

APPENDIX K3

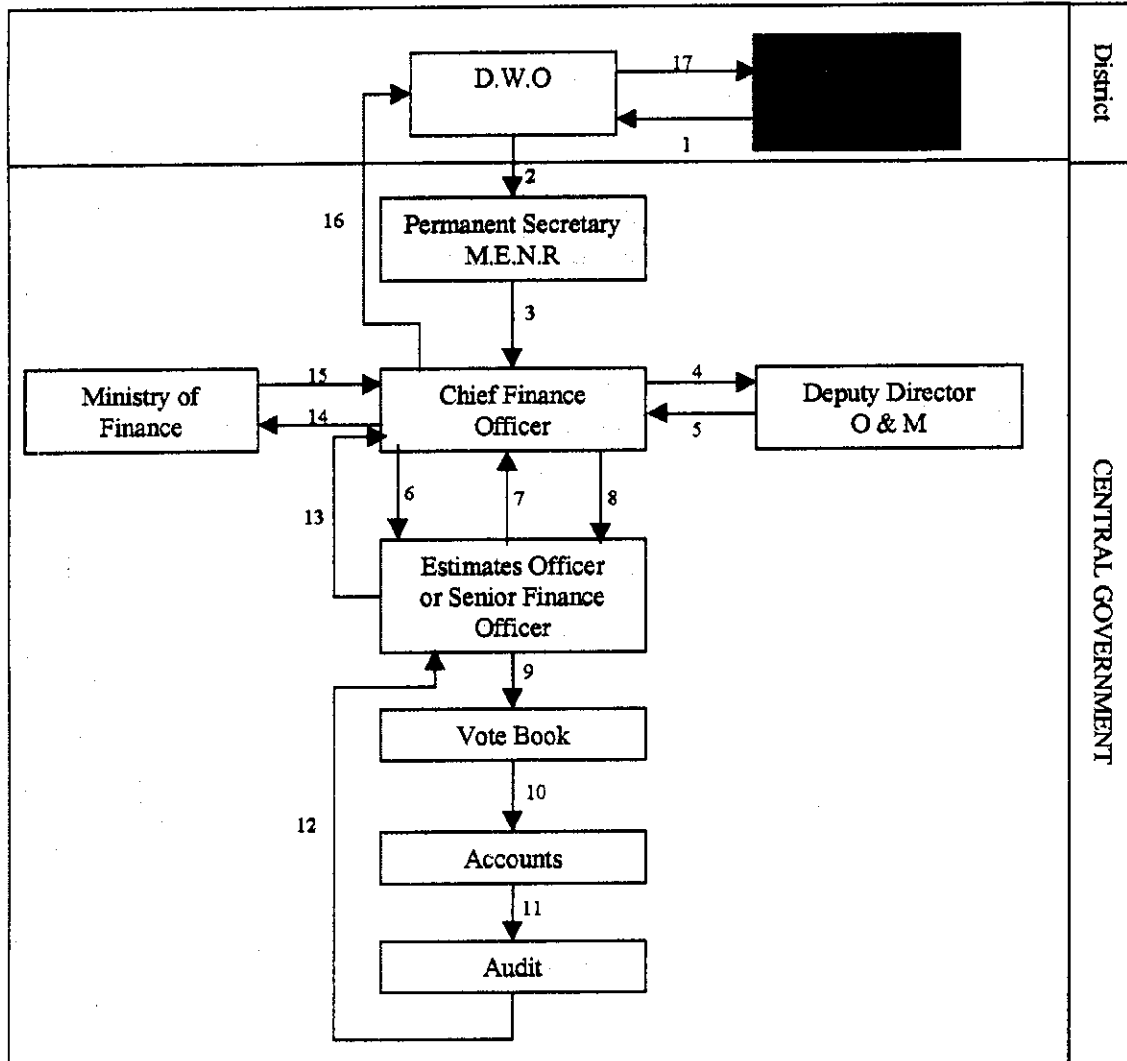
GENERAL

A.I.E PROCESSING CHART

FIGURE: 8.2

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

A.I.E = Authority to Incur Expenditure

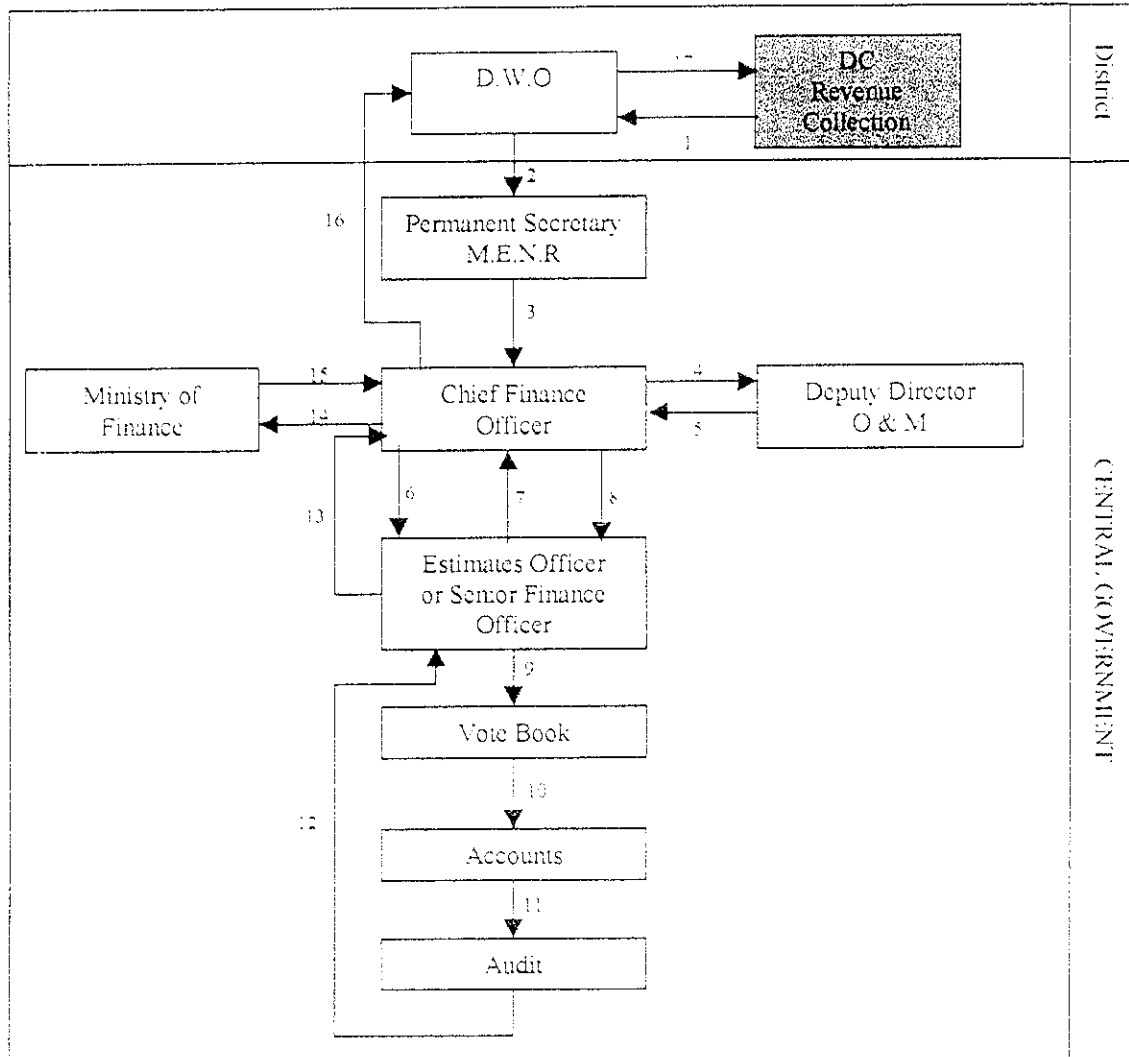


- 1) DC forwards form F.O. 17 to the DWO containing the total monthly collection made on behalf of the water department.
- 2) DWO requests for A.I.E based on form F.O. 17 collection and A.I.E percentage and forwards to P.S. The A.I.E percentage depends on the district and is determined by MENR. The percentage for the towns covered varies from 63% to 90%.
- 3) Permanent Secretary forwards request to Chief Finance Officer.
- 4) Chief Finance Officer forwards request to Deputy Director O & M for recommendation.
- 5) Deputy Director O & M recommends and returns request to Chief Finance Officer.
- 6) Chief Finance Officer forwards request to Estimates Officer or Senior Finance Officer department.
 - Checks the records and confirms the amounts
 - Compares with district allocation budget and
 - Drafts A.I.E for Chief Finance Officer to sign.
- 7) Estimates Officer forwards documents to Chief Finance Officer.
- 8) Chief Finance Officer signs and returns documents to Estimates Officer
- 9) Estimates Officer forwards documents to Vote Book for entry against the budget provision.
- 10) Vote Book Officer forwards document to Accounts for checking.
- 11) Accounts forwards documents to Audit for checking.
- 12) Audit forwards documents to Estimates Officer
- 13) Estimates Officer seals the A.I.E and drafts for signature of Chief Finance Officer.
- 14) Chief Finance Officer forwards request to Ministry of Finance Att: Paymaster General.
- 15) Ministry of Finance / Treasury returns A.I.E to the Chief Finance Officer.
- 16) Chief Finance Officer forwards the A.I.E to the DWO
- 17) DWO forwards A.I.E to the district Accountant from where cheque now can be issued provided the district has:
 - Liquidity and
 - Procurement formalities have been complied with.

A.I.E PROCESSING CHART

FIGURE: 8.2

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



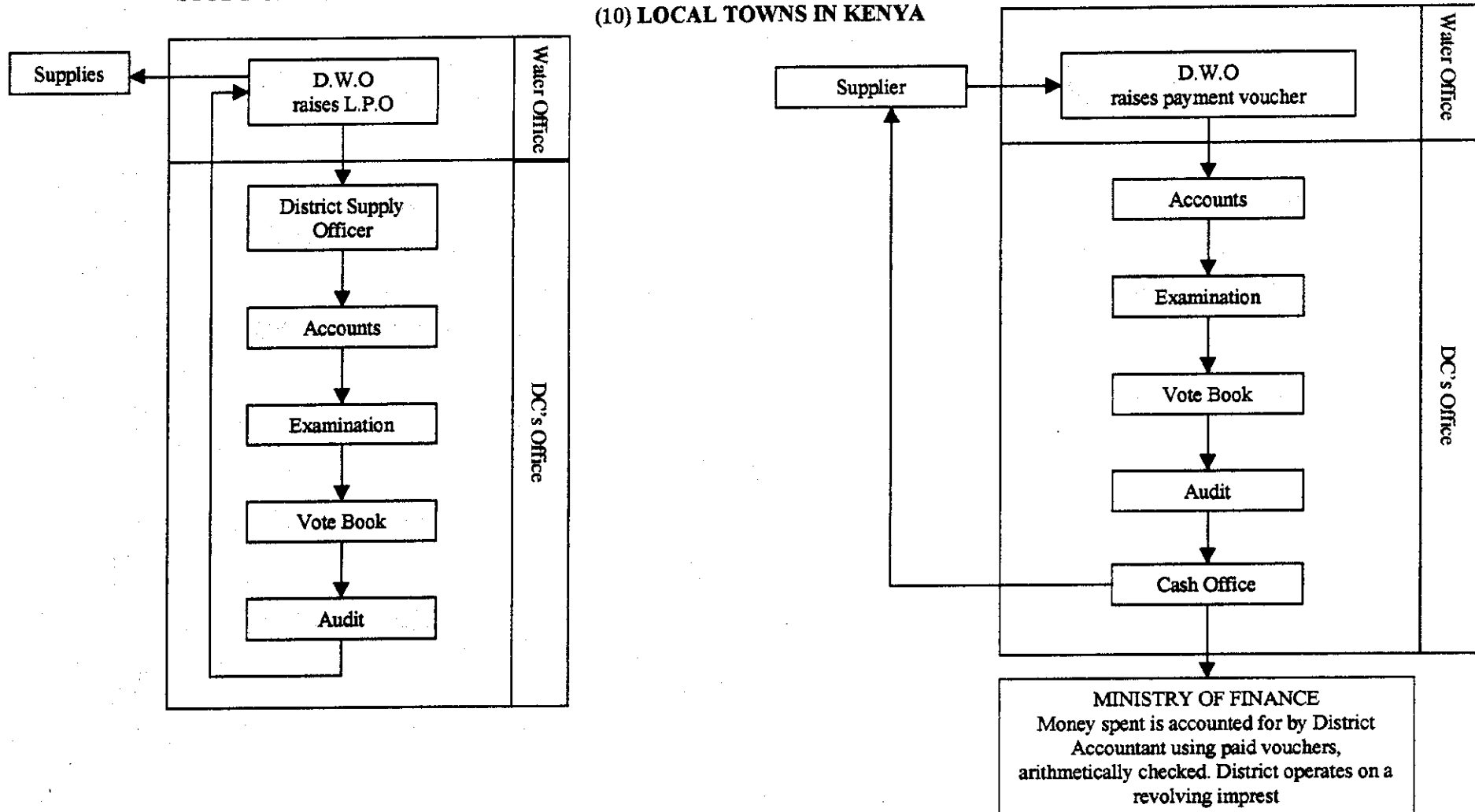
A.I.E = Authority to Incur Expenditure

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L.P.O & PAYMENT PROCESSING CHART

FIGURE: 8.3

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





Development Impact Consulting



Engineering and Utility Management Ltd.

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: MALINDI
10.11.2000**

Sub-Area Office NWPC

Management Contract H.P.Gauff in association with Gauff Utility

Interviewer: LEK and CK
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**Discussion held with: Manager Mr. Donald Pumfrey
Mr. Eng. Moses Kinya
Project Manager Nairobi Office: Mr. David Baker**

Tel.: 0123-31037, 30923

Meeting with the manager in Malindi had to be termed in-official, as H.P.Gauff was not informed by the project management. No indices or financial details could be obtained, therefore only general discussion. Clearance was to be obtained from NWPC head office in Nairobi, but nothing has been received so far.

MALINDI MANAGEMENT CONTRACT

QUESTIONS:	Answers:
<p>GENERAL:</p> <p>Contract in place?</p> <p>Line of Command?</p> <p>Any comments on current situation?</p> <p>Problems experienced?</p> <p>Any recommendation on changes to improve the situation?</p> <p>Cause of the problem if any?</p> <p>Any problems on Fee payments?</p>	<p><i>Yes</i></p> <p><i>NWCPC Manager (Chief Sub-Area Manager) in Malindi -> Regional Manager Mombasa -> MD NWCPC ->HQ Liaison officer-> Head O&M HeadOffice Nairobi -> MD of NWCPC -> Board of Directors (for certain issues only)</i></p> <p><i>Management consultant still trying to catch up with the gap left between the first and the second contract. Offices are set up, even though not yet final, as O&M separate from administration and store. Trying to re-instate procedures that were in place before</i></p> <p><i>Only in relation to the procurement because of delay and additional requirements, as well as writing off of debts that cannot be collected. Water Act not really supporting the effort and should be dealt with soonest.</i></p> <p><i>Procurement issues should be simplified Write-off procedure on consumer outstandings that cannot be collected, should be simplified within GOK / NWCPC framework Tariff: The Consultant's suggested social Tariff structure(leave rural kiosk tariffs low) should have been considered when Tariff policy was made, because these payments are very difficult to collect and often result in illegal action as a consequence; and approval period should be much shorter as it is currently</i></p> <p><i>Government and Parastatal guidelines and procedures and the Water Act (Criminal case first, Civil case second...)</i></p> <p><i>No, standing order to cover fee and O&M is paid from the collection account, balance at end month goes to NWCPC</i></p>
<p>FINANCES:</p> <p>Is the management financially independent?</p> <p>Can collected revenue sustain the operation?</p>	<p><i>In principle yes, but with limitations on procurements.</i></p> <p><i>Cannot be commented on at the moment as source cost are not known to the Manager. But it is clear that electricity tariff adjusted three times while water is not over the same period in</i></p>

<p>How is revenue collected?</p>	<p><i>time. Neither is the the authority of the Client to comment on actual figures. Can only comment on the trend which is as expected going up. Project since 8 months in operation and initial setting up accounts for considerable time.</i></p> <p><i>At the office, as KCB was not willing to continue with the collection. Revenue is collected on behalf of the Client and banked in Malindi twice daily, then transferred to Mombasa.</i></p>
<p>OPERATION:</p> <p>Any interference in the day to day operation?</p> <p>Procedures manifested already ?</p>	<p><i>No, but biggest impediment is the procurement which has to follow the standard Government procedures</i></p> <p><i>No, but best practice in the circumstances is applied for O&M and Financial issues. Later on these will be pu into user manuals</i></p>
<p>STAFF:</p> <p>Relationship with the NWCPC/Management staff?</p> <p>Are any incentives offered to improve the output?</p>	<p><i>Staff mixed between NWCPC and management. Staff then seconded to the management consultant.</i></p> <p><i>Total: approx. 70 with ratio: 50 Consultant / 20 NWCPC</i></p> <p><i>Yes</i></p>
<p>RECOMMENDATIONS:</p> <p>For other management contracts?</p>	<p><i>1. Operator/Manager to have sufficient autonomy.</i></p> <p><i>2. There should be a mode of speedy decision making, i.e. shorten the institutional framework to go through for the purpose of increased efficiency.</i></p>



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Gibb Eastern Africa L

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: NYERI Water Company
NYEWASCO**

P.O.Box

Tel.: 0171-4548/4617/4623 Dir. Line 2684

Date: 20.12.00

Fax: 0171-2734

Interviewer: LEK
.....

Telephone Interview held with: MD : Eng. Nguiguti

NYERI WATER COMPANY NYEWASCO	
<p>Any comments on current situation?</p> <p>Any recommendation on changes to improve the situation?</p> <p>Cause of the problem if any?</p> <p>Agency agreement between company and Council finalised?</p> <p>Ownership of the company clear?</p> <p>Any advice for other water companies to integrate into their agency agreement?</p>	<p><i>Staff still not happy with their remuneration and also other terms and conditions of service.</i></p> <p><i>The company is registering as a member of F.K.E and hopes to seek for advice to resolve outstanding issues.</i></p> <p><i>Misunderstandings between union officials</i></p> <p><i>This was signed on 19th March 1999 and ammended on 7th April 2000.</i></p> <p><i>Yes, owner is Nyeri Municipal Council.</i></p> <p><i>User changes for use of assets needs to be established before commencement of operation</i></p>
<p>Does the company have an Opening Balance Sheet?</p> <p>How were assets handeled?</p> <p>How were Consumer outstanding balances handeled?</p> <p>How were liabilities handeled? (Power, Creditors)</p> <p>Is the company financially independent?</p> <p>Can collected revenue sustain the operation?</p>	<p><i>?</i></p> <p><i>All assets remain in the ownership of Nyeri Municipal Council.</i></p> <p><i>These were taken over by the company. ? at what level, as they were or audited?</i></p> <p><i>These were taken over by the company.</i></p> <p><i>Yes.</i></p> <p><i>Collected revenue not enough to cater for O & M, debt servicing (council's), depreciation of used asstes</i></p>

<p>Any other problems encountered?</p>	<p><i>and new works</i></p> <p><i>Intereferance of running of the company by the council, however this is now decreasing.??????</i></p>
<p>Relationship between CMT and Board?</p> <p>Relationship CMT/Board/ Council?</p> <p>Any interference in the day to day operation?</p> <p>Is day to day operation autonomous as far as CMT is concerned?</p> <p>How is the relationship with the consumers? Has the situation improved?</p>	<p><i>Government ??????</i></p> <p><i>There has been a problem as the council has tried to interfere with the work of the board however, the council has not succeeded.</i></p> <p><i>No.</i></p> <p><i>Yes.</i></p> <p><i>Customers are much happier with the service rendering by the company.</i></p>
<p>Relationship with the staff? All former staff absorbed?</p> <p>Conditions under which staff were absorbed?</p> <p>Retired on the Council side?</p> <p>Have staff salaries changed since take over? How?</p>	<p><i>All former staff were absorbed however, their salary expectations have not been met</i></p> <p><i>All had to be absorbed. Their retention then by the company depends on their performance.</i></p> <p><i>No.</i></p> <p><i>The minimum salsry increase given with effect of 1st Sept. 1999 was 15%. Since then the staff have had 7.5% increase with effect from 1st Jan. 2000.</i></p>

Are any incentives offered to improve the output?	<i>Incentives are being worked out.</i>
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CONSORTIUM

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

Location: KITALE Water Company

P.O.Box 2248

Tel.: 0325-30074

Date: 24.11.00

Interviewer: LEK and CK

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**Discussion held with: Act MD (actually TM): Patrick Wambulwa
CM Kibet Torut**

Fin. Advisor to Kitale, Eldoret: Mr. Langer

KITALE WATER COMPANY

KIWACO

<p>Any comments on current situation?</p> <p>Any recommendation on changes to improve the situation?</p> <p>Cause of the problem if any?</p> <p>Agency agreement between company and Council finalised?</p> <p>Ownership of the company clear?</p> <p>Any advice for other water companies to integrate into their agency agreement?</p>	<p><i>Very difficult</i></p> <p><i>There are other models, whereby 3 yrs are given to gradually rehabilitate and build capacity. Amounts/Funding necessary is determined by a consultant, partly loan partly grant through the Central Government, (a model from Philipines)</i></p> <p><i>Lacking start up help. A a centralised advise through the regulatory body, which helps you first and then controlls and regulates as soon as you stand</i></p> <p><i>No access to loan facilities and burden of honouring liabilities taken over from the former operator (Council)</i></p> <p><i>No</i></p> <p><i>Yes</i></p> <p><i>Agency agreement should be finalised prior to commencement of the new company, reconciliation of personell issues of absorbed staff, consumer accounts, power liabilities and investment loans as they cause a lot of problems when confronted with it afterwards</i></p>
<p>Does the company have an Opening Balance Sheet?</p> <p>How were assets handeled?</p> <p>How were Consumer outstanding balances handeled?</p> <p>How were liabilities handeled? (Power, Creditors)</p> <p>Is the company financially independent?</p> <p>Can collected revenue sustain the operation?</p>	<p><i>Working on it</i></p> <p><i>Proposed all retained by the Council. Proposal from UWASAM for lease amount for the assets, not discussed with Council yet</i></p> <p><i>Taken over as they were</i></p> <p><i>Worked on at the moment. Forced into power payments, current and past. Problem is that no credits are reflected on the KP&L account, as the Council made payments which were then applied by KP&L to various accounts but not clear. Everything needs reconciliation. Working on it since February</i></p> <p><i>Yes, in so far as own bank a/c, and Council is not involved at all.</i></p> <p><i>No, because majority of meters not working and billing way beyond production. Procured out of revenue 450 new meters from collection, placed in certain zones to improve billing and revenue collection.,</i></p> <p><i>Applied to CIM grant f or new meters, additional funds</i></p>

<p>Any other problems encountered?</p>	<p><i>hoped for from KfW loan – but earliest 2 nd half of next year. Fitting of meters for non- metered accounts into priority one.</i></p> <p><i>Loan had been given to the Council (through LGLA)???? From mid 1970s KfW, before could be from different sources Accountant from KIWACO at Council, to speed up the analysis</i></p> <p><i>Portfolio: mainly domestic, apart from prison and police All GOK bodies have a payment problem, delays</i></p> <p><i>Supply:</i></p> <p><i>Water shortage, cut off power (1 mio current 600 arrears), then used diesel, diesel from collection 10 hours pumping For 3800 cbm/day</i></p> <p><i>Agricultural consumers, i.e. seasonal payments like the month of March, which requires money for planting, no payment of water.</i></p> <p><i>KCC closed one of the major consumers</i></p> <p><i>If 80 % is collected</i></p> <p><i>Network rehabilitated in 1992</i></p>
<p>Relationship between CMT and Board?</p> <p>Relationship CMT/Board/ Council?</p> <p>Any interference in the day to day operation?</p> <p>Is day to day operation autonomous as far as CMT is concerned?</p> <p>How is the relationship with the consumers? Has the situation improved?</p>	<p><i>MD on the Board, on interference</i></p> <p><i>Goodwill to be improved further, involve chairman into building good will</i></p> <p><i>Consolitative meeting, Board and Councillors, frequent Like AGM to explain such that everybody understands What has been discussed and decided, then has to go the Board / Council, because Agency agreement not yet done, and KfW conditions involve the Council.</i></p> <p><i>No</i></p> <p><i>Yes</i></p> <p><i>Company started in Nov, but officially in January. Consumer did not really get better service since, but consumeris attended to friendly, illegal connections are reported by consumers, because they suffer themselves under the current rationing,</i></p> <p><i>Technically: in the network immediate attendance to a problem, but at production it is a problem.</i></p> <p><i>There are 5 pumping stations and power is the main problem</i></p>
<p>Relationship with the staff?</p> <p>All former staff absorbed?</p> <p>Conditions under which staff were</p>	<p><i>Initially yes, but later 2 staff were taken back to the council, 3 additional employed. Total Staff : 93 (Billing and Connection details as at 30.06.00 refer)</i></p> <p><i>Letter of release from the Council however never formalised</i></p>

<p>absorbed?</p>	<p><i>with PSC and signing of the agency agreement and letter of employment from the company. But agreed to take back to council he who cannot perform.</i></p>
<p>Retired on the Council side?</p>	<p><i>Provident Fund ? suggested to continue to pay into it, but needs to be checked whether possible or not. Again an issue that</i></p>
<p>Have staff salaries changed since take over? How?</p>	<p><i>No for those from council, company paid full new salaries that had not been implemented by the council. KIWACO agreed to pay even arrears back to 1.1.99</i></p>
<p>Are any incentives offered to improve the output?</p>	<p><i>MR and plumbers got bicycles and the labourers (bicycles are theirs to use, but given as loan, whereby 50 Kshs /day paid when used for KIWACO and this is off-set against loan)</i></p>

ACTUAL CONSUMER BILLS CALCULATION ANALYSIS SUMMARY TABLE: ST 1.1

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

only calculated for actual meter reading information and billing obtained from the respective consumer ledger.

LAMU

	No Of Bills	Correct Bill	No. Of Wrongly Calculated Bills	No. Of Connections without bill and Consp. > 0	Amount Charged	No. Of Different Charges (Kshs.)	No. Of Different Consp. (m ³)
Between 0m ³ and 10m ³	56	250.00	0	0	2 amounts of 280/= and 480/=	2	10
Between 11m ³ and 20m ³	27		2	0	Range from 280/= to 580/= with intervals of 25/= and 50/=	12	10
Between 21m ³ and 40m ³	8		0	0	Range from 590/= to 1,040/= with intervals of 30/=, 60/=, 90/= and 120/=	8	8
Between 41m ³ and 60m ³	2		0	0	2 amounts of 1,190/= and 1,860/=	2	2
Between 61m ³ and 100m ³	1		0	0	1 amount of 26,95/=	1	1
Over 100m ³	1		0	0	1 amount of 4,285/=	1	1
Totals:	95		2				

NAROK

	No Of Bills	Correct Bill	No. Of Wrongly Calculated Bills	No. Of Connections without bill and Consp. > 0	Amount Charged	No. Of Different Charges (Kshs.)	No. Of Different Consp. (m ³)
Between 0m ³ and 10m ³	211		12	16	Range from 200/= to 2,570/=	14	10
Between 11m ³ and 20m ³	76		6	5	Range from 250/= to 1,130/=	16	10
Between 21m ³ and 40m ³	69		15	2	Range from 250/= to 2,570/=	33	18
Between 41m ³ and 60m ³	20		5	0	Range from 570/= to 7,625/=	18	13
Between 61m ³ and 100m ³	7		1	1	Range from 200/= to 11,100/=	7	6
Over 100m ³	16		1	2	Range from 1,235/= to 30,150/=	16	15
Totals:	425		40				

NERU

	No Of Bills	Correct Bill	No. Of Wrongly Calculated Bills	No. Of Connections without bill and Consp. > 0	Amount Charged	No. Of Different Charges (Kshs.)	No. Of Different Consp. (m ³)
Between 0m ³ and 10m ³	25		2	12	Range from 125/= to 300/=	4	10
Between 11m ³ and 20m ³	426		17	44	Range from 161/= to 1,300/=	26	9
Between 21m ³ and 40m ³	105		20	18	Range from 200/= to 1,800/=	38	18
Between 41m ³ and 60m ³	31		4	6	Range from 853/= to 2,435/=	15	11
Between 61m ³ and 100m ³	13		5	0	Range from 1,490/= to 7,070/=	11	6
Over 100m ³	8		0	4	Range from 5,100/= to 18,025/=	8	8
Totals:	692		48				

KABARNET

	No Of Bills	Correct Bill	No. Of Wrongly Calculated Bills	No. Of Connections without bill and Consp. > 0	Amount Charged	No. Of Different Charges (Kshs.)	No. Of Different Consp. (m ³)
Between 0m ³ and 10m ³	138		0	0	2 amounts of 200/= and 250/=	2	10
Between 11m ³ and 20m ³	35		1	1	Range from 275/= to 475/=	9	8
Between 21m ³ and 40m ³	15		0	0	Range from 560/= to 1,070/=	10	10
Between 41m ³ and 60m ³	6		1	0	Range from 1,190/= to 1,850/=	6	5
Between 61m ³ and 100m ³	2		0	0	2 amounts of 2,165/= and 2,635/=	2	2
Over 100m ³	10		0	0	Range from 4,600/= to 76,650/=	10	10
Totals:	207		2				

VERIFIED STATISTICS SUMMARY

SUMMARY TABLE: STS.2

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

DETAILS	Units	NAROK	MERU	MURANGA	KABARNET	MAKINDU	WUNDANYI	MIGORI	LAMU	WEBUYE	MUMIAS	
Total Population	No.	43,000	130,100	60,000	17,500	6,400	7,200	99,700	12,000	73,000	110,400	
Total Staff	No.	34	48	58	29	10	35	29	17	28	13	
Total Active + In-active Accounts	No.	1,333	3,225	2,933	768	438	1,136	669	837	1,852	1,439	
Ratio (accounts per staff)	No.	39.21	67.19	52.38	26.48	43.80	32.46	23.07	49.24	66.14	110.69	
No of A/C transferred to community	No.	-	-	-	-	136	-	133	-	Not available	-	
Metered Accounts	No.	999	2,644	2,930	470	423	1,114	213	800	1,846	1,603	
Working	No.	371	272	1,449	206	115	493	79	104	7	8	
Non-working	No.	495	2,225	1,441	161	104	290	136	697	1,609	1,284	
Unmetered Accounts	No.	289	463	2	-	23	-	456	35	433	104	
Actual Billed Accounts	No.	399 (48.19%)	110 (4.77%)	1,433 (49.65%)	206 (36.20%)	107 (47.77%)	427 (68.81%)	26 (12.15%)	95 (33.46%)	4 (0.55%)	4 (0.81%)	
Estimate Billed Accounts	No.	539 (65.10%)	2,196 (95.23%)	1,453 (50.35%)	363 (63.80%)	117 (52.23%)	192 (31.19%)	188 (87.85%)	608 (86.54%)	729 (99.45%)	650 (99.39%)	
Dis-connected Accounts	No.	221	283	38	189	188	367	220	95	767	528	
Major / Minor Consumers	No.	209/18	25/228/1	28/285/8	12/55/7	14/2/10	8/6/11	3/2/11	2/7/1	3/7/30	9/1/59/7	
Minimum charged bills	%	67.27%	15.43%	63.77%	34.54%	19.93%	67.04%	53.01%	78.14%	12.37%	18.41%	
Production capacity per month	m ³	72,000	150,000	100,800	420,000	14,400	46,080	14,400	90,000	54,000	42,900	
Actual Production June 2000	m ³	38,431	132,000	82,500	51,000	12,180	21,800	5,400	22,833	27,120	21,180	
Production efficiency	%	50.80%	88.00%	81.85%	Capacity not used	84.58%	46.88%	37.50%	26.37%	50.22%	49.37%	
Total consumption June 00	m ³	23,418	48,068	41,028	11,800	7,182	10,020	5,692	7,804	27,013	31,568	
Actual	m ³	10,843	2270	21,114	5,402	2,652	5,710	392	1,294	245	245	
Estimate	m ³	12,573	42788	19,914	6,098	4,530	4,310	5,200	6,510	26,768	31,311	
UPW June 2000	m ³	13,016	88,944	41,472	39,500	4,968	11,580	consumed > produced	15,029	107	consumed > produced	
UPW	%	35.73%	65.87%	60.27%	77.45%	41.00%	63.61%		65.82%	0.39%		
Value of water lost	Kshs.	313,892.94	2,208,726.10	1,288,842.37	1,313,563.91	193,022.75	431,117.74		563,136.63	3,214.49		
Billed Revenue June 2000	Kshs.	564,742.00	1,144,803.00	1,275,044.00	382,430.00	277,415.00	423,967.00	92,858.00	292,380.00	811,523.00	721,750.00	
Billed Revenue HQ Reporting June 2000	Kshs.	295,000.00	1,203,181.00	1,211,226.00	382,430.00	276,285.00	385,672.00	40,000.00	338,122.00	150,000.00	150,000.00	
Billing Efficiency June 2000	%	64.27%	34.13%	49.73%	22.55%	68.96%	48.56%	>100%	34.18%	99.61%	>100%	
Collected revenue June 2000	Kshs.	427,026.00	428,318.00	1,108,328.00	328,123.00	68,812.00	228,720.00	32,258.00	100,838.00	178,228.00	132,896.00	
Collection efficiency June 2000	Kshs.	78.61%	37.42%	86.92%	85.80%	24.12%	63.95%	34.81%	34.52%	21.98%	18.39%	
Average Tariff June 2000 / m ³	Kshs.	24.12	25.40	31.08	33.25	38.63	42.31	18.57	37.47	30.04	22.87	
Total Debtors end May 2000	Kshs.	8,864,102.50	20,412,091.50	12,841,260.80	1,539,626.00	6,587,732.65	3,289,084.15	940,348.00	3,137,731.00	2,357,599.95	2,020,145.95	
HQ Reporting end May 2000	Kshs.	4,235,072.00	40,094,320.50	13,808,023.90	1,539,959.00	7,317,723.10	3,716,960.00	809,915.30	2,436,479.00	355,421.00	1,552,762.00	
Major consumers:												
G.O.K	%			61.42%	Not available	N/A		46.08%	Not available	Not available	0.64%	
(Others Consumption >100m ³ or arrears >20,000.00)	%	3.26%	52.94%	10.98%	50.35%	91.60%	2.04%	15.98%	43.20%	1.40%	5.37%	
Minor Consumers	%	96.74%	47.06%	27.60%	49.65%	8.40%	51.88%	84.02%	56.80%	97.96%	94.63%	
AIE percentage	%	84%	60%	65%	N/A		55%	65%	90%	63%	Not available	
FY Collector	Kshs.	3,827,478.00	6,771,976.00	9,247,457.50	2,319,895.20		2,173,738.00	730,954.00	1,295,717.00	2,163,140.00		
AIE earned FY 99/00	Kshs.	2,449,585.92	4,063,185.80	6,010,847.38	N/A		1,412,929.70	475,120.10	1,166,146.30	1,362,778.20		
AIE received FY 99/00	Kshs.	1,286,980.00	3,956,986.00	6,022,560.00	N/A		2,535,300.00	623,460.00	1,269,860.00	Not available	Not available	
AIE Expenditure:												
Transport & staff related expenses	Kshs.	497,238.00 (38.87%)	765,085.70 (19.86%)	1,910,296.65 (38.81%)	217,863.35 (28.54%)		344,413.25 (16.81%)	399,494.00 (50.94%)	377,321.60 (29.83%)			
O&M	Kshs.	534,042.00 (41.53%)	2,420,062.90 (62.81%)	2,490,248.25 (60.33%)	200,470.00 (24.42%)		1,119,580.65 (51.40%)	320,280.60 (40.84%)	854,179.50 (67.53%)			
Postage	Kshs.	9,922.00 (0.77%)	31,953.20 (0.83%)	22,736.00 (0.48%)	3,537.40 (0.43%)		94,960.00 (4.36%)	15,400.00 (1.95%)	18,400.00 (1.45%)		Not available	
Telephone	Kshs.	-	152,208.90 (3.95%)	55,000.00 (1.11%)	235,643.25 (28.71%)		89,200.00 (4.10%)	-	-			
Purchase of Meters	Kshs.	-	63,927.80 (1.68%)	99,000.00 (2.00%)	-		34,999.00 (1.61%)	-	-			
Stationery	Kshs.	45,000.00 (3.50%)	104,138.50 (2.70%)	66,854.00 (1.33%)	6,290.00 (0.77%)		85,000.00 (3.90%)	49,121.00 (6.26%)	14,945.00 (1.16%)			
Fuel & Gas	Kshs.	199,715.70 (15.53%)	315,690.50 (8.19%)	304,286.50 (6.15%)	157,032.00 (19.13%)		406,947.20 (18.82%)	-	-			
AIE Expense:	Kshs.	1,285,917.70	3,883,087.10	4,947,421.40	820,836.00	3	2,178,100.10	2	784,295.60	2	1,264,846.10	2

- x Verified Figures (Extracted from the consumer information raw data)
- x Provided figures (Extracted from O&M, Billing and revenue data and AIE data as provided and production figures from Gibb)
- x Calculated figures (Arrived at using provided figures)
- x Splitting between GOK and other consumers not possible due to the recurrent connection nos. in different zones or not adequate information thereto. Further verification of data required from field

- 1 AIE expenditure relating to water supply only
- 2 AIE expenditure relating to District
- 3 Details relating to 6 months only
- 4 Details not readily available

Information obtained from vote book and grouped

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

SUMMARY TABLE: ST 8.3

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

Problems	Symptoms	Cause	Recommended Change
1. Organization Structure			
<p>Office Set-up</p> <p>Lack of decent or sufficient office space, Lacking equipment, Lacking or delayed stationery, No calculators, No computers.</p>	<ul style="list-style-type: none"> • Messy office environment. lost files, limited communication. • Low staff morale. • Reduced efficiency. • Delayed billing, wrong billing calculation. • Delayed consumer problem attendance. • No data base. 	<ul style="list-style-type: none"> • Insufficient funding. • Delays in A.I.E. processing. • Centralised GOK printing. • Centralised decision-making. 	<ul style="list-style-type: none"> • Decentralise decision-making process. • Change funding procedure. • Arrange for decent office space
<p>Staffing Set-up</p> <p>Delayed promotion, No training opportunities No skill in commercial field / management, Lacking recruitment by qualification, Low remuneration, No O/T payments or compensation, Limited personnel management and control, "Technical" attendance to work.</p>	<ul style="list-style-type: none"> • Reduced efficiency. • Low staff morale. • No commercial approach. • Lacking understanding of commercial operations. 	<ul style="list-style-type: none"> • Inefficient / delayed personnel management at HQ. • Insufficient funding. • GOK recruit practice concerning commercial or managerial skill. • GOK salary scales. • Lacking organisation chart. • Lacking job description. • Favourism at HQ level. • Inefficient system of staff discipline. • Lacking personnel management and control. 	<ul style="list-style-type: none"> • Decentralise decision-making. • Change funding procedure. • Set up organisation charts with detailed job description and skill requirements • Arrange for intensive management training for Engineers or recruit well-qualified managers. • Set up positive and negative staff sanctioning system. • Use negative sanctioning as retrenchment criteria. • Limit recruitment to the system requirement, based on skill and merit.
<p>Transport</p> <p>No or limited transport</p>	<ul style="list-style-type: none"> • Certain field operations not possible. • Delayed reaction time to field operations • Reduced control over field activities 	<ul style="list-style-type: none"> • Insufficient funding • Lack of planning on Asset Maintenance i.e. grounded vehicles. • No planning on transport requirement. 	<ul style="list-style-type: none"> • Change funding procedure • Prepare criteria for transport requirements based on size of system coverage, pipe network, number of consumer e.t.c. • Decentralise decision making

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
2. Organization Activities and Procedures			
<p>Consumer Management</p> <p>No application forms available, different forms used, No conditions of supply (back page not copied), Out dated format or no agreement form filled, just connected All consumer information held in consumer ledgers, No control system over new connections in the field, Different interpretation of gazette notice on new meters, No quality control on connection material and meter, semi-illegal connections</p>	<ul style="list-style-type: none"> • Insufficient consumer information • Connections not included in consumer ledger • High UfW • No legal agreement as basis for supply • Information not in compiled format • No comprehensive data base • New Flat Rate consumers. • Meters still provided through the water undertaker. • Issues kept pending due to lack of clear guidance • High rate of meter malfunction 	<ul style="list-style-type: none"> • No control of new applications • Centralised GOK printing • Delays in AIE processing • Insufficient funding • No control over consumer applications and connections / Illegal staff consumer co-operation • No regular review of GOK formats • Insufficient operating and / or outdated implementation guidelines • No guidelines and control on quality standards 	<ul style="list-style-type: none"> • Introduce administration fee for new connection application • Increase connection charges to commercial rates • Decentralise procurement of stationary • Change funding procedure • Redesign application format and other formats • Computerise consumer data base and obtain field information from all existing consumer using the re-designed application format • Design meaningful recording formats and reports. • Prepare implementation guidelines related to gazette notices and relating procedures. • Prepare guidelines on control of new connections • Stop installation of unmetered new connections • Use negative sanctioning as retrenchment criteria.

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p>Meter Reading</p> <p>No routing for MR, On Minimum charge and still "read" monthly, Involvement of a single MR in several steps of the meter reading up to billing process, Lack of stationary, Lack of transport, unmotivated staff, Wrong meter reading</p>	<ul style="list-style-type: none"> • Low reliability of information found • High % of all connections are estimated. • High number of connections on minimum • Wrong billing 	<ul style="list-style-type: none"> • No meter reading procedure • No logic MR reading routing • No MR control in place • Unskilled staff • GOK salary scale • Insufficient funding • No motivation to boost efficiency 	<ul style="list-style-type: none"> • Design a controlled meter reading and routing process • Design zoning where necessary • Design meaningful connection referencing. • Replace meters that serve Minimum charge consumers with Flow Restriction Meters (Devices to avoid waste) • Concentrate reading meters A/C's > 10 cbm consumption and control the Meter Reading in to a meaningful effort. • Prepare staff re-organisation plan • Use negative sanctioning as retrenchment criteria.
<p>Billing</p> <p>Wrong billing, Delayed tariff implementation not retroactively implemented, Delayed stationary, Unskilled staff and no calculators, High number of estimated bills</p>	<ul style="list-style-type: none"> • Low billing efficiency • Increased UFW. • Wrongly calculated bills • Reduced collection efficiency due to consumer disputes and complaints • Inconsistent calculations • Delayed billing 	<ul style="list-style-type: none"> • No calculators • No clear instruction from HQ on gazette implementation like New deposit, Delayed tariff adjustments New meter handling • Monthly returns to HQ are never checked. • No sanctioning for inefficient and dishonest staff • Delays in AIE processing • High percentage of defective and not serviced meters 	<ul style="list-style-type: none"> • Change funding procedure • Prepare implementation instructions for gazetted changes • Consider billing software for stations with consumers > 1,000 • Control reporting procedure • Use negative sanctioning as retrenchment criteria.
<p>Dis-connection</p> <p>No disconnection material, No set disconnection criteria system, wrongly organised staff, no transport, Consumer / staff collaboration, No record maintenance, Low disconnection efforts, bills lack due date remark</p>	<ul style="list-style-type: none"> • Low collection 	<ul style="list-style-type: none"> • Delays in AIE processing • Insufficient funding • No control on disconnection / reconnection records • No follow up for years, (those consumers are simply forgotten) • No motivation to boost efficiency 	<ul style="list-style-type: none"> • Design organised disconnection program. • Design implementation and control program. • Increase deposits to the latest requirement level. • Investigate into simplified disconnection method. • Computerise for systems > 1000 consumers

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p>Illegal Connection / Illegal re-connection</p> <p>Suspected high rate of illegal connection and re-connection, no transport</p>	<ul style="list-style-type: none"> • High UFW • Low rate of re-connection statistics. 	<ul style="list-style-type: none"> • Illegal staff / consumer collaboration • No suitable technical approach to disconnect such that no illegal re-connection possible (low income estates) • No spot checks on disconnected accounts for years, disconnected consumers are forgotten • No legal action, where consumer caught with illegal connections • Legal action difficult as case difficult to substantiate and knowledge of staff inadequate. • Police / judiciary not supportive. • Weak Water Act, penalties low and legal system open for corruption. • No clear guidance on how to deal with illegal consumers 	<ul style="list-style-type: none"> • Amend Water Act to impose stiff penalties • Amend water act to include debt recovery, including additional cost incurred. • Investigate into flow restriction meters to consumers with illegal re-connection tendencies. If account cannot be legalised, find technical approach to seal permanently. • Set clear guidelines on how to handle illegal activities • Introduce penalties for illegal consumers through the water undertaker • Use of District Bailiffs
<p>Debt Arrears</p> <p>Very high debt arrears Unreliable Records, Lacking debt substantiation, GOK the biggest debtor</p>	<ul style="list-style-type: none"> • Monthly increasing debt while no systematic disconnection • Unrealistically high monthly consumption of GOK institutions (hospital, police, prison) 	<ul style="list-style-type: none"> • No efficient and timely disconnection system • No clear HQ guidelines • Weak Water Act with no provision for debt collection. • Civil proceedings expensive on the onset to file suite. • Preferential treatment of GOK bodies • Legal action difficult as records difficult to substantiate • No motivation to boost efficiency • Old and leaking system (taps, tanks, pipes) in GOK institutions 	<ul style="list-style-type: none"> • Treat GOK bodies like any other consumer • Undertake analysis to substantiate and confirm old debts • Determine which old debtors should be written off (dead accounts, e.t.c.) • Amend GOK write off procedure (Old community accounts) • Introduce late payment penalties • Overhaul internal plumbing, piping and storage system of GOK institutions

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p>Revenue Collection</p> <p>Wrong bills, bills lack due date remark, consumers have no payment moral</p>	<ul style="list-style-type: none"> • Low collection efficiency • High consumer complaints 	<ul style="list-style-type: none"> • Incorrect meter reading • No motivation to boost efficiency • Insufficient disconnection • No priority given to major consumers. • Weak or no debt collection systems • No efficient collection monitoring • Lacking information on cost of production and distribution of water 	<ul style="list-style-type: none"> • Control organised disconnection program. • Set up positive and negative staff sanctioning system. • Create staff and stake holder awareness on cost of production and distribution of water • Use negative sanctioning as retrenchment criteria • Design a major consumer monitoring and control system • Computerise for systems > 1000 consumers • Design a suitable, safe and consumer friendly cash collection system
<p>UfW</p> <p>Unreliable or no records on production and consumption and no information where water is lost (physical loss, wrong or no MR, illegal consumption), No transport, No materials, No tools, Poor reticulation design, Poor workmanship when laying pipe network, No quality control on material used for consumer lines, Poor installation of consumer meters , wrong and high estimated meter reading, illegal connections</p>	<ul style="list-style-type: none"> • High UfW. • Estimated unaccounted for water, as no production figures details available • Limited supply, as high percentage of water lost 	<ul style="list-style-type: none"> • Master meters defunct or non-existent • Majority of consumer meters defunct • Poor maintenance of the reticulation system 	<ul style="list-style-type: none"> • Arrange for servicing facilities for master meters (outsource) • Install flow restriction meters • Set up servicing facility and program for consumer meters • Rehabilitate the existing network • Consider leak detection exercise, depending on the extent of project rehabilitation of the existing network

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p>Costs</p> <p>No or limited information about cost at system level, No cost consciousness at system or HQ level, Lengthy district administration payment processing on vouchers issued by the DWO, Centralised tendering, High power bills depending on system design, inadequate tariff not cost related, but politically justifiable</p>	<ul style="list-style-type: none"> • Costs > collected revenue • Inflated tenders • Inflated costs • Very high power bills 	<ul style="list-style-type: none"> • Low billing and collection efficiency • No meaningful cost control • Vested interest in the District Tender Board and district administration • No planning, never preventive always reactive operation • Water tariff is fixed where as power tariff has a variable cost component incorporating external factors of the economy (oil price, Kshs. exchange rate) • At the time of investment operating cost were given a lesser priority than investment cost. • There is no basis for information to calculate a cost covering tariff • Water tariffs are politically sensitive, as water has no substitute • 	<ul style="list-style-type: none"> • Decentralise planning and control of cost to create cost consciousness • Involve an external consultant/ market price analyst to give annual pricing guidelines and limitations • Decentralise procurement procedure to system level • Outsource certain activities to provincial level where economies of scale are of advantage to the system • Decentralise system control to the provincial level with independent external annual auditors • Decentralise chemical procurement to system level • Negotiate reduced power tariff used for production of water
<p>Financial Control</p> <p>No HQ control over AIE is spending, No HQ control over billing,</p>	<ul style="list-style-type: none"> • AIE spending not O&M demand driven. • Priorities left to DWO's decision with control or substantiation. • No compiled information everything OK as long as procurement procedure complied with 	<ul style="list-style-type: none"> • GOK procurement procedure (district tender board) (counter productive control) • GOK reporting and control procedures not effective • Occasional internal audit checks by colleagues of the system and not effective • Disciplinary (GOK) system only transfers therefore inefficient • District Administration accounts for the AIE spent to Treasury • MENR only receives the expenditure information from treasury against the respective votes 	<ul style="list-style-type: none"> • Design a transparent reporting and accounting system within the MENR for AIE expenditure • Decentralise control to provincial level and additional independent external auditor • DWO to prepare financial plans • Use mismanagement of funds as retrenchment criteria • Use price guideline of an external consultant/ market price analyst as a control instrument • Assess and set up benchmarks for adequate use of chemicals

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p>Stock</p> <p>Procurement procedure, shortage level, no stock management, no summarised stock movement records</p>	<ul style="list-style-type: none"> • Chronic shortage • High UFW • Questionable Water quality • Delayed attendance to source and network problems • Assistance of well-wishers (donor agencies and consumers) • Delay in all aspects of operation 	<ul style="list-style-type: none"> • Insufficient funding • GOK procurement procedure • Centralized procurement • Neglect of divisional systems 	<ul style="list-style-type: none"> • Set up stock management system and controls • Decentralise AIE procurement procedures • Decentralise procurement of chemicals to system level • Decentralise AIE funding
3. O&M Field Activities and Procedures			
<p>Consumer Meter servicing</p> <p>Lacking materials, tools and skill, No meter servicing facilities, No transport, buried meters</p>	<ul style="list-style-type: none"> • High UfW • Majority of meters estimated for billing • Low billing efficiency 	<ul style="list-style-type: none"> • No servicing schedule • No field control • Wrong priorities and AIE spending not controlled • Low staff moral • No staff planning • No technical guidance available 	<ul style="list-style-type: none"> • Improve on funding procedures • Design a routine meter servicing schedule • Arrange for staff training • Decentralise AIE funding • Decentralise procurement procedures without the District Administration • Undertake survey on servicing capacity within the province • Setup consumer meter repair workshop • Arrange for simple meter volumetric test facility. • Prepare standard consumer meter installation manual • Gradual consumer meter installation rehabilitation in line with proposed installation manual

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p>Master Meter servicing</p> <p>Lacking materials, tools and skill, Insufficient information about the existing network</p>	<ul style="list-style-type: none"> • Lack of reliable production details 	<ul style="list-style-type: none"> • No system level skill • No parts at provincial level • No efforts made by staff • Insufficient funding 	<ul style="list-style-type: none"> • Improve on funding procedure • Outsource servicing, pegged to supply / tenders of the master meters • Look into economies of scale under provincial officer
<p>Pipe Network servicing</p> <p>No transport No tools No materials, skill, "Spaghetti" consumer lines, No location information and network plans</p>	<ul style="list-style-type: none"> • Delayed attendance to burst and leaks • High UFW 	<ul style="list-style-type: none"> • Mixed network piping material • No planned network design • No technical guidance available / manual • No preventive maintenance on network appurtenances • Insufficient funding • No stock management 	<ul style="list-style-type: none"> • Prepare a planned pipeline network with standardised materials • Ensure rehabilitation on high and controlled standard • Introduce retainer security on contracted work • Clarify and document water wayleaves • Include consumer lines into the planned network • Amend the Water Act, Transfer responsibility of the consumer line connections up to the meter from the consumer to the water undertaker. • Prepare preventive maintenance schedule and manuals
<p>Source & T-Works</p> <p>High power consumption, Power rationing, damage caused by uncontrolled power surges, system neglect</p>	<ul style="list-style-type: none"> • Pumps not working • Laboratory not operational • Water quality questionable • Dosing system not functioning • Reduced production / pumping hours 	<ul style="list-style-type: none"> • Lacking preventive maintenance • No financial planning on replacement of assets • Insufficient funding • Power tariff too high in comparison to the water tariff • No technical guidance / manual • No preventive maintenance • No funds to repair of defective pumps 	<ul style="list-style-type: none"> • Negotiate a reduced power tariff used for water production and distribution • Investigate into the possibilities of water used to create power before it is treated and distributed • Exclude water production from power rationing • Prepare preventive maintenance schedule and manuals • Update WS operators handbook • Out-source pump maintenance • Improve funding procedure

PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
4. Reporting			
<p>Data is copied from one month to the next and from one year to the next, No adequate filing system for returns</p>	<ul style="list-style-type: none"> • No control nor planning tool • Information not readily available. 	<ul style="list-style-type: none"> • Outdated report format (quantity not quality) 	<ul style="list-style-type: none"> • Decentralise to provincial level • Set up a meaningful M.I.S reporting system. • Redesign current reporting system and format with filtered information for HQ

ACTION PLAN

SUMMARY TABLE: ST 8.4

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

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
1.	Arrange for decent office space							x		x	x		MENR		→		
2.	Set up organisation charts with detailed job description and skill requirements.	x	x	x	x	x	x	x	x	x	x		Consultant		→		
3.	Arrange for intensive management training for Engineers or recruit well-qualified managers.	x	x	x	x	x	x	x	x	x	x		Consultant		→		
4.	Arrange for commercial and technical staff training	x	x	x	x	x	x	x	x	x	x		Consultant		→		
5.	Set up positive and negative staff sanctioning system.	x	x	x	x	x	x	x	x	x	x		Consultant		→		
6.	Use negative sanctioning as retrenchment criteria.	x	x	x	x	x	x	x	x	x	x		MENR			→	
7.	Decentralise personnel management to provincial / regional level												MENR			→	
8.	Limit recruitment to the system requirement, based on skill and merit.	x	x	x	x	x	x	x	x	x	x		Consultant & MENR		→		
9.	Prepare criteria for transport requirements based on size of system coverage, pipe network, number of consumer e.t.c.	x	x	x	x	x	x	x	x	x	x		Consultant		→		
10.	Redesign consumer recording and reporting formats	x	x	x	x	x	x	x	x	x	x		Consultant		→		
11.	Computerise consumer data base and consider billing software	x	x	x	x	x	x	x	x	x	x		Consultant		→		
12.	Obtain field information from all existing consumer using the re-designed application format	x	x	x	x	x	x	x	x	x	x		Consultant		→		

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

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Mogori	Lamu	Webuye	Mumias	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
1	Arrange for printing office space							X		X	X		ME/NR		▼		
2	Set up organisation charts with detailed job description and skill requirements	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
3	Arrange for intensive management training for Engineers or recruit well-qualified managers	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
4	Arrange for commercial and technical staff training	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
5	Set up positive and negative staff sanctioning system	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
6	Use negative sanctioning as retrenchment criteria	X	X	X	X	X	X	X	X	X	X	X	ME/NR			▼	
7	Reentrustee personnel management to provincial regional level												ME/NR			▼	
8	Limit recruitment to the system requirement based on skill and merit	X	X	X	X	X	X	X	X	X	X	X	Consultant & ME/NR		▼		
9	Prepare criteria for transport requirements based on size of system coverage, pipe network, number of consumers etc.	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
10	Redesign consumer recording and reporting formats	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
11	Computerise consumer data base and consumer billing software	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
12	Obtain field information from all existing consumer using the re-designed application format	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		

ACTION PLAN

SUMMARY TABLE: ST 8.4

No.	Action	Narok	Meru	Muranga	Kabaret	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
13.	Prepare implementation guidelines related to gazette notices and relating procedures	x	x	x	x	x	x	x	x	x	x		Consultant & MENR		→		
14.	Prepare consumer and connection management guidelines	x	x	x	x	x	x	x	x	x	x		Consultant		→		
15.	Investigate replacement of Minimum charge consumer meters with Flow Restriction Meters (Devices to avoid waste)	x	x	x	x	x	x	x	x	x	x		MENR		→		
16.	Design consumer / connection – management guidelines	x	x	x	x	x	x	x	x	x	x		Consultant		→		
17.	Design meter reading / servicing / disconnection schedules and guidelines.	x	x	x	x	x	x	x	x	x	x		Consultant		→		
18.	Amend the Water Act to impose stiff penalties, debt recovery including additional costs incurred												MENR	x			→
19.	Introduce penalties for illegal consumers through the water under taker												MENR				→
20.	Treat GOK bodies like any other consumer.	x	x	x	x	x	x	x	x	x	x		MENR		→		
21.	Undertake analysis to substantiate and confirm old debts	x	x	x	x	x	x	x	x	x	x		Consultant		→		
22.	Propose write off procedure for old debtors	x	x	x	x	x	x	x	x	x	x		Consultant and MENR				→
23.	Recommend commercial charges and penalties	x	x	x	x	x	x	x	x	x	x		Consultant and MENR		→		
24.	Create staff, consumer and stake holder awareness on cost of production and distribution of water	x	x	x	x	x	x	x	x	x	x		Consultant		→		

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mombasa	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
13	Prepare implementation guidelines related to gazette notices and related procedures	X	X	X	X	X	X	X	X	X	X	X	Consultant & MENR		▼		
14	Prepare consumer and connection management guidelines	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
15	Investigate replacement of Minimum charge consumer meters with Flow Restriction Meters Devices to avoid waste	X	X	X	X	X	X	X	X	X	X	X	MENR		▼		
16	Design consumer connection management guidelines	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
17	Design meter reading servicing disconnection schedules and guidelines	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
18	Amend the Water Act to impose stiff penalties, debt recovery including additional costs incurred												MENR	X			▼
19	Introduce penalties for illegal consumers through the water undertaker												MENR				▼
20	Treat GCM codes like any other consumer	X	X	X	X	X	X	X	X	X	X	X	MENR		▼		
21	Undertake analysis to substantiate and confirm old debts	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
22	Propose write off procedure for old debts	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR				▼
23	Recommend commercial charges and penalties	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR		▼		
24	Create staff consumer and stake holder awareness on cost of production and distribution of water	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		

ACTION PLAN

SUMMARY TABLE: ST 8.4

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
25.	Outsource the servicing for master meters and condition future supply / tenders to procurement with service backup	x	x	x	x	x	x	x	x	x	x		Consultant and MENR		→		
26.	Decentralise A/E funding and procurement procedures to system level and transfer efficient and stringent control to the provincial / regional office level	x	x	x	x	x	x	x	x	x	x		Consultant and MENR			→	
27.	Decentralise decision making process to station level	x	x	x	x	x	x	x	x	x	x		Consultant and MENR			→	
28.	Decentralise planning and control of cost	x	x	x	x	x	x	x	x	x	x		Consultant and MENR			→	
29.	Design efficient and stringent control system for the provincial / regional office level (Price analyst, independent external auditors, adequate use of chemicals)	x	x	x	x	x	x	x	x	x	x		Consultant and MENR			→	
30.	Negotiate reduced power tariff used for production of water												MENR	x	→		
31.	Investigate into the possibilities of water used to create power before it is treated and distributed.												MENR	x	→		
32.	Design MIS reporting system for Povincial to HQ reporting (investment planning, policy making)	x	x	x	x	x	x	x	x	x	x		Consultant			→	
33.	Set up stock management system and controls	x	x	x	x	x	x	x	x	x	x		Consultant		→		
34.	Set up consumer meter workshop (with volumetric test facilities)	x	x	x	x	x	x	x	x	x	x		Consultant		→		

ACTION PLAN

SUMMARY TABLE ST 8.4

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mombasa	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
25	Outsource the servicing for master meters and bond for future supply tenders to procurement with service package	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR		▼		
26	Decentralise A/E funding and procurement procedures to system level and transfer of debt and stringent control to the provincial/regional office level	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR				▼
27	Decentralise decision making process to station level	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR				▼
28	Decentralise planning and control of cost	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR				▼
29	Design efficient and stringent control system for the provincial/regional office level (Price analyst, independent external auditors, adequate use of chemicals)	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR				▼
30	Negotiate reduced power tariff used for production of water												MENR	X			▼
31	Invest gate into the loss of tre of water used to create power before it is treated and distributed												MENR	X			▼
32	Design MIS reporting system for Provincial to HQ reporting (investment planning, policy making)	X	X	X	X	X	X	X	X	X	X	X	Consultant				▼
33	Set up stock management system and controls	X	X	X	X	X	X	X	X	X	X	X	Consultant				▼
34	Set up consumer meter workshop (with volumetric test facilities)	X	X	X	X	X	X	X	X	X	X	X	Consultant				▼

ACTION PLAN

SUMMARY TABLE: ST 8.4

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III	
35.	Prepare / update O&M guidelines / manuals	x	x	x	x	x	x	x	x	x	x		Consultant		→			
36.	Propose outsourcing criterias for pump maintenance depending on the pump capacity.												Consultant		→			
37.	Include consumer lines into the planned network	x	x	x	x	x	x	x	x	x	x		Consultant and MENR	x	→			
38.	Clarify and document water wayleafs	x	x	x	x	x	x	x	x	x	x		Consultant and MENR					→
39.	Introduce retainer security on contracted civil works and quality control	x	x	x	x	x	x	x	x	x	x		Consultant and MENR	x				→

ACTION PLAN

SUMMARY TABLE: ST 3.4

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan	Action to be taken by	Donor involvement recommended	Phase I	Phase II	Phase III
35	Prepare / update O&M guidelines / manuals	X	X	X	X	X	X	X	X	X	X	X	Consultant		▼		
36	Propose outsourcing criteria for pump maintenance depending on the pump capacity											X	Consultant		▼		
37	Include consumer lines into the planned network	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR	X	▼		
38	Clarify and document water way easements	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR				▼
39	Introduce retention security on contracted civil works and quality control	X	X	X	X	X	X	X	X	X	X	X	Consultant and MENR	X			▼

APPENDIX H4

LAMU TOWN

Year	Population	Income brackets		Population	Demand rate lcd	Demand m ³ /day	Institutional demand m ³ /d	Total demand m ³ /day	Production capacity m ³ /day	Transmission capacity m ³ /d	Storage capacity m ³
		Status	%								
1999	11,800	High	5	590	250	148	200	1,784	3,500	1,600	460
		Middle	65	7,670	150	1,151					
		Low	30	3,540	75	266					
2000	12,000	High	5	600	250	150	200	1,790	3,500	1,600	450
		Middle	65	7,800	150	1,170					
		Low	30	3,600	75	270					
2001	12,100	High	5	605	250	151	200	1,803	3,500	1,600	450
		Middle	65	7,865	150	1,180					
		Low	30	3,630	75	272					
2002	12,200	High	5	610	250	153	200	1,817	3,500	1,600	450
		Middle	65	7,930	150	1,190					
		Low	30	3,660	75	275					
2003	12,400	High	5	620	250	155	200	1,843	3,500	1,600	450
		Middle	65	8,060	150	1,209					
		Low	30	3,720	75	279					
2004	12,500	High	5	625	250	156	200	1,866	3,500	1,600	450
		Middle	65	8,125	150	1,219					
		Low	30	3,750	75	281					
2005	12,600	High	5	630	250	158	200	1,870	3,500	1,600	450
		Middle	65	8,190	150	1,229					
		Low	30	3,780	75	284					
2006	12,800	High	5	640	250	160	200	1,896	3,500	1,600	450
		Middle	65	8,320	150	1,248					
		Low	30	3,840	75	288					
2007	12,900	High	5	645	250	161	200	1,909	3,500	1,600	450
		Middle	65	8,385	150	1,258					
		Low	30	3,870	75	290					
2008	13,000	High	5	650	250	163	200	1,923	3,500	1,600	450
		Middle	65	8,450	150	1,268					
		Low	30	3,900	75	293					
2009	13,200	High	5	660	250	165	200	1,949	3,500	1,600	450
		Middle	65	8,580	150	1,287					
		Low	30	3,960	75	297					
2010	13,300	High	5	665	250	166	200	1,962	3,500	1,600	450
		Middle	65	8,645	150	1,297					
		Low	30	3,990	75	299					

Table H4-2: 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										
O&M	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
Postage	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
Telephone	93,190	113,951	149,392	149,392	149,392	149,392	149,392	153,550	153,550	153,550
Purchase of meters	223,166	272,883	357,754	357,754	357,754	357,754	357,754	367,711	367,711	367,711
Stationery	402,189	491,790	644,744	644,744	644,744	644,744	644,744	662,688	662,688	662,688
Fuel & Gas	267,308	326,860	428,519	428,519	428,519	428,519	428,519	440,445	440,445	440,445
Current O&M Costs	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
Incremental O&M Costs	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)
Total Expenditures	10,278,467	12,850,116	17,240,093	17,240,093	17,240,093	17,240,093	17,240,093	17,765,097	17,765,097	17,765,097
Surplus(Deficit)	14,245,238	17,137,058	22,073,565	22,073,565	22,073,565	22,073,565	22,073,565	22,652,685	22,652,685	22,652,685
Average Tariff (Kshs/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	14,245,238	17,137,058	22,073,565	22,073,565	22,073,565	22,073,565	22,073,565	22,652,685	22,652,685	22,652,685
Cumulative Cash Flow	14,245,238	31,382,294	53,455,859	75,529,424	97,602,989	119,676,554	141,750,119	164,402,804	187,055,489	209,708,174

Table H4-3: Financial Cash Flow for Lamu Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	63,677,800	10,278,457	73,956,257	24,523,695	(49,432,562.06)
2	78,483,000	12,850,116	91,333,116	29,987,173	(61,345,944)
3	40,105,200	17,240,093	57,345,293	39,313,658	(18,031,635)
4	14,520,000	17,240,093	31,760,093	39,313,658	7,553,565
5		17,240,093	17,240,093	39,313,658	22,073,565
6	-	17,240,093	17,240,093	39,313,658	22,073,565
7	-	17,240,093	17,240,093	39,313,658	22,073,565
8	-	17,755,097	17,755,097	40,407,782	22,652,685
9	-	17,755,097	17,755,097	40,407,782	22,652,685
10	-	17,755,097	17,755,097	40,407,782	22,652,685
Total	196,786,000	162,594,327	359,380,327	372,302,501	12,922,174

Average Tariff Rate (Ksh/m3) 37.47

FIRR		2%
NPV		(13,689,393)
RER		1.036

Table H4-4: Economic Cash Flow for Lamu Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	66,302,800	10,278,457	76,581,257	42,115,666	(34,465,591)
2	78,483,000	12,850,116	91,333,116	42,605,201	(48,727,915)
3	40,105,200	17,240,093	57,345,293	43,584,271	(13,761,022)
4	14,520,000	17,240,093	31,760,093	44,073,806	12,313,713
5		17,240,093	17,240,093	44,563,340	27,323,248
6		17,240,093	17,240,093	45,542,410	28,302,318
7		17,240,093	17,240,093	46,031,945	28,791,852
8		17,755,097	17,755,097	46,521,480	28,766,383
9		17,755,097	17,755,097	47,500,550	29,745,453
10		17,755,097	17,755,097	47,990,085	30,234,988
Total	199,411,000	162,594,327	362,005,327	450,528,753	88,523,426

Current Tariff Rate (Ksh/m3) 37.47

EIRR		13%
NPV		49,149,268
CBR		0.804

Lamu TOWN WATER SUPPLY

Table H4-5: Estimated Benefit of time saved through water carrying.

Year	Population served	Number of Household	Current Households Served	Projected Households Served	Additional Households Served	Water Carriage Benefit	Health Benefit	Health Costs Saved	Total
									Benefits
2001	12,100	2,574	670	2317	1647	28,261,512	12,355,660	1,498,494	42,115,666
2002	12,200	2,596	670	2336	1667	28,590,012	12,499,277	1,515,912	42,605,201
2003	12,400	2,638	670	2374	1705	29,247,012	12,786,511	1,550,748	43,584,271
2004	12,500	2,660	670	2394	1724	29,575,512	12,930,128	1,568,166	44,073,806
2005	12,600	2,681	670	2413	1743	29,904,012	13,073,745	1,585,584	44,563,340
2006	12,800	2,723	670	2451	1781	30,561,012	13,360,979	1,620,419	45,542,410
2007	12,900	2,745	670	2470	1801	30,889,512	13,504,596	1,637,837	46,031,945
2008	13,000	2,766	670	2489	1820	31,218,012	13,648,213	1,655,255	46,521,480
2009	13,200	2,809	670	2528	1858	31,875,012	13,935,447	1,690,091	47,500,550
2010	13,300	2,830	670	2547	1877	32,203,512	14,079,064	1,707,509	47,990,085
Total	127,000					302,325,120	132,173,617	16,030,016	450,528,753

Current Tariff Rate	Kshs.	37.47				30
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Note:

The benefits increase with increase in population

Table H4-6: ESTIMATED WATER REVENUE - Lamu

YEAR	0	1	2	3	4	5	6	7	8	9	10	11
Design production capacity (m ³ /day)	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
ditto (million m ³ /year)	1.278	1.278	1.278	1.278	1.278	1.278	1.278	1.278	1.278	1.278	1.278	1.278
Expected daily production (m3/day)	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
Current daily production		761	761	761	761	761	761	761	761	761	761	761
Projected population	11,831	12,000	12,100	12,200	12,400	12,500	12,600	12,800	12,900	13,000	13,200	13,300
Projected daily demand (m ³ /day)	1,764	1,790	1,803	1,817	1,843	1,856	1,870	1,896	1,909	1,923	1,949	1,962

Average Tariff	Kshs	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47	37.47
Revenue from Extra Water Sold	Kshs	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	25,985,445
Revenue from Unaccounted for Water	Kshs	8,932,428	8,932,428	10,026,552	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	Kshs	-	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	3,301,660
Revenue from Sewerage Charges	Kshs	-	-	-	-	-	-	-	-	-	-	-
Total Financial Benefits	Kshs	24,523,695	29,987,173	39,313,658	39,313,658	39,313,658	39,313,658	39,313,658	39,313,658	40,407,782	40,407,782	40,407,782

Table H4-7: Mean Household Size and Income by Region and Poverty

District	Town	Mean Household Size			Total Household Income (Kshs)
		Non-Poor	Poor	Mean	
Narok	Narok	5.3	6.6	5.6	9,263.74
Meru	Meru	5.6	7.1	6	4,753.56
Murang'a	Murang'a	5.3	7.2	5.9	5,871.58
Baringo	Kabarnet	4.5	6.5	5.1	4,861.78
Makueni	Makindu	4.7	7	6.2	2,815.25
Taita-Taveta	Wundanyi	3.5	5.3	4.2	1,798.31
Migori	Migori	4.9	6.4	5.3	3,387.01
Lamu	Lamu	4.3	6.3	4.7	5,263.86
Bungoma	Webuye	6.2	7.1	6.6	4,070.67
Butere-Mumi	Mumias	4.8	6.3	5.5	3,707.80

Source: Welfare Monitoring Survey II, 1994

Table H4-8: Lamu Institutional Development Costs

No.	Activity	Bases of cost estimate	Estimated cost (Ksh.)
1	Hold consensus building workshop	(a) Travel refreshments and honorarium for 50 participants at SH. 5,000 /= per participant	250,000
		(b) Consultants facilitation costs and travel	700,000
		(c) Transport and related expenses for ministry staff	200,000
2	Develop and register the trust instrument	Legal and follow up effort	50,000
3	Management Contract	Appoint local expert to support the institutional rehabilitation process for the 3 year period	52,800,000
4	(a) Identify water supply and sewerage infrastructure and estimate cost	Standard infrastructural valuation procedures	5,000,000
	(b) Identify and value other assets.		
5	Develop staffing and financial plans for the new organisation	25 working days at Sh. 40,000 per w/day	1,000,000
6	Develop operations manual	20 working days at Sh. 30,000 per day	600,000
7	Operational Support	Vehicles, motor cycles, computers and software, office equipment	
8	Provide initial working capital to the new organisation	Average annual billings for the last 3 years	2,000,000
Sub -total			62,600,000
Contingency (10%)			6,260,000
Total			68,860,000

Table H4-9: Financing Plan - Lamu TOWN WATER SUPPLY

	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

Table H4-10: Economic Investment Costs - Lamu TOWN WATER SUPPLY

	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
Household costs	2,625,000				2,625,000
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	66,302,800	78,483,000	40,105,200	14,520,000	199,411,000

Table H4-11: Financial Sensitivity Analysis - Increase Project Life to 15 years

Financial Cash Flow for Lamu Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	63,677,800	10,278,457	73,956,257	24,523,695	(49,432,562)
2	78,483,000	12,850,116	91,333,116	29,987,173	(61,345,944)
3	40,105,200	17,240,093	57,345,293	39,313,658	(18,031,635)
4	14,520,000	17,240,093	31,760,093	39,313,658	7,553,565
5		17,240,093	17,240,093	39,313,658	22,073,565
6	-	17,240,093	17,240,093	39,313,658	22,073,565
7	-	17,240,093	17,240,093	39,313,658	22,073,565
8	-	17,755,097	17,755,097	40,407,782	22,652,685
9	-	17,755,097	17,755,097	40,407,782	22,652,685
10	-	17,755,097	17,755,097	40,407,782	22,652,685
11	-	17,755,097	17,755,097	40,407,782	22,652,685
12	-	17,755,097	17,755,097	40,407,782	22,652,685
13	-	17,755,097	17,755,097	40,407,782	22,652,685
14	-	17,755,097	17,755,097	40,407,782	22,652,685
15	-	17,755,097	17,755,097	40,407,782	22,652,685

Total	196,786,000	251,369,811	448,155,811	574,341,409	126,185,598
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Average Tariff Rate (Ksh/r) 37.47

FIRR		9%
NPV		54,438,368
RER		1.282

Table H4-12: Financial Sensitivity Analysis - Increase Project Life to 15 years + Investment Cost & O&M by 15%

Financial Cash Flow for Lamu Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	73,229,470	11,820,226	85,049,696	24,523,695	(60,526,001)
2	90,255,450	14,777,634	105,033,084	29,987,173	(75,045,911)
3	46,120,980	19,826,107	65,947,087	39,313,658	(26,633,429)
4	16,698,000	19,826,107	36,524,107	39,313,658	2,789,551
5		19,826,107	19,826,107	39,313,658	19,487,551
6	-	19,826,107	19,826,107	39,313,658	19,487,551
7	-	19,826,107	19,826,107	39,313,658	19,487,551
8	-	20,418,361	20,418,361	40,407,782	19,989,420
9	-	20,418,361	20,418,361	40,407,782	19,989,420
10	-	20,418,361	20,418,361	40,407,782	19,989,420
11	-	20,418,361	20,418,361	40,407,782	19,989,420
12	-	20,418,361	20,418,361	40,407,782	19,989,420
13	-	20,418,361	20,418,361	40,407,782	19,989,420
14	-	20,418,361	20,418,361	40,407,782	19,989,420
15	-	20,418,361	20,418,361	40,407,782	19,989,420
Total	226,303,900	289,075,283	515,379,183	574,341,409	58,962,226

Average Tariff Rate (Ksh/m) 37.47

FIRR		4%
NPV		(374,638)
RER		1.114

Table H4-13: Financial Sensitivity Analysis - Finance by Grant

Financial Cash Flow for Lamu Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	63,677,800	10,278,457	73,956,257	24,523,695	(49,432,562)
2	78,483,000	12,850,116	91,333,116	29,987,173	(61,345,944)
3	40,105,200	17,240,093	57,345,293	39,313,658	(18,031,635)
4	14,520,000	17,240,093	31,760,093	39,313,658	7,553,565
5		17,240,093	17,240,093	39,313,658	22,073,565
6	-	17,240,093	17,240,093	39,313,658	22,073,565
7	-	17,240,093	17,240,093	39,313,658	22,073,565
8	-	17,755,097	17,755,097	40,407,782	22,652,685
9	-	17,755,097	17,755,097	40,407,782	22,652,685
10	-	17,755,097	17,755,097	40,407,782	22,652,685
11	-	17,755,097	17,755,097	40,407,782	22,652,685
12	-	17,755,097	17,755,097	40,407,782	22,652,685
13	-	17,755,097	17,755,097	40,407,782	22,652,685
14	-	17,755,097	17,755,097	40,407,782	22,652,685
15	-	17,755,097	17,755,097	40,407,782	22,652,685
Total	196,786,000	251,369,811	448,155,811	574,341,409	126,185,598

Average Tariff Rate (Ksh/m3) 37.47

FIRR		9%
NPV		126,185,598
RER		1.282

Table H4-14: Economic Sensitivity Analysis - Increase Economic Investment Costs by 15%

Economic Cash Flow for Lamu Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	76,248,220	10,278,457	86,526,677	42,115,666	(44,411,011)
2	90,255,450	12,850,116	103,105,566	42,605,201	(60,500,365)
3	46,120,980	17,240,093	63,361,073	43,584,271	(19,776,802)
4	16,698,000	17,240,093	33,938,093	44,073,806	10,135,713
5		17,240,093	17,240,093	44,563,340	27,323,248
6		17,240,093	17,240,093	45,542,410	28,302,318
7		17,240,093	17,240,093	46,031,945	28,791,852
8		17,755,097	17,755,097	46,521,480	28,766,383
9		17,755,097	17,755,097	47,500,550	29,745,453
10		17,755,097	17,755,097	47,990,085	30,234,988
Total	229,322,650	162,594,327	391,916,977	450,528,753	58,611,776

Current Tariff Rate (Ksh/m3)

37.47

EIRR		7%
NPV		21,492,302
CBR		0.870

Table H4-15: Economic Sensitivity Analysis - Increase O&M Costs by 15%

Economic Cash Flow for Lamu Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	66,302,800	11,820,226	78,123,026	42,115,666	(36,007,360)
2	78,483,000	14,777,634	93,260,634	42,605,201	(50,655,433)
3	40,105,200	19,826,107	59,931,307	43,584,271	(16,347,036)
4	14,520,000	19,826,107	34,346,107	44,073,806	9,727,699
5		19,826,107	19,826,107	44,563,340	24,737,234
6		19,826,107	19,826,107	45,542,410	25,716,304
7		19,826,107	19,826,107	46,031,945	26,205,839
8		20,418,361	20,418,361	46,521,480	26,103,119
9		20,418,361	20,418,361	47,500,550	27,082,188
10		20,418,361	20,418,361	47,990,085	27,571,723
Total	199,411,000	186,983,476	386,394,476	450,528,753	64,134,277

Current Tariff Rate (Ksh/m3) 37.47

EIRR		9%
NPV		29,624,369
CBR		0.858

