Pakistan

Metropolitan Water Supply Project (Khanpur I)

Report Date: February 2003

Field Survey: November 2002

1. Project Profile and Japan's ODA Loan

Project site

The Khanpur water filtration plant water supply pump (front tank)

1.1 Background

The capital of the Islamic Republic of Pakistan was located in Karachi during the period following the country's independence in 1956. It was determined that the capital would be shifted to Islamabad, however, in 1959, with construction of the new capital actually taking place in 1961. In 1987, the population of Islamabad stood at 280,000, or 1.32 million including the neighboring old city of Rawalpindi and farming areas in the vicinity. The population was forecast to rise to 2.07 million by the year 2000. In 1980, the government of Pakistan established a 10-year plan on water supply systems as part of social infrastructure development with the goal of providing the entire urban population and 66% of the rural population with water by 1990. Further, the country's sixth five-year economic development plan (1983-1988) set goals for the provision of water supply[1] at 59% for the entire country, a level which was to cover 90% of urban areas and 45% of rural areas. Though actual figures as of 1988 fell slightly short of the targets, standing at 53%, 80%, and 40% respectively, reasons for the shortfall were largely attributed to lack of capital. The seventh five-year plan (1988-1993) called for heightened coverage of 81% for the entire country, 95% for urban districts (100% for metropolitan areas), and 75% for rural areas.

Consistent with the goals described here, the current project was considered to be of high priority in the framework of the seventh five-year plan. It sought to maintain water supply (100% at the time of appraisal) in the capital city of Islamabad in order to accommodate the city's increasing

[1] The same as the water supply diffusion rate, this figure refers to the percentage of the population served with water supply within the area designated for water services under the project plan (i.e. the actual population provided with water services).

population and expanding capacity as an urban center, and to expand supply in Rawalpindi and neighboring farming areas (coverage for these districts was estimated at 70% at appraisal).

1.2 Objectives

In order to keep pace with increased demand for water in the Islamabad metropolitan area including Rawalpindi and farming areas in the vicinity, which had risen in tandem with urban development, the project sought to provide the area with waterworks facilities sourced at the Khanpur Dam.

1.3 Project Scope

The project scope consisted of (1) sluice gate and water conveyance facilities, (2) water purification plants, (3) pumps and electrical equipment, (4) water supply facilities, (5) water storage facilities, and (6) consulting services. The ODA loan covered the entire foreign currency portion as well as part of the domestic currency portion of the project cost.

1.4 Borrower/Executing Agency

President of the Islamic Republic of Pakistan/Capital Development Authority (CDA).[2]

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	12,518 million yen 12,442 million yen
Exchange of Notes Loan Agreement	March 1989 March 1989
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.5 % 30 years (10 years) Partial untied
Final Disbursement Date	October 2000

2. Results and Evaluation

2.1 Relevance

The project set forth the objective of achieving 2002 levels of forecasted for Islamabad, and 1998 levels for Rawalpindi. Demand for water was estimated based on population increase estimates made at the time of appraisal. It was forecast that the population of Islamabad would increase from 280,000 in 1987 to 620,000 in 2000 and 760,000 in 2010. As for the Rawalpindi area, its population was expected to rise from 1.03 million in 1987 to 1.45 million in 2000, and to 1.77 million in 2010. In response to the increasing demand, the waterworks sector was assigned high priority under the seventh five-year plan (1988-1993). When the current project was evaluated, the goals of improvement of water supply coverage in the Rawalpindi area, which was already insufficient, and

[2] The CDA, established as a government-affiliated corporation in 1960 with the objective of facilitating the construction of the capital in Islamabad, oversees the entire integrated development process from land use planning to construction of the various types of facilities. Water supply projects for the Rawalpindi area, which were not covered by Japan's ODA loan, were implemented under the auspices of the Water Sanitation Authority (WASA), and the Rawalpindi Cantonment Board (RCB).

maintenance of a 100% coverage level for Islamabad, were considered to be of great urgency. The project was therefore deemed relevant at the appraisal stage. The population of Islamabad, in particular, was 790 thousand in 1998 (source:1998 census) and, according to the executing agency, it has been increasing since 1998 onwards, reaching 890 thousand in 2002.The population of Islamabad in particular, therefore, rose more rapidly than initially expected. Based on data which was collected at the field survey of November 2002, water supply coverage is being maintained at 100% in Islamabad, as shown in Table 1, while for the areas under the jurisdiction of the Water Sanitation Authority (WASA) and Rawalpindi Cantonment Board (RCB), coverage is 80% and 28% respectively. The latter figures of 80% and 28%, however, represent data prior to May 2002 when water supply under this project was commenced to the areas. In other words, they represent water supplied from sources other than the Khanpur Dam, including wells, etc., stemming from the fact that water supplied to the area by the ODA loan project had commenced only in May 2002 due to delays in the provision of water pipes.

At present, as was the case at the project planning stage, increased demand for water is forecast based on population trends, which are climbing, in the Islamabad and Rawalpindi areas. In terms of its purpose to stave off water shortages, the project's relevance therefore remains unchanged, though the underestimation of expected population growth at the planning stages casts doubt on the appropriateness of project scope calculations made at that time. Though the goal set forth in the project plan of meeting 1998 water demand levels has incidentally been achieved, the project itself has not yet been completed as of 1998 due to delays, and therefore did not contribute directly to maintaining and/or expanding upon water supply coverage to areas stricken with water shortages. As of the commencement of water supply provided by the project in the year 2000, however, water supply coverage has been maintained in Islamabad despite increases in the population that have exceeded original forecasts. Judging from the fact that the CDA is indeed able to effectively provide water supply, it can be construed that the project did contribute to some extent to successful operations. Further, a report[3] on research conducted by the CDA in 1998 on the city of Islamabad's water supply systems (hereinafter referred to as "F/S") outlines a future plan for improvement to the city's water systems that incorporates construction of the new reservoir in the city of Islamabad and subsequent effective use of water conveyed from Khanpur under the project discussed here. As a result, more effective use of existing facilities built by the project is anticipated for the future.

[3] Feasibility Study of Project "Water Supply Conduction Lines from Shah Allah Ditta Reservoir to Different Sectors of Islamabad", September 1998, MM Pakistan (Pvt) Ltd.

Table 1: Trends in demand for water and water supply coverage

(Unit: m^3/day)

		1998	1999	2000	2001	2002
Islamabad	**Demand for water supply**	-	206,475	210,873	215,265	220,486
	Water supply coverage	-	100%	100%	100%	100%
	Rate of increase in demand	-	-	2.1%	2.1%	2.4%
Rawalpindi (areas under RCB jurisdiction)	**Demand for water supply**	-	-	-	-	170,455
	Water supply coverage	-	-	-	-	28.0%
Rawalpindi (areas under WASA jurisdiction)	**Demand for water supply**	129,400	143,900	152,400	160,100	168,300
	Water supply coverage	80%	80%	80%	80%	80%
	Rate of increase in demand	-	11.2%	5.9%	5.1%	5.1%

Sources: CDA, RCB, WASA

2.2 Efficiency

2.2.1 Project Scope

The project was carried out without any particular changes in scope (see 1.3).

2.2.2 Implementation Schedule

Construction for the project was originally scheduled to begin in January 1991, with a completion date set for September 1993. However, looking at the time of project completion, the project was delayed slightly less than seven years, spanning the period of September 1994-May 2000. By far the most significant reason for the delay was difficulty with land acquisition, which required a total of eight years, much longer than the year and seven months anticipated at the planning stage[4]. Though it was clear at the planning stages that land acquisition procedures would be required, negotiations with the land owners broke down repeatedly according to the CDA. Compounding the problem further was the fact that some local residents, who were initially living outside areas designated for compensation, built and set up domicile in squatter homes in these zones in attempts to illicitly receive such compensation. As a result, negotiations required a period of three years, and administrative procedures required five.[5] Bidding and contract-related procedures were delayed in turn by delays in bidding preparation and evaluation procedures.

2.2.3 Project Cost

Project costs exceeded estimates by approximately 1,000 million yen for the foreign currency portion of the project, attributed mainly to higher than costs related to the construction of water

[4] At the planning stage, the construction work was scheduled to start after completion of entire land acquisition. In fact, the construction work was implemented in parallel with the promotion of land acquisition work.

[5] According to the CDA, compensation was paid in the amount of approximately 37 million Rs (=roughly 123 million yen at an average exchange rate for the period of 1990-2000 of 1Rs=3.36 yen). Some cases, however, are still in court.

purification and conveyance facilities than expected. The local currency portion of the project (rupee base) also surpassed estimates by approximately Rs 120 million. However, due to exchange rate fluctuations, with the value of the yen nearly doubling since the project was appraised, project costs covered by ODA loan resulted in falling slightly below projections.

2.2.4 Consultant, Construction Company, and Supplier Performance

Though the CDA noted that it was pleased with the engineering and construction performed by the construction companies, it was dissatisfied with manual content, training content, decision-making regarding equipment specifications, and spare parts replacement provided by the consultants and suppliers. Specifically, the CDA indicated that there were problems[6] with a lack of manuals that the local staff felt were necessary, including telephone use manuals at water purification facilities; the fact that training was held in English; and uncertainty with regard to feasibility of spare parts procurement and repairs in Pakistan stemming from the fact that the equipment provided was of cutting-edge technology.

2.3 Effectiveness

2.3.1 Water Supply Volume, Available Hours, and Water Quality

It was originally planned that daily water supply volume would be distributed at a rate of one third to Islamabad, two third to Rawalpindi respectively. As shown in Table 2, the current daily water supply volume falls below targets set at the planning phase, particularly for the areas of Rawalpindi that fell under the jurisdiction of the RCB and WASA, standing at 30% and 20% of target figures respectively. This poor performance is linked to reduced water volume at the Khanpur dam source due to drought, which has made the purified water production unable to reach at forecasted rate (232,050m^3/day) for the Khanpur filtration plant at the planning stages. Further, extension of water pipes in the areas of Rawalpindi serviced by RCB and WASA was delayed, with operations finally commenced in areas under RCB jurisdiction at a rate of 18,200m^3/day as of March 2001. Areas under WASA jurisdiction began operations, assisted with a water pipe project implemented by the Asia Development Bank, as of May 2002 at a rate of 4,550m^3/day, which was increased to 13,650m^3/day as of January 2003. A water conveyance rate of 18,200m^3/day to WASA is scheduled[7] to commence as of February 2003, but this is dependent on the volume of water in Khanpur Dam. Since heavy rainfall is not expected before the rain season begins in July, at present discussions are being held between RCB and WASA to determine how water will be distributed.

[6] Details on consultant performance are unavailable due to the absence of a TOR (Terms of Reference). In contrast to CDA statements, however, other related agencies including WASA stated that there were problems with the technical level of CDA staff.

[7] 3MGD of water is conveyed as of January 6, 2003 (according to local reports of January 17).

Table 2: Daily water supply volume: a comparison of original and actual scope

(Unit: m^3/day)

Local agency	Plan	Actual		
		2000	2001	2002[i)]
CDA	75,075	27,300	36,400	54,600
RCB	89,635	-	18,200	27,300
WASA	67,340	-	-	13,650
Total	232,050	27,300	54,600	95,550

Sources: CDA, RCB, WASA

Note 1) Figures are current as of January 2003.

Daily water supplying hours vary by region. In Islamabad, water is available for approximately 1-2 hours. In RCB and WASA-controlled areas, water is available for a minimum of 32-45 minutes and four hours respectively.[8]

Current daily water volume stands at just 40% of values determined at the project planning stage, the reason for the problem being the drought-induced water shortage at Khanpur Dam[9], a situation which is also prevalent at the Simly Dam.[10] Given that secure water source is so crucial to the success of the project, it is clear that certain factors were not given sufficient consideration at the planning phase, i.e. estimates on the amount of water that could be drawn from Khanpur Dam, geographical conditions for the construction of reservoir that would ensure a reliable water sources, and so on.

As for the quality of water supplied, according to the water quality department of the CDA, water is disbursed to end users only after testing at each purification and distribution facility based on government standards. Further, in response to poor water quality due to rain and waste water entering the pipes through the distal ends due to damage caused by deterioration, the CDA conducts daily random sampling of water quality at the distal ends and proceeds with repairs where necessary. The frequency of testing and repairs is, however, far from sufficient. According to the CDA, most people utilize mineral water or boiled water for drinking, using the water supplied by the waterworks systems for washing, cooking, and the like.

2.3.2 Consulting Services

Consulting services included preparation of manuals distributed for use at the CDA headquarter and the Khanpur water filtration plant. According to the CDA, the reason the manuals are utilized very infrequently is because facilities are new and require little maintenance at the moment. At the Khanpur plant, staff have expressed the opinion that they would like simple, easy-to-understand manuals in the form of flow charts and the like, as well as manuals on how to utilize accessory equipment, such as telephones, rather than on the main equipment. Training took place both overseas and locally at the filtration facilities. Since five of the individuals who participated in the overseas training have since left the CDA, it is unclear whether any technology transfer took place within the

[8] The minimum of 32-45 minutes is a parameter set by RCB for the areas under its control. In actuality, the current daily average is 62 minutes per day, as shown in 2.4.1.

[9] According to precipitation statistics, the amount of rainfall received by the Islamabad and Rawalpindi areas has been on a downward trend since 1999 (the figure for 2001 was approximately 17% less than that for 1997). The same trend can be observed for the rest of the country as well.

[10] Simly Dam is located east of Islamabad. Another ODA loan project was carried out at the same time as the project discussed here, also with the purpose of providing water to the metropolitan area. Completed in October 1995, the project utilized Simly Dam as its source.

agency upon the conclusion of the training. The local training component was held at the filtration plant for a total of 30 people, mostly in English. Since many of the participants had minimal understanding of English, translation into the local language was necessary. According to the CDA, nine of the 30 trainees are currently employed at the filtration plant, while others are with the RCB, WASA, other CDA divisions, or have since left their positions. Plant employees who have been through the training report that there is no organized system, e.g. in-house training programs, for the transfer of skills they acquired through their training, though they do provide oral guidance to junior employees as part of their daily work. Even where training programs are carried out and manuals provided, it cannot be expected that project results will be significant if there exists no system and no qualified personnel to carry out transfer of skills within the executing agency. In light of this situation, where training and/or manual compilation is included in the consulting service terms of reference (TOR), consultations should be held with the executing agency with a view to enhancing awareness on the part of the parties concerned in the agency, and thereby to render technology transfer more sustainable. Training programs should be created with this in mind.

2.3.3 Recalculation of the FIRR

Due to the fact that the water shortages at the dam sources are not likely to be solved and the target figures for water supply to be achieved anytime in the near future, and also because the CDA has no concrete plans to raise water utility fees, no increase in income is currently forecast, leaving the recalculated FIRR in the negative. The FIRR calculated at the project planning phase was 7.31%.

2.4 Impact

2.4.1 Impact on Society

In assessing the impact of the project on society, the questionnaire survey carried out on the local residents, being the ultimate beneficiaries of the project. The survey was carried out in a residential area of Rawalpindi under the jurisdiction of the RCB. Based on advice offered by the RCB, the area selected for the survey was one that had been supplied with water from wells and jointly owned water tanks prior to receiving water service through the project (estimated population=3,000 houses). In the absence of resident registries and other materials critical to the sampling process, the survey was carried out with the goal of a sample of 200. As for the actual process, a number of researchers paid random visited to homes in the designated areas and conducted interviews with the residents over a specified period (10 days), attaining a total of 190 completed questionnaires. The purpose was to investigate any changes in water supply before and after project-assisted water supply was instituted, as well as any changes in the daily lives of the residents.

The average age of those surveyed was 38, with an equal ratio of men and women. Average monthly income stood at Rs. 6,826 (approximately 15,000 yen), and the average number of family members per household was seven. Water was available an average of 62 minutes per day at the time of the survey, indicating that the minimum time frame set by the RCB was being met. The survey found that the water was used for washing, bathing, and drinking/cooking in that order; most drinking water needs were met by purchased mineral water. As for changes in water supply and pressure, 59% and 82% of respondents respectively noted that water volume and pressure were greater, as indicated in Table 3. The questionnaire indicated that residents were paying a monthly average of Rs83 (roughly 185 yen), Rs42 more than they had paid previously, and that they hoped

for a lower upper limit of Rs57. Most respondents (77%) reported, however, that overall they were happy with the water service provided.

Table 3: Changes in water supply for beneficiaries

Water utility fees	Water supply hours	Water pressure	Water volume	Approval rating
Monthly average: R83	Daily average: 62 minutes	Improved: 83%	Increased: 59%	Pleased w/project outcome: 77%
Change: increase of Rs 42	Change: none	Unchanged: 8%	Unchanged: 3%	Not pleased w/project outcome: 22%
		Dropped: 9%	Dropped: 38%	

Source: Results of a questionnaire carried out on RCB-controlled districts

The questionnaire also inquired about changes in daily habits, i.e. the frequency with which respondents washed hands, washed dishes, bathed, washed clothes, and cleaned. Most residents answered that no changes had occurred. No changes were reported in the instance of outbreak of waterborne diseases such as gastrointestinal disorders and parasites, attributed to the fact that the short period of time the water was available limited the ability of the residents to obtain safe water, and/or that water quality was still poor.[11]

Based on the results described above, including the fact that residents were happy with the results of the project, the project is evaluated as having had a socially positive and beneficial impact. Due to the fact, however, that the average time of water supply remains at 62 minutes, the same period as prior to project implementation, there have been many calls for water utility rates to be lowered. Also, without increasing the time of water supply, there can be no expectations for changes in daily habits or for decreased instance of waterborne disease. In light of these factors, important issues for future consideration include a more balanced utility fee system and making water available for longer periods of time.

2.4.2: Impact on the Promotion of Urban Construction (urban development)

The project discussed here set forth the objective of keeping abreast of growing demand for water in tandem with the expansion of the city and its population that have characterized new construction on the capital of Islamabad. The CDA, which is now in the process of drawing up a basic framework for urban development, acknowledges that the stable water supply system in place is critical. In addition, the waterworks system provided by the project also enabled the expansion of two blocks of recently extended urban districts that were delineated under the new "master plan" for the capital area at the appraisal stage. The project therefore can be said to have achieved the goals of the original master plan.

At present, the filtration plants at Khanpur and Simly, the former built under ODA loan and the water supply facility of the latter also built under ODA loan, together comprise approximately 64% of the CDA's total water output. As described in 2.3.1 above, the Khanpur facility is providing 75% of the target water volume figures for the city of Islamabad, but only about 40% of total daily-basis water volume. In terms of maintaining the water supply ratio in support of the development of the

[11] In preliminary interviews with beneficiaries, respondents answered that they were now able to wash their dishes immediately after eating, that they washed their clothes more often, and so on. It was also indicated that for daily habits to change, social education for mothers, children, etc. would need to be considered in addition to the issue of water supply.

city's role as capital, the project's contribution to urban development is deemed insufficient.

2.4.3 Impact on the Environment

According to the executing agency, no particular negative impact stemming from the project has been reported as of the present time. As described on section 2.2.2 (Implementation Schedule), though there were delays related to land acquisition and administrative procedures that required more time than anticipated in the original plan, which lead to a longer implementation period, the land was eventually acquired through agreement with the land owners on compensation

2.5 Sustainability

Though there were no particular problems with the performance of facilities built by the project, capacity anticipated at the project planning stages were not fully utilized due to water shortages. Further, in order to ensure facility operation and maintenance (O&M) and future sustainability, it is crucial that an improved system of operations by the executing agency and the agency in charge of facility management should be established. The following is an overview of current circumstances and issues related to organizational, technical, and financial aspects.

2.5.1 Operational Structure

Agencies in charge of project facility operations are: the CDA for the Khanpur filtration facility and water conveyance pipes/water storage facilities for Islamabad, and the RCB for pipes and storage facilities for Rawalpindi.[12] Originally, at the time of project appraisal, the CDA was to oversee all operations and maintenance; when the RCB commenced water service since March 2001 to Rawalpindi (see 2.3.1), however, RCB took over operations of the city's reservoir facility at the request of CDA. Though the CDA is a large organization comprised of roughly 12,000 employees, the department in charge of the current project is staffed by a total of 47 (4 managers/technicians, 12 technical staff, and 31 others). There is no personnel changes among divisions and the staffs in the department were not particularly active in promoting use of project facilities or collecting water utility fees.

Special Assistance for the Project Sustainability (SAPS) study on the Metropolitan Water Supply Project (Simly), Pakistan, JBIC, March 2000 (hereinafter referred to as "SAPS study") indicates that CDA performance is lacking in several areas; in response to the situation, a special action plan has been proposed to deal with issues over the short, medium, and long term, including the establishment of an independent waterworks sector body. Meanwhile, the CDA in October of last year submitted a proposal on improving Islamabad's waterworks system to the Ministry of Interior. The proposal incorporated 17 items, one of which stated that all proposals mentioned in the SAPS study would be implemented. According to the CDA, the action plan may be implemented as early as next year if the budget is available. In light of the CDA's lack of capacity and inability to proceed in a timely manner on the project discussed here, it seems unlikely that the action plan will be carried out in full quickly. Instead, in order to hasten policy development, emphasis is being placed on the rapid realization of recommendations for CDA reform that were laid out in the SAPS study.

[12] Responsibility for operations will be shifted to WASA as of 2003.

2.5.2 Operation and Maintenance Structure (O&M)

The division in charge of O&M for the current project, consisting of 47 people, is known within CDA as the "Khanpur Dam Project." Among these 47, 24 employees work at the Khanpur filtration plant and the others at CDA headquarters in Islamabad. It was originally forecast that 166 new employees for O&M would be hired in tandem with installation of new facilities, but due to the fact that the machinery is advanced and therefore requires less personnel for operation and maintenance, and also due to budget constraints, the numbers have remained unchanged.

Though the CDA is responsible for operations of the Khanpur filtration plant—the project's major facility—the project supervisor, who works in Islamabad, does not appear to make frequent visits to the facility, nor is the necessity of an ongoing organizational structure that includes regular reporting by the on-site project coordinator acknowledged. RCB and WASA, the agencies in charge of conveyance facilities to Rawalpindi, also lack a proper operational structure that would incorporate regular testing of pipes and water storage facilities.

Since none of the related agencies have in place a proper system to handle operation and maintenance, there is a reason for uncertainty with regard to their ability to respond to the breakdowns or accidents that may occur in the future. It is therefore a matter of urgency to clarify within the organizations who is responsible in what situation, as well as to create, as quickly as possible, a manual providing instructions on how to proceed in emergency situations.

2.5.3 Personnel and Technical Skill

According to the CDA, since the project facilities are as yet new and as a result no problems have occurred with regard to O&M, there is concern over the possibility that, should breakdowns occur in the future, employees will not be able to deal with the situation with their skills at current levels. One reason for this is the fact that the equipment is of the latest technology and is not seen elsewhere in Pakistan; there are therefore no technicians capable of dealing with the equipment, and it is unlikely that spare parts could be procured within the country. Due to budgetary constraints, the CDA currently has no programs in place, e.g. dispatching employees overseas for training, to deal with these potential problems. Other related organizations (RCB, WASA) also note that the CDA is lacking in terms of the level of its personnel and technical skill. RCB and WASA are also not without their problems in these areas, particularly with regard to technical level; it has been noted, for example, that personnel at the Rawalpindi reservoir were not even capable of dealing with a broken telephone at the site. According to WASA, responsibility for reservoir facilities for Rawalpindi will be entrusted by RCB to WASA as of the year 2003. Though WASA has stated that it would install appropriate personnel at that time, the fact is that all of the related agencies require both new personnel and technology. Employee education including attending lectures offered by other institutions, in-house training incorporating skill transfer, etc., has become an important issue.

2.5.4 Financial Status

Because CDA's accounting system is as yet underdeveloped, detailed financial information on the waterworks sector is currently unavailable. CDA's annual income (including government subsidies and water utility fee payments) and expenditure for fiscal 2001 and 2002 is given in Table 4 below. As indicated, CDA's expenses are covered by its income taking the agency's budget as a whole. Although there is no indication of capital investment (provided by government subsidies) in the budget breakdown, it seems that it is already incorporated in the expenditure judging from the

information by the executing agency.

Table 4: CDA Budget Breakdown

(Unit: million Rs)

		FY 2001	FY 2002
■Annual income			
	Government subsidy	2	-
	Other annual income	1,126	1,443
Subtotal		1,128	1,443
■Expenditure			
	O&M cost	1,072	1,373
	Employee salaries, etc.	30	34
Subtotal		1,102	1373
■Annual income-expenditure		26	70

Source: CDA

Note 1: 2002 budget figures are estimates (Pakistan's fiscal year runs from July-June)

Though some areas are equipped with meters, they are currently not in use because most of them are broken or water fees are just being charged on fixed amount basis. Water utility fees are instead billed to the user every three months in a fixed amount depending on the size and classification of the dwelling. Water utility fee collection rates for fiscal 2000 remained at a level of 25%, leaving approximately 90 million Rs in unpaid fees. The tendency to be in arrears on payments was particularly conspicuous among commercial and industrial facilities. RCB and WASA apply the same water utility fee collection system in Rawalpindi, yet they enjoy collection rates of approximately 70% and 80% respectively. The number of taps collected upon for the three agencies is as follows: 50,769 for CDA, 28,500 for RCB, and 70,693 for WASA.[13]

The difference between the collection rates among the three agencies is attributed to problems with the organization of the CDA, particularly in light of the fact that collection systems are the same for all three. Since financial management operations at CDA are carried out on the company as a whole, waterworks division losses are not paid much heed. As a result, there is no incentive to raise collection rates, even among division leaders. (The SAPS study offers a proposal for a financial system that would facilitate better water utility collection rates).

Water division finances at both RCB and WASA are noted in Table 5 below. As indicated, RCB demonstrated a deficit of Rs54.5 million for fiscal 2001, while WASA enjoyed a surplus of Rs30.4 million. WASA had forecasted a deficit of Rs.119.7 million for fiscal 2002, having included estimated additional water supply-related O&M cost, piping costs, and new hire expenditures relating to the Khanpur dam based on costs for the previous fiscal year. In order to offset the expected deficit, the agency applied for assistance from the state of Punjab.

[13] The CDA figure is for 2001, while the RCB and WASA figures are of 2002.

Table 5: RCB/WASA Water Division Budget Breakdown

(Unit: million Rs)

		RCB	WASA	
		FY 2001	FY 2001	FY 2002 (estimated)
■Income				
	Water utility fees	16.6	153.1	152.4
	New tap construction revenue	6.1	1.4	1.4
	Other	-	4.7	156.1
Subtotal		22.7	159.2	309.9
■Expenditure				
	O&M cost	2.9	143.6	349.5
	Employee salaries, etc.	16.3	46.0	80.1
	Other	58.0	-	-
Total		77.2	189.6	429.6
■Income-expenditure		-54.5	30.4	-119.7

Source: RCB, WASA

None of three agencies was financially self reliant, with each depending on the budget of the organization as a whole, or on government subsidies. In order to improve collection rates, RCB and WASA take legal measures and/or suspended service against parties in arrears. To promote sustainability and self-reliance of the sector, however, strategies to raise water utility collection rates, cut O&M costs including personnel expenses, etc. must be actively pursued.

2.5.5 Future Planning

As was described in section 2.1 above (Relevance), a plan for CDA's water supply system was noted once, in the F/S, but not since then. The F/S report noted population estimates and the corresponding expected demand for water by the year 2030, also forecasting that demand would surpass supply between the years 2005 and 2010. In order to accommodate these trends, a total of 145,600 m^3/day would be needed, to be derived from newly built dams and other sources. The report further proposed a computer system-guided water supply system network, but this remains unfulfilled at the present time.

The proposal on improving Islamabad's water supply system, submitted by the CDA to the Ministry of Interior, presented ideas for future steps including the following: establishing a comprehensive framework based on the results of a 1985 JICA survey on water supply systems;[14]conducting feasibility studies on dam construction based on the same survey by JICA; research on improving existing water supply systems; establishing water supply network systems; and improvement to CDA's operations systems . It also incorporated an "action plan" that included an overview of reform for the CDA, which first appeared in the SAPS study. The CDA has announced that part of the plan may be implemented as of the next fiscal year; as described above, however, there are serious doubts as to the capacity of the agency to carry out its plans. In the meantime, because there is a danger that demand for water will exceed supply, calls are being made for the sure implementation of short-term action plan proposed in the SAPS study, including securing water sources and rehabilitating pipe networks.

[14] Study on the Water Supply Plan from Khanpur Dam to Islamabad and Rawalpindi, JICA, March 1985.

3. Feedback

3.1 Lessons Learned

3.1.1 The element of water distribution should have been sufficiently considered in structuring the project scope. It is also necessary to strengthen ownership of the executing agency and other potential participants in the project and to make clear demarcation among them in terms of responsibility.

The construction of water distribution pipe was excluded from the project scope, since they were judged to be possibly implemented by the budget of the borrowing country. Therefore, CDA was solely nominated as an executing agency, while RCB and WASA were not recognized as the executing agency, though such two organizations were responsible for dealing with two third of planned volume of water supply under this project. As a result, their involvement in the project was rather limited.

In this type of the project aimed at water supply to end users, the element of water distribution should have been sufficiently considered in structuring the project scope , whether the portion is to be covered by ODA loan or not. Furthermore, the entity responsible for the water distribution should have been authorized as an executing agency for ODA loan project, or at least urged to make voluntary participation in the various activities for achieving the project goal as a relevant organization. These factors are indispensable to secure the project effectiveness as well as the project sustainability.

3.2 Recommendations (to the executing agency)

(To the executing agency)

3.2.1 Project implementation requires organizational reform of the executing agency and other bodies.

The waterworks division of the CDA lacks qualities of leadership or self reliance in financial or personnel/technical aspects, a fact which was particularly evident in that the agency took no steps to correct the extremely low collection rate on water utility fees, and that there is no budget management. Meanwhile, WASA, which oversaw the Rawalpindi area, had just recently become an independent agency by separating from its larger organization. Intent on budget and planning issues, WASA was more conscious of its role in the project than CDA. The government of Pakistan is in the midst of implementing a decentralization policy, and the role of the CDA within the Ministry of Interior is likely to change. Still, it is advisable, in order to ensure the sustainability and self-reliance of CDA's waterworks division, to rapidly implement the recommendations for organizational reform that were offered by SAPS study in the year 2000. In particular, anticipating that demand will exceed supply as of the year 2005, organizational reform should be implemented ahead of time. Reform is also advisable for RCB and WASA, which both exhibit particularly severe problems with low skill levels.

(To the executing agency)

3.2.2 Effective use of the Khanpur filtration plant is an issue of extreme urgency.

At present, the Khanpur filtration plant facilities are not being utilized at the level of the original

project plan due to a water shortage in the Khanpur Dam reservoir. Though part of the blame for the problem lies with the unpredictable event of lack of rainfall due to drought, for upcoming projects it is advisable to establish means of making the most efficient use of project facilities into the future. In this way, projects will be able to accommodate the demand for water that is expected to continue to increase. To achieve this, it is considered necessary to formulate a comprehensive water supply plan that includes the securing of water sources that meet the current circumstances of both the Islamabad and Rawalpindi areas, as well as strategies designed to ensure utilization of project facilities according to plan. To this end, and further to avoid a situation, currently predicted for the year 2005, where demand exceeds supply, not only the implementation of recommendations proposed in the SAPS study, but also review and revision of the F/S in 1998 may have to be considered prior to the year 2005.

(To JBIC)

3.2.3 In order to ensure the sustainability of project impact, as well as self-reliance, the importance of organizational reform must be impressed upon the CDA, and steps should be continuously taken to utilize the recommendations offered by a SAPS study.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope	(1) Sluice gate and water conveyance facilities 1) Repair of the pre-existing Left Bank Canal 2) Raw water storage reservoir conduit (550 meters) (2) Water purification facilities 1) Water purification facility construction (Coagulative precipitation→Sand filtration): Capacity 273,000 m^3/day (two systems) (3) Pumps/electrical equipment 1) Rawalpindi:1,250KW × 3 2) Islamabad: 850KW × 3 (4) Water supply facilities 1) Rawalpindi: θ1,400 × 17Km 2) Islamabad: θ1,200 × 6Km, θ800 × 3Km (5) Water storage facilities 1) Rawalpindi: 22,300 m^3 × 2 2) Islamabad: 16,600 m^3 × 1 (6) Consulting cost: foreign nationals (293MM), local (382MM)	(1) Sluice gate and water conveyance facilities as planned: 1) As planned 2) As planned (2) Water purification facilities 1) Capacity: 281,000 m^3/day (3) Pumps/electrical equipment 1) 1,400KW × 3 2) 970KW × 3 (4) Water supply facilities 1) θ1,400 × 13.3Km 2) θ900 × 6.9Km (5) Water storage facilities 1) As planned 2) As planned (6) Consulting costs: as noted left
2. Implementation Schedule	Planning period May 1989-February 1990 Land acquisition May 1989-December 1990 Bidding and contract procedures May 1990-December 1990 Construction period January 1991-September 1993	Planning period March 1990-March 1991 Land acquisition January 1990-June 1998 Bidding and contract procedures March 1994-June 1994 Construction period September 1994-May 2000
3. Project Cost Foreign Currency Local Currency Total ODA loan portion Exchange rate	 8,763 million yen 12,422 million yen (1,714 million Rs) 21,185 million yen 12,518 million yen 1 Rs = 7.25 yen (As of August 1988)	 9,657 million yen 6,176 million yen (1,838 million Rs) 15,833 million yen 12,442 million yen 1 Rs = 3.36 yen (Average for 1990-2000)

Third Party Evaluator's Opinion on
Metropolitan Water Supply Project (Khanpur I)

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Relevance

Keeping in view the unpredictability of rains, less water storage facilities, this project was quite relevant to the needs of the beneficiaries. Reviewing the country's development plans, it is apparent that water supply system has remained a high priority area of government's policies. The project was also relevant, as it was perceived to significantly contribute the government's plan to provide 100% coverage to the citizens of Rawalpindi and Islamabad on urgent basis. Given the lack of material and technical resources, the government of Pakistan had to seek this assistance from any other source, particularly the country, which has required technical expertise and has ability to provide required capital as well. Though the growth of population is more than the forecasted at the time of appraisal, yet, this project would remain a main contributor to fulfil the growing water consumption needs of the population. In the presence of two other water sources, i.e, Simly Dam and Rawal Dam, this project would also contribute in required provision of, safe drinking water, with its water purification plant. The supply of water was in line to meet the needs of the population for drinking, washing and cleaning purposes, and construction work's need of water. The CDA's expected plan to make effective water supply system in Islamabad, as proposed in the feasibility study, referred to in evaluation report, would further enhance relevance of the project.

The turnover of the employees who had been given specific training, would also compromise project's effectiveness and efficiency. Five of the individuals who participated in the overseas training had left CDA, and out of the 30 people trained locally, only nine are working at the filtration points, leaving technology transfer far from being very effective.

Impact

It is difficult to assess the impact of the project, as its production is much below the target due to various reasons. According to brief interview with the senior management of the said project in CDA, when it started , its out put was 10% of its capacity. The main reason was less rains in the area, and hence very little availability of the water. According to the CDA officials, at present stage, its out put is less than 50% of its capacity. The main reason of its being less functional is that system of distribution of water through pipe lines is not fully laid yet. Due to the absence of an effective distribution system, the level of optimum use of the dam is still not achieved. These problems were not perceived at the time of the design of the project, and emerged after the completion of the project. According to the CDA officials, it is expected that the capacity of project will be fully utilised after two years.

No negative social impacts are reported so far. During construction, the problem of displacement of the people emerged; however, people were compensated according to the compensation policy of that time.

Since most of people rely on this water for drinking and other purposes, its purification should have been 100 %. However, as reported in the evaluation report, the frequency of its testing and repair is far from sufficient, its ability to ensure positive impact on the public health in its coverage area would remain compromised. Based on observation, it seems unlikely that majority of the people, who have very low buying capacity, would use bottled water from market. They use the water for drinking, either by boiling it, or use it in whatever form it is available. In the cities of Islamabad and Rawalpindi, the main source of drinking water remains water supplied by WASA and CDA.

The provision of potable water through this dam has provided an important facility to the population of Islamabad and Rawalpindi. However, the people's habits are not changed after the supply of water. This is probably due to lack of effective social campaign for the said purpose, and how to use water economically.