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STAFF APPRAISAL REPORT

UGANDA

WATER SUPPLY AND SANITATION

REHABILITATION PROJECT

June 25, 1984

Water Supply and Urban Development Division
Eastern Africa Projects Department

CURRENCY EQUIVALENTS

Currency Unit = Uganda Shilling (UShs)
1 USh = US$0.00333
300 UShs = US$1.00

MEASUREMENT EQUIVALENTS

1 meter (m)	= 39 inches = 3.28 feet
1 kilometer (km)	= 0.62 miles
1 square kilometer (km^2)	= 0.386 square miles
1 hectare (ha)	= 0.01 km^2 = 2.25 acres
1 cubic meter (m^3)	= 35.3 cubic feet (cu ft)
1 liter (l)	= 0.26 US gallons
1 cubic meter per second (m^3/sec)	= 35.3 cubic feet per second
1 imperial gallon	= 1.2 US gallons (US gal)

PRINCIPAL ABBREVIATIONS AND ACRONYMS

AFDB	African Development Bank
CTB	Central Tender Board
EEC	European Economic Community
GOU	Government of the Republic of Uganda
GtZ	Gesellschaft fuer Technische Zusammenarbeit
ICB	International Competitive Bidding
IDA	International Development Association
IDB	Islamic Development Bank
KfW	Kreditanstalt fuer Wiederaufbau
LCB	Local Competitive Bidding
MLG	Ministry of Local Government
MLMWR	Ministry of Lands, Mineral and Water Resources
MOH	Ministry of Health
NORAD	Norwegian Aid Agency
NWSC	National Water and Sewerage Corporation
ODA	British Overseas Administration
PCU	Project Coordination Unit
SDR	Special Drawing Rights
SIDA	Swedish International Development Authority
UNDP	United Nations Development Program
WHO	World Health Organization
WDD	Water Development Department

FISCAL YEAR

Government	July 1 - June 30
NWSC	July 1 - June 30

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

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This report is based on the findings of an appraisal mission consisting of Messrs. K. Kleiner, G. Steinke, T. Skytta, A. Nur, W. Brieger, H.W. Barker, P. Ofosu Amaah, R. Knop and S. Sender (GtZ), who visited Uganda in October/November 1983.

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UGANDA

WATER SUPPLY AND SANITATION PROJECT

CREDIT AND PROJECT SUMMARY

BORROWER: Republic of Uganda

BENEFICIARIES: National Water and Sewerage Corporation (NWSC) and Water Development Department (WDD) of the Ministry of Lands, Mineral, and Water Resources (MLMWR), the Ministry of Health (MOH) and the city councils of seven major towns through the Ministry of Local Government (MLG).

AMOUNT: SDR 26.9 (US$ 28.0) million equivalent.

TERMS: Standard.

RELENDING TERMS: Of the proceeds of the credit, the Government would:

(a) (i) onlend US$10.8 million equivalent to NWSC for 20 years, including four years of grace at a variable interest rate; and

(ii) channel US$ 4.6 million equivalent as equity to NWSC; and

(b) allocate:
- (i) US$ 8.4 million equivalent to WDD;
- (ii) US$ 0.4 million equivalent to the Ministry of Health; and
- (iii) US$ 3.8 million equivalent to the Ministry of Local Government.

PROJECT DESCRIPTION: The proposed project is designed to assist the Government in financing the rehabilitation of the water supply and sanitation facilities of seven major towns; and provide training and technical assistance.

RISKS: The main risks facing project implementation are weak organizations and the limited capacity of local contractors. They have been addressed: by providing technical assistance and designing procurement packages which would attract strong contractors for the mechanical/electrical, and civil works; and by retaining consultants for the supervision of construction work. The remaining risk is the still unsettled political and security situation in the country. Under prevailing conditions, the project as designed is feasible. A deterioration, however, could have adverse effects on project implementation, both in terms of cost and completion, and in a severe case may require revisions of the project scope.

ESTIMATED COSTS:

	Local	Foreign	Total
	US$ million		
1. Rehabilitation of and replacements for:			
water supply facilities	2.18	7.22	9.40
sewerage facilities	0.83	1.90	2.73
2. Supply of refuse disposal equipment and septic tank emptiers	0.37	2.63	3.00
3. Low cost sanitation and health education	0.51	0.34	0.85
4. Training	0.01	0.75	0.76
5. Technical assistance	0.32	1.43	1.75
6. Consultancy services	0.70	2.00	2.70
7. Total Base Costs (January 1984)	4.92	16.27	21.19
Physical Contingencies	0.77	2.42	3.19
Price Contingencies	2.40	4.05	6.41
Total Project Cost (net of taxes and duties)	8.09	22.74	30.83

FINANCING PLAN:

IDA Credit	5.3	22.7	28.0
Government of Uganda	2.8	-	2.8
Total Financing	8.1	22.7	30.8

ESTIMATED DISBURSEMENTS:

	FY85	FY86	FY87	FY88	FY89
	in US$ million				
Annual	5.0	8.0	7.0	5.0	3.0
Cumulative	5.0	13.0	20.0	25.0	28.0

RATE OF RETURN: 20% on 98.5% of total project costs using current tariffs as a proxy for benefits.

APPRAISAL REPORT: Report No. 4968-UG, dated June 25, 1984.

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

I. THE WATER SUPPLY AND WASTE DISPOSAL SECTOR

Country Background

1.01 Uganda lies astride the Equator in East Africa. It is bounded by Kenya, Tanzania, Rwanda, Zaire and Sudan and has no direct access to the Indian Ocean. It has a total area of approximately 240,000 km^2, about 20% of which is lakes and swamps. Most of Uganda is on a plateau varying between 900 m and 1,300 m above sea level.

1.02 Uganda's altitude moderates the tropical climate; mean maximum temperatures range from 20°C at night to 35°C during the day, and mean minimum from 8°C to 23°C. Annual rainfall varies considerably within the country. The northeast has an arid climate averaging of 500 mm of rain annually, while the south receives about 1,400 mm. There are normally two dry spells per year, one from December to February, the other in June and July.

1.03 The population in Uganda is predominantly rural. The 1980 census showed a total population of 12.6 million of which only about 1.1 million (8.7%) resided in urban areas. At an estimated overall population growth rate of 3% and an urban growth rate of 5%, the 1983 population is estimated as follows:

Total population	13.8 million	100.0%
Urban population	1.3 million	9.5%
Rural population	12.5 million	90.5%

1.04 Uganda has a wealth of natural resources with favorable soils and climatic conditions for agricultural production, a rich mineral base to support the industrial sector and ample water for energy production. However, the Ugandan economy was shaken by a series of internal and external shocks: the emigration from the country of many of the most highly skilled personnel after the military coup in 1971; the sharp rise in the price of petroleum in 1973; the break-up of the East African Community in 1977; and the damage and looting which occurred during the 1978/79 war.

Water Resources

1.05 Uganda lies virtually within one major river basin, the upper White Nile Basin, and is generally rich in surface water resources. Only a small area (about 5% of the total area of the country) in the east and north drains to Lake Turkana in Kenya. The minimum flow of the White Nile at its out-flow from Lake Victoria is 680 m^3/s. There are also six major lakes in Uganda. In all, about 20% of the total area is covered with bodies of water. Comprehensive river basin studies have not yet been carried out. However, a survey was carried out for the catchments of Lake

Victoria, Lake Kyoga and Lake Mobutu Sese Seko (Lake Albert) from 1967 to 1981. The survey was a joint venture of Uganda and eight downstream riparian countries (excluding Ethiopia) of the Nile River and was financed by UNDP.

1.06 Since Uganda lies on a "basement complex" of pre-cambrian rocks consisting of schists, marbles, granites, gneisses and quartzites, ground water resources are generally poor. Groundwater occurs in limited yields along fissures, cracks and joints of the granite-gneiss formations. Springs are common in some parts of the country, i.e., south in the Kabale area, west along the slopes of Rwenzori, and east along the slopes of Mount Elgon. Low yield boreholes, protected springs and shallow wells provided with hand pumps (drilled or dug wells, sometimes with swamp-side filtration) are believed to be suitable for wide application in water supply of small rural communities.

Sector Organization

1.07 The Ministry of Land, Minerals and Water Resources (MLMWR) has the sole responsibility for water resources management and development as well as operation and maintenance of water supply and sewerage systems in Uganda. The Water Development Department (WDD) of MLMWR carries out this responsibility in urban water supply and sewerage and in rural water supply. In 1972, with Bank/WHO/UNDP assistance, a parastatal body, the National Water and Sewerage Corporation (NWSC) was established to gradually take over all urban water supply and sewerage operations on a self-sustaining basis. It initially took over operations of Kampala and Jinja and, also, in 1973, the system of Entebbe. After this, no other systems have been added to the three urban centers that NWSC currently operates. The present intention of MLMWR is that NWSC should take over the remaining towns as soon as WDD has rehabilitated the systems and NWSC has been strengthened.

1.08 Until recently, protection of springs and wells in rural areas was the responsibility of the Ministry of Health (MOH). This was transferred to WDD in 1982. Sanitation is, in general, monitored by MOH. To this effect, it is responsible for ensuring proper control of effluent qualities of urban sewerage systems and developing sanitation of rural areas as well as, in collaboration with town councils, improving low cost sanitation in unsewered urban areas. MOH is also responsible for initiating and delivering health education in the country.

1.09 City municipal, and town councils, which are under the Ministry of Local Government (MLG), are responsible for refuse collection and disposal. Within the city and town councils, the Public Health Department is in charge of these services. The MLG has a supervisory function, advises on standardization of equipment in order to facilitate operation, spare part supply and training, and has to approve the purchase of equipment.

Levels of Service

1.10 Urban Water Supply: There are altogether 56 towns in Uganda (with population over 2,000) out of which 11 have a population over 15,000. Thirty-three towns have central water supply systems. NWSC operates the systems in Kampala, Jinja and Entebbe and WDD in some 30 urban centers. Due to their poor state of repair and need for rehabilitation, the existing schemes serve at present only about 40% of the total urban population. The averge water consumption of the served population is estimated to be in the order of 75 lcd. This indicates shortage in water supply.

1.11 Rural water supplies consist of boreholes equipped with handpumps, protected springs and small dams and valley tanks. Uganda used to have an extensive network of boreholes, over 5,000 in total and some 950 dams and valley tanks. Over the last decade, as very little maintenance work was done, boreholes became largely inoperative and some surface reservoirs silted up. Mainly with UNICEF assistance which began in 1981, WDD has been able to restore these supply systems and today about 60% of the boreholes are again in operation. UNICEF has also helped WDD to construct new shallow wells equipped with hand pumps as well as protecting some 200 springs. It is estimated that there are well over 5,000 springs in Uganda which could be successfully protected to be used as water supply points or water source for small scale gravity systems. Population coverage in rural water supply is estimated to be in the order of 7 to 8%. Walking distances to improved water sources are in the range of 0.5 km up to 10 km which results in people using polluted sources whenever there is such a source nearer than the improved source.

1.12 Sewerage/Sanitation: Out of the 56 towns, some 13 have sewer systems although most of them are not in full operation today. Eleven of these 13 towns have populations over 15,000 and 2 are smaller towns, namely Iganga and Lira. It is estimated that only some 20% of the total urban population in these 13 towns would be served even if these systems were rehabilitated to operate at their design capacity. Taking into account properly constructed and maintained alternative methods of excreta disposal, mainly septic tanks, it is estimated that some 30% of Uganda's total urban population has appropriate sewerage/sanitation service. The use of pit latrines is rather common in Uganda as building regulations traditionally require construction of appropriate excreta disposal facilities at each individual house. In general, however, the standard of latrines and other facilities needs to be improved. In rural areas the main method of excreta disposal is pit latrines although it is not as common as in urban areas to have a latrine in the household. Distribution of pit latrines greatly varies from area to area. However, generally latrine facilities have deteriorated due to neglect and conditions in the past decade. There is no proper statistical material available of actual sanitation coverage but it is estimated that some 10% of the rural population have adequate sanitation facilities.

1.13 Solid Waste Disposal: Before 1972 all major Uganda towns had a well organized refuse collection and disposal system. In Kampala and Jinja

refuse was collected from dustbins by compacting refuse trucks. In all cases refuse was disposed of on landfill sites. Today only a fraction of the 1972 refuse equipment is available, services are not regular and cover only the central areas of town. Refuse is therefore disposed of anywhere, in streets, backyards, vacant plots and sanitary lanes or people bury or burn it. Besides flies and rats, refuse heaps also attract domestic animals. Due to the exodus of the Asian community from the towns there was also a significant change in the nature and quantity of refuse from a "dry" and less bulky to a "wet" (vegetable and fruit) and more bulky type which decomposes very quickly and would need to be collected more frequently.

Cost Recovery

1.14 There is no clearly set government policy on recovering investment and operating costs from the consumers of water supply and sanitation services provided by WDD. The draft Decade Action Plan for Uganda provides little guidance in this regard, as it suggests that "the actual charges to be levied should not be based solely on the recovery of investment, operation and maintenance costs but need to be broadly based on social benefit/cost consideration." In other words, a right balance between financial and social/health consideration should be found when pricing the water/sanitation services. In practice, rural services are provided free of charge and public standpipes in urban areas were decreed free of charge since the early 1970s. Most of the urban supplies run by the WDD rely on government support (subsidies) to meet their operation and maintenance costs. NWSC which presently is responsible for three urban centers (Kampala, Entebbe and Jinja) is required by its founding law, (section 14(1)) to ensure that its revenues provide adequately for the overall cost of operation and maintenance of its services as well as for depreciation, debt service and a reasonable return on investment, but, because of low tariffs and poor collections, has also had to rely on government subsidies to cover its operation and maintenance costs. For refuse collection, government policy is full cost recovery by local authorities, but in practice block grants provide from 60-85% of operating expenditures.

Sector Objectives

1.15 The Government endorses the goals of the International Drinking Water Supply and Sanitation Decade and is giving high priority to the water sector. The Government has put together a recovery program, which was recently updated and published in October 1983. This Revised Recovery Program (RRP) maps out a coherent short-term development strategy, embracing macro-economic and sectoral policies as well as individual projects. The basic objective is to revive the productive sectors through rehabilitation and improved utilization of existing capacity. For the water supply and sewerage sector, the basic objective is to restore the basic services through rehabilitation of existing water supply and sewerage facilities. The investment program for the sector is shown in Annex 1. With the assistance of UNDP and the Bank Group, an updated water sector study/action plan will be produced in 1984 using various previous studies

prepared by WHO, SIDA and UNICEF. This study will help the Government to improve its planning capabilities in the water sector. Considering the enormous backlog in services (paragraphs 1.10 to 1.13), the weak institutions and poor implementation capacity, high degrees of service coverage by the end of the decade will be difficult to reach. The proposed project, which is focusing on rehabilitation of existing facilities of water supply, sewerage and refuse disposal in seven major towns of Uganda will be of great importance and has high priority within the sector objectives.

Sector Development

1.16 With the present ongoing and proposed projects of the Bank, EEC, ADB, IDB, the Federal Republic of Germany and France almost all major existing urban water supply schemes in Uganda will be rehabilitated by about 1987/88 and the respective organizations strengthened by the provision of technical assistance, improvement of billing and collection and introducing appropriate water tariffs.

1.17 UNICEF is active in rural water supply programs up to 1986. The program is mainly focusing on rehabilitation and it is estimated that it will benefit the following incremental rural populations:

(a)	rehabilitation of boreholes	1.00 million
(b)	spring and shallow well program	0.35 million
(c)	new borehole drilling	0.15 million
		1.50 million

It is estimated that this would raise the coverage in service in rural areas from about 7 to 15 %.

1.18 At the same time the urban water supply systems will be improved, the existing sewerage systems will be rehabilitated under the proposed Bank Group and ADB projects. Major extensions of the sewerage systems in the near future are not anticipated because of their costs. The proposed Bank Group project will also provide septic tank emptiers for all urban centers in order to restore previous standards. No major external or internal programs are at present in the pipeline to improve/construct pit latrines. The low cost sanitation demonstration and health education component of the proposed Bank project would assist in developing future investment programs.

Sector Constraints

1.19 The major constraints to the improvement and expansion of the water supply and sanitation services are: (i) the scarcity of local currency resources; (ii) staffing problems due to a shortage of qualified and experienced engineers and administrative staff and to extremely low salary levels which provide little incentive to existing staff; (iii) inadequate local construction capacity and output of building materials; and (iv) weak institutions in the sector.

1.20 Relieving these constraints will take considerable time and effort, especially staffing and institutional problems. Restoring the loss of qualified manpower which has taken place over the past ten years, and developing the additional trained manpower required for planned sector expansion, will inevitably take years to accomplish. The comprehensive sector manpower and training study funded under Engineering Credit 1110-UG provides a detailed breakdown of current and future manpower requirements by specific job categories, and recommends an action plan to recruit and train the required staff over the remainder of the decade. The proposed project will begin to address the sector manpower constraint by financing a substantial training component, the main elements of which are described at Annex 12.

Sector Legislation

1.21 Existing legislation for the water sector is fragmentary. Several pieces of legislation deal with various aspects of water use. Principal among these are the Water Works Act (Cap. 137), (the Water Boards Act (Cap. 138) has been repealed, the Mining Act (Cap. 248), the Public Health Act (Cap. 269) and legislation concerning the principal project executing agency, the National Water and Sewerage Corporation Decree (No. 34 of 1972).

1.22 The Water Works Act regulates the supply of water to the public and subsidiary legislation under it provides for the supply of water to all the major towns in Uganda, including the towns whose water supply works are to be rehabilitated under the Project. Under this law, the Minister responsible for water resources may designate water authorities to construct and take over water works required or provided for the supply of water to a designated area. The power of levying rates is vested in the Minister under the Act except that such power is now exercised by the National Water and Sewerage Corporation (NWSC). This Act is limited in that it covers only the supply of water; it does not deal with the control and management of water resources generally in Uganda.

1.23 With the repeal of the Water Boards Act, the NWSC was created with the main function of developing and operating "in any specified area of Uganda, water and sewerage services on a national and self-supporting basis." NWSC has a Board of Directors, comprising public figures and representatives from various governmental organizations, and a Managing Director who is appointed by the Minister. Although as is usually the case for parastatal organizations, the Minister may give directions of a general nature to the Corporation, Section 14 provides that the corporation "shall cause its functions to be carried out so as to ensure that its revenues provide adequately for the overall cost of operation and maintenance of its services, and for depreciation, amortization, interest and a reasonable return on investment." In addition to this provision, NWSC is given the power (with prior approval of the Minister) to fix, impose and collect rates, charges and fees for water and sewerage services and to regulate the remuneration and conditions of service of officers and employees of the

Corporation. The NWSC Act also provides that NWSC may, with the prior approval of the Minister responsible for finance, borrow money from domestic and foreign sources for the purposes of its operations and it is fully authorized to enter into contracts.

1.24 Other legislation dealing with the water sector includes the Public Health Act which provides in part for the public health standards applicable to sewerage and drainage and the Mining Act which provides for the regulation of the use of water in mining operations.

1.25 In order to assist the Government in the formulation of its Water Sanitation Decade Plan, the Government requested the World Health Organization (WHO) to prepare the basic format works for such plan. In connection with this plan and in view of the fragmentary nature of the legislation in this sector, a consultant was employed under WHO's auspices to review the existing legislation and to recommend and draft appropriate legislation. The first volume of the consultant's work has been reviewed by the Bank and the second volume will be reviewed to ensure that the recommendations of the report are appropriate for the sector. During negotiations assurances were obtained that the Government would make available to the Association for its review and comment the recommendations it proposes to implement and the legislative changes to be introduced prior to their promulgation.

1.26 Notwithstanding the above statements, existing legislation for the water sector in Uganda is adequate for the purposes of the project, particularly as it relates to the role of NWSC. The recommendations which would be implemented in accordance with para. 1.25 above should enable the role of various sector institutions to be clarified and should consolidate all relevant legislation.

The Bank Group's Role

1.27 Other than the Water Supply Engineering Project (CR 1110-UG), the proposed project would be the first Bank Group activity in the Uganda Water Supply and Sanitation Sector. The Bank Group current lending strategy places emphasis on fast-disbursing assistance to finance the import requirements for economic development and rehabilitation. In the water supply and sanitation sector, the Bank aims to assist the Government in the rehabilitation of existing urban water and sewerage facilties and improve the operating efficiency of the principal sector institutions, NWSC and WDD. After this rehabilitation phase the Government will immediately need further assistance in extending the existing facilities in order to service a much higher percentage of the rapidly growing urban population.

II. THE PROJECT AREA

Location-Special Features

2.01 The project areas (Map IBRD No. 17806) comprise 7 major towns including Kampala, the capital of Uganda, Jinja, Entebbe, Masaka, Mbarara, Tororo and Mbale. While Kampala, Jinja and Entebbe draw their raw water from Lake Victoria which is of good quality, the other four towns depend on river water which requires extensive treatment. The seven towns have a combined population of about one million, that is about 75% of the total urban population of Uganda.

Existing Water Supply and Waste Disposal Systems

2.02 All project towns have central water supply systems consisting of conventional water treatment works, reservoirs and distribution network. Supply is either through house connection, private or public standpipe. The water consumption is not metered at present; existing water meters are either out of order or are not read. Water from Lake Victoria (Kampala, Jinja and Entebbe) is usually treated in rapid gravity filters and chlorinated while river water (Masaka, Mbarara, Tororo and Mbale) is additionally pretreated by aluminum sulphate and sedimentation. All these water supply systems have been badly neglected in the past 10 years and necessary replacement has not taken place. As a result, all existing systems are operated below their design capacity. Water losses in the distribution systems are high (25% to 40%) and water is wasted due to absence of water metering and too low tariffs. The unserved population obtains its supplies from usually unprotected sources (wells, rivers, lakes). The indivudual water supply facilities of the project towns and their deficiencies are described in detail in Annex 2.

2.03 Sanitary sewage schemes with central sewage treatment works have been developed in all seven project towns between the 1940s and Independence, covering predominantly the commercial town centers, the industrial areas (Kampala, Jinja, Mbale) and some residential areas. During the past decade, however, operation and maintenance of all existing sewerage facilities has been neglected. Sewers are blocked, mechanical and electrical components of pumping stations and sewage treatment works are out of operation. The local authorities lack adequate equipment, funds and trained staff to operate the schemes satisfactorily. As a result raw sewage overflows from sewers and by-passes treatment works, finally polluting water courses and creating health hazards. Many septic tanks have not been emptied for years and are often overflowing. The individual sewerage facilities are described in detail in Annex 2.

2.04 Pit latrines are very common in urban centers. In general there is capable public health personnel in MOH as well as in the Town Councils

(Public Health Department) for supervising and organizing latrine construction programs. However due to lack of funds and materials, existing pit latrines are generally of poor standard or are only temporary structures.

2.05 More than ten years ago all seven project towns had functioning solid waste collection and disposal systems. Most of them used collecting vehicles of the compacting type. Over the years, most of the equipment fell into a state of complete disrepair; replacements did not take place. Today only a fraction of the previous equipment is available and there is a serious lack of spare parts. In addition the composition of the waste has changed from light and bulky to more dense and higher moisture content (vegetables, fruits). At present only three compacting trucks are in use in Kampala, Jinja, Mbale and the waste collecting system is running on a very small scale. Kampala uses skips (5.5 m^3) and containers (15 m^3) in the inner town and at some markets. The other towns use open trucks which are also used for other activities of the city council. All the towns have small landfill sites and they are not operated as sanitary landfills. The existing facilities are described in detail in Annex 2.

Population Served and Standards of Service

2.06 The table below summarizes the data on population served in 1983 through public water supply and present standards of services in the various project towns.

	Population in 1000's			Service Coverage in % of Served Population			Ratio of Actual 1/ Water Supply to Demand of Served Population
	Total	Served		Private	Private	Public	
	No.	No.	%	Connection	Standpipe	Standpipe	
Kampala	686	391	57	31	13	56	0.6
Jinja	119	66	56	44	39	17	0.9
Entebbe	22	19	86	57	9	34	0.6
Masaka	35	31	90	20	47	33	0.7
Mbarara	32	29	90	16	62	22	0.6
Tororo	27	22	80	18	42	40	0.4
Mbale	34	32	94	14	57	29	0.8
Total	955	590	62 2/	30 2/	24 2/	46 2/	0.6 2/

At average approximately 62% of the total population is served and only 60% of the actual water demand of the served population can be covered by the present output of the waterworks.

1/ Due to inadequate or intermittent water supply caused by the poor state of repair, lack of maintenance and need for replacement.

2/ Weighted average.

2.07 Sanitary services and facilities in the project towns consist of sewer systems, septic tanks and pit latrines. The table below summarizes the data on present (1983) standards of services in the various project towns.

	Population in 000's Total No.	----Service Coverage % of Total Population----			
		Sewerage	Septic Tanks	Pit Latrines	No Facilities
Kampala	686	17	8	67	8
Jinja	119	29	9	53	9
Entebbe	22	5	23	64	8
Masaka	35	17	11	61	11
Mbarara	32	14	6	70	10
Tororo	27	7	7	75	11
Mbale	34	30	12	50	8
Total	955	18	9	65	8

2.08 Refuse collection is limited at present to the central town areas and market places. It is estimated that at present (1983) only 38% of the total urban population is served. The service is not regular. People have to carry the refuse to containers or central refuse dumps from where it is removed by skip loaders or loaded onto trucks.

Population Projections and Water Supply Demand

2.09 Given the present economic conditions in the country, estimating the future urban population growth trends is difficult. Based on the 1980 census and population growth studies carried out by the Town and Regional Planning Department of the Government and available previous studies, the population has been projected as follows:

Town	---Population in 000's--- 1980	1983	1986	1990	Projected Annual Increase
Kampala	500	686	792	962	5%
Jinja	95	119	141	172	7.2% in 1983/1984 thereafter 5%
Entebbe	20	22	25	30	3% up to 1985 thereafter 5%
Masaka	32	35	38	46	2.6% up to 1985 thereafter 5%
Mbarara	30	32	36	44	"
Tororo	25	27	30	36	"
Mbale	31	34	37	45	"
	733	955	1,095	1,335	

2.10 The future water demands of the seven towns are contained in Annex 3. The demand projections are based upon unit water demands for house connections, private standpipes (one tap in front of the house) and public standpipe users, projected served population and demands by industrial, commercial and institutional water consumers. Average projected domestic unit water demands for the project towns are:

Public standpipe users	20 l/cd
Private standpipe users	80 l/cd
House connections	180 l/cd

These consumption levels have been estimated by the consultants and found satisfactory by the Bank Group. Losses are estimated at 25% to 35% of the total production. It is assumed that these losses will be reduced by 5-10% in 1988 by the proposed leak detection works. Such works can only be carried out after the water pressure in the network has been restored. That means that in many parts of the distribution system leak detection will only be possible after the rehabilitation of the water works. The tables in Annex 3 demonstrate very clearly not only the present emergency situation for water supply and the urgency of a second project which would focus on extension of the water supply systems. This second project should start immediately after this rehabilitation project and not later than 1986/87 in order to eliminate the water shortage and to serve a larger portion of the population.

III. THE PROJECT

Genesis

3.01 Shortly after the war in 1979, the Government invited the Bank Group to help reactivate a project initially examined in 1970 to expand the water supply and sewerage systems in Kampala and Jinja. When the status of the earlier work was reviewed, it was concluded that the available

information should be updated and additional work be undertaken to cover other priority towns as the Government had requested. Recognizing the Government's manpower constraints, the engineering project was proposed and approved in March 1981 (CR 1110-UG). It assisted the Government with the preparation of master plan updates, feasibility and preliminary engineering studies for the rehabilitation and expansion of the water supply and sanitation (sewerage, low cost sanitation and solid waste disposal) facilities of seven major towns, Kampala, Jinja, Entebbe, Mbarara, Masaka, Mbale and Tororo. At that time, Arua could not be included in the project because of the security situation in the far northeast West Nile province. Through the engineering credit the preparation of the water supply and sanitation rehabilitation project has been advanced so that appraisal could take place in October/November 1983.

Project Objectives

3.02 The main objectives of the proposed project are:

(a) to alleviate the existing emergency situation in the seven major towns through rehabilitation of existing water supply and sewerage facilities and of refuse collection and disposal;

(b) to demonstrate the benefits of low-cost sanitation through the introduction of a pilot scheme, combined with a health education program; and

(c) to strengthen the two water sector agencies, NWSC and WDD, with the main emphasis on NWSC in light of the Government's commitment to expand its role through provision of technical assistance and training.

The focus of the proposed project is on rehabilitation. Refuse collection would remain the responsibility of local councils. Inclusion of this project component is considered important for reasons of public health. The level of proposed IDA financing (para. 3.07) and the design of procurement packages reflects the Government's limited ability to contribute to the project and the serious shortage of contracting capacity in the country. Highly unattractive employment conditions make it difficult for NWSC and WDD to attract and retain qualified staff, and thus the rehabilitation of these two organizations, including their finance and accounting functions, will take several years, even with technical assistance and training.

Project Description

3.03 The project would cover seven towns in Uganda (Kampala, Jinja, Entebbe, Masaka, Mbarara, Tororo and Mbale) and would comprise:

(a) the rehabilitation of existing water and sewage treatment works;

(b) the replacement of corroded water mains, reservoirs, and the construction of oxidation ponds;

(c) the supply of the most urgently required equipment for refuse collection and disposal, and for septic tank emptying;

(d) a pilot latrine construction and public latrine rehabilitation program and a health education component; and

(e) the implementation of a training program and the provision of technical assistance and consultancy services for supervision and engineering designs for a follow-up project.

A detailed description of the project components is given in Annex 4.

Coordination With Activities of Other Donors

3.04 Activities of other donors in this sector have been fully taken into account in the preparation of the project. The European Economic Community (EEC) is rehabilitatingthe Kampala waterworks, financing the laying of water mains and installation of pumps (pipes and pumps have been supplied by the Islamic Development Bank), and providing technical assistance to NWSC (one technical advisor to the managing director, one finance manager, one workshop trainer and a mobile workshop). Within the framework of the project, the Federal Republic of Germany (executing agency GtZ) is providing the following technical assistance to NWSC: One waterworks superintendent, based in Kampala but responsible for operation and maintenance and training on the job in all seven project towns, one sewerage works superintendent with same responsibilities, one low cost sanitation engineer based in Kampala in the Ministry of Health or Local Government and one low cost water supply engineer based in the headquarters of WDD in Entebbe as advisor to the Commissioner. It will also provide spare parts, pipe material and workshop equipment. The African Development Bank (ADB) is financing the completion of the sewer/oxidation pond system in Mbarara. The total value of the above activities of other donors amounts to US$16.5 million (parallel financing).

Cost Estimates

3.05 The total project cost is estimated at US$30.8 million excluding taxes and duties. Approximately 74% or US$22.7 million would be foreign costs. A summary of the cost estimate is given on the following page; a detailed cost breakdown is given in Annex 5.

3.06 The base cost estimates are expressed in January 1984 prices and are based on revised and updated data of preliminary design reports prepared by the consultants. Physical contingencies have been taken as 20% of the base cost for rehabilitation works and 10% for supply of material and all other project components. Foreign price contingencies have been assumed at 3.5% in 1984, 8% in 1985 and 9% thereafter. Local price

Summary of Project Cost Estimates

	UShs Million			US$ Million			% of
	Local	Foreign	Total	Local	Foreign	Total	Total
1) Rehabilitation, replacement and urgent extension works for							
Kampala: water supply	276	696	972	0.92	2.32	3.24	10.5
sewerage	57	243	300	0.19	0.81	1.00	3.2
Jinja : water supply	87	486	573	0.29	1.62	1.91	6.2
sewerage	78	105	183	0.26	0.35	0.61	2.0
Entebbe: water supply	27	183	210	0.09	0.61	0.70	2.3
sewerage	15	15	30	0.05	0.05	0.10	0.3
Masaka : water supply	57	153	210	0.19	0.51	0.70	2.3
sewerage	24	99	123	0.08	0.33	0.41	1.3
Mbarara: water supply	12	108	120	0.04	0.36	0.40	1.3
sewerage	-	15	15	-	0.05	0.05	0.2
Tororo : water supply	186	534	720	0.62	1.78	2.40	7.8
sewerage	12	39	51	0.04	0.13	0.17	0.5
Mbale : water supply	9	6	15	0.03	0.02	0.05	0.2
sewerage	63	54	117	0.21	0.18	0.39	1.2
Sub-total	903	2,736	3,639	3.01	9.12	12.13	39.4
2) Supply of refuse disposal equipment and septic tank emptiers in all 7 towns							
Refuse disposal equipment	111	675	786	0.37	2.25	2.62	8.5
Septic tank emptiers	-	114	114	-	0.38	0.38	1.2
Sub-total	111	789	900	0.37	2.63	3.00	9.7
3) Low cost sanitation and health education for all 7 towns:							
Low cost sanitation	114	36	150	0.38	0.12	0.50	1.6
Health education	39	66	105	0.13	0.22	0.35	1.1
Sub-total	153	102	255	0.51	0.34	0.85	2.7
4) Training, technical assistance and sundries							
Training	3	225	228	0.01	0.75	0.76	2.5
Technical assistance	-	225	225	-	0.75	0.75	2.4
Supply of vehicles to NWSC and WDD	-	90	90	-	0.30	0.30	1.0
Housing for NWSC	90	60	150	0.30	0.20	0.50	1.6
Supply of office equipment for NWSC and PCU and supply of chemicals for water works	6	54	60	0.02	0.18	0.20	0.6
Consultancy services	210	600	810	0.70	2.00	2.70	8.8
Sub-total	309	1,254	1,563	1.03	4.18	5.21	16.9
5) Total Base Costs (January 1984)	1,476	4,881	6,357	4.92	16.27	21.19	68.7
6) Contingencies							
Physical	231	726	957	0.77	2.42	3.19	10.4
Price	720	1,584	2,304	2.40	4.05	6.45	20.9
Total Contingencies	951	1,941	2,892	3.17	6.47	9.64	31.3
7) Total project cost	2,427	6,822	9,249	8.09	22.74	30.83	100.0

contingencies have been assumed at 20% in 1984, 10% in 1985, 8% in 1986 and 6% thereafter. Goods and services imported for the project will be free of duties and taxes. In the program for project expenditure (Annex 6) the following project implementation schedule has been assumed:

	Percentage of Total Works				
	1984	1985	1986	1987	1988
Mechanical, electrical and civil works	5	30	30	25	10
Supply of major equipment		50	50	-	-
Vehicles, mobile workshops	-	100	-	-	-
Low-cost sanitation, houses and offices	-	30	30	30	10
Chemicals, leak detection and workshop equipment and materials	-	50	50	-	-
Health education training technical assistance and consultancy services	5	25	30	25	15

Project Financing

3.07 Considering the great importance of the project for the recovery of the country, the high priority given to it by the Government, and the fact that the nature of the project (rehabilitation) requires quick implementation, that foreign contractors will need to be involved in most of the works, and the acute shortage of local funds, it is proposed that the Bank Group finance about 90% of the total cost. The proposed project financing, net of taxes (averaging 12%), would then be as follows:

Sources of Funds	US$ Million	%
IDA Credit	28.00	90.8
Government of Uganda	2.83 1/	>.2
Total	30.83	100

1/ Participation by other donors is possible, e.g., by EEC, UNDP and ODA in financing parts of the training component of the project. No firm commitments are available at present.

The IDA Credit would finance 100% of the foreign cost (US$22.7 million) and 65% of the local cost (US$5.3 million equivalent). Assurances were obtained during negotiations that the Government would provide the balance of the project costs in accordance with the program of project expenditure as shown in Annex 6 and that the Government would apply the "Window 2" rate (UShs300=US$1 at present) for all transactions of Bank Group funds (US$) into UShs for payments made in local currency.

Project Implementation

3.08 The following agencies would be responsible for the implementation of the project:

(a) The Water Development Department (WDD) of the Ministry of Lands, Mineral and Water Resources (MLMWR) which is responsible for national water resources, and the development, operation and maintenance of all water supply and sewerage systems.

(b) The National Water and Sewerage Corporation (NWSC), an autonomous parastatal organization. At present NWSC operates only the systems at Kampala, Jinja and Entebbe.

(c) The Ministry of Health, for implementing the health education component. The Ministry has fully endorsed this project component and is adequately staffed to monitor the implementation.

(d) For the refuse collection component, the local councils concerned, under the supervision of the Ministry of Local Government. A refuse expert of the Project Coordination Unit (provided through this project) will ensure the successful implementation.

3.09 The Project Coordination Unit (PCU) which was established under the engineering project and reports directly to the MLMWR would be responsible for the coordination between the various agencies and for the total project accounting. In order to perform this job the PCU will be reinforced by technical assistance (financed under the Engineering Credit 1110-UG). The PCU would prepare quarterly "Project Progress Reports" and, after completion of the project, a "Project Completion Report" on the basis of Bank guidelines.

3.10 MLMWR, with IDA approval, will retain the consultants H.P. Gauff KG and Parkman Ltd. (who are responsible for preparation of detailed engineering and tender documents under the engineering project, CR 1110-UG) for supervision of construction. Gauff will remain responsible for the projects in Kampala, Jinja and Entebbe and Parkman for Masaka, Mbarara, Tororo and Mbale.

3.11 According to the project implementation schedule (Annex 7) tender documents would be issued in June 1984. The General Procurement

Notice was published on Jan. 16, 1984. Pre-qualification documents from contractors have been sumitted on March 16, 1984. All major contracts would be awarded by October 1984. Construction of the project would be substantially completed by July 1988. Closing date for the credit would be September 30, 1989. The acute need for the services requires quick project implementation and a construction time of only four years has been allowed. Appropriate measures are built into the various contracts and project management procedures to ensure that this relatively quick implementation program will succeed. Financing (para. 3.07) and procurement packages (para. 3.12) have been designed to reach the target.

Procurement

3.12 Since quick implementation of the project is essential and since appropriate local contracting capacity is not available, procurement packages have been prepared which are attractive to large international contractors (who may subcontract part of their work to small local contractors) and stringent prequalification procedures will be applied. Strong Government support, technical assistance, and stringent supervision are expected to ensure smooth project implementation.

3.13 Contracts would be grouped as follows:

(a) To be procured under ICB:

(i) Contract 1A and 1B 2/ (Mechanical & Electrical Works): Comprising all mechanical and electrical work (supply of plant and materials and installation) for water works, sewage treatment plants, and water and sewage pumping stations rehabilitation/extensions. The contracts would include the preparation of detailed installation drawings and a six-weeks training of local staff in operation and maintenance after completion of the works. Contracts 1A and 1B would be awarded separately or to one contractor--estimated total cost is US$6.4 million.

(ii) Contract 2A and 2B (Civil Works): Comprising all civil works (including supply of all required materials) for replacing water and sewer mains, rehabilitation/construction of sewage oxidation ponds, construction of concrete reservoirs, relining of existing steel water pipes, repair/construction of public latrines and minor building works required under contracts 1A and 1B--the estimated total cost is US$9.7

2/ 'A' would be for Kampala, Jinja and Entebbe, under NWSC, with consultancy services provided by Gauff. 'B' would be for Masaka, Mbarara, Tororo and Mbale, under WDD, with consultancy services by Parkman.

million. The coordination between civil and mechanical works contractors will be specified in the tender documents.

(iii) Contract 3 (Supply Contract Package for All Towns): Comprising the supply of refuse disposal vehicles and equipment, septic tank emptiers, sewer maintenance equipment and spare parts, supply of vehicles and of one mobile workship. The contract will include training of local staff by the supplier in the use of the equipment—the estimated total cost is US$6.0 million;

(b) To be procured under LCB or limited ICB: Local competitive Bidding (LCB) would apply to the following contracts estimated total cost US$2.4 million representing about 8% of total project cost:

(i) construction of houses and offices (designed and supervised by local architect);

(ii) supply of material for low cost sanitation;

(iii) supply of office material, material for health education and training;

(iv) supply of furniture for houses and offices, supply of chemicals, bicycles and motor cycles and supply of leak detection equipment; and

(c) "Other" procurement arrangements would be made for parts of the low cost sanitation component, for technical assistance, for consultancy services and for overseas training. The estimated total cost is US$6.10 million.

(i) Construction of pit latrines (low-cost sanitation) will either be by force account of local authorities --town councils--or by small contractors.

(ii) Technical assistance will be part of a package presented by the Federal Republic of Germany (executing agency GtZ).

(iii) Consultancy services for supervision and final design for a follow-up project will be provided by the consultants (Gauff, Parkman) which have prepared the engineering designs and tender documents for the project. The estimated cost is US$2.7 million.

All bidding documents for contracts awarded under ICB will be reviewed by IDA prior to issue. Minor contracts to be awarded under LCB will be reviewed on a selective basis after award. The total value of contracts to be awarded is estimated at:

(a) ICB US$22.3 million;

(b) LCB US$2.4 million; and

(c) "Other" US$6.10 million.

3.14 Procurement arrangements, cost of packages and source of finance are summarized in Annex 8. Local bidding procedures were examined during appraisal and are acceptable to IDA (the appropriate documents are available on file).

3.15 All bidding packages for goods estimated to cost over US$150,000 equivalent and bidding packages for works over US$500,000 equivalent would be subject to IDA's prior review of procurement documentation resulting in a coverage of about 90% of the total estimated value of contracts for goods and 95% of all works contracts. The balance of contracts would be subject to random review by IDA after contract award.

3.16 Disbursements for works carried out by force account would be made against Statements of Expenditures (SOE), the documentation for which would not be submitted for review but would be made available for inspection by IDA during the course of supervision mission.

3.17 Preference for domestic manufacturers and contractors may be granted by the borrower but will only apply for minor works and supplies (Annex 8). Qualifying domestic manufacturers would receive a preference in bid evaluation of 15% or the import duty whichever is lower. For civil works, qualifying domestic contractors would receive a preference in bid evaluation of 7½%.

Disbursements

3.18 The table below gives the categories to be financed out of the credit, the amounts and the percentage to be financed in each category.

Category	US$ Millions Total Cost a/ (Incl. Contingencies)	Amount of Credit Allocated	% of Expenditures to be Financed
1. Mechanical/electrical works for water supply and sewerage	6.4	6.0	100% of all foreign costs and 65% of all local costs
2. Civil works for water supply and sewerage	9.7	8.5	
3. Supply of refuse equipment, septic tank emptiers, sewer maintenance equipment, vehicles and mobile workshop	6.0	5.7	
4. Construction of houses and offices and low cost sanitation measures	1.8	1.3	
5. Supply of furniture, office material, chemicals, leak detection equipment, pipe material and workshop equipment	0.8	0.7	
6. Health education and training	1.7	1.6	(for health education, 100% of local costs)
7. Consultancy services and technical assistance	4.4	4.2	
8. Unallocated	-	-	
9. Total	30.80	28.00	

a/ Net of taxes.

3.19 The forecasts of annual project expenditures are shown in Annex 6. The schedule of credit disbursements (Annex 9) reflects the quick implementation of this rehabilitation project (see paras. 3.07 and 3.12). The region wide disbursement profile for the sector is not considered appropriate in this case (see paragraph 3.11). Closing date for the Credit would be September 30, 1989.

International Water Rights Issues

3.20 Water for three towns included in the project, Kampala, Entebbe and Jinja, is drawn from Lake Victoria which is part of the Nile River system. Prior to 1959, the utilization of Nile River waters was governed by agreements or exchange of letters between the United Kingdom (acting on behalf of several of its colonies) and Egypt. However, since that year, the validity of these agreements has been questioned by several of the riparian states and there do not appear to be international agreements binding on all riparians which cover the use of such waters. Nevertheless, the Government of Uganda has informed all down-stream riparians of the proposed project. They voiced no objection.

3.21 Water for the town of Tororo has been drawn since 1948 from the River Malaba which forms part of the boundary between Kenya and Uganda. The Government of Uganda sought and received the Government of Kenya's agreement to an increased abstraction of water from the river for the water supply of the town of Tororo.

Health and Environmental Aspects

3.22 By rehabilitating the existing water supply facilities in the seven major towns of Uganda the project is expected to reduce the incidence and risk of diseases attributable to lack of safe and adequate water. The increase in water supplies will lead to an increase in waste water. Since the existing sewerage systems are not functioning well or at all, the project will also include the rehabilitation of these facilities. The financing of urgently required septic tank emptiers and refuse disposal equipment for all seven towns will also contribute considerably to reduce present health risks.

3.23 The project is also focusing on the improvement of health education especially in connection with the construction and use of low cost sanitation facilities (pit latrines). An outline of the proposed health education component of the project with its objectives, proposed strategies, action, evaluation and monitoring mechanisms is given in Annex 10.

Manpower and Training

3.24 Uncompetitive employment conditions will continue, possibly for some years, making it difficult for NWSC and WDD to attract, motivate and retain qualified staff. Technical assistance and training by themselves will not remove this constraint to the institutional development of the two sector agencies. Despite this the project will begin to establish sector training capability while at the same time ensuring that training needs related directly to the project are met.

3.25 The training program will focus on the training of:

(a) existing and new staff to manage, operate and maintain the water supply and sewerage facilties to be rehabilitated;

(b) accounts and revenue collection staff at headquarters and branch offices;

(c) leakage detection and control staff; and

(d) a cadre of counterpart training staff as the nucleus on which to build and expand the training program through possible future project(s).

Land Acquisition

3.26 Assurances were obtained during negotiations that MLMWR has acquired the land necessary for the construction of waste stabilization ponds in Mbale and Jinja and for the construction of four houses in Kampala.

IV. THE BORROWER AND THE IMPLEMENTING AGENCIES

Lending Arrangements

4.01 The Borrower would be the Government of Uganda. About USh 3,241.8 million (US$10.8 million) of the Credit would be onlent to NWSC for 20 years, including 4 years of grace, at a variable interest rate, to be adjusted annually, equal to the minimum rate established by the Government for commercial bank loans plus 3%. The onlending rate has been assumed at 17% for the first three years and, in light of the expected decline in the rate of inflation, at 10% thereafter. About USh 1,389.0 million (US$4.6 million) would be passed to NWSC as government equity. USh 2,530.2 million (US$8.4 million) would be allocated to WDD, while the balance would be allocated to the Ministry of Health for implementing the health education component, and to the local councils for implementing the refuse collection component under the supervision of the Ministry of Local Government. Completion of the subsidiary loan agreement between Government and NWSC would be required as a condition of effectiveness.

Organization and Management

4.02 NWSC and WDD would have prime responsibility for implementation of the physical components of the project (paras. 3.03-3.10).

4.03 NWSC, an autonomous parastatal reporting to MLMWR, was established in 1972 to develop and operate water supply and sewerage systems in any area specified by MLMWR. The Minister of MLMWR has direct

responsibility for overseeing the activities of NWSC, which is headed by a Board of Directors comprising public figures and Government representatives. Day-to-day control over NWSC's activities rests with the Managing Director and his Deputy. NWSC is organized into three functional departments at headquarters in Kampala: Engineering, Finance and Accounts, and Personnel and Administration. These departments are headed respectively by the Chief Engineer, the Chief Accountant 3/ and the Corporation Secretary, all reporting to the Managing Director through his Deputy. The two field branches, Kampala/Entebbe and Jinja, each have three sections corresponding to the departments at headquarters. An organization chart of NWSC is shown as Annex 11. The present Managing Director is well qualified and conscientious. The Chief Accountant is qualified and the Finance Manager and other professional staff being provided by the EEC and Germany (GtZ) (para. 3.04) assumed their duties in March 1984. However, NWSC is hampered by a lack of trained staff in all of its departments. Unattractive terms of employment, the result of low tariffs and inadequate levels of billing and collections, are the main explanation for NWSC's inability to attract and retain competent staff in sufficient numbers (paras. 4.05 and 4.06). To improve the situation to a point where its compensation package could be considered competitive with those offered by financially healthier parastatals, NWSC in July 1983 presented to its Board a proposal that would have raised its annual salaries and wages bill from USh 44.0 million to USh 75.0 million and provided a further USh 89.0 million in various allowances (transport, lunch, etc). Approved by the Board, the proposal was rejected by the Minister, MLMWR, as both too expensive and untimely in light of unchanged tariff levels and requests by NWSC in past years for government subsidies to meet its payroll. A 26% increase in basic salary was awarded, with no adjustments to allowances, although the staff at WDD had in the meantime received increases of 20% and 50% in April and July 1983 respectively. Based on the increases in tariffs (para. 5.07) and on improvements in billing and collections, already in progress (para. 4.14), Government has now adjusted NWSC's staff remuneration so as to restore parity with WDD.

4.04 An organization chart of WDD is also shown in Annex 11. Four Assistant Commissioners for Water Resources; Construction and Development; Planning, Design and Documentation; and Operation and Maintenance respectively, and the head of Accounts and Administration report to the Commissioner through his Deputy. Essentially, WDD's problems are similar to NWSC's, although in many instances manpower shortages can be overcome by transferring staff from other ministries. As the towns of Masaka, Mbarara, Tororo and Mbale are scheduled to be transferred to NWSC's control by July 1988, the proposed project seeks to strengthen WDD primarily in terms of its accounting and finance functions by requiring the implementation of major organizational, staffing and procedural changes (para. 4.13).

3/ The Finance and Accounts Department will be formally headed by the Finance Manager after his post has been officially established (para. 4.09).

Training

4.05 Based upon a comparison of the number of existing employees with the number required to man existing water supply and sewer systems at a level which will ensure uninterrupted operation and adequate maintenance, serious manpower deficiencies and shortages exist for engineers, qualified accountants, skilled craftsmen and treatment plant operators.

4.06 The major constraint to the sector's ability to recruit, train and retain the staff it requires is the extremely low level of pay and employment benefits provided. This situation is exacerbated by a shortage of professional personnel staff and the total lack of any trained full-time training staff. Despite these constraints, the inexperience of some higher level staff and the adverse circumstances in which the sector is required to operate, the level of staff motivation and enthusiasm is relatively high. The competence of the longer serving sub-professional staff appeared to be adequate; on-the-job refresher training programs should level out such skill variations as currently exist among these staff.

4.07 The planned output of Uganda education and training institutions will not be adequate to meet the substantial manpower and training needs of the sector. For example, of Makerere University's annual output of 60 engineering graduates (20 of them civil) only three or four can be expected to join the sector against an average requirement of twice that number. Largely through the initiative of WDD in 1979, a three-year water technician program was established at the Uganda Technical College (UTC). Although the program now graduates about 20 technicians per year, the current sector deficiency of this category is several hundred, with an estimated requirement for an additional fifty technicians per year until 1991. Moreover, in its present form the program is inadequately water-oriented, weakly staffed, predominantly academic, and provides no supervised planned practical experience or project work during the six months allocated for this purpose. Over the past few years limited overseas training for professional and sub-professional staff has been provided, mostly through bilateral arrangements but, of the recipients remaining in the sector, few are currently occupying positions for which they received such training.

4.08 MLMWR and the implementing agencies were convinced of the necessity to augment the output of local education and training institutions through the progressive development of sector in-service training capability. Sector commitment to human resource development was clearly evident. The project therefore will finance a substantial training component which, based on the results of the Manpower and Training Study financed under the Water Supply Engineering Project (CR 1110-UG), is designed to meet the short-term training needs related to the project and to prepare the ground for the development and implementation of a long-term training strategy. The main elements of the training component are detailed in Annex 12.

Accounting

4.09 NWSC: Although NWSC's accounting procedures are basically adequate to provide information needed for financial control, and planning and management information reports, its accounts have not been finalized since 1978. This has been due mainly to NWSC's difficulty in keeping the position of Chief Accountant filled with a suitable person, to the general shortage of accounting staff on account of unattractive employment conditions (paras. 4.05 and 4.06), and to the widespread destruction of records during the war. NWSC's auditors, Coopers and Lybrand, prepared qualified accounts up to fiscal year 1978; the firm of V.R. Shah & Co. attempted to continue, but found the task impossible without the missing records. Having obtained approval from the Minister, MLMWR, as well as agreement from the Association that the audit requirements of Section 4.02 of the Project Agreement covering Credit 1110-UG be waived, NWSC has prepared a new set of accounts based on a "statement of affairs" as of June 30, 1983, yet to be audited, as a first step in rehabilitating the Finance and Accounts Department. NWSC now has a qualified Chief Accountant who does, however, still lack the experience and self-assurance to be fully effective. The EEC had originally intended to provide a Financial Advisor to the Chief Accountant for a period of 18 months but, following discussions among all concerned, the terms of reference were amended during the appraisal mission to change the position to that of Finance Manager, with line responsibility for all activities of NWSC's Finance and Accounts Department. The Finance Manager joined NWSC in March 1984, but his post has not yet been formally established. He will be required for a minimum of three years; the EEC has indicated its willingness to finance him beyond the original 18 month term. An advertising campaign, launched in May/June 1983 to fill a large number of vacancies in NWSC's Accounts Department, resulted in the recruitment in September 1983 of five accountants and 23 accounts clerks and assistants, arrears inspectors and meter readers. This success was due largely to the promise of improvements in the terms of employment. NWSC's subsequent failure to gain approval for a revised compensation package has resulted in the departure of several of the new staff, including one accountant. It is expected that further losses will be averted by the most recent improvements in staff compensation (para. 4.03).

4.10 WDD: WDD's accounting records have been maintained at MLMWR's headquarters and are prepared on a cash basis in accordance with government accounting procedures. The operating expenditures and collections for the water supply schemes operated by WDD are consolidated to show an annual comparison of actual with budgeted expenditures and collection targets. A breakdown of recurrent expenditures for WDD's various activities (rural and urban water supply, sewerage, etc.) is not provided, and information on receivables and collections is not consolidated; thus a complete evaluation of WDD's overall financial performance and position is not possible.

4.11 Meter reading, billing and revenue collections, and the payment of wages and salaries are the responsibility of WDD's branches. Each branch

Accounts Section is headed by an Executive Officer, Accounts and typically staffed with four accounts clerks. Revenue collections are required to be deposited into the bank account of MLMWR. In practice, tariffs are often incorrectly applied, customer records are incomplete, few meters exist, billing is done monthly but standards are poor in terms of accuracy and timeliness, and the ledgers maintained are inadequate. The level of revenues and accounts receivable at any given time is not readily ascertainable.

4.12 Procedures concerning WDD's budget allocations and expenditure control need to be improved. The area engineers do not participate in the budget preparation process and are not advised of their budget allocation. Consequently, there are no parameters within which they may authorize expenditures. They are instead required to forward vouchers for items other than salaries and wages to WDD's Accounts Department, where expenditures are checked against budget allocations. The actual accounting records are maintained and payments are made by MLMWR's Accounts Department. Inventory records are maintained by the branches in quantity only. Recurrent budget funds are made available to MLMWR by the Ministry of Finance in 12 equal monthly installments, but since sub-allocations to WDD do not follow the same regular pattern and WDD's Accounts Department is often by-passed when branches send vouchers to MLMWR for payment, the accounts kept by WDD are difficult to reconcile with those maintained by MLMWR. Furthermore WDD's actual allocations are often below budgeted levels because funds are diverted by MLMWR headquarters to other departments. Funds for capital expenditures are released by the Ministry of Finance to WDD though MLMWR on a project basis, following review, during the proposal stage, by the Ministry of Planning to ensure consistency with the National Development Programme. In the case of more routine capital investments, WDD is required to justify its requests only to the Ministry of Finance. Purchases valued at more than USh 200,000 are required to be made through the Central Tender Board.

4.13 Since WDD's Accounts Department had reached a situation where, due to staff constraints and a virtual collapse of the accounting and reporting system, it was unable to exercise its controlling function over revenue collections and expenditures, a competent Chief Executive Officer, Accounts, was appointed in May 1983 to rehabilitate and expand WDD's accounting systems and introduce a budget system at its headquarters and branches. He is being assisted by a deputy (Senior Executive Officer, Accounts), by three Higher Executive Officers, Accounts (HEO), for Revenues; Salaries and Wages; and Internal Audit, respectively, and by an Accountant, Bookkeeping. Also, to improve staff quality at the branch offices, four Higher Executive Officers were appointed in November 1983 to head the accounts sections at Masaka, Mbale, Mbarara and Tororo. To facilitate the process of rehabilitating and strengthening WDD, WDD's accounts were separated from those of other MLMWR departments with effect from January 1, 1984.

Billing and Collection

4.14 NWSC: Since July 1983, NWSC has billed its consumers for water supply and sewerage services on a monthly basis in all three towns. Prior to that, Kampala customers were billed quarterly. While billing is normally carried out promptly during the early part of each month, collections remain substantially in arrears. NWSC's accounts receivable for Kampala, Entebbe and Jinja were USh 155.2 million as of June 30, 1983, and USh 103.4, million as of March 31, 1984 (equivalent to about 16 months' and 11 months' billing respectively). This marks an improvement over earlier levels, which were as high as 20 months' billing, and reflects concentrated efforts to improve collections, including a rigorous disconnection program. In order to further improve collections, NWSC is also planning a campaign to identify the large number of illegal consumers. Government agencies are estimated to account for about 50% of water consumption billed, but they represent the bulk of accounts receivable (71% as of March 31, 1984). As a condition of credit effectiveness, the Government would withhold from the monthly budget allocations to its ministries monies owed to NWSC as of June 30, 1984. Accounts receivable from government ministries as of March 31, 1984 have been confirmed and verification of more recent invoices is in progress. Also, Government would ensure that the future indebtedness of its ministries does not exceed 60 days' billing.

4.15 WDD: Due to inadequacies in the accounting system (para. 4.11), and to the absence of reasonable collection targets (para. 5.02), collections from both private and government consumers are poor. Overall, collections are estimated at about 20% of theoretical revenues. Collections actually received by MLMWR are low (USh 2.5 million and USh 1.8 million in 1981/82 and 1982/83 respectively), with the unaccounted for funds frequently used by the area engineers to purchase items needed to operate and maintain their systems. Disconnection programs are not being effectively applied because they are deemed unjustified where consumers have refused payment on account of interrupted service and because the equipment needed for disconnection is often lacking. The steps being taken to rehabilitate and strengthen WDD (para. 4.13) are expected to result in major improvements in the areas of billing and collection.

Audit and Insurance

4.16 NWSC: At present, the chartered accounting firm, Coopers and Lybrand, whose staff in Uganda is adequately qualified and headed by two

partners who are Ugandan nationals, serves as NWSC's auditors. Assurances were obtained that annual accounts audited by independent auditors acceptable to the Association would be submitted to the Association within nine months of the end of the financial year.

4.17 WDD: WDD is subject to annual audits which are carried out regularly by the Auditor General's Department. Annual audits would be performed of project expenditures and audited statements would be submitted to the Association within nine months of the close of the fiscal year. SOE would be separately audited and an annual audit report submitted within nine months after the end of the fiscal year in which the expenditures were incurred.

4.18 As NWSC maintains no insurance program of any kind, assurances were obtained during negotiations that the Corporation would obtain adequate cover for its assets. WDD, being a government department, is self-insured. Assurances were obtained during negotiations that project equipment and materials for WDD would be covered by marine and transit insurance to site, in appropriate foreign exchange needed to replace equipment and materials lost or damaged.

V. FINANCIAL ASPECTS

Past Performance and Present Financial Position

5.01 NWSC: The Corporation's accounts have not been finalized since 1978 (para. 4.09), but the available information indicates that NWSC has consistently experienced difficulties in generating and collecting revenues to cover normal operating expenses and has had to rely repeatedly on government subsidies to meet its payroll (para. 4.03). The newly introduced tariff increases (para. 5.07), combined with an intensified collection effort and with the Government's commitment to reduce its share of NWSC's accounts receivable (para. 4.14), are expected to improve NWSC's financial position significantly. Lower staff turnover resulting from improved compensation levels together with the appointment of a Finance Manager (para. 4.09) are expected to bring further benefits.

5.02 WDD: Aggregate recurrent expenditures and revenues for WDD's entire operations for fiscal years 1980/81 to 1983/84 are summarized below; details are provided in Annex 13.

Revenues and Recurrent Expenditures
(USh million)

	1980/81		1981/82		1982/83		1983/84	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual a/
WDD budget request b/	n/a	—	n/a	—	n/a	—	964.1	—
Total expenditures c/ (Total Program)	113.2	76.8	360.4	322.3	330.6	160.0	481.0	43.9
Revenue collections (Appropriations in aid)	0	0	0	2.5	0	1.8	50.0	n/a
Budget allocation (Net Total Program)	113.2	76.8	360.4	319.8	330.6	158.2	431.0	n/a

a/ Through October 31, 1983.

b/ Submitted as part of MLMWR's request. Records prior to 1983/84 have been lost.

c/ Expenditures below authorized levels reflect use of WDD funds for other MLMWR departments as well as reductions in funds made available by the Ministry of Finance.

The above summary reveals that WDD had not had sufficient funds to operate and maintain water supply systems to satisfactory standards. Collection targets were not set prior to the 1983/84 fiscal year. The department has never generated any substantial revenues and cannot realistically expect to meet its 1983/84 target. It therefore relies on budget allocations from the Ministry of Finance, but due to Uganda's difficult economic situation, the funds made available regularly fall short of requirements.

5.03 A summary of WDD's expenditures on development from 1980/81 through 1983/84 is given in Annex 14. Information on WDD's budget requests is not available, but implementation has not exceeded 69% of the annual budget provided for water supply and sewerage.

5.04 To ensure that the Government's funding for the project would be available when needed, Government would establish, as a condition of Credit effectiveness, a Project Advance Account into which it would deposit its share of project cost at the beginning of each quarter, with an initial deposit set at USh 90 million.

Tariffs

5.05 The Government was required under the Development Credit Agreement for the Water Supply Engineering Project (CR 1110-UG) to put into effect, by January 1, 1983, a program to revise the structure of the water supply and sewerage tariffs of WDD and NWSC. The program was to reflect the conclusions of a tariff study on which work was to commence by November 1, 1981. Largely due to the post of Project Coordinator remaining vacant for several months following the death of the original incumbent and to the current understaffing of the PCU, terms of reference reviewed and approved by the Association were only recently sent to several consultants qualified to undertake the work, with a deadline for submitting proposals set at January 31, 1984 and a target date of June 30, 1984 established for award of contract. The draft of the tariff study is expected to be ready by the end of 1984.

5.06 NWSC is required under the National Water and Sewerage Decree of 1972, to ensure that its revenues cover all its costs and provide a reasonable return on investment, but its hitherto low tariffs, even after the increase of December 1, 1981, combined with poor collections, have always made achievement of this objective impossible (para. 5.01). In areas not served by NWSC, government policy generally has been to provide water free of charge to villagers and at a modest fee to the rest of the population. As a result, tariffs for water supplied from systems under WDD's control have remained virtually unchanged since 1964 and collections have not been seriously enforced (para. 5.02). Recognizing the urgent need for adjustments, NWSC and WDD in June 1983 submitted to the Minister, MLMWR, an application for a common national tariff structure and for an interim increase of about 300% based on NWSC's own computations. Following a ministerial review, a revised request for even larger (in excess of 700%) increases for most consumer categories was presented to the Cabinet in November 1983 but not accepted in its entirety.

5.07 Following an exchange of views with MLMWR, the Association in April 1984 accepted as adequate the Government's proposal to increase tariffs, with effect from May 1, 1984, from USh 86.40 per 1,000 gallons to USh 700 per 1,000 gallons for institutional, commercial and industrial users, and from USh 72/month per household to USh 100/month per household for users with private standpipes and house connections. IDA's acceptance was based on the understanding that these adjustments were to be an interim measure and that further increases would be implemented in FY85 to reflect the recommendations of the tariff study (para. 5.05). The new tariffs apply to the seven project (Category A) towns, while those for all other (Category B) towns are significantly lower. Details, including a comparison of new and old tariffs, are given in Annex 19.

5.08 The monthly tariff of USh 100/month per household is affordable, representing about 1% of the average monthly income, including fringe benefits, of private standpipe user households, and less than 1% of the average monthly income of households with house connections.

5.09 To ensure that NWSC will make satisfactory progress in achieving its financial objectives as set forth in the National Water and Sewerage Decree (para. 5.06) and accumulate cash balances needed for a modest capital investment program from FY88 onward, agreement was reached during negotiations that, until the results of the tariff study are available and agreed upon, tariff adjustments prior to the transfer to NWSC of the four project towns currently under WDD's control would be made on the basis of financial performance criteria for NWSC. National tariffs common to NWSC and WDD would be maintained and set at levels sufficient to cover NWSC's cash operating costs for FY 86 through FY90, plus 15% of depreciation on a revalued basis in FY86, 25% in FY87, 45% in FY88, 55% in FY89, and 65% in FY90. This is projected to require the following increases in the average tariff in July of each year: 30% in 1985, 22% in 1986, 21% in 1987, 17% in 1988 and 13% in 1989. NWSC would review the adequacy of tariffs at semiannual intervals and make the necessary adjustments to achieve these targets. Agreement was also reached during negotiations that, for the purpose of computing annual depreciation charges, fixed assets would be revalued annually on the basis of the Manufactures Unit Value index, a price index published by IBRD for exports of manufactured goods, including machinery, from industrialized to developing countries.

Financing Plan

5.10 Forecast income statements, funds flow statements, and balance sheets for NWSC, comprising the present member towns of Kampala, Jinja, and Entebbe. are given for FY84 through FY90 in Annex 15. Projections for an expand . .WSC, comprising seven towns as of July 1988, are presented in Annex 17. Forecasts showing the financial performance of Masaka, Mbale, Mbarara and Tororo if they were operated on the basis of a commercial accounting system are contained in Annex 16. The assumptions used are outlined in Annex 18.

5.11 The Government would transfer the water supply and sewerage systems at Masaka, Mbale, Mbarara and Tororo from WDD's control to NWSC by July 1988. The transfer would include the staff, the cash balances, the accounts receivable and payable, the inventories, the work in progress and the revalued fixed assets of the four water supply systems, and would not result in any additional obligations for NWSC, being treated as an increase in government equity in NWSC. A detailed action plan, which includes provisions relating to the selection and training of accounting and

technical staff and a schedule for the phased transfer, commencing July 1986, of accounting systems and operational and administrative responsibilities, would be prepared by NWSC and WDD by the end of 1985, if necessary by drawing on technical expertise to be financed from the Credit. As part of this plan, WDD would annually revalue the net fixed assets of the four project towns in the same fashion as NWSC.

5.12 As the project is expected to be physically completed within five fiscal years, the financing plan for NWSC covers FY85 through FY89 and is summarized as follows:

Financing Plan, 1985-1989

			Millions USh	US$	%
Sources					
Internal Cash Generation			4,660.1	15.5	32.5
Less:					
Working Capital Requirements		1,568.6			
Debt Service		1,255.7	2,824.3	9.4	19.7
Net Internal Cash Generation			1,835.8	6.1	12.8
Borrowings: IDA Cr.	3,241.8	(US$10.8)			
IDC	1,062.4	(US$ 3.6)	4,304.2	14.4	30.0
Equity a/			6,948.5	23.2	48.5
Grants: EEC (Gaba T.W.)			1,239.0	4.1	8.7
Total Funds			14,327.5	47.8	100.0
Requirements					
Capital Expenditure					
Proposed Project			5,244.6	17.5	36.6
IDC			1,062.4	3.6	7.4
Other			3,309.0	11.0	23.1
Total Capital Expenditures			9,616.0	32.1	67.1
Acquisition of WDD's Fixed Assets			4,643.1	15.5	32.4
Increase in Cash			68.4	0.2	0.5
Total			14,327.5	47.8	100.0

a/ USh 4,842.0 thereof is related to transfer of WDD to NWSC.

5.13 The financing plan assumes that tariffs are increased as outlined in para. 5.09, that 70% of IDA Credit funds allocated to NWSC are onlent while 30% are made available as equity (para. 4.01), that interest during construction in the amount of USh 1,062.4 million (US$3.6 million) would be capitalized, and that NWSC would not be required to bear the foreign exchange risk in order to protect its cash position (para. 5.14). NWSC would provide 12.8% of its capital requirements from net internal cash generation, 30.0% from loans, 8.7% from grants and 48.5% from equity.

Future Operations and Financial Position

5.14 Based on the established targets (para. 5.09) and the above assumptions, NWSC's financial position would be considerably improved. Although operating income would be negative through FY90, net internal cash generation would be adequate to enable NWSC to finance some expansion of its water supply and sewerage systems not related to the proposed project. WDD would be similarly affected and, consequently, the transfer of Masaka, Mbarara, Tororo and Mbale is not expected to impair NWSC's ability to make satisfactory progress in achieving its long term financial objectives as stated in the National Water and Sewerage Decree of 1972 (para. 5.06). As Annex 17 shows, the debt/debt and equity ratio would decline significantly as a result of the transfer, from 22% in FY88 to 17% in FY89, and NWSC, rather than fully financing relatively minor extensions to its water supply and sewerage systems, would be in a much stronger position from FY88 onward to borrow the funds required to undertake a much larger capital expansion program. To help ensure a sound financial structure, agreement was reached during negotiations that NWSC would not incur debt without the approval of the Association unless future debt service, including that of proposed borrowings, is covered at least 1.5 times by internal cash generation and that, until project completion, NWSC would not incur annual capital expenditures, other than for the proposed project, in excess of US$250,000 equivalent without a financing plan agreed with the Association.

VI. ECONOMIC AND SOCIAL ANALYSIS

Project Benefits

6.01 The proposed rehabilitation of the water supply and sewerage systems in the seven major towns of Uganda would bring immediate relief to approximately 62% of the total population (total about 1 million) living in these towns. It would also bring relief to commercial and industrial enterprises whose development has been hampered considerably due to the lack or shortage of water. Although the project will bring an end to the emergency situation, major extensions of the water supply systems are urgently required in the near future in order to serve a larger portion of the rapidly growing population (para. 2.10). The project will also restore the services for septic tank emptying and refuse collection. Besides improving health conditions, the project would also contribute to the economic recovery of the country.

6.02 More generally, all water supply consumers would benefit from NWSC's and WDD's improved management and staff capabilities to be brought about by the project's training and technical assistance component and improved operation by reducing water losses, installation of water meters (provided under the Water Supply Engineering Credit), supply of spare parts and maintenance equipment. Through its financial covenants the project is expected to lead towards institutional effectiveness which should benefit not only the consumers but all taxpayers in the country.

6.03 Parallel to the physical improvement of the services, the project aims at improving health education in the seven project towns. This is particularly important because a large portion of the population is still depending on unprotected water sources. The health education component is linked to a low cost sanitation demonstration project which should lead to improved pit latrine construction. Benefits which can be attributed to this project component are increased labor productivity and decreased costs for medical services.

Least Cost Solution

6.04 In a rehabilitation project the least cost solution is either to repair and/or replace parts of the facilities or completely abandon facilities and construct new plants. In most cases the rehabilitation of the existing facilities was the obvious least cost solution. Where the present value of replacement and future operation and maintenance costs was lower than comparable costs for rehabilitation, existing plants or parts of it have been abandoned. Besides mere analytical aspects, such as sensitivity against discount rates and cost variation, great importance was attached and preference to facilities was given which can be easily operated and maintained and are less dependent on spare parts and skilled labor. The Bank Group and the Project Coordination Unit have directed and checked the consultants' designs and proposals according to these criteria.

Economic Rate of Return (ERR)

6.05 The economic rate of return of the project is the discount rate at which the present value of the capital and operating and maintenance costs is equal to the present value of benefits attributable to the investment over the economic life of the project. In the cost calculation, taxes and duties have been excluded. Shadow pricing of foreign exchange and labor was not considered applicable. The present "Window 2" exchange rate reflects the market value of the USh. For project implementation only unskilled local labor will be available. The contractor will have to import most of the skilled labor. Since the wages for unskilled labor are lower than the shadow price and only present a minor portion in the total project costs, these additional benefits have not been considered in the economic rate of return calculation. Capital costs include the annual investments for the rehabilitation of the water supply systems and are based on January 1984 prices plus appropriate physical contingencies; incremental operating and maintenance costs are based on estimates since reliable actual present costs are not available. The overall economic rate of return for the project is 20% on 98.5% of total project costs using current tariffs as a proxy for benefits. The rate of return is sensitive to a 10% increase in costs or a 10% reduction in benefits by about 2%. A combined increase in costs and 10% reduction in benefits would result in an ERR of 16%. Details of the calculation are given in Annex 20.

6.06 The average incremental cost of water supply for the project area is estimated at US$0.28/$m^3$ at an opportunity cost of capital of 10%. The average incremental cost is lower than the expected average selling price of US$0.47/$m^3$ (in real terms) in 1987 when the benefits become available. (Details of the calculations are given in Annex 20.)

Impact on Poverty Group

6.07 The poverty group in the seven towns served by the project is estimated at 46% (270,000) of the total served population (590,000), (para. 2.06), based on the assumption that all of the population served through public standpipes are below the poverty threshold. Since standpipe water users do not pay for water, this group would profit most and have considerable health benefits from a restored safe water supply. The tariff study will examine these issues in detail.

Project Risks

6.08 The project is designed to cope with the risks which lie in weak organizations, limited capacity of local contractors and shortage of local funds by providing technical assistance and procurement packages which would attract strong contractors for the mechanical/electrical, and civil works; and by retaining consultants for the supervision of construction

work. In addition, intensive supervision of project implementation, including continuous checks on budget allocations, would be required. The remaining risk is the still unsettled political and security situation in the country. Under prevailing conditions the project as designed is feasible. A deterioration in this situation, however, could have adverse effects on project implementation, both in terms of cost and time, and may in a severe case require revisions in the project scope.

VII. AGREEMENTS REACHED AND RECOMMENDATIONS

Agreements Reached:

7.01 During negotiations, assurances were obtained that:

(a) WDD's accounts are being maintained separately from those of other MLMWR departments (para. 4.13); and

(b) Tariff increases acceptable to the Association have been implemented (para. 5.07).

(c) the Government would provide funds to (i) finance the balance of the project costs in accordance with the agreed program of project expenditure (para. 3.07) and (ii) meet the annual operating expenses of the Project Implementation Unit.

(d) MLMWR would employ consultants whose qualifications, experience and conditions of employment are satisfactory to IDA (para. 3.10);

(e) the amended regulations of the Uganda Tender Board shall be satisfactory to the Association (para. 3.14);

(f) until the results of the tariff study are available and agreed upon, tariff adjustments prior to the transfer of the four project towns currently under WDD's control would be made on the basis of financial performance criteria for NWSC. National tariffs common to NWSC and WDD would be maintained and set at levels sufficient to cover NWSC's cash operating costs for FY86 through FY90, plus 15% of depreciation on a revalued basis in FY86, 25% in FY87, 45% in FY88, 55% in FY89, and 65% in FY90. NWSC would review the adequacy of tariffs at semiannual intervals and make the necessary adjustments to achieve these targets (para. 5.09);

(g) for the purpose of computing annual depreciation charges, NWSC would annually revalue its fixed assets on the basis of the Manufactures Unit Value index, a price index published by IBRD for exports of manufactured goods, including machinery, from industrialized to developing countries (para. 5.09). WDD would similarly revalue the fixed assets of the four project towns to facilitate their transfer to NWSC by July 1988 (para. 5.11).

(h) Government would onlend part of the proceeds of the IDA Credit to NWSC for 20 years, including a grace period of 4 years, at a variable interest rate, to be adjusted annually, equal to the minimum interest rate established by the Government for commercial bank loans plus 3% (paras. 4.01 and 5.13);

(i) NWSC's accounts would continue to be audited by independent auditors acceptable to IDA and audited annual accounts and audit reports would be sent to IDA within nine months of the end of each fiscal year (para. 4.16). WDD's project expenditures would be audited annually and audited statements would be submitted to the Association within nine months of the close of the fiscal year. Statements of expenditure would be separately audited and annual audit reports submitted within nine months of the end of the fiscal year (para. 4.17);

(j) adequate provision would be made for the insurance of NWSC's fixed assets and for the insurance of imported goods to be financed out of the proceeds of the Credit (para. 4.18);

(k) NWSC would not incur debt without the approval of the Association unless future debt service, including that of proposed borrowings, is covered at least 1.5 times by internal cash generation and that, until project completion, NWSC would not incur annual capital expenditure, other than for the proposed project, in excess of US$250,000 equivalent without a financing plan agreed with the Association (para. 5.14);

(l) proposed legal changes of existing water legislation will be made available to IDA for review and comment prior to their introduction (para. 1.25);

(m) the PCU would prepare quarterly "Project Progress Reports" and, after completion of the project, a "Project Completion Report" on the basis of Bank guidelines (para. 3.09);

(n) MLMWR has acquired the land necessary for the construction of waste stabilization ponds in Mbale and Jinja and for the construction of four houses in Kampala (para. 3.26);

(o) the Government would pay the arrears in water fees of various government ministries to NWSC in accordance with para. 4.14 and would ensure that future indebtedness does not exceed 60 days' billing;

(p) MLMWR would transfer responsibility for the water supply and sewerage systems at Masaka, Mbarara, Tororo and Mbale from WDD to NWSC by not later than July 1, 1988 and a detailed action plan for the transfer would be prepared by NWSC and WDD by the end of 1985 (para. 5.11); and

(q) the Government would apply the "Window 2" rate (USh 300 = US$1 at present) for all transactions of Bank funds (US$) into USh for payments made in local currency (para. 3.07).

7.03 As conditions of credit effectiveness:

(a) the subsidiary loan agreement between the Government and NWSC should be executed (para. 4.01);

(b) the monies owed NWSC by government ministries as of June 30, 1984 should be paid (para. 4.14);

(c) Government should establish a Project Advance Account with an initial deposit of USh 90.0 million (para. 5.04); and

(d) Government should open a Special Account.

Recommendations

7.04 With the above agreements, the proposed project would be suitable for an IDA Credit of US$28.0 million.

ANNEX 1

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

SECTOR INVESTMENT PROGRAM
(US$ '000)

Project Area	Cost Estimate	Financing Agency	1979/80	1980/81	1981/82	1982/83	1983/84 Budget	1984/85 Project	1985/86 Project	1987/89	Remarks
Urban Water Supply											
1. Kampala: Supply of Trunk Main Pipes & Pumping Sets	5,600	IDB				4,200	1,400				Supply completed 22.9 km/300-600 mm
2. Kampala: Rehabilitation of Gaba T. Works	3,000	EEC Phase I			1,000	1,500	500				
3. Kampala: Laying of Trunk Mains, etc.	4,530	EEC Phase II					400	3,130	1,000		Use of pipes supplied under (1)+0.4 million for Technical Assistance not yet allocated
4. Seven Towns Project. Rehabilitation of WS Systems + Common Services	13,000	IBRD/IDA						3,000	6,000	4,000	Kampala, Jinja, Entebbe, Masaka, Mbarara, Mbale and Tororo
5. Mbarara & Masaka: Pumps for T. Works	300	EEC				300					
6. Tororo & Mbale: Rehabilitation of T. Works	600	IBRD/IDA							600	500	Reconstruction Credit II
7. Other Towns (Gulu, Lira and Kabermaido)		ADB, EEC France									
NWSC	17,300	(Degremont)		1,300	200	10					
WDD				5,600	2,400	960	830	3,000	3,000		
Sub-total	44,330			6,900	3,600	6,970	3,130	9,130	10,600	4,500	
Sewerage/Sanitation											
1. Kampala: Rehabilitation of Bugolobi Treatment Works	400	Government			100	300				F & OS Contract	
2. Seven Towns Project: Rehabilitation of Sewerage Systems	4,200	IBRD/IDA						1,800	2,400		Sewerage, Low-Cost Sanitation and Septic Tank Emptiers
3. Mbarara, Gulu, Lira: Completion of Sewage Ponds and Sewers	4,500	ADB						2,500	2,000		
Sub-total	9,100				100	300		4,300	4,400		
Rural Water Supply											
UNICEF-Programme	13,600	(Various)		200	1,100	4,200	4,900	3,200			
TOTAL of All Programmes	67,030			7,100	4,800	11,470	8,030	16,630	15,000	4,500	

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Existing Facilities for Water Supply Sewerage and Solid Waste Disposal

Water Supply Facilities

1. Kampala (686,000 inhabitants) abstracts its water from Lake Victoria and treats all its water in the Gaba Water Works. The water is treated by rapid gravity, pressure filters and micro-straining and is chlorinated. At present approximately 40,000 m^3/d is produced, while the maximum design capacity is about 78,000 m^3/d. The demand of the served population (57%) would amount to 65,000 m^3/d (1984). Rehabilitation of the plant has been underway for two years with EEC financing. Completion is scheduled for 1984/85. The bottlenecks in production are at present the limited clear water pumping capacity and filtration. Another source of continuous problems are the rising mains from Gaba Water Works to the high level reservoirs at Muyenga and the booster station at Bunga. Pipe breaks due to water hammer and operating problems in the Bunga booster station have been frequent in the past. It is therefore estimated that only in 1988, after the problems in the main supply system have been eliminated, that the average output will reach 70,000 m^3/d. Kampala has a high and low level distribution system with a total of 340 km of pipelines of 75 to 600 mm in diameter. Many stretches are badly corroded and need to be replaced. The total high and low level reservoir capacity amounts to approximately 45,000 m^3. Most of the reservoirs need to be repaired; the reservoir at Nagura needs to be replaced completely.

2. Jinja (119,000 inhabitants) also abstracts its water from Lake Victoria and treats all its water in the Walukuba Water Works which was constructed in 1951 and extended in 1956 and 1968. At present the water is treated in rapid gravity filters and chlorinated. Sedimentation tanks are also used, but this treatment is ineffective because chemicals for flocculation are not available. The existing micro-strainers are out of order. Most of the mechanical/electrical equipment is already 15 to 30 years old and needs to be replaced. At present only 56% of the population can be served and water supply is shut down in the whole town during the night in order to fill the high level reservoir. The low level (steel tank) reservoir needs to be replaced. Present reservoir capacity amounts to 25,000 m^3. The distribution system consists of 100 km of pipelines ranging from 75 to 350 mm in diameter.

3. Entebbe (22,000 inhabitants) also abstracts its water from Lake Victoria. The treatment plant was constructed in 1954 and extended in 1970. Due to breakdown of facilities in the old treatment line, the raw water is only chlorinated. In the new line, the water is treated in pressure filters and chlorinated. Some of the pressure filters are out of order. At present, approximately 3,000 m^3/d (peak output) is produced, while the maximum design capacity is about 6,000 m^3/d. Demand of the served population (86%) would amount to 4,400 m^3/d (1984). Total reservoir capacity is 6,600 m^3 and the distribution system consists of 56 km of pipelines from 75 to 300 mm in diameter.

4. Masaka (35,000 inhabitants) abstracts its water from the swamps along the Nabajuzi River. The treatment plant was constructed in 1948 and extended in 1960. In 1982, the treated water pumps were replaced (financed by EEC). Both the structures as well as the mechanical/electrical equipment are in very poor condition. At present only about 3,000 m^3/d average is produced, while the design capacity of the plant is 4,500 m^3/d. The demand in 1984 will amount to 4,700 m^3/d. The water is treated by "splash" aeration, addition of aluminum sulphate, sedimentation, rapid gravity filtration and chlorination. The treated water is pumped to the Boma and Bwala Hill reservoirs. Total reservoir capacity is about 3,300 m^3 and the distribution system consists of 26 km of pipelines of 80 to 300 mm in diameter.

5. Mbarara (32,000 inhabitants) abstracts its water from the Ruizi River. The treatment plant was constructed in 1950 and extended in 1966. In 1982 EEC financed the replacement of seven pumps in the new and old pump house. The water is treated by "splash" aeration (old works), addition of aluminum sulphate, sedimentation, rapid gravity filtration and chlorination. Present average plant output amounts to 3,000 m^3/d, whereas the design capacity would be 4,900 m^3/d. The water demand at source in 1984 would be 4,900 m^3/d. Total reservoir capacity is 3,300 m^3 and the distribution system consists of 41 km of pipelines 80 to 300 mm in diameter.

6. Tororo (27,000 inhabitants) abstracts its water from the Malaba River which is the border river between Uganda and Kenya. The treatment plant needs very urgently the replacement of part of its mechanical/electrical equipment and must be extended. At present only 1,600 m^3/d (at average) can be produced, after rehabilitation the output could be increased to 2,000 m^3/d. The water demand in 1984 at the source would, however, be 3,800 m^3/d. Due to the urgency of the rehabilitation, the Government intends to finance these works from the present IDA Reconstruction Credit II. The water is treated by dosing with aluminum sulphate, sedimentation, rapid gravity filtration and chlorination and is then pumped 8 km to a high level reservoir. Total reservoir capacity is 5,600 m^3 and the distribution network consists of 28 km of pipelines 80 to 300 mm in diameter.

7. Mbale (33,000 inhabitants) has two water treatment plants. The old Bunkoko Works (4 km east of the town) receives its raw water from two small mountain rivers (Namatsyo and Nabuyonga River) by gravity while the new Manafwa Works (1962) is situated 16 km south of the town and abstracts its water from the Manafwa River. The estimated present average output of the two works is 2,300 + 2,300 = 4,600 m^3/d whereas the demand would be 5,700 m^3/d (1984). The Government intends to finance the rehabilitation of the new Manafwa Works from the present IDA Reconstruction Credit II. After rehabilitation this water works alone would be able to produce 8,000 m^3/d at average. Total reservoir capacity is 3,300 m^3 and the distribution system comprises 41 km of pipelines from 80 to 300 mm in diameter.

Sewerage Facilities

8. Kampala (686,000 inhabitants) has a sewerage system which covers most of the central areas of the town. There are a total of 136 km of sewers with diameters of up to 660 mm. All sewage is treated in the Bugolobi Sewage Treatment Plant and discharged to swamps which are connected to Lake Victoria. The treatment plant consists of an old part, constructed in 1940, and a new part which was completed in 1970, and has a capacity of 12,000 + 15,000 = 27,000 m^3/d. The new treatment plant was only two years in operation. Treatment consists of screening, grit removal, primary and secondary sedimentation, trickling filters, sludge digestion tanks and sludge drying beds. The old part of the treatment plant is at present not operating at all. The new part was cleaned up and put back into operation in 1983 by a local contractor, but needs further rehabilitation of its mechanical/electrical equipment. The sewer reticulation system suffers from a number of collapses and blockages and three intermediate pumping stations are out of order, mainly caused by lack of maintenance. As a result of the deficiencies in the sewerage system and the low level of water supply, only approximately 5,000 m^3/d of sewage is reaching the treatment plant at present. The rehabilitation of the old part of the treatment plant has therefore at present lower priority. There are approximately 7,700 septic tanks within the project area; most of them have not been emptied for years. Twenty-four public toilet blocks have been damaged or are broken down.

9. Jinja (119,000 inhabitants). The oldest sewerage facilities date from 1954 when the central business district was sewered. A total population of almost 35,000 is served by the existing foul sewer network of approximately 35 km (175 mm to 525 mm in diameter). Most of the sewage is treated in the Kirinya waste stabilization ponds which were constructed in 1962. The first pond is full of sludge and needs urgently to be cleaned out. Some housing areas (Kimaka) and an industrial area on the west side of the Nile (brewery and textile factory) discharge untreated sewage into the Nile River. One sewage pumping station is out of operation; all public toilet blocks have been damaged. There are about 300 septic tanks.

10. Entebbe (22,000 inhabitants). Only a small part of the town has a foul sewer network serving a population of about 1,000. The 1.8 km long trunk sewer leading to the small waste stabilization ponds is blocked. They therefore do not receive any flow. There are about 500 septic tanks within the project area.

11. Masaka (35,000 inhabitants). The town centre and market area were sewered in about 1961, extended in 1970, and have a sewer system of approximately 5 km length, a diameter of 175 to 225 mm. The existing conventional sewage treatment plant consisting of sedimentation tanks, aeration tanks and open sludge digesters is presently completely out of operation and therefore by-passed. It has been looted and completely neglected. All main structures are in good condition but most of the

mechanical/electrical equipment has to be replaced. Motors and equipment of two pumping stations in the sewerage system have been dismantled and looted. At present the sewage of only approximately 1,200 inhabitants is reaching the site of the treatment plant. There are approximately 400 septic tanks in the town. Thirteen of the public toilet blocks have been damaged and are out of use.

12. Mbarara (32,000 inhabitants). The small town center was fully sewered in 1961 and has a sewer system of 3 km length. The existing small conventional sewage works have been completely neglected during recent years and are out of order. There are three waste stabilization pond systems under construction, financed by ADB. One system will replace the existing treatment plant, another system will serve the Kakobe Housing Estate which has at present central septic tanks and the third system will serve the hospital, police and prison, which also have septic tanks at present. ADB will also finance the sewers leading to these ponds.

13. Tororo (27,000 inhabitants). The town center is sewered since about 1960. The effluents of the trading center and of some 2,000 inhabitants are treated at a waste stabilization pond system north of town. Due to the small diameter, the trunk sewer is frequently blocked; overflowing sewage pollutes an open land area near the town center. Most institutions and the high cost housing areas are served by septic tanks (approximately 200).

14. Mbale (33,000 inhabitants). Only the commercial town center and the industrial area are sewered. There are approximately 20 km of sewers with diameters of up to 450 mm. Waste stabilization ponds treat the effluents from the northern parts of the town and work satisfactorily. The conventional trickling filter plant, constructed in 1962, for the southern parts of the town is out of order. Almost all mechanical and electrical equipment would need to be replaced. The steel parts are all heavily corroded; concrete structures are, however, in good condition. Raw sewage is by-passing the plant and polluting the adjacent papyrus swamp. There are approximately 450 septic tanks within the town area. Most of the town's public latrines have been looted and are not in use.

Solid Waste Disposal

15. Kampala (686,000 inhabitants). In 1972 Kampala had an organized refuse collection and disposal system. At that time, 12 compacting trucks (dust bin collection) and three caterpillars at the landfill sites Lugogo By-pass, Port Bell and Wakaliga were available. At present, although the population has increased considerably since 1972, collection services are limited to the town center. The services are carried out with compacting trucks, six skip loaders of which only three are usually in use (46 skips of 5.5 m^3 each) and three roll-off container trucks. No equipment is available on the landfill sites. Dust bin (house) collection has been abandoned.

16. Jinja (119,000 inhabitants) also had an organized collection system. Today only two old compacting trucks and one old tipper is available. Refuse is only collected in central and market areas. No equipment is available at the Masese landfill site.

17. Entebbe (22,000 inhabitants). The Town Council owns one compacting truck which is out of order and a truck which has to be shared with other sections of the Council. Refuse is only collected from time-to-time, and no equipment is available at the landfill site.

18. Masaka (35,000 inhabitants) which was heavily damaged in the liberation war, has only one truck for refuse collection which has to be shared with other sections of the Council. People get rid of their refuse by using vacant plots.

19. Mbarara (32,000 inhabitants) which also damaged in the war, and has two trucks for refuse disposal; they have to be shared with other sections of the Council. Most of the collected refuse is used on farmland.

20. Tororo (27,000 inhabitants). There is one old tipper available for all municipal services. Refuse is only collected in the central areas. There is no equipment on the landfill sites.

21. Mbale (33,000 inhabitants) once had a well-organized refuse collection system with two compacting trucks (dust bin collection) and one tipper. At present the Council has only one tipper and there is no equipment on the landfill site.

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

POPULATION/WATER DEMAND GROWTH

Year	Population in 000's: Total Population	Served Population: Total	Served Population: House Connections	Served Population: Private Standpipe	Served Population: Public Standpipe	Average Daily Water Demand in '000 m³/d: House Connection	Private Standpipe	Public Standpipe	Industrial	Commercial	Institutional	Total Demand	Treatment Plant: Required Output	Treatment Plant: Estimated Output
Kampala														
1983	686	391	121	51	219	21.78	4.08	4.38	8.59	2.88	3.20	44.91	60.63	35
1984	720	405	125	53	227	22.50	4.24	4.54	10.74	3.20	3.56	48.78	65.85	40
1985	755	411	129	63	219	23.22	5.04	4.38	11.22	3.35	3.96	51.17	69.08	45
1986	792	418	134	76	208	24.12	6.08	4.16	11.81	3.53	4.43	54.13	73.06	50
1987	832	423	139	91	193	25.02	7.28	3.86	12.48	3.71	4.98	57.33	76.25	60
1988	873	425	144	109	172	25.92	8.72	3.44	13.28	3.90	5.65	60.91	80.40	70
1989	917	463	155	121	187	27.90	9.68	3.74	13.70	4.09	5.96	65.07	84.59	70
1990	962	507	169	134	204	30.42	10.72	4.08	14.16	4.28	6.09	69.75	89.98	70

(Average treatment plant output after rehabilitation (financed by EEC) will be approximately 70,000 m³/d)

Jinja														
1983	119	66	29	26	11	5.22	2.08	0.22	1.05	1.32	1.51	11.60	17.4	15
1984	127	71	31	28	12	5.58	2.24	0.24	1.32	1.67	1.66	12.71	19.1	15
1985	135	76	33	31	12	5.94	2.48	0.24	1.37	1.80	1.82	13.65	19.5	20
1986	141	81	36	33	12	6.48	2.64	0.24	1.57	1.94	2.00	14.87	21.1	22
1987	149	87	38	37	12	6.84	2.96	0.24	1.80	2.10	2.20	16.14	22.3	25
1988	156	94	42	40	12	7.56	3.20	0.24	2.06	2.26	2.42	17.74	24.0	25
1989	164	102	45	44	13	8.10	3.52	0.26	2.28	2.44	2.56	19.16	25.9	25
1990	172	110	49	47	14	8.82	3.76	0.28	2.52	2.63	2.71	20.72	28.0	25

(Average treatment plant output after rehabilitation and up-rating will be approximately 25,000 m³/d)

Entebbe														
1983	22.4	18.6	10.6	1.7	6.3	1.91	0.14	0.13	-	0.16	0.25	2.59	4.0	2.5
1984	23.0	19.1	10.9	1.7	6.5	1.96	0.14	0.13	-	0.16	0.26	2.65	4.1	2.5
1985	23.7	19.7	11.2	1.8	6.7	2.02	0.14	0.13	-	0.17	0.27	2.73	4.1	3.0
1986	24.9	20.7	11.6	2.0	7.1	2.09	0.16	0.14	-	0.19	0.28	2.86	4.2	4.0
1987	26.2	22.7	12.0	2.4	8.3	2.16	0.19	0.17	-	0.21	0.30	3.03	4.2	4.2
1988	27.5	23.9	12.4	2.8	8.7	2.23	0.22	0.18	-	0.23	0.31	3.17	4.4	4.4
1989	28.8	25.6	12.8	3.2	9.6	2.30	0.26	0.19	-	0.25	0.32	3.32	4.6	4.6
1990	30.2	27.2	13.2	3.6	10.4	2.38	0.29	0.21	-	0.27	0.33	3.48	4.9	4.9

(Average treatment plant output after rehabilitation, approximately 5,000 m³/d)

Masaka														
1983	34.6	31.4	6.3	14.6	10.5	1.13	1.17	0.21	0.28	0.65		3.44	4.6	3.0
1984	35.5	31.9	6.4	15.0	10.5	1.15	1.20	0.21	0.29	0.68		3.53	4.7	3.0
1985	36.4	32.8	6.7	15.6	10.5	1.21	1.25	0.21	0.30	0.71		3.68	4.9	3.5
1986	38.2	34.4	7.2	16.7	10.5	1.30	1.34	0.21	0.33	0.76		3.94	5.1	3.5
1987	40.1	36.1	7.7	17.9	10.5	1.39	1.43	0.21	0.35	0.81		4.19	5.3	4.5
1988	42.1	37.9	8.2	19.2	10.5	1.48	1.54	0.21	0.37	0.87		4.42	5.6	4.5
1989	44.2	39.8	8.8	20.5	10.5	1.58	1.64	0.21	0.40	0.93		4.76	6.0	4.5
1990	46.4	41.8	9.4	21.9	10.5	1.69	1.75	0.21	0.43	0.98		5.06	6.3	4.5

(Average treatment plant output after rehabilitation, approximately 4,500 m³/d)

Mbarara														
1983	32.4	29.2	4.6	18.2	6.4	0.83	1.46	0.13	0.25	0.89		3.56	4.7	3.0
1984	33.2	29.9	4.7	18.8	6.4	0.85	1.50	0.13	0.26	0.93		3.67	4.9	3.0
1985	34.1	30.7	4.9	19.4	6.4	0.88	1.55	0.13	0.27	0.97		3.80	5.0	3.5
1986	35.8	32.2	5.2	20.6	6.4	0.94	1.65	0.13	0.29	1.03		4.04	5.2	3.5
1987	37.6	33.8	5.5	21.9	6.4	0.99	1.75	0.13	0.31	1.10		4.28	5.4	4.7
1988	39.5	35.6	5.8	23.4	6.4	1.04	1.87	0.13	0.33	1.17		4.54	5.7	4.7
1989	41.5	37.4	6.2	24.8	6.4	1.12	1.98	0.13	0.35	1.25		4.83	6.0	4.7
1990	43.5	39.2	6.6	26.2	6.4	1.19	2.10	0.13	0.37	1.33		5.12	6.4	4.7

(Average treatment plant output after rehabilitation, approximately 4,700 m³/d)

Tororo														
1983	27.0	21.6	3.8	9.0	8.8	0.68	0.72	0.18		1.17		2.75	3.7	1.6
1984	27.7	22.2	4.0	9.4	8.8	0.72	0.75	0.18		1.21		2.86	3.8	1.6
1985	28.4	22.7	4.2	9.7	8.8	0.76	0.78	0.18		1.26		2.98	3.9	2.0
1986	29.9	24.5	4.7	10.8	9.0	0.85	0.86	0.18		1.34		3.23	4.2	2.0
1987	31.1	26.3	5.1	11.8	9.4	0.92	0.94	0.19		1.44		3.49	4.4	4.4
1988	32.9	28.[illegible]	5.6	12.9	9.8	1.01	1.03	0.20		1.53		3.77	4.7	4.7
1989	34.6	30.[illegible]	6.0	14.1	10.3	1.08	1.13	0.21		1.63		4.05	5.1	5.1
1990	36.3	32.7	6.6	15.3	10.8	1.19	1.22	0.22		1.74		4.37	5.5	5.5

(Average treatment plant output after extension in 1987 will be approximately 2,000 + 5,000 = 7,000 m³/d)

Mbale														
1983	33.5	31.8	4.5	18.1	9.2	0.81	1.45	0.18	1.10	0.59		4.13	5.5	4.6
1984	34.4	32.7	4.7	18.8	9.2	0.85	1.50	0.18	1.12	0.60		4.25	5.7	4.6
1985	35.2	33.4	4.8	19.4	9.2	0.86	1.55	0.18	1.14	0.62		4.35	5.8	5.8
1986	37.0	35.2	5.2	20.8	9.2	0.94	1.66	0.18	1.18	0.63		4.59	5.9	5.9
1987	38.9	37.0	5.6	22.2	9.2	1.01	1.78	0.18	1.21	0.65		4.83	6.1	6.1
1988	40.8	38.8	5.9	23.7	9.2	1.06	1.90	0.18	1.24	0.67		5.05	6.3	6.3
1989	42.8	40.7	6.3	25.2	9.2	1.13	2.02	0.18	1.28	0.69		5.30	6.6	6.6
1990	45.0	42.8	6.7	26.9	9.2	1.21	2.15	0.18	1.32	0.71		5.57	7.0	7.0

(Average Mbale treatment plant output after rehabilitation (financed through Second Reconstruction Credit) will be approximately 8,000 m³/d)

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Project Description

A. Water Supply Component

1. Works to be financed under the project would consist of the following rehabilitation and replacement works and urgently required extensions:

Kampala

(a) Replacement of corroded mains (5.2 km, diameter 75-200 mm);

(b) Construction of two reinforced concrete reservoirs at Muyenga (4,000 and 3,200 m^3) and replacement of a concrete reservoir at Naguru (4,200 m^3 capacity); and

(c) Relining of existing steel pipes (12 km, diameter 250 to 600 mm).

Jinja

(a) Rehabilitation and upgrading of Walukuba Water Works by replacement of the low and high level treated water pumps, motors and motor control centers and main distribution board, re-furbishing the micro strainers and replacement of chemical dosing equipment, etc. After rehabilitation and upgrading the water works capacity will raise from at present approximately 15,000 to 25,000 m^3/d at average;

(b) Replacement of a corroded steel reservoir at Walukuba by a reinforced concrete reservoir (4,500 m^3 capacity);

(c) Replacement of the low level main from Walukuba Reservoir to the distribution system (0.65 km, diameter 350 mm); and

(d) Supply of replacement pipework and fittings (2.4 km, diameter 100 to 150 mm) and maintenance and leak detection equipment.

Entebbe

(a) Rehabilitation of the water works by replacement of the raw and treated water pumps, motors and motor control center and main distribution board. Supply of bulk water meters and spare parts, etc. After rehabilitation the water works capacity will raise from at present approximately 2,500 to 5,000 m^3/d at average;

(b) Minor replacements/reinforcements in the distribution system (4.1 km, diameter 100-300 mm);

(c) Rehabilitation of existing steel reservoirs; and

(d) Workshops and store rehabilitation and supply of

Masaka

(a) Rehabilitation of the water treatment works by replacement of the intake pumps, motors and control equipment and appurtement pipework, one high lift pump, air blowers and chemical dosing equipment. Refurbishment of filters and backwash tank and other minor repair and replacement works. After rehabilitation, the water works capacity will raise from at present approximately 3,000 to 4,500 m^3/d at average;

(b) Replacement of the Bwala Hill steel tank (54 m^3), construction of a small booster station and 400 m of rising main (50 mm diameter);

(c) Extension of the distribution system to Kyabakuza and pineapple factory by constructing of 2.4 km of pipeline diameter 100 mm, a concrete storage tank of 250 m^3 capacity, distribution pipework and additional clear water pumps in the water treatment works; and

(d) Construction of an office building for the area engineer including one flat for the area engineer, basic office outfit and hard furniture.

Mbarara

(a) Rehabilitation of the water works by replacement of two intake and two high lift pumps, three air blowers, motors and control equipment, pipework and valves, chemical dosing equipment. Refurbishment of sand filters and backwash tank. Supply and installation of a transformer (500 KVA) and a standby generator (500 KVA) and other minor replacement and repair works. After rehabilitation, the water works capacity will have raised from at present approximately 3,000 to 4,700 m^3/d at average;

(b) Refurbishment of Boma and 8 No satellite storage tanks and completion of construction of the Ruti Storage Tank.

Tororo

(a) The rehabilitation of the existing Malaba Water Treatment Works will be financed by the WB Second Reconstruction Credit and will consist of replacement of the intake and high lift pumps, refurbishment of the sand filters, replacement of air blowers, backwash tank and dosing equipment and minor other repair work. After rehabilitation the water works capacity will raise from at present 1,600 to 2,000 m^3/d at average. This will still be far below the present (1984) water demand of 3,800 m^3/d. An extension of the waterworks (see below) is therefore proposed;

(b) Extension of the Malaba Water Treatment Plant by constructing of additional clarifiers, rapid gravity sand filters, raw and clear water pumping facilities and appurtenant works.
After extension the water works will have a total capacity of 2,000 + 5,000 = 7,000 m^3/d which will cover the demand up to 1993;

(c) Replacement of the rising main to Tororo (6.6 km, diameter 300 mm);

(d) Supply and installation of a transformer (1 MVA); and

(e) Construction of an office for the area engineer including basic office outfit and furniture.

Mbale

(a) The rehabilitation of the existing Manafwa (new works) and (a)Bunkoko (old works) water works will be financed by the IDA Second Reconstruction Credit and will consist (for Manafwa Works) of replacement of intake and high lift pumps, backwash pumps, air blowers and compressor, refurbishment of sand filters and replacement of dosing tank and equipment. In the Bunkoko Works only minor works will be carried out because this plant will eventually have to be replaced. Rehabilitation works will consist of replacement of backwash pumps and air scour blowers, mixing tank and dosing. After rehabilitation the Manafwa Works capacity will rise from at present approximately 2,300 to 8,000 m^3/d at average which would cover the demand up to 1993;

(b) Extension of the distribution network to the Army Camp (0.9 km of diameter, 80 mm); and

(c) Minor civil works for rehabilitation of the waterworks.

B. Sewerage Component

2. Sewerage facilities in each town to be financed and constructed under this project are listed below:

Kampala

(a) Further rehabilitation of the Bugolobi Sewage Treatment Plant by supply and installation of mechanical/electrical equipment, repair work, overhauling and refitting;

(b) Rehabilitation of three sewage pumping stations by supply and installation of new pumps, motors and switchgear;

(c) Repair of broken sewers;

Jinja

(a) Rehabilitation/extension of the Kiringa waste stabilization pond system by construction of two anaerobic ponds and appurtenant pipe work.

(b) Construction of two anaerobic ponds at Kimaka;

(c) Rehabilitation of the Kiriny Prison sewage pumping station by supply and installation of new pumps, motors and switchgear.

Entebbe

(a) Repair of sewers (0.1 km, diameter 225 mm);

(b) Recommissioning of existing sewage ponds at Kitoro;

(c) Supply of tools and equipment for sewer cleaning and maintenance and construction of a storeroom.

Masaka

(a) Rehabilitation of the sewage treatment plant by supply and installation of two new surface aerators, new return sludge pumps and motors, electrical equipment and other repair works and construction of a maturation pond;

(b) Rehabilitation of the prison and police sewage pumping station by supply and installation of new pumps, motors and switchgear.

Mbarara

(a) Construction of a septic tank sludge dump station.

Tororo

(a) Replacement of the existing trunk sewer to the waste stabilization pond (1.2 km, diameter 300 mm);

(b) Rehabilitation of the waste stabilization ponds; and

(c) Construction of a septic tank sludge dump station.

Mbale

(a) Construction of a waste stabilization pond system at Doko for replacement of the existing conventional sewage treatment plant, consisting of two anaerobic ponds, two facultative ponds, two maturation ponds, interconnecting pipework and fencing; and

(b) Construction of a main sewer to the new ponds.

For all Seven Towns

(a) Supply of tools and equipment for sewer cleaning and maintenance.

(b) Rehabilitation of public latrines: 24 in Kampala, 14 in Jinja, five in Entebbe, 13 in Masaka, one in Tororo and 10 in Mbale, a total of 67;

(c) Supply of septic tank emptiers of about 7 m^3 capacity as follows:

	Vacuum Trucks	Vacuum Trailers
Kampala	1	-
Jinja	1	-
Entebbe	1	-
Masaka	1	-
Mbarara	-	1
Tororo	-	1
Mbale	1	-
Urgent needs in remaining small town:	2	-
Total No. of vehicles	7	2

C. Low Cost Sanitation Component

3. It is the objective of this component to provide different types of latrine facilities of improved design and construction for demonstration in the health education program. There will be 95 latrine facilities with 4-6 units and 45 single ventilated improved pit latrines (VIP's) distributed as follows:

	4-6 Units	Single VIP's
Kampala	30	10
Jinja	15	10
Entebbe	10	5
Masaka	10	5
Mbarara	10	5
Tororo	10	5
Mbale	10	5
	95	45

The total project will also provide materials for private latrine construction (cement, sheet, ventpipes, fly screens) for approximately 1,400 units, moulds, slabs and squatting plates.

D. Refuse Collection and Disposal

4. The project aims at restoring refuse collection and disposal to a minimum required level at minimum cost. Services can only be provided for the central town areas, market places and high density housing areas. In low density areas people will continue to use their refuse for farming, animal feeding or bury and burn it on their plot. This is possible and does not pose serious problems because their waste consists mainly of organic matter. In order to keep the cost low, house-to-house collection is not envisaged. The refuse will have to be carried to a container placed in the vicinity. House-to-house dust bin collection will be tested in a limited area. Only in Kampala where two compacting refuse trucks are still available. Although the refuse would be ideal for composting, this is not envisaged within this rehabilitation project. The waste expert provided under this project will, however, be requested to find out how and where decentralized composting can be organized and to what extent farmers are interested to participate. The proposed equipment for the various towns is listed below:

Proposed Equipment

Type of Equipment	Kampala	Jinja	Entebbe	Mbale	Mbarara	Masaka	Tororo
Skip trucks	2	1	-	-	-	-	-
Skip trailers	-	1	2	3	3	3	1
Skips (15 m^3)	50	-	-	-	-	-	-
Skips (5 m^3)	50	30	15	30	30	30	10
Tractors with shovel	-	1	2	3	3	3	2
Shovel loaders (wheel drive)	1	1	-	-	-	-	-
Trailer (5 m^3)	-	-	4	4	4	4	4
Pickups (vehicles)	2	1	1	1	1	1	1
Light motor cycles	3	2	2	2	2	2	2
Bicycles	15	5	3	3	3	3	3
Hand carts	100	40	15	15	15	15	10
Tools for sweepers	100	40	15	15	15	15	10
Dust bins (60 l.)	4,000	-	-	-	-	-	-

Repair of Existing Equipment

Skip trucks	3	-	-	-	-	-	-
Compressor Trucks	-	-	-	1	-	-	-
Trucks	-	2	1	1	1	1	1
Dozer	1	-	-	-	-	-	-

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Project Cost Estimates a/

	US$ Million		
	Local	Foreign	Total
1. Water Supply and Sewerage			
Kampala			
Water Supply			
Replace corroded mains 5.2 km dia. 75-200 mm.	0.14	0.33	0.47
Construct concrete reservoirs A and B at Muyenga	0.47	1.08	1.55
Construct concrete reservoir at Naguru	0.25	0.59	0.84
Reline steel pipes	0.06	0.32	0.38
Sub-Total	0.92	2.32	3.24
Sewerage			
Rehabilitation of Bugolobi Sewage Treatment Plant	0.05	0.20	0.25
Repair of sewers and sewage pumping stations	0.01	0.07	0.08
Rehabilitation of public latrines	0.08	0.01	0.09
Re-equipping of sewerage maintenance section	0.05	0.53	0.58
Sub-Total	0.19	0.81	1.00
Jinja			
Water Supply			
Rehabilitation and upgrading of Walukuba water works	0.09	0.72	0.81
Construction of concrete low level reservoir	0.16	0.62	0.78
Replacement of low level distribution main	0.03	0.07	0.10
Supply of replacement pipe work and fittings, workshop equipment, measurement equipment for Hill Reservoir, equipment for maintenance section and leak detection	0.01	0.21	0.22
Sub-Total	0.29	1.62	1.91

a/ January 1984 price level

	US$ Million		
	Local	Foreign	Total
Sewerage			
Rehabilitation of Kirinya sewage ponds by constructing 2 anaerobic ponds	0.14	0.15	0.29
Construction of 2 anaerobic ponds at Kimaka	0.10	0.12	0.22
Rehabilitation of Kirinya Prison pumping station	—	0.04	0.04
Sewer maintenance equipment	—	0.04	0.04
Rehabilitation/construction of public latrines	0.02	—	0.02
Sub-Total	0.26	0.35	0.61
Entebbe			
Water Supply			
Rehabilitation of water works	0.02	0.40	0.42
Rehabilitation of existing steel reservoirs	0.02	0.05	0.07
Reinforcements/replacements in the distribution system	0.04	0.11	0.15
Workshop and store rehabilitation and supply of equipment	0.01	0.05	0.06
Sub-Total	0.09	0.61	0.70
Sewerage			
Rehabilitation of sewers	0.01	0.02	0.03
Recommission existing sewage ponds at Kitoro	0.02	0.02	0.04
Workshop and store rehabilitation and supply of equipment	—	0.01	0.01
Rehabilitation/construction of public latrines	0.02	—	0.02
Sub-Total	0.05	0.05	0.10

	US$ Million		
	Local	Foreign	Total
Masaka			
Water Supply			
Rehabilitation of the water works	0.03	0.23	0.26
Construction of booster station, steel reservoir and rising main	0.01	0.02	0.03
Rising main and reservoir to Kyabakua	0.05	0.16	0.21
Office building for area engineer including 1 flat, basic office outfit and hard furniture	0.10	0.10	0.20
Sub-Total	0.19	0.51	0.70
Sewerage			
Rehabilitation of sewage treatment plant	0.04	0.21	0.25
Rehabilitation of prison and police pumping station	--	0.05	0.05
Supply of sewerage maintenance equipment	--	0.06	0.06
Rehabilitation/construction of public latrines	0.04	0.01	0.05
Sub-Total	0.08	0.33	0.41
Mbarara			
Water Supply			
Rehabilitation of the water works	0.03	0.33	0.36
Rehabilitation of storage tanks	0.01	0.03	0.04
Sub-Total	0.04	0.36	0.40
Sewerage			
Supply of sewerage maintenance equipment, septic tank sludge dump station	--	0.05	0.05

	US$ Million		
	Local	Foreign	Total
Tororo			
Water Supply			
Malaba treatment plant extension 5,000 m^3/d capacity	0.43	1.26	1.69
Replacement of rising main 6.6 km dia. 300 mm incl. surge vessel	0.14	0.44	0.58
Office for area engineer including basic office outfit and furniture	0.05	0.08	0.13
Sub-total	0.62	1.78	2.40
Sewerage			
Replace trunk sewer to treatment plant	0.03	0.07	0.10
Rehabilitate existing sewage ponds	0.01	--	0.01
Supply sewerage maintenance equipment	--	0.06	0.06
Sub-Total	0.04	0.13	0.17
Mbale			
Water Supply			
Civil works for rehabilitation of water treatment plants	0.03	--	0.03
Extension of network to army camp	--	0.02	0.02
Sub-total	0.03	0.02	0.05
Sewerage			
Construction of sewage ponds and main sewer	0.18	0.12	0.30
Supply of sewerage maintenance equipment	--	0.05	0.05
Rehabilitation/Construction of public latrines	0.03	0.01	0.04
Sub-total	0.21	0.18	0.39

2. Supply of Refuse Disposal Equipment and Septic Tank Emptiers for all 7 Towns (Distribution List, See Annex 4)

Refuse Disposal Equipment (including training in use of the equipment by the supplier)

	US$ Million		
	Local	Foreign	Total
3 Skip trucks	-	0.15	0.15
13 Skip trailers	-	0.20	0.20
195 Skips (5 m^3)	0.05	0.16	0.21
50 Skips (15 m^3)	0.05	0.15	0.20
14 Tractors with shovel	-	0.28	0.28
2 shovel loaders (4 wheel drive)	-	0.18	0.18
20 trailers (5 m^3)	-	0.04	0.04
8 pick-up vehicles	-	0.08	0.08
15 light motorcycles	-	0.02	0.02
35 bicycles	-	0.01	0.01
Tools and equipment for workshops	-	0.30	0.30
Workshop repairs	0.20	0.20	0.40
210 handcarts	-	0.10	0.10
Tools for sweepers	-	0.02	0.02
Repair of existing equipment	0.03	0.08	0.11
Spare parts	-	0.22	0.22
4000 dust bins	0.04	0.06	0.10
Sub-total	0.37	2.25	2.62

Supply of Septic Tank Emptiers (Distribution List, see Annex 4) (including supply of spare parts and training in use of the equipment by the suppliers) in use of the equipment by the suppliers)

7 septic tank emptiers (trucks)	-	0.35	0.35
2 septic tank emptiers (trailers)	-	0.03	0.03
Sub-total	-	0.38	0.38

3. Low Cost Sanitation and Health Education

Low cost sanitation (pit latrines) for demonstration and urgent needs in hospitals, schools and market places:

	4-6 Units	Single VIPs			
Kampala	30	10	0.08	0.02	0.10
Jinja	15	10	0.04	0.01	0.05
Entebbe	10	5	0.02	0.01	0.03
Masaka	10	5	0.02	0.01	0.03
Mbarara	10	5	0.02	0.01	0.03
Tororo	10	5	0.02	0.01	0.03
Mbale	10	5	0.02	0.01	0.03
Washing slabs	50		0.03	0.01	0.04
Molds for slabs, squatting plates & raisers			0.01	—	0.01
Material (cement, steel, ventpipes, fly screens, etc.) for private VIPs			0.12	0.03	0.15
Sub-total			0.38	0.12	0.50

	US$ Million		
	Local	Foreign	Total
4. Health Education in All 7 Project Towns:			
10 fellowships for health education (1 yr)	—	0.13	0.13
Workshops & national planning sessions	0.05	—	0.05
Transport for health supervision & outreach, 1 four wheel drive, 1 van with speaker system, 150 bicycles, 20 motorcycles, inclusive operation and maintenance cost	0.03	0.08	0.11
Teaching aids (posters, pamphlets, projectors, cassette recorder, video camera, one TV)	0.02	0.01	0.03
Traditional media & drama development, mass media development	0.03	—	0.03
Sub-Total	0.13	0.22	0.35
5. Training, Technical Assistance and Sundries			
Training			
Overseas training program for counterpart training staff (4)	—	0.08	0.08
Technical assistance under twinning arrangement comprising short term training, expert assignment (36 man-months), home base support services including provision of training material, provision of short-duration overseas training programs/attachments (60 man-months)	—	0.55	0.55
Training vehicles, equipment, tools, equipment for training room	—	0.12	0.12
Local course fees for sponsored trainees and special course development costs, office support services and local staff salary costs.	0.01	—	0.01
Sub-Total	0.01	0.75	0.76

	US$ Million		
	Local	Foreign	Total
6. Technical Assistance, etc.			
1 refuse expert for organizing the refuse collections and disposal in all 7 towns for a period of 2 years, including required equipment (Min. of Local Gov't., expert will be based in the PCU)	--	0.20	0.20
2 mechanics/plumbers for assistance in maintenance, and repair of water and sewerage facilities, water meter installation and repair, assistance in leak detection and sewer cleaning, for a period of 30 months (service for all 7 towns, NWSC & WDD)	—	0.40	0.40
1 fully equipped mobile workshop, incl. 2 years of operation and purchase of required material for repairs for above mechanics	—	0.15	0.15
Sub-Total	—	0.75	0.75
7. Vehicles			
25 vehicles for maintenance of water and sewerage works, supervisory personnel, construction supervision (12 vehicles to be provided by contractor), transport for technical assistance personnel including 100 bicycles for water meter readers and other customer services (NWSC and WDD)	—	0.30	0.30
8. Housing			
Construction of four medium standard houses for technical assistance staff to NWSC in Kampala including, land acquisition, hard furniture, design and supervision by a local architect	0.30	0.20	0.50

	US$ Million		
	Local	Foreign	Total
9. Consultancy services			
Construction supervision: expatriate supervisors, 140 man months including cost for transport and accommodation (to be provided by the contractor)	0.20	1.20	1.40
4 local engineers for assistance	0.30	—	0.30
Detailed design and tender documents for follow-up project: 100 man-months of expatriate and local staff including staff services	0.20	0.80	1.00
Sub-Total	0.70	2.00	2.70
10. Supply of Chemicals, Basic Office Equipment			
Chemicals for the operation of the 7 water works (chlor lime, alum.) for a period of 2 years	—	0.15	0.15
Basic office equipment for NWSC headquarters and branches and the PCU	0.02	0.03	0.05
Sub-Total	0.02	0.18	0.20
Base Cost	4.92	16.27	21.19
Contingencies			
Physical	0.77	2.42	3.19
Price	2.40	4.05	6.45
Total Project Cost	8.09	22.74	30.83

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

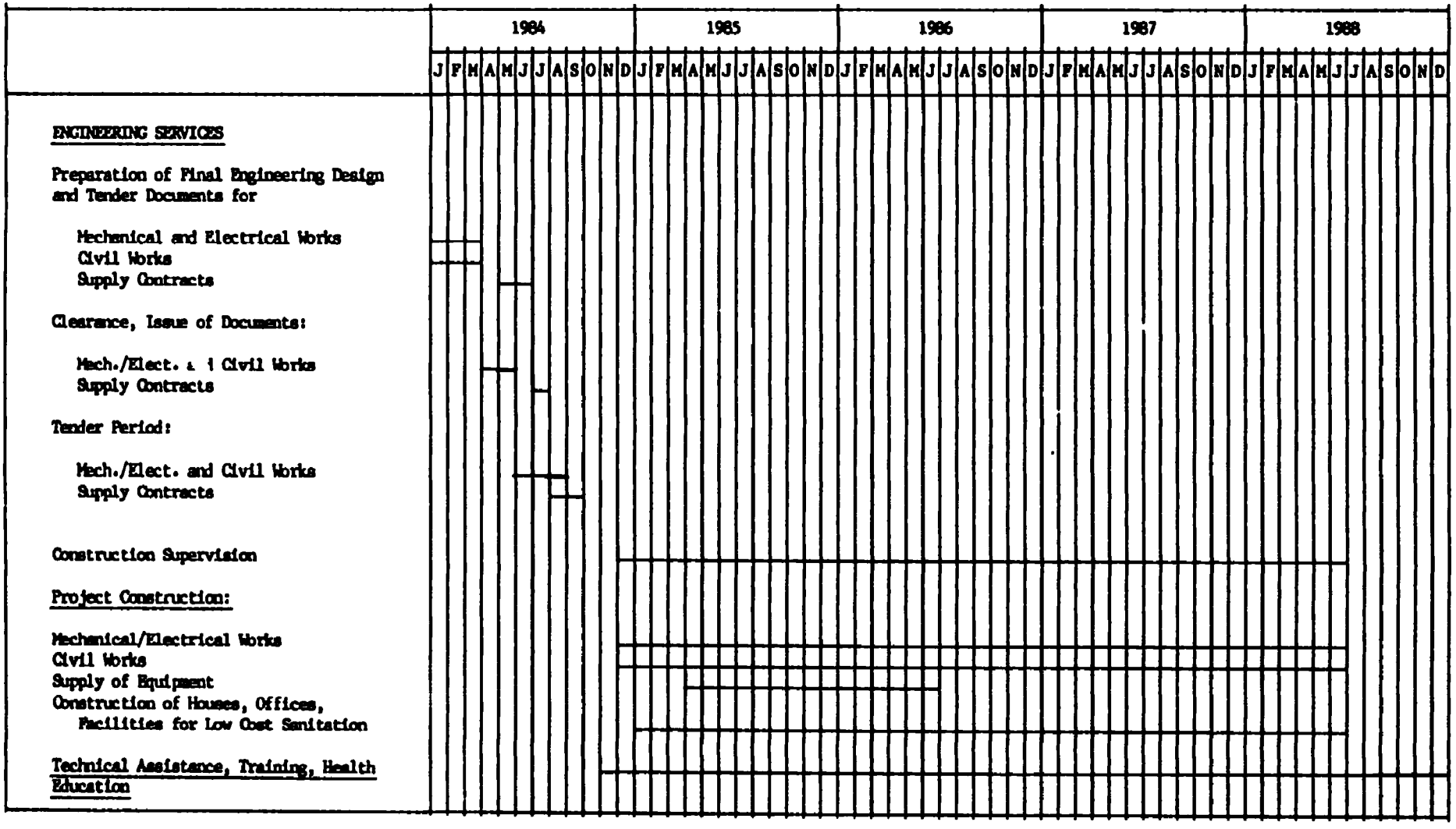
PROGRAM OF PROJECT EXPENDITURE
(US$ millions)

	1984			1985			1986			1987			1988			Total		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
Mechanical & Electrical Works:																		
Water Supply	0.031	0.148	0.179	0.183	0.891	1.074	0.183	0.891	1.074	0.153	0.742	0.895	0.061	0.297	0.358	0.61	2.97	3.58
Severage	0.005	0.028	0.033	0.027	0.168	0.195	0.027	0.168	0.195	0.022	0.140	0.162	0.009	0.056	0.065	0.09	0.56	0.65
Civil Works:																		
Water Supply	0.070	0.193	0.263	0.420	1.155	1.575	0.420	1.155	1.575	0.350	0.962	1.312	0.140	0.385	0.525	1.40	3.85	5.25
Severage	0.035	0.028	0.063	0.207	0.168	0.375	0.207	0.168	0.375	0.172	0.140	0.312	0.069	0.056	0.125	0.69	0.56	1.25
Supply of Equipment:																		
Refuse Equipment	--	--	--	0.185	1.125	1.310	0.185	1.125	1.310	--	--	--	--	--	--	0.37	2.25	2.62
Septic Tank Emptiers	--	--	--	--	0.190	0.190	--	0.190	0.190	--	--	--	--	--	--	--	0.38	0.38
Sewer Maintenance Equipment	--	--	--	0.025	0.390	0.415	0.025	0.390	0.415	--	--	--	--	--	--	0.05	0.78	0.83
Vehicles	--	--	--	--	0.300	0.300	--	--	--	--	--	--	--	--	--	--	0.30	0.30
Mobile Workshop	--	--	--	--	0.150	0.150	--	--	--	--	--	--	--	--	--	--	0.15	0.15
Minor Works & Supplies:																		
Low Cost Sanitation	--	--	--	0.114	0.036	0.150	0.114	0.036	0.150	0.114	0.036	0.150	0.038	0.012	0.050	0.38	0.12	0.50
Houses and Offices	--	--	--	0.123	0.099	0.222	0.123	0.099	0.222	0.123	0.099	0.222	0.041	0.033	0.074	0.41	0.33	0.74
Furniture & Office Material	--	--	--	0.018	0.024	0.042	0.018	0.024	0.042	0.018	0.024	0.042	0.006	0.008	0.014	0.06	0.08	0.14
Chemicals	--	--	--	--	0.075	0.075	--	0.075	0.075	--	--	--	--	--	--	--	0.15	0.15
Leak Detection Equipment, Pipes, Workshop Equipment	--	--	--	0.010	0.010	0.120	0.010	0.110	0.120	--	--	--	--	--	--	0.02	0.22	0.24
Health Education	0.007	0.011	0.018	0.032	0.055	0.087	0.039	0.066	0.105	0.032	0.055	0.087	0.020	0.033	0.053	0.13	0.22	0.35
Training	0.001	0.037	0.038	0.002	0.188	0.190	0.003	0.225	0.228	0.002	0.188	0.190	0.001	0.113	0.114	0.01	0.75	0.76
Technical Assistance	--	0.030	0.030	--	0.150	0.150	--	0.180	0.180	--	0.150	0.150	--	0.090	0.090	--	0.60	0.60
Consultancy Services	0.035	0.100	0.135	0.175	0.500	0.675	0.210	0.600	0.810	0.175	0.500	0.675	0.105	0.300	0.405	0.70	2.00	2.70
Base Cost	0.184	0.575	0.759	1.521	5.774	7.295	1.564	5.502	7.066	1.161	3.036	4.197	0.490	1.383	1.873	4.92	16.27	21.19
Contingencies																		
- Physical	0.033	0.097	0.130	0.235	0.816	1.051	0.241	0.788	1.029	0.185	0.502	0.687	0.077	0.218	0.295	0.77	2.42	3.19
- Price	0.043	0.024	0.067	0.562	0.778	1.340	0.769	1.371	2.140	0.689	1.160	1.849	0.342	0.717	1.059	2.40	4.05	6.45
Total Project Cost	0.260	0.696	0.956	2.318	7.368	9.686	2.574	7.661	10.235	2.035	4.698	6.733	0.909	2.318	3.227	8.09	22.74	30.83

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

PROJECT IMPLEMENTATION SCHEDULE



UGANDA

WATER SUPPLY AND SANITATION REHABILITATON PROJECT

PROCUREMENT ARRANGEMENTS

(US$ millions)

Project Element	Procurement Method ICB	LCB	Other	Total Cost Incl. Contingencies
Mechanical/electrical works:				
Contract IA	2.5(2.4)	-	-	2.5(2.4)
Contract IB	3.9(3.6)	-	-	3.9(3.6)
Civil works:				
Contract IIA	7.6(6.7)	-	-	7.6(6.7)
Contract IIB	2.1(1.8)	-	-	2.1(1.8)
Major supply contracts:				
Refuse equipment	3.5(3.3)	-	-	3.5(3.3)
Septic tank emptiers	0.6(0.6)	-	-	0.6(0.6)
Sewer maintenance equipment	1.2(1.1)	-	-	1.2(1.1)
Vehicles and mobile workshop	0.7(0.7)	-	-	0.7(0.7)
Minor works and supplies:				
Low cost sanitation		0.3(0.2)	0.4(0.3)	0.7(0.5)
Houses and offices		1.1(0.8)	-	1.1(0.8)
Furniture, office material, chemicals, leak detection equipment, pipe material and workshop equipment		0.8(0.7)	-	0.8(0.7)
Others:				
Health education	0.1(0.1)	0.1(0.1)	0.4(0.3)	0.6(0.5)
Training	0.1(0.1)	0.1(0.1)	0.9(0.9)	1.1(1.1)
Technical assistance			0.9(0.9)	0.9(0.9)
Consultancy services			3.5(3.3)	3.5(3.3)
Total	22.3(20.4)	2.4(1.9)	6.1(5.7)	30.8(28.0)

Note: Figures in parentheses are the respective amounts financed by IDA.

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

ESTIMATED SCHEDULE OF DISBURSEMENTS

(US$ millions)

Bank FY Semester	Disbursements		
	During Semester	Accumulated	In % (Cummulative)
FY85			
Dec. 31, 1984	1.0	1.0	4
June 30, 1985	4.0	5.0	18
FY86			
Dec. 31, 1985	4.0	9.0	32
June 30, 1986	4.0	13.0	46
FY87			
Dec. 31, 1986	4.0	17.0	61
June 30, 1987	3.0	20.0	71
FY88			
Dec. 31, 1987	3.0	23.0	82
June 30, 1988	2.0	25.0	89
FY89			
Dec. 31, 1988	3.0	28.0	100

Assumptions

Credit is approved in July 1984 and effective within three months.

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Health Education Component

Introduction

1. Due to economic, social and political difficulties experienced in Uganda during the last decade, the water, sewerage and sanitation systems in the major cities are in dire need of rehabilitation. The present condition poses an immediate threat to public health as evidenced by the increase in reported cases of diarrheal diseases in Kampala during 1982.

2. In the rehabilitation process, low-cost and technologically appropriate options must be introduced to speed recovery. One such option is local adaptation of the ventilated improved pit (VIP) latrine.

3. It is, however, not enough to provide improved services. People must accept and utilize them in a proper and hygenic manner. Herein lies the need for health education to encourage correct use and, thereby, promote health.

Target Population

4. The target population for education will be all citizens, but particular emphasis will be on those persons/families who have limited or no access to water and sewerage services. This means much effort will be focused on low-income, peripheral neighborhoods.

Objectives for Health Education

5. The project intends to achieve a reduction in morbidity and mortality from diseases associated with unsafe water supply, improper feces disposal and poor personal, household and environmental hygiene. Due to inadequacy of health statistics, partly as a result of disruption of health service delivery, it is difficult to set exact goals. In detail the project will aim at the following:

(a) Families in target areas inadequately served or unserved by water and/or sewerage should construct ventilated and improved latrines and will use the latrines in preference to defecation in the bush or other open places. Families will keep their latrines clean.

(b) Families collecting water from unreliable sources (e.g., unprotected springs) will boil or otherwise purify the water before consumption. Neighborhoods will work together to protect and improve springs, wells and other water sources. Water from sanitary sources will be collected in hygenic containers and will be maintained in a hygenic manner until consumption.

(c) Families will keep household refuse in covered dustbins until eventual disposal at designated collection depots.

(d) School authorities, staff and pupils will work together to provide potable water, to dispose of refuse properly and to dispose of human wastes hygenically on school premises. School personnel and pupils will maintain water and sanitation facilities which are located at the school so that these are clean and functional.

Health Education Strategies

(a) The program will first be built around staff development. This will consist of both fellowships to increase the number of professionally trained health educators and in-service training for existing health and related staff.

(b) Community outreach and organization will be linked with construction of demonstration VIP latrines in public places. Organization and self-help will also focus on improved water supply especially in peri-urban areas. Work with local social groups will form part of this outreach.

(c) School health education will focus on children, teachers and parents as demonstration units will be located at some primary schools. Curriculum development and provision of teaching aids will be included. Interagency cooperation with the Ministry of Education will be necesssary.

(d) The primary health care approach can be implemented where government, religious and voluntary agencies are phasing in this service. The desirability of PHC rests on the fact that it utilizes trained community members to educate, organize and serve their own neighborhoods, thereby being better able to communicate with the public.

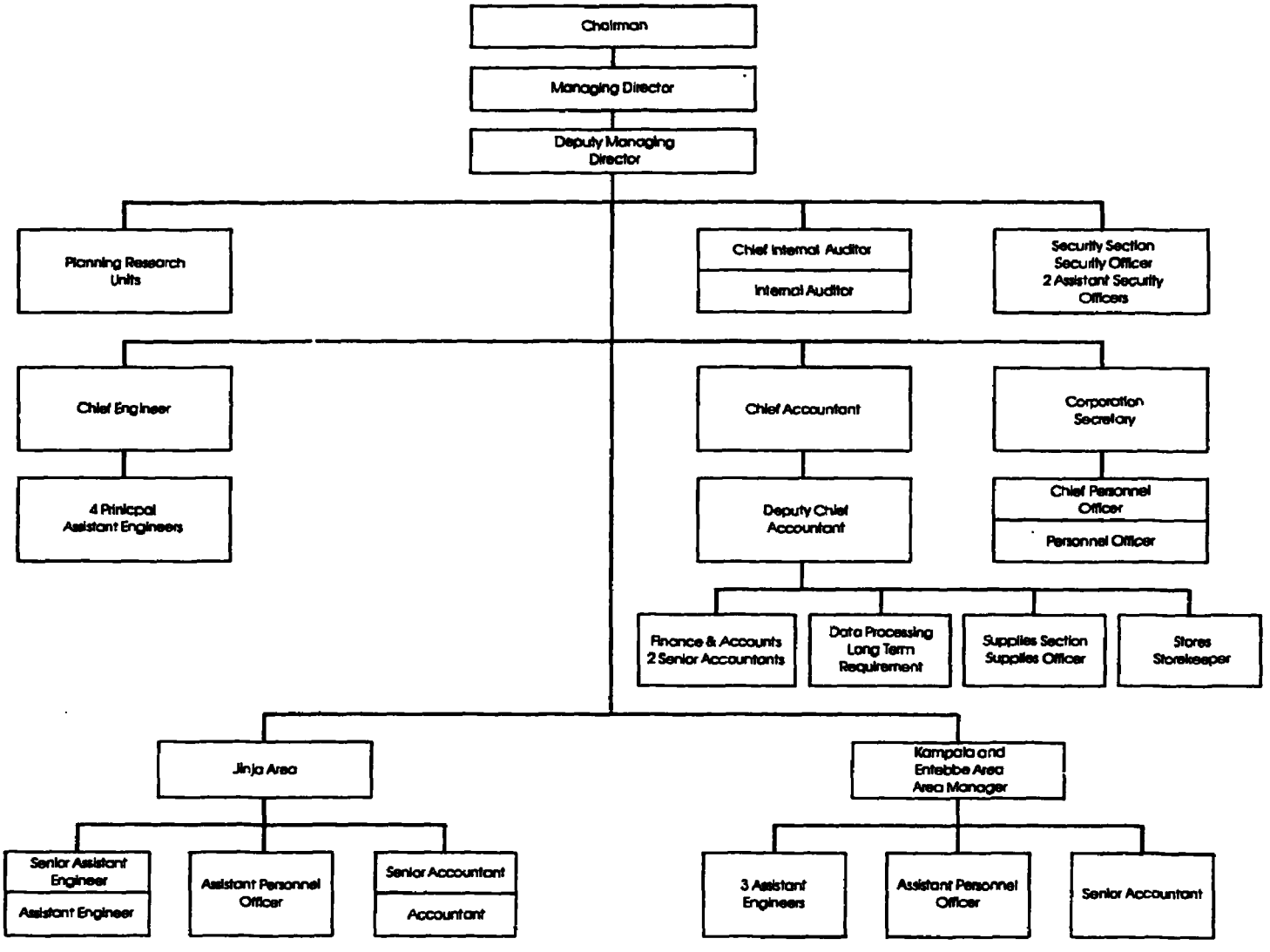
(e) Traditionally oriented and culturally relevant media (drama, stories, songs, dance, etc.) will be developed to support community outreach activities.

(f) Mass media support, in communities where available, will be utilized to reinforce outreach, school health and other strategies.

Action Plan and Monitoring Mechanisms

6. Specification/time frame plans and evaluation and monitoring mechanisms to achieve the set objectives for health education are contained in the consultants' report which is available in the project file.

UGANDA
WATER SUPPLY AND SANITATION REHABILITATION PROJECT
Organization Structure — National Water and Sewerage Corporation



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Note: A Finance Manager assumed his duties in March 1984, but his post has not yet been formally established.

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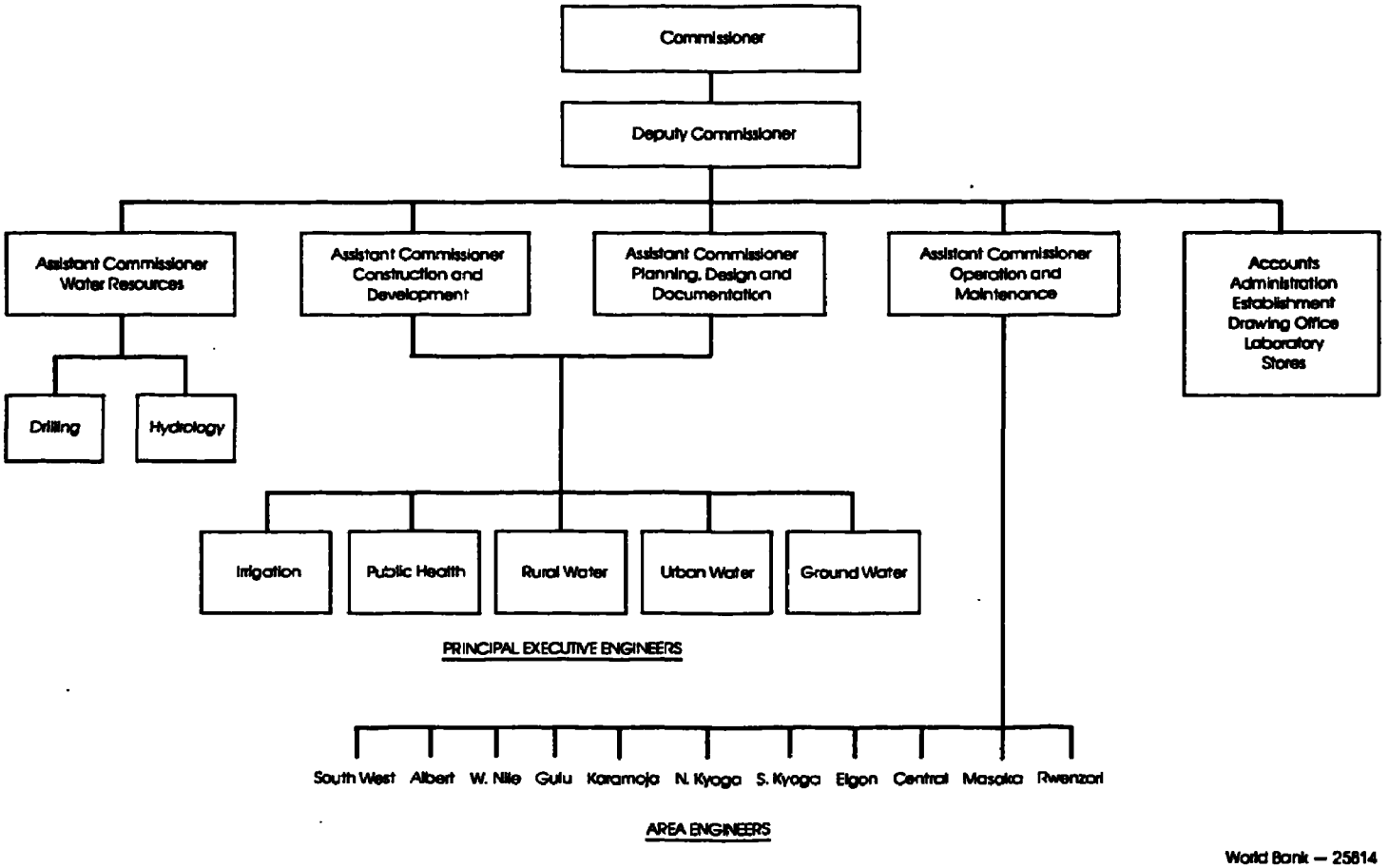
WATER SUPPLY AND SANITATION REHABILITATION PROJECT
Organization Structure — Water Development Department



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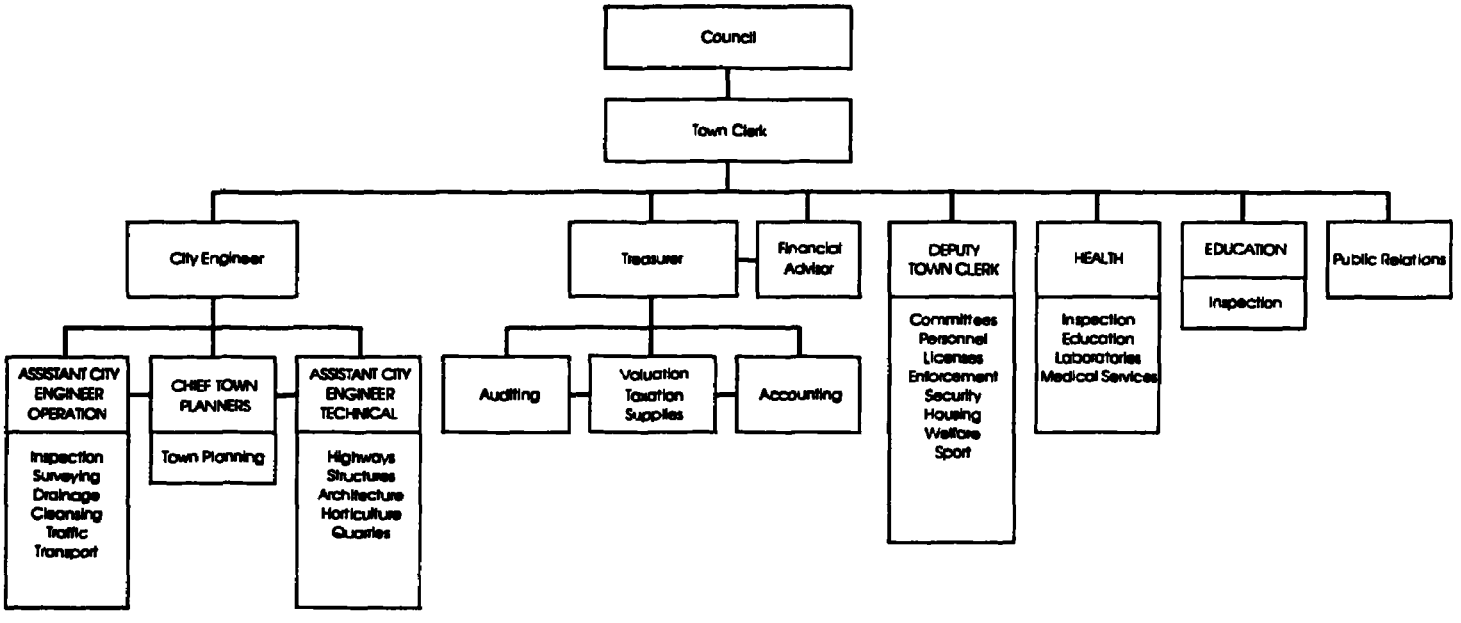
WATER SUPPLY AND SANITATION REHABILITATION PROJECT
Organization Structure — City Councils



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UGANDA

ANNEX 12
Page 1 of 6

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Training Needs and Program

Manpower Situation

1. Manpower data and projections provided by the manpower and training study undertaken by Coopers and Lybrand Associates, financed under IDA Credit 1110-UG, indicates that some 3,700 staff work in the sector against a requirement for about 5,500 in 1982, and against a need for a further 1,500 by 1991. In relation to the training needs of new staff, the training needs implicit in these projections are reduced from 3,300 to 2,000 persons by allowing for unskilled and secretarial staff. The resultant average recruitment rate of some 250 staff per year up to 1991 is unlikely to be achieved by the two sector agencies.

2. Current manpower stock and projections for the water supply and sewerage installations to be rehabilitated in each of the seven towns, including headquarters staff of NWSC and WDD (main and area HQ), indicate current total manpower strength of some 850 staff (excluding unskilled) and a requirement for an additional 800 staff by end-1987. While not insignificant the sum of the training needs (refresher and basic training) of such staff numbers would not justify the establishment of a central training facility whether permanent or temporary. Also bearing in mind the "crash" nature of the rehabilitation project and its shorter than usual duration, it would not be feasible to establish a central training facility in time to supply trained staff to coincide with the start of the construction and equipment installation phase of the project. The focus of the project training component would therefore, be on the provision of on-the-job training at each sub-project location by mobile teams of expert/counterpart training staff. In addition to this primary training objective the project training component would develop the first phase of a sector training service which, in the longer term, possibly through follow-up projects, would be strengthened and expanded to provide a range of programs to meet the training needs of both urban and rural sub-sectors.

Training Strategy

3. The necessity to build up a training system progressively over the longer term makes it highly desirable for the sector to establish a "Twinning Arrangement for Training;" preferably with an established water sector operational training organization capable of providing a complete spectrum of training services through a continuous training relationship with the Uganda water sector.

4. Examples of services to be provided under a Twinning Arrangement would include:

(a) "on-call" availability of a multi-purpose expatriate team of short-term training experts covering the range of training needs related to the seven towns and to the needs of HQ (including WDD area HQ) staff;

(b) training of local counterpart training staff;

(c) the design, administration and supervision of short, 3-4 month overseas programs of practical skills reinforcement;

(d) participation in the development and instruction of special water-related training programs provided by Uganda Technical College (Water Technicians Courses) and the Institute of Public Administration (revenue collection, billing, bookkeeping);

(e) immediate availability of training equipment lists, manuals, training aids, instructional guidelines, etc., and

(f) systematic monitoring and evaluation of training progress in both the short and long terms.

5. Dependent upon the future rate of expansion of water supply and sanitation services, and the future ability of sector agencies to recruit and retain staff, a later phase of the sector training strategy may need to consider the possible development of a sector training facility. The emphasis and priority for the medium term is expected to continue to be given to direct, on-the-job training at the site of the numerous installations in need of rehabilitation.

Proposed Project Training Component

6. The project training component would consist of the following elements:

(a) the development and training of a counterpart team of full-time training staff with a view both to participating in implementing the training component and forming the nucleus of a sector training unit on project completion;

(b) the provision of a multi-purpose expatriate team of short term training experts with operational and training experience covering the complete range of training needs related to sub-project installations to be rehabilitated, and to Headquarters Staff (including Area HQ) of the implementing institutions;

(c) On-the-job training programs will be prepared and delivered by mobile training teams comprising expatriate and counterpart training staff and will include, or be based upon, the design of preventive maintenance schedules and daily, weekly, and monthly controls and records in respect of all installations to be rehabilitated or replaced. This will include:

i) for the repair and replacement of water mains, sewers, pipework and fittings:

- Trench operations
- Trench timbering (where appropriate)
- Pipe transportation, loading and unloading
- Pipe stacking in the yard and on site
- Tools for pipe work, usage, care and maintenance
- Cutting of pipe materials
- Preparation of pipes for jointing
- Jointing of cast iron, asbestos cement, polyvinylchloride, polythylene and galvanised iron pipes, as appropriate
- Layout and installation of pipes and specials
- Mains branch connections
- Installation of valves, hydrants, air release valves, wash-outs, meters
- Filling and emptying of pipe systems, avoidance of water hammer
- Cleaning and disinfection of installed mains
- Preparation and execution of pressure tests
- Main repairs and modifications
- Maintenance of valves, etc.
- Taking measurements of installed, and modified, pipe systems and sketching
- Job safety and hygiene

(ii) for raw water, treated water and sewage pump maintenance and repair:

- Dismantling and assembling of pumps at workshop
- Identification of pump damage, repair requirement
- Spare parts of pumps
- Pump testing in test pits
- Handling, transport of pumps
- Motor installation and dismantling
- Operation and check procedures for installed and repaired pumps and motors

(iii) for water meters:

- Installation of water meters at main systems and service connections
- Dismantling and reinstallation
- Reading and recording

- Cleaning and repair
- Spare parts of water meters
- Testing, registration and calibration of water meters

(iv) for electrical works:

- Operation procedures for electric motors
- Control and recording systems
- Operation of measuring devices
- Dismantling and assembling of electric machinery
- Testing and maintenance
- Maintenance and repair of switch gear and electrical devices
- Service, charging and maintenance of batteries
- Electric wiring systems
- Record of modification of wiring diagrams
- Job safety

(v) for standby generators:

- Diesel engine/generator unit operation
- Control and recording systems
- Engine lubrication and maintenance
- Engine adjustment procedures
- Air induction and exhaust systems
- Starter battery control and maintenance
- Fuel systems
- Inspection of transformers and overhead lines
- Job safety

(vi) for leak detection:

- Simple hydraulics
- Causes of underground waste water
- Sources of contamination
- Leak detection methods, equipment
- Leakage reporting and recording
- Valve operations
- Pressure and flow recorders
- Job safety and hygiene

(vii) for reservoir operation:

- Hydraulics of reservoir operation (inflow, storage capacity, outflow)
- Water circulation in reservoirs
- Ventilation
- Cleaning and service work
- Control, reading and maintenance of recording installations (level indicator, etc.)
- Disinfection of reservoirs
- Safety precautions

(viii) for water treatment processes:

- appreciation of water treatment processes
- operation of treatment plant equipment; stopping, starting, attending: intake pumps, sedimentation tanks, chemical dosing equipment, filters, backwash tanks, clear water pumps and tanks, chlorine containers, micro-strainers, and air blowers and compressors

(d) a central training "focal point" would be set-up comprising one well-equipped classroom, a training/reference library, a training demonstration area or room, and a training media production room. A training room already exists, but is no longer used as such, at the NWSC Sixth Street Workshop which could provide a suitable location for the training "focal point;"

(e) a centralized program of seminars and courses would be arranged to familiarize managers and area/plant supervisory staff with the purpose, scope and methodology of the on-the-job training program, and to provide instruction in the skills and techniques of on-the-job training in varying work situations;

(f) the design, administration and supervision of an external training program for professional and sub-professional staff; this would comprise short, intensive training attachments to appropriate water utilities in the region or abroad, and would emphasize the development of operational experience in the areas of project planning, inventory control, preventive maintenance, water metering, leakage detection, water quality control, accounting systems, and personnel management;

(g) collaboration in the reform, development and instruction of special water-related training programs provided by Uganda Technical College (Water Technicians Course) and the Institute of Public Administration (revenue collection, billing, bookkeeping); and

(h) preparation of a Phase II training component, for inclusion in a possible follow-up Bank-financed project or implementation with other donor-financing. The expert/counterpart training team would operate as a sub-unit of the Project Coordination Unit.

7. The size of the project-related training cadres is indicated by the number of staff currently in post, supplemented by the project recruitment rates for the period 1984-1987. The breakdown of these totals by broad occupational categories is as follows:

Category	Current Actual	Recruitment 1984-87	Total 1987
NWSC (HQ, Kampala, Jinja, Entebbe			
Professional technical	4	20	20
Professional Non-Technical	4	25	19
Sub-Professional Technical	127	(-67)	60
Sub-Profession Non-Technical	110	55	165
Manual	130	297	427
Sub-total	375	387	695
WDD (HQ, Sub-Project Towns/Area HQ			
Professional Technical	19	39	58
Professional Non-Technical	10	10	20
Sub-Professional Technical	71	258	329
Sub-Professional Non-Technical	87	38	125
Manual	293	128	421
Sub-total	480	473	953
TOTAL	855	860	1,648

Technical Assistance and Training Costs

8. MLMWR and the sector agencies accept that technical assistance would be required to implement the training component which would represent the first phase of a long-term human resource development program for the sector as a whole. A training consultant would be required and would be appointed on terms and conditions satisfactory to the IDA. Criteria for consultant selection would include the ability to provide the range of training services required by the project training component and to satisfy the broader needs of establishing a twinning arrangement for training with the water supply and sanitation sector.

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ANNEX 13

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

WATER DEVELOPMENT DEPARTMENT

Recurrent Expenditures
(USh Million)

	1980/81		1981/82		1982/83		1983/84
	Budget	Actual	Budget	Actual	Budget	Actual	Budget
Staff	11.4	7.6	15.8	8.9	17.9	15.2	31.0
Group Employees	16.6	17.3	20.0	35.6	23.0	22.1	67.2
Allowances, Overtime	4.2	5.5	9.7	4.4	11.0	15.7	19.1
Travel	6.8	12.5	22.1	26.2	25.8	25.3	23.0
Operation and Maintenance Vehicles	8.1	11.3	85.0	69.6	73.7	22.1	71.4
Operation and Maintenance Machinery/Plant	1.7	0.1	6.0	1.6	1.8	5.2	10.1
Electricity, Water	2.3	0.1	1.8	0.5	3.1	1.0	2.2
Maintenance - Buildings	2.3	0.6	3.8	1.6	1.0	15.5	1.3
Materials Supplies	18.3	9.2	151.3	149.9	130.3	32.7	198.6
Production Machinery	6.7	4.7	33.8	8.5	30.0	—	30.0
Other	34.8	7.9	11.1	15.5	13.0	5.2	27.1
Total	113.2	76.8	360.4	322.3	330.6	160.0	481.0

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ANNEX 14

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

WATER DEVELOPMENT DEPARTMENT

DEVELOPMENT EXPENDITURES

(USh million)

	1980/81		1981/82		1982/83		1983/84
	Budget	Actual	Budget	Actual	Budget	Actual	Budget
Urban Water Supply							
Mbarara	3.00	0.53	3.20	--	1.00	0.55	--
Masaka	--	--	23.50	--	1.00	--	--
Mbale	--	--	--	--	--	--	--
Tororo	--	--	23.50	--	1.00	--	--
Other	70.00	50.17	609.31	242.86	421.00	263.71	25.00
Total	73.00	50.70	659.51	242.86	424.00	264.26	25.00
Sewerage							
Mbarara	--	--	--	--	12.00	22.63	--
Masaka	--	--	--	--	--	--	--
Mbale	--	--	--	--	1.00	--	--
Tororo	--	--	--	--	1.00	--	--
Other	--	--	--	--	--	0.55	--
Total	--	--	--	--	14.00	23.18	--
Combined Urban/ Water Sewerage	73.00	50.70	659.51	242.86	438.00	287.44	25.00

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WATER SUPPLY AND SANITATION REHABILITATION PROJECT

NATIONAL WATER AND SEWERAGE CORPORATION

Financial Forecasts FY84-FY90

Income Statement
(USh Million)

		1984	1985	1986	1987	1988	1989	1990
Water Sales ('000 m^3)		9,033	10,804	13,111	16,923	21,806	23,474	25,046
Average Price (USh/m^3)		17.41	60.11	78	95	115	134	152
Operating Revenues		157.3	649.4	1,022.7	1,607.7	2,507.7	3,145.5	3,807.0
Operating Expenses								
Personnel Cost	- Water	35.8	110.3	133.6	143.0	151.6	160.7	170.3
	- Sewerage	19.3	59.4	72.0	77.0	81.6	86.5	91.7
	- Total	55.1	169.7	205.6	220.0	233.2	247.2	262.0
Transport	- Water	48.5	58.2	82.4	95.9	116.7	126.1	136.0
	- Sewerage	22.9	28.6	46.5	56.9	74.7	81.4	88.2
	- Total	71.4	86.8	128.9	152.8	191.4	207.5	224.2
Chemicals	- Water	31.7	46.6	64.9	84.4	106.9	119.3	133.1
Power	- Water	8.3	40.5	52.2	84.1	117.1	129.6	142.9
	- Sewerage	1.2	6.5	9.7	11.3	13.0	14.9	16.9
	- Total	9.5	47.0	61.9	95.4	130.1	144.5	159.8
Maintenance	- Water	93.0	139.6	188.9	268.4	321.3	354.3	391.1
	- Sewerage	26.6	45.7	73.5	112.5	159.7	179.3	200.6
	- Total	119.6	185.3	262.4	380.9	481.0	533.6	591.7
Depreciation	- Water	646.5	699.0	784.0	1,278.7	1,451.8	1,623.3	1,798.8
	- Sewerage	886.9	920.3	990.1	1,462.4	1,604.4	1,765.5	1,949.4
	- Total	1,533.4	1,619.3	1,774.1	2,741.1	3,056.2	3,388.8	3,748.2
Total Op. Exp.	- Water	863.8	1,094.2	1,306.0	1,954.5	2,265.4	2,513.3	2,772.2
	- Sewerage	956.9	1,060.5	1,191.8	1,720.1	1,933.4	2,127.6	2,346.8
	- Total	1,820.7	2,154.7	2,497.8	3,674.6	4,198.8	4,640.9	5,119.0
Operating Income		(1,663.4)	(1,505.3)	(1,475.1)	(2,066.9)	(1,691.1)	(1,495.4)	(1,312.0)
Interest Charged to Operations		2.8	80.0	73.5	67.0	60.5	361.8	438.2
Net Income		(1,666.2)	(1,585.3)	(1,548.6)	(2,133.9)	(1,751.6)	(1,857.2)	(1,750.2)
Operating Ratio		1,158	332	244	229	167	148	135

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

NATIONAL WATER AND SEWERAGE CORPORATION

FINANCIAL FORECASTS FY84-FY90

Funds Flow Statement
(USh Million)

	1984	1985	1986	1987	1988	1989	Summary 1985-1989	1990
Internal Sources								
Net Income before Interest	(1,663.4)	(1,505.3)	(1,475.1)	(2,066.9)	(1,691.1)	(1,495.4)	(8,233.8)	(1,312.0)
Depreciation	1,533.4	1,619.3	1,774.1	2,741.1	3,056.2	3,388.8	12,579.5	3,748.2
Sub-total	(130.0)	114.0	299.0	674.2	1,365.1	1,893.4	4,345.7	2,436.2
Less: Operational Requirements								
Increase (Decrease) Working Capital	(80.1)	68.9	134.1	516.2	425.8	192.7	1,337.7	203.7
Interest Charged to Operations	2.8	80.0	73.5	67.0	60.5	361.8	642.8	438.2
Debt Repayment	0.0	68.8	68.8	68.8	68.8	337.7	612.9	319.7
Sub-total	(77.3)	217.7	276.4	652.0	555.1	892.2	2,593.4	961.6
Internal Funds Available	(52.7)	(103.7)	22.6	22.2	810.0	1,001.2	1,752.3	1,474.6
Capital Investment (incl. IDC)								
Proposed Project - Water	0.0	803.7	1,399.0	1,469.7	1,048.5	332.1	5,053.0	0.0
- Sewerage	0.0	176.4	307.2	322.7	230.2	72.9	1,109.4	0.0
- Total	0.0	980.1	1,706.2	1,792.4	1,278.7	405.0	6,162.4	0.0
Other Construction - Water	1200.0	939.0	300.0	0.0	320.0	400.0	1,959.0	650.0
- Sewerage	0.0	0.0	0.0	0.0	480.0	600.0	1,080.0	850.0
- Total	1200.0	939.0	300.0	0.0	800.0	1,000.0	3,039.0	1,500.0
Total Capital Investment	1200.0	1919.1	2006.2	1792.4	2,078.7	1,405.0	9,201.4	1,500.0
Balance to be Financed	1,252.7	2,022.8	1,983.6	1,770.2	1,268.7	403.8	7,449.1	25.4
Financed by:								
Borrowings	762.8	641.2	1154.1	1278.3	935.7	294.9	4,304.2	0.0
Equity	219.9	442.6	552.1	514.1	343.0	110.1	1,961.9	0.0
Grants	270.0	939.0	300.0	0.0	0.0	0.0	1,239.0	0.0
Total Finance Sources	1,252.7	2,022.8	2,006.2	1,792.4	1,278.7	405.0	7,505.1	0.0
Cash Increase (Decrease)	0	0	22.6	22.2	10.0	1.2	56.0	(25.4)
Cash at Beginning of Year	7.1	7.1	7.1	29.7	51.9	61.9		63.1
Cash at End of Year	7.1	7.1	29.7	51.9	61.9	63.1		37.7

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WATER SUPPLY AND SANITATION REHABILITATION PROJECT

NATIONAL WATER AND SEWERAGE CORPORATION

FINANCIAL FORECASTS FY84-FY90

Balance Sheet
(USh million)

	1984	1985	1986	1987	1988	1989	1990
Assets							
Fixed Assets							
Plant in Operation:							
- Water	25,677.1	28,092.5	32,212.4	36,903.8	41,572.0	46,172.5	51,062.0
- Sewerage	38,894.0	41,130.4	44,965.0	49,386.1	54,122.2	59,780.2	65,985.4
- Total	64,571.1	69,222.9	77,177.4	86,289.9	95,694.2	105,952.7	117,047.4
Less: Depreciation							
- Water	18,803.7	20,583.9	23,117.5	26,476.8	30,311.5	34,662.8	39,581.3
- Sewerage	30,310.0	32,973.1	36,765.9	41,537.2	46,879.9	52,864.6	59,571.8
- Total	49,113.7	53,557.0	59,883.4	68,014.0	77,191.4	87,527.4	99,153.1
Net Fixed Assets:							
- Water	6,873.4	7,508.6	9,094.9	10,427.0	11,260.5	11,509.7	11,480.7
- Sewerage	8,584.0	8,157.3	8,199.1	7,848.9	7,242.3	6,915.6	6,413.6
- Total	15,457.4	15,665.9	17,294.0	18,275.9	18,502.8	18,425.3	17,894.3
Work in Progress:							
- Water	0.0	803.7	770.7	448.1	469.7	342.8	258.8
- Sewerage	0.0	176.4	145.1	93.6	512.4	398.3	423.3
- Total	0.0	980.1	915.8	541.7	982.1	741.1	682.1
Current Assets:							
Cash and Banks	7.1	7.1	29.7	51.9	61.9	63.1	37.7
Accounts Receivable	52.4	108.5	170.8	268.5	418.8	525.3	635.8
Inventories	50.0	100.0	200.0	650.0	956.9	1,059.5	1,170.5
Total	109.5	215.6	400.5	970.0	1,437.6	1,647.9	1,844.0
Total Assets	15,566.9	16,861.6	18,610.3	19,788.0	20,922.5	20,814.3	20,420.4
Equity and Liabilities							
Equity							
Capital	15,812.1	16,254.7	16,806.8	17,320.9	17,663.9	17,774.0	17,774.0
Retained Earnings	(1,666.2)	(3,251.5)	(4,800.1)	(6,934.0)	(8,685.6)	(10,542.8)	(12,293.0)
Grants	270.0	1,209.0	1,509.0	1,509.0	1,509.0	1,509.0	1,509.0
Revaluation Reserve	257.5	1,146.3	2,478.0	4,034.5	5,679.3	7,344.6	9,002.8
Total Equity	14,673.4	15,358.5	15,993.7	15,930.4	16,166.6	16,084.8	15,992.8
Long Term Debt	850.4	1,422.8	2,508.1	3,717.6	4,584.5	4,541.7	4,222.0
Current Liabilities							
Accounts Payable	43.1	80.3	108.5	140.0	171.4	187.8	205.6
Total	43.1	80.3	108.5	140.0	171.4	187.8	205.6
Total Equity and Liabilities	15,566.9	16,861.6	18,610.3	19,788.0	20,922.5	20,814.3	20,420.4
Debt/Debt and Equity (%)	5	8	14	19	22	22	21

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WATER SUPPLY AND SANITATION REHABILITATION PROJECT

WATER DEVELOPMENT DEPARTMENT

FINANCIAL FORECASTS FY84-FY90

Income Statement
(USh Million)

		1984	1985	1986	1987	1988	1989	1990
Water Sales ('000 m^3)		1,006	2,446	2,741	3,987	4,718	5,190	5,696
Average Price (USh/m^3)		17.41	60.11	78	95	115	134	152
Operating Revenues		17.5	147.0	213.8	378.8	542.6	695.5	865.8
Operating Expenses								
Personnel Cost	- Water	27.3	32.9	38.3	44.3	49.2	54.9	57.4
	- Sewerage	1.6	2.0	2.4	2.9	3.3	3.8	4.4
	- Total	28.9	34.9	40.7	47.2	52.5	58.7	61.8
Transport	- Water	7.8	9.3	10.9	12.9	14.2	15.8	18.1
	- Sewerage	1.6	2.8	3.1	3.6	4.0	4.5	5.1
	- Total	9.4	12.1	14.0	16.5	18.2	20.3	23.2
Chemicals	- Water	76.2	83.7	140.9	158.7	176.8	196.5	219.1
Power	- Water	4.4	17.4	31.1	35.1	38.9	43.7	48.8
	- Sewerage	0.1	0.1	0.2	0.3	0.4	0.5	0.7
	- Total	4.5	17.5	31.3	35.4	39.3	44.2	49.5
Maintenance	- Water	24.3	27.1	40.7	48.0	50.8	54.2	61.9
	- Sewerage	2.0	3.4	5.1	5.7	6.4	7.2	8.0
	- Total	26.3	30.5	45.8	53.7	57.2	61.4	69.9
Depreciation	- Water	168.4	177.1	201.2	333.5	381.0	429.1	468.8
	- Sewerage	59.3	63.4	71.5	112.8	130.9	146.4	161.7
	- Total	227.7	240.5	272.7	446.3	511.9	575.5	630.5
Total Op. Exp.	- Water	308.4	347.5	463.1	634.5	710.9	794.2	874.1
	- Sewerage	64.6	71.7	82.3	125.3	145.0	162.4	179.9
	- Total	373.0	419.2	545.4	757.8	855.9	956.6	1,054.0
Operating Income		(355.5)	(272.2)	(331.6)	(379.0)	(313.3)	(261.1)	(188.2)
Interest Charged to Operations		0	0	0	0	0	0	0
Net Income		(355.5)	(272.2)	(331.6)	(379.0)	(313.3)	(261.1)	(188.2)
Operating Ratio		2,131	285	255	200	158	138	122

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

WATER DEVELOPMENT DEPARTMENT

FINANCIAL FORECASTS FY84-FY90

Funds Flow Statement
(USh Million)

	1984	1985	1986	1987	1988	1989	Summary 1985-1989	1990
Internal Sources								
Net Income before Interest	(355.5)	(272.2)	(331.6)	(379.0)	(313.3)	(261.1)	(1,557.2)	(188.2)
Depreciation	227.7	240.5	272.7	446.3	511.9	575.5	2,046.9	630.5
Sub-total	(127.8)	(31.7)	(58.9)	67.3	198.6	314.4	489.7	442.3
Less: Operational Requirements								
Increase (Decrease) Working Capital	(37.8)	41.7	37.2	51.7	66.8	37.5	234.9	42.3
Interest Charged to Operations	0	0	0	0	0	0	0	0
Debt Repayment	0	0	0	0	0	0	0	0
Sub-total	(37.8)	41.7	37.2	51.7	66.8	37.5	234.9	42.3
Internal Funds Available	(90.0)	(73.4)	(96.1)	15.6	131.8	276.9	254.8	400.0
Capital Investment								
Proposed Project - Water	0	579.5	614.7	322.9	372.2	117.1	1,806.4	0
- Sewerage	0	89.0	114.2	375.8	87.3	27.5	723.8	0
- Total	0	468.5	758.9	698.7	459.5	144.6	2,530.2	0
Other Construction - Water	0	180.0	0	0	130.0	230.0	540.0	340.0
- Sewerage	0	150.0	0	0	30.0	40.0	220.0	60.0
- Total	0	330.0	0	0	160.0	270.0	760.0	400.0
Total Capital Investment	0	798.5	758.9	698.7	619.5	414.6	3,290.2	400.0
Balance to be Financed	90.0	871.9	855.0	683.1	487.7	137.7	3,035.4	0
Financed by:								
Borrowings	0	0	0	0	0	0	0	0
Equity	88.5	900.0	845.0	698.7	459.5	144.6	3,047.8	0
Grants	0	0	0	0	0	0	0	0
Total Finance Sources	88.5	900.0	845.0	698.7	459.5	144.6	3,047.8	0
Cash Increase (Decrease)	(1.5)	28.1	(10.0)	15.6	(28.2)	6.9	12.4	0
Cash at Beginning of Year	1.5	0	28.1	18.1	33.7	5.5		12.4
Cash at End of Year	0	28.1	18.1	33.7	5.5	12.4		12.4

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

WATER DEVELOPMENT DEPARTMENT

FINANCIAL FORECASTS FY84-FY90

Balance Sheet
(USh Million)

	1984	1985	1986	1987	1988	1989	1990
Assets							
Fixed Assets							
Plant in Operation:							
- Water	6,533.6	7,089.3	8,387.8	9,639.7	10,954.1	12,240.0	13,741.6
- Sewerage	2,602.0	2,901.6	3,311.4	3,966.0	4,481.8	4,960.2	5,471.6
- Total	9,135.6	9,990.9	11,699.2	13,605.7	15,435.9	17,200.2	19,213.2
Less: Depreciation							
- Water	4,137.3	4,552.3	5,140.4	5,936.5	6,851.8	7,897.6	9,077.2
- Sewerage	1,700.6	1,861.8	2,091.6	2,392.6	2,738.8	3,131.7	3,575.3
- Total	5,837.9	6,414.1	7,232.0	8,329.1	9,590.6	11,029.3	12,652.5
Net Fixed Assets:							
- Water	2,396.3	2,537.0	3,247.4	3,703.2	4,102.3	4,342.4	4,664.4
- Sewerage	901.4	1,039.8	1,219.8	1,573.4	1,743.0	1,828.5	1,896.3
- Total	3,297.7	3,576.8	4,467.2	5,276.6	5,845.3	6,170.9	6,560.7
Work in Progress:							
- Water	0	379.5	298.3	124.2	179.6	226.7	166.7
- Sewerage	0	89.0	70.0	89.2	47.6	40.1	35.1
- Total	0	468.5	368.3	213.4	227.2	266.8	201.8
Current Assets:							
Cash and Banks	0	28.1	18.1	33.7	5.5	12.4	12.4
Accounts Receivable	5.8	24.5	35.7	63.3	90.6	116.1	144.6
Inventories	12.0	40.0	80.0	110.0	154.4	172.0	192.1
Total	17.8	92.6	133.8	207.0	250.5	300.5	349.1
Total Assets	3,315.5	4,137.9	4,969.3	5,697.0	6,323.0	6,738.2	7,111.6
Equity and Liabilities							
Equity							
Capital	3,590.4	4,490.4	5,335.4	6,034.1	6,493.6	6,638.2	6,638.2
Retained Earnings	(355.5)	(627.7)	(959.3)	(1,338.3)	(1,651.6)	(1,912.7)	(2,100.9)
Grants	0	0	0	0	0	0	0
Revaluation Reserve	58.8	248.4	552.4	954.5	1,429.4	1,955.5	2,510.8
Total Equity	3,293.7	4,111.1	4,928.5	5,650.3	6,271.4	6,681.0	7,048.1
Long Term Debt	0	0	0	0	0	0	0
Current Liabilities							
Accounts Payable	21.8	26.8	40.8	46.7	51.6	57.2	63.5
Total	21.8	26.8	40.8	46.7	51.6	57.2	63.5
Total Equity and Liabilities	3,315.5	4,137.9	4,969.3	5,697.0	6,323.0	6,738.2	7,111.6

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

NATIONAL WATER AND SEWERAGE CORPORATION

FINANCIAL FORECASTS - FY84-FY90

Consolidated Income Statement
(USh Million)

		1984	1985	1986	1987	1988	1989	1990
Water Sales (000m^3)		9,033	10,804	13,111	16,923	21,806	28,664	30,742
Average Price (USh/m^3)		17.41	60.11	78	95	115	134	152
Operating Revenues		157.3	649.4	1,022.7	1,607.7	2,507.7	3,841.0	4,672.8
Operating Expenses:								
Personnel Cost	- Water	35.8	110.3	133.6	143.0	200.8	215.6	227.7
	- Sewerage	19.3	59.4	72.0	77.0	84.9	90.3	96.1
	- Total	55.1	169.7	205.6	220.0	285.7	305.9	323.8
Transport	- Water	48.5	58.2	82.4	95.9	130.9	141.9	154.1
	- Sewerage	22.9	28.6	46.5	56.9	78.7	85.9	93.3
	- Total	71.4	86.8	128.9	152.8	209.6	227.8	247.4
Chemicals	- Water	31.7	46.6	64.9	84.4	283.7	315.8	352.2
Power	- Water	8.3	40.5	52.2	84.1	156.0	173.3	191.7
	- Sewerage	1.2	6.5	9.7	11.3	13.4	15.4	17.6
	- Total	9.5	47.0	61.9	95.4	169.4	188.7	209.3
Maintenance	- Water	93.0	139.6	188.9	268.4	372.1	408.5	453.0
	- Sewerage	26.6	45.7	73.5	112.5	166.1	186.5	208.6
	- Total	119.6	185.3	262.4	380.9	538.2	595.0	661.6
Depreciation	- Water	646.5	699.0	784.0	1,278.7	1,451.8	2,052.4	2,267.6
	- Sewerage	886 9	920.3	990.1	1,462.4	1,604.4	1,911.9	2,111.1
	- Total	1,533.4	1,619.3	1,774.1	2,741.1	3,056.2	3,964.3	4,378.7
Total Op. Exp.	- Water	863.8	1,094.2	1,306.0	1,954.5	2,265.4	3,307.5	3,646.3
	- Sewerage	956.9	1,060.5	1,191.8	1,720.1	1,933.4	2,290.0	2,526.7
	- Total	1,820.7	2,154.7	2,497.8	3,674.6	4,198.8	5,597.5	6,173.0
Operating Income		(1,663.4)	(1,505.3)	(1.475.1)	(2,066.9)	(1,691.1)	(1,756.5)	(1,500.2)
Interest Charged to Operations		2.8	80.00	73.5	67.0	60.5	361.8	438.2
Net Income		(1,666.2)	(1,585.3)	(1,548.6)	(2,133.9)	(1,751.6)	(2,118.3)	(1,938.4)
Operating Ratio		1,158	332	244	229	167	146	132

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

NATIONAL WATER AND SEWERAGE CORPORATION

FINANCIAL FORECASTS FY84-FY90

Consolidated Funds Flow Statement
(USh Million)

	1984	1985	1986	1987	1988	1989	Summary 1985-1989	1990
Internal Sources								
Net Income before Interest	(1,663.4)	(1,505.3)	(1,475.1)	(2,066.9)	(1,691.1)	(1,756.5)	(8,494.9)	(1,500.2)
Depreciation	1,533.4	1,619.3	1,774.1	2,741.1	3,056.2	3,964.3	13,155.0	4,378.7
Sub-total	(130.0)	114.0	299.0	674.2	1,365.1	2,207.8	4,660.1	2,878.5
Less: Operational Requirements								
Increase (Decrease) Working Capital	80.1	68.9	134.1	516.2	425.8	423.6	1,568.6	246.0
Interest Charged to Operations	2.8	80.0	73.5	67.0	60.5	361.8	642.8	438.2
Debt Repayment	0	68.8	68.8	68.8	68.8	337.7	612.9	319.7
Sub-total	(77.3)	217.7	276.4	652.0	555.1	1,123.1	2,824.3	1,003.9
Internal Funds Available	(52.7)	(103.7)	22.6	22.2	810.0	1,084.7	1,835.8	1,874.6
Capital Investment (incl. IDC)								
Proposed Project - Water	0	803.7	1,399.0	1,469.7	1,048.5	449.2	5,170.1	0
- Sewerage	0	176.4	307.2	322.7	230.2	100.4	1,136.9	0
- Total	0	980.1	1,706.2	1,792.4	1,278.7	549.6	6,307.0	0
Other Construction - Water	1,200.0	939.9	300.0	0	320.0	630.0	2,189.0	990.0
- Sewerage	0	0	0	0	480.0	640.0	1,120.0	910.0
- Total	1,200.0	939.0	300.0	0	800.0	1,270.0	3,309.0	1,900.0
Total Capital Investment	1,200.0	1,919.1	2,006.2	1,792.4	2,078.7	1,819.6	9,616.0	1,900.0
Acquisition of WDD Fixed Assets						4,643.1	4,643.1	
Balance to be Financed	1,252.7	2,022.8	1,983.6	1,770.2	1,268.7	5,378.0	12,423.3	25.4
Financed by:								
Borrowings	762.8	641.2	1,154.1	1,278.3	935.7	294.9	4,304.2	0
Equity	219.9	442.6	552.1	514.1	343.0	5,096.7	6,948.5	0
Grants	270.0	939.0	300.0	0	0	0	1,239.0	0
Total Finance Sources	1,252.7	2,022.8	2,006.2	1,792.4	1,278.7	5,391.6	12,491.7	0
Cash Increase (Decrease)	0	0	22.6	22.6	10.0	13.6	68.4	(25.4)
Cash at Beginning of Year	7.1	7.1	7.1	29.7	51.9	61.9	-	75.5
Cash at End of Year	7.1	7.1	29.7	51.9	61.9	75.5	-	50.1

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

NATIONAL WATER AND SEWERAGE CORPORATION

FINANCIAL FORECASTS - FY84-FY90

Consolidated Balance Sheet
(USh Million)

Year Ending June	1984	1985	1986	1987	1988	1989	1990
Assets							
Fixed Assets							
Plant in Operation:							
- Water	25,677.1	28,092.5	32,212.4	36,903.8	41,572.0	58,412.5	64,803.6
- Sewerage	38,894.0	41,130.4	44,965.0	49,386.1	54,122.2	64,740.4	71,457.0
- Total	64,571.1	69,222.9	77,177.4	86,289.9	95,694.2	123,152.9	136,260.6
Less: Depreciation:							
- Water	18,803.7	20,583.9	23,117.5	26,476.8	30,311.5	42,560.4	48,658.5
- Sewerage	30,310.0	32,973.1	36,765.9	41,537.2	46,879.9	55,996.3	63,147.1
- Total	49,113.7	53,557.0	59,883.4	68,014.0	77,191.4	98,556.7	111,805.6
Net Fixed Assets:							
- Water	6,873.4	7,508.6	9,094.9	10,427.0	11,260.5	15,852.1	16,145.1
- Sewerage	8,584.0	8,157.3	8,199.1	7,848.9	7,242.3	8,744.1	8,309.9
- Total	15,457.4	15,665.9	17,294.0	18,275.9	18,502.8	24,596.2	24,455.0
Work in Progress:							
- Water	0	803.7	770.7	448.1	469.7	569.5	425.5
- Sewerage	0	176.4	145.1	93.6	512.4	438.4	458.4
- Total	0	980.1	915.8	541.7	982.1	1,007.9	883.9
Current Assets							
Cash and Banks	7.1	7.1	29.7	51.9	61.9	75.5	50.1
Accounts Receivable	52.4	108.5	170.8	268.5	418.8	641.4	780.4
Inventories	50.0	100.0	200.0	650.0	956.9	1,231.5	1,362.6
Total	109.5	215.6	400.5	970.0	1,437.6	1,948.4	2,193.1
Total Assets	15,566.9	16,861.6	18,610.3	19,788.0	20,922.5	27,552.5	27,532.0
Equity and Liabilities							
Equity:							
Capital	15,812.1	16,254.7	16,806.8	17,320.9	17,663.9	22,760.6	22,760.6
Retained Earnings	(1,666.2)	(3,251.5)	(4,800.1)	(6,934.0)	(8,685.6)	(10,803.9)	(12,742.3)
Grants	270.0	1,209.0	1,509.0	1,509.0	1,509.0	1,509.0	1,509.0
Revaluation Reserve	257.5	1,146.3	2,478.0	4,034.5	5,679.3	9,300.1	11,513.6
Total Equity	14,673.4	15,358.5	15,993.7	15,930.4	16,166.6	22,765.8	23,040.9
Long Term Debt	850.4	1,422.8	2,508.1	3,717.6	4,584.5	4,541.7	4,222.0
Current Liabilities:							
Accounts Payable	43.1	80.3	108.5	140.0	171.4	245.0	269.1
Total	43.1	80.3	108.5	140.0	171.4	245.0	269.1
Total Equity and Liabilities	15,566.9	16,861.6	18,610.3	19,788.0	20,922.5	27,552.5	27,532.0
Debt/Debt and Equity (%)	5	8	14	19	22	17	16

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Notes to Financial Statements

A. General

1. The financial statements are based on information supplied by NWSC, WDD and their consultants. Foreign price escalation rates were assumed to be 3.5% in 1984, 8% in 1985 and 9% thereafter, while local price escalation rates were taken to be 20% in 1984, 10% in 1985, 8% in 1986, and 6% thereafter. The four towns currently under WDD's jurisdiction (Masaka, Mbarara, Tororo, and Mbale) are assumed to become part of NWSC's operations at the beginning of FY89. Their staff, cash, accounts receivable and payable, inventories, and fixed assets on a revalued basis would be transferred to NWSC and treated as an increase in NWSC's capital.

B. Income Statements

Tariffs and Revenues

2. Water consumption forecasts are derived from Annex 3. It is assumed that consumption would be billed and collected as follows: 60% by NWSC and 30% by WDD in 1984, 60% by both in 1985, 65% in 1986, 70% in 1987, 80% in 1988, 85% in 1989, and 90% in 1990. A common national tariff structure and major tariff increases were introduced for NWSC and WDD in May 1984. It has been assumed that the common tariff structure would be retained and that, until the results of the tariff study are available and agreed upon, future adjustments would based solely on financial performance criteria for NWSC prior to the transfer of the four towns in July 1988. Thus, the average tariff has been set at levels that would allow NWSC to produce revenues sufficient to cover its cash operating costs for FY86 through FY90, plus 15% of depreciation on a revalued basis in FY86, 25% in FY87, 45% in FY88, 55% in FY89, and 65% in FY90. This would require increases in the average tariff in July of each year as follows: 30% in 1985, 22% in 1986, 21% in 1987, 17% in 1988 and 13% in 1989.

Personnel Cost (Salaries, Wages, and Benefits)

3. At the end of FY83, NWSC had a total of 1,213 staff (387 permanent and 826 non-permanent, but full time). It is estimated that the

facilities at Kampala, Jinja and Entebbe from project completion, in FY87, through completion of a follow-up project, in FY89. Thereafter, small increases of about 2% annually would be required. NWSC's current (FY84) annual expenditures for salaries, wages, and benefits amount to USh 44.0 million compared with an estimated level of USh 164.0 million required to attract and retain the calibre of staff needed. Assuming the inflation rates referred to in paragraph 1 of this Annex, the competitive level of salaries, wages, and benefits in USh million, would be: FY84, 164.0; FY85, 188.6; FY86, 205.6; FY87, 220.0; FY88, 233.2; FY89, 247.2; FY90, 262.0. To restore parity with WDD, NWSC's personnel costs were assumed to increase by 50% with effect from March 1984; they were taken to reach 90% of the competitive level in FY 1985 and 100% thereafter. In accordance with past experience, salaries and wages were divided between water and sewerage in a ratio of 65:35. WDD's personnel costs reflect consultants' estimates of required staffing levels.

Transport

4. These costs include fuel and maintenance and are based on consultants' estimates.

Chemicals

5. These costs are based on consultants' estimates.

Power

6. These costs were based on consultants' estimates and reflect a 25% price increase to about USh 0.55 per kWh scheduled for January 1984 as well as an assumed 400% increase with effect from July 1984, following the appraisal of a proposed Bank power project; thereafter, price increases were taken to be as indicated in paragraph 1 of this Annex.

Maintenance

7. These cost estimates were prepared by the consultants and by the appraisal mission.

Depreciation

8. Based on the past and expected composition of assets, an average annual rate of 2.6% has been assumed for water supply assets through FY86,and 3.7% thereafter. For sewerage assets, an average annual rate of 2.3% has been assumed through FY86 and 3.1% thereafter.

Balance Sheets

9. Fixed Assets. Asset registers have not been kept current and the replacement values of fixed assets as of December 1983 have been estimated by the consultants. Fixed assets and depreciation have been revalued

annually to reflect price escalations estimated at 5.75% in FY85, 8.5% in FY86, and 9% thereafter.

10. Work in Progress. Capital expenditures for NWSC and WDD are as shown in Annexes 15-17. Transfers to fixed assets were made as follows: 100% of other construction at the end of FY85, 100% of other construction and 70% of work in progress on the proposed project in FY86, 80% and 90% of work in progress on the proposed project in FY87 and FY88 respectively, and 60% of all work in progress annually thereafter.

11. Accounts Receivable. The Treasury has undertaken to withhold from the monthly budget allocations to government ministries monies owed to NWSC as of June 30, 1984. Accounts receivable from government ministries as of March 31, 1984 amounted to USh 73.6 million. This would reduce NWSC's total accounts receivable to about four months' billing by the end of FY84. Thereafter, accounts receivable are assumed to represent two months' billing, or 16.7% of annual revenues. WDD's current and future accounts receivable position is assumed to be similar to NWSC's.

12. Inventories. These are assumed to be increased gradually to 1% of gross revalued plant in operation.

13. Accounts Payable. Accounts payable at the end of each year have been assumed to be 15% of cash operating expenses for that year.

Borrowings and Long Term Debt

14. For NWSC, it is assumed that USh 4,262.5 million (about US$14.2 million) of the estimated USh 4,752.0 million (US$15.8 million) project expenditure excluding interest during construction would be financed from the IDA Credit. Of this, 70%, or USh 2,983.8 million (US$9.9 million), is assumed to be on-lent to NWSC by the Government for 20 years, including three years of grace. The annual interest rate would be variable and has been assumed at 17% p.a. for the first three years and 10% p.a. thereafter. Interest during construction, estimated at USh 547.4 million (about US$1.8 million), is assumed to be financed by the Government by being added to the loan balance. NWSC has for several years failed to service long term liabilities to various creditors, mainly municipal authorities. The total debt, estimated at about USh 44.6 million (US$0.15 million) including accrued interest, is assumed to be repaid over five years, commencing in FY85, based on an average annual interest rate of 6.25%. In addition, FOS, a private Ugandan company, has at the instruction of MLMWR undertaken rehabilitation work for NWSC estimated at about USh 43.0 million (US$0.14 million), while the Islamic Development Bank (IDB) has financed pipes in the amount of USh 701.46 million as of August 30, 1983. The terms of payment by NWSC for these goods and services have not

been formulated beyond a general intent that payment should eventually be made. It has been assumed that these terms would be concessional: the annual interest rate for both loans would be 10%, but the FOS-related loan would be interest-free through June 1984 and would be repaid over five years, while the loan for the IDB-financed pipes would be repaid over 15 years.

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

National Water And Sewerage Corporation

Water Development Department

Tariff Structure a/

	Monthly Tariffs		
	Previous b/	Revised c/	
		Category A d/	Category B e/
	USh	USh	USh
blic Standpipes f/	0	0	0
neral Water Rate (Water only)	72	5% of annual rental value g/ 100 minimum	5% of annual rental value g/ 80 minimum
mestic (Internal) (water and Sewerage)	72	100	80
Institutions			
- Public (Hospitals, schools)	86.40/1000 Ig	700/1000 Ig	100/1000 Ig
- Private (Schools, colleges)	86.40/1000 Ig	700/1000 Ig	120/head/month
ndustry	86.40/1000 Ig	700/1000 Ig	360/1000 Ig
:els, Petrol Stations	86.40/1000 Ig	700/1000 Ig	396/1000 Ig
;idential Houses with mming Pools	86.40/1000Ig	700/1000Ig	396/Ig
mises with Luxury Appliances rden Hoses and Sprinklers)	1,000	2,000	1,200

Some minor tariff categories have been omitted.

NWSC tariffs only. For WDD, unmetered owners or occupants of property located within 1,000 feet of a water main, regardless of whether they were connected or not, were subject to a General Water Rate (GWR), generally equal to 5% of the annual value of the property, with a minimum charge set at USh 30 per month. An additional Internal Supply Rate (ISR) in the same amount applied to consumers with connected water supply. Other users, such as restaurants and hotels, were charged higher GWR and ISR percentage rates. There were no separate charges for sewerage. WDD's charge to the few consumers with metered supply was USh 3/1000 gallons in most towns.

With effect from May 1984.

Comprises the seven project towns.

Comprises urban centers other than the seven project towns.

Water is provided free of charge to consumers, but municipal authorities are charged USh 700/1,000 Ig.

Determined by government valuer in conjunction with valuation for property tax purposes.

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Economic Rate of Return and Average Incremental Cost of Water
(US$ Million)

Capital Costs a/	1985	1986	1987	1988	1989 through 2000	2001
Rehabilitation of the water supply systems						
by IDA and Government (inc. RCII)	5.50	4.90	3.50	1.60	-	-
by EEC and IDB	3.13	1.00	-		-	-
Incremental reinvestment costs b/	-	-	-		-	4.30
Sub-total	8.63	5.50	3.50	1.60	-	4.30
Incremental operating costs of rehabilitated systems c/ d/ NWSC	-	-	-	0.74	0.74	0.74
WDD	-	-	-	0.23	0.23	0.23
Total	-	-	-	0.97	0.97	0.97
Total Capital and Operating Cost Stream	8.63	5.90	3.50	2.57	0.97	5.27
Incremental Water Sales due to the Project in million m^3/a d/	-	-	5.86	11.72	11.72	11.72
Expected tariff in US$/$m^3$		0.47 US$/$m^3$				
Incremental Revenue in real terms (US$ million) d/	-	-	2.76	5.51	5.51	5.51

a/ Capital costs are based on January 1984 prices and include physical contingencies. Also included are technical assistance and cost for consultancy services.

b/ Incremental reinvestment cost for mechanical/electrical equipment will arise in year 2000 and 2014. (estimated life of the equipment about 15 years).

c/ Incremental operating and maintenance cost are based on estimates since reliable actual present costs are not available.

d/ Project will be completed in 1988. Full incremental operating cost and full benefit can be expected in 1988.

Results of the Calculation:

List of Stream Data:

Periods	C1 (million US$/a)	B1 (million US$/a)	B2 (million m^3/a)
1	8.63	0.00	0.00
2	5.90	0.00	0.00
3	3.50	2.76	5.86
4	2.57	5.51	11.72
5-16	0.97	5.51	11.72
17	5.27	5.51	11.72
18-29	0.97	5.51	11.72
30	5.27	5.51	11.72

Stream Name	Economic Rate of Return
N.1	20

Incremental Cost per m^3 of Water

Discount Rate	Present Value: Costs million US$	Present Value: Consumption million m^3	Incremental Cost per m^3 in US$
8%	27	106	0.26
10%	24	86	0.28
15%	20	54	0.37

Annex 21

UGANDA

WATER SUPPLY AND SANITATION REHABILITATION PROJECT

Selected Documents and Data Available in the Project File
(Catalogue Number - 105.619)

1. Kampala - Master Plan Up-date and Book of Drawings

   Jinja - Master Plan Up-date and Book of Drawings

   Entebbe - Feasibility Study and Book of Drawings
   Special Reports on Economics and Finance, Sociology, Hydrology, Water Quality, Low Cost Sanitation and Solid Waste Disposal and Legislation,
   prepared by H.P. Gauff KG, Consulting Engineers, 1982

2. Urban Water Supply and Sanitation Feasibility Studies for Masaka, Mbarara, Tororo and Mbale, Final Reports prepared by Parkman Consultants Ltd., 1982

3. Preliminary Design for Phase I Construction Project for Kampala, Jinja and Entebbe and Books of Drawings,
   prepared by H.P. Gauff KG, Consulting Engineers, 1983

4. First Construction Works Preliminary Design Reports for Masaka, Mbarara, Tororo and Mbale,
   prepared by Parkman Consultants Ltd., 1983

5. Manpower and Training Study, Final Report,
   prepared by Coopers and Lybrand Associates, 1983

6. Report on "Development of Health Education Component, Water and Sanitation Project in Uganda",
   prepared by W.R. Brieger (special consultant), 1983

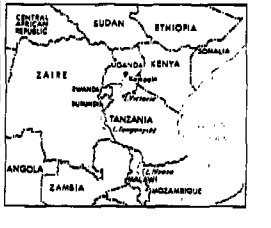
IBRD 17806
JANUARY 1984

UGANDA
WATER SUPPLY AND SANITATION REHABILITATION PROJECT
Project Locations

- Project locations
- Main paved roads
- Other main roads
- Railways
- Rivers
- Swamps
- National parks / Game reserves
- National capital
- Provincial headquarters
- Provincial boundaries
- International boundaries

KILOMETERS 0 20 40 60 80 100
MILES 0 20 40 60

SUDAN
ZAIRE
KENYA
TANZANIA
RWANDA
NORTHERN
NILE
WESTERN
NORTH BUGANDA
CENTRAL
SOUTHERN
SOUTH BUGANDA
EASTERN
KARAMOJA
BUSOGA
MOYO
Madi Opei
Yumbe
Kitgum
ARUA
Rhino Camp
Atanga
GULU
Pakwach
Ngote
LIRA
Masindi
Bunia
Hoima
Bugenda
SOROTI
Nakasongola
Namasagali
Pallisa
FORT PORTAL
Kyenjojo
MUBENDE
BOMBO
Bukalara
Iganga
JINJA
Lugazi
KAMPALA
MPIGI
ENTEBBE
Beni
Katese
Katunguru
MASAKA
MBARARA
Kabale
Kisoro
Bukoba
Kaabong
Kotido
MOROTO
KAPCHORWA
MBALE
Kitale
TORORO
Kisumu



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