Pakistan "Metropolitan Water Supply Project (Simly)"

Report Date: March 1999

Field Survey: October 1998

Evaluator: Chuo Audit Corporation
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Project Summary

Borrower:	President of Islamic Republic of Pakistan
Executing Agency:	Capital Development Authority
Exchange of Notes:	March 1989
Date of Loan Agreement:	March 1989
Final Disbursement Date:	August 1997
Loan Amount:	¥5,750 million
Loan Amount Disbursed:	¥4,195 million (including charges)
Procurement Conditions:	Partially Untied
Loan Conditions:	Interest rate: 2.5%
	Repayment Period: 30 years (10 years grace period)

Third-Party Evaluation Report

Chuo Audit Corporation

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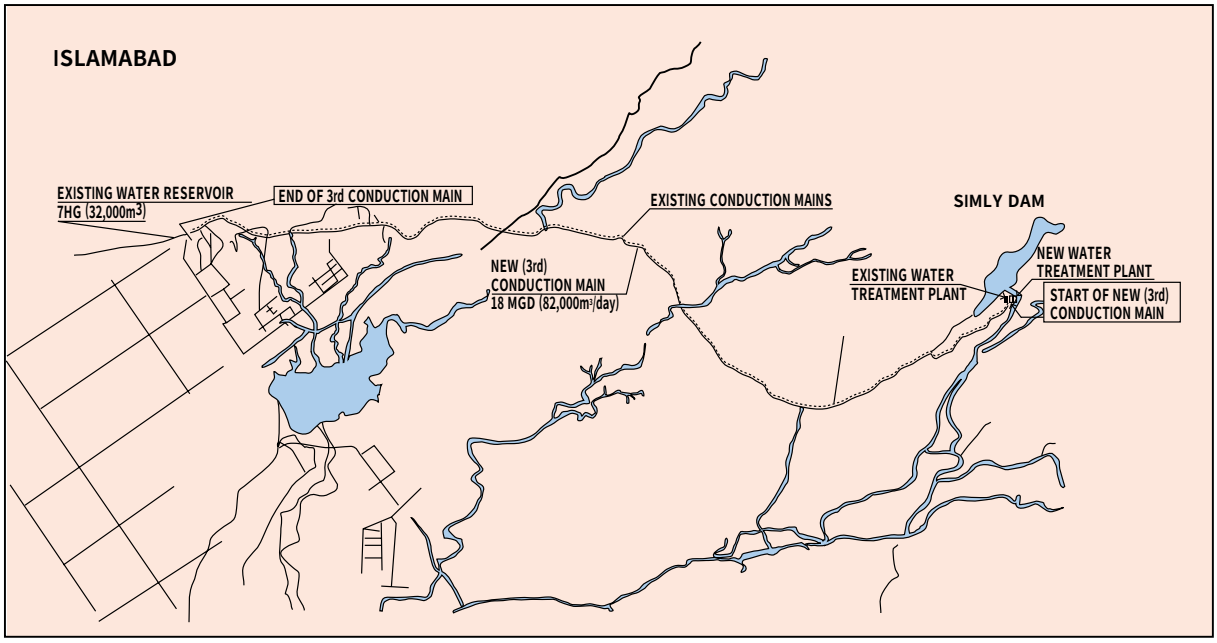
Project Location



I. Evaluation Summary and Target Project

1. Evaluation Summary

This report, requested by the Japan Bank for International Cooperation (JBIC), describes the analysis and opinion of Chuo Audit Corporation (hereafter referred of as the “evaluation team”), as a third-party evaluation, on the effects and impacts of the "Metropolitan Water Supply Project (Simly)" (hereafter referred to as "this project") implemented in the Islamic Republic of Pakistan using ODA loan.

This evaluation was conducted mainly from the following viewpoints.

- What are the issues related to the implementation of this project?
- What is required from the City Development Agency (CDA) management, the executing agency, in order to maintain the benefits of this project?
- How do water users evaluate this project?

The evaluation was conducted based on the analyses of related documents provided by JBIC, consultations with JBIC, and information provided by the Japanese consultants of this project as well as the visit to the project site to collect information from the Pakistan government, CDA, Japanese contractors, related organizations, and water users.

However, a detailed evaluation on the financial aspect of CDA, which was the specialty of the evaluation team, could not be done due to lack of sufficient materials for analysis and discussion at CDA.

As another water supply project of “Metropolitan Water Supply Project (Khanpur I)” is under implementation using ODA loan, it is therefore necessary to evaluate the combined effects of the two water supply projects in this area, when the latter project is completed, since water supply projects functions only when all projects come into operation as a system.

2. Issues Regarding Implementation of this Project

(1) Background

Islamabad, where this project was implemented, the capital of the Islamic Republic of Pakistan, is an artificial city whose construction began in 1961. The city's population in March 1998 was 790,000. Combined with the 3.35 million inhabitants of neighboring Rawalpindi city, the population of the Islamabad metropolitan area (hereafter referred to as the metropolitan area) amounts to 4.15 million ("5th Population and Household Statistics August 1998"). The total metropolitan area population was 2.46 million in 1981, making the annual population increase rate a high 4%. The population increase was particularly marked in the center of the city, while the development area of Islamabad keeps on expanding.

The Pakistani government set the target of supplying clean water to 66% of the total population by 1990 as part of the 10-Year Development Plan (from 1980 to 1990). Moreover, in the Seventh Development Plan (from 1988 to 1993), the Pakistani government set the goal of supplying clean water to 95% of the city population by 1993, as shown in Table 1.

Table 1 Percentage of Served Population (Plan and Actual)

	1983 (Actual)	1988 (Actual)	1993 (Plan)
Urban areas	78%	80%	95%
Rural areas	22%	40%	60%

Source: CDA Materials

However, Islamabad's "clean water served rate" as shown in Table 2 is still lower than that for the above urban areas.

Table 2 Percentage of Served Population in Islamabad Metropolitan Area (Plan and Actual)

	1983 (Actual)	1988 (Actual)	1993 (Plan)
Metropolitan area	38%	53%	75%

Source: CDA Materials

On the other hand, the number of clean water contracts increased only 14,600 in the 15-year period from 1983 to 1998, as shown in Table 3. Household water contracts increased only by 12,700 in the same period, which is just an average of 850 new contracts per year.

Table 3 Current Status of Clean Water Contracts in Islamabad

(Unit: 1,000 contracts)

Division/Year	1983	1988	1993	1998
Household	23.7	28.1	32.0	36.4
Public	0.2	0.3	0.5	0.6
Industrial and commercial	1.2	1.9	2.4	2.7
Total number of contracts	25.1	30.3	34.9	39.7

Source: CDA Materials

(2) Water Supply Status in Islamabad

Actual volume of water supply in Islamabad were 387,000 m^3/day in 1998, which, broken down by water source, consists in 188,500 m^3/day from the Simly Dam, 155,900 m^3/day from deep wells, and 42,600 m^3/day from surface water. The Simly Dam accounts for 49% of total supplied water. Moreover, Islamabad has nine water treatment plants, which purify 231,100 m^3/day, or 60% of the total water supply.

The water reservoir capacity in Islamabad is 131,800 m^3, the equivalent of 10 hours of total water supply.

(3) Project Summary

ODA loan was requested by the Pakistani government in 1987 for this project. JBIC appraised this project in 1988. This project was planned with the purpose of expanding the processing capacity of the existing water treatment plant around the Simly Dam by 95,500 m^3/day (this figure was ultimately reduced to 81,800 m^3/day), add a total length of 28 km of water pipelines going to the city (1,200 m/m diameter, ductile cast iron pipes), and expand the capacity of water supply to existing water distribution facilities, as demand for clean water in Islamabad was forecasted to rapidly increase along with the growth of the population and the expansion of the development area.

At the time of appraisal, it was estimated that when the Khanpur Water Treatment Plant (providing an average of 70,520 m^3/day to Islamabad) would be completed in addition to this project, clean water supply to Islamabad would fully cover the demand till the year 2002.

This project was completed in October 1995, and commercial operation has already started. Through this project, the water supply capacity to Islamabad has increased by 81.800 m^3/day, or 25%, and the condition of water supply to the city has been greatly improved.

(4) Project Scope

The scope of this project, despite some slight changes, is mostly as planned. A comparison of planned and actual figures is shown in Table 4.

Table 4 Project Scope

Item	Plan	Actual	Remarks
1. Simly Water Treatment Plant - Processing capacity	95,500 m^3/Day	81,800 m^3/Day	Due to restrictions on the raw water supply capacity from the Simly Dam, the government's approved supply volume was lowered.
2. Water pipelines Diameter x length	1.2m×28.0km	1.2m×28.0km	As planned.
3. Consulting Services	286 M/M	204 M/M	According to the plan, consultants would just review the D/D prepared by CDA, but as the D/D was based on the land survey which did not reflect actual condition, the consultants were obliged to prepare a new D/D. The construction period was reduced from the original 33 months to 24 months by efficient construction work.

Source: PCR and CDA material

(5) Project Cost

Total costs for this project amounted to 6.02 billion yen (as of 1997). Of this amount, the amount of ODA loan was 4.19 billion yen (of which 1.03 billion is for local currency portion) to cover the above-described construction costs and consulting services.

Table 5 Comparison of Original Plan and Actual

(Units: Foreign Currency: ¥ million, Local Currency: PRs million)

Item		Plan (for local currency)	Actual (for local currency)	Difference (for local currency)	For covered by ODA loan (for local currency)
Construction cost		4,833 (163)	3,789 (315)	−1,044 (152)	3,789 (315)
Consulting service		434 (11)	406 (15)	−28 (4)	406 (15)
Tax etc.		3,569 (492)	1,823 (590)	−1,746 (98)	− (−)
Reserve cost		483 (16)	− (−)	−483 (−16)	− (−)
Total project cost		9,319 (682)	6,018 (920)	−3,301 (238)	4,195 (330)
Breakdown	Foreign currency (¥ million)	4,372	3,158	−1,214	3,158
	Local currency (¥ million)	4,947	2,860	−2,087	1,037

(Note) Exchange Rate At the time of plan (1988) 1PRs = ¥7.25
Actual (average) 1PRs = ¥3.09

Source: PCR and CDA material

The total project cost was 6.02 billion yen compared to the planned amount of 9.32 billion yen, a 3.3 billion yen cost underrun. This breaks down into a 1.21 billion yen underrun for the foreign currency portion, and a PR 238 million cost overrun for the local currency portion.

The foreign currency cost underrun is attributed to a number of factors including a 400 million to 500 million yen reduction resulting from the reduced processing capacity of the water treatment plant, as well as price competition seen in the tender. With regard to the local currency portion, as the tax was planned to be covered by the Pakistani government, the actual increase in local currency costs was only PR 156 million, which seems to have been attributed to the influence of local inflation.

The status of financing is shown in Table 6.

Table 6 Status of Financing

(Units: Foreign Currency: ¥ million, Local Currency: PRs million)

To be Financed From	Plan (Local Currency)	Actual (Local Currency)	Difference (Local Currency)
JBIC	5,750 (190)	4,195 (330)	－1,555 (140)
Pakistani government funds	3,569 (492)	1,823 (590)	－1,746 (98)
Total	9,319 (682)	6,018 (920)	－3,301 (238)

Source: PCR and CDA Materials

The funds required for the project were provided from a ODA loan for the amount of 4.2 billion yen and PR 590 million from the Pakistani government. Since the funds of the Pakistani government were allocated only for the tax portion of the project, the entire amount of funds for this project was procured substantially from the ODA loan.

(6) Implementation Schedule

This project was implemented based on the results of a feasibility study performed by the Japan International Cooperation Agency (JICA) in 1987. The project was completed in October 1995, and has already started supplying water.

The appended table is "Comparison of Plan and Actual Implementation Schedule".

The selection of the consultants was delayed by approximately 2 years from the original schedule, while the preparation of a new detailed design (hereafter, D/D) took approximately another 9 months, and the evaluation of contractor prequalifications (hereafter, P/Q) was prolonged approximately another 1 year. As a result, the project was 3 years and 9 months behind the planned schedule when construction work started. Further delays were foreseen during the construction, due to the impossibility of using blast on account of the proximity of the new water pipeline to existing water pipeline, as well as the delayed delivery of construction materials, and various problems including technical problems to switch pipelines inside tunnels with minimum suspention time of water supply. However, through the efficient implementation work on the part of the Japanese consultants and the Japanese contractors, the construction period was approximately 9 months shorter than planned. As a result, the entire project was completed 3 years behind the original schedule, and CDA has given a high evaluation of the implementation capability of the Japanese consultants and Japanese contractors.

(7) Operation Training

Training of water treatment plants operation was arranged by the consultant both in England for CDA senior engineers and at the Simly Water Treatment Plant for local operators by British and CDA senior engineers. However, participants were unable to attend the training continuously at the Simly Water Treatment Plant, due to insufficient transportation from Islamabad. As a result, supplementary training had to be performed, but it has been pointed out that sufficient technology transfer could not be

accomplished due to time restrictions.

JBIC is requested to collect information from consultants more frequently than before and to perform adequate monitoring for the project.

[JBIC's view to the underlined part: As the consultants are employed by CDA, there were certain limits on the extent to which JBIC could collect information through the consultants. However, recently JBIC has been working to collect information through a local office, thus improvement is expected. We believe that other problems besides means of transportation were also major factors explaining why continuous training could not be implemented at the Simly Water Treatment Plant.]

It has been reported that, when operations began, there was nobody who was qualified to operate the Simly Water Treatment Plant, and consequently operators had to be dispatched in haste from the other CDA Water Treatment Plants.

(8) Issues Regarding Project Implementation

<1> Management ability of CDA

The original plan called for CDA to prepare a D/D by local consultants using its own budget, and to review this D/D by foreign consultants to be employed under ODA loan. However, as the land surveys that were to form the base of the D/D turned out to be incomplete, it was found out that the designed water treatment plant would not fit in the actual site, when the water treatment plant design was prepared. Therefore a new D/D had to be prepared again by the Japanese consultants. During the appraisal, JBIC allowed the D/D to be prepared by local consultants, stating that "CDA has experience implementing water supply projects in the metropolitan area, and is to receive technical support from consultants." However, as a result, the D/D had to be prepared again, causing delays in the project. This is firstly attributable to CDA's selection of local consultants and its insufficient management ability. However, considering that this was CDA's first JBIC project, JBIC should have carefully investigated the implementation capabilities of CDA at the time of the appraisal, and should have discussed with CDA about possible problems during implementation, including its improvement method.

<2> Observance of JBIC procurement guidelines

The evaluation of P/Q performed by CDA was biased in favor of local companies, and among the qualified companies, there were some that did not meet basic P/Q requisites, and thus did not satisfy the JBIC procurement guidelines (hereafter, Guidelines). JBIC requested that the Pakistani government and CDA strictly observe the Guidelines, and held discussions over approximately one year. This delay could have been avoided if CDA had selected contractors in conformity with the Guidelines. JBIC should again request that CDA and the Pakistani government observe the Guidelines.

<3> Coordination within CDA

In the last stage of construction, the installation of pressure gauges, which was not planned in the initial scope, was strongly demanded by CDA's Water Department, which is in charge of operations. The Water Department was trying to employ the same control system that was used for existing water

pipelines, namely the detection of abnormalities through inspections at pressure gauges installed at intermediate points. This type of request would be avoided if the Planning Bureau had confirmed the intentions of the Water Department from the planning stage, but the organization structure is so vertical as to result in a lack of consideration of smooth operation and management of other department.

II. Project Effects and Impacts as Seen by Water Users

1. Water Supply Requirements

Generally, water supply projects are required to supply water with the following technical requirements:

- Hygienic water (water quality)
- Required amount (water amount)
- Stable supply (water pressure).

Furthermore, there are also the following management-related requirements:

- Adequate price (water charges)
- Continuous service

In other words, water supply projects are “facility industry” functioned in an organically integrated system of each components such as water sources, raw water intake, raw water supply, water treatment, water conveyance, water distribution. Therefore, in order to ensure continuous function, water supply management and physical management of facilities (fixed assets), and investment plan in equipment are said to be extremely important. Moreover, since water supply projects target a limited number of users in a specified area, all costs, in principle, should be borne fairly among the beneficiaries of the service and independent profit system should be employed in order to ensure efficient operation of the water supply project. Of course, in the stage of clean water diffusion, large-scale investments are required and such water supply projects may temporarily receive government aid, but basically their finance management should be independent. It is recommended to establish investment plans and to raise funds, including revision of water charge, in a systematic manner so that the executing agency can maintain and expand water supply facilities regularly to provide continuos water supply services.

In this regard, this report will describe evaluation results on the above aspects of water quality, water amount, water pressure, water charges, water management, and investment management, which are required for water supply projects.

2. Operation Conditions for this Project

(1) Water Quality

CDA analyzes the quality of the supplied drinking water based on the water quality standard of the World Health Organization (hereafter, "WHO") and performs water quality inspections through samplings at water treatment plants (2 parameters, chlorine and pH, at 1-hour intervals every day) as well as detailed inspections (non-periodic) at laboratories in Islamabad. However, according to the analysis reports submitted by CDA (September 26, 1998 sampling, September 28 analysis), it is found that arsenic and other trace elements have not been analyzed.

The Pakistani government has not yet set a nation-wide water quality standard for drinking water and each supplier simply has its own standard, but does not impose any penalty in the case of non-compliance. The Pakistani government should set a unified water quality standard for drinking water and consider establishing regulations.

Lately, the use of bottled drinking water instead of CDA-supplied water has been increasing, although

details are not known.

(2) Water Amount

This project has increased the water supply capacity by 81,800 m^3/day and the project can be said to have achieved additional water supply since all water treated in this project is distributed without any leakage from new pipelines. As shown in Table 7, the water supply plan for fiscal 1998 sets the average water supply volume at 80,800 m^3/day, and is close to full utilization of the water supply capacity. However, even after completion of the project, water supply restrictions are still seen in Islamabad and there is a chronic water shortage.

Table 7 Movements in the Clean Water Volume

(Unit: 1,000 m^3/day)

Fiscal Year	Simly (New Facilities)	Simly (Existing Facilities)	Total
1995/96 (Actual)	26.9	107.7	134.6
1996/97 (Actual)	30.3	107.7	138.0
1997/98 (Plan)	80.8	107.7	188.5

Source: CDA material

Although it is not covered by the ODA loan, the old water pipeline from the Simly Water Treatment Plant to the city has been estimated to suffer at least 30% of non-accountable water according to a study done by consultants upon request by CDA. The evaluation team also observed leaks and stolen water at the existing old pipeline during the field survey. A water loss amount of 30% through leaks etc. is the equivalent of approximately 32,000 m^3/day.

Regarding the location of the water treatment plant, while the other concept exists of locating water treatment plants close to consumption areas in order not to have to transport processed water over long distances, CDA considers the original plan for this project which uses the natural downstream method to be appropriate, since it will create additional charge for pumping up the water if they will change locations.

(3) Water Pressure

Water pressure is low in Islamabad and general households have cisterns both under and over the ground, and they use pumps to use the water. The water does not gush when taps are opened. Moreover, there is a risk that the low water pressure will cause intake of dirty water from cracks or joints of distribution pipes.

(4) Water Charges

Water charges in Islamabad are subject to approval by the national assembly, but the present water charge system being used is the application of a fixed monthly charge for general users, and a meter system for industrial and commercial use. However, as meters are not maintained or inspected, a fixed

charge system is also applied in reality, even in the case of industrial and commercial water use.

Generally, Japan and ASEAN countries charge water in proportion to the usage amount by reading meters. On the other hand, meters are hardly used in Pakistan on account that they require several work, such as meter reading, maintenance, repair, and replacement. Since the meter system needs a hardware part (the apparatus) and a software part (operation), and both parts must be coordinated smoothly on a daily operation basis, introduction of such a system should be studied along with the collection of adequate water charges considering that the meter system will lead to improve management efficiency.

The water charges that are applied to residents are determined based on the property's acreage, the size of the residence, and the diameter of the water conduit. The level of the charge covers operating expenses (labor cost, consumables cost, power charges, raw water cost, and administrative expenses). However, as depreciation costs are not included, investment capitals will not be recovered, and furthermore, interest costs are not taken into account.

The water charge level that is currently in use is as shown in Table 8. The level in Islamabad is low compared to Jakarta, reflecting the income level of residents and the problem of water charge collection.

Table 8 Comparison of Water Charges

Country	City	Consumption volume per day (l/person/day)	Annual water charges (US$)
Pakistan	Islamabad	147 (Estimated as 30% water leak)	58
	Karachi	157	60
Indonesia	Jakarta	135	216

Source: CDA material, ADB Second Water Utilities Data Book 1997.

Based on the above-described water charge system, CDA revenue and expenditure status is as shown below. Since CDA employs cash basis accounting system, revenue and expenditure are shown on a cash basis.

Despite the fact that both the number of contracts and the volume of supplied clean water are increasing, operating revenue has been declining for the last three years. Furthermore, water charges, which form operating revenue, are now so low that they do not even cover personnel expenses.

Table 9 CDA Revenue and Expenditure Status

(Unit: PRs million, Index: Proportion of operating revenue as 100)

Item	1996/6	Index	1997/6	Index	1998/6	Index
Operating revenue (Water charges)	59.7	100	51.6	100	48.7	100
Operating expenses	274.5	460	315.4	611	345.0	708
Personnel expenses	67.2	112	72.2	140	75.6	155
Consumable expenses	14.2	24	16.6	32	20.0	41
Electric power charges	179.5	301	207.6	402	235.9	484
Raw water expenses	0.01	0	0.01	0	0.0	0
Others	13.6	23	19.0	37	13.5	28
Operating loss	214.8	360	263.8	511	296.3	608

Source: CDA material

As for revenue, water charge income is shown as actually collected amounts, excluding charged but uncollected amount. Since water charges are set so as to balance with operating expenses including past losses which is calculated based on collected amount as revenue, water charges tend to be on the high side. In other words, under the current water charge system, payers are obliged to bear operating expenses as well as uncollected water charges in the past. Unless an adequate billing amount (accrued amount) is used, CDA's management problems will simply be transferred to the users. Moreover, regarding the repayment fund for investment capitals, while governmental support may be needed in the short term, considerations should be made to enable recovery from the all users who benefit from the water, in the long term.

A petition to raise water charges by 50% of the current charges at the end of December 1998 has been submitted, but it is indispensable to implement concrete improvement plan for the collection of uncollected charges by CDA before raising charges.

With regard to operating expenses, according to CDA materials, total operating expenses for fiscal 1998 were PR 345 million. Electricity charges accounted for 68% of this amount, and thus electricity saving is an issue for CDA cost control. Compared to the previous term, operating expenses increased by PR 30 million, and the electricity charges alone accounted for PR 28 million out of this amount.

(5) Water Management

CDA is not required to use a self-supporting accounting system and it receives supplementary funds for deficits and equipment investment from the federal government, with no repayment obligation. However, CDA does bear interest payments related to equipment investment funds, and in the case of this project it pays 11% in annual interest.

In order to sustain water supply projects, systematic financial planning is required, but as CDA did not provide us with the materials required for financial analysis, it is unclear to us to which degree financial control is performed at CDA. However, even if CDA makes new plans for its equipment investments, it still needs to receive investment funds from the government, it has no autonomy in revision of water charges, and these water charges are set at a level that is considerably below operating expenses. As a result, it is in no condition to become financially self-sufficient. Even if it

drafts long-term plans, CDA does not have fund procurement authority, and in this respect it is unable to bear responsibilities up to project implementation.

(6) Asset Management

In order to ensure the continuous function of the water supply project, physical management of facilities, asset management, and systematic equipment investments are extremely important. Although CDA performs physical maintenance of equipment, which is considered highly important for daily operations, it does not perform asset management, nor does it perform evaluations of assets value, therefore depreciation is not applied. Asset management taking into consideration of the assets value is required for daily asset management as well as for judgement on optimum investments and CDA should perform asset evaluation, or at least make an inventory, and if possible, consider preparing balance sheets, which it currently does not have.

The water departments of South Asian countries, which are the object of ODA loans, prepare balance sheets based on independent accounting, perform asset management, and perform efficient equipment investment. Considering that even in Pakistan, Water Department of Rawalpindi City has begun preparing balance sheets as part of the ADB project, CDA may be able to prepare them too. CDA should be fully aware that, by preparing balance sheets, it would be able to perform rigorous asset management and investment effectiveness analysis, and furthermore be able to obtain basic data for setting appropriate water charges.

[JBIC's view to the underlined part: CDA is a government organization directly under the Cabinet and the assets obtained through ODA loans are managed at the federal administration level. Although it is not certain, at this moment, whether in the future the Pakistan government will treat CDA as an independent accounting body, CDA recently started work to identify the assets it should own and manage.]

3. Other Public Welfare Improvement Results

No statistical data could be obtained this time regarding the status of cholera, typhoid fever, and paratyphoid fever, which are considered to be water-borne gastrointestinal infectious diseases, but from the aspect of measuring project effects and impact, it would be desirable for CDA to implement actual condition surveys with the cooperation of related organizations, and notify the results to users.

III. Management Issues of Islamabad Water Supply Project

1. The Organization Called CDA

CDA is the executing agency for this project, established in 1960 with the aim to develop the metropolitan area, linked directly to the federal government and under the supervision of the Cabinet Division. At the end of June 1998, CDA has a total number of employees of 12,140, but 9,401 were entry-level employees with qualification levels ranging from 1 to 6, and only 2,739 employees were experienced engineers and managers. 121 persons belonged to Water & Sewerage Development (of which 115 were entry-level employees), 1,224 persons to Water Supply, (of which 1,133 were entry-level employees), but with very few engineers. For this project, construction is the responsibility of the Water & Sewerage Development Section, and operation and facilities maintenance following the completion are the responsibility of the Water Supply Department.

The water supply amount per employee is 287 m^3/day, which is about 60% of the 451 m^3/day (1994) in Jakarta in Indonesia in the Islamic world. The number of employees per 1,000 water taps is 34, which is quite high compared with 8, in Karachi and 6, in Jakarta.

CDA Water & Sewerage Development Department and Water Supply Department do not have a systematic personnel training arrangement, and engineers learn only by trying to imitate and follow techniques from their seniors (this cannot be called on-the-job training), as explained by several CDA employees.

Furthermore, contractors in this project have prepared 7 Water Treatment Plant manuals, but they have not been placed at the Simly Water Treatment Plant, and are hardly used. Performance of daily operations are based mainly from experience.

2. Stable Supply Status

(1) Total Amount and Restriction of Supply to Fixed Hours

As CDA currently supplies water to the entire Islamabad city area with restriction of fixed hours, and water pressure is low, it will need additional water sources. However, measures need to be taken also for water leaks. Although it will take time until leaks can be improved, even partial improvement of leaks would help the prevention of new equipment investments for additional water sources.

(2) Water Leak Countermeasures

CDA has installed water gauges at the end of water pipelines and it can monitor supplied water volume, but since no distributed water meters nor household water meters have been installed, the distributed water volume is unknown, and the volume of the non-accountable water resulting from leaks etc. cannot be established. Therefore, the real volume of water usage cannot be ascertained, which is necessary to determine optimum size of future equipment investments.

Moreover, the expansion and repair of water distribution pipes in the city is to be performed by CDA using its own budget. Since the water distribution pipes include some that have been installed some 30 years ago, replacement of pipes based on systematic planning is required. However, CDA does not have full records of which pipes were installed when and where, and it does not even have data on the

total length of pipes.

(3) Water Saving Measures

In Islamabad as water meters are not installed at each household, a fixed charge system is applied. As a result, each household uses water to wash their car or to water their garden without regard for the city's water shortage problem. CDA must be more active in implementing a water-saving campaign.

3. Adequate Prices

(1) Level of Water Charge

As CDA does not apply depreciation, the current water charges do not cover the necessary amount to recover equipment investment funds, namely, necessary funds to reimburse government loans. Therefore, when it becomes necessary to replace facilities after a given number of years, CDA is forced to raise the funds largely from outside sources, resulting in difficulties to replace the equipment continuously.

With regard to the level of water charge where temporary aid from the government is sometimes required, it will be necessary to set up clearly future policy about who is to bear water supply costs, including equipment investment amount, in each stage of clean water facilities evolution. Moreover, in studying the overall water charge system, it would be desirable that studies be conducted on whether to continue the current fixed charge system, or introduce a system of meters for each house, and whether to introduce an incremental or decremental water charge system.

(2) Charge Collection

CDA is considering raising water charges in order to reduce its deficit. However, CDA does not make special efforts to collect accounts that are in arrears, resulting in insufficient revenue. Unless CDA becomes aware of the necessity of improving collection of arrears to balance the revenue with the expenditure, it will likely be unable to resolve its deficit just by raising water charges.

(3) Cost Cutting

The largest portion of costs is electricity charges, but in order to cut costs with the aim of setting suitable water charges, it will be necessary to perform cost analyses by its factor, by type of cost accrual, and by division of cost management. This will require the preparation of basic materials and their disclosure to concerning parties. Through such analyses, it will become possible to study concrete means of cutting costs. Currently, the preparation of basic materials is being done manually, and therefore the materials that can be provided are limited, and the process is time consuming. Initially, CDA should review its work methods, find ways to rapidly disclose essential statistics that can serve as indices, and introduce computers on a case to case basis.

Furthermore, CDA should also perform analyses of contents of budget, rather than sticking to its old practice of just comparing budget with actual expenses. As at the Simly Water Treatment Plant, new spare parts have not been procured since the start of operation, and as oil that is not produced in

Pakistan has not been procured, the required maintenance could not be done, according to plant staff. It will be necessary to procure items, as its first priority. This is indispensable and its absence would impede the realization of efficient daily operation. It is necessary for CDA to have a system that can identify what is required and when they are necessary, as well as a systematic procurement plan including procurements from overseas.

4. CDA Financial Issues

Since financial statements (including budget/actual expense comparison tables) were not provided by CDA, details are not available. According to the annual report of CDA from July 1996 to June 1997 and verbal explanations by CDA financial officers, CDA's budget categories are as follows.

<1> Grant-in Aid

- Capital--Facilities construction funds
  Note: Past water projects were funded by the federal government.
- Operating funds--These funds are for the maintenance of facilities, and consist of grants from the government and business income from CDA.

<2> Self financing

Revenue and expenditure from July 1997 to June 1998 were as follows.

Table 10 CDA Revenue and Expenditure Status (1997-1998)

(Unit: PRs million)

Division	Brought forward	Money received	Payment	Balance
Capital	△ 769.1	3,764.5	2,780.0	215.4
Operation financing	3,772.7	1,010.7	351.0	4,432.4
Self financing	△ 3,549.8	1,199.5	1,131.7	△ 3,482.0
Total	△ 546.2	5,974.7	4,262.7	1,165.8

Source: CDA material

Of the above-listed figures, business income of CDA amounted to PR 185 million, as shown in Table 11.

Table 11 CDA Business Income (1997-1998)

(Unit: PRs million)

Division	Amount
Fixed asset tax	132.4
Water charges	47.9
Others	4.8
CDA in total	185.1

Revenue and expenditure for accounting of water supply were as described above.

5. Business Management System

(1) Budget and Achievement Management

We interviewed CDA's accounting department and various levels of management about the budget and achieved figures, but we could not obtain the budget figure of income and expenditure. Nor did we receive information permitting judgment of CDA's financial position, such as the extent of accounts receivables, the details of ordinary expenditures, and the scale of future investments.

Budgets should be open to everybody as budgets represent commitment to implement certain projects by the government, who is entrusted it by taxpayers. If CDA's management does not know the budget of the sections they themselves manage, it is doubtful whether they can really fulfill their responsibilities toward taxpayers.

Moreover, prior to the survey, we requested financial materials from JBIC, but in vain. In order to be able to periodically know the financial status prior to financing, it should be considered to make it mandatory to submit accounting results, by amending loan agreement conditions. However, since JBIC does not directly provide funds to CDA under the loan agreement, JBIC may ask to submit financial information to the Pakistani government.

(2) Uncollected Charges

Although the Charge Collection Department manager provided information about the total amount charged by the CDA and the amount received from January to March 1998, no data was provided about arrears by month and by year.

CDA issues bills every three months by computer, and payments are usually done by bank transfer, but all subsequent arrears management is done manually. Although the amount of arrears is known for each user, CDA itself does not aggregate the total amount of arrears. Keeping statistics on total arrears by year and month is the basis of arrears management, thus it is urgently necessary for CDA to improve the system.

Moreover, since CDA treats only collected amounts as revenues in its operating statements, water charges to be paid according to the amount of water use (billed amount) are not indicated. Moreover, information on aspects such as why are payments not made or why billing was stopped is not shared within CDA.

(3) Asset Management (investment decisions and asset management)

CDA's asset management is based on physical maintenance, but there are no records of taking in and out. Therefore, CDA can not point out where exactly are the assets that should be maintained nor what their numbers and quantities are. Inspection of stocks such as spare parts and of fixed assets is necessary as well as preparation of inventory ledgers and fixed assets ledgers.

While these are future issues, CDA should consider preparing balance sheets and evaluating appraisal value of each type of asset. It will be also recommended to prepare data where CDA can judge the priority of assets management among others. Unless CDA has basic information, including the effectiveness of past investments, investment imbalances, the existence of equipment that has become outdated with the passage of time, and so on, it will not be able to make rational investment decisions in the future.

IV. Requests to CDA and Ideal Form of JBIC Aid in the Future

1. Requests to CDA – For the resolution of CDA's management problems

(1) Transition to Self Support

Water supply projects are implemented for a limited number of users in a specified area. In general, required costs should be borne fairly among the beneficiaries and management should be done on a self-supporting accounting basis. However, CDA is not required to perform self supporting accounting as it is operated under government budget, deficits and equipment investment funds are entirely made up for by the federal government, and CDA merely pays for interest.

In order to secure an efficient water supply business and regularly maintain water supply facilities so that user can receive water service continuously, CDA should consider introducing a self-supporting accounting system for its water supply division.

(2) Shift from Cash Based Accounting to Accrual Accounting

Along with the adoption of a self supporting accounting system, a shift to accrual accounting should also be considered for CDA. With regard to charge revenue, the adoption of bill-based accounting would make it possible to grasp uncollected amounts and their causes from an early stage, and by incorporating the concept of depreciation, it would be possible to generate funds internally in CDA for future equipment renovations.

(3) Preparation of Charge Collection System

As far as the water charge collection system is concerned, the bill issuing system is functioning, but the arrearage management system is virtually inoperative. Therefore, CDA should periodically calculate uncollected amounts, investigate the causes of arrears and determine the probability of payment for each account, establish beforehand the categories of arrearage causes, and likewise decide on establishing counter measures including the possibility of stopping water supply based on the results of the above-mentioned investigations.

Accounts in arrears that offer no possibility of collecting past dues must be treated as irrecoverable. It is also necessary to establish rules for the write-off of irrecoverable accounts.

With regard to arrears management, computers have been introduced for the bill issuing function, but CDA should also consider gradually expanding the range of computer utilization.

(4) Study of Charge Measures and Costs

In revising charges, it is necessary to introduce the concept of water charges based on earnings for services offered, recovery of investment funds by means of depreciation, and adequate maintenance. Then the level of water charge shall be discussed and agreed among the parties concerned by establishing the rules beforehand. Moreover, taking into prospect next 5 to 10 years, CDA should study the revision of charges, in coordination with equipment investment planning and fund raising plans.

[JBIC view to the underlined part: While it is necessary to strengthen the financial status of CDA's water supply business, a large hike of the level of water charges may be difficult to realize, and this matter should be approached with due care taking into consideration of the payment ability of the users, the quality of the provided water service, and other factors.]

(5) Study of Asset Management Methods

The verification of the status of facilities laid underground such as water ducts and distributing pipes may in some cases be difficult, but in order to continuously perform water supply operations, it is necessary to conduct inventory and fixed asset management both from a physical and a monetary aspect, and this requires physical inspection and the preparation of store ledgers and fixed asset ledgers. These will serve as basic materials for future equipment investments.

(6) Rehabilitation of Existing Facilities

With regards to existing water pipelines that go from the Simly Water Treatment Plant to the city, obsolescence is progressing and its rehabilitation is a pressing issue. It is necessary to study systematic repairs and other related issues.

(7) Introduction of Meter Check Systems (bulk, pilot test)

While there is room for studies on technical feasibility because of low water volume and water pressure, in order to ascertain and to be able to manage the volume of distributed water, it is recommended to install water gauge for distributing pipes.

Moreover, we believe that CDA should consider selecting specific areas as model cases, establish separate water meters for each house, in order to identify problems related to the full collection of water charges, and fully implement customer services. Moreover, in order to work out countermeasures for irrecoverable charges of insolvent customers, we suggest that CDA use such model area for trial purposes.

(8) Water Leak Measures

As for measures against water leaks, it is necessary to perform a technical diagnosis on where to start and how to proceed. However, considering that it took Japan approximately 30 years to reduce water leak rate from 30% to 10%, a long-term approach is needed rather than measures aimed at creating short-term results. Though CDA does not perform water leak inspections in the evening, which are

commonly done in Japan, it should consider the implementation of such inspections.

(9) Implementation of Water Saving Campaigns and User Surveys

CDA does conduct water saving campaigns, but the continued implementation of such campaigns would be desirable. Furthermore, CDA should also consider regularly conducting user surveys and, although it is a public corporation, it should try assuming the perspective of a service industry.

2. Preparation of Data Related to Water Supply Projects Through JBIC Financing

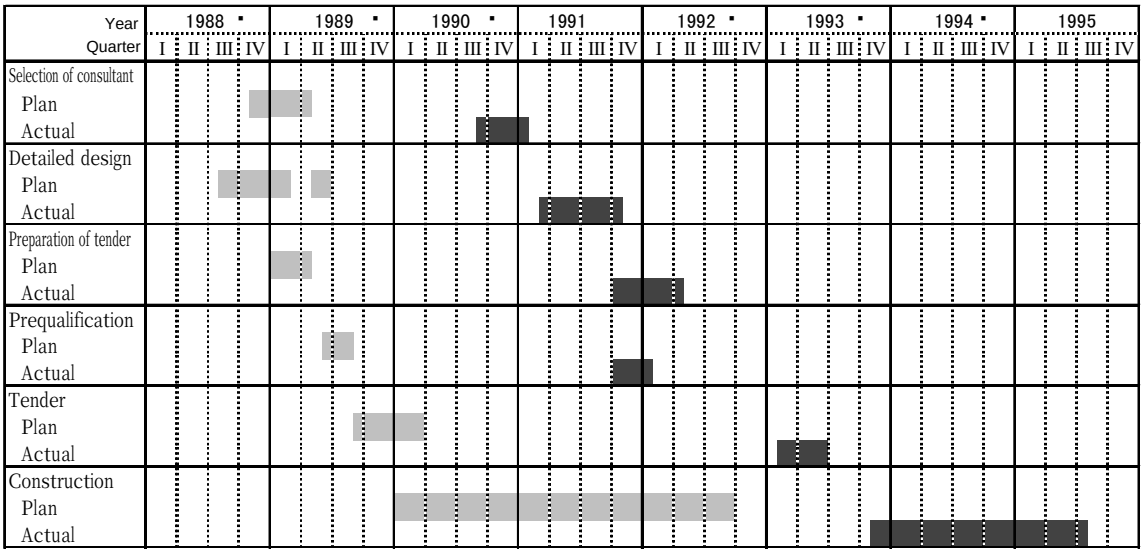
(1) The Use of Problems of Individual Projects by Sector

How about using various problems affecting the water supply sector not limited to Pakistan for future appraisal of water supply projects?

(2) Preparation of Basic Data of Individual Projects by Sector

As water projects involve various types of data that form the basis of management, JBIC should request the executing agency to prepare such data, and make them available during the project implementation period by means of consulting service which shall be included in the project scope and shall be financed by ODA loan.

Appendix　Comparison of Plan and Actual Implementation Schedule



Source: JBIC materials

① A tunnel under which the new and old conduction pipes are installed

② Simly Water Treatment Plant

③ Overall view of new Simly Water Treatment Plant