

11 IMPLEMENTATION PROGRAMME FOR PROPOSED PLANS

11.1 WATER SUPPLY REHABILITATION

The proposed implementation schedule for rehabilitating the Lamu water supply system is given in Figure 11.1.

11.2 WASTEWATER AND SANITATION REHABILITATION

There are no recommendations for rehabilitation of the current on – plot sanitation facilities.

11.3 UTILITY MANAGEMENT PLAN

The proposed implementation schedule for rehabilitating the Lamu water supply system is given in Figure 11.1.

11.4 LEGAL AND INSTITUTIONAL FRAMEWORK

The transitional arrangements from the current ownership and operation of the Urban Water Supply to the operations of the Trust Corporation will be structured as follows;

- (a) Develop consensus among important stakeholders on the proposed approach to the operations of Lamu Urban Water Supply Service (the Trust Corporation). This is best achieved through a stakeholder workshop.
- (b) Appoint members of the Trust from identified stakeholders
- (c) Prepare the constituting instrument for Lamu Urban Water Supply Service. This can be done concurrently with activities (a) and (b) above. Registration, however, must await stakeholder consensus. On achievement of consensus on the proposed approach, present the Trust Instrument and registration forms to the Registrar of Trusts at AGs Chambers and ensure registration of the Trust Corporation.
- (d) Concurrently with (a), (b) and (c) above, carry out an inventory of the water supply system infrastructure of Lamu Urban Water Supply System. Assign estimated value to these assets. Carry out a valuation of all other assets of Urban Water Supply including equipment, vehicles, furniture, fittings and loose assets.
- (e) Develop organisational structures and staffing plans for the new organisation;
- (f) Complete the financial plan for the new organisation;

Figure 11.1

**STUDY OF INSTITUTIONAL IMPROVEMENTS AND REHABILITATION OF WATER SUPPLY AND SEWERAGE SYSTEMS FOR 10 LOCAL TOWNS IN KENYA
IMPLEMENTATION SCHEDULES OF PROPOSED PLANS
LAMU WATER SUPPLY REHABILITATION WORKS AND O&M**

Ref	Activity description	Duration in months	MONTH																																																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42									
A	REHABILITATION WORKS																																																				
1	Appoint consultant for rehabilitation works	3	█	█	█																																																
2	Feasibility study, detailed design	8			█	█	█	█	█	█	█	█																																									
3	Tendering procedures, award and negotiations	7											█	█	█	█	█	█																																			
4	Construction	12																																																			
5	Defects Liability Period	12																																																			
B	O&M																																																				
6	Appoint management consultant	3	█	█	█																																																
7	Establish consumer data base/billing system	4			█	█	█	█																																													
8	Management and staff training	12			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█																																		
9	Meter replacement and repair	9			█	█	█	█	█	█	█	█																																									
10	Other recommended action plan activities	24			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

- (g) Agree on:
 - (i) Lease, transfer or sale of infrastructural assets and other assets by GOK and Lamu Municipal Council to the Trust Corporation;
 - (ii) Transfer or recruitment of the existing staff to the new organisation. Agree also on the retirement package or the transfer within the Ministry of staff not absorbed in the new organisation;
 - (iii) Arrange financial support to the new organisation.
- (g) Develop the operations manual for Lamu Urban Water Supply Service;
- (h) Ensure all the assets, staff and financial resources are in place in the new organisation (necessary transfers / acquisitions made)

These activities and time frames are illustrated in **Table 11.1**

Table 11.1: Lamu Water Supply Service– Transitional arrangements and time frame

No.	Activity	Month	1	2	3	4	5	6	7	8	9	10	11	12
1.	Hold consensus building workshop		●	-----	-----	▶★								
2.	Appoint Board of Trustees		●	-----	-----	▶★								
3.	Develop and present for registration the Trust Instrument		●	-----	-----	▶★								
4.	Identify and make an inventory of water and sanitation infrastructure assets and estimate their value. Identify and estimate the value of other assets.					●	-----	-----	▶★					
5.	Develop structures and staffing plans						●	-----	▶★					
6.	Prepare financial plan for the Trust						●	-----	▶★					
7.	Agree on: (i) Lease, transfer or sale of assets (ii) Transfer or recruitment of staff (iii) Financial support					●	-----	-----	-----	▶★				
8.	11.5 Develop operations manuals							●	-----	▶★				
9.	Assets, staff and financial resources in place										★			
10.	Lamu Water Supply Service operational											★		
Key:	11.6 Event ● -----▶		11.7 Event deadline ★											

11.5 FINANCIAL PLAN

11.5.1 Business Plan

The summarized business plan for Lamu town is given in Table 11.2. The specific feature of interest is that the utility will be able to fully cover its operating and maintenance costs. The plan indicates also very healthy net cash flows from year to year. If these are re-invested into the system, then the residents of the town can be guaranteed a reliable water supply for many years to come. However, the achievements of the predictions indicated in this business plan are strictly contingent upon there being the appropriate institutional management framework for the town. This will call for a change in management style and structures that will facilitate the delivery of the set intent.

11.5.2 Financing Plan

It is assumed that the rehabilitation costs will be composed of four components: Institutional Strengthening, Professional Input for works, Water Supply and Sanitation. These financial costs of the project are projected to be incurred as follows.

Table 11-3: Financing Plan - Lamu Town Water Supply

Year	1	2	3	4	Total
	Kshs	Kshs	Kshs	Kshs	Kshs
Institutional Development Costs	25,300,000	14,520,000	14,520,000	14,520,000	68,860,000
Consultancy Fees for Works (20% of works)	6,396,300	10,660,500	4,264,200	-	21,321,000
Water Supply Rehabilitation	31,981,500	53,302,500	21,321,000	-	106,605,000
Sanitation Rehabilitation	-	-	-	-	-
Total Overall Project Cost	63,677,800	78,483,000	40,105,200	14,520,000	196,786,000

The total cost of rehabilitation is Kshs.196,786,000 approximately. These costs are spread over a four-year period.

The working capital and the institutional set-up costs must be availed at the beginning of the rehabilitation plan.

It should be noted that the financial evaluation has been based strictly on the cost of rehabilitation.

Table 11.2: BUSINESS PLANS FOR Lamu TOWN WATER SUPPLY

CASH FLOWS

Year	1	2	3	4	5	6	7	8	9	10
REVENUE GENERATED										
Revenue from Extra Water Sold	15,591,267	18,189,812	25,985,445	25,985,445	25,985,445	25,985,445	25,985,445	25,985,445	25,985,445	25,985,445
Revenue from Unaccounted for Water	8,932,428	8,932,428	10,026,552	10,026,552	10,026,552	10,026,552	10,026,552	11,120,676	11,120,676	11,120,676
Savings from Collection Efficiency	-	2,864,933	3,301,660	3,301,660	3,301,660	3,301,660	3,301,660	3,301,660	3,301,660	3,301,660
Revenue from Sewerage Charges	-	-	-	-	-	-	-	-	-	-
Total	24,523,695	29,987,173	39,313,658	39,313,658	39,313,658	39,313,658	39,313,658	40,407,782	40,407,782	40,407,782
Expenditures (Kenya Shilling)										
Transport & Staff Related Expenses	4,414,265	5,397,691	7,076,458	7,076,458	7,076,458	7,076,458	7,076,458	7,273,401	7,273,401	7,273,401
O&M	4,904,739	5,997,435	7,862,732	7,862,732	7,862,732	7,862,732	7,862,732	8,081,556	8,081,556	8,081,556
Postage	93,190	113,951	149,392	149,392	149,392	149,392	149,392	153,550	153,550	153,550
Telephone	223,168	272,883	357,754	357,754	357,754	357,754	357,754	367,711	367,711	367,711
Purchase of meters	402,189	491,790	644,744	644,744	644,744	644,744	644,744	662,688	662,688	662,688
Stationery	267,308	326,860	428,519	428,519	428,519	428,519	428,519	440,445	440,445	440,445
Fuel & Gas	1,238,447	1,514,352	1,985,340	1,985,340	1,985,340	1,985,340	1,985,340	2,040,593	2,040,593	2,040,593
Current O&M Costs	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)	(1,285,918)
Incremental O&M Costs	10,257,385	12,829,044	17,219,021	17,219,021	17,219,021	17,219,021	17,219,021	17,734,025	17,734,025	17,734,025
Surplus(Deficit)	14,266,310	17,158,128	22,094,637	22,094,637	22,094,637	22,094,637	22,094,637	22,673,757	22,673,757	22,673,757
Average Tariff (Ksh/m³)	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47
Investment Costs										
Net Cash Flow	14,266,310	17,158,128	22,094,637	22,094,637	22,094,637	22,094,637	22,094,637	22,673,757	22,673,757	22,673,757
Cumulative Cash Flow	14,266,310	31,424,438	53,519,075	75,613,712	97,708,349	119,802,986	141,897,623	164,571,380	187,245,137	209,918,894

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 WATER SUPPLY

The capacity of the current source is adequate to meet the year 2004 demand which is 2000 m³/d. The pumped supply from the wellfield to the storage tank is limited by the size of the existing pole mounted transformer, the average daily volume of water pumped is 1,600 m³.

Preliminary recommendations for improvement are prioritised and listed below:

- Supply and install a 100 KVA transformer.
- Install bulk and domestic meters.
- Identify sections of the distribution system where pipes are leaking and/or diameters are too small and replace or reinforce.
- Construct 500 m³ ground level storage tank.

The recommended rehabilitation measures are summarised in Table overleaf.

12.2 SANITATION

The existing on-site disposal of effluent is being overloaded due to the increased use of flush toilets and showers. Shallow wells in many private homes cannot be used due to the pollution by the on-site disposal of effluent.

As the population and water supply increases so will the load on the existing on site sanitation facilities and it is therefore necessary to plan for a waterborne sewerage system. Due to the narrow and congested streets, the provision of a full sized sewerage system will be difficult and expensive to construct. Consideration should be given to the use of a small-bore sewer age system coupled with communal septic tanks.

Such new works and expansion is outside the scope of the present study. There are therefore no proposed sanitation works for Lamu under this study.

12.3 Legal and institutional guidelines

Lamu water supply, like the other nine towns covered in this study, is served by the Ministry of Environment and Natural Resources. The water operator is the District Water Officer (DWO).

In recommending a viable institutional and legal framework for Lamu Urban water Supply, the following guidelines were utilized: Government policy on the water sector Government policy on the restructuring and privatisation of public enterprises and the eligibility criteria for grant funding within the sector by Government of Japan. Other considerations include; sustainability of water supply and sanitation services; improved access to community, especially women; community participation and involvement; speed of incorporation in view of current strict deadlines and consistency with existing incorporation laws; - public orientation as opposed to private sector orientation.

The legal framework for water sector management in Kenya include: The Water Act, Cap. 372; The National Water Policy set out in Sessional Paper No. 1 of 1999; and the National Water Master Plan. The institutional framework for the water sector involves: the Ministry of Environment and Natural Resources; the National Water Conservation and Pipeline Corporation; the five River Basin Development Authorities; private sector operators and non governmental organisations;

12.3.1 Options for Lamu Urban Water Supply

Applying these guidelines, various institutional and legal options for Lamu Urban Water Supply were listed and expounded upon. They were:

- (a) State corporation
- (b) Limited liability company
- (c) Co-operative society
- (d) Trust corporation

After weighing the advantages and disadvantages of each option, and evaluating their conformance with Government of Kenya and JICA requirements, the formation of a Trust Corporation for Lamu Urban Water Supply Service was proposed as the best option.

12.3.2 Legal requirements and Institutional framework for a Trust Corporation

The legal requirements for creating the proposed Trust Corporation for Lamu Urban Water Supply Service were outlined, together with an institutional framework. The following two structures were recommended:

(a) A Board of Trustees (BOT)

The Board of Trustees will be the governing body of the Trust Corporation. It will acquire and manage assets on behalf of the stakeholders; and will be responsible for policy guidance and the strategic direction of the Trust Corporation. The proposed Board of Trustees will be appointed from the current stakeholders of Lamu Urban Water Supply.

(b) Management structures

The Trust can operate the water supply and sewerage system in the Town or alternatively, the Trust can contract out this function to a private operator. In the event the BOT decides to manage these services, it can appoint senior members of the Management Team.

These are:

- (a) The General Manager
- (b) The Technical Manager
- (c) The Commercial Manager

12.3.3 Implementation and Recommended Institutional Form.

The transitional arrangements from the current ownership and operation of the Urban Water Supply to the operations of the proposed Trust Corporation were outlined. The arrangements were:

Developing consensus among important stakeholders on the proposed approach to the operations of Lamu Urban Water Supply Service (the Trust Corporation); appointing members of the Trust from identified stakeholders; Preparing the constituting instrument for Lamu Urban Water Supply Service; carrying out an inventory of the water supply system infrastructure of Lamu Urban Water Supply System and assigning values to these assets; developing organisational structures and staffing plans; completing the financial plan for the new organisation; agreeing on transfer modalities; developing an operations manual for Lamu Urban Water Supply Service; and ensuring all the assets, staff and financial resources are in place in the new organisation.

12.4 OVERALL FINANCIAL AND ECONOMIC EVALUATION

Table 12.1 Lamu - Overall Financial and Economic Evaluation (Without Sensitivity Analysis)

Financial Evaluation			Economic Evaluation			Social Concerns		Overall Evaluation
FIRR	NPV	RER	EIRR	NPV	CBR	Health needs	Water needs	
N/V	N/V	N/V	V	V	V	V	V	ESV

N/V = Not Viable
 V = Viable
 ESV = Socio-economically Investment Justifiable

Table 12.2 Lamu - Overall Financial and Economic Evaluation (With Sensitivity Analysis)

Financial Evaluation			Economic Evaluation			Social Concerns		Overall Evaluation
FIRR	NPV	RER	EIRR	NPV	CBR	Health needs	Water needs	
V	V	V	V	V	V	V	V	ESV

V = Viable
 ESV = Socio-economically Investment Justifiable

12.4.1 Financial Evaluation

The project has been assessed not to be financially viable under current tariff regime if a 10-year period is selected. Increase in tariff, while not socially undesirable, may be hindered by national considerations of uniform tariff policy. However, the project's ability to cover more than adequately its O&M costs is highly commendable.

It should nevertheless be observed that the 10-year life span given for financial evaluation might be unrealistic for utility investment. A 15-year life span is assumed to be more to the point and over the period, the project is financially viable whether financed by loan or Grant.

12.4.2 Economic Evaluation

The project is fully economically viable. From a public goods perspective, it makes good sense to invest in rehabilitating the water and sanitation services.

12.4.3 Social Evaluation

It was found that 99% of the residents, on the average, consider supply of clean water a higher priority than other social infrastructure. They would also be willing to pay a higher tariff to obtain the social benefits arising from a clean and constant water supply system. The project is therefore socially justified.

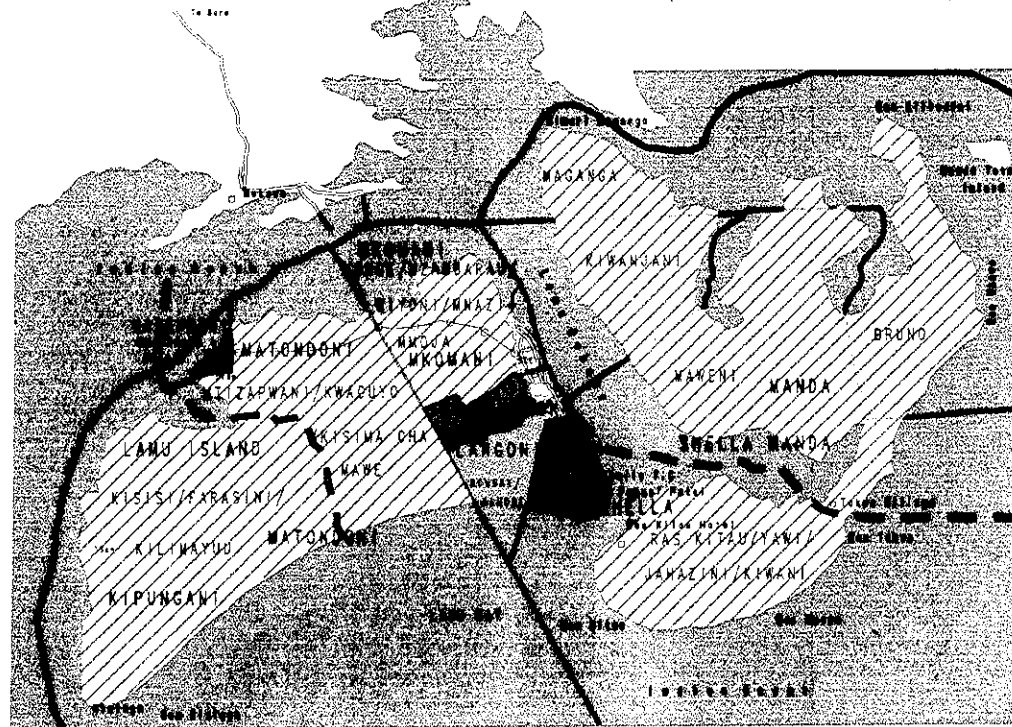
12.4.4 Overall Evaluation

The project, with due consideration, is considered to be socio-economically justified as provided in Tables 12.1 and 12.2.

APPENDIX H1

LAMU TOWN

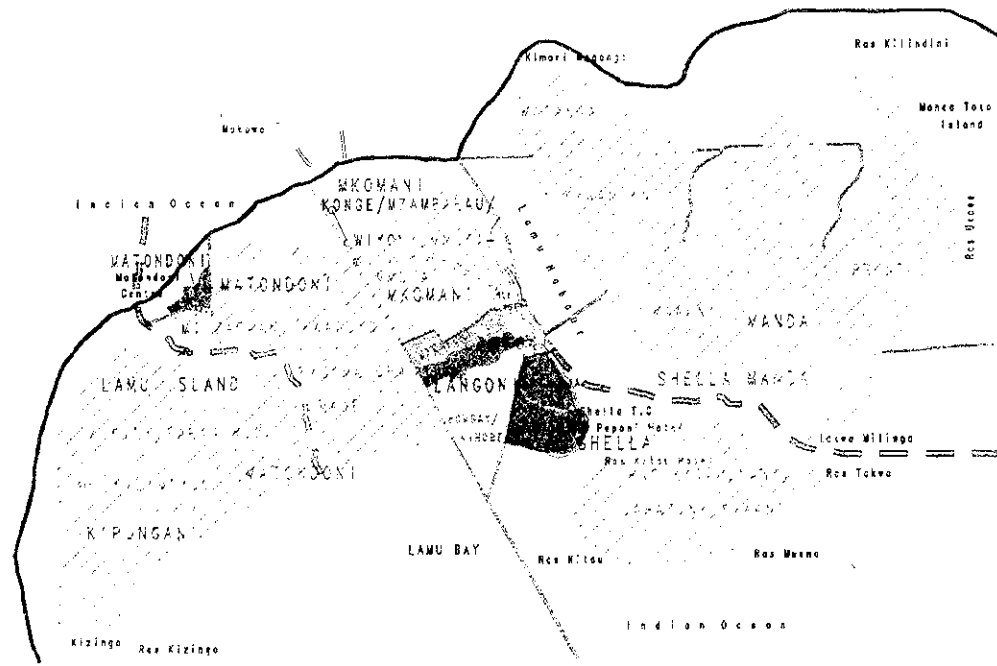
LAMU TOWN
(POPULATION DENSITY)



LEGEND

Road	River	Division Boundary
Footpath/Track	Seasonal River	Location Boundary
Telephone line	Canal/Furrow	Sub Loc. Boundary
Railway Line	Swamp	Village/Estete Bdy
Air Port/Field	Lake/Ocean	Munic/Town Boundary
Power Line	Water Tank	Core Urban Inset
Property boundary	Bore Hole	Population Density
Sub Location Name BOMA	Well, Spring	(Persons per SQ.KM.)
Village/Estete Name	Forest	1 - 100 PERSONS
TENA	Hill	101 - 200 PERSONS
		201 - 300 PERSONS
		301 AND OVER

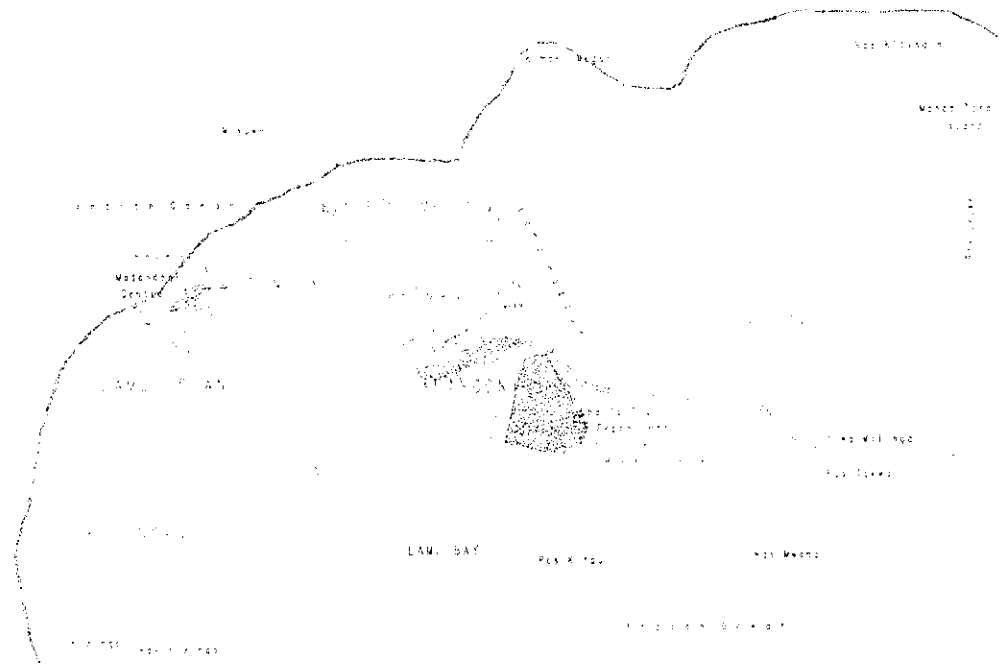
LAMU TOWN
 (POPULATION 1985/86)



LEGEND

ROAD	ROAD	District Boundary
Footpath/Track	Shangani River	County Boundary
Telephone Line	Canal/Drainage	Sub-County Boundary
Rail Way Line	Swamp	Ward/Neighbourhood
Air Field/Field	Water Source	Municipal Boundary
Market	Water Tank	State Urban Area
Property Boundary	Well	State Urban Area
Sub-County Name (DMA)	Well (Spring)	State Urban Area
Ward	Market	State Urban Area
Ward Name	Market	State Urban Area

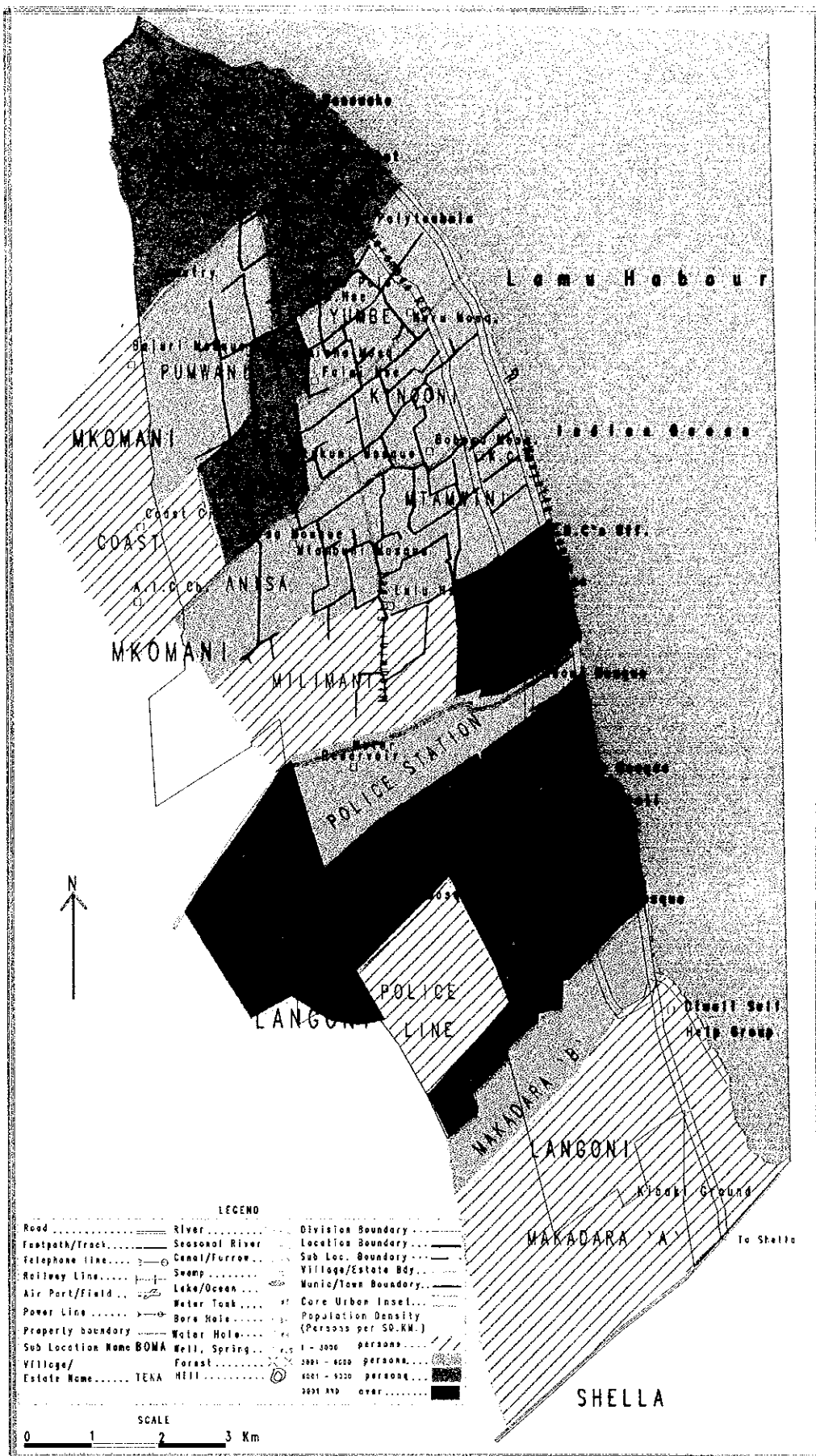
INVESTIGATION



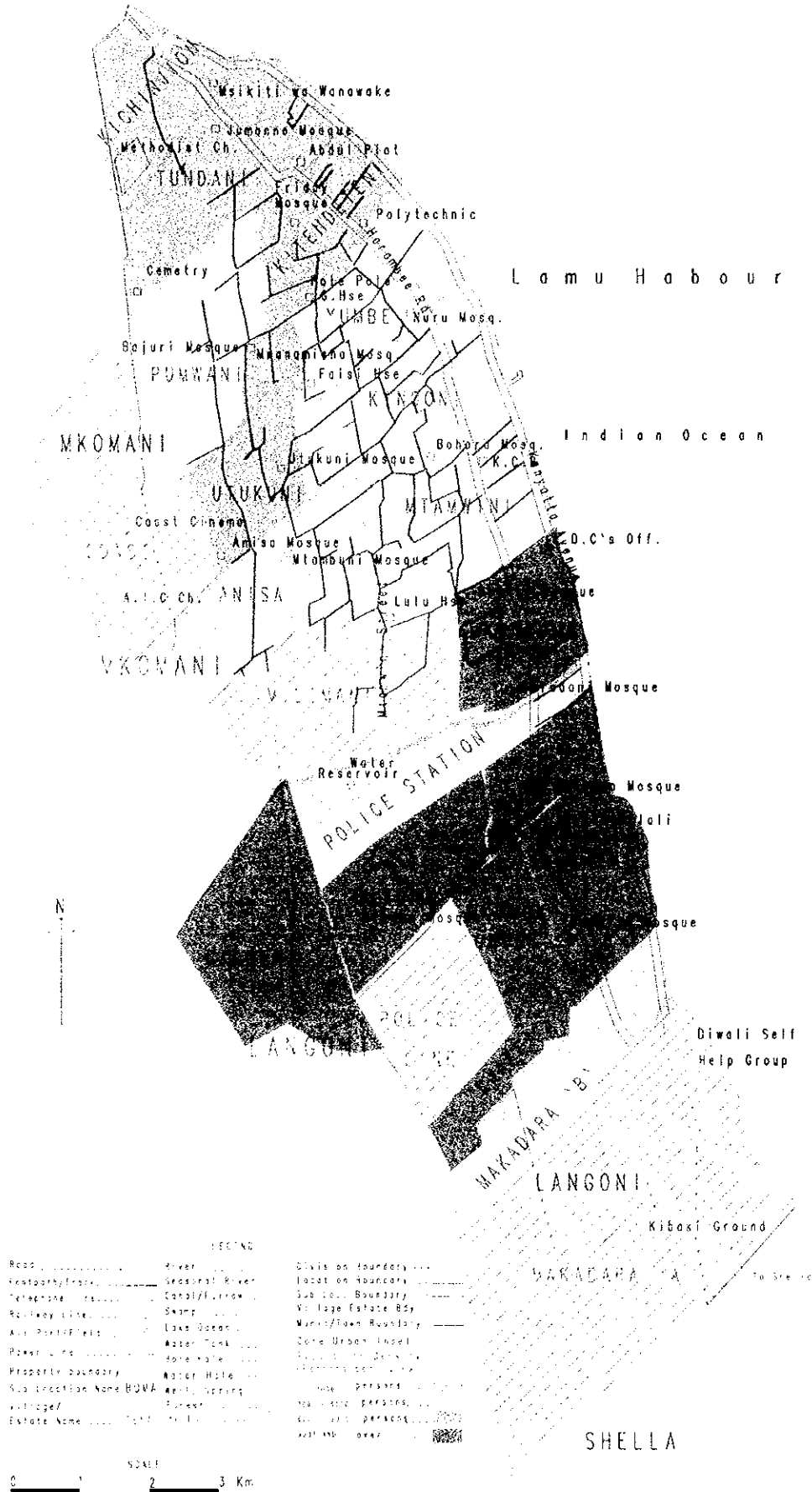
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LAMU TOWN - INSET (POPULATION DENSITY)



LAMU TOWN - INSET (POPULATION DENSITY)



- LEGEND**
- | | | |
|------------------------|----------------|--------------------|
| Road | River | Division boundary |
| Fastway/Track | Seasonal River | Lot on boundary |
| Telephone | Canal/Stream | Sub Loc. Boundary |
| Railway line | Swamp | Village Estate Bdy |
| Avn. Post/Field | Lake/pond | Municipal Boundary |
| Paved road | Water Tank | Core Urban Inset |
| Property boundary | Home plot | Lot on boundary |
| Sub location Name BOMA | Water Hole | Lot on boundary |
| Village | Well/Spring | Lot on boundary |
| Estate Name | Forest | Lot on boundary |

SCALE
0 1 2 3 Km

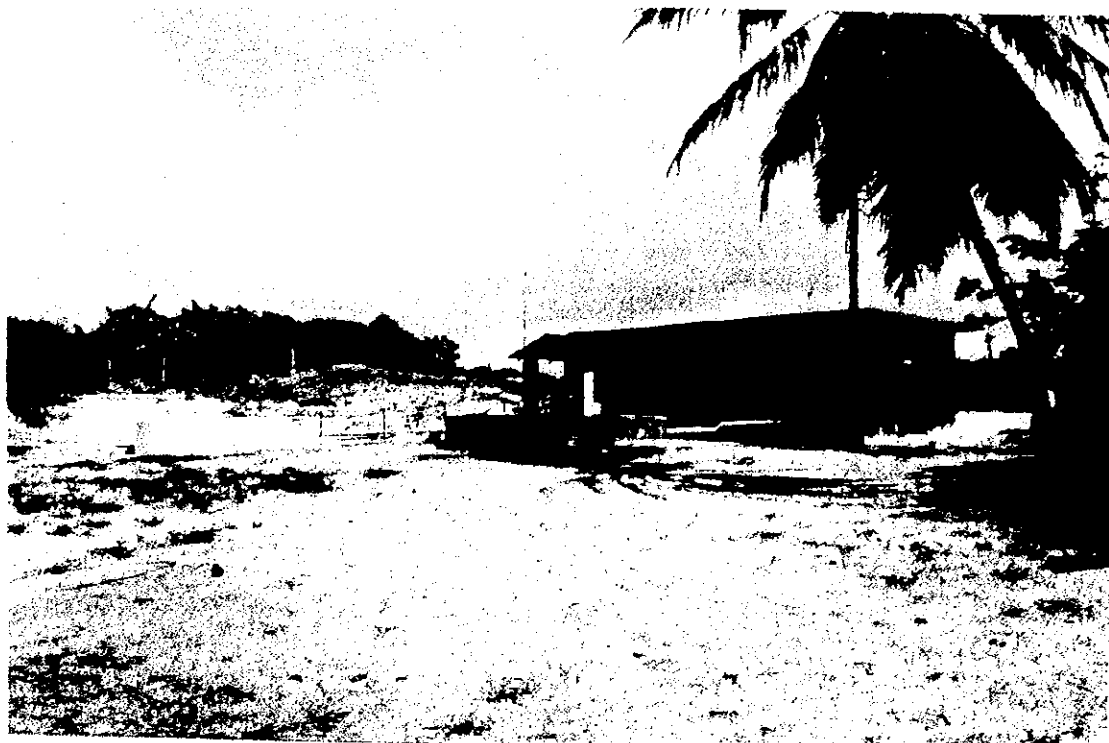
H1-3 1999 POPULATION DATA FOR LAMU TOWN

LOCATION	SUB-LOCATION	AREA	NO. OF HOUSEHOLDS	MALE	FEMALE	TOTAL
MKOMANI	MKOMANI	KICHINJIONI	73	151	128	279
		TUNDANI	133	247	289	536
		KITENDETENI	83	188	175	363
		YUMBE	72	152	162	314
		KINOONI	111	204	202	406
		MTAMWINI	98	219	228	447
		MKUNGUNI	145	258	271	529
		MILIMANI	72	136	144	280
		GARDEN	65	125	134	259
		MILIMANI (BADRU)	64	111	96	207
		ANISA	91	214	251	465
		UTUKUNI 'A'	69	116	165	281
		UTUKUNI 'B'	52	89	98	187
		PUMWANI	70	152	159	311
		COAST	73	142	127	269
		KONGE/MZAMBARAUNI/WIYONI/MNAZ SPECIAL POPULATION	99	235	166	401
		LANGONI	LANGONI	BOMBAY/KIHOBE	-	257
BOMBAY/KIHOBE	89			209	203	412
KASHMIR	122			289	311	600
MAKAFUNI	59			161	158	319
GARDENI	250			548	595	1143
WATER SUPPLY	70			161	158	319
POLICE STATION	0			2	0	2
POLICE STATION AREA	81			161	155	316
RIADHA	95			222	238	460
MABATINI	89			169	196	365
POLICE LINE	31			46	6	52
MKONOKONONI	81			162	190	352
LANGONI	114			207	257	464
MSUFUNI	108			225	241	466
SWAFFA	54			129	136	265
KIJITONI	82			165	201	366
FARASI WAWILI	89			174	182	356
MADARAKA 'A'	123	207	148	355		
MADARAKA 'B'	77	181	154	335		

APPENDIX H2

LAMU

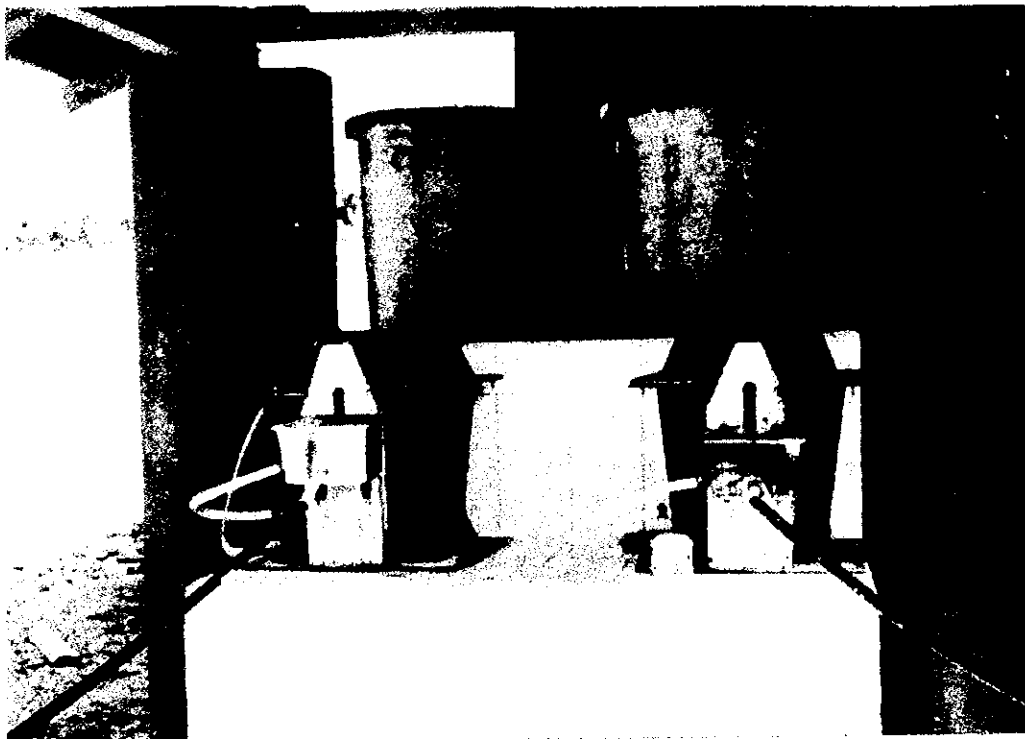
TOWN



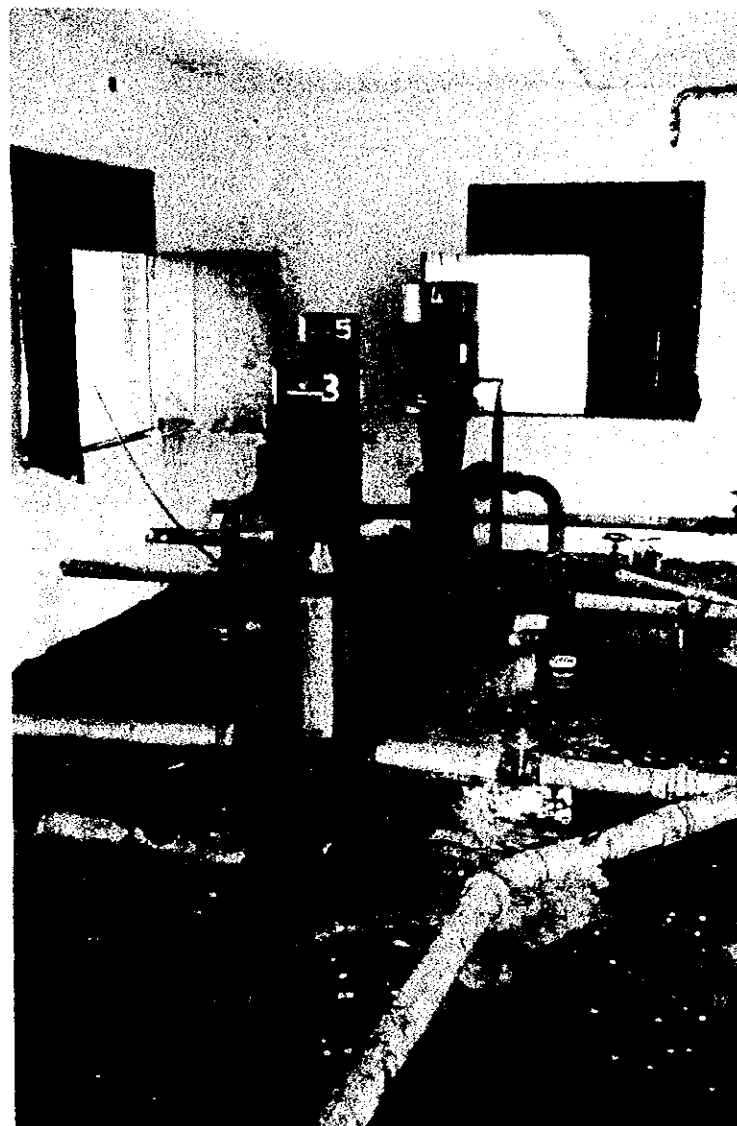
HIGH LIFT PUMPING STATION AND COLLECTOR TANKS (SHELA BEACH)



TYPICAL SHALLOW WELL
(SHELA BEACH)



CHLORINE (BLEACHING POWDER) DOSERS AT HIGH LIFT PUMPING STATION



HIGH LIFT PUMPS (SHELA BEACH)

APPENDIX A2 - ENGINEERING PRINCIPAL DESIGN CRITERIA

The following principal design criteria are used, with reference to the appropriate sections of the 1986 Design Manual prepared by the Ministry of Water.

(a) Water quality

(i) Bacteriological quality of water

No faecal coliforms (1986 Design Manual, section 5.2.2, subsection A.1). Following the 1994 WHO guidelines for drinking water quality, this can be achieved by disinfection:

- with a free chlorine residual of 0.5 mg/l (8.12.4 of the 1986 Manual gives 0.3 mg/l to 0.5 mg/l);
- at a pH less than 8, and
- a turbidity less than 1 NTU;
- for at least 30 minutes.

Section 138 of the draft Water Act states:

“All water undertakers must ensure that any water for human consumption shall be disinfected using approved disinfectants and the required residual levels maintained at the reservoirs, distribution lines and end points.”

The word “any” means that all potable water must be disinfected, even groundwater. The word “residual” implies that the approved disinfectants will be limited to chlorine compounds or other halogens. It would not cover UV radiation, ozone, etc.

(ii) Chemical quality of water

- Fluoride to be less than 1.5 mg/l, or 3 mg/l in exceptional cases (1986 manual, section 5.3.1).
- Colour to be less than 15 TCU (5.3.2) or up to 50 TCU in exceptional cases (5.3.3).
- Turbidity to be less than 1 NTU for disinfection (1994 WHO guidelines).
- pH to be between 6.5 and 8.5 (5.3.2) or up to 9.2 in exceptional cases (5.3.3), but less than 8.0 during disinfection (1994 WHO guidelines).

- Iron to be less than 0.3 mg/l (5.3.2), or 1.0 mg/l in exceptional cases (5.3.3).
- Manganese to be less than 0.1 mg/l (5.3.2), or 0.5 mg/l in exceptional cases (5.3.3).
- Water should not attack concrete or ferrous products (5.3.4). This requirement imposes further limitations on pH.

(b) Treatment

(i) General

The works should be designed for continuous operation (8.1.4).

(ii) Pre-settlement

Section 8.4.1 of the 1986 Design Manual recommends pre-settlement ahead of slow sand filters when raw water turbidity is between 20 and 100 NTU. Pre-settlement tanks may also be used ahead of clarifiers when the turbidity exceeds 1,000 NTU.

(iii) Aeration

Not required for surface waters (Section 8.6.1). May be required for groundwater (8.6.2) to be followed by sedimentation or filtration when carried out to oxidise iron and manganese.

(iv) Treatment chemicals

Coagulant : aluminium sulphate (8.7.4)
 pH correction: soda ash (8.7.4)
 Disinfectant : tropical chloride of lime or calcium hypochlorite (8.12.2)

(v) Sedimentation

Section 8.9.3 of the 1986 Design manual requires horizontal flow tanks with a design surface loading of 1 m/hr.

Section 8.9.4 states that the operational requirements of vertical-flow, sludge blanket clarifiers are so strict that they should not be used except under very exceptional circumstances.

(vi) Rapid gravity filtration

The principal criteria for rapid gravity filters are:

- design surface loading to be 5 m/hr (8.10.1);

- filter bed thickness 0.7 m to 1.0 m (8.10.2);
- filter media to be quartz sand, 0.5 mm to 1.0 mm, with a uniformity coefficient less than 1.5 (8.10.2);
- backwash rate to be 50 m/hr minimum (8.10.4);
- air scour only in exceptional cases (8.10.4).

(vii) Chemical dosing for disinfection

The World Health Organisation recommends that water intended for potable use should be disinfected with 0.5 mg/l of free available chlorine for at least thirty minutes at a pH less than 8. This recognises that germicidal efficiency is dependent on both the free chlorine concentration and the time of contact.

To achieve a free chlorine residual, sufficient chlorine must be dosed to react with any dissolved ammonia, iron, manganese, etc. The required doses are:

- 7.6 g of chlorine to react with 1 g of ammonia;
- 0.54 g of chlorine to react with 1 g of ferrous iron, and
- 1.5 g of chlorine to react with 1 g of manganese.

(c) Transmission systems

Transmission systems should be designed for:

- twenty-four hour operation (implied in 12.7.1 for clear water pumps, explicit in 12.7.2 for raw water pumps and 12.7.3 for borehole pumps);
- one standby pump (12.8.1);
- diesel generators to provide 50% cover (12.8.2);
- a minimum head of 4 m in the transmission main (9.3.7).

(d) Storage

Section 11.3.1 of the 1986 Design Manual requires balancing storage to be fifty per cent of the daily demand. Section 11.3.2 requires the following emergency storage:

- 12 hours for gravity supply to storage;
- 18 hours for pumped supply;
- 8 hours for supplies from more than one independent system.

(e) Distribution

The principal criteria are as follows:

Minimum head at consumer connections to be 10 m;
Maximum head generally not greater than 60 m.

(f) Water demand in urban areas

People with individual connections	high class housing	250lcd
	medium	150
	low	75
People without connections	low	20

APPENDIX H3

LAMU TOWN

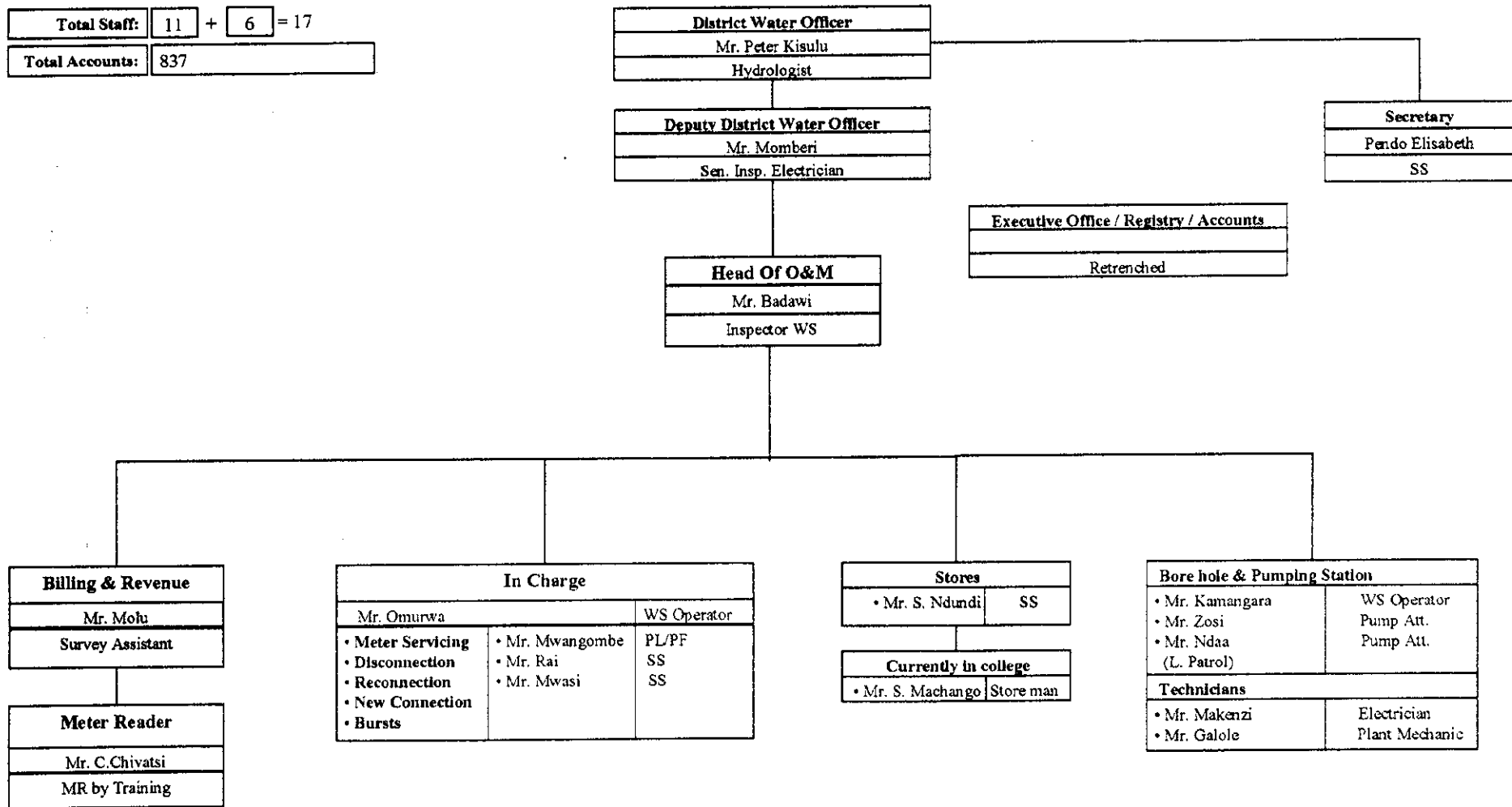
LAMU

LAMU WATER SCHEME ORGANISATION CHART

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN(10) LOCAL TOWNS IN KENYA

FIGURE: 8.1.8

Total Staff:	11	+	6	= 17
Total Accounts:	837			



Staff shared between district and Lamu water supply



Development Impact Consulting



Engineering and Utility Management Ltd.

GIBB Eastern
Africa
LAWGIBB Group Member 

Gibb Eastern Africa Ltd.

P. O. Box 16694, NAIROBI Tel: 713741, 712649 Fax: 712720 E-mail: dic@insightkenya.com

CONSORTIUM

Study of Institutional Improvement and Rehabilitation of Water Supply Systems for Local Towns in the Republic of Kenya

Location: Lamu WS&S System

Date: 07.-09.11.2000

Interviewer: LEK and CK

Discussions/Interview with: District Water Officer: Mr. Peter Kisulu
Billing & Revenue Officer: Mr. Mohammed Molu
Officer in Charge O&M: Mr. Badawi
Meter Reader: Mr. Charles Chivatsi

P.O.Box 185
Lamu

Telephone: 0121-33037

No.	Question:	Answer:
A.	Utility System	
1.	Office Set-up Office space? Office equipment? Tel.lines? Fax? E-mail? Reliable Power supply? Rationing? Other comments? Hardware, Software and skill: separate questionnaire !!	<i>6 offices, 1 office and 2 stores at pumping</i> <i>Typewriter</i> <i>1 with 6 extensions</i> <i>No</i> <i>No</i> <i>Yes, because KenGen generator that needs water from Lamu WSS to cool their engine</i> <i>No</i> <i>Not available</i>
2.	Staffing Set-up Total number of staff? Male/Femal ratio? Fluctuation? Due to? Average years within the system? Orga chart in place? Job description available? Level of skill? Overdue staff promotion? Training facilities offered? Used facilities? Technical Administration Management Qualification Station Manager Recruitment statistics Remuneration and benefits	<i>17 (4 retrenched: MR, WS Operator in Charge, Deputy O&M, Rev.Collection)</i> <i>18 for District (7 retrenched)</i> <i>??, but not many transfers</i> <i>approx. 7 yrs</i> <i>only for District, in form of departmental layout</i> <i>No</i> <i>Yes, for many years, assume that up-grading has stopped and those doing the promotion in HQ have been faced out</i> <i>Always apply, but never forthcoming. Nothing seen over the last 6 yrs</i> <i>N/A</i> <i>Hydrologist</i> <i>Not available</i> <i>HQ</i>
3.	Transport and Logistics Cars? Which? Number: Motorbike? Which? Number: Bicycle? Number:	<i>Landrover 110 Pick-up (old)</i> <i>1 Yamaha, but grounded awaiting funds</i> <i>Nil</i>
4.	Institutional Frame MENR: Line of command	<i>PWO in Mombasa, rarely directly with Nairobi, and then no particular counterpart</i>
B.	Utility Indices	
1.	Billing Consumption Actual vs Estimate	<i>Refer to Table 8.2.8</i> <i>Average for January to June 2000 is:</i>

<p>Consumption Billed per month</p> <p>Consumption Billed for the last 3 years</p> <p>Billing Efficiency: Water billed/ Water supplied</p> <p>Billing Effectiveness: How many out of 100 bills are wrong or returned for reason</p>	<p><i>10,348 m3 per month for Actual 4,232 m3 per month for Estimates 10 m3 per month for 1 kiosk Refer to Table 8.2.8</i></p> <p><i>Not readily available</i></p> <p><i>Abstracted from Table 2 and calculated for period 1 – 6/00 = 89.33% as average for the above period.</i></p> <p><i>Not available</i></p>
<p>2. Revenue & Collection</p> <p>Revenue Billed vs Revenue Collected per month</p> <p>Collection efficiency: Total billed/ Total collected</p> <p>For the last 3 years monthly and annual figures</p>	<p><i>Refer to Table 8.3.8, calculated billed average for the period 1 – 6/00 is Kshs. 309,109.00 vs collected over the same period, Kshs. 139,379.00</i></p> <p><i>= 45% using table 8.3.8</i></p> <p><i>Not readily available</i></p> <p><i>Water Department collects 30.00 Kshs per month on behalf of the Council for cleaning the streets and drainage system and collection of rubbish from the main market. Not clear what is then done with the rubbish</i></p>
<p>3. UfW</p> <p>1 - Recorded consumption/Production (supply efficiency) per month Or production vs billed consumption</p> <p>For the last 3 years, monthly and annually</p> <p>Value of UfW: loss x average tariff rate of system per month</p> <p>Consumer Meters:</p>	<p><i>Reflected in Table 8.2.8, average is 10%</i></p> <p><i>Not available</i></p> <p><i>Average tariff not available</i></p> <p><i>Information availed from B&R in Charge: Approx 900 meters, 10% working = 90 meters 90%estimated = 810 meters Disconnected: not known</i></p>
<p>4. Tariff</p> <p>What is the average tariff rate per</p>	<p><i>Not known</i></p>

	cbm? Total billed water/Total water supplied Tariff structure? Current Last 3 years: Additional charges? Additional sources of income?	<i>Refer to gazetted tariff urban</i>
5.	Funding Required Funding per month? Salary Procurements Power Chemicals Others	<i>Revenue based A.I.E.: 90%</i> <i>Information available on funding from International Funds for Agric.(IFAD) on community Water Dev.</i> <i>Not known</i> <i>Refer to HQ</i> <i>Total FY:99/00 Kshs. 1,264,846.10 through revenue based A.I.E and Kshs. 1,542,415 through IFAD for community schemes.</i> <i>Through HQ</i> <i>Through HQ</i>
6.	Cost Total per month Salary Power O&M Administration Others	<i>Not readily available</i> <i>Requested figures from HQ</i> <i>Requested figures from HQ</i> <i>Based on the FY 99/00 procurement cost for the year was Kshs. 1,264,846.10, average per month being Kshs.105,403.80</i> <i>Included under O & M figure</i> <i>Included under O & M figure</i>
7.		
8.	Debt Arrears Debt Arrears Situation in Kshs Increase per month Total FY 99/00 98/99 97/98 Debtors Totals/Billed Revenue Debtors Totals/Collected Revenue	<i>As at the end of the FY99/00 was Kshs, 2,673,666.00</i> <i>Kshs. 2,673,666.00</i> <i>Not available</i> <i>Not available</i> <i>Can be calculated using figures provided under Table 8.3.8. but not correct because Debtors Totals would have to be based on billed revenue averages.</i>
C.	Utility Procedures	
1.	Staff Recruitment	<i>DWO, but people are simply sent or transferred</i>
2.	Defaulters Handling	<i>Nothing can be done</i>
3.	Administration Are debtors maintained monthly? Is an aging analysis available? Debtors lists for different Consumer categories?	<i>Only in consumer ledger</i> <i>Only summary prepared every 3 month for GOK</i> <i>No</i> <i>No</i>
	Accounting Manual or computerised? If manual elaborate: Double Book keeping done	<i>Manual and only the A.I.E received is accounted for</i> <i>No</i>

	Ledger cards	<i>Only consumer ledgers which records the bills calculated and payments made</i>
	Banking Facilities	<i>KCB only</i>
4.	Funding	<i>Power & Salaries are paid through HQ. Chemicals are ordered through HQ. Other expenditures as shown under Table 8.5.8 are effected through revenue based A.I.E. of 90% of collected revenue.</i>
5.	Installment Payment	<i>Yes, but with approval of DWO No criteria set</i>
6.	Meter Reading	<i>Currently only 1 MR, as the second one was retrenched 8 zones MR commences from 17th of the month for approx. 2 weeks MR goes with the MR books and transfers the information into the consumer ledger (organised like the zones) Consumers come to the office to get their bill and the bill is prepared while the consumer waits for it. Charge of 30.00 for the Council is as well reflected. Visited several meter connections, which were stalled and estimated in the MR books. Many looked very untouched for some time. Where new meters were installed, they showed in 1 week already 13 cbm consumption, while the account had been on much lower average. Lamu has many wells of good quality in the streets and under houses, shared by a number of people. Water from the undertaker is mainly for drinking. There are a number of cases where one connection then supplies a number of neighbours with the hosepipe. Assessment is a very difficult issue, as there is a substitute for basic requirements (wells) and difficult how many neighbours and how much they take. "Stonehouse" on 10 cbm average, seen to supply neighbour with hosepipe and new meter red 13 cbm after one week !! Other consumers, mainly on the northern shoreline get no water at all, while they are still charged the 10 cbm average !!</i>
7.	Disconnection	<i>Disconnection list is prepared by the Officer in Charge of Billing & Revenue 3 people make the disconnection team. They go to the consumer with the bill that has been prepared and tell him to pay or get dis-connected. If they say they pay, then they pay. Religion plays a big role and Lamu is very small Illegal re-connections are not expected to be done, because people are very religious and would not want to be known as stealing water</i>
	New connection	<i>New applications are only done with new meters</i>
8.	Meter Servicing	<i>Normally not done, only sometimes they flush the meters</i>

		<i>Many glasses cannot be read and there is nothing that can be done</i>
9.	HQ Reporting	<i>DWO was assuming that O&M reports are done, but they were not AND clear that no checking of the figures that should help to direct. Whatever is to be forwarded is done as a formality not because it is useful information that is used at District and other levels.</i>
10.	Procedure Manuals	<i>Manuals for pumphouse only, but service only done when there is a breakdown and only if parts are available</i>
11.	Financial Control	<i>After September 2000 revenue collection was shifted from the DC's office to the water office after the DWO requested for the change to centralize issuance of bills + payments and avoid the hussles to the consumer movement to the water office to receive the bill and later to present the payment receipt. The cash and cheques collected are then surrendered to the DC's office by filling in a collection control sheet with receipt nos. + amount collected, and a voucher FO 17 indicating the amount collected. The above documents are examined, audited and submitted to cash office. The cash office issues an official receipt.</i>
12.	Cash/Cheque Un-accounted for cash advances? Consumer payments into consumer accounts? Cash/Bank book maintained and up to date?	<i>No Consumer ledgers are updated with cash payment upon payment. No cash or bank book maintained</i>
13.	Reconciliation For Cash? For Bank?	<i>Only done when surrendering cash + cheques at the DC's office</i>
D.	Discussions	
1.	Staff Awareness of operation and financing cost vs turnover? Job satisfaction and expectation? Existing constraints? Physical Financial Institutional Political	<i>No Not happy with salary, limited tools and financial constrains Yes, total overhaul of the distribution system</i>

	<p>Personnel</p> <p><i>Staffing with the required level of skill in the right field, not adding more SS, or somebody that has skill, but not in the field where staff is necessary: P/Pf, Accounts, MR</i></p> <p><i>Re-organisation actually expected after retrenchment, as it has caused a problem by removing people that are required.</i></p> <p>Efforts made to overcome the constraints?</p> <p>Consumer relationship?</p> <p><i>Ok, since ElNino rehabilitation as it has improved supply considerably, however illiteracy levels creates problems.</i></p> <p>Relationship with PWE?</p> <p><i>DWO gives weekly up-date on phone</i></p> <p>Relationship with Ministry?</p> <p><i>Either through PWO, or directly by simply contacting the person who sent the information</i></p> <p>Relationship with LA? Planning Department?</p> <p><i>Ok, Physical planning Department or the County Council request water department normally to comment</i></p> <p>With other utility providers? External influence affecting the performance? Working environment?</p> <p><i>No, but relationship with KenGen is good</i></p> <p><i>Not bad</i></p> <p>What is the opinion about PSP?</p> <p><i>Should be encouraged</i></p> <p><i>If Private operator or manager, salary expectation from DWO would be approx. 1.000 %</i></p>
<p>2.</p> <p>Consumers</p> <p>Comments on:</p> <p>Reliability</p> <p>Quality</p> <p>Billing</p> <p>Price</p> <p>Consumer requests on:</p> <p>Coverage</p> <p>Reaction Time</p> <p>Proposed changes</p> <p>Service rating</p> <p>Cost in relation to service provided?</p> <p>Tapped vs kiosk?</p> <p>View and understanding of PSP?</p> <p>What does the consumer expect?</p> <p>What does the consumer propose?</p> <p>What is his/her situation on rationing?</p>	<p><i>Talked to</i></p> <p><i>Biggest Hotel within Lamu town with working meter and sufficient supply:</i></p> <p><i>No problems with the water department</i></p> <p><i>Guesthouse (location centre of town, next to plaza) owner, who got disconnected many years ago:</i></p> <p><i>As there was no water in the past, they use the well within the house and drinking water is brought from another connection they have, where water was always available. If water available they will re-connect, but tourism very low and therefore not required at the moment.</i></p>
<p>3.</p> <p>Stakeholders</p>	<p><i>No discussion held</i></p>
<p>E.</p> <p>Consumers</p>	

1.	Consumer Portfolio Total number? Ratio Major/minor consumers? Consumer classification Consumer categories? No. of new connect. Applied? No of new connect. Done? Percentage of suspected illegal connections? Coverage water? How many Kiosks are in operation? Coverage Sanitation?	<i>Approx. 900 accounts.</i> <i>Not available, but for Hotels and guesthouses no separate lists are kept.</i> <i>Checking the consumer ledgers showed that a number of potential major consumers are on minimum charge of 10 cbm</i> <i>N/A</i> <i>As gazetted</i> <i>??</i> <i>??</i> <i>Not experienced, religion plays major role</i> <i>Shella planned to be connected</i> <i>1, but hardly any consumption, only perhaps during the dry season for other islands</i> <i>No sanitation in place</i>
2.	Consumer Indices	
3.	Consumer Procedures Open account? Close account? Get a credit into the next bill? Change address? Transfer account?	<i>Forms are available and filled by the consumer, WS Operator in Charge does the survey, looks for the nearest account and assesses connection material requirement</i> <i>Consumer then pays deposit, 110.00 Kshs labour and meter. He ensures that information is absorbed into the MR book and consumer ledger before the meter is installed.</i> <i>Consumer fill close account form, pays 200,00 Kshs to have the final reading and removal of the meter done. Start deposit refund procedure, but not really known what is the situation on the deposit refund situation at the DC's office. Does not happen often.</i> <i>Possible, but it never happened</i> <i>N/A, as consumer collects or mail is delivered</i> <i>Done but any outstanding bills have to be cleared</i>
F.	Technical System	
1.	System Components? Is pumping necessary?	<i>30 wells, of which 5 are not working currently (starter burnt out, foot valves not working, etc)</i> <i>10 just rehabilitated through E1Nino</i> <i>Pumpstation: from sumptank to reservoir</i> <i>Chlorination</i> <i>Reservoir 450 cbm in town next to the office</i> <i>Additional reservoir of 500 cbm planned</i> <i>Yes,</i> <i>KenGen no problem, no dis-connection, because they need the water to cool the generator!!</i>

2.	Zonal Meters How many are in the system? Are they controlling areas? Are they functioning?	<i>2 at the pumpstation 1 at reservoir, size 6", with daily recording The whole system Yes</i>
3.	Network Transmission lines? Distribution lines? Consumer lines? Whole system coverage? Fully utilised?	<i>2 x 4 km main 6" lines, whereby consumers are connected to this raising main, consuming less than 1/3 of production 2" line off the raising main for Hospital, DC and seafront area from the reservoir 6" into 4" into 2" 1/2" corroded, many under the buildings There are plans to connect Shella with the 6" raising main and DWO has discussed with consumer representatives, as currently they depend on their own wells</i>
4.	Coverage	
G.	Technical Indices	
1.	Production Capacity per day Actual per day Production Efficiency?	<i>2.000 cbm/day since September 1.6000 cbm/day since September</i>
2.	Pumping Efficiency	<i>?</i>
3.	Supply Efficiency Recorded consumption/actual production	<i>Situation has only improved in September, before: Jan. – June: average 16.700 cbm production/month as information given in the O&M monitoring report</i>
4.	Service Efficiency How many days to attend to the problem? No. of total meters/number of operational meters? Total zonal meters/operational zonal meters?	<i>Depends on the material availability and within the northern part of the network they do not really do anything but relate any problem to the supply situation ?? All working, but only measuring production</i>
5.	Sanitation Treatment Capacity Actual	<i>N/A most households do have cesspits BIG risk to contaminate the wells</i>
H.	Technical Procedures	
1.	O&M	<i>No procedure in place</i>
2.	Rationing	<i>Done, but without system in place</i>

3.	Stock&Procurement Itemised stock list? Stock value Repair workshop Meter test bench Meter repairs/month/year Meter calibration Meter test request by consumers? List of tools and repair equipment available?	<i>Refer to Table 8.7.8 with stock balances and cost as extracted from the stock cards.</i> <i>Not available</i> <i>Not available</i> <i>??</i> <i>Not done</i> <i>No</i> <i>There is no list of tools or repair equipments available however incase of need, the storeman checks whether the necessary tools are available and issues to the user. The user is expected to return the same after use</i>
4.	Meter Test Procedures	<i>Not done</i>
5.	Requisition Procedures	<i><u>Purchasing:</u> The user department requests for the item. An LPO is prepared, signed by the DWO, processed at the DC's office (accounts, exam, vote book) and delivered to supplier. Goods are supplied, delivery note signed and items recorded in various stock cards.</i> <i><u>Issuing:</u> Storeman raises an S11 (counter requisition and issue voucher) which is signed by the person receiving the items. Stock cards is then reduced with the item which has been issued.</i> <i>Generally there is no set stock levels because of insufficient funds, therefore most stocks are only purchased on demand.</i>

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA

Total No. Of Connections	ARREARS (Kshs.)	JUNE BILL (Kshs.)	METERED	FLAT RATE	WORKING	NON-WORKING	NO WATER	CUT OFF	ACTUAL CONSUMPTION (JUNE 2000) M ³	AVERAGE CON.M ³	LAST PAYMENT (Kshs.)
837	3,137,731.00	292,380.00	800	35	104	697	10	95	1,294	6,510	595,401.00
No. Of Actual Bills		95		Total Of Active & Inactive		837		Total m3 Billed		7,804	
No. Of Estimate Bills		608									
Assumed In-Active		134									
Total		837									
Minimum Charge Bills		92.75%									

NOTE: While last payment column was supposed to reflect payments prior to 30th June 2000, payments are reflected upto 21st September 2000

**STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA**

A/C No.	ARREARS (Kshs.)	JUNE BILL (Kshs.)	METERED	FLAT RATE	WORKING	NON- WORKING	NO WATER	CUT OFF	CUT OFF DATE	ACTUAL CONSUMPTION (JUNE 2000) M ³	AVERAGE CON.M ³	LAST PAYMENT (Kshs.)	DATE OF LAST PAYMENT
001-00101	1,990.00	280.00	1			1					10	1,180.00	9/2/00
001-00180	4,160.00	280.00	1			1					10		
001-01600	3,355.00	280.00	1			1					10	310.00	25/11/99
001-02600	7,685.00	280.00	1			1					10		
001-02700	840.00	280.00	1			1					10	280.00	14/3/00
001-05350	696.00		1			1						696.00	19/6/00
001-06561	840.00	280.00	1			1					10	800.00	20/6/00
001-07501	1,570.00	230.00		1								1,570.00	12/6/00
001-09500	1,950.00	230.00		1								740.00	6/9/99
001-11000	3,725.00	280.00	1			1					10		
001-11100	480.00	480.00	1			1					10	4,840.00	30/5/00
001-11500	1,755.00	280.00	1			1					10	1,300.00	4/1/00
001-11770	1,320.00	280.00	1			1					10	1,165.00	7/3/00
001-12251	2,765.00	280.00	1		1					6			
001-13370	280.00	280.00	1			1					10	840.00	25/5/00
001-13770	3,230.00	280.00	1			1					10		
001-15000	1,120.00	280.00	1			1					10	1,120.00	20/6/00
001-12501	560.00	280.00	1			1					10	465.00	24/6/00
001-13252	1,400.00	280.00	1			1					10	1,680.00	24/5/00
001-17709	1,990.00	280.00	1			1					10	775.00	2/2/00
001-19501	2,455.00	280.00	1		1					3		840.00	20/4/00
001-20000	1,865.00	280.00	1			1					10	280.00	6/6/00
001-21501	2,455.00	280.00	1			1					10		
001-22003	2,145.00	280.00	1			1					10	155.00	22/9/99
001-22301	5,072.00	480.00	1		1					2			
001-23000	560.00	280.00	1			1					10	560.00	7/3/00
001-23251	560.00	280.00	1			1					10	870.00	3/4/00
001-25001	4,005.00	280.00	1			1					10		
001-26005	5,010.00	280.00	1			1					10		
001-26350	1,685.00	280.00	1			1					10	565.00	8/6/00
001-27001	3,850.00	280.00	1			1					10		
001-29007	10,080.00	280.00	1			1	1				10		
001-30510	1,620.00	230.00		1									
001-31004	4,005.00	280.00	1			1	1				10		
001-37851	1,265.00	280.00	1			1	1				10	1,000.00	9/2/00
001-38000	1,525.00	280.00	1			1						1,805.00	7/3/00
001-43860	280.00	280.00	1			1					10	280.00	8/6/00
001-44100	530.00	280.00	1			1					10	560.00	2/6/00
001-44305	1,825.00	230.00		1									
002-09504	2,610.00	280.00	1			1					10		
002-15004	3,550.00	280.00	1			1					10		
002-16501	1,755.00	280.00	1			1					10	1,255.00	13/6/00
002-16300	2,895.00		1			1		1	25/1/00				
SUB-TOTAL	103,313.00	11,680.00	39	4	3	36	3	1		11	330	25,931.00	

**STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA**

Year 2000	January	February	March	April	May	June	September
Total Prod. M ³	14,355	11,488	12,245	18,715	20,562	22,833	49,898
Water Sold M ³	10,681	9,741	10,112	10,512	10,501	10,541	9,871
Flat rate M ³	850	800	800	6,263	7,391	9,292	22,678
Kiosk m ³	240	340	350	240	520	600	350
Unaccounted for W. %age	10	10	10	10	10	10	10
No production days	2,574	597	973	1,690	2,140	2,390	
No. of Disconnections	30			31		-	
No. of Reconnections	16	28	0	2	38	10	
KWH Consumed	0	4	0	2	12	2	
Revenue	N/A	9,374	10,890	15,330	12,460	12,460	
New connections	1,260.00	8,500.00		4,640.00	12,940.00	2,220.00	
Reconnections		2,000.00		1,000.00	6,000.00	1,000.00	
Metered	NIL	320,984.00	328,647.00	329,172.00	323,912.00	324,222.00	
Flat	3,840.00	4,800.00	8,150.00	9,200.00	11,960.00	13,800.00	
Kiosks	100.00	100.00	100.00	NIL	150.00	150.00	
Total Revenue	168,868.00	336,384.00	336,872.00	344,012.00	355,062.00		
Expenditure							
Fuel	N/A	97,270.00	22,964.00	157,078.00	127,196.00	*?*	
Chemicals	11.017	9.070	9.418	14.293	16.015	17.564 kg	38.406
	2,533.91	2,086.10	2,166.14	3,287.39	3,683.45	4,039.72	8,833.38
Repairs, spares				6,000.00	7,000.00	8,000.00	
Workshop, uniform							
Replacement of Equip							
Tel. Stationery, Transport				7,000.00	6,500.00	5,000.00	
Allowances	75,834.00	*?*	75,834.00	44,710.00	44,710.00	*?*	
Total Expenditure	78,524.00	175,346.00	*?*	222,076.00	189,086.00	*?*	
Revenue Collected							

Information abstracted from the yellow A3 sheet, called Book4, as actual O&M Monitoring Report not available
Information obtained from Book 2
Information calculated

1. Since September 2000, additional 10 wells are operational (Alnino) which now reflects a production of approx 1.600 cbm/day as compared to an average of 560 cbm/day prior to the rehabilitation.
2. Where *?*, the information could not be read, because carbon paper used was no longer producing legible information

**STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA**

YEAR 2000

	JUNE	MAY	APRIL	MARCH	FEBRUARY	JANUARY
Accumulated Debt	2,436,479.00	2,397,137.00	2,156,127.00	1,880,790.00	1,750,181.00	1,655,281.00
Current month billed revenue	338,122.00	336,022.00	338,372.00	336,892.00	336,384.00	168,867.00
Total revenue collectable	2,774,601.00	2,733,159.00	2,494,499.00	2,217,682.00	2,085,565.00	1,824,148.00
Actual collection	100,935.00	296,680.00	97,362.00	61,555.00	205,775.00	73,967.00
Accumulated FY collection	1,536,696.00	1,435,796.00	1,139,116.00	1,041,754.00	980,199.00	774,424.00
Total outstanding revenue	2,673,666.00	2,436,479.00	2,397,137.00	2,156,127.00	1,880,790.00	1,750,181.00

YEAR 1999

	DÉCEMBER	NOVEMBER	OCTOBER	SEPTEMBER	AUGUST	JULY
Accumulated Debt	1,540,684.00	1,434,014.00	1,334,891.00	1,251,059.00	1,224,232.00	1,093,816.00
Current month billed revenue	168,192.00	168,192.00	168,827.00	169,657.00	168,698.00	177,282.00
Total revenue collectable	1,708,876.00	1,602,206.00	1,503,718.00	1,420,776.00	1,392,930.00	1,271,098.00
Actual collection	53,595.00	61,522.00	69,704.00	85,885.00	141,871.00	46,866.00
Accumulated FY collection	700,457.00	646,862.00	585,340.00	274,622.00	188,737.00	46,866.00
Total outstanding revenue	1,655,281.00	1,540,684.00	1,434,014.00	1,334,891.00	1,251,059.00	1,224,232.00

**STUDY OF INSTITUTIONAL IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA**

MONTH	REVENUE COLLECTED FY 99/00	A.I.E. APPLIED FOR	RECEIVED ALL./LIQUIDITY	EXPENDITURE INCURRED FY 99/00		
				ITEM	ALLOCATED	ACTUAL
July	46,866.00			887 Account		
August	141,871.00	?	628,000.00	Transport & Operating Exp	30,000.00	30,000.00
Sep	85,885.00			Passage & Leave	70,000.00	69,999.70
Oct.	69,704.00	?		Travelling & Accom. Exp.	24,000.00	23,925.00
Nov.	61,522.00			Postage & Telegrams	6,860.00	6,400.00
Dec.	53,595.00			Renewal of W/S	200,000.00	199,950.00
Jan.	73,967.00		170,860.00	Maintenance of WS	110,000.00	109,650.00
Feb	205,775.00	295,599.00		892 Account		
March	61,555.00		266,000.00	Transport & Operating Exp	100,000.00	99,904.50
April	97,362.00	297,431.00		Travelling & Accom. Exp.	75,000.00	74,933.00
May	296,680.00		205,000.00	Postal & Telegrams	14,000.00	12,000.00
June	100,935.00			Maintenance of WS & Sewer.	420,000.00	419,579.50
Total	1,295,717.00	593,030.00	1,269,860.00	Purchase of stationery	15,000.00	14,945.00
				Passage & Leave Exp	80,000.00	78,559.40
				886 Account		
				Purchase of supplies for Prod.	125,000.00	125,000.00
				Total	1,269,860.00	1,264,846.10
				Balance		5,013.90

Lamu receives a revenue based AIE of 90%
Money received under IFAD was used for development community water systems,
Siyu Djabia, Mtagawaia, Mbaragoni

NOTE: A.I.E. received related to Lamu and the divisions covered.
Allocation to the divisions not possible

Community Dev. Funded by International Funds for Agric. Develop.(IFAD)		
Travelling + expenses	150,000.00	127,859.00
Transport operating expenses	150,000.00	
Telephone Exp.	50,000.00	50,000.00
Purchase of stationery	50,000.00	
Training	150,000.00	149,890.00
Purchase of plant + equipment	100,000.00	100,000.00
Cost of hand dug wells	1,000,000.00	103,231.00
Construction of Djabias (underground tanks)	2,105,000.00	1,011,435.00
Total	3,755,000.00	1,542,415.00

**STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY
SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA**

ITEM	BALANCE	UNIT	VALUE
<u>PIPES</u>			
GI pipe 3/4"	1	2,959.00	2,959.00
GI pipe 1"	8	2,020.00	35,340.00
GI pipe 6"	1	26,000.00	26,000.00
PVC pipe 3/4"	10	320.00	3,200.00
PVC pipe 1"	10	275.00	2,750.00
PVC pipe 1 1/4"	1	736.00	736.00
PVC pipe 1 1/2"	1	858.00	858.00
PVC pipe 3"	4	750.00	3,000.00
PVC pipe 2"	9	1,565.00	14,085.00
Reducing Bush 1" * 3/4"	15	50.00	750.00
GI elbow 1"	10	70.00	700.00
GI Tee 3/4"	10	65.00	650.00
GI Nipple 1"	5	55.00	275.00
GI gate valve 3/4"	9	880.00	7,920.00
GI union 3/4"	5	135.00	675.00
GI elbow 3/4"	11	46.00	506.00
GI plain socket 1"	5	60.00	300.00
GI nipple 3/4"	5	40.00	200.00
GI tee 1 1/4"	2	150.00	300.00
Reducing socket 1 1/2" * 1"	5	115.00	575.00
GI reducing socket 1 1/4" * 1"	5	100.00	500.00
GI gate valve 3"	1	10,560.00	10,560.00
GI reducing socket 3" * 2"	2	510.00	1,020.00
<u>FITTINGS</u>			
Bush / Redu 3/4 * 1/2"	11	35.00	385.00
Bush / Redu 1 * 1 1/2"	1	44.00	44.00
GI plug 3/4"	400	35.00	13,200.00
GI plug 1 1/4"	60	75	4,500.00
GI plug 1"	160	45	7,040.00
Red/socket 3/4" * 1/2"	8	70	560.00
PVC tee 3/4	5	100	500.00
PVC tee 1"	5	120	600.00
Bend 1"	15	144	2,160.00
Socket/ Red 2" * 1"	5	175	875.00
Gate Valve 1"	4	1100	4,400.00
PVC elbow 2/4"	5	59	295.00
GI tee 3"	11	1340	14,740.00
PVC tee 2"	5	572	2,860.00
GI union 3"	1	1280	1,280.00
GI union 2"	12	550	6,600.00
GI union 1"	5	150	750.00
GI bend 3/4	19	96	1,824.00
PVC adaptor 1"	7	60	420.00
Reducing socket 1" * 3/4"	5	90	450.00
Foot valve GI 2"	5	1870	9,350.00

**STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY
SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA**

ITEM	BALANCE	UNIT	VALUE
GI Foot valve 3"	2	4290	8,580.00
GI tee 1 1/2"	2	180	360.00
GI tee 1"	10	100	1,000.00
Gate valve GI 2"	2	3400	6,800.00
PVC end cap 2"	1	440	440.00
PVC adaptor 3/4"	7	40	280.00
STATIONERY			0.00
Operation chart sec 4	2	195	390.00
Water supply bill GP230	6	60	360.00
GP 231	2	577.50	1,155.00
Paper cips	3	20	60.00
Envelops 8.7*4.3mm	3	49	147.00
Envelops 12.8 * 4.9mm	2	110	220.00
Photocopy paper	1	350	350.00
Typing paper	2	240	480.00
Duplicating paper	1	240	240.00
GP288	10	160	1,600.00
GP229	18	360	6,480.00
FO 12	1	176	176.00
Form WDD 55	3	800	2,400.00
FO 13	1	577	577.00
FO 13A	1	115	115.00