

**CHAPTER 16 INSTITUTIONAL ARRANGEMENT AND
CAPACITY BUILDING STRATEGY**

CHAPTER 16 INSTITUTIONAL ARRANGEMENTS & CAPACITY BUILDING STRATEGY

To ensure the successful implementation and subsequent operation and maintenance of the improved water and new wastewater facilities envisaged in this Plan, several institutional development initiatives will be needed at various levels. The institutional design to implement this project needs serious attention since the areas to be covered are very diverse in terms of economic activity and income levels and the current arrangements require some clarification and strengthening. Expansion into wastewater services and improvement in water services requires serious consideration of strategies that go beyond mere changes in the organizational structure.

This chapter, thus, consists of the institutional policy options and recommendations; the proposed project implementation structure; the facilities operation and maintenance arrangements; the institutional capacity building strategy; and the social marketing and public information strategy. *Private sector participation options* are explored. If GSL is prepared to take policy decisions and action to mobilize private sector involvement in service provision, several key initiating actions are recommended. Table 16.8, at the end of this chapter, summarizes the budget requirements to support this institutional package.

16.1 General Institutional Policy Recommendations

In this section, several institutional policy recommendations are made which will affect the sustainability and efficiency of water and sewerage service provision in the future. Appropriate authorities should consider the following principles, policies and options to guide future operations.

- (1) **Financing Mechanism.** Following the existing capital subsidy policy of government, 50 percent of the capital requirements will be transferred as grant, while the balance is extended as a 10 percent, 24-year loan with 2-year grace period. The NWSDB shall receive the grants and shall be the borrower of the loan (i.e., take the debt service obligation and risks). The NWSDB then constructs the facilities and participates in the operation of the treatment plants and sewerage pumping stations. The NEMC will charge consumers the fees and tariffs required; and will pay the NWSDB an agreed fee sufficient to cover the debt service requirements and the O&M services provided. Upon completion of debt service payments, the ownership of the facilities (including those financed by

grant) will be transferred to the NEMC. NWSDB's O&M services can be discontinued when the NEMC has developed sufficient capacity to takeover and run the facilities by themselves; however, the debt service obligations will continue as planned. In addition, if all parties agree, the facilities, including any outstanding debt service obligation may be transferred earlier than planned, to the NEMC (or possibly, private operators).

Financing of Environment Alleviation Projects. A broader issue which the NWSDB, the Ministry of Finance and other economic planning agencies should consider is the financing of projects with direct environment alleviation impact. Projects, like sewerage, often have a difficult time passing the financial affordability criteria. At the very least, externally financed projects with direct environmental alleviation objectives, like sewerage projects, should be passed on at the same (or better) terms as the funding source.

(2) ***Role of NWSDB in Bulk Service Provision.*** The NWSDB could further develop its role as bulk distributor of treated water and bulk provider of wastewater treatment and disposal services – but this should only be considered as part of a larger strategy. As a general policy, water and sewerage operations and maintenance should progressively be transferred to capable, reasonably sized utilities that shall bear full responsibility to its customers for all aspects of operations for a defined service area. This utility may be a public (municipal or NWSDB) or private concern, or a joint venture.

1) While splitting up the institutional responsibilities (in this case, production and treatment by NWSDB; and water distribution, billing and collection, by PS/UC) may be a viable strategy today, it may prove to be a future hindrance when integration becomes advantageous to achieve economies of scale and efficient resource management. Smaller utilities tend to be more expensive in the long term. The policy advice, at this time, is for NWSDB to retain some flexibility and keep the legal options and means open for possible re-integration of the sub-systems in the future.

2) It would also be useful for NWSDB to clearly define its water allocation policy among the bulk dealers, in view of the often-limited supplies, and not promise the PS/UC water that it cannot deliver. The PS/UC should also be protected from non-delivery of water by the NWSDB. In the immediate term, there should be full review and possibly, re-negotiation of current bulk water contracts. More rigorous criteria and preconditions for granting “bulk water distributorships” and widening the options in the selection of “distributors” beyond PS/UC's, possibly including consumer

groups, NGO's or the private sector, should be considered. Specific areas for review and strengthening are suggested in succeeding sections.

- (3) ***Building Up the Sector Regulatory Function.*** As previously indicated, this regulatory functions has to be vested in a third party. As a direct service provider, the NWSDB would be severely hampered by conflict of interest from effectively pursuing this role. The fundamental role of the "regulator" is to ensure that both service providers and the consumers are fairly treated. This "regulatory office" should be able to exercise quasi-judicial powers to review tariffs of all service providers (NWSDB, MC's/PS's/UC's, or private sector). It would have the regulatory powers and tools to enforce service standards and institutional performance standards. With sufficient coordination with other agencies, this regulatory office would also be poised to enforce environmental and water resource conservation measures.

In the immediate term, the NEMC should establish an independent interim ***Board of Regulators*** composed of representatives of private, commercial or business interests, public authorities, consumer groups, socio-civic organizations, etc. to function as a regulatory body. The local water and sewerage office should be allowed to operate as independently as possible within the bounds set by the Board. The essential regulatory functions and powers include: tariff review and approval; setting of service standards and objectives and annual performance and financial audits. This Board of Regulators will **not** be involved in day-to-day operations and decisions. These shall continue to reside within the municipal administration.

- (4) ***Cost Recovery Policy and Sewerage Tariff Setting Procedures.*** Cost recovery policies should lead to setting the process and procedures for computing, reviewing and approving the required tariff for sewerage and water services.
- 1) **Operation and maintenance costs.** As a general policy, water and wastewater operation and maintenance costs, including septic tank cleaning services, should be recovered from the users. Since the benefits of improved water and environmental conditions also accrue to the neighborhood and the city, some level of direct contribution to O&M costs by the city or neighborhoods may be justified.
 - 2) **Capital costs.** If capital costs are to be recovered partially or fully, the approach should be most easily done through the property/land taxation system. This assumes a reasonable rate of tax compliance on property taxes and the cooperation of the

municipal councils in enacting an ordinance and collecting the surcharge or in pre-allocating a percentage of the local land tax revenues to a "water and sewerage fund" which will be used to service the debt.

In service areas where both water supply and sewerage services are available, the responsibilities, particularly for billing and collection, should be vested on a single institution. There should only be one tariff structure to cover **both** water and wastewater services. This is the only way to recover direct sewerage costs. Tariff for wastewater collection, treatment and disposal will be based on metered water consumption.

(5) *Tariff and Revenue Raising Strategies.* Even with best efforts to minimize operating costs, there will invariably be an initial shock with the new tariffs required to support the new services. Because of the low revenue base (the current rates), the tariffs to support the improved water service and the new wastewater services will be substantially higher *if revenues will be raised exclusively from user tariff* (i.e., based on consumption volumes). A practical revenue strategy will have to be formulated following these recommended principles:

- 1) Those who will have an immediate and/or direct economic or commercial benefit or saving due to the improved environment and service should bear the initial shock.
 - i. Land values tend to rise with the availability of improved water and sewerage services regardless of whether a landowner is actually connected to the system or not. Similarly, property developers will be able to construct multi-story, high-density buildings without the need for expensive wastewater treatment packages.
 - ii. Business and commercial establishments will directly benefit – hotels, restaurants, tourism-oriented service industries.
 - iii. New homeowners and builders in the service area will not have to construct septic tanks.
- 2) As the impact of the accompanying social marketing program takes effect (over 3-4 years), the sharing of the financial costs can gradually be made more equitable (i.e., based on consumption, use of service and economic value of the service to the users).

(6) *Demand, Willingness-to-pay and Social Marketing.* A key challenge for urban policy is in sustaining an ability to respond to demand, i.e., demand that is based, not on what the planners and engineers think, but on what the stakeholders, particularly the householders,

are willing and capable of paying for. Demand occurs at different levels, i.e., the central level, the municipal level and most importantly, the user level. Technical, financial and institutional options are closely linked and its selection should respond to a clearly expressed demand and willingness-to-pay (*or willingness-to-subsidize*).

- 1) *Consumer Demand.* To gain full advantage of the benefits of any project, the demand (and willingness-to-pay) of householders for these household-level benefits should be ascertained. After all, to achieve the environmental sanitation objectives of this project, 1) improvements to the in-house water and toilet facilities may be required; 2) householders have to agree to connect to the system or improve their on-site facility; and, 3) the system will have to be properly operated and maintained. Householders will have to pay for these costs.

- 2) *Municipal and Central-Level Demand.* At municipal and central levels, the demand for the improvements has been initially expressed during the Study stages. This has been a relatively painless process since the costs of development assistance have, thus far, been in the form of grants. The issue of municipal and central-level demand for improvements will have to be assessed with a clear understanding of the impact of the O&M costs and the risks. Given the current tariff revenue base, it is likely that the operation of the new facilities may initially require an even higher level of subsidy from municipal or other sources to augment the revenues which can be raised from tariff. The importance of improved water supply and environment in the Study area to the regional and national economy will be the principal basis for this central and municipal demand.

There are two policy areas that need to be addressed. The first is related to the concept of demand as the basis for planning and implementation approaches; the second, to strengthening public awareness and interest among residents about environmental alleviation options to increase demand and willingness to pay for improvements.

- (7) *Policies to Improve Access of Low-Income Groups to Improved Water and Sanitation Services.* Sri Lanka has been a pioneer in testing innovative community-based development approaches and strategies. The institutional structures for planning and operations of services targeting low-income groups tend to be more complicated, sensitive and politically charged. Low-income groups are the first to feel the impact of deteriorating environmental conditions because of their inability to provide for alleviation measures.

Clearly, issues stem, among others, from the inadequate participation of beneficiaries in decision-making and from a lack of clarity on criteria and ground rules. For example, the criteria for installing public standposts and/or communal sanitation facilities is often not explicit and discretionary - neither are the ground rules for sustainability. The essential concerns that have to be met are:

- that the beneficiaries participate in making the major decisions, including operations and financial responsibilities, and agree with the steps to be taken;
- that the beneficiaries have a stake in the success of the project, and
- that they have a hand in monitoring the quality of construction, operation and maintenance.

While this Study will now focus on developing a project in the identified priority areas, the need for improved services, particularly in low income areas, will still have to be addressed by the local authorities. The NEMC has the prime mandate for promoting access to these services.

(8) ***Sewerage Operations Policies.*** Unlike water supply (which is a basic need), the user demand for wastewater collection, treatment and disposal service is generally lower in the users' priority scale. It has to be more actively marketed and promoted. For the local agencies involved, this will be the first attempt at full-scale wastewater management operation. It is therefore crucial that the initial set of operating policies adopted be sound. The NEMC should consider several key policies to ensure the sustainability of sewerage operations.

1) ***Promoting Sewer Service Connections.*** Current experiences, local and elsewhere, with sewerage projects indicate that the high initial connection costs have tended to discourage potential customers from availing of the service. The slow build-up of the customer base has been a major obstacle to system functioning. Low flows contribute to the frequent fouling of the system.

Sewer service connections usually consist of a pipe extending from the sewer line up to a fixed length to the house for which service applicants are charged a connection fee that includes labor, materials and surface restoration. The full expense to the homeowner, however, goes beyond the connection fee. Often, relocation of in-house piping and other adjustments inside the homes become necessary. In densely populated areas, installing the sewer connection may require breaking up and restoring existing concrete or permanent structures. Taken together, the amount required can be a sizeable expense to the customer. Policies that would alleviate the

situation for the existing and potential customers are needed. These policies have an implication on the utility's cash flow that should be assessed.

- Financing through "home improvement loans" and "revolving fund for sewer service connections". The NEMC should also consider encouraging the banks to offer low-interest loans for toilet construction and pipe works to potential customers. Alternatively, the NEMC should be able to establish a revolving fund which domestic customers can avail of for financing the service connection, including piping works inside the homes. The fund can be repaid possibly over five years together with the monthly service bills.
- Special Offers. A "limited promotions" policy that may be considered is to have special time periods (or areas) when an additional service pipe length (or some other discount or benefit) is offered. Such "special" arrangements may be offered to specific neighborhoods during a fixed specific period corresponding, for example to the period when the sewer line is being laid along specific streets - after which the "special promotion" is discontinued and offered to the next neighborhood.

- 2) ***Influent standards policy for acceptance of wastewater into the sewerage system.*** The wastewater treatment plants are designed to handle only domestic wastewater. The introduction of industrial and/or hazardous wastewater reduces treatment efficiency and increases treatment costs. Removal of heavy metals or toxic substances is most economically done in pre-treatment facilities owned by the "polluting source". Through regular monitoring of raw wastewater quality, the plant should be able to monitor compliance with influent standards and, at the same time, ensure the efficacy of its treatment operations. Influent standards have been adopted in other major cities abroad. Similar steps should be taken to establish and enforce standards in the Study Area.
- 3) ***Service extension policy.*** Where the institutional and technical arrangements are appropriate and the internal water distribution and/or wastewater collection systems are customer-financed, services may be extended for customer groups under agreed terms and fees. This may be applicable to existing or future land development or housing projects areas. Such self-provided systems should conform to specifications.
- 4) ***Mandatory sewer connection policy for customers with high consumption.*** To help ensure the financial viability and raise the utilization rate of the new sewerage system,

a policy and ordinance requiring commercial and high residential water consumers to connect will be needed to make the sewerage system viable.

- 5) *Incentive policy for sewerage field staff.* The higher health risks and unpleasant working conditions associated with working on sewerage are sufficient reasons for offering additional incentives for field staff. The preference of most O&M field staff tends to be for water supply assignments that are perceived as “cleaner” and “of higher status”.

- 6) *Managing Septage Collection, Treatment and Disposal.* Outside the sewerage service areas, residents will continue to rely on septic tanks and soakaways to treat and dispose of wastewater. In these areas, the NEMC will implement a program to ensure that the existing septic tanks are functioning properly through regular desludging and cleaning at least once every five years. Costs for such services will be borne by the users through surcharges on their monthly bill and will depend on the size of their septic tank; cost of the service will be spread over five years. In renewing their business licenses, commercial establishments (outside the sewered area) must present a certification from the waterworks office (at least once every five years) that their septic tank has been desludged. In effect, residences and establishments outside the sewerage service area will be billed for water and septage collection (instead of the sewerage) services.

16.2 Organizing for Facilities Operation & Maintenance

Based on the functional distribution below, the organization structures to support the immediate improvement are described in this section. The structures have been modified to respond to the new and/or expanded scale of activities and some perceived current weaknesses. The distribution of functional responsibilities for project implementation and facilities O&M is proposed in Table 16.1.

Table 16.1 Distribution of Responsibilities for Project Implementation and O&M

Functional Responsibilities & Roles		NWSDB	CPC	NEMC
Project Implementation and Management	Capital Funds Sourcing	•		
	Planning and Design	•		
	Construction Supervision	•		•
	Project Coordination	•	•	
Water Supply Operation and Maintenance	Water Production	•		•
	Water Treatment	•		
	Bulk Supply	•		
	Network Distribution	•		•
Sewerage Operation and Maintenance	Wastewater Collection			•
	Treatment & Disposal	•		
	Septage Collection			•
	Septage Treatment & Disposal	•		
Customer Service	Billing and Collection	•		•
	Social Marketing & Public Information	•	•	•

In the course of preparing this study, the Central Provincial Council, through the Office of the Chief Secretary, has provided enthusiastic support in facilitating various tasks and has provided invaluable advice. It is envisaged that during project implementation, closer coordination among the national and local authorities and the residents and community-based organizations, will be essential and will have to be continued through the Provincial Coordinating Committee headed by the Chief Secretary. The PCC is envisaged to have a principal role in monitoring and reviewing the progress of the work to ensure that the project is proceeding according to schedule and budget. Many project implementation problems, such as permits and right-of-way issues, can be judiciously resolved and expedited if addressed at this level. Political liaison, consultation and dialogue will be another important role, which the PCC can lead. Other inputs which can be provided through the PCC would include: coordination of training and social marketing activities, tree-planting in the sewerage treatment plant “green” buffer zone. The planting of trees and seedlings in the green zone is envisaged to be among the principal obligations (a contractual work item) of the treatment plant contractor.

All actions and commitments to be entered into by the Municipal Council will need prior clearance and approval of the Provincial Council, through the Chief Secretary.

Financial accountabilities including institutional responsibilities for loan repayment and counterpart funding for this project will be the subject of internal agreements among the central and local authorities and subsequent bilateral negotiations with potential external support agencies.

The basic responsibilities for project implementation will be vested in a Project Management Office headed by a full-time Project Director, with staff coming from the various agencies involved. Details about the PMO are found in Section 16.3.

Based on the technical studies, the new facilities to be constructed for which the institutional arrangements have to be designed consists may be outlined as follows:

Table 16.2 Summary of Proposed New Facilities to be Operated and Maintained

New Facilities	Phase 1 - 2005	Phase 2 - 2015
<i>Production wells</i>	7 wells	-
<i>Pumping Stations</i>	3	-
<i>Water transmission</i>	10.5 kms	0.5 kms
<i>Water distribution</i>	9 kms	2 kms
<i>NE STP(Aerated Lagoon)*</i>	1,400 m ³ /d cap.	1,400 m ³ /d cap
<i>Sewage Pumping Stations*</i>	2	1
<i>Sewer lines</i>	15 kms	5 kms

* To be initially operated and maintained by the NWSDB and ultimately transferred to the NEMC.

16.2.1 Organizational Structure

The restructuring plan at NEMC will be towards transforming the Waterworks Office into a new Water and Sanitation Office (NEMC-WSO) and improving the *accountability for performance* in providing both water and wastewater services. The new office will coordinate with the Interim NWSDB Operations Team on the sewage pumping stations, wastewater treatment plant and septage management operations. NEMC should be able to immediately take on the sewer connection, sewer cleaning and maintenance and customer service functions, after some training. A full-time sub-unit of the Office of the Municipal Accountant is proposed to be detailed within the Water and Sanitation Office under the Superintendent. Similarly, the septic tank cleaning operations (gully sucker) now under the municipal health inspector will be transferred to the WSO. A new Training Unit will also be needed implement the retraining of staff.

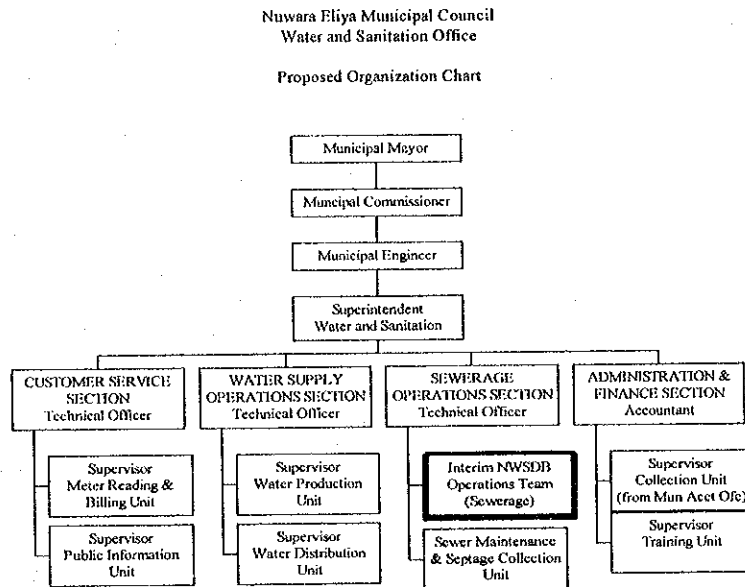


Figure 16.1 Proposed Organization for NEMC Water and Sanitation Office

16.2.2 Inter-Agency Agreements and Contracts

As independent bodies, the KMC, NWSDB and PS's/UC's will have to enter separately into legally binding contracts or agreements prior to project implementation. The negotiating parties may enter into alternative arrangement. It should, however, achieve the same objective and/or clearly define institutional responsibility. These agreements may have to be conditionally entered into immediately to secure external financing support. As required, approval from the Central Provincial Council should be sought. The provisions of the agreements should include the following suggested aspects.

- (1) **Proposed NEMC-NWSDB Agreement.** Because of constraints, it is not likely that the municipal administration will be able to immediately operate and maintain the new sewer new plant. Current problems related to water supply operations, particularly the non-revenue water and start-up of the newly rehabilitated facilities (ADB-funded) will use up available local manpower and other resources. The Consultants recommend that the NWSDB start-up, operate and maintain the STP and sewage pumping stations, on behalf of NEMC, and gradually turnover the responsibilities over a six to eight-year period. This should allow the NEMC to develop sufficient capacity to operate and maintain the new facilities. Costs for such operations will have to be negotiated and agreed upon by both parties. Some employees of NEMC would be detailed to the treatment plants for on-job training and actual operations.

Based on this concept, a contract or memorandum of agreement will have to be entered into between NEMC and NWSDB whereby, NWSDB will operate the water treatment and wastewater treatment plants, receive, treat and dispose of the effluents and sludge from the NEMC system in a sanitary manner. For this service, NEMC will pay a monthly service fee to the NWSDB. The service fee should be sufficient to cover all the associated operating costs of the NWSDB and cover any debt service obligations of the NWSDB for acquiring the facility. The fee may be re-negotiated periodically. It should also be stressed that this is intended to be an *interim* arrangement only. Ultimately, the facility will be turned over to the NEMC.

Only domestic wastewater is covered by the Agreement; industrial wastewater and storm water are not included.

The installation of sewer connections and maintenance, cleaning of sewer mains and collection of septage within the city will be done by NEMC. Only water treatment, wastewater treatment and disposal functions are temporarily transferred to the NWSDB. Billing and collection will continue to be done by NEMC.

- (2) **Contracting for other services.** The overall responsibility for septage collection is lodged with municipal councils. However, private sector involvement, through service contracts, for septage collection should be considered. Provisions should be made for regular cleaning of septic tanks in the service area every five year. The practice of contracting out sewer cleaning may also be introduced, as required. However, the municipal council should ensure proper pre-qualification of the capability of the contractors and rationalize the use of contractors versus the use of in-company services for cost effectiveness.

As the new facilities are brought on-line there will be increased demand for in-house plumbing services by homeowners. Increased water pressure may also cause leaks and wastage after the meter. It will therefore be useful for the NEMC to establish a plumber referral system.

16.2.3 Private Sector Participation as an Option

The Ministry of Housing and Urban Development requested the Study Team to look into institutional options involving the private sector. Private sector participation at the NWSDB, at this time, is limited to service contracting for specific activities. Current activities enlarging its role as the producer and “wholesale” provider of water could open up possibilities for the private sector coming in as the water distributors, instead of UC’s.

(1) *Options Assessed.*

Central to any discussion on private sector participation should be an understanding of the various options that the government and the private sector can enter into. The options generally vary in terms of ownership of the facilities, responsibility for capital investments and responsibility for operation and maintenance. Basic features of the various options assessed are briefly described below.

- 1) Under *concession* schemes, a private firm is awarded a long-term (possibly 25 years) contract during which it is mandated to provide a specified level of service to a well-defined area (the concession area). The concessionaire is given access to operate the existing assets of the water utility (ownership of the asset is retained by the government). To achieve the required level of service, the concessionaire may be required to provide additional investments that are usually turned over to the government at the conclusion of the concession contract. For the "privilege" of providing the service, the private firm pays the government an agreed upon concession fee. Concession bids are usually evaluated based on the initial tariff that the concessionaire proposes to charge. Performance monitoring of the concessionaire in delivering the mandated level of service is usually the critical element in concessions.
- 2) In *build-operate-transfer (BOT)* schemes, a private firm proposes to invest and operate a water system (or parts thereof) for a fixed period (usually 25 years) after which it transfers ownership of the facility to the government. For example, in a BOT for water source and treatment, the public water utility agrees to buy the water produced by the private sector BOT proponent at agreed rates with "take or pay" guarantees.
- 3) *Joint ventures* are another form of private sector participation when the public water utility and the private firm organizes a joint company which takes responsibility for operating the water and sewerage operation and investment. Each partner has a clear set of roles and responsibility. The private sector representative usually takes the lead management role.
- 4) Minor forms of private sector participation would include leasing, management contracts, etc. Under the *lease* arrangement, the private firm agrees to "rent" the existing facilities of the water utility, operate the facilities, bill and collect customers and pay a fixed "rental fee" to the water utility. In *management contracts* (or service contracts), the private company provides a specific service for which it is paid an agreed fee.

(2) *Assessment and Conclusions.*

- 1) In the context of this study, there are so many related sector policy issues on private sector participation that have to be addressed which are beyond the scope of this study. This makes an unequivocal recommendation for private sector involvement difficult. However, the institutional structures recommended in this study will make it possible for smooth transition should the PSP decision be taken in the future. Overall, options in the form of concessions or joint ventures can be workable and should be explored further. The NWSDB may be described, at this time, as interested.
- 2) To prepare a serious proposal for privatization, potential investors and operators spend huge amounts up-front to develop their strategies. A clear decision and timetable by the political leaders at the highest levels to privatize is needed to invite serious local and foreign companies. At the sector level, it would be useful for the following decisions and actions, among others, are established.
 - a. clear ground rules, timetables and procedures;
 - b. who are the contracting parties representing the owners of the assets;
 - c. the regulatory arrangements and tariff adjustment process;
 - d. policies to protect the tenure of employees; and
 - e. incentives and government guarantees, if any.
- 3) At the micro level,
 - a. Define the scope; get agreements in principle from the NEMC;
 - b. Prepare the standard technical description of the proposed area;
 - c. Prescribe the mode of privatization and the terms (a draft of the contract itself would be useful to merit serious discussions);
 - d. Establish the bidding procedures, evaluation criteria and award procedures.
- 4) For this project in Nuwara Eliya, the additional specific issues which need to be addressed include the following.
 - a. No doubt, Colombo will be a more attractive alternative because of its size and potential. However, the attractiveness of Nuwara Eliya as a PSP project potential can be enhanced with proper incentives and a clear and transparent process.
 - b. A corollary issue is the “fairness” of opening up the Nuwara Eliya area for privatization ahead of Colombo. The capital city has been the major recipient in the past of cheaper, government-subsidized financing for capital investment. The issue raised is why Colombo should continue to receive cheaper financing while the lesser cities would have to make do with private financing which is generally perceived as more expensive.

- 5) Policy advice regarding private sector participation:
 - a. Establish clear objectives for selecting the private sector approach and a clear strategy and timetable.
 - b. Get the basic ground rules and incentives officially approved at the highest levels. Preparing a proposal is an expensive undertaking for potential investors for which the opportunity must be clear. PSP is as much a private sector decision, as it is a Government decision. Government can only open up to the PSP approach and put in incentives. In the end, it is the private sector that decides whether it will take the business risk.
 - c. Whatever option is selected, it is important for operational efficiency that both water supply and sewerage service provision should be included;
 - d. Ensure there are ample provisions and consultations to address staff employment security issues;
 - e. It would be useful to have a private sector participation advisor to help guide the process. Most proponents have wide experience in negotiating and structuring these water and sewerage privatization contracts.
- 6) There is a need for wider understanding of the concepts and options among consumers and most specially the staff who will be affected. However, in the final analysis, it will be the trust and confidence of the potential private sector investors that the privatization process is fair and transparent will be the key factor which will determine the success of the transition process.

16.3 Organizing for Project Implementation and Management

- (1) A *Project Management Office (PMO) for Phase 1*, headed by a full-time Project Director (PD), will be organized to coordinate all the activities related to this Project. The PD will report to the Deputy General Manager – RSC/C directly on matters related to the Project. To guide the implementation of this Master Plan, ensure proper external coordination, continuity and consistency with current policies, the National Steering Committee (NSC) and Provincial Coordination Committee (PCC), established during this study stage, will be continued with the same composition. The NSC is presided over by the Secretary, Ministry of Housing and Urban Development; while the Chief Secretary shall preside over the Provincial Coordination Committee. The appointment of the PD shall be made by the NWSDB and confirmed by the NSC. The PD shall coordinate with the DGM for Special Projects (and the AGM for Japanese Projects Unit, in particular) who oversees foreign assistance. He is expected to co-ordinate closely with the concerned Chief Engineers within the RSC/C and officials of the municipal councils, PS's and UC's.

(2) **Terms of Reference.** The PMO shall bear planning and design, construction management, capacity building and social marketing responsibilities for this Project. Specifically, the PMO should:

- 1) Supervise the detailed *design and construction* activities of the new facilities; Prepare the tender documents and guide the selection of contractors;
- 2) Supervise the planning and implementation of *training programs* planned under this project;
- 3) Supervise the implementation of the *NRW reduction program* to be implemented under this project;
- 4) Promote, advocate and monitor the adoption of needed *policy reforms* raised in this Master Plan, including the needed *inter-agency agreements* for O&M and the *bulk supply arrangements* with PS/UC affected by this project.
- 5) Plan and coordinate a large-scale *social marketing and public information program* in coordination with the respective municipal councils;
- 6) Monitor compliance of the contractor with the *environmental mitigation plan*;
- 7) Act as the Secretariat of the National Steering Committee (NSC) and Provincial Coordination Committee (PCC).

Project management consultants will assist the PMO in the above functions and transfer technology on project management and construction inspection skills.

(3) **Staffing.** The PMO will be located within the premises of the RSC/C and staffed by full-time consultants and counterparts. In addition, the MC will make a field sub-office available in Nuwara Eliya. Staff from the RSC/C Planning and Design Office and the Construction Office will be the counterpart for facilities design and construction. Staff from the NEMC will also be needed particularly to monitor construction progress, to implement social marketing activities and to organize training activities. Administrative services and office support facilities (vehicles, drafting, communications, etc) will be provided by the RSC/C. During Phase 1, it is envisaged that the PMO will consist of the following staff.

Table 16.3 Staffing of the Project Management Office

Post	Contributing Office
Project Director	NWSDB
Water Supply Engineers (P&D)	RSC/C
Sewerage Engineers (P&D)	RSC/C
Utility Management Specialists (2)	NWSDB
Construction Inspectors	RSC/C, NEMC
NRW Engineers & Technicians	RSC/C, NEMC
Technical Training Specialists (3)	RSC/C, NEMC
Social Marketing Specialists (2)	NEMC

Modified Organization Chart of NWSDB (Partial)
(showing only project-related elements)

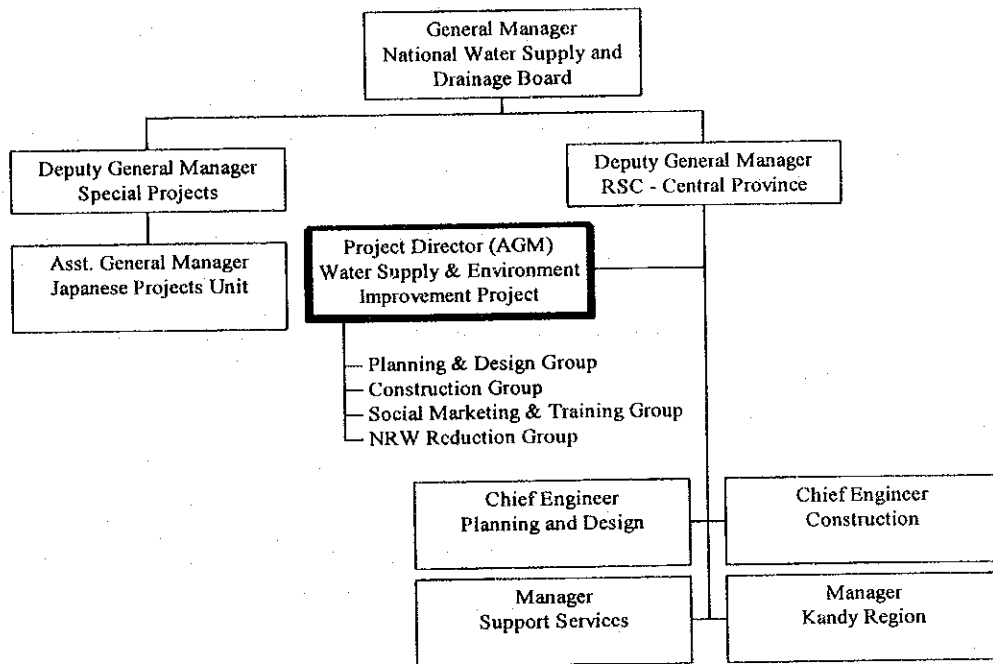


Figure 16.2 Proposed Location of the PMO

After the completion of Phase 1 of project implementation, the staff of the PMO will be retained intact to form the core of a new Institutional Development Services Office (IDSO) to be created under the DGM of RSC/C. The capacity developed at the PMO during Phase 1 should not be dissipated. The proposed regular line function of the new IDSO is discussed in detail in Section 16.8.

16.4 Specific Policy Recommendations for NWSDB – Kandy Region

The Study has also taken into consideration current initiatives within the NWSDB to restructure and upgrade its overall operations. It is not the intention of this Study to conduct still

another institutional study. The institutional problems of the NWSDB are complex and have to be addressed in a unified manner starting with the policy issues highlighted in earlier chapters and proceeding to examine internal institutional performance issues and future opportunities.

In the long term, NWSDB should consider strengthening its capacity to deliver wastewater technical assistance to other major cities. This would be best lodged at the Planning and Design Department of the RSC/C, in close coordination with the head office.

There are two (2) major organization structure adjustment proposed:

- (1) Establish an *Institutional Development Services Office (IDSO)* under the Deputy General Manager of RSC/C. The principal responsibility and function of IDSO is to promote bulk dealerships; conduct capacity audits of potential bulk distributors; training and development; technical assistance and advise to PS's/UC's and social marketing program implementation. The core staff of the PMO during Phase 1 will constitute this new office. *It is intended as a means of retaining and enhancing institutional capacity developed during the first phase.* This office may also manage subsequent phases of this project.

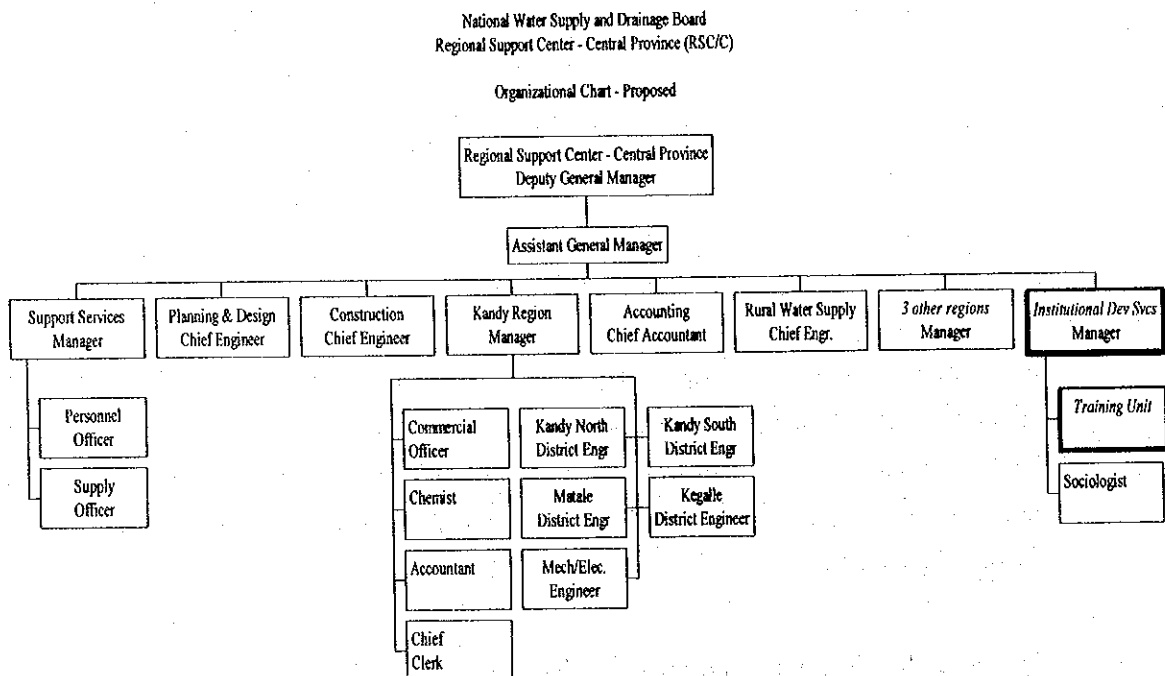


Figure 16.3 Proposed Changes in the NWSDB-RSC/C Organization

- (2) Of immediate concern to this Project is the need to establish **NWSDB Interim Operations Teams** (for either water treatment or sewerage treatment plants) to bear the main responsibility for ensuring that the new facilities are properly operated and maintained. Training of NEMC staff will also be a prime function of this Team. It will be *interim* since these functions will ultimately be turned over to the NEMC. Since many of the O&M problems can be traced to design and construction decisions, the involvement of the Operations Team, even during the initial stages, will be critical.

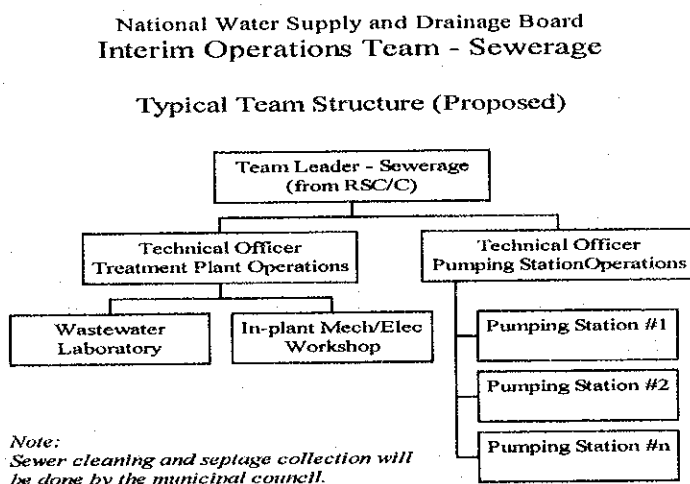


Figure 16.4 Proposed Typical Structure of the NWSDB Interim Operations Team

The Teams will be organized and appointed by the Kandy Regional Manager at the recommendation of the PMO Project Director. The Team Leader will be administratively under the Regional Manager; but will work in close coordination and guidance of the local NEMC officials.

16.5 Capacity Building Strategy Guidelines

In this section, strategic guidelines, principally consisting of *human resources development* and *introduction of management systems*, are described.

16.5.1 Human Resources Development

Staffing. The current staffing level stands at 13.55 staff per 1,000 connections. This will have to be reduced to about 7. Based on the projected increase in service connections, this implies that the present level of 54 staff will have to be maintained through 2015. More significantly, it also implies that training and re-training of present staff will be critical. Staff should have

multiple skills and be sufficiently flexible to perform well in different functions easily. The training effort should help to create “generalists”, not “specialists”. The ideal staff profile required would consist of the following:

Management/Supervisory	4
Professional	4
Technician-Operators	39
<u>Office Support</u>	<u>7</u>
Total	54

Training. For Nuwara Eliya, the training should focus on improving the capacity of the WSO to address the new responsibilities. The NEMC-WSO training should focus more on: Operation and Maintenance of Production Wells, including Chlorination; Reduction of Non-Revenue Water; Financial Planning and Control; and Customer Relations.

Based on the assessments, the emerging HRD strategy for this Project will focus on three (3) main elements.

(1) *Direct Provision of Training* on Project Management & Construction, on Water Supply O&M (including *Reduction of Non-Revenue Water*), on Sewerage Facilities O&M and on Improved Financial Management Control Systems

- 1) The **objective** of this component strategy is to ensure that there will be adequately skilled staff to supervise the planning and construction activities of the Project and to operate, maintain and manage the new water production, treatment and distribution and the wastewater collection, treatment and disposal facilities. The primary target of the training will be staff and officers directly involved in project implementation and field staff performing daily operation and maintenance activities. To the extent possible, access to NWSDB training resources should also be extended to the private sector.
- 2) The courses outlined in Table 16.4 are modular and participants are expected to complete all the individual subject areas listed in the series. Each module is envisaged to be a five-day course. Detailed training designs will be prepared and reviewed prior to implementation. Further coordination with the ongoing O&M Improvement Program (ADB-assisted) should be undertaken to ensure consistency with current policies and guidelines. It is envisaged that the basic training materials to be used will consist of

the O&M Guidelines and manuals. Overseas training also may be organized as described the program on Table 16.4.

- 3) Implementation Responsibility and Monitoring. The PMO will collaborate with the Engineer Training Unit of RSC/C and the MPTD in organizing and implementing project-related staff training. It is envisaged that the training programs will be held in both Kandy and Nuwara Eliya.
- 4) Guidelines will be formulated as part of the capacity building to monitor the following:
 - *impact of training interventions*, based on key performance parameters;
 - *the effectiveness of training designs and methods* through a year-round assessment of training methods and techniques; and
 - *Individual progress* in acquiring new skills and knowledge through tests and exercises to be conducted during the training programs.
- 5) Resource requirements for Phase 1
 - *Direct Costs for Phase 1*. There will be an estimated 226 trainees required to undergo various programs listed in Table 16.4. Assuming an average of five days per course, budget estimates for direct training are as shown in Table 16.5.

Table 16.5 Budget Estimates for Direct Training (in Rs.)

Series	KMC	NEMC	NWSDB	Total
<i>Project Mgmt & Construction Series</i>	37,000	37,000	39,000	113,000
<i>Water Supply Facilities O&M Series</i>	32,000	32,000	57,000	121,000
<i>Sewerage Facilities O&M Series</i>	94,500	94,500	109,500	298,500
<i>Financial Mgmt & Control Series</i>	44,500	44,500	82,000	171,000
Total	208,000	208,000	287,500	703,500
<i>Less: Local Counterpart</i>				56,500
Required Budget for Workshops				647,000
Say				650,000

Table 16.4 Recommended Training Programs (Phase 1) and Estimated Number of Trainees

Series	Modules	Recommended Training Coverage	KMC	NEMC	NWSDB	Total
<i>Project Management and Construction Series</i>	Procurement of Goods and Services	Legal documentation & requirements (local and international). Preparation of technical specifications. Bidding & tendering documents. Bid evaluation & award criteria and procedures. Procurement principles & guidelines. Materials testing and acceptance.	3	3	3	9
	Construction Management, Inspection, Supervision and Monitoring	Role of construction inspectors and working relationships. Construction standards, inspection and testing procedures for pipe laying, soil compaction and surface restoration, reinforced concrete, equipment installation and general civil works. Street closures; public safety; worker safety. Logbooks and progress reports. Construction Planning. Progress payment procedures. Project completion and start-up planning.	8	8	10	26
<i>Water Supply Facilities Operation & Maintenance Series</i>	Reduction of Non-Revenue Water	Production metering, Reservoir leakage and overflow. Transmission mains losses. Distribution system leakage. Service connection meters. Illegal service connections. Unbilled legal connections.	5	5	10, with PS & UC staff	20
	Sewer Cleaning, Rehabilitation and Maintenance	Sewer connections. Sewer cleaning. Sewer rehabilitation. Work safety and emergency procedures. Operations reporting system; Cost efficiency; Testing procedures; Equipment and tools maintenance.	10	10	5	25
<i>Sewerage Facilities Operation & Maintenance Series</i>	O&M of Sewerage Pumping Stations	Routine maintenance (daily); Periodic maintenance; Work safety and emergency procedures; Operations reporting system; Cost efficiency; Equipment and tools maintenance.	5	5	10	20
	O&M of Sewerage Treatment Plants	Oxidation ditch. Aerated lagoon. Grit chambers. Sedimentation tanks. Disinfection. Sludge thickening & drying. Work safety & emergency procedures. Operations reports. Cost efficiency. Equipment & tools maintenance.	5	5	10	20
	Septage Collection, Treatment & Disposal	Septic tank cleaning procedures. Operation and maintenance of vacuum trucks.	12	12	6	30
	Engineering & Management of Sewerage Systems	Treatment efficiency. Sludge management. Wastewater effluent standards. Laboratory methods. Operations planning and cost control systems.	3	3	10	16
	Commercial Practices Systems	Marketing and customer service. Billing and collection. Consumption analysis. Tariff setting.	5	5	10, with PS & UC staff	20
<i>Financial Management and Control Series</i>	Analysis of Financial Statements	Financial performance indicators. Income statements. Balance sheets. Sources and application of funds. Auditing.	5	5	10, with PS & UC staff	20
	Financial Planning, Budgeting and Controls	Preparing annual budgets. Cost accounting and cost controls. Inventory controls. Long term and short term planning.	5	5	10, with PS & UC staff	20

The unit cost for the above budget is Rs. 518 per trainee per day. There is a stronger bias towards sewerage training (compared to water supply training). The budget includes the following provisions:

- Resource person honoraria @ Rs. 250/hour;
- Training materials @ Rs. 500 per day
- Meals and lodging @ Rs. 1,000 per day

Cost sharing arrangements for training expenses. The nominating agency is expected to provide for the daily allowance, travel to and from the training site as well as the salary of the staff during the training. In addition, a minimal contribution (or "fee") towards the direct costs equivalent to Rs. 50 per training day will be shouldered by the nominating agency. This reduces the budget requirement by Rs. 56,500.

- *Local Workshops.* In addition, an annual provision of Rs. 50,000 is made for participation of staff in other in-country training programs on subjects related to the training plan. Total four-year allocation: Rs. 200,000.
- *Overseas Program.* The Project budget will include provision for overseas training for six (6) staff directly involved in operation and maintenance of the system. Those who will undergo overseas training are expected to act as trainers for the local training programs. Provisions will be made for 30-day observation visits and training, estimated as follows:

Airfares: 6 persons @ US\$ 1200	7,200
Per Diems: 6 persons @ US\$ 120/day for 30 days	21,600
Training Costs: 6 persons @ US\$ 2,000	12,000
Miscellaneous: 10% of above estimates	<u>4,000</u>
Total	44,800
@ Rs. 65 / US\$	Rs. 2,912,000
Say	<u>Rs. 3,000,000</u>

(2) *Strengthening Capacity of the Manpower Training Division of NWSDB and the RSC/C Training Unit for Sewerage Facilities O&M Training*

The NWSDB Manpower and Training Division (MPTD) and the Engineer Training Unit at RSC/C will be strengthened to deliver more effective training services, particularly for sewerage operation, maintenance and management. Training services for septage management and sewer maintenance will also be opened to the PS's/UC's and private sector contractors. Steps towards organizing, training and professionalizing private contractors who provide water- and wastewater-related services should be promoted by NWSDB.

- 1) The **objective** of this component is to equip the MPTD and the RSC/C Training Unit to provide training services to the concerned agencies for more effective water supply and sewerage O&M training programs. Specifically, the following strategy is envisaged:
 - *Developing the RSC/C as a specialized training resource with a focus on sewerage and wastewater facilities operation, maintenance and management.*
 - *Improving trainer skills.* Trainers and “coaches” should develop expertise in adult learning principles and approaches and use of participatory methods.
 - *Developing strong training designs and improving training methods and techniques.* Training designs, not just a list of topics with a time schedule, are needed. These training designs would clearly describe learning objectives, the relevance to corporate objectives and the process to be used in gaining the competency.
 - *Use of new facilities as field-training sites* should help make the training activities practical and “hands-on”.
 - *Identifying and developing appropriate training materials.* For operator-level, the need for locally produced materials is indispensable. A library of reference materials, including training materials, should be further developed. Where appropriate, existing and new O&M Guidelines will be adapted and used as the basic training materials.
 - *Cooperation with CMC and other possible training-support systems.* Cooperation with universities and colleges, vocational training institutes, and continuing education programs of professional organizations will help bolster the available resources. The CMC has developed various sewer maintenance training materials; permission to review, adapt and use these materials should be sought.

- 2) **Intensive technical assistance** will be needed to improve institutional capacity to operate and maintain the new water and sewerage facilities, particularly the sewer network, pumping stations and treatment plants. The PMO should try to arrange for the posting of a “*system start-up and training adviser*”, either local or expatriate, who will oversee the developing of local training capacity and at the same time bear responsibility for starting up the system and bring it to designed capacities. Other subject-expert expatriates would be brought in, as needed.

- 3) **Resource requirements.**
 - **Training equipment.** Various audio-visual equipment, including a van, will be procured for the conduct of the training programs (and the social marketing and

public information program). Estimated cost: Rs. 2.0 M.

- Library support. Various training and information materials, documents and reference materials will be procured which will build up the reference library of the Training Unit. Estimated cost: 200,000.

Provisions for the posting of a system start-up and training adviser will be included in the engineering consulting services budget.

- (3) *Organizing formal and on-job training on treatment plant and pumping stations operations (both water and wastewater) for operators from the NEMC.*

The Terms of Reference for the NWSDB Operations Team includes a clear plan for training of the staff detailed by the NEMC. Training will be done through a planned series of formal classroom and on-job training. Skill tests should be conducted to ascertain the acquisition of new skills and knowledge. The PMO will be responsible for ensuring that this skill transfer to NEMC staff takes place.

16.5.2 Improving Financial Management and Control Systems

- (1) NWSDB. There are several initiatives underway to improve internal planning and control systems within the NWSDB. A computerized Central Data Management system is currently being installed which will, among others, improve monitoring of budgets and expenditures at the regional and central level. Within the limited scope of this Study, it will not be practical to consider a broad range of management systems that need to be improved or developed. The PMO will however have to keep track of the progress of and contribute to the development of the institutional and management systems development programs and to ensure that the concerns, particularly for wastewater operations, are adequately addressed.
- (2) At the NEMC, the current initiatives to set up a customer database which will interface with a computerized billing and collection system. The implementation of this database will greatly help in analyzing consumption patterns, monitoring and making customer service decisions.
- (3) The financial management and control systems of the NEMC as they relate to the water (and wastewater) operations will be further reviewed. Substantial improvements can be achieved by installing Commercial Practices Standards for the utility operations. The CPS would include a comprehensive system for billing collection, customer service,

inventory control, cost accounting and financial reporting (balance sheets, income statements and sources and uses of funds). The computerization of customer accounts should be accelerated so that consumption analysis can be done. Overall, these improvements should contribute to a higher level of financial decision-making based on commercial principles. The key challenge would be in designing the system to be as compatible as possible with the current municipal system.

- (4) Clearly, the introduction of wastewater management functions will additionally require an expansion of existing planning and monitoring systems that the NEMC should prepare for. These would include:
 - Establishing the service and performance standards, including unit operation costs, and clear performance accountabilities;
 - Operation and maintenance guidelines and standards
 - Performance monitoring and auditing systems
 - Cost accounting procedures and controls will be needed to differentiate water supply from sewerage expenses, and also from septage collection and treatment costs and revenues.
- (5) Costs for this management systems improvement will basically be included in the consulting services budget.

16.6 Strategic Guidelines for Social Marketing and Public Information

In this section, guidelines are proposed for launching a social marketing and public information program. A thorough understanding of the benefits and costs by the residents and community leaders is important to ensure the sustainability of the service. The social marketing and public information program is envisaged to increase demand for improved water supply, sanitation and wastewater management services. Two approaches are recommended.

(1) *Social Marketing Approach.*

The important point is that the authorities should engage the consumers in continuing dialogue, consultation and feedback to gain their confidence that their concerns are being addressed. There are several community-based organizations and non-government organization which are active within the study area. These organizations have a creditable track record and enjoy the general trust and confidence of the residents. The support and involvement of these groups is crucial in this social marketing program. It is envisaged that,

through existing communication, consultation and decision-making structures and processes, a plan to enable communities to make informed decisions about their communal environmental problems will be supported through this project.

(2) *Public Information Approach.*

- 1) *Audiences and Messages.* Different audiences have different information needs; and some dissemination methods are more effective than others depending on the audience one is trying to reach. It is therefore useful to first identify who the various audiences are, define their information needs and draw up a strategy to address these needs. Based on the assessments and the initial household survey, there are several key messages targeting specific audiences which have to be addressed.

Table 16.6 Suggested Messages to be Disseminated

Sample Messages	Target Audience					
	Domestic (Income level)			Business		Gov't
	High	Middle	Low	Major	Minor	
Uncollected wastewater is a serious health risk.	.	.	.			
Lakes and rivers are polluted due to uncontrolled wastewater.
Shallow tube well supplies can be polluted by wastewater.	.	.	.			
Household benefits of improved sanitation and sewerage.
Options for on-site disposal.		
Industrial wastewater is not acceptable in a domestic sewerage system.				.	.	.
Septic tanks have to be cleaned regularly to be effective.	
New sewer connection policies, including revolving fund.	
How to apply for sewer connection.	
How and where to pay for service.	
How and where to report problems and complaints.	
Annual financial and operating highlights of the utility.

The direct benefits of the availability of sewerage to consumers will be improved household health and hygiene, general convenience, removal of stagnant wastewater from canals and low-laying areas and improved business prospects. For landowners, the land values should also rise with the availability of good water and wastewater collection facilities.

For Nuwara Eliya, it is particularly important to stress that, unlike in the past, the new well sources require pumping, thus, higher costs. There is a serious deterioration of existing water resources as indicated by the annual shortages during the dry months and a point has been reached where tapping of the “more expensive” sources is necessary to assure consistent service during the dry months.

- 2) **Media and Methods.** There are various ways of disseminating the information with varying degrees of appropriateness and impact.

Table 16.7 Various media to be used for public information

Dissemination Media	Target Audience					
	Domestic (income level)			Business		Gov't
	High	Middle	Low	Major	Minor	
Radio and Television	•	•		•	•	•
Newspapers	•	•		•	•	•
Handbills and Fliers		•	•			
Public Meetings		•	•			
Posters & Billboards	•	•	•	•	•	
Consumer Newsletters	•	•				
School System Activities	•	•	•			
Sponsored Facilities Tours		•	•			
Special Events	•	•	•	•	•	•

- (3) **Internal staff awareness program.** The NWSDB and the NEMC should not underestimate the importance of an internal staff awareness program, particularly for field workers who are in direct contact daily with customers. All staff should be able to effectively respond to questions and represent the best interests of the company.
- (4) **Civic and business organizations.** In the Nuwara Eliya area, business and other special interest groups, such as the Rotary Club of Nuwara Eliya, Lions Club, Jaycees Club of Nuwara Eliya, Nuwara Eliya Tourist Service Association (NETSA) and the NE Business Association, can play a key role in enhancing the sustainability of the project. There should be other organizations, including schools and religious organizations, not included in the list above which should be tapped.
- (5) **Responsibility.** A Social Marketing and Public Information Program will be formulated even prior to the start of the project and made reviewed annually. Inasmuch as there is no current unit in the RSC/C responsible for social marketing and public information, it is envisaged that the PMO will coordinate closely with the public information offices in the NEMC. The

NEMC seem to be better organized to launch this strategy; however, some capacity strengthening will also be needed.

- (6) *Budgets.* Generally, the implementation of this Program is a continuing normal business operating expense borne by the local agencies. A limited budget can be set aside for the preparation of materials, including in-depth community based research on effective communication approaches, preferably through NGO's who have gained the respect and confidence of the communities. Estimated cost: Rs. 250,000.

16.7 Budget Requirements

The institutional package to support Phase 1 of this project is summarized in the following table. Costs for local and expatriate capacity building consultants and advisers will be included in the engineering services budget component.

Table 16.8 Summary of Institutional Development Budget (Phase 1)

Activities	Water Supply Component	Sewerage Component	Total Budget Rs.
Implementation of Training Programs	250,000	400,000	60,000
Overseas Training Program	1,000,000	2,000,000	3,000,000
Other Training Program	100,000	100,000	200,000
Acquisition of Audio-Visual and other Training Equipment	1,000,000	1,000,000	2,000,000
Build-up of Library	100,000	100,000	200,000
Social Marketing and Public Information Program		250,000	250,000
<i>Total</i>	<i>2,450,000</i>	<i>3,850,000</i>	<i>Rs. 6,300,000</i> <i>US\$ 96,920</i>

CHAPTER 17

FINANCIAL ANALYSIS

CHAPTER 17 FINANCIAL ANALYSIS

17.1 Introduction

This Chapter considers the financial aspects of the projects in Nuwara Eliya. In this study, two projects are dealt with; water supply and sewerage; each project has two portions (M/P and F/S).

Though the study area is exactly same as the Municipality of Nuwara Eliya, a hypothetical business entity that is made up from only new investment was assumed for each analysis. The construction will be conducted by the NWSDB and the Nuwara Eliya Municipality who will operate and maintain the system. But as the analysis is done on the "hypothetical entity", the analysis excludes internal transactions and uses the forecast averaged retail price of the NWSDB.

As for the sewerage service, the Government will supply a 100 percent of capital investment in the form of subsidy, and also the monthly service charge is currently free in the existing Colombo sewerage service. In order to make the sewerage operation viable after construction, it was assumed that at least the direct operational and maintenance cost would be recovered by a monthly fee from customers (both from domestic and non-domestic users).

In addition to the monthly fee income, another financing scheme should also be considered, because without the actual sewerage facility, the local residents should shoulder a portion of the financial costs of the sewerage service.

A large portion of local residents seem to have almost little or no ability to pay the monthly sewerage charge requirement, but their income level will eventually be improved by the economic development of the country. Therefore, one percent annual tariff increase in real terms was assumed.

Due to the very low level of willingness to pay and the existence of a substantial portion of low income level residents, it was assumed that it will take time for this level of domestic tariff to be accepted and for a high collection rate to be realized. This is why a low level of starting charge has been adopted.

As shown in the results of financial analysis, if a 100 percent subsidy of the Government is secured, moderate introductory level is applicable. But in many cases, a 100 percent subsidy does not actually mean 100 percent. Some portion has to be financed by the local side (local government, local residents and/or third category groups).

Therefore Case 2, in which local residents will finance 10 percent of the capital investment, was also examined. Other types of local financing will also have to be considered.

17.2 Financial Condition of the whole NWSDB

The Study considers the areas of Greater Kandy and Nuwara Eliya the subject of this volume Nuwara Eliya (with the other volume dealing with Greater Kandy). But as the scale of the fund requirement presented in the Master Plan for both projects is very large it is necessary to first study not only the financial issues covering the Study Area but also the whole financial situation and the financial capability of the NWSDB to challenge this Master Plan.

The capital investment by the NWSDB, which is currently being examining at their head quarters, is Rs. 86 billion from 1999 to 2010. The Master Plan has a substantial share of this comprehensive plan. The conventional scheme to finance the NWSDB's new capital investment is 50 percent grant and 50 percent loan with the condition of ten-percent interest, 24 years for repayment and two years grace period in the case of urban water supply projects. The definition of "urban" is a population of over 6,000 and this condition is applicable to both Greater Kandy and Nuwara Eliya. For the case of rural projects, 50 percent of the grant portion will increase to 85 percent while the loan portion decreases to 15 percent.

The loan condition on foreign funds varies case by case. But the borrower from foreign financing agencies is the Ministry of Treasury. Regardless of the financing conditions between the foreign agency and the Ministry, the Ministry gives loan to NWSDB under the above stated condition.

The Balance Sheet and the Income Statement of the NWSDB for the year of 1996 and 1995 are shown from on Tables A17.1.1 through A17.1.4 of Appendix 17.1. In addition, eight years of financial trend are shown on Tables A17.1.5 through A17.1.6 of Appendix 17.1. These tables should not be considered as simple copies from the corresponding annual reports. For financial statements the format is very critical. The consultants reclassified the tables of the original annual reports using a clearer format.

The owners' equity portion of the Balance Sheet has been expanded through repeated grants from the Government and foreign donors. In addition to the owners' equity, the long-term liabilities, especially from foreign financing agencies, amount to a substantial figure.

When we compare the income statement for the year of 1996 with the one for 1995, the year of 1996 was a "bad year" due to a delay in the tariff increase. But several informal figures on the financial result for the year 1997, including the net profit have shown improvement. Therefore 1996 can be considered an exceptional year and the income statement for 1995 shows a more typical revenue and expense structure of recent NWSDB operations.

As the water supply business requires huge fixed assets, the ROA (return on total assets) is very low. But for the income before depreciation and interest (EBDI), in 1995 the NWSDB secured 38.5 percent and net income in 1995 was 9.6 percent respectively. On the trend of the last eight years, net income has concentrated in range from seven to eight percent. We can conclude that the cost of water production and distribution has been controlled, at least with respect to direct and indirect operations cost.

The largest problem in the financial structure is the debt service. The debt service coverage ratio, which is (the profit before interest and depreciation (EBID)) / (debt service), has to be watched very carefully and continuously. As the turnover of assets is very low in the water supply business and revenue on total assets is also very low, the large-scale capital investment financed through borrowing will deteriorate the financial structure of the NWSDB very easily. Fortunately, the debt service ratio for 1995 was more than 200 percent. The debt service ratio has to be controlled to lie between 120 to 150 percent from now on.

The figure of 120 to 150 percent means that the remaining net income after payment of debt service is only 20 to 50 percent. This shows how fragile the financial structure of water supply business is. Continuous efforts to keep direct operating cost down and to realize an effective tariff rate to cover costs required.

The establishment of a sound and effective accounting system is a must for the NWSDB to be a financially independent and stable organization. Among the three fundamental financial statements, the most fundamental is the balance sheet and income statement. That is, to understand accrual based accounting is a fundamental requirement for financial soundness of the NWSDB.

Although, the NWSDB prepares both the balance sheet and the income statement annually, cash basis accounting seems to have deep roots in every aspect of the NWSDB. This is a common phenomenon in public organizations that are controlled and supported financially by Governments everywhere around the world.

In order to see the long-term effect of large-scale capital investment on the financial structure, it is necessary to see a pro forma income statement and balance sheet. However, the pro forma statement, except for the cash requirement and the cash inflow, cannot be prepared with the available data and information. The information on depreciation and debt service in the long run is not sufficiently disclosed.

In general, the financial statements of the NWSDB are not easy to understand. The NWSDB must try to observe international accounting standards and express financial results more clearly like ordinary private firms. Not the net figure, but gross figures have to be disclosed in the areas of revenue, depreciation and debt management, etc.

17.3 Financial Projection of the Whole NWSDB

The financial projection until 2002 that has recently prepared by the NWSDB also concentrates on cash requirement analysis and cash inflow analysis. Therefore, the study team employed the same approach and extended the projection period from 2002 to 2015, the period the Master Plan is to cover. (See Tables A17.1.7 through A17.1.8 of Appendix 17.1)

For the long-term estimation of expenditure, similar assumptions used in recent NWSDB's projection were also used. Some of the crucial assumptions made by the NWSDB are: NRW 35 percent, inflation rate 10 percent (1998-1999) and 8 percent (2000 – 2002), average domestic demand 25 m³ at 2002 respectively. The trend will continue until 2015 in general, but due to uncertainty in the financial world, it was assumed that the current 10 percent level of inflation would continue. All input costs are assumed to increase in proportional to general inflation rate. The NWSDB has to maintain operational costs within the projected level and to increase revenue by pursuing various opportunities.

As for tariff increases, the NWSDB's forecast assumes less than the forecast inflation rate. We have suggested an increase in tariffs in order to perform the NWSDB's mission without weakening its financial basis. We have therefore made up a revenue projection (see Table

A17.1.8 of Appendix 17.1) which corresponds to one percent annual average tariff increase in real terms.

However, if the Sri Lanka economy grows at a moderate pace most of the tariff increase will be absorbed by the economic growth. With higher tariffs also comes the increased possibility of new projects being initiated due to an increase in retained income, which at present is negative.

Regarding debt service, the available data from the NWSDB covers only the period from 1997 to 2002. Based on projected actual numbers, the debt service schedule until 2000 is provided (see Table A17.1.9 of Appendix 17.1). We believe that the provided projection until 2002 is the most feasible estimate and also the upper limit within which the financial structure of NWSDB can be well controlled. Using this philosophy the projection has been extended until 2015, being the most feasible upper limit of annual debt service burden as shown in Table A17.1.9 of Appendix 17.1

In Table 17.1, the data the debt service is shown. We have added the former JICA study team estimates that were produced during study of the Kalu Ganga Project as an additional reference. If the debt service is controlled within this level and other things go along with our estimates, the cumulative deficit that now amounts to almost annual volume of sales of water will disappeared by the year of 2006.

It is a critical requirement for the NWSDB to keep expenditure within the mid-ninety percent level of revenue in order to be a financially healthy organization. But the compatibility of the Master Plan with the above debt service limit is a completely different issue but we have to seek the feasible way of financing the Master Plan.

Table 17.1 shows that the allowances for additional new projects with respect to debt service are severely limited, especially during the early stage of the study period. But as our study revealed, the inception of new projects is necessary in order to satisfy future service demand. The NWSDB is trying to develop a new business plan targeting the year of 2010 (twelve years from now). In the new plan, PSP (private sector participation) will be a major breakthrough in solving the issue between fund requirement and debt service limitation.

Private sector participation (PSP) will occupy 27 percent of new capital investment as presented in Table 17.2. If this 27 percent is applied to the total scale of capital investment (Rs.

86 billion, until 2010), the investment from the private sector will be Rs. 23.3 billion until 2010.

The feasibility of our Master Plan must be fortified by the incorporation of an appropriate PSP scheme within the project development. While the NWSDB has a firm orientation toward PSP as the future direction, the actual strategy of how to invite the private sector is still very vague. Whether the projects developed in this Master Plan are suitable for PSP is not as yet clear.

In general, private capital requires cost recovery, profitability and the minimizing the risk associated strongly far from the Governmental point of view. Therefore, the conventional capital portion of Governmental grant and loan also has to be utilized in the form of supporting and inviting PSP. Current 50:50 percent financing structure might be rearranged in actual project picture.

The water supply project in Nuwara Eliya may be a candidate for a BOT scheme. Sewerage projects are usually very difficult to get PSP in project such as BOT. One of the improvements reported by PSP is the collection of monthly fees, of which both the KMC and NEMC accumulate substantial arrears.

Table 17.1

NWSDB Debt Service Projection (1000 Rs.)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
1. Financial Projection (from 1997 to 2002 by NWSDB and from 2003 to 2010 by JICA Study Team) (A)															
Interest	528,000	496,667	469,167	545,833	657,500	739,167	790,614	845,641	904,498	967,452	1,034,788	1,106,810	1,183,845	1,266,241	11,536,222
Loan Repayment	130,000	130,000	160,000	197,000	276,000	276,000	320,850	372,988	433,599	504,059	585,969	681,190	791,883	920,565	5,780,104
Total	658,000	626,667	629,167	742,833	933,500	1,015,167	1,111,464	1,218,629	1,338,098	1,471,511	1,620,757	1,787,999	1,975,728	2,186,806	17,316,326
2. Debt Outstanding & Repayment Schedule (by NWSDB)															
Interest	436,728	588,756	580,612	562,526											
Loan Repayment	87,872	67,872	150,715	150,716											
Total	524,600	656,628	731,327	713,242											
Loan Balance	4,974,175														
3. Foreign Loan Commitment before Kalu Ganga Project (previous JICA Study Report in 1994) (B)															
Interest	516,122	561,592	560,877	544,001	525,211	497,684	470,457	442,631	415,104	387,578	360,051	332,525	304,998	277,472	6,196,303
Loan Repayment	71,157	133,633	156,065	187,969	260,770	260,770	260,770	260,770	260,770	260,770	260,770	260,770	260,770	260,770	3,156,524
Total	587,279	695,225	716,942	731,970	785,981	758,454	731,227	703,401	675,874	648,348	620,821	593,295	565,768	538,242	9,352,827
4. Difference (A-B)															
Cumulative	70,721	-68,558	-87,775	10,863	147,519	256,713	380,237	515,228	662,224	823,163	999,936	1,194,704	1,409,960	1,648,564	7,963,499
	70,721	2,163	-85,612	-74,749	72,770	329,483	709,720	1,224,948	1,887,172	2,710,335	3,710,271	4,904,975	6,314,935	7,963,499	

Table 17.2

Diversification of Financial Source for Future Capital Investment until 2010

	M Rs.	
1. The First Source		
GOSL/Donor Institution	60,000	70%
Generated Fund (500 MRs. Per year)	15,000	17%
Cost Recovery (40,000 Rs. Per Connection)	6,000	7%
Local Authority (15 %)	2,000	2%
Total	3,000	3%
	86,000	100%
2. The Second Source		
GOSL Donor		25%
PSP (Private Sector Participation)		37%
NWSDB		27%
Total		11%
		100%

17.4 Major Assumption of Financial Analysis

(1) Scope of analysis

Only incremental portion added by this project was examined, and an appropriate “hypothetical business entity” in each project, which is associated with new investment, was set up for the analysis.

In the water supply project of Nuwara Eliya, this “hypothetical business entity” covers whole newly added water supply activities of the NEMC. In the case of the sewerage service, the same scheme of the analysis is applied. While the construction will be done by NWSDB, the facility may be transferred to the NEMC soon or later after completion. The hypothetical entity covers the part of NWSDB and the NEMC that are related to the whole new project proposed in this study.

As discussed later in 17.5 Tariff Issue, Rs. 13.36 per m³ in 1998 was assumed as the standard water tariff for the financial analysis. This is the retail price.

- (2) The overhead on the new hypothetical business entity is assumed at 15 % in principle, which is actually unclear in the financial report of the NEMC.
- (3) In every project, early stage of the project period suffers cash deficit. In order to keep operation, the working capital must be supplied by subsidy or loan.

As a reference, the working capital burden was estimated under the assumption of the cash availability with 10 % interest. Interest payment and cumulative figure is shown on the respective table.

(4) The depreciation period is assumed as follows.

- Civil Works including engineering fee etc.: 50-year life and no salvage value.
- Machinery and Electrical equipment: 15-year life and with 20 % salvage value.
- Vehicles: 15-year life and no salvage value.

The salvage value at the year of 2050 is assumed to be converted to cash at the book value for the estimation of FIRR.

- (5) Annual inflation rate was assumed to be constant at the rate of 10% until 2050.
- (6) The loan condition by the government is 10 % interest rate and 24 years with two-year grace period, which is same as the current government policy.
- (7) Since NWSDB's financial forecast uses 94 % as water tariff collection rate, same figure was applied after examining the collection performance of the NEMC. Because of the time lag between billing and collection the exact number for collection rate had not been available during the study period.

This correction rate is incorporated in determine the average water tariff in the forecasting done by NWSDB and this study. In case of the new sewerage service, the collection rate might be lower than in the case of the water supply. We used the effective tariff that incorporates collection rate already as the proposed tariff.

- (8) In sewerage projects, 100 % percent subsidy from government for capital investments was assumed, while 50% in the water supply project. But as the government subsidy may not cover whole capital investments, the case with 90 % subsidy coverage was examined as a reference. As to operation and maintenance costs, though current government policy assumes free service, it was assumed that the O&M cost recovery should be performed from the tariff, especially from various business customers.

17.5 Tariff Issue

(1) Water Tariff

The revenue from water sales depends on the sales volume and the effective tariff level. Therefore, the tariff structure is critical effects on the financial performance of the water supply systems. But as the water tariff has the direct effect on the local residents and businesses, the assumed tariff for new project is carefully examined and must be acceptable to the local residents and businesses.

As NWSDB applies the unified tariffs for each category of customers in retail water sales in whole Sri Lanka, unified average water tariff at the year of 1998 was computed, and it is Rs. 14.84 per m³. But as discussed in this section later, because of current low price and limited number of business users of the water supply in Greater Kandy and Nuwara Eliya area com-

pared with Colombo, Rs. 13.36 per m³, 90% of Rs. 14.84, was set up as the unified average tariff.

Under the current tariff rate (effective from January 1, 1998), the effective water price for domestic users (assuming 25 m³/month consumption) is Rs.1.8/m³. The effective water price for non-domestic users (assuming 100 m³/month) is Rs.9.5 /m³.

Therefore, the effective average water price assuming 94% collection rate and 70/30 as domestic/non-domestic consumption ratio is as follows;

$$(Rs.1.8 \times 0.70 + Rs.9.5 \times 0.30) \times 0.94 = \underline{Rs. 4.37}$$

In 1997, the average price for KMC water was Rs. 9.01 per m³. But the cost was Rs. 10.80 per m³. Also as KMC does not maintain cost accounting system, the exact cost of KMC water supply is actually unknown. In Kundasale local water supply scheme, average water price was Rs. 10.94 per m³.

The averaged retail water supply price of NWSDB (whole country) is Rs. 14.84 per m³ in 1998. But according to Table 3.15, the effective cost of NWSDB source water in the study area is Rs. 14.16. The difference between Rs.14.16 and, for example, Rs. 10.94 in Kundasale local water supply scheme is compensated by the internal subsidy from metropolitan area to rural area same as other public service such as postal service, national railways.

Actually, without considering this internal subsidy, the financial feasibility of the projects in rural area is very difficult to attain but we excluded this type of internal subsidy in the financial analysis.

Incorporating all above-mentioned factors, we determined Rs.13.36 per m³ as the average water tariff in 1998 for newly produced water, which is exactly same level as Greater Kandy Water Supply Project. This number will be the basis of financial analysis in all the water supply cases. This amount is 90 % of the actual national average tariff of NWSDB.

Whether is new water tariff (Rs.3.0 / m³) for domestic users affordable or not?

In some reference books, it is shown that the affordable water tariff is less than 3 % of monthly household income. Using this standard, the required monthly income is Rs. 3,558.

$$Rs. 3.0 \times 25 / 0.03 = Rs. 2,500$$

According to Household Income Data (1998), in the NEMC the household less than monthly income Rs.3,000 is 5.4 % and the household from Rs.3,001 to Rs.6,000 is 35.2 % respectively.

The domestic tariff of Rs. 3.0 per m³ may be considered as affordable level. But if reduction of the burden of low-income household less than Rs. 2,500 monthly is requested, the progressive tariff structure must be strengthened, though the current domestic tariff structure already has progressive nature. Whether to strengthen the progressive characteristics is the matter of political decision. Another way is to increase business user tariff.

The remaining portion of water revenue must be recovered from non-domestic users. In order to reach the Rs.13, 36 per m³ level, the effective tariff for non-domestic users should be increased further.

Every one has to understand the cost difference between the existing water and the newly produced water from the project. The low price of old system does not guarantee the new water with low price. Even if other authorities try to construct new scheme, the almost same level of the tariff will be required.

As to the annual tariff increase, 1 % annual increase in real terms is assumed. If the growth of Sri Lanka economy is moderate, 1 % increase will be less than the growth of per capita income of Sri Lanka. In some cases, we have to accept more than 1 % tariff increase while some projects are feasible without tariff increase. Combining the low cost water from the existing water supply facilities with new water will reduce the burden of consumers.

(2) Sewerage Tariff

As for the sewerage service, the government will supply 100 % of capital investment as the form of capital subsidy and also monthly service charge is currently free in existing sewerage service at Colombo area. But in order to maintain the sewerage service viable, it was assumed that at least the direct operation and maintenance cost should be recovered from monthly fee from customers.

In order to assume the monthly fee, affordable monthly fee was examined. It is told in general that the reasonable ratio of both water supply and sewerage service charge is around 5 % where the share of water supply is a little higher than the one of sewerage service. Therefore,

2% of household monthly income was tentatively assumed as affordable sewerage tariff for domestic customers.

In the NEMC, the 5.4 % household earns less than Rs. 3,000 monthly, and in the range from Rs.3,001 to Rs. 6,000, there are 36.1 % household. In case of Rs. 3,500 household, 2% of income is Rs. 70. Assuming monthly water consumption is 25 m³, the sewerage service fee of Rs.70 corresponds to Rs. 2.8 / m³. But still there are about five percent households less than Rs. 3,000 and their response about willingness to pay are very low. Therefore, Rs. 2.0 per m³ was set up as the starting tariff for the domestic customers. It will take time until people become accustomed to pay the sewerage fee because people do not understand the cost and the benefit of the sewerage service that they have not experienced. In this regard, social marketing effort will be required.

The remaining portion of the sewerage service costs has to be shouldered by the non-domestic users. The expected ratio of no-domestic/domestic tariff was examined and four to five times was applied depending of the respective case.

The consideration on the additional connection cost.

After the facility construction has finished, the NEMC will start sewerage operation by taking over the facility from NWSDB. After the commencement of the operation, costs of connecting work that has to be paid by the domestic user will be the major issue. It is the additional cost for the users. The costs required inside of the user's premise from the point where the public work by this project covers, should be shouldered by the users.

If the connection cost to individual domestic users is about Rs. 5,000, it will be equivalent to the annual fee of 100 months (about eight years).

$$\text{Rs. } 5,000 / (\text{Rs. } 2 \times 25) = 100 \text{ month (assuming } 25 \text{ m}^3 \text{ /month consumption)}$$

To most of the low-income households, it is impossible to pay such amount of additional cost. Therefore, it is desirable that these cost be paid by some others, say business users or local authority, or be shouldered temporarily by them, at least.

In case of the NEMC, the number of the domestic household in the Phase I is about 200. Therefore, the total additional connecting cost is;

$$5,000 \times 200 = \text{Rs. } 1 \text{ million}$$

It is only 0.24% of the project cost (Rs. 418 million in Phase I). Also it is less than 2.5 % of total tariff revenue from 2004 to 2015 (Rs. 40.7million), of which the most part is paid by the non-business users (to simplify, inflation and interest are ignored). Maybe it will be the burden of a little more than three or four percent added to their monthly bill from 2004 to 2015.

For the whole Master Plan, the same logic will be applicable. By extending the recovery of the cost over the reasonable period, the additional connection cost of domestic users is the additional burden on the non-domestic users at around three or four percent level.

17.6 Financial Analysis

Following two sets of outputs were prepared for each project (refer to Appendices 17.2 and 17.3).

- (1) Pro Forma Financial Statements (Fund Flow Table, Income Statement Table and Balance Sheet)
- (2) Financial Internal Rate of Return (FIRR)

In addition to these typical financial statements, the working capital burden of each project is calculated. Either the form of subsidy internal or external, or the interest-baring loan, the cash deficit of the each year in the early stage should be covered somehow. The loan with interest rate of 10 % was examined as a measure to cover it, and it was found viable.

The summary tables for the FIRRs and the sensitivity analysis for the FIRRs are shown in Tables 17.3 to 17.5. The computing process for each FIRR is shown in Appendices 17.2 and 17.3.

Table 17.3 FIRRs by Different Tariff Increase Rate of Water Supply System

Tariff Increase Rate	0.0%	0.5%	1.0%	1.5%	2.0%
FIRR for M/P	5.16%	6.21%	7.20%	8.15%	9.07%
FIRR for F/S	4.26%	5.39%	6.43%	7.42%	8.36%

Note: Figures in bold faces are the recommended cases.

Table 17.4 Results of Sensitivity Analysis on Water Supply Projects

Case	Annual Tariff Increase	Variance of Capital Investment and O&M Cost			
		-5%	0%	+5%	+10%
FIRR of M/P	1.0%	7.76%	7.20%	6.67%	6.17%
FIRR of F/S	1.0%	7.02%	6.43%	5.88%	5.36%

Table 17.5 FIRRs by Different Grant Coverage for Sewerage Project

Item	unit	Case 1	Case 2
Grant Coverage for the Investment	%	100	90
Starting Tariff for Domestic Users	Rs./m ³	2.00	2.00
Non-Dom. Tariff Multiplier against Dom.	Times	4	5
Annual Tariff Increase Rate	%	1.00	1.00
FIRR for M/P	%	13.18	2.07
FIRR for F/S	%	9.30	1.47

The following discussions detail the financial analysis for individual cases.

17.6.1 Result of Financial Analysis (1): Nuwara Eliya Water Supply Project (Master Plan)
(Appendix 17.2)

The Pro Forma Financial Statements (Fund Flow Table, Income Statement, and Balance Sheet) were prepared until 2050 as presented in Appendix 17.2. As shown in Table 17.3, FIRR of this case is 7.2 %. In the viewpoint of long-term period, this project is financially rewarded and attractive. It is in 2010 that the annual financial flow become positive and it is in 2016 that the cumulative deficit disappears. The additional working capital requirement is moderate comparing other projects. This project is financially feasible and recommendable.

As for the sensitivity analysis on the tariff increase and the variance of the cost (the investment and O&M), the FIRRs this project is rather stable (Tables 17.3 and 17.4).

17.6.2 Result of Financial Analysis (2): Nuwara Eliya Water Supply Project (F/S)
(refer to Appendix 17.2)

This F/S plan covers most part of M/S plan. Therefore, financial picture is almost identical but the result of the financial analysis is a little better than M/P. FIRR is 6.43%. It is in 2010 that the annual financial flow will become positive and the cumulative deficit disappears in 2015. The additional working capital requirement is moderate comparing other projects. This project is financially feasible and recommendable.

As for the sensitivity analysis on the tariff increase and the variance of the cost (the investment and O&M), the FIRRs this project is rather stable (Tables 17.3 and 17.4).

17.6.3 Result of Financial Analysis (3): Nuwara Eliya Sewerage Project (Master Plan)

(refer to Appendix 17.3)

In the case of 100 % subsidy for the investment, the Pro Forma Financial Statements (Fund Flow Table, Income Statement, and Balance Sheet) is presented in Appendix 17.3. As shown in Table 17.5, FIRR of this case is 13.18 %. It is in 2007 that the annual financial flow becomes positive and the cumulative deficit disappears in 2013. The additional working capital requirement is moderate comparing other projects. This project is financially feasible and recommendable.

The unit sewerage tariff for non-domestic users is assumed at four times of domestic users. It must be understand that the calculated FIRR is the special case that is computed from the tariff revenue, O&M cost, and overhead cost. It does not mean the efficiency of the investment. It shows only that the tariff revenue can recover the O&M cost in long period. All the capital investment is excluded from the calculation.

If 10 % of capital investment is required to be recovered from the tariff revenue, the financial picture becomes different from 100 % subsidy case. The Pro Forma Financial Statements (Fund Flow Table, Income Statement, and Balance Sheet) is shown in Appendix 17.3. As shown in Table 17.5, FIRR of this case is 2.07 %. It is in 2017 that the annual financial flow becomes positive and it is in 2022 that the cumulative deficit disappears. The additional working capital requirement is higher than the one for the 100% subsidy case. However, this project is financially feasible and recommendable.

The unit sewerage tariff for non-domestic users is assumed at the level of five times of the domestic users. It must be understand that this FIRR is the special case that is computed from the tariff revenue, O&M cost, Overhead cost, and only 10% of capital investment. It does not mean the efficiency of the investment. It only shows that the tariff revenue can recover the O&M cost in long period. A 90% of the capital investment is excluded from the calculation.

17.6.4 Result of Financial Analysis (4): Nuwara Eliya Sewerage Project (F/S)

(refer to Appendix 17.3)

In case of 100 % subsidy, the Pro Forma Financial Statements (Fund Flow Table, Income Statement, and Balance Sheet) is shown in Appendix 17.3. As shown in Table 17.5, FIRR of

this case is 9.30 %. It is in 2010 that the annual financial flow becomes positive and it is in 2017 that the cumulative deficit disappears. The additional working capital requirement is moderate comparing other projects. This project is financially feasible and recommendable.

The monthly tariff for non-domestic users is assumed at the level of four times of domestic users. But it must be understood that this FIRR is the special case that is computed from the tariff revenue, O&M cost, and overhead cost. It does not mean the efficiency of the investment. It only shows that the tariff revenue can recover the O&M cost in long period. All the capital investment is excluded from the calculation.

If 10 % of capital investment is required to be recovered from the monthly tariff revenue, the financial picture becomes different from 100 % grant case. The Pro Forma Financial Statements (Fund Flow Table, Income Statement, and Balance Sheet) is shown in Appendix 17.3. As shown in Table 17.5, FIRR of this case is 1.47 %. It is in 2012 that the annual financial flow becomes positive and it is in 2020 that the cumulative deficit disappears. The additional working capital requirement is higher than the one for the 100% grant case. But anyway this project is financially feasible and recommendable. But additional financial scheme will be beneficial to the project.

The monthly tariff for non-domestic users is assumed at the level of five times of the one for domestic users. But it must be understood that this FIRR is the special case that is computed from the tariff revenue and O&M cost and 10% of capital investment. It does not mean the efficiency of the investment. It only shows that the tariff revenue can recover the O&M cost in long period. A 90% of the capital investment is excluded from the calculation.

17.7 Conclusion

The results of financial analysis for four cases are presented above. Although financial characteristics of each case are different, all of four cases seem to be financially feasible and recommendable. But in the sewerage project, the case of 90% subsidy, it becomes weak financially, and the additional financial scheme should be developed.

Water supply project and sewerage project must be differentiated. Sewerage project is only feasible with 100% subsidy. Even if 10% of capital expenditure becomes financial burden, the financial feasibility will decrease substantially. In comparing with sewerage project, water supply project is more financially feasible under the current 50% subsidy scheme.

CHAPTER 18

PROJECT EVALUATION

CHAPTER 18 PROJECT EVALUATION

18.1 General

The proposed projects for the improvement of the water supply system and for the development of new sewerage system in Nuwara Eliya were evaluated from the viewpoints of the expected benefits and appropriateness/feasibility. The composition of the evaluation items was composed of the following: financial, socio-economic, technical, institutional, and environmental.

18.2 Water Supply Project

18.2.1 Financial Aspect

(1) Nuwara Eliya Water Supply Project (Master Plan)

As shown in Table 17.2, the FIRR for this case is 7.2 percent. As described in the Chapter 17, the financial feasibility for the long period through 2050 was confirmed, although it takes time that the cash balance becomes positive.

(2) Nuwara Eliya Water Supply Project (F/S)

As shown in Table 17.2, the financial perspective is almost same as the Master Plan because the F/S project covers most of Master Plan project leaving only marginal works to the later phase.

18.2.2 Socio-Economic Aspect

A qualitative economic analysis has not been possible in this aid agency sponsored study, due to the difficulty in effectively measuring costs and benefits.

The implementation of the Project will bring the following socio-economic benefits to the population in addition to other tangible benefits, such as the expansion of the area to be served and a steady supply of safe water;

- Increase of employment opportunity
- Increase in consumer's satisfaction

- Mitigation of fire damages
- Increase in income of the business sectors
- Increase in value-added of the land

The above mentioned increase in value-added of the land in the area to be served by the Project will happen only when other infrastructure projects are implemented to utilize the benefits of this water supply project. It should therefore be noted that the water supply project is an integral part of the infrastructure development of the area concerned.

Among several factors which hinders an economic growth in developing countries, the introduction of a fiscal budget allocation to remove bottlenecks in infrastructure development is expected to bring with it positive investment incentives which will benefit the economy as a whole by stimulating investment in the development of industrial estates, etc.

In this respect, the implementation of the Project with the aim of augmenting the water supply capacity to provide for the development of other types of infrastructure will be vital to securing steady growth of the economy.

18.2.3 Technical Aspect

In the course of planning the Nuwara Eliya Water Supply System, various kinds of comparative studies with possible alternatives for the location of facilities, structure of the system, construction method, material, process were made to establish the optimum plan of the system. The object of this Study is aimed at energy- and cost-saving, ease of operation and maintenance of the system and the minimization of environmental impact on the surroundings during and after construction based on appropriate technologies and in due consideration of the current practices in Sri Lanka. The Project is considered technically feasible.

18.2.4 Institutional Aspect

Although due consideration will be given to the NEMC which is the agency that will be in charge of the Nuwara Eliya Water Supply Project after its implementation, the NWSDB has sufficient capability to cope with the implementation of the Project during the construction stage with some addition to its existing organization. After construction, the NWSDB should assist in the operation and maintenance of the facilities under an agreement between the

NWSDB and the NEMC, until the staff of the NEMC is fully trained. On the condition that those arrangements will be made, the Project is considered institutionally sound.

18.2.5 Environmental Aspect

An Environmental Impact Assessment (EIA) of the proposed project was carried out during the course of the Study. The results of this EIA study have highlighted possible environmental impacts, which will be made by the implementation of this project. Preventive measures and relevant legislative arrangements are considered to mitigate the anticipated environmental impacts.

As a whole, the proposed project, including the said preventive measures, is determined to have minimal and tolerable impacts to the environment.

Among others, the following preventive measures are included in the scope of the proposed project:

- (1) By employing the groundwater source development, construction of an impounding dam, which will have a large impact on the environment, can be avoided.
- (2) Improvement of the transmission system will decrease the energy requirement during the rainy season by transmitting the surface water effectively.

18.3 Sewerage Project

18.3.1 Financial Aspect

(1) Nuwara Eliya Sewerage Project (Master Plan)

Case 1 (100% subsidy coverage)

The FIRR is 13.18 percent for this case. With a moderate supply of working capital, the project is financially feasible and recommendable. It is of course necessary to view the project with a longer perspective covering the life of the whole facility.

Case 2 (90% subsidy coverage)

This case requires a partial sharing of the capital investment with the local side for several reasons. Under the current assumption, the FIRR is 2.07 percent and is marginal. If, however, additional financial schemes are developed in order to cope with the burden and the capital investment, it is possible to improve the financial feasibility of this project.

(2) Nuwara Eliya Sewerage Project (F/S)

Case 1 (100% subsidy coverage)

The FIRR is 9.30 percent. If higher starting tariff for domestic users or higher annual increase rate on the tariff is accepted, the FIRR will be improved further.

Case 2 (90% subsidy coverage)

In this case participation in cost sharing for the capital investment will be required. Under the assumption specified in this case, the FIRR is 1.47 percent.

18.3.2 Socio-Economic Aspect

Safe drinking water and the sanitary disposal of waste have long been recognized as basic needs of society, as both of them function to safeguard human health and enable a more productive life. Health and environmental problems caused by inadequate water supply and poor waste disposal have been exacerbated by continued population growth and the high concentration of that population in urban areas.

While it is a given that advanced sewer systems help to alleviate these issues, the positive effects of sewer systems can be broken down into two categories. The first of these is direct effects, i.e., the direct contributions that sewer projects make to those individuals who discharge waste into the sewer system. The other is indirect effects, i.e., the indirect contributions a sewerage system makes to those individuals who are not connected to the system, as well as those contributions the system makes to future generations. In economic terms, such indirect benefits are called external economies, in which production or consumption yields positively benefit even those who are not paying for the service directly. The following is a series of examples of such benefits.

(1) Improved public health

Improved public health is a community benefit which contributes to all members of the community regardless of whether or not they are connected to the sewerage system. A concrete example of the benefits of improved overall community health is the decrease in social costs, since an increased level of sanitation will lead to a decrease in health care costs and in auxiliary sanitary service costs.

(2) Infrastructure as a basis for economic development

Investment in a sewerage system lays a positive base for economic development, both through the employment generated through the actual building of the system and through contributing to overall public welfare, which in turn can be used to induce investment into the private sector by both domestic and foreign enterprises. As such, the development of a sewerage system can be seen as a long-term investment, which may generate increased national income for future generations.

(3) Construction's short-term effects on the local economy

During the period of construction of the sewerage system, the public sector's expenditures have the effect of increasing district output (expansionary effect). When these expenditures are initially made, output will rise at first by an equal amount. But as those in capital-goods industries begin receiving more income through this increase in expenditures, they will then set into motion a chain of additional secondary consumption spending and employment. This expansionary effect will generate an increase in national income.

(4) Construction's long-term effects on the local economy

Even after construction has been completed, the sewerage system will have a positive effect on local employment by absorbing a part of the labor force as maintenance workers. The consequent increase in income will serve to increase effective demand, which will in turn contribute to economic growth, as will the derived demand from the project's maintenance activities.

(5) Using construction to acquire technology

Developing nations have a potential advantage in that they can reap the benefits of the technological progress of more advanced nations. They do not have to repeat the trial and error period which more advanced nations had to go through. Advanced construction and maintenance technologies which can be acquired through the building of a sewerage

system will be a long-term benefit.

As explained above, economic benefits of developing a sewerage system are not limited to individual users, but rather are spread over society as a whole, as well as over multiple generations. Some of the public health benefits, such as the avoidance of epidemics, are external to the individual user and so not necessarily included in the price of service. Since the benefits of a sewerage system are reaped over many generations, in theory, the financial burden could be spread out over many generations as well. Annual maintenance and operating costs should also be borne by generations to come as such funds will be necessary in supporting a high level of future service. However, in actuality it is quite difficult to spread the costs of such projects over the various indirect beneficiaries of the completed project. As a result, the portion of public expenditures which are not attributable to the individual user are not always fairly charged to other possible beneficiaries. Thus, when calculated in these terms, the projected amount of funds to be generated by charging only direct users may appear to be insufficient. However, when also calculating the broad social benefits which are indirectly created by the project, and which are not included within standard FIRR procedures, one discovers that the negative financial results derived via accounting procedures (FIRR) may not be an appropriate index for gauging the overall economic meaning of a sewage project.

18.3.3 Technical Aspect

In the course of planning the Nuwara Eliya Sewerage System, various kinds of comparative studies with possible alternatives as to the location of facilities, structure of the system, construction method, material, process and so on were made to establish the optimum plan of the system. The outcome of the Study is aiming at energy- and cost-saving, easy operation and maintenance of the system and minimization of the impact on the surrounding environment during and after construction, based on the appropriate technology and in due consideration of the current practice in Sri Lanka. The Project is therefore considered technically feasible.

18.3.4 Institutional Aspect

Although due consideration will be given to the NEMC which is obviously the most appropriate agency that will be in charge of the Nuwara Eliya Sewerage Project after its implementation, the NWSDB has sufficient capability to cope with the implementation of the Project during the construction stage with some additions to its existing organization. After construction, the NWSDB should play a leading role in operation and maintenance under an

agreement between the NWSDB and the NEMC until the staffs of the NEMC are fully trained. On the condition that those arrangements are made, the Project is considered institutionally sound.

18.3.5 Environmental Aspect

An Environmental Impact Assessment (EIA) of the proposed project was carried out during the course of this Study. The results of this EIA have highlighted possible environmental impacts, which will be made by the implementation of this project. Preventive measures and relevant legislative arrangements are thereby considered to mitigate the anticipated environmental impacts.

As a whole, the proposed project, including the said preventive measures, is determined to have minimal and tolerable impacts to the environment.

Among others, the following preventive measures are included in the scope of the proposed project:

- (1) Sludge treatment will be minimal by employing the aerated lagoon method.
- (2) The sludge discharged from septic tanks, which is presently discharged directly to the environment, will be treated at the treatment plant.

CHAPTER 19

**CONCLUSION AND
RECOMMENDATIONS**

CHAPTER 19 CONCLUSIONS AND RECOMMENDATIONS

19.1 General

The present status of the water supply systems in Nuwara Eliya is quite poor even though an improvement project has been conducted under ADB financing. The water shortage that occurs during the dry season is the most critical issue facing the water supply system. Its water supply capacity is sufficient during the rainy season from its surface water sources. The high NRW percentage is also one of the issues that needs to be resolved by the rehabilitation of the system. The rehabilitation of the transmission and distribution system by realignment of the water service blocks and augmentation of the pipeline network will contribute not only to an increase in transmission and distribution capacity of the system but also to a reduction in NRW. Because of the above reasons, this study has been conducted to establish the long-term development plan of the water supply system in Nuwara Eliya and the feasibility study for the priority project.

Development of a sewerage system is more difficulty than that of the water supply system because it places an additional financial burden on the population. To date, the population has not had to shoulder the costs for these services. Even though a sewerage system brings various indirect benefits to both users and non-users of the system, only the user should shoulder the direct financial burden to some extent. The difficulty in introducing a sewerage system stems mainly from this point.

The following conclusion and recommendations are made for the smooth implementation of the project.

19.2 Water Supply Project

19.2.1 Conclusion

The financial viability of the Nuwara Eliya water supply project is highly dependent on the tariff rate. The current tariff rate is considered to be lower than the proper level in terms of affordability and in comparison with other public utility charges. The results of the case study indicate that taking into account the current depressed tariff structure, the Project will be viable if the tariff rate is allowed to increase at a rate of one percent per annum for each complete phase of the long-term development plan. Even if the project is halted after the im-

plementation of Phase 1, which is the subject priority project of the feasibility study the requirement for increasing the tariff is not different from the Master Plan because most of the facilities will be constructed in Phase 1, and the increase in water demand into the future will not be as large due to the expected benefits of NRW reduction.

19.2.2 Recommendations

Recommendations for the implementation of the Project are summarized in accordance with their importance and priorities as follows:

(1) Taking necessary measures to ensure the feasibility and financial viability of the Project

For the debt service management together with the implementation of the proposed projects and for clearing up the accumulated deficit, the normal methods used in water supply management, such as reducing NRW and the implementation of cost containment strategies will not be sufficient. The present water tariff system will therefore need to be reviewed in order to set a higher level of tariff structure but at a reasonable level, considering the financial means of the consumers in the Study Area. Providing these measures are taken the viability of the proposed project will then be assured.

(2) Improvement of Non-Revenue Water (NRW)

Reduction of non-revenue water (including unaccounted-for water) is a major subject to tackle in the management of the Nuwara Eliya water supply system. It will, if successfully implemented, result in an increase in revenue and a reduction in operational costs.

The most efficient and economical measures to achieve a reduction in NRW may be recommended as follows:

- Leak detection and repair or replace of valves, pipes, service connections, and reservoirs
- Replacement of “bundles” of service connection lines with appropriately sized distribution main extension pipes
- Provision of water meters to every consumer, repair of defective water meters, and calibration to reduce registration error.
- Conducting efficient meter reading and billing collection
- Controlling illegal connections and unbilled legal connections
- Provision or repair of bulk flow meters to monitor the amount of supply.

(3) Protection of Water Source

It is necessary for the municipality to establish a policy for protection of the surface water sources in terms of quality and quantity of the raw water. For water quality, in particular, the following possible sources of contamination must be recognized:

- a) Cultivation and/or dwelling in the catchment area of surface water sources.
- b) Contamination by detergent and soap originating from washing and bathing upstream of intake facilities

For the quantity of the water sources, a control system of groundwater utilization in the Study Area must be established.

(4) Role of the Regional Support Center (Central) and the NEMC

The Central Regional Support Center of the NWSDB is considered as the most appropriate agency to be in charge of the Project during its implementation. After completion of Phase 1 of the project, the NEMC, should play a major role in the operation and maintenance of the system. Therefore the involvement of the RSC (C) and the NEMC from the initial stage of the planning and design of the Project is a significant requirement, needed to reflect the real needs and problems experienced by the RSC (C) and the NEMC.

(5) Conduct vigorous investigation on groundwater potentiality.

The groundwater potentiality investigation conducted in this study was based on presently available data and information. As a result of the investigation it was found that the Study Area has high potentiality for groundwater development. Because of the constraints of time and budget, the identification of sites to be developed and their available yield could not be finalized. However, if a safe groundwater source can be developed with sufficient supply capacity, then the cost for water supply system can be kept at a feasible level. The development of surface water sources is uneconomic and will result in the project becoming infeasible. In this regard it is strongly recommended that the hydrogeological survey, with test well drilling and pumping tests, be conducted continuously by the NWSDB with the support of experienced foreign specialists before implementation of the project.

(6) Provision of Sewerage Services

The augmentation of water supply capacity will bring an increase in the sewage to be discharged in the service area. At present, on-site sewage treatment systems are working at the hospital, large hotels and factories though most of them were not functioning well. Other remaining areas are served by on-site facilities, which mainly treat excreta and do not treat other wastewater. The pollution load to be discharged into watercourses will accordingly increase in the area steadily if no countermeasure is provided. In addition, although the maintenance of those facilities is left to the responsibility of owners, their neglect of proper maintenance will lead to the pollution of surface water and groundwater. The wastewater from the town center of the NEMC, which is the major pollutant discharge area, is discharged to midstream of the Nanu Oya river. It flows down to Gregory Lake via Victoria Park. Both are major resources for the tourist industry. In this regard, a high priority should be given to the provision of the proposed sewerage system.

19.3 Sewerage Project

19.3.1 Conclusion

The current water supply service in the NEMC will be improved upon completion of the water supply project by the end of 2004. The increased water consumption will, on the other hand, further accelerate the deterioration of the urban environment and water pollution in rivers and lakes, especially during the dry season.

The proposed sewerage project for the NEMC is prepared to mitigate these existing and foreseeable problems by the target year of 2005. Likewise, the necessity and appropriateness as well as urgency of the proposed project is acknowledged and justified for the betterment of public hygiene and environmental conservation in the NEMC.

As stated in previous discussions, the sewage tariff to be introduced after implementation of the project will be the critical issue for operation of the project. In order to enable the project to be financially feasible, at least the capital investment should be granted by the Central government. In addition, efforts should be made to increase the number of connections in the service area. During the initial stage, the population should pay the cost for service connections, including the cost of modification of plumbing in private premises. In this regard, financial incentives should be given to the users in order to ease the burden of payment such as special loan services.

It may be concluded that the scope and scale of required investment in the project appear appropriate, and the effects of the investment seem satisfactory. Because both the NWSDB and the NEMC do not have experience in the introduction of a sewerage system with treatment plant, institutional arrangements should be made with both authorities with a close relationship to each other.

It is quite difficult to recover the costs of the investment without substantial financial complements through the Central Government's financial subsidies even if the tariff increases annually. As a result, special considerations should be made for the financial scheme to ensure that the initial capital investment can be fully funded.

19.3.2 Recommendations

Recommendations for the implementation of the Project are summarized in accordance with their importance and priorities as follows:

(1) Taking measures to ensure the feasibility and financial viability of the Project

Securing funds for the project through Government grant is indispensable for the viability of the proposed project.

(2) Establishment of legislative set-up for the sewerage services.

A sewerage service with a tariff system is a new concept for the public in an urban environment. In order to progress the project, to promote service connections and to secure the tariff for its operation and maintenance, a legislative set-up is needed.

(3) Establishment of tariff system

An affordable tariff system should be established through consultation with officials of the NEMC.

(4) Monitoring of the Industrial effluent.

The sewerage system was designed for sewage of normal domestic quality. If the quality of wastewater from large users becomes worse than the expected quality, its effect can-

not be ignored. In this regard, the establishment of a quality standard for wastewater to be discharged into the sewer system together with the establishment of an effective monitoring system is indispensable.

(5) Role of the Regional Support Center (Central) and NEMC

The Central Regional Support Center of the NWSDB is considered as the most appropriate agency to be in charge of the Project during and after its implementation. After implementation of Phase 1 of the Project, the RSC (C) should play a major role in the operation and maintenance of the system, until the staffs of the NEMC become fully trained. The involvement of the RSC (C) and the NEMC from the initial stage of the planning and design of the Project is quite significant in order to reflect the real needs and problems experienced by the RSC (C) and NEMC.

(6) Timely Review of the Feasibility Study prior to the Implementation

This Feasibility Study is prepared on the basis of the presently available data and information and most reasonable projections to be made from such information. In the future there may be more developments or changes in the socio-economic or natural conditions in the project area, which are now unforeseeable but might have an affect, if they occur, on the recommendations presented in this study. It is therefore recommended that the Feasibility Study be reviewed on a regular basis in the future to take into account the situation at the time of project implementation.

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