

## **5 EXISTING WASTE WATER DISPOSAL & SANITATION CONDITIONS**

### **5.1 SEWERAGE SYSTEM**

The only waterborne sewerage system serves St. Joseph's Mission Hospital and staff housing. The sewerage system discharges to a set of waste stabilisation ponds, from where effluent is disposed of into the Migori River. The entire system is owned by the Diocese of Homa Bay.

### **5.2 SEWERAGE SYSTEM (O&M)**

Operation and maintenance of the sewerage system at St. Joseph's Mission Hospital is the responsibility of the Diocese of Homa Bay.

### **5.3 SEWAGE TREATMENT WORKS (O&M)**

Operation and maintenance of the waste stabilisation ponds serving St. Joseph's Mission Hospital is the responsibility of the Diocese of Homa Bay.

### **5.4 OTHER DISPOSAL FACILITIES**

The rest of the town's residents rely on septic tanks, cess pits and/or pit latrines for waste disposal. Emptying septic tanks is the responsibility of Migori Town Council.

### **5.5 ON-GOING OR PLANNED EL NINO WORKS**

No improvements are being carried out under the ongoing El Niño project.

### **5.6 OTHER WORKS AND PROJECTS**

There are no other projects to improve sanitary conditions in Migori.

5.7

**SUMMARY OF SHORTCOMINGS AND PRELIMINARY  
RECOMMENDATIONS FOR REHABILITATION**

Construction of a waterborne sewerage system is outside the scope of this study and will be an expensive undertaking, given that appropriate collection and treatment techniques will be used. In the short term, perhaps legislation can be put in place to prevent the discharge of sewage in public places with the inherent nuisance and health consequences.

## **6 PROPOSED STRATEGY FOR WASTEWATER DISPOSAL AND SANITATION REHABILITATION**

### **6.1 DEMAND FOR SANITATION SERVICES**

With the exception of St. Joseph's Mission Hospital, Migori is reliant on on-site sanitation technologies. As noted in Section 3.8.3, the overall per capita water supply to the town is only 3.67 litres per head per day. Until the water supply is augmented, through substantial expansion of either the gazetted scheme or the community-managed Nyasare scheme, there will be no wastewater disposal problems to be overcome in Migori.

### **6.2 DEMAND FOR WASTEWATER DISPOSAL SERVICES**

There is no public waterborne sewerage in the town and no justification for one to be constructed in the immediate future as stated in Section 6.1. The only waterborne sewerage system is privately owned and operated.

### **6.3 CONFIRMATION OF REHABILITATION OPTIONS**

As there is no waterborne sewerage system for the town, there are no works for rehabilitation.

### **6.4 PRELIMINARY DESIGN OF RECOMMENDED OPTION**

This is not applicable for the reasons outlined in Section 6.3.

### **6.5 COSTING OF RECOMMENDED REHABILITATION PLAN**

This is not applicable as rehabilitation or new sewerage works are not proposed under this study.

### **6.6 FUTURE DEVELOPMENT OF A WATERBORNE SEWERAGE SYSTEM**

Once the water supply to the town has been increased through the proposed rehabilitation measures and the second phase of the Nyasare water supply project, water consumption and wastewater

generation will increase. In the more densely settled portions of the town, the wastewater generation rate may exceed the infiltration capacity of the soil, so the construction of a waterborne sewerage system may become necessary.

For budgetary purposes, an allowance is made for sewerage government institutions in Milimani, the District Hospital and the Market and surrounding areas. The estimated cost of sewerage these areas is given in Table 6.1 below.

**Table 6.1**  
**Cost of future sewerage system**

<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Amount (KShs)</b>
Collector sewers	m	4,500	4,000	18,000,000
Outfall sewer	m	2,500	5,400	13,500,000
Waste stabilisation ponds	Sum			95,000,000
<b>Overall Total</b>				<b>126,500,000</b>
Add 20% P&G				25,300,000
Sub-total				151,800,000
Add 15% Contingencies				22,770,000
Sub-total				174,570,000
Add 20% consultancy design fees				34,914,000
<b>GRAND TOTAL</b>				<b>209,484,000</b>

## **7.0 LAWS AND REGULATIONS OF ENVIRONMENTAL IMPACT**

### **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 different objectives; 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 4<sup>th</sup> 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**

Migori water supply is based on groundwater exploitation through a number of boreholes although Migori and Osani rivers have high potential to supply the needs of the town. There are plans to expand the water supply system through Austrian aid utilizing Osani River, which is likely to yield better quality surface water. Although test results were not available for confirmation, Migori River is believed to be polluted, explaining why there has been no incentive to exploit it. There are also proposals to exploit Kuja River for gravity supply to Migori town as part of the water resources development master plan for the Lake Basin Authority. In addition to the MENR gazetted and Nyasare community water supply schemes people draw water from traditional shallow wells whose water quality cannot be confirmed.

The programme for monitoring water quality both at source and within the distribution systems is in place in Migori town, however, implementation is generally poor because of lack of appropriate and adequate laboratory equipment and reagents. Water quality analysis results available site were for pH and residual chlorine only. However, borehole data filed with MENR showed that the groundwater used in Migori town is of good quality and non-aggressive to cement and iron products.

### **7.3.2 Existing Sanitation Situation**

Migori 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. There is a small internal sewerage system serving St. Joseph's Mission Hospital and staff quarters, whose final effluent is discharged into Migori River.

### **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 4<sup>th</sup> Schedule. The guidelines propose the checklist method for screening and scoping for EIA.

The general environmental concerns and a checklist for Migori town have been summarized herein. A comprehensive EIA will be conducted at the feasibility stage, however, it is envisaged that most of 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. However, areas that require detailed environmental impact assessment study have been identified during this initial EIA.

#### **7.4 ENVIRONMENTAL CONCERNS IN MIGORI TOWN**

1. Migori River is heavily polluted as it passes through the town and cannot be economically used as a source of water for the town.
2. There is no sewerage system for the municipality and sanitation is based on on-site pit latrines, septic tanks and cess-pits, which do not provide adequate service especially in the intensively developed area along the Kisii – Migori – Isebania road.
3. The pit latrines commonly used are a threat to the water wells, which constitute the main source of water because the MENR Water Supply is inadequate and unreliable.
4. The council has no exhauster to empty the pit latrines and septic tanks. Exhauster service is available at very high costs from Kisii. The minimum charges are currently Kshs.3,000 per trip.
5. The council pit latrines serving the market are over used and are in poor state of use and repair posing a risk to public health in the town.
6. Effluents from St. Joseph's Hospital sewage ponds, Migori Teachers' Training Institute and the G K Prison are the major contributors to Migori River pollution.
7. The council does not have by-laws for controlling wastewater discharges.
8. The district hospital has no incinerator so the hazardous wastes generated at the hospital is disposed of together with domestic and commercial refuse posing danger to public health.
9. Solid waste management is inadequate. The council has one old tractor, which cannot cope effectively with collection and disposal of solid wastes.
10. The slaughter slab does not have adequate provision for wastewater disposal. Effluent from the washings of the slab discharges to River Migori causing pollution, however, the solid wastes are collected by the council tractor for disposal.
11. Storm water collection and drainage is inadequate.

12. There is encroachment of riparian area of Migori River by unplanned structures especially kiosks and low-income residential slums. These contribute to pollution and violation of the Environmental policy on protection of riparian areas.

## 7.5 RESULTS OF INITIAL ENVIRONMENTAL EXAMINATION

Migori town depends on boreholes for its main water supply. There are 5 boreholes operated by MENR with a total production capacity of 480 m<sup>3</sup>/day against a demand of over 2000 m<sup>3</sup>/day. Part of the town is supplied through Nyasare Water Supply, which is a community based water undertaking. Nyasare taps water from a number of springs along Nyasare Valley.

Sanitation in Migori town is based on on-site pit latrines and septic tanks. The town does not own an exhauster vehicle; exhauster services are obtained from Kisii town which is over 40 Km away.

Summaries of initial environmental examination are presented in tables 7.1 and 7.2 for the Water Supply and Sanitation Components respectively.

**Table 7.1 IEE Checklist - Water Supply Component**

ITEM	EVALUATION	COMMENT
1. Human Settlement	5	No negative impact expected
2. Economic Activities	5	Improvement in water supply should enhance economic activities
3. Transport	4	No impact expected
4. Water and Common Rights	3	Uncertain, intensified groundwater exploitation may affect other water users.
5. Sanitation	5	Improved water supply will enhance sanitation situation
6. Waste	4	No impact expected
7. Hazards / Dangers	4	No impact expected
8. Topography and Geology	5	No impact expected
9. Soil Erosion	4	No impact expected
10. Groundwater	1	Main supply is based on ground water
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 impact expected
14. Weather	5	No impact expected
15. View	5	No impact expected
16. Air Pollution	4	No impact expected
17. Water Pollution	4	Needs attention during construction
18. Soil Contamination	5	No impact expected
19. Noise and Vibration	4	No impact expected
20. Ground Subsidence	3	Unclear; effect of ground water pumping should be investigated
21. Noxious Odours	5	No impact expected
22. Cultural and Archeological Assets	5	No impact expected
23. Conflict with community Aspirations	3	Unclear due to existence of a significant community water supply system - Nyasare.

**KEY:**

1. Serious impact expected
2. Minor impact expected
3. Uncertain (investigation needed to clarify)
4. Almost no impact expected if proper construction procedures 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	4	No negative impact expected
3. Transport	4	No impact expected
4. Water and Common Rights	4	No impact expected

5. Sanitation	1	Aim of study is to improve 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	4	No impact expected
10. Groundwater	3	Uncertain, groundwater exploitation may be affected by on-site sanitation systems
11. River and Wetlands	5	No impact expected
12. Coastline and Sea	5	No such sites in project area
13. Flora and Fauna	5	No impact expected
14. Weather	5	No impact expected
15. View	5	No impact expected
16. Air Pollution	4	No impact expected
17. Water Pollution	3	Uncertain, on-site sanitation systems may affect groundwater
18. Soil Contamination	3	Spillage of exhausted sludges may contaminate the soil
19. Noise and Vibration	4	No impact expected
20. Ground Subsidence	3	Uncertain because of groundwater withdrawal, investigations needed
21. Noxious Odours	3	Exhausted sludges may impart objectionable smell if not properly handled
22. Cultural and Archeological Assets	5	No impact expected

23. Conflict with community Aspirations	5	No impact expected
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**KEY:**

1. Serious impact expected
2. Minor impact expected
3. Uncertain (investigation needed to clarify)
4. Almost no impact expected if proper construction procedures are used
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 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**

Demand analysis indicates that the current MENR gazetted water supply scheme cannot meet even 10% of the town demand. Hydrogeological analysis of the catchment area reveals that the groundwater potential is limited by the water bearing formations. Quite a number of boreholes are not productive at all or have very low yield. If further expansion of the water supply system will be based on groundwater it is not quite clear what impact will result.

### **7.7.2 Impacts from Increased Wastewater Generation**

Although the current level of water service is too low to justify a sewerage system for a large part of the town, the proposed 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 especially in the more densely settled e.g. in Milimani area accommodating the government housing and institutions, the District Hospital, the Central Business and surrounding

area. For these areas a sewerage system should be considered in the near future.

The risk of groundwater contamination by on-site sanitation systems in areas where people draw water from shallow wells is real. Hence in the absence of a sewerage system, intensified public education on proper waste management is needed for protection of the environment.

### **7.7.3 Impacts from Operation of Sanitation Facilities**

There is no evidence that current operation of the existing on-site sanitation system is polluting the environment except those that serve public places like the market. However, increased wastewater flow will aggravate the situation. There is need to install a sewerage system in the densely settled areas 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 sited for location of additional boreholes and pipeline wayleaves. 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.

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 efficacy of groundwater utilization on a long-term basis in Migori town is not guaranteed. There is need to institute a study of alternative and more reliable water sources for the town. Water quality monitoring for the rivers and streams in the area that can serve as potential water sources should be intensified.
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 whereabouts 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 finishing 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, disconnection/ re-connection or new connection statistics or their operability, 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. than 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 knowledgeable 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.

### 8.1.7. Migori Water Supply & Sanitation System

Migori is a District Water Office and at the same time provides the urban water supply for Migori Town, currently serving a population of approximately 99,700 people. The town is under Nyanza Province with Kisumu as the Provincial Headquarter.

The water supply situation in Migori seems extremely critical and it is understood that consumers are complaining a great deal about the current situation. Originally, supply was from 5 boreholes, out of which only 2 are currently in service, although one out of the two was not operating due to pump breakdown when the Consultant visited the town. According to information received from the District Office the one operating borehole serves about 100 consumers, showing how critical the water supply was at the time of the visit. Nyasare Water Supply, which is a community managed water project, though originally meant to serve a section of the rural, area now partly serves the urban area supplementing the Migori Water Supply.

#### 8.1.7.1 Utility System Organisation

##### 8.1.7.1.1 Staffing:

The total number of staff is 29, out of which 17 are shared for the whole District. Refer to Appendix G 3 Figure 8.1.7. – Organisation Chart.

The Officer In Charge of the Water Supply, oversees the operations of Migori Water Supply and is directly answerable to the Head of O&M for Migori District. Ten staff members under the Water Supply Operator are responsible for various activities in the field ranging from meter reading, meter servicing, line patrol, disconnection, reconnection, new connection and burst attendance. Eight of them are categorised as subordinate staff. Billing and Revenue is done by the Revenue Monitoring section, which is made up of 4 staff - 3 Water Supply Operators and 1 Clerical Officer. The accounts section, with only one Senior Clerical Officer, handles A.I.E. issues and expenditures.

Neither organisation chart nor specific Job descriptions are available for the Water Supply, only a general schedule of duties prepared in 1999 was available in a file.

The index of number of accounts per staff member is:

Staff	Consumer Accounts	Accounts/Staff
29	669	23.07

##### 8.1.7.1.2 Office Set-up, Facilities and Transport:

The District Office is located in a sizeable compound and is made up of temporary structures. The D.W.O. and his deputy have timber + iron sheet small offices, and the rest of the staff occupies small round uni-huts. Basic hard furnishings including tables, chairs and cabinets are provided, but are, however, not adequate, and what is available needs repair. The officer in charge of the Migori Water Supply sits a distance away from the District Office, where there are 3 permanent offices, 1 uni-hut and a container. The District Office has one telephone line and 1 typewriter but no power.

There is 1 pick-up 4-wheel drive, 4 years old and used for the whole District and 2 motor bikes, one not functioning



### 8.1.7.1.3 Consumer and Meter Information:

Most information is available somewhere and somehow, but in most cases 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 Provincial Water Officer and MENR Headquarters.

An abstract of the comparison between information available or provided, with the verified information, is shown here below. Complete information is available in Appendix G 3 Table 8.1.7 and Table 8.4.7.

Detail	Provided from Migori	Verified for June 2000
Registered Consumers:	700*	842
Never connected	Not readily available	40
Transfer to Scheme	Not readily available	133
Metered:	89	213
Working:	40	79 but 26 actual bills
Not-Working:	49	136 but 188 estimate bills
Un-metered:	Not readily available	456
Disconnected:	Not readily available	220
Major Consumers	Not readily available	3
Minor Consumers:	Not readily available	211

\*Only 352 operating as the rest have no water

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

There are no Kiosks under the Migori Water Supply and the ones available are run through the Nyasare Community Water Scheme. Information availed indicates that there are individual boreholes within the Migori Municipality, which the residents use as alternative sources of water.

### 8.1.7.1.4. Production and Consumption

Production:

Production figures were availed from the O&M monthly monitoring report for the period January to June 2000 which gives an average of 4778m<sup>3</sup> a month. The verbal daily production figure was given as 180m<sup>3</sup> which would however translate in to 5,400 m<sup>3</sup> per month.

The capacity as provided for the 5 boreholes when in operation is 480m<sup>3</sup> per day, hence 14,400 m<sup>3</sup> per month.

Detail	As provided
Design Capacity / Month	14,400m <sup>3</sup>
Production average/ Month	5,400m <sup>3</sup>
Production / Day	180m <sup>3</sup>

At the time the Consultant visited the area, only one borehole was operating, but It was decided to use the verbally provided production figure to calculation the index.

Based on the available production information, the **Production Efficiency = 37.50 %**.

*Consumption:*

Reported consumption records are available in Appendix G3 Table 8.2.7, and compared with verified details from Appendix G3 Table 8.1.7.:

Detail	%	June 2000 as provided	%	Average as provided (01-06/00)	%	June 2000 verified
Actual Consumption	11	402 m <sup>3</sup>	17	768 m <sup>3</sup>	7	392 m <sup>3</sup>
Estimate & Flat Rate	89	3,261 m <sup>3</sup>	83	3,684 m <sup>3</sup>	93	5,200 m <sup>3</sup>
<b>TOTAL:</b>	<b>100</b>	<b>3,663 m<sup>3</sup></b>	<b>100</b>	<b>4,452 m<sup>3</sup></b>	<b>100</b>	<b>5,592 m<sup>3</sup></b>

Consumption records as provided were obtained from O&M monitoring report prepared on a monthly basis and forwarded to HQ

It is to be noted that the consumption figures do exceed the production figures and it seems advisable to reconfirm the information obtained especially when looking at the production reported for June 2000 with only 3,714 m<sup>3</sup>.

The analysis of Appendix G 3 Table 8.1.7. gives the information of the current consumer portfolio in Migori 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 cbm	18	138	4,235.00	29,455.00
11 to 20 cbm	4	39	995.00	14,400.00
21 to 40 cbm	2	4	991.00	3,050.00
41 to 60 cbm	-	3	-	3,800.00
61 to 100 cbm	2	1	4,505.00	2,525.00
> 100 cbm	-	3	-	28,700.00
<b>Total</b>	<b>26</b>	<b>188</b>	<b>10,726.00</b>	<b>81,930.00</b>

8.1.7.1.5. Unaccounted for Water (UfW):

The production and consumption figures for January to June 2000 reflect the unaccounted for water as shown under Appendix G3 Table 8.2.7, which indicates that for the said period UfW ranges between 1.4% to 13%.

However provided production for June 2000 compared with the verified June consumption results in a consumption greater than production, which needs to be looked into again.

8.1.7.1.6. Billing and Revenue Collection:

*Billing:*

The Billed and collected revenue is reflected in Appendix G 3 Table 8.3.7 and abstracted from monthly returns to the PWO and MENR. The billed revenue does not, however, reflect the correct picture, because an average is used as the monthly figure. No explanation was given. The month of June, being the last month of the Financial

Year does not reconcile the picture and the total billed revenue does not therefore reflect what is recorded in the consumer ledgers.

The approach of the consultant was to verify using Appendix G3 Table 8.1.7., which contains the information abstracted from the consumer ledgers for the month of June 2000. This exercise indicated the amount of Kshs 92,656.00 as the billed revenue, whilst the monthly return to the HQ reflects the June figure as Kshs 40,000.00.

While the Tariff was adjusted effective November 1999, the increase is not reflected in the reported billed revenue. No adjustment or increase can be seen in any of the following months.

The calculated billing efficiency is 117%, but not recommended as an indicator because it is based on a consumption higher than production which seems unrealistic, considering that every water supply system has UfW.

#### *Revenue Collection:*

The revenue collected is reflected in Appendix G3 Table 8.3.7. as provided through the Migori WS office return to the PWO and MENR HQ. The total for the FY 99/00 amounts to Kshs 730,954.00, resulting in an average of Kshs 60,912.80 per month. This information is significant as the average reported monthly billed revenue amounts to only Kshs 54,941.90, hence less than what was collected.

For the whole FY 99/00, the collection efficiency exceeds 100% which seems again unrealistic and requires further clarification. However based on June 2000 verified billed revenue of Kshs. 92,656.00 and comparing with collected revenue for the same month of Kshs. 32,258.00, a **Collection Efficiency** figure of **34.81%** can be calculated.

#### 8.1.7.1.7. Average Tariff:

Based on June 2000 records from Appendix G3 Table 8.1.7., the Billed Revenue is Kshs. 92,656.00 / Billed consumption of 5,592 cbm results in **Kshs. 16.57 per m<sup>3</sup>**, being the average tariff for June 2000.

#### 8.1.7.1.8 Debt Situation:

The debt arrears situation as provided by Migori is the computed total, forwarded on a monthly basis in the format of Appendix G 3 Table 8.3.7. The Migori basis of calculation shows two main problems:

- a. Monthly bills are estimated, and
- b. The outstanding balance from the last FY incorporates the same problem.

As the estimated billed revenue is not reconciled at the end of the FY, no correction ever takes place. The outstanding amount as provided is therefore not correct. Using information from Appendix G 3 Table 8.1.7. the situation prior to the June 2000 bill is:

Detail	Migori Debtors as provided	No. of accounts	Verified Debtors	No. of accounts
Total Debtors	609,915.30	700	940,349.00	596
<b>Major Consumers</b>				
10,001 to 20,000	Not available		66,919.00	5
20,001 to 30,000	Not available		51,885.00	2
Above 30,000	Not available		63,267.00	2
<b>Total Major</b>			<b>182,071.00</b>	<b>9</b>
<b>Minor consumers</b>				
0 to 10,000	Not available		758,278.00	587
<b>Total Minor</b>			<b>758,278.00</b>	<b>587</b>

The above debtor analysis reveals that the majority of the debt will be very difficult to reconcile, collect and substantiate, especially when considering the fact that consumption records exceed the production. It is the believe of the consultant that consumers in Migori town receive inflated water consumption bills and the above debt should be written off at the time a management consultant is involved.

#### 8.1.7.1.9. Funding:

Based on the collected revenue and an A.I.E. (Authority to Incur Expenditure) of 65%, funds are sent from Treasury to the District Treasury. The process, which is applicable for All District offices, involves the MENR Head Office and is explained under chapter 8.4.4. of the main report. The A.I.E. percentage is determined by the MENR Head Office with no involvement of Migori WS.

Appendix G3 Table 8.5.7. reflects A.I.E. received which can be compared with the A.I.E. earned by calculating 65% of Kshs 730,954.00 which Kshs. 475,120.10. It is to be noted that the A.I.E received is by far exceeding the A.I.E earned but no explanation can be offered without obtaining more information from the HQ level

A.I.E. Earned FY 99/00	A.I.E. Received FY 99/00
475,120.10	823,460.00

It should be noted that the A.I.E. received is utilised by all Water Divisions within the District. A separation between Migori WS and the other Divisions was not readily available.

Total expenditure below represents the whole District and was abstracted from the votebook:

Details:	Expenditure FY 99/00
A.I.E. used for O&M	784,295.60

#### 8.1.7.2. Utility System Procedures:

All current procedures, as far as the office and field operations are concerned, are covered in the Appendix G 3 Questionnaire 8.1.7. 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.

Procedures that continue at Head Office level, and apply to all towns analysed, are investigated separately and covered under chapter 8.4. of the Main Report.

#### 8.1.7.2.1. Administration:

##### 8.1.7.2.1.1. Staff:

Staff members are transferred and/or promoted based on decisions made at MENR HQ and local recommendations or requests are not considered. The process at HQ regarding personnel matters is generally slow and issues are either kept pending or simply filed away. While there is provision for annual forms to be completed by staff members requesting for promotion and training, such requests have not materialised for many years.

The constraints experienced in every level of operation explain a generally low level of staff morale. Salary levels are considered as being much too low. There are no laid down personnel procedures in place and everything seems grounded.

##### 8.1.7.2.1.2 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. New application forms are in use even though they are not comprehensive and lack vital information, which would be of assistance especially when following defaulters. There are no forms in place to be filled when closing or terminating an account and the consumer only writes a letter expressing the wish to close and action is taken upon receipt of such a letter. Transfer of account is handled by filling in of a new application form by the person taking over and retains the old number, and only a comment is inserted in the consumer ledger about the change. Final reading is taken and bill calculated to be paid by the previous consumer before any deposit refund can be done. If the final bill is paid, the deposit refund is recommended to be paid at the DC's Office. At the moment, it is understood that a new directive has come up requiring deposit to be held at MENR HQ and refund would obviously have to be processed from there. Upon request for change of address, the consumer ledger is adjusted accordingly. Currently, bills are hand-delivered.

##### 8.1.7.2.1.3. Meter Reading, Billing & Revenue Collection

###### Meter Reading:

Meter reading is undertaken monthly, commences around the 23<sup>rd</sup> of every month and takes about 2 days. There are few serviceable meters, estimated to be 40 in number. The analysis of the verified data reflects however that 88% of all consumer meters are estimated on a monthly basis and the reliability of meter reading records should be looked into further. The readings are entered in to the consumer ledger and bills are prepared on a monthly basis

###### Billing:

The Revenue Monitoring Section transfers the meter reading information and calculates bills. Bills are ready by the end of the month. Initially, bills were being posted but now are hand delivered to the consumers. Every Monday, payment data is collected from the DC's Office and consumer ledgers updated accordingly.

**Disconnection:**

Consumers who have not paid for 3 months are targeted for disconnection. The disconnection list is prepared by checking the consumer ledgers, which are supposed to be updated by collecting payment receipts from the DC's Office every Monday. Disconnection is done by plugging. No information was obtained relating to Disconnection or reconnection records. But the O&M monitoring report states nil dis or reconnection during the period January to June 2000

**New Connection:**

Upon a consumer request for a new connection, a site visit/survey is carried out to determine whether possible to provide water, and assess the required materials. If possible to provide water, an agreement form is filled which has to be approved by the DWO. The consumer is requested to pay a connection fee of Kshs. 500.00 and a deposit. In addition the consumer is required to purchase the required fittings as identified when carrying out the survey. Upon making the payment, the consumer is allocated an account number and finally connected to the water supply.

**Revenue Collection:**

All consumer bills and deposit payments are made at the DC's Office. Payment morale is very low because of limited supply, as water does not flow throughout the month. Labour charge fee of Kshs. 500 relating to new connections is collected at the DWO's Office and later surrendered to the DC's Office.

**8.1.7.2.1.4. Authority to Incur Expenditure (AIE) and Procurements:**

**Authority to Incur Expenditure (AIE):**

Monthly revenue returns are prepared to the Head Office and supported by form F.O.17 prepared at the D.C.'s Office, reconfirming the total amount of revenue collected. This information enables the DWO to forward a request to HO to approve the A.I.E.

**Procurement:**

Stocks are purchased and used as per requirements and depending on availability of funds.

Chemical requests are made through the HO. Appendix G3 Table 8.6.7 has details of chemicals received during the FY 99/00. Stock balances as at end of June 2000 and ordered chemical information was not available due to lack of documentation.

**8.1.7.2.2. Operation & Maintenance:**

***Intake***

No procedure in place, staffs attend to a problem when it arises

***Treatment***

No procedure laid down.

### *Lines and Appurtenances*

No routine or preventive maintenance procedures are in place. Indication was that the line patroller has to check the main lines and service lines every day and report back to the office if there is any problem to be attended to, however no record was available to show how this activity is controlled or Scheduled

### *Master Meters*

Not available

### *Consumer Meters:*

No procedures or records of field activities are in place.

### *Stock*

No stock available, stocks are purchased and used as no funds to keep stocks

### *Operation Manuals:*

No manuals for technical procedures available.

### 8.1.7.3. Community Projects:

Nyasare Water community project is covered under 8.2.2. of the main report

### 8.1.7.4. El-Nino Project:

Information obtained from Migori Water Office indicated that El-Nino rehabilitation Project is drilling 2 boreholes with capacity of 20m<sup>3</sup> per hour each.

### 8.1.7.5. Recommended Priority Measures

The prevailing situation in Migori asks for immediate action. The set up Office operation, reporting and recording should get immediate attention, considering the size of Migori as a District town and especially the number of potential consumers, served by the system.

With only one borehole in operation at the time of the visit and considering the current population of 99,700 people, the calculated l/c/d stands at 1.87.

While consumers are charged more than what seems to be the water produced, they do not seem to get the water for which they are charged. It is suspected that this can be explained with over-estimation of bills. For the month of June 2000 estimated bills accounted for 86% of all the bills issued.

While the collection efficiency for June 2000 was 35%, the annual abstracted Collection Efficiency exceeds even 100%. It is therefore difficult to assess what should be a realistic collection efficiency for Migori, because the annual average seems much too high and is suspected to relate to the averaged or estimated recording of the monthly issued bills..

Concluding from the above, it is assumed that the actual water loss is high, even though not on record and the recommended priority measures are:

- 1) Full rehabilitation of the existing source and distribution system, and 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 are reflected in the comprehensive Utility Management plan under chapter 8.10., of the main report and given the second priority. However, in the case of Migori field verification of all existing consumer accounts, due to the continued shortage of water and taking over of accounts into the community system, is to be dealt with as priority under above number 3). Any improvement in Migori will however depend first on the completion of the two El-Nino boreholes, followed by the complete rehabilitation improvement. Utility management makes only sense where the undertaker has water to sell.

In Migori it as well has to be kept in mind, that the Nyasare Community Project is represented in town and they have applied to take over the Migori Water Supply

#### 8.1.7.6. 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 Migori is lined out 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. 700 (including 456 un-metered accounts) 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, 1 saloon vehicle, 3 motorbikes (1 meter reading, 1 line patrol, 1 new connections)), 2 bicycles and basic office equipment are available,
- Funds for remuneration of the proposed staffing organisation is available,
- Funds for 6 months (NOTE: if the production situation has not improved by that time, the period might have to be extended to 12 months) interim operation, while cash collection is re-organised such that funds remain available at system level, and
- Funds for the involvement of the management consultant



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 Migori Water Supply.

Assumption 2:

Staffing re-organisation, training and selection of staff as recommended by the management consultant receives the necessary support from MENR.

Assumption 3:

The meters to be replaced will require a period of 7 months, during which time approx. 100 meters are replaced in a standardised manner and on a monthly basis by the Migori WS staff.

The minimum time involvement of the management consultant support is taken as 12 months.

Task	Months																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Appointed Management Consultant	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Setting up of temporary office structure	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Setting up of consumer database and billing program, field verification	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Management and staff training for the relevant staff	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Replacement / repair of all faulty consumer meters	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Implementation of other Action Plan activities	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

PHASE I

Phase 2 concentrates on de-centralisation changes, for which the more detailed activities are described in the Action Plan of Appendix K3 Summary Table ST 8.4

Task	Months																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Review and initiation action on staff performance criteria	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Implementation by MENR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Initiate de-centralisation recommendation	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Implementation by MENR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Initiate control, monitoring and MIS reporting system	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

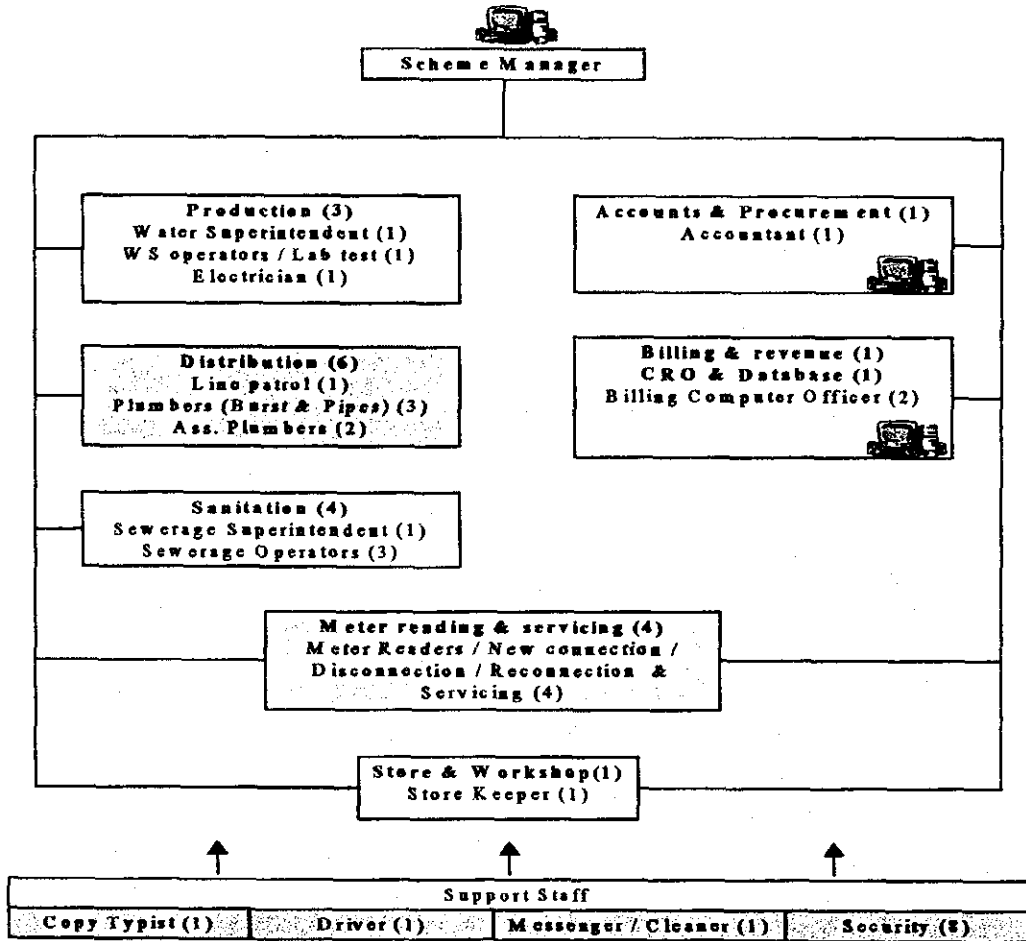
PHASE II

Phase 3 relates to legal changes recommended for which the more detailed explanations are listed and described in the Action Plan of Appendix K3 Summary Table ST 8.4

Task	Months																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Speeding up water amendment	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Simplify debtor write-off procedures	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Initiate retention / quality control system recommendation	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

PHASE III

8.1.7.7 Recommended Migori Organisation Chart:



NOTE:



= Computer allocated to department

Total recommended number of staff = 33

NOTE:

Currently no sanitation but provisionally noted in the chart above.

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 deseminiate 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 19<sup>th</sup> March, 1999 and amended on 7<sup>th</sup> 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 too 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	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuve	Niumias	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	X
3.	Arrange for intensive management training for Engineers or recruit well-qualified managers.	X	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	X
5.	Set up positive and negative staff sanctioning system.	X	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	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	X
8.	Redesign consumer recording and reporting formats	X	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	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	X
11.	Prepare implementation guidelines related to gazette notices and relating procedures	X	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	X
13.	Design consumer / connection – management guidelines	X	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	X
15.	Undertake analysis to substantiate and confirm old debts	X	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	X
17.	Recommend commercial charges and penalties	X	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	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	X

No.	Action	Narok	Meru	Muranga	Kabarnet	Makindu	Wundanyi	Migori	Lamu	Webuve	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	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	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 analyst, independent external auditors, adequate use of chemicals )	X	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	X
25.	Set up stock management 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 criterias for pump maintenance depending on the pump capacity.											X
29.	Include consumer lines into the planned network	X	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	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 is unrealistic.

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**



## **9. INSTITUTIONAL AND LEGAL ASPECTS OF MIGORI URBAN WATER SUPPLY SERVICE**

### **9.1 Institutional Set-up of Migori Urban Water Supply Service.**

Migori urban water supply is under the responsibility of the District Water Office (DWO), Migori District. This means that in addition to the operation and management of the Migori Urban Water Supply, the DWO has the responsibility of operating and managing other water supply systems in Migori District. The District Water Officer, Migori, is supported by a Deputy District Water Officer. The detailed organisational structure for Migori District Water Management is presented in the utility management section of this report. The functional arrangement in the District water supply system includes the following sections:

- (a) Operations and maintenance.
- (b) Revenue and billing.
- (c) Accounts.
- (d) Administration.
- (e) Supplies.

The staff complement at Migori Urban Water Supply is 16 with in the operation of the other water projects in Migori District.

The only waterborne sewerage system serves St. Joseph's Mission Hospital and staff housing. The rest of the towns residents rely on septic tanks, cess pits and / or pit latrines for waste disposal. Emptying septic tanks is the responsibility of Migori town Council.

In recommending a viable institutional and legal framework for Migori Urban Water Supply, it is necessary to provide details of the existing institutional and legal framework for the water sector in Kenya.

### **9.2 Existing Institutional Framework for the Water sector**

#### **9.2.1 Organisations Concerned with Water Supply**

Water is principally now being managed under the Ministry of Environment and Natural Resources. However, there are specific institutions responsible for the development, operation and maintenance, and regulation of water supply. These institutions are analyzed below.

##### **(a) Department of Water Development**

The Department of Water Development (WDD) is the GOK agency responsible for the development, conservation and control of water. In support of this, its mission statement is: "to ensure proper and orderly Water Resources Management, including

assessment, conservation, development and protection of the environment from degradation from water development activities." In order to fulfill its mission, the functions of the department are stated as:

- Water development and water supply;
- Control of water catchments;
- Water resource management;
- Water quality and pollution control;
- Water conservation.

To execute these functions, the Director of Water Development is responsible for three branches, which together are responsible for ten Divisions, one additional Division, the Kenya Water Institute (KEWI), six provincial water offices and, through the provincial offices, 64 district offices throughout Kenya. WDD operates a total of 375 (309 rural)<sup>3</sup> schemes through its network of Provincial, district and Divisional offices.

The Department of Water Development manages ground and surface water resources by hydrological observation, assessing water resources, controlling water quality, planning water projects, assessing environmental and other impact of water resource management practices. There are 500 observation stations around the country providing data for this unit. The branch also manages a division for water rights ad assessment, which issues, cancels and registers water permits and maintains water resources database.

The four branches of the department are:

- Water resource development
- Water resource management
- Water research
- Kenya Water Institute

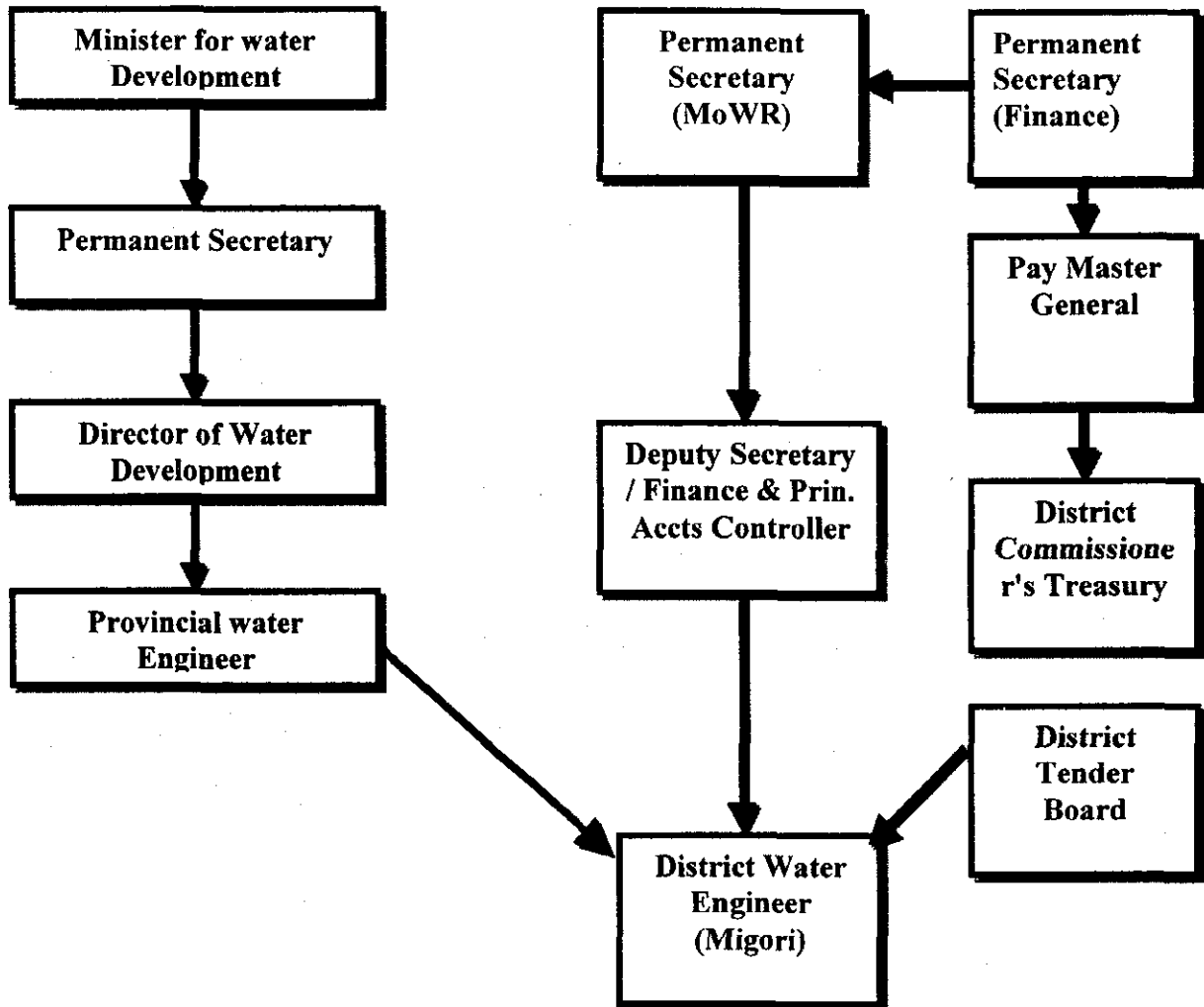
#### **(b) Water Operations at District and Scheme Level**

In Districts and scheme level, management is vested on the District Water Engineer. The District Water Engineer is also Secretary to the District Water Board and executes decisions as required by the DDC.

**Chart 1: Management Structure for Water and Sewerage Services - Water Undertaker: Director of Water Development**

**ADMINISTRATIVE**

**FINANCIAL**



**9.2.2 Agencies Related to the Ministry of Environment and Natural Resources**

There are various agencies operating in support of the mission of the Department of Water Development. These include:

**(a) Water Appointment Board (WAB)**

WAB reports to the Minister of Water. It, on behalf of the Minister, authorises, supervises and controls the use of water throughout Kenya. The function is discharged through Catchment Boards. There are six catchment Boards as follows: Tana, Rift Valley, Athi, Northern Ewaso Nyiro, Lake Victoria North, and Lake Victoria South.

## **(b) District Water Boards**

District Water Board, established since 1991, in each district assist the planning and coordination of water related activities. The Boards are subcommittees of the DDC's. Their mandate includes:

- Protection, conservation and preservation of all catchment areas in the district;
- Partitioning, allocations and authorisation of al water bodies;
- Water quality and pollution control activities;
- Management and control of water use;
- Overseeing and coordinating all water related activities in the District;
- Assisting in the enforcement of the Water Act.

## **(c) National Water Conservation and Pipeline Corporation (NWPC)**

The National Water Conservation and Pipeline Corporation (NWPC) was established under the State Corporations Act, Chapter 446 of the Laws of Kenya vide Legal Notice No. 270 of 24<sup>th</sup> June, 1988, as an autonomous agency reporting to the then Ministry of Water Development. The Corporation became operational on 1<sup>st</sup> July, 1989. The Corporation was created to meet the following objectives:

- To commercialize the water sector operations;
- To achieve financial autonomy in water operations;
- To improve performance of water supplies and
- To reduce dependence on public funding of water projects.

At the time of establishment, the Corporation was mandated to undertake the following in connection with water supplies and projects where it had been appointed water undertaker:

- (i) Under the general direction of the Minister for the time being responsible for water resources, manage and develop the specified water supplies and projects;
- (ii) Supply water in bulk to such water undertakers as the Minister may, after consultation with the Board of Directors, by notice in the Gazette, designate;
- (iii) Supply water in bulk or otherwise, to such persons or class of persons as the Minister may, after consultation with the Board, by notice in the Gazette, designate;
- (iv) Do all such things as may be necessary or advantageous for the management of the water projects and for securing an adequate supply of water;
- (v) Apply for and obtain all such licenses, permits and other authorities required under any written law or as may be desirable.

The Corporation was also mandated to assist the Government in the formulation and execution of a National Water Development Policy.

### **9.2.3 Other Institutions Related to Water**

#### **(a) Ministry of Local Government (MOLG) and Local Authorities**

MOLG is the third institution with major responsibilities for the water supply and sanitation sector. The ministry's mission is to promote the development of Kenya through the establishment and existence of viable and well organised Local Authorities (LA's). MOLG currently oversees 164 LAs which are established by the Minister as provided for in Local Government Act. Among their many responsibilities is the provision of water and sanitation services in their areas as set out in the Act. Of the 164 LA's, 10 administer water and sewerage schemes, and the rest administer sewerage only or sanitation schemes, water being supplied by another water undertaker such as MENR or NWCP. The Water and Sewerage Department of the Nairobi City Council, although a local authority scheme, is really a special case because of its size and the degree of autonomy it enjoys.

Of the five MOLG departments reporting to the Permanent Secretary and which, together, are to execute the functions and fulfill the mission, the Urban Development Department has direct technical responsibility for water and sanitation (see Figure 2.1.2 for its organisation structure). It has a Planning Division and a Technical Division out of its functions of:

- Formulating, with LA's, urban development policies;
- Coordinating implementation of urban development policies, programmes and projects in LAs; monitoring and evaluating these;
- Providing technical assistance to LAs.

Water and Sanitation Section is one of four technical sections addressing different subsectors of LAs and providing technical assistance to them.

#### **(b) Non-Governmental Organisations (NGOs) and Community Schemes**

The impact of NGOs in the provision of water supplies appears to be considerable and to have operated over many years. It has been estimated that at least 60 of the more than 400 NGOs active in Kenya are engaged in the water sector. Most have water components in integrated rural development projects.

It appears that many NGO projects employ MENR staff as technical advisers during development, after which they are handed over to the communities with some ongoing help from the Ministry. However, other water projects which may form part of larger integrated development projects, are undertaken without MENR being notified.

The district or divisional offices of the Ministry should be the contact point for all such schemes and a registration procedure should be mandatory.

In addition to the above, there are schemes operated by small informal groups which often collapse without financial or technical assistance. Those that do not fail are better managed, either with or without external help from, say, MENR field staff, with realistic fund raising arrangements. The Ministry of Culture and Social Services attempts to mobilise and assist groups like these, but is hampered by lack of funds and manpower in the field.

### **9.3 Legal Framework of the Water Sector**

An appropriate legal and regulatory framework is necessary to monitor and control the water sector. The main objectives of the regulatory system are to: ensure compliance with standards of acceptable service, protect the ratepayer and create an environment that promotes stable and viable water institutions. The Kenyan Government has enacted laws related to water supply and sewage disposal including environmental legislation. The main laws include:

- (a) The Water Act (Cap 372)
- (b) The National Water Conservation and Pipeline Corporation Order (Legal Notice No.270, June 24, 1988)
- (c) The Local Government Act (Cap 265)
- (d) The Irrigation Act
- (e) The Tana and Athi Rivers Development Authority Act
- (f) The Keno Valley Development Authority Act and The Lake Basin Development Authority Act
- (g) The Agriculture Act (Cap 318)
- (h) The Public Health Act (Cap 242)
- (i) The Environmental Management and Co-ordination Act of 1999.
- (j) Wildlife (Conservation and Management) Act (Cap 376)

These laws are briefly described and assessed where relevant to the water sector.

#### **9.3.1 The Water Act (Cap 372)**

The Water Act, which is the most important law related to water, was first established in 1951 to make better provision for the conservation, control, apportionment and use of water resources. It was revised in 1972 and further subsidiary legislation was enacted in 1995.

**(a) The objective of the Water Act**

The purpose of the Water Act is to make provision for the conservation, control, apportionment and use of the water resources of Kenya, and for purposes incidental thereto and connected therewith. Except for waters which are wholly situated in a private land owner's domain, the Act vests the rights over all surface and ground water in the Government subject only to the rights which users may acquire under licence.<sup>1</sup> The overall power for the control of every body of water is exercised by the Minister,<sup>2</sup> who has the duty to promote the investigation, conservation and proper use of water resources of Kenya.<sup>3</sup> Part III of the Act provides for the general powers of the Minister. He has power to purchase or acquire land by any other means for the conservation, improvement or use of water,<sup>4</sup> to construct and maintain such works as may be necessary for the protection of the source or course of any body of water, the disposal or control of flood water, the conservation of water, and the distribution, apportionment or measurement of water;<sup>5</sup> to impose water rates upon any person benefiting by such works;<sup>6</sup> to impose water rates in connection with community water projects;<sup>7</sup> to impose water rates on local authorities with respect to water projects in reserved areas;<sup>8</sup> to order drainage of swamps;<sup>9</sup> to establish protected catchment areas in cases where special measures are necessary for the protection of water resources;<sup>10</sup> to expropriate, on payment of compensation, and operate or dispose of water works;<sup>11</sup> to enter upon, use, order the use of, maintain, vary, destroy or remove abandoned water works wherever situated,<sup>12</sup> and, in cases of emergency as a result of a serious deficiency of water for domestic purposes caused by reason of exceptional shortage of rain, accident, or other unforeseen circumstances, to direct that any person who has excess water supply for his domestic purposes does supply to such area or other person the excess quantity.<sup>13</sup>

**(b) Institutions under the Water Act**

The Act then establishes two important institutions. The first is the Water Resources Authority, established under section 19, with the duties, *inter alia*, to investigate the

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<sup>1</sup> Supra, note 24, section 3.

<sup>2</sup> Ibid., section 4.

<sup>3</sup> Ibid., section 7.

<sup>4</sup> Ibid., section 8.

<sup>5</sup> Ibid., section 9.

<sup>6</sup> Ibid., section 10.

<sup>7</sup> Ibid., section 11.

<sup>8</sup> Ibid., section 12.

<sup>9</sup> Ibid., section 13.

<sup>10</sup> Ibid., section 14.

<sup>11</sup> Ibid., section 15.

<sup>12</sup> Ibid., section 16.

<sup>13</sup> Ibid., section 17.

water resources of the country and advise and make recommendations on the improvement, preservation, conservation, utilization and apportionment, to prepare estimates of the future water supply requirements of any area of the country, and to formulate proposals for meeting the existing and future water supply requirements of any area.<sup>14</sup> The second is the Water Apportionment Board established under section 25, with the duty, to grant permits for proposed diversion, abstraction, obstruction, storage or use of water from a body of water or drainage of a swamp,<sup>15</sup> and powers to prescribe measuring and controlling devices for water consumption,<sup>16</sup> to require equitable use and to prohibit any practice that may cause undue reduction of water during drought and in the case of small watercourses,<sup>17</sup> to determine all questions as to full, efficient, reasonable and beneficial utilization of water,<sup>18</sup> and to declare various matters pertaining to bodies of water.<sup>19</sup> Overall, the Water Apportionment Board works in an advisory capacity to the Minister and determines the apportionment of national waters according to user requests.

### **(c) Powers of the Minister under the Act**

The Act then empowers the Minister to take a number of steps to ensure the protection of water catchment areas and ground water resources. He may declare an area to be a protected catchment area, a conservation area, or a protected area. Where the Minister is satisfied, after consultation with or on the advice of the Water Resources Authority, that special measures are necessary for the protection of water resources in or derived from any area, he may declare such area or any part thereof to be a protected catchment area.<sup>20</sup> By order, the Minister may require, regulate or prohibit any activities within such a protected catchment area which may be contrary to the requisite protection goals. Any person who fails to comply with such order shall be guilty of an offence.<sup>21</sup> Under section 74 of the Act, the Minister has power to declare, after consultation with the Water Resources Authority, an area to be a conservation area if special measures for the conservation of ground water in the public interest whether for the protection of public water supplies or for the protection of water supplies used for industrial or other purposes are required. Any person who has been using ground water in an area so declared to be a conservation area and who desires to continue with the use must, within six months of the Minister's declaration, obtain a permit.<sup>22</sup> Besides, no person may construct and use any well for the abstraction of ground water, extend any existing well for the abstraction of additional ground water, or abstract ground water by mechanical means from any well, within a conservation area without a permit.<sup>23</sup> Where the Minister has appointed an undertaker to be responsible for the control and distribution of water in a given

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<sup>14</sup> *Ibid.* section 20.

<sup>15</sup> *Ibid.* sections 36, 78, & 79.

<sup>16</sup> *Ibid.* section 28.

<sup>17</sup> *Ibid.* section 29.

<sup>18</sup> *Ibid.* section 30.

<sup>19</sup> *Ibid.* section 31.

<sup>20</sup> *Ibid.* section 14.

<sup>21</sup> *Ibid.*

<sup>22</sup> *Ibid.* section 75.

<sup>23</sup> *Ibid.*, section 76.



area,<sup>24</sup> there is a corresponding duty to ensure an adequate supply. Accordingly, whenever the Minister is satisfied that special measures are necessary for the protection of a catchment area from which the water supply of an undertaker is obtained, he may declare such area to be a protected area.<sup>25</sup> By order, he may require, regulate or prohibit the carrying out of any activities in the area that may be inimical to the protection of the area or the water supply obtained therefrom. Such an order must be published in the Gazette and in a newspaper circulating in the district where the area is situated.<sup>26</sup>

#### (d) Pollution control

The Water Act also addresses the issue of pollution of water resources, albeit in the part of the statute addressing miscellaneous issues.<sup>27</sup> One may be tempted to conclude that pollution, and the quality of water generally, is not given the priority that it deserves in the statute. There is comparatively more emphasis on ensuring that there is no diminution in the quantity and not quality of supplies. However, pollution of water used for human consumption is an offence under the Act.<sup>28</sup> The perpetrator of the pollution shall not be so liable if he was practising a lawful method of cultivation of land or the watering of stock which does not conflict with the principles of good husbandry.<sup>29</sup> Similarly, it is not an offence if the perpetrator is involved in reasonable use of oil, tar, or other substances on any highway or road and reasonable steps are taken to prevent pollution. Finally, the pollution does not constitute an offence where the perpetrator was involved in the disposal of wastes or effluent in any area that the Minister may have specified.<sup>30</sup>

In any event, it is an offence for any person to wilfully and without authority throw, convey, or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near any body of water in such manner as to cause, or be likely to cause, pollution.<sup>31</sup> Besides, under Rule 72 of the Water (General) Rules<sup>32</sup>, any person the effluent from whose works is returned to or discharged into a body of water not being "in such a degree of purity as will satisfy" the Water Apportionment Board or containing any matter "poisonous or otherwise likely to be injurious directly or indirectly to public health, to livestock or to crops, or to orchards or gardens irrigated with such water, or to any product for which such water is used in any process whatsoever," shall be guilty of an offence. Absent water quality and discharge standards as well as a monitoring mechanism, these provisions have remained inoperable, although well-intentioned!

A further attempt to amend the Act is now in progress led by the Water Rights

<sup>24</sup> That is, under section 124 of the Act.

<sup>25</sup> Section 150(1)

<sup>26</sup> Section 150(2).

<sup>27</sup> Part XVI of the Act.

<sup>28</sup> *Ibid.*, section 158(1).

<sup>29</sup> *Ibid.*

<sup>30</sup> *Ibid.*

<sup>31</sup> *Ibid.*, section 160(2)(b).

<sup>32</sup> *Ibid.*, L.N. 374 of 1964. See also Rules 77-80.