PAPER 24

WATER SUPPLY AND SEWERAGE

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1. Water supply and sewerage disposal in the urban centres of Kampala, Entebbe and Jinja are controlled by the National Water and Sewerage Corporation. Water supply in all other areas of Uganda is controlled by the Water Development Department.

2. Sewerage facilities in the areas outside the three major urban centres are partially controlled by local authorities and partially by the Water Development Department. The facilities are extremely primitive with the only treatment in many areas being oxidation ponds. The rural sewerage systems should not be considered as rehabilitation per se, but once the rehabilitation period has passed, then improvement of rural sewerage should be considered a matter of high priority, especially in areas of larger population.

NATIONAL WATER AND SEWERAGE CORPORATION

(a) WATER SUPPLY

3. The pumping and treatment works at Gaba (Kampala) and Jinja were inspected. The works at Entebbe were not inspected but we were advised that the condition is similar to those seen.

4. In 1969/70 the three water-supply works were controlled by separate authorities. Details of Jinja and Entebbe are not available but annual statistics for Kampala were:

Table 24.1

Kampala Water Works 1969/70

Pumpage (m. cu. metres)	13.8
Water consumption (m. cu. metres)	13.8
Income (Shs.m.)	13.6
Expenditure (Shs.m.)	13.5

Current annual outputs are shown in Table 24.2

Table 24.2

Urban Water Works 1978

	Kampala	Entebbe	Jinja
Pumpage (m. cu. metres)	19.5	1.8	6.8
Water consumption (m. cu. metres)	19.5	1.8	6.8
Expenditures (Shs.m.)	23.0	0.8	2.3
Income (Shs.m.)	19.3	0.9	8.1

Source: Information supplied by the Director of NWSC

5. Physical damage at the three centres, as a result of the liberation war, is negligible. However, the results of looting are more serious as many vehicles were stolen and various items of furniture, records, tools and minor equipment either stolen or destroyed. None of the pumping stations was capable of meeting consumer demand before the war. Due to the lack of foreign exchange over eight years, essential spare parts, replacements and minor tools and equipment were not available and this has resulted in serious deficiencies in purification levels, and operation at well below design capacities.

6. The appallingly serious situation regarding the urban water supply systems is illustrated by the data for Kampala.

Table 24.3

Current demand	36.8	m.cu.m./annum
Estimated 1980 demand	41.4	"
Designed intake capacity	43.8	"
Actual intake capacity	26.3	"
Maximum output of plant	26.3	"
Maximum output of high and low level delivery pumps	26.4	"

Source: Information supplied by the Director of NWSC

7. From Table 24.3 above it can be seen the maximum output of the Kampala system is 24.6 m.cu.m. per annum. This is 66.8% of current demand and 59.4% of the estimated 1980 demand. From data quoted in Tables 24.2 - 3 the actual current supply of 19.5 m.cu.m. per annum is 53.6% of current demand and 47.2% of the estimated 1980 demand. This results in frequent water interruption in Kampala, as water to various districts is cut off in order to replenish the reservoirs of treated water.

Needs And Costs

8. In order to correct the imbalance of supply and demand it is necessary to rehabilitate the existing plant and increase the capacity of what are now the binding constraints on output. Specific details of requirements are retained on file, and costs towards this end are included in Table 24.4. An on-going programme to increase capacity will then be required and therefore any work carried out in the coming two years must be compatible with future improvements. The purification cycle is far from effective at the three plants. At Kampala, the raw water passes through a mesh grid filter. This filter is non-existent. None of the micro-strainers were in operation because of faulty bearings, lack of mesh elements and the need for electrical overhaul. The candy pressure filters are all in operation but half of the gravity sand filters are not being used because a new compressor required for back-washing has not been commissioned. The remaining gravity sand filters are being used although the sophisticated automatic back wash system has failed. The automatic liquid chlorine injection system has not been used due to faults, for some time. Both raw and fresh water pumps are in need of overhaul as frequent breakdowns occur. Serious leakages are evident throughout the system.

9. The situation at Jinja and Entebbe is similar to that at Kampala. The necessary cost for rehabilitation in foreign exchange and local currency is contained in Table 24.4. Again, specific details of requirements are retained on file. The tabulated costs do not include normal operating expenses which should be balanced by income.

Table 24.4

Rehabilitation Costs (UShs.m.)

	1979/80		1980/81	
	F.E.	LOCAL	F.E.	LOCAL
Kampala	18.5	5.0	11.3	3.0
Jinja	6.7	1.6	14.2	4.0
Entebbe	2.9	0.9	2.0	0.5
TOTAL	28.1	7.5	27.5	7.5

Source: Estimates derived from detailed lists of items required.

10. In concluding this section of the paper, I cannot stress too strongly the urgent need to improve the quality and increase the capacity of the urban water supply systems. Failure to recognise the severity of the situation and to allow rehabilitation to become a protracted operation may well result in epidemics of water borne diseases. If this occurs, then the cost to the community in terms of medical resources and loss of production may well exceed the cost of the preventative actions of rehabilitation. It is considered essential that the total funds indicated in Table 24.4, less foreign aid committed, be allocated.

b) URBAN SEWERAGE

11. As stated previously, the National Water and Sewerage Corporation controls sewerage plants at Kampala, Jinja and Entebbe, and in these areas only 40% of the properties have sewer connections with the remainder having septic tanks or other facilities. The Kampala plant which was functioning satisfactorily in 1970 was inspected and is virtually non-operational. The sewerage plants at Jinja and Entebbe have not been inspected but their condition is reported to be similar to that at Kampala. Discussion will centre on the sewerage treatment plant at Kampala with only estimated costs and needs being offered at the other two centres. The information for these needs has been supplied by the Director of the National Water and Sewerage Corporation.

12. The sewerage system in Kampala is mainly fed by gravity but two pumping stations cater for low lying areas. One of these stations is not in operation and the other is working at well below design capacity. The overall treatment system is of good design and has been in operation for many years, with design and capacity improvements added at various periods. However, because of the lack of spare parts caused by the shortage of foreign exchange, most of the system is ineffective. Neither of the comminutors, nor the detritus tank is functioning. Flow recorders have been installed but not commissioned. Sedementary tanks are full of solids. The pumps to the digestors are not in working order. One of the digestors has never been commissioned and the other is not functioning. Sludge pumps have failed and therefore drying beds are not in use. There is also a recirculation system using rising mains but even if it were needed, this system has failed due to faulty pumps.

13. From the brief description given above it may be deduced that virtually raw effluent is passing into the sewerage outlet to the Nakivuba Channel and thence to Lake Victoria.

War Damage

14. There is virtually no damage which can be attributed to the recent liberation war. The present deplorable condition of the sewerage plant is solely the result of years of neglect throughout the period of the Amin regime.

Needs

15. The immediate needs are for workshop rehabilitation, electrical repairs and the provision of spare parts, chemicals, minor tools and equipment. The first aim must be the rehabilitation of the existing system. Inspection shows that this means principally the overhaul and/or replacement of the pumping equipment at the various points in the overall system.

16. Just before the liberation war a British firm, Humphreys and Sons, was constructing extensions and modernising recording equipment. This work was so advanced and near completion that steps should be taken to complete the extension project. This will involve comparatively little expenditure but will result in much higher treatment levels and capacity.

17. Because of the serious risk to community health that now exists, as much of this work as possible must be done in financial year 1979/80, with any outstanding work completed the following year. The virtually untreated sewerage enters the Nakivubo Channel at a point approximately three miles from the Lake Victoria water intake at Gaba. The natural flow of the Nakivubo Channel is in the direction of Gaba which puts additional stress on the already unsatisfactory water treatment plant.

Estimated Financial Requirements

18. The following modest capital investment, in terms of foreign exchange and local currency is needed to rehabilitate the sewerage systems at Kampala, Jinja and Entebbe:

1979/80 - Shs.11m. - Foreign Exchange
" 5m. - Local

1980/81 - Shs.13m. - Foreign Exchange
" 6m. - Local

(These estimates have been derived from detailed lists of items required, supplied by the Director of NWSC).

On-going capital expenditure should then be undertaken, using the Corporation's restored financial viability, so the service can be extended.

Expertise

19. Discussions with senior officials of the Corporation lead me to believe that the indigenous staff is quite capable of operating and maintaining the various sewerage works, if they have the necessary workshop facilities and continuous supply of spare parts.

20. Some contractual expatriate expertise however will be necessary to complete the installation of the capital works, the overhaul, and/or to instal pumping systems.

WATER DEVELOPMENT DEPARTMENT

21. As stated at the beginning of this section, the Water Development Department is responsible for the national water supply and some associated functions outside the three main urban areas. Water supply in 1970 was generally not satisfactory and a feasibility study was commissioned and carried out by Messrs. Norconsult of Norway under the auspices of the African Development Bank (using a 20-year design period, 1970-90 to cater for demand to A.D. 2000). Also, a feasibility study was undertaken on behalf of the World Health Organisation which adopted a thirty year period to the year 2000.

22. The Department operates 24 water supply pumping stations and is responsible for the sinking and maintenance of many thousands of boreholes operated either by hand or motorised pumps. The construction section builds and maintains water catchment facilities and the Department also operates a hydrology section.

23. As in the urban water supply area, physical war damage has been negligible in the regions that could be assessed. However, the actual pumping capacity of the supply stations has fallen over the last 10 years and, in terms of supply per capita, this reduction is even more pronounced. This situation has occurred, as in other areas, because of the lack of foreign exchange to purchase spare parts and equipment replacements. The looting which occurred during the liberation war has worsened the situation, as many vehicles, items of plant and equipment, records, office furniture and spare parts have been stolen or wantonly destroyed.

24. If rehabilitation is not carried out at a reasonable level the rural water supply system will continue to deteriorate and lead to grave health problems. Essentially, the Department must be re-equipped with vehicles, plant and equipment, spare parts for existing machinery, office furniture etc. Pumps and liquid chlorine injectors have failed in many areas and a workshop capable of maintaining this kind of equipment is essential. Costs, over and above normal operating expenses are estimated below. These costs are based on a detailed itemisation of needs which are retained on file. The itemised needs have been examined and are considered to be reasonable based on current information.

Table 24.5

Estimated Rehabilitation Costs

	1979/80		1980/81	
	F.E.	LOCAL	F.E.	LOCAL
Water Supply Stations	13.1	30.0	5.1	10.1
Construction Division	23.5	5.1	11.9	2.8
Control Workshop	2.4	3.2	-	-
Drilling Division	30.8	6.2	18.7	3.7
Hydrological Division	1.0	-	0.8	-
TOTAL	70.8	44.5	36.5	16.6

AVAILABILITY OF FUNDS

25. If the essential funding itemised throughout this paper cannot be obtained then reductions should be on a percentage basis. If any reductions in funding are enforced then obviously the rehabilitation exercise will extend beyond the 1980/81 period and the risks of disease will increase.

26. Commitments of external aid of which we have been advised are listed below:

UNICEF	- Rehabilitation and sinking of boreholes over a three year period. Approximately 4,500 in number.
United Kingdom	- Supply of water pumps. Value Shs. 1.5m.
EEC	- Water and Sewerage. Value Shs. 20m.

It is presumed that the aid will be in the form of foreign exchange but details are not available.