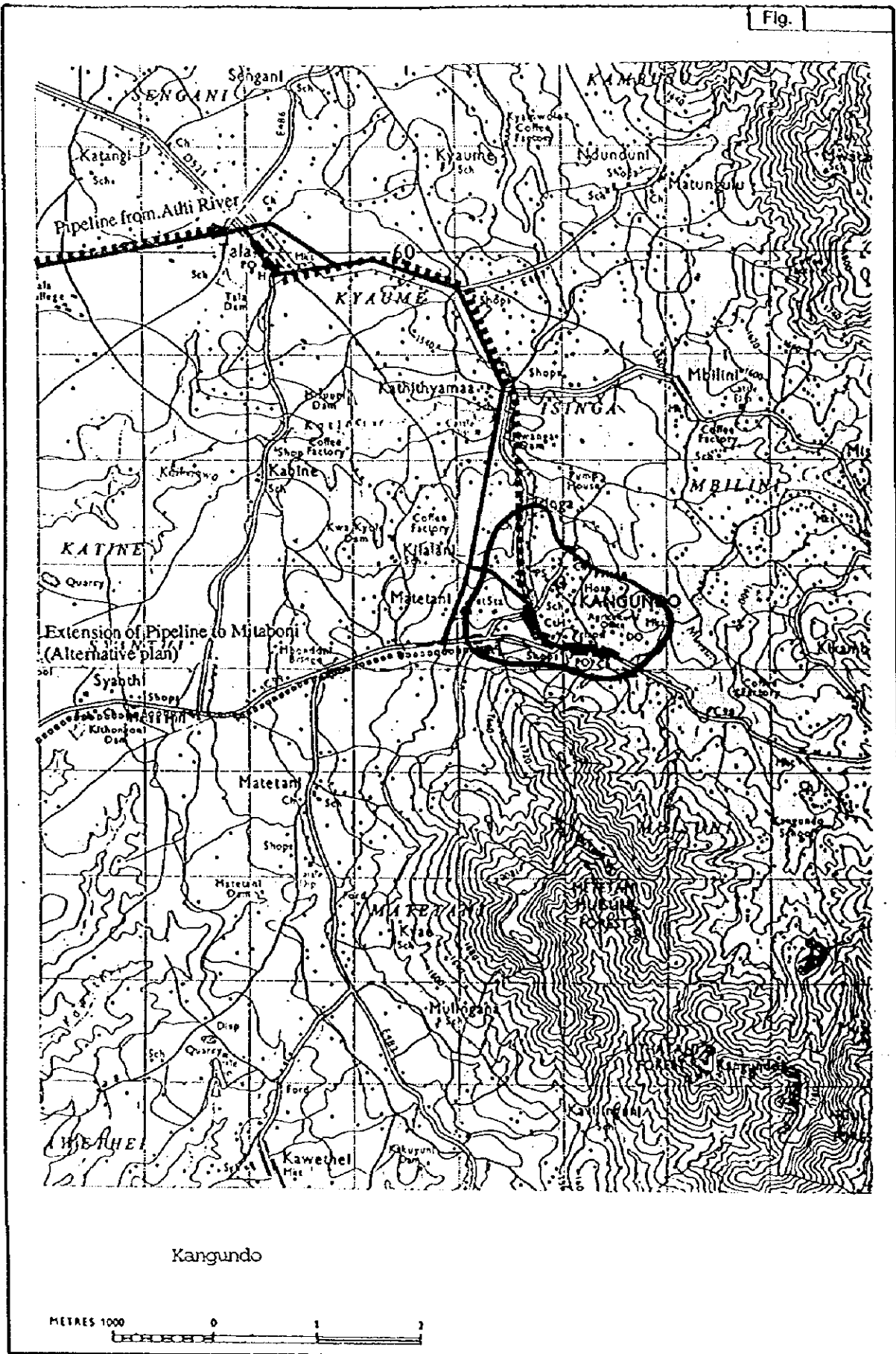
Design year :

Design population :

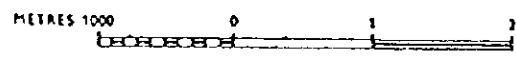
Remarks

No future plan is possible due to lack of funds. Chlorination is carried out as advised by the hospital laboratory, which is very irregular. Delay by the consumers to pay in time causes cash flow problems and thus O&M deterioration. All non- functioning meters should be repaired and all consumers metered to decrease wastage and thus increase population served.

Fig.



Kangundo



**Aftercare Study on
the National Water Master Plan**

TALA (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Tala*
 Organisation/Water Undertaker : *Kangundo - Tala town council*
 District : *Machakos* Location: *Tala*
 Map (1/50,000) Ref. no : *149/4* Co-ordinates *X 37° 19' Y S 01° 16'*
 Drainage Sub-basin : *SEA*

Existing facilities:

Source: *1 No borehole* Type of Intake : *B/H* Elevation : *1550m Tala town*
 Raw water system : *Pumping* H : *960 m* Dia : *37mm*
 Treatment Process : *None*

Consumer are supplied directly by boreholeriser. No chlorination is done. Storage tank remains empty because riser exhausts before reaching distribution tank

Designed Capacity:

Treated water/Distribution system - Area covered: *5km² of Isiolo urban*
 Distribution mains (80mm and above): *mm to mm*
 Total length : *22 km only small size mains*

UFW (Estimated) : *m³/d*
 Consumers - Total no : *400 - 1997* Working Meters: *40*
 Metered : *80*
 Unmetered : *320*

Water production : *100 m³/d* Remark : *Kangundo - Tala owes about 2,100,000 to KPLC.*
 Service area population : *13,000*
 Population served : *10,000*

Financial/Revenue: - 1997

O & M costs : *Ksh 176,604*
 Revenue earned : *Kshs 276,660*
 Revenue collected : *Kshs 217,911*

Rehabilitation required/costs - Completely new.

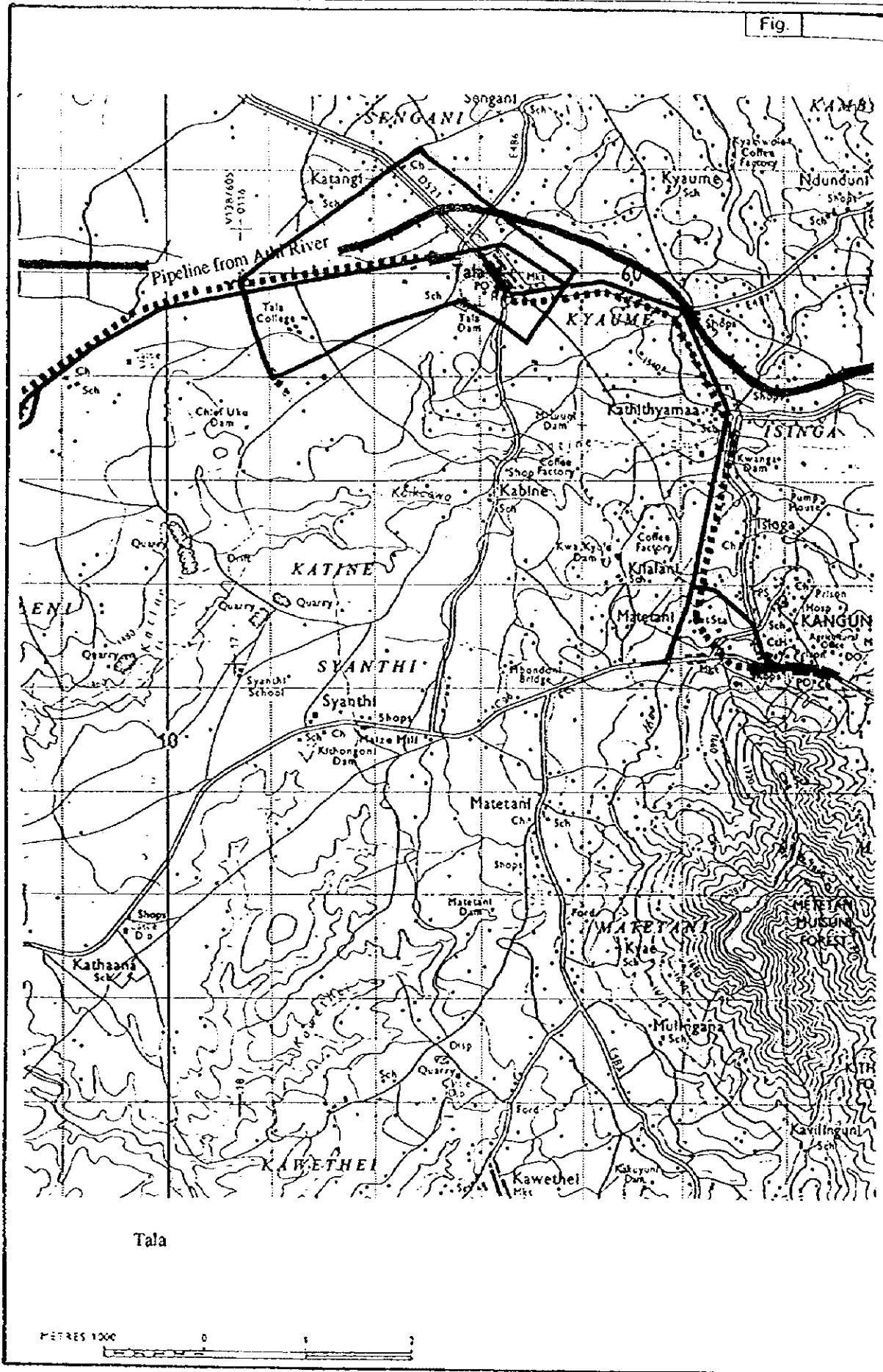
	Kshs Estimated
<i>i) Supply system using boreholes</i>	<i>10,000,000</i>
<i>ii) Distribution system</i>	<i>25,000,000</i>
Total	<i>35,000,000</i>

Future development plan

Source : *Borehole until Athi river pipeline reaches.*
 Treatment : *Chlorination.* Capacity : *1,800 m³/d*
 Design year :
 Design population: *13,000*

Remarks

Tala water supply is at gasping stage. Town council is no debt to KPLC and other creditors supply for water. Chlorination is not possible due to shortage of funds.



**Aftercare Study on
the National Water Master Plan**

NUNGUNI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Nunguni*

Organisation/Water Undertaker : *Community*

District : *Makueni* Location: *Kilungu.*

Map (1/50,000) Ref. no : *162/4*

Co-ordinates *X 37° 22' Y S 01° 50'*

Drainage Sub-basin : *3FA*

Existing facilities:

Source : *Spring*

Type of Intake : *Chamber* Elevation : *1930m*

Raw water system : *Gravity*

H: *m* Dia : *50mm*

Treatment Process : *None.*

The scheme has been unoperational since mid-1996, due to breakdown of the generating plant supplying power to pumps.

Designed Capacity :

Treated water/Distribution system -

Area covered: *2.5km²*

Distribution mains (80mm and above): *mm to mm*

Total length : *km*

UFW (Estimated) : *m³/d 1996*

Consumers - Total no :

Working Meters: *None, all consumers are charged flat rate*

Metered :

Unmetered :

Water production : *m³/d*

Remark :

Service area population :

Population served :

Financial/Revenue

O & M costs : *Ksh*

Revenue earned : *Kshs*

Revenue collected : *Kshs*

Rehabilitation required/costs

i) *Intake improvements*

3,000,000

ii) *New pump and diesel engines*

4,000,000

iii) *Additional storages*

5,000,000

iv) *Raw water distribution system*

11,000,000

v) *Treatment works*

12,000,000

Total

35,000,000

Future development plan

Source : *Dam on river Kyangonyo*

Treatment : *Full* Capacity : *m³/d*

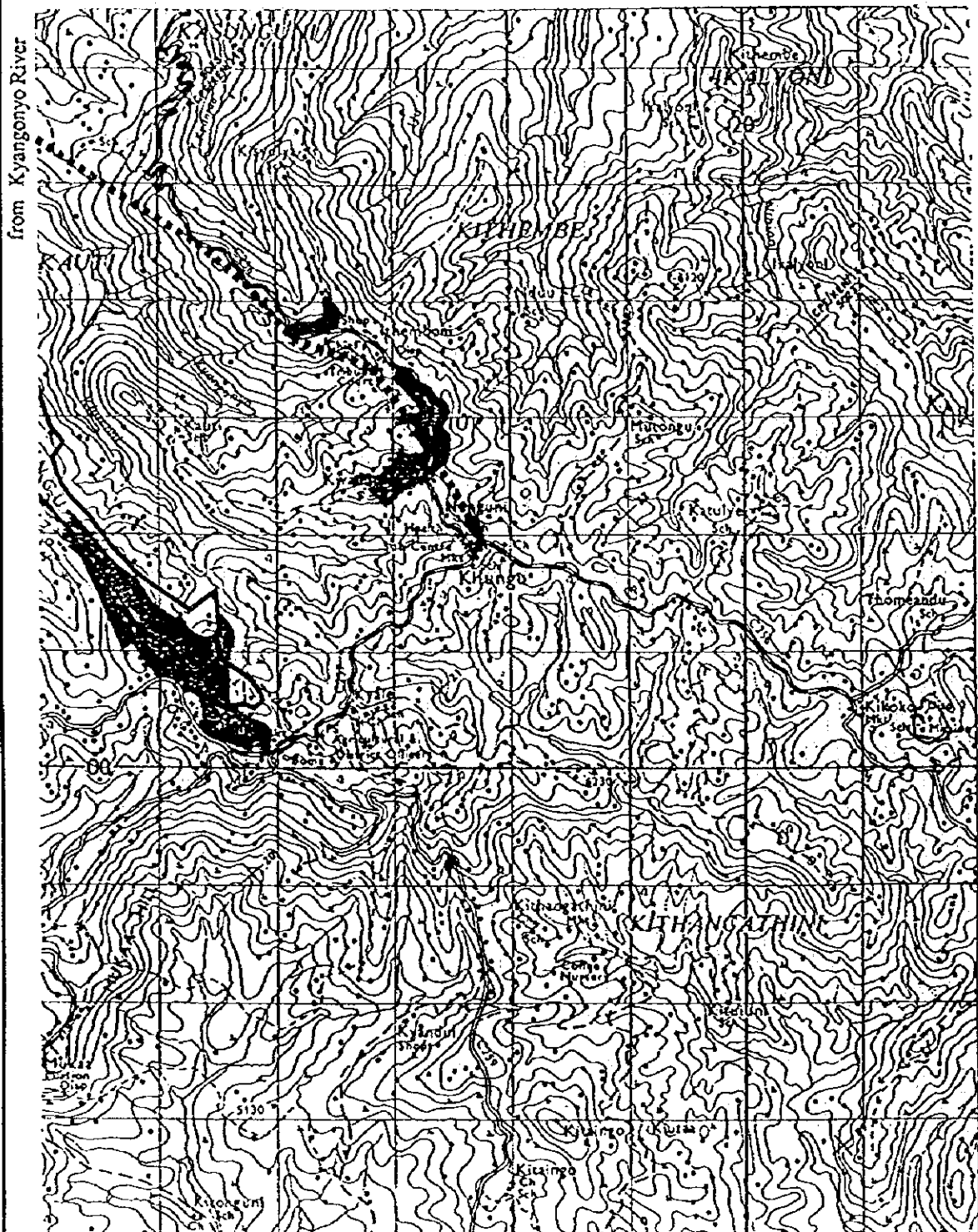
Design year :

Design population:

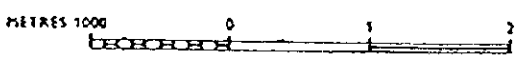
Remarks

The water from the existing water supply is supplied to limited consumers such as institutions and market kiosks. The public has been depending directly on numerous small resources systems and springs for their domestic water needs.

Fig. 1



Nunguni



Aftercare Study on
the National Water Master Plan

WOTE (1/1)

Urban Water Supply
System Survey

General

Name of Urban Centre : Wote

Organisation/Water Undertaker : MOWR

District : Makueni

Location: Makueni

Map (1/50,000) Ref. no : 163/3

Co-ordinates X 37° 36' Y S 01° 48'

Drainage Sub-basin : 3FA

Existing facilities:

Source : 2 No boreholes

Type of Intake : Boreholes Elevation : 1167m

Raw water system : Pumping

H: m Dia : 175mm

Treatment Process : None.

Not even chlorination is carried out, although this is required. Tests have been carried out by the hospital at intervals which indicated contamination.

Designed Capacity :

Treated water/Distribution system -

Area covered: 2km²

Distribution mains (80mm and above): 100 mm to 80 mm

Total length : 4.5 km

UFW (Estimated) : m³/d

Consumers - Total no : 128 year 1996

Working Meters: About 80 meters have been removed for non payment

Metered : 127(80 removed)

Unmetered : 1

Water production : 84m³/d

Remark : *Due to storage of diesel in this remote area, pumps are worked between 8 hrs to hrs minimum*

Service area population : 6,000

Population served : 3,500

Financial/Revenue 1996

O & M costs : Ksh

Revenue earned : Kshs 294,621

Revenue collected : Kshs 221,626

Rehabilitation required/costs

Kshs Estimated

Future development plan

Source : Kaiti river

Treatment : Full Capacity : m³/d

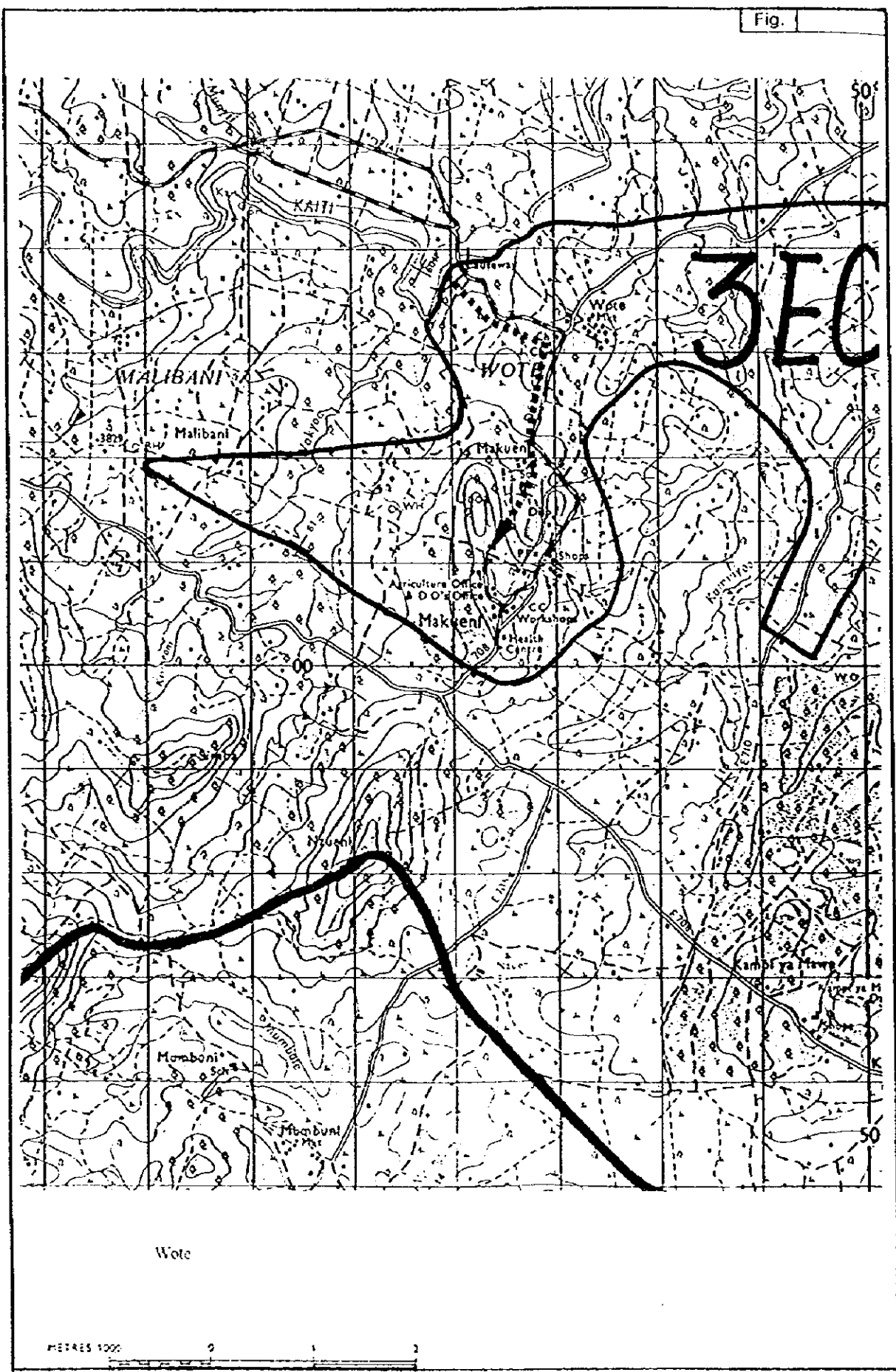
Design year :

Design population:

Remarks

The proposed Kaiti River sche is estimated to cost Kshs. 235 Million and is expected to provide a long term water supply plan for Wote and Makueni.

Fig.



**Aftercare Study on
the National Water Plan**

EMALI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Emali*

Organisation/Water Undertaker : *National Water Conservation & Pipeline Corporation*

District : *Makueni*

Location : *Nzaui*

Map (1/50,000) Ref. no : *173/2*

Co-ordinates X : *37° 29' E*

Y : *02° 05' S*

Drainage Sub-basin : *3FA*

Existing facilities

Source : *Nol Turesh Springs*

Type of Intake : *Channel*

Elevation : *1255 m*

Raw water system : *Gravity*

H : *1300 m* Dia : *100 mm*

Treatment Process :

Preventative chlorination at source works (Nol Turesh Springs). Raw water is well mineralised and of high quality

Designed Capacity : *m³/d*

Treated water/Distribution system -

Area covered : *1 km²*

Distribution mains (80mm and above): *80 mm to 100 mm*

Total length : *8 km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *208*

Working Meters: *10*

Metered : *10*

Unmetered : *198*

Water production : *482 m³/d - 1995*

Remark : *Water production figure obtained from WRAP Report. No master meter exists to give actual consumption*

Service area population :

Population served : *3,200 - 1995*

Financial/Revenue

O & M costs :Kshs *282,000*

Revenue earned :Kshs *301,871*

Revenue collected :Kshs *244,257*

Rehabilitation required/costs

i) *2.5 km of 100mm dia. AC requires replacement*

Estimated Cost

Kshs

1,500,000

ii) *4 No. 50mm dia. sluice valves for washout*

40,000

iii) *5 No. 50mm dia. air valves*

100,000

Total

1,640,000

Future development plan

Source : *Nol Turesh Springs*

Treatment : Capacity : *605 m³/d*

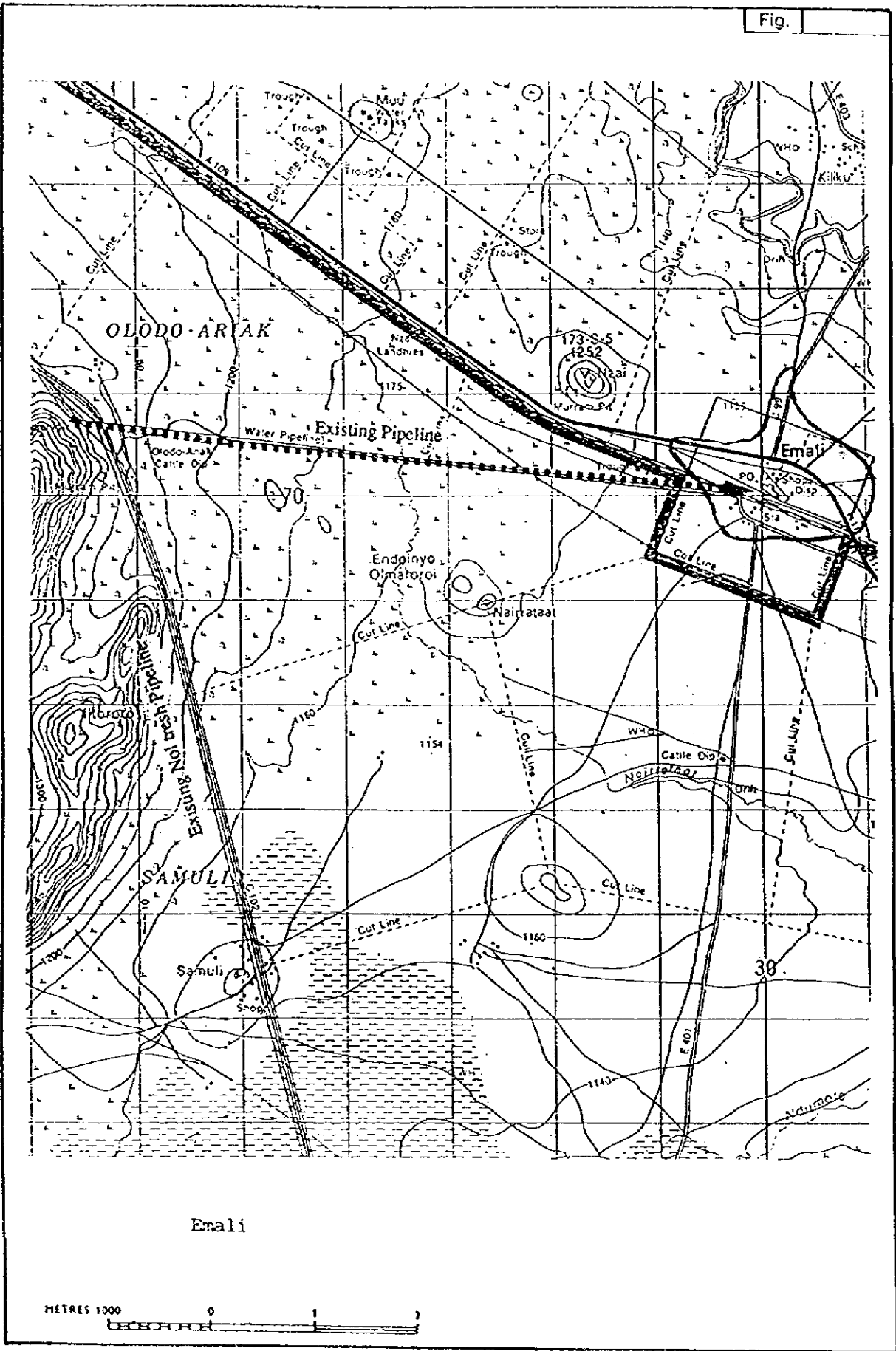
Design year : *2010*

Design population : *12,100*

Remarks

Emali is connected to the Nol Turesh pipeline which serves Machakos, Kajjado and Athi River. Prior to this, it was served by the Kenya Railways' pipeline which was constructed in early 1950's, primarily to serve the railway stations. This line has since been abandoned since the Nol Turesh pipeline was commissioned. Rehabilitating the railway line from Nol Turesh will reduce abstraction from the new Nol Turesh line and improve supply to Emali.

Fig.



**Aftercare Study on
the National Water Plan**

MTITO ANDEI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Mtito Andei*

Organisation/Water Undertaker : *Ministry of Water Resources*

District : *Makueni* Location : *Mtito Andei*

Map (1/50,000) Ref. no : *183/1*

Co-ordinates X : *38° 11' E* Y : *02° 42' S*

Drainage Sub-basin : *3FB*

Existing facilities

Source : *Umanyi Springs*

Type of Intake : *Weir* Elevation : *m*

Raw water system : *Gravity*

H : *m* Dia : *200 mm*

Treatment Process : *None*

No treatment is carried out since the raw water is considered to be potable and mineralised

Designed Capacity :

Treated water/Distribution system -

Area covered : *5 km²*

Distribution mains (80mm and above): *150 mm to 200 mm*

Total length : *13 km (Including transmission lines)*

UFW (Estimated) : *m³/d*

Consumers - Total no : *350*

Working Meters:

Metered : *328*

Unmetered : *22*

Water production : *m³/d*

Remark : *The population figures are estimates*

Service area population : *35,000*

Population served : *15,000*

Financial/Revenue

O & M costs : *Kshs 613,945*

Revenue earned : *Kshs 1,674,803*

Revenue collected : *Kshs 856,419*

Rehabilitation required/costs

i) *Pumping unit for elevated tank*

Estimated Cost Kshs

200,000

ii) *Elevated tank*

1,000,000

iii) *Full chemical treatment plant*

10,000,000

Total

11,200,000

Future development plan

Source :

Treatment : Capacity : *m³/d*

Design year :

Design population :

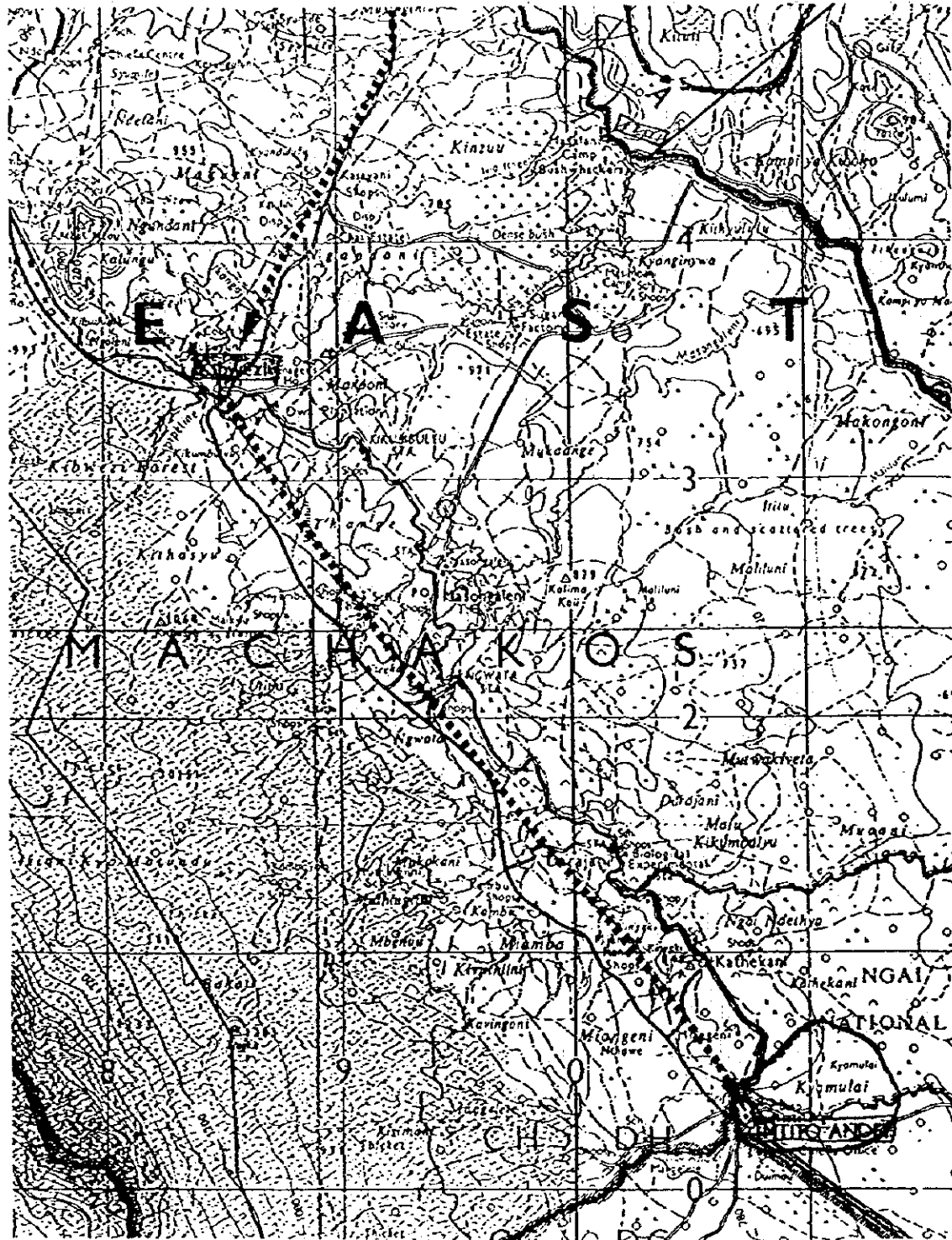
Remarks

The existing pipeline was laid by the Kenya Railways in 1950's to serve the Mtito Andei Railway Station.

A reservoir of 500 m³ capacity was sited close to the main road. As the town grew around the reservoir site, pressure is found to be very low to serve the upcoming development.

Fig.

Pipeline from Athi River



Mtito Andei+Kibwezi

KILOMETRES 5 4 3 2 1 0 5 10

**Aftercare Study on
the National Water Plan**

NORTH HERR (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *North Horr*

Organisation/Water Undertaker : *Community*

District : *Marsabit*

Location : *North Horr*

Map (1/250,000) Ref. no : *NA-37-1*

Co-ordinates X : *37° 06' E*

Y : *03° 20' N*

Drainage Sub-basin : *5J*

Existing facilities

Source : *Shallow Well (protected)*

Type of Intake :

Elevation : m

Raw water system : *Pumping*

H : m Dia : *50 mm*

Treatment Process : *No Treatment*

Designed Capacity : *m³/d*

Treated water/Distribution system -

Area covered : *0.5 km²*

Distribution mains (80mm and above): mm to mm

Total length : km

UFW (Estimated) : *m³/d*

Consumers - Total no : *6*

Working Meters: *6*

Metered : -

Unmetered : *6*

Water production : *21 m³/d*

Remark :

Service area population : *9,690*

Population served : *2,500*

Financial/Revenue

O & M costs :Kshs *51,750*

Revenue earned :Kshs

Revenue collected :Kshs

Rehabilitation required/costs

Estimated Cost

Kshs

i) *Overhaul of a diesel engine*

120,000

ii) *Replacement of 300mm dia. of corroded pipe*

200,000

iii) *New wells including protection*

240,000

iv) *Expansion of the distribution system*

600,000

v) *Displacement doser for chlorine dosage*

160,000

Total

1,320,000

Future development plan

Source : *Shallow wells and pans*

Treatment : *Chlorination* Capacity : *24 m³/d*

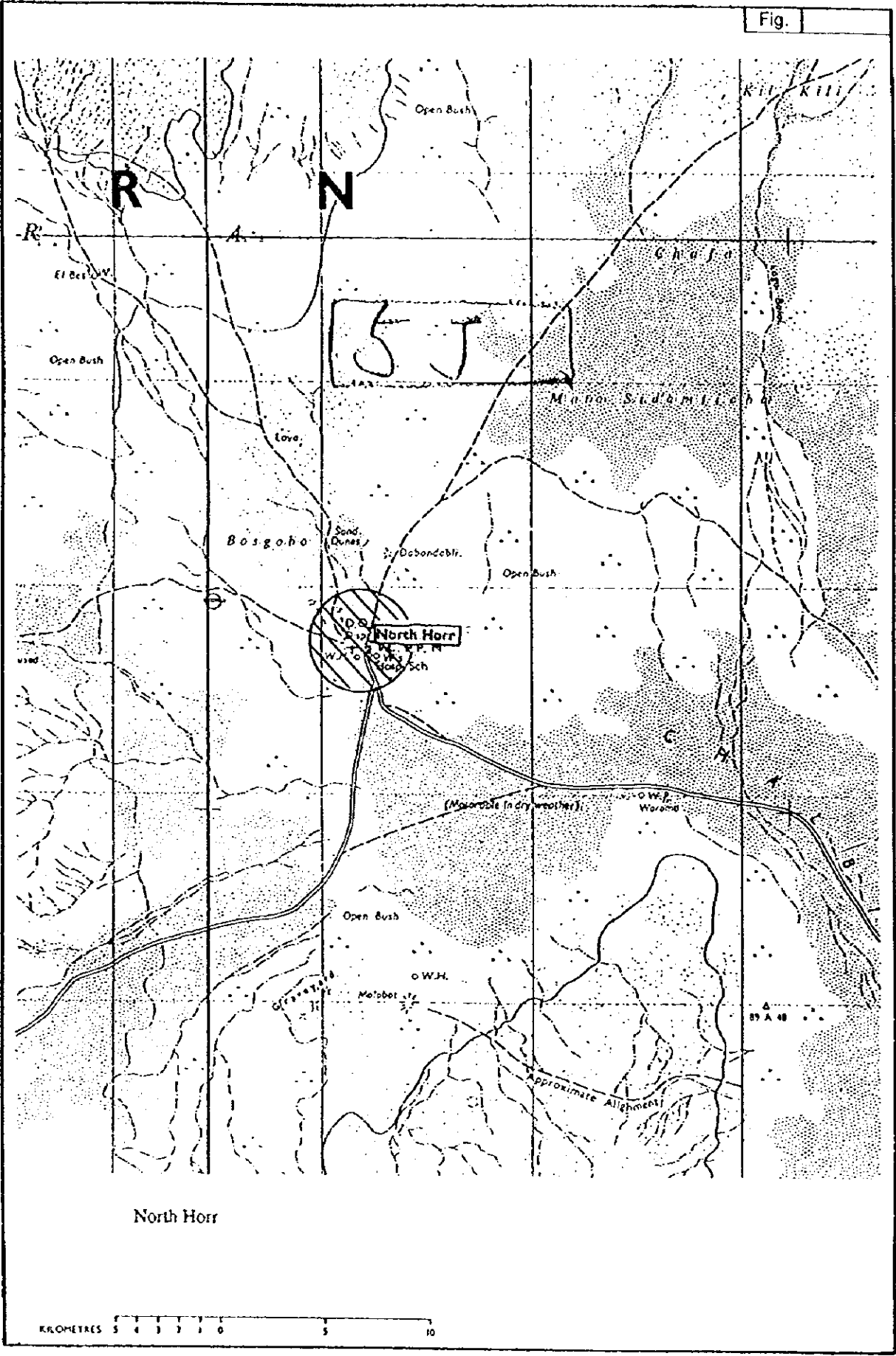
Design year : *1989*

Design population : *4,843*

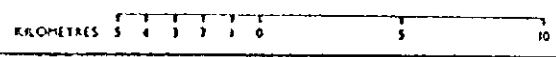
Remarks

The design year for the future development plan has already been surpassed. The yield from the shallow wells is not adequate to meet the demand of the growing urban population. Operation and maintenance require to be strengthened.

Fig.



North Horr



**Aftercare Study on
the National Water Plan**

KARGI (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Kargi*

Organisation/Water Undertaker : *Community*

District : *Marsabit* Location : *Kargi*

Map (1/250,000) Ref. no : *NA-37-6*

Co-ordinates X : *37° 20' E* Y : *02° 31' N*

Drainage Sub-basin : *5J*

Existing facilities

Source : *Borehole No. C3960*

Type of Intake :

Elevation : *102 m*

Raw water system :

H : *33.6 m* Dia : *75 mm*

Treatment Process : *No Treatment*

Designed Capacity : *m³/d*

Treated water/Distribution system -

Area covered : *km²*

Distribution mains (80mm and above): *80 mm*

Total length : *2.0 km*

UFW (Estimated) : *m³/d*

Working Meters: *6*

Consumers - Total no : *6*

Metered : *-*

Unmetered : *6*

Water production : *160 m³/d*

Remark : *Production on assumption of
20 hr pumping per day*

Service area population :

Population served :

Financial/Revenue

O & M costs :Kshs *427,500*

Revenue earned :Kshs

Revenue collected :Kshs

Rehabilitation required/costs

Estimated Cost

Kshs

i) *Replacement of transmission line*

1,500,000

ii) *Replacement of distribution line*

420,000

iii)

Total

1,920,000

Future development plan

Source : *Boreholes / pans*

Treatment : *Chlorination* Capacity : *270 m³/d*

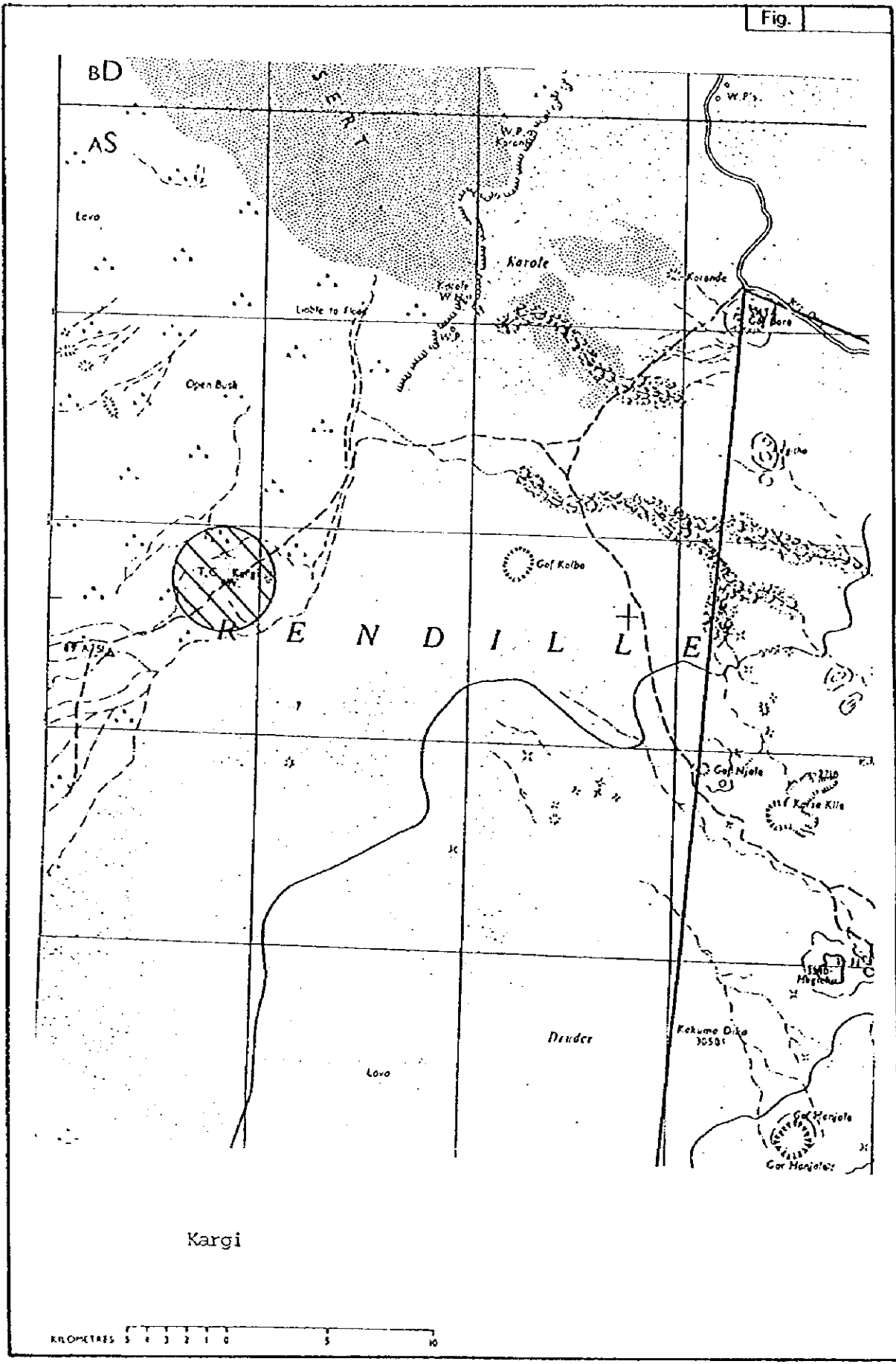
Design year : *2023*

Design population : *8,700 (at 2.5% growth rate)*

Remarks

Borehole yield is not adequate to meet the demand of the local community. Location of boreholes has been identified for 2023 requirement including disinfection by chlorine (TCL). Records on production, population and finance are not available / kept.

Fig.



Kargi

KILOMETRES 5 4 3 2 1 0 5 10

**Aftercare Study on
the National Water Plan**

KORR (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Korr*

Organisation/Water Undertaker : *Local Community*

District : *Marsabit* Location : *Korr*

Map (1/50,000) Ref. no : *66/2*

Co-ordinates X : *37° 30' E* Y : *01° 58' N*

Drainage Sub-basin : *2GD*

Existing facilities

Source : *Shallow wells*

Type of Intake :

Elevation : *580 m*

Raw water system : *Hand pumps*

H : m Dia : mm

Treatment Process :

No treatment carried out

Designed Capacity : *m³/d*

Treated water/Distribution system -

Area covered : *3.0 km²*

Distribution mains (80mm and above): mm to mm

Total length : km

UFW (Estimated) : *m³/d*

Consumers - Total no :

Working Meters:

Metered :

Unmetered :

Water production : *m³/d*

Remark :

Service area population : *8,000*

Population served :

Financial/Revenue

O & M costs :Kshs

Revenue earned :Kshs

Revenue collected :Kshs

Rehabilitation required/costs

Estimated Cost

Kshs

Total

Future development plan

Source :

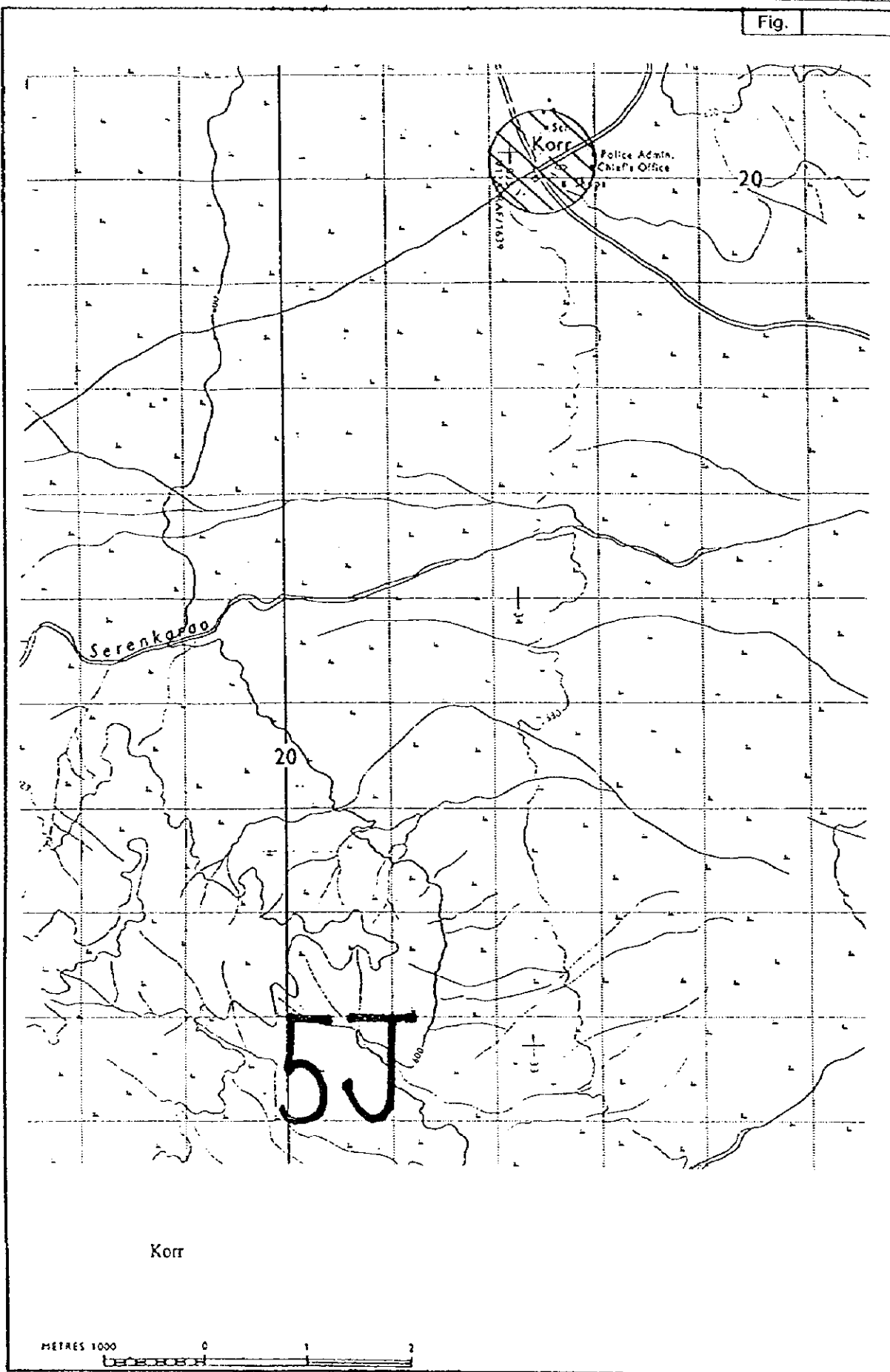
Treatment : Capacity : *m³/d*

Design year :

Design population :

Remarks

There are 3 No. shallow wells equipped with hand pump. This is in addition to 3 No. institutional boreholes equipped with wind pumps.



**Aftercare Study on
the National Water Plan**

MARSABIT (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Marsabit*

Organisation/Water Undertaker : *Ministry of Water Resources*

District : *Marsabit*

Location : *Mountain*

Map (1/50,000) Ref. no : *NA-37-6*

Co-ordinates X : *37° 58' E*

Y : *02° 18' N*

Drainage Sub-basin : *SEC*

Existing facilities

Source : *Bakuli Spring*

Type of Intake :

Elevation : *1580 m*

Raw water system :

H : m Dia : *75/100/150 mm*

Treatment Process :

Full treatment using composite filtration unit, dosage rate of 1.5 kg/d for chlorine, 5 kg/d for Alum and 2 kg/d for Soda Ash. Alum and Soda Ash dosing carried out only during rainy seasons

Designed Capacity : *300 m³/d*

Treated water/Distribution system -

Area covered : km²

Distribution mains (80mm and above): *80 mm to 150 mm*

Total length : *7.5 km*

UFW (Estimated) : m³/d

Consumers - Total no : *680*

Metered : *643*

Unmetered : *37*

Water production : *136 m³/d - 1996*

Remark :

Service area population : *28,000*

Population served : *19,750*

Financial/Revenue

O & M costs :Kshs *625,749*

Revenue earned :Kshs *666,050*

Revenue collected :Kshs *502,190*

Rehabilitation required/costs

Estimated Cost

Kshs

i) *Rehabilitation / new diesel standby units*

1,200,000

ii) *Rehabilitation of distribution mains*

600,000

iii) *Full chemical treatment plant*

Total

1,800,000

Future development plan

Source : *Dam*

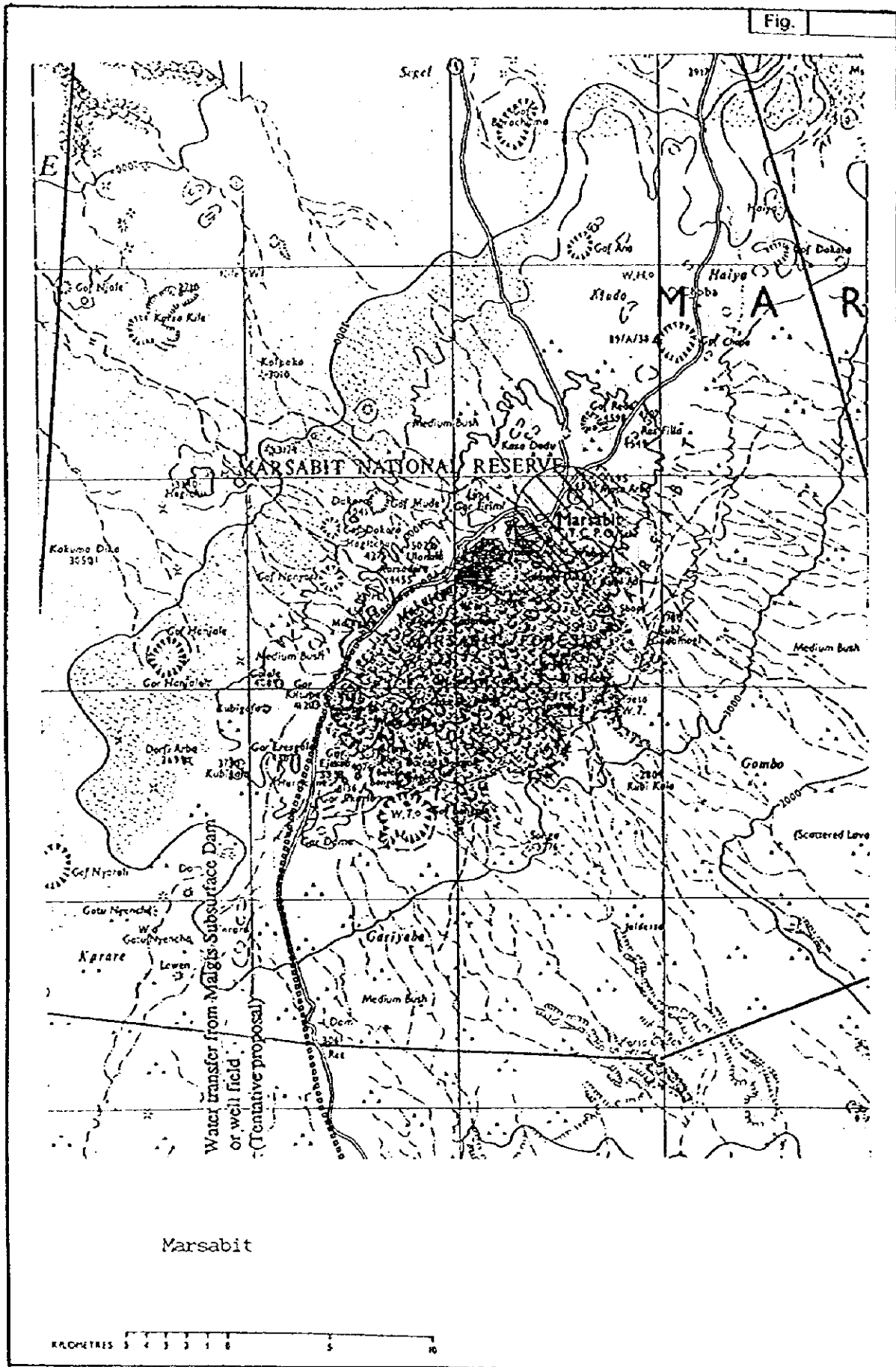
Treatment : *Full treatment* Capacity : *4,572 m³/d*

Design year : *2023*

Design population : *60,000*

Remarks

2 No. springs and 1 No. dam serve the Marsabit Water Supply. This supply was constructed by the Drought Recovery Programme under the then Ministry of Land Reclamation, Regional & Water Development. Feasibility studies have been carried out by a firm of Consulting Engineers for 2023 requirement.



**Aftercare Study on
the National Water Master Plan**

SOLOLO (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Sololo*
Organisation/Water Undertaker : *Community & NGO*
District : *Moyale* Location : *Sololo*
Map (1/250,000) Ref. no : *NA-37-2* Co-ordinates X : *38° 39' E* Y : *03° 34' N*
Drainage Sub-basin : *5EB*

Existing facilities

Source : *Ramatta, Madondi & Sololo Me* Type of Intake : Elevation : *700 m*
Raw water system : *Hand Pumps* H : m Dia : *150 mm*
Treatment Process : *Chlorination*

Designed Capacity :

Treated water/Distribution system - Area covered : *8 km²*
Distribution mains (80mm and above): - mm to - mm
Total length : - km

UFW (Estimated) : m³/d

Consumers - Total no :

 Metered :

 Unmetered :

Working Meters:

Water production : - m³/d

Remark :

Service area population : *9885 (1990)*

Population served :

Financial/Revenue

O & M costs :Kshs

Revenue earned :Kshs

Revenue collected :Kshs

Rehabilitation required/costs

Kshs

i)

ii)

iii)

iv)

v)

vi)

Total estimated cost

Future development plan

Source :

Treatment : *None* Capacity : *549 m³/d*

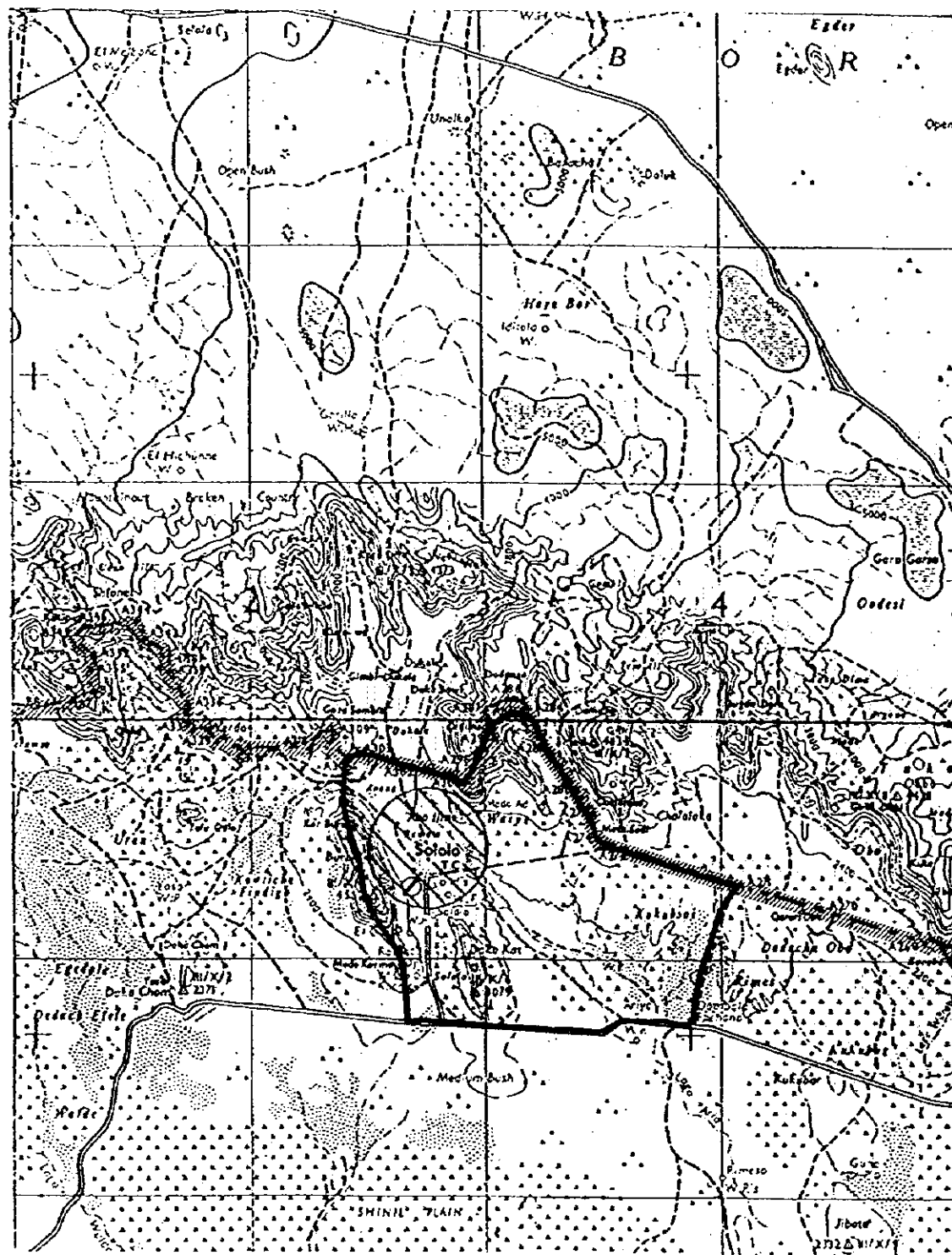
Design year : *2010*

Design population : *21,659*

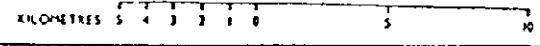
Remarks

Sololo does not have a formal water supply and residents fetch water from the earth dams and hand pumps. These are spread over a large area and no disinfection is carried out. Contamination of the earth dams is very high since they are used for both domestic and livestock consumption. The sources are unreliable during the dry seasons.

Fig.



Sololo



**Aftercare Study on
the National Water Master Plan**

MOYALE (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Moyale*
 Organisation/Water Undertaker : *Ministry of Water Resources*
 District : *Moyale* Location : *Moyale*
 Map (1/250,000) Ref. no : *NA-37-3* Co-ordinates X : *39° 02' E* Y : *03° 30' N*
 Drainage Sub-basin : *5EA*

Existing facilities

Source : *Moyale Dam* Type of Intake *Bore* Elevation : *1100 m*
 Raw water system : *Gravity* H : *m* Dia : *150 mm*
 Treatment Process :

Whilst a composite filtration unit exists, only chlorine is dosed at the distribution tank. FRO dosers are not functioning and chlorine is dosed manually.

Designed Capacity :

Treated water/Distribution system - Area covered : *3 km²*
 Distribution mains (80mm and above): *80 mm to 80 mm*
 Total length : *0.5 km*

UFW (Estimated) : *m³/d*

Consumers - Total no :

Metered :

Unmetered :

Water production : - *m³/d*

Remark :

Service area population :

Population served :

Financial/Revenue

O & M costs :Kshs

Revenue earned :Kshs

Revenue collected :Kshs

Rehabilitation required/costs

i) *Rehabilitate the 40m of 150mm dia. raw water transmission main* Kshs *100,000*

ii)

iii)

iv)

v)

vi)

Total estimated cost *100,000*

Future development plan

Source :

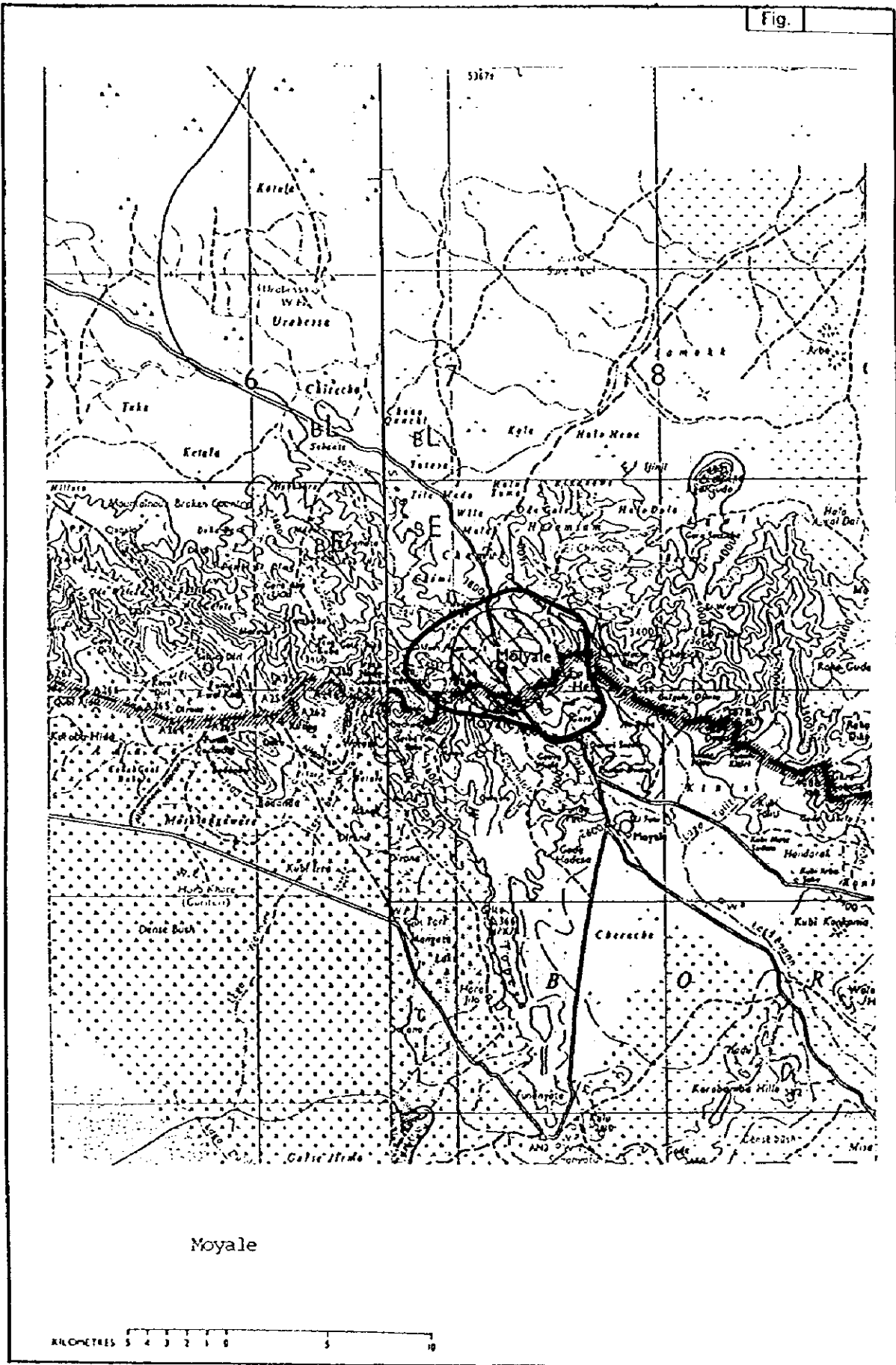
Treatment : Capacity : *m³/d*

Design year :

Design population :

Remarks

Due to siltation, the depth of the dam has been reduced from 10m to 1m, reducing the capacity considerably. The transmission main is not functioning largely due to defective construction. The composite filtration unit is not fully effective as Alum and Soda Ash are not dosed.



Moyale

KILOMETRES 5 4 3 2 1 0 5 10

**Aftercare Study on
the National Water Master Plan**

MERU (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Meru*

Organisation/Water Undertaker : *MOWR*

District : *Meru* Location: *Ntima*

Map (1/50,000) Ref. no : *108/3*

Co-ordinates *X 37° 39' Y N 00° 03'*

Drainage Sub-basin : *4 FA*

Existing facilities:

Source: *Gatubara stream & spring, Kathita river*

Type of Intake : *Weir*

Elevation : *1759m.*

Raw water system : *Gravity*

H: *m*

Dia : *300mm*

Treatment Process :

2 No composite and 1 No conventional T works. Both chlorine and Alum are dosed using manual control. The FRO dosers are not functioning.

Designed Capacity: *m³/day*

Treated water/Distribution system

Area covered: *12 km²*

Distribution mains (80mm and above): *80 mm to 200 mm*

Total length : *7.3 km*

UFW (Estimated) : *6,057 m³/d*

Consumers - Total no : *2519-(1996)*

Metered : *2247*

Unmetered : *272*

Working meters:

Data not available

Water production : *4730 m³/d*

Remark :

Service area population : *85,000*

Population served : *16,330*

Financial/Revenue:

O & M costs : *Ksh 1,466,425*

Revenue earned : *Kshs 9,247,008*

Revenue collected : *Kshs 4,812,980*

Rehabilitation required/costs

i) *1 No level gauge.*

ii) *2 No composite filters*

iii) *Replacemen of FRO dosers*

iv) *2 No meters*

Kshs Estimated

40,000

10,000,000

90,000

60,000

Total

10,190,000

Future development plan

Source : *Kathita river*

Treatment : *Full conventional*

Capacity : *10280 m³/d*

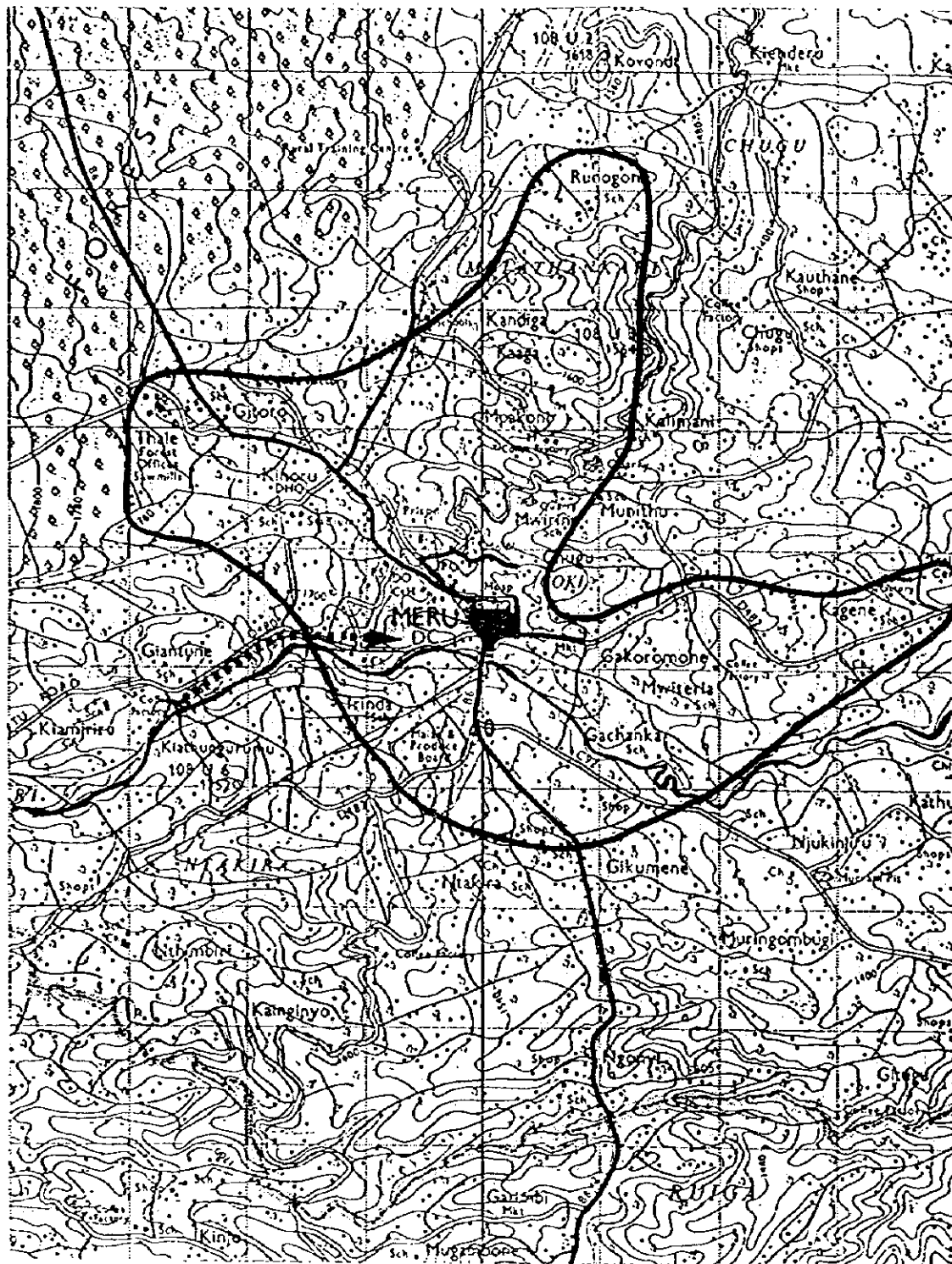
Design year : *2010*

Design population:

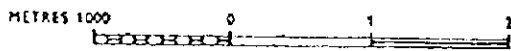
Remarks

The scheme has been divided into high and a low - level zones. Severe shortages occur in the high - level zone due to increase in population.

Fig.



Meru



**Aftercare Study on
the National Water Master Plan**

NKUBU (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Nkubu*

Organisation/Water Undertaker : *MOWR*

District : *Meru*

Location: *Nkuene*

Map (1/50,000) Ref. no : *122/1*

Co-ordinates *X 37° 40'E Y S 00° 03'*

Drainage Sub-basin : *4 FA*

Existing facilities:

Source: *Thingithu river*

Type of Intake : *Intake cham* Elevation : *1580m.*

Raw water system : *Gravity*

H : *m* Dia : *300 mm*

Treatment Process : *full conventional treatment.*

After Alum and chlorine dosing, the treated water is pumped to elevated tank for distribution.

Designed Capacity: *m³/day*

Treated water/Distribution system

Area covered: *km²*

Distribution mains (80mm and above): *mm to mm*

Total length : *km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *323*

Metered : *300*

Unmetered : *23*

Working Meters: *Data not available*

Water production : *m³/d*

Remark :

Service area population :

Population served :

Financial/Revenue:

O & M costs : *Ksh 967,499*

Revenue earned : *Kshs*

Revenue collected : *Kshs 1,124,139*

Rehabilitation required/costs

Kshs Estimated

Total

Future development plan

Source : *Kungwa Ndegwa River.*

Treatment : *Full*

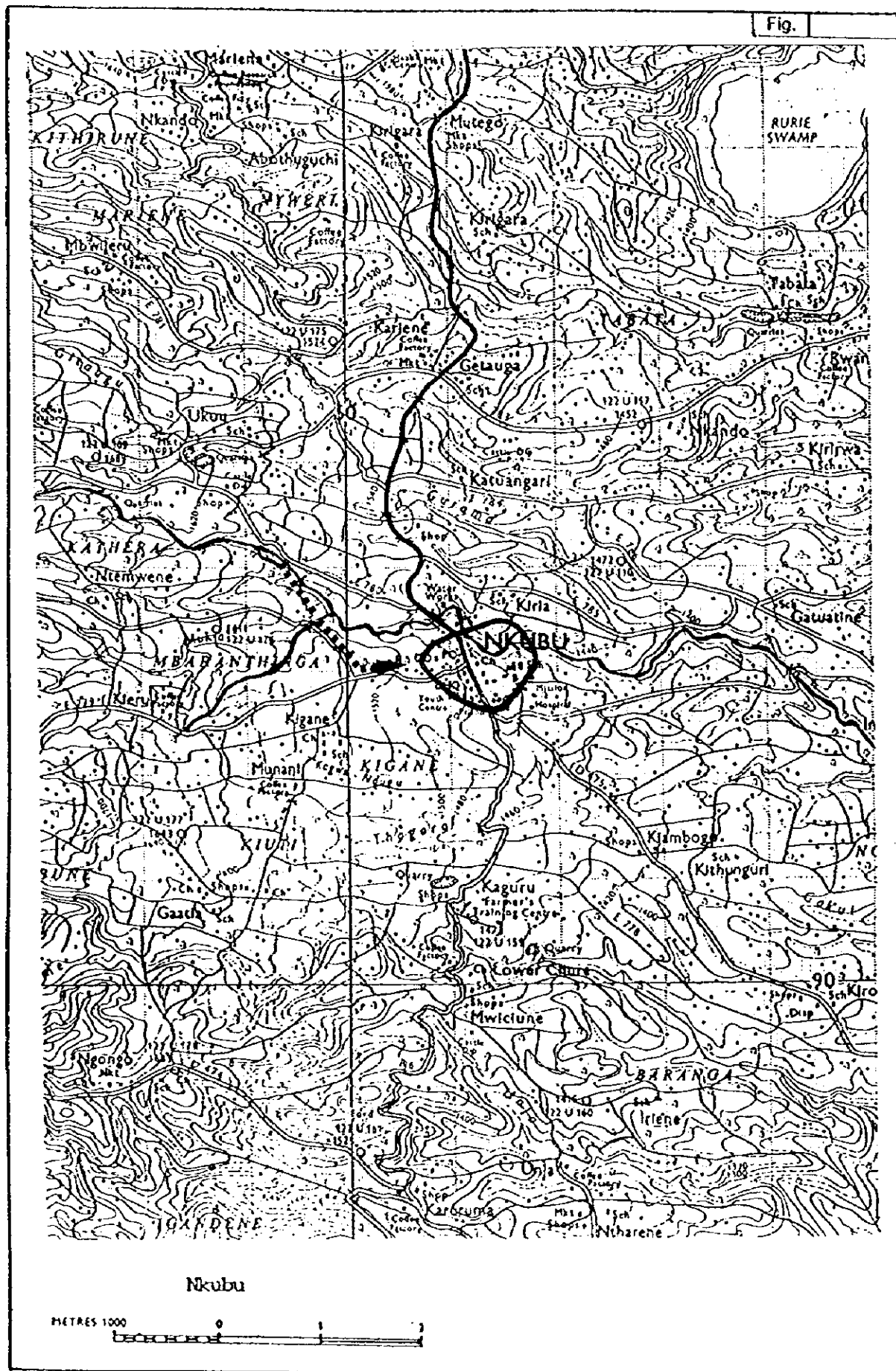
Capacity : *1160 m³/d*

Design year : *2010*

Design population: *15,611*

Remarks

A complete new intake and full T' works with staff housing and offices are required to meet the present demand and also cater for the year 2010. Estimated cost of the proposed works is Kshs. 24.0M



Aftercare Study on
the National Water Master Plan

CHOGORIA (1/1)

Urban Water Supply
System Survey

General

Name of Urban Centre : *Chogoria*

Organisation/Water Undertaker : *MOWR*

District : *Chogoria* Location: *Chogoria*

Map (1/50,000) Ref. no : *122/1*

Co-ordinates *X 37° 38'E Y S 00° 13'*

Drainage Sub-basin : *4 EB*

Existing facilities:

Source: *Mutonga river*

Type of Intake : *Weir* Elevation : *1580m.*

Raw water system :

H: *m* Dia : *100 mm*

Treatment Process : *Full conventional treatment.*

Comprising of coagulation, sedimentation, filtration and chlorination. Treated water is pumped to an elevated tank for further distribution.

Designed Capacity: *m³/day*

Treated water/Distribution system

Area covered: *km²*

Distribution mains (80mm and above): *mm to mm*

Total length : *km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *20*

Metered :

Unmetered : *20*

Working Meters:

Water production : *m³/d*

Remark :

Service area population :

Population served :

Financial/Revenue:

O & M costs : *Costs borne by Meru office.*

Revenue earned : *Kshs*

Revenue collected : *Kshs*

Rehabilitation required/costs

Kshs Estimated

Total

Future development plan

Source :

Treatment : Capacity : *m³/d*

Design year :

Design population:

Remarks

Chogoria water supply is an off - shoot of Mwimbi water supply Mwimbi T' works has a capacity of 1300m³/d with the current production of 500m³/d. Demand for Mwimbi, under which Chogoria is considered, is 2,050m³/day with a total population of 17,000 persons. Inadequate supply of water and frequent bursts have been reported. Chogoria Hosp. has its own supply.

**Aftercare Study on
the National Water Master Plan**

CHUKA (1/1)

General

Name of Urban Centre : *Chuka*
 Organisation/Water Undertaker : *MOWR*
 District : *Chuka* Location: *Chogoria*
 Map (1/50,000) Ref. no : *122/1* Co-ordinates *X 37° 38' E Y S 00° 13'*
 Drainage Sub-basin : *4 EB*

Existing facilities:

Source: *River Tungu* Type of Intake : Elevation : *1580m.*
 Raw water system : *Gravity* H : *m* Dia : *300 mm*
 Treatment Process : *Chlorination only*

*The intake is inside Mt. Kenya forest while the water is treated 6 km outside the forest edge.
Chlorination is done at storage tank using FRO doser at a rate of 7kg/day*

Designed Capacity: <i>m³/day</i>	Area covered: <i>km²</i>
Treated water/Distribution system	Distribution mains (80mm and above): <i>80 mm to 300 mm</i>
	Total length : <i>14 km</i>
UFW (Estimated) : <i>m³/d</i>	Working Meters: <i>60</i>
Consumers - Total no : <i>590</i>	
Metered : <i>590</i>	
Unmetered :	
Water production : <i>355m³/d</i>	Remark :
Service area population : <i>8,000</i>	
Population served : <i>7560</i>	

Financial/Revenue:

O & M costs : *Ksh 360,135 Chemical only.*
 Revenue earned : *Kshs 974,367*
 Revenue collected : *Kshs 984,846 includes arrears from previous years*

Rehabilitation required/costs

Kshs Estimated

Total

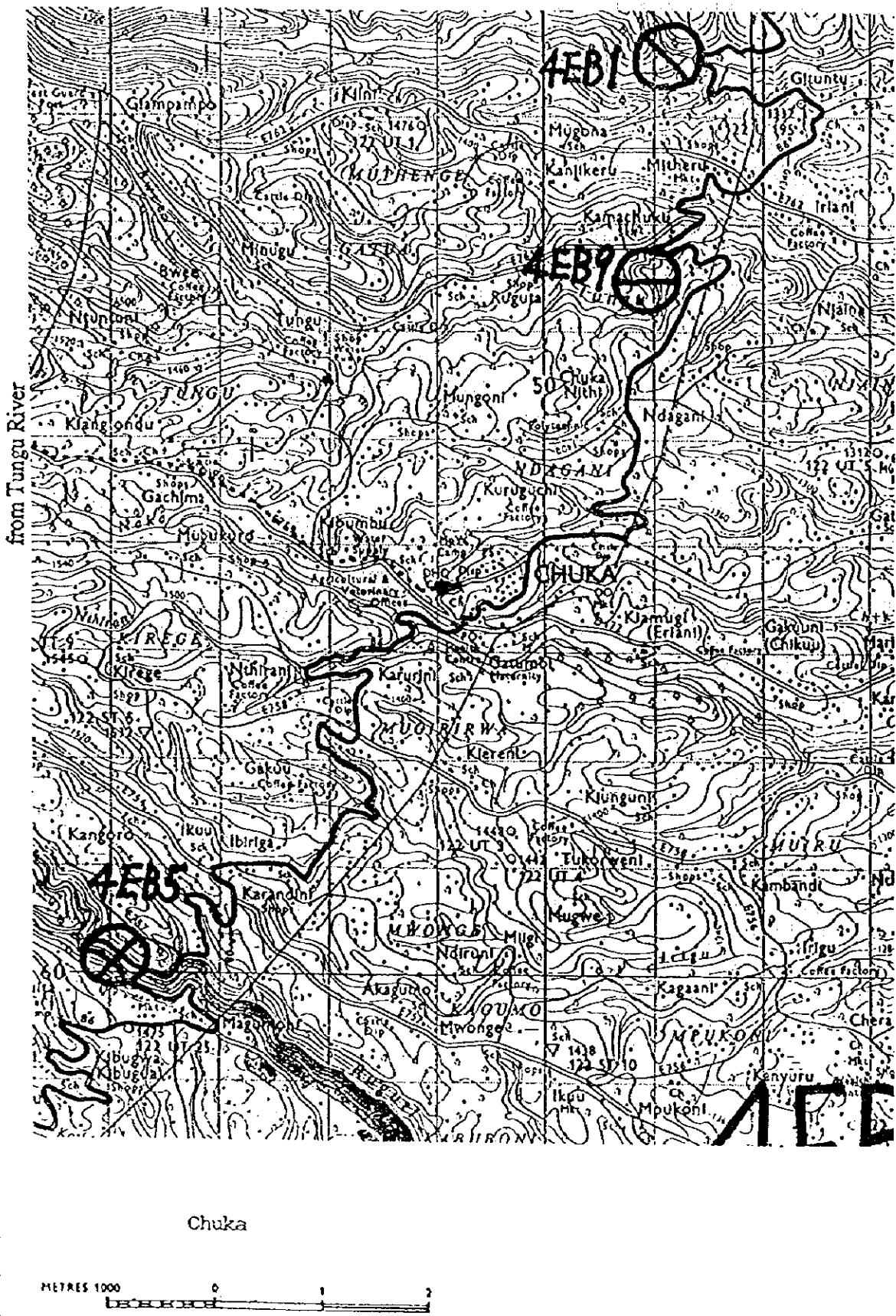
Future development plan

Source : *Ruguti river*
 Treatment : Capacity : *m³/d*
 Design year :
 Design population:

Remarks

Water demand for a population of 8,000 persons is over and above the current production of 355m³/d. A new source inside Mt Kenya Forest on Ruguti River has been identified, but detailed design is yet to be carried out. Provision of independent source for Karingani, which is presently supplied by Chuka water supply will ensure extending the existing water supply horizon

Fig.



**Aftercare Study on
the National Water Master Plan**

MAUA (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Maua*

Organisation/Water Undertaker : *MOWR*

District : *Nyambene* Location: *Maua*

Map (1/50,000) Ref. no : *108/4*

Co-ordinates *X 37° 57' Y N 00° 14'*

Drainage Sub-basin : *4 FA*

Existing facilities:

Source: *Mboone stream*

Type of Intake : *River* Elevation : *5700m.*

Raw water system : *Gravity*

H: *m* Dia : *100 PVC mm*

Treatment Process : *Full conventional treatment*

*1 No mixing chamber - 1 No sedimentation chamber - 1 No rapid sand filter - 1 No clear water tank
- Alum and soda ash not dozed due to lack of funds. Only chlorination is carried out, at 0.6kg/d*

Designed Capacity: *400 m³/day*

Treated water/Distribution system

Area covered: *km²*

Distribution mains (80mm and above): *80 mm*

Total length : *3.7 km*

UFW (Estimated) : *m³/d*

Consumers - Total no : *465 (1996)*

Metered :

Unmetered :

Working Meters: *Meters are not functioning.*

All consumers on flat rate.

Water production : *164 m³/d*

Remark :

Service area population : *8,000(1998)*

Population served : *Ni*

Financial/Revenue:

O & M costs : *Ksh Not available*

Revenue earned : *Kshs 1,115,913 (1996)*

Revenue collected : *Kshs 1,037,784(1996)*

Rehabilitation required/costs

Kshs Estimated

i) *Laboratory equipment*

250,000

ii) *Rehabilitation of Distribution System.*

10,000,000

iii) *Main supply metering*

400,000

Total

10,650,000

Future development plan

Source : *Ura river*

Treatment : *Full*

Capacity : *1590 m³/d*

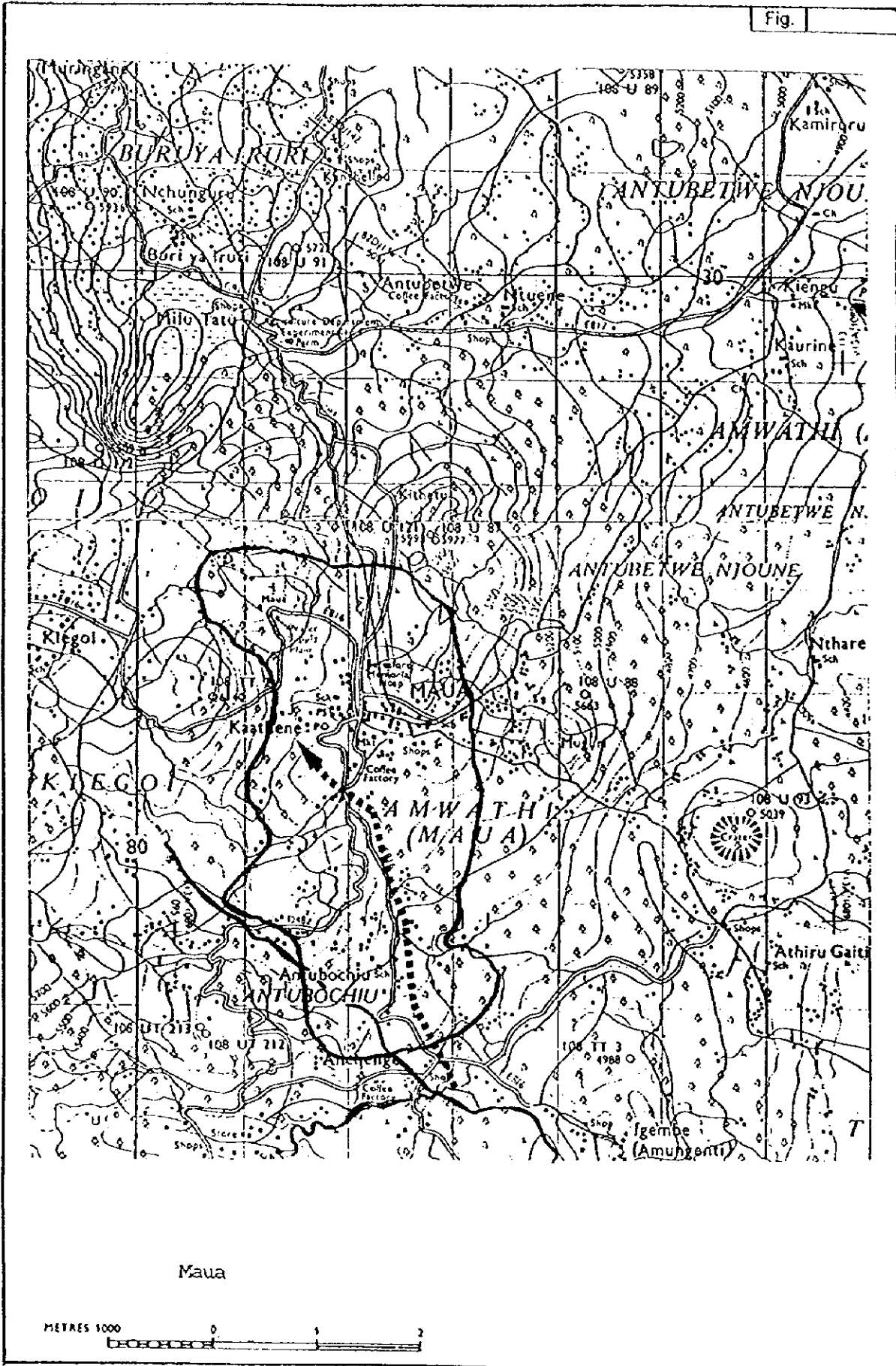
Design year : *2000*

Design population: *10,000*

Remarks

The system is designed for full treatment. However, at present only disinfection is done. Water meters are not working due to lack of servicing. Rehabilitation and expansion of distribution is continuous and is carried out when funds are available.

Fig.



**Aftercare Study on
the National Water Master Plan**

UJARA (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Ijara*
 Organisation/Water Undertaker : *Community*
 District : *Garissa* Location : *Ijara*
 Map (1/250,000) Ref. no : *SA-37-8* Co-ordinates X : *40° 30' E* Y : *01° 37S*
 Drainage Sub-basin : *4KB*

Existing facilities

Source : *Pans (2 Nos.) 80,000 & 20,000 m³* Type of Intake *None* Elevation : *60 m*
 Raw water system : *Manual fetch* H : *m* Dia : *mm*
 Treatment Process : *None*

Designed Capacity : *m³/d*
 Treated water/Distribution system -

Area covered : *4 km²*
 Distribution mains (80mm and above): *mm to mm*
 Total length : *km*

UFW (Estimated) : *m³/d*
 Consumers - Total no :
 Metered :
 Unmetered :

Working Meters:

Water production : *m³/d*
 Service area population : *20,000*
 Population served : *5,000*

Remark :

Financial/Revenue

O & M costs : *Kshs*
 Revenue earned : *Kshs*
 Revenue collected : *Kshs*

Rehabilitation required/costs

- i) *Desilting of the pans*
- ii)
- iii)
- iv)
- v)
- vi)

Kshs
250,000

Total estimated cost *250,000*

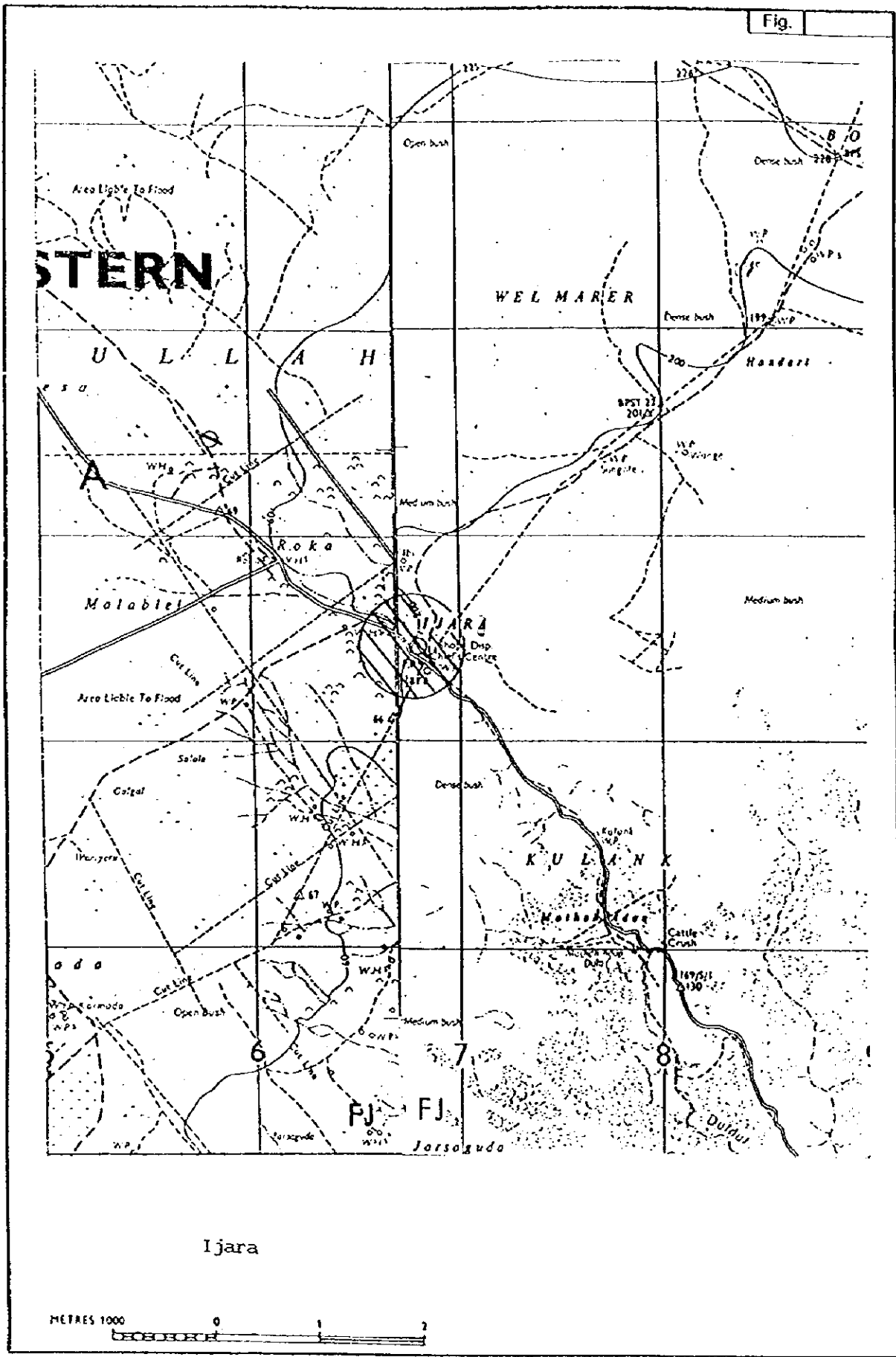
Future development plan

Source : *Boreholes*
 Treatment : *Full treatment* Capacity : *500 m³/d*
 Design year :
 Design population : *10,000*

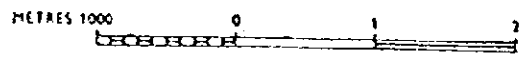
Remarks

Ijara does not have a formal water supply. Water for consumption is fetched from the pans and no treatment is done. A formal water supply is required but provision of pumping facilities is a drawback, due to its remoteness. The existing pans face a severe silting problem, more so after the 1997 rains when the area was flooded. Regular dredging is required to maintain the pan holding capacity.

Fig.



Ijara



**Aftercare Study on
the National Water Master Plan**

KOTILE (1/1)

**Urban Water Supply
System Survey**

General

Name of Urban Centre : *Kotile*
 Organisation/Water Undertaker : *Ministry of Water Resources*
 District : *Garissa* Location : *Kotile*
 Map (1/50,000) Ref. no : *168/3* Co-ordinates X : *40° 18' E* Y : *01° 56' S*
 Drainage Sub-basin : *4GG*

Existing facilities

Source : *Pans* Type of Intake : Elevation : *50 m*
 Raw water system : *Manual Abstraction* H : *m* Dia : *mm*
 Treatment Process : *None*
 Designed Capacity : *m³/d*
 Treated water/Distribution system - Area covered : *1 km²*
 Distribution mains (80mm and above): *mm to mm*
 Total length : *km*

UFW (Estimated) : *m³/d*
 Consumers - Total no : Working Meters:
 Metered :
 Unmetered :

Water production : *m³/d* Remark :
 Service area population : *5,000 - See Remarks below*
 Population served :

Financial/Revenue

O & M costs :Kshs
 Revenue earned :Kshs
 Revenue collected :Kshs

Rehabilitation required/costs

	Estimated Cost	Kshs
i) <i>Desilting of water pans</i>		<i>100,000</i>
ii)		
	Total	<i>100,000</i>

Future development plan

Source : *A reliable way of catering for water needs to be evolved*
 Treatment : Capacity : *m³/d*
 Design year :
 Design population :

Remarks

Kotile residents fetch water from the water pan dug by the Ministry of Water Resources. The capacity of the pan has been reduced drastically after the rains due to high level of siltation. The pans also tend to dry up during prolonged drought. Boreholes with hand pumps may provide the short-term solution.