

APPENDIX K3

GENERAL

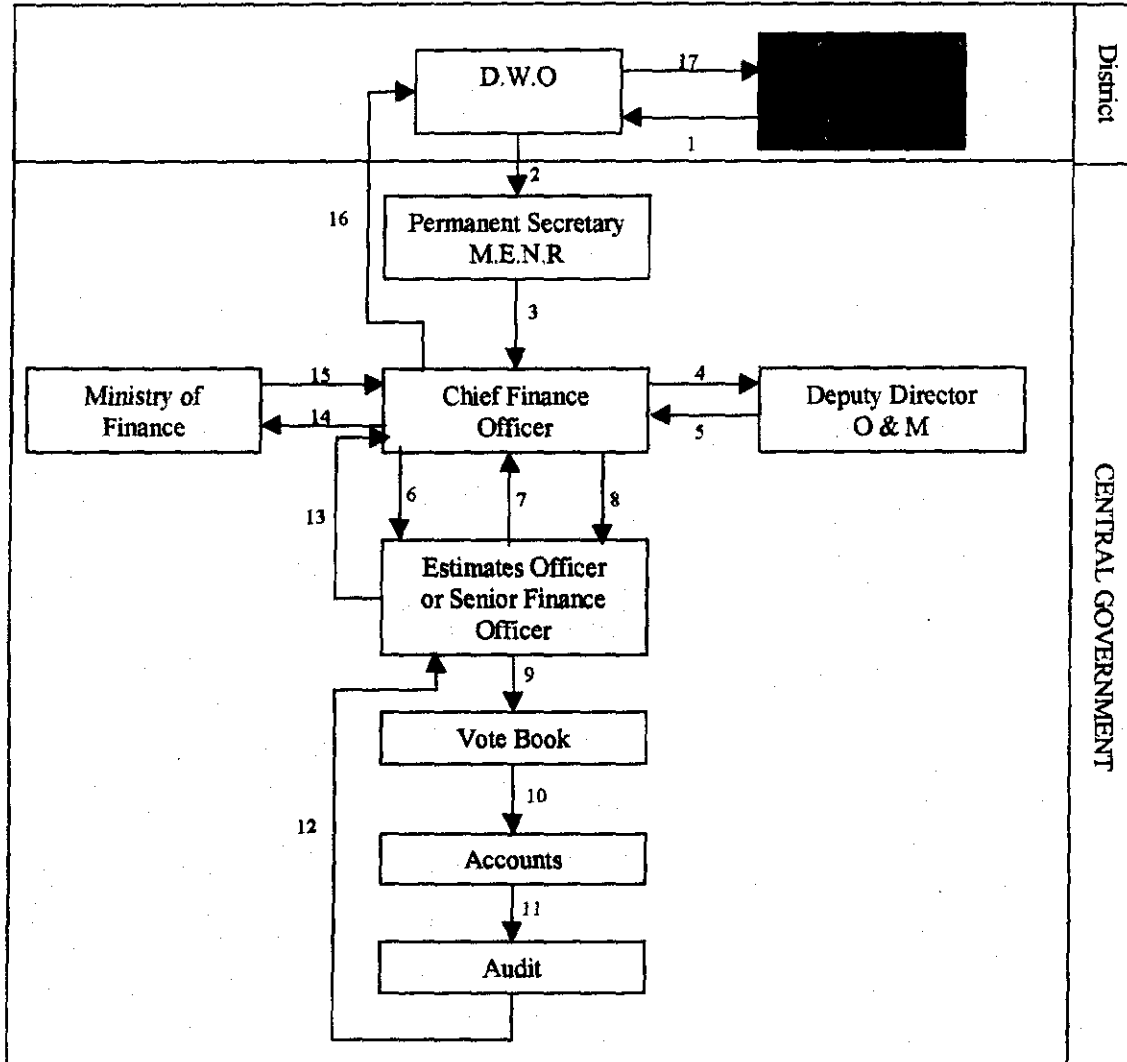


A.I.E PROCESSING CHART

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



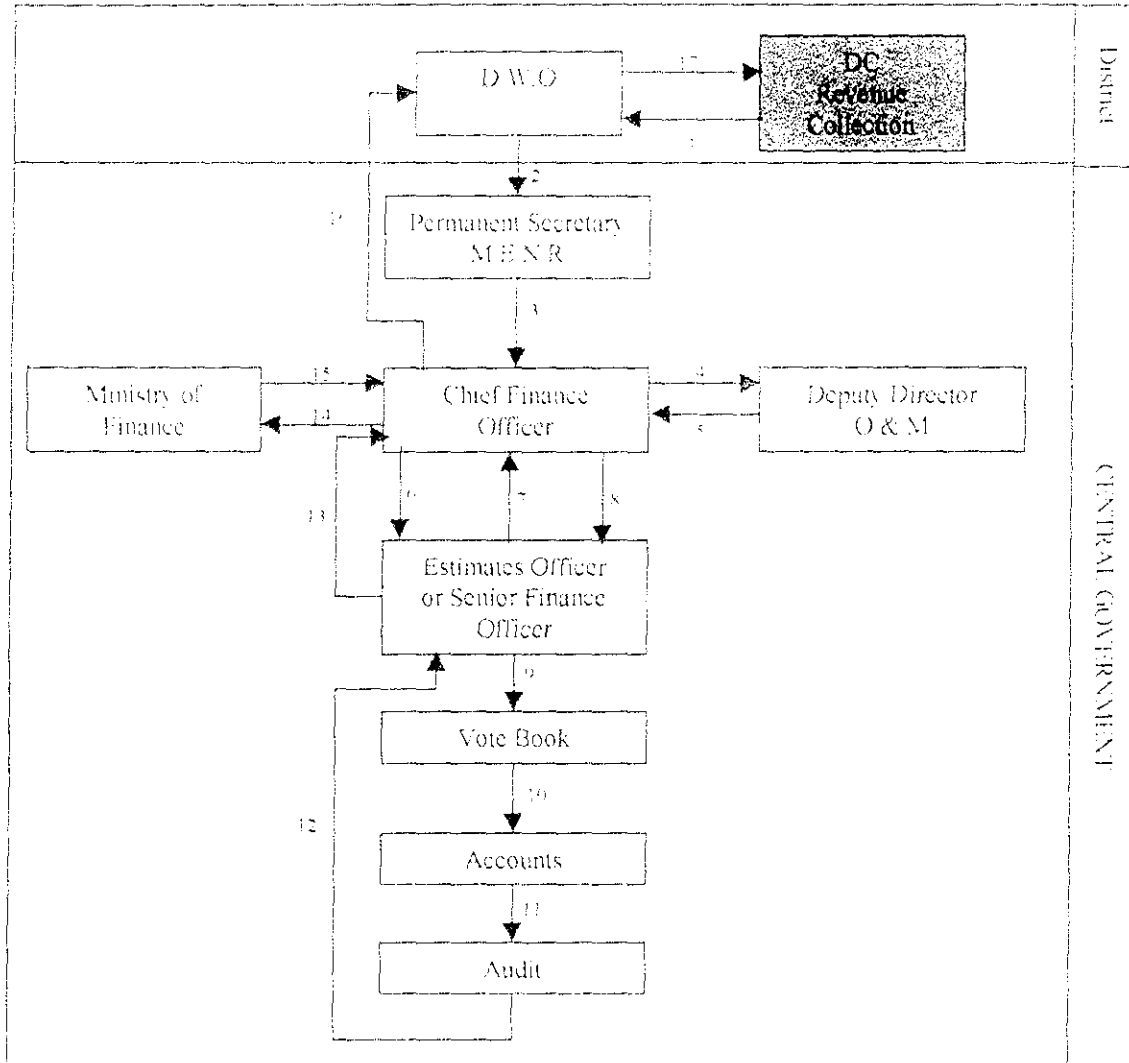
- 1) DC forwards form F.O. 17 to the DWO containing the total monthly collection made on behalf of the water department.
- 2) DWO requests for A.I.E based on form F.O. 17 collection and A.I.E percentage and forwards to P.S. The A.I.E percentage depends on the district and is determined by MENR. The percentage 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

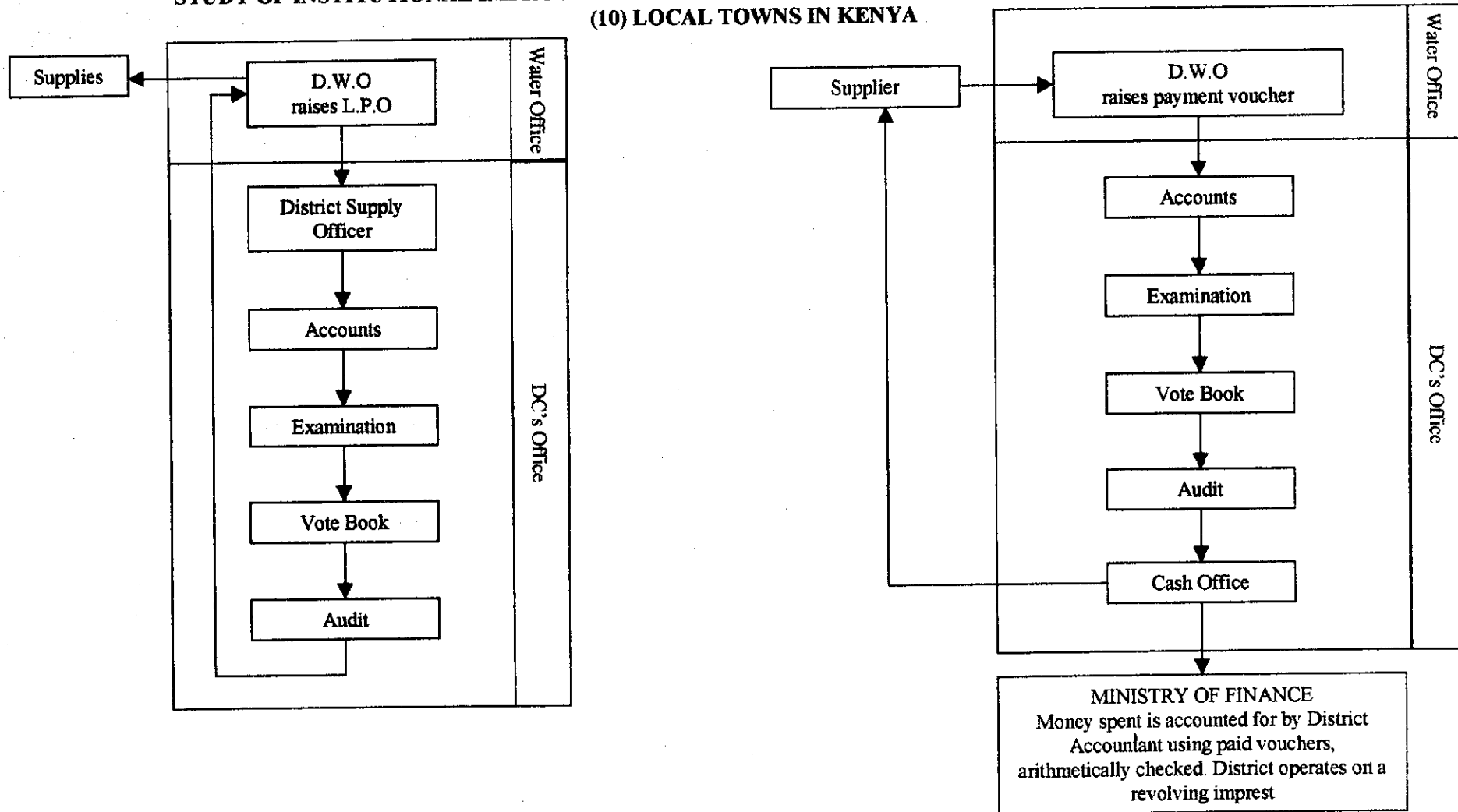


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- 12) Audit forwards documents to Estimates Officer.
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- 14) Chief Finance Officer forwards request to Ministry of Finance. Att. Paymaster General.
- 15) Ministry of Finance - Treasury returns A.I.E. to the Chief Finance Officer.
- 16) Chief Finance Officer forwards the A.I.E. to the DW.O.
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 - Liquidity and
 - Procurement formalities have been complete 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



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:	<i>Answers:</i>
<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.</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 policywais 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 at 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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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

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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 intereferance 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 Philippines)</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)????</i> <i>From mid 1970s KfW, before could be from different sources</i> <i>Accountant from KIWACO at Council, to speed up the analysis</i> <i>Portfolio: mainly domestic, apart from prison and police</i> <i>All GOK bodies have a payment problem, delays</i> <i>Supply:</i> <i>Water shortage, cut off power (1 mio current 600 arrears), then used diesel, diesel from collection 10 hours pumping</i> <i>For 3800 cbm/day</i> <i>Agricultural consumers, i.e. seasonal payments like the month of March, which requires money for planting, no payment of water.</i> <i>KCC closed one of the major consumers</i> <i>If 80 % is collected</i> <i>Network rehabilitated in 1992</i></p>
<p>Relationship between CMT and Board?</p>	<p><i>MD on the Board, on interference</i> <i>Goodwill to be improved further, involve chairman into building good will</i></p>
<p>Relationship CMT/Board/ Council?</p>	<p><i>Consolitative meeting, Board and Councillors, frequent</i> <i>Like AGM to explain such that everybody understands</i> <i>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>Any interference in the day to day operation?</p>	<p><i>No</i></p>
<p>Is day to day operation autonomous as far as CMT is concerned?</p>	<p><i>Yes</i></p>
<p>How is the relationship with the consumers? Has the situation improved?</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> <i>Technically: in the network immediate attendance to a problem, but at production it is a problem.</i> <i>There are 5 pumping stations and power is the main problem</i></p>
<p>Relationship with the staff? All former staff absorbed?</p>	<p><i>Initially yes, but later 2 staff were taken back to the council, 3 additional employed. Total Staff : 93</i> <i>(Billing and Connection details as at 30.06.00 refer)</i></p>
<p>Conditions under which staff were</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 ²	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 ²	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				

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 ³)
Between 0m ³ and 10m ²	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 ²	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		80,000		17,500		8,400		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		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 AAC transferred to community	No.	-		-		-		-		136		-		133		-		-		Not available															
Metered Accounts	No.	999		2,644		2,930		470		423		1,114		213		800		1,646		1,503															
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		1,639		1,284															
Unmetered Accounts	No.	289		463		2		-		23		-		456		35		433		104															
Actual Billed Accounts	No.	399		48		119%		110		4.77%		1,433		48.65%		206		36.20%		107		47.77%													
Estimate Billed Accounts	No.	539		65.10%		2,186		95.23%		1,453		50.35%		363		63.80%		117		52.23%		192		31.19%											
Dis-connected Accounts	No.	221		263		36		199		198		357		220		96		767		528		-													
Major / Minor Consumers	No.	20/918		25/2281		28/2858		12/657		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	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	36,431		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%		37.50%		29.37%		50.22%		49.37%		31.55%		-													
Total consumption June 00	m ³	23,416		45,054		41,028		11,590		7,182		10,020		5,992		7,804		27,013		31,558		-													
Actual	m ³	10,843		2270		21,114		6,402		2,652		5,710		392		1,294		245		31,311		-													
Estimate	m ³	12,573		42786		19,914		6,098		4,530		4,310		5,200		6,510		26,768		-		-													
UFW June 2000	m ³	13,015		85,944		41,472		39,500		4,998		11,580		consumed > produced		15,029		107		consumed > produced		-													
UFW	%	36.73%		85.87%		50.27%		77.46%		41.00%		53.61%		-		85.82%		0.39%		-		-													
Value of water lost	Kshs.	313,882.94		2,208,728.10		1,288,842.37		1,313,563.91		193,022.75		431,117.74		-		563,136.63		3,214.49		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		82,656.00		292,380.00		811,523.00		150,000.00		150,000.00													
Billed Revenue HQ Reporting June 2000	Kshs.	295,000.00		1,203,181.00		1,211,226.00		382,430.00		278,285.00		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%		22.56%		58.68%		49.58%		>100%		34.18%		89.61%		>100%		-													
Collected revenue June 2000	Kshs.	427,020.00		428,318.00		1,106,328.00		328,123.00		88,912.00		228,720.00		32,258.00		100,838.00		178,228.00		132,000.00		-													
Collection efficiency June 2000	Kshs.	75.81%		37.42%		86.92%		85.80%		24.12%		83.89%		34.81%		34.52%		21.96%		18.39%		-													
Average Tariff June 2000 / m ³	Kshs.	24.12		25.40		31.08		33.26		38.63		42.31		16.57		30.04		22.87		-		-													
Total Debtors and May 2000	Kshs.	8,664,102.50		20,412,091.50		12,841,260.80		1,639,628.00		6,597,732.65		3,289,084.15		940,349.00		3,137,731.00		2,357,599.95		2,020,145.95		-													
HQ Reporting and 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		609,915.30		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%		Not available		-													
Others Consumption >100m3 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	%	64%		60%		N/A		N/A		65%		65%		90%		63%		Not available		-		-													
FY Collection	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		1,362,778.20		-		-													
AIE earned FY 99/00	Kshs.	2,449,585.92		4,083,186.00		6,010,847.38		N/A		1,412,929.70		475,120.10		1,166,145.30		-		-		-		-													
AIE received FY 99/00	Kshs.	1,286,980.00		3,956,986.00		6,022,560.00		N/A		2,535,300.00		823,480.00		1,269,860.00		-		-		-		-													
AIE Expenditure:																																			
Transport & staff related expenses	Kshs.	497,238.00		38.87%		765,085.70		19.89%		1,910,298.65		38.81%		217,863.35		26.54%		344,413.25		15.81%		399,494.00		50.94%											
O&M	Kshs.	534,042.00		41.53%		2,420,062.50		62.81%		2,490,246.28		50.33%		200,470.00		24.42%		1,119,580.85		81.40%		320,280.80		40.84%											
Postage	Kshs.	9,922.00		0.77%		31,893.20		0.83%		22,736.00		0.46%		3,537.40		0.43%		94,960.00		4.36%		15,400.00		1.96%											
Telephones	Kshs.	-		-		152,208.80		3.95%		85,000.00		1.11%		235,643.25		28.71%		89,200.00		4.10%		-		-											
Purchase of Meters	Kshs.	-		-		83,927.80		1.06%		99,000.00		2.00%		-		-		34,999.00		1.61%		-		-											
Stationery	Kshs.	45,000.00		3.50%		104,138.50		2.70%		65,854.00		1.33%		8,290.00		0.77%		85,000.00		3.90%		49,121.00		6.28%											
Fuel & Gas	Kshs.	199,715.70		16.53%		315,690.50		8.19%		304,286.50		8.15%		157,032.00		19.13%		409,947.20		18.82%		-		-											
AIE Expense:	Kshs.	1,286,917.70		2		3,883,067.10		1		4,847,421.40		2		820,836.00		3		4		2,178,100.10		2		784,296.60		2		1,284,846.10		2		4		4	

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

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	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	Kabarnet	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		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		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 AIE 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			→

APPENDIX G4
MIGORI
TOWN

Table G4-1: Water Demand Projection, Migori Town Water Supply

Table G4-1 Demand

Year	Population	Income brackets		Population	Demand rate lcd	Demand m ³ /d	Institutional demand m ³ /d	Total demand m ³ /d	Production capacity m ³ /d	Transmission capacity m ³ /d	Storage capacity m ³
		Status	%								
1999	95,446	High	18	17,180	250	4,295	228	12,898	480	180	312
		Middle	35	33,406	150	5,011					
		Low	47	44,860	75	3,364					
2000	99,700	High	18	17,946	250	4,487	238	13,473	480	180	312
		Middle	35	34,895	150	5,234					
		Low	47	46,859	75	3,514					
2001	104,200	High	18	18,756	250	4,689	249	14,082	480	180	312
		Middle	35	36,470	150	5,471					
		Low	47	48,974	75	3,673					
2002	108,900	High	18	19,602	250	4,901	260	14,716	480	180	312
		Middle	35	38,115	150	5,717					
		Low	47	51,183	75	3,839					
2003	113,800	High	18	20,484	250	5,121	272	15,379	480	180	312
		Middle	35	39,830	150	5,975					
		Low	47	53,486	75	4,011					
2004	118,900	High	18	21,402	250	5,351	284	16,068	480	180	312
		Middle	35	41,615	150	6,242					
		Low	47	55,883	75	4,191					
2005	124,300	High	18	22,374	250	5,594	297	16,798	480	180	312
		Middle	35	43,505	150	6,526					
		Low	47	58,421	75	4,382					
2006	129,900	High	18	23,382	250	5,846	310	17,554	480	180	312
		Middle	35	45,465	150	6,820					
		Low	47	61,053	75	4,579					
2007	135,700	High	18	24,426	250	6,107	324	18,338	480	180	312
		Middle	35	47,495	150	7,124					
		Low	47	63,779	75	4,783					
2008	141,800	High	18	25,524	250	6,381	339	19,163	480	180	312
		Middle	35	49,630	150	7,445					
		Low	47	66,646	75	4,998					
2009	148,200	High	18	26,676	250	6,669	354	20,028	480	180	312
		Middle	35	51,870	150	7,781					
		Low	47	69,654	75	5,224					
2010	154,900	High	18	27,882	250	6,971	370	20,933	480	180	312
		Middle	35	54,215	150	8,132					
		Low	47	72,803	75	5,460					

Table G4-2: BUSINESS PLANS

Migori Town Water Supply

CASH FLOWS

Year	1	2	3	4	5	6	7	8	9	10
REVENUE GENERATED										
Revenue from Extra Water Sold	1,088,649	1,270,091	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415
Revenue from Unaccounted for Water	-	-	-	-	-	-	-	-	-	-
Savings from Collection Efficiency	-	580,286	669,236	669,236	669,236	669,236	669,236	669,236	669,236	669,236
Revenue from Sewerage Charges	-	-	-	-	-	-	-	-	-	-
Total	1,088,649	1,850,376	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651
Expenditures (Kenya Shilling)										
Transport & Staff Related Expenses	195,957	333,068	447,057	447,057	447,057	447,057	447,057	447,057	447,057	447,057
O&M	217,730	370,075	496,730	496,730	496,730	496,730	496,730	496,730	496,730	496,730
Postage	4,137	7,031	9,438	9,438	9,438	9,438	9,438	9,438	9,438	9,438
Telephone	9,907	16,838	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601
Purchase of meters	17,854	30,346	40,732	40,732	40,732	40,732	40,732	40,732	40,732	40,732
Stationery	11,866	20,169	27,072	27,072	27,072	27,072	27,072	27,072	27,072	27,072
Fuel & Gas	54,977	93,444	125,424	125,424	125,424	125,424	125,424	125,424	125,424	125,424
Current O&M Costs	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)
Incremental O&M Costs	(271,869)	86,676	384,758	384,758	384,758	384,758	384,758	384,758	384,758	384,758
Surplus(Deficit)	1,360,618	1,763,700	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892
Average Tariff (Kshs/m3)	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
Investment Costs										
Net Cash Flow	1,360,618	1,763,700	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892	2,098,892
Cumulative Cash Flow	1,360,618	3,124,218	5,223,111	7,322,003	9,420,895	11,519,788	13,618,680	15,717,572	17,816,465	19,915,357

Table G4-3 Financial Cashflow

Table G4-3: Financial Cash Flow

Migori Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	50,189,056	(271,869)	49,917,187	1,088,649	(48,828,538.08)
2	58,751,760	86,676	58,838,436	1,850,376	(56,988,060)
3	32,212,704	384,758	32,597,462	2,483,651	(30,113,812)
4	-	384,758	384,758	2,483,651	2,098,892
5	-	384,758	384,758	2,483,651	2,098,892
6	-	384,758	384,758	2,483,651	2,098,892
7	-	384,758	384,758	2,483,651	2,098,892
8	-	384,758	384,758	2,483,651	2,098,892
9	-	384,758	384,758	2,483,651	2,098,892
10	-	384,758	384,758	2,483,651	2,098,892
Total	141,153,520	2,892,875	144,046,395	22,808,232	(121,238,163)

Average Tariff Rate (Ksh/m3) 16.57

FIRR		#DIV/0!
NPV		(115,210,971)
RER		0.158

Table G4-4 Economic Cashflow

Table G4-4: Economic Cash Flow

Migori Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	51,989,056	(271,869)	51,717,187	21,668,679	(30,048,508)
2	58,751,760	86,676	58,838,436	22,793,691	(36,044,746)
3	32,212,704	384,758	32,597,462	23,966,575	(8,630,887)
4		384,758	384,758	25,187,332	24,802,574
5		384,758	384,758	26,479,899	26,095,140
6		384,758	384,758	27,820,338	27,435,579
7		384,758	384,758	29,208,650	28,823,891
8		384,758	384,758	30,668,771	30,284,013
9		384,758	384,758	32,200,702	31,815,943
10		384,758	384,758	33,804,442	33,419,683
Total	142,953,520	2,892,875	145,846,395	273,799,078	127,952,683

Current Tariff Rate (Ksh/m3) 16.57

EIRR		21%
NPV		83,403,987
CBR		0.533

Table G4-5 Economic Benefits

Migori Town Water Supply**Table G4-5: 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	104,200	19,660	129	983	854	14,650,694	6,405,142	612,844	21,668,679
2002	108,900	20,547	129	1027	898	15,411,340	6,737,689	644,662	22,793,691
2003	113,800	21,472	129	1074	945	16,204,354	7,084,387	677,834	23,966,575
2004	118,900	22,434	129	1122	993	17,029,736	7,445,236	712,360	25,187,332
2005	124,300	23,453	129	1173	1044	17,903,670	7,827,311	748,917	26,479,899
2006	129,900	24,509	129	1225	1096	18,809,972	8,223,538	786,828	27,820,338
2007	135,700	25,604	129	1280	1151	19,748,642	8,633,915	826,093	29,208,650
2008	141,800	26,755	129	1338	1209	20,735,863	9,065,519	867,389	30,668,771
2009	148,200	27,962	129	1398	1269	21,771,637	9,518,349	910,716	32,200,702
2010	154,900	29,226	129	1461	1332	22,855,963	9,992,406	956,073	33,804,442
Total	1,280,600					185,121,871	80,933,491	7,743,716	273,799,078

Current Tariff Rate	Kshs.	16.57				16.57
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Note:

The benefits increase with increase in population

Table G4-8: ESTIMATED WATER REVENUE Migori Town Water Supply

YEAR	0	1	2	3	4	5	6	7	8	9	10	11
Design production capacity (m ³ /day)	480	480	480	480	480	480	480	480	480	480	480	480
ditto (million m ³ /year)	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
Current daily production (m ³ /day)	180	180	180	180	180	180	180	180	180	180	180	180
Current daily water sales (m ³ /day)		180	180	180	180	180	180	180	180	180	180	180
Projected population	95,446	99,700	104,200	108,900	113,800	118,900	124,300	129,900	135,700	141,800	148,200	154,900
Projected daily demand (m ³ /day)	12,898	13,473	14,082	14,716	15,379	16,068	16,798	17,554	18,338	19,163	20,028	20,933

Average Tariff	Kshs	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57	16.57
Revenue from Extra Water Sold	Kshs	1,088,649	1,270,091	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415
Revenue from Unaccounted for Water	Kshs	-	-	-	-	-	-	-	-	-	-	-
Savings from Collection Efficiency	Kshs	-	580,286	669,236	669,236	669,236	669,236	669,236	669,236	669,236	669,236	669,236
Revenue from Sewerage Charges	Kshs	-	-	-	-	-	-	-	-	-	-	-
Total Financial Benefits	Kshs	1,088,649	1,850,376	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651

Table G4-7: 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	18,164.20
Meru	Meru	5.6	7.1	6	9,320.70
Murang'a	Murang'a	5.3	7.2	5.9	11,512.90
Baringo	Kabarnet	4.5	6.5	5.1	9,532.90
Makueni	Makindu	4.7	7	6.2	5,520.10
Taita-Taveta	Wundanyi	3.5	5.3	4.2	3,526.10
Migori	Migori	4.9	6.4	5.3	6,641.20
Lamu	Lamu	4.3	6.3	4.7	10,321.30
Bungoma	Webuye	6.2	7.1	6.6	7,981.70
Butere-Mumi	Mumias	4.8	6.3	5.5	7,270.20

Source: Welfare Monitoring Survey II, 1994

Table G4-8: Institutional Development | Migori Town Water Supply

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	39,600,000
4	(a) Identify water supply and sewerage infrastructure and estimate cost	Standard infrastructural valuation procedures	2,500,000
	(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	3,000,000
Sub -total			47,900,000
Contingency (10%)			4,790,000
Total			52,690,000

Table G4-9 Financial Costs

Table G4-9: Financing Plan Migori Town Water Supply

	1	2	3	4	Total
	Kshs	Kshs	Kshs	Kshs	Kshs
Institutional Development C	23,650,000	14,520,000	14,520,000		52,690,000
Consultancy Fees for Works (20% of works)	4,423,176	7,371,960	2,948,784	-	14,743,920
Water Supply Rehabilitation	22,115,880	36,859,800	14,743,920		73,719,600
Sanitation Rehabilitation	-	-	-	-	-
Total Overall Project Cost	50,189,056	58,751,760	32,212,704	-	141,153,520

Table G4-10 Economic Costs

Table G4-10: Economic Investment Costs Migori Town Water Supply

	1	2	3	4	Total
	Kshs	Kshs	Kshs	Kshs	Kshs
Institutional Development C	23,650,000	14,520,000	14,520,000	-	52,690,000
Household costs	1,800,000				1,800,000
Consultancy Fees for Works (20% of works)	4,423,176	7,371,960	2,948,784	-	14,743,920
Water Supply Rehabilitation	22,115,880	36,859,800	14,743,920	-	73,719,600
Sanitation Rehabilitation	-	-	-	-	-
Total Overall Project Cost	51,989,056	58,751,760	32,212,704	-	142,953,520

Table G4-11: Financial Sensitivity Analysis - Increase Project Life to 15 years

Financial Cash Flow Migori Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	50,189,056	(271,869)	49,917,187	1,088,649	(48,828,538)
2	58,751,760	86,676	58,838,436	1,850,376	(56,988,060)
3	32,212,704	384,758	32,597,462	2,483,651	(30,113,812)
4	-	384,758	384,758	2,483,651	2,098,892
5	-	384,758	384,758	2,483,651	2,098,892
6	-	384,758	384,758	2,483,651	2,098,892
7	-	384,758	384,758	2,483,651	2,098,892
8	-	384,758	384,758	2,483,651	2,098,892
9	-	384,758	384,758	2,483,651	2,098,892
10	-	384,758	384,758	2,483,651	2,098,892
11	-	384,758	384,758	2,483,651	2,098,892
12	-	384,758	384,758	2,483,651	2,098,892
13	-	384,758	384,758	2,483,651	2,098,892
14	-	384,758	384,758	2,483,651	2,098,892
15	-	384,758	384,758	2,483,651	2,098,892

Total	141,153,520	4,816,667	145,970,187	35,226,485	(110,743,701)
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Average Tariff Rate (Ksh/n)	16.57
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FIRR		#DIV/0!
NPV		(108,898,570)
RER		0.241

Table G4-12: Financial Sensitivity Analysis - Increase Project Life to 15 years + Investment Cost & O&M by 15%
Financial Cash Flow Migori Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	57,717,414	(312,649)	57,404,765	1,088,649	(56,316,116)
2	67,564,524	99,678	67,664,202	1,850,376	(65,813,825)
3	37,044,610	442,472	37,487,082	2,483,651	(35,003,431)
4	-	442,472	442,472	2,483,651	2,041,179
5	-	442,472	442,472	2,483,651	2,041,179
6	-	442,472	442,472	2,483,651	2,041,179
7	-	442,472	442,472	2,483,651	2,041,179
8	-	442,472	442,472	2,483,651	2,041,179
9	-	442,472	442,472	2,483,651	2,041,179
10	-	442,472	442,472	2,483,651	2,041,179
11	-	442,472	442,472	2,483,651	2,041,179
12	-	442,472	442,472	2,483,651	2,041,179
13	-	442,472	442,472	2,483,651	2,041,179
14	-	442,472	442,472	2,483,651	2,041,179
15	-	442,472	442,472	2,483,651	2,041,179
Total	162,326,548	5,539,167	167,865,715	35,226,485	(132,639,229)

Average Tariff Rate (Ksh/n)	16.57
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FIRR	#DIV/0!
NPV	(129,086,457)
RER	0.210

Table G4-13: Financial Sensitivity Analysis - Finance by Grant

Financial Cash Flow Migori Town Water Supply

Year	Investment Cost	O&M Cost	Total Cost	Water Revenue	Net Revenue
1	50,189,056	(271,869)	49,917,187	1,088,649	(48,828,538)
2	58,751,760	86,676	58,838,436	1,850,376	(56,988,060)
3	32,212,704	384,758	32,597,462	2,483,651	(30,113,812)
4	-	384,758	384,758	2,483,651	2,098,892
5	-	384,758	384,758	2,483,651	2,098,892
6	-	384,758	384,758	2,483,651	2,098,892
7	-	384,758	384,758	2,483,651	2,098,892
8	-	384,758	384,758	2,483,651	2,098,892
9	-	384,758	384,758	2,483,651	2,098,892
10	-	384,758	384,758	2,483,651	2,098,892
11	-	384,758	384,758	2,483,651	2,098,892
12	-	384,758	384,758	2,483,651	2,098,892
13	-	384,758	384,758	2,483,651	2,098,892
14	-	384,758	384,758	2,483,651	2,098,892
15	-	384,758	384,758	2,483,651	2,098,892
Total	141,153,520	4,816,667	145,970,187	35,226,485	(110,743,701)

Average Tariff Rate (Ksh/m) 16.57

FIRR		#DIV/0!
NPV		(110,743,701)
RER		0.241

Table G4-15: Economic Sensitivity Analysis - Increase O&M Costs by 15%

Economic Cash Flow

Migori Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	51,989,056	(312,649)	51,676,407	21,668,679	(30,007,728)
2	58,751,760	99,678	58,851,438	22,793,691	(36,057,747)
3	32,212,704	442,472	32,655,176	23,966,575	(8,688,601)
4	-	442,472	442,472	25,187,332	24,744,860
5		442,472	442,472	26,479,899	26,037,426
6		442,472	442,472	27,820,338	27,377,866
7		442,472	442,472	29,208,650	28,766,178
8		442,472	442,472	30,668,771	30,226,299
9		442,472	442,472	32,200,702	31,758,230
10		442,472	442,472	33,804,442	33,361,969
Total	142,953,520	3,326,806	146,280,326	273,799,078	127,518,752

Current Tariff Rate (Ksh/m3) 16.57

EIRR		21%
NPV		83,071,922
CBR		0.534

Table G4-14: Economic Sensitivity Analysis - Increase Economic Investment Costs by 15%

Economic Cash Flow Migori Town Water Supply

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
1	59,787,414	(271,869)	59,515,545	21,668,679	(37,846,866)
2	67,564,524	86,676	67,651,200	22,793,691	(44,857,510)
3	37,044,610	384,758	37,429,368	23,966,575	(13,462,793)
4	-	384,758	384,758	25,187,332	24,802,574
5		384,758	384,758	26,479,899	26,095,140
6		384,758	384,758	27,820,338	27,435,579
7		384,758	384,758	29,208,650	28,823,891
8		384,758	384,758	30,668,771	30,284,013
9		384,758	384,758	32,200,702	31,815,943
10		384,758	384,758	33,804,442	33,419,683
Total	164,396,548	2,892,875	167,289,423	273,799,078	106,509,655

Current Tariff Rate (Ksh/m3) 16.57

EIRR		15%
NPV		63,462,123
CBR		0.611

TableG4-16E- Sensitivity Case3

Table G4-16: Economic Sensitivity Analysis - Increase Economic Investment Costs and O& M by 15%**Economic Cash Flow Migori Town Water Supply**

Year	Economic Investment Cost	O&M Cost	Total Cost	Economic Benefit	Net Revenue
2001	59,787,414	(312,649)	59,474,765	21,668,679	(37,806,086)
2002	67,564,524	99,678	67,664,202	22,793,691	(44,870,511)
2003	37,044,610	442,472	37,487,082	23,966,575	(13,520,507)
2004	-	442,472	442,472	25,187,332	24,744,860
2005		442,472	442,472	26,479,899	26,037,426
2006		442,472	442,472	27,820,338	27,377,866
2007		442,472	442,472	29,208,650	28,766,178
2008		442,472	442,472	30,668,771	30,226,299
2009		442,472	442,472	32,200,702	31,758,230
2010		442,472	442,472	33,804,442	33,361,969
Total	164,396,548	3,326,806	167,723,354	273,799,078	106,075,724

Current Tariff Rate (Ksh/m3)

16.57

EIRR		15%
NPV		63,130,058
CBR		0.613

Table G4-17-rehab-costs-water

Table G4.17 : Cost estimates of rehabilitation works Migori Town Water Supply				
Description	Unit	Quantity	Rate (Kshs)	Amount (KShs)
Boreholes and collector pipework				
Equip ENEP borehole 3 to deliver to chlorine contact tank, including pump, riser and headworks pipework and electrical installation	Sum			3,000,000
Equip ENEP borehole 4	Sum			3,000,000
Re-equip existing borehole 5	Sum			3,000,000
80 mm steel collector pipework from borehole 5 to borehole 4	m	200	5,600	1,120,000
100 mm steel collector pipework from borehole 4 to old waterworks site	Sum	1,700	6,000	10,200,000
Cap disused boreholes 3 and 8	nr	2	5,000	10,000
subtotal				20,330,000
Groundwater disinfection and surface mounted pumps				
80 m ³ chlorine contact tank	Sum			1,200,000
Pump house for surface mounted pumps	Sum			1,000,000
One duty plus one standby surface-mounted pumps 41m ³ /hr against 112 m, 22 kW	Sum			4,000,000
150 mm steel rising main from old waterworks site to hilltop storage	m	700	6,900	4,830,000
subtotal				11,030,000
Distribution system				
110 mm uPVC pipe from break pressure tank to Migori Teacher's Training College	m	1,700	1,000	1,700,000
Install float operated shutoff valves at elevated tanks	nr	2	80,000	160,000
New consumer meters (replacement and stock)	nr	700	3,000	2,100,000
subtotal				3,960,000
Logistical facilities and equipment				
New office and laboratory facilities	m ²	400	25,000	10,000,000
4WD twin-cab pickups	nr	1	2,500,000	2,500,000
4WD standard vehicles	nr	1	1,500,000	1,500,000
Motorcycles for line patrols, meter readings, etc.	nr	3	250,000	750,000
Multi-geared bikes	nr	2	25,000	50,000
Desk top computer setups	nr	3	200,000	600,000
Printers	nr	2	100,000	200,000
Licensed standard computer software	Sum			1,000,000
Standard office equipment, furniture and fittings	Sum			1,500,000
subtotal				18,100,000

Table G4.17 : Cost estimates of rehabilitation works Migori Town Water Supply				
Description	Unit	Quantity	Rate (Kshs)	Amount (KShs)
Overall Total				53,420,000
Add 20% P&G				10,684,000
Sub-total				64,104,000
Add 15% Contingencies				9,615,600
Sub-total				73,719,600
Add 20% consultancy design fees				14,743,920
GRAND TOTAL				88,463,820

