

# **APPENDIX K3**

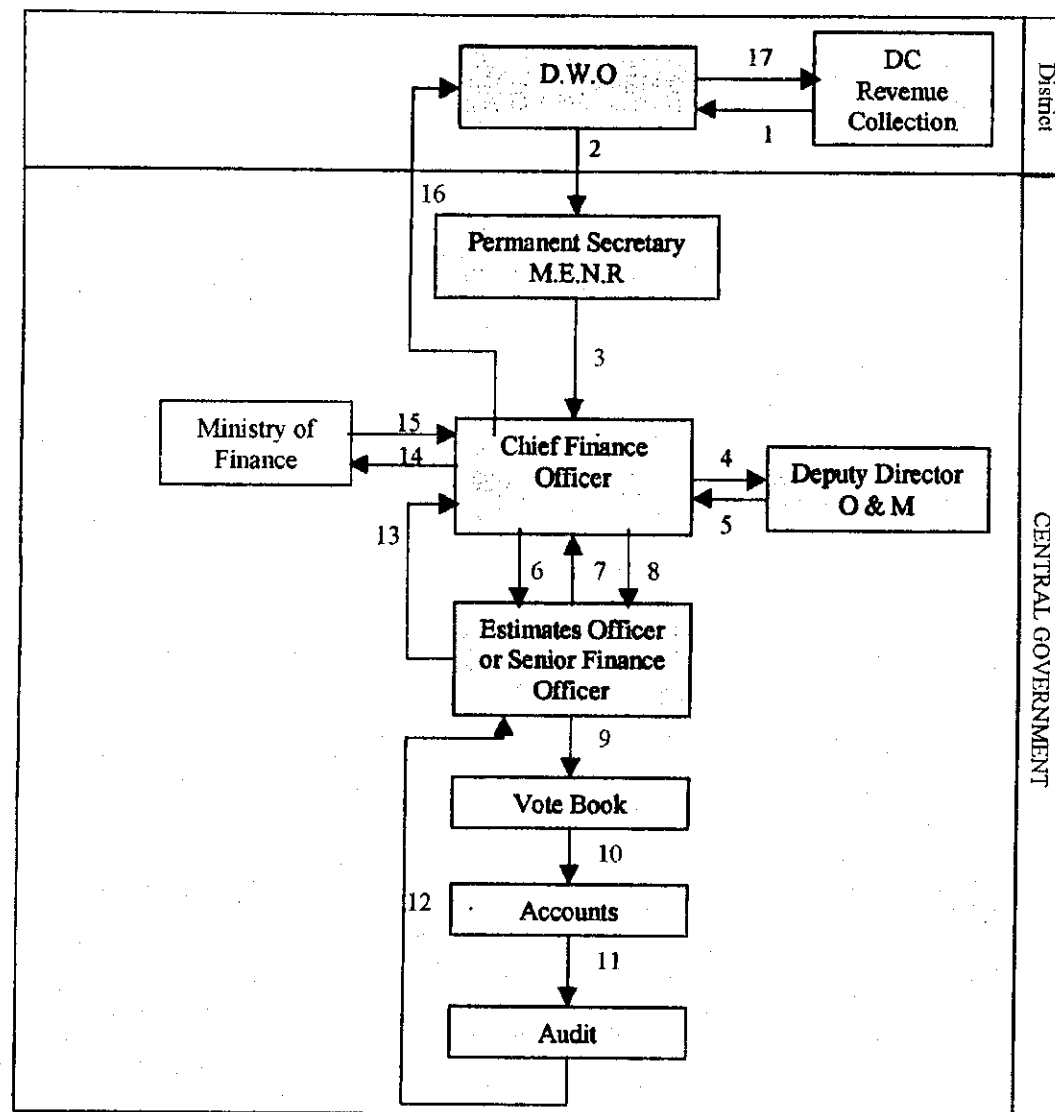
## **GENERAL**



# A.I.E PROCESSING CHART

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

**FIGURE: 8.2**



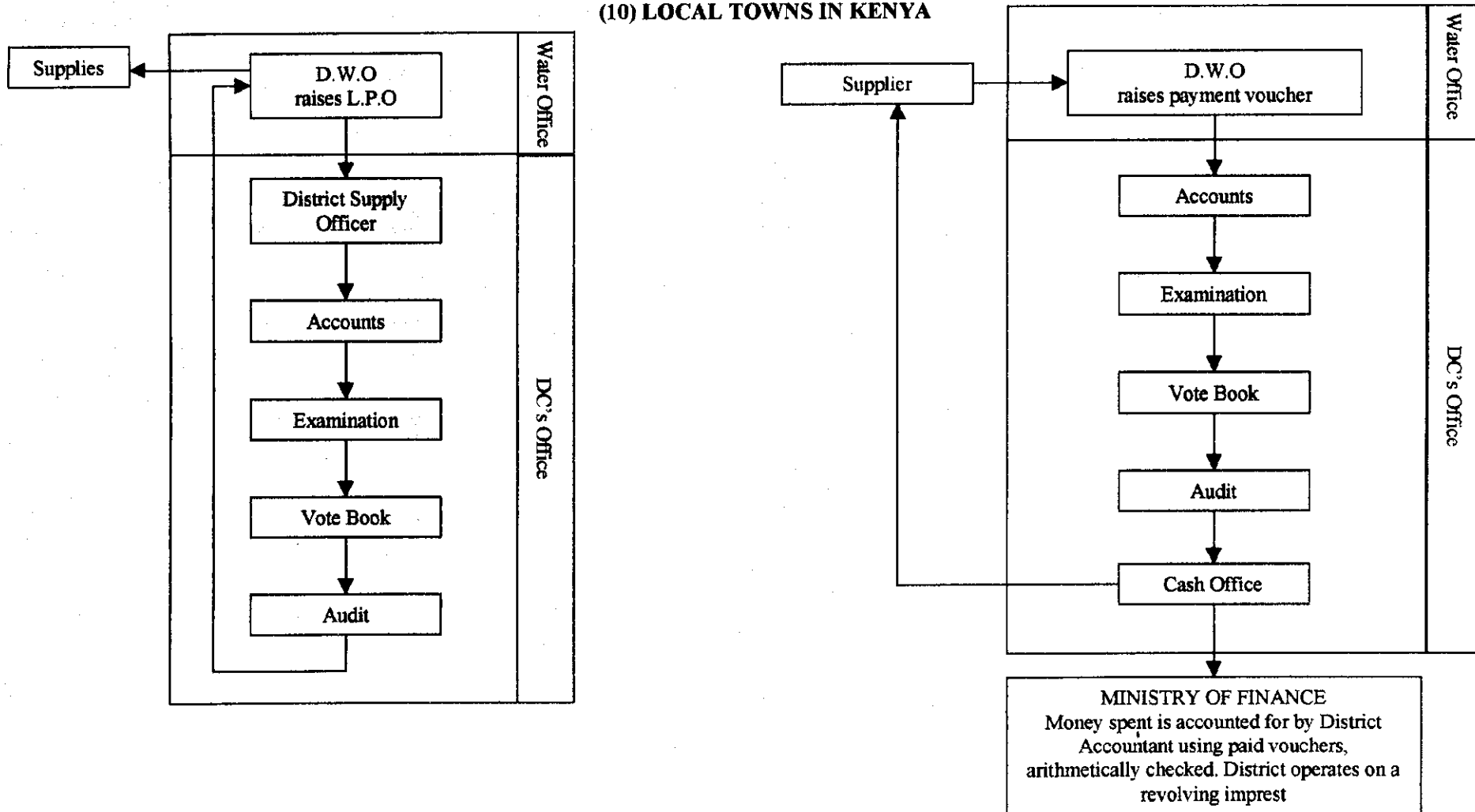
A.I.E = Authority to Incur Expenditure

- 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 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) Estimate Officer forwards documents to Chief Finance Officer.
- 8) Chief Finance Officer signs and returns documents to Estimates Officer.
- 9) Estimate Officer forwards documents to Vote Book for entry against the budget provision.
- 10) Vote Book Officers forwards documents to Accounts for checking
- 11) Accounts forwards documents to Audit for checking.
- 12) Audit forwards documents to Estimate 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.

## 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**



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## CONSORTIUM

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

**Location: MALINDI**

**Sub-Area Office NWPC**

**10.11.2000**

**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><b>GENERAL:</b></p> <p><b>Contract in place?</b></p> <p><b>Line of Command?</b></p> <p><b>Any comments on current situation?</b></p> <p><b>Problems experienced?</b></p> <p><b>Any recommendation on changes to improve the situation?</b></p> <p><b>Cause of the problem if any?</b></p> <p><b>Any problems on Fee payments?</b></p>	<p><i>Yes</i></p> <p><i>NWCPC Manager (Chief Sub-Area Manager) in Malindi -&gt; Regional Manager Mombasa -&gt; MD NWCPC -&gt; HQ Liaison officer-&gt; Head O&amp;M HeadOffice Nairobi -&gt; MD of NWCPC -&gt; 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&amp;M separate from administration and store.</i></p> <p><i>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.</i></p> <p><i>Water Act not really supporting the effort and should be dealt with soonest.</i></p> <p><i>Procurement issues should be simplified</i></p> <p><i>Write-off procedure on consumer outstandings that cannot be collected, should be simplified within GOK / NWCPC framework</i></p> <p><i>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&amp;M is paid from the collection account, balance at end month goes to NWCPC</i></p>
<p><b>FINANCES:</b></p> <p><b>Is the management financially independent?</b></p> <p><b>Can collected revenue sustain the operation?</b></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><b>How is revenue collected?</b></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><b>OPERATION:</b></p> <p><b>Any interference in the day to day operation?</b></p> <p><b>Procedures manifested already ?</b></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&amp;M and Financial issues. Later on these will be pu into user manuals</i></p>
<p><b>STAFF:</b></p> <p><b>Relationship with the NWCP/Management staff?</b></p> <p><b>Are any incentives offered to improve the output?</b></p>	<p><i>Staff mixed between NWCP/Management and management. Staff then seconded to the management consultant.</i></p> <p><i>Total: approx. 70 with ratio: 50 Consultant / 20 NWCP</i></p> <p><i>Yes</i></p>
<p><b>RECOMMENDATIONS:</b></p> <p><b>For other management contracts?</b></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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## CONSORTIUM

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**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**

**Date: 20.12.00**

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

**Fax: 0171-2734**

**Interviewer: LEK**

**Telephone Interview held with: MD : Eng. Nguiguti**

NYERI WATER COMPANY NYEWASCO	
<p><b>Any comments on current situation?</b></p> <p><b>Any recommendation on changes to improve the situation?</b></p> <p><b>Cause of the problem if any?</b></p> <p><b>Agency agreement between company and Council finalised?</b></p> <p><b>Ownership of the company clear?</b></p> <p><b>Any advice for other water companies to integrate into their agency agreement?</b></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 19<sup>th</sup> March 1999 and ammended on 7<sup>th</sup> 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><b>Does the company have an Opening Balance Sheet?</b></p> <p><b>How were assets handeled?</b></p> <p><b>How were Consumer outstanding balances handeled?</b></p> <p><b>How were liabilities handeled? (Power, Creditors)</b></p> <p><b>Is the company financially independent?</b></p> <p><b>Can collected revenue sustain the operation?</b></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 &amp; M, debt servicing (council's), depreciation of used asstes</i></p>



<p><b>Any other problems encountered?</b></p>	<p><i>and new works</i></p> <p><i>Intereference of running of the company by the council, however this is now decreasing.??????</i></p>
<p><b>Relationship between CMT and Board?</b></p> <p><b>Relationship CMT/Board/ Council?</b></p> <p><b>Any interference in the day to day operation?</b></p> <p><b>Is day to day operation autonomous as far as CMT is concerned?</b></p> <p><b>How is the relationship with the consumers? Has the situation improved?</b></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><b>Relationship with the staff?</b></p> <p><b>All former staff absorbed?</b></p> <p><b>Conditions under which staff were absorbed?</b></p> <p><b>Retired on the Council side?</b></p> <p><b>Have staff salaries changed since take over? How?</b></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 1<sup>st</sup> Sept. 1999 was 15%. Since then the staff have had 7.5% increase with effect from 1<sup>st</sup> Jan. 2000.</i></p>

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

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**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><b>Any comments on current situation?</b></p> <p><b>Any recommendation on changes to improve the situation?</b></p> <p><b>Cause of the problem if any?</b></p> <p><b>Agency agreement between company and Council finalised?</b></p> <p><b>Ownership of the company clear?</b></p> <p><b>Any advice for other water companies to integrate into their agency agreement?</b></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><b>Does the company have an Opening Balance Sheet?</b></p> <p><b>How were assets handeled?</b></p> <p><b>How were Consumer outstanding balances handeled?</b></p> <p><b>How were liabilities handeled? (Power, Creditors)</b></p> <p><b>Is the company financially independent?</b></p> <p><b>Can collected revenue sustain the operation?</b></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&amp;L account, as the Council made payments which were then applied by KP&amp;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><b>Any other problems encountered?</b></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 Portfolio: mainly domestic, apart from prison and police All GOK bodies have a payment problem, delays Supply: Water shortage, cut off power (1 mio current 600 arrears), then used diesel, diesel from collection 10 hours pumping For 3800 cbm/day Agricultural consumers, i.e. seasonal payments like the month of March, which requires money for planting, no payment of water. KCC closed one of the major consumers If 80 % is collected Network rehabilitated in 1992</i></p>
<p><b>Relationship between CMT and Board?</b></p> <p><b>Relationship CMT/Board/ Council?</b></p> <p><b>Any interference in the day to day operation?</b></p> <p><b>Is day to day operation autonomous as far as CMT is concerned?</b></p> <p><b>How is the relationship with the consumers? Has the situation improved?</b></p>	<p><i>MD on the Board, on interference 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, Technically: in the network immediate attendance to a problem, but at production it is a problem. There are 5 pumping stations and power is the main problem</i></p>
<p><b>Relationship with the staff?</b> <b>All former staff absorbed?</b></p> <p><b>Conditions under which staff were</b></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>

<b>absorbed?</b>	<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>
<b>Retired on the Council side?</b>	<i>Provident Fund ? suggested to continue to pay into it, but needs to be checked whether possible or not. Again an issue that</i>
<b>Have staff salaries changed since take over? How?</b>	<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>
<b>Are any incentives offered to improve the output?</b>	<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>

# **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 <sup>3</sup> .)
Between 0m <sup>3</sup> and 10m <sup>3</sup>	56	250.00	0	0	2 amounts of 280/= and 480/=	2	10
Between 11m <sup>3</sup> and 20m <sup>3</sup>	27		2	0	Range from 280/= to 580/= with intervals of 25/= and 50/=	12	10
Between 21m <sup>3</sup> and 40m <sup>3</sup>	8		0	0	Range from 590/= to 1,040/= with intervals of 30/=, 60/=, 90/= and 120/=	8	8
Between 41m <sup>3</sup> and 60m <sup>3</sup>	2		0	0	2 amounts of 1,190/= and 1,860/=	2	2
Between 61m <sup>3</sup> and 100m <sup>3</sup>	1		0	0	1 amount of 26,95/=	1	1
Over 100m <sup>3</sup>	1		0	0	1 amount of 4,285/=	1	1
<b>Totals:</b>	<b>95</b>		<b>2</b>				

### **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 <sup>3</sup> .)
Between 0m <sup>3</sup> and 10m <sup>3</sup>	211		12	16	Range from 200/= to 2,570/=	14	10
Between 11m <sup>3</sup> and 20m <sup>3</sup>	76		6	5	Range from 250/= to 1,130/=	16	10
Between 21m <sup>3</sup> and 40m <sup>3</sup>	69		15	2	Range from 250/= to 2,570/=	33	18
Between 41m <sup>3</sup> and 60m <sup>3</sup>	20		5	0	Range from 570/= to 7,625/=	18	13
Between 61m <sup>3</sup> and 100m <sup>3</sup>	7		1	1	Range from 200/= to 11,100/=	7	6
Over 100m <sup>3</sup>	16		1	2	Range from 1,235/= to 30,150/=	16	15
<b>Totals:</b>	<b>425</b>		<b>40</b>				

### **MERU**

	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 <sup>3</sup> .)
Between 0m <sup>3</sup> and 10m <sup>3</sup>	25		2	12	Range from 125/= to 300/=	4	10
Between 11m <sup>3</sup> and 20m <sup>3</sup>	426		17	44	Range from 161/= to 1,300/=	26	9
Between 21m <sup>3</sup> and 40m <sup>3</sup>	105		20	18	Range from 200/= to 1,800/=	38	18
Between 41m <sup>3</sup> and 60m <sup>3</sup>	31		4	6	Range from 853/= to 2,435/=	15	11
Between 61m <sup>3</sup> and 100m <sup>3</sup>	13		5	0	Range from 1,490/= to 7,070/=	11	6
Over 100m <sup>3</sup>	8		0	4	Range from 5,100/= to 18,025/=	8	8
<b>Totals:</b>	<b>692</b>		<b>48</b>				

### **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 <sup>3</sup> .)
Between 0m <sup>3</sup> and 10m <sup>3</sup>	138		0	0	2 amounts of 200/= and 250/=	2	10
Between 11m <sup>3</sup> and 20m <sup>3</sup>	35		1	1	Range from 275/= to 475/=	9	8
Between 21m <sup>3</sup> and 40m <sup>3</sup>	15		0	0	Range from 560/= to 1,070/=	10	10
Between 41m <sup>3</sup> and 60m <sup>3</sup>	6		1	0	Range from 1,190/= to 1,850/=	6	5
Between 61m <sup>3</sup> and 100m <sup>3</sup>	2		0	0	2 amounts of 2,165/= and 2,635/=	2	2
Over 100m <sup>3</sup>	10		0	0	Range from 4,600/= to 76,650/=	10	10
<b>Totals:</b>	<b>207</b>		<b>2</b>				

# VERIFIED STATISTICS SUMMARY

SUMMARY TABLE: ST6.2

## 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	56	29	10	35	29	17	28	13
Total Active + In-active Accounts	No.	1,333	3,225	2,933	768	438	1,136	569	837	1,439	1,439
Ratio (accounts per staff)	No.	39.21	67.19	52.38	26.48	43.80	32.46	23.07	49.24	51.4	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	1,646	1,603
Working	No.	371	272	1,449	206	115	493	79	104	7	8
Non-working	No.	495	2,225	1,441	181	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 13.46%	4 0.55%	4 0.61%
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	263	36	199	198	357	220	95	767	528
Major / Minor Consumers	No.	209/18	25/2281	28/2858	12/557	14/210	8/611	3/211	2/701	3/730	9/1597
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	m³	72,000	150,000	100,800	420,000	14,400	46,080	14,400	90,000	54,000	42,900
Actual Production June 2000	m³	38,431	132,000	82,500	51,000	12,180	21,600	5,400	22,833	27,120	21,180
Production efficiency	%	50.60%	88.00%	81.85%	Capacity not used	84.58%	46.88%	37.50%	25.37%	50.22%	49.37%
Total consumption June 00	m³	23,418	45,058	41,028	11,500	7,182	10,020	5,882	7,804	27,013	31,558
Actual	m³	10,843	2270	21,114	5,402	2,652	5,710	392	1,294	245	245
Estimate	m³	12,573	42786	19,914	6,098	4,530	4,310	5,200	6,510	26,768	31,311
UPW June 2000	m³	13,015	86,844	41,472	39,500	4,998	11,580	consumed > produced	15,029	107	consumed > produced
UPW	%	35.73%	65.87%	60.27%	77.46%	41.00%	53.61%	66.82%	0.39%	0.39%	0.39%
Value of water lost	Kshs.	313,892.94	2,208,726.10	1,288,842.37	1,313,563.91	193,022.76	431,117.74	583,136.63	3,214.46	3,214.46	721,750.00
Billed Revenue June 2000	Kshs.	564,742.00	1,144,603.00	1,275,044.00	382,430.00	277,415.00	423,967.00	92,656.00	292,360.00	811,523.00	721,750.00
Billed Revenue HQ Reporting June 2000	Kshs.	295,000.00	1,203,181.00	1,211,228.00	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	%	54.27%	34.13%	49.73%	22.55%	58.96%	49.58%	>100%	34.18%	99.61%	>100%
Collected revenue June 2000	Kshs.	427,020.00	428,318.00	1,108,328.00	328,123.00	88,812.00	228,720.00	32,258.00	100,836.00	178,228.00	132,898.00
Collection efficiency June 2000	Kshs.	76.91%	37.42%	88.92%	85.80%	24.12%	53.85%	34.81%	34.52%	21.99%	18.39%
Average Tariff June 2000 / m³	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.	8,664,102.50	20,412,081.50	12,841,280.80	1,639,628.00	6,597,732.85	3,289,084.15	940,349.00	3,137,731.00	2,357,599.95	2,020,145.95
HQ Reporting end May 2000	Kshs.	4,236,072.00	40,094,320.50	13,808,023.90	1,639,959.00	7,317,723.10	3,716,960.00	609,915.30	2,438,479.00	355,421.00	1,552,762.00
Major consumers:											
G.O.K	%			81.42%	Not available	N/A	46.08%	Not available	Not available	0.64%	Not available
(Others Consumption > 100m³ or arrears > 30,000.00)	%	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%
A/E percentage	%		60%	65%	N/A		85%	65%	90%	63%	Not available
FY Collection	Kshs.	3,827,478.00	6,771,978.00	9,247,457.50	2,319,896.20		2,173,738.00	730,854.00	1,296,717.00	2,163,140.00	
A/E earned FY 99/00	Kshs.	2,449,586.92	4,083,185.80	6,010,847.38	N/A		1,412,929.70	475,120.10	1,186,145.30	1,382,778.20	
A/E received FY 99/00	Kshs.	1,288,980.00	3,956,986.00	6,022,580.00	N/A		2,535,300.00	823,460.00	1,289,880.00	Not available	Not available
A/E Expenditure:											
Transport & staff related expenses	Kshs.	497,238.00 36.87%	785,095.70 19.88%	1,010,298.05 38.61%	217,883.35 26.54%		344,413.25 15.81%	399,494.00 50.94%	377,321.60 29.83%		
O&M	Kshs.	534,042.00 41.63%	2,420,092.50 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 67.63%		
Postage	Kshs.	9,822.00 0.77%	31,863.20 0.83%	22,736.00 0.46%	3,537.40 0.43%		94,980.00 4.38%	15,400.00 1.96%	18,400.00 1.45%	Not available	
Telephone	Kshs.	-	152,208.90 3.95%	65,000.00 1.11%	235,643.25 28.71%		89,200.00 4.10%	-	-		
Purchase of Meters	Kshs.	-	63,827.80 1.66%	99,000.00 2.00%	-		34,999.00 1.61%	-	-		
Stationery	Kshs.	45,000.00 3.50%	104,138.50 2.70%	65,864.00 1.33%	8,290.00 0.77%		85,000.00 3.90%	49,121.00 6.26%	14,945.00 1.18%		
Fuel & Gas	Kshs.	199,716.70 15.63%	316,880.50 8.15%	304,288.50 6.16%	157,032.00 19.13%		409,947.20 18.82%	-	-		
A/E Expense:	Kshs.	1,285,917.70 2	3,853,067.10 1	4,947,421.40 2	820,836.00 3		2,178,100.10 2	784,295.60 2	1,284,846.10 2		

- x Verified Figures (Extracted from the consumer information raw data)
- x Provided figures (Extracted from O&M, Billing and revenue data and A/E data as provided and production figures from Gibbs)
- 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 A/E expenditure relating to water supply only
  - 2 A/E 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
<b>1. Organization Structure</b>			
<b>Office Set-up</b>  Lack of decent or sufficient office space, Lacking equipment, Lacking or delayed stationery, No calculators, No computers.	<ul style="list-style-type: none"> <li>• Messy office environment. lost files, limited communication.</li> <li>• Low staff morale.</li> <li>• Reduced efficiency.</li> <li>• Delayed billing, wrong billing calculation.</li> <li>• Delayed consumer problem attendance.</li> <li>• No data base.</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient funding.</li> <li>• Delays in A.I.E. processing.</li> <li>• Centralised GOK printing.</li> <li>• Centralised decision-making.</li> </ul>	<ul style="list-style-type: none"> <li>• Decentralise decision-making process.</li> <li>• Change funding procedure.</li> <li>• Arrange for decent office space</li> </ul>
<b>Staffing Set-up</b>  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.	<ul style="list-style-type: none"> <li>• Reduced efficiency.</li> <li>• Low staff morale.</li> <li>• No commercial approach.</li> <li>• Lacking understanding of commercial operations.</li> </ul>	<ul style="list-style-type: none"> <li>• Inefficient / delayed personnel management at HQ.</li> <li>• Insufficient funding.</li> <li>• GOK recruit practice concerning commercial or managerial skill.</li> <li>• GOK salary scales.</li> <li>• Lacking organisation chart.</li> <li>• Lacking job description.</li> <li>• Favourism at HQ level.</li> <li>• Inefficient system of staff discipline.</li> <li>• Lacking personnel management and control.</li> </ul>	<ul style="list-style-type: none"> <li>• Decentralise decision-making.</li> <li>• Change funding procedure.</li> <li>• Set up organisation charts with detailed job description and skill requirements</li> <li>• Arrange for intensive management training for Engineers or recruit well-qualified managers.</li> <li>• Set up positive and negative staff sanctioning system.</li> <li>• Use negative sanctioning as retrenchment criteria.</li> <li>• Limit recruitment to the system requirement, based on skill and merit.</li> </ul>
<b>Transport</b>  No or limited transport	<ul style="list-style-type: none"> <li>• Certain field operations not possible.</li> <li>• Delayed reaction time to field operations</li> <li>• Reduced control over field activities</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient funding</li> <li>• Lack of planning on Asset Maintenance i.e. grounded vehicles.</li> <li>• No planning on transport requirement.</li> </ul>	<ul style="list-style-type: none"> <li>• Change funding procedure</li> <li>• Prepare criteria for transport requirements based on size of system coverage, pipe network, number of consumer e.t.c.</li> <li>• Decentralise decision making</li> </ul>

## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

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

## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

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

# **PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX**

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

# **PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX**

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

## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

Problems	Symptoms	Cause	Recommended Change
<p><b>Funding</b></p> <p>Delay in A.I.E. Shortage of funds available</p>	<ul style="list-style-type: none"> <li>Chronic shortage of everything required for office and field operation</li> </ul>	<ul style="list-style-type: none"> <li>AIE earned is not equal AIE received</li> <li>Lengthy and delayed AIE processing procedure. With involvement of District Administration</li> <li>Limited liquidity at the DC's office</li> <li>Centralized procurement through HQ</li> <li>GOK procurement procedures</li> <li>Low billing and collection efficiency</li> <li>Reporting to the HQ does not depict the actual status quo</li> <li>Information received by the HQ is not used as a management tool for concerned planning and control</li> <li>Receipt of extra AIE depends on political interests and efforts / stamina of DWO</li> </ul>	<ul style="list-style-type: none"> <li>Decentralise AIE procedures to district level and transfer efficient and stringent control to the provincial level</li> <li>Cash retainer out of revenue collections to remain at the water supply system</li> <li>Simplify AIE procedures</li> <li>Decentralise procurement to system level</li> <li>Simplify GOK procurement procedures</li> <li>Involve an external consultant/ market price analyst to give annual pricing guidelines and limitations</li> <li>Setup positive and negative staff sanctioning system</li> <li>Use mismanagement of funds as a retrenchment criteria</li> </ul>

## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

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

## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

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



## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

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

## PROBLEM – SYMPTOM – CAUSE – RECOMMENDATION MATRIX

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

# 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	Kabaret	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		→		

# 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	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		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	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	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 consider 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	Kabnet	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	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 under taker												MENR				→
20.	Treat GOK bodies 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 debtors	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	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	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.	Investigate into the possibilities 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	x	Consultant		→		
36.	Propose outsourcing criterias 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 wayleafs	x	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	x	Consultant and MENR	x			→

Table D4-1: Water Demand projection for Kabarnet Town Water Supply

TableC4-1 Demand

Year	Population	Income brackets		Population	Demand rate lcd	Demand m <sup>3</sup> /d	Institutional demand m <sup>3</sup> /d	Total demand m <sup>3</sup> /d	Production capacity m <sup>3</sup> /d	Transmission capacity m <sup>3</sup> /d	Storage capacity m <sup>3</sup>
		Status	%								
1999	16,931	High	24	4,063	250	1,016	181	2,746	12,800	12,960	5,440
		Middle	46	7,788	150	1,168					
		Low	30	5,079	75	381					
2000	17,500	High	24	4,200	250	1,050	187	2,838	12,800	12,960	5,440
		Middle	46	8,050	150	1,208					
		Low	30	5,250	75	394					
2001	18,200	High	24	4,368	250	1,092	194	2,951	12,800	12,960	5,440
		Middle	46	8,372	150	1,256					
		Low	30	5,460	75	410					
2002	18,800	High	24	4,512	250	1,128	201	3,049	12,800	12,960	5,440
		Middle	46	8,648	150	1,297					
		Low	30	5,640	75	423					
2003	19,500	High	24	4,680	250	1,170	208	3,162	12,800	12,960	5,440
		Middle	46	8,970	150	1,346					
		Low	30	5,850	75	439					
2004	20,200	High	24	4,848	250	1,212	215	3,275	12,800	12,960	5,440
		Middle	46	9,292	150	1,394					
		Low	30	6,060	75	455					
2005	20,900	High	24	5,016	250	1,254	223	3,389	12,800	12,960	5,440
		Middle	46	9,614	150	1,442					
		Low	30	6,270	75	470					
2006	21,700	High	24	5,208	250	1,302	231	3,519	12,800	12,960	5,440
		Middle	46	9,982	150	1,497					
		Low	30	6,510	75	488					
2007	22,500	High	24	5,400	250	1,350	239	3,648	12,800	12,960	5,440
		Middle	46	10,350	150	1,553					
		Low	30	6,750	75	506					
2008	23,300	High	24	5,592	250	1,398	247	3,777	12,800	12,960	5,440
		Middle	46	10,718	150	1,608					
		Low	30	6,990	75	524					
2009	24,100	High	24	5,784	250	1,446	256	3,907	12,800	12,960	5,440
		Middle	46	11,086	150	1,663					
		Low	30	7,230	75	542					
2010	25,000	High	24	6,000	250	1,500	265	4,053	12,800	12,960	5,440
		Middle	46	11,500	150	1,725					
		Low	30	7,500	75	563					



Table D4-2: BUSINESS PLANS FOR Kabarnet TOWN WATER SUPPLY

## CASH FLOWS

Year	1	2	3	4	5	6	7	8	9	10
<b>REVENUE GENERATED</b>										
Revenue from Extra Water Sold	9,111,654	11,461,960	17,746,232	19,118,235	20,502,374	22,070,377	23,638,381	25,206,384	26,786,524	28,550,528
Revenue from Unaccounted for Water	10,821,287	10,821,287	11,852,869	11,852,869	11,852,869	11,852,869	11,852,869	12,884,450	12,884,450	12,884,450
Savings from Collection Efficiency	-	64,184	492,078	492,078	492,078	492,078	492,078	492,078	492,078	492,078
Revenue from Sewerage Charges	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>19,932,941</b>	<b>22,347,431</b>	<b>30,091,178</b>	<b>31,463,181</b>	<b>32,847,320</b>	<b>34,415,324</b>	<b>35,983,327</b>	<b>38,582,912</b>	<b>40,163,052</b>	<b>41,927,056</b>
<b>Expenditures (Kenya Shilling)</b>										
Transport & Staff Related Expenses	3,587,929	4,022,538	5,416,412	5,663,373	5,912,518	6,194,758	6,476,999	6,944,924	7,229,349	7,546,870
O&M	3,986,588	4,469,486	6,018,236	6,292,636	6,569,464	6,883,065	7,196,665	7,716,582	8,032,610	8,385,411
Postage	75,745	84,920	114,346	119,560	124,820	130,778	136,737	146,615	152,620	159,323
Telephone	181,390	203,362	273,830	286,315	298,911	313,179	327,448	351,104	365,484	381,536
Purchase of meters	326,900	366,498	493,495	515,996	538,696	564,411	590,127	632,760	658,674	687,604
Stationery	217,269	243,587	327,994	342,949	358,036	375,127	392,218	420,554	437,777	457,005
Fuel & Gas	1,006,614	1,128,545	1,519,604	1,588,891	1,658,790	1,737,974	1,817,158	1,948,437	2,028,234	2,117,316
Current 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)
Incremental O&M Costs	8,117,689	9,254,090	12,899,071	13,544,873	14,196,388	14,934,447	15,672,506	16,896,131	17,639,902	18,470,219
<b>Surplus(Deficit)</b>	<b>11,816,352</b>	<b>13,093,341</b>	<b>17,192,106</b>	<b>17,918,308</b>	<b>18,650,933</b>	<b>19,480,877</b>	<b>20,310,821</b>	<b>21,686,781</b>	<b>22,523,149</b>	<b>23,456,837</b>
Average Tariff (Kshs/m <sup>3</sup> )	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25
Investment Costs										
<b>Net Cash Flow</b>	<b>11,816,352</b>	<b>13,093,341</b>	<b>17,192,106</b>	<b>17,918,308</b>	<b>18,650,933</b>	<b>19,480,877</b>	<b>20,310,821</b>	<b>21,686,781</b>	<b>22,523,149</b>	<b>23,456,837</b>
<b>Cumulative Cash Flow</b>	<b>11,816,352</b>	<b>24,908,693</b>	<b>42,100,800</b>	<b>60,019,107</b>	<b>78,670,040</b>	<b>98,150,917</b>	<b>118,461,738</b>	<b>140,148,519</b>	<b>162,671,668</b>	<b>186,128,505</b>

Table C4-3 Financial Cashflow

Table D4-3: Financial Cash Flow for Kabarnet Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	30,558,840	8,117,589	38,676,429	19,932,941	(18,743,488.28)
2	18,701,400	9,254,090	27,955,490	22,347,431	(5,608,059)
3	16,192,560	12,899,071	29,091,631	30,091,178	999,546
4	14,520,000	13,544,873	28,064,873	31,463,181	3,398,308
5		14,196,388	14,196,388	32,847,320	18,650,933
6	-	14,934,447	14,934,447	34,415,324	19,480,877
7	-	15,672,506	15,672,506	35,983,327	20,310,821
8	-	16,896,131	16,896,131	38,582,912	21,686,781
9	-	17,639,902	17,639,902	40,163,052	22,523,149
10	-	18,470,219	18,470,219	41,927,056	23,456,837
Total	79,972,800	141,625,217	221,598,017	327,753,722	106,155,705

Average Tariff Rate (Ksh/m3)

33.25

FIRR		33%
NPV		74,263,595
RER		1.479

**Table D4-4: Economic Cash Flow for Kabarnet Town Water Supply**

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	33,708,840	8,117,589	41,826,429	34,300,667	(7,525,763)
2	18,701,400	9,254,090	27,955,490	36,488,649	8,533,159
3	16,192,560	12,899,071	29,091,631	39,041,294	9,949,663
4	14,520,000	13,544,873	28,064,873	41,593,940	13,529,066
5		14,196,388	14,196,388	44,146,585	29,950,197
6		14,934,447	14,934,447	47,063,894	32,129,447
7		15,672,506	15,672,506	49,981,203	34,308,697
8		16,896,131	16,896,131	52,898,512	36,002,382
9		17,639,902	17,639,902	55,815,821	38,175,919
10		18,470,219	18,470,219	59,097,794	40,627,575
<b>Total</b>	<b>83,122,800</b>	<b>141,625,217</b>	<b>224,748,017</b>	<b>460,428,359</b>	<b>235,680,342</b>

**Current Tariff Rate (Ksh/m3)**

33.25

<b>EIRR</b>		<b>145%</b>
<b>NPV</b>		<b>177,719,045</b>
<b>CBR</b>		<b>0.488</b>

**Kabarnet TOWN WATER SUPPLY****Table D4-5: 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	18,200	3,309	1439	2978	1539	26,404,664	6,926,318	969,685	34,300,667
2002	18,800	3,418	1439	3076	1637	28,088,973	7,368,136	1,031,539	36,488,649
2003	19,500	3,545	1439	3191	1752	30,054,000	7,883,591	1,103,703	39,041,294
2004	20,200	3,673	1439	3305	1866	32,019,028	8,399,045	1,175,866	41,593,940
2005	20,900	3,800	1439	3420	1981	33,984,055	8,914,500	1,248,030	44,146,585
2006	21,700	3,945	1439	3551	2112	36,229,800	9,503,591	1,330,503	47,063,894
2007	22,500	4,091	1439	3682	2243	38,475,546	10,092,682	1,412,975	49,981,203
2008	23,300	4,236	1439	3813	2374	40,721,291	10,681,773	1,495,448	52,898,512
2009	24,100	4,382	1439	3944	2505	42,967,037	11,270,864	1,577,921	55,815,821
2010	25,000	4,545	1439	4091	2652	45,493,500	11,933,591	1,670,703	59,097,794
<b>Total</b>	<b>214,200</b>					<b>354,437,895</b>	<b>92,974,091</b>	<b>13,016,373</b>	<b>460,428,359</b>

<b>Current Tariff Rate</b>	<b>Kshs.</b>	33.25				<b>33.25</b>
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Note:

The benefits increase with increase in population

Table D4-6: ESTIMATED WATER REVENUE - Kabarnet

YEAR	0	1	2	3	4	5	6	7	8	9	10	11
Design production capacity (m <sup>3</sup> /day)	12,800	12,800	12,800	12,800	12,800	12,800	12,800	12,800	12,800	12,800	12,800	12,800
ditto (million m <sup>3</sup> /year)	4.672	4.672	4.672	4.672	4.672	4.672	4.672	4.672	4.672	4.672	4.672	4.672
Current daily production ( m3/day)	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Current daily water sales ( m3/day)		383	383	383	383	383	383	383	383	383	383	383
Projected population	16,931	17,500	18,200	18,800	19,500	20,200	20,900	21,700	22,500	23,300	24,100	25,000
Projected daily demand (m <sup>3</sup> /day)	2,746	2,838	2,951	3,049	3,162	3,275	3,389	3,519	3,648	3,777	3,907	4,053

Average Tariff	Kshs	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25
Revenue from Extra Water Sold	Kshs	9,111,654	11,461,960	17,746,232	19,118,235	20,502,374	22,070,377	23,638,381	25,206,384	26,766,524	28,550,528	
Revenue from Unaccounted for Water	Kshs	10,821,287	10,821,287	11,852,869	11,852,869	11,852,869	11,852,869	11,852,869	12,884,450	12,884,450	12,884,450	
Savings from Collection Efficiency	Kshs	-	64,184	492,078	492,078	492,078	492,078	492,078	492,078	492,078	492,078	
Revenue from Sewerage Charges	Kshs	-	-	-	-	-	-	-	-	-	-	
<b>Total Financial Benefits</b>	<b>Kshs</b>	<b>19,932,941</b>	<b>22,347,431</b>	<b>30,091,178</b>	<b>31,463,181</b>	<b>32,847,320</b>	<b>34,415,324</b>	<b>35,983,327</b>	<b>38,582,912</b>	<b>40,163,052</b>	<b>41,927,056</b>	

**Table D4-7: 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-Mumia	Mumias	4.8	6.3	5.5	3,707.80

**Source: Welfare Monitoring Survey II, 1994**

Table D4-8: Kabarnet 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	4,500,000
Sub -total			65,100,000
Contingency (10%)			6,510,000
Total			71,610,000

Table C4-9 Financial Costs

Table D4-9: Financing Plan - Kabarnet TOWN WATER SUPPLY

	1	2	3	4	Total
	Kshs	Kshs	Kshs	Kshs	Kshs
Institutional Development Costs	28,050,000	14,520,000	14,520,000	14,520,000	71,610,000
Consultancy Fees for Works (20% of works)	418,140	696,900	278,760	-	1,393,800
Water Supply Rehabilitation	2,090,700	3,484,500	1,393,800		6,969,000
Sanitation Rehabilitation	-	-	-	-	-
<b>Total Overall Project Cost</b>	<b>30,558,840</b>	<b>18,701,400</b>	<b>16,192,560</b>	<b>14,520,000</b>	<b>79,972,800</b>



Table C4-10 Economic Costs

Table D4-10: Economic Investment Costs - Kabarnet TOWN WATER SUPPLY

	1	2	3	4	Total
	Kshs	Kshs	Kshs	Kshs	Kshs
Institutional Development Costs	28,050,000	14,520,000	14,520,000	14,520,000	71,610,000
Household costs	3,150,000				3,150,000
Consultancy Fees for Works (20% of works)	418,140	696,900	278,760	-	1,393,800
Water Supply Rehabilitation	2,090,700	3,484,500	1,393,800	-	6,969,000
Sanitation Rehabilitation	-	-	-	-	-
<b>Total Overall Project Cost</b>	<b>33,708,840</b>	<b>18,701,400</b>	<b>16,192,560</b>	<b>14,520,000</b>	<b>83,122,800</b>

**Table D4-11: Financial Sensitivity Analysis - Increase Project Life to 15 years**

**Financial Cash Flow for Kabarnet Town Water Supply**

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	30,558,840	8,117,589	38,676,429	19,932,941	(18,743,488)
2	18,701,400	9,254,090	27,955,490	22,347,431	(5,608,059)
3	16,192,560	12,899,071	29,091,631	30,091,178	999,546
4	14,520,000	13,544,873	28,064,873	31,463,181	3,398,308
5		14,196,388	14,196,388	32,847,320	18,650,933
6	-	14,934,447	14,934,447	34,415,324	19,480,877
7	-	15,672,506	15,672,506	35,983,327	20,310,821
8	-	16,896,131	16,896,131	38,582,912	21,686,781
9	-	17,639,902	17,639,902	40,163,052	22,523,149
10	-	18,470,219	18,470,219	41,927,056	23,456,837
11	-	18,470,219	18,470,219	41,927,056	23,456,837
12	-	18,470,219	18,470,219	41,927,056	23,456,837
13	-	18,470,219	18,470,219	41,927,056	23,456,837
14	-	18,470,219	18,470,219	41,927,056	23,456,837
15	-	18,470,219	18,470,219	41,927,056	23,456,837
<b>Total</b>	<b>79,972,800</b>	<b>233,976,313</b>	<b>313,949,113</b>	<b>537,389,001</b>	<b>223,439,888</b>

**Average Tariff Rate (Ksh/m3)** 33.25

<b>FIRR</b>		<b>37%</b>
<b>NPV</b>		<b>144,809,835</b>
<b>RER</b>		<b>1.712</b>

**Table D4-12: Financial Sensitivity Analysis - Increase Project Life to 15 years + Investment Cost & O&M by 15%**

**Financial Cash Flow for Kabarnet Town Water Supply**

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	35,142,666	9,335,228	44,477,894	19,932,941	(24,544,953)
2	21,506,610	10,642,203	32,148,813	22,347,431	(9,801,382)
3	18,621,444	14,833,932	33,455,376	30,091,178	(3,364,198)
4	16,698,000	15,576,604	32,274,604	31,463,181	(811,423)
5		16,325,846	16,325,846	32,847,320	16,521,474
6	-	17,174,614	17,174,614	34,415,324	17,240,710
7	-	18,023,382	18,023,382	35,983,327	17,959,945
8	-	19,430,550	19,430,550	38,582,912	19,152,362
9	-	20,285,888	20,285,888	40,163,052	19,877,164
10	-	21,240,752	21,240,752	41,927,056	20,686,304
11	-	21,240,752	21,240,752	41,927,056	20,686,304
12	-	21,240,752	21,240,752	41,927,056	20,686,304
13	-	21,240,752	21,240,752	41,927,056	20,686,304
14	-	21,240,752	21,240,752	41,927,056	20,686,304
15	-	21,240,752	21,240,752	41,927,056	20,686,304
<b>Total</b>	<b>91,968,720</b>	<b>269,072,759</b>	<b>361,041,479</b>	<b>537,389,001</b>	<b>176,347,521</b>

**Average Tariff Rate (Ksh/m3)**

33.25

<b>FIRR</b>		<b>25%</b>
<b>NPV</b>		<b>108,654,587</b>
<b>RER</b>		<b>1.488</b>

**Table D4-13: Financial Sensitivity Analysis - Finance by Grant**

**Financial Cash Flow for Kabarnet Town Water Supply**

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	30,558,840	8,117,589	38,676,429	19,932,941	(18,743,488)
2	18,701,400	9,254,090	27,955,490	22,347,431	(5,608,059)
3	16,192,560	12,899,071	29,091,631	30,091,178	999,546
4	14,520,000	13,544,873	28,064,873	31,463,181	3,398,308
5		14,196,388	14,196,388	32,847,320	18,650,933
6	-	14,934,447	14,934,447	34,415,324	19,480,877
7	-	15,672,506	15,672,506	35,983,327	20,310,821
8	-	16,896,131	16,896,131	38,582,912	21,686,781
9	-	17,639,902	17,639,902	40,163,052	22,523,149
10	-	18,470,219	18,470,219	41,927,056	23,456,837
11	-	18,470,219	18,470,219	41,927,056	23,456,837
12	-	18,470,219	18,470,219	41,927,056	23,456,837
13	-	18,470,219	18,470,219	41,927,056	23,456,837
14	-	18,470,219	18,470,219	41,927,056	23,456,837
15	-	18,470,219	18,470,219	41,927,056	23,456,837
<b>Total</b>	<b>79,972,800</b>	<b>233,976,313</b>	<b>313,949,113</b>	<b>537,389,001</b>	<b>223,439,888</b>

**Average Tariff Rate (Ksh/m3)** 33.25

<b>FIRR</b>		<b>37%</b>
<b>NPV</b>		<b>223,439,888</b>
<b>RER</b>		<b>1.712</b>

TableC4-14 E-Sensitivity Case1

Table D4-14: Economic Sensitivity Analysis - Increase Economic Investment Costs by 15%

## Economic Cash Flow for Kabarnet Town Water Supply

Year	Economic InvestmentCost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	38,765,166	8,117,589	46,882,755	34,300,667	(12,582,089)
2	21,506,610	9,254,090	30,760,700	36,488,649	5,727,949
3	18,621,444	12,899,071	31,520,515	39,041,294	7,520,779
4	16,698,000	13,544,873	30,242,873	41,593,940	11,351,066
5		14,196,388	14,196,388	44,146,585	29,950,197
6		14,934,447	14,934,447	47,063,894	32,129,447
7		15,672,506	15,672,506	49,981,203	34,308,697
8		16,896,131	16,896,131	52,898,512	36,002,382
9		17,639,902	17,639,902	55,815,821	38,175,919
10		18,470,219	18,470,219	59,097,794	40,627,575
<b>Total</b>	<b>95,591,220</b>	<b>141,625,217</b>	<b>237,216,437</b>	<b>460,428,359</b>	<b>223,211,922</b>

Current Tariff Rate (Ksh/m3)	33.25
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<b>EIRR</b>		<b>86%</b>
<b>NPV</b>		<b>166,242,586</b>
<b>CBR</b>		<b>0.515</b>

TableC4-15 E- Sensitivity Case2

Table D4-15: Economic Sensitivity Analysis - Increase O&amp;M Costs by 15%

## Economic Cash Flow for Kabarnet Town Water Supply

Year	Economic InvestmentCost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	33,708,840	9,335,228	43,044,068	34,300,667	(8,743,401)
2	18,701,400	10,642,203	29,343,603	36,488,649	7,145,045
3	16,192,560	14,833,932	31,026,492	39,041,294	8,014,802
4	14,520,000	15,576,604	30,096,604	41,593,940	11,497,335
5		16,325,846	16,325,846	44,146,585	27,820,739
6		17,174,614	17,174,614	47,063,894	29,889,280
7		18,023,382	18,023,382	49,981,203	31,957,821
8		19,430,550	19,430,550	52,898,512	33,467,962
9		20,285,888	20,285,888	55,815,821	35,529,934
10		21,240,752	21,240,752	59,097,794	37,857,042
<b>Total</b>	<b>83,122,800</b>	<b>162,868,999</b>	<b>245,991,799</b>	<b>460,428,359</b>	<b>214,436,560</b>

Current Tariff Rate (Ksh/m3)	33.25
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<b>EIRR</b>		<b>115%</b>
<b>NPV</b>		<b>160,918,282</b>
<b>CBR</b>		<b>0.534</b>

Table D4-16: Economic Sensitivity Analysis - Increase Economic Investment Costs and O&amp; M by 15%

## Economic Cash Flow for Kabarnet Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
2001	38,765,166	9,335,228	48,100,394	34,300,667	(13,799,727)
2002	21,506,610	10,642,203	32,148,813	36,488,649	4,339,835
2003	18,621,444	14,833,932	33,455,376	39,041,294	5,585,918
2004	16,698,000	15,576,604	32,274,604	41,593,940	9,319,335
2005		16,325,846	16,325,846	44,146,585	27,820,739
2006		17,174,614	17,174,614	47,063,894	29,889,280
2007		18,023,382	18,023,382	49,981,203	31,957,821
2008		19,430,550	19,430,550	52,898,512	33,467,962
2009		20,285,888	20,285,888	55,815,821	35,529,934
2010		21,240,752	21,240,752	59,097,794	37,857,042
<b>Total</b>	<b>95,591,220</b>	<b>162,868,999</b>	<b>258,460,219</b>	<b>460,428,359</b>	<b>201,968,140</b>

Current Tariff Rate (Ksh/m3)

33.25

<b>EIRR</b>		<b>73%</b>
<b>NPV</b>		<b>149,441,824</b>
<b>CBR</b>		<b>0.561</b>

Table C4-17-rehab-costs-water

Table D4.17 : Cost estimates of rehabilitation works for Kabarnet Water Supply				
Description	Unit	Quantity	Rate	Amount (KShs)
<b>Distribution system</b>				
New consumer meters (replacement and stock)	nr	300	3,000	900,000
subtotal				900,000
<b>Logistical facilities and equipment</b>				
4WD twin-cab pickups	nr	1	2,500,000	2,500,000
Motorcycles for line patrols, meter readings, etc.	nr	3	250,000	750,000
Desk top computer setups	nr	3	200,000	600,000
Printers	nr	1	100,000	100,000
Licensed standard computer software	Sum			200,000
subtotal				4,150,000
Overall Total				5,050,000
Add 20% P&G				1,010,000
Sub-total				6,060,000
Add 15% Contingencies				909,000
Sub-total				6,969,000
Add 20% consultancy design fees				1,393,800
GRAND TOTAL				8,362,800



