Section of the MOWR. It is intended that a second Water (Amendment) Bill be prepared, circulated to stakeholders and the Attorney General, and then submitted to Parliament.

9.3.2. The National Water Conservation and Pipeline Corporation Order, 1988

The National Water Conservation and Pipeline Corporation was established in 1988 by an Order,[33] and among its functions are the development and management of the water projects listed in the Schedule to the Order, as amended from time to time.[34] To that end, and in connection with the water projects in the Schedule, Regulation 5 provides that the Corporation shall (a) supply water in bulk to such water undertakers as may be designated by the Minister, (b) supply water, in bulk or otherwise, to such persons or class of persons as the Minister may designate, (c) do all such things as may be necessary or advantageous for the management and development of water projects and for securing an adequate supply of water, and (d) apply for and obtain such licences, permits and authorities required under any written law or as may be desirable. Further, the Regulation provides that the Corporation shall operate under the general direction of the Minister and shall assist the government in the formulation and implementation of a national water development policy.

It is noteworthy that the functions of the Corporation do not include addressing or dealing with factors or activities that may affect the availability of water or its quality. The supply with which the Corporation is concerned is dependent on the availability which, in turn, is dependent on conservation of catchment areas and drainage basins and ensuring that activities in these areas do not lead to diminution of the water in quantity and quality. The implication here is that the Corporation would be rendered functus officio if the supplies dried out!

A major weakness in the legislation establishing the Corporation is the absence of any statement indicating how it is to relate to other institutions, eg MOWR and local authorities, in the development and management of water supplies. This has caused considerable confusion among these other institutions and needs to be resolved.

9.3.3 The Local Government Act (Cap 265)

This Act was set up in 1963 to provide for the establishment of authorities for local government, to define their functions and to provide for "connected" and "incidental" matters. It was revised in 1986.

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[33] Supra, note 37.

[34] As per the last amendment to the Schedule, effected vide L.N. 42 of 1989, the total number of water projects under the Corporation is now forty two.

In the context of this study, the Act provides that every local authority (municipal, town and urban council) may establish, maintain and regulate sewerage and drainage works within or outside its area. It may also compel the construction of private drains and their connection to public drains or sewers, and fix charges for the use of sewerage and drainage facilities.

In addition, a local authority (municipal, town, urban or area council) may undertake the supply of water within its area, and may establish, acquire and maintain works for this purpose. A local authority may make by-laws under this Act to the extent that a water undertaker may make regulations under the Water Act. However, it is not stated dearly that every local authority undertaking water supply is a water undertaker under the Water Act. For example, the Water (Water Undertakers) Rules apply only to gazetted water undertakers.

Many local authorities operate and manage water supply systems, not only as water undertakers but also pursuant to the provisions of the Local Government Act.[35] The water and sewerage department of every local authority is responsible for operation and maintenance of works for the supply systems. Augmentation and expansion of the systems are under the control of the parent ministry.

9.3.4 The Irrigation Act

Section 15(2)(a) of the Irrigation Act (Cap. 347) enjoins the Irrigation Board, in conjunction with the water Resource Authority, to formulate and be responsible for the execution of policy in relation to national irrigation schemes. One can only hope that such policy would take into account and be in consonance with the provisions of the Water Act.

This Act provides for the establishment, constitution and functions of the National Irrigation Board which is responsible for the development, control and improvement of national irrigation schemes in the areas designated by the Minister of Water Resources.

9.3.5 The Tana and Athi Rivers Development Authority Act

The Act provides for the establishment of an authority to advise on the institution and coordination of development projects in the two basins.

9.3.6 The Kerio Valley Development Authority Act and the Lake Basin Development Authority Act

These Acts each provide for the establishment of an Authority to:

(a) Plan and coordinate the implementation of development projects in the

[35] Chapter 65, Laws of Kenya, (Revised Edition, 1986), sections 178-180.

catchment area;

(b) Establish a long range development plan for the area;

(c) Coordinate the abstraction and use of natural resources, especially water, and to monitor this;

(d) Maintain a database of all relevant statistics for the area.

The Acts do not state that the Authorities have sole or any responsibility for developing and distributing water supplies in bulk, either within the Area or outside it.

9.3.7 The Agriculture Act (Cap 318)

Section 201 of the Agriculture Act acknowledges the supremacy of the Water Act. It states -

"Nothing in this Act or any rules made thereunder shall prejudice or affect the provisions of the Water Act, and where anything in this Act or any rule is inconsistent with any such provision that provision shall prevail." This provision should be included under other Acts as far as water is concerned.

The Act promotes agricultural development according to sound practices of good land management and stresses the need for conservation of soil and its fertility. Thereby, the Act indirectly emphasises the importance of preventing of soil erosion and the consequential deterioration of the quality of surface water.

9.3.8 The Public Health Act (Cap 242)

This Act requires local authorities to take all lawful measures to prevent and deal with the outbreak of disease. As there is a direct connection between certain diseases, sewage and water supply, every local authority, whether a water undertaker or not, has a statutory duty in water supply, water pollution and sewage disposal. For this purpose, the Act gives every local authority wide powers to deal with unsatisfactory water supplies, wastewater and sewage disposal and water pollution. For example, a local authority is mandated to prevent pollution of any supply of water used for drinking or domestic purposes, to purify it should it become polluted and to take action against those causing the pollution. Furthermore, the local authority is empowered to exercise its powers outside its area, if for example the source of water is outside its area.

Powers given to the Minister include: delegation of powers to local authorities and others to control the standard of purity of treated effluent and to control industries liable to pollute water courses; making rules for the protection of water supplies in defined areas; prohibition of insanitary irrigation within a town or its environs. There is

a fair amount of subsidiary legislation which includes detailed provisions for drainage and sewerage.

9.3.9 *The Environmental Management and Co-ordination Act 1999*

Management of water resources has also been addressed by legislation outside the sectoral confines. In particular, this has been addressed under the rubric of environmental protection and conservation by the newly enacted Environmental Management and Co-ordination Act.[36] The Act has detailed provisions on this matter. For instance, section 42 provides that no person shall, without the written approval of the Director General of the National Environment Management Authority, given after an environmental impact assessment in relation to a river, lake or wetland carry out a number of activities, namely, (i) erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in or under the river, lake or wetland; (ii) excavate, drill, tunnel or disturb the river, lake or wetland; (iii) introduce any, animal whether alien or indigenous, dead or alive, in any river, lake or wetland; (iv) introduce or plant any part of a plant specimen, whether alien or indigenous, dead or alive, in any river, lake or wetland; (v) deposit any substance in a lake, river or wetland or in, on, or under its bed if that substance would or is likely to have adverse environmental effects on such water body; (vi) direct or block any river, lake or wetland from its natural and normal course; or (vii) drain any lake, river or wetland. Besides, the Minister is empowered to declare a lake shore, wetland, coastal zone or river bank to be a protected area for purposes of conserving the environmental quality of such a body of water.[37] He may also issue general and specific orders, regulations or standards for the management of river banks, lake shores, wetlands, or coastal zones and for the protection and conservation of such areas if they face imminent risk of environmental degradation. Such orders may provide for, inter alia, the development of overall environmental management plans for the water bodies taking into account the relevant sectoral interests, the development of contingency plans for the prevention and control of all deliberate and accidental discharge of pollutants into the water bodies, as well as the development of plans for the protection of wetlands.[38]

(a) Management of environment - lakes and rivers

The National Environment Management Authority is also under a duty to issue guidelines for the management of the environment of lakes and rivers.[39] It is also required to develop, issue and implement regulations, procedures, guidelines and measures for the sustainable use of hill sides, hilltops, mountain areas and forests and the control of the harvesting of forests and other natural resources so as to protect water catchment areas.[40]

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[36] Act No. 8 of 1999. The Act became operational effective January 14, 2000.
[37] Ibid. section 42(2).
[38] Ibid., section 42(3).
[39] Ibid., section 42(4).
[40] Ibid., sections 44 & 47.

Further, the Minister is empowered to declare any area of land, sea, lake or river to be a protected natural environment area for the purpose of promoting and preserving specific ecological processes, natural environment systems, natural beauty or species of indigenous wildlife or the preservation of biological diversity in general. Once an area has been so declared, the National Environment Management Authority is empowered to issue guidelines and prescribe measures for the management and protection of such area.[41]

(b) Environmental impact assessment - water projects

Section 58 of the Act makes it mandatory for projects that are likely to have adverse environmental impacts on water to undergo environmental impact assessment. These projects are dams, rivers and water resources including storage dams, barrages and piers; river diversions and water transfer between catchments; flood control schemes; and drilling for the purpose of utilizing ground water resources including geothermal energy.[42]

What is clear from the above is that the Environmental Management and Co-ordination Act is innovative in one fundamental way. Unlike the other legal instruments before it, it focuses the management strategy less on the resource (water) per se and more on the protection and conservation of the ecosystems that enhance and maintain both the quality and quantity of the resource available for use. By focussing more on the ecosystems, the Act adopts a holistic approach to water resource management which, in turn, enables the consideration of related factors such as deforestation, agricultural and animal husbandry and human settlements, all of which have direct implications on the availability and sustainable use of water.

(c) Water quality standards

As already noted above, the major problem with the prevention and control of water pollution is the absence of any water quality and discharge standards. With the Environmental Management and Co-ordination Act in force, this may soon become history. Water polluting activities and pollutants will be subjected to strict control measures under the Act. The Act establishes a Standards and Enforcement Review Committee whose functions are, *inter alia*, to advise the National Environment Management Authority on how to establish criteria and procedures for the measurement of water quality, to recommend to the Authority minimum water quality standards for uses such as drinking, industry, agriculture and recreation, and to analyse and submit to the Director General of the Authority conditions for discharge of effluents into the environment.[43] Implementation of the quality standards will be reinforced by penal sanctions, a factor that recognizes societal interest in water quality. Any person who discharges or applies any poison, toxic, noxious or

[41] Ibid., section 54.
[42] Ibid., section 58 and Second Schedule to the Act.

[43] Ibid., sections 70 & 71.

obstructing matter, radioactive waste or other pollutants or permits any person to dump or discharge such matter into the aquatic environment in contravention of the established water pollution control standards shall be guilty of an offence and liable to imprisonment for a term not exceeding two years or to a fine not exceeding one million shillings or to both such imprisonment and fine.[44] In addition, the person shall be ordered to pay the cost of the removal of the pollutant(s), including the costs of restoration of the damaged environment and, also, to pay third parties reparation, cost of restoration, restitution or compensation as may be determined by the court on application by such third parties.[45]

(d) Trade and industrial effluents

Trade and industrial effluents shall be discharged only into existing sewerage systems and only pursuant to an effluent discharge licence issued by the local authority operating or supervising such sewerage system.[46] The discharge licence may be cancelled by the Authority if (i) the holder contravenes any provision of the Act, (ii) the holder fails to comply with any condition specified in the licence, or (iii) the Authority considers it in the interest of the environment or in the public interest so to do.[47] Otherwise all licenses issued for effluent discharge shall be kept in a register to be maintained by the Authority as a public document that may be inspected by any person on payment of the prescribed fee.[48]

An important provision of the Act is section 158 which provides that any written law in force before the commencement of the Act relating to the management of the environment shall have effect subject to such modifications as may be necessary to give effect to the Act. Further, where the provisions of such law conflict with those of the Act, the latter shall prevail. This provision is crucial in charting the future trends in legislative action with respect to the management of the environment generally and water in particular.

9.3.10 Wildlife (Conservation and Management) Act (Cap. 376).

Mention should also be made of the Wildlife (Conservation and Management) Act (Cap. 376). Under S.15 thereof, the Minister is empowered, upon certain conditions being satisfied, to prohibit, restrict or regulate any particular acts in any area adjacent to the Park, National Reserve or local sanctuary. In particular, he may declare an area to be a protection area and may also specify the acts which are prohibited or regulated and the extent or manner of such restriction or regulation. The Minister's action might well encroach upon water allocation and related matters. Should that happen, it would then become necessary to ensure that the Minister's actions are in conformity with the express provisions of the Water Act.

9.4 Concerns with the Current Institutional Framework

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[44] Ibid., section 72.
[45] Ibid.
[46] Ibid., sections 74 & 75.
[47] Ibid., section 76.
[48] Ibid., section 77.

Past measures and policies have not effectively addressed the problems in the water supply and sanitation sector. The water delivery systems continue being ineffective and inefficient. The main reasons for these are:

(a) The politics of water - Water has been regarded as a social good. It is therefore part of a political culture that water provision and sanitation is the obligation of the state. Citizens, administrators and politicians regard water utilities as naturally existing to fulfill that social role. Moreover, water utilities are significant employers and instruments of political patronage.

(b) Uncertainty over the policy regime and regulatory framework has been a major constraint in the water supply and sanitation sector management. It is held that rules which are clear, sound and stable, and institutions which enforce those rules in a fair and predictable manner, are the linchpin to efficient institutions.

(c) The role of private capital and management in the water supply and sanitation sector and the pricing of services have not been clarified. Lack of detailed information on the sector and its potential as a business is a major reason why entrepreneurial resources have yet to be mobilized on a scale consistent with the potential of the sector.

(d) There are no performance standards for water utilities in Kenya currently. This means that managers cannot be sanctioned for poor performance. This extends to the fact that there are no effective sanctioning system for wayward and dishonest employees as well.

(e) The centralized system of managing water utilities particularly those under the MENR and NWCPC makes efficient operations difficult.

(f) Water services are provided by centrally managed monopolistic public enterprises or government departments. Those charged with the responsibility for delivery of water services are rarely given the managerial and financial autonomy they need to do their job properly.

(g) Users of these services both actual and potential are not well positioned to make their demands felt.

In addition to the above there are specific constraints arising from the administrative and financial over water. These are:

(h) The Ministry is responsible for all features of water development and management. This includes policy formulation, water sector regulation and is also the main water undertaker. This leads to over centralized decision making processes leading to slowness in project implementation and capacity responsiveness.

(i) The financial management aspects of water schemes is governed by Treasury Regulations. Revenues, especially for those schemes operated by the Ministry of Water Resources, revert to District Treasuries with little reference to the dynamic needs of the water schemes. This affects operation of water schemes in that there is absence of financial control at the District level. This results in:

- Lack of attention in even a minor leakage problem as repair financing decisions lies elsewhere.

- In excess financing charges for the water sector.

- Lack of accountability and transparent with respect to the finances raised and utilized by the water schemes.

(j) There exists Parallel authority systems in the implementation of projects, particular at the District and Provincial Water Engineers level.

(k) The Water Act, which is the operative Act for the water sector does not formally recognize the position of the Permanent Secretary in the management of water resources.

(l) Water resource management responsibilities are often fragmented among sector agencies and this becomes a major impediment to integrated water resources management.

9.5 Concerns with the Existing Legal Framework

Implementation of the law is generally intended by Government and public authorities. If laws are made for good reasons, there must be equally good reasons for their enforcement. Law which is not implemented because it is not enforced encourages the public to disregard it, and is unfair to those who observe h.

Several studies of the sector spanning two decades have revealed that most problems are due to poor implementation and enforcement of the law, rather than any serious deficiencies in h. It is reported that formal enforcement action is virtually unknown, with scarcely a single prosecution under the relevant laws in the last 35 years. (The Study was unable to verify this absence of prosecutions.) The reasons for this low level of enforcement were:

(a) The division of responsibilities among many agencies, with little coordination and between which cooperation is not always good. At best this makes for procedural difficulties, and at worst leads to lack of interest.

(b) The number of laws involved which may be difficult to understand and correlate, particularly by the subordinate officials concerned.

(c) The demise of the Water Resources Authority and the Regional Water Committees, which, in the absence of amendments to the Water Act, implies that their functions have been taken over unlawfully.

(d) Lack of experience of enforcement procedures by officials and lack of case law.

(e) Staff shortages.

(f) Inability to take Water Act prosecutions to subordinate courts quickly. (The present procedure whereby prosecution of people contravening the Water Act must be initiated by the AG will be quite unworkable if the number of prosecutions increases. This would be better handled by designated officers at a lower level, eg water bailiffs).

(g) An absence of what can best be described as the "philosophy of enforcement", particularly at senior levels. One might add, from the present perspective:

(h) Generally poor motivation among officials of the public service because of inadequate pay and service conditions when these are compared to the private sector and even state corporations.

9.6 Proposals for Reform of the Water Sector

The need to improve the management systems of providing water and sanitation services in urban areas in Kenya is now apparent and urgent. The technical and operational; commercial and financial; human and institutional; and environmental problems of the water utilities must be addressed. This requires examining different management arrangements that will deliver the intent. Three approaches are considered for ameliorating the problems of water supply in Kenya. These are:

(a) Retaining the current water management arrangements but strengthening the operations.

(b) Corporatization of water and sanitation services.

(c) Allowing private sector participation in water utility management.

Each of these options requires careful analysis as to its viability and application in the Kenyan context. These options are discussed hereunder:

9.6.1 *Retaining Existing Arrangements*

The proponents of **Retaining the current water management arrangements but strengthening the operations** maintain that the current urban water undertakership arrangements remain. They argue the problem is not institutional but one of the quality of management. Therefore performance of the water utilities can be enhanced

without changing current institutional arrangements but by adopting appropriate reform programmes which include:

(a) Strengthening the institutional mechanisms of the Ministries of Water Resources and Local Authorities, the urban centers and the National Water Conservation and Pipeline Corporation.

(b) Developing institutional mechanisms such as contract plans and performance evaluation systems to hold managers of water utilities accountable for results.

(c) Recruiting skilled manpower with market based compensation systems for the utilities.

(d) Increasing the autonomy and freeing water utility managers from government interference in day-to-day operational decision making and from non-commercial goals. This will include granting autonomy to management of the utility to hire and fire, negotiate on tariffs and spend outside civil service rules. It also includes restructuring the board of management to diminish the role of sector ministry and civil servants.

(e) Allowing gradual move to cost recovery tariffs

9.6.2 Corporatization

Corporatization means the formation of autonomous utilities to take charge of water supply and sanitation. Corporatization implies full application of commercial principles to the water service providers. The utilities will have focused and explicit performance objectives, well-defined budgets based on revenues from users, and managerial and financial autonomy. The managers can then be held accountable for their performance. The advantage is rapid improvement in performance.

The key in Corporatization is the formation of autonomous utilities. This can be done through:

(a) Transferring the assets of the water utility to public **trust company**, owned directly by the Government or indirectly through a local authority. The assets are therefore separated and isolated from those of the Government or council. This company will be managed by an independent Board of Trustees similar to that envisaged under the Kenya Revenue Authority Act. Since this is a public company owned by the Government, it will have the capacity to source multilateral funds for development purposes.

(b) Forming an **autonomous operating entity** which will be granted some rights to manage the utility by the public trust company. Corporatization will be achieved where an autonomous operating unit is created and which is then allowed to operate on full commercial principles enjoying commercial freedoms. Corporatization establishes independence of a local authority or government unit and insulates it from noncommercial pressures and constraints. This is because

lack of autonomy and accountability creates problems such as overemployment and unfocused goals occur because managers do not have control over day-by-day operations. They also must refer decisions on prices, wages, employment, and budgets to someone else. It is known that water departments in urban authorities are not autonomous units. Under this phase, mechanisms for the creation of institutional framework which can lead to commercialization would be considered. This will include the role of the main stakeholders in the commercialization process and the internal arrangements required to create autonomous water departments including human resource and finance issues.

9.6.3 Private Sector Participation

Private sector participation (PSP) in water and sanitation is based on the separation of the ownership of assets from the management of those assets. Private sector participation involves changing the managerial characteristics of the water industry. It further calls for the making of a complex set of choices about all the factors influencing water sector performance and creating the conditions under which private involvement can yield the desired performance improvements. Experience from PSP in water and sanitation has helped to:

(a) improve the quality and availability of services

(b) expand service coverage

(c) mobilize capital from both public and private sources for urgently needed investments

(d) introduce new cost-effective technologies and stimulate the development of superior management and more efficient use of labour

(e) reduce operating subsidies, and in some cases, transform them into positive returns on investments

(f) reduce political interference in the operations of water utilities which often contributes to the chronic inefficiency in public utilities[49]

9.7 Proposed Institutional Options and Legal Aspects of Migori Urban Water Supply

The proposed institutional options and legal implications for the institutional improvement and rehabilitation of water supply system for Migori Urban Water Supply are guided by:

(a) Government policy on water resource management (Sessional Paper No. 1 of 1999) and policy linkages with Poverty Reduction Strategy Paper (PRSP);

[49] Nakani, P.2

(b) Government policy on the restructuring and privatisation of public enterprises (1992)

(c) Grant financing eligibility for institutional strengthening and infrastructure rehabilitation by development partners and, more particularly, the Government of Japan.

(d) Sustainability of water supply and sanitation services;

(e) Improved access of water service to community, especially women;

(f) Cost effective operations balanced by affordability;

(g) Speed of incorporation in view of current strict deadlines;

(h) Consistency with existing incorporation laws;

(i) Community participation and involvement - public orientation as opposed to private sector orientation;

(j) Substantial autonomy to deliver service without undue political interference.

The options considered and presented hereunder include: State Corporations; Limited Liability Company; societies Act; and the Trustee Act (Perpetual succession) Act, Cap. 164. These options are summarised below. A detailed analysis of these options and their legal implications are presented in Annex 1(Institutional options and Legal aspects of Migori Urban Water Supply Service)

9.7.1 State Corporation

This can be established under the provisions of the State Corporations Act[50] (Chapter 446). This would be a public institution whose day to day operations would be decided by a Board of Directors in which the Government would have a substantial control. It would satisfy the requirement by the Government that it must retain the ownership of its assets and other investments in the sector. It would also meet the condition for grant financing by the Government of Japan through JICA.

However, in the light of the fact that the stated Government policy is to pull out of the water sector, this is not a recommendable option as it would be contradictory to the government policy. Besides, the National Water Conservation and Pipeline Corporation has not particularly been efficient in the discharge of its mandate in order to justify the establishment of another corporation.

9.7.2 Limited Liability Company

[50] Chapter 446, Laws of Kenya, (Revised Edition, 1987).

This can be incorporated under the provisions of the Companies Act[51] and may be limited either by shares or by guarantee and be public or private. A company limited by shares may be public in which case its shares may be floated on the stock exchange and any person may become an investor therein by purchase of the shares. The number of shareholders is limited only by the share capital. A private company, on the other hand, has a limited number of shareholders; they cannot be more than fifty. Since the number of shareholders is limited only by the share capital, a public company may cater for the interests of more stakeholders than the private company. But since, in both cases, the profit motive is the driving force in the membership, this may ensure efficiency in the delivery of services.

The company limited by guarantee is a more social service oriented organization that is not motivated by the profit motive. To that extent, the company may promote community participation and involvement in its decision-making process.

The main disadvantage of a limited liability company is likely to be 'taken over' by people with the economic muscle and be used for their own selfish interest with little or no benefits enuring to the community that is supposed to be benefited. More crucial is the fact that the company will not meet the eligibility criterion for funding by the Government of Japan through JICA. Besides, in cases where companies have been incorporated to take over municipal water supplies, there have been several technical and operational problems. This is especially so in cases where the local authorities concerned have incorporated wholly owned limited liability companies where the municipal councillors have brought in political interference. Cases in point include Eldoret and Nakuru Municipal water supplies.

9.7.3 Co-operative Society

A co-operative society can be registered under the provisions of The Co-operative Societies Act[52] Under the provisions of this Act, a society which has as its object the promotion of the welfare and economic interests of its members, and has incorporated in its by-laws the principles of (a) voluntary and open membership, (b) democratic member control, (c) economic participation by members, (d) autonomy and independence, (e) education training and information, (f) co-operation among co-operatives, and (g) concerns for community in general, may be registered as a co-operative society with or without limited liability.

The co-operative society is a business organization that would provide an effective tool for community participation and involvement in the operations of a water supply project. It would also promote commercial orientation in the sense that members would expect dividends at the end of every year.

Besides taking a considerably long time to be registered, a co-operative society does not enjoy autonomy from government control in the sense that the Commissioner for Co-operative Development, the Registrar of Co-operative Societies and other officers

[51] Chapter 486, Laws of Kenya (Revised Edition, 1989).
[52] Act No. 12 of 1997 repealing The Co-operative Societies Act, Chapter 490.

are all appointees and officials of the Government with considerable statutory powers of control of the operations of the co-operative society. To this extent, the Government would still be in control of the water sector.

9.7.4 Trust Corporation

A trust corporation may be registered under the provisions of the Trustee (Perpetual Succession) Act.[53] Under this Act, trustees who have been appointed by any body or association of persons established for any religious, educational, literary, scientific, social, athletic or charitable purpose, or who have constituted themselves for any such purpose, may apply to the Minister in the prescribed manner for a certificate of incorporation as a body corporate. The trust corporation has perpetual succession, can sue and be sued in its own name, and can hold movable and immovable property and any other interest belonging to or held by any person(s) for the benefit of the trust. New trustees may be appointed to succeed those deceased or retiring. Besides, the trust would enjoy considerable autonomy, but be accountable to the stakeholders in the operations and management of the project. The board of trustees stands in a fiduciary relationship with regard to the stakeholders on whose behalf they manage the trust corporation.

A detailed analysis of the above options are presented in **Table 9.1** below.

[53] Chapter 164, Laws of Kenya (Revised Edition 1981).

Table 9.1: Analysis of Various Substantial Options

OPTION	LEGAL BASIS	ADVANTAGES	DISADVANTAGES	RECOMMENDATION
State Corporation	State Corporations Act (Cap. 446)	❖ Easy to establish ❖ Government backing ❖ Public Institution ❖ Easy transfer of assets	❖ No independence autonomy ❖ Political interference ❖ Would be contrary to stated policy ❖ Low motivation	Not recommended
Limited liability Company	Companies Act (Cap. 486)	❖ Easy to incorporate ❖ Commercial orientation ❖ Public can be shareholders (whose company is not wholly owned by council) ❖ Transparency and accountability ❖ May be exempted from taxation if limited by guarantee ❖ Community participation and involvement ❖ May be supported by development financiers ❖ Separate legal entity from shareholders ❖ No direct government involvement and control	❖ Can be easily wound-up (especially where wholly owned by Council) ❖ Taxation may limit future investment ❖ Can be taken over by a few rich persons purchasing shares thereby frustrating public participation (where company is public) ❖ Transfer of assets problematic	Not recommended as it raises complex logistic problems

Co-operative Society	Co-operative Societies Act (Cap. 490)	❖ Effective tool for community participation ❖ Business oriented ❖ Profit motivation	❖ Takes too long to register ❖ Lack of "common interest" among the co-operators ❖ Government involvement and interference ❖ Transfer of assets problematic ❖ May be easily taken over by the rich	Not a viable option
Trust Corporation	*Trustee (Perpetual* Succession) Act (Cap. 164)	❖ Easy to register ❖ Perpetual succession, hence sustainability ❖ Independent legal status as public agency ❖ Community service oriented ❖ Governance by own instrument ❖ Political interference unlikely as board of trustees is appointed by stakeholders on basis of instrument ❖ Number of trustees based on instrument ❖ Possible exemption from taxation ❖ Transfer of assets not possible this being a public institution ❖ No shares hence not amenable to acquisition by the rich	❖ All stakeholders may not be represented on the Board of Trustees	This is the best option that is recommended for adoption.

9.8 Recommended Institutional Options and Legal Implications

In the light of the above analysis and the requirements of both the Government of Kenya and JICA, the registration of a trust corporation to take over the water supply and sanitation services would be the best option. This option not only meets the requirements of the two parties but also presents fewer logistical and operational problems.

The legal requirement will be as follows:-

(a) Application for registration in the prescribed form accompanied by,

(b) A statement of the objects and constitution of the trust concerned, e.g. to take over and operate the Migori water supply service, to enter into an agreement for the lease of any assets and equipment, to impose and charge tariffs for the supply of such services, to employ such personnel or such terms and conditions as may be deemed necessary, to formulate working arrangements for the effective and efficient operation of the water supply, to acquire and hold such property as may be necessary for the discharge of its functions, etc;

(c) A statement and short description of the property or interest therein which at the date of application is held or intended to be held by the trust;

(d) A statement as to whether the trust concerned is a society registered or exempt from registration, or is incorporated under the Companies Act;

(e) The names and addresses of the trustees;

(f) The proposed title of the corporate body, of which the words "trustees" and "registered" shall form part, e.g. THE REGISTERED TRUSTEES OF ------ (TOWN) WATER SUPPLY SERVICE;

(g) The proposed device of the common seal; and

(h) The regulations for the custody and use of the common seal.

Under the constitution in (b) above, provisions can be made for the number of trustees to be registered and how these may be appointed do as to be representative of all the stakeholders.

Organizationally, the Board of Trustees will have the overall management of the trust in order to ensure efficient delivery of services to the consumers. To this extent, it will be its responsibility to hire the management staff and such other personnel as may be required. To ensure transparency and accountability, the Board of Trustees will be expected to consult regularly with the major stakeholders on the progress achieved in implementing the mandate of the Trust. This consultative process will be provided in the trust instrument.

9.9 Institutional Framework for the Proposed Migori Urban Water Supply Service.

In this section we develop the organisational structures and operating mechanism for the Trust Corporation, which is the recommended institutional and legal option for Migori Urban Water Supply Service.

9.9.1 Organisational Structure

The proposed institutional framework comprises the following structures:

(a) The Board of Trustees (BOT)
(b) Management

The role of these structures is now defined.

9.9.2 Board of Trustees

The Board of Trustees will be the governing body of the Trust Corporation. It will acquire and manage assets on behalf of the stakeholders; and will be responsible for policy guidance and the strategic direction of the Trust Corporation. The Board of Trustees will be appointed from the current stakeholders of Migori Urban Water Supply. Major stakeholders are:

(a) Migori Town Council;

(b) District Water Officer (DWO);

(c) Major consumers, especially the co-operative societies , business enterprises and institutions (educational and health);

(d) Development partners;

(e) Religious organisations;

(f) Community water projects;

(g) District Social Development Officer (DSDO)

The initial appointment will be facilitated by the Inter-Ministrial Core Team. Thereafter, replacement within the Board of Trustees shall be effected by the Trustees themselves on the basis of agreed procedure. This renewal process will be detailed in the constitution of the Trust Corporation.

Other provisions enshrined in the constitution of the Trust are:

(i) That the number of trustees shall be between 5 - 7;

(ii) That Government representation shall be provided in BOT to safeguard public interest;

(iii) That BOT can co-opt, for particular purpose, an expert on issues of relevance to the Trust or beneficial to the advancement of the interests of the Trust;

(iv) That the Board of Trustees shall convene a stakeholders consultative forum every year to keep stakeholders closely informed of the progress in the affairs of the Trust Corporation.

The specific duties of the Board of Trustees are:

(a) To lease and / or acquire and own assets on behalf of the stakeholders;

(b) To appoint the General Manager and senior managers of the Trust Corporation and to fix their remuneration;

(c) To approve the organisational structure and the establishment level of the management and operational staff;

(d) To approve policy and strategy of the organisation;

(e) To approve the capital and operating budgets of the Trust Corporation;

(f) To monitor management performance in accordance with the agreed plans;

(g) To prepare and submit reports to the Stakeholder Council in the manner provided by law and the Trust Instrument.

9.9.3 Management

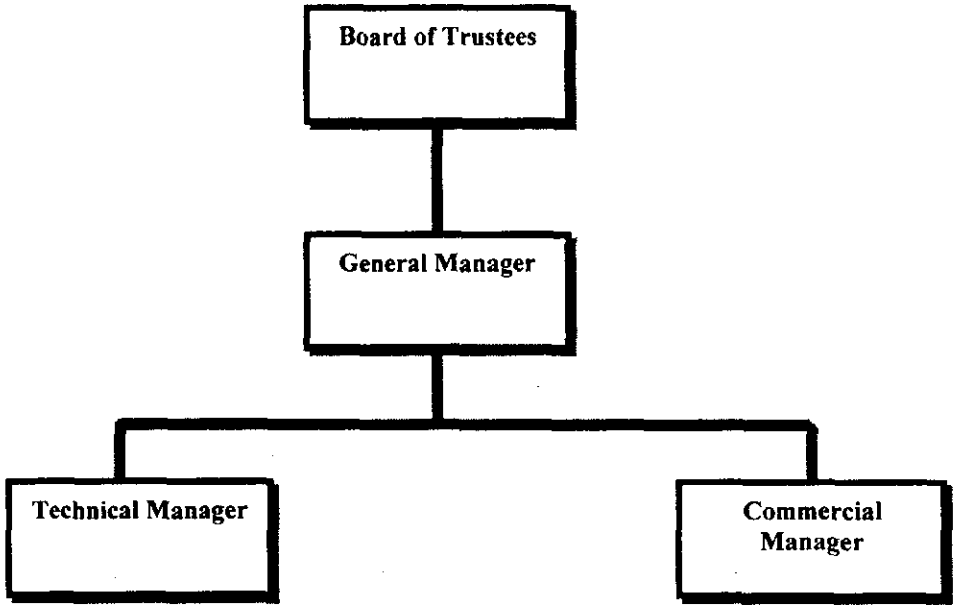
It should be noted that the Trust can operate the water supply and sewerage system in the Town. Alternatively, the Trust can contract out this function to a private operator. In the event the BOT decides to manage these services, it will appoint senior members of the Management Team.

These are:

(a) The General Manager
(b) The Technical Manager
(c) The Commercial Manager

Other positions will be approved by the BOT but will be recruited by the Management Team. The high level organisational structures of the Trust Corporation are illustrated in **Fig. 3.1.**

Fig. 3.1: High level organisational structures for Migori Water Supply Service.



The General Manager: will be responsible for all aspects of the management and operations of the Trust Corporation. These include policy and strategy formulation for BOT approval and subsequent implementation after BOT approval.

The Technical Manager: will be responsible for operations and maintenance; and assets replacement for efficient supply of water and sanitation services.

The Commercial Manager: will be responsible for billing and revenue collection; accounting and financial management of the Trust Corporation. He / She will also approve water supply and sanitation connections and oversee customer service standards.

9.9.4 Syndication of Water Supply and Sewerage Services Management

It is quite possible that some of the smaller towns could derive economies of scale from syndication of the water supply and sewerage services management. This essentially means forming a management company to manage the water and sewerage services in two or more local towns.

The proposal to form a trust corporation on a syndicated basis must be seen against the need to ensure that stakeholders in the "catchment area" of the local town have a common interest in water and sewerage issues that directly affect them. It is unlikely that stakeholders in different local towns could show a common interest that would sustain the formation of a Water and Sewerage Services Trust Corporation encompassing these different towns. In the event, therefore, where syndication could

be a feasible option in the management of the water and sewerage services, this should be confined to the operational management aspects. In effect, therefore, Water and Sewerage Trust Corporations in the concerned local towns could contract out the operations and management of the water supply and sewerage services to a professional private sector operator. This is a feasible option in areas where expertise in the management of these essential services is limited. It is also a more practical and simpler solution than the formation of a management company by the Trust Corporation in the local towns. The latter is likely to suffer from over-politicisation of the leadership and management role of such a company.

9.9.5 Operating Mechanisms

The operations of the Trust Corporation will be as follows:

(a) The initial appointment to the Board of Trustees will be facilitated by the Interministerial Core Team. Appointment will be from current stakeholders and will include Government representation. A woman representative should also be appointment. Subsequent appointments to fill vacancies in the BOT shall be provided in the constitution of the Trust. The relevant provision should allow BOT to renew itself by appointing replacements from specified stakeholders. To obtain ownership and support of stakeholders to the proposed Trust and the appointment thereof, a sensitization and consensus building workshop involving major stakeholders should be held before the Trust Corporation is registered.

(b) The Board of Trustees will "hire and fire" the Senior Managers of the Trust Corporation. The BOT can also contract out the management of the water supply and sanitation system to a private operator. BOT must, however, ensure that the services of the Trust Corporation are not harmed by such an arrangement and will ensure that safeguards are in place to provide services in a sustainable manner. The BOT will own or lease assets and properties on behalf of the Trust Corporation and will enter into contracts with third parties. The BOT will sue and be sued on behalf of the Trust Corporation.

(c) The management (and / or management agent) will manage the day to day operations of the Trust Corporation. Management will be accountable for their performance to the Board of Trustees through regular reports and meetings of the Board of Trustees.

10.0 FINANCIAL, ECONOMIC AND SOCIAL EVALUATION

10.1 INTRODUCTION

This section provides for the financial, economic and social evaluation of Migori Urban Water Supply. The financial viability analysis is only useful for indicative purposes only. It is contended that projects of this nature should rely more on economic and social viability. These two aspects are given more emphasis in the evaluation.

10.2 INSTITUTIONAL MANAGEMENT COSTS

To obtain the desired results from the rehabilitation of Migori water supply, there will be need for new institutional management arrangement. This will be supported by a change in management style. This involves substantial investment, which is taken as part of the cost of the project. The financial costs of undertaking this exercise are summarized in Table 10.1.

Table 10.1: Institutional Development Costs

No.	Activity	Bases of cost estimate	Estimated cost (Ksh.)
1	Hold consensus building workshop	(a) Travel refreshments and honorarium for 50 participants at SH. 5,000 /= per participant	250,000
		(b) Consultants facilitation costs and travel	700,000
		(c) Transport and related expenses for ministry staff	200,000
2	Develop and register the trust instrument	Legal and follow up effort	50,000
3	Management Contract	Appoint local expert to support the institutional rehabilitation process for the 3 year period	39,600,000
4	(a) Identify water supply and sewerage infrastructure and estimate cost	Standard infrastructural valuation procedures	2,500,000
	(b) Identify and value other assets.		
5	Develop staffing and financial plans for the new organisation	25 working days at Sh. 40,000 per w/day	1,000,000
6	Develop operations manual	20 working days at Sh. 30,000 per day	600,000
7	Operational Support	Vehicles, motor cycles, computers and software, office equipment	
8	Provide initial working capital to the new organisation	Average annual billings for the last 3 years	3,000,000
Sub-total			**47,900,000**
Contingency (10%)			**4,790,000**
Total			**52,690,000**

It is contended that the key problem in the town's water supply system is management weakness. Institutional support is recommended as the foundation for improving the nature and efficiency of management.

10.3 WATER TARIFFS

Migori water supply scheme is subject to the tariff regime legally set by the Minister of Water. The legal tariffs are as indicated in the Table 10.2.

Table 10.2: Urban Water Tariffs

	Charge (Kshs.)
PART I - GENERAL	
(a) Where no meter is installed, a monthly charge of	200
(b) Where a meter installed, the charges will be as follows:	
(i) Where the amount of water sold through the meter in any one month does not exceed 10 cubic metres (minimum charge)	200
(ii) Where the amount of water sold through the meter in any one month is more than 10 cubic metres but does not exceed 20 cubic metres, the charge per cubic metre in excess of 10 cubic metres	25
(iii) Where the amount of water sold through the meter in any one month is more than 20 cubic metres but does not exceed 50 cubic metres, the charge per cubic metre in excess of 20 cubic metres	30
(iv) Where the amount of water sold through the meter in any one month is more than 50 cubic metres but does not exceed 100 cubic metres, the charge per cubic metre in excess of 50 cubic metres	45
(v) Where the amount of water sold through the meter in any one month is more than 100 cubic metres but does not exceed 300 cubic metres, the charge per cubic metre in excess of 100 cubic metres	75
(vi) Where the amount of water sold through the meter in any one month is more than 300 cubic metres the charge per cubic metre in excess of 300 cubic metres	100
c) Where water is sold through a meter at a kiosk, the charge per cubic metre	15
d) Where water is sold by retail at a kiosk per unit of 20 litres or part thereof, the charge per	2
e) For the bulk sales to an undertaker for resale, the charge per cubic metre	15
PART II - BOARDING SCHOOLS	**Charge**
1. A school with a permissible water demand not exceeding 600 cubic metres per month, the charge per cubic metre	20
2. A school with a permissible water demand not exceeding 1200 cubic metres per month, the charge per cubic metre	25
3. Any other learning institution with a permissible water demand of 1200 cubic metres per month, the charge per cubic metre	25
4. The charge per cubic metre of water consumed in excess of permissible water demand	45

Source: Kenya Subsidiary Legislation, 1999: Legal Notice No. 174

The tariffs apply only to those who have formal access to water. Those with no access to water and who acquire water from vendors pay about Ksh10.00 per 20 litres or Kshs. 500 per m^3. This, for all practical purposes,

is a very high charge and has a dramatic effect on the household disposable income. A computation based on the water consumers' distribution and billing in Migori gives an average billing of Kshs.16.57 per m^3.

10.4 FINANCIAL COSTS OF REHABILITATION

The financial costs for rehabilitation works for Migori water supply amounts to Kshs.141 million. These are composed of the cost of rehabilitation water supply amounting to Kshs.88 million and that of institutional reform amounting to Kshs.53 million (Table 10.1).

10.5 ECONOMIC COSTS OF REHABILITATION

The economic costs for the rehabilitation of Migori water supply have been taken to be the total financial costs plus the incremental costs of households to connect to the mains. An average of 1,200 additional households will be connected at the cost of Kshs.1,500 per household. The resulting additional costs will be Kshs.1,800,000 bringing total economic costs to Kshs.143 million.

10.6 Financial Benefits from Rehabilitation

The main benefit of the rehabilitation plan will be institutional strengthening of the town's water supply system. This will result in enhancement of management. The observable outcomes will be increased water supply, reduction of water losses and improvement in the revenue collection efficiency. The benefits will accrue under the following assumptions:

1. The management Consultant is in place at the beginning of Year 1 and involved for it period of 36 months.

2. The distribution network and metering would be rehabilitated/replaced during the first year of the management involvement.

3. Staff levels, remuneration and requirements are as proposed by the recommended Migori organization chart.

4. The working capital to kick-start the process is available.

5. The appropriate infrastructure to support operations (transport, computers and software requirements and office space) is available.

The benefits will occur as summarized in the following paragraphs.

10.6.1 Revenue from Extra Water Sold

The scheme is designed to produce an average of 480 m^3 per day. It currently produces 180 m^3 per day. Projected demand for the gazetted area will reach 20,933 m^3 per day in 10 years. Increased management efficiency with rehabilitation will improve water production to design capacity from the third year of rehabilitation. This will improve water

revenues by an average of Kshs.1.8 million per annum.

10.6.2 Reduction in Unaccounted for Water (UfW)

The average UfW has not been determined as records available indicate consumption greater than supply.

10.6.3 Improvement in Collection Efficiency

Collection efficiency averages 34.81%. No change is anticipated in the first year. Improved collection efficiency to 87% in year 2 is expected as a result of improved services. The efficiency will change to 95% as the billing system is enhanced through computerization from year 3 to 10.

Improved collection efficiency will improve cash flows by an average of Ksh.0.66 million per annum.

10.6.4 Improvement in Sewerage Coverage Revenue

No benefits are calculated from this source because there are currently no public sewerage services in Migori town.

10.7 ECONOMIC BENEFITS FROM REHABILITATION

In identifying the benefits, the way to be consistent and accurate is to look at all people conceivably affected by the program and ask how much better off they will be as a result of the expected water and sanitation rehabilitation exercise in the town. In order to give a precise estimation of the social benefits accruing to each individual category, a number of assumptions are made in each approach.

The major focus for this study is on three broad categories of social benefits that are assumed to accrue to the household within a situation of an improved water and sanitation system. These are:

- Social/economic benefits (hereby referred to as opportunity costs) of alternative uses of time previously used for fetching water by the household over along distance.
- Social benefits enjoyed by the household due to better health for water users and their families.
- Social benefits accruing from reduction in health costs.

(1) Valuation of economic benefits of time saved

The methodology used in the calculation of these benefits is founded on a number of assumptions. These assumptions include:

i. The minimum amount of water required by each household to meet basic sanitary requirement is 100L per day. Therefore at the cost of

Kshs 10 per a 20L-jerrican of raw water, they would have to spend an average of Kshs 50 per day on water.

ii. Assuming that the water source is one km away, it means that it would take on average a minimum of 30 minutes per trip to fetch a 20L-jerrican of water. Consequently, to get the minimum daily water requirement of 100L (i.e. 5x20L-jerrican) it would take 2.5 hours.

iii. Assuming that a household earns an average minimum daily wage rate of Kshs 150 for an eight-hour normal working day, it is then possible to calculate the opportunity cost of fetching water in terms of man-hours spent and converting this to money units. The loss is (2.5/8 x Kshs 150) = Ksh.47 per household per day. The annual total loss per household is Ksh.47x365 days = Ksh.17,155.

(2) Economic benefits of better health for users and their families

In analyzing the benefits accrued to an individual, the study considered the opportunity cost of falling sick due to water and sanitation related problems. Given the health data on Migori (the study, however, from the outset, acknowledges lapses in data capture), on average, each household losses 50 productive days due to the debilitating effects of water related ailments. Assuming a mean daily average wage rate of Kshs.150 per person per day, it follows that the total loss per household will be Kshs.150*50 = Kshs.7,500 per annum. This is the benefit that would accrue to the users with improvement in water delivery.

(3) Economic benefits from reduction in Health costs.

According to the findings of the Welfare Monitoring Survey II of 1994, the budget share of household income spent on health care is 1.8%. Assuming that 50% of this income goes to sanitation related ailments, and given that the average mean monthly household income for Migori is Kshs.6,641.20, it implies that each household spends Kshs.59.80 on this type of ailments per month. The total expenditure per household in the town is Kshs.59.80 x 12 = Kshs.717.60 per annum.

(4) Summary of Economic Benefits derived for Migori Town

Nature of Benefits	Derived Benefits in Kshs Per Household per annum
Economic benefits of time saved from fetching water from source	**17,155**
Economic benefits of better health for users and their families	**7,500**
Economic benefits in reduced health cost	**718**
Total benefits per household per annum	**25,373**

10.8 ABILITY TO MEET O&M COSTS

The water supply will be able to raise enough incremental revenue to cover operating and maintenance costs. The net contribution margin is projected to average Kshs.2 million per annum.

10.9 FINANCIAL EVALUATION

Preliminary project evaluation of the proposed Water Supply rehabilitation project should be undertaken in compliance with the financial and economic viability of the project. The overall results of the financial evaluation of Migori town water supply schemes are summarized in **Table 10.3.** An average discount rate of about 4%, which reflect the current cost of soft loans to Kenya is used for the evaluation. The base evaluation is for a period of 10 years.

Table 10. 3 Financial Evaluation for Migori Town Water Supply

Financial Evaluation					
FIRR		**NPV**		**RER**	
Rate	**Viability**	**Kshs.**	**Viability**		**Viability**
ND	N/V	(115,210,971)	N/V	0.158	N/V
N/V	=	Not Viable			
ND	=	Not Determinable			

The results of the financial evaluation given in the Table 10.3 indicate that the Town Water Supply of Migori is not financially viable, based on the current tariff and a 10-year project life. The NPV of Kshs.(115,210,971) shows that even after rehabilitation of the waterworks the supply will not be able to recover the initial cost of the investment by year 10.

The financial internal rate of return (FIRR) is below the hurdle rate of 4%. The revenue – expenditure ratio (RER) is 0.158 indicating the project is not fully able to cover all its costs.

10.9.1 Financial Sensitivity Analysis

It is generally agreed that evaluation a water utility over a ten-year period may be too ambitious. Most water utility investments are expected to indicate positive returns from 25 to 30 years after investment. In this case the project was financially evaluated using the following scenarios.

Case 1: The project is has a life of 15 years.

Case 2: The project is has a life of 15 years but costs (Investment + O&M) increase by 15%.

Case 3: The project is has a life of 15 years and is financed by Grant.

In carrying out the above analysis we assume that the cash flow at the end of year 10 is maintained in the additional periods. The results of this analysis are presented in Table 10.4.

Table 10.4: Financial Sensitivity Analysis for Migori Town Water Supply

	Base Case	Case1	Case2	Case3
	Project has a life of 10 years	**Project has a life of 15 years**	**Project has a life of 15 and Investment Cost and O&M increase by 15%**	**Case 1 but Project financed by Grant**
FIRR	ND	ND	ND	ND
NPV	(115,210,971)	(108,898,570)	(129,086,457)	(110,743,701)
RER	0.1583	0.2413	0.2098	0.2413
	N/V	N/V	N/V	FV

N/V = Not Viable
FV = Financially Viable
ND = Not Determinable

The project does not become financially viable under each of the three conditions.

10.10 Economic Evaluation

The results of the economic evaluations are summarized in Table 10.5, which shows that the rehabilitation costs for Migori town water supply are justifiable with a fairly acceptable economic rate of return. An average discount rate of about 4%, which reflects the current cost of soft loans to Kenya, is used for the evaluation.

The project is evaluated using:

(a) a rate of EIRR (Economic Rate of Return)
(b) a value of NPV (Net Present Value)
(c) a ratio of CBR (Cost Benefit Ratio)

Table 10- 5 Economic Evaluation for Migori Town Water Supply

Economic Evaluation					
EIRR		NPV		CBR	
Rate	Viability	Kshs.	Viability		Viability
21%	EV	83,403,987	EV	0.533	EV
EV	=	Economically Viable			

The project is economically viable with a high EIRR against the hurdle rate of 4%. The positive NPV value of Kshs. 83 million makes the project economically very attractive. The project is also able to cover its costs comfortably with a cost-benefit ratio (CBR) of 0.533.

10.10.1 Economic Sensitivity Analysis

An economic sensitivity analysis was performed to determine whether changed circumstances would affect the viability of the project. The following assumptions have been made for the sensitivity analysis.

Case 1: Investment costs increase by 15%
Case 2: O&M costs increase by 15%
Case 3: Both investment costs and O&M increase by 15%

The results of the sensitivity analysis are presented in Table 10.6.

Table 10.6: Economic Sensitivity Analysis for Migori Town Water Supply

	Base Case	Case1	Case2	Case3
		Increase Investment Cost by 15%	Increase O&M by 15%	Increase both costs by 15%
EIRR	21%	15%	21%	15%
NPV	83,403,987	63,462,123	83,071,922	63,130,058
CBR	0.533	0.611	0.534	0.613
	EV	EV	EV	EV
EV	=	Economically Viable		

The project is economically viable under all the given conditions. The project economically stands well against any changes in investment and operating costs and is viable under all circumstances.

10.11 SOCIAL EVALUATION

There is no doubt that society values water due to its effect on social welfare. In this study the two main issues considered were full time availability of clean water and the impact of water on public sanitation and health. Residents in the urban area were requested, through a rapid assessment survey, to specify the relative importance they attach to each of these two aspects.

In all the cases, full time availability of clean water was considered to be of very great importance, with a weighting of 98% by residents surveyed. The residents were willing to pay a higher tariff to have availability of water guaranteed. This means that it might be probable for tariff increases to be justified, which would further enhance the financial viability of the project.

The residents were quite clear in their minds that clean water impacts positively on public sanitation and health. On health issues, the response indicated that 95% of disease incidences suffered at the local level should be eliminated by the supply of clean water. Again, residents were willing to pay a premium to mitigate against the health effects of non-availability of clean water.

11 IMPLEMENTATION PROGRAMME FOR PROPOSED PLANS PROGRAMME

11.1 WATER SUPPLY REHABILITATION

The proposed implementation schedule for rehabilitating Migori utility Migori water supply system is given as Figure 11.1.

11.2 WASTEWATER AND SANITATION REHABILITATION

There are no recommendations for rehabilitation of the current on–plot sanitation facilities.

11.3 UTILITY MANAGEMENT PLAN

The proposed implementation schedule for utility management plan for Migori water supply system is given as Figure 11.1.

11.4 LEGAL AND INSTITUTIONAL FRAMEWORK

11.4.1 Implementation and Road Map for Recommended Institutional Form

The transitional arrangements from the current ownership and operation of the Urban Water Supply to the operations of the Trust Corporation will be structured as follows;

(a) Develop consensus among important stakeholders on the proposed approach to the operations of Migori Urban Water Supply Service (the Trust Corporation). This is best achieved through a stakeholder workshop.

(b) Appoint members of the Trust from identified stakeholders

(c) Prepare the constituting instrument for Migori Urban Water Supply Service. This can be done concurrently with activities (a) and (b) above. Registration, however, must await stakeholder consensus. On achievement of consensus on the proposed approach, present the Trust Instrument and registration forms to the Registrar of Trusts at AGs Chambers and ensure registration of the Trust Corporation.

(d) Concurrently with (a), (b) and (c) above, carry out an inventory of the water supply system infrastructure of Migori Urban Water Supply System. Assign estimated value to these assets. Carry out a valuation of all other assets of Urban Water Supply including equipment, vehicles, furniture, fittings and loose assets.

(e) Develop organisational structures and staffing plans for the new organisation;

Figure 11.1

STUDY OF INSTITUTIONAL IMPROVEMENTS AND REHABILITATION OF WATER SUPPLY AND SEWERAGE SYSTEMS FOR 10 LOCAL TOWNS IN KENYA
IMPLEMENTATION SCHEDULES OF PROPOSED PLANS
MIGORI WATER SUPPLY AND SEWERAGE REHABILITATION WORKS AND O&M

Ref	Activity description	Duration in months	MONTH
			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
A	**REHABILITATION WORKS**		
1	Appoint consultant for rehabilitation works	3	
2	Feasibility study, detailed design	7	
3	Tendering procedures, award and negotiations	9	
4	Construction	12	
5	Defects Liability Period	12	
B	**O&M**		
6	Appoint management consultant	3	
7	Establish consumer data base/billing system	4	
8	Management and staff training	12	
9	Meter replacement and repair	7	
10	Other recommended action plan activities	24	

(f) Complete the financial plan for the new organisation;

(g) Agree on:

(i) Lease, transfer or sale of infrastructural assets and other assets by GOK and Migori Town Council to the Trust Corporation;

(ii) Transfer or recruitment of the existing staff to the new organisation. Agree also on the retirement package or the transfer within the Ministry of staff not absorbed in the new organisation;

(iii) Arrange financial support to the new organisation.

(g) Develop the operations manual for Migori Urban Water Supply Service;

(h) Ensure all the assets, staff and financial resources are in place in the new organisation (necessary transfers / acquisitions made)

These activities and time frames are illustrated in **Table 11.1**

Table 11.1: Migori Water Supply Service – Transitional arrangements and time frame.

No.	Activity	Year	2***											
		Month	1	2	3	4	5	6	7	8	9	10	11	12
1.	*Hold consensus building workshop*													
2.	Appoint Board of Trustees													
3	Develop and present for registration the Trust Instrument													
4.	Identify and make an inventory of water and sanitation infrastructure assets and estimate their value. Identify and estimate the value of other assets.													
5.	Develop structures and staffing plans													
6.	Prepare financial plan for the Trust													
7.	Agree on: (i) Lease, transfer or sale of assets (ii) Transfer or recruitment of staff (iii) Financial support													
8.	1.1 Develop operations manuals													
9.	Assets, staff and financial resources in place													
10.	Migori Water Supply Service operational													

Key:	1.2 Event	1.3 Event deadline

11.5 FINANCIAL PLAN

11.5.1 Business Plan

The summarized business plan for Migori town is given in Table 11.2. The specific feature of interest is that the utility will be able to fully cover its operating and maintenance costs. The achievements of the predictions indicated in this business plan are strictly contingent upon there being the appropriate institutional framework for the town. This will call for a change in management style and structures that will facilitate the delivery of the set intent.

11.5.2 Financing Plan

It is assumed that the rehabilitation costs will be composed of four components: Institutional Strengthening, Professional Input for works, Water Supply and Sanitation. These financial costs of the project are projected to be incurred as follows.

Table 11.3: Financing Plan - Migori Town Water Supply

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

The total cost of rehabilitation is Kshs.141 million approximately. These costs are spread over a four-year period.

The working capital and the institutional set-up costs must be availed at the beginning of the rehabilitation plan.

It should be noted that the financial evaluation has been based strictly on the cost of rehabilitation.

Table 11.2: BUSINESS PLANS Migori Town Water Supply

CASH FLOWS

Year	1	2	3	4	5	6	7	8	9	10
REVENUE GENERATED										
Revenue from Extra Water Sold	1,088,649	1,270,091	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415	1,814,415
Revenue from Unaccounted for Water	-	-	-	-	-	-	-	-	-	-
Savings from Collection Efficiency	-	580,286	669,236	669,236	669,236	669,236	669,236	669,236	669,236	669,236
Revenue from Sewerage Charges	-	-	-	-	-	-	-	-	-	-
Total	1,088,649	1,850,376	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651	2,483,651
Expenditures (Kenya Shilling)										
Transport & Staff Related Expenses	195,957	333,068	447,057	447,057	447,057	447,057	447,057	447,057	447,057	447,057
O&M	217,730	370,075	496,730	496,730	496,730	496,730	496,730	496,730	496,730	496,730
Postage	4,137	7,031	9,438	9,438	9,438	9,438	9,438	9,438	9,438	9,438
Telephone	9,907	16,838	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601
Purchase of meters	17,854	30,346	40,732	40,732	40,732	40,732	40,732	40,732	40,732	40,732
Stationery	11,866	20,169	27,072	27,072	27,072	27,072	27,072	27,072	27,072	27,072
Fuel & Gas	54,977	93,444	125,424	125,424	125,424	125,424	125,424	125,424	125,424	125,424
Current O&M Costs	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)	(784,296)
Incremental O&M Costs	**(271,869)**	**86,676**	**384,758**	**384,758**	**384,758**	**384,758**	**384,758**	**384,758**	**384,758**	**384,758**
Sulplus(Deficit)	**1,360,518**	**1,763,700**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**
Average Tariff (Kshs/m3)	17	17	17	17	17	17	17	17	17	17
Investment Costs										
Net Cash Flow	**1,360,518**	**1,763,700**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**	**2,098,892**
Cumulative Cash Flow	**1,360,518**	**3,124,218**	**5,223,111**	**7,322,003**	**9,420,895**	**11,519,788**	**13,618,680**	**15,717,572**	**17,816,465**	**19,915,357**

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 WATER SUPPLY REHABILITATION

12.1.1 Existing water supply systems

There are two water supply systems serving Migori:

- The gazetted water supply scheme, operated by the Ministry of the Environment and Natural Resources, supplying water from two boreholes near the Migori River.

- Nyasare community-managed water supply scheme, supplying water from springs some 8 km from the town.

12.1.2 Shortcomings of Migori Gazetted Water Supply

- The source capacity is insufficient, production is reportedly only 180 m^3/d from two boreholes.

- In November, only one borehole was in use, and that was delivering un-disinfected groundwater directly into the distribution system.

- Groundwater abstraction is not metered, so water production cannot be quantified.

- There is no provision for measuring groundwater levels.

- There are no standby generators, so production was severely disrupted during the recent power rationing.

- There are only a few working consumer meters.

- The DWO is housed in temporary structures with poor facilities.

12.1.3 El Niño Emergency Project

The following works are being carried out under the El Niño Emergency Project:

- Four boreholes have been drilled, two of which were dry and one is adjacent to an existing production borehole.

- Construction of additional storage and break pressure tank.

- Laying a new 110 mm uPVC main from the main storage site to the break pressure tank site.

- *Migori Teachers' Training College to receive un-disinfected* supply from one borehole and Migori Primary School to receive un-disinfected supply from another borehole, the rest of Migori will be left dependent on a single borehole.

12.1.4 Other works and projects

The Nyasare water supply scheme is to be expanded using funds from the Government of Austria. Future expansion of the gazetted scheme must take cognisance of this.

12.1.5 Rehabilitation requirements

The JICA TOR specified that rehabilitation comprises refurbishment of existing facilities to current production levels only. There will be no expansion works under the rehabilitation phase. The proposed rehabilitation measures are:

- Equip the three available boreholes and provide facilities for flow metering, level monitoring and sampling.

- Arrange for the three boreholes to be grouped into a single well-field to deliver all groundwater production to storage.

- Provide a centralised chlorination facility to disinfect all water produced.

- Reinforce the distribution system below the break pressure tank to ensure adequate pressures at Migori Teachers Training College and the adjacent primary school.

- Install consumer meters at all connections.

- Provide appropriate office space, equipment and vehicles.

12.1.6 Rehabilitation costs

The estimated cost of rehabilitating the Migori water supply system is KShs 88,463,820.

12.2 FUTURE EXPANSION OF WATER SUPPLIES

- Surface water source(s) will be required to meet the projected demands.
- Full treatment will be required.
- Additional storage will be required – there are three potential storage sites.
- The distribution network should be extended – prioritising high density areas.

The estimated cost of expanding water supplies so that the limits of supply coincide with the municipal boundary is Kshs 2,865,542,400 (including preliminary and general items, contingencies and consultancy fees).

12.3 SEWERAGE SYSTEM REHABILITATION

12.3.1 Existing Sewerage Network And Sewage Treatment Plant

There is no municipal sewerage system in Migori.

12.3.2 Conditions And Performance Of The Existing System

Not applicable.

12.3.3 El Niño Emergency Project

There is no sewerage component under the El Nino emergency project.

12.3.4 Other Works And Projects

There are no other ongoing projects.

12.3.5 Rehabilitation Measures

Not applicable.

12.4 FUTURE EXPANSION OF SANITATION FACILITIES

Once water supply in Migori town is improved, wastewater generation rates may increase sufficiently to justify a waterborne sewerage system in the more densely settled areas of the town. The estimated

cost of constructing a sewerage system to serve the centre of the town is KShs 209,484,000 (including preliminary and general items, contingencies and consultancy fees).

12.5 INSTITUTIONAL AND LEGAL FRAMEWORK

12.5.1 Legal and institutional guidelines

Migori water supply, like the other nine towns covered in this study, is served by the Ministry of Environment and Natural Resources. The water operator is the District Water Officer (DWO).

In recommending a viable institutional and legal framework for Migori urban water supply, the following guidelines were utilized: Government policy on the water sector, Government policy on the restructuring and privatization of public enterprises and the eligibility criteria for grant funding within the sector by Government of Japan. Other considerations include; sustainability of water supply and sanitation services; improved access to community, especially women; community participation and involvement; speed of incorporation in view of current strict deadlines and consistency with existing incorporation laws; - public orientation as opposed to private sector orientation.

The legal framework for water sector management in Kenya include: The Water Act, Cap. 372; The National Water Policy set out in Sessional Paper No. 1 of 1999; and the National Water Master Plan. The institutional framework for the water sector involves: the Ministry of Environment and Natural Resources; the National Water Conservation and Pipeline Corporation; the five River Basin Development Authorities; private sector operators and non governmental organizations.

12.5.2 Options for Migori Urban Water Supply

Applying these guidelines, various institutional and legal options for Migori Urban Water Supply were listed and expounded upon. They were:

(a) State corporation
(b) Limited liability company
(c) Co-operative society
(d) Trust corporation

After weighing the advantages and disadvantages of each option, and evaluating their conformance with Government of Kenya and JICA

requirements, the formation of a Trust Corporation for Migori Urban Water Supply Service was proposed as the best option.

12.5.3 Legal Requirements and Institutional Framework for a Trust Corporation

The legal requirements for creating the proposed Trust Corporation for Migori Urban Water Supply Service were outlined, together with an institutional framework. The following two structures were recommended.

(a) A Board of Trustees (BOT)

The Board of Trustees will be the governing body of the Trust Corporation. It will acquire and manage assets on behalf of the stakeholders; and will be responsible for policy guidance and the strategic direction of the Trust Corporation. The proposed Board of Trustees will be appointed from the current stakeholders of Migori Urban Water Supply.

(b) Management structures

The Trust can operate the water supply and sewerage system in the Town or alternatively, the Trust can contract out this function to a private operator. In the event the BOT decides to manage these services, it can appoint senior members of the Management Team.

These are:

(a) The General Manager
(b) The Technical Manager
(c) The Commercial Manager

12.5.4 Implementation and Recommended Institutional Form.

The transitional arrangements from the current ownership and operation of the Urban Water Supply to the operations of the proposed Trust Corporation were outlined. The arrangements were:

Developing consensus among important stakeholders on the proposed approach to the operations of Migori Urban Water Supply Service (the Trust Corporation); appointing members of the Trust from identified stakeholders; Preparing the constituting instrument for Migori Urban Water Supply Service; carrying out an inventory of the water supply system infrastructure of Migori Urban Water Supply System and assigning values to these assets; developing organisational structures and staffing plans; completing the financial plan for the new organisation; agreeing on

transfer modalities; developing an operations manual for Migori Urban Water Supply Service; and ensuring all the assets, staff and financial resources are in place in the new organisation.

12.6 OVERALL FINANCIAL AND ECONOMIC EVALUATION

Table 12.1 Migori - Overall Financial and Economic Evaluation (Without Sensitivity Analysis)

Financial Evaluation			Economic Evaluation			Social Concerns		Overall Evaluation
FIRR	NPV	RER	EIRR	NPV	CBR	Health needs	Water needs	
N/V	N/V	N/V	V	V	V	V	V	ESV

N/V = Not Viable
V = Viable
ESV = Socio-economically Investment Justifiable

Table 12.2 Migori - Overall Financial and Economic Evaluation (With Sensitivity Analysis)

Financial Evaluation			Economic Evaluation			Social Concerns		Overall Evaluation
FIRR	NPV	RER	EIRR	NPV	CBR	Health needs	Water needs	
N/V	N/V	N/V	V	V	V	V	V	ESV

V = Viable
ESV = Socio-economically Investment Justifiable

12.6.1 Financial Evaluation

The project has been assessed not to be financially viable under current tariff regime if a 10-year or 15-year period is selected. However, the project's ability to cover more than adequately its O&M costs is highly commendable.

12.6.2 Economic Evaluation

The project is fully economically viable. From a public goods perspective, it makes good sense to invest in rehabilitating the water and sanitation services.

12.6.3 Social Evaluation

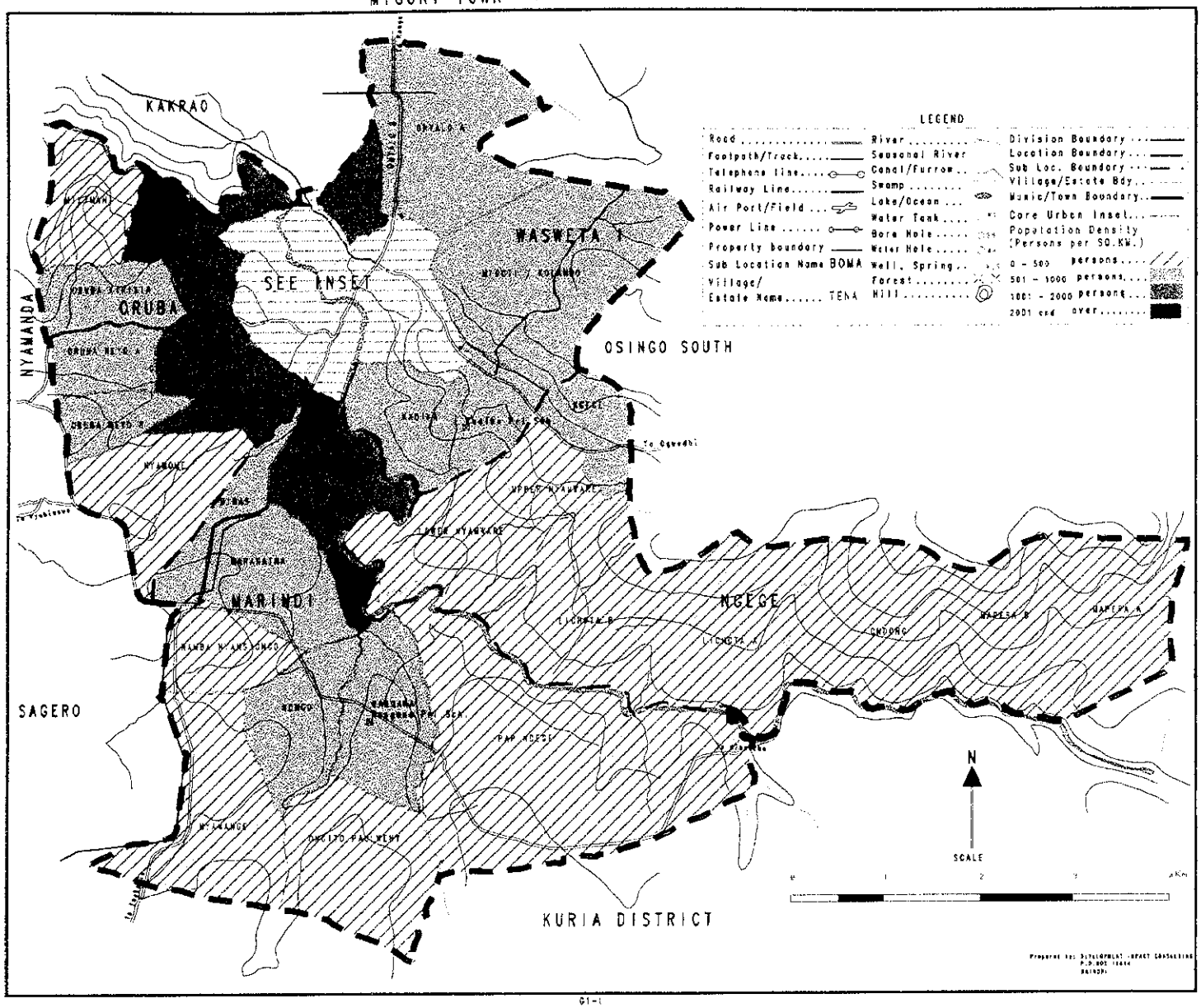
It was found that 96% on average of the residents consider supply of clean water a higher priority that other social infrastructure. They would also be willing to pay a higher tariff to obtain the social benefits arising from a clean and constant water supply system. The project is therefore socially justified

12.6.4 Overall Evaluation

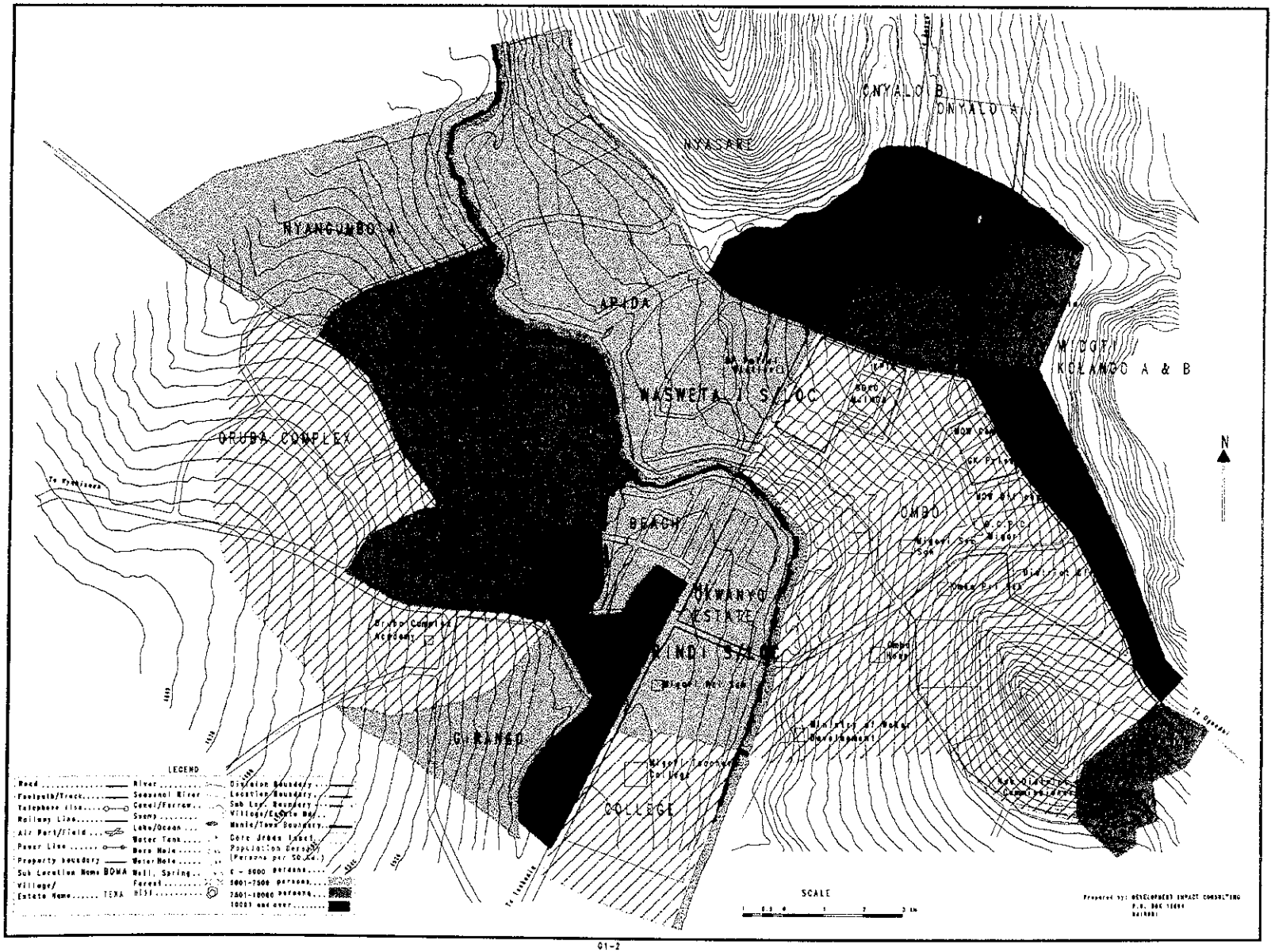
The rehabilitation project is socio-economically justified as shown in Table 12.2.

APPENDIX G1
MIGORI
TOWN

MIGORI TOWN *(POPULATION DENSITY)*



MIGORI TOWN *(POPULATION DENSITY)* (INSET)



G1-3 1999 POPULATION DATA FOR MIGORI TOWN

DIVISION	SUB-LOCATION	AREA	NO. OF HOUSEHOLDS	MALE	FEMALE	TOTAL
SUBA EAST	WASWETA I	KIMAIGA I/II	163	327	361	688
		KWASALA I/II/III	128	219	288	507
		KWASALA SOWETO	173	273	290	563
		SOWETO	100	418	448	866
		SOWETO/HOSPITAL/STADIUM	18	22	14	36
		MILIMANI/MIDOTI/KOLANDO A,B	409	965	915	1,880
		KOYARE	114	246	281	527
		OMBO/A.P. LINES/DIST. OFFICES	48	84	41	125
		KADIKA	261	597	673	1,270
		OMBO HOSPITAL/MIDDLE STAFF	313	553	660	1,213
		GK PRISON/MOW OFFICES	28	49	19	68
		MOW CAMP/MIGORI S. SCH.	36	73	59	132
		OMBO/SOKO MJINGA	94	210	216	426
		OMBO/MASTER MIND TOBACCO	47	92	105	197
		APIDA	1070	1793	1947	3740
		CHRISTIAN I	117	225	217	442
		CHRISTIAN II & III	135	213	243	456
		AUKA RAMBA I	121	219	189	408
		AUKA RAMBA II	60	103	113	216
		AUKA RAMBA III	59	148	163	311
		NYASARE	166	328	394	722
		ONYALO 'B'	86	172	216	388
		ONYALO 'A'	285	628	666	1,294
SUNA RAGA	MARINDI	MIDAS	117	243	237	480
		GIRANGO	138	250	247	497
		ODODA MARKET	174	288	296	584
		BEACH	93	155	163	318
		BEACH	70	126	110	236
		OKWANYO	296	473	487	960
		COLLEGE A	73	171	209	380
		COLLEGE B	58	141	159	300
		TOTAL	212	477	583	1,060
		WUOTHOGI	442	908	935	1,843
		MARANATH	180	409	427	836
		NAMBANYA	90	226	243	469
		KONGO/RAG	285	619	721	1,340
		ONGITO/PA	70	145	191	336
		NYAMANGE	85	209	229	438
		SPECIAL POPULATION	-	-	1843	
	ORUBA	DIP AREA	568	1063	1164	2227
		SHAURI YAKO	514	940	1638	1968
		ORUBA	112	183	205	388
		COMPLEX	269	530	548	1078
		GIRANGO 'A'	189	410	451	861
		GIRANGO 'B'	251	480	548	1,028
		NYAMOME	79	165	170	335
		ORUBA KEY	252	595	692	1287
		MILIMANI 'A'	108	256	319	575
		MARONGO	113	289	328	617
		NYANGUBO	331	777	834	1,611
		ORUBA CENTRAL	393	901	1084	1985
		SPECIAL POPULATION	-	-	2055	

SUNA CENTRAL	NGEGE	NYAMWARE NGEGE KAW LICHOTA (B/ LICHOTA (A/ ONDONG/WI MAPERA 'B'/ MAPERA 'A'	143 227 124 184 123 105 132	345 563 302 455 267 254 326	411 670 336 499 308 270 346	757 1,233 638 954 575 524 672
SUNA EAST	OSINGO SOUTH OSINGO NORTH	-	553 793	1192 2010	1382 2171	2574 4181
GOD JOBE	WASIO MANYATTA	-	688 945	1664 2196	1782 2421	3446 4617
UPPER SUNA	SAWEGI OGWEDHI		620 329	1655 731	1788 790	3443 1521
SUNA RABOUR	KWA UNGUO	-	997 486	2280 1100	2446 1178	4726 2278
SUNA NORTH	OTACHO KAKRAO	-	1512 2142	3664 5204	3927 5492	7591 10696

APPENDIX G2
MIGORI
TOWN

ABANDONED GROUND LEVEL STORAGE AT OLD WATERWORKS

BOREHOLE No. 3 - PUMP UPLIFTED MID OCTOBER CAUSING ACUTE WATER SHORTAGE

APPENDIX A2 - ENGINEERING PRINCIPAL DESIGN CRITERIA

The following principal design criteria are used, with reference to the appropriate sections of the 1986 Design Manual prepared by the Ministry of Water.

(a) Water quality

(i) Bacteriological quality of water

No faecal coliforms (1986 Design Manual, section 5.2.2, subsection A.1). Following the 1994 WHO guidelines for drinking water quality, this can be achieved by disinfection:

- with a free chlorine residual of 0.5 mg/l (8.12.4 of the 1986 Manual gives 0.3 mg/l to 0.5 mg/l);
- at a pH less than 8, and
- a turbidity less than 1 NTU;
- for at least 30 minutes.

Section 138 of the draft Water Act states:

"All water undertakers must ensure that <u>any</u> water for human consumption shall be disinfected using approved disinfectants and the required <u>residual</u> levels maintained at the reservoirs, distribution lines and end points."

The word "any" means that all potable water must be disinfected, even groundwater. The word "residual" implies that the approved disinfectants will be limited to chlorine compounds or other halogens. It would not cover UV radiation, ozone, etc.

(ii) Chemical quality of water

- Fluoride to be less than 1.5 mg/l, or 3 mg/l in exceptional cases (1986 manual, section 5.3.1).
- Colour to be less than 15 TCU (5.3.2) or up to 50 TCU in exceptional cases (5.3.3).
- Turbidity to be less than 1 NTU for disinfection (1994 WHO guidelines).
- pH to be between 6.5 and 8.5 (5.3.2) or up to 9.2 in exceptional cases (5.3.3), but less than 8.0 during disinfection (1994 WHO guidelines).

- Iron to be less than 0.3 mg/l (5.3.2), or 1.0 mg/l in exceptional cases (5.3.3).
- Manganese to be less than 0.1 mg/l (5.3.2), or 0.5 mg/l in exceptional cases (5.3.3).
- Water should not attack concrete or ferrous products (5.3.4). This requirement imposes further limitations on pH.

(b) Treatment

(i) General

The works should be designed for continuous operation (8.1.4).

(ii) Pre-settlement

Section 8.4.1 of the 1986 Design Manual recommends pre-settlement ahead of slow sand filters when raw water turbidity is between 20 and 100 NTU. Pre-settlement tanks may also be used ahead of clarifiers when the turbidity exceeds 1,000 NTU.

(iii) Aeration

Not required for surface waters (Section 8.6.1). May be required for groundwater (8.6.2) to be followed by sedimentation or filtration when carried out to oxidise iron and manganese.

(iv) Treatment chemicals

Coagulant	:	aluminium sulphate (8.7.4)
pH correction	:	soda ash (8.7.4)
Disinfectant	:	tropical chloride of lime or calcium hypochlorite (8.12.2)

(v) Sedimentation

Section 8.9.3 of the 1986 Design manual requires horizontal flow tanks with a design surface loading of 1 m/hr.

Section 8.9.4 states that the operational requirements of vertical-flow, sludge blanket clarifiers are so strict that they should not be used except under very exceptional circumstances.

(vi) Rapid gravity filtration

The principal criteria for rapid gravity filters are:

- design surface loading to be 5 m/hr (8.10.1);

- filter bed thickness 0.7 m to 1.0 m (8.10.2);
- filter media to be quartz sand, 0.5 mm to 1.0 mm, with a uniformity coefficient less than 1.5 (8.10.2);
- backwash rate to be 50 m/hr minimum (8.10.4);
- air scour only in exceptional cases (8.10.4).

(vii) Chemical dosing for disinfection

The World Health Organisation recommends that water intended for potable use should be disinfected with 0.5 mg/l of free available chlorine for at least thirty minutes at a pH less than 8. This recognises that germicidal efficiency is dependent on both the free chlorine concentration and the time of contact.

To achieve a free chlorine residual, sufficient chlorine must be dosed to react with any dissolved ammonia, iron, manganese, etc. The required doses are:

- 7.6 g of chlorine to react with 1 g of ammonia;
- 0.54 g of chlorine to react with 1 g of ferrous iron, and
- 1.5 g of chlorine to react with 1 g of manganese.

(c) Transmission systems

Transmission systems should be designed for:

- twenty-four hour operation (implied in 12.7.1 for clear water pumps, explicit in 12.7.2 for raw water pumps and 12.7.3 for borehole pumps);
- one standby pump (12.8.1);
- diesel generators to provide 50% cover (12.8.2);
- a minimum head of 4 m in the transmission main (9.3.7).

(d) Storage

Section 11.3.1 of the 1986 Design Manual requires balancing storage to be fifty per cent of the daily demand. Section 11.3.2 requires the following emergency storage:

- 12 hours for gravity supply to storage;
- 18 hours for pumped supply;
- 8 hours for supplies from more than one independent system.

(e) Distribution

The principal criteria are as follows:

Minimum head at consumer connections to be 10 m;
Maximum head generally not greater than 60 m.

(f) Water demand in urban areas

People with individual connections	high class housing	250lcd
	medium	150
	low	75
People without connections	low	20

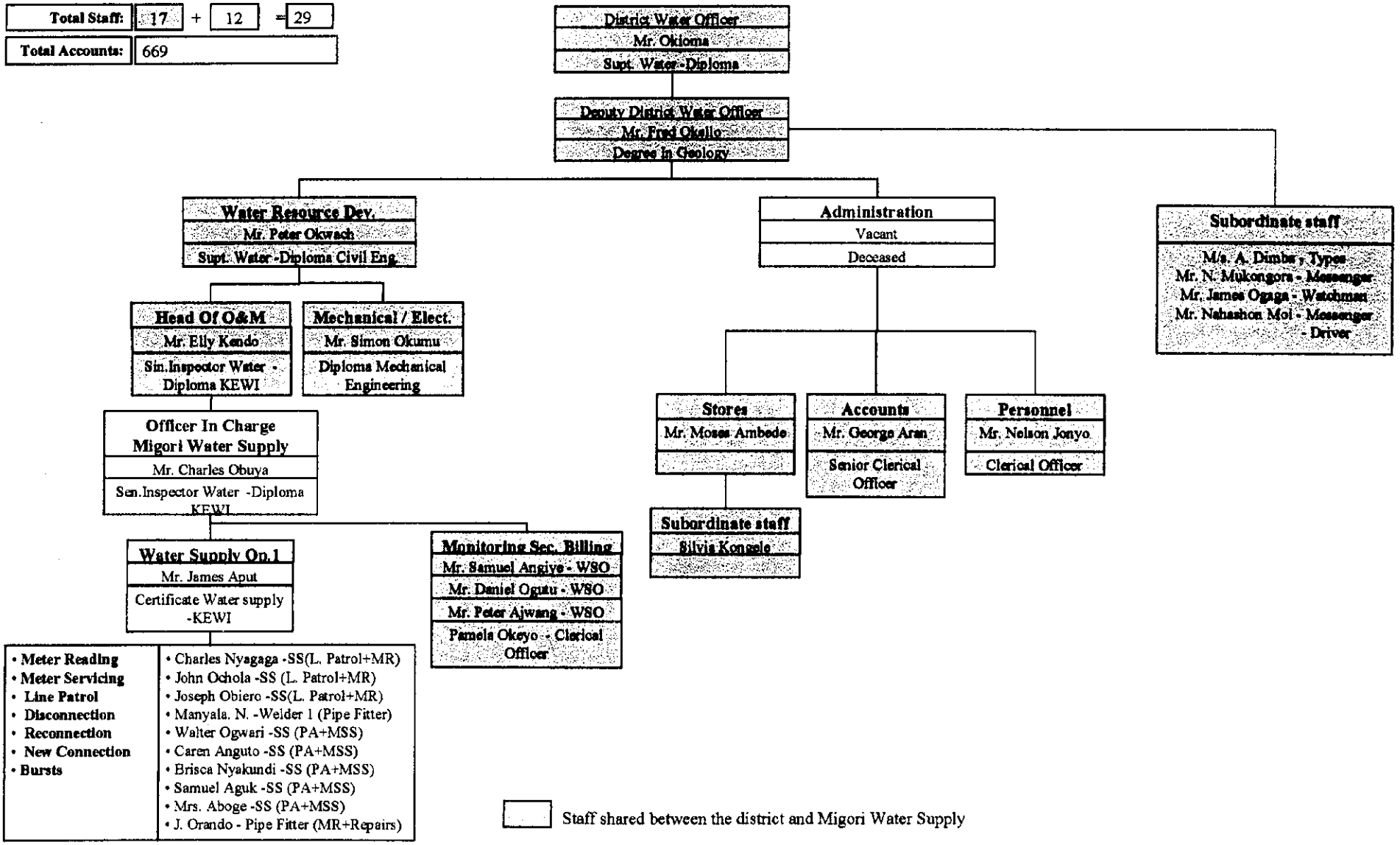
APPENX G3
MIGORI
TOWN

MIGORI WATER SCHEME ORGANISATION CHART

MIGORI

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

FIGURE: 8.1.7



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CONSORTIUM

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

Location:	**Migori WS&S System**
Date:	**1-3.11.2000**
Telephone:	**0387-20031**
Interviewer:	**CK**

Discussions held with:

District Water Officer:	**Samuel P. N. Okioma**
Deputy D.W.O:	**Peter Okwach- Provided most Questionnaire infor.**
Operator in charge:	**James Aput- O & M monitoring report + procedures**
Revenue Monitoring:	**Samuel Ologi- collection + revenue +consumer data**
Accounts:	**George Alany-AIE allocation + expenditure**

No.	Question:	Answer:
A.	Utility System	
1.	Office Set-up	*Temporary structures of timber and iron sheets*
	Office space?	*2 timber + iron sheet offices, 1 for the District Water Officer and the other one for his Deputy and Secretary.* *Additionally 6 unihuts used for the other operations* *The Division Water Officer sits about (a kilometre??) away where there are 3 permanet offices, 2 unihuts and 1 container.*
	Office equipment?	*1 typewriter*
	Tel.lines?	*1 telephone line*
	Fax?	*None*
	E-mail?	*None*
	Reliable Power supply?	*Only at where the Division Water Officer sits but rationed*
	Rationing?	
	Other comments?	
	Hardware, Software and skill: separate questionnaire !!	*None*
2.	Staffing Set-up	
	Total number of staff?	*29 no.*
	Male/Femal ratio?	
	Fluctuation? Due to?	*No marked fluctuations*
	Average years within the system?	*About 8 years*
	Orga chart in place?	*No, only a written schedule of duties which was prepared in October 1999*
	Job description available?	*Yes under above mentioned schedule of duties*
	Level of skill?	*The personnel in charge are skilled.* *Majority of the subordinate staffs are also skilled but upgrading process is very slow.*
	Overdue staff promotion?	*Yes. Only recently 4 of the s/s got promoted but not graded yet.* *Application for promotions dates more than 5 years back.*
	Training facilities offered?	*KEWI, at the moment 1 District staff is at KEWI studying for a diploma*
	Used facilities?	
	Technical? or Administration? or Management?	*Technical training offered, administration and management training generally lacking. Available facilities at KIM or GTI (Mombasa) for clerical cadre.*
	Qualification Station Manager	*Diploma holder- Superintendant Water*
	Recruitment statistics	*Available at MENR HQ*
	Remuneration and benefits	*Available at MENR HQ*
3.	Transport and Logistics	
	Cars? Which? Number:	*1 Pick-up 4 wheel drive 4 yrs old and used for the whole District.*
	Motorbike? Which? Number:	*2 Motor bikes, one not fuctioning.*
	Bicycle? Number:	
4.	Institutional Frame	
	MENR: Line of command?	*District Water Officer, Provincial Water Officer, Director, PS*
	NWCPC: Line of command?	

B.	Utility Indices	
1.	**Billing** **Consumption Actual vs Estimate** **Consumption Billed per month** **Consumption Billed for the last 3 years** **Billing Efficiency: Water billed/ Water supplied** **Billing Effectiveness: How many out of 100 bills are wrong or returned for reason**	*Refer to Table 8.2.7. Figures are more of estimates* *Not available* *Data available in Table 8.2.7. but not reliable*
2.	**Revenue & Collection** **Revenue Billed vs Revenue Collected per month** **For the last 3 years monthly and annual figures** **Collection efficiency: Total billed/ Total collected**	*Provided figures: billed about Kshs. 50,000.00* *Collections about Kshs. 36,000.00* *Not available* *As per provided figures 72%*
3.	**UfW** **1 - Recorded consumption/Production (supply efficiency) per month** **Or production vs billed consumption** **For the last 3 years, monthly and annually?** **Value of UfW:** **loss x average tariff rate of system per month** **FY:99/00** **FY:98/99** **FY:97/98**	*Refer to Table 8.2.7 calculated average from January to June 2000 = 6.33%. Available figures are estimated.* *Not available* *Not calculated as figures provided are estimated*
4.	**Tariff** **What is the average tariff rate per cbm? (Total billed water/Total water supplied = Average)**	*Refer to Table 8.2.7 and Table 8.3.7 however figures not reliable*

	Tariff structure? Current **Last 3 years:** **Additional charges?** **Additional sources of income?**	*Refer to Gazetted Tariff* *?* *?*
5.	**Funding** **Required Funding per month?** **Salary** **Procurements** **Power** **Chemicals** **Others**	 *Revenue based AIE of 65% of revenue collected* *H/O* *Refer to table no 8.5.7.* *H/O* *H/O*
6.	**Cost** **Total per month** **Salary** **Power** **O&M** **Administration** **Others**	 *H/O* *H/O* *Refer to table no 8.5.7..*
7.	**Accounting** **Manual or computerised?** **If manual elaborate:** **Double Book keeping done** **Ledger cards**	 *Manual statement showing how AIE received is spent using the vote book.* *At the end of the month a statemnet showing revenue collected and billed revenue + arrears*
8.	**Debt Arrears** **Debt Arrears Situation in Kshs** **Increase per month?** **Total FY 99/00** **98/99 97/98** **Debtors Totals/Billed Revenue** **Debtors Totals/Collected Revenue**	 *Refer to table 8.3.7*
C.	**Utility Procedures**	
1.	**Staff Recruitment/Promotion**	*Done from the Ministry Headquarters for job group H and above. The Ministry informs The Public Service Commission about the vacancy. The P.S.C. advertises the post and recruites.* *Below Job Group H, the district advisory board chaired by the DC considers request for promotion. Application done thru' the D.W.O. who recommends to the Committee. The Committee is made up of the DC, District Personnel Officer + Heads of Departments within the District. Generally the scheme of service is very poor and takes many years to get promoted.*
2.	**Defaulters Handling**	*Defaulters are supposed to be taken to court but this rarely happens.*
3.	**Administration** **Are debtors maintained monthly?** **Is an aging analysis available?** **Debtors lists for different** **Consumer categories?**	 *Not available* *Not available*
4.	**Funding**	*Money available through revenue based AIE which is supposed to be 65% of revenue collected*

5.	**Installment Payment**	*It is allowed but not practised*
6.	**Meter Reading & Billing**	*Done on a monthly basis but very few serviceable meters, estimated to be 40 in no.* *Meter readings starts 23rd of every month and the exercise takes 2 days. The readings are entered in to the consumer ledgers and bills are prepared on a monthly basis. Initially bills were being posted but now they are hand delivered to the consumers.*
	New Connection	*Consumer expresses his/her wish to open an account. A survey is done and if possible to provide water the consumer is requested to fill an application form which is approved by the DWO. Consumer pays deposit + labour charges and organises for material requirements as per the essessment done. After making the payment, the consumer is allocated an account number and finally connected to the water supply.*
7.	**Disconnection**	*Consumers who have not paid for 3 months are targeted for disconnection. The list is prepared by checking the consumer ledgers which are supposed to be updated by collecting receipts from the DC' s office every Monday.* *Disconnection is done by plugging*
8.	**Meter Servicing**	*There is no laid down procedure for meter servicing and it is only done when the need arises.*
9.	**HQ Reporting**	*Operation charts and revenue returns prepred on a monthly basis are forwarded to Nairobi through DWO, PWO*
10.	**Procedure Manuals**	*Not available*
11.	**Financial Control**	*Payment of bills is done at the DC's office. Labour charge fee of Kshs. 500.00 is collected at the DWO and later surrendered to the DC's office. Water sales + reconnection fees are collected using same receipt book but different accounts charged. Consumer deposits charged different account*
12.	**Cash/Cheque** **Un-accounted for cash advances?** **Consumer payments into consumer accounts?** **Cash/Bank book maintained and up to date?**	 *None* *Consumers pay at the DC's office and consumer ledgers are updated on a weekly basis* *No cash or bank book*
13.	**Reconciliation** **For Cash?** **For Bank?**	 *N/A* *N/A*
D.	**Discussions**	
1.	**Staff** **Awareness of operation and financing cost vs turnover?** **Job satisfaction and expectation?** **Existing constraints?** **Physical**	 *General staff awareness is lacking because water supply is taken as a basic service.* *No funds leads to limited activity* *Remuneration is low and therefore job satisfaction is low.* *Expectation is 250% increment plus enhanced operation activities.* *Infrastructure not adequate i.e. offices lacking as there are only temporary structures available with no power.*

	Financial	*Revenue based AIE allocation is very small, and time consuming produres to acquire the same. Suggests that Water Office opens a local account and MENR issues a cheque direct to them.*
	Institutional	*Organisation to be reviewed to make it responsive to commercial aspect. Training required for staff in management, computer, and additional vehicles ie. Divisions Offices should have 1 pick-up and 1 motor bike each and 1 double cabin pick-up for the District Office.*
	Political	*.Very little interference apart from the administration aspect where awards of works to be undertaken is manipulated (through the District Tender Board chaired by the DC)*
	Personnel	*None. MENR claims there is excess staff but is not the case, activity is what is lacking.*
	Efforts made to overcome the constraints?	*Requirements communicated to MENR HQ Nairobi but limited action*
	Consumer relationship?	*Fair but consumers feel they are not getting proper service.*
	Relationship with PWE?	*OK*
	Relationship with Ministry?	*OK*
	Relationship with LA?	*There is limited interaction as the council does not consult the Water Department in their planning.*
	Planning Department?	*Good, and work together even where projects are being undertaken*
	With other utility providers?	*OK*
	External influence affecting the performance?	*Only District administration who hamper technical operations i.e. influence by giving jobs to unqualified people or co.*
	Working environment?	*OK apart from good office structure requirement.*
	What is the opinion about PSP?	*Welcome, because for the water system to succeed, commercial aspect need to be introduced. This will lead to better services and ensure sustainability.* *The personnel are ready to adjust to this work environment.*
2.	**Consumers**	*No discussions held*
	Comments on:	
	Reliability	
	Quality	
	Billing	
	Price	
	Consumer requests on:	
	Coverage	
	Reaction Time	
	Proposed changes	
	Service rating	
	Cost in relation to service provided?	
	Tapped vs kiosk?	

	View and understanding of PSP? What does the consumer expect? What does the consumer propose? What is his/her situation on rationing?	
3.	**Stakeholders**	*No discussions held*
4.	**Community Project**	*Nyasare Water Supply:* *Chairman: Mr. Benson Omuro* *Act. Manager: Peris Ochieng (former manager suspended)* *Registered under the Society Act and has been in operation since 1994. Has employed staff headed by a Manager (total no. 9). The project was funded by the Austrian Govt. and handed over Management to Nyasare on completion.* *Phase 1 of the project which is complete and is supplying water to the rural areas and partly urban supplementing the Ministry Water Supply. Source is from a stream.* *Water Supply system is by gravity* *-communal drawing points are available in the rural area i.e 45* *stand pipes* *-Town supply through water kiosks which are 10 and sells water for 1 shs. For 20 litre jerrican. Those who can afford to connect there are individual connections which are metered.* *Tariff:(since May 96)* *(1) Rural : 40 Kshs. per household per month* *(2) Individual connections: 0 to 10 m^3 = 10Kshs per m^3* *11 to 30 = 20Kshs.* *31 to 50 = 30Kshs* *51 to 100 = 40Kshs* *over 100 = 50Kshs* *standing charge = 100Kshs* *There are 238 metered connections 20 of which are disconnected* *Billing approx. 5100m3 = approx. 100,000.00 Kshs monthly* *Revenue collected approx. 80,000.00 Kshs monthly* *(can fluctuate from 30,000.00 to 100,000.00)* *Total expenditure per month is approx. 76,000.00 Kshs* *Chlorination 3,000.00 per month* *Salaries 33,150.00* *Balance for other O & M plus allowances* *Production is 6998m3 per month-master meter available* *An allowance is paid to the Chairman or other elected members whenever they do some work for the organisation, Chairman,Vice chairman,Secretary,Ass. Secretary,Treasurer, Ass. Treasurer* *Since 1997, the organisation has been operating without donor funds.* *Supply is concentrated along the Nyasare River Valley and to become a member requires payment of Kshs. 20. There are 989 paid up members. Area divided in to 6 zones and each*

		zone is represented in the committee. The organisation is making proposal to increase the tariff. *Problems* *-Yield reduced because of human activities at the catchment areas.* *-Inability of consumers to pay* *-Defaulters- They hired a lawyer once and the response was good* *The organisation works closely with MENR . According to MENR, Migori, the community needs to strengthen the management base of the organisation.* *The community intends to come up with a phase 2 project to develop other sources of water and an Austrian Agency(Institute for International Co-operation) is willing to assist.* *They have also applied to take over Migori Water Supply under the Ministry.*
	EL NINO	*El nino rehabilitation project is drilling 2 boreholes with capacity of 20m3 per hour*
E.	**Consumers**	
1.	**Consumer Portfolio**	
	Total number?	*Originally were 700 consumers but only 352 are operating, rest have no water.*
	Ratio Major/minor consumers?	*Not available but will be calculated form the consumer data collected*
	Consumer classification	
	Consumer categories?	*Households, small business & Institutions*
	No. of new connect. Applied?	*Not available*
	No of new connect. Done?	*Not available*
	Percentage of suspected illegal connections?	*About 5%*
	Coverage water?	*About 40% of the supply area, but supply still not sufficient.*
	How many Kiosks are in operation?	*No kiosks available*
	Coverage Sanitation?	*Available are pit latrines, septic tanks, sewerage ponds (St. Joseph Mission Hospital)*
2.	**Consumer Indices**	
3.	**Consumer Procedures**	
	Open account?	*Refer to notes under Utility Procedures New Connections*
	Close account?	*Consumer writes a letter and indicates he wants to terminate the account. Current meter reading is taken and amount due prepared.* *Deposit refund is recommended if the consumer clears the total amount outstanding. Refund is supposed to be made through the DC's office.*

	Get a credit into the next bill? **Change address?** **Transfer account?**	*If proved that the consumers credit is genuine, the Divisional Water Officer approves crediting of the same.* *Consumer communicates either verbally or in writing. The change is done immediately the information reaches the office.* *The person moving in has to fill new agreement form. He retains the old number, and a remark in relation to the change of account holder is inserted in the consumer ledger.* *The person vacating has to write a letter and inform the office. Final reading is taken and bill calculated. If final bill paid, the Water Depart. Recommends refund of deposit from the DC's office*
F.	**Technical System**	
1.	**System Components?** **Is pumping necessary?**	*Originally were 5 boreholes, but only 2 are running. Out of the 2, one which is supposed to serve the biggest supply area at the moment has broken pump and has not been operating since January 2000* *From the 1st borehole(main) water is pumped for(1 km???) to a tank with capacity of 136m3 and then distributed by gravity.* *From the 2nd borehole water is pumped direct to the consumer. There used to be a tank but not functional. Serves about 100 consumers.*
2.	**Zonal Meters** **How many are in the system?** **Are they controlling areas?** **Are they functioning?**	*None*
3.	**Network** **Transmission lines?** **Distribution lines?** **Consumer lines?** **Whole system coverage?** **Fully utilised?**	*The whole network estimated to be 6 kms* *No* *No due to lack of water*
4.	**Coverage**	*About 20 km2*
G.	**Technical Indices**	
1.	**Production** **Capacity per day** **Actual per day** **Production Efficiency?**	*480m3 per day for all the 5 boreholes* *180m3 per day for the 2 working boreholes*
2.	**Pumping Efficiency**	*Pump rating 10 h/p for each pump*
3.	**Supply Efficiency** **Recorded consumption/actual production**	*?*
4.	**Service Efficiency** **How many days to attend to the problem?** **No. of total meters/number of operational meters?**	*Depends on availability of materials* *89 metered , 40 operational*

	Total zonal meters/operational zonal meters?	*Not available*
5.	**Sanitation** **Treatment Capacity** **Actual**	*None*
H.	**Technical Procedures**	
1.	**O&M**	*The line patroller has to check the main lines + service lines every day and report back to the office if there is any problem to be attended to. Duties are then allocated to the pipefitters to attend to the problems.* *Meter reading start 23rd of every month and takes 2 days*
2.	**Rationing**	*Yes done zonally*
3.	**Stock&Procurement** **Itemised stock list?** **Stock value** **Repair workshop** **Meter test bench** **Meter repairs/month/year** **Meter calibration** **Meter test request by consumers?** **List of tools and repair equipment available?**	 *Stocks are purchased and used, no funds to keep stocks* *None* *None* *Not done, only flushed where suspected blockage* *None* *Yes initially when the Ministry was providing meters, a new meter used to be installed to gauge consumption, but now only flushing is carried out.* *No sufficient tools and repair equipments, the employees occassionally uses their personal tools*
4.	**Meter Test Procedures**	*Not done*
5.	**Requisition Procedures**	*The user fills in a requisition form and recommended by head of that section. The requisition is then forwarded to the DWO. If approved it is sent to the store where the items are issued if available and the stock card adjusted accordingly. If goods not available an LPO has to be issued, however there is limitation due to lack of funds.* *Where sufficient funds available an LPO is issued and signed by the DWO and then processed at the District Treasury through the normal GOK procedures ie. Accounts, examination, vote book,audit and finally delivered to the supplier.* *The supplier supplies the goods to the Water Depart. and delivery note is signed. Items are then recorded in various stock cards.*

MIGORI

CONSUMER ACCOUNT INFORMATION DATA

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

TOTAL No. OF CONNECTIONS	ARREARS (Kshs.)	JUNEBILL (Kshs.)	CONSUMER NEVER CONNECTED	TRANSFERRED TO NYASARE W.PROJ.	METERED	FLAT RATE	WORKING	NON-WORKING	NO WATER	CUT OFF	ACTUAL CONSUMPTION (JUNE 2000) M3	ESTIMATE CON.M3	LAST PAYMENT (Kshs.)
842	940,349.00	92,656.00	40	133	230	496	79	136	59	222	392	7,149	500,718.00

No of Actual Bills	26
No of Estimate Bills	188
Assumed In-active	455
Consumer Never Connected	40
Transferred to scheme	133
Total	842
Minimum Charge Bills	53.01%

Total Of Active & Inactive
669

See Note:					F	G				E		D	
Adjustment:					(17)	(40)				(2)		(1,949.00)	
	940,349.00	92,656.00	40	133	213	456	79	136	59	220	392	5,200	500,718.00

Total m3 Billed
5,592

NOTE:

a) While last payment column was supposed to reflect payments prior to 30th June 2000, payments are reflected upto 23rd November 2000
b) The working and non-working meters do not tally with the number of metered connections due to the balance being recorded as cut off
c) The flat rate and metered accounts summing up to 726 do not tally with the total number of connections because the difference is either held in cut off, nyasare water project or no water column.
d) The flat rate and metered accounts summing up to 726 do not tally with the total number of connections because the difference is either held in cut off, nyasare water project or no water column.
d) 156 connections with an estimated consumption of 1827cbm are regarded as cut off thus reducing the total estimated consumption. 122cbm relating to 12 connections transferred to Nyasare water scheme was also excluded from the total estimated consumption i.e. 1827 + 122 -7149 = 5200
e) 2 connections were reported as cut off but have bills and consumptions allocated to them
f) Out of the 230 Metered accounts 17 have been marked as under Nyasare W. Proj. thus reducing the same
g) 40 out of the 496 flat rate connection are also indicated as under Nyasare W. Proj. thus reducing the flate rate.

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

L1

A/C No.	CONN. NUMBER	ARREARS (Kshs.)	JUNE BILL (Kshs.)	CONSUMER NEVER CONNECTED	TRANSFERRED TO NYASARE W.PROJ.	METERED	FLAT RATE	WORKING	NON-WORKING	NO WATER	CUT OFF	CUT OFF DATE	ACTUAL CONSUMPTION (JUNE 2000) M^3	AVE CON.M^3	LAST PAYMENT (Kshs.)	DATE OF LAST PAYMENT
0001	1	795.00				1			1					40	2,480.00	20/3/00
0002	2	1,040.00				1			1					10	1,116.00	15/12/99
0003	3					1			1					10	1,205.00	12/5/00
0004	4	2,987.00				1			1		1	18/12/99		10	2,239.00	31/12/99
0005	5	2,620.00				1		1			1	24/12/94			1,062.00	27/4/93
0006	6						1							10	1,450.00	24/7/00
0007	7	1,220.00	250.00			1			1					10	485.00	28/6/98
0008	8	1,045.00	500.00			1			1					20	1,060.00	7/4/00
0009	9	50.00					1							20	2,030.00	29/4/00
0010	10					1		1			1	24/2/96			95.00	10/7/95
0011	11						1							15	700.00	11/1/00
0012	12	190.00					1							10	200.00	1/8/00
0013	13						1							10	480.00	8/12/99
0014	14	880.00					1							10	600.00	18/5/00
0015	15	3,535.00					1				1	24/12/99		15	75.00	21/6/93
0016	16	280.00				1			1		Vac	24/4/95			175.00	5/3/93
0017	17					1		1							465.00	14/1/00
0018	18					1		1							328.00	27/3/00
0019	19	250.00					1							15		
0020	20	2,145.00				1			1		1	24/2/99		15	210.00	19/11/99
0021	21					1		1							800.00	13/3/98
0022	22	525.00					1				1	24/7/98		15	350.00	30/3/00
0023	23						1							10	200.00	25/7/00
0024	24					1		1							250.00	28/9/00
0025	25		250.00			1		1							545.00	21/3/00
0026	26						1						1	10	1,110.00	6/6/00
0027	27	1,683.00				1			1					12	161.00	19/11/99
0028	28	1,520.00				1			1					12	939.00	15/12/99
0029	29	1,313.50				1			1		1	24/11/93				
0030	30	2,948.50					1							10	1,200.00	15/12/99
0031	31	1,422.00				1		1			1					
0032	32					1		1			Vac	24/10/99			200.00	6/4/99
0033	33	570.00					1								680.00	7/4/00
0034	34	740.00				1		1			1	24/8/94				
0035	35	1,253.00				1			1						480.00	16/12/99
0036	36	768.50					1				1	24/11/91				
0037	37						1				1	5/10/93			140.00	5/10/92
0038	38		200.00				1							10	520.00	4/4/00
0039	39	250.00				1			1					10	250.00	26/6/00
0040	40	460.00	200.00				1							10	500.00	30/4/00
SUB-TOTAL		30,490.50	1,400.00	0	0	23	17	10	13	0	11		1	319	24,780.00	

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

A/C No.	CONN. NUMBER	ARREARS (Kshs.)	JUNEBILL (Kshs.)	CONSUMER NEVER CONNECTED	TRANSFERRED TO NYASARE W.PROJ.	METERED	FLAT RATE	WORKING	NON-WORKING	NO WATER	CUT OFF	CUT OFF DATE	ACTUAL CONSUMPTION (JUNE 2000) M^3	AVERAGE CONSUMPTION M^3	LAST PAYMENT (Kshs.)	DATE OF LAST PAYMENT
0124	79		200.00				1							10	900.00	23/8/00
0081	81	3,895.00				1			1		1					
0082	82		250.00			1		1					5		530.00	4/8/00
0083	83	1,650.00					1							15	1,230.00	12/3/99
0084	84					1			1		1	18/2/98		10	225.00	18/2/98
0127	85	1,405.00	375.00			1			1					15	400.00	27/12/99
0128	86	280.00	200.00				1							10	1,080.00	17/10/00
0087	87	2,700.00	325.00				1							15	640.00	18/8/99
0088	88	1,785.00					1				1	28/7/99		10	1,000.00	4/1/99
0089	89					1		1			1	24/4/98			5,000.00	1/4/98
0090	90	710.00	250.00			1			1					10	940.00	31/8/00
0091	91			1												
0092	92	520.00					1				1	23//2/98		30		
0093	93	1,120.00					1				1	24/8/98		20	760.00	6/4/98
0094	94			1												
0095	95	1,590.00				1			1		1	24/2/98		10		
0096	96	995.00	200.00			1		1					2		795.00	19/5/00
0097	97	360.00				1			1		1	24/12/97		10		
0098	98	120.00				1		1					5			
SUB-TOTAL		17,130.00	1,800.00	2	0	10	7	4	6	0	8		12	165	13,500.00	

STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

Year 2000	January	February	March	April	May	June
Total Prod. M^3	5,652	4,968	4,332	5,273	4,730	3,714
Total Water Sold M^3	5,131	4,639	4,153	4,578	4,556	3,663
Sold through meters m^3	937	953	861	705	753	402
Flat rate M^3	2,143	2,034	1,972	2,143	2,085	1,820
Average Assessment m^3	2,051	1,652	1,320	1,730	1,718	1,441
Kiosk m^3						
Unaccounted for W.	521 9%	329 7%	179 4%	695 13%	174 3.6%	51 1.4%
No production days	31	28	31	30	31	31
No. of Disconnections	nil	nil	nil	nil	nil	nil
No. of Reconnections	nil	nil	nil	nil	nil	nil
KWH Consumed	9,651	8,339	7,243	8,767	7,852	6,338
Revenue						
New connections						
Reconnections						
Metered	10,200.00	9,668.00	9,836.00	11,120.00	8,320.00	6,115.00
Flat	33,100.00	31,000.00	28,144.00	32,180.00	26,710.00	22,145.00
Average assessment	18,272.00	15,000.00	11,856.00	6,820.00	11,170.00	11,740.00
Total Revenue	**61,572.00**	**55,668.00**	**49,836.00**	**50,120.00**	**46,200.00**	**40,000.00**
Expenditure						
Fuel						
Chemicals						
Repairs,spares						
Workshop,uniform						
Replacement of Equip						
Tel.Stationery,Transport						
Allowances						
Total Expenditure						
Revenue Collected						

BILLING AND REVENUE COLLECTION DATA

STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

YEAR 2000

	JUNE	MAY	APRIL	MARCH	FEBRUARY	JANUARY
Accumulated Debt	609,915.30	701,625.30	701,034.30	677,269.30	635,948.30	599,740.30
Current month billed revenue	40,000.00	46,200.00	50,120.00	49,836.00	55,668.00	61,572.00
Total revenue collectable						
Accumulated FY collection	730,959.00	698,701.00	560,791.00	511,262.00	485,191.00	470,844.00
Total outstanding revenue	617,657.30	609,915.30	701,625.30	701,034.30	677,269.30	635,948.30

YEAR 1999

	DECEMBER	NOVEMBER	OCTOBER	SEPTEMBER	AUGUST	JULY
Accumulated Debt	647,687.30	673,754.30	747,844.30	739,765.30	705,569.00	689,313.30
Current month billed revenue	57,072.00	57,564.00	61,519.00	59,484.00	67,720.00	52,548.00
Total revenue collectable						
Accumulated FY collection	445,480.00	340,461.00	256,830.00	121,221.00	69,816.00	36,292.00
Total outstanding revenue	599,740.30	647,687.30	673,754.30	747,844.30	739,765.30	705,569.00

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

MONTH	REVENUE COLLECTED FY 99/00	A.I.E. APPLIED FOR	RECEIVED ALL./LIQUIDITY
July	36,292.00		
August	33,519.00		
Sept.	51,405.00		250,000.00
Oct.	135,609.00		
Nov.	83,631.00	166,939.00	375,000.00(Dev.)
			233,840.00
Dec.	105,019.00		
Jan.	25,364.00	122,622.00	167,000.00
			1,312,640.00(Dev.)
Feb	14,347.00		
March	26,071.00		122,620.00
April	49,529.00		50,000.00
May	137,910.00		
June	32,258.00		
Total	**730,954.00**	**289,561.00**	**823,460.00**
		Totals	**1,687,640.00(Dev.)**

EXPENDITURE INCURRED FY 99/00		
ITEM	ALLOCATED	ACTUAL
887 Account		
Passage + Leave	120,000.00	120,000.00
Transport Operating exp.	144,560.00	142,774.00
Travelling & Accom	118,360.00	114,720.00
Postal + Telegram	16,000.00	15,400.00
Purchase of stationery	49,180.00	49,121.00
Maintenance of WS & Sewer	235,740.00	233,250.60
Misce. Other charges	10,000.00	10,000.00
Honorarium & All.	12,000.00	12,000.00
Fuel & Gas	30,000.00	
894 Account		
Maintenance of Water Supplies	87,620.00	87,030.00
Total	**823,460.00**	**784,295.60**
Balance		**39,164.40**
Development		
Construction of W/S (524)	125,000.00	124,837.00
Construction of W/S(Urban-560)	125,000.00	123,950.00
Rehabilitation of W/S	125,000.00	125,000.00
Total	**375,000.00**	**373,787.00**
Balance		**1,213.00**

Percentage allocated to Migori as A.I.E. is 65%
Kshs. 1,312,640.00 allocated for construction of shallow wells and roof catchment was never utilised because Treasury did not release the funds

STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA

YEAR 2000

	JUNE	MAY	APRIL	MARCH	FEBRUARY	JANUARY
Accumulated Debt	609,915.30	701,625.30	701,034.30	677,269.30	635,948.30	599,740.30
Current month billed revenue	40,000.00	46,200.00	50,120.00	49,836.00	55,668.00	61,572.00
Total revenue collectable						
Actual collection	32,258.00	137,910.00	49,529.00	26,071.00	14,347.00	25,364.00
Accumulated FY collection	730,959.00	698,701.00	560,791.00	511,262.00	485,191.00	470,844.00
Total outstanding revenue	617,657.30	609,915.30	701,625.30	701,034.30	677,269.30	635,948.30

YEAR 1999

	DECEMBER	NOVEMBER	OCTOBER	SEPTEMBER	AUGUST	JULY
Accumulated Debt	647,687.30	673,754.30	747,844.30	739,765.30	705,569.00	689,313.30
Current month billed revenue	57,072.00	57,564.00	61,519.00	59,484.00	67,720.00	52,548.00
Total revenue collectable						
Actual collection	105,019.00	83,631.00	135,609.00	51,405.00	33,519.00	36,292.00
Accumulated FY collection	445,480.00	340,461.00	256,830.00	121,221.00	69,816.00	36,292.00
Total outstanding revenue	599,740.30	647,687.30	673,754.30	747,844.30	739,765.30	705,569.00

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

MONTH	REVENUE COLLECTED FY 99/00	A.I.E. APPLIED FOR	RECEIVED ALL./LIQUIDITY
July	36,292.00		
August	33,519.00		
Sept.	51,405.00		250,000.00
Oct.	135,609.00		
Nov.	83,631.00	166,939.00	375,000.00(Dev.)
			233,840.00
Dec.	105,019.00		
Jan.	25,364.00	122,622.00	167,000.00
			1,312,640.00(Dev.)
Feb	14,347.00		
March	26,071.00		122,620.00
April	49,529.00		50,000.00
May	137,910.00		
June	32,258.00		
Total	**730,954.00**	**289,561.00**	**823,460.00**
		Totals	**1,687,640.00(Dev.)**

EXPENDITURE INCURRED FY 99/00 ITEM	ALLOCATED	ACTUAL
887 Account		
Passage + Leave	120,000.00	120,000.00
Transport Operating exp.	144,560.00	142,774.00
Travelling & Accom	118,360.00	114,720.00
Postal + Telegram	16,000.00	15,400.00
Purchase of stationery	49,180.00	49,121.00
Maintenance of WS & Sewer	235,740.00	233,250.60
Misce. Other charges	10,000.00	10,000.00
Honorarium & All.	12,000.00	12,000.00
Fuel & Gas	30,000.00	
894 Account		
Maintenance of Water Supplies	87,620.00	87,030.00
Total	**823,460.00**	**784,295.60**
Balance		**39,164.40**
Development		
Construction of W/S (524)	125,000.00	124,837.00
Construction of W/S(Urban-560)	125,000.00	123,950.00
Rehabilitation of W/S	125,000.00	125,000.00
Total	**375,000.00**	**373,787.00**
Balance		**1,213.00**

Percentage allocated to Migori as A.I.E. is 65%
Kshs. 1,312,640.00 allocated for construction of shallow wells and roof catchment was never utilised because Treasury did not release the funds

STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEM FOR TEN (10) LOCAL TOWNS IN KENYA

MONTH	ORDERED(KG)			RECEIVED(KG)		
		TCL	S/Ash	Alum	TCL	S/Ash
Jul-99						
Aug-99					45	
Sep-99						
Oct-99						
Nov-99						
Dec-99						
Jan-00					25	
Feb-00						
Mar-00					25	
Apr-00						
May-00					25	
Jun-00						
Total					**120**	

NOTE: The information obtained seems not to be comprehensive