5 EXISTING WASTE WATER DISPOSAL & SANITATION CONDITIONS

5.1 SANITATION SYSTEM

5.1.1 General

There is no waterborne sewerage system in the town.

Waste disposal is by means of septic tanks, cess pits and/or pit latrines and is the responsibility of Narok Town Council. The council abattoir discharges waste to holding pits which are emptied spasmodically. The pits overflow into the river and the abattoir has been forced on occasions to cease operations when clearing of the pits has not taken place.

The town council has an exhauster vehicle which collects waste and discharges to sludge holding/drying beds which are located on undeveloped land outside the urban area and which are maintained by the council.

The prisons authority has recently constructed a large septic tank the effluent from which discharges to a rocky soakaway. This effluent may eventually find its way into the river upstream from the water supply abstraction point.

With the improvement and expansion of water supply facilities there will be a corresponding increase in per capita consumption, resulting in an increase in discharged quantities of grey and black water. Existing traditional methods of waste disposal will become overloaded and non - sustainable. The problem must be addressed as failure to do so will lead to unhygienic conditions, a rise in the incidence of water borne diseases and a reduction in the quality of life of the population.

Alternative solutions must be found for waste disposal.

Traditional sewerage systems are expensive to construct. However given the growth potential of Narok as a stopover venue for tourists to the Maasai Mara, and for heavy through traffic on the international trunk road, the central business area will benefit from a conventional pond sewerage system. The comparatively small area will make construction more economically viable than in attempting to sewer the whole of the water supply service area.

Smaller community based small - bore sewerage systems may probably be the best solution for sewering the remainder of the town.

5.2 SEWERAGE SYSTEM (O&M)

Not applicable.

5.3 SEWAGE TREATMENT WORKS (O&M)

Not applicable.

5.4 OTHER DISPOSAL FACILITIES

None.

5.5 ON-GOING OR PLANNED EL NINO WORKS

There are no El Nino Emergency Project works planned for Narok.

5.6 OTHER WORKS AND PROJECTS

None.

5.7 SUMMARY OF SHORTCOMINGS AND PRELIMINARY RECOMMENDATIONS FOR REHABILITATION

The main shortcomings of the present system are:

- Wastewater is discharged to the environment without any formal system of drains or sewers.
- Wastewater from the abattoir is discharged to the river and this is leading to pollution of the river as the wastewater is not fully treated.
- The prisons soakage pit will not work adequately as it discharges into rocky ground. The partially treated overflow will find its way into the river upstream of the water intake abstraction point.

Construction of a waterborne sewerage system is outside the scope of this study and will be an expensive undertaking.

In the short term, recommendations for improving the present system of disposal and prevention of pollution especially of the river upstream of the abstraction point are as follows:

- The council should enforce legislation to prevent the indiscriminate discharge of sewage in public places.
- The council should conduct a public awareness campaign to educate the public about the health risks involved with improper discharge of sewage.
- The council should instruct the prisons to construct an on-plot treatment facility to treat its wastewater to the required national standards for discharge to a river in order to safeguard the water supply from pollution.
- The council should similarly instruct the abattoir to construct an on-plot treatment facility to treat its wastewater to the required national standards for discharge to a river to prevent pollution especially for downstream users.

6 PROPOSED STRATEGY FOR WASTEWATER DISPOSAL AND SANITATION REHABILITATION

6.1 DEMAND FOR SANITATION SERVICES

Current waste disposal methods in Narok are on-site by means of septic tanks, cess pits and pit latrines. There is evidence of wastewater (grey and black) in the open drains in the town.

If and when water supply facilities are improved there will be a corresponding increase in the amounts of sewerage and wastewater, which if untreated will become a serious health hazard.

With the poor percolation capacity of the soils and the close proximity of the rock surface in Narok, there is a need for water borne sewerage in the medium and high density housing areas and to serve large institutions.

In the low population density areas, on-plot sanitation for households will continue to suffice.

6.2 DEMAND FOR WASTE WATER DISPOSAL SERVICES

There is an immediate existing demand for proper disposal of wastewater from the prisons and the abattoir.

The demand for wastewater disposal facilities in the future will depend on the chosen form of sanitation for different areas.

6.3 CONFIRMATION OF REHABILITATION OPTIONS

A waterborne sewerage system for the town would be extremely expensive to construct. Consideration should be given to the installation of a community based small-bore sewerage system. These options involve new works and are therefore outside the scope of this study.

There is an urgent need to provide on-plot treatment at the prisons and the abattoir and the council should ensure that the two institutions take immediate steps to do so. As the rehabilitation involves expansion and deals with individual institutions, it is outside the scope of this study.

6.4 PRELIMINARY DESIGN OF RECOMMENDED REHABILITATION OPTIONS

This is not applicable as the recommended works are outside the scope of this study.

6.5 COSTING OF RECOMMENDED REHABILITATION PLAN

This is not applicable as the recommended works are outside the scope of this study.

7.0 LAWS AND REGULATIONS OF ENVIRONMENTAL IMPACT ASSESSMENT

7.1 GENERAL

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

7.2 LEGISLATION/REGULATIONS GOVERNING ENVIRONMENTAL IMPACT ASSESSMENT

7.2.1 General

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

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

Effectiveness in enforcement has not been commensurate with the many acts and regulations; in some instances there have been contradictions when an institution has evoked its act at the expense of proper operation of facilities belonging to another institution. The reason for the foregoing situation is that each sector utilizing water, apart from the water authority, has 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 4th schedule of the Act.

7.2.3 Laws Relating Specifically to Water Supply and Sanitation

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

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

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

7.2.4 Environmental Impact Assessment (Guidelines and Administrative Procedures)

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

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

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

7.2.5 Objectives of Environmental Impact Assessment

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

- To identify the existing environmental concerns which need to be taken into account in the proposals for rehabilitation of water supply and sanitation system.
- To evaluate the environmental impacts of the proposed rehabilitation works.
- To propose the counter measures to mitigate the impacts.
- To make recommendations for environmental conservation.

7.3 INITIAL ENVIRONMENTAL EXAMINATION

7.3.1 Water Quality of Existing Supplies

The programme for monitoring water quality both at source and within the distribution systems is in place at Narok town, however, implementation is generally poor because of lack of appropriate and adequate laboratory equipment and reagents. Water quality analysis results were not available at the works, except pH and residual chlorine. Narok town obtains its water from Narok River.

The river source is subject to pollution from agricultural activities upstream of the intake. The stream is laden with sediment, which accounts for the brown colour. At the time of visit the water works personnel indicated that the water flow of the river at the intake had reduced considerably. It was not possible to determine the flow because the gauging station located at the works was no longer operational.

7.3.2 Existing Sanitation Situation

Narok town does not have a sewerage system but depends on on-site sanitation systems comprising mainly of 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. Disposal of sullage from business premises and abattoir wastes present a serious environmental problem.

7.3.3 Screening and Scoping for Environmental Impact Assessment

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

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

7.4 EXPERIENCES IN APPLICATION OF EXISTING LEGISLATION AND REGULATIONS IN WATER AND ENVIRONMENTAL MANAGEMENT IN NAROK TOWN

Interviews conducted with the personnel involved in management of water resources and pollution control revealed the following experiences:

(i) The personnel are aware and well versed with the relevant sections of the Water Act Cap 372 (1972) dealing with

- Enforcement of regulations – section 146
- Prevention of pollution – section 145
- Protection of water catchment areas – section150

(ii) Apart from making provision for pollution prevention and protection of catchment areas the Water Act does not specifically deal with environmental impacts or environmental protection.

(iii) Although the new Environmental Management and Coordination Act (1999) took effect on 14th January, 1999 the personnel were not conversant with it.

(iv) The personnel observed the following difficulties with execution of the existing laws and regulations:

- Fines for offenders are very low and not punitive enough to deter prevalence of default or spur compliance.
- The process and procedure of effecting protection of water resources is unnecessarily long.
- Issuance of Water Permits takes a very long process.
- Section 158 of the Water Act, which deals with Water Pollution, does not give the Water Department clear powers to protect water resources.
- The Water Bailiff's who are well versed with the Water Act do not have powers to prosecute cases related to water matters.
- There is a conflict between the Water Department and the Public Health department on water and environmental matters because of fragmentation of authority.
- The implementation of the Environmental Management and Coordination Act has not been effected in Narok.

7.5 ENVIRONMENTAL CONCERNS IN NAROK TOWN

1. All water catchments have been opened up to cultivation.

2. Charcoal burning has led to serious deforestation in the catchment areas.

3. Demarcation of land has led to human settlement in catchment areas

4. Lack of the sewerage system in Narok town has led to discharge of wastes to Narok River.

5. Narok GK Prison which is located upstream of Narok Water Supply does not have a safe sewage disposal system.

6. Narok District Hospital which generates a lot of waste, does not have a proper waste disposal system, its septic tanks are leaking into the environment.

7. Monitoring of Water (raw) quality and quantity in the water resources is quite infrequent due to lack of equipment and resources.

8. The abattoir in Narok Town discharges its wastes to Narok River.

9. Treated Water in Narok is not adequate hence vegetable vendors wash their merchandise in raw water in Narok River.

10. Car washing is done in the river.

11. Solid wastes are strewn all over town and when it rains, these wastes are washed down to Narok River.

12. There is danger of pollution of groundwater by the many pit latrines and soak pits used in town.

7.6 RESULTS OF INITIAL ENVIRONMENTAL EXAMINATION

Narok Town does not have a sewerage infrastructure and the current sanitation system is based on septic tanks and pit latrines serving commercial institutional and private residential plots. Initial Environmental Examination Checklists have been derived as shown in Table 7.1 for the water supply component, and Table 7.2 for the sanitation system.

Table 7.1 IEE Checklist – Water Supply Component

ITEM	EVALUATION	COMMENT
1. Human Settlement	3	Not immediately clear until surveyed at detailed stage
2. Economic Activities	5	Increase in water supply will have positive impact
3. Transport	4	Proper attention required during

		construction period
4. Water and Common Rights	3	Increased abstraction at intakes may reduce river discharge thus affecting water rights downstream
5. Sanitation	5	Increased water supply will improve sanitation
6. Waste	4	Needs attention during construction
7. Hazards/ Dangers	4	Needs attention during construction
8. Topography & Geology	5	No impact expected
9. Soil erosion	4	Needs attention during construction
10. Groundwater	5	Project does not involve groundwater abstraction
11. River and Wetlands	1	Narok River will be affected by increased abstraction
12. Coastline and Sea	5	There are no such sites in project area
13. Flora and Fauna	3	Variation in discharges in Narok River may affect flora and fauna in the river
14. Weather	5	No structures that may have an influence on weather are expected on this project
15. View	5	No structures that may affect view are expected on this project
16. Air Pollution	5	No adverse impact expected on air
17. Water Pollution	3	Increased wastewater flow resulting from increased water supply may affect operation of sanitation facilities
18. Soil Contamination	5	No impact expected
19. Noise and Vibration	4	Needs attention during construction
20. Ground Subsidence	5	No impact expected

21. Noxious Odours	5	No impact expected.
22. Cultural and Archeological Assets	5	No site affected
23. Conflict with Community Aspirations	5	Not an issue

KEY:

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

Table 7.2 IEE Checklist - Sanitation Component

ITEM	EVALUATION	COMMENT
1. Human Settlement	4	No impact expected
2. Economic Activities	4	No negative impacts expected
3. Transport	4	No impacts expected
4. Water and Common Rights	1	Discharges of wastes affect water quality downstream of Narok River
5. Sanitation	1	The aim of project is to improve sanitation
6. Waste	2	Sludge exhausted from septic tanks, pit latrines and cess-pits need proper management
7. Hazards / Dangers	4	No impact expected
8. Topography and Geology	4	No impact expected
9. Soil Erosion	4	No impact expected
10. Groundwater	1	Use of pit latrines, cesspits and improperly functioning septic tanks may cause deterioration of groundwater.
11. River and Wetlands	3	Control of discharge may reduce

		pollution of Narok River.
12. Coastline and Sea	4	There are no such sites in project area
13. Flora and Fauna	3	Discharges to Narok River may affect Flora and Fauna
14. Weather	4	No impact expected
15. View	4	No impact expected
16. Air Pollution	4	No impact expected
17. Water Pollution	3	Sanitation improvement is meant to reduce discharges to Narok River that may cause pollution.
18. Soil Contamination	4	Raw sludge exhausted from septic tanks, cess-pits and pit latrines may cause soil contamination
19. Noise and Vibration	4	No impact expected
20. Ground Subsidence	4	Raw sludge usually generate odours
21. Noxious Odours	2	No impact expected
22. Cultural and Archeological Assets	4	Such sites are not affected
23. Conflict with Community Aspirations	4	No impact expected

KEY:

1. Serious impact expected
2. Minor impact expected
3. Uncertain (investigation may clarify)
4. Almost no impact expected (no need for EIA)

7.7 INITIAL ENVIRONMENTAL IMPACT ASSESSMENT

By and large, the proposed rehabilitation project will have positive impacts by providing improved sanitation, reducing incidence of disease, and general improvement of the environment. However, from the results of IEE, four main

items of potential impacts of the proposed rehabilitation works are be identified for study as listed below:

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

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

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

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

7.7.1 Impacts Resulting from Water Abstraction

The available data on the hydrology of Engare Narok River indicates that the 100% exceedence flow at the waterworks intake (RGS 2K03) is 38,016 m^3/d as compared to the forecasted demand of 5,600 m^3/d. However, discussion with the water bailiff revealed that, the river catchment is undergoing intensive ecological change because of clearance of the rain forests to give way for human settlements and wheat cultivation. It is not clear what the impact of increased abstraction at the existing intake will be and this needs to be examined further.

7.7.2 Impacts from Increased Wastewater Generation

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

A study of the hydrogeology of the area shows that the groundwater potential is very low whereas the water table is quite shallow where aquifers exist. The risk of groundwater contamination by on-site sanitation systems in these areas is therefore real. On-site wastewater disposal in some of the major institutions like the District Hospital, the GK Prison are already overflowing and are of major environmental concern. Installation of a sewerage system, coupled with intensified public education on proper waste management is needed for protection of the environment.

7.7.3 Impacts from Operation of Sanitation Facilities

Operation of the on-site sanitation facilities with increased wastewater flow will worsen environmental degradation and add waste load into Narok River. There is need to install a sewerage system to reduce waste load into the river.

There is also a need to monitor operation of the on-site sanitation facilities by invoking the Public Health Act.

7.7.4 Impacts from Construction

At the rehabilitation stage construction will be concentrated in the areas of existing treatment works and along the pipelines and these constructions will not be of any large scale as to adversely affect human settlements. Excavations for pipelines may cause interruption to traffic flow but this will be on a temporary scale. Serious traffic inconveniences will be avoided by appropriate construction methods.

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 effect of clearance of rain forests and intensification of cultivation in the water catchment areas on future water potential. Cultivation will also generate agricultural waste discharges, especially fertilizers, which will affect the long-term water quality in Narok River, which is the only water supply source for Narok town.

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

8. PROPOSED UTILITY MANAGEMENT PLAN

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

8.0. GENERAL APPROACH

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

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

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

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

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

8.1. EXISTING WATER SUPPLY& SANITATION SYSTEMS

8.1.0. Overview Of All Systems Visited

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

8.1.0.1.Utility Systems Organisation

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8.1.0.2. Utility System Procedures

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

8.1.0.2.1. Administration:

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

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

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

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

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

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

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

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

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

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

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

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

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

8.1.1. Narok Water Supply & Sanitation System

Narok is the District Head Office falling under the Provincial Water Office Nakuru (Rift Valley Province), and at the same time provides the urban water supply for Narok town, currently serving a population of approximately 43.000 people.
The water demand for Narok cannot be met by the current source. Treatment works cannot be fully utilised as rehabilitation measures are necessary, and an inadequate distribution network reaches only certain areas of the town. Consumers complain of getting no water, while being charged average on those accounts that have non-working meters. Rationing consumers is done on the approval of the DWO.

8.1.1.1. Utility System Organisation:

8.1.1.1.1. Staffing:

The total number of staff is 34, of which 15 members, including the District Water Officer, are shared between District and Narok Water Supply activities. Refer to Appendix A3 Figure 8.1.1. – Organisation Chart. A clear delineation between District and Narok WS staff has been difficult and is reflected in the organisation chart to the best of the understanding of the consultant.
The DWO joined the Narok Water Supply only recently, and the office seems to work in a good spirit of co-operation with the new man. This is reflected in achievements, especially in the area of Revenue Collection.
The Officer in Charge of O&M is responsible for Source, Treatment, Distribution, Billing and Revenue Collection and Accounts. The Accounts section only processes A.I.E. and forwards procurements. The previously 2 officers from supplies have been retrenched. 10 staff members are assigned to the production and distribution network, and are allocated work where and when it arises. The explanation given for the inability to allocate specific task-teams is a perceived shortage of staff.
The background of all Billing and Revenue staff is technical. Meter reading is done by a variety of people, including those allocated to the distribution network and staff from the Revenue Department if necessary. Again no specific task-team for meter reading is in place. Training, if offered, remains technical and there is an absence of skills in commercial and managerial aspects.
A departmental organisation chart is available for the District only. Job descriptions are said to be available, but they were not found. These descriptions, as explained by staff members, are job-category descriptions, and have nothing to do with describing what a staff member is expected to do.
The index of number of accounts per staff member is:

Staff	Consumer Accounts	Accounts/Staff
34	1.333	39.21

8.1.1.1.2. Office Set-up, Facilities and Transport:

The office is located in a large compound with several stone buildings and the office block is shared between District and Narok WS staff. Five offices and a secretarial room are allocated to the Narok WS, although there is a certain amount of overlapping with the District staff. Basic hard furnishings are provided including tables, chairs and cabinets. The secretary has the use of one electric typewriter, but no calculators are available for the Billing office. Two working telephone lines are available. The store is equally shared between District and Town, and has basic furniture. There is a workshop for the District.
One Landrover and one Yamaha 125 motor-bike are shared with the District.

8.1.1.1.3. Consumer and Meter Information:

All information is available somewhere, 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 (PWO) and MENR Head Quarters.
An abstract of the comparison between information available or provided, with the verified information, is shown here below. Complete information is available in Appendix A3 Table 8.1.1.:

Detail	Provided from NAROK	Verified for June 2000
Registered Consumers:	1394	1333
Never Connected:	Not readily available	61
Metered:	1000	999
Working:	600	371,but 399 actual bills
Not-Working:	400	495, but 539 estimate bills
Un-metered:	400	289
Disconnected:	Not readily available	221
Major Consumers	Not readily available	20
Minor Consumers:	Not readily available	918

There are six operational Kiosks in town, but all apparently have a problem with supply. One Kiosk operator visited explained that business is poor due to the fact that other "normal" consumers are charged at average rates because their meter is not working, while his operational meter reflects the correct consumption. These "normal" consumers are also selling water, but at a lower price, simply because they are not charged for the water that they are actually consuming.
The distinction between Major and Minor consumers was based on the June 2000 consumption exceeding 100 cbm for Major consumers only.

An average of twelve applications for a new connection are received monthly out of which five new meters are connected.

8.1.1.1.4. Production and Consumption:

Production:

Production figures as used for the monthly O & M Monitoring returns, seem to be the result of estimation, as the verification of Appendix A3 Table 8.2.1, calculated by compiling information from the daily occurance book, reflects.

Difference: April: 2,021m^3, May: 2,445m^3, June: 3,542 m^3

The verified production average per month, as abstracted from the meter reading in the daily occurance book, and limited to the months April to June, is: 36,620 m^3/month as opposed to the records forwarded to the PWO and HQ: 39,290 m^3/month.

Detail	Average 4-6/00 as provided	Average 4-6/00 as verified
Design Capacity / Month	72,000 m^3	72,000 m^3
Production / Month	39,290 m^3	36,620 m^3
Production / Day	1,309 m^3	1,220 m^3

Based on the verified production (April to June 2000) and the designed capacity of 2,400 m^3/day, the average production efficiency is calculated with 50,83% and the **Production Efficiency for June 2000= 50.60 %**

The actual production in Narok can be established, as three existing master meters, located at the production outlet are working and daily recording is done. Four out of five high lift and four out of five low lift pumps are operational.

Consumption:

Consumption records are available in Appendix A3 Table 8.2.1. and compared with the verified details from Appendix A3 Table 8.1.1.:

Detail	%	June 2000 as provided	%	Average as provided	%	June 2000 verified
Actual Consumption	56	8.463 m^3	56	8.362 m^3	55	10.843 m^3
Estimate & Flat Rate	40	6.133 m^3	40	6.007 m^3	45	12.573 m^3
Kiosks	4	600 m^3	4	600 m^3	-	Included in above
TOTAL:	100	15.196 m^3	100	14.969 m^3	100	23.416 m^3

Consumption records can only be compiled by summation, on a monthly basis, from the consumer ledger information. This exercise is, however, not done on a monthly basis in Narok, and the information required for the monthly returns to the Provincial and Head Office are recorded as "estimated based on experience" approximate figures. As these returns do not appear to be commented on, or returned back to the Narok office, the practice of approximation seems to be accepted. No reconciliation is however done at the end of the FY.

The June 2000 consumer portfolio as analysed here below shows that Narok has a solid number of minor consumers, consuming up to 10 cbm per month and representing 67.27% of all billed connections.

Consumption Steps	Number of Bills		Revenue Earned (June 2000)	
	Actual	Estimate	Actual Kshs	Estimate Kshs
0 to 10 cbm	211	420	58.802.00	108.247.00
11 to 20 cbm	76	66	31.170.00	29.020.00

Consumption Steps	Number of Bills		Revenue Earned (June 2000)	
21 to 40 cbm	69	37	58.110.00	34.300.00
41 to 60 cbm	20	8	35.185.00	11.190.00
61 to 100 cbm	7	4	25.095.00	10.480.00
> 100 cbm	16	4	170.785.00	38.415.00
TOTAL:	**399**	**539**	**333.090.00**	**231.652.00**

It should be pointed out that future tariff adjustments towards a cost covering tariff structure will become very difficult for such towns where the highest contribution into the earned revenue comes from the lowest consumption group, which is however not the case in Narok. A social tariff, shifting cost to the consumers or institutions on higher consumption, might bring the expected results.

8.1.1.1.5. Un-accounted for Water (UfW):

The main problem relates to weakness in the transmission / distribution system and the storage tanks in town. The steel tank, designed to supply one area of town cannot be used due to severe leakage with the consequence that part of the consumers cannot be reached.

The practice of approximating production and consumption figures is equally reflected in the un-accounted for water records.

Narok WS reflects its monthly losses in the O&M Monitoring Report. Refer to Appendix A3 Table 8.2.1. for the months January – June 2000. The average reported loss from Narok over those 6 months is calculated as 42.67 % per month. Using the verified production of 36,431 m^3 and the verified consumption of 23,416 m^3, the month of June 2000 translates into a loss of 35.73 % or cbm 13.015 as against 42.14 % reported from Narok..

The value of UfW, calculated for June 2000, using the average tariff of Kshs 24.12, is therefore Kshs 313,892,94.

8.1.1.1.6. Billing and Revenue Collection:

Billing:

The Billed and collected revenue is reflected in Appendix A3 Table 8.3.1 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. The explanation given was that the return has to be submitted before the figures are compiled. The month of June, being the last month of the Financial Year does not reconcile the picture and the total billed revenue does therefore not reflect what is recorded in the consumer ledgers.

The approach of the consultant was to verify using Appendix A3 Table 8.1.1, which contains the information abstracted from the consumer ledgers for the month of June 2000. This exercise indicated the amount of Kshs 564,742.00 as the billed revenue, whilst the monthly return to PWO and MENR abstracted from Appendix A3 Table 8.3.1 states the June figure as Kshs 295,000.00.

While the Tariff was adjusted effective November 1999, the information only trickled down into the Districts by February 2000. No adjustment can be seen in the billed revenue. A considerable increment in the revenue collection can, however, be seen

from March 2000 onwards; it is not clear whether this increment is as a result of the efforts of the new District Water Officer or the new Tariff. This inconclusivity in the reasons for increased revenue collection is further compounded because Appendix A3 Table 8.3.1 lacks the billed revenue information for the months July to December 1999, which information could have shown the billed revenue before the tariff increment.
Based on the production details obtained from the daily occurrence book, the production for the month of June was 36,431 m^3 and Appendix A3 Table 8.1.1 records a billed consumption of 23,416 m^3. Therefore the verified
Billing Efficiency for June stands at **64.27%**

Revenue Collection:
The revenue collected is reflected in Appendix A3 Table 8.3.1 as provided through the Narok WS office return and the District Treasury. This amounts for the whole FY to Kshs 3,827,478.00, resulting in an average of Kshs 318,956,50 per month.

Detail	June 2000 as provided	Average FY 99/00 As provided	June 2000 Verified
Billed Revenue:	295,000.00	298,833.00 (1-6)	564,742.00
Collected Revenue:	427,020.00	318,956.50 (1-12)	427,020.00

The attempt to verify payments with the information contained in Appendix A3 Table 8.1.1. must be termed as futile because the officers abstracting the information from the consumer ledgers, not only did consider payments up to 30.06.00, but also any payment that was in their records by the time the exercise was undertaken.
The amount used for calculating the Billing efficiency is the collected revenue, verified with the District Treasury.
The verified **Collection Efficiency for June 2000** stands at **75.61 %**

8.1.1.1.7. Average Tariff:
As no reliable summarised consumption or billing details are available, the average tariff is taken to be based on June 2000 records from Appendix A3 Table 8.1.1 and records taken from the daily occurance book.
Billed Revenue Kshs 564,742.00 / billed consumption of 23.416 cbm =
verified **Average Tariff for June 2000 Kshs 24.12 per m^3**

8.1.1.1.8. Debt Situation:
The debt arrears situation as provided by Narok is the computed total, forwarded on a monthly basis in the format of Appendix A3 Table 8.3.1. The Narok 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 A3 Table 8.1.1., Table 8.4.1.and the account numbers of GOK consumers provided by Narok, the situation **prior to the June 2000 bill** is:

Detail	Narok Debtors as provided	%	Verified Debtors	%
Total Debtors	4,235,072.00	100	8,664,102.50	100
Major Consumers				
GOK Others *	Not readily available		3,269,057.00 1,297,866.00	38 15
Total Major			4,566,923.00	
Minor Consumers **	Not readily available		4,097,179.50	47

* Criteria used for major consumers: > 20.000/= Kshs or consumption >100m^3

** Criteria used for minor consumers:<20.000/= Kshs or <100m^3

Efforts have been made by the new DWO to reduce the outstanding balances, primarily by attempting to collect monies outstanding from Government entities. A more rigorous disconnection programme for other consumers is said to have been undertaken, but monthly disconnection and reconnection records could not be obtained.

8.1.1.1.9. Funding:

Based on the collected revenue and an A.I.E. (Authority to Incur Expenditure) of 64% , funds are sent from Treasury to the District Treasury. The process involves the MENR Head Office and is explained under 8.4. of the main report. The A.I.E. percentage is determined by the MENR Head Office with no involvement of Narok WS. Appendix A3 Table 8.5.1. reflects that the A.I.E. earned is not necessarily A.I.E. received.

A.I.E. Earned FY 99/00	A.I.E. Received FY 99/00
2,449,585.90	1,286,980.00

The A.I.E. received is to be utilised by all Water Divisions within the District. A separation between Narok WS and the other Divisions was not readily available. It was, however, mentioned that approximately 10% of the A.I.E. received is disbursed on Divisions. Simultaneously it was mentioned that these same Divisions do not collect any revenue and that the District involvement is limited to technical advice.

Any A.I.E. due and not received within that FY, cannot be carried forward into the next FY and is considered a "lost effort" as far as the Narok WS is concerned.

An approved A.I.E. does not translate into instant liquidity or the ability to procure, because it equally requires the District Treasury to be liquid. The District Treasury Narok has a revolving fund of Kshs 4 million, meant to cater for all GOK Departments within the District and spending priority is not determined by the Water Department but the District Administration.

Details:	Expenditure FY 99/00
A.I.E used for O&M	1,285,917.70

Narok District Water Department is provided with an imprest of Kshs 20,000.00 which has to be accounted for before replenishment and expenditure has to be covered under the approved A.I.E.

8.1.1.2. Utility System Procedures:

All current procedures, as far as the office and field operations are concerned, are covered in the Appendix A3 Questionnaire 8.1. 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 8.4. of the Main Report.

8.1.1.2.1. Administration:

8.1.1.2.1.1. Staffing:

Staff members are transferred and/or promoted based on decisions made at HQ level and local recommendations or requests are not considered. The processing of transferrals and promotions in Nairobi seems to be extremely protracted. After staff have undergone further studies and training, they often return to the same job-level at which they were prior to any such initiative. Expected salary adjustments commensurate with promotion are equally slow in arriving.
While there is provision for annual forms to be completed by staff members requesting promotion and training, such requests are widely perceived to be a waste of time and effort as the consensus is that the paperwork will simply take up space in a filing cabinet at HQ.
Personnel issues stand a far higher chance of success if dealings are direct with HQ Nairobi as no local structure is in place to deal efficiently with, for example, salary queries.
The constraints experienced in every level of operation contribute towards lowering of staff morale. Salary levels are considered as being much too low.
Staff working in the Billing and Revenue Department have a technical background, and have been placed in positions that bear no relation to the job category for which they were trained, employed and are paid for. When placed into these non-technical positions, staff do not get training, but are expected to learn from the others on the job.

8.1.1.2.1.2. 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. Stationery for a new application is always in short supply (2 formats are available: W.D.D.3 and W.S.D. (Revised)) and consumers have to copy and return the form. Since 01/2000 new consumers are advised to bring their own meter. The new account number is given as the next number in the register. There are a total of 61 connection numbers that have been given out to applicants, who have never come back to finalise payment, which is a precondition for the physical connection. Account numbers do not relate to the area in which the connection is located.
There are no forms available to close a consumer account, but pending bills have to be cleared before the account is closed in the consumer ledger. The **refund of a consumer deposit** has developed into a problem for the consumer, since the refund has to be claimed from Nairobi. As, for most of the consumers, the transport to Nairobi is more expensive than the deposit placed, it does not appear to be financially viable

for the consumer to reclaim the deposit. It could not, however, be established what the consumers actually do. It is not possible to off-set the deposit against the final balance.
The **transfer of an account** to another consumer is only recorded in the consumer ledger after the outstanding has been cleared. The account number does not indicate the transfer, as the new consumer simply takes over the old number. In the case of frequently changing accounts, it is suspected that account names do not reflect the actual user.
Change of address is not considered in Narok, as all consumer bills are either hand delivered or collected, and no information is ever mailed.

8.1.1.2.1.3. Meter Reading, Billing & Revenue Collection:

Meter Reading

Meter reading is undertaken by the same staff members that are manning the revenue office, and is done in form of a continuous process. At the time of visiting the station (21.09.00) 308 consumer accounts had been read. While there are no meter reading books in place, the records are noted on a plain piece of paper and then transferred by the same staff into the consumer ledgers. Bills are then calculated immediately and hand delivered by the same staff to the respective consumer within 3 days of reading the meter.

Billing:

The Billing section calculates with personally owned calculators, as the office does not provide the same. The billing process requires the necessary billing stationery, which in case of non-availability causes a delay.
In the event of a wrong bill issued, it is possible to obtain a book credit into the consumer ledger. A refund situation is however very difficult.
Consumers who have not been paying their bills for some time, do receive a two months warning for disconnection on the lower part of the bill, marked in red.

Disconnection:

The same Revenue section prepares a disconnection list for those consumers who have received a warning on their last bill. The disconnection list is only prepared providing that the necessary staff and materials are available. The meter is removed and the connection is plugged and painted in an attempt to avoid potential tampering with the connection. The meter is then returned to the office. The disconnection date is entered into the consumer ledger and the meter is stored in the DDWO's office in a large box.

New Connection:

Upon a consumer request for a new connection, a site visit/survey is carried out by either the Divisional Water Extension Officer or the Officer In Charge of O & M. If the connection is possible, the application form is filled at the office, and approved by the DWO. The consumer is then requested to pay a connection fee of Kshs. 215.00 and a deposit ranging between Kshs. 1,000.00 and Kshs. 50,000.00 depending on the consumer category. In addition the consumer is required to purchase the required

calculate the connection and determine the required norms, but this is no longer applicable.
No procedures or records of field activities are in place. Only major consumer meters, if broken down or stalled, receive attention such that an effort is made to replace with a meter of a long disconnected consumer.

Stock
No stock available. Both former supplies officers were retrenched, therefore no detailed information obtained. Only chemical details available.

Operation Manuals:
Only for the pumps said to be available.
No manuals for technical procedures.

8.1.1.3. Community Projects:

The consultant did not obtain any information about community projects within the Narok Water Supply area.

8.1.1.4. El-Nino Project:

No information was obtained concerning any on-going El-Nino activity.

8.1.1.5. Recommended Priority Measures:

The willingness of staff to improve when assistance and advice is available has been observed during discussions with the MENR staff. The implementation of the recent retrenchment exercise has left deeply felt frustration amongst the staff members and any form of PSP has been commented on as "welcomed".

The reduction of Un-accounted for Water (UfW) is considered important and should be improved greatly by replacing approx. 50% of the current consumer meters and those on flat rate (approx 800 meters).

Equally important is to increase the supply situation as the current l/c/d is calculated as 18,44 based on June 2000 consumption figures and current population figures for the year (2000)

The June 2000 Revenue efficiency (Billing x Revenue Collection) is 49%. The billing efficiency of 65% relates considerably to estimated and flat rate billing. The support of a good billing program apart from the meter replacement, should bear early results, as the collection efficiency with currently 75% must be seen as encouraging, especially when considering that Narok has a minor consumer base, of those between 0-10cbm per month, calculated at 67% of all consumer accounts. Normally the collection of revenue from the minor consumers is much more difficult than middle or major consumer brackets, unless consumers have been disconnected in the past and no substitute at acceptable quality level can be drawn within reasonable distance from the settlements.

The following are the recommended priority measures:

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

All other recommended activities are reflected in the comprehensive Utility Management plan under chapter 8.10., and given the second priority.

8.1.1.6. 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 Narok is lined out here below for the 3 different Phases mentioned.

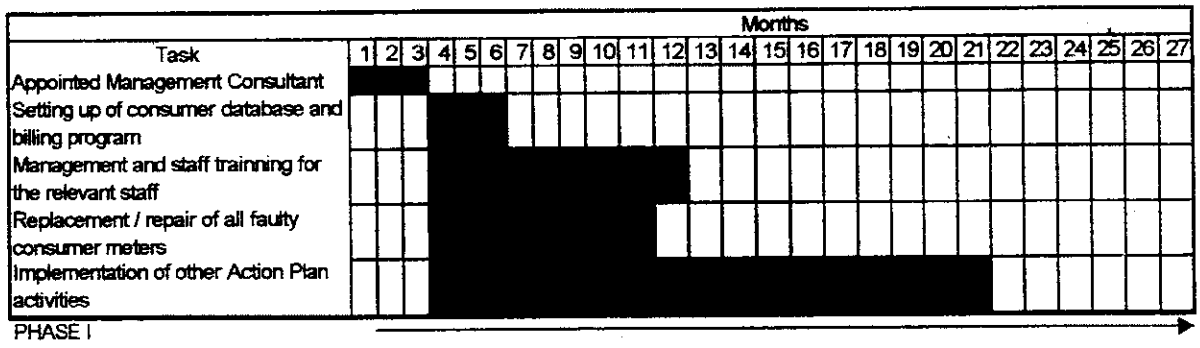
The overall assumption under which the proposed activities will reflect in the expected results, is that major players and stakeholders ensure that recommended reforms in the water sector are implemented.

Other assumptions under which the proposed activities will reflect in the expected results, are:
Assumption 1:

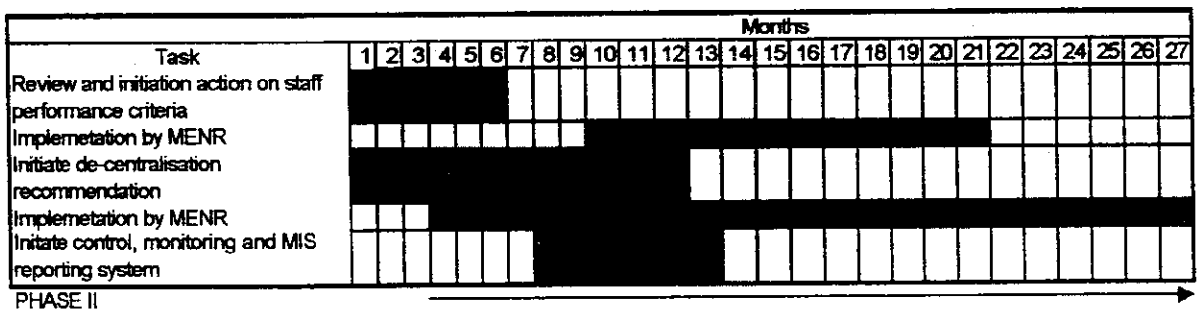
- Funds for approx. 800 (500 not working, 300 un-metered) consumer meter are available.
- Funds for setting up temporary office with computer hardware (5), printer (2), billing software, additional transport (1x 4WD pick-up, 1 saloon car, 4 motorbikes (2 meter reading, 1 line patrol, 1 new connections)) and basic office equipment are available.
- Funds for remuneration of the proposed staffing organisation is available,
- Funds for 6 months interim operation, while cash collection is re-organised such that funds remain available at system level. It is to be noted that the current production situation is limiting financial improvements and a major step towards sustainability will only be achieved after rehabilitation works improve the possible supply to consumers of Narok
- Funds for the involvement of the management consultant

All funds must be available or planned for at the beginning of the management consultants involvement. Refer to Table 4.4. Cost Estimate for Rehabilitation Works for the Narok Water Supply.

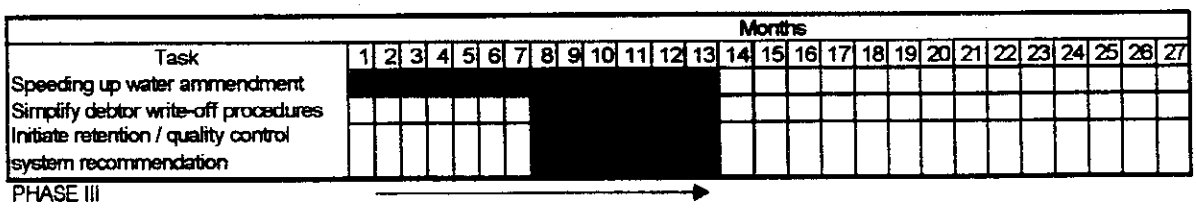
Assumption 2:
Staffing re-organisation, training and selection of staff as recommended by the management consultant, receives the necessary support from MENR.
Meters can be replaced within a period of 8 months, during which time approx. 100 meters are replaced in a standardised manner and on a monthly basis by Narok water system staff.
The minimum time involvement for the management consultant support is taken as 18 months.



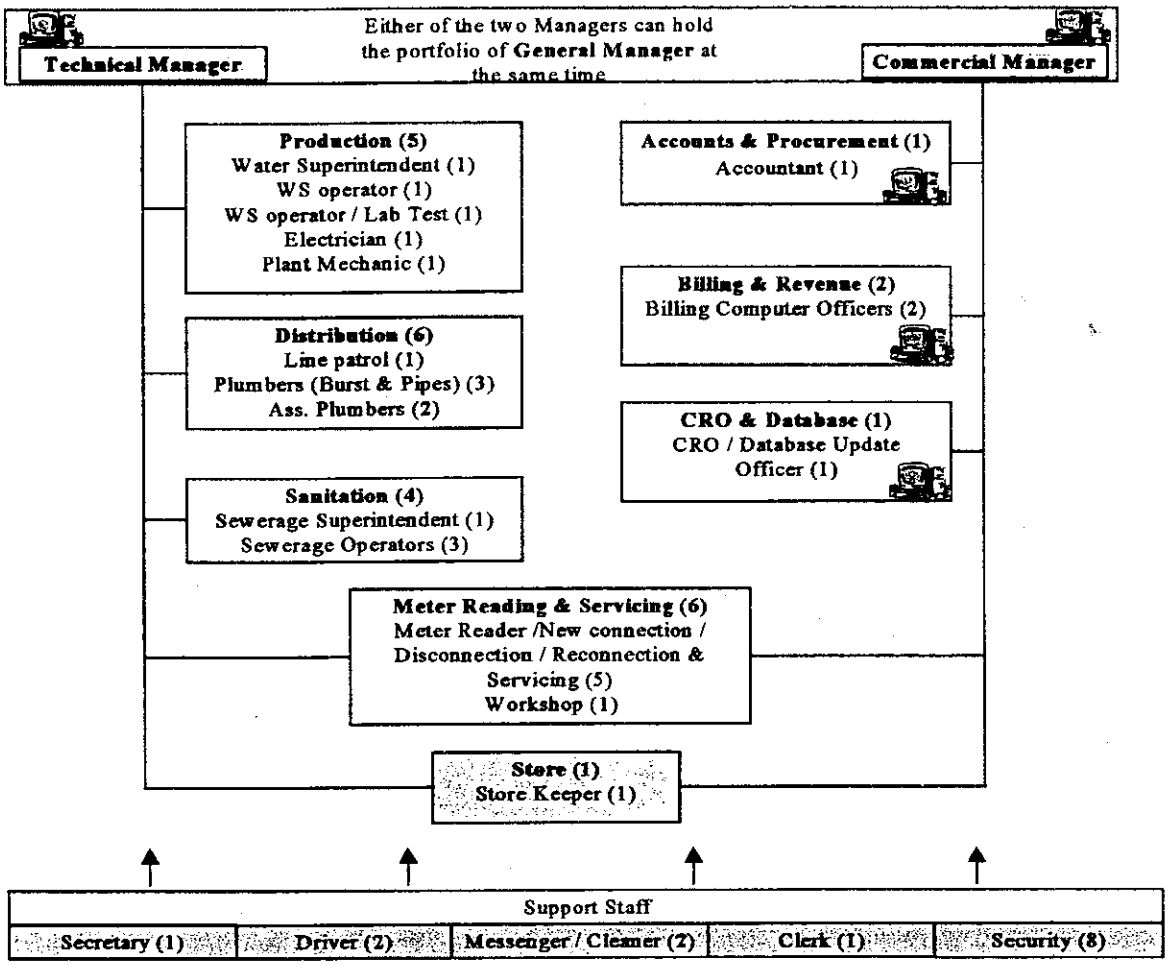
Phase 2 concentrates on de-centralisation changes, for which the more detailed activities are described in the Action Plan of Appendix K3 Summary Table ST 8.4



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



8.1.3.7. Recommended Narok Organisation Chart:



Note:

Department is allocated a computer

Total recommended number of staff = 38 (additional 4 for sanitation)

The possibility of out-sourcing security services, master meter maintenance and pump maintenance should be surveyed and assessed during the management consultancy contract. Implementation should be considered during the preparation of the rehabilitation works. Casual labour to support trenching or cleaning of blocked sewers e.t.c, will be sourced from the market whenever the need arises.

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

NOTE:

As the sanitation system is not in place staff shown for sanitation is only meant to be an indication.

8.2. COMMUNITY SYSTEMS WITHIN THE EXISTING UTILITY SYSTEMS

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

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

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

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

8.2.1. Makindu

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

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

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

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

the work during and after the completion.

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

8.2.2. Migori

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

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

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

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

8.2.3. Webuye

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

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

8.3. PROBLEMS AND SHORTCOMINGS OF THE EXISTING SYSTEMS:

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

- Low efficiency on production,

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

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

8.3.1. Division Specific Problems:

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

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

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

8.3.2. Districts Specific Problems:

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

8.3.3. NWC&PC Area Office Specific Problems:

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

Regional Office.

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

8.4. MENR HEADQUARTER PROCEDURES, SHORTCOMINGS AND IMPEDIMENTS

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

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

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

8.4.1. Personnel Issues and Procedures

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

8.4.2. Power

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

8.4.3. Chemicals

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

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

8.4.4. A.I.E. Issues and Procedures

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

8.4.5. Planning and Control

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

8.5. PROVINCIAL WATER OFFICE FUNCTIONALITY

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

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

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

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

8.6. NWC&PC SHORTCOMINGS AND IMPEDIMENTS

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

8.7. COMMERCIALISED SYSTEMS IN KENYA

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

8.7.1. Malindi: Management Contract (NWC&PC)

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

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

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

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

8.7.2. Nyeri: NYEWASCO Private Water Company

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

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

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

8.7.3. Kitale: KIWACO Private Water Company

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

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

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

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

8.8. PROBLEMS AND SHORTCOMINGS OF EXISTING COMMERCIALISED SYSTEMS

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

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

- Government procurement procedures

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

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

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

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

8.9. OPTIONS FOR VIABLE MANAGEMENT AND OPERATION

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

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

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

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

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

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

8.9.1. Recommended Changes within the current Institutional Framework

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

8.9.2. Recommended Changes for a De-centralised Framework

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

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

8.9.3. Recommended Changes for a Transition Approach

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

8.10. RECOMMENDED UTILITY MANAGEMENT PLAN

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

8.10. RECOMMENDED UTILITY MANAGEMENT PLAN

No.	Action	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	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	Webuye	Mumias	Utility Management Plan
20.	Decentralise AIE funding and procurement procedures to system level and transfer efficient and stringent control to the provincial / regional office level	x	x	x	x	x	x	x	x	x	x	
21.	Decentralise decision making process to station level	x	x	x	x	x	x	x	x	x	x	
22.	Decentralise planning and control of cost	x	x	x	x	x	x	x	x	x	x	
23.	Design efficient and stringent control system for the provincial / regional office level (Price analyst, independent external auditors, adequate use of chemicals)	x	x	x	x	x	x	x	x	x	x	
24.	Design MIS reporting system for Povincial to HQ reporting (investment planning, policy making)	x	x	x	x	x	x	x	x	x	x	
25.	Set up stock management system and controls	x	x	x	x	x	x	x	x	x	x	
26.	Set up consumer meter workshop (with volumetric test facilities)	x	x	x	x	x	x	x	x	x	x	
27.	Prepare / update O&M guidelines / manuals	x	x	x	x	x	x	x	x	x	x	
28.	Propose outsourcing criterias for pump maintenance depending on the pump capacity.											
29.	Include consumer lines into the planned network	x	x	x	x	x	x	x	x	x	x	
30.	Clarify and document water wayleafs	x	x	x	x	x	x	x	x	x	x	
31.	Introduce retainer security on contracted civil works and quality control	x	x	x	x	x	x	x	x	x	x	

No.	Action	Narok	Meru	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 Provincial 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 wavers	X	X	X	X	X	X	X	X	X	X	X
31	Introduce retainer security on contracted civil works and quality control	X	X	X	X	X	X	X	X	X	X	X

8.11. RECOMMENDED PRIORITY PROJECTS

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

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

8.12. RECOMMENDED PRIORITY MEASURES:

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

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

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

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

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

9. INSTITUTIONAL AND LEGAL ASPECTS OF NAROK URBAN WATER SUPPLY SERVICE

9.1 Institutional Set-Up of Narok Urban Water Supply Service.

Narok urban water supply is under the responsibility of the District Water Office (DWO), Narok District. This means that in addition to the operation and management of the Narok Urban Water Supply, the DWO has the responsibility of operating and managing other water supply systems in Narok District. The District Water Officer, Narok, is supported by a Deputy District Water Officer. The detailed organisational structure for Narok 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 Narok water supply has a technical staff of 6, viz. the District Water Officer (who is a hydrologist), 3 waterworks superintendents, a pollution control superintendent and an electrical inspector. In addition, there are also 13 employees serving in various technical capacities work for the Narok Urban Water Supply, including semi-skilled plant / pump attendants. It should be noted, however, that while most staff are deployed specifically in the Narok Urban Water Supply, others are also deployed in the operation of the other water projects in Narok District.

Narok town has no sewerage system. Waste disposal is by means of septic tanks, cess pits and / or pit latrines and this is the responsibility of Narok Town Council.

In recommending a viable institutional and legal framework for Narok 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)[3] 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.

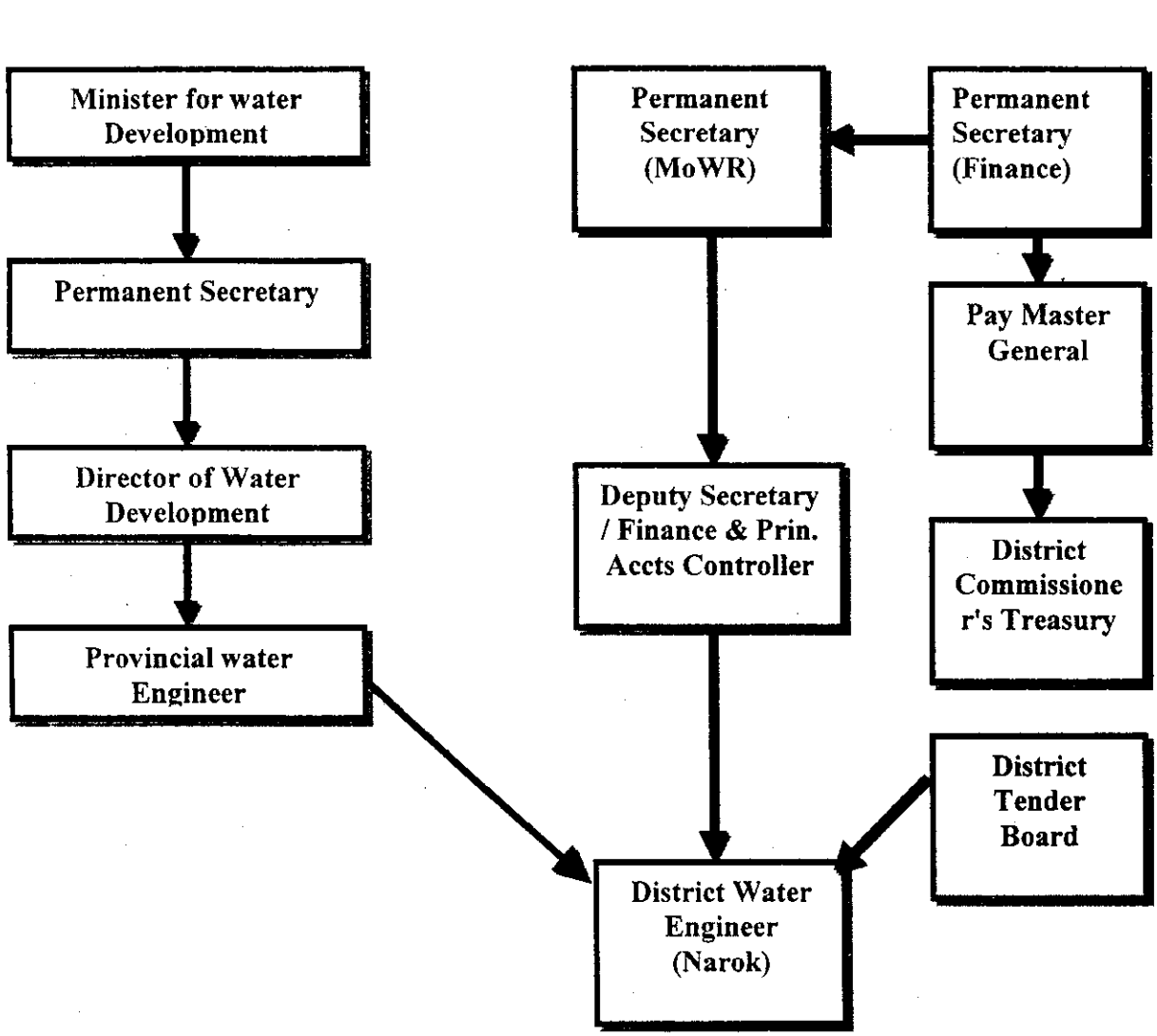
The four branches of the department are:

- 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



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 (NWCPC)

The National Water Conservation and Pipeline Corporation (NWCPC) was established under the State Corporations Act, Chapter 446 of the Laws of Kenya vide Legal Notice No. 270 of 24th June, 1988, as an autonomous agency reporting to the then Ministry of Water Development. The Corporation became operational on 1st 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 NWCPC. 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.