7.0 LAWS AND REGULATIONS OF ENVIRONMENTAL IMPACT ASSESSMENT

7.1 GENERAL

The current Government of Kenya policy requirement stipulates that before any major development project is undertaken in the public or private sector, there is need to carry out Environmental Impact Assessment (EIA) on the project in order to ensure that each component conforms to good environmental management. This study involves mainly the identification of laws and regulations that govern the environmental impact assessment of water supply and sanitation projects.

7.2 LEGISLATION/REGULATIONS GOVERNING ENVIRONMENTAL IMPACT ASSESSMENT

7.2.1 General

A large number of Acts and organizations deal with issues of pollution, environmental degradation and conservation. These include among others:

- Constitution of Kenya (especially Section 71)
- Water Act (Cap 372)
- Agriculture Act (Cap 318)
- Irrigation Act (Cap 347)
- Forests Act (Cap 385)
- Lakes and Rivers Act (Cap 409)
- Maritime Zone Act (Cap 371)
- River Basin Development Authorities Act (e.g. Cap 443)
- Land Tenure and Land Use Legislation
- Wildlife (Conservation and Management) Act (1976 and 1989 Amendment)
- Public Health Act (Cap 242)
- Local Government Act (Cap 265)
- Environmental Management and Co-ordination Act (1999)

Effectiveness in enforcement has not been commensurate with the many acts and regulations; in some instances there have been contradictions when an institution has evoked its act at the expense of proper operation of facilities belonging to another institution. The reason for the foregoing situation is that each sector utilizing water, apart from the water authority, has a different mandate; their primary focus is not water development. The need to harmonize the application of the various Acts and Regulations, for effective protection of the environment, has been felt and expressed for a long time; hence the birth of the Environmental Management and Co-ordination Act of 1999.

7.2.2 Environmental Management and Co-ordination Act (1999)

The most significant Act that specifically addresses environmental impact is the newly enacted Environmental Management and Co-ordination Act, 1999. Among the specific issues related to EIA procedures are stipulated in the Act as follows:

- Establishment of Environmental Management Authority (NEMA) to administer the Act.
- Submission of an EIA Report to NEMA by developers before undertaking any new project specified in the Act.
- Issue of an Environmental Impact License by NEMA if it is satisfied with the EIA Report.
- Environmental Impact Assessment to be conducted in accordance with the EIA guidelines and procedures provided in the 4th schedule of the Act.

7.2.3 Laws Relating Specifically to Water Supply and Sanitation

Within the Environmental Management and coordination Act, a number of sections dealing specifically with water and sanitation can be identified as follows:

- Part V Section 42 dealing with protection of rivers, lakes and wetlands,
- Part VIII Section 72 dealing with water pollution prohibition,
- Part VIII Section 74 dealing with effluents to be discharged into the sewerage system,
- Part VIII Section 86 dealing with standards for waste,
- Part VIII Section 87 dealing with prohibition against dangerous handling and disposal of wastes,
- Part VIII Sections 88 and 89 dealing with waste licenses and licensing of waste disposal sites,
- Part VIII Sections 91 – 93 dealing with hazardous wastes and their disposal,
- Part XIII dealing with environmental offences and related penalties.

In order to minimize the conflicts in enforcement (due to the many different Acts and Regulations) as mentioned before, the Environmental Management and Coordination Act stipulates that where the provisions of any existing law conflicts with the provisions of this Act, then the provisions of this Act shall prevail. The foregoing proviso, in conjunction with the multi-disciplinary or composition of the Environmental Committees will hopefully enhance the effectiveness of administration and enforcement of the Act.

7.2.4 Environmental Impact Assessment (Guidelines and Administrative Procedures)

The format of the EIA Report has been set out in the guidelines and should include the following sections:

- Introduction
- Title of the Project
- Project Initiator
- Statement of Need
- Project Description
- Project Options
- Description of Existing Environment
- Results of Preliminary Assessment
- Detailed Examination of Impacts
- Suggested Mitigation and Abatement measures
- Residual Impacts
- Project Evaluation
- Summary Conclusions

In addition, the EIA guidelines and procedures describe procedures to be used in environmental planning and management in Kenya. It also gives a checklist of sectors, which can provide guidance to the public and private sector agencies involved in initiating development projects.

7.2.5 Objectives of Environmental Impact Assessment

The objectives of Environmental Impact Assessment Study for this project are identified as follows:

- To identify the existing environmental concerns which need to be taken into account in the proposals for rehabilitation of water supply and sanitation system.

- To evaluate the environmental impacts of the proposed rehabilitation works.

- To propose the counter measures to mitigate the impacts.

- To make recommendations for environmental conservation.

7.3 INITIAL ENVIRONMENTAL EXAMINATION

7.3.1 Water Quality of Existing Supplies

The programme for monitoring water quality both at source and within the distribution systems is in place at Mumias town, however, implementation is generally poor because of lack of appropriate and adequate laboratory equipment and reagents. Current water quality analysis results were not available at the works except pH and residual chlorine values for treated water. However, the National Water Master Plan records a sediment load of 142 mg/l for the Lusumu River, while a 1972 study recorded a turbidity of 30 JTU, a pH of 7.3 and alkalinity of 40 mg/l.

The Lusumu river source for Mumias town is subject to pollution from agricultural activities upstream of the intake. The stream is also heavily coloured and laden with sediment.

7.3.2 Existing Sanitation Situation

Mumias has a sewerage system confined to one estate but without treatment works; only temporary ponds which discharge raw sewage into the environment. The major part of the town depends on on-site sanitation systems comprising mainly pit latrines, cess-pits and septic tanks. The on-site systems generally provide inadequate service especially in public places like markets, institutions and bus parks.

7.3.3 Screening and Scoping for Environmental Impact Assessment

Many guidelines have been used in Kenya for EIA but especially those of the World Bank. Often, the sponsor of a development has stipulated the standards to be met, because in the past Kenya did not have specific guidelines. However, as mentioned before, the Environmental Management and Coordination Act (1999) has set out the guidelines for EIA in its 4th Schedule. The guidelines propose the checklist method for screening and scoping for EIA.

The general environmental concerns and a checklist for every town have been summarized in the sections that follow. A more comprehensive EIA will be undertaken at the feasibility stage, however, it is envisaged that almost all the project components will be of such small scale that their impacts will not be serious. Impacts arising from construction activities will mainly affect the human environment but can be minimized by proper construction methods.

7.4 ENVIRONMENTAL CONCERNS IN MUMIAS TOWN

1. Solid waste management is poor. Rate of refuse generation is high especially sugarcane stalks. There is no provision of skips for refuse storage before final hauling to disposal site. The town plans have not made provision for garbage collection routes.

2. Effective use of on-site sanitation is hampered by high water table e.g. in Shibale area. Risks for groundwater contamination are high and many residents still depend on shallow wells as their main source of water.

3. There is no place to dump exhauster effluent when the on-site facilities are emptied.

4. The existing sewerage network serves only one estate, which was put up by the National Housing Corporation. The wastewater discharges into open temporary ponds and hence into a small seasonal stream. The ponds provide only a 1 to 2-day storage before the sewage flows out, substantially raw.

5. Wastes from the slaughter slab especially blood and remains of animal dung are led directly into a small stream without any treatment.

6. High rise buildings are coming up in the town without provision for adequate sewage disposal.

7. Dwelling estates put up by the Muslim community in particular have very high occupancy ratios per room and hence high rates of sewage generation, and yet there is no provision for adequate sewage disposal.

8. Solid wastes are sometimes dumped on individual farms where the owners are ignorant of the type and quality of wastes. Farms are therefore exposed to risks of soil contamination.

9. The bus park, Sunday market and Friday markets have no sanitation facilities.

Concerns Associated With Implementation Of Environmental/Public Health Legislation

1. No Environmental Committee has been formed to harmonize actions on environmental issues.

2. The Public Health Officer, the Divisional Water Officer and the Municipal Engineer are not aware of the new Environmental Management and Co-ordination Act (1999).

7.5 RESULTS OF INITIAL ENVIRONMENTAL EXAMINATION

Mumias town is mainly of a rural nature, having a very large municipal areal extent while the effectively developed area is quite small. The trend of development of the town is scattered which results in non cost effectiveness in provision of communal infrastructure such as water supply and sewerage. The council has been seeking assistance to put up a sewerage system without success, so sanitation is primarily based on on-site facilities except the National Housing Corporation estate, which is water borne. There is, however, no proper sewage treatment and disposal facility. The results of initial environmental examination are summarized in tables 7.1 and 7.2.

Table 7.1 IEE Checklist - Water Supply Component

ITEM	EVALUATION	COMMENT
1. Human Settlement	5	No negative impact expected
2. Economic Activities	5	Project will enhance economic activities
3. Transport	4	No impact expected
4. Water and Common Rights	5	No impact expected
5. Sanitation	4	Improved Water supply should enhance sanitation
6. Waste	4	No impact expected
7. Hazards / Dangers	4	No impact expected
8. Topography and Geology	5	No impact expected
9. Soil Erosion	5	No impact expected
10. Groundwater	5	No impact expected
11. River and Wetlands	5	No impact expected
12. Coastline and sea	5	No such sites exist in project area
13. Flora and Fauna	5	No negative impact expected
14. Weather	5	No impact expected
15. View	5	No impact expected
16. Air Pollution	5	No impact expected

17. Water Pollution	4	No negative impact expected
18. Soil Contamination	5	No impact expected
19. Noise and Vibration	4	No impact expected
20. Ground Subsidence	5	No impact expected
21. Noxious Odours	5	No impact expected
22. Cultural and Archeological Assets	5	No impact expected
23. Conflict with community Aspirations	5	No impact expected

KEY:

1. Serious impact expected
2. Minor impact expected
3. Uncertain (investigation needed to clarify)
4. Almost no impact expected if proper construction procedure are used
5. Almost no impact expected (no need for EIA)

Table 7.2 IEE Checklist - Sanitation Component

ITEM	EVALUATION	COMMENT
1. Human Settlement	5	No negative impact expected
2. Economic Activities	5	Project will enhance economic activities
3. Transport	4	No impact expected
4. Water and Common Rights	5	No impact expected
5. Sanitation	1	Aim of project is to improve sanitation
6. Waste	2	Municipality has place for discharge of exhausted sludges
7. Hazards / Dangers	4	No impact expected
8. Topography and Geology	5	No impact expected
9. Soil Erosion	4	No impact expected

10. Groundwater	2	Location of on-site latrines with respect to water will need to be considered
11. River and Wetlands	5	No impact expected
12. Coastline and Sea	5	No such sites exist in project area
13. Flora and Fauna	4	No impact expected
14. Weather	5	No impact expected
15. View	5	No impact expected
16. Air Pollution	5	No impact expected
17. Water Pollution	4	Sanitation improvement will stem potential groundwater pollution
18. Soil Contamination	3	Sludge spills from exhausting services may contaminate the soil
19. Noise and Vibration	4	No impact expected
20. Ground Subsidence	4	No impact expected
21. Noxious Odours	5	No impact expected
22. Cultural and Archeological Assets	5	No impact expected
23. Conflict with Community Aspirations	5	No impact expected

KEY:

1. Serious impact expected
2. Minor impact expected
3. Uncertain (investigation to clarify needed)
4. Almost no impact expected if construction undertaken properly
5. Almost no impact expected (no need for EIA)

7.7 INITIAL ENVIRONMENTAL IMPACT ASSESSMENT

By and large, the proposed rehabilitation project will have positive impacts by providing improved sanitation, reducing incidence of disease, and general improvement of the environment. However, from the results of IEE, four main items of potential impacts of the proposed rehabilitation works are be identified for study as listed below:

(i) Impacts resulting from abstraction of water from river or groundwater sources during operation.

(ii) Impacts arising from the increase in wastewater generation that would result from the improved water supply.

(iii) Impacts resulting from the operation of wastewater management and sanitation facilities.

(iv) Impacts resulting from construction activities during implementation of rehabilitation works.

7.7.1 Impacts Resulting from Water Abstraction

Hydrological analysis of the catchment area reveals that the 100% exceedence flow of the Lusumu River far exceeds the 2010 demand at the raw water intake. It can be concluded that the impact of increased abstraction at the existing intake will be negligible. However, the raw water quality will continue to deteriorate as a result of agricultural activities upstream.

7.7.2 Impacts from Increased Wastewater Generation

Improved water service to be wrought by the rehabilitation will definitely make more water available to the consumers. The resulting increased wastewater flow will present disposal problems by putting pressure on the capacity of the existing on-site sanitation systems.

The hydrogeology of the area shows that the groundwater table is quite high for example in areas like Shibale where people draw water from shallow wells. The risk of groundwater contamination by on-site sanitation systems in these areas is therefore real. Installation of a sewerage system, coupled with intensified public education on proper waste management is needed for protection of the environment.

7.7.3 Impacts from Operation of Sanitation Facilities

Current operation of the existing sewerage system is polluting the environment since the temporary ponds used do not have adequate capacity. On-site sanitation facilities do not function well and pose danger to groundwater and increased wastewater flow will aggravate the situation. There is need to install a sewerage system to forestall pollution and to intensify monitoring the operation of on-site sanitation facilities by invoking the Public Health Act.

7.7.4 Impacts from Construction

At the rehabilitation stage construction will be concentrated in the areas of existing treatment works and along the pipelines and these constructions will not be of any large scale as to adversely affect human settlements.

Excavations for pipelines may cause interruption to traffic flow but this will be on a temporary scale. Serious traffic inconveniences will be avoided by appropriate construction methods.

However, development of sewage treatment facilities will necessitate major disturbance of human settlements if the current town plans have not set aside land for the purpose. This will need further clarification at the feasibility stage.

Disturbance of the soil during construction may also give rise to soil erosion but this will be minimal because no large-scale earthworks are anticipated in the rehabilitation phase. The noise and vibrations are common features of most construction works and there are no unusual works that need special attention with respect to noise and vibration.

7.8 ISSUES FOR FURTHER INVESTIGATION

1. The impact of a sewerage system especially the treatment works and the outfall or receiving water body. The current temporary ponds are discharging into a stormwater canal, which is not environmentally acceptable.

2. Since a substantial section of the population is not served by the current water supply scheme and therefore draws water from traditional sources, the full impact of continued use of on-site sanitation systems on the degradation of water quality in such sources needs to be studied.

8. PROPOSED UTILITY MANAGEMENT PLAN

The 10 study towns visited can be grouped into three different institutional categories or groups under the Ministry of Environment and Natural Resources. District water offices: Narok, Meru, Muranga, Wundanyi, Migori and Lamu report to the Ministry directly, Division water offices: Makindu, Webuye and Mumias are included in the respective District reporting, and Kabarnet Sub Area office reports to the Regional area office, which falls under the jurisdiction of the National Water Conservation & Pipeline Corporation, which again operates as a State Corporation under the same Parent Ministry, the Ministry of Environment and Natural Resources.

8.0. GENERAL APPROACH

The approach for the analysis of the 10 towns was to work with a comprehensive base questionnaire that covers the commercial, financial and technical aspects of a water utility system. Interviews and discussions were held with those staff members that are either in charge or responsible for certain aspects of the day to day operation.
For the commercialised systems in Kenya, three sample towns were chosen: Malindi which is operated under a management contract for the NWC&PC, and Nyeri and Kitale Water Company, which are operated on the basis of an agency agreement for and on behalf of the respective municipal councils. Different questionnaires were used in order to obtain information about the problems that they have experienced since commencement of their operation.

The current system of Government reporting and record keeping has made it very difficult to obtain reliable and meaningful data within the given timeframe. The prevailing situation in all systems is that details are available, but neither instantly ready, nor summed up. Consequently numerous figures had to be compiled and abstracted from various ledgers and folders, in order to draw a picture of the current situation. At system level, the consumer ledger was found to be the most resourceful book of information concerning number of accounts, their condition (metered, non-metered, active, in-active), monthly consumption, arrears and payments received. It was therefore decided to use the consumer ledger information and take a snapshot picture of the situation for the month of June 2000. Where annual figures and records were available, those were absorbed for the Financial Year 99/00 in order to calculate monthly averages for comparison with the snapshot month June 2000. To substantiate procedures in place, it was considered essential, to question the figures and details that are routinely forwarded to the Head Quarter.

As procedures do continue at Head Quarter level it was as well attempted to find out, what procedures have to be undergone and is the information that is provided from Divisional or District Offices analysed in order to make planning assignments possible.

The details and procedures representing the NWC&PC area office in Kabarnet have been analysed upto the Regional Office level only. Operational decision making, funding and most personnel related issues are vested in the powers of

the Regional Manager. Instructions and procedural requirements, retained by the Head Office or vested in the State Corporation Act , are however considered for the analysis.

8.1. EXISTING WATER SUPPLY& SANITATION SYSTEMS

8.1.0. Overview Of All Systems Visited

All records and details abstracted in or compiled for the ten towns visited, are compiled in Appendices: A3 for Narok Town, B3 for Meru Town, C3 for Muranga Town, D3 for Kabarnet Town, E3 for Makindu Town, F3 for Wundanyi Town, G3 for Migori Town, H3 for Lamu Town, I3 for Webuye Town and J3 for Mumias Town. System situation description has been prepared for every town visited. Appendix K 3 holds questionnaires used for the commercialised systems and all summary statistics. Summary Table ST 8.2. contains the verified statistics for all 10 towns, using the month of June 2000 as the month for which verification could be done, based on the information abstracted from the various consumer ledgers. Comparisons between the towns are drawn from the same overview called "verified statistics summary" on details considered most relevant.

8.1.0.1.Utility Systems Organisation

8.1.0.1.1. Staffing:
All systems have a high number of unskilled Subordinate Staff being employed with different responsibilities. The O&M department integrates not only the source, treatment and distribution aspect of the water systems, but it is also responsible for billing and revenue collection. Within the billing and revenue collection department, majority of all staff have a technical background. Training, if offered, is within the technical field, financial or commercial training is not really considered. The staff assigned to the distribution system do as well undertake meter reading for which no schedules are available. Control over staff activities and where abouts becomes very difficult. The number of consumer accounts per staff ranges from 23 in Migori to 110 in Mumias. Organisation Charts have been drawn for all 10 towns, based on the information collected and are to be found under the Appendix of the respective town.

The managers responsible for the various systems have no commercial or managerial, but technical background. There is no training offered to prepare officers into their managerial responsibilities, even though the assignment described in The "Schedule of Duties for the Ministry of Water Resources" – January 1999, issued by the Permanent Secretary, describes the duties of every District Water Officer as:

Representative of the MWR in the District and responsible to the PWO/Central for the following duties and responsibilities:

- Overall planning, control and management of all water related matters in the District, including financial management thereof
- Any other duties as may be assigned

8.1.0.1.2. Office Set-up, Facilities and Transport:
While some District offices have adequate space, Division offices visited are in dire need of a decent working- and consumer-receiving-environment. Hard funishing can be termed as basic, but storage facilities for keeping and archiving documents reflect additional requirements in all places visited. Shortage of stationary or calculators is common everywhere.
The new NWC&PC office in Kabarnet has been taken over from the contractor just recently and basic requirements are still in very good condition.
The transport situation of all systems visited is below requirement. Water systems that are shared with the District water operation do have the advantage that transport can at least be shared in case of an emergency. All other systems do depend on well wishers, public transport or they walk.

8.1.0.1.3. Consumer and Meter Information:
The existing level of information concerning the status of the meters, dis-connection/ re-connection or new connection statistics or their operationality, must be termed as low. In a number of towns, the available though estimated figures are not diverting too much from the snapshot situation taken for the month of June 2000, but others are completely "off-track" and reflect that the value of information has to be more emphasized.

Ad hoc information was difficult to obtain anywhere. The statement that everything is available somewhere, somehow, but not in a comprehensive and meaningful format, easy to analyse, applies to all systems. As an example can be taken that the cost for maintaining a vehicle cannot be abstracted from one ledger card, but different kind of items are reflected on different ledger cards for certain expenditure categories. This means, that the cost determination could only be made by going through a number of ledger cards and then compiling the same information.

8.1.0.1.4. Production and Consumption:
For a number of systems, neither production nor consumption figures can be determined with certainty.

Where master meters were either not working or simply lacking, pumping hours were used to calculate the production; where gravity flow does not provide meter information, the situation was reflected, based on the assessment offered by the staff of the respective water system and then compared with the engineer's information. All systems operate well below their capacity, which can be related to:

- Limited use of power, because more pumping cannot be justified with equally increasing billed consumption
- Weak distribution systems, which cannot take the increased pressure and result in higher UfW
- Faulty pumps
- Reduced source capacity

To confirm consumption details is even more difficult, as the majority of consumer meters are not operational. The number of estimated accounts range from 31% in Wundanyi to 99% in Mumias. The verification of consumption details was only

possible for the month of June 2000, by abstracting consumer ledger information in a uniform format for all systems. While the information still reflects a number of discrepancies, it was considered the closest one can get, within the scopes and limited timeframe of the study.

While Migori, Webuye and Mumias have a very high estimated number of accounts (88% - 99%), the consumption abstracted exceeds the production considerably or is almost the same and raises the question of: what is the assessment tool for estimating accounts, or better their consumption?

8.1.0.1.5. Un-accounted for Water (UfW):
Where production and consumption details are not very reliable, the determination of UfW is difficult and equally unreliable. While most systems do fill monthly returns with arithmetical calculations on the UfW, the verified information reflects differences. Where a calculation of UfW was possible, the percentages range from 1% for Webuye town to 77% for Kabarnet town (excluding Mumias and Migori towns which reflect a higher consumption than production).

The overall calculated loss, expressed in Kenya Shillings is considerable. The verified month of June 2000 calculates for 8 out of the 10 towns, for which UfW calculation was done, a total of approximately Kshs 6,374 million per month, or extrapolated: Kshs 76,492 million per calendar year.

As the calculation is based on water lost and the average tariff calculated for every town, this calculation should serve as a guiding figure only, as the figures used for the calculation are based on the month of June 2000 information and might vary, when a deeper analysis is carried out. The loss furthermore does not yet capture the full cost of the loss, because the current tariff is considered as not cost covering.

The determination of cost represents one of the most basic problems again applying to all systems, which starts by trying to establish the actual expenditure. With the current level of information cost can only be assessed but not established.

8.1.0.1.6. Billing and Revenue Collection:
Many monthly billing records and returns were found to be estimated. Various explanations were offered, but all centered around the fact, that the information has to be monthly and manually abstracted from all consumer ledgers after the billing has been completed. The time available between completion of billing and submission of the monthly return is considered too short to complete the time consuming exercise. As monthly returns do not seem to be returned by the Head Quarter, the estimation is seen as an accepted practice. While the practice of estimation could be accepted for the given reason, the reconciliation at the end of the FY is missing, and annual details for the Head Quarter are simply wrong. Only Muranga town and possibly Makindu seem to be reporting actual monthly records. The tariff increment effective November 1999 could not be seen in many of the estimated billing figures for most systems, neither was it apparent for some of the revenue officers, that delayed implementation of the tariff increment should be captured with a retro-active adjustment.

The issue of estimation of monthly billing returns was not applicable for Kabarnet, as the water system only obtains meter readings and the Regional Office prepares computer generated bills. Monthly information about what was billed to the consumer should be correct.

For the verification exercise of June 2000 bills, the consultant filtered out consumers with the same actual consumption and noted, that different billing amounts seem to be calculated for the same consumption. As the majority of the billing officers do not have a calculator, this can be seen as a possible explanation for the variations. Appendix K 3 – ST 1.1. shows the analysis and reflects the situation for a few sample towns. The same bill variation seems to be the case for Kabarnet however limited in number, explanation for which should relate to the billing program.

Revenue collection records and returns are based on records obtained from the District Commissioner's office. Only minor discrepancies were noted, which can be explained by the fact, that report preparation does not necessarily fall together with calendar end month.

The attempt, to verify consumer payments against reported revenue collection, failed. The payment situation abstracted from the consumer ledgers for the month of June, 2000 was explained to reflect the situation as at 30.06.00. Unfortunately ALL the 9 water systems (excluding Kabarnet) involved in the exercise, misunderstood the information requested for and reflected last payments up to December,2000.

The billing efficiency for the various towns ranges between 22% in Kabarnet town and 64% in Narok town, while the collection efficiency ranges between 22% and 87% for Muranga. It should be noted that Migori and Mumias have not been considered for this comparison, as their billing efficiency is exceeding 100 % and unrealistic, as consumption should not be higher than the production.
The combined billing and collection efficiency ranges between 15% and 49% and is suggested to be used as one of the criteria for selecting priority projects.

Muranga is the only town where consumers voluntarily come to the DC's office to ask for the amount due for payment, which they then pay, without even having received the bill. Bills are only issued for GOK institutions, schools or companies on request. While Lamu operates in a similar way, it must be noted that Muranga merges this fact with a high billing and collection efficiency.

8.1.0.1.7. Average Tariff:
The average tariff had not been calculated in any of the towns visited, because it is not required for any of the GOK returns, hence not a commonly used term. The calculation of the average tariff, where possible, was prepared for the month of June 2000. It ranges between 16.57 Kshs for Migori and 42.31 Kshs for Wundanyi.

The June 2000 average tariff read in conjunction with the percentage of consumers billed on 10 cbm minimum charge, indicates which towns have a substantial base of minimum consumers. The minimum charged consumers

range from 12.37 % in Webuye to 78.14 % in Lamu. An analysis for the number of consumers falling into the various consumption brackets is commented on in the report for the various systems and gives an indication of the revenue base and the consumer portfolio.

8.1.0.1.8. Debt Situation:
The monthly debt situation is reported to the Head Quarter, whereby brought forward balances are increased by the monthly ("averaged or estimated") billed revenue less revenue collected. For all towns it was therefore found, that balances abstracted from the consumer ledgers did not correspond with the reported information. Discrepancies reflected are substantial in some cases. It can however not be established where or when those differences slipped into the system. An analysis was undertaken to split between GOK, major and minor consumers where possible. The one consumer taking the biggest share of unpaid bills in District towns, is the Government of Kenya. While the debt situation increases on a monthly basis, no effective measures seem to be in place to improve on the prevailing situation. Collection targets are set for the WS systems, but collection of GOK debt must be termed as very difficult and the possibility of involving the MENR Head Quarter should be considered after verification and substantiation of existing GOK debts.

Verified debt , as abstracted from the consumer ledgers, for all the towns visited amounts to: Kshs 61,899 million as at the end of May, 2000 and Kshs 64,678 million as at the end of the Financial Year 99/00. This can be interpreted such that the debt outstanding, increases by approximately 3 million per month for all the ten towns. Even though this information has been abstracted from the respective consumer ledgers, it must be pointed out, that a much more intensive analysis will have to be done, to confirm the collectable debt, as it includes disputed bills relating to wrong billing calculation, wrong meter reading or no water situations. The abstracted figure can however be used as an indicator. When comparing the total outstanding at the end of the Financial Year with the value of the annual water loss of approximately Kshs 64,8 million, the need for intervention concerning UfW, becomes even more apparent. Remedial efforts should concentrate and start with the attempt to reduce this aspect of water lost.

8.1.0.1.9. Funding:
Salaries, power and chemical expenses are paid through MENR Head Quarter. All other expenses at District level are funded through A.I.E. (Authority to Incur Expenses).

The A.I.E. earned during the FY is not automatically the A.I.E received. Any application, pending approval at the end of the FY, is not returned for resubmission in the new year, but null and void. It appears, that the 10 towns have earned a total of Kshs 17,930 million in A.I.E., but only received and incurred expenditure amounting to Kshs. 17,182 million. When a comparison is drawn between A.I.E. earned and A.I.E. received on a town by town basis, it shows that some towns managed to receive more A.I.E. then they have actually earned while others received considerably less. It could not be established with certainty how the procedure of "receiving more" operates.

8.1.0.2. Utility System Procedures

Existing procedures were analysed against the facts, figures and details obtained. Statements were questioned against the background of facts established.

8.1.0.2.1. Administration:

8.1.0.2.1.1. Staff:
No personnel management, training or recruitment procedures are in place and the approach of utilising staff where and when needed, results in a situation of no control over staff movements. Moving the technical staff into billing and revenue, instead of recruiting qualified and trained staff for the commercial aspect of the utility operation reflects on the system efficiency. The staff morale is equally affected and the low salary structure and delayed promotions attribute to the often understandable "not really concerned" situation. Sanctioning within the civil service structure has not been very effective in the past. The worst to happen was a transfer with no financial repercussions. At the same time positive efforts are not appreciated which often leads to the above indifference.

The recent retrenchment exercise has however changed the prevailing opinion concerning job security. The criteria for the recent retrenchment has not been understood by the staff, as in a number of systems, important and knowledged staff members were removed.

8.1.0.2.1.2. Consumer Accounts:
Clear guidelines on new connection, dis-connection, re-connection and any other routine procedure, are not in place. Especially for cases of recently gazetted changes, the gazette notice seems not sufficiently explained with the consequence, that every system handles the issue differently. Concerning new meters, deposit levels or delayed tariff implementation, wrong implementation of the gazetted notice translates into loss of revenue. If for example the tariff adjustment information and implementation instruction reaches the systems with a certain delay, the gap between gazettment and implementation should be closed. Some systems did so, others did not.
The maintenance of consumer and connection records must be considered as vital for any utility system. All systems lack however clear guidelines and control at system level. The ever prevailing shortage of stationary or operating material is the excuse and/or explanation for messy filing or files and books not found or records not kept. Clear guidelines on consumer record keeping were not found and the recording varies from application form to meter reading book to consumer ledger, depending on the WS system.

8.1.0.2.1.3. Meter Reading, Billing and Revenue Collection:
Meter reading schedules and procedures are not in place and there is no control over the process, neither the staff entrusted the exercise. Wrong or no meter reading affects the billing efficiency and eventually revenue collection, as consumers dispute by simply not paying. When wrong or over estimated bills go along with no supply and service, the payment morale drops and illegal activities increase. While all District water offices have water bailiffs on their staff list, they

are not used to handle cases of illegal water consumption, but only deal with water rights and granting permits for water abstraction.
All systems operated by the MENR issue manual bills and varying bill formats are used. Formats of the system have not been improved for years and some reflect for example consumption stated in gallons, while almost all consumer meters are read in cbm. This increases the risk of error calculations. Majority of consumer bills are hand delivered or collected from the water office, as no funds are available for mailing.
Systematic dis-connection and control procedures were not found to be in place. Explanations given relate always to shortage of funds and/or lacking plugging material, no transport or shortage of staff. Once an account is dis-connected, the consumer retains this status, unless he comes forward to regularise his/her account. Routine checks on long dis-connected accounts, are not practiced or not really possible, because the transport or staff necessary, is not available. This fact bears a high risk of undetected illegal re-connections and contributes into the high UfW.

8.1.0.2.1.4. A.I.E. and Procurements:
An A.I.E. is calculated based on the monthly revenue collection and a certain A.I.E. percentage, determined by MENR, and varying from town to town. In the case of the towns visited, the percentage ranges between 60 % and 90 %. The basis for the different percentages could not be established.
The receipt of an A.I.E. is affected by many factors and in all cases causing delays for procurements and the day to day operation. Appendix K 3 – Figure 8.2. illustrates the 17 steps between revenue collected at the DC's office and the approved authority to spend. The approved A.I.E. can only be used for procurement, if the Local Purchase Order (L.P.O.) processing procedure has been complied with. Suppliers often reject to supply against an L.P.O., because the payment processing procedure is another lengthy procedure to follow. Appendix K 3 – Figure 8.3. illustrates the path a pro-forma invoice has to take, before a cheque can be issued. Supplies are limited to listed suppliers within the District and the District Tender Board has to approve such suppliers.
The issuance of a cheque to a supplier is furthermore dependant on District Office liquidity and priorities set by the District Administration. As the District Administration is not only responsible for A.I.E. of the water department, but all the other GOK departments represented within the District, priorities might be given to other departments, depending on the situation. Collection efforts from the water department can be frustrated by such factors, which are beyond their control.
As long as quotations are obtained as required, and vouchers are signed by the respective signatories, expenditure seems the responsibility of the respective District Water Officer. It must only be ensured that it can be booked against votes that have been budgeted for. Finally, the District Administration has to account for the expenditure incurred, while the Ministry concerned is no longer involved. The complicated and lengthy procedures do not seem to relate to Financial Control at the end of the process.

Transport and staff related expenditure absorb a relatively high percentage of the approved and received A.I.E., while stationary or other inexpensive items are said to be lacking. It could not be established based on which criteria approved A.I.E. are spent and whether quotations obtained, reflect a realistic market price, when

compared. The process shows that Water department requirements are not only at the discretion of the water department through its representative the District Water Officer, but mainly depend on the District Administration, which is answerable to the Office of the President and the Treasury/Ministry of Finance.

Divisional Offices are affected by the same procedure, but their requirements have to undergo an additional step in order to be incorporated into the District requirements.

The Kabarnet area office submits all its requirements through the Regional Office, which in turn still has to follow the same or similar GOK procurement procedures.

8.1.0.2.2. Operation & Maintenance:
No preventive maintenance is in place, neither are technical manuals available. There is no guidance on standards and no procedure control over quality of water. Consumer meter servicing is neither scheduled, nor controlled or guided. Master meter preventive or routine maintenance is not covered by any procedure, and servicing lacks skill and the necessary tools. While some provincial water offices do have the necessary equipment, they lack spares. The reason for all shortcomings is said to be the lack of funding.

Chronically empty stores are explained by the same lack of funding. Only Lamu town had stock balance records available, which could relate to its location and island status. In most cases it was explained that procurements mainly relate to a technical problem that has to be attended to and parts are used as soon as they are available.

The WS Operators Handbook was found in the Webuye WS system, but the available version seemed very old (without any printing date) and not reflecting any system specific information or guidance.

8.1.10. Mumias Water Supply & Sanitation System

Mumias is the Divisional Water Office for Mumias Town under the Butere District Water Office with the Provincial Headquarter situated at Kakamega Town. The Divisional Water Office is expected to provide water for Mumias Town with a population of approximately 110,400 people.
Kenya Finland Western Water Supply Programme (commonly referred to as KIFINCO) started water projects covering Western Province in 1981 and 217 of them were located in Mumias Division alone. Many of these projects stalled after being handed over to the committees and an attempt is being made to rehabilitate them using the demand driven approach under the 2nd phase of the project referred to as Kenya Finland Community Water Supply Management Project. Currently only 2 projects are being revived and the Division WO provides technical support and advice.
Mumias Sugar Company was the major consumer of Mumias Water Supply but has, since 1998, stopped using the main supply after constructing their own borehole.

8.1.10.1. Utility System Organisation

8.1.10.1.1. Staffing

The total number of staff is 13. Refer to Appendix J 3 Figure 8.1.10.- Organisation Chart, prepared to the best understanding of the consultant.
The Division Water Officer oversees the overall O&M operations of Mumias Water Supply. Two water supply operators are in charge of the distribution system with five immediate subordinate staff; in addition four pump attendants attend to the intake and treatment works, and one water supply operator is in charge of billing and revenue.

The index of number of accounts per staff member is:

Staff	Consumer Accounts	Accounts/Staff
13	1,439	110.69

8.1.10.1.2. Office Set-up, Facilities and Transport:

The Division Water Officer has one room situated at the storage tank site. The revenue clerk shares one room with other Divisional Revenue collectors, and is situated at the Divisional Administration Headquarters. A store is also available at the treatment works and is used to store the chemicals.
Basic hard furnishings are lacking at the Division W.O. office and the furniture available are broken and require replacement. Office files and document are scattered all over the small office as storage facilities are lacking.
The office has no power, no telephone or stationery, and only the revenue clerk has a calculator.
There are no dedicated means of transport available. The Division W.O. however has access to a motor bike provided by the Kenya Finland Community Water Supply Management Project. This is provided to assist him reach, and give technical support to the two community water projects which have been revived by the organisation. The Division W.O. receives financial support to operate the motorbike etc.

8.1.10.1.3. Consumer and Meter Information:

Most information is somehow available, but not in a compiled or summarised format. The decision was therefore made to obtain as much information as possible for June 2000 from the consumer ledgers, and use that "Base Verification Month" as a representative snapshot. This information was then related to figures and returns that are normally sent to the District Water Office.

An abstract of the comparison between information available or provided, with the verified information, is shown here below. Complete information is available in Appendix J 3 Table 8.1.10.

Detail	Provided from Mumias	Verified for June 2000
Registered Consumers:	800	1439
No water	Not readily available	136
Dead Account	Not readily available	321
Metered:	625*	1603
Working:	Not readily available	8, but 4 actual bills
Not-Working:	Not readily available	1284, but 650 estimate bills
Un-metered:	230*	104
Disconnected:	Not readily available	528
Major Consumers	Not readily available	2
Minor Consumers:	Not readily available	652

* Information was derived from the O & M report for the month of June 2000

The distinction between Major and Minor accounts was based on the June 2000 consumption exceeding 100 m^3 for Major consumers.

There were no water kiosks reported in Mumias.

8.1.10.1.4. Production and Consumption

Production:

The production figure availed by the operator was 1,230 m^3 per day which translates into a total of 36,900 m^3 per month. Further information received from the O&M monitoring report for the period July 1999 to June 2000 (except April 2000 which was not available) gives an average of 35,994 m^3 a month. Design Capacity / Month was not available on site, but has been calculated based on the engineering information, to be 1,430 m^3 per day, and hence 42,900 m^3 per month. Originally, 3 pumps were working but after July 1999 only 2 pumps were functioning and pumping 12 hours a day each at a rate of 60m^3 per hour. Further information received at the time of the visit indicates that 2 pumps have not been functioning for over an year, even though the O&M reports shows pumping hours for two pumps up to March 2000. Observation from the O&M monitoring report indicates that by June 2000, only one pump was operating and pumping hours had been reduced to 353 hours.

Thus it was very difficult to substantiate production information available from site and therefore a decision was made to rely on the 353 hours pumping with 60m^3 pumped per hour, resulting in 21,180 m^3 for the month of June

Detail	As provided	June 2000 as provided
Design Capacity / Month	42,900m^3	42,900m^3
Production average/ Month	36,900m^3	21,180m^3
Production / Day	1,230m^3	706m^3

Based on the available production information, the **Production Efficiency is calculated as 49.37 %.**

Consumption:
Reported consumption records "as provided" are available in Appendix J3 Table 8.2.10, and compared with verified details from Appendix J3 Table 8.1.10.

Detail	%	June 2000 as provided	%	Average as provided 07/99 to 06/00	%	June 2000 verifie
Actual Consumption	63	12,505 m^3	48	16,231m^3	1	245 m^3
Estimate & Flat Rate	37	7,355 m^3	52	17,273m^3	99	31,311 m^3
TOTAL:	100	19,860 m^3	100	33,504 m^3	100	31,556 m^3

Consumption records "as provided" were obtained from the O&M monitoring report, prepared on a monthly basis and forwarded to the District Office. The observation made is that the provided figures are contradictory, do not reflect the actual situation, and are in stark contrast with the verified June 2000 figures, which in themselves are again very doubtful.

The analysis of Appendix J 3 Table 8.1.10. gives the information of the current consumer portfolio in Mumias and equally indicates, where the bulk of revenue is coming from.

Consumption Steps	Number of Bills		Revenue Earned (June 2000)	
	Actual	Estimated	Actual Kshs	Estimated Kshs
0 to 10 m^3	2	107	1,555.00	60,058.00
11 to 20 m^3	1	459	275.00	475,363.00
21 to 40 m^3	1	61	3,120.00	95,084.00
41 to 60 m^3		20		30,715.00
61 to 100 m^3		1		1,770.00
> 100 m^3		2		36,400.00
Total	**4**	**650**	**4,950.00**	**699,390.00**

It is recommended that further information is obtained to reconfirm the actual situation.

8.1.10.1.5. Unaccounted for Water (UfW):
The production and consumption figures abstracted from the O&M Monitoring report for the period July 1999 to June 2000 reflect the unaccounted for water as shown under Appendix J3 Table 8.2.10, but it is not clear how these figures have been calculated, and further clarification is therefore necessary.
However, using production for June 2000 of 21,180m^3 compared with the verified June consumption of 31,556m^3, result in a consumption exceeding production and cannot be analysed further.

8.1.10.1.6. Billing and Revenue Collection:
Billing:
The billed and collected revenue is reflected in Appendix J 3 Table 8.3.10 and abstracted from monthly returns to the District Water Office. The billed revenue does not reflect any change even after the tariff increment in November 1999. The billed revenue before November 1999 actually is higher than billed revenue after November 1999; an indication that the billed revenue may not reflect the correct picture. No explanation was forthcoming concerning this.
The approach of the consultant was to verify using Appendix J 3 Table 8.1.10., which contains the information abstracted from the consumer ledgers for the month

of June 2000. This exercise indicated the amount of Kshs. 721,750.00 as the billed revenue, whilst the monthly return to the District Water Office abstracted from Appendix J 3 Table 8.3.10 reflects the June figure as Kshs 150,000.00. This indicates a difference of Kshs. 571,750.00 and we can only assume that the billed revenue figure used in the return to the District is not derived from the consumer ledgers. It is noted that the consumer ledger information reflects over estimation and its correctiness is seriously doubted. The billing efficiency calculated below is therefore also in doubt. Using the verified June 2000 billed consumption of 31,556m^3 and the monthly production figure of 21,180m^3, a billing efficiency is exceeding 100% and cannot be recommended to be used.

Revenue Collection:
The revenue collected is reflected in Appendix J3 Table 8.3.10. as provided through the Mumias WS office return to the District Water Office. The total for the FY 99/00 amounts to Kshs 1,530,006.00 resulting in an average of Kshs 127,500.50 per month. It is to be noted that further payment details obtained from the weekly collection information as reflected in appendix J 3 table 8.3.10.1 indicate a total collection of Kshs. 1,438,775.00 for the whole financial year 99/00 and the difference cannot be explained.

Detail	June 2000 As provided	Average FY 99/00 As provided	June 2000 Verified
Billed Revenue	150,000.00	154,518.65	721,750.00
Collected Revenue	132,696.00	127,500.50	132,696.00

Based on June 2000 verified billed revenue and comparing with collected revenue for the same month, a **Collection Efficiency** figure of **18.39%** can be calculated. The information shows that 99% of billed consumption is estimated but it is not clear how this estimation is done. It is clear as from the above table that billed revenue as forwarded monthly does not have any relation with the consumer ledger information, which is the only source of information regarding billing.

8.1.10.1.7. Average Tariff:

The Average Tariff is calculated based on June 2000 records from Appendix J 3 Table 8.1.10. The Billed Revenue is Kshs. 721,750.00 / Billed consumption of 31,556 m^3 results in **Kshs. 22.87 per m^3.**

8.1.10.1.8. Debt Situation:

The debt arrears situation as provided by Mumias is the computed total, forwarded on a monthly basis in the format of Appendix J 3 Table 8.3.10. The Mumias basis of calculation shows that:

a. Monthly bills are estimated, and
b. The outstanding balance from the last FY incorporates the same problem, brought forward into the new year

As noted when doing the verification, the billed revenue which is reported may not necessarily be the amount shown on the consumer ledgers, and it is not clear whether a reconciliation is done at the end of the Financial Year to correct the estimation. The outstanding amount as provided may therefore not be correct.

Using information from Appendix J 3 Table 8.4.10., the situation **prior to the June 2000** bill is:

Detail	Mumias Debtors as provided prior to June 2000	No. of accounts	Verified Debtors prior to June 2000	No. of accounts
Total Debtors	1,552,762.00	800	2,020,145.95	1545
Major Consumers				
10,001 to 20,000	Not available		42,460.00	3
20,001 to 30,000	Not available		27,970.00	1
> 30,000	Not available		45,740.00	1
Total			**116,170.00**	**4**
Minor Consumers				
0 to 10,000	Not available		1,903,975.95	1,540
Total			**1,903,975.95**	**1,540**

8.1.10.1.9. Funding:

The information received at system level is that no imprest is availed from the District, and any expense has to be advanced by the respective staff member. The receipt is then submitted to the District for reimbursement. In case of emergency, the Division W.O. has to call the District Office for assistance and then make arrangements for the required items to be delivered.

As the Division W.O. offers technical support to the community projects, he receives an imprest from the project initiator, Kenya Finland Western Water Supply Programme. The project motor bike is occasionally used for Mumias Water Supply.

No details were available regarding the A.I.E. received and spent, as the same information could only be obtained from the District Office at Butere Town. The officer responsible for this account was however not available and the information was locked in a cabinet.

The only information available relating to the expenditure for Mumias WS is reflected under Appendix J 3 Table 8.2.10, but is not comprehensive because it shows expenditure for fuel, chemicals, and allowances and salaries only

8.1.10.2. Utility System Procedures:

All current procedures, as far as the office and field operations are concerned, are covered in the Appendix J 3 Questionnaire 8.1.10. It was the approach of the consultant to verify as many as possible technical, financial and commercial details to substantiate procedures with the facts obtained. It was however difficult to collect information within the given time frame as a number of key staff members were not available.

8.1.10.2.1. Administration:

8.1.10.2.1.1. Staff:

One staff member had been retrenched and any fluctuation of staff was explained as due to transfers. No organisation chart or job description in place. Skill levels must be described as low. The available revenue clerk is actually a water supply operator.

8.1.10.2.1.2 Consumer Accounts:

Consumer information is held in the application form and the consumer ledger, which is up-dated with the monthly meter reading, calculated bill and payment received. The Division W.O. has the application forms for new connections and does the survey himself. No other information could be confirmed concerning closing of a consumer account, change of address, or account transfer.

8.1.10.2.1.3. Meter Reading, Billing & Revenue Collection

Meter Reading:

There are four zones read by four meter readers. Meter reading starts from 24th of every month and takes two days. The reading is then forwarded to the revenue clerk.

Billing:

After receipt of readings from the field, the Billing Clerk transfers the same to the consumer ledgers, which are already updated with payment received from consumers. Bills are then calculated for all consumers. Consumers come to collect the bills or the bills are dropped to the consumer by the meter reader.

Disconnection:

Information availed indicates that the revenue clerk prepares the disconnection list and sends the meter reader for disconnection. There were no records available showing disconnection instructions or disconnected accounts, otherwise information can only be abstracted from the consumer ledgers

New Connection:

Upon a consumer request for a new connection, a site visit/survey is carried out by the Division W.O. to determine whether it is possible to provide water. If supply is possible, he assesses the required materials and ensures quality control. The completed application form is forwarded to the revenue clerk. The consumer pays all the charges and one receipt is issued for all charges, however weekly collection records reflect the split between water charges, labour, and deposit.

Revenue Collection:

All consumer bills and deposit payments are made to the revenue clerk based at the Division Officers office at Mumias Town. When collecting money from the consumers, receipting is done such that the original goes to the consumer, one copy is for the District Accountant, and one copy is forwarded to the DWO's office.

8.1.10.2.1.4. Authority to Incur Expenditure (AIE) and Procurements:

Authority to Incur Expenditure (AIE):

Monthly revenue returns are forwarded to the District Water Office and no specific A.I.E.s are known to be processed for Mumias. Any A.I.E. processing is undertaken from the District Office and no information was collected concerning this procedure.

Procurement:

disagreement of consumers, who express their objection with a low payment morale.
To clarify the issue of water losses and at the same time improve revenue collection, it is recommended to give the following priorities:

1. **Full rehabilitation of the existing distribution system, including standardised meter connections,**
2. **Replacement or repair of all faulty and flat rate consumer meters,**
3. **Setting up of a consumer data base and a reliable billing program, and**
4. **Management and staff Training for the relevant staff members.**

All other recommended activities under the Utility Management Plan under Chapter 8.10., are given second priority. These second priorities are however to be considered as equally important.
The very high number of non-functioning consumer meters is seen as the major contributor into the conflicting consumption picture.

8.1.10.6. Recommended Project Implementation Plan:

Based on the Action Plan Activity Phases as reflected in Appendix K3 Summary Table ST 8.4., the following Project Implementation Plan for Mumias is outlined here below for the 3 different Phases mentioned.
The overall assumption under which the proposed activities will reflect in the expected results, is that major players and stakeholders ensure that recommended reforms in the Water Sector are implemented.
Other assumptions under which the proposed activities will reflect in the expected results are:

Assumption 1:

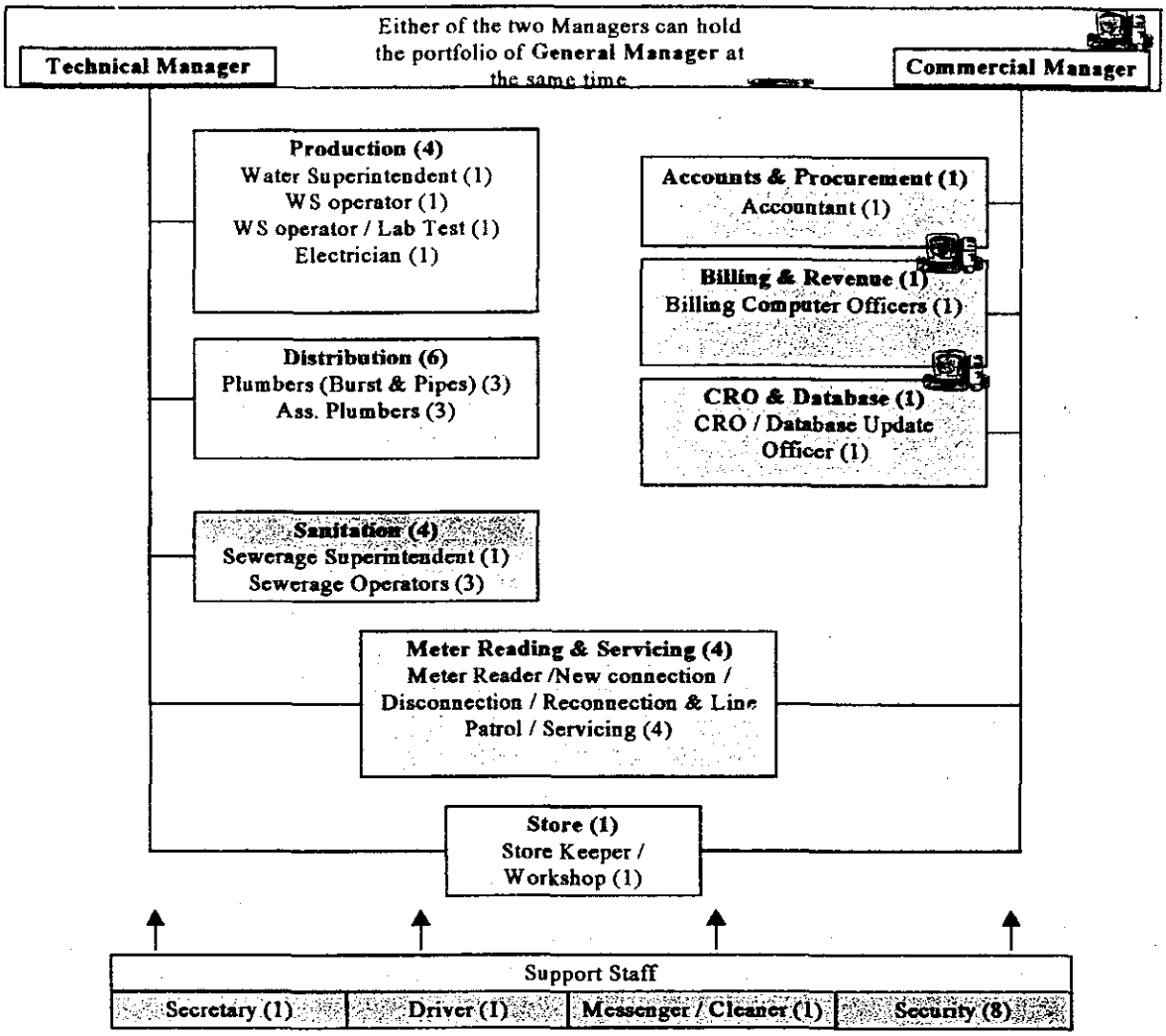
- Funds for approx. 800 (700 not working, 100 unmetered) consumer meters are available
- Funds for setting up temporary office structure with power connection, computer hardware (3), printers (2), billing software, additional transport (1 x 4WD pick-up, 3 motorbikes (1 meter reading, 1 line patrol, 1 new connections), 2 mountain bikes) and basic office equipment are available
- Funds for remuneration of the proposed staffing organisation is available
- Funds for 6 months interim operation, while cash collection is reorganised such that funds remain available at system level, and
- Funds for the involvement of the Management Consultant are available

All funds must be available or planned for at the beginning of the Management Consultant's involvement. Refer to Table 4.4.: Cost Estimate for Rehabilitation Works for the Mumias Water Supply.

Assumption 2:

Staff reorganisation, training and selection of staff as recommended by the management consultant receives the necessary support from MENR.

8.1.10.7 Recommended Mumias Organisation Chart:



Note:

Department is allocated a computer

Total recommended number of staff = 31 (additional 4 for sanitation)

NOTE:

- Currently no sanitation, therefore only provisionally noted in the chart

The possibility of out-sourcing security services, master meter and pump maintenance should be surveyed and assessed during the management consultancy contract. Implementation should be considered during the preparation of the rehabilitation works. In connection with the supply of master meters, it is assumed the supply of an adequate number will make a service contract, conditioned to the supply, possible.

Casual labour to support trenching or cleaning of blocked sewers will be sourced from the labour market whenever the need arises.

It is further recommended that consumer payments be received through existing Financial Institutions.

8.2. COMMUNITY SYSTEMS WITHIN THE EXISTING UTILITY SYSTEMS

Only three towns had community maintained systems within their supply area. Western Province, unlike any other province visited, has enjoyed massive support of community projects through Finnish Aid. Phase 1 of the KIFINCO project initiated and financed between 1981 and 1995 almost 4000 community projects. The current Phase 2 has now 4 main components under the overall objective of " increasing access to safe water for improved health and well being of the communities in Western Province, by increasing community management skills for maintenance, operation, improvement and replication of water facilities and for the protection of water resources":

- Monitoring and evaluation whether systems are functioning
- Support to those communities that approach the project and are prepared to contribute
- Provincial/District capacity building
- Water Resource Management

Implementation of new or rehabilitation projects are done through external contractors, while MENR staff is involved in the technical supervision. During Phase 1 all work was done through external staff, which led to frictions between MENR staff and those employed from outside.

Phase 2 concentrated at the onset on awareness creation amongst all District and Divisional Offices, using the ToT approach (Train the Trainer), and then involved other leaders and representatives of communities, to deseminate the new approach.

8.2.1. Makindu

There are four operational and functioning community systems within the Makindu water supply area, but information could only be obtained from three.
Kikumbuli Community took over 136 accounts in 1992, because they received water from Umani Springs. No information could be obtained on how it is managed, but community members are receiving water.

Amref financed 2 additional projects, the Kai Water Project and the Nzumi Water Project. Both systems serve approximately 7.400 people. Amref conditions were the involvement of the community in trenching and laying of the pipes and construction of the tanks. Community members were trained in the technical field and bookkeeping, and training included formulation of the By-laws.

Both systems operate smoothly and the Makindu WS system receives payment of bills promptly. Maintenance of the line is the responsibility of the community. Artisans and Kiosk attendants are from within the community and receive a salary for the work they do. The Community plans to use the money on the account for maintenance and expansion of the line.

The Mulili Water Project was financed by German Agro Action and started its operation just recently. It serves approximately 3.700 people. The approach for the project was similar to Amref's, whereby the community is actively involved in

the work during and after the completion.

Bulk supply from Makindu WSS to all communities at Kshs 15,00/cbm and no problems have been experienced so far.

8.2.2. Migori

The Nyasare Water Supply community project is registered under the Society Act and has been in operation since 1994. The project was financed by the Austrian Government and serves the rural and part of the urban population of Migori town. The community has 989 paid up members.

The management and operation of the system is paid for work done and O&M cost incurred monthly are covered out of the collected revenue. The management comprises of the Chairman, Vice chairman, Secretary, Ass. Secretary, Treasurer and Ass. Treasurer.

Since 1997, the organisation has been operating without donor funds.
Even though the community faces problems in revenue collection, there are efforts to increase the tariff. The organisation works closely with the District Water Officer Migori.

The community intends to come up with a phase 2 project, to develop other water sources and the Institute for International Co-operation (Austrian Aid) is willing to assist. They have also applied to take over Migori Water Supply under the Ministry.

8.2.3. Webuye

Webuye has one community project for which no information could be obtained. The Muchi Milo Community project, initially financed by KIFINCO, is non-operational since 1995. Electrical fittings were vandalised twice, now the project seems completely stalled. KIFINCO in Kakamega had information that chairman of the project has political ambitions and is therefore suspected to have political enemies, who could be responsible for the vandalism. The new approach of KIFINCO is the "demand driven approach", i.e. communities can come for help, if they are prepared to contribute 50% into the cost.

Muchi Milo treasurer did not seem to know, neither did the Divisional Water Officer, even though KIFINCO had informed all Districts and Divisions creating awareness down to the communities through leaders and representatives.
Consumers are now neither receiving water from the mains nor through the community project.

8.3. PROBLEMS AND SHORTCOMINGS OF THE EXISTING SYSTEMS:

All systems visited suffer from a number of problems which in turn lead to more shortcomings, ultimately translating into:

- Low efficiency on production,

- Limited supply situation,
- Billing below expectation, and
- Revenue collection, which cannot sustain the operation.

An assessment of the problems seen and experienced in the various systems visited, is represented in the Problem-Symptom-Cause Matrix under Appendix K 3 – ST 8.3. To various degrees the systems show that neither the Head Quarter nor the water systems do know what they produce, what is in place, what is outstanding, what are the actual cost for the water production and/or what is the financial position they are in.
Community systems established with the involvement and / or contribution of the community, combined with training into the management and operation, seems more successful, than those systems that have been simply handed over to the people. This equally reflects in the second phase approach of the KIFINCO project, which is demand driven and with financial involvement of the community.

8.3.1. Division Specific Problems:

Divisions operate under the District offices. The systems visited operate under even more difficult circumstances. All problems are similar to the problems experienced in the Districts, because whatever is a problem for the District results in an even bigger problem or longer delay for the Division.

The criteria for category Division or District does not relate to the population served. While Mumias is a Divisional office, with less than a decent office and the necessary skilled staff, it serves a population of 110.400 people, Wundanyi is a well equipped District office and serves a population of 7,600 people. The same applies to Webuye Division office, serving approximately 73,000 people and lacking the absolute basics.

The Division is run with no imprest at all and the most basic requirement like making a photocopy or using public transport to visit the District office, expects the staff member to pre-finance the expense and claim it from the District in due course. Refund procedures can take weeks, even months.

8.3.2. Districts Specific Problems:

The biggest problem seen at District level is the A.I.E. funding and procurement procedure. While the District Administration is involved throughout the lengthy procedures, the District Administration has to cater for all the Government Departments and does not necessarily give the Water Department priority over other Departments. Special efforts in revenue collection may result in Nil A.I.E. received, as was the case in Narok, where the approved A.I.E. came just before the end of the Financial Year and lacking liquidity at the District Administration office resulted in an approved A.I.E. but no funds. Un-utilised A.I.E can then not be carried forward into the new FY.

8.3.3. NWC&PC Area Office Specific Problems:

The area office is totally dependant on the Regional Office and faces the same problems as the Division Offices under the Districts. Decision making does not take place on the ground and any requirement has to be organised through the

Regional Office.

Recent changes turned a small imprest previously available into a NIL cash flow. The 50% of re-connection and labour charges do not seem to come forward, Even the smallest operational requirement becomes a problem. A further problem is, that billing and consumer related issues face considerable delays as they cannot be dealt with immediately. They have to be forwarded to the Regional office and reply has to be awaited. Disputes are decided by a committee at the regional level, while the recommendation of the area manager seems to be given lesser or often no consideration.

8.4. MENR HEADQUARTER PROCEDURES, SHORTCOMINGS AND IMPEDIMENTS

Every utility system visited had the feeling that the Head Quarter receives monthly forms and returns only to file the same away. No reaction is received. Considering the meaning of reporting, facts and figures should be used for planning, control and management decisions.

As the majority of the information reflects discrepancies or plain gaps and no reaction comes from the Headquarter, it means that either the information is not used for decision making, or the discrepancies are not seen and plans are based on wrong information.

Procedures and tangible details are more difficult to obtain at Head Quarter level than at the District. Efforts by the consultant to get clear and substantiated information, were fruitless in most cases. Similar to the record keeping at District or Division level, information is available somewhere and somehow, but the magnitude of data handled at the Head Quarter makes the search even more complicated.

8.4.1. Personnel Issues and Procedures

All Division, District and Province staff salary matters are dealt with at Head Quarter. The structure seems to be such that within the personnel department at the Head Quarter, one officer is allocated a certain number of staff numbers. Following up several personnel issues for the District, can result in having to see several officers for the same problem relating to several staff members. The attempt to obtain comprehensive remuneration details for the towns visited, failed.

8.4.2. Power

Payment of power bills from the District has been changed during the last Financial Year. The processing procedure at District level had caused a number of power accounts being cut. Current practice is, that power bills for all water systems operated by the MENR, are paid for from the Head Quarter. If the bills are received at District level, they are passed on to Nairobi for settlement. As many bills are paid for many Districts with one payment, to find and obtain details for any particular WS System, requires lengthy searches. The question as to whether credits are correctly reflected on the following power bills, could not be established.

8.4.3. Chemicals

Sourcing and procurement for chemicals is done centrally for all the WS systems operated by MENR. The procedure involves an annual open tender, approved by the MTB (Ministerial Tender Board), followed by the CTB (Central Tender Board). While the District gave the information that chemicals have to be collected from the Nairobi Central store, the information at the Head Quarter was, that chemicals are delivered to the Districts and only additional requirements over and above the planned quantity have to be collected. It is to be analysed, whether the centralised procurement bears any price advantages over the system level procurement, as the existing system does not reflect any other advantages.

As chemical requirements are planned from the Head Quarter and information of chemicals from the Districts is in most cases based on estimated past experience, the question arises also, whether there is a realistic basis for actual chemical requirements, relating to actual production?

8.4.4. A.I.E. Issues and Procedures

The A.I.E. procedure originates from the District and has to be processed through MENR Head Quarter and Ministry of Finance/Treasury, before it can go back for further processes to the District. Appendix K 3 – Figure 8.2. and Figure 8.3. reflect the whole process, which is lengthy and complicated.

8.4.5. Planning and Control

Planning is based on information about the performance of a water supply system. Indices like production-, consumption-, billing- and revenue collection-efficiency or system compiled cost, are necessary tools to control the use of chemicals, calculate a cost covering tariff or determine the right transport requirements or staffing levels. As reported information from the water supply systems lack the correct information or if availed, are not translated into an efficient Management Information System, the question arises as to: Which are the tools, that the Head Quarter plans with?
While the A.I.E. process and involved procedures are lengthy and complicated, the accounting for the money spent, is done by the District Administration to Treasury. The MENR receives only the printed information, against which votes the expenditure has been booked. The question is, whether GOK procurement procedures have been complied with, but not whether the three or five quotations obtained reflected a realistic market price, hence the whole system is more procedure than financial control.

8.5. PROVINCIAL WATER OFFICE FUNCTIONALITY

The functionality of the provincial water offices could not be clearly established. However, the schedule of duties for the Provincial Water Officer is giving the following duties and responsibilities:

- Development, maintenance, control and supervision of all Ministry's operations in the Province
- Any other duties as may be assigned.

Meetings with the district water officers, receiving donors and delegations and general co-ordination, were the comments received. While all technical and

financial returns are as well copied to the Provincial Office, reminders on performance and targets do originate from the MENR Head Quarter. It therefore remains to be explored further, what role the Provincial Office plays in the context of management support, control and/or assistance, when compared with the schedule of duties? Is the Provincial Office an information and control filter for the mass of operational and financial details that are sent to the Headquarter? Is the Provincial Office used as an information dissemination medium? How is the infrastructure, which is in place at the Provincial Office, utilised?

8.6. NWC&PC SHORTCOMINGS AND IMPEDIMENTS

NWC&PC has already a partly de-centralised reporting system, as the Regional Manager only reports filtered information to Nairobi. Decision making remains however an equally lengthy procedure (experienced as well, where commercialisation is involved). AS NWC&PC has to comply with the normal GOK procurement procedures, only slightly modified, problems are of similar nature.

8.7. COMMERCIALISED SYSTEMS IN KENYA

The number of commercialised systems, evolving from former Government operated systems, is limited. Malindi, Nyeri and Kitale were chosen. All systems visited and analysed are currently operated under an agency agreement. The difference in their structure is, that the agent in Malindi is a privately owned company, while the other two companies of Nyeri and Kitale are wholly owned by the former operator, with a Board of Directors representing the stakeholders of the water and sanitation system. Assets remained in all three cases with the former operator of the system.

8.7.1. Malindi: Management Contract (NWC&PC)

The Malindi Management Contract is actually an agency agreement between the National Water Conservation and Pipeline Corporation and H.P. Gauff in association with Gauff Utility Services Kenya Ltd. The Amendment to the State Corporation Act under which NWC&PC has been incorporated, gives NWC&PC the formal mandate to enter into agency agreements, which are accepted by the Attorney General.

The agreement was signed in March 2000, covering a period of 4.5 years.
The company is given autonomy for the day to day operation and related decision making. The overall regulations guiding the NWC&PC do however relate as well to the agency agreement. This means that Government procurement regulations and procedures or writing off debt procedures have to be observed and complied with by the agent as well.

Appendix K 3-Q 8.6.1. reflects the interview with the representative(s) of the agent. While the Malindi agency agreement built on an earlier pilot project, where consumer account aspects, billing and revenue collection, Meter reading and O&M aspects had already been systematically taken up in the past, the new agency agreement took off with the experience gained before. The major task is to get procedures and schedules refreshed and close the information gap that was caused by a delay of almost two years between the old project and the new agreement.

As the project was only in operation for a period of 8 months by the time of the visit, comments on the self-sustainability could not be obtained yet. The initial setting up time required must be considered and self-sustainability should be looked at, at a later point in time.

8.7.2. Nyeri: NYEWASCO Private Water Company

Nyeri Water Company, NYEWASCO, operates under an agency agreement which was signed on 19th March, 1999 and amended on 7th April, 2000. The duration of the agency agreement is 20 years. The agreement is between the Municipal Council of Nyeri and the company.

A Core Management Team is in place and all other staff members were taken over. However it was said that the individual staff performance determines whether they will stay with the company. Salary increments of 15% and 7.5% have been effected since the operation started. An incentive scheme for the staff is being worked on.

Appendix K 3 – Q 8.6.2.reflects the interview with the Managing Director of NYEWASCO.

8.7.3. Kitale: KIWACO Private Water Company

The Kitale Water Company operates under an agency agreement drafted, but not yet finalised or signed. The agreement is between KIWACO, the new company and the Municipal Council of Kitale.

A new Core Management Team (CMT) has been recruited and is supported by a Financial Advisor, seconded by CIM (Centre for International Migration). All other staff members were taken over from the Council Water Department, pending finalisation of the agency agreement.

Day to day operation has been transferred to the agent at the beginning of the year 2000, while numerous financial issues have not yet been sorted out with the former operator and creditors of the former operator. Much of the manager's time is therefore spent on issues relating to the past and negotiation concerning the agency agreement. The day to day operation is independent.

Appendix K 3 – Q8.6.3. reflects the interview with the CMT and the Financial Advisor.

8.8. PROBLEMS AND SHORTCOMINGS OF EXISTING COMMERCIALISED SYSTEMS

The problems or impediments experienced in Malindi and adversely affecting the efficiency, can be summarised as follows:

- The line of command is too long and decision making processes take to much time and additional effort

- Government procurement procedures

The problems or impediments experienced in Nyeri seem very limited and reduced to staff related issues. All former problems, concerning interference of some Councillors with the Board, seem no longer applicable.

- Audited Accounts from the Council to start with the Opening Balance of the company are not yet available
- Not clear how consumer balances absorbed? (audited or not)
- Not clear how old creditors to be absorbed (audited or not)

The problems and impediments experienced in Kitale and adversely affecting the current operation of the company, can be summarised as follows:

- The agency agreement should be signed prior to the commencement of the new company
- Liabilities taken over from the previous operator should be reconciled and audited, to enable the company to start of with a clear picture of the Opening Balance situation
- Financial start up help should be available
- Amount or mode of lease for the assets not yet finalised
- Loan balance of assets not yet clear with the council
- Production affected, due to power on cut off, not for current but old KP&LC debt, carried forward
- Staff issues (transfer, provident fund etc) not finalised as agency agreement still pending

8.9. OPTIONS FOR VIABLE MANAGEMENT AND OPERATION

The approach for recommended changes has focussed on the intention to offer viable approaches that can be implemented within the shortest possible timeframe. Achievements should be possible, while more substantial changes touching on the institutional and legal framework are discussed, formalised or registered.

The various degrees of implementation carry the risk that other players involved in the changes do not agree to the recommended changes. To avoid this major risk, which has been experienced in the Kenyan environment, especially in the Water Sector, a gradual approach is recommended.

While the registration of a private company, Water User Association, Trust or Trust Corporation can be done within a few months, it is seen as a very time consuming and involving exercise, to prepare a detailed network condition plan, existing asset and liability information and clarify the position on the consumer accounts. The assessment, training, selection and repeat training of existing staff into a commercial environment requires "change management" in order to build capacity.

The problems caused by not having reconciled or audited data ready, when registering the "commercial" institution, can be learned from the commercialised

systems currently already in operation. The preparation of these details can fall into the operation of the "commercial" institution, provided the mode of establishing and confirming the figures has been agreed upon, prior to commencement of the 'commercial' operation.

Recommended changes have been worked out in Appendix K3 – ST 8.3 and are used as the basis for further analysis, leading to the phased options, reflected in the Action Plan. Refer to Appendix K3 – ST 8.4

8.9.1. Recommended Changes within the current Institutional Framework

Recommended changes for Phase I of the Action Plan are those changes that can be implemented immediately, with the assistance of a consultant and jointly with the client MENR. All recommended changes are vested within the powers of the client.

8.9.2. Recommended Changes for a De-centralised Framework

The analysis of the current situation reflects that the centralised system under which all water systems are managed and operated, accounts for many of the impediments listed. Phase II of the Action Plan indicates, which steps are recommended to be taken.

The decentralisation approach is as well seen as a step-by-step movement towards bringing the systems closer to the communities, pending a gradual approach towards Private Sector Participation. No lead model has been confirmed yet and a countrywide move can only be implemented by a gradual approach, as capacity building will be a lengthy process and not just a decision or declaration.

8.9.3. Recommended Changes for a Transition Approach

It is expected that recommended changes of Phase I will lead into and continue during Phase II and III. Any changes recommended under the institutional framework management, can build on the grass root work that has commenced with the preparatory measures of Phase I, as they are seen as a requirement for any kind of improvement or change towards a commercialised operation.

8.10. RECOMMENDED UTILITY MANAGEMENT PLAN

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan
1.	Arrange for decent office space							x		x	x	
2.	Set up organisation charts with detailed job description and skill requirements.	x	x	x	x	x	x	x	x	x	x	
3.	Arrange for intensive management training for Engineers or recruit well-qualified managers.	x	x	x	x	x	x	x	x	x	x	
4.	Arrange for commercial and technical staff training	x	x	x	x	x	x	x	x	x	x	
5.	Set up positive and negative staff sanctioning system.	x	x	x	x	x	x	x	x	x	x	
6.	Limit recruitment to the system requirement, based on skill and merit.	x	x	x	x	x	x	x	x	x	x	
7.	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	
8.	Redesign consumer recording and reporting formats	x	x	x	x	x	x	x	x	x	x	
9.	Computerise consumer data base and consider billing software	x	x	x		x	x	x	x	x	x	
10.	Obtain field information from all existing consumer using the re-designed application format	x	x	x	x	x	x	x	x	x	x	
11.	Prepare implementation guidelines related to gazette notices and relating procedures	x	x	x	x	x	x	x	x	x	x	
12.	Prepare consumer and connection management guidelines	x	x	x	x	x	x	x	x	x	x	
13.	Design consumer / connection – management guidelines	x	x	x	x	x	x	x	x	x	x	
14.	Design meter reading / servicing / disconnection schedules and guidelines.	x	x	x	x	x	x	x	x	x	x	
15.	Undertake analysis to substantiate and confirm old debts	x	x	x	x	x	x	x	x	x	x	
16.	Propose write off procedure for old debtors	x	x	x	x	x	x	x	x	x	x	
17.	Recommend commercial charges and penalties	x	x	x	x	x	x	x	x	x	x	
18.	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	
19.	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	

8.10. RECOMMENDED UTILITY MANAGEMENT PLAN

No.	Action	Naivasha	Meru	Murang'a	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan
1	Arrange for account officers									\	\	
2	Set up and position of HR with defined job description and skill requirements	\	\	\	\	\	\	\	\	\	\	X
3	Arrange for intensive management training for Engineers or recruit well qualified managers	\	\	\	\	\	\	\	\	\	\	X
4	Arrange for commercial and business staff training	\	\	\	\	\	\	\	\	\	\	X
5	Set up positive and negative staff sanctioning system	\	\	\	\	\	\	\	\	\	\	X
6	Link remunerations to the system requirement based on skill and merit	\	\	\	\	\	\	\	\	\	\	X
7	Prepare criteria for transfer requirements based on size of system coverage and network number of consumer e.t.c	\	\	\	\	\	\	\	\	\	\	X
8	Redesign consumer reading and reporting formats	\	\	\	\	\	\	\	\	\	\	X
9	Computerise consumer data base and consider billing software	\	\	\		\	\	\	\	\	\	X
10	Obtain field information from all existing consumer using the re-designed operation format	\	\	\	\	\	\	\	\	\	\	X
11	Prepare implementation guidelines related to gazette notices and relating procedures	\	\	\	\	\	\	\	\	\	\	X
12	Prepare consumer and connection management guidelines	\	\	\	\	\	\	\	\	\	\	X
13	Design consumer connection management guidelines	\	\	\	\	\	\	\	\	\	\	X
14	Design meter reading servicing disconnection schedules and guidelines	\	\	\	\	\	\	\	\	\	\	X
15	Undertake analysis to substantiate and confirm old debts	\	\	\	\	\	\	\	\	\	\	X
16	Propose write off procedure for old debtors	\	\	\	\	\	\	\	\	\	\	X
17	Recommend commercial charges and penalties	\	\	\	\	\	\	\	\	\	\	X
18	Create staff consumer and stake holder awareness of cost of production and distribution of water	\	\	\	\	\	\	\	\	\	\	X
19	Outsource the servicing for master meters and condition future supply tenders to procurement with service backup	\	\	\	\	\	\	\	\	\	\	X

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuye	Mumias	Utility Management Plan
20.	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	
21.	Decentralise decision making process to station level	x	x	x	x	x	x	x	x	x	x	
22.	Decentralise planning and control of cost	x	x	x	x	x	x	x	x	x	x	
23.	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	
24.	Design MIS reporting system for Povincial to HQ reporting (investment planning, policy making)	x	x	x	x	x	x	x	x	x	x	
25.	Set up stock management system and controls	x	x	x	x	x	x	x	x	x	x	
26.	Set up consumer meter workshop (with volumetric test facilities)	x	x	x	x	x	x	x	x	x	x	
27.	Prepare / update O&M guidelines / manuals	x	x	x	x	x	x	x	x	x	x	
28.	Propose outsourcing criterias for pump maintenance depending on the pump capacity.											
29.	Include consumer lines into the planned network	x	x	x	x	x	x	x	x	x	x	
30.	Clarify and document water wayleafs	x	x	x	x	x	x	x	x	x	x	
31.	Introduce retainer security on contracted civil works and quality control	x	x	x	x	x	x	x	x	x	x	

No.	Action	Narok	Meru	Murang'a	Kabarnet	Nakuru	Nyandarua	Migori	Lamu	Mwhaxe	Mumias	Utility Management Plan
20	Decentralise all finance and procurement procedures to system level and train for efficient and stringent control to the provincial / regional office level	X	X	X	X	X	X	X	X	X	X	X
21	Decentralise decision making process to station level	X	X	X	X	X	X	X	X	X	X	X
22	Decentralise planning and control of cost	X	X	X	X	X	X	X	X	X	X	X
23	Design efficient and stringent control system for the provincial / regional office level (Price analysis, independent external auditors, adequate use of chemicals)	X	X	X	X	X	X	X	X	X	X	X
24	Design MIS reporting system for Provincial to HQ reporting (investment planning, policy making)	X	X	X	X	X	X	X	X	X	X	X
25	Set up staff development system and controls	X	X	X	X	X	X	X	X	X	X	X
26	Set up consumer meter workshop with volumetric test facilities	X	X	X	X	X	X	X	X	X	X	X
27	Prepare / update O&M guidelines / manuals	X	X	X	X	X	X	X	X	X	X	X
28	Propose outsourcing criteria for pump maintenance depending on the pump capacity											X
29	Include consumer links into the planned network	X	X	X	X	X	X	X	X	X	X	X
30	Clarify and formulate water abstracts	X	X	X	X	X	X	X	X	X	X	X
31	Introduce retainer security on contracted civil works and quality control	X	X	X	X	X	X	X	X	X	X	X

8.11. RECOMMENDED PRIORITY PROJECTS

The final choice of priority projects is recommended to be made during or as a result of the stakeholders workshop. The utility indices and figures compiled in Annex K3 – ST8.2. allow however to draw conclusions and give a basis for good comparison. There are a number of criteria offered as a selection criteria, like:

- Which town promises the fastest results?
- In which town are the highest savings expected?
- Where is the intervention most urgently needed?
- Billing and Revenue Collection Efficiency highest or lowest? or
- Which town has shown the highest effort under the prevailing circumstances?

8.12. RECOMMENDED PRIORITY MEASURES:

The reduction of Un-accounted for Water (UfW) must be considered as the overall priority measure, necessary for all the systems analysed.
Un-accounted for Water is made up of:

- Physical losses in the transmission and distribution system
- Wrong meter reading and billing, and
- Water theft

For those towns where the calculation showed no UFW, the consultant is of the opinion that the information availed needs further confirmation and more detailed field investigation, because such a situation isunrealistic.

To reduce the said water losses it is therefore recommended to give the following priorities:

1) **Full rehabilitation of the existing distribution system, including standardised meter connections,**
2) **Replacement or repair of all faulty consumer meters,**
3) **Setting up of a consumer data base and a reliable billing program, and**
4) **Management- and Staff Training for the relevant staff members**