Pakistan

Ex-post monitoring for ODA loan project

"Metropolitan Water Supply Project (Kanpur Water Supply Project Phase I)"

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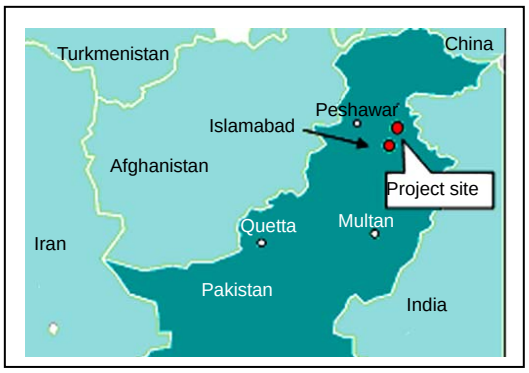
Field Survey: July 2008

## 1. Outline of the Project and Japan's ODA Loan




Location of the project

Kanpur Water Purification Plant

### 1.1 Purpose of the Project

The purpose of this project is to meet an increasing demand for water in the Islamabad metropolitan area including Rawalpindi and villages in its neighborhood by developing and improving a water purification plant and water supply facility which depends on the Kanpur Dam as the source of water, thereby contributing to urban development.

### 1.2 Outline of the Loan Agreement

(Refer to "Comparison between major plans and performance" on page 12 about the scope of the project.)

| | |
|---|---|
| Loan Amount/Disbursed Amount | 12,518 million yen / 12,442 million yen |
| Date of Loan Agreement /<br>Final Disbursement Data | March 1989<br>October 2000 |
| Ex-post Evaluation | Fiscal 2002 |
| Executing Agency | Capital Development Authority (CDA) |
| Main Contractor | Taisei Construction Corporation (Japan), Mitsubishi Corporation (Japan) (JV)/Taisei Construction Corporation (Japan), etc. |
| Consulting Services | NJS Company, Ltd. (Japan) |

1.3 Background and reasons for conducting ex-post monitoring survey

According to the ex-post evaluation carried out in fiscal 2002, the effect of the project was not necessarily high. The reasons were several: the water storage of the Kanpur Dam which was the source of water purification plant declined; the overall amount of daily water supply was 41% of the plan; the amount of water supply to Islamabad was 73% of the plan; and the amount of water supply to Rawalpindi was 20~30% of the plan. At the same time, the evaluation report pointed out various problems with the executing agency such as the scarcity of personnel, underdeveloped institutions, and the shortage of active efforts, thus expressing concern over the sustainability of the project. Therefore, in order to reexamine the manifestations of effects and the project's sustainability after the ex-post evaluation, we carried out this field survey. We outline the survey, review the result per item and draw conclusions.

## 2. Findings of monitoring

2.1 Effectiveness (Effect)

Overview of the relevance

| |
|---|
| Although the necessity of the Kanpur purification plant to catch up with an increasing demand for water remains high, due to the influences of lack of financial resources and underdeveloped infrastructure, the amount of water supply still remains lower than the original plan[1]. No noticeable improvements have been made. |

2.1.1 Amount of daily water supply

As described in Table 1, the amount of water supply[2] marked 41% of the plan at the time of ex-post evaluation. In the original plan, it was designed to distribute one third of its capacity to Islamabad, and the remaining two thirds to Rawalpindi. However, water supply to Rawalpindi marked only 20~30% of the plan.

The current amount of water supply (in 2008) slightly improved to 47% of the plan (55% for Islamabad and 43% for Rawalpindi), though, it has still not reached 50% of the plan. Compared to the figure in the ex-post evaluation, water supply to Rawalpindi has improved slightly, whereas that to Islamabad has declined.

According to an interview with WAPDA[3] which is responsible for the management of the

[1] The effectiveness is evaluated based on the following criteria: 80% of the plan is "high;" 50% or more and below 80% of the plan is "moderate," and less than 50% of the plan is "low." (For details, refer to the Ex-post Evaluation Report on completed ODA Loan Projects 2007 (p 22))

[2] The executing agency of this project is the Capital Development Authority (CDA), which is responsible for supplying water to Islamabad. Water supply to Rawalpindi is under the control of the two organizations, Rawalpindi Water Sanitation Authority (WASA) and Rawalpindi Cantonment Board (RCB). For more details, refer to the section, "2.3.1.1 Operation and maintenance system."

[3] Water and Power Development Authority

dam, compared to the ex-post evaluation (2002), the water storage capacity of the Kanpur Dam and precipitation in its neighborhoods are stable enough to supply water at its designed capacity. Table 2 supports this view, whereby it is confirmed that there are no problems in terms of the physical capacity of the Kanpur Dam and its water source.

The following are presumably the reasons that the water supply is lower than the plan despite the fact that a sufficient amount of water is stored.

(1) For Islamabad: Underdeveloped infrastructure for water distribution and a problem with the distribution cost

1) Originally it was planned that the Kanpur Dam would supply water to nine districts[4] in Islamabad. However, subsequent development of water conveyance/distribution infrastructure (mainly water conveyance/distribution pipe networks) has been slow, and only five districts out of the nine districts are installed with the infrastructure.

[4] Islamabad consists of districts, each of which has an area of approximately 2km$^2$. Each district is equipped with living infrastructure such as commercial facilities and mosque. The districts to which the Kanpur Dam supplies water are five (G-10, G-11, F-10, F-11 and E-10).

Table 1: Change in the amount of daily water supply

(In $m^3$ per day)

At the time of ex-post evaluation (November 2002)

| Agency in the target area | Plan | Actual figure | | |
|---|---|---|---|---|
| | | 2000 | 2001 | 2002 |
| For Islamabad | | | | |
| CDA | 75,075 | 27,300 | 36,400 | 54,600 |
| For Rawalpindi | | | | |
| RCB | 89,635 | - | 18,200 | 27,300 |
| WASA | 67,340 | - | - | 13,650 |
| Total | 232,050 | 27,300 | 54,600 | 95,550 |

(Source) CDA/RCB/WASA

At the time of ex-post monitoring (July 2008)

| | | Actual | | | | | |
|---|---|---|---|---|---|---|---|
| | Plan | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| For Islamabad | | | | | | | |
| CDA | 75,075 | 41,000 | 41,000 | 41,000 | 41,000 | 41,000 | 41,000 |
| For Rawalpindi | | | | | | | |
| RCB | 89,635 | 31,822 | 31,822 | 36,368 | 36,368 | 38,641 | 40,914 |
| WASA | 67,340 | 27,276 | 27,276 | 27,276 | 27,276 | 27,276 | 27,276 |
| Total | 232,050 | 100,098 | 100,098 | 104,644 | 104,644 | 106,917 | 109,190 |

(Source) CDA/RCB/WASA

Table 2: Amount of water storage of the Kanpur Dam/Change in rainfall

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| Mean monthly flow rate (acre-ft) | 6,298 | 18,801 | 9,483 | 24,464 | 11,566 | 20,329 | 12,189 |
| Design maximum water level (ft) | 1,982 | 1,982 | 1,982 | 1,982 | 1,982 | 1,982 | 1,982 |
| Maximum water level (ft) | n.a | 1,965 | 1,940 | 1,964 | 1,943 | 1,976 | n.a |
| Minimum water level (ft) | n.a | 1,956 | 1,934 | 1,956 | 1,935 | 1,970 | n.a |
| Average precipitation (mm) | 637 | 1,054 | 1,093 | 1,042 | 977 | 1,307 | 472 |

(Source) WAPDA / (Note) The data of 2008 are for six months till June.

Figure 1: Kanpur Dam at present

Figure 2: Water gate of the Kanpur Dam

2) The following table is a list of major sources of water under the control of CDA that is responsible for water supply to Islamabad. The Kanpur Dam accounts for only approximately 13% of the total supply. On the other hand, the availability of the Simly Dam[5], the major source of water of Islamabad sustains a high rate of 80%. The reason behind these gaps is the cost of water distribution. According to CDA officer, the water distribution from the Kanpur Dam costs more than double the cost that from the Simly Dam. Hence, in principle, CDA gives priority to using the more economical Simly Dam.

Table 3: Major sources water of Islamabad and amount of water supply

(In $m^3$)

| Source of water | Supply capacity | Actual amount | Design ratio |
|---|---|---|---|
| Simly Dam | 190,932 | 150,018 | 79% |
| Kampur Dam | 75,009 | 40,914 | 55% |
| Other sources | 188,659 | 125,470 | 67% |
| Total | 454,600 | 316,402 | 70% |

(Source) CDA

The reason for the difference in the water distribution costs between the two said dams largely derives from geographic conditions. The Kanpur Dam needs to use pumps to send water inducing the electric power cost, whereas the Simly Dam can send its water by gravity.

(2) For Rawalpindi (area under the jurisdiction of WASA): Unpaid water charges and insufficient inter-organizational coordination

The WASA purchases water from CDA which is in charge of the management of Kanpur purification plant. In order to meet an increasing demand for water in Rawalpindi and reduce

[5] It is the source of water located in the eastern part of Islamabad. It was constructed under the Japan's ODA loan project (Metropolitan Water Supply Project).

the use of water from high-cost tubewells[6], WASA has repeatedly requested CDA to increase the amount of water supply. However, CDA claims that WASA has a delinquent account and expresses a view that it will not increase its water supply as long as the problem remains unsolved. This problem also lies behind a low level of water supply.[7] (Therefore, WASA is compelled to use tubewells to cover the demand. Since groundwater costs more than surface water, WASA expresses its urgent need for water supply from CDA.)

On the other hand, the person in charge at CDA has left the official requests from WASA unanswered for several months. Such lack of inter-organizational communication and coordination is also in the background.[8]

(3) For Rawalpindi (area under the jurisdiction of RCB): Underdeveloped water conveyance/distribution infrastructure

The area which is under the jurisdiction of the Rawalpindi Cantonment Board (RCB) also suffers from a lack of capacity to meet its demand. The person in charge at RCB attributed the cause to be inadequate development of water conveyance / distribution infrastructure by RCB. Since 2001, RCB has been implementing the projects to develop water conveyance and distribution infrastructure premised upon the use of the Kanpur Dam and completed the phase II. So far, two thirds of the area has been covered by the necessary infrastructure.

Currently, RCB has submitted a request for the water distribution project phase III for the Kanpur Dam. It plans to expand the capacity of the reservoir and enlarge the water distribution and drainage networks. When this project is completed, it is anticipated that the supply capacity will be secured to satisfy fully the demand for water. However, the water supplied by CDA to RCB comes via WASA. Hence, it is assumed that the problem mentioned in (2) between WASA and CDA will also affect the water supply in the areas under the jurisdiction of RCB as well.

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[6] Tubewell: An iron tube with a diameter of 10~20cm is driven into the ground to reach the underground water table. The groundwater is pumped up with electric or diesel pumps, thereby costing comparatively higher than surface water. WASA has 260 tubewells, costing WASA 240 million rupees (equivalent to about 400 million yen) per month. A WASA person claims that the cost is threefold in comparison with the use of surface water.

[7] On the other hand, WAPDA that is responsible for the Kanpur Dam states that about 50% of water charges from CDA remain unpaid. We do not know its direct relationship with the WASA's delinquent account, but this may be one of the reasons for CDA's financial problems.

[8] During our field survey we organized a meeting to discuss this matter among the relevant organizations. In the meeting they had discussions to share and recognize the present problem. We urged them to make an opportunity to have discussions regularly and strengthen the coordinating function.

2.1.2 Available hours of water per day

Table 4 below shows the available hours of water per day, both at the time of ex-post evaluation and at present (2008). A huge discrepancy between users' perception and planned figure by the executing agency was found. Although a certain improvement was made in some RCB-controlled districts, as confirmed by the increase of available hours from 62 minutes to 96 minutes. However, the figures obtained at the time of ex-post evaluation were not clearly defined and there was a possibility that they were based on the executing agency's policy. Therefore, we must be cautious to make a simple comparison between the hours of water service at present and that at the time of ex-post evaluation.

Table 4: Comparison of the hours of daily water supply

| Area | Jurisdiction | Ex-post evaluation | Hours of water supplied at present | Respondents of the beneficiary survey |
|---|---|---|---|---|
| For Islamabad | CDA | 60-120 min. | Not known | 66 min. |
| For Rawalpindi | RCB | 32-45 min.[9] | 540 min. | 96 min. |
| | WASA | 240 min. | 240 min. | 134 min. |
| | Average | | | 98 min. |

(Source) The responses of the executing agencies come from CDA, RCB and WASA. Others are based on the results of the beneficiary survey.

The views of a local expert about this discrepancy, which implies that users' perception might be more accurate, are as follows.

- Due to the frequent load shedding because of the shortage of electricity in the metropolitan area, the water pumps installed in each household are not in service for many hours. This may cause a discrepancy with the actual time of water supply.[10]
- Stealing water by direct connection to distribution pipes might reduce the net amount of distribution to end users .

2.1.3 Water quality

At the time of ex-post evaluation, tests were performed at the water purification plant and water supply facilities. Both the measurements passed the standards. However, as a result of the water quality tests, the ex-post evaluation report pointed out the problems of broken pipes and possible water contamination by rainwater and wastewater at the end point of water supply because water conveyance/distribution pipes were worn out. It was also pointed out that the

[9] The RCB figures are taken from its policy. It is reported that water is supplied actually for 62 minutes per day on the average according to our interviews with users.

[10] The findings of the beneficiary survey to be discussed below reveal that many residents point out the problem of a short length of water service time, which endorse this view.

inspection system was not adequate in that a water quality test is carried out only when residents filed their complaints and, thus, the numbers of testing and maintenance/repair were not enough.

During this field survey, we confirmed that the tests at the water purification plant and the water supply facilities detected no problems with water quality. However, the beneficiary survey conducted among water users reveals that a nearly half of its respondents are not satisfied with the water quality. It can be thus deduced that pipes still have problems at the end points of water supply. It will be necessary to carry out periodical tests rather than request-basis tests in order to accurately grasp the condition of water quality at the end point of the system.

2.1.4 Water supply service

In this field survey we carried out a beneficiary survey to compare the current state of water supply service with that at the time of ex-post evaluation (in 2002).[11] The features of the findings are as follows.

For overall satisfaction, 44% of respondents reported "Unsatisfactory", which slightly outweighs those reporting "Satisfactory"(40%). In a previous survey, a comparison was made between before and after the water supply service had been started. Although direct comparison of these results might be difficult, still we can claim that level of satisfaction (40%) is not very high. In particular, the factors that caused reports of "Unsatisfactory" are: no improvement of water service since the time of ex-post evaluation, as confirmed by low water volume and pressure; and a shortage of supply forcing residents to buy water from private enterprises which causes additional expense, thereby reducing the level of satisfaction. For instance, in some districts of Islamabad, residents are forced to use a more expensive water service from water wagons in order to supplement the shortage of water from the network service, and furthermore the water charge was raised from 83 rupees at the time of ex-post evaluation to 130 rupees per month on the average.

[11] In the three districts that receive water supply service from the Kanpur Dam we selected 223 sample households from the residents who have lived since the time of ex-post evaluation (five years ago) and visited each household to collect comments.

Table 5: Result of the beneficiary survey

| Agency | Water pressure | | | Water volume | | | Degree of satisfaction | | |
|---|---|---|---|---|---|---|---|---|---|
| | Improved | No change | Decreased | Improved | No change | Decreased | Satisfied | No change | Dissatisfied |
| CDA | 9% | 63% | 28% | 11% | 62% | 27% | 26% | 15% | 59% |
| RCB | 34% | 34% | 32% | 34% | 34% | 32% | 50% | 16% | 34% |
| WASA | 34% | 35% | 31% | 35% | 33% | 32% | 43% | 17% | 40% |
| Total | 26% | 44% | 30% | 27% | 43% | 30% | 40% | 16% | 44% |

2.2 Impact

As pointed out at the time of ex-post evaluation, it was improvement that the area served had been expanded through the development of Kanpur water purification plant. However, at present the design ratio of daily water supply still remains around 50% due to the undeveloped distribution infrastructure. As a result, the project's impacts such as its contribution to urban development are not as sufficient as expected.

2.3 Sustainability

Outline of sustainability

There are no problems with the operation and maintenance of the Kanpur Dam and water purification plant. However, there are still some problems that may give an adverse effect on sustainability such as vague delineation of roles in operation and maintenance of other facilities related to water supply, financial shortage, and silt in water distribution pipes.

2.3.1 Executing agency

2.3.1.1 Operation and maintenance system

(1) Operation and maintenance system of the Kanpur Dam and water purification plant

CDA's responsibilities are clearly defined in the operation and maintenance of the Kanpur Dam and water purification plant, thereby causing no problems. The CDA's organization and size of the staff have not changed much since the time of ex-post evaluation. The number of employees is 12,000, out of which 100 persons including 37 engineers (12 senior engineers and 25 technical workers) work for the Bulk Water management. The personnel at the Kanpur purification plant remains almost the same. That is, 25 employees work at the plant.

CDA is responsible for water distribution from the purification plant to distribution reservoirs for Islamabad and for Rawalpindi. Responsibility to operate and maintain the water distribution facilities from the distribution reservoir to the user rests with WASA, CDA or RCB in the area under the jurisdiction of each organization. WASA is in charge of the operation and maintenance of major facilities such as the distribution reservoir for Rawalpindi, whereas RCB is responsible only for water distribution to the area under its jurisdiction.

(2) Problems in operation and maintenance of canals from the Kanpur Dam to the purification plant[12]

The maintenance of the left bank canal that sends water from the Kanpur Dam to the purification plant falls under the responsibility of the provincial governments of Punjab and North West Frontier. Currently, they are not actively taking measures to fulfill the function and leave the problem of silt[13] as it is, which will be discussed later (in the section of 2.3.2 Maintenance Condition).

2.3.1.2 Technical capacity for operation and maintenance

During our field survey, we had interviews with CDA staff at the water purification plant and the manager of the distribution reservoir of WASA through a local expert concerning major operational procedures and techniques in equipment operation. The results showed no problems. It is assessed that through five years' experience in operation after the time of ex-post evaluation, their technical capacity has improved and their capacity to operate has reached an adequate level for ordinary operation and maintenance. Five employees have received formal training, and other 25 employees have obviously acquired the capacity to operate through OJT at the purification plant.

2.3.1.3 Financial status

Direct expenses for the operation and maintenance of facilities are secured. However, the scarcity of revenues for the operation of overall facilities including water supply costs affects the manifestations of the project's effect.

As explained in the section of effectiveness, CDA reduces the amount of water supply from the Kanpur Dam which is more costly. A reason is its chronic state of scarce sources of revenues.[14]

Several reasons are considered as the causes of financial difficulty . In particular, the primary reason is imbalance between the water rates set lower for political reasons and the cost of water supply, and low collection rates of water charges may also be responsible.

The yearly expenditure related to operation and maintenance of the Kanpur purification plant is shown below. Interviews with a CDA officer indicate that the expenses for basic

[12] There are two canals for the Kanpur Dam, out of which the left bank canal is primarily for use by local governments and industries, and partially for irrigation. On the other hand, the right bank canal is used for irrigation.

[13] In the problem of silt, the quarry (a private enterprise), the cause of the problem, should bear partial responsibility in terms of operation and maintenance. However, it has not taken any part yet.

[14] We could not obtain detailed data on the finance of the water supply department. Our statements here are based on the information obtained through interviews with people in the section in charge.

operation and maintenance have been secured, thus causing no big problems in operation and maintenance.

Table 6: Operation and maintenance expenses for the Kanpur Dam

| Year | (million rupees) | (million yen) |
|---|---|---|
| 2003 | 75.0 | 126.0 |
| 2004 | 136.1 | 228.7 |
| 2005 | 158.9 | 266.9 |
| 2006 | 139.0 | 233.5 |
| 2007 | 170.2 | 285.9 |

(Source) CDA

The collection rates of water charges have not changed much since the time of ex-post evaluation. Particularly, the collection rate of CDA is low. A local expert's view is that CDA's low collection rate is still due partly to institutional problems such as low awareness of financial management among staff members. Furthermore, the expert further argued that the facts that meters were not adequately installed and that meters, if installed, had troubles also prevent CDA from collecting accurate water charges.

Table 7: Collection rate of water charges

| Agency | Collection rate |
|---|---|
| CDA | 39% |
| WASA | 65-70% |
| RCB | No answer |

(Source) CDA/WASA

### 2.3.2 Maintenance Condition

As discussed in the section on technical capacity for operation and maintenance, at the Kanpur purification plant its staff members have a high level of technical maturity and no big troubles have taken place in the facilities. Thus, it can be concluded that it has no problems with operation and maintenance. However, the capacity for preventive maintenance is not sufficient, which may erode trust in the plant in the long run. A typical case is seen in the stagnation in the process of decision-making concerning the procurement of spare parts. For instance, the same batteries and fuses used in the transformer substation of the purification plant cannot be procured within Pakistan and are no longer manufactured in Japan, either. As a result, the plant uses domestic low-quality batteries.[15]

[15] We confirmed, together with the local expert, the fact that a new type of battery has been already introduced by a Japanese supplier. We received information to indicate that there are no problems with its interchangeability. However, the executing agency insists that it has not had technically validating data, thereby pending its decision for procurement.

Concern has been growing over operation and maintenance of silt and dust in the left bank canal that connects the Kanpur Dam with the water purification plant. Silt and dust generated at the quarry by the canal flow into the canal and already begin to block the flow. If left as it is, there is a fear of totally damaging the capacity of the canal. In a worse case, if part of the sediments flow into the reservoir at the lower reaches through the canal, there is a possibility of affecting the reservoir capacity.

Under the circumstances, CDA has been trying to take out sediments for several days per year, which gives no fundamental solution to the problem. The following measures will be required in the future.

- Setting up coordination meetings that involves the relevant organizations and officially identifying the role and responsibility of respective organizations related to operation and maintenance
- Exploring measures including the relocation of the quarry that is the cause of the problem.

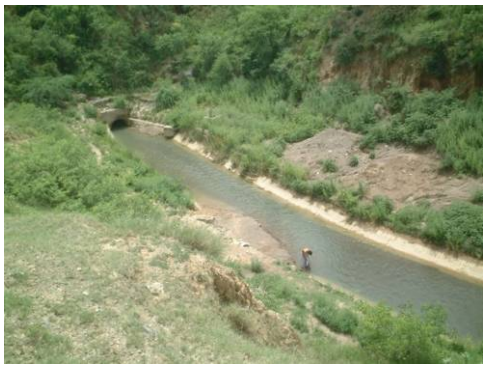

Figure 3: Silt in the canal

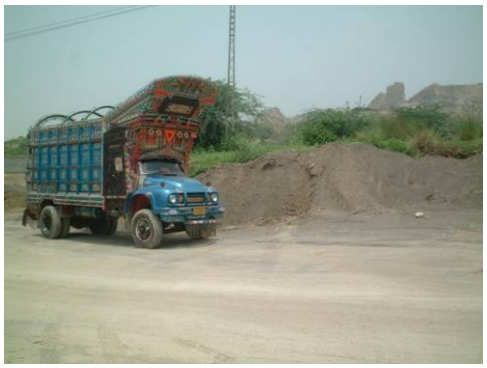

Figure 4: Quarry by the canal

## 3 Conclusions, lessons learned and recommendations

### 3.1 Conclusion

We have observed certain improvements in terms of water storage and the amount of water supply, and yet the design ratio still hovers as low as less than 50%. Thus, the project's effect is low. In the backdrop of the low effect lie multiple problems such as the lack of inter-organizational coordination and undeveloped infrastructure.

### 3.2 Recommendations (for the executing agency)

(1) Various factors are related to the problem of the failure to achieve the design amount of water supply. For instance, they include financial problems of relevant organizations and inadequate inter-organizational coordination as well as undeveloped infrastructure. There are no many quick remedial measures. It is necessary to solve as quickly as possible the

problem of inadequate coordination among relevant organizations through holding periodic discussions, etc.

(2) In order to improve the problem of slit in the canal, it will be essential to clearly indicate the location of responsibility in operation and maintenance. CDA should take the initiative in holding a meeting among parties concerned to discuss how to address the issue. Measures for the ultimate solution to the problem of slit will require such action as relocating the quarry which causes the problem. Thus discussions involving relevant parties including the executive officer of the quarry will be necessary.

(3) We have detected no problems in the water quality at the purification plant and in the water pipe. Yet presumably there still remains the problem with water quality at the end point of water supply. It will be important to perform periodic tests as well as testing on request in order to know correctly the problem of water quality at the end point of water supply.

(4) The issue of procurement of spare parts is largely caused by the shortage of information held by the executing agency. It is necessary to provide technical support on, for instance, the validation of interchangeability, by outside electric engineers.

(5) What is clearly required is a measure to increase the collection rate of water charges to secure financial soundness. Concretely, these comprise proper rates of water charges, meter installation, and firm collection of water charges (including staff education).

3.3 Lessons learned

None

Comparison between major plans and performance
(taken from the ex-post evaluation report)

| Item | Plan | Performance |
|---|---|---|
| ①Output | | |
| (1)Water intake/canal | Repair of the (existing) Left Bank Canal | As planned |
| facilities | Canal to the reservoir, etc. 550m | As planned |
| (2)Water purification | Construction of a new purification plant | Capacity 281,000 $m^3$/day |
| facilities | (Coagulation-sedimentation → sand filtration) : | |
| | Capacity 273,000 $m^3$/day (two lines) | |
| (3)Pumps/electric facilities | | |
| For Rawalpindi | 1,250KW x 3 | 1,400KW x 3 |
| For Islamabad | 850KW x 3 | 970KW x 3 |
| (4) Water supply facilities | | |
| For Rawalpindi | θ1,400 x 17Km | θ1,400 x 13.3Km |
| For Islamabad | θ1,200 x 6Km、θ800 x 3Km | θ900 x 6.9Km |
| (5) Water storage facilities | | |
| For Rawalpindi | 22,3 00 $m^3$ x 2 | As planned |
| For Islamabad | 16,600 $m^3$ x 1 | As planned |
| (6)Consulting expenses | Non-Japanese（293MM） | Same as the left |
| | Local persons（382MM） | |
| ②Project period | | |
| Design period | May 1989 ~ February 1990 | March 1990 ~ March 1991 |
| Land expropriation | May 1989 ~ December 1990 | Jan. 1990 ~ June 1998 |
| Procedures on bidding/contract | May 1990 ~ December 1990 | March 1994～June 1994 |
| Construction period | January 1991~ September 1993 | Sept. 1994 ~ May 2000 |
| ③Project cost | | |
| Foreign currency | 8,763,000 million yen | 9,657 million yen |
| Local currency | 12,422 million yen | 6,176 million yen |
| | （1,714 million Rs） | （1,838 million Rs） |
| Total | 21,185 million yen | 15,833 million yen |
| ODA loan portion | 12,518 million yen | 12,442 million yen |
| Rate | 1 Rs＝7.25yen | 1 Rs＝3.36 yen |
| | (As of August 1988) | (Average of 1990 ~ 2000) |